



Surface exploration of the limestone resource at Roberts Hill, Maydena

by P. K. WRIGLEY

Abstract

A systematic, grid based, surface rock-chip sampling and mapping programme has delineated several lenses within the Cashions Creek Limestone grading $\geq 94\%$ CaCO_3 , $\leq 0.4\%$ Mg. The most substantial of these lenses is estimated to contain a tentative inferred mineral resource of 1.1 Mt of 95.3% CaCO_3 and 0.35% Mg to a depth of 25 m down dip.

A systematic percussion drilling programme is recommended to test for continuity of grades with depth, and to facilitate calculation of probable/proved ore reserves.

INTRODUCTION

This report details the results of a detailed, grid based, geological mapping and systematic surface rock-chip sampling programme in the Roberts Hill area, 2 km southwest of Maydena. The location of the grid is shown in Figure 1.

The aim of the exploration programme was to locate an alternative quarry site to Benders Limestone Quarry at Lune River. The target is a minimum resource of 1 million tonnes of limestone grading at least 94% CaCO_3 and not more than 0.4% Mg. The grade specification is that required by Benders' largest customer, the Pasmenco-EZ Risdon plant, which currently consumes about 25 000 tonnes per annum.

GEOLOGICAL SETTING

The following is an extract and synthesis of information presented by Calver (1990a, 1992). Figure 2 is a reproduction of Calver's reconnaissance geology of the Maydena area.

Three Limestone formations, all belonging to the Ordovician Gordon Group, are present in the Roberts Hill-Risbys Basin area. These are (from oldest to youngest):

- the Karmberg Limestone (chert-bearing impure limestone about 450 m thick, not considered prospective);
- the Cashions Creek Limestone (massive, oncolitic limestone up to 150 m thick, considered prospective);

- the Benjamin Limestone (a heterogeneous limestone formation about 1300 m thick with variable grades, possibly including some prospective intervals).

These units dip at about 35° to the northeast and are truncated to the northeast by a major fault against Permian sediments. As a consequence, only the lower 400 m of the Benjamin Limestone crops out on Roberts Hill.

PREVIOUS EXPLORATION

A reconnaissance study of the limestone resources of the Maydena-Florentine Valley area was conducted by Calver (1990a), who reviewed previous exploration for industrial limestone in the region (primarily that of Hughes and Everard, 1953) and conducted further sampling. Based on the analytical results he obtained, and on environmental, transportation and topographic considerations, Calver recommended that further work be focussed on Roberts Hill-Risbys Basin rather than the Florentine Valley or areas northwest of Maydena, which are proximal to Mt Field National Park.

Calver (1992) reported that a fully cored diamond-drill hole (Maydena DDH1) sited on Roberts Hill failed to intersect a significant thickness of limestone at the required grade (the best intercept being 50 m of 94.9% CaCO_3 , 0.64% Mg). However, Calver's previous sampling had indicated lenses could exist in the sequence with better grades than those found in Maydena DDH1, and a systematic outcrop sampling programme was recommended to locate any high-grade pods prior to further drilling.

GRIDDING

A grid was established to cover the areal extent (1.5 km^2) of the Cashions Creek and Benjamin Limestone Formations. The baseline was 2260 m long and was surveyed on a bearing of 116° AMG (102.5° mag.), which is approximately parallel to strike. Gridlines up to 600 m long were cut at 200 m intervals on a bearing of $26^\circ/206^\circ$ AMG ($12.5^\circ/192.5^\circ$ mag.). Following the first pass sampling, infill lines were surveyed to close the grid up to 100 m spacings over the Cashions Creek Limestone (the most prospective interval).

Control points for the grid are the Maydena DDH1 (which has been accurately surveyed by the Department's surveyor) and the intersection of Pillingers Creek with Roberts Road. Maydena DDH1 is the origin for the grid.

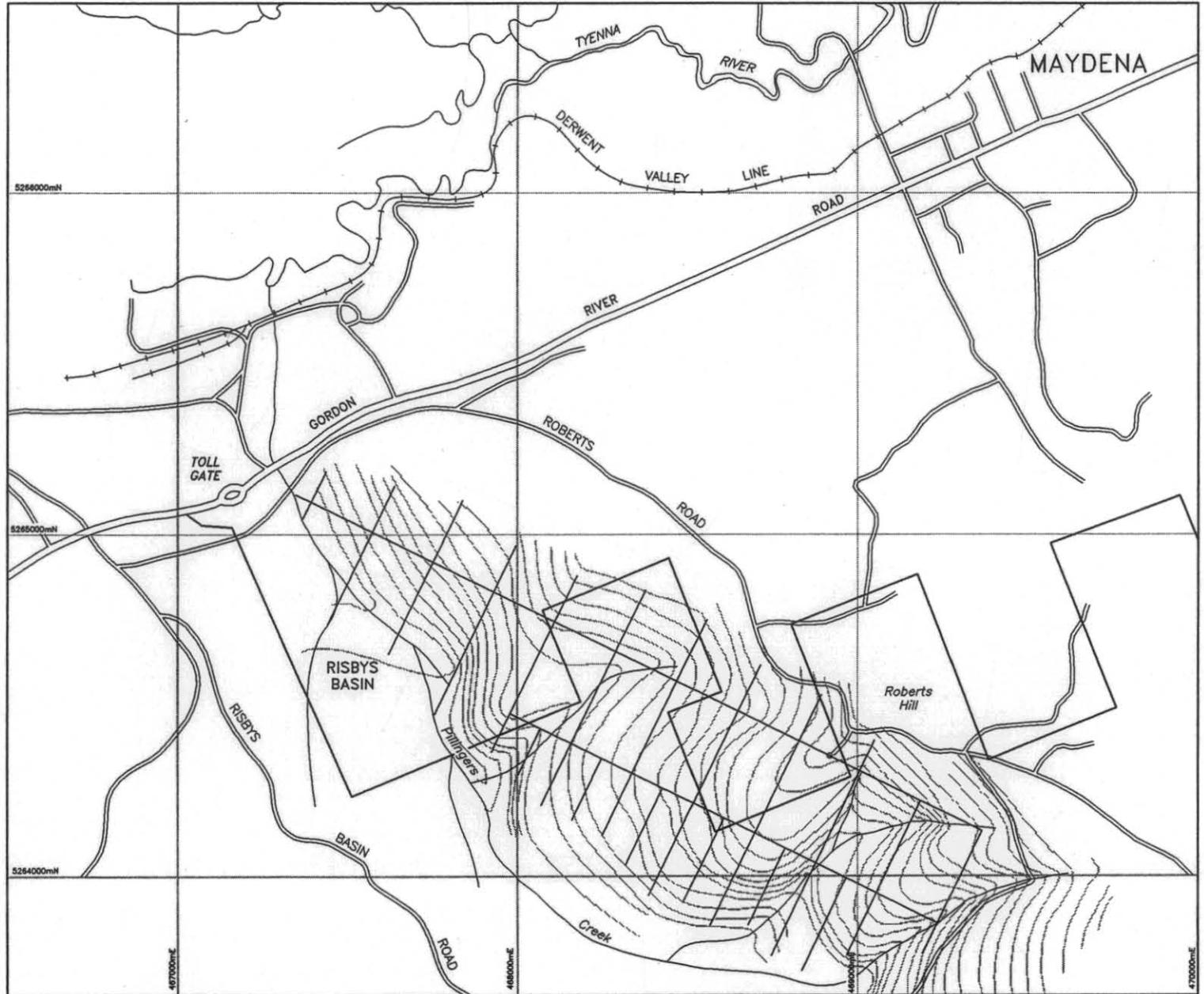


Figure 1

Location of area of investigation.

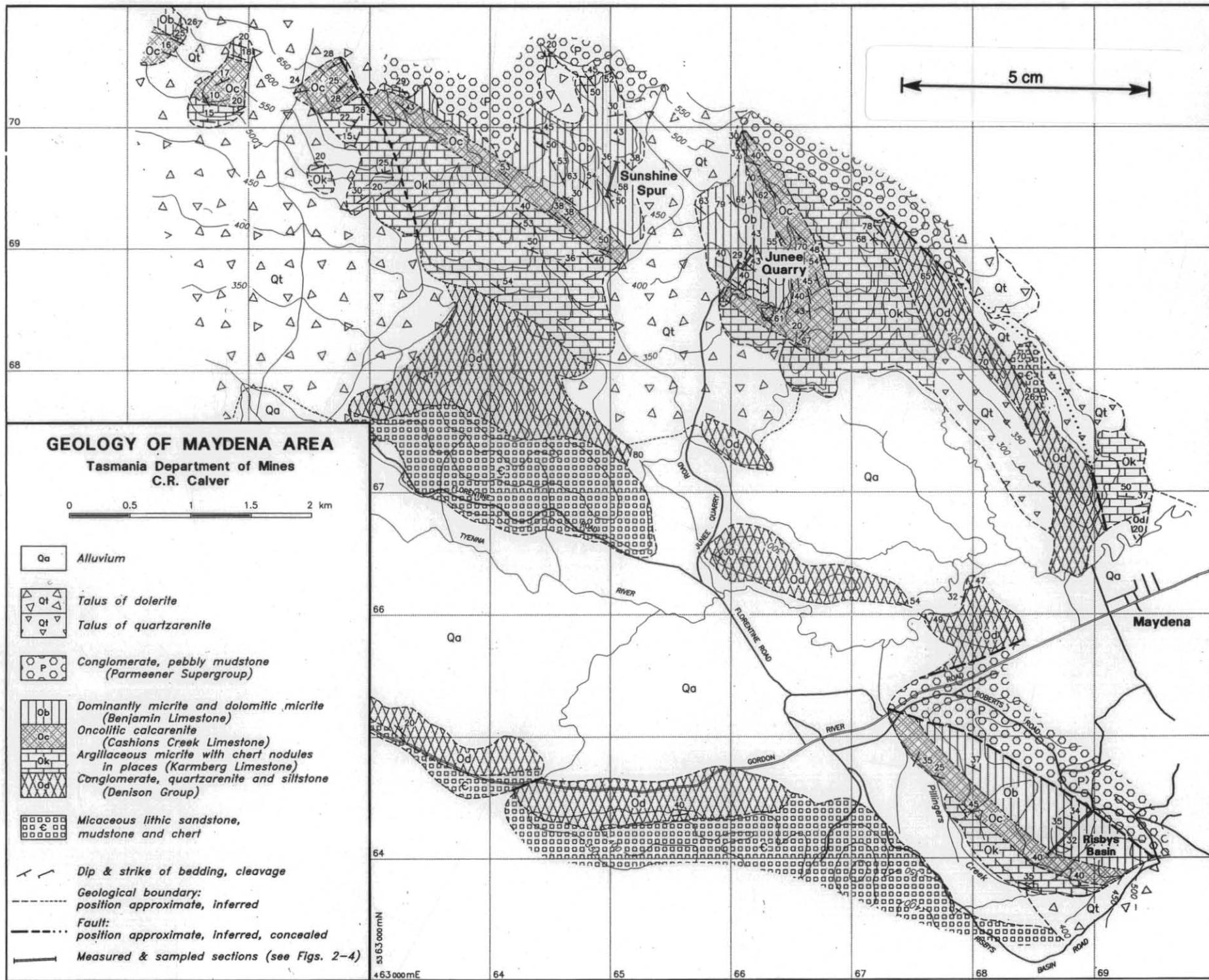


Figure 2

A standard local co-ordinate system was used on the grid, and it should be borne in mind that the nominal grid co-ordinates bear no relation to AMG co-ordinates (i.e. local grid northings increase to the NW and westings increase to the SW).

ROCK-CHIP SAMPLING AND ANALYSIS

Representative samples, averaging about 3 kg weight each, were taken over 25 m intervals (i.e. 200 g to 400 g samples were taken from each outcrop over a 25 m interval). A total of 184 samples were taken and analysed for CaCO₃ and Mg in the Department's laboratory using AAS. Analytical accuracy is estimated to be ±1% for CaCO₃ and ±0.05% for Mg (D. Zani, pers. comm). Total iron and silica were not determined, as they are not considered critical impurities (R. Bender, pers. comm.) and previous sampling had indicated that their concentrations were within acceptable limits (Calver, 1990).

Results are discussed under the section titled Geochemistry.

GEOLOGICAL MAPPING

The outcrop geology is shown in Figure 3.

Stratigraphy

Cashions Creek Limestone

The Cashions Creek Limestone varies in thickness between 95 and 145 m over a strike distance of 800 m between lines 1400 mN and 600 mN. Calver (1992) reported a true thickness of 112 m in Maydena DDH1. The average true thickness in outcrop is about 116 metres. The formation is predominantly thickly bedded, typically forming large, smooth domal outcrops. It is generally pale grey, and consists of alternating units of oncolitic and non-oncolitic fine to coarse-grained calcarenite. These intraformational units vary in thickness from 5 to 40 metres. Stylolites and dolosiltite-filled worm burrows are generally minor but can be locally abundant.

Benjamin Limestone

The grid-based mapping has indicated that at least 330 m (true thickness) of the Lower Benjamin Limestone Member crops out on Roberts Hill. A distinctive unit, a medium to dark grey calcisiltite about 10–20 m thick, occurs at the base of the formation.

Above this unit, unfossiliferous micrite (lithofacies 5 of Calver, 1990b) predominates throughout the sequence. This unit has been further subdivided, based on the abundance of worm burrows, which are commonly filled with dolosiltite. Thin beds of fossiliferous micrite (lithofacies 8 of Calver) occur within the micrite/burrowed micrite units but are not shown on the geological plan.

At approximately 100 m and 180 m above the base of the Benjamin Limestone, thin (10–20 m) "mixed" units occur. These are comprised mostly of birdseye micrite (lithofacies 1) and calcisiltite. Micrite (lithofacies 5) and calcarenite (lithofacies 3) also occur.

It is considered that the calcisiltite units are best included as a sub-category of lithofacies 3 (calcarenite) in Calver's (1990b) classification scheme.

Quaternary/Recent

The Quaternary/Recent deposits have not been discriminated on the geological map. It should be noted that much of the cover is probably thin (1–2 m) but on line 1800 N and grid south of line 400 N, thick (at least 5 to 10 m) dolerite talus obscures limestone outcrop.

Structure

The units dip at approximately 34°, commonly between 30° and 40°. Large variations in dip (between 70° and 15°) are due to asymmetrical kinks with wavelengths of one to two metres and axes parallel to strike. These kink folds are usually obscured but a good example occurs near 1000 N, 175 E.

GEOCHEMISTRY

Locations and analytical results from the rock-chip sampling programme are shown in Figure 4 and Appendix 1.

Significant results of the sampling include:

- (i) most of the outcropping Cashions Creek Limestone either satisfies or exceeds the specification for minimum CaCO₃ grade. Within the Cashions Creek Limestone, lenses up to 65 m thick and at least 400 m long are within the specification for maximum Mg concentration. Table 1 shows average CaCO₃ and Mg analyses for the Cashions Creek Limestone for each grid line (up to 1400 N). The weighted average grade for the Cashions Creek Limestone between lines 400 N and 1400 N is 94.75% CaCO₃ and 0.62% Mg.

Table 2 shows average results for the best zones within the Cashions Creek Limestone between lines 400 N and 1400 N. The locations of these zones are shown on Figure 4. The best interval has been traced between line 400 N and line 800 N; it has an average true thickness of 33 m and weighted average grade of 95.28% CaCO₃ and 0.35% Mg.
- (ii) thin zones (up to 10 m thick) within the Benjamin Limestone satisfy the CaCO₃ and Mg specifications, although the grades appear to be variable along strike. These zones occur within the "mixed" units described previously.
- (iii) thicker zones (up to 60 m) within the Benjamin Limestone have very low Mg (average 0.30%) but marginal CaCO₃ (average 92%). These zones appear to have limited strike extent and could therefore be due to surface effects.

It should be noted here that Maydena DDH1, which is 400 m from the nearest outcrop of Cashions Creek Limestone, intersected 112 m (true thickness) of Cashions Creek Limestone, grading 93.3% CaCO₃ and 0.79% Mg including 50 m of 94.9% CaCO₃ and 0.64% Mg (Calver, 1992). The occurrence of thin, high CaCO₃, low Mg zones

within the Benjamin Limestone (as described in subsection (ii) above) was confirmed.

The discrepancies in the drill hole and surface results for the Cashions Creek Limestone (fig. 5) are probably due to lensing out of the higher grade zones at depth, although the possibility that surface weathering and/or sampling bias is a factor cannot be totally discounted.

LIMESTONE RESOURCES

It is considered that sufficient data have been gathered to enable the estimation of inferred mineral resources (as defined in the Australasian Code for Reporting of Identified Mineral Resources and Ore Reserves).

A nominal depth extent of 25 m has been chosen for the purposes of the following inferred mineral resource estimates. The other data used are from Tables 1 and 2. It should be noted that the sampling method chosen has simplified much of the calculations. Each sample is assumed to have an equal area of influence (which is generally true), so that the average grade need be weighted only for width.

1. Inferred mineral resource estimate for total thickness of Cashions Creek Limestone between 350 N and 1450 N.

Depth:	25 m
Length:	1100 m
Average Width:	116 m
Density:	2.7 t/m ³
Cut-off:	N/A

Therefore:

Inferred mineral resource (approx.):
8.6 million tonnes
Weighted average grade (approx.):
95% CaCO₃, 0.6% Mg

2. Inferred mineral resource estimate for total thickness of Cashions Creek Limestone between 350 N and 850 N.

Depth:	25 m
Length:	500 m
Average Width:	131 m
Density:	2.7 t/m ³
Cut-off:	93.5% CaCO ₃ , 0.6% Mg

Therefore:

Inferred mineral resource (approx.):
4.4 million tonnes
Weighted average grade (approx.):
95% CaCO₃, 0.5% Mg

3. Inferred mineral resource estimate for best zone in Cashions Creek Limestone (Lower Zone A) between 350 N and 850 N.

Depth:	25 m
Length:	500 m
Average true thickness:	33 m
Density:	2.7 t/m ³
Cut-off:	93.5% CaCO ₃ , 0.45% Mg

Therefore:

Inferred mineral resource (approx.):
1.1 million tonnes
Weighted average grade (approx.):
95.3% CaCO₃, 0.35% Mg

CONCLUSIONS

Systematic surface sampling on the Roberts Hill grid has confirmed that the Cashions Creek Limestone is highly prospective for high grade industrial limestone.

The exploration has delineated a tentative inferred mineral resource, to a down-dip depth of 25 m, of approximately:

8.6 Mt of 95% CaCO₃, 0.6% Mg

including: 4.4 Mt of 95% CaCO₃, 0.5% Mg

including: 1.1 Mt of 95.3% CaCO₃, 0.35% Mg

The Benjamin Limestone is unlikely to contain a quarriable resource of sufficient size and within the grade specifications in its own right, but the material from some low Mg zones could be used for blending with the high Mg zones (i.e. "overburden") in the Cashions Creek Limestone.

RECOMMENDATIONS

Systematic drilling of the Cashions Creek Limestone is recommended to test the subsurface extent of high grade lenses located in the surface sampling programme. Because of perceived time constraints, percussion drilling is favoured over diamond drilling. A reverse circulation percussion drill would be preferable in terms of sample recovery, but as the Department does not have a rig of this type, a series of short (about 100 m) percussion holes is recommended. Proposed drill sites are shown on Figure 4. Each hole is designed to intersect the high grade lenses at a depth of 25 to 50 metres.

ACKNOWLEDGMENTS

Grateful acknowledgment is made to the following Departmental office-based staff for their untiring assistance with gridding and sampling: Mike Davie, Greg Dickens, Mark Dwyer, Anthony Hollick, John Ladaniwskyj, Andrew McGuinness, Chris Meech and Chris Perry.

Clive Calver is thanked for his advice and discussions, as are the staff of the Department's chemical laboratory, particularly Peter Sheridan and Katherine Burt, for providing the assay data.

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[20 October 1992]

Table 1
Averages per gridline for CaCO₃ and Mg in the Cashions Creek Limestone

CO-ORDINATES			AVERAGE GRADES (%) PER LINE		THICKNESS (m)		COMMENT
Northing	Westing		CaCO	Mg	Apparent	True	
	From	To					
400	365	500+	93.83	0.50	135	110	Includes 50 m unknown grade
500	400	575	96.26	0.44	175	145	
600	400	590+	96.21	0.51	190	155	
700	400	525+	94.42	0.60	125	100+	Base not sampled
800	375	525	94.57	0.57	150	125+	Base obscured
900	360	500	93.12	0.95	140	115+	Base obscured
1000	350	475	94.52	0.90	125	100+	Base obscured
1100	345	475	93.87	0.72	130	105+	Base obscured
1200	340	500	94.54	0.61	160	130	
1300	310	425	95.40	0.63	115	95	
1400	305	425	95.54	0.41	120	100	
Average			94.75	0.62	142	116	
Weighted average			94.82	0.61			

Table 2

Best intervals in the Cashions Creek Limestone

(A) LOWER ZONE A

CO-ORDINATES		AVERAGE OF GRADES (%) PER LINE		THICKNESS (m)	
Northing	Westing	CaCO	Mg	Apparent	True
400	475 – 500	93.70	0.35	25	15
500	475 – 525	96.45	0.27	50	35
600	500 – 590	95.27	0.36	90	65
700	500 – 525+	94.90	0.30	25+	15+
800	475 – 525	94.70	0.45	50	35
Average		95.08	0.35	48	33
Weighted Average		95.28	0.35		

(B) LOWER ZONE B

CO-ORDINATES		AVERAGE OF GRADES (%) PER LINE		THICKNESS (m)	
Northing	Westing	CaCO	Mg	Apparent	True
1200	400 – 450	94.95	0.46	50	35
1300	375 – 425	94.90	0.44	50	35
1400	375 – 425	93.75	0.42	50	35
1600	280 – 300	95.13	0.43	50	35
Average		94.68	0.44	50	35

(C) UPPER ZONE A

CO-ORDINATES		AVERAGE OF GRADES (%) PER LINE		THICKNESS (m)	
Northing	Westing	CaCO	Mg	Apparent	True
500	400 – 450	96.40	0.52	50	35
600	425 – 475	98.50	0.42	50	35
700	425 – 450	95.30	0.51	25	15
800	400 – 425+	96.70	0.33	25	15
Average		96.73	0.45	37.5	25

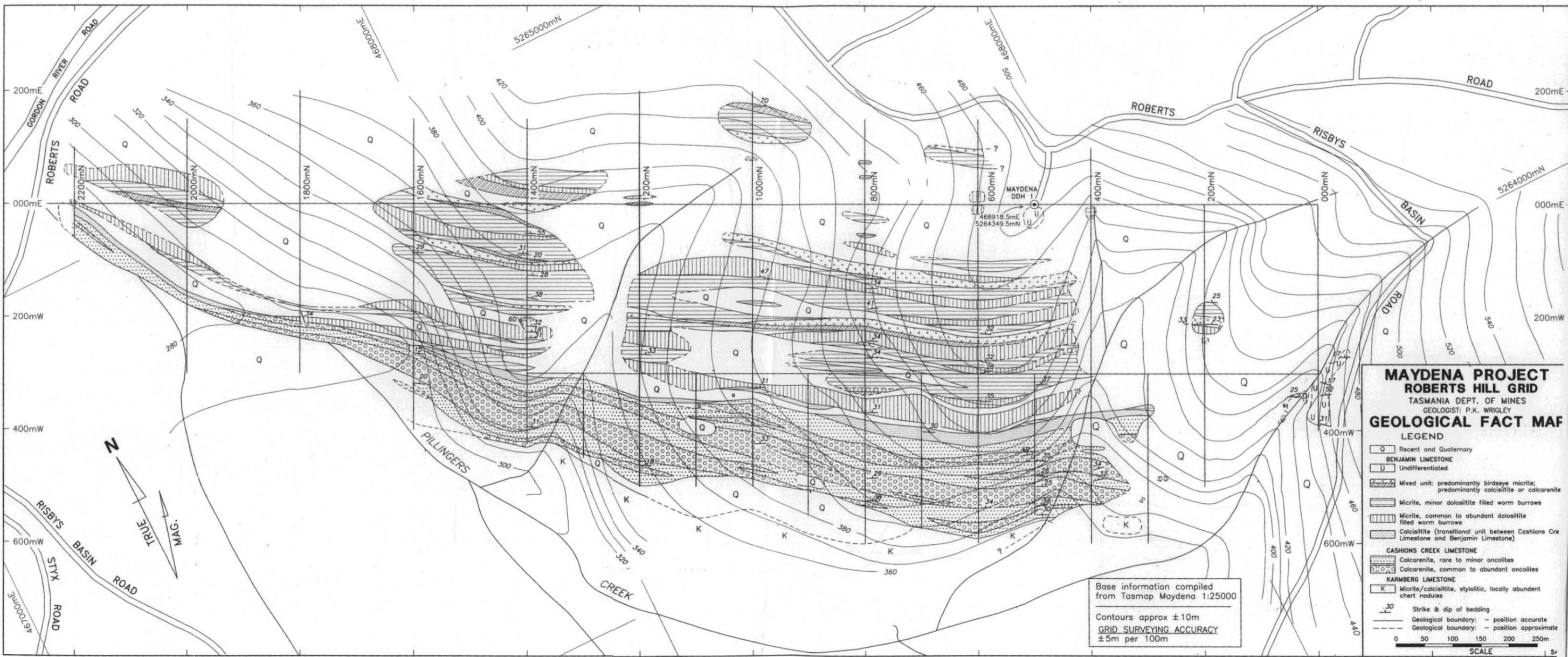


Figure 3

5 cm

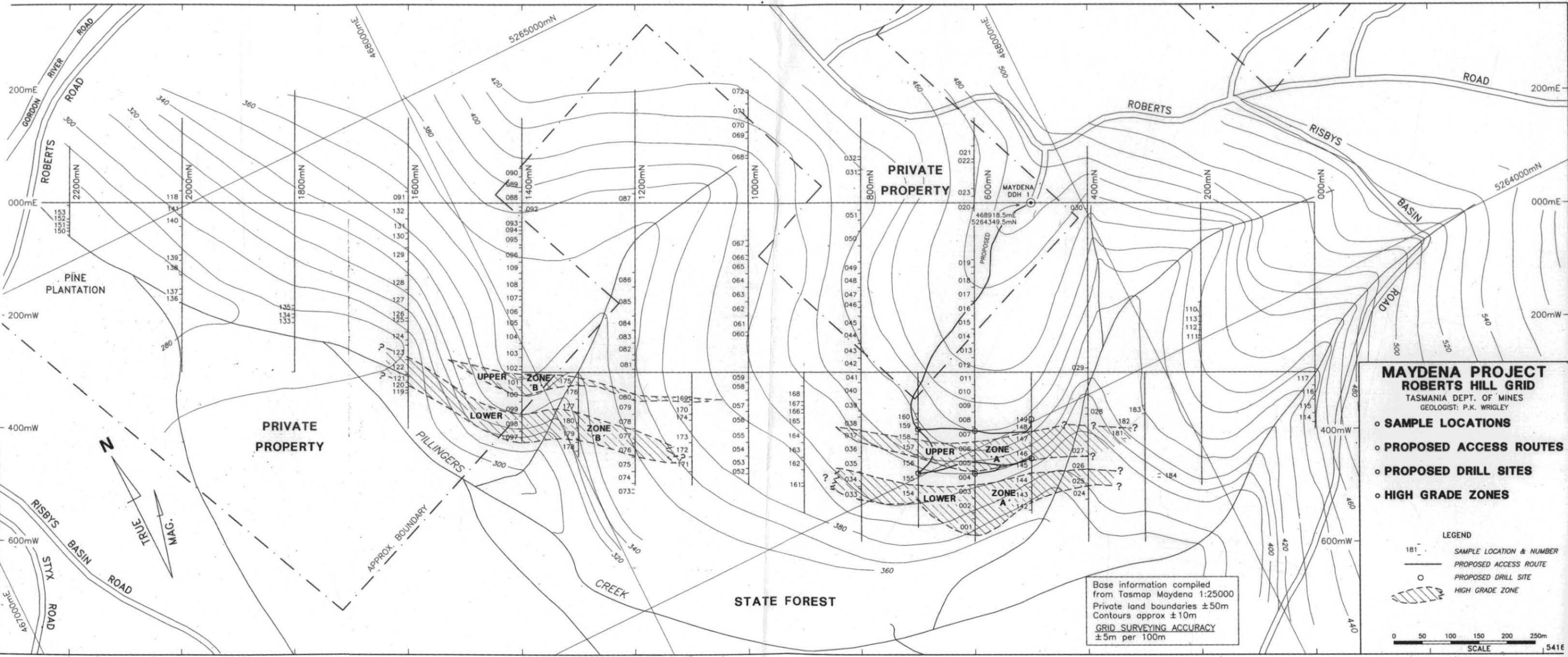
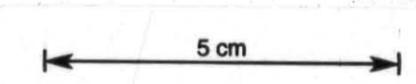


Figure 4



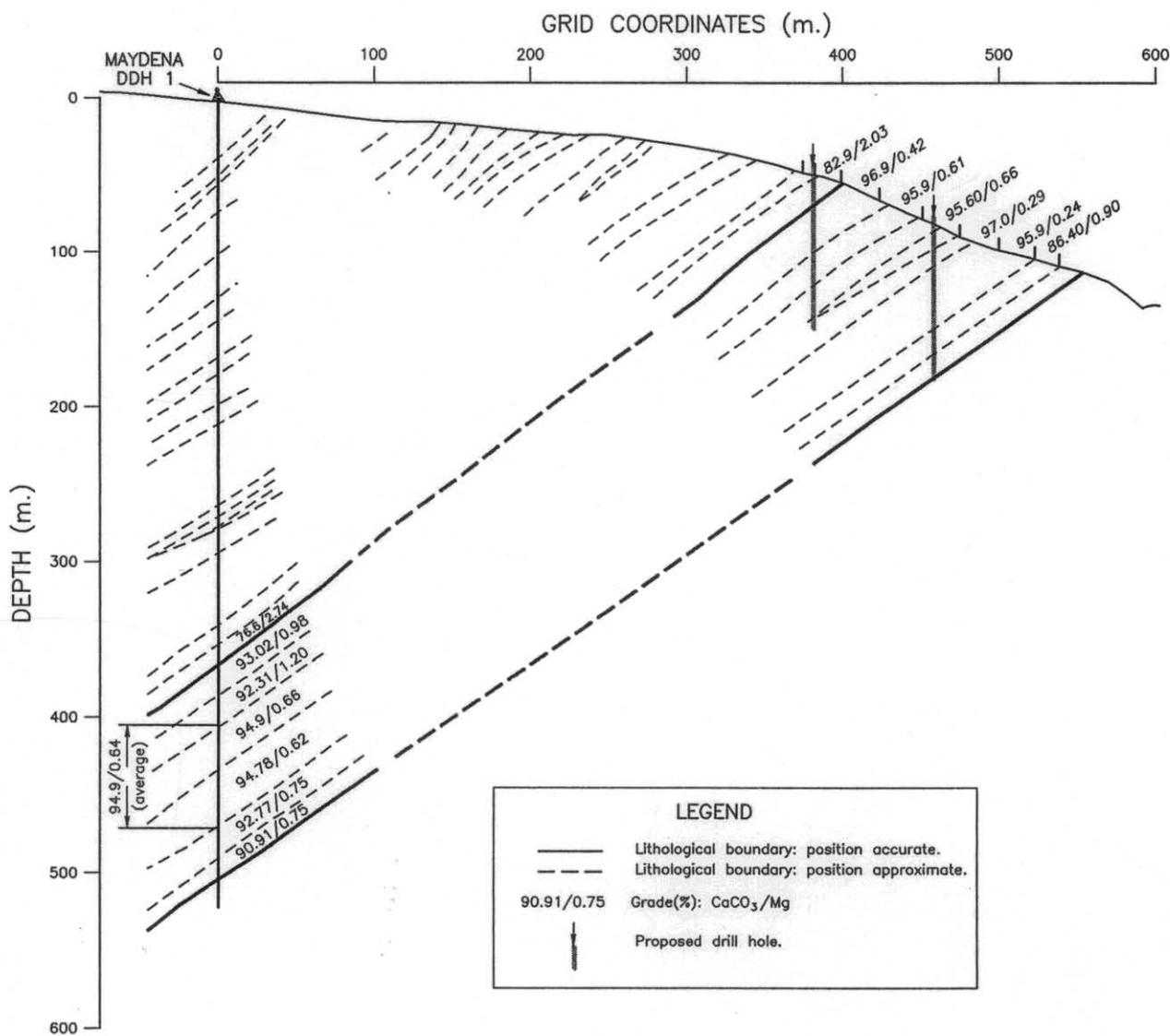
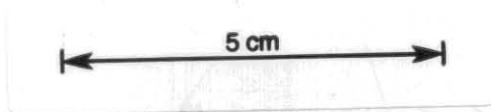


Figure 5



APPENDIX 1

Risbys Basin grid: sample locations and analytical results

REG. NO.	FIELD NO.	GRID CO-ORDINATES		SAMPLE WEIGHT (kg)	CaCO (%)	Mg (%)	DESCRIPTION
		Northing	Eastings/ Westings				
920003	105001	600	590-560W	6.47	93.6	0.44	CCL : oca
920004	105002	600	550-525W	3.91	93.7	0.29	CCL : fca
920005	105003	600	525-500W	3.07	98.5	0.34	CCL : oca
920006	105004	600	500-475W	2.67	96.4	0.89	CCL : oca
920007	105005	600	475-450W	5.38	98.0	0.58	CCL : ca
920008	105006	600	450-425W	3.30	99.0	0.25	CCL : fca
920009	105007	600	425-400W	2.31	94.3	0.79	BL : cs
920010	105008	600	400-375W	2.60	90.0	0.51	BL : m
920011	105009	600	375-350W	2.82	92.0	0.82	BL : bm
920012	105010	600	350-325W	3.20	88.3	0.76	BL : tm
920013	105011	600	325-300W	1.30	88.7	0.84	BL : tm
920014	105012	600	300-275W		90.6	0.69	BL : tm
920015	105013	600	275-250W		85.5	1.91	BL : bm
920016	105014	600	250-225W		95.4	0.42	BL : bem
920017	105015	600	225-200W		93.4	0.58	BL : bem+tm
920018	105016	600	200-175W		92.7	1.11	BL : fm
920019	105017	600	175-150W		90.5	2.17	BL : tm
920020	105018	600	150-125W		91.4	0.81	BL : bem+m+ca
920021	105019	600	125-100W		92.1	0.36	BL : bem+ca+m
920022	105020	600	025-000W		90.7	0.83	BL : bm
920023	105021	600	100-075E		86.4	0.99	BL : m/cs
920024	105022	600	075-050E		82.2	1.48	BL : bm
920025	105023	600	025-000E		91.7	0.41	BL : bm
920026	105024	400	525-500W	1.95	87.0	0.67	CCL : oca
920027	105025	400	500-475W	2.04	93.7	0.35	CCL : oca
920028	105026	400	475-450W	1.93	92.4	0.58	CCL : oca
920029	105027	400	450-425W	1.07	93.5	0.61	CCL : oca
920030	105028	400	375-365W	0.65	95.7	0.46	BL : cs
920031	105029	400	300-298W	0.35	86.8	0.98	BL : m
920032	105030	400	020-000W		83.9	1.16	BL : bm
920033	105031	800	048-050E		90.3	0.35	BL : m
920034	105032	800	075-080E		90.3	0.53	BL : m
920035	105033	800	525-500W	2.15	95.2	0.45	CCL : ca
920036	105034	800	500-475W	2.18	94.2	0.45	CCL : oca
920037	105035	800	475-450W	2.37	93.3	0.75	CCL : oca+ca
920038	105036	800	450-420W	2.22	94.8	0.76	CCL : ca
920039	105037	800	420-400W	1.61	96.7	0.33	CCL : ca
920040	105038	800	400-375W	1.47	93.2	0.67	CCL : fca/cs
920041	105039	800	375-350W	1.05	83.8	0.65	BL : bm
920042	105040	800	350-320W	2.15	86.9	0.63	BL : m+cs+bem
920043	105041	800	320-300W	0.39	86.4	0.74	BL : m+cs
920044	105042	800	300-275W		87.1	0.68	BL : m
920045	105043	800	275-250W		91.5	0.55	BL : m
920046	105044	800	250-225W		90.7	0.85	BL : bm
920047	105045	800	225-200W		95.2	0.60	BL : cs/bem
920048	105046	800	200-175W		89.6	0.93	BL : m
920049	105047	800	175-150W		91.0	0.99	BL : m
920050	105048	800	150-125W		92.4	1.05	BL : bm+bem

REG. NO.	FIELD NO.	GRID CO-ORDINATES		SAMPLE WEIGHT (kg)	CaCO (%)	Mg (%)	DESCRIPTION
		Northing	Easting/ Westings				
920051	105049	800	125-100W		99.7	0.26	BL : fca+bem
920052	105050	800	075-050W		89.5	1.01	BL : bm
-	105051	800	030-015W		*SAMPLE LOST *		BL : bem
920053	105052	1000	480-470W	2.24	95.8	0.54	CCL : fca
920054	105053	1000	470-450W	3.10	93.2	0.94	CCL : bca
920055	105054	1000	450-425W	2.17	96.2	0.63	CCL : oca
920056	105055	1000	425-400W	2.58	93.8	1.07	CCL : oca+bca
920057	105056	1000	400-370W	2.30	97.0	1.08	CCL : bca+oca
920058	105057	1000	365-350W	2.07	91.1	1.11	CCL : bca
920059	105058	1000	350-330W	0.88	79.7	1.38	BL : cs+m
920060	105059	1000	330-300W	1.06	80.1	2.08	BL : bm
920061	105060	1000	250-225W		86.6	1.12	BL : fm
920062	105061	1000	225-200W		85.9	0.75	BL : bcs
920063	105062	1000	200-175W		77.2	3.09	BL : bm
920064	105063	1000	175-150W		91.4	0.68	BL : tm
920065	105064	1000	150-125W		92.8	0.59	BL : m
920066	105065	1000	125-100W		91.6	1.46	BL : bm
920067	105066	1000	100-075W		86.3	1.56	BL : bm
920068	105067	1000	075-050W		85.3	2.54	BL : bm
920069	105068	1000	080-100E		92.2	0.41	BL : tm/bem
920070	105069	1000	100-125E		91.6	0.30	BL : bem
920071	105070	1000	125-150E		93.2	0.44	BL : m
920072	105071	1000	150-175E		92.5	0.31	BL : m
920073	105072	1000	195-205E		90.3	0.53	BL : m
920074	105073	1200	510-500W	1.30	55.6	0.27	KL : cs
920075	105074	1200	500-475W	1.80	91.3	0.66	CCL : ca
920076	105075	1200	475-450W	2.87	93.6	0.77	CCL : ca+fca
920077	105076	1200	450-425W	2.37	95.1	0.41	CCL : oca
920078	105077	1200	425-400W	1.29	94.8	0.51	CCL : oca
920079	105024	400	525-550W	1.95	89.0	0.60	CCL : oca
920080	105078	1200	400-375W	2.85	94.7	0.86	CCL : ca
920081	105079	1200	375-350W	1.20	94.3	0.82	CCL : ca+oca
920082	105080	1200	350-340W	1.29	98.0	0.27	CCL/BL :fca+cs
920083	105081	1200	300-275W		91.3	0.53	BL : m
920084	105082	1200	275-250W		89.2	0.71	BL : m+ca
920085	105083	1200	250-225W		83.7	1.19	BL : bm
920086	105084	1200	225-200W		88.6	0.84	BL : m+bm
920087	105085	1200	200-150W		90.4	0.30	BL : tm/bem
920088	105086	1200	150-125W		93.1	0.27	BL : m
920089	105087	1400	000-025E		86.6	0.38	BL : cs+fm
920090	105088	1400	000-025E		87.5	1.99	BL : bm+cs
920091	105089	1600	025-050E		88.7	0.71	BL : fm+cs
920092	105090	1400	050-075E		89.5	0.31	BL : m+bem
920093	105091	1600	000-025E		91.1	0.28	BL : m/cs+bem
920094	105092	1400	000-010W		94.8	0.27	BL : m+ca+bem
920095	105093	1400	030-040W		84.5	2.77	BL : cs
920096	105094	1400	040-050W		84.4	0.32	BL : am
920097	105095	1400	050-075W		90.4	0.77	BL : fm
920098	105096	1400	075-100W		85.3	2.80	BL : m
920099	105097	1400	425-400W	1.14	93.0	0.35	CCL : fca/cs
920100	105098	1400	400-375W	2.04	94.5	0.48	CCL : oca
920101	105099	1400	375-350W	3.10	94.9	0.65	CCL : oca+fca

REG. NO.	FIELD NO.	GRID CO-ORDINATES		SAMPLE WEIGHT (kg)	CaCO (%)	Mg (%)	DESCRIPTION
		Northing	Eastings/ Westings				
920102	105100	1400	350-325W	2.34	98.4	0.23	CCL : oca+fca
920103	105101	1400	325-300W	1.68	96.9	0.33	BL : cs
920104	105102	1400	290-275W		89.0	0.63	BL : m
920105	105103	1400	275-250W		84.8	0.69	BL : bm
920106	105104	1400	250-220W		81.3	1.03	BL : bm
920107	105105	1400	220-200W		86.5	1.52	BL : bm
920108	105106	1400	190-180W		85.2	1.27	BL : bm
920109	105107	1400	165-150W		82.7	0.90	BL : fm
920110	105108	1400	150-125W		86.6	0.95	BL : bm
920111	105109	1400	125-100W		88.9	0.49	BL : bm+bem+cs
920112	105110	200	175-200W		93.7	0.44	BL : m
920113	105111	200	240-225W		91.0	0.50	BL : m+bem
920114	105112	200	225-220W		79.8	1.71	BL : bm
920115	105113	200	210-200W		90.9	0.39	BL : bem
920116	105114	000	400-375W		85.5	0.58	BL : bm
920117	105115	000	375-350W		88.3	0.69	BL : bm
920118	105116	000	350-325W		92.0	0.38	BL : m+bem
920119	105117	000	325-315W		84.9	0.50	BL : bm
920120	105118	2000	025-000E		85.6	0.43	BL : bm
920121	105119	1600	335-330W	2.56	94.7	0.60	CCL : fca
920122	105120	1600	320-317W	2.11	95.1	0.28	CCL : ca,breccia
920123	105121	1600	317-300W	5.78	95.5	0.53	CCL : oca
920124	105122	1600	300-275W	2.45	95.2	0.29	CCL : oca
920125	105123	1600	275-257W		92.4	1.05	CCL : fca+cs
920126	105124	1600	240-225W		88.4	0.46	BL : bm
920127	105125	1600	205-200W		88.8	0.36	BL : m
920128	105126	1600	200-185W		88.2	0.31	BL : m
920129	105127	1600	185-150W		91.1	0.48	BL : bm
920130	105128	1600	150-125W		88.5	0.60	BL : bm
920131	105129	1600	100-075W		93.5	0.35	BL : bem
920132	105130	1600	060-050W		95.0	0.27	BL : bem
920133	105131	1600	050-025W		90.5	0.70	BL : bm
920134	105132	1600	025-000W		91.7	1.00	BL : bm
920135	105133	1800	230-210W		95.5	0.55	CCL : ca+oca
920136	105134	1800	210-200W		87.7	1.02	BL : bm
920137	105135	1800	200-175W		89.9	0.59	BL : bm
920138	105136	2000	175-160W		93.6	0.53	CCL : ca
920139	105137	2000	160-150W		88.6	0.88	BL : cs+m
920140	105138	2000	125-100W		91.3	0.61	BL : bm
920141	105139	2000	100-090W		81.4	1.78	BL : bm
920142	105140	2000	040-035W		82.7	1.38	BL : bm
920143	105141	2000	020-000W		84.1	0.49	BL : m+cs
920144	105142	500	540-525W	1.90	86.4	0.90	CCL/KL : oca+cs +chert
920145	105143	500	525-500W	2.37	95.9	0.24	CCL : fca
920146	105144	500	500-475W	4.40	97.0	0.29	CCL : oca
920147	105145	500	475-450W	4.24	95.6	0.66	CCL : oca+ca
920148	105146	500	450-425W	3.96	95.9	0.61	CCL : oca
920149	105147	500	425-400W	3.50	96.9	0.42	CCL : fca/cs
920150	105148	500	400-385W	0.46	82.9	2.03	BL : cs
920151	105149	500	385-375W	2.30	88.2	1.01	BL : fm+bm
920152	105150	2200	050-045W		95.2	0.48	CCL : fca
920153	105151	2200	040-035W		95.2	0.25	CCL : oca

REG. NO.	FIELD NO.	GRID CO-ORDINATES		SAMPLE WEIGHT (kg)	CaCO (%)	Mg (%)	DESCRIPTION
		Northing	Eastings/ Westings				
920154	105152	2200	035-030W		93.1	0.21	CCL : oca
920155	105153	2200	020-005W		93.0	1.10	CCL : cs/fca
920201	105154	700	525-500W	2.78	94.9	0.30	CCL : oca
920202	105155	700	500-475W	4.39	93.8	0.76	CCL : oca
920203	105156	700	475-450W	5.30	94.7	0.84	CCL : ca+oca
920204	105157	700	450-425W	2.18	95.3	0.51	CCL : oca
920205	105158	700	420-400W	1.33	93.4	0.59	CCL : fca/cs
920206	105159	700	395-385W	0.72	70.5	4.93	BL : cs
920207	105160	700	385-375W	1.36	86.5	0.51	BL : bm
920208	105161	900	500-495W	0.56	93.0	0.79	CCL : fca
920209	105162	900	470-450W	1.76	92.3	1.26	CCL : oca+ca
920210	105163	900	450-425W	3.86	95.0	0.66	CCL : ca
920211	105164	900	425-400W	3.49	93.9	0.85	CCL : ca
920212	105165	900	400-375W	2.18	91.5	1.36	CCL : ca
920213	105166	900	375-360W	0.32	93.0	0.78	CCL : ca
920214	105167	900	360-355W	0.40	81.6	2.54	BL : cs
920215	105168	900	355-325W	2.14	88.3	0.80	BL : bm
920216	105169	1100	345-350W	0.76	94.7	0.38	CCL : fca
920217	105170	1100	350-375W	2.03	93.2	0.75	CCL : fca
920218	105171	1100	475-450W	4.95	90.8	1.01	CCL : fca+oca
920219	105172	1100	450-425W	5.80	93.7	0.73	CCL : oca+ca
920220	105173	1100	425-405W	3.62	95.7	0.64	CCL : fca
920221	105174	1100	385-375W	0.70	95.1	0.78	CCL : ca
920222	105175	1300	310-325W	3.67	97.4	0.28	CCL : ca
920223	105176	1300	325-350W	5.07	95.8	0.64	CCL : ca+oca
920224	105177	1300	350-375W	3.04	94.0	0.86	CCL : ca
920225	105178	1300	440-425W	2.10	88.5	0.49	CCL/KL : oca/cs
920226	105179	1300	420-400W	0.85	94.7	0.33	CCL : fca/cs
920227	105180	1300	400-375W	6.08	95.1	0.54	CCL : fca
920330	105181	340	415-400W		96.0	0.26	CCL : oca
920331	105182	310-330	400-375W		94.4	0.60	CCL : oca
920332	105183	300	375-350W		89.9	0.77	CCL : ca
920333	105184	280	480W		93.6	0.79	CCL : oca

LEGEND

- oca onc calcarenite
- fca fine c.a.
- ca calcarenite
- bca burrowed calcarenite
- cs calcisiltite
- bcs burrowed c.s.
- m micrite
- bm burrowed micrite
- bem birdseye micrite
- fm fossiliferous micrite
- am argillaceous micrite

- BL Benjamin Limestone
- CCL Cashions Creek Limestone
- KL Karmberg Limestone