



Mineral Resources Tasmania

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Potential bulk geological commodities near Tasmanian ports

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INTRODUCTION

This report reviews some Tasmanian geological resources which appear to have potential for development as bulk commodities, that is, commodities with a high volume of production per annum. The aim of this report is to provide a preliminary and general guide as to the types of geological resources that are available and the geographic areas in which exploration for a mineable resource might be worthwhile.

This report does not deal with specific resources that have already been identified such as, for example, those listed in the CONMAT data base. These known resources are reviewed elsewhere by other authors (Sloane and Weldon, in prep.).

METHODOLOGY

Geological resources of interest were identified by inspecting the relevant 1:250 000; 1:50 000; and 1:63 360 scale maps in the various Tasmanian Geological Atlas series. The criteria assessed were rock type, distance to port, and likelihood of there being a significant volume of material that could be extracted by a large open-pit operation. Materials within 10 km of a port that has the capacity to handle large ships are of highest potential for development. Materials located 10–20 km from such ports may also have some potential and are listed here. Also listed are materials in the vicinity of ports with more limited capacity for ship size.

RELEVANT GEOLOGICAL MAPS

Tasmanian Geological Atlas — 1:250 000 Series:

Launceston, Oatlands, Hobart, Queenstown, Burnie, Bass Strait Islands.

Tasmanian Geological Atlas — 1:63 360 and 1:50 000 Series:

Smithton, Table Cape, Burnie, Devonport, Beaconsfield, Pipers River, Boobyalla, Blue Tier, St Helens, St Marys, Buckland, Kingborough.

PORTS, ETC.

The Tasmanian ports considered here are Port Latta, Burnie, Devonport, Beauty Point, Bell Bay, Long Reach, Triabunna, Electrona, Whale Point and Port Huon. Hobart is not considered because access for bulk materials to a loading facility would be difficult, and the establishment of a very large quarry within 10 km of the port is unlikely. Of the ports listed Port Latta, Burnie, Bell Bay, Long Reach, Triabunna and Whale Point are probably best placed for handling bulk commodities.

There are stretches of Tasmania's coast where there are no major ports but where there are relevant rock types. Parts of the east, southeast and west coasts are of particular interest in this regard, and notes on the available resources are included in this report. Also included are notes on geological materials near the Emu Bay Railway, as this railway runs directly to the Port of Burnie.

GEOLOGICAL RESOURCES

For the most part the potential bulk geological resources near Tasmanian ports are rock types suited to the production of crushed aggregate. These rock types are dolerite of Jurassic age, basalt of Tertiary age, quartzose sedimentary rocks of Cambro-Ordovician age, quartzite of Precambrian age, and granite of Devonian-Carboniferous age.

There may be some value in testing shale-bearing formations such as the Cowrie Siltstone for material suited to the manufacture of lightweight aggregate. Such material will display the characteristic of 'bloating', that is, it will expand when subjected to high temperature. Some five million tonnes of expanded clay, shale and slate were used in lightweight aggregate in the USA in 1980-81 (Lefond, 1983) but production may have since diminished because of energy costs. Other uses of shale are as a source of silica in cement, as a raw material for fired products (bricks, tiles, etc.), and as unfired filler or packing.

Dolomite and limestone appear to have little potential as bulk commodities because of the poor location of resources, either with respect to ports or with respect to developing a large open-pit mine.

VOLUME OF RESOURCE

It has been assumed that a resource of 100 million tonnes would be desirable as a basis for a large, export-oriented crushed aggregate operation. It has also been assumed that 100 m represents a feasible depth for a large open-pit mine. The surface dimensions of a 100 mt, 100 m deep open pit would not exceed 1 km² for any of the rock types listed below. These limitations on surface and vertical pit dimensions provide a useful, rough guide as to the likelihood of a significant resource being present in rock units delineated on the various geological maps.

Rock densities (Leaman, 1973)

Devonian granite	2.6 tonnes/m ³
Tertiary basalt	3.0 tonnes/m ³
Jurassic dolerite	3.0 tonnes/m ³
Ordovician limestone	2.7 tonnes/m ³
Cambro-Ord. quartzose seds.	2.7 tonnes/m ³
Precambrian quartzite	2.6 tonnes/m ³
Precambrian dolomite	2.9 tonnes/m ³
Unconsolidated sand (wet)	2.1 tonnes/m ³
Unconsolidated sand (dry)	1.65 tonnes/m ³

RESOURCES NEAR PARTICULAR PORTS — SUMMARY

Port	Resource	Distance from port (km)
Port Latta	Tertiary basalt	0-10, 10-20
	Precambrian dolomite	0-10, 10-20
	Precambrian quartzite	10-20
	Precambrian shale	0-10, 10-20
Burnie	Tertiary basalt	0-10, 10-20
	Devono-Carboniferous granitoid	10-20
	Cambro-Ordovician sediments	10-20

Devonport	Tertiary basalt	0-10, 10-20
	Jurassic dolerite (minor)	0-10, 10-20
	Ordovician limestone	0-10, 10-20
	Cambro-Ordovician sediments	0-10, 10-20
	Precambrian quartzite	0-10, 10-20
Beauty Point	Tertiary basalt (minor)	0-10
	Tertiary gravel (minor)	0-10
	Jurassic dolerite	0-10, 10-20
	Ordovician limestone	0-10, 10-20
	Cambro-Ordovician sediments	0-10, 10-20
Bell Bay / Long Reach	Tertiary basalt	0-10
	Tertiary gravel	10-20
	Jurassic dolerite	0-10, 10-20
	Jurassic dolerite	0-10, 10-20
Electrona	Jurassic dolerite	0-10, 10-20
	Jurassic dolerite	0-10, 10-20
Whale Point / Port Huon	Jurassic dolerite	0-10, 10-20
	Jurassic dolerite	0-10, 10-20

RESOURCES NEAR PARTICULAR PORTS — DISCUSSION

Port Latta

Tertiary basalt: Basalt is relatively sparse and thin within 10 km of Port Latta. At Spion Kop Lookout (CQ547704), which is 11 km from the port, there is about 80 m thickness of basalt. The locality is on an existing road but the route to Port Latta is indirect.

Precambrian dolomite: There are dolomite outcrops between the Bass Highway at Black River and South Forest, that is, 6-10 km from Port Latta. However the outcrops are at elevations of less than 40 m a.s.l. and there is extensive alluvial cover. Thus, prospects for a large, deep open pit appear to be poor.

Precambrian shale: This rock type is one of the major components in the Cowrie Siltstone formation which is abundant within 0-10 km of Port Latta. The topographic situation around CQ580680 appears satisfactory for a large open pit. This locality is about 10 km from the port, beside the Savage River pipeline track.

Precambrian quartzite: Work elsewhere in northwest Tasmania (Longworth and McKenzie, 1981) has shown that the Precambrian quartzite units may be of high chemical quality but that their physical character can vary from hard and coherent to soft and easily disaggregated. Despite several exploration programmes, no lump silica resource has been put into regular production.

Quartzite occurs some 9 km from Port Latta at Myhill Lookout. It also occurs at a distance of some 10 km from Port Latta fringing the Rocky Cape National Park. There appears to be potential for a 100 mt pit at Myhill Lookout. This locality is on an existing road but the route to Port Latta is indirect.

Burnie

Tertiary basalt: Basalt is plentiful within 20 km of Burnie with an apparently good topographic setting for a large quarry some 10 km from the port, to the north of Ridgley. The site is beside the Emu Bay Railway.

Cambro-Ordovician quartzose sedimentary rocks: These rocks form Mt Pearce and Moory Mount which are immediately adjacent the Emu Bay Railway, some 60 km from Burnie port.

Devono-Carboniferous granite: Granite crops out beside the Emu Bay Railway at Hampshire, some 28 km from Burnie port. It is adjacent to the mineralised Kara-Hampshire zone and it may be worth considering an integrated basalt/granite/limestone/wollastonite operation in the context of developing more magnetite-scheelite ore.

Granite crops out at Natone, which is about 15 km in a direct line from Burnie port but much more distant by the indirect road routes. There is a brown granite, dimension stone resource at Natone which might provide another commodity in addition to crushed aggregate.

Devonport

Tertiary basalt: This rock type is common within 10 km of Devonport but the subdued topography does not facilitate development of a deep open pit. It also seems that disruption of other rural and urban activities could be considerable.

Jurassic dolerite: Comments as for basalt.

Cambro-Ordovician quartzose rocks and Precambrian quartzite: Quartzite occurs 6-10 km from Devonport around Forthside. Moina Sandstone occurs in the same general area.

Ordovician limestone: There is limestone at Melrose, 7-10 km from Devonport whilst the deposits at Railton are about 18 km from the port.

Beauty Point

Tertiary gravel: Quartzose gravels occur close to Beauty Point but the resource is small (Noldart and Threader, 1974).

Tertiary basalt: Relatively minor and probably thin doleritic basanite occurs at Rowella. The locality is 10 km directly from Beauty Point but more distant by road.

Jurassic dolerite: Dolerite extends inland from Shag Head, a feature 2 km southeast of Beauty Point across water. About 3 km from Shag Head, at Ralstons Hill, there appears to be a site suited to a large, open pit.

Ordovician limestone: There is limestone in Middle Arm Creek, about 7 km south of Beauty Point, but the elevation seems too low and the topography too subdued for a large open pit. The topography at Flowery Gully offers better prospect for a large open pit. Flowery Gully is some 12 km from Beauty Point.

Cambro-Ordovician quartzose rocks: Starting 5 km south of Beauty Point is the strike ridge of quartzose rocks that includes Cabbage Tree Hill and Salisbury Hill, which together extend for around seven kilometres. Material is currently mined for crushed aggregate on the western side of Cabbage Tree Hill by Boral.

Bell Bay/Long Reach

The ship loading facilities of Bell Bay and Long Reach are located on the eastern side of the River Tamar and are about 6 km apart.

Tertiary gravel: Various quartzose gravels occur some 5 km from the ports, east of the Tippogoree Hills, but they are probably too thin and scattered to form a significant resource.

Tertiary basalt: This rock type is minor in the area and seems to have little potential.

Jurassic dolerite: Dolerite is abundant in the area and the topography is suited to the development of a large open pit within a few kilometres of Long Reach. Pacific Quarries (EL10/90) are promoting this resource.

Triabunna

Jurassic dolerite: Dolerite occurs in the intervals 0-2 km and 4-10 km from the woodchip loading facility at Triabunna. The nearer resource may have potential as a quarry site although it is rather small in area.

Electrona

Jurassic dolerite: A substantial body of dolerite occurs 2.5-4.5 km west of Electrona at Red Hill. Much of the dolerite is the coarse-grained felsic variant known as granophyre. The topographic setting at Red Hill seems good for a major quarry and it is all downhill to the wharf. However, the chances of unwanted impact on other activities like semi-rural housing development are considerable.

Port Huon

Port Huon and the woodchip-loading facility to the south at Whale Point are about one kilometre apart.

Jurassic dolerite: Dolerite is common within 10 km north and west of Port Huon, although within 3 km it is mixed with sedimentary rocks of the Parmeener Supergroup. Beyond 3 km the topographic setting seems good for quarry development but the chances of unwanted impacts by the quarry and transport system are again considerable.

Whale Point

Jurassic dolerite: On the face of it, Whale Point is a good looking bulk crushed aggregate prospect although there may be difficulties with land tenure and environmental/cultural impacts. Dolerite underlies Whale Point Hill and the contiguous hill to the south. The topography rises quickly from the Whale Point jetty to a maximum of over 200 m a.s.l. about one kilometre away on top of Whale Point Hill, thus implying ease of delivery of material to a loading facility at the jetty. Very crude estimates suggest that there is over 300 mt of dolerite in Whale Point Hill and the contiguous hill to the south.

COASTAL AREAS WITHOUT PORTS

East and southeast Tasmania

Jurassic dolerite: Dolerite underlies much of the coast between Swansea and Marion Bay. Excluding the Triabunna area, there are areas of possible interest at

Webber Point and Mt Murray, which are between Swansea and Triabunna, and also at Earlham Hill and Cape Bernier which are south of Orford.

For environmental and cultural reasons there seems little prospect of development on most of Forestier Peninsula and Tasman Peninsula, although there may be some possibilities on Tasman Peninsula south of Wedge Bay and between Outer North Head and North West Head.

Environmental and cultural factors may outweigh the chances of major development on Bruny Island, particularly on south Bruny Island. However, areas around Cape Queen Elizabeth and The Yellow Bluff on north Bruny Island may be worth further assessment. There are narrow coastal reserves along much of the coastline in southeast Tasmania and these may pose difficulties for the development of any loading facility.

There is extensive dolerite in the coastal area between Port Esperance and Southport. The topographic setting in this area appears good for the development of a large open pit mine, the ground tenure is mostly Crown Land, and there are parts of the coast where there is no reserve. North West Bay Co Pty Ltd holds most of the area under Exploration Licence 6/93.

Devono-Carboniferous granitoids: Although much of northeast and eastern Tasmania is underlain by granitoids, there are few available coastal areas where the topographic setting would be conducive to the development of a large open pit. An area of particular interest lies east of Mt Elephant and St Patricks Head, where the topography rises steeply to reach elevations of 200 m within one kilometre of the coast. The rock type is dacitic porphyrite, or in common language, fine-grained granite.

Western Tasmania and the Bass Strait Islands

The following tables list localities where resources of possible interest occur adjacent to the sea.

West Coast

Locality	Resource
Cape Sorell	Precambrian quartzite
Ocean Beach	Sand (quartz plus heavy mins)
Mt Heemskirk	Devono-Carboniferous granitoid
Duck Creek	Palaeozoic limestone
Ahrberg Bay	Sand (quartz)
Marrawah/Mt Cameron	Basalt
Cape Grim	Basalt

Bass Strait Islands

Island	Resource
Hunter Island	?Precambrian quartzite ?Sand
Three Hummock Island	Devono-Carboniferous granitoid ?Tertiary basalt ?Sand
King Island	Devono-Carboniferous granitoid ?Sand (quartz) Sand (quartz plus heavy mins)
Flinders Island	Devono-Carboniferous granitoid ?Sand

For other small islands see Tasmanian Geological Atlas, 1:250 000 Series, Sheets SK/55-1, 2.

EXPLORATION LICENCES NEAR PORTS

The following table lists Exploration Licences, Special Prospecting Licences and Retention Licences that have been current at various times in the last 30 years or so. For each licence, the radial extent (up to 20 km) with respect to nearby ports is shown.

Port Latta

Licence	Radial extent (km)	Licence	Radial extent (km)
SPL302	2-20+	EL6/72	11-20+
EL26/65	0-20+	EL18/76	17-20+
EL12/65	0-20+	EL20/76	11-20+
EL16/67	6-20+	EL10/79	19-20+
SPL41	9-10	EL18/80	3-20+
SPL40	13-17	EL29/80	0-20+
EL9/68	1-11	EL43/84	19-20+
EL15/69	7-20+	EL15/85	11-20+
EL11/69	7-20+	EL23/87	13-20+
EL46/70	7-20+	EL2/87	9-20+
EL43/70	11-20+	EL25/88	14-18
EL36/71	7-12	EL19/89	5-12, 13-20
EL20/72	20-20+	EL10/92	15-20+
EL22/72	20-20+		

Burnie

SPL344	0-20+	EL4/77	10-20+
EL26/65	0-20+	EL10/78	15-20+
EL12/65	0-20+	EL26/80	19-20+
EL15/65	9-20+	EL23/79	5-20+
EL12/67	18-20+	EL14/80	8-20+
EL6/67	4-20+	EL26/80	18-20+
EL17/68	17-20+	EL2/84	18-20+
EL14/68	11-12	EL46/86	12-20+
EL13/68	9-10	EL30/86	6-14
EL11/69	12-20+	EL41/86	14-18
EL1/69	0-20+	EL24/86	9-15
EL19/72	15-20+	EL15/87	15-20+
EL9/72	8-20+	EL49/87	20-20+
EL5/72	11-20+	EL30/88	9-20+
EL10/72	14-20+	EL25/90	8-15
EL24/73	14-20+	EL9/92	5-20+
EL8/77	8-20+	EL21/92	20-20+

Devonport

SPL344	0-20+	EL4/74	8-20+
EL1/60	0-20+	EL18/75	5-20
EL5/62	0-20+	EL18/79	1-20+
EL12/65	18-20+	EL24/80	15-20+
EL15/65	0-20+	EL26/80	7-20+
EL13/67	11-20+	EL24/80	16-20+
EL10/68	15-20+	EL49/82	16-20+
SPL36	17-20	EL33/83	10-20+
EL24/69	17-20+	EL2/84	12-20+
EL14/70	18-20+	EL37/84	5-18
EL36/70	8-20+	EL49/87	17-20+
EL35/70	0-20+	EL30/88	15-20+
EL19/72	14-20+	EL48/89	10-13
EL10/72	14-20+	RL8805	10-20

<u>Licence Radial extent (km)</u>		<u>Licence Radial extent (km)</u>		<u>Licence Radial extent (km)</u>		<u>Licence Radial extent (km)</u>	
Beauty Point				Whale Point			
EL1/60	0-20+	EL17/73	1-6	EL36/82	14-20+	EL104/87	5-12
EL5/62	2-20+	EL11/79	2-10	EL29/82	1-20+	EL110/87	12-14
EL14/65	16-20+	EL18/79	15-20+	EL26/82	1-20+	EL94/87	12-15
EL3/65	1-18	EL21/79	4-20+	EL23/83	4-20+	EL4/90	15-20
EL15/65	4-20+	EL50/80	5-7	EL29/84	16-20+	EL11/90	20-20+
EL7/67	3-17	EL24/80	5-20+	EL19/85	18-20+	EL38/90	11-20
EL12/67	12-20	EL39/81	6-12	Port Huon			
EL13/67	0-20+	EL28/81	0-20+	EL13/65	15-20+	EL28/82	3-20+
SPL45	14-20+	EL45/82	15-20+	EL17/65	0-20+	EL23/83	9-20+
EL10/68	12-20+	EL39/82	3-20+	EL29/70	13-20+	EL40/83	7-20+
EL7/69	2-6	EL60/83	3-20+	EL3/70	18-20+	EL29/84	0-20+
EL14/69	0-14	EL17/82	1-12	EL22/79	10-20+	EL11/84	22
EL24/69	12-20+	EL17/85	2-10	EL26/79	9-20+	EL18/85	18-20+
EL26/70	3-12	EL50/87	14-20+	EL29/79	2-20+	EL23/85	9-20+
EL33/71	5-9	EL18/87	2-14	EL37/79	17-20+	EL19/85	2-10
EL5/71	0-11	EL99/87	5-7	EL26/79	9-20+	EL53/86	2-20+
EL7/71	17-20+			EL29/79	2-20+	EL52/86	12-20+
Bell Bay				EL37/79	18-20	RL8714	2-11
EL5/62	5-20+	EL53/80	18-20+	EL8/80	2-15	EL7/86 (pt 2)	17-20+
EL1/60	0-20+	EL41/80	14-18	EL5/80	0-20+	EL7/86 (pt 3)	18-20+
EL2/67	0-20+	EL35/81	5-20+	EL6/80	20-20+	EL12/87	0-20+
EL13/67	0-20+	EL38/82	10-20+	EL27/81	13-20+	EL13/87	0-20
SPL69	18	EL16/85	18-20+	EL36/82	2-15	EL11/87	10-20+
EL31/70	7-12	EL31/86	12-20+	EL29/82	9-20+	EL104/87	17-20+
EL37/71	16-19	EL36/86	15-20	EL26/82	2-20+	EL94/87	14-20
EL26/76	10-20+	EL32/87	16-20+	EL27/82	0-20+	EL38/90	3-16
EL16/79	6-15	EL39/87	6-20+	REFERENCES			
EL21/79	2-15	EL10/90	2-20	LEAMAN, D. E. 1973. Applied geophysics in Tasmania, Part 1; Summary of survey and rock properties. <i>Bulletin Australian Society Exploration Geophysicists</i> . 4 (2-3):27-58.			
EL24/80	15-20+	EL10/91	8-14	LEFOND, S. J. 1983. <i>Industrial Minerals and Rocks</i> . American Institute of Mining, Metallurgical and Petroleum Engineers: New York.			
EL26/80	7-20+			LONGWORTH & MCKENZIE PTY LTD. 1981. <i>Report on Stage 2 - geological investigation of EL 43/70 for Kaiser Aluminium</i> . Longworth and McKenzie Limited [TCR 1553].			
Long Reach				EL13/65	15-20+	EL11/84	23
EL13/67	4-20+	EL53/80	12-20+	EL17/65	0-20+	EL29/84	0-20+
EL2/67	0-20+	EL35/81	2-20+	EL29/70	13-20+	EL18/85	17-20+
SPL69	14	EL38/82	8-20+	EL3/70	18-20+	EL19/85	2-10
EL31/70	4-13	EL16/85	14-20+	EL26/79	9-20+	EL23/85	8-18
EL37/71	14-17	EL31/86	6-20+	EL29/79	2-20+	EL7/86 (pt 2)	14-20+
EL16/72	19-20+	EL36/86	10-15	EL37/79	18-20+	EL7/86 (pt 3)	18-20+
EL26/76	5-20	EL32/87	14-20+	EL8/80	2-15	EL53/86	2-20+
EL16/79	6-15	EL39/87	8-20+	EL5/80	2-15	EL52/86	12-20+
EL21/79	3-20+	EL98/87	15-18	EL6/80	20-20+	EL104/87	16-20
EL63/80	2-20	EL1/88	0-20+	EL27/81	13-20+	EL94/87	13-20
EL53/80	13-20+	EL56/88	3-19	EL36/82	2-15	RL8714	2-11
EL41/80	8-13	EL10/90	2-15	EL27/82	0-20+	EL11/87	10-20+
EL28/81	0-20+	EL10/91	7-14	EL28/82	4-20+	EL12/87	8-20+
EL35/81	2-20+			EL26/82	2-20+	EL13/87	0-20+
Triabunna				EL29/82	12-20+	EL38/90	2-16
EL17/65	0-20+	EL15/79	15-20+	EL23/83	9-20+		
EL20/74	7-20+	EL30/80	7-20+	REFERENCES			
EL14/79	11-17	EL1/88	7-20+	LEAMAN, D. E. 1973. Applied geophysics in Tasmania, Part 1; Summary of survey and rock properties. <i>Bulletin Australian Society Exploration Geophysicists</i> . 4 (2-3):27-58.			
Electrona				LEFOND, S. J. 1983. <i>Industrial Minerals and Rocks</i> . American Institute of Mining, Metallurgical and Petroleum Engineers: New York.			
EL17/65	0-20+	EL18/85	5-11	LONGWORTH & MCKENZIE PTY LTD. 1981. <i>Report on Stage 2 - geological investigation of EL 43/70 for Kaiser Aluminium</i> . Longworth and McKenzie Limited [TCR 1553].			
EL22/79	10-20+	EL53/86	2-20+	NOLDART, A. J.; THREADER, V. M. 1974. Economic geology, in: GEE, R. D.; LEGGE, P. J. Geological atlas one mile series. Zone 7 Sheet 30 (8215N). Beaconsfield. <i>Explanatory Report Geological Survey Tasmania</i> .			
EL26/79	1-20+	EL52/86	13-20+				
EL29/79	2-20+	EL7/86 (pt 2)	8-13				
EL5/80	0-20+	RL8714	20+				
EL8/80	15-20+	EL10/87	0-20+				
EL27/81	2-18	EL11/87	1-20+				

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