UR1976_58

1976/58. Investigation of limestone deposits at Ida Bay.

S.M. Forsyth
G.R. Green

Abstract

Some 6 million tonnes of limestone may be obtained by extending the present quarry at Ida Bay above the 'grey band'. Lack of assay data makes any overall grade estimation hazardous, although a grade of approximately 92% $CaCO_3$ appears likely. Due to lack of sampling no guess at average $MgCO_3$ content can be made. As a consequence a proposed drilling programme to help in planning quarrying procedure is outlined.

A possible further reserve of high quality limestone may occur about one kilometre NNE of the present quarry near the Ida Bay Railway line, but a systematic sampling and drilling programme is required to test this possibility.

1976/58. Investigation of limestone deposits at Ida Bay.

S.M. Forsyth
G.R. Green

Following a request by Mr R.T. Bender, the Department of Mines conducted a geological mapping and sampling programme in the Ida Bay area to investigate the possibility of producing 2 million tonnes of high grade limestone. This report is based on the results of this study and previous work.

Field work was undertaken over three weeks in May-June 1976. Attention was focused on mining leases currently held by Consolidated Goldfields Australia Limited and Southern Alloys Venture Pty Ltd, with the exception of lease 8461 which is affected by a Cave Reserve. The small portion of lease 39M/71 south of the saddle between Marble Hill and Lune Sugarloaf has been ignored, as it is understood that a gentleman's agreement precludes quarrying in this area.

The nearest part of the Entrance Cave system, Midnight Hole, is approximately one kilometre from Newlands Quarry (Goede, 1969), and no part of the present survey falls within the various areas proposed as part of an enlarged Cave Reserve.

One hundred and three chip samples, usually over a one metre vertical interval, have been assayed and the sample locations surveyed. The contact between the limestone and overlying Parmeener Super-Group sediments has been located and surveyed, and attempts have been made to locate the dolerite-sediment boundary to the east of Newlands Quarry by magnetometry. Detailed geological mapping was not possible because of access problems due to vegetation, although some new information has enabled a partial revision of the geological map of Everard (*in* Hughes, 1957). Portions of lease boundaries were resurveyed and the results tied into an existing 1:500 plan of Newlands Quarry. Calculations of tonnage of limestone available for quarrying in the Newlands Quarry area have been made.

Previous literature

The limestone deposits at Ida Bay have been the subject of several departmental reports including those by Nye (1926), Dickenson (1945), and the report and accompanying geological map of Everard (*in* Hughes, 1957). A series of sketches by Dickenson (dated between 1947 and 1948) for the Australian Commonwealth Carbide Co. Ltd (A.C.C.C.L.) show core logs and bed by bed percentages of $CaCO_3$ for twelve bore holes. The locations of all holes, with the exception of Bore Hole 6, are also shown. An A.C.C.C.L. plan dated 18 March 1960, drawn from data supplied by H.A. Winter, shows the percentage $CaCO_3$ at ten foot intervals for a further five bore holes. The location of these five bore holes is shown on Department of Mines Plan 1615-93 (prepared by T.D. Hughes). A Detail Survey of the Newlands Quarry area, prepared by Peacock, Darcey and Anderson (20 June 1975) for Kemerton Pty Ltd, has been made available to the department, as well as a similar plan illustrating the results of over 40 recent assays for $CaCO_3$, provided by the quarry manager.

Limestone quarries

Blaneys Quarry [DM874876]* occurs partially within a Cave Reserve at the end of the Ida Bay Railway formation, and was referred to as the Old Quarry by Nye (1926). Newlands Quarry [DM888874] is located one kilometre

*Co-ordinates are given with respect to an arbitrary grid shown on Figure 3, except where prefixed by the universal grid reference letters DM.

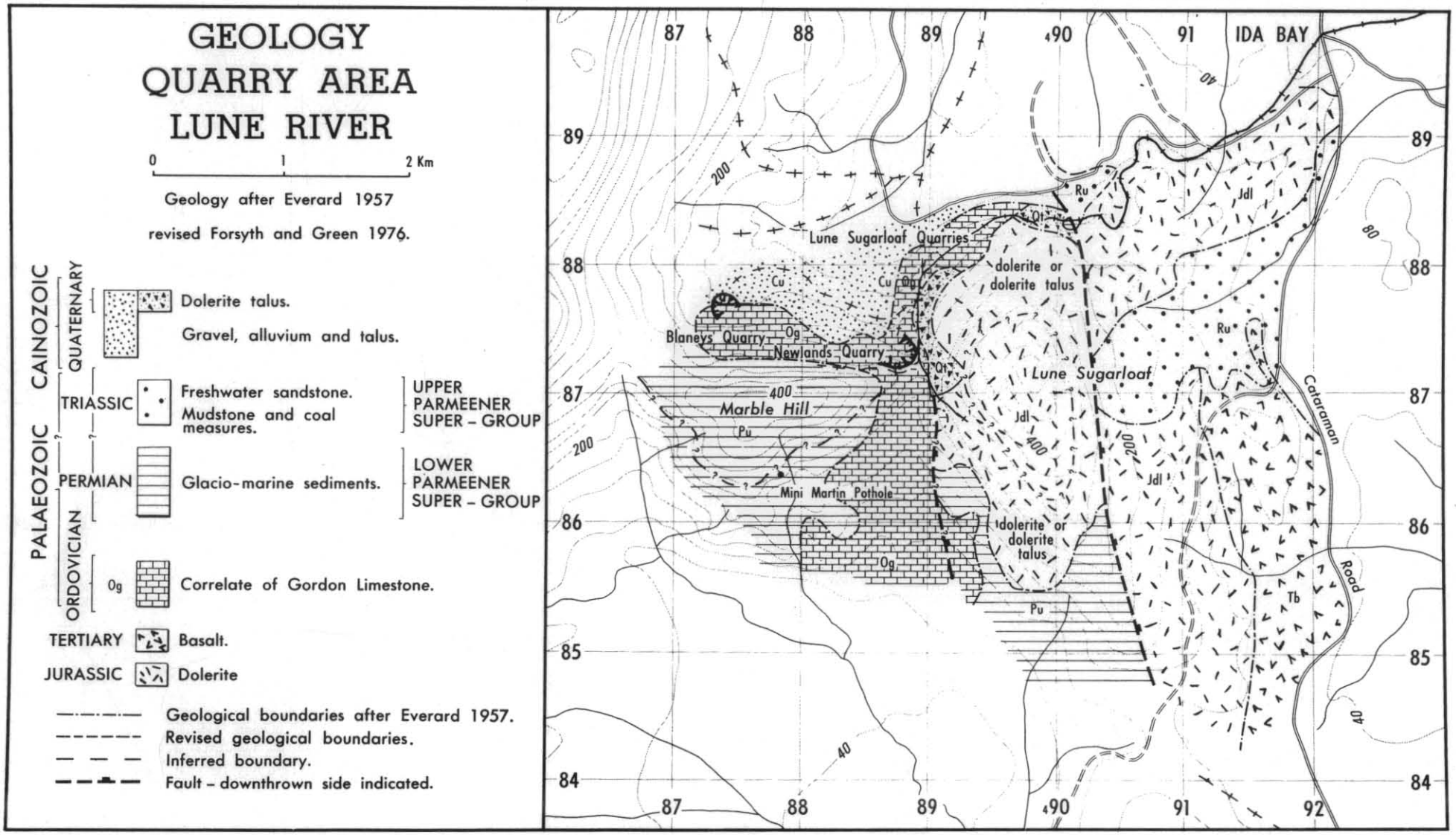

GEOLOGY
QUARRY AREA
LUNE RIVER
0
1
2 Km
Geology after Everard 1957
revised Forsyth and Green 1976.
PALAEOZOIC CAINOZOIC
QUATERNARY
Dolerite talus.
Gravel, alluvium and talus.
TRIASSIC
Freshwater sandstone.
Mudstone and coal measures.
UPPER PARMEENER SUPER - GROUP
PERMIAN
Glacio-marine sediments.
LOWER PARMEENER SUPER - GROUP
ORDOVICIAN
Og
Correlate of Gordon Limestone.
TERTIARY
Basalt.
JURASSIC
Dolerite
Geological boundaries after Everard 1957.
Revised geological boundaries.
Inferred boundary.
Fault - downthrown side indicated.
IDA BAY
Lune Sugarloaf Quarries
Blaneys Quarry
Newlands Quarry
Marble Hill
Mini Martin Pothole
Lune Sugarloaf
dolerite or dolerite talus
Cataraman Road
Ru
Jdl
Qt
Cu
Og
Pu
Tb
400
200
80
40
87
88
89
90
91
92
84
85
86

Figure 1.

5 cm

east of Blaneys Quarry and may now be reached by road from Ida Bay. It is the only quarry currently in production. About one kilometre NNE along the railway towards Lune River from the Newlands area two smaller quarries occur south of the railway at DN893882. These have been referred to as the New Quarry or Present Quarry by Nye (1926) and the quarries at 3 mile 55 chains by Dickenson (1945). They are here referred to as the Lune Sugarloaf Quarries. A third small quarry occurs north of the railway in the same area.

GEOLOGY

Gordon Limestone correlate

Up to 150 m of limestone crops out beneath Parmeener Super-Group sediment on the northern and southern flanks of Marble Hill, and at lower elevations along the north side of Lune Sugarloaf (fig. 1). The limestone is probably more extensive than indicated, as Mini Martin pothole occurs above the 300 m contour south of Marble Hill (Goede, 1969). Fossil assemblages show the beds in Blaneys Quarry and beneath Newlands Quarry to be Blackriverian in age, the beds in Newlands Quarry Trentonian, whilst the highest beds at Newlands are Cincinnatian and correlate biostratigraphically with coralline facies occurring towards the top of the Gordon Limestone elsewhere in Tasmania (C. Burrett, pers. comm.). The higher quality of the limestone beds at the Lune Sugarloaf Quarries suggests that they may be partially equivalent to the beds occurring above Newlands Quarry, and it has been suggested that a zone rich in *Receptaculites* beneath the coralline beds in the saddle of Marble Hill and Lune Sugarloaf may be equivalent to a *Receptaculites* zone in the west of Sugarloaf Quarry (Banks, *in* Hughes, 1957).

Generally the limestone is medium to dark grey, granular in texture, with an average grain size ranging from silt to sand, although coarser grades are present. Beds are up to 2 m thick and slightly lenticular, although partings may be as close as a few centimetres in otherwise uniform beds, while fine laminae occur in others. Variation between beds is recognised by changes in grain size, texture, colour, frequency of partings, stylolites, algal lamination, dolomitisation and numbers and types of fossils. In Newlands Quarry, a characteristic zone of light grey, very fine-grained, thinly bedded limestone (sometimes finely laminated), is known as the 'grey band'. Granule grade crystalline limestone occurs at several localities near the Parmeener Super-Group south-west of the quarry, and may represent one stratigraphic horizon.

Veins and irregular masses of calcite occur commonly at Newlands, together with joint controlled solution channels sometimes containing stalactitic travertine. Sink holes and fissures commonly occur outside the quarry area, some fissures being over 20 m deep and one metre wide. Open cavities have also been recorded in bore holes.

Parmeener Super-Group

Boulders of conglomerate up to several metres across (which in some cases may be outcrop) form an east-west line above the highest limestone at [1686E 620N]. The open framework conglomerate has a poorly sorted clay rich matrix and shows no bedding. Its constituent clasts are up to 20 cm across and are generally rounded. Some striated quartzite occurs but no limestone clasts were observed. These rocks have been correlated with the Woodbridge Tillite. In some places, tillite changes upwards into crudely bedded sandstone. At [1705E 604N], grey silty mudstone crops out 7 m above the base of the tillite boulders, suggesting that the boulders are almost *in situ*. These are considered to demark the base of the Parmeener Super-Group. To the south, the unconformity undergoes an abrupt change in height of 10 m over a short distance. This may be due to faulting but is more likely due to initial

basement relief. No certain outcrops of Parmeener sediments were found between the crest and the lease boundary, but the first frequent occurrence of Parmeener float consists of either conglomeratic sandstone or poorly bedded conglomeratic siltstone. Higher in the sequence dark grey mudstone, weathering yellow-orange, devoid of fossils and generally without dropstones, occurs together with rare grey massive limestone. About 30 m above the base of Parmeener Super-Group, a float of richly fossiliferous sandy siltstone with some dropstones, and containing *Trigonetreta stokesi* Koenig was found. This part of the sequence is correlated with the Bundella Mudstone, whilst the underlying mudstone, although not identical resembles the Woody Island Siltstone.

Lower Parmeener Super-Group sediments also occur about 0.5 km east of the Sugarloaf Quarries [DM903884] in cuttings along the Ida Bay Railway. These sediments consist of siltstone with some dispersed large quartz grains, and yielded a single spiriferid.

Upper Parmeener Super-Group rocks also crop out in a cutting a short distance south-east of the siltstone. These rocks include micaceous sandstone and siltstone underlying deeply weathered dolerite. Upper Parmeener rocks were also found immediately below this location on the road system, where quartz sandstone, red beds, coal and carbonaceous siltstone with sphenopsid stems were observed.

Jurassic dolerite

Deeply weathered dolerite, dolerite float and occasional fine-grained dolerite crop out along the railway east of the Upper Parmeener sediments. Dolerite also crops out in a large quarry [DM905887] between the railway and road. The western portion of this quarry reveals an irregular intrusive contact, dipping gently eastward between dolerite and the underlying Upper Parmeener coal measures. In the guttering of a secondary road leading north from this area, fine-grained dolerite also crops out at DM898890, some distance past Upper Parmeener sandstone. These fine-grained outcrops are thought to belong to one (probably thin) dolerite sheet intruding the Upper Parmeener sediments, and are regarded as distinct from the dolerite capping Lune Sugarloaf, which by contrast has a medium (2 mm) grain size. The results of a magnetometer survey suggest the western boundary of the Sugarloaf intrusion passes near [2328E 978N] (345 m a.s.l.) which is at the base of a scarp capped by prismatic dolerite boulders in vertical orientation, which may represent slightly dislodged dolerite columns.

Tertiary gravel and alluvium

Everard (*in* Hughes, 1957) recorded a thick apron of gravel and alluvium north of Marble Hill. No further investigation of this area has been undertaken.

Quaternary

Clayey talus containing fragments of Lower Parmeener rocks, together with rounded siliceous and granitic pebbles probably derived from the Lower Parmeener sediments, extends downslope from Marble Hill (fig. 1) and is exposed in an old railway cutting west of the access road to Newlands Quarry. An isolated patch east of sample point S74 [1953E 718N] is discussed later.

Dolerite talus from Lune Sugarloaf extends to Newlands Quarry and is exposed along the eastern road to the upper bench. Magnetometer Line 1 (from 0 to 345 m) and Lines 2 and 3 appear to be entirely on dolerite talus. Dolerite blocks up to 3 m long have travelled as far west as sample point S5 [1732E 1088N]. Magnetometer surveys along Lines 1 and 2 suggest the talus is

generally about 3 m deep and illustrates blocks up to 7 m x 7 m are enclosed in the talus (D.E. Leaman, pers. comm.). Dolerite talus is frequently exposed along the railway between Newlands and Lune Sugarloaf Quarries. East of Lune Sugarloaf Quarries, the talus crosses the railway to reach the road, where about one metre of material covers the Upper Parmeener sediments.

Slightly ferruginous semi-consolidated material with rootlet(?) voids, exposed beneath the dolerite talus on the railway, may also be derived from dolerite from Lune Sugarloaf.

STRUCTURE

Nye (1926) reported that the beds in Blaneys Quarry dipped at low angles to the south-west. This dip changes across a gully between the quarry and cave entrance, so that east of the gully the beds dip easterly (Dickenson, 1947). In the Newlands area, dips measured on partings presumably parallel to bedding dip east at between 4° and 12°, confirming an appearance of broad warping in the eastern part of the quarry face. The beds may be considered as dipping just north of east at an average angle of 7°, with superimposed broad warping of probably less than one metre amplitude. Further east along the railway, the dip progressively increases to a maximum of 14°. As the dip of the Parmeener sediments is unknown, it is not known whether the major variation in dip of the limestone is due to folding and tilting associated with faulting. Palaeontological evidence indicates that the beds exposed in Blaneys Quarry are the same age as those between the railway and Newlands Quarry (C. Burrett, pers. comm.).

The area in which limestone occurs is bounded to the east by a fault downthrowing Upper Parmeener sediments and an intrusive dolerite sheet. The fault has been fairly accurately located in railway cuttings in an area showing close jointing between outcrops of Lower and Upper Parmeener sediments. The fault lies slightly west of the position indicated on Everard's map and trends more westward, as evidenced by an extension of Upper Parmeener sediments along the road in that direction. The point where the fault crosses the road is obscured by dolerite talus.

The position of the fault downthrowing dolerite against limestone east of Newlands has been more difficult to locate and is more crucial to the extent of limestone reserves. If the dolerite at Lune Sugarloaf is part of the sheet shown intruding upper marine Permian rocks west of Marble Hill (Farmer, 1975), then the height of the dolerite sheet above the pre-Parmeener unconformity at Marble Hill must have been in excess of 150 m, as no dolerite crops out on Marble Hill. Although Everard's map shows dolerite intruding limestone north of Lune Sugarloaf, Lower Parmeener sediments have now been found which could occur between the dolerite and limestone.

The magnetometer surveys revealed the dolerite to be less extensive than considered by Everard. The magnetometer results for Line 1 are consistent with the dolerite occurring at the 345 m contour being the base of a sheet (D.E. Leaman, pers. comm.). If this is so, in excess of 150 m of Lower Parmeener sediment could occur beneath the dolerite at Lune Sugarloaf and a major fault could occur anywhere along the length of Line 1 (fig. 3). Alternatively, the dolerite at 345 m may be faulted against Lower Parmeener sediment. The small area of Parmeener mudstone mapped by Everard south-east of the saddle between Marble Hill and Lune Sugarloaf may be interpreted as lying east of the fault, as shown by Everard, or to the west. The latter interpretation is supported by the presence of talus of Lower Parmeener fragments near sample point 74, apparently without source, unless the unconformity dropped in height towards the east. Thus the position of the fault between Marble Hill and Lune Sugarloaf is uncertain.

TONNAGE RESERVES

Tonnage reserve calculations indicate that approximately 6 million tonnes of limestone are available above the 'grey band' within the present quarry area.

N-S profiles were drawn at 50 m intervals across the quarry (fig. 5) and areas of available limestone were calculated for each profile (each profile was assumed to have a 25 m zone of influence to the east and west). The density of limestone was assumed to be 2.72 g/cm^3 (Leaman, 1973). A small amount of Parmeener Super-Group tillite overburden may be present in the western part of the area (proviles A-A, B-B). Fifteen metre high faces with a 75° dip and 3 m benches were assumed (R. Billingham, pers. comm.) and reserves below the Parmeener Super-Group unconformity were calculated to the lease boundary (profiles C-C, D-D, E-E), or to the crest of the ridge between Lune Sugarloaf and Marble Hill (profiles F-F, G-G, H-H, J-J).

The calculated reserves should be regarded as a conservative estimate, as no account has been made of stone of adequate quality below the grey band, or the possible occurrence of considerable further reserves of limestone to the east of the present quarry on the western slopes of Lune Sugarloaf.

LIMESTONE QUALITY

Assay results for $CaCO_3$ and $MgCO_3$ are shown on Figures 2 and 3. As assays for $MgCO_3$ have only been done in the present survey, conclusions regarding $MgCO_3$ content must be regarded as tentative. The samples show a wide range in $MgCO_3$ content from 0.4-9.6% with an average of 2.9% for the 53 samples collected within and adjacent to the present quarry. In general, there is a reciprocal relationship between $CaCO_3$ and $MgCO_3$. For example, above the Newlands Quarry on Line D-D (fig. 2), limestone averaging 95.4% $CaCO_3$ and 1.7% $MgCO_3$ occurs over a vertical interval of 17.6 m, whereas around the top benches on the western edge of the quarry, limestone averaging 86.6% $CaCO_3$ and 6.91% $MgCO_3$ is present over an interval of 15 m.

Newlands area

The area south of the first U-bend in the access road above the railway [1750E 1050N] was sampled by Dickenson (1945). The results above a 3 m thick low grade zone were:

Eastern run	139-162 m	93.0% weighted average $CaCO_3$
Check eastern run	136-166 m	91.9% weighted average $CaCO_3$

Of five bore holes in this area, four show consistent results of about 92% $CaCO_3$ from surface to about 141 m.

Hole No.	*Interval*	*% $CaCO_3$*
1	142.1-161.5	92.15
2	140.6-162.0	92.1
3	140.8-153.7	92.05
4	142.9-157.5	91.8

Below 140 m, or about 50 m below the grey band, the limestone quality in holes 1-4 is poor. The southernmost hole, B.H. 5, reveals poor quality limestone from 158.5 m (surface) to 135.7 m. Bore Hole 6, of unknown locality, sampled the interval 122.4-135 m, revealing poor quality limestone. Changes of grade detected by the present surface sampling along the access road are similar to those shown by Bore Holes 1-5.

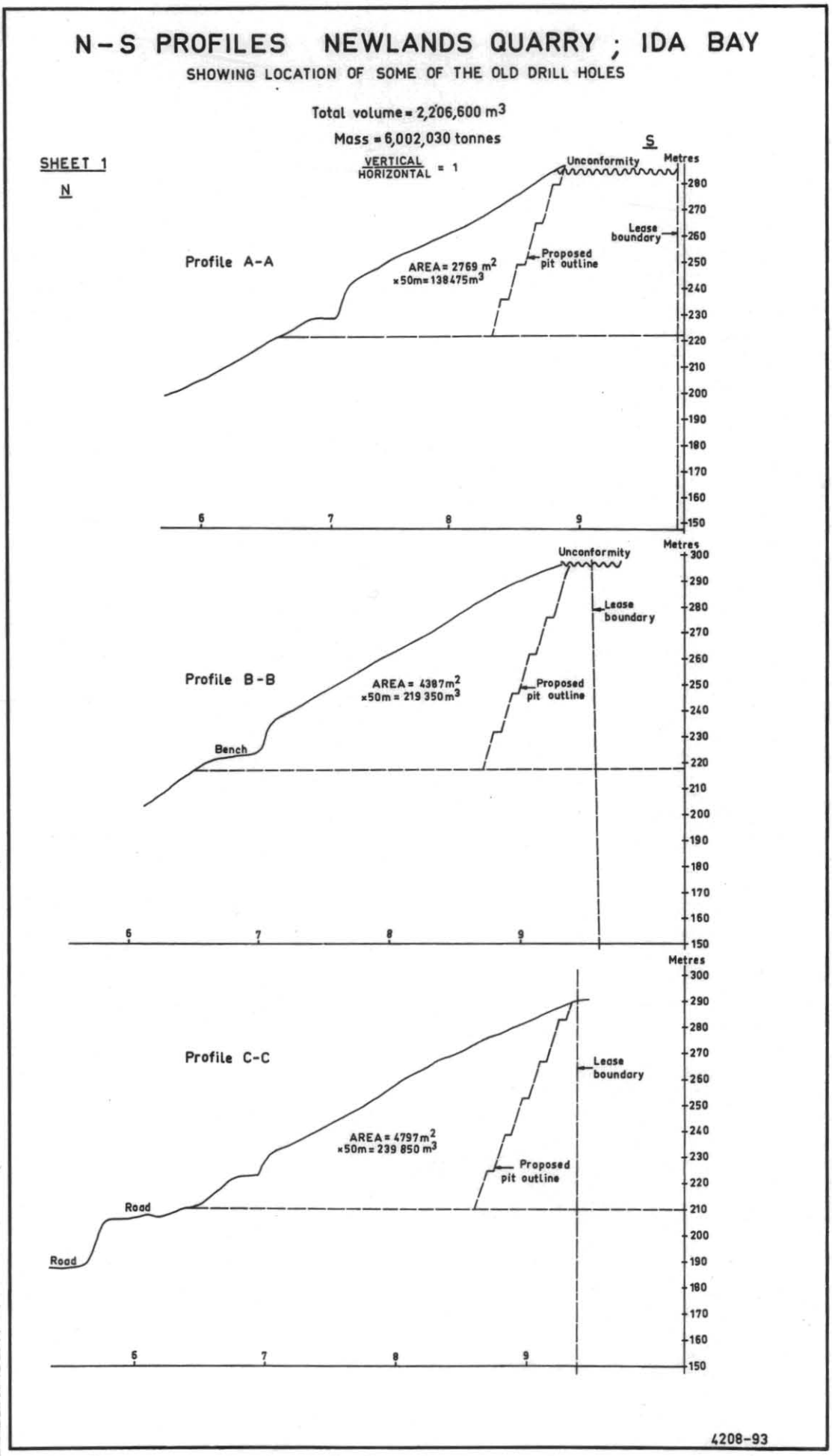
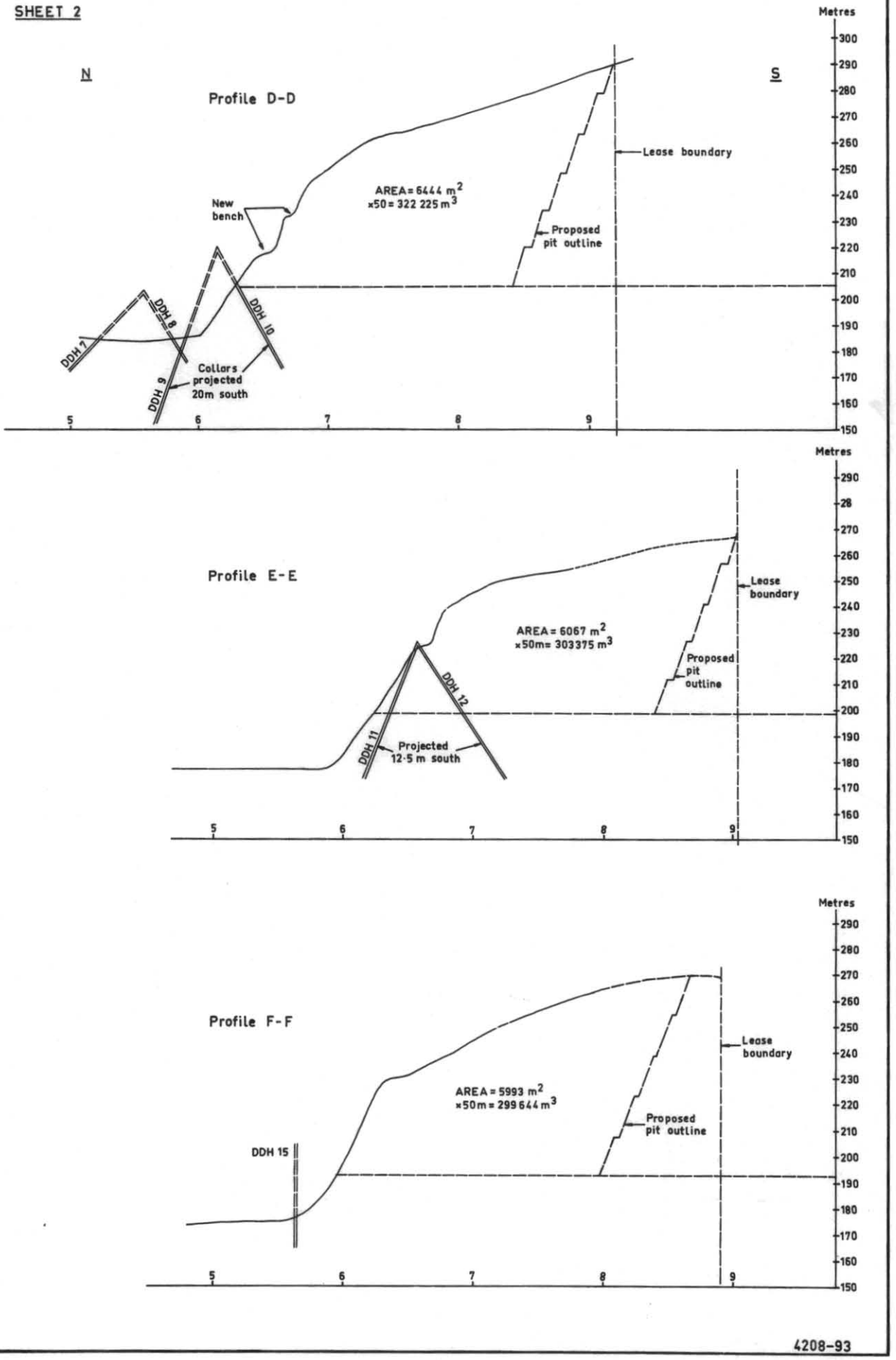


Figure 5.

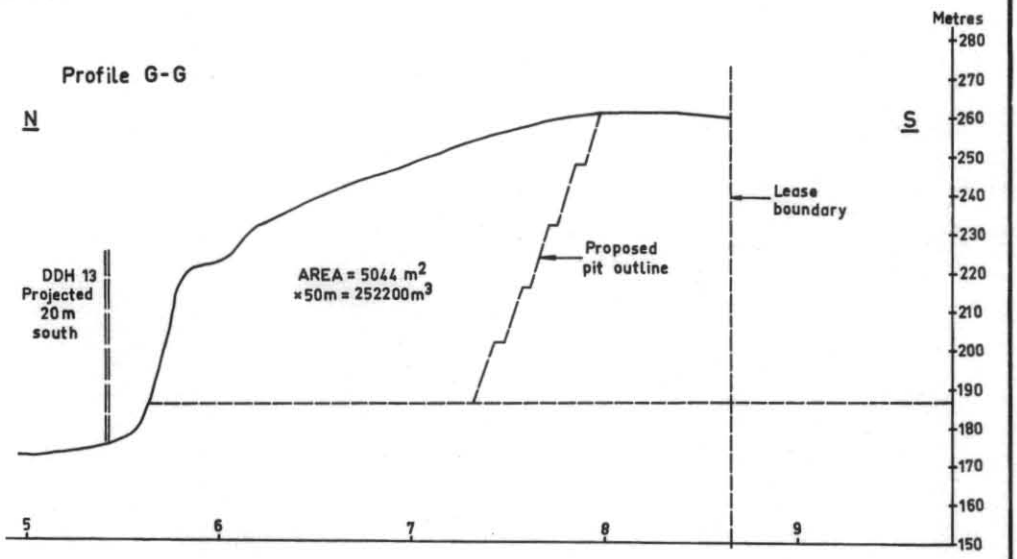
58-8

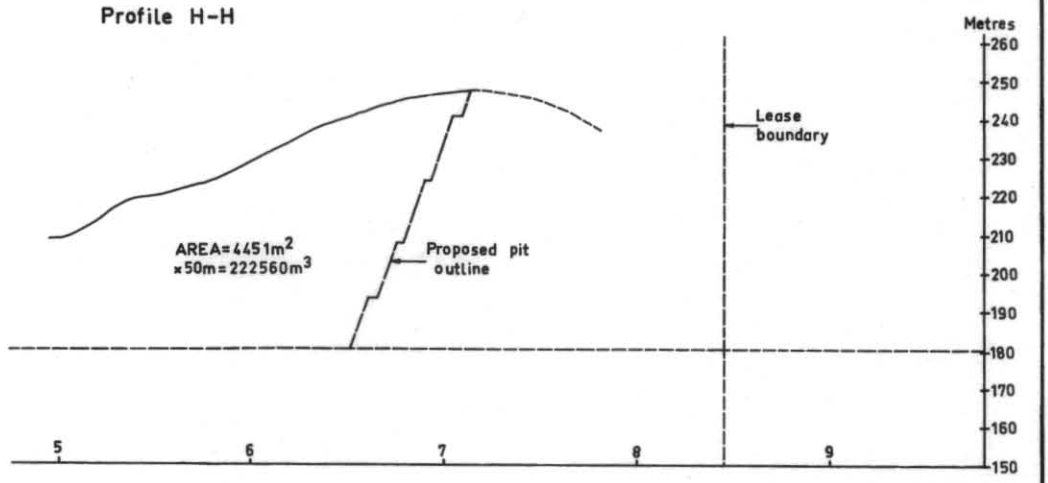
5 cm

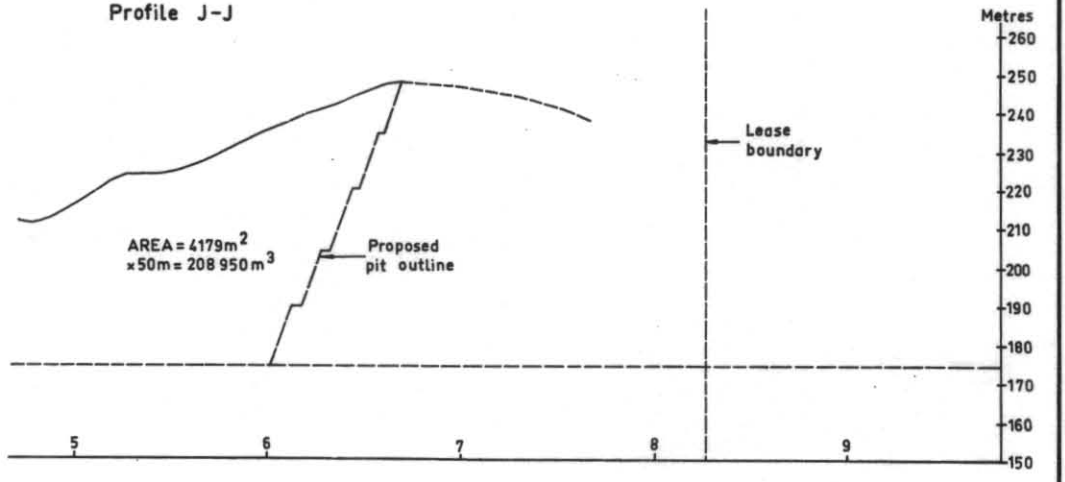
SHEET 2


N
S
Profile D-D
Metres
AREA = 6444 m²
×50 = 322 225 m³
New bench
Lease boundary
Proposed pit outline
DDH 7
DDH 8
DDH 9
DDH 10
Collars projected 20m south
Profile E-E
AREA = 6067 m²
×50m = 303375 m³
Lease boundary
Proposed pit outline
DDH 11
DDH 12
Projected 12·5 m south
Profile F-F
AREA = 5993 m²
×50m = 299 644 m³
Lease boundary
Proposed pit outline
DDH 15
4208-93

SHEET 3







4208-93

The 1947 drilling results in the main face show some continuity of zones of contrasting limestone grade, sub-parallel to the bedding (fig. 4). The degree of chemical correlation between bore holes is superior to lithological correlation, although both are hampered by probable deflection of inclined bores and slight warping of bedding. A particular 3 m thick low grade zone, coincident with the grey band in Hole 13, seems to drop below the grey band in moving westerly across the quarry. Below this low grade zone, an interval about 18 m thick ranges in grade from 92.8% to 93.3%, whilst above it a superior quality zone in excess of 17 m thick ranges in grade from 92.8% to 94%. Higher still, poor quality limestone (86.5%-87.6%) 6-9 m thick was encountered in Holes 11, 12, 13 and 15 and may correspond to the 14 m thick 86.3% $CaCO_3$ interval with 6.9% $MgCO_3$, detected by the present sampling, an estimated 12 m above the grey band at the western side of the quarry. Above this zone, sampling is incomplete. Those parts sampled appear to average the highest $CaCO_3$ percentage in the Newlands area, although $MgCO_3$ varies from 0.56% to 6.9%. The $MgCO_3$ weighted average is 2.50% for the sampled 33 m zone of 92.7% $CaCO_3$ spanning the grey band west of the quarry, whilst the higher quality beds above the quarry yielded results of 2.36% and 1.7% $MgCO_3$ for the two areas sampled (fig. 2).

Although the zones show a reasonable degree of continuity across the quarry, their continuity behind the face is an unknown factor.

Sampling down the ridge west of the quarry indicates two zones of low quality limestone, one 60 m below the grey band and one from 16-26 m below the grey band. Sample point 84 above the grey band may be from the low quality zone recorded at the quarry. Elsewhere, the average $CaCO_3$ values are 92.8% and 93%, with corresponding $MgCO_3$ values of 1.38% and 2.68%.

Lune Sugarloaf quarries

Nye (1926) reported that the lower 10 m of beds exposed in the western face averaged 95.17% $CaCO_3$, whilst the overlying 5 m exposed in the eastern face averaged 93.60%. Although reported as closing because of high silica content (Dickenson, 1945), the numerical average of 6 samples taken from the back face of the western quarry is 94.6% $CaCO_3$ and 4.72% $MgCO_3$, whilst for the eastern quarry the values are 95.1% $CaCO_3$ and 1.72% $MgCO_3$.

CONCLUSIONS AND RECOMMENDATIONS

Approximately 6 million tonnes of limestone are available above the 'grey band' by extending the Newlands Quarry to the south. Further limestone occurs to the west of the quarry below the 'grey band' and possibly underneath dolerite scree to the east of the quarry.

No reliable estimate of grade can be made at this stage because of the incomplete nature of the sample coverage, although an average grade of approximately 92% $CaCO_3$ appears likely. A considerable tonnage of limestone in excess of 95% $CaCO_3$ might be obtained by selective quarrying. As no figures for $MgCO_3$ content are available, apart from those samples assayed in the present survey, no estimate of average $MgCO_3$ content can be made. Since a high $MgCO_3$ content is deleterious to efficient furnace operation (D. Batten pers. comm.; Nye, 1926) more information is clearly required. This is important as only the western part of the quarry was sampled and this sampling does not represent a continuous section.

More than 50-60 m below the 'grey band', the limestone is generally of poor quality. Above this horizon zones of limestone of approximately 92-93%

$CaCO_3$ alternate with lower grade zones. In order to plan overall quarrying strategy, it is recommended that a drilling programme be carried out to:

(1) Provide complete vertical sections for $CaCO_3$ and $MgCO_3$ assays to give some estimate of average grade.
(2) To determine the continuity of low and high grade zones laterally.

For these purposes, it is recommended that at least six vertical drill holes spaced at 75 m intervals should be drilled near the top of the ridge south of the quarry. Drill holes should be extended at least 25 m, and preferably 60 m, below the grey band. Diamond drilling would be preferable because individual beds could be recognised, sampled and assayed and lithological correlation attempted.

This information should be used to decide whether limestone of suitable grade for carbide manufacture could be obtained by mixing material from low and high grade zones or whether it would be necessary to select higher quality stone for carbide manufacture and use the low grade material for other (*e.g.* agricultural) purposes. Information from the proposed drilling programme is required to plan the most efficient use of the resource in the long term.

Routine sampling and assaying for both CaO and MgO, together with more detailed drilling as various blocks of stone are removed, should become an integral part of quarry management. It is interesting to note that Nye (1926) also recommended regular sampling of new faces and selective quarrying to maintain the quality of limestone received at the carbide works.

Sampling of the faces of the Lune Sugarloaf quarries revealed very pure limestone of at least 94% $CaCO_3$ and a low $MgCO_3$ content of 1.7%. Approximately one million tonnes of limestone could be obtained by extending the more westerly quarry 150 m to the south-east along a 100 m wide face. As there is little outcrop in this area, a pilot survey involving some four drill holes would be required to test whether grade is consistent, but this remains a promising area.

ACKNOWLEDGMENTS

Assays were carried out by R. Singline, M. Firth and R. Roby, Department of Mines laboratories, Launceston, and approximate assays by W.E. Baker, Department of Mines geochemist. Dr D.E. Leaman undertook most of the magnetometry. C. Burrett of the University of Tasmania kindly provided palaeontological conclusions

REFERENCES

DICKENSON, D.R. 1945. Limestone quarries at Ida Bay. *Unpubl.Rep.Dep.Mines Tasm.* 1945:46-63.

FARMER, N. 1975. Geological atlas 1:250 000 series. SK55/8. Hobart. *Department of Mines, Tasmania.*

GOEDE, A. 1969. Underground stream capture at Ida Bay, Tasmania, and the relevance of cold climatic conditions. *aust.geogrl Stud.* 7:41-48.

HUGHES, T.D. 1957. Limestones in Tasmania. *Miner.Resour.geol.Surv.Tasm.* 7.

LEAMAN, D.E. 1973. Applied geophysics in Tasmania. Part 1. Summary of surveys and rock properties. *Bull.aust.Soc.Explor.Geophys.* 4:27-58.

NYE, P.B. 1926. Report on the limestone quarries at Ida Bay. *Unpubl.Rep. Dep.Mines Tasm.* 1926:203-211.

[21 September 1976]

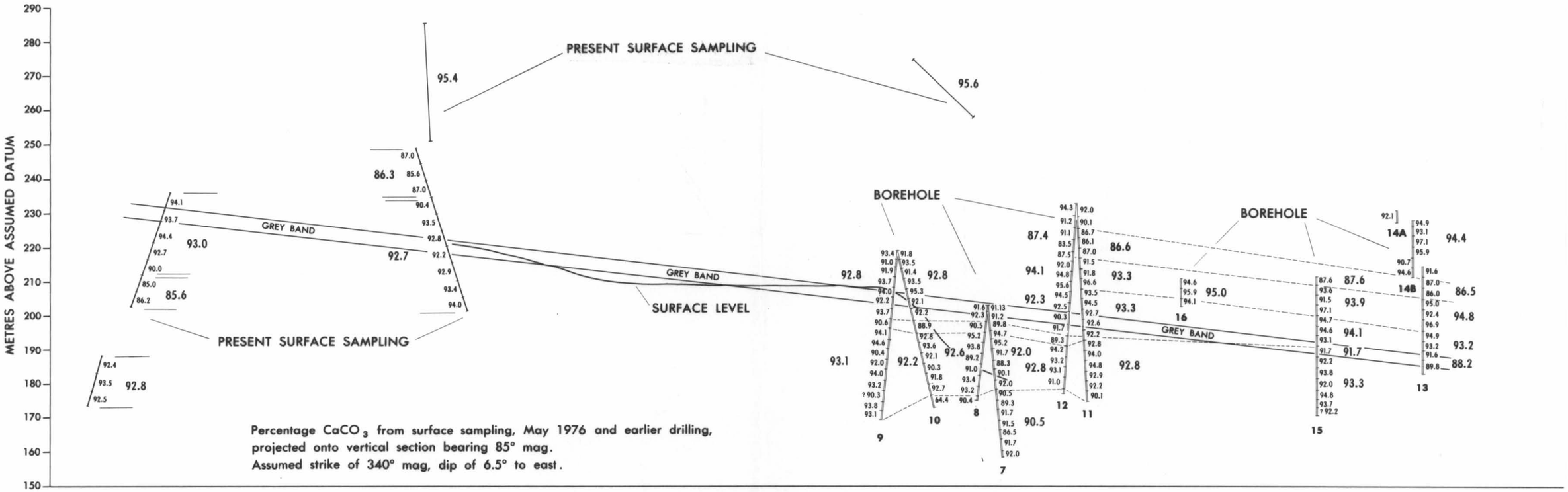
APPENDIX 1

Chemical analysis of limestone, Ida Bay

Reg. No.	*Sample No.*	*% Loss on ignition*	*% Acid insoluble*	*Assay %*			
				MgO	*$MgCO_3$*	*CaO*	*$CaCO_3$*
760857	1	39.2	10.4	0.8	1.7	48.0	85.7
760858	2	40.4	7.5	0.7	1.5	49.8	88.9
760859	3	37.5	8.8	1.2	2.5	48.4	86.4
760860	4	40.0	11.0	0.5	1.1	48.1	85.8
760861	5	38.0	13.6	2.8	5.8	43.7	78.0
760862	6	36.7	16.2	2.2	4.6	43.4	77.5
760863	7	37.2	15.0	2.7	5.6	42.8	76.4
760864	8	42.5	4.1	2.7	5.6	49.8	88.9
760865	9	41.5	5.5	1.0	2.1	50.8	90.7
760866	10	41.7	4.0	2.8	5.9	50.2	89.6
760867	11	41.1	5.3	1.3	2.7	50.7	90.5
760868	12	41.4	5.1	2.2	4.6	49.8	88.9
760869	13	43.0	2.8	1.2	2.5	52.3	93.3
760870	14	42.3	4.6	2.3	4.8	50.0	89.3
760871	15	42.3	3.6	1.3	2.7	51.6	92.1
760872	16	41.3	5.7	1.3	2.7	50.4	90.0
760873	17	41.7	4.9	0.5	1.1	51.5	91.9
760874	18	41.8	6.2	0.5	1.1	51.1	91.2
760875	19	42.3	3.8	1.0	2.1	52.1	93.0
760876	20	42.6	2.8	1.0	2.1	52.9	94.4
	21	42.7	3.37	0.58	1.2	52.9	94.4
	22	41.5	5.36	1.44	3.0	50.5	90.1
	23	40.0	8.94	2.34	4.89	47.4	84.6
	24	42.2	4.51	1.31	2.74	51.2	91.3
	25	42.8	2.98	1.48	3.10	51.6	92.1
760909	26	40.4	7.4	1.6	3.4	49.0	87.4
760910	27	41.4	2.6	2.1	4.4	51.5	91.9
760911	28	41.4	5.5	0.7	1.5	51.6	92.1
760912	29	42.0	5.2	0.6	1.3	51.7	92.3
760913	30	41.7	5.2	1.6	3.5	50.2	89.6
760914	31	42.3	4.5	1.8	3.8	51.1	91.2
760915	32	43.3	5.3	0.8	1.7	51.5	91.9
760916	33	43.4	2.3	1.9	4.0	52.1	93.0
760917	34	43.1	2.8	2.1	4.4	51.4	91.7
760918	35	42.7	2.7	0.9	1.9	52.9	94.4
760919	36	46.1	3.5	0.9	1.9	52.4	93.5
760920	37	43.6	1.6	0.7	1.5	53.2	94.9
760921	38	43.6	1.6	0.5	1.1	54.0	96.4
760922	39	43.0	6.9	0.90	1.9	53.1	94.8
760923	40	43.1	2.0	1.51	3.16	52.4	93.5
760924	41	42.0	4.3	0.61	1.3	51.6	92.1
760925	42	43.3	1.1	0.32	0.67	54.1	96.5
760926	43	43.3	1.0	0.30	0.63	54.2	96.7
760927	44	43.1	1.9	0.71	1.5	53.3	95.1
760928	45	43.3	1.8	1.14	2.38	52.8	94.2
760929	46	42.9	2.4	1.64	3.43	52.2	93.2
760930	47	42.9	2.5	0.65	1.40	53.3	95.1
760931	48	42.4	2.8	0.71	1.5	52.7	94.0
760932	49	39.2	10.3	2.04	4.27	46.6	83.2
760933	50	38.0	12.9	2.45	5.12	44.6	79.6
761101	51	43.2	1.3	0.60	1.3	53.7	95.8
761102	52	43.7	3.1	1.6	3.5	51.3	91.6
761103	53	42.8	1.9	0.56	1.2	53.1	94.8

Reg. No.	Sample No.	% Loss on ignition	% Acid insoluble	Assay %			
				MgO	$MgCO_3$	CaO	$CaCO_3$
761104	54	42.6	3.2	1.7	3.6	51.0	91.0
761105	55	41.1	6.0	0.47	1.0	51.1	91.2
761106	56	42.9	2.4	2.1	4.4	51.0	91.0
761107	57	42.8	2.3	0.96	2.0	52.4	94.2
761108	58	43.0	0.84	0.52	1.1	53.9	96.2
761109	59	41.5	5.9	3.4	7.1	47.7	85.1
761110	60	42.8	4.5	1.8	3.8	50.3	89.8
761111	61	42.5	2.5	0.72	1.5	52.9	94.4
761112	62	42.6	2.8	2.6	5.4	50.4	90.0
761113	63	41.4	6.9	3.3	6.9	47.0	83.9
761114	64	42.4	4.6	2.7	5.6	49.6	88.5
761115	65	43.4	3.0	4.6	9.6	48.4	86.4
761116	66	43.2	2.4	0.40	0.84	55.1	98.3
761117	67	43.0	2.8	0.20	0.40	53.4	95.3
761118	68	43.4	2.0	0.27	0.56	53.7	95.8
761119	69	43.4	1.4	0.43	0.90	53.9	96.2
761120	70	43.4	1.9	1.3	2.7	52.0	92.8
761121	71	43.3	1.4	0.36	0.75	53.7	95.8
761122	72	41.8	5.1	0.93	1.9	50.6	90.3
761123	73	41.3	6.4	0.50	1.0	50.6	90.3
761124	74	41.4	5.5	0.53	1.1	51.0	91.0
761125	75	43.1	1.5	0.91	1.9	53.4	95.3
761126	76	43.3	2.1	0.83	1.7	53.9	96.2
761127	77	42.9	1.7	0.97	2.0	53.9	96.2
761128	78	43.6	2.1	3.3	6.9	50.3	89.8
761129	79	43.2	0.90	0.33	0.69	55.1	98.3
761130	80	43.0	1.3	0.35	0.73	54.4	97.1
761131	81	42.9	1.2	0.31	0.65	55.1	98.3
761132	82	42.9	1.6	0.36	0.75	54.4	97.1
761133	83	42.4	4.2	2.7	5.6	50.6	90.3
761134	84	38.9	11.6	2.5	5.2	45.8	81.7
761135	85	42.6	2.8	1.1	2.3	52.7	94.1
761136	86	42.8	3.0	1.1	2.3	52.7	94.1
761137	87	42.6	2.9	1.1	2.3	52.0	92.8
761138	88	44.2	1.3	0.97	2.0	53.5	95.5
761139	89	42.9	2.1	1.4	2.9	51.9	92.6
761140	90	42.9	2.4	1.4	2.9	51.6	92.1
761141	91	43.0	2.1	1.0	2.1	52.6	93.9
761142	92	42.7	2.7	2.6	5.4	50.1	89.4
761143	93	41.2	7.2	3.9	8.2	46.3	82.6
761144	94	40.7	6.9	1.4	2.9	49.3	88.0
761145	95	43.3	1.4	1.4	2.9	52.7	94.1
761146	96	41.4	5.4	0.66	1.4	51.2	91.4
761147	97	41.5	5.0	0.51	1.1	51.6	92.1
761148	98	42.9	2.0	0.62	1.3	53.2	95.0
761149	99	41.7	5.8	0.54	1.1	51.3	91.6
761150	100	42.7	5.1	3.2	6.7	48.1	85.8
761151	101	42.5	4.7	2.5	5.2	49.6	88.5
761152	102	41.5	6.4	1.9	4.0	49.3	88.0
761153	103	40.2	9.4	1.0	2.1	48.0	85.7

Analyses by Department of Mines Laboratories, Launceston



VERTICAL SECTION NEWLANDS QUARRY LUNE RIVER

0 50 100 metres

5 cm

FIGURE 2

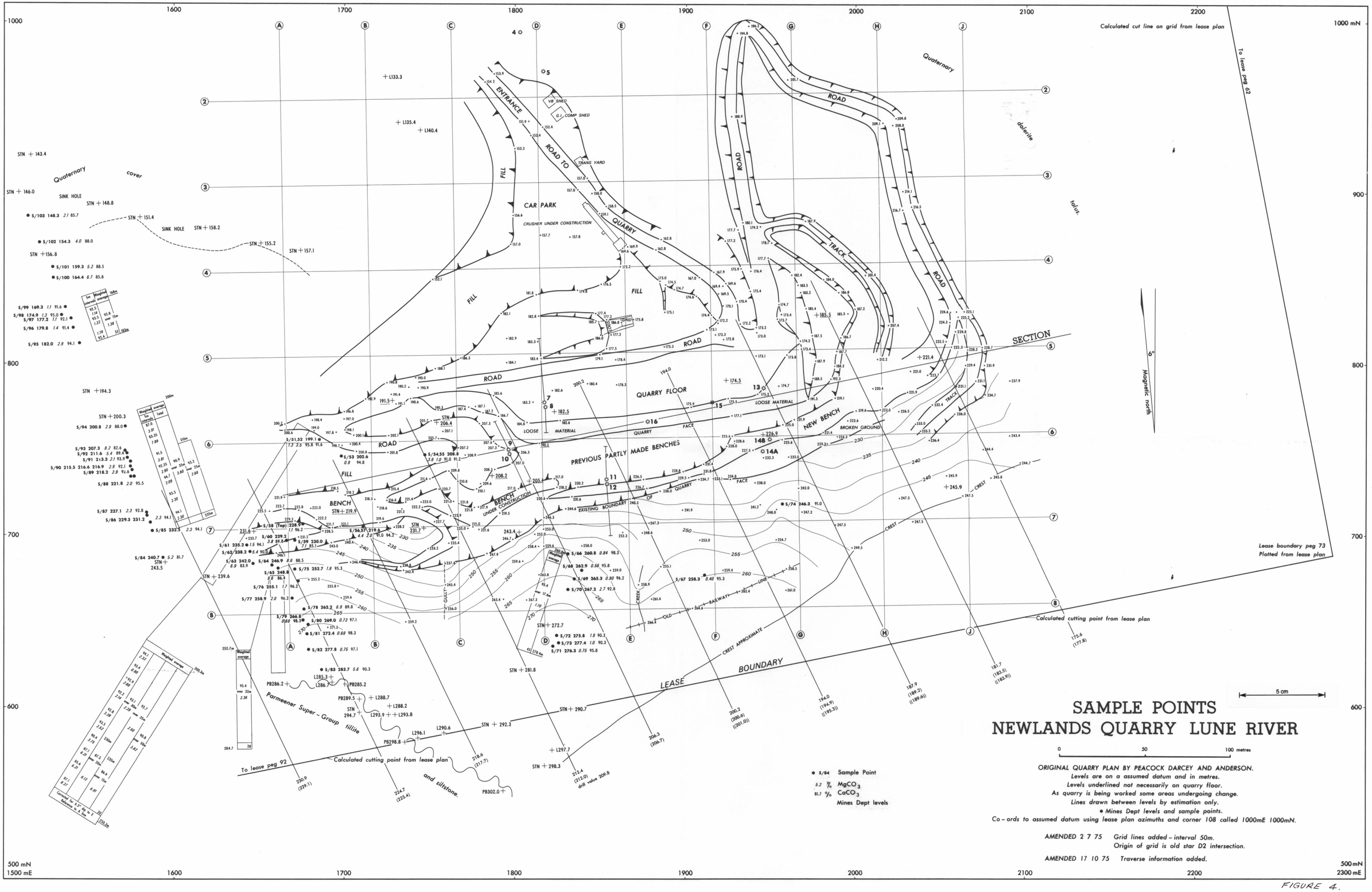
5 cm

LOCATION PLAN NEWLANDS QUARRY LUNE RIVER

0 200 400 metres
(1:4000)

ARBITRARY GRID, SURVEYED AND DRAWN BY G. BENN, DEPARTMENT OF MINES SURVEYOR, MAY - JUNE 1976

FIGURE 3.



SAMPLE POINTS
NEWLANDS QUARRY LUNE RIVER

0 50 100 metres

ORIGINAL QUARRY PLAN BY PEACOCK DARCEY AND ANDERSON.
Levels are on a assumed datum and in metres.
Levels underlined not necessarily on quarry floor.
As quarry is being worked some areas undergoing change.
Lines drawn between levels by estimation only.
• Mines Dept levels and sample points.
Co-ords to assumed datum using lease plan azimuths and corner 108 called 1000mE 1000mN.

AMENDED 2 7 75 Grid lines added - interval 50m.
Origin of grid is old star D2 intersection.

AMENDED 17 10 75 Traverse information added.

• 5/84 Sample Point
5.2 % $MgCO_3$
81.7 % $CaCO_3$
Mines Dept levels

FIGURE 4.

Reduce to 350 mm