1979/25. Two diamond drill holes at Harts Hill, near Margate

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Abstract

Two holes were drilled in the neighbourhood of Harts Hill. The first of these at EN20503422 proved 30 m of limestone (Harts Hill Limestone*) on 40 m of beds of the Hickman Formation* and then penetrated 30 m of fossiliferous Bundella Mudstone to terminate at a depth of 100 m. The second hole a short distance to the south [EN20343376] proved 21 m of Deep Bay Formation* beds on 10.6 m of limestone (Harts Hill Limestone*) resting on 47.9 m of beds belonging to the Hickman Formation and terminated in Bundella Mudstone at a depth of 82.65 m.

INTRODUCTION

An isolated area of loose limestone blocks has long been known around the summit of Harts Hill and at one time a small quarry was worked in the highly weathered (?Tertiary) products of the limestone from old sink holes or spelean deposits. The stratigraphic relationships of the limestone to beds both above and below were unknown. The bores were sited to prove the thickness, extent and stratigraphic relationships of the limestone and associated beds.

The first hole at EN20503422 at the top of Harts Hill proved 30 m of fossiliferous limestone (Harts Hill Limestone*) a possible correlate of the Berriedale Limestone. This limestone was underlain by 40 m of fossiliferous mudstone and siltstone (Hickman Formation*). The bore terminated at 100 m after passing through approximately 30 m of fossiliferous Bundella Mudstone.

Failure to find the limestone even a short distance away from Harts Hill led to the drilling of a second hole a short distance to the south of the first hole [EN20343376] in order to determine the extent and lateral variation of the limestone and associated formations. The intervention of a fault, throwing down to the south, between the two sites also allowed the hole to be sited so as to begin above the limestone and so determine its relationship to overlying beds. The bore recorded 21.15 m of highly fossiliferous Deep Bay Formation* beds before penetrating almost 48 m of beds assigned to the Hickman Formation. The hole terminated in Bundella Mudstone at a depth of 82.65 m.

The results of the two holes taken together show very rapid, lens-like, lateral thinning and transition and accounts for the failure of the limestone to appear elsewhere in the neighbourhood. New formations based on these bores will be described in the forthcoming explanatory report for the Kingborough 1:50 000 geological map. The presence of *Cancrinella* in beds of the Hickman formation suggests that this part of the sequence is the approximate age equivalent of the Berriedale Limestone-Grange Mudstone sequence of the Hobart area.

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* Unpublished formation name.

GEOLOGICAL LOG OF HARTS HILL NO. 1 DIAMOND DRILL HOLE

Depth (m)	Description	Formation
0.00 - 8.80	Limestone, grey, fossiliferous, buff weathering with thin calcareous mudstone partings. A few dropped pebbles. Limestone, bioclastic - impure. Fauna - *Deltopecten, Martiniopsis, Peruvispira, Wyndhamia dalwoodensis,* fenestellids, *Stenopora.*	HARTS HILL LIMESTONE
8.80 - 13.92	Limestone, grey, impure, bioclastic; buff weathering, with highly calcareous bryozoan mudstone. Core shattered from 10.35 - 10.55 m. Some calcite veins. Fauna - *W. dalwoodensis* common. Also martiniopsids, *Schuchertella.* Bryozoa abundant.	
13.92 - 21.40	Limestone, buff weathering, grey - has suffered much from solution. Many of fossils preserved only as moulds. Very limy to base. Fauna - as above but with *Terrakea* and more neospiriferid fragments. Many bryozoa.	
21.40 - 23.00	Siltstone, dark grey to black, fossiliferous, lime mainly in fossils not matrix. Fauna - brachiopod and bryozoan fragments.	
23.00 - 26.75	Limestone, grey, buff weathering, similar to limestones higher in sequence. Fauna - *Etheripecten, Grantonia hobartensis, Sulciplica,* martiniopsids, *W. dalwoodensis, Eurydesma* at 25.75 m. Ostracods common. Neospiriferid fragments very common.	
26.75 - 28.69	Siltstone, dark-grey, very few fossils. Ostracods. *Cancrinella* at 26.80 m. Limestone, grey, buff weathering, highly fossiliferous.	
28.69 - 29.40	Siltstone, calcareous, fossiliferous, laminated in places. Siltstone, medium grey in places. *Cancrinella* at 28.90 m.	
29.40 - 30.05	Limestone, dark grey, buff weathering, fossiliferous.	
30.05 - 34.20	Siltstone, grey, calcareous. Fossiliferous throughout. *Cancrinella* to 34.20 m. Fairly massive. Bioturbation in part of core. Fauna - *W. dalwoodensis* fairly common. *Peruvispira* common. *Martiniopsis. Etheripecten. Sulciplica, Stutchburia.*	HICKMAN FORMATION
34.20 - 39.09	Siltstone, grey, calcareous (*Cancrinella* at 35.40m). Bioturbate, ostracod rich. Some bryozoa. Sparsely fossiliferous throughout. *Gangamopteris* at 39 m. Fauna - *Streblopteria, Deltopecten, Stutchburia.*	

GEOLOGICAL LOG OF HARTS HILL NO. 1 DIAMOND DRILL HOLE (continued)

Depth (m)	Description	Formation
39.09 - 39.49	Sandstone, fine-grained, silty. Some fossils.	HICKMAN FORMATION
39.49 - 41.50	Sandstone, dark grey, a few ostracods, otherwise apparently unfossiliferous. Massive - no signs of bedding.	
41.50 - 42.59	Pebble and granule conglomerate - pebbles up to 12 mm - irregular sandstone matrix. Spiriferid fragments in middle.	
42.59 - 44.14	Mudstone and siltstone - very dark grey in colour - no fossils - mica flakes. No bedding.	
44.14 - 48.30	Siltstone, dark grey. Sparsely fossiliferous. Some shell scraps - mostly unfossiliferous. *Sulciplica* and *Martiniopsis* at 48.30 m.	
48.30 - 48.60	Siltstone, with irregular quartz granule patches.	
48.60 - 50.50	Mudstone, dark grey to black, pyrite, mica flakes. Unfossiliferous.	
50.50 - 51.20	Siltstone, unfossiliferous, micaceous alternating with irregular granule conglomerate layers and patches. No fossils. A few dropped pebbles.	
51.20 - 54.84	Siltstone, dark grey to black, unfossiliferous. Wispy bedded - friable, fairly featureless.	
54.84 - 56.60	Alternating beds of siltstone and irregular granule - conglomerate beds and patches. Siltstone dark-grey. Dropped pebbles present.	
56.60 - 65.00	Siltstone, light to medium grey, wispy bedded, with some thin (100 mm) granule conglomerate beds. Dropped pebbles. Fossils from 59.50 m downwards. Fauna - spiriferid fragments, *Stenopora*, fenestellids.	
65.00 - 70.20	Sandstone, medium- to coarse-grained, poorly-sorted, light buff coloured, quartz sandstone. Fossiliferous. 500 mm siltstone band in middle. Dropped pebbles throughout. Fauna - *Stenopora, Deltopecten*.	
70.20 - 100.05	Light-grey siltstone, fossiliferous - with *Martiniopsis konincki* (Bundella) and *Trigonotreta stokesi* at 71.20 m. Fossiliferous throughout. Buff weathering. Dropped pebbles. Wispy bedded in places. Typical Bundella lithology continues to termination of hole at 100.05 m. Fossiliferous throughout.	BUNDELLA MUDSTONE
	Hole terminated at 100.05 m.	

GEOLOGICAL LOG OF HARTS HILL NO. 2 DIAMOND DRILL HOLE

Depth (m)	Description	Formation
0.00 - 8.95	Siltstone, grey, brown weathering, richly fossiliferous throughout. Heavily bryozoan but also fairly shelly. Fossils preserved as moulds in places. Typical 'Cygnet Grange' (Deep Bay) lithology. Fauna - *Sulciplica, Aperispirifer wairakiensis, Schuchertella, Merismopteria, Atomodesma, Martiniopsis, Stenopora,* fenestellids, *Wyndhamia dalwoodensis.*	DEEP BAY FORMATION
8.95 - 11.45	Limestone, impure, fossiliferous, grey. Fauna - *Terrakea,* bryozoa, spiriferids, *W. dalwoodensis.*	
11.45 - 13.85	Siltstone, calcareous, fossiliferous, fossils mainly as moulds. Shells and bryozoa. Fauna - *Peruvispira, Schuchertella, Terrakea, W. dalwoodensis,* spiriferids.	
13.85 - 14.50	Siltstone, grey, friable, unfossiliferous.	
14.50 - 21.15	Siltstone, medium to coarse. Hard, dark, highly bioturbate throughout. Shell fragments throughout. Thin calcite veins in places. Dropped pebbles present. Bryozoan. Fauna - *Peruvispira, Deltopecten, Terrakea brachythaera, Etheripecten, Myonia,* spiriferid fragments.	
21.15 - 22.40	Limestone, impure, hard, shelly, grey, *W. dalwoodensis, Terrakea.*	HARTS HILL LIMESTONE
22.40 - 24.00	Siltstone, hard, dark grey, fossiliferous.	
24.00 - 29.00	Limestone, impure, fossiliferous throughout, open veins with calcite crystals along veins. Fauna - *Terrakea, W. dalwoodensis.*	
29.00 - 29.48	Siltstone, calcareous, fossiliferous, stenoporids, fenestellids.	
29.48 - 31.80	Limestone, grey, impure, fossiliferous. *W. dalwoodensis, Martiniopsis.*	
31.80 - 53.60	Siltstone, fossiliferous, calcareous, ranging in colour from almost dark grey to black. Bioturbate. Some dropped pebbles. Bryozoa and shells throughout. (*Cancrinella* from 37.49 - 46.83 m). Siltstone becoming less fossiliferous from approx. 46.00 m downwards. Fauna - *Streblopteria,* spiriferids, *Martiniopsis.*	
53.60 - 54.10	Siltstone, heavily bioturbate, full of shell fragments.	HICKMAN FORMATION
54.10 - 60.58	Siltstone, dark, unfossiliferous, mica flakes. Some dropped pebbles. A few rare bands of comminuted shell debris.	

GEOLOGICAL LOG OF HARTS HILL NO. 2 DIAMOND DRILL HOLE (continued)

Depth (m)	Description	Formation
60.58 - 61.86	Siltstone, heavily bioturbate, full of shell fragments.	HICKMAN FORMATION
61.86 - 65.15	Siltstone, dark grey, wispy bedded, with lighter coloured thin bands of silt. Unfossiliferous.	
65.15 - 65.35	Siltstone, bioturbate, full of shell fragments.	
65.35 - 75.10	Siltstone, dark, unfossiliferous, pyritic, micaceous. Scattered small shell fragments throughout. Shells in bands and beds alternating with non shelly siltstone.	
75.10 - 79.70	Sandstone, coarse, bioturbate, with thin bands of finely laminated siltstone in some parts. Siltstone bands highly-disturbed (hydroplastic). Dropped pebbles. Pyrite spangles in places. *Peruvispira* common. *Eurydesma* in middle part of sandstone. Grey brown weathering.	
79.70 - 82.65	Siltstone, grey, fossiliferous, of Bundella type. Fauna - *Trigonotreta stokesi, Eurydesma, Keeneia, Stenopora*.	BUNDELLA MUDSTONE
	Hole terminated at 82.65 m.	