

1979/16. Results of drilling for water in the Devonport-Port Sorell-Sassafras area 1967-1979 and selection of future bore sites

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Abstract

Results of bores drilled in the last fifteen years are reviewed and suggestions made regarding the selection of future water bore sites. Maps are presented to show the geology of the area, the thicknesses of the Moriarty and Thirlstane basalt and the thickness of overburden on the Thirlstane Basalt.

INTRODUCTION

This report is designed mainly as a guide to landowners and private drilling contractors prospecting for groundwater in the Devonport-Port Sorell-Sassafras area. This area is bounded by the Mersey and Rubicon River estuaries and the Bass Highway, and has been the subject of a regional groundwater investigation by the Department of Mines since 1973.

At the time of writing (May 1979) there are at least 186 bores and 100 hand dug wells in the district. Their locations are shown in Figure 1. The resulting bore density of about one bore per square kilometre is probably the State's highest and is a reflection of the increasing importance of groundwater in the district. All the bores surveyed have been drilled during the last fifteen years and private drilling contractors drill on average an additional bore a week. For many farmers groundwater is a supplementary source of water, but for others it is their major supply. It seems inevitable that as agriculture turns increasingly to more intensive contract cash-cropping as well as beef and dairy farming, the small spring-fed surface streams draining the higher basalt areas will eventually be incapable of meeting demands. Groundwater may assume a major role.

The increased drilling activity in recent years is shown in Table 1. Fifty-nine per cent of bores were considered useful by landowners and remained operative. The remainder were abandoned but not all of these were failures; forty (27%) were dry and twenty (14%) struck water. The yield of most of these wet-but-abandoned bores was too low to run irrigation sprinklers, which require yields greater than about 300 l/min.* This trend to use groundwater more selectively as an irrigation supply is shown in column 6 of Table 1, where the proportion of wet-but-abandoned bores has increased in recent years. There is also an inverse correlation between annual rainfall and bores drilled. It is also likely that the Department of Mines drilling programme, involving twenty-two bores drilled between 1973 and 1975, attracted interest in groundwater and was partly responsible for the increased activity of private contractors in succeeding years.

This report is based on all available bore information from the district. It has been found possible to delineate major aquifers and to estimate the chances of success of any bore drilled into these. The accompanying maps may be used to avoid unfavourable areas or select potentially successful ones, and to predict the depth to favourable aquifers. Using the overburden map, the amount of bore casing needed can be determined within reasonable limits and overall drilling costs more accurately estimated.

One of the most important conclusions of the study is that many of the bores abandoned in previous years may have been successful if drilled deeper.

* A conversion table from l/min to gallons/hour is listed in Appendix 1.

Table 1. BORES DRILLED BY PRIVATE CONTRACTORS SINCE 1967.

Year	1 Bores drilled	2 Operative bores	3 Dry bores	4 Bores abandoned	5 Abandoned-dry bores	6 Col. 5 as % of col.1.	7 Annual Rainfall (mm) Hawley Devonport	
1967	3	1	2	2	0	0	574	589
1968	1	1	0	0	0	0	993	1005
1969	2	2	0	0	0	0	872	919
1970	10	4	5	6	1	10	913	953
1971	6	6	0	0	0	0	1124	1276
1972	6	6	0	0	0	0	541	583
1973	13	11	2	2	0	0	1085	1209
1974	11	4	5	7	2	18	1176*	1240
1975	6	6	0	0	0	0	1131	1325
1976	44	21	15	23	8	18	589	779
1977	23	15	6	8	2	9	625	848
1978	21	9	5	12	7	33		941
Total	146	86	40	60	20			
%		59	27	41	14			

* Excluding November.

The usual practice after an unsuccessful hole has been to drill further holes nearby to roughly the same depth. It is recommended that in areas where a suitable thickness of aquifer exists beneath the site, bores should in future be drilled deeper before being finally abandoned.

GEOLOGICAL OUTLINE OF THE AREA

The detailed stratigraphy of the area is now well established. All the bore data, including logs from deep stratigraphic holes and oil bores, have shown that thick sequences of Tertiary sediments and basalt have been deposited in three adjacent deep structural troughs, known as the Wesley Vale, Port Sorell and Sassafras Basins. These rocks are the districts best aquifers and should be the target for any bore drilled for irrigation groundwater supplies. The basins are underlain and bounded by older rocks, principally Jurassic dolerite and Permian sediments, which crop out or are shallowly buried along their margins. Thus, the Wesley Vale Basin (which may be more than 500 m deep) is bounded by dolerite and Permian rocks on Staggs Hill along its south-western side, and by the dolerite of Horse Shoe Reef along the coast. Its eastern limit is the north-south line of partly exposed dolerite horsts extending from west of Port Sorell south to Thirlstane. This dolerite also marks the western boundary of the Port Sorell Basin (>300 m deep), which in turn is bounded by dolerite along its eastern edge. The southern limit of the Sassafras Basin (>300 m deep) is near the Bass Highway, where dolerite and Permian sediments are exposed in the escarpment south of the road. The Sassafras Basin is separated from the other two basins by low buried dolerite saddles about 5 - 6 km north of Sassafras.

The Tertiary sequence in each of the basins is essentially the same:

		<i>Approximate maximum thick- ness (m)</i>
<i>Top</i>	Moriarty Basalt	60
	Wesley Vale Sand	50
	Thirlstane Basalt	170
<i>Bottom</i>	Harford Beds	>300

The accompanying geological sections (fig. 6) based on all available bore logs show the structure and stratigraphy of the area.

Moriarty Basalt. This unit occupies the higher 'plateau' areas at Northdown and Sassafras and it also occurs at East Sassafras and near Moriarty. It was originally probably much more extensive. The basalt is invariably deeply weathered, usually to a red-brown textured clay. Occasional boulders or vesicular 'honeycomb' basalt occur in some areas.

Wesley Vale Sand. This unit occurs extensively throughout the area as a thin deposit of sand, clayey sand, quartzite gravel or weakly cemented sandstone. The sequence also contains tuffaceous sand and in places is predominantly clay. It is present beneath the Northdown and Sassafras plateaus.

Thirlstane Basalt. This is the most reliable aquifer in the area. It is mostly concealed beneath the Wesley Vale Sand and Moriarty Basalt, but erosion has exposed many small outcrops in the lower-lying areas south-east of Moriarty. The basalt is a lens-shaped series of superimposed lava flows with a gently sloping upper surface. It apparently accumulated as a basin infilling and therefore thins towards the basin margins. In places (e.g. south of Port Sorell) where it flowed against steep dolerite margins it thins abruptly. The basalt is generally fresh and hard, usually in characteristic alternating 'layers' of massive and vesicular basalt. Occasionally it occurs as soft basalt or even clay in its upper levels, or between flows, or where it is exposed.

Harford Beds. This is a thick lens-shaped deposit of pink, brown and grey mudstone, often carbonaceous or lignitic, sometimes sandy and commonly gravelly in its upper levels. It does not outcrop in the district and has only been intersected in deep bores. Groundwater may be obtained in gravel horizons near the top of the Beds immediately below the base of the Thirlstane Basalt, but the rest of the unit is not a productive aquifer.

RESULTS OF DRILLING FOR WATER

Drilling in the Moriarty Basalt at Northdown and Sassafras

Up to May 1979, twenty-three bores have been drilled in the Northdown area, entirely within the outcrop area of the Moriarty Basalt. The average depth of bores was 64 m. Ten (42%) were failures and their average depth was 52 m. Of these, two were drilled entirely in the Moriarty Basalt, seven passed through the Moriarty Basalt and bottomed in the Wesley Vale Sand and one penetrated both these units and intersected the underlying Thirlstane Basalt.

Thirteen bores (57%) were successful. The average depth was 73 m and the average yield 130 l/min. The highest recorded yield was 300 l/min.

Of these successful bores, six and possibly seven (including the highest yielding) bottomed in the Thirlstane Basalt, three bottomed in the Moriarty Basalt and three in the Wesley Vale Sand. The Moriarty Basalt was the main supplier of water in only three of the twenty-three bores, giving an overall success rate for this area of 13%. Therefore, the Moriarty Basalt alone should be disregarded as a source of irrigation groundwater supplies. Bores drilled for this purpose have only a small chance of success. The chances of obtaining useful amounts of water are better (29%) if drilling is continued into the underlying Wesley Vale Sand. If the bore remains dry, deeper drilling, to perhaps at least 20 m into the Thirlstane Basalt, has a very good (about 80%) chance of success. In all cases the decision to drill deeper is both a geological and economic one, but there is no doubt that in the outcrop area of the Moriarty Basalt at Northdown, yields generally increase with depth.

The Moriarty Basalt is a more reliable aquifer in the Sassafras area. Of eighteen bores drilled there, nine (50%) were abandoned but only four (22%) were completely dry. The average yield of the five wet but abandoned bores was 70 l/min and the average depth of all nine was 50 m. One of the dry bores penetrated 6 m into the Thirlstane Basalt, two bottomed in the Wesley Vale Sand and one bottomed in the Moriarty Basalt.

The average depth and yield of the nine successful and operating bores is 45 m and 400 l/min respectively. Five of these received most of their water from the Moriarty Basalt, Permian sediments were the main aquifer for one, the Wesley Vale Sand for another and no logs are available for the remaining two. Of the eighteen bores, four (22%) were total failures and fourteen (78%) struck some water. Nine (50%) obtained useful supplies. The Wesley Vale Sand was the main aquifer for only one bore, although twelve intersected this unit. There is therefore little point in drilling beneath the base of the Moriarty Basalt in the Sassafras area. Importantly, the Thirlstane Basalt does not exist beneath much of the area here, and only two bores (13 and 79) intersected it. The depth limit for drilling at Sassafras, outside the outcrop limit of the Thirlstane Basalt, is therefore about 50 m.

Drilling in the Wesley Vale Sand

The Wesley Vale Sand is not a reliable aquifer. Of 124 bores for which adequate logs exist, seventy passed through varying depths of, or bottomed in, the unit. Fifty-eight (83%) of these were failures and the formation was the main aquifer in only eight (11%) bores. With the notable exception of the Port Sorell area (where basalt is absent), the Wesley Vale Sand is underlain by varying thicknesses of Thirlstane Basalt, which is a much more reliable aquifer. In these cases, the Wesley Vale Sand should be cased off and drilling continued into the basalt.

Drilling in the Thirlstane Basalt

This is the most reliable aquifer in the district and it also contains the largest amount of groundwater. The unit occurs over an area of about 100 km², is up to 170 m thick in places and has an average thickness of perhaps 80 m. Of ninety-three bores drilled in the basalt, seventy-six (82%) were successful and remain operative. Their average depth of penetration into the aquifer is 42 m and the average yield 200 l/min. The highest yield is about 1300 l/min. If basin margins and saddles (where the basalt is thinnest) were avoided, close to 100% success rate could be expected with adequate penetration.

The importance of the Thirlstane Basalt as an aquifer can be better understood by examining the records of bores drilled throughout the whole district in (a) areas outside the outcrop limit of the Thirlstane Basalt, and (b) areas inside the outcrop limit.

(a) Outside limit of Thirlstane Basalt

Up to November 1978 forty-four bores were drilled. Nineteen (43%) are operative with an average depth of 27 m and average yield 250 l/min. Twenty-five bores (57%) were failures (average depth 28 m) and in all cases yields would not have increased with depth.

(b) Inside limit of Thirlstane Basalt

Up to November 1978, 128 bores were drilled in areas underlain by the Thirlstane Basalt and therefore had a good chance of success if drilled deeply enough. No log is available in one case. In the remaining 127, thirty-two (25%) were failures. There are several reasons for the failures;

(1) Nine bores (145-149, 164, 166, 167), including six drilled closely together and to roughly the same depth, were all sited on the edge of the basins, all passed through thin and deeply weathered Thirlstane Basalt and all entered Jurassic dolerite. None struck water.

(2) Three bores (53, 54, 55) were drilled in the Thirlstane area on the buried dolerite saddle between the Wesley Vale and Port Sorell Basins. Here the Thirlstane Basalt is thin (about 20 m) and the saddle probably represents a groundwater divide producing groundwater flows away to the basin centres. Probably there is restricted groundwater storage.

(3) Thirteen bores (12, 13, 58, 59, 101, 105, 113, 114, 116, 117, 118, 123?, 132, 133) were probably not drilled deep enough. There is no statistical correlation between yield and depth of aquifer penetrated, but most bores have a better chance of success if deeper vesicular horizons are intersected.

(4) Seven bores penetrated dry Thirlstane Basalt. In most cases the rock was deeply and unusually weathered.

The overall success rate for each rock type in the district is shown in Table 2.

Table 2. Overall success rates of drilling in various rock types in the Devonport - Port Sorell - Sassafras area (percentages in parentheses).

	Moriarty Basalt	Wesley Vale Sand	Thirl- stane Basalt	Jurassic dolerite	Permian sediments	Precambrian sediments
Total of bores	44	106	93	18	6	1
Successful	22(50)*	22(21)	76(82)	1(6)	3(50)	0(0)
Failures	22(50)*	84(79)	17(18)	17(94)	3(50)	1(100)

* These figures are for the Northdown and Sassafras areas combined. Separate success rates are 13% for Northdown and 78% for Sassafras. The remainder (9%) were drilled elsewhere.

SELECTING FUTURE BORE SITES

Domestic water supplies

Many landowners are only interested in obtaining small amounts of water for gardening and household supplies. Bores yielding as little as 5-10 l/min may be considered useful. In such cases, drilling is recommended irrespective of the geology beneath the site as few rocks are completely dry. Most failures can be expected in Jurassic dolerite, especially in the low horst areas between Port Sorell and Northdown.

Irrigation water supplies

Previous experience has shown that farmers wanting irrigation quantities of groundwater will abandon bores yielding less than 75 l/min, and sometimes 300 l/min. Many desire to irrigate direct from the bore, but bores with relatively low yields can be used for irrigation by pumping first into small holding dams and then reticulating the water from there. The chances of obtaining useful yields can be increased by the use of the accompanying geological, isopach and overburden maps (fig. 2, 3, 4, 5).

Using the geological map (fig. 2). The map shows the surface distribution of the various rock types in the district. Some boundaries are approximate because of the difficulty of mapping in areas of no outcrop; often soils are the only indication of rock type. Locating the proposed bore site on the map, and referring to the geological succession on Page 3, will indicate to the driller the sequence of rock types beneath the site. Drilling should not proceed in areas marked dolerite or Permian sediments. Other areas may also be unsuitable, and these can be determined by using the isopach and overburden maps (fig. 3, 4, 5).

Using the isopach map of the Thirlstane Basalt (fig. 3). This map shows simply the thickness of the Thirlstane Basalt, irrespective of the overlying topography. The zero contour line indicates the probable extent of the basalt, which does not exist outside this limit. Since the upper surface of the unit is gently sloping, the map clearly reveals that the basalt is mainly a basin infilling with some probable source south-west of Oppenheim Hill. Here the basalt flowed down a steep-sided valley cut in Jurassic dolerite and Permian sediments and accumulated in the basins. The maximum thickness is about 170 m in the Port Sorell Basin west of Harford. It is about 150 m thick beneath Wesley Vale. The basalt is draped over the shallowly buried basin divide in a roughly north-south line passing through Thirlstane, where it is only about 20 m thick. It is significant that Parsons bores (53, 54) drilled here were dry, possibly because any permeable zones in the basalt dip away towards the basin centres.

In the Sassafras and East Sassafras area and near Oppenheim Hill, few bores have been drilled and the map should be regarded as approximate.

Since the basalt flowed into pre-existing basins flanked in some areas by steep dolerite slopes and cliffs, it thins rapidly or abruptly towards the margins (see fig. 6). Therefore, if bores are sited in these areas there is a danger that the aquifer may be missed altogether and the bore be unsuccessful. A second adjacent bore may be successful if the basalt is thick enough. Problem areas in this regard are (1) along the eastern margin of the Port Sorell Basin where faulted(?) and almost vertical cliffs of dolerite have dammed the basalt, (2) south of Port Sorell at Parkers Ford, where the northwards advance of basalt was checked by a steeply rising basement, (3) along the north-eastern margin of the Wesley

Vale Basin, and (4) near Oppenheim Hill on the Bass Highway. In all these cases, the basalt varies rapidly in thickness over small distances and bore siting will be critical.

The northern limit and thickness of the Thirlstane Basalt along the coast is not known with certainty because of a lack of drilling control.

The minimum thickness of basalt required for irrigation supplies is perhaps 20 m and preferably 40 m. Where the basalt is thicker than this, it should be made the main drilling target and all overlying rocks (if dry) cased off.

Using the isopach map of the Moriarty Basalt (fig. 4). This map shows the variation in thickness of the Moriarty Basalt. Because the rock occurs at the top of the Tertiary succession and is not overlain by any other major rock type, its zero contour line corresponds with its surface outcrop shown in Figure 2 and its contoured thickness reflects the topographic map. In the Northdown area it is an unreliable aquifer and the map indicates the minimum thickness of casing required if no water is struck in it. (Often, the underlying Wesley Vale Sand will be dry and will also need to be cased off). In the Sassafras area the basalt is a more reliable aquifer, and in most cases the map indicates the maximum recommended depth for drilling; bores drilled here beneath the base of the basalt generally did not strike water. The minimum thickness of basalt required for successful bores in this area is not known with certainty, but it is obviously better to drill where the rock is thickest.

Using the overburden thickness map of the Thirlstane Basalt (fig. 5). The Thirlstane Basalt has proved to be the most reliable aquifer in the district and generally irrigation water supplies will not be obtained in the overlying Wesley Vale Sand and Moriarty Basalt. The map shows the thickness of material overlying the top of the basalt. The outer limit corresponds to the zero thickness contour in Figure 3, outside which the aquifer does not exist. The basalt or its weathering products are exposed at the surface within all areas bounded by the zero contour line. Bores drilled here will need little or no casing and their overall depths will be less than bores sited on the Northdown and Sassafras plateaus, where in places the aquifer is buried beneath 70 m of overburden. In these latter areas bores should, where possible, be sited in topographically low lying areas to reduce footage and casing. The map is especially useful in that it indicates directly the amount of casing that will be required in the bore and an immediate minimum drilling cost can be estimated. In fact, the contours will reliably reflect the variation in minimum drilling costs in the district, provided of course that the Thirlstane Basalt is the main target.

Since the map is based on 20 m topographic contours, depths are probably accurate to ± 10 m in the Northdown and Sassafras areas, and to ± 5 m in the lower lying areas, near Moriarty, Thirlstane and Harford.

A CAUTION

Drilling for water is always a gamble and even in the most promising areas bores may fail. Unexpectedly successful bores may also be drilled at apparently unfavourable sites. Nevertheless, this report has tried to show that by carefully analysing all the bore data for a particular district it is possible to reduce the risks involved, and that armed with an understanding of the geology of the site and surrounding area, drilling is not necessarily a hit-and-miss operation.

The maps remain an aid only and are no guarantee of success. At the very least, they predict an approximate log of any bore site before the hole is drilled, and produce estimates of overburden thicknesses and minimum bore depths (and hence cost). Results from future drilling will enhance their usefulness. On the other hand, they provide no information on water quality (which in any case is good-excellent and relatively constant throughout the area), bore yields (which are highly variable and unpredictable because of the many factors involved) and depths at which water will be struck (again highly variable).

SERVICES AVAILABLE

The Department of Mines is engaged in regional groundwater investigations throughout Tasmania, and it remains actively interested in the Devonport - Port Sorell - Sassafras region even though the study there is nearing completion. Departmental geologists are available to advise landowners on all aspects of bore siting and design. This service is free.

GEOLOGICAL MAPS

The geology of the Devonport - Port Sorell - Sassafras region has been mapped in detail by the Department of Mines and the resulting maps published as part of the Department's regional mapping programme. The area is covered by four maps, the references for which are given below.

JENNINGS, I.B.; BURNS, K.L.; MAYNE, S.J.; ROBINSON, R.G. 1959. Geological atlas 1 mile series. Zone 7 sheet 37. Sheffield. *Department of Mines, Tasmania.*

BURNS, K.L. 1963. Geological atlas 1 mile series. Zone 7 sheet 29 (8115N) Devonport. *Department of Mines, Tasmania.*

GEE, R.D.; LEGGE, P.J. 1971. Geological atlas 1 mile series. Zone 7 Sheet 30 (8215N) Beaconsfield. *Department of Mines, Tasmania.*

GULLINE, A.B.; BRAVO, A.P.; NAQVI, I.H. 1973. Geological atlas 1 mile series. Zone 7 sheet 38 (8215S). Frankford. *Department of Mines, Tasmania.*

[12 July 1979]

APPENDIX 1

Approximate conversions from litres/minute to gallons/hour

<i>l/min</i>	<i>g.p.h.</i>	<i>l/min</i>	<i>g.p.h.</i>
4	50	100	1350
8	100	250	3300
15	200	500	6500
40	500	1000	13250
55	750	1500	20000
75	1000	2000	26500

APPENDIX 2

Results of drilling for water in the Devonport - Port Sorell - Sassafras area

Information about 186 holes drilled in the Devonport - Port Sorell - Sassafras area is tabulated below. The following notes apply to this table.

- 1. All localities lie within the AMG 100 km grid square DQ. All localities lie within the Tamar 1:100 000 map sheet except for those marked * which lie in the Forth 1:100 000 map sheet. Where uncertain, references are placed in parentheses. Locations marked † are probably in the Forth map sheet.
- 2. SWL = standing water level on completion of bore; may fluctuate.
- 3. TDS = total dissolved solids (water quality expressed in milligrams per litre, virtually equivalent to parts per million).
- 4. Depths in metres. Tm = Moriarty Basalt; Tw = Wesley Vale Sand; Tt = Thirlstane Basalt; Q = Quaternary; Pm = Permian; Pe = Pre-cambrian
WS 6.2 = water struck at 6.2 m during drilling.
- 5.

o = operating	l = drillers log
a = abandoned or filled in	p = pump tested
c = capped	s = sub(artesian)
D = drilled by Department of Mines	u = unconfined
C = drilled by private contractors	w = water analysis available
d = divined	
g = geologists log	

RESULTS OF DRILLING FOR WATER IN THE DEVONPORT - PORT SORELL - SASSAFRAS AREA.

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
1	E.R. Green, 'The Grange', Moriarty	26. 6.74	579373*	65	142	9	90	270	0-81 weathered-fresh <i>D, o, g, p, s, w. basalt</i> (T _t) 81-142 grey gravelly clay.	
2	M. Findlay, 'Tulloch Farm', Wesley Vale	19. 7.74	538370*	75	26	1	90	180	0-26 <i>sand, grit</i> (T _w), clayey sand 26- dolerite.	D, c, g, p, s, w.
3	H. Peirce, Wesley Vale	13. 9.74	532398*	65	62	16	230	340	0-28 brown clay, 26-62 <i>basalt</i> (T _t), weathered in places.	D, o, g, p, s, w.
11-91 4	Shearwater Country Club, Port Sorell	18. 9.74	615431	10	14	1.5	400	950	0-14 sand and quartz gravel (Q?), 14- hard mudstone.	D, o, g, p, u, w.
5	P. Clark, Port Sorell	15.10.74	611407	20	39	1.5	270	220	0-27 <i>sand</i> (T _w), 27- 39 clay.	D, c, g, p, s, w.
6	Crown land, near Port Sorell	25.10.74	625405	10	18	0.3	<10	200	0-18 clay, sand, gravel (T _w) 18- Fresh dolerite.	D, a, g, s.
7	R. Peirce, 'Moorlands',	8.11.74	532418*	10	65	3	80	470	0-6 basalt boulders, 6-33 clay, (weathered basalt?), 33-65 <i>basalt</i> (T _t).	D, o, g, p, s, w.
8	A. Dick, Wesley Vale	22.11.74	544390*	65	80	10	230	c250	0-33 clay and sandy clay, 33-80 <i>basalt</i> (T _t).	D, o, g, p, s, w.

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Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
9	F. Piper, 'Hillcrest', Moriarty	2.12.74	558382*	75	64	--	dry	--	0-30 clay, clayey sand, 30-64 basalt (T _t).	D,a,g.
10	E.R. Green, Moriarity	16.12.74	610365	40	64	4	140	340	0-5 weathered basalt, 5-64 basalt (T _t).	D,o,g,p,s,w.
11	Richardson Bros, Harford	11. 2.75	620355	40	74	25	35	c250	0-5 yellow clay, 5-74 basalt (T _t).	D,o,g,p,s,w.
12	Skurving Bros, 'Rose Hill', East Sassafras	25. 2.75	624296	40	61	--	dry	--	0-61 grey, brown, blue, green clay (T _w).	D,a,g.
13	P. Rockcliff, Sassafras	24. 3.75	588305	140	69	n.d.	<10	190	0-6.5 weathered basalt, 6.5-15 clayey sand and grit, 15-22 grit, 22-63 tuffaceous (?) sand and grit, 63-69 fresh basalt (T _t).	D,a,g,w.
14	D. Lowe, 'Miranda Vale', Latrobe	10. 7.75	536336*	40	44	3	90	350	0-5 clay and sand, 5-44 mudstone and sandstone (P _m).	D,o,g,p,s,w.
15	A. Richardson, 'Woodfield', Sassafras	22. 7.75	575336*	70	50	0	230	440	0-5 clay, 5-50 basalt (T _t).	D,o,g,p,s,w.
16	D. Addison, 'Keigh Hill', Newground Road	29. 7.75	553339*	100	55	1	230	310	0-13 clay, tuffaceous clay (T _w), 13-34.5 clay and sandy clay (T _w), 34.5-55 basalt (T _t).	D,o,g,p,s,w.

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16-13

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
17	B. Edwards, Port Sorell	6. 8.75	601389	35	38	--	dry	--	0-5 dolerite boulders, clay, 5-38 dolerite	D,a,g,s.
18	M. Addison, 'Highfield', Moriarty	13. 8.75	562365*	60	58	11	160	160	0-15 clay, 15-17 weathered basalt, 17-58 <i>basalt</i> (T _t)	D,o,g,p,s,w.
19	D. Parsons, 'Veron Park', Thirlstane	20. 8.75	590376	40	61	2	60	280	0-11 clay, ironstone, 11-12 gravel (T _w), 12-15 <i>basalt</i> (T _t), 15-61 clay.	D,a,g,s,w.
20	L. Addison, Harford Road	12. 9.75	597342	80	50	2	760	290	0-15 clay, 15-26 weathered basalt, 26-50 <i>basalt</i> (T _t).	D,o,g,p,s,w.
21	M. Elliston, 'Cherry Hills', Latrobe	16. 9.75	525335*	40	37	--	dry	--	0-5 clay, 5-37 Precambrian quartzite, siliceous mudstone (P _c)	D,a,g.
22	M. Marshall, East Devonport	15.10.75	487402*	50	70	n.d.	35	n.d.	0-70 <i>basalt</i> (T _t)	D,o,g,s.
23	Badcock Bros, Moriarty	5. 7.67	574360*	55	22	1	290	310	0-6 clay, 6-13 <i>basalt</i> , 13-19 clay, 19-22 <i>basalt</i> (T _t).	C,o,l,s,w.
24	Badcock Bros, Moriarty	12.10.72	572358*	55	25	1	265	230	0-3 sandy clay, 3-4.5 clay and gravel, 4.5-14 <i>weathered basalt</i> , 14-25 <i>basalt</i> (T _t). WS 4-10.	C,o,l,s,w.

13/47

16-14

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
25	Badcock Bros, Moriarty	30. 1.73	573362*	55	15	4	55	n.d.	0-15 brown and grey clay with patches of gravel (<i>T_w</i>).	C,a,l,s.
26	W. Bovill, East Devonport	7. 1.73	494414*	10	48	4	230	n.d.	0-18 brown clay with basalt boulders, 18-48 <i>basalt</i> .	C,o,l,s.
27	W. Bovill, East Devonport	8. 1.73	494410*	10	33	25	n.d.	n.d.	0-5 clay (with boulders) and minor gravel, 5-33 <i>basalt</i> .	C,a,l,s.
28	A.H. Buchanan, Sassafras	10. 3.70	574297*	160	53	-	dry	-	0-4 sandy clay, 4-11 weathered basalt, 11-35 basalt, 35-53 sand and clay.	C,a,l.
29	A.H. Buchanan, Sassafras	10. 3.70	574298*	160	59	-	dry	-	0-7 clay, 7-18 weathered basalt, 18-24 basalt, 24-59 sand and clay.	C,a,l.
30	A.H. Buchanan, Sassafras	4. 4.70	578299*	150	48	26	250	n.d.	0-7 clay, 7-15 weathered basalt, 15-40 <i>basalt</i> (<i>T_m</i>), 40-48 <i>sand, gravel, clay</i> , WS 28, 41, 45.	C,o,l,s.
31	W.N. Cumming, Harford	17. 3.70	unknown	n.d.	38	22	n.d.	n.d.	0-6 clay, 6-26 sand, 26-37 basalt, 37-38 <i>sand</i> , WS 38.	C,o,l,s.

14/47

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁴
32	Dawson, Moriarty	23. 1.73	562368*	60	35	n.d.	20	n.d.	0-26 clay, 26-35 <i>weathered basalt</i> , 35 basalt (T _t), WS 4, 34.	C,a,l,s.
33	D. De Haan, Devonport	15.10.74	508407*	20	24	--	dry	--	0-6 clay, 6-24 dolerite.	C,a,l.
34	D. De Haan, Devonport	18.10.74	508408*	20	23	--	dry	--	0-17 clay and gravel, 17-23 dolerite.	C,a,l.
35	D. De Haan, Devonport	24.10.74	508407*	20	57	3	50	n.d.	0-17 clay, 17-24 <i>basalt and gravel</i> , 24-29 basalt (T _m), 29-33 <i>clay</i> , 33-57 basalt, WS 18, 23-32.	C,o,l,s.
36	J. Dover, Wesley Vale	8.10.75	541377*	80	21	5	70	220	0-11 <i>clay</i> , 11-12 <i>weathered basalt</i> , 12-21 <i>basalt</i> (T _t), WS 6, 9-20.	C,o,l,s,w.
37	A.C. Duff, Northdown	22. 3.70	573419*	110	117	--	dry	--	0-59 clay (<i>weathered basalt</i> T _m), 59-96 sand and clay, 96-110 sandstone and siltstone (T _w).	C,a,l.
38	A.C. Duff, Northdown	30. 6.72	574415*	110	66	18	90	n.d.	0-48 <i>weathered basalt</i> (T _m), 48-66 sand, WS 14-24.	C,c,l,s.

16-15

15/4-7

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
39	A.C. Duff, Northdown	30. 6.72	575415*	110	42	8	130	n.d.	0-19 clay (weathered basalt), 19-42 <i>basalt</i> (<i>T_m</i>), WS 15-35.	C,c,l,s.
40	A.C. Duff, Northdown	April 1973	577416*	110	24	9	45	n.d.	0-24 coloured <i>clay</i> (weathered basalt <i>T_m</i>), WS 14-17.	C,o,l,s.
41	T. Fords, East Devonport	26. 4.69	unknown*	10	36	4	270	n.d.	0-3 sand, 3-5 clay, 5-7 tuff, 7-36 <i>basalt</i> , 36- clay, WS 27, 29.	C,o,d,l,s.
42	B. Freer, Wesley Vale	19. 3.70	590423	40	53	--	3	--	0-1 weathered dolerite, 1-53 dolerite, WS 8.	C,a,l.
43	A.C. Hampton, East Devonport	16. 8.73	490394*	60	33	12	30	342	0-22 clay and minor gravel, 22-33 <i>basalt</i> , WS 24.	C,o,d,l,s,w.
44	E. Heald, Wesley Vale	11. 6.71	518402*	50	25	5	350	220	0-18 coloured clay (weathered basalt), 18-25 <i>basalt</i> (<i>T_t</i>), WS 18.	C,o,d,l,s,w.
45	B. Ingram, Sassafras	2. 1.73	583289	160	34	3	350	n.d.	0-3 clay, 3-34 <i>basalt</i> (<i>T_m</i>), weathered in places.	C,o,d,l,s.

16-16

16/47

16-17

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
46	L. King, Wesley Vale	25. 6.71	498392*	55	42	3	50	550	0-6 clay, boulders, gravel, 6-26 <i>rock</i> , weathered in places (basalt?), 26-27 wash, gravel, 27-35 <i>rock</i> , 35-36 wash, 36-39 <i>rock</i> , 39-42 clay (T _w).	C,o,l,s,w.
47	D. McKenzie, Devonport	6.10.75	545375*	100	89	24	260	n.d.	0-33 clay and sand, 33-89 <i>basalt</i> (T _t), WS 73-88.	C,o,l,s
48	J. McLean, Latrobe	19. 7.71	unknown*	25	17	9	75	700	0-11 clay, gravel, basalt boulders 11-25 <i>basalt</i> (weathered in places), WS 12-14.	C,o,l,s.
49	G. Norris, Wesley Vale	23.10.75	545379*	100	34	3	500	n.d.	0-14 clay, sand, coal, 14-34 <i>basalt</i> (weathered in places T _t), WS 30-34.	C,o,l,s.
50	Norton, Devonport	4. 4.72	516415*	10	26	4	65	n.d.	0-7 gravel, sand with shells, 7-11 weathered <i>basalt</i> , 11-26 <i>basalt</i> (T _t), WS 50.	C,o,l,s.
51	R. Oliver, Hawley Beach	24. 1.73	608441	20	5	--	dry	--	0-4 sand, sandy clay 4-5 <i>dolerite</i> .	C,a,l.

17/41

16-18

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
52	R. Oliver, Hawley Beach	25. 1.73	608441	20	13	3	35	n.d.	0-3 sand, 3-5 <i>sandy clay</i> , 5-9 gravel, clay, 9-13 <i>sandy clay</i> (T _w), 13- dolerite.	C,o,l.
53	D. Parsons, Thirlstane	1. 8.67	599361	60	39	--	dry	--	0-16 clay, basalt boulders, weathered basalt, 16-39 basalt.	C,a,d,l.
54	D. Parsons, Thirlstane	2. 8.67	599359	60	15	--	dry	--	0-8 clay, 8-15 basalt (T _t).	C,a,d,l.
55	D. Parsons, Thirlstane	8.10.75	585372	45	17	8	15	n.d.	0-11 clay, 11-13 basalt (T _t), 13-17 clay, WS 11.	C,a,l,s.
56	D. Parsons, Thirlstane	9.10.75	586370	45	30	6	45	n.d.	0-22 basalt (T _t), 22-27 weathered basalt, 27-30 clay, WS 15,17,20.	C,a,l,s.
57	D. Parsons, Thirlstane	15.10.75	584370	45	45	6	540	665	0-6 basalt, 6-17 sand, clay, 17-45 basalt (T _t), weathered in parts, WS 35, 46.	C,o,l,s,w.
58	R. Radford, Bakers Lane	1.10.74	572396*		33	--	dry	--	0-6 clay, 6-33 sand (T _w).	C,a,l.

18/47

16-19

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
59	R. Radford, Bakers Lane	8.10.74	577396*		83	--	dry	--	0-63 clay and sand, 63-83 basalt (weathered in parts <i>T_t</i>).	C,a,l.
60	R. Radford, Bakers Lane	11.10.74	573384*		46	6	1300	213	0-17 clay, 17-46 vesicular basalt (<i>T_t</i>), weathered in parts, WS 9+.	C,o,l,s,w.
61	U.L. Redpath, Sassafras	26. 7.72	565306*		35	9	55	n.d.	0-15 clay (weathered basalt?), 15-35 mudstone and shale (<i>P_m</i>), WS 21-30.	C,c,l,s.
62	J. & B. Slater, Moriarty	14. 8.73	570364*	60	81	6	50	n.d.	0-4 clay (weathered basalt), 4-81 basalt (weathered in parts <i>T_t</i>), WS 4,8,16,50,79.	C,o,d,l,s,w.
63	J. & B. Slater, Moriarty	5. 5.69	568357*	70	86	10	650	280	0-7 clay (weathered basalt), 7-86 basalt (<i>T_t</i>), WS 15,46,78,80.	C,o,l,s,w.
64	B. Stewart, Thirlstane	4. 1.73	616373		43	9	100	n.d.	0-9 clay and minor gravel, 9-43 basalt (weathered in parts <i>T_t</i>), WS 5,9,13,32.	C,o,l,s.
65	H. Thomas, Hawley	10. 7.74	608441	20	12	--	dry	--	0-6 sand and clay, 6-12 dolerite, WS 6.	C,a,l.

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16-20

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
66	H. Thomas, Hawley	11. 7.74	608441	20	11	3	15	n.d.	0-6 <i>sand</i> and clay, 6-11 <i>dolerite</i> .	C,o,l,
67	A.G. Turnbull, New-ground	19. 6.71	594348	80	75	27	130	625	0-3 clay, sand, 3-17 C,o,l,s,w. clay (weathered basalt?) 17-75 <i>basalt</i> (T _t), WS 64.	
68	E.R. Wilson, North-down	1. 7.74	563403*	90	45	0	60	n.d.	0-45 clay, sand, and 'conglomerate' (running sand 20-30 m).	C,a,l.
69	E.R. Wilson, North-down	5. 7.74	566401*	75	75	27	75	296	0-20 clay, sand, 20-33 <i>basalt</i> , 33-75 <i>clay and basalt</i> (T _t ?).	C,o,l,w.
70	R. Winspear, 'Pardoe'	27. 6.74	unknown†	--	26	9	45	n.d.	0-23 <i>basalt</i> (weathered in parts), 23-26 boulders, clay and sand.	C,o,d,l.
71	D. Yaxley, Devonport	25. 4.70	498381*	60	45	11	300	n.d.	0-9 clay, 9-26 grey sandy <i>shale</i> , 26-45 <i>shale</i> (P _m), WS 19,25, 26,32.	C,o,l,s.
72	D. Yaxley, Devonport	22. 1.73	498381*	60	30	--	dry	--	0-3 sandy clay, 3-10 C,a,l. clay, 10-30 grey <i>shale</i> (P _m).	
73	D. Yaxley, Devonport	23. 1.73	492381*	50	29	4	180	n.d.	0-28 <i>clay</i> , 28-29 <i>conglomerate</i> (P _m), 29- <i>dolerite</i> .	C,o,l,s.

00/47

16-21

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
74	Westbrook Holdings, Sassafras	23. 4.70	unknown†	--	15	--	dry	--	0-2 boulders and clay, 2-15 boulders.	C,a,l.
75	Westbrook Holdings, Sassafras	23. 4.70	unknown†	--	45	--	dry	--	0-8 clay, 8-16 boulders and clay, 16-22 sand and gravel, 22-23 clay, 23-45 sandy clay.	C,a,l.
76	Westbrook Holdings, Sassafras	23. 4.70	unknown†	--	30	12	150	n.d.	0-2 clay, 2-22 basalt, 22-23 sand, 23-30 sandy clay and clay, WS 24,25,26.	C,o,l,s.
77	A.G. Turnbull	June 1971	595349	80	70	27	90		n.d.	C,o,s.
78	C.H. Richardson, 'Brierley Grove'	1976	590297	140	24	0.6	700	n.d.	0-24 <i>basalt</i> , weathered in places (T _m).	C,o,s.
79	R.S. Shadbolt,	1968	595318	100	91	n.d.	230	n.d.	n.d.	C,o.
80	R. Laycock, 'Ingomar', Sassafras	c1971	583289	170	n.d.	n.d.	c300	n.d.	In Tertiary basalt.	C,o.
81	P.C. Green	November 1977	588388	70	52	n.d.	50	n.d.		C,o.
82	D. White, Wesley Vale	18. 2.77	538372*	100	43	9	75	n.d.	0-20 clay and sand, 20-23 weathered basalt, 23-42.7 <i>basalt</i> (T _t), WS 23-39.	C,o,l,s.

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16-22

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
83	M. Barnes, East Devonport	11. 3.76	488393*	60	53	n.d.	23	380	0-0.6 topsoil, 0.6-22.5 clay, 22.5-53 basalt, WS 22.5.	C,o,l,w.
84	E. Beveridge, East Devonport	15. 3.76	478402*	40	50	3	265	n.d.	0-5.5 clay, 5-38 basalt, 38-50 clay, WS 5.5.	C,o,l,s.
85	M. & N. De Haan, Wesley Vale	1976	539366*	100	12,11, 15,21, 6,9.	all 6 dry	--	--	0-21 sand and clay (T _w), overlying dolerite.	C,a,l.
86	W. Dunium, Wesley Vale	16. 2.76	542382*	60	30	15	150	230	0-3 clay, 3-7 sand, 7-12.5 clay, 12.5-30 basalt (T _t), WS 26.	C,o,l,s,w.
87	H.W. Hingston, Wesley Vale	19.11.76	543397*	60	38	6	60	n.d.	0-1.5 clay, 1.5-16 yellow sand (T _w), 16-38 basalt (T _t), weathered 21-30, WS 15,35.	C,o,l,s.
88	M. Imlach, East Devonport	10. 3.76	unknown*	--	42.7	--	83	350	0-20 topsoil and clay, 20-42.7 basalt, WS 20.	C,o,l,s,w.
89	Latrobe Municipal Council	December 1976	612425	20	29.6	--	dry	--	0-3 loam and clay, 3-3.4 gravel, 3.4-29.6 clay, with gravel at 16, 25.6 (T _w).	C,a,l.

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16-23

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
90	Latrobe Municipal Council	December 1976	615425	20	24.4	--	dry	--	0-3 loam and sand, 3-3.4 gravel, 3.4-24.4 clay (T _w).	C,a,l.
91	Latrobe Municipal Council	December 1976	606427	20	4.6	--	dry	--	0-3 loam and clay (T _w), 3-4.6 dolerite.	C,a,l.
92	Latrobe Municipal Council	December 1976	615429	10	18.3	--	dry	--	0-3.4 sand, 3.4-6.4 sand and clay, 6.4-6.7 gravel, 6.7-11 clay, 11-12.8 gravel, 12.8-18.3 green clay (T _w).	C,a,l.
93	Latrobe Municipal Council	17. 1.77	605442	40	21	--	dry	--	0-18 sand and clay (T _w), 18-21 dolerite.	C,a,d,l.
94	Latrobe Municipal Council	December 1976	613431	12	11.3	--	dry	--	0-11.3 clay with gravel (T _w).	C,a,l.
95	Latrobe Municipal Council	December 1976	595405	40	21	--	dry	--	0-0.6 loam, 0.6-6 sand and clay, 6-18 sand (T _w), 18-21 dolerite.	C,a,l.
96	Latrobe Municipal Council	January 1977	610419	30	18.3	--	275	500	0-0.6 peat, 0.6-5.5 white sand, 5.5-18 compact sand (T _w), 18-18.3 dolerite.	C,o,l,p,w.

03/47

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
97	R. Mathews, Wesley Vale	20. 1.77	528381*	60	33.6	--	dry	--	0-4.5 topsoil and clay, 4.5-15 sand and clay, 15-21 basalt, 21-33.6 clay.	C,a,l.
98	R. Mathews, Wesley Vale	21. 1.77	525382*	65	60	9	45	n.d.	0-3 topsoil and clay, 3-4.5 sand, 4.5-16 clay, 16-25 basalt, 25-33.6 'mudstone' 33.6-60 basalt (T _t), WS 16-50.	C,o,l,s.
99	M. Nalder, Moriarty	20. 6.77 (deepened 28. 8.78)	565369*	60	25.9	4	68	n.d.	0-4.5 clay, 4.5-12 decomposed material (T _t), 12-26 basalt, WS 6,20,23.	C,o,l,s.
100	D. Parsons, Thirlstane	6. 7.77	604372	40	71.6	13.7	190	n.d.	0-14 clay and boulders, 14-71.6 basalt (T _t), WS 58, 63.	C,o,l,s.
101	D. Parsons, Thirlstane	6. 7.77	604368	50	24	--	dry	--	0-1 'pudding stone', 1-5.8 clay, 5.8-17 basalt and clay, 17-24 basalt (T _t).	C,a,l.

16-24

04/47

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
102	B. Richardson, Harford	10. 8.76	(620348)	70	74.7	8.5	300	n.d.	0-1 clay and gravel, 1-16 clay, 16-56 basalt (<i>T_t</i>), 56-74.7 basalt and mudstone, WS 16,55.	C,o,l,s.
103	B. Richardson, Harford	3. 8.76	621348	70	60	n.d.	110	n.d.	0-12 sand, gravel and clay, 12-60 basalt (<i>T_t</i>).	C,a,l.
104	B. Richardson, Harford	27. 7.76	622362	60	39.6	n.d.	270	n.d.	n.d.	C,o
105	R. Richardson, Thirlstane	12. 1.77	617369	60	15	2.5	7.5	n.d.	0-7.3 clay and boulders, 7.3-15 basalt (<i>T_t</i>), WS 6.	C,a,l,s.
106	R. Richardson, Thirlstane	14. 1.77	617369	45	61	4.6	61	n.d.	0-6.7 clay, 6.7-16.7 decomposed material (<i>T_t</i>), 16.7-61 basalt, WS 6.7-16.7.	C,a,l,s.
107	R. Richardson, Thirlstane	15. 1.77	617369	45	47.3	4.6	83	n.d.	0-0.6 ironstone, 0.6-6 clay, 6-16.5 decomposed material (<i>T_t</i>), 16.5-47.3 basalt, WS 6-16.	C,o,l,s.
108	R. Richardson, Thirlstane	16. 1.77	617368	45	29	4.6	83	n.d.	0-9 clay, 9-18 decomposed material (<i>T_t</i>), 18-29 basalt, WS 11-18.	C,o,l,s.

16-25

05/47

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
109	A.A. Rundle, Squeaking Point	4. 3.77	633397	5	17.1	6	23	n.d.	0-15.2 grey loam and sand, 15.2-17.1 gravel (<i>T_w</i>), WS 15.	C,o,l,s.
110	G. Sims, Wesley Vale	27.10.76	538370*	100	16.5	--	dry	--	0-1 topsoil, 1-15.9 clay and sand (<i>T_w</i>), 15.9-16.5 dolerite.	C,a,l.
111	G. Sims, Wesley Vale	28.10.76	538370*	100	19.8	2.1	136	n.d.	0-1 topsoil, 1-10.7 clay, 10.7-19.8 clay and gravel (<i>T_w</i>), WS 11.	C,o,l,s.
112	G. Spinks, Wesley Vale	12. 2.76	544382*	100	53.1	7.6	23	n.d.	0-3 topsoil and sand, 3-10.4 clay, 10.4-17.1 coarse sand, 17.1-53.1 basalt (<i>T_t</i>), WS 22.8.	C,o,l,s.
113	P. Stevenson, Moriarty	14. 9.76	553361*	100	38.4	--	dry	--	0-32.9 clay and basalt, 32.9-38.4 weathered basalt (<i>T_m</i>).	C,a,l.
114	Thomas Bros, North-down	23.11.76	565424*	110	54.9	--	dry	--	0-3 clay, 3-7.6 boulders and clay, 7.6-48.8 clay (<i>T_m</i>), 48.8-54.9 sand.	C,a,l.
115	Thomas Bros, North-down	23.11.76	565424*	110	54.9	3	68	n.d.	0-3 clay, 3-7.6 boulders and clay, 7.6-49 clay (<i>T_m</i>), 49-54.9 sand, WS 3,5.	C,a,l,s.

16-26

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16-27

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
116	Thomas Bros, North-down	24.11.76	565424*	110	38.1	--	dry	--	0-0.6 topsoil, 0.6-38.1 clay (<i>T_m</i>).	C,a,l.
117	Thomas Bros, North-down	24.11.76	565424*	110	29	--	dry	--	0-0.3 topsoil, 0.3-29 clay (<i>T_m</i>).	C,a,l.
118	Thomas Bros, North-down	24.11.76	565424*	110	38	--	dry	--	0-0.6 topsoil, 0.6-38 clay (<i>T_m</i>).	C,a,l.
119	Thomas Bros, North-down	29.11.76	564424*	110	71.4	n.d.	135	n.d.	0-0.6 topsoil, 0.6-11.6 clay, 11.6-64 basalt (<i>T_m</i>), 64-71.4 sand, WS 15,37, 53.	C,o,l,s.
120	W. Anderson, Thirl-stane	14.10.76	609385	25	34.7	6	55	n.d.	0-0.6 topsoil, 0.6-10.7 clay, 10.7-18.3 weathered basalt, 18.3-26.8 basalt (<i>T_t</i>), 26.8-28.9 blue clay, 28.9-34.7 basalt, WS 11,20.	C,o,l,s.
121	B.A. Badcock, Hawley	18.11.76	604423	30	10.7	0	90	n.d.	0-0.6 topsoil, 0.6-6 clay and sand (<i>T_w</i>), 6-7.6 dolerite, 7.6-10.7 decomposed material.	C,o,l,s.
122	R. Byard, Port Sorell	23.12.76	600423	40	11.3	4.6	90	n.d.	0-0.3 topsoil, 0.3-9.5 clay, 9.5-11.3 coarse sand (<i>T_w</i>), WS 9.5.	C,o,l,s.

07/47

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
123	G. Collins, Wesley Vale	27.10.76	(525414)*	20	53.4	12.2	18	n.d.	0-1 topsoil, 1-21 sand and clay, 21-50.3 <i>basalt</i> (T_m), 50.3-53.4 clay, WS 20,47.	C,o,l,s.
124	A.C. Duff, 'Boisdale', Northdown	22.11.76	576421*	100	28.9	--	dry	--	0-0.6 topsoil, 0.6-28.9 clay (T_m).	C,a,l.
125	A.C. Duff, 'Boisdale', Northdown	22.11.76	574419*	105	38.1	--	dry	--	n.d. (T_m)	C,a.
126	A.C. Duff, 'Boisdale', Northdown	12. 7.77	576421*	100	77.8	n.d.	190	n.d.	0-0.3 topsoil, 0.3-9.1 clay, 9.1-33.5 clay and 'weathered material', 33.5-42.7 sand and clay, 42.7-51.9 blue and black clay, 51.9-77.8 <i>basalt</i> (T_t), WS 64.	C,o,l,s.
127	Education Department, Moriarty School	31. 5.77	565369*	60	22.9	11.6	83	n.d.	0-0.6 topsoil, 0.6-6.4 clay, 6.4-11.6 clay and boulders, 11.6-22.9 <i>basalt</i> (T_t), WS 11,16,20.	C,o,l.

16-29

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
128	C.A. Eastaugh, Wesley Vale	12. 1.76	(560408)*	100	53.1	24.4	23	380	0-0.6 topsoil, 0.6-42.2 clay and sand, 42.2-48.5 <i>basalt</i> (T_m), 48.5-53.1 sand, WS 44.	C,o,l,s,w.
129	R. Gamble, Wesley Vale	30.12.76	(544383)*	80	34.8	12.2	45	310	0-0.6 topsoil, 0.6-4.6 clay, 4.6-5.2 ironstone, 5.2-13.7 clay, 13.7-16.5 <i>weathered basalt</i> (T_t), 16.5-34.8 <i>basalt</i> , WS 18,32.	C,o,l,s,w.
130	P. Green, Bakers Lane	25.10.77	589390	70	29.6	--	dry	--	0-0.3 topsoil, 0.3-3 clay, 3-29.6 sand (T_w),	C,a,l.
131	P. Green, Bakers Lane	27.10.77	587389	90	51.9	n.d.	46	n.d.	0-0.3 topsoil, 0.3-16.8 sand and clay, 16.8-44.2 <i>basalt</i> (T_m), 44.2-51.9 <i>weathered basalt</i> , WS 17.4,46.	C,o,l.
132	D. Houston, Parkers Ford	20.10.77	612408	20	15.9	--	dry	--	n.d. (T_w).	C,a,l.
133	D. Houston, Parkers Ford	21.10.77	612409	15	21.9	--	dry	--	n.d. (T_w).	C,a,l.

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Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
134	D. Houston, Parkers Ford	25.10.77	612408	20	24.4	1.5	n.d.	n.d.	0-0.3 topsoil, 0.3-11 <i>sand</i> , 11-20.7 sand and clay, 20.7-24.4 <i>coarse sand</i> (T _w), WS 4, 21.	C,o,l,s.
135	Kelley Bros, Sassafras	10.12.76	564289*	160	39.7	--	dry	--	0-0.6 topsoil, 0.6-3 clay and boulders (T _m), 3-39.7 clay and sand.	C,a,l.
16-30 136	Kelley Bros, Sassafras	10.12.76	564289*	160	41.2	n.d.	60	n.d.	0-0.6 topsoil, 0.6-18.3 <i>clay and basalt boulders</i> (T _m), 18.3-27.4 basalt, 27.4-34.8 sand and coarse gravel, 34.8-36.6 basalt, 36.6-41.2 clay, WS 15, 21.	C,a,l.
137	Kelley Bros, Sassafras	13.12.76	564289	160	42.7	n.d.	50	n.d.	0-0.6 topsoil, 0.6-16.8 clay, 16.8-36.6 <i>basalt</i> (T _m), 36.6-42.7 white sand, WS 21.4	C,a,l.
138	Kelley Bros, Sassafras	14.12.76	564289*	160	36.6	n.d.	53	n.d.	n.d. (T _m).	C,a

16-31

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
139	Kelley Bros, Sassafras	n.d.	564289*	160	59.2	n.d.	53	n.d.	0-0.6 topsoil, 0.6-10.7 clay, 10.7-12.2 <i>weathered basalt</i> , 12.2-33.6 <i>basalt</i> (T_m), 33.6-39.7 coal, 39.7-53.1 basalt, 53.1-59.2 clay and sand, WS 12.2, 21.4, 39.7.	C,a,l.
140	R.H. Loane, Wesley Vale	12. 8.76	548416*	70	77.5	22.9	300	n.d.	0-0.6 topsoil, 0.6-19.8 clay, 19.8-43.3 <i>sand</i> , 43.3-74.7 <i>basalt</i> (T_t), 74.7-77.5 black clay, WS 19.8, 43.3, 56.4, 68.6.	C,o,l,s.
141	R.H. Loane, Wesley Vale	16. 8.76	546416*	70	64.1	10.7	100	n.d.	0-0.6 topsoil, 0.6-15.3 clay, 15.3-24.4 <i>weathered basalt</i> (T_m), 24.4-41.8 <i>sand</i> (T_w) 41.8-56.4 <i>basalt</i> (T_t), 56.4-64.1 black clay, WS 10.7-42, 50.3.	C,o,l,s.
142	R.H. Loane, Wesley Vale	17. 8.76	548412*	80	61	n.d.	35	n.d.	0-0.6 topsoil, 0.6-25.6 clay, 25.6-29 <i>weathered basalt</i> (T_m), 29-61 <i>sand</i> , WS 25.6.	C,a,l.

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16-32

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
143	R.H. Loane, Wesley Vale	19. 8.76	549416*	65	61	12.2	150	n.d.	0-0.6 topsoil, 0.6-25.6 <i>clay</i> (<i>T_m</i>), 25.6-29 weathered basalt, 29-61 <i>sand</i> , WS 11,20,24.5,50.3.	C,o,l,s.
144	D.E. Richardson, Sassafras	26. 5.76	585293	160	51.8	1.2	1100	270	0-0.6 topsoil, 0.6-4.7 <i>honeycomb basalt</i> , 4.7-7.6 clay and basalt boulders, 7.6-24.4 <i>honeycomb basalt</i> (<i>T_m</i>), 24.4-25.6 grey clay, 25.6-39.6 n.d., 39.6-50.3 basalt, 50.3-51.8 white sand, WS 0.6-4.7,7.6-24.4.	C,o,d,l,s,w.
145	E. Beveridge, East Devonport	15. 1.78	477389*	15	38.2	0.3	23	n.d.	0-4 topsoil and clay, 4-5.5 dolerite, 5.5-11.6 clay, 11.6-38.2 dolerite, WS 11.6.	C,a,l,s.
146	E. Beveridge, East Devonport	13. 1.78	479389*	15	19.5	--	dry	--	0-1.2 <i>honeycomb basalt</i> , 1.2-18.9 <i>clay</i> (<i>T_w</i>), 18.9-19.5 dolerite.	C,a,l.
147	E. Beveridge, East Devonport	14. 1.78	477388*	15	19.5	n.d.	60	n.d.	0-10.7 clay, loose basalt, 10.7-18.3 clay, 18.3-19.5 dolerite, WS 10.7.	C,a,l.

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16-33

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
148	E. Beveridge, East Devonport	16. 1.78	478388*	15	19.5	--	dry	--	0-3.7 topsoil and clay, 3.7-7 weathered basalt, 7-18.9 clay, 18.9-19.5 dolerite.	C,a,l.
149	E. Beveridge, East Devonport	16. 1.78	478389*	15	29.3	--	dry	--	0-0.6 honeycomb basalt, 0.6-7.6 decomposed material, 7.6-28.1 clay, 28.1-29.3 dolerite.	C,a,l.
150	V. Mitchell, Moriarty	19. 1.78	(557357)*	80	105.2	5.5	135	n.d.	0-0.3 topsoil, 0.3-3.7 clay, 3.7-11.9 loose basalt, 11.9-102 basalt (T _t), 102-105 red and brown clay, WS 10.7,74.7.	C,a,l,s.
151	V. Mitchell, Moriarty	23. 1.78	(557357)	80	106.1	22.9	190	n.d.	0-0.3 topsoil, 0.3-20.4 clay, 20.4-22.9 weathered basalt, 22.9-104 basalt (T _t), 104-106.1 clay, WS 21, 49,61.3.	C,o,l,s.
152	S. Parsons, Thirlstane	7. 2.78	600379	30	51.9	--	dry	--	0-1.5 loose basalt and clay, 1.5-21.4 clay, 21.4-26.5 weathered basalt, 26.5-51.9 black clay.	C,a,l.

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Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
153	S. Parsons, Thirlstane	8. 2.78	598377	30	47.3	flowing artesian	380	n.d.	0-0.3 topsoil, 0.3-15.9 boulders and clay, 15.9-39.3 black clay, 39.3-47.3 <i>basalt</i> (T _t), WS 42.7-47.3. Flowing at 140 l/min.	C,o,l.
154	B. Iles, Thirlstane	16.12.77	(603361)	55	50.3	1.5	50	n.d.	0-0.3 topsoil, 0.3-7.3 clay, 7.3-9 boulders, 9-50.3 <i>basalt</i> (T _t), WS 9, 19.8.	C,o,l,s. C,o,l,s.
155	B. Iles, Thirlstane	20.12.77	(603362)	60	66.5	n.d.	230	n.d.	0-0.3 topsoil, 0.3-9 clay, 9-12.2 boulders, 12.2-66.5 <i>basalt</i> (T _t), WS 12.2, 62.5.	C,o,l.
156	L. Richardson, Moriarty	n.d.	(597353)	60	39.7	3	1140-1500	n.d.	0-0.3 topsoil, 0.3-3.7 clay, 3.7-15.9 weathered <i>basalt</i> , 15.9-38.7 <i>soft basalt</i> (T _t), 38.7-39.7 loose <i>basalt</i> , WS 15.9, 21, 38.	C,o,l.
157	Bainbridge, 'Pennine'	c1972	617343	100	c50	n.d.	n.d.	n.d.	n.d.	C,o.
158	A.H. Higgs, Port Sorell	n.d.	625421	c5	n.d.	n.d.	n.d.	n.d.	In Quaternary sediments.	C,o.

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Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
159	Rex, Port Sorell	n.d.	618427	10	n.d.	n.d.	n.d.	n.d.	In Quaternary and Tertiary sediments	C,o.
160	APPM, Wesley Vale	11.12.64	546413*	80	195	n.d.	70	n.d.	0-1 topsoil, 1-8.5 sand clay and silty sand, 8.5-22.9 weathered basalt, 22.9-52.5 clay and gravelly clay with plant and shell remains, 52.5-190 basalt, 190-195 sand, gravel, clay.	D,a,g.
161	D. Dick, Wesley Vale	27. 4.78	551398*	100	144.9	15	227	n.d.	0-51.9 topsoil and clay, 51.9-61 sand, 61-62.5 weathered basalt, 62.5-144.9 basalt, WS 73,137.	C,o,l,s.
162	B. Slater, Moriarty	30. 8.78	568355*	65	97.6	0.6	230	n.d.	0-10.7 topsoil and clay, 10.7-17.7 weathered basalt, 17.7-97.6 basalt, WS 15,60,78.	C,o,l,s.
163	C. Aspinall, Wescombes Road	25. 8.78	554354*	75	24.4	4.6	68	n.d.	0-13.7 topsoil and clay, 13.7-18.3 weathered basalt, 18.3-24.4 vesicular basalt, WS 14,18-24.	C,o,l,s.

16-35

16-36

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
164	G. Norton	30. 8.78	517413*	10	16.8	--	dry	--	0-1.5 loam and clay, 1.5-5.5 gravel and clay, 5.5-7.6 basalt, 7.6-15.3 clay, 15.3-16.8 dolerite.	C,a,l.
165	G. Norton	1. 9.78	517413*	10	29.0	1.2	150	n.d.	0-1.4 clay, 1.4-5.5 boulders and clay, 5.5-21.4 basalt, 21.4-27.5 clay and gravel, 27.5-29 dolerite, WS 21.4-27.5.	C,o,l,s.
166	G. Norton	31. 8.78	517413*	10	33.6	0.6	low	--	0-1.5 grey loam and sand, 1.5-7.3 clay and boulders, 7.3-21.4 basalt, 21.4-32 clay, 32-33.6 dolerite, WS 7.3.	C,a,l,s.
167	G. Norton	4. 9.78	517413*	10	33.6	0.6	23	n.d.	0-1.5 topsoil and clay, 1.5-6.1 boulders and clay, 6.1-22.9 basalt, 22.9-32 clay, 32-33.6 dolerite, WS 6.1.	C,a,l,s.

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16-37

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
168	G. Norton	29. 9.78	517413	10	47.3	--	230	n.d.	0-1 topsoil, sand and clay, 1-13.7 <i>sand</i> , 13.7-21.4 <i>sandstone</i> and <i>boulders</i> , 21.4-47.3 <i>dolerite</i> , WS 12.2,22,33.6.	C,o,l,s.
169	A.V. Rockcliffe, 'Brierley Rise', Sassafras	10. 5.78	588293	160	51.9	7.6	130	n.d.	0-4.3 topsoil and clay, 4.3-16.8 <i>loose basalt</i> and clay, 16.8-32 <i>basalt</i> , 32-51.9 clay and white sand, WS 10.7,24.4, 29.	C,a,l,s.
170	A.V. Rockcliffe, 'Brierley Rise', Sassafras	11. 5.78	589294	160	31.1	7.6	300	n.d.	0-10.7 topsoil and clay, 10.7-15.3 weathered basalt, 15.3-30.5 <i>basalt</i> , 30.5-31.1 white clay, WS 19.8,22.	C,o,l,s.
171	A.V. Rockcliffe, 'Brierley Rise', Sassafras	11. 5.78	587292	160	42.7	4.6	300	n.d.	0-4.6 clay, 4.6-7.6 weathered basalt, 7.6-29 <i>vesicular basalt</i> , 29-32.6 weathered basalt, 32.6-38.1 <i>basalt</i> , 38.1-42.7 clay and sand, WS 7.6,27.8.	C,o,l,s.

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16-38

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
172	C. Sienesi, Bakers Lane	13. 9.77	584387	75	24.4	6.1	68	--	0-4.3 grey loam and clay, 4.3-10.7 weathered basalt, 10.7-24.4 basalt, WS 8.2, 21.4.	C,o,l,s.
173	R. Baldock, Wesley Vale	18. 1.79	540364*	120	18.3	n.d.	75	n.d.	0-9.1 <i>yellow clay</i> (T _w), 9.1-10.7 weathered dolerite, 10.7-18.3 dolerite, WS 8.5.	C,o,l.
174	R. Radford, Moriarty	14.12.78	562374*	80	97.5	21.3	455	n.d.	0-13.7 clay (T _w), 13.7-21.9 sand, clay and wood (T _w), 21.9-25.6 clay, 25.6-97.5 basalt (T _t), WS 33.5, 73.1,91.4.	C,a,l,s.
175	R. Radford, Moriarty	19.12.78	564374*	65	97.5	6.1	265	n.d.	0-10.7 clay (T _w), 10.7-16.4 weathered basalt, 16.4-97.5 basalt (T _t), WS 82.2.	C,a,l,s.
176	R. Radford, Moriarty	4. 1.79	563371*	80	88.3	n.d.	760+	n.d.	0-10.7 clay and sand (T _w), 10.7-21.3 weathered basalt, 21.3-88.3 basalt (T _t), WS 25.9-44.2.	C,o,l.
177	G. Green, Port Sorell	10. 2.79	592439*	55	15.2	n.d.	13-15	n.d.	0-4.6 clay, 4.6-15.2 dolerite, WS 12.8.	C,o,l.

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16-39

Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
178	K. Green, Thirlstane	6.12.78	580372*	70	73.1	n.d.	45	n.d.	0-11.3 clay (<i>T_t</i>), 11.3-13.1 weathered basalt (<i>T_t</i>), 13.1-70.1 <i>basalt</i> (<i>T_t</i>), 70.1-73.1 clay (<i>T_t</i>), WS 22.8.	C,o,l.
179	K. Green, Thirlstane	7.12.78	581366*	50	59.7	6.1	600+	n.d.	0-9.1 clay and boulders (<i>T_t</i>), 9.1-11.3 weathered basalt (<i>T_t</i>), 11.3-59.7 <i>basalt</i> (<i>T_t</i>), WS 19.8, 33.5.	C,o,l,s.
180	K. Green, Thirlstane	8.12.78	578369*	60	64	n.d.	38	n.d.	0-13.7 clay and boulders (<i>T_t</i>), 13.7-21.3 <i>clay</i> , 21.3-62.1 basalt (<i>T_t</i>), 62.1-64 clay (<i>T_t</i>), WS 19.8.	C,a,l.
181	T. Halley, Port Sorell	10. 2.79	591439*	50	19.8	--	dry	--	0-11.3 clay, 11.3-19.8 dolerite.	C,a,l,d.
182	T. Halley, Port Sorell	12. 2.79	591439*	50	42.6	--	dry	--	0-19.8 clay, 19.8-28.9 weathered dolerite, 28.9-42.6 dolerite.	C,a,l,d.
183	Montgomery, Port Sorell	17.10.78	591423*	60	15.2	n.d.	4	n.d.	0-1.5 clay, 1.5-12.2 sandy clay, 12.2-15.2 dolerite.	C,a,l.

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Bore	Owner and Address	Date Completed	AMG ref. ¹	Altitude (m)	Total Depth (m)	SWL ² (m)	Yield (l/min)	TDS ³	Geological log ⁴ (aquifer italicised)	Remarks ⁵
184	Montgomery, Port Sorell	17.10.78	591423*	60	12.2	--	dry	--	0-4.6 clay, 4.6-10.7 sandy clay, 10.7-12.2 dolerite.	C,a,l.
185	A.C. Duff, North-down	1976	574424*	90	c83	n.d.	300+	n.d.	bottomed in hard basalt (T _t).	C,o.
186	A.C. Loane, North-down	18. 5.79	557412*	105	153	n.d.	230+	n.d.	0-47 clay (T _m), 47-70.1 sand and clayey sand, some tuffaceous sand 70.1-153, basalt (T _t), WS 100+.	C,o,g.

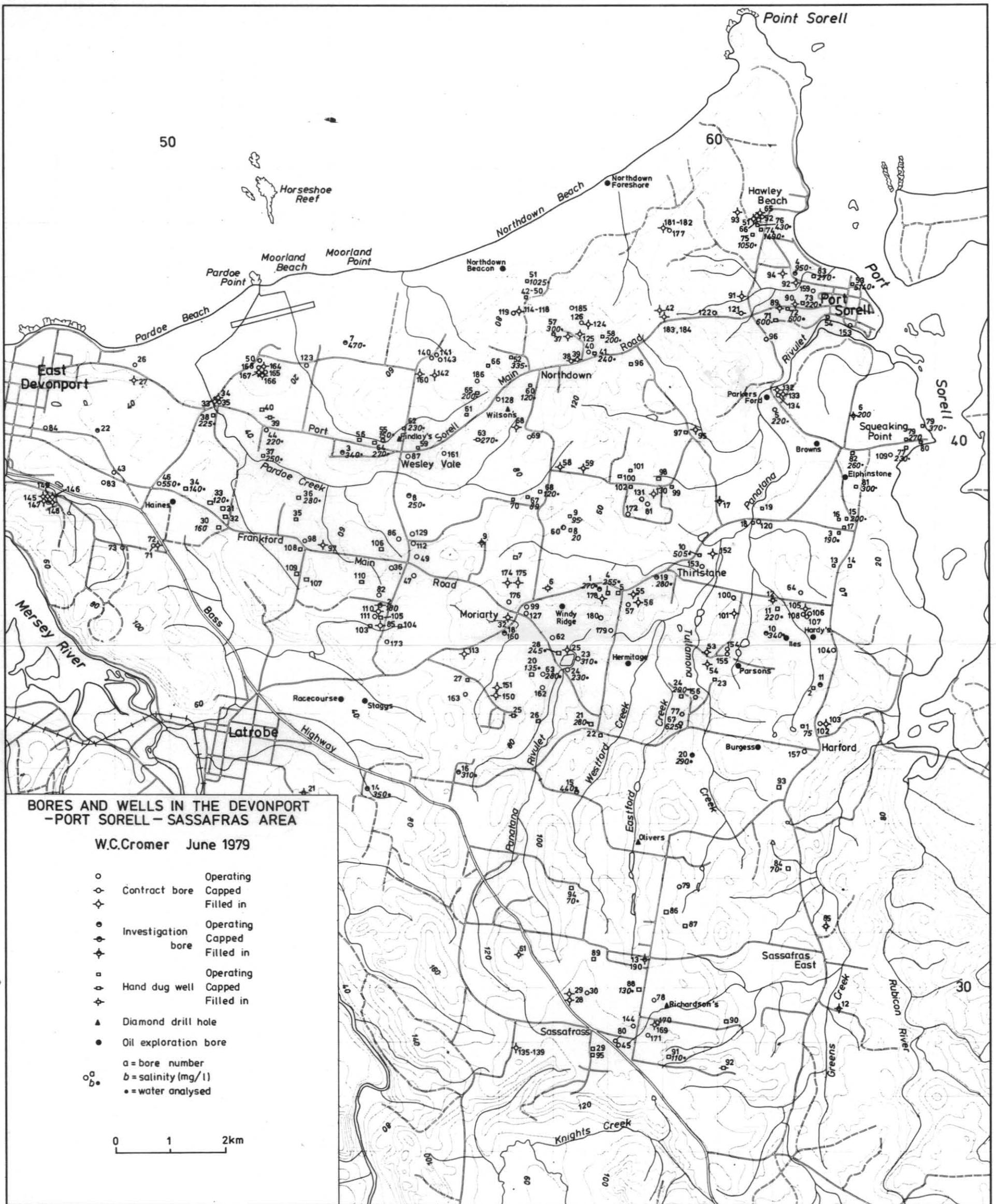


Figure 1

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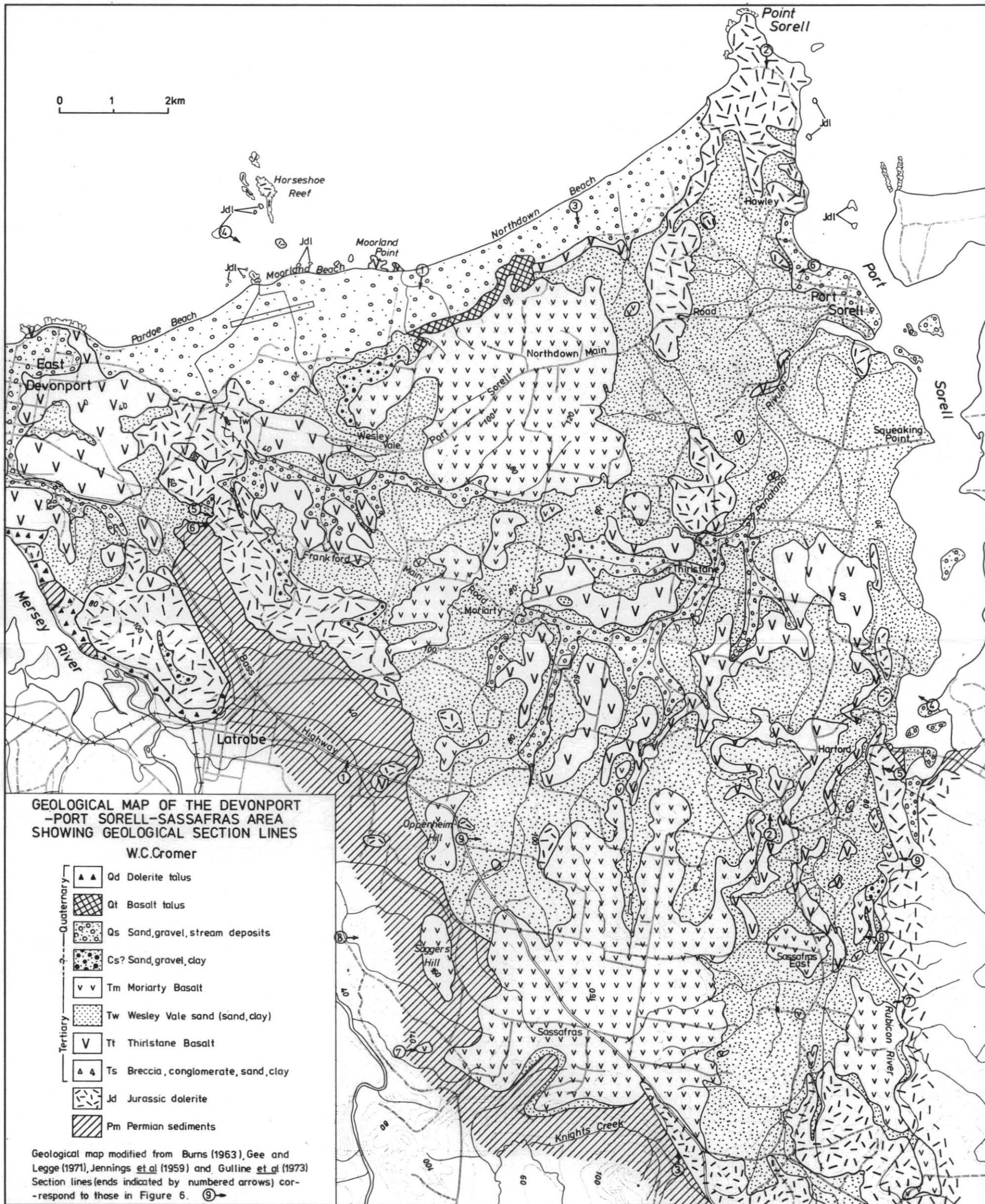
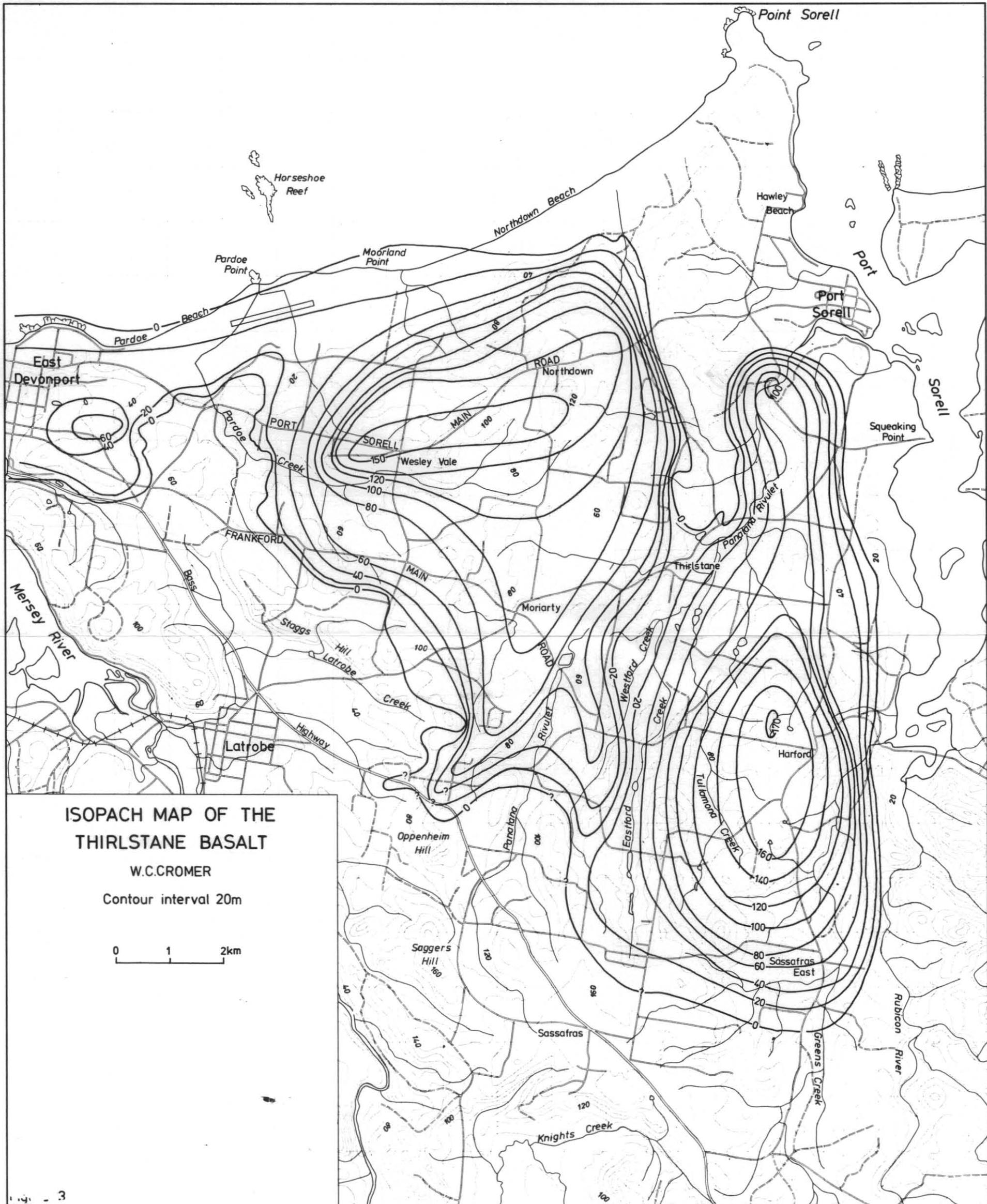


Figure 2

1979-16

5 cm

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**ISOPACH MAP OF THE
THIRLSTONE BASALT**

W.C.CROMER

Contour interval 20m

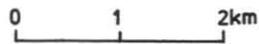
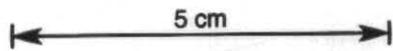
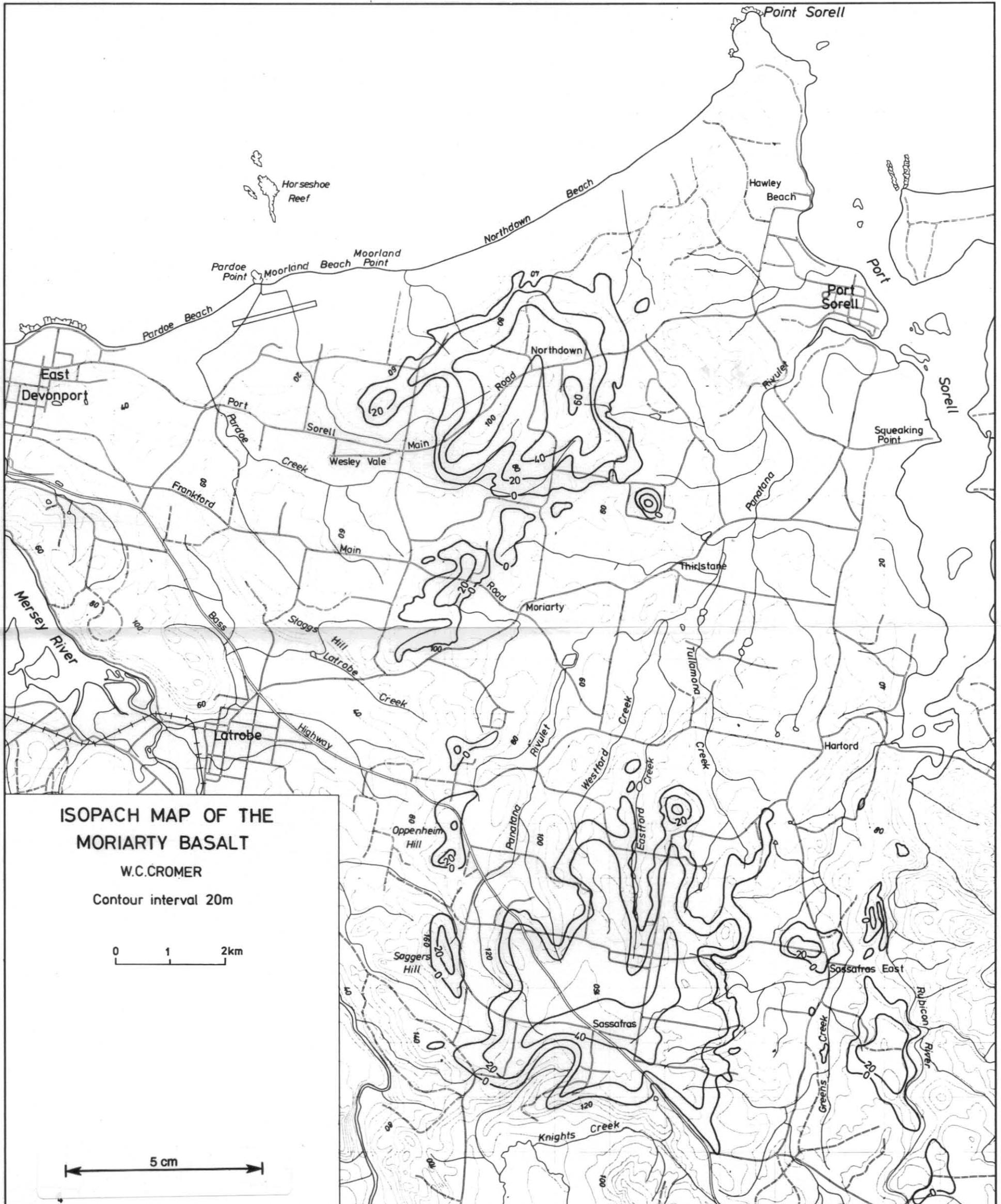


Fig. 3

1979-16



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**ISOPACH MAP OF THE
MORIARTY BASALT**

W.C.CROMER

Contour interval 20m

0 1 2km

5 cm

Figure 4

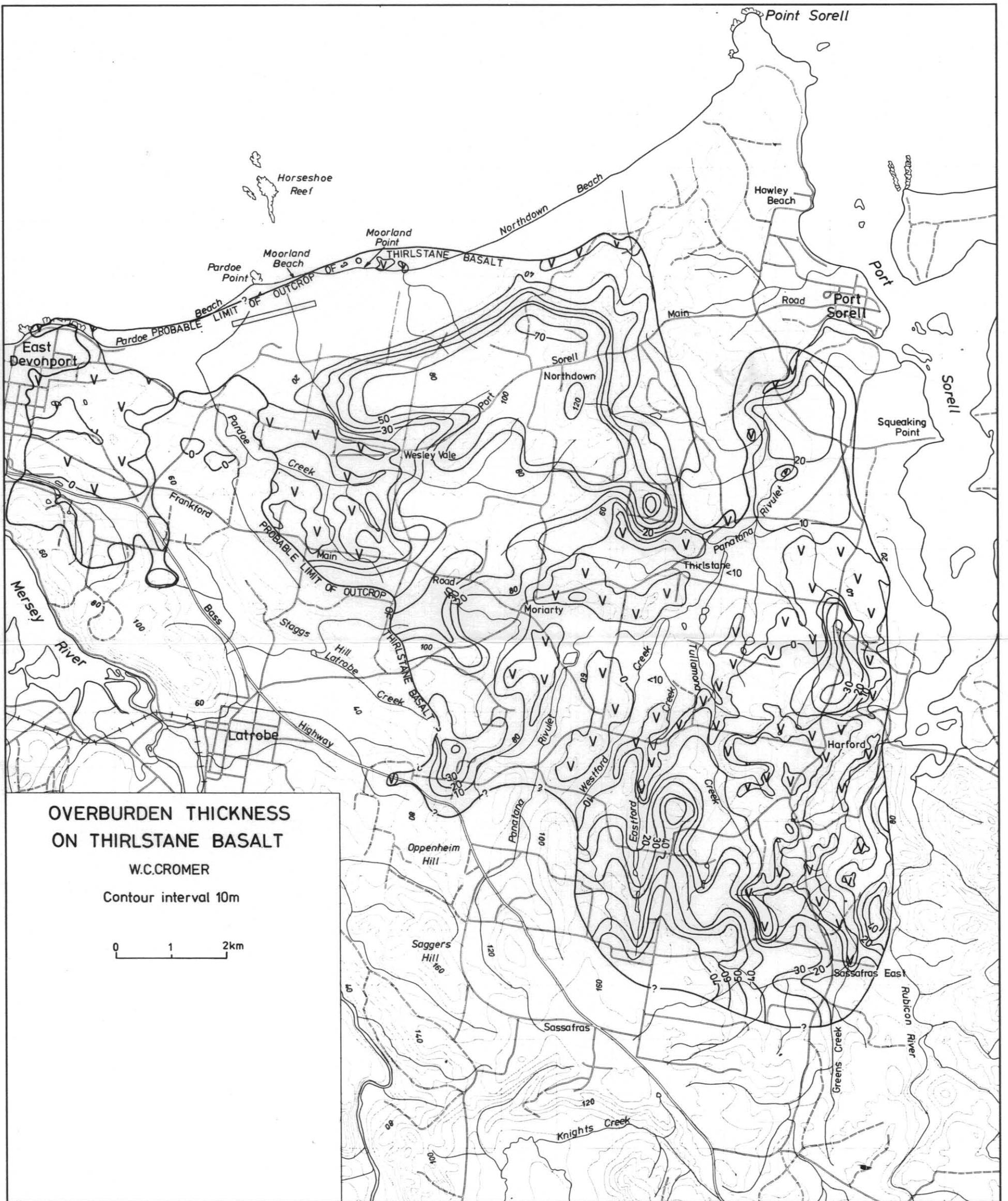


Figure 5

1979-16

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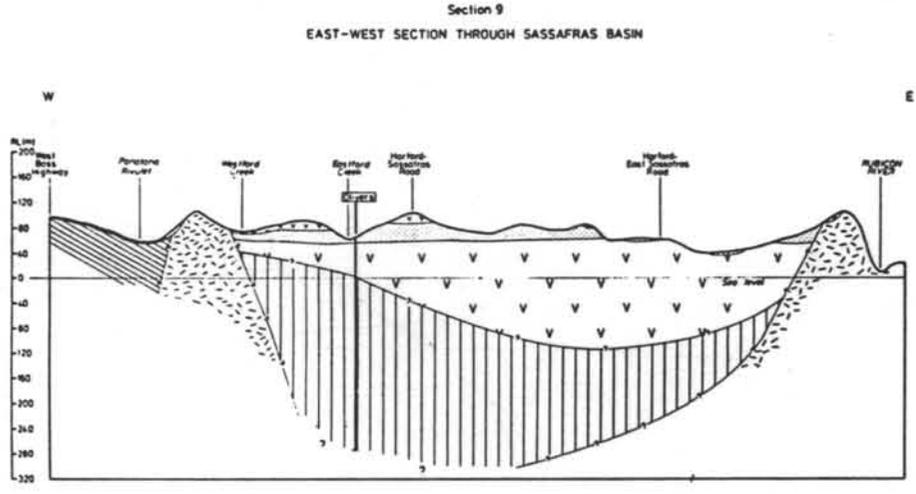
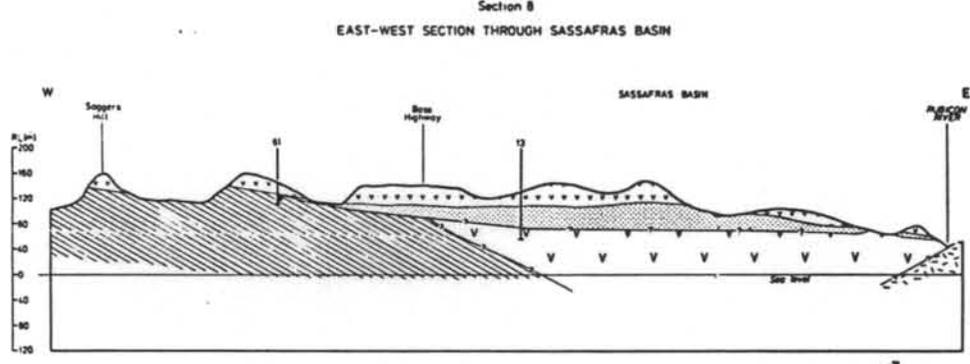
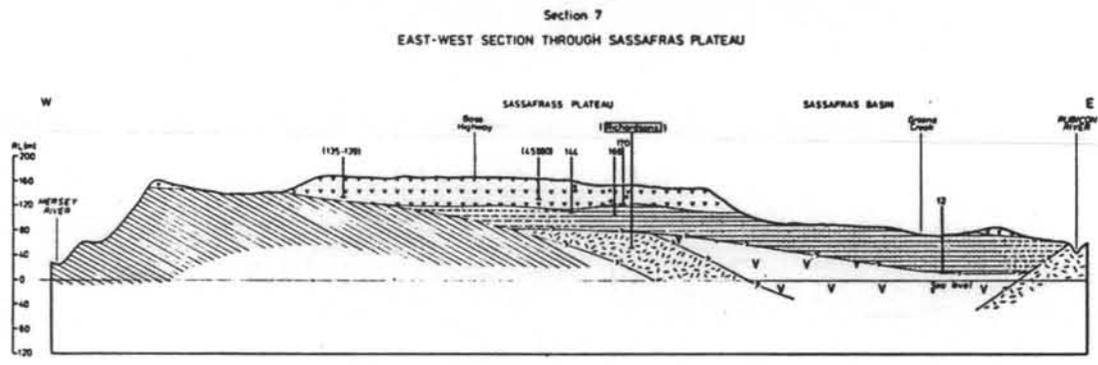
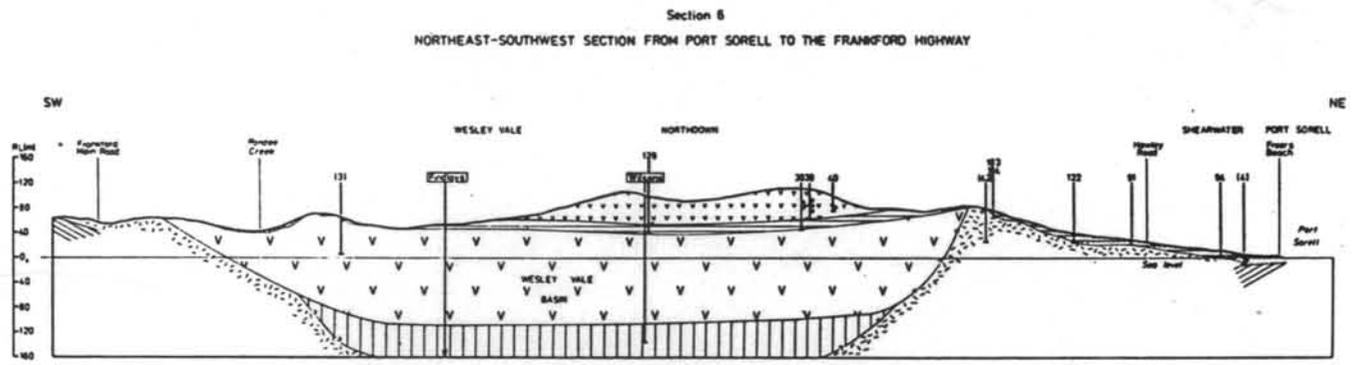
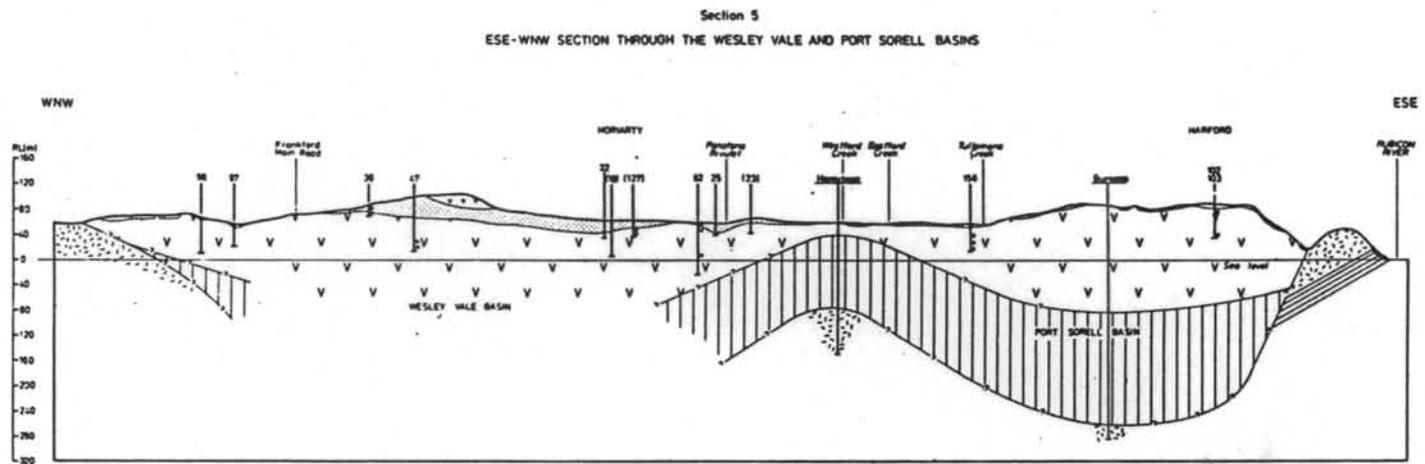


Figure 6

5 cm

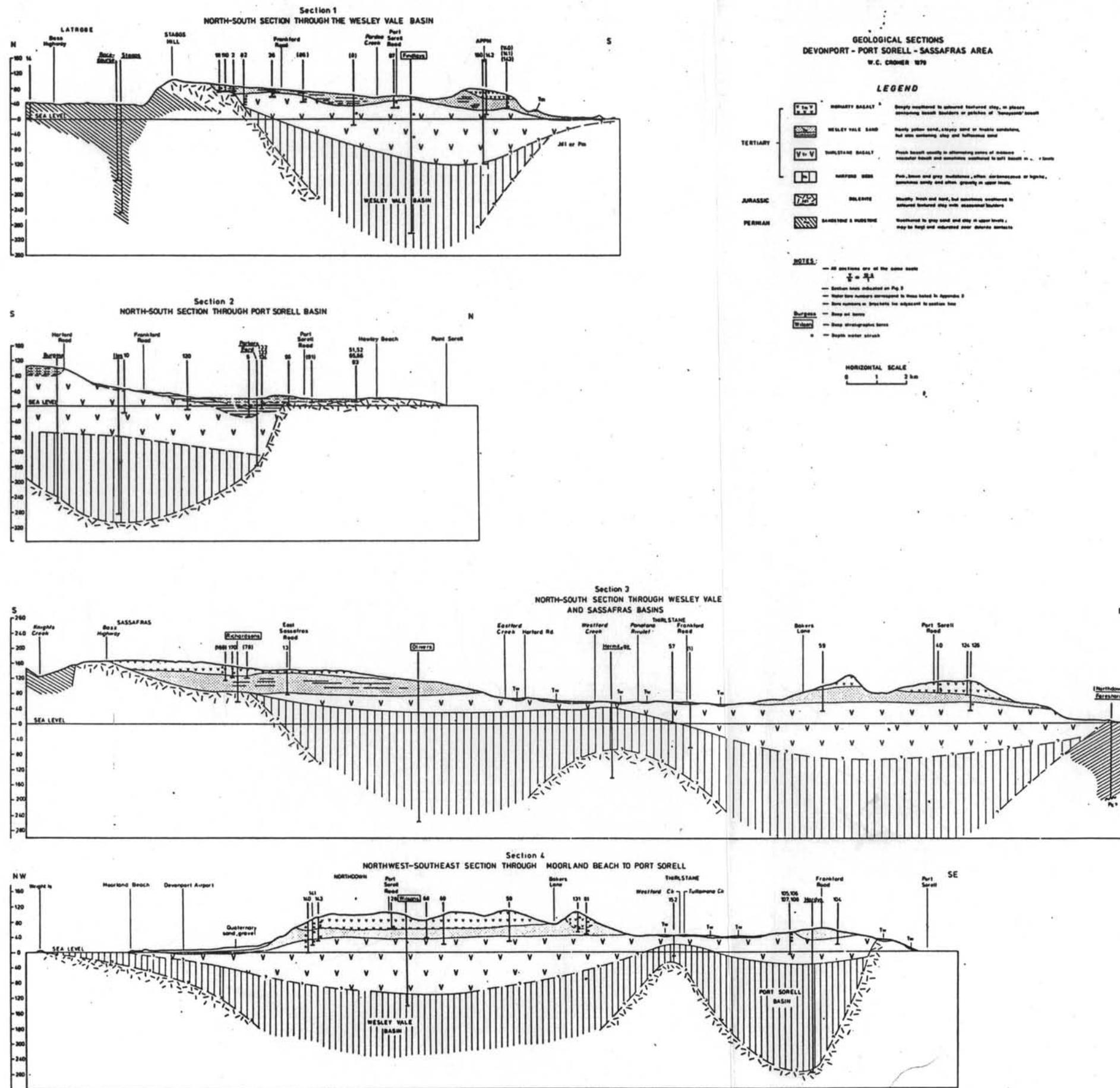


Figure 6

5 cm