MINERAL RESOURCES TASMANIA

Tasmania

DEPARTMENT of INFRASTRUCTURE ENERGY and RESOURCES

NORTHEAST TASMANIA GROUNDWATER MAP

SCALE 1:250000

0 5 10 15 20 25km

AGD66 - AMG Zone 55.

AQUIFER TYPE	PROSPECTIVITY (Whole of Tasmania)	ROCK GROUPS	NUMBER OF BORES	PERCENTAGE SUCCESSFUL (YIELD >0.03)	AVERAGE YIELD (L/s) #	MAXIMUM YIELD (L/s)	PERCENT IRRIGATION SUCCESSFUL (YIELD >=1.5)	SALINITY RANGE (mg/L)	GENERAL AQUIFER CHARACTERISTICS	VULNERABILITY TO POLLUTION
POROUS (INTERGRANULAR)	HIGH	Quaternary aeolian deposits marginal to the coast consisting of fine to medium grain size sand.	5	100					These aquifers are contained in surface deposits of limited thickness. Yields depend on the grain size of the sand and the thickness of saturated sand. Groundwater is usually extracted from these aquifers using spear bores of up to about 7 metres depth. A single spear is often capable of yielding up to 0.5 L/s or enough to supply domestic, garden and stock quantities. A nest of spears (10-20) using a central pump may yield irrigation quantities (5-10 L/s). Yields are reduced from spears by even a small clay content in the sand. Many spear bores have been drilled or installed in coastal sands. Quality is often good enough for the water to be used for a wide range of purposes. Aquifers are mostly unconfined.	High.
POROUS (INTERGRANULAR)	MODERATE - HIGH	Quaternary coastal plain deposits consisting of sand, clayey sand, and gravel, occurring on low lying areas near the coast. Probable marine origin.	101	86.1	0.61 (61)	6.33	6.6	57 - 2550	These aquifers are contained in surface deposits of limited thickness. Yields depend on clay content, grain size and thickness of saturated material. Coarse sand and fine gravel deposits (such as near Lady Barron on Flinders Island) may yield up to 2-3 L/s from a single spear bore. In a number of situations a single spear could yield domestic and stock supplies in the more prospective locations and a nest of several would be capable of supplying small irrigation amounts. Where the aquifer materials have a small clay content, yields from a spear can be reduced to 0.1 L/s or less. In such cases large volume excavations into the aquifer may be the most effective means of utilising the groundwater if irrigation quantities are required. In many parts of northeast Tasmania these deposits contain varying amounts of clay. Quality is variable but the groundwater can often be used for a wide range of purposes. Aquifers are unconfined to confined.	Moderate to high. Depending on whether low permeability material overlies the aquifer.
POROUS (INTERGRANULAR)	LOW - MODERATE	Quaternary, alluvium and talus deposits. The alluvium usually consists of clay, together with sand and gravel deposits with varying clay content. The talus consists of boulders and usually has a moderate to high clay content. Minor windblown sand on sloping bedrock. Terrestrial origin.	25	96.0	1.26 (24)	4.55	33.3	2160	These aquifers are contained in surface deposits usually of limited thickness. Yields in alluvium are often low due to high clay content. However where coarse gravel with a low percentage of fine grained materials occurs (such as Pyengana and east of Ringarooma), some useful yields are possible. The talus is often in elevated positions on the landscape and groundwater storage is usually small. In a large number of areas where this unit occurs, the potential for groundwater in the underlying rocks should be examined. Many bores penetrate layers of this material and obtain water from underlying rocks. Water quality in the coarse grained alluvial sediments is often good as the deposits are usually near to surface streams and may be directly recharged from them. Aquifers are confined to unconfined.	Low to high. Clayey material at the surface will aid in protecting groundwater at depth including underlying aquifers. Coarse-grained aquifers without such protection are vulnerable as are aquifers underlying these materials.
POROUS (INTERGRANULAR)	LOW - HIGH (Moderate - High on this map)	Tertiary sediments consisting of clay, sand and gravel of non marine origin (lacustrine and alluvial deposits) ranging from small thicknesses up to several hundred metres.	452	70.4	1.96 (282)	15.17	38.3	28 - 2160	Aquifers in the Longford and Tamar regions are usually of fine to medium sized sand although occasional thin gravel zones occur. Around Scottsdale and Cleveland, fine gravel (quartz derived from granite weathering) occurs in zones of varying thickness with some coarser quartz gravel on some horizons. High yields of 10-15 L/s have been pumped from these aquifers, with potential to pump much higher amounts in some cases where thick sand/gravel zones have been drilled. Some of the better aquifers occur in deep leads or old buried river channels. Lower yields are obtained where clay content of the aquifers increases and where they are thinner. Yields in the better areas allow a range of uses from domestic and stock to irrigation. The Tertiary deposits from Port Sorell - Thirlstane area are often more clay rich and the potential for groundwater resources is lower than the above areas. This also applies to areas where the deposits are of limited extent. Quality is variable but the water is often suitable for a wide range of uses, including domestic and irrigation. Quality is usually poor in the Tamar area and in shallow, perched water table aquifers in low rainfall areas. Aquifers are often confined, occasionally unconfined.	Low to high. Low where thick clay layers cover aquifers (e.g. Longford area). High where gravel aquifers reach or almost reach the surface (e.g. Waterhouse).
FRACTURED ROCK (Intergranular on some horizons)	HIGH	Triassic sandstone (lithic and quartz), mudstone minor coal, terrestrial origin. Permian mudstone, siltstone, sandstone (often pebbly), minor limestone and conglomerate, tillite. Permian is mainly of marine origin with small zones of terrestrial origin.	*20* *259* 279	*75.0* *84.6* 83.9	*0.83 (14)* *3.00 (277)* 2.88 (231)	*3.78* *25.30* 25.33	*7.1* *35.0* 33.3	*350 - 6900* *97 - 1970* 97 - 6800	The Triassic and Permian rocks are mainly regarded as fractured rock aquifers, although there may be some intergranular storage in the coarser grained units (sandstone, conglomerate mainly). Transmission of water to bores is probably largely via joints and bedding planes. Yields range from domestic, stock and garden supplies to irrigation quantities (up to 25 L/s). These rocks make up some of the most prospective and commonly drilled units in the eastern part of the state. In elevated locations such as on the slopes of the Central Plateau, prospectivity is likely to be much lower than in lower lying locations. Quality is variable but the water is usually suitable for a wide range of uses. Aquifers are mainly unconfined to confined locally.	High. A layer of low permeability material at the surface will offer some protection and vulnerability may be reduced to low to moderate.
FRACTURED ROCK	MODERATE-HIGH (High on this map)	Ordovician to Devonian turbidite sequence of sandstone and mudstone (Mathinna Supergroup). Ordovician, Cambrian and Precambrian limestone, siltstone, slate, sandstone, quartzite and conglomerate.	*300* *44* 344	*88.0* *65.9* 85.2	*1.48 (339)* *5.04 (28)* 2.30 (267)	*30.40* *25.30* 30.40	*21.8* *67.9* 26.6	*64 - 3330* 64 - 3330	Success rate of bores in this group of rocks is high even though there is a wide range of rock types and ages. Yields range from domestic, garden, stock supplies to irrigation outputs (up to 25 L/s). 5 bores drilled into limestone all had yields of greater than 10 L/s in areas south of Deloraine. Thick mudstone sequences in the Mathinna Supergroup are often less prospective than other rock types. The Precambrian rocks of the Dazzler Range west of Beaconsfield are largely untested. Salinity is commonly low, which allows the water to be used for a wide range of purposes. The Mathinna Supergroup around Bridport and some other near coastal regions contain some more saline water. Aquifers are often semiconfined to confined, and occasionally unconfined.	High. A thick layer of low permeability material covering the aquifer will reduce vulnerability.
FRACTURED ROCK	HIGH	Tertiary basalt.	557	84.7	3.25 (437)	37.83	50.3	45 - 2760	Prospectivity for groundwater is high at most locations in basalt, but there are some exceptions and where these are known, these areas have been placed in a lower prospectivity group (with Jurassic dolerite). Storage per unit volume of rock can be greater for basalt than other fractured rock aquifers if the rock is vesicular. As a result of this and the often intense fracturing, basalt tends to have a greater proportion of higher yielding bores than other fractured rock aquifers. Small to moderate irrigation quantities are often obtained (up to about 38 L/s) and stock, domestic and garden use is common. Small areas of basalt or areas where basalt tops hills may have low potential as a result of the limited storage. Quality of groundwater is usually good and a wide range of uses are usually possible. In lower rainfall areas, salinity may increase and use becomes more restricted. Aquifers are mainly confined to unconfined locally.	High. Deep clay soil developed on the basalt or clay sediments of Tertiary age (e.g. Westbury area) would offer some protection.
FRACTURED ROCK	MODERATE	Jurassic dolerite. Triassic basalt - St Marys. Tertiary basalt - Scottsdale, Ringarooma, Tamar.	146	56.2	0.73 (67)	8.85	11.9	85 - 1470	Jurassic dolerite is usually less fractured than the Tertiary basalt and at most locations has lower prospectivity. Yields vary from domestic, stock, garden supplies (0.1-0.5 L/s) to occasionally small irrigation supplies. Quality is variable but is seldom saline enough in this region to limit uses markedly. Tertiary basalt areas of lower prospectivity include the area north of Scottsdale where the rock is deeply weathered to a clay and south of Ringarooma where is appears to lack sufficient fracturing or fractures are very tight. Tertiary basaltic rocks along the Tamar are often coarse grained, similar to Jurassic dolerite. The Triassic basalt near St Marys is untested. Aquifers are often unconfined, semiconfined to confined.	Moderate. Can be high if highly fractured zones are not covered by low permeability material.
FRACTURED ROCK	LOW - MODERATE	Devonian granite and porphyrites. Cambrian serpentinite and dolerite dykes.	60	51.7	0.61 (21)	1.88	9.5	240 - 1950	The granitic rocks are often sparsely jointed and generally have a lower prospectivity than other rock types. Locally, closely spaced fracturing will raise prospectivity. Some granitic rocks in the Scottsdale Batholith may have a higher than average prospectivity (adamellite and granite - Trewalla and Kamona types). Although some 50 % of bores have produced some water, there are a number of bores where considerable depths of granite have been drilled under Tertiary sediments where no water was produced and these bores have been assigned as failed Tertiary sediment bores. Large areas of granitic rocks are untested. Yields are usually in the range suited to stock, domestic uses, although occasionally higher yields are obtained. Quality is variable but sometimes it is a little saline for many uses. Aquifers are unconfined to confined.	Low to moderate. Can be higher if localised highly fractured zones are not covered by a layer of lower permeability material.

1. Statistics provided in the legend are based on deep boreholes entered in MRT groundwater database (BORIS) by February 2003. Boreholes shown on the map are those with locations mainly supplied by drillers and from location in the field by MRT staff.
2. # Boreholes with yields >0.03 L/s have been considered as successful bores. Yield related statistics (average, maximum yield and percent irrigation successful) are based on the number of successful bores (numbers in brackets in the average yield column). Outputs of bores are those supplied by drillers and are mostly the result of short term pumping measurements. Some bores have been successful, but outputs have not been reported. These bores are included in the total percentage of successful bores but have not been used for other statistical calculations. Boreholes reported as dry holes usually have a small unreported yield (<0.05 L/s)
3. Successful bores with a reported yield of >= 1.5 L/s have potential for small irrigation purposes. Very limited irrigation is possible with lower yields.
4. * There are many spear bores installed for investigation and production purposes in coastal sand deposits in Tasmania. Salinity ranges for some of the Quaternary aquifers have been obtained from these borehole records and included in the legend (marked with a star *).
5. Small elevated areas of any hydrogeological unit will usually have lower prospectivity because of limited storage and high drainage rates.
6. In areas where there is little or no water bore data, the groundwater prospectivity has been assumed to be similar to that in the areas where data are widely available.
7. The northeast part of Tasmania covered by this map includes some areas that have low rainfall / high evaporation rates and which are subject to soil salinity problems. Low rainfall / high evaporation is also probably the cause of the relatively poor quality of groundwater at some locations in the region.

BOREHOLE YIELD
(See separate map for borehole groundwater quality - TDS)

Bore Location Accuracy - 500 - 2000 m	Bore Location Accuracy - 1 - < 500 m	Litres / second	Potential usage of groundwater based on borehole yield
○	•	Yield Unknown	
○	•	0 (Dry borehole)	
○	•	<= 0.05	Limited use for domestic and stock
○	•	0.05 - 0.5	Domestic, stock, garden
○	•	0.5 - 1.5	Domestic, stock, garden, limited irrigation
○	•	1.5 - 5.0	Domestic, stock, garden, small area irrigation
○	•	5.0 - 10.0	Domestic, stock, garden, moderate area irrigation, small communities
○	•	> 10.0	Domestic, stock, garden, larger area irrigation, small towns, supplement to larger towns

Outputs of bores are those supplied by drillers and are mostly the result of short term pumping measurements.
Outputs may not be sustained for long periods of continuous pumping.
Boreholes reported as dry holes usually have small unreported yields e.g. <0.05 L/s.
The bores shown are those recorded in the Mineral Resources Tasmania groundwater database (BORIS).
Conversion factors -
1 litre per second ~ 800 gallons per hour ~ 8.6 millimetres per hectare per day ~ 0.84 acre inches per day.

POTENTIOMETRIC CONTOURS

- 170 — Potentiometric contours of deeper Tertiary Aquifers (5 m contour interval) Longford Area (Geological Bulletin 59)

The data for this map were derived from the Tasmanian Geological Atlas 1:250,000 digital series and Mineral Resources Tasmania Groundwater data base (BORIS) and are based upon the potential for groundwater within broad rock groups.
Plotted borehole data as at 05-OCT-2006

SALINITY CONTOURS

1500 — Salinity contours of deeper Tertiary Aquifers (500 mg/L contour interval) Longford Area (Geological Bulletin 59)

Other groundwater and hydrogeology maps and reports are available from Mineral Resources Tasmania, Borehole data is available from the Mineral Resources Tasmania web site -

www.mrt.tas.gov.au

GROUNDWATER QUALITY
Expressed as Total Dissolved Solids (TDS)

TDS in mg/L	Potential usage of groundwater based on water quality
<= 500	All purposes, domestic and irrigation
500 - 1000	Most purposes, general upper limit for irrigation
1000 - 1500	Most purposes, upper limit for drinking, limited irrigation
1500 - 3000	All livestock, very limited irrigation
3000 - 7000	Most livestock (not pigs or horses)
> 7000	Limited stock use (beef cattle, sheep)

Areas of similar groundwater quality across different rock types are shown by shading as above. Solid lines _____ indicate deep aquifers while broken lines – – – – – indicate shallow aquifers. Boundaries are approximate only.

These are general limits for the use of groundwater. The use of water for irrigation with the higher levels of salinity in the above table should only be considered on particularly suitable soil types with the adoption of specific management practices, or if the bore water is mixed with fresh water. For further information see Australian and New Zealand guidelines for fresh and marine water quality.

This map is not the result of a concise survey therefore groundwater potential and salinity areas are indicative only. This map does not remove the need for site specific investigations.

Groundwater potential data compiled by:
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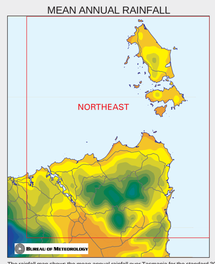
MEAN ANNUAL RAINFALL



3300 mm
3000
2500
2000
1500
1000
500
400

The rainfall map shows the mean annual rainfall over Tasmania for the standard 30-year period from 1961 to 1990. It was derived by the Climate and Consultancy Section in the Tasmania and Antarctica Regional Office of the Bureau of Meteorology, from a gridded analysis prepared by the Bureau's National Climate Centre. The analysis system blends measured rainfall with topography to give estimates of rainfall for each area. The results will be less accurate in mountainous or data-sparse regions, and may differ from the observations at individual locations.

LOCATION DIAGRAM

Map first published July 2006

Base data from the LIST, © State of Tasmania

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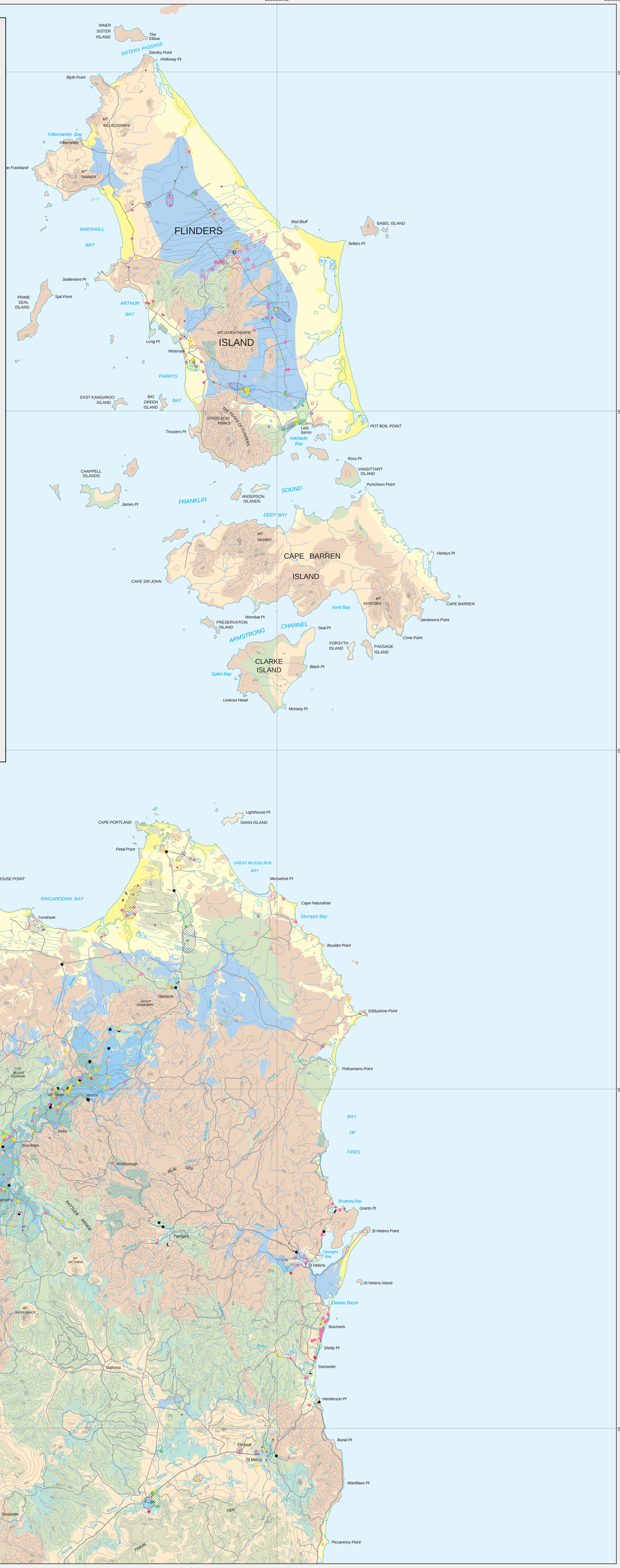

WARNING: INKS ARE LIGHT SENSITIVE

Plotfile for this map generated from digital data: 05-OCT-2006

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