AUSTRALIAN UNITED GEOLOGICAL ASSOCIATES GROUP PTY LTD

ACN 006 476 419 ABN 63 006 476 419

(THE AUGA GROUP)

POB 86 MOAMA NSW 2731

Report Prepared for Pacific Basin Bluestone Pty Ltd (of 491 Smollett Street Albury NSW 2640) over EL 21/2012 (2 Sq. Km. at Mount George in Northern Tasmania)

This is a composite report covering the outstanding reporting due for the period 01 OCT 2013 – 31 MAR 2015 inclusive and includes the following:

1 December 2013 Quarterly Mineral Exploration Report

2 March 2014 Quarterly Mineral Exploration Report

3 2013/14 Annual Technical Report

4 2014/ 2015 Annual Technical Report

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Completion 06 May 2015

ABSTRACT

A OBJECTIVE

To identify an economically viable volume of pristine dolerite close to the port of Bell Bay with high bulk modulus to meet present and anticipated export demand

B METHODOLGY

- Literature Survey
- Air Photo Interpretation and Satellite Imagery Review
- Ground Reconnaissance and Field Truthing
- Chip Sampling – surface

C RESULTS

- An acceptable, but limited resource
- Isolated location, but hosting a good quarry site
- Likely insufficient to meet the commercial scrutiny of a bank
- Remote from closest port
- Conveyor movement of product denied
- Transport limited to road

D RECOMMENDATIONS

- Retain the Exploration Licence area for the present
- Conduct limited drilling to refine knowledge of rock character at depth if further tenement acquisition unavailable
- Pursue acquisition of EL 6/2009 and RL 3/1997 – each possessing superior geoscientific assessment and closer proximity to Bell Bay Port

CONTENTS

Author Dr. H.J. Harrington PhD FRSV
Geologist
Director Tasmanian Hardrock Pty Ltd
Undated (but likely circa 1995)

1 INTRODUCTION

- **Datum - Coordinate Datum GDA94**
  No mapping undertaken during the reporting period

- **Exploration Rationale/Objective**
  To identify an economically viable volume of pristine dolerite close to the port of Bell Bay with high bulk modulus to meet export demand

  Geological Setting
  Well-established and understood for dolerite, the EL has almost no overburden and the outcropping rock is generally not greatly weathered Soil is virtually non-existent on slopes greater than 10 degrees

- **EL 21/2012** (2 Sq. Km. at Mt. George Northern Tasmania)
  See accompanying plan
  Reporting Period 2013-2015 inclusive
  Tenement Holder – Pacific Basin Bluestone Pty Ltd (ACN 156 204 134)

2 REVIEW OF PREVIOUS WORK DURING THE LIFE OF THE EXPLORATION LICENCE

- Guide Notes for a visit to Bell Bay, George Town and a Proposed Superquarry site in Williams Creek Northern Tasmania
  Author - Dr. H.J. Harrington for Tasmanian Hardrock Pty Ltd (circa 1995)

- Delta Materials Pty Ltd MRT Reports (Various)

- The Rock Which Makes Tasmania
  David Edward Leaman PhD
  ISBN 0958119902 (Leaman Geophysics 2002)

3 EXPLORATION COMPLETED DURING THE REPORTING PERIOD

- **Desktop studies** as above at serial 2

- **Regional Exploration Activities**
  Selective Reconnaissance over 26 sq. km. comprising EL 21/2012, EL 6/2009 and RL 3/1997 to establish overburden, fault control and fracture pattern and any obvious weathering profile
  Review of satellite imagery

- **Prospect-based Exploration Activities**
  Air photo interpretation allied to ground truthing in the field
  Systematic chip sampling and hand-lens evaluation

4 DISCUSSION OF RESULTS

As anticipated the EL area does provide an acceptable, but limited resource of dolerite. Given the company's over-arching commercial objective, this terrain though is unlikely to be sufficient to satisfy a major business partner with sufficient confidence to risk investing significant expenditure in what is arguably a novel enterprise. This particular site is arguably located at the extremity of commercial acceptance.

5 CONCLUSIONS

- **Recommendations**
  Retain EL 21/2012 for the present. Consider undertaking a modest drilling programme to refine knowledge of the resource at depth. Employ geophysical methods to identify any structural discontinuity and deep weathering which might not be observable at the surface. Since a significant portion of the EL (in the south) is dominated by a gas pipeline corridor, it is recommended that the EL be reduced to excise the excluded area.

- **Proposed Future Exploration**

  Acquire title over EL/2009 and RL 3/1997 – thus providing ground closer to the port with a substantial body of recent MRT exploration reporting including drilling and geophysics results.

  Concentrate most effort on the best ground closest to the port, thus permitting minimum distance for conveyor transport to port.

6 ENVIRONMENT

- Surface Disturbing Operations - Nil
- Archaelogical Surveys - Nil
- Botanical Surveys - Nil
- Fauna Surveys - Nil
- Rehabilitation - Unnecessary
- Capping of Drill Holes - Not applicable

EXPENDITURE TABLE (01 OCT 2013 – 31 MAR 2015 INCLUSIVE)

ACTIVITY	YEAR	$
1 Literature Review		
2 Geological Reconnaissance Ground Truthing	40 Hours @ $600/hour for the period 01 OCT 13 to 31 MAR 15	24,000.00
3 Air Photo Interpretation Review of Satellite Imagery		
4 Travel Accommodation Victualling General Disbursements Telephone/Facsimile Postage Secretarial word processing etc		2,000.00

REFERENCES x 2

- Delta Materials Pty Ltd MRT Reports for EL 6/ 2009

- The Rock Which Makes Tasmania
  D.E. Leaman PhD
  Published by Leaman Geophsyics (2002)
  ISBN 0958119902

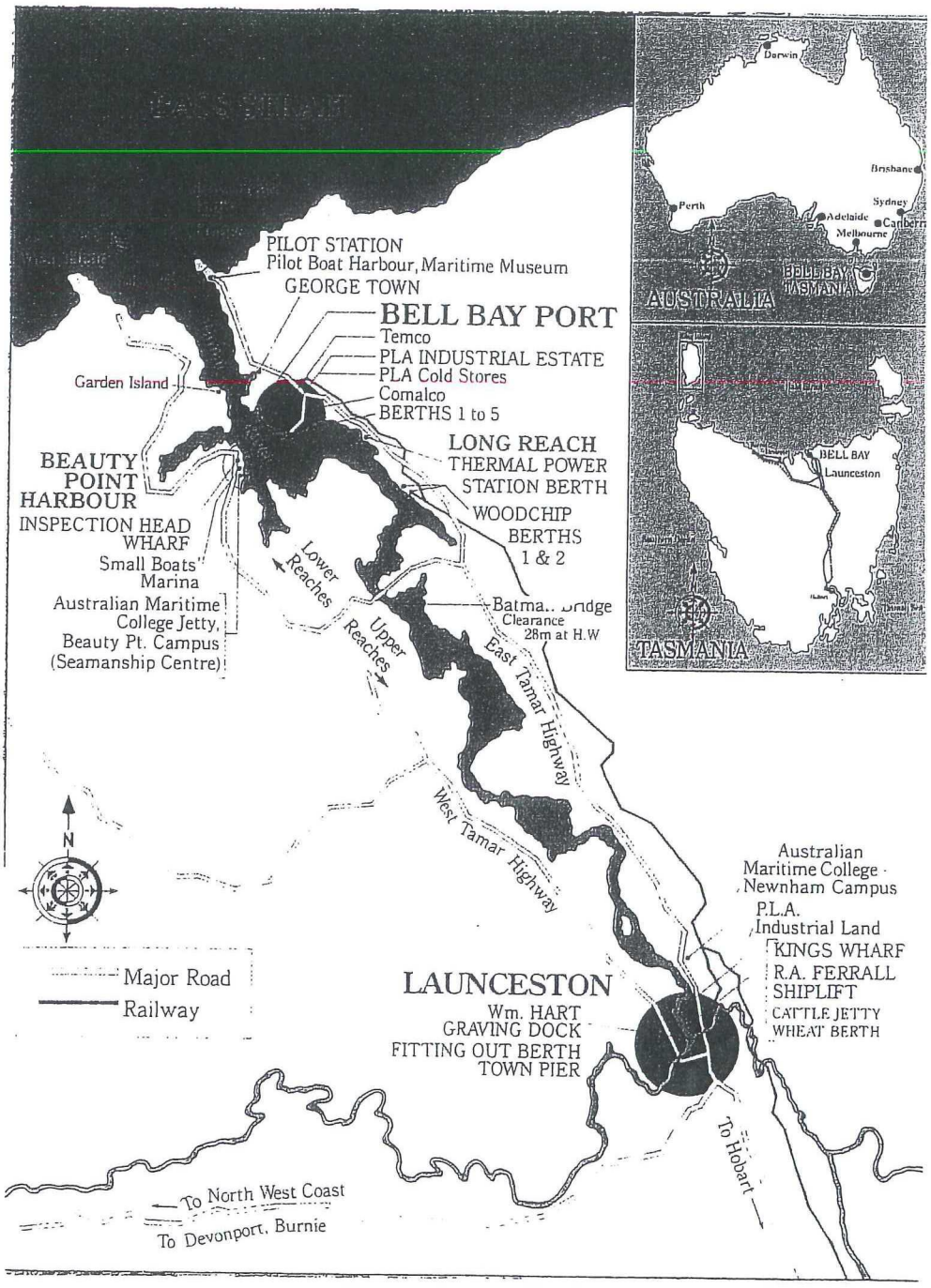
APPENDICES x 1

- Unpublished Guide Notes for a visit to Bell Bay, George Town and a Proposed Superquarry Site in Williams Creek Northern Tasmania

  Author Dr. H.J. Harrington PhD FRSV
  Geologist
  Director Tasmanian Hard Rock Pty Ltd
  Undated (but likely circa 1995)

TASMANIAN HARDROCK

GUIDE NOTES FOR A VISIT TO BELL BAY, GEORGE TOWN AND A PROPOSED EXPORT SUPERQUARRY SITE IN WILLIAMS CREEK NORTHERN TASMANIA


PILOT STATION
Pilot Boat Harbour, Maritime Museum
GEORGE TOWN
BELL BAY PORT
Temco
PLA INDUSTRIAL ESTATE
PLA Cold Stores
Comalco
BERTHS 1 to 5
Garden Island
LONG REACH
THERMAL POWER
STATION BERTH
WOODCHIP
BERTHS
1 & 2
BEAUTY
POINT
HARBOUR
INSPECTION HEAD
WHARF
Small Boats
Marina
Australian Maritime
College Jetty,
Beauty Pt. Campus
(Seamanship Centre)
Lower Reaches
Upper Reaches
Batma.. Bridge
Clearance
28m at H.W
East Tamar Highway
West Tamar Highway
N
Major Road
Railway
LAUNCESTON
Wm. HART
GRAVING DOCK
FITTING OUT BERTH
TOWN PIER
Australian
Maritime College
Newnham Campus
P.L.A.
Industrial Land
KINGS WHARF
R.A. FERRALL
SHIPLIFT
CATTLE JETTY
WHEAT BERTH
To Hobart
To North West Coast
To Devonport, Burnie
Darwin
Brisbane
Perth
Sydney
Adelaide
Canberra
Melbourne
BELL BAY
TASMANIA
AUSTRALIA
BELL BAY
Launceston
TASMANIA

THE DEAL

COMPANY B3 (BELL BAY BLUESTONE)

Tasmanian Hardrock Pty Ltd has carried out successful exploration and located a large deposit of bluestone in a fine situation beside the Port of Bell Bay and close to other infrastructure that includes water, gas, electricity, a highway and the housing and labour in George Town. The deposit is a major tangible asset at the surface that can be inspected easily. It is proposed that a superquarry be developed in it with the products being shipped to markets in Australia and overseas. Tasmanian Hardrock has exploration skills but is not set up for the business development which should now pass to people with the necessary major business skills and experience.

It is possible that the development could be done by a new company, here termed B3, (a name based on the first letters of Bell Bay Bluestone). Some suggestions follow.

The company would acquire the deposit from Tasmanian Hardrock, or the right to work it, using a valuation or valuations by one, or two, expert independent valuers who are chartered members of the AusIMM and are recognised by the ASX. Then B3 would develop a business that would have two main parts – one a quarry and the other shipping arrangements.

The quarry and supporting works and equipment would cost maybe $20 million for a production of 1 million tonnes a year.

No capital costs are involved for ships because chartered vessels would be used for those buyers who want the rock delivered by B3 to another port. Other buyers, like many of the buyers of iron ore and coal, would make their own shipping arrangements.

The tentative and preliminary estimate of the IRR on the next page was calculated by KPMG using data in a business plan prepared by Tasmanian Hardrock.

INTERNAL RATE OF RETURN

AUD 000

Year	1	2	3	4	5	6	7	8	9	10	11	12
Establishment:												
Stage 1	-1000											
Stage 2		-11165										
Contingency		-1000										
Working capital			-3825									
Replacement mobile equipment							-3150					
Sales			17500	35000	35000	35000	35000	35000	35000	35000	35000	35000
Operating costs			-14700	-27480	-27480	-27480	-27480	-27480	-27480	-27480	-27480	-27480
Net cash			-1025	7520	7520	7520	4370	7520	7520	7520	7520	7520

IRR to year 12	35%											

This preliminary table was produced by KPMG from data in a Tasmanian Hardrock business plan. It is no more than indicative of the return on a capital expenditure of $20M for the quarry and ship loading facility. The IRR will have to be changed to take account of the negative effect of the cost of an arrangement with Tasmanian Hardrock, and the considerable positive effect on net cash of working 2 shifts to increase production to 2Mtpa, or 3 shifts to 3 Mtpa. It is also desirable to consider depreciation, new R&D subsidies that could be announced in the Australian budget of 2004, and export development grants. It is based on the selling price for Bell Bay and does not include a consideration of shipping because some buyers will prefer to make their own shipping arrangements and for some voyages the costs can be variable because of the positive effects of back-loading. Yet another possibility is the reduction in capital costs if some or all of the quarry plant is leased, or if the quarry work is done by contractors. Note that the production in Year 3 is put at 500,000 tons and thereafter at 1Mtpa but sales could be greater or less. The effect of greater sales would be dramatic.

THE ECONOMIES OF SCALE

OPEN PIT (QUARRY) COSTS IN BROAD TERMS

Costs vary from site to site being affected by fuel and local factors.

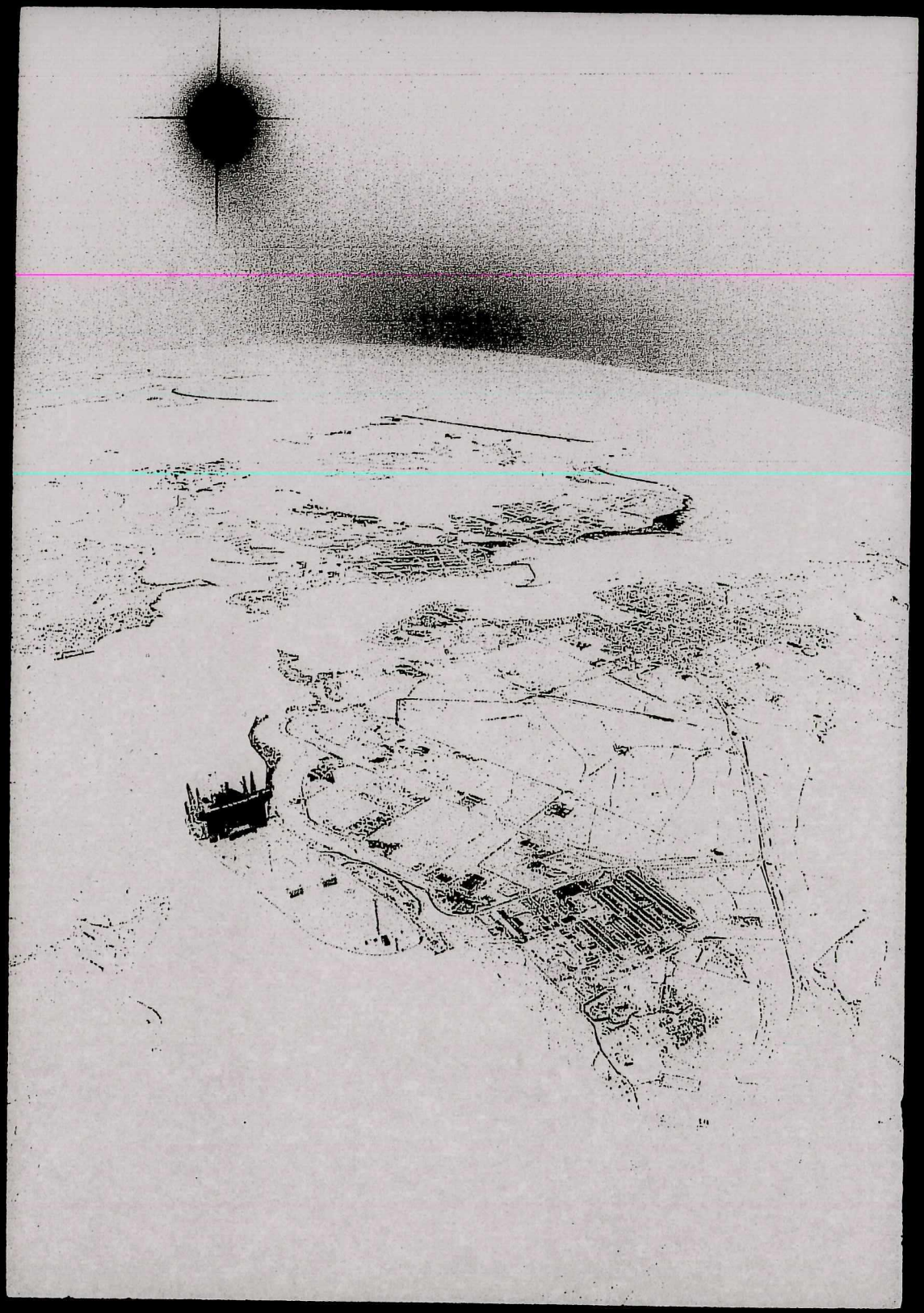
The figures below are for an early start-up at 150,000 tpa rising to superquarry outputs of 15,000,000 tpa. Costs at productions up to 1,000,000 tpa are well known from many quarries (open pits), and costs at the higher outputs are known from the Kalgoorlie superpit and other sources.

Only the figures for hard rock are significant at Bell Bay because of the almost complete absence of medium rock and of weathered overburden (soft rock).

MINING RATE									
(tonnes/day)	500	1,000	5,000	10,000	15,000	20,000	25,000	35,000	50,000
(million t.p.a.)	0.15	0.30	1.50	3.00	4.50	6.00	7.50	10.00	15.00
OPEN PIT MINING COST ($/tonne)									
hard rock	$5.00	----------	----------	----------	----------	----------	----------	----------	$1.00
medium rock	$3.00								$0.75
soft rock (e.g. overburden)	$1.00	----------	----------	----------	----------	----------	----------	----------	$0.50

CAPITAL EQUIPMENT COST OPEN PIT MINING (VALUES ARE IN $MILLIONS)

(total $millions)									
hard rock	$1.00	----------	----------	----------	----------	----------	----------	----------	$100.00
medium rock	$0.75								$50.00
soft rock	$0.50	----------	----------	----------	----------	----------	----------	----------	$30.00



Bell Bay and ship beside the Comalco aluminium plant, with George Town and Beaconsfield on opposite sides of the harbour, near sunset.

THE ROCK SUPPLY INDUSTRY AND THE RATIONALE FOR THE BELL BAY QUARRIES

Because the rock industry keeps a low profile many people do not realise that it is one of our largest industries, and that it generates profits not only at quarries but also in transport, and in the use of its products in manufacturing.

In Australia the production of rock is over 120 million tonnes. The price from a bin at a quarry varies from $6 to $10 per tonne usually, but can be $24 or more. The cost to put the rock in the bin is usually about $5.

Transport by road beyond the pit increases the value of the rock up to 6 times or more, though usually less. There are no statistics for the average increase, but if it is 2.5 times, the raw crushed rock has an average delivered value of say $16 per tonne and a total value of around $2,500,000,000. That figure is "soft" but it gives an idea of the size of the industry; and it allows another point to be made: the rock industry has one foot in quarries, a foot and one arm in heavy transport tied to the quarries, and an arm in manufacturing.

On the production side the industry has two segments, five-sixths of it being based on hard-rock quarries and one sixth on river gravels.

On the consumption side there are three main segments, roads, concrete and manufacturing plants, and each of those has subdivisions. For example a road consists of three layers, the sub-base, base and top-course. First-grade rock is needed for the top-course which is in the form of asphalt of several specifications, or top-chips sprayed with tar. High-quality rock is desirable because it can mean that a main city artery might need resurfacing only every ten years instead of every five years with resultant savings.

Manufacturing plants are of many kinds. Some are small and make simple products such as concrete building blocks and pavers. Others are larger and make more complex products such as beams, power-line poles, railway ties, pipes and culverts. The making of each product can support several businesses in any large city.

The division of the total market into regional markets, and segments and subdivisions, is very important to the proposed Bell Bay quarries because it provides many niche markets at the start-up stage. For viability the quarries require only two niche markets of 500,000 tonnes. Those markets are small by industry standards but are numerous, and some are facing the exhaustion of the quarries that supply them, as will now be explained.

Historically the industry started with tens of thousands of quarries of homestead or village size. Modern large cities now commonly have only two or three major quarries in or near them, and several small quarries. Characteristically the quarries were established in an early phase of each city's growth, and without protective buffer zones. The cities expanded around them, and over other potential quarry resources which are now unworkable. Many of the original quarries are approaching exhaustion, and the quarry operators face intense opposition when they try to move

anywhere in or near built-up areas. They are forced to move a long way from the city they are serving, and even then can face opposition and very strong environmental regulations as well as high road transport costs.

Sydney is one example of this situation. For many decades most of its rock came from quarries in dolerite at Prospect, 28 km west of the CBD. Suburbia spread around and far past Prospect. The first-grade rock is worked out. There is still a large quantity of low-grade material which can be sold for some uses. The exhaustion of reserves was foreseen and quarries were started elsewhere. River gravels and sands along the Nepean River below Penrith are important. Hard-rock quarries were started south of Wollongong but they have limited lives and are 95 km or more from Sydney. The Land and Environment Court gave permission for two new quarries near Berrima and Mittagong, 105 km and 130 km from Sydney, or one-third the distance to Canberra. They have not yet opened and face high establishment costs, estimated at $32 million just for road access in one case, and high road transport costs.

The Sydney situation triggered lateral thinking by Tasmanian Hardrock, and the recognition that sea transport from a source far from Sydney had become competitive with road transport. Rail transport was investigated and rejected for the time being, because it is restricting and has high charges, the lowest State charge being 5.85 cents per tonne/kilometre for wheat. In addition the States use rail as a taxing device in the case of coal, and they could do that just as easily with rock. This might change as the rail system evolves.

A geological search for a suitable rock deposit was conducted over the whole of Australia, being concentrated near ports or potential ports. Very quickly it was found that virtually all of the coastal cities in Australia have problems similar to those of Sydney, though different in details, and none had quarries, or could have quarries capable of supplying Sydney on a long-term basis. It was then realised that a suitable coastal quarry, when located, and if large enough, could supply rock to several major Australian cities, and gain economies of scale. It was only another step to the realisation that many overseas cities in coastal locations, and most are coastal, would be facing difficulties just like those of Australian cities. There was an incentive to look for a high-quality very large deposit that could be used to export rock to a number of domestic and overseas port cities.

During the search for a deposit, it was learned from the Institute of Quarrying that European cities faced similar problems to those in Australia, with the result that the industry was undergoing major reconstruction. It has been necessary in Europe to obtain rock by sea from distant locations, and four super-quarries were opened about 1986 to 1988, one in a sea-loch in northwest Scotland, one on the Isle of Lewis, one in a Norwegian fjord and one in Nova Scotia (Canada). They are called super-quarries because the economies of scale allow them to have productions up to 15 million tonnes p.a.

The Glen Sanda quarry of Foster Yeoman in Scotland was the first to open and supplies the British region and the North Sea region, but also sends 1 million tonnes per annum to Texas. The Explaura quarry in Nova Scotia supplies Atlantic cities and

Gulf cities in the USA, and any other markets as opportunities are made. All opened because of market pressures and opportunities.

At the same time a big change was occurring in the increase in the numbers of self-unloading ships. They have been observed by the writer on the Great Lakes system where they help to make Chicago – Detroit one of the world's biggest port systems even though those cities are nearly in the geographical centre of North America. Self-unloaders are now used by Foster Yeoman, of Britain, providing great flexibility in the selection of discharge points, with competitive advantages.

The knowledge that the idea of super-quarries had been successfully developed in the North Atlantic using shipping transport greatly increased our confidence level for adopting the same system in the Pacific. A long exploration programme was undertaken in Australia and other Pacific regions such as New Zealand. Places with social or political problems were rejected.

An area at Bell Bay met all the criteria for acceptance. No other suitable site was found, which could mean that would-be competitors could face great difficulties. If they do appear there is room for them because even a production of 15 million tonnes is only a small fraction of the total market in coastal cities.

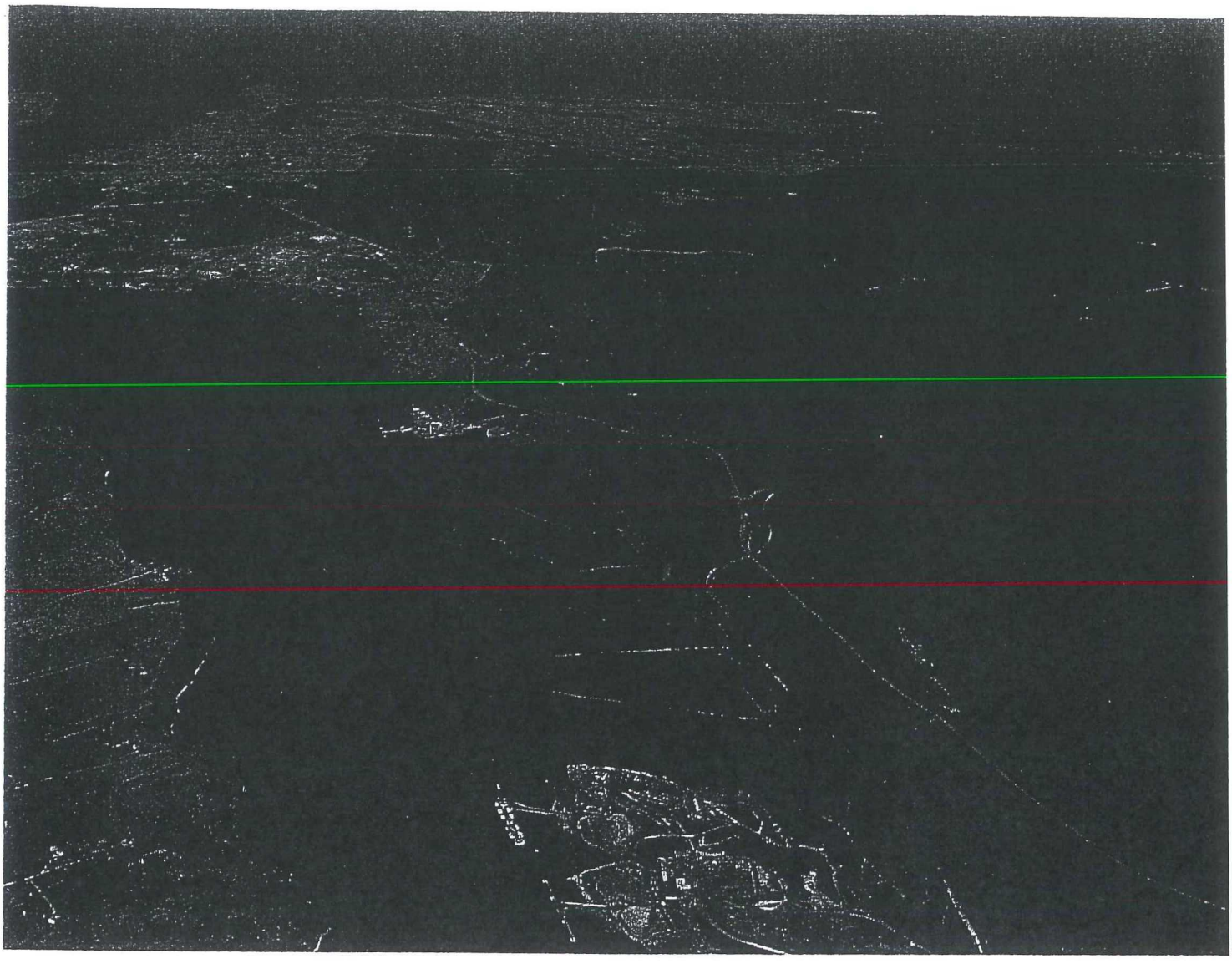
THE NAME BELL BAY BLUESTONE

Geologists have hundreds of names for different rocks, but only a few such as basalt and granite are used by the public.

Strictly the rock at Bell Bay should be named dolerite, a name that has sensitive overtones of meaning in Tasmania, but it is meaningless for most people outside Tasmania, and for trade purposes it has become necessary to adopt the well-known trade name, bluestone.

Engineers and others habitually use the word bluestone for the rock chips, usually about 10 mm in diameter, that are used in Australia to make thousands of kilometres of tar and asphalt roads, and thousands or millions of cubic kilometres of concrete.

(For those who are interested dolerite is similar to basalt except that the crystals in dolerite are coarser because the parent hot liquid termed magma, cooled more slowly than basalt magma. Some of the dolerite at Bell Bay is so coarse that it makes a fine polished stone that was once sold as Tamar Black Granite).



Bell Bay harbour with woodchip yards in the foreground and a ship being loaded for Nagoya. The hills to the right of the highway, lower right, contain the bluestone deposit and the planned superquarry. Rock will be moved by conveyor belt for 1.5 km to a ship berth. To the left of the highway the long straight cleared strip carries electricity, water and gas lines. George Town and its aluminium and steel alloy industries are in the distance.

THE BLUESTONE DEPOSIT, ITS POSITION, SIZE AND QUALITY, AND THE TITLE TO IT

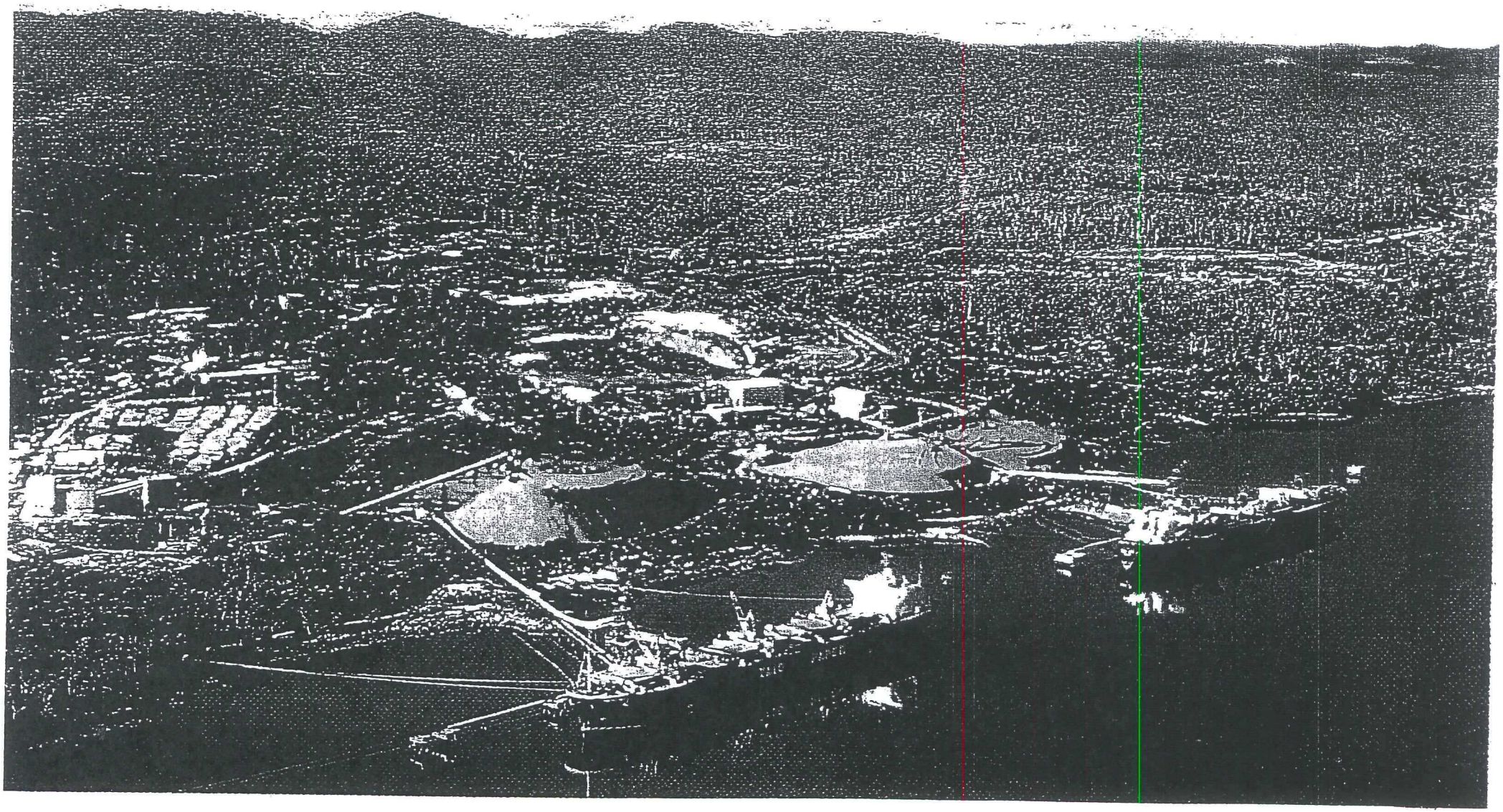
Bell Bay is a large harbour in northern Tasmania. At the end of World War II it was pin-pointed as the place for a new industrial zone. On its eastern side there is George Town (two words) and a narrow zone of fairly flat land, parts of which are occupied by industries such as the large TEMCO plant of BHP Billiton, the COMALCO aluminium plant, a gas-fired power station and wood-chip plants.

Behind the flat land there are high hills consisting of Bell Bay bluestone. Parts of the hills are reserves, but the greater part was taken up for exploration by Tasmanian Hardrock Pty Ltd. under an Exploration License issued by Mineral Resources Tasmania, formerly the Department of Mines and now part of the Department of Infrastructure, Energy and Resources.

After specified expenditure and exploration of the lease had been carried out, Mineral Resources Tasmania was satisfied that a major deposit of rock had been established and a Retention License was issued by the Minister to allow commercial development. Before extraction actually commences the Retention License has to be converted to a Mining License.

When the work on the Exploration Lease was done, Tasmanian Hardrock calculated a rock resource of several billion tonnes. Since that time the JORC code (Joint Ore Resources Committee) has been developed, partly to improve the estimates of resources and reserves in reports made to the Australian Stock Exchange. As a Fellow of the Australasian Institute of Mining and Metallurgy and other professional bodies, the writer is associated with the JORC Code and adheres to it, even though it is not strictly designed for the quarry industry. The original estimate has not yet been revised or divided into resource and reserve parts in accordance with the code. It would be comparatively simple to do so, given the excellent exposure of the rock, using an independent consultant. (In rough terms a reserve in a mine is proved by drillholes on all 4 sides, whereas a resource is indicated soundly but not absolutely measured on all 4 sides).

Most rock deposits elsewhere are covered by a weathered zone sometimes of the order of 50 m thick, that has to be removed at a cost, and transported at a cost to a dump and later restored. The Bell Bay deposit has very little soil or weathered rock on it, which means much lower working costs. It means also that it is well exposed at the surface and that, in turn, means that visitors can easily appreciate the huge quantity of rock for themselves, and have confidence that it exists. Moreover it is there to be observed and sampled, and large amounts of money do not need to be spent to find it, at considerable risk. That saving is very important. It means that the high costs and risks of exploration have been met already, that a deposit has been found, and is not deep underground but at the surface where it can be inspected and can be worked by the cheaper open pit methods. Water and power are critical to all mining ventures, and usually have to be provided at great cost, but they are already available adjacent to the lease, along with costly infrastructure such as a town and a port, a highway and a railway. Because of other mining ventures in northern



Two ships loading at the woodchip berths in Bell Bay harbour. The hills behind contain the bluestone deposit and the site for the superquarry. The berths are simple and the ships are loaded by conveyor belts and jetslingers. The rock loading berth will be similar and will be to the left of this photograph.

Tasmania, there are service and repair companies readily available at Launceston, Burnie and elsewhere. No other sites with such advantages still available are known to the writer. There is even a golf course between the quarry site and George Town, but the lease is free of housing or other developments. When the site was explored it was necessary to rub one's eyes to believe it all.

The quality of the rock is very high. Dolerite, the Tasmanian bluestone, has been used in Tasmania for roads, buildings and harbour works for 190 years and has been thoroughly proved in service. In addition, many thousands of samples have been the subject of standard testing in Government and industry engineering laboratories in Hobart and Launceston. Tasmanian Hardrock has had standard testing done by Boral laboratories, and also commissioned an independent summary report of other tests by the Department of Mines. Extracts from the technical reports are meaningful for engineers and structural architects, but not for others, and extracts are therefore relegated to an Appendix .

The engineering tests to be done are laid down by professional societies and government agencies, and Australian Standards, and it is worth noting that they are similar in Australia and Japan, and also in many other countries. It is also worth noting that in many places sub-standard rock is sold, and therefore engineers and architects are forced to write specifications to suit what is available, not what is best.

Japanese companies emphasise "purity", a concept not used in Australia, and roughly meaning absence of weathered rock and contaminants such as crushed brick and concrete and old asphalt roads, used mainly at present outside Australia as cheap additives or alternatives by some suppliers. They are used also for the benefits of recycling.

The uniformity of the Bell Bay deposit is of value because engineers and architects can get to know how it performs, whereas they are uncertain about the great variability of some other quarries. They can also prepare specifications for the best rock instead of having to design to fit whatever rock happens to be available.

THE QUARRY AND THE TRANSPORT OF ROCK TO THE SHIP

The quarry plant and operations are expected to be in a standard pattern, involving items like wheel loaders, a primary crusher, a vibratory grizzly feeder and so on. The cost of the plant is the main capital expenditure for the company at about $7M to $8M, with a range to be expected. In some situations the capital cost is avoided by using a contractor to construct the plant and operate it. There are specialist firms in that field. They are costly.

Transport of broken rock from the quarry to a ship loader was considered in a report commissioned from Mr. Don Reed, a partner in Sinclair Knight Merz, a well-known firm of consulting engineers. Before becoming a consultant, Mr Reed had been 15 years with Boral, TNT and Pioneer (as it then was), and had managed Pioneer in Israel and Spain, and he specialises in quarry work.

He considered the costs of trucks versus a conveyor. He estimated the cost of trucking from the quarry to storage on shore at the ship berth, a distance of 2 km mainly on an existing road, to be $1 flag fall plus $1, a total of $2 per tonne. There could be no capital cost for trucks for the company because there is a local tradition, built up in the large logging industry, of contract owner-drivers who obtain trucks by lease or other means.

A conveyor would go in a more direct and shorter line to the shore and would cost up to $2 million, which with interest would equate to 24 cents per tonne, plus a running cost of 30 cents, or a total of about 54 cents for a production of 1 Mtpa.

For a production of 500,000 tpa trucks would be chosen and for 1 Mtpa the conveyor would give a saving of 73%. The rock could be moved on a fairly small conveyor because it could be moved continuously over a period between the arrival of ships.

The conveyor would deliver rock to stockpiles and to bins holding 50,000 tonnes or more. Under the bins there would be another larger and faster conveyor to load the rock into adjacent ships, plus two or three feeders from the stockpiles to the conveyor.

The cost of bins and loading equipment was estimated at $1.5M or less.

SHIPPING

Tasmanian Hardrock has no shipping expertise and therefore obtained a report by a specialist on the cost of shipping rock from Bell Bay to Yokohama. The result was about AUD18 to AUD19 at the approximate middle of a range of costs, which are dependent on variables. One of the resultant tables with a breakdown of costs is on the next page. The exchange rate used was 0.75 for AUD to USD. The rate at 3 May 2004 was 0.719. The calculated figures are given in USD and AUD. The result is much the same as the cost of trucking rock from the proposed quarry at Berrima to the Sydney CBD, which is about $18 to 20 plus toll charges. That result is important.

The calculated shipping rate figure was therefore checked on 3 May 2004 with the Australian Government units for coal exports and iron ore exports, and they advised that prices and costs vary from contract to contract, but that a current average freight cost for coal to Japan is AUD16 plus discharge costs which are variable. Assuming low discharge costs of $2 to $3 the total freight would be around $18 to $19, or essentially the same as that calculated in the table. Rates for iron ore are comparable.

A further freight check could be made at a charge, but has not been made, with consultants to the coal industry Barlow Jonker (www.coalportal.com/) who are international but have a Sydney office (02 – 9221 8977).

The variables involved in freight charges are discussed very briefly below to help the understanding of the table.

The harbour depths at Bell Bay and Yokohama are similar. At the proposed Bell Bay berth there is a draft limit of 11.2m which equates to a vessel of around 55,000 tonnes maximum cargo lifting capacity (DWCT). This in turn means using "Handymax" (45,000 DWT) bulk carriers or partially loaded "Panamax" (65,000 DWT). An improvement would be ore-strengthened self-discharge bulk carriers with discharge rates up to 5,000 tonnes/hour because they are independent of the facilities at the discharge port which makes for flexibility and economy. Such vessels are used in the north Atlantic and Great Lakes. Another alternative would be a "geared" bulk carrier, a type fitted with cranes at each hatch giving a discharge rate of up to 1,000 tonnes/hour.

Charter rates change constantly, are listed regularly in trade sources, and at present are higher than those in the table because of a special situation, the rise in the exports of coal, iron ore and other bulk commodities to China. For the same reason the availability of ships is low at present, whereas not long ago many ships were laid up.

The speed of 13.5 knots used in the table is a standard used by ship brokers.

Bunkers used on bulk carriers are either Marine Diesel OIL (MDO in the table), Heavy Fuel Oil, or a mixture called Intermediate Fuel OIL (IFO). International bunker prices, based on Singapore, are usually tied to crude oil prices within about 10%,

SHIPPING
THE "MOST LIKELY" OF SEVERAL POSSIBLE COST SCENARIOS

Company	B3		
Voyage Route	Bell Bay to Yokohama to Bell Bay (Piston Run)		
Vessel Type	Panamax	Geared Type	Crane
Speed Knots	13.5	IFO – Sea Tonne/day	29.5
MDO Port and Sea Tonne/Day	0.2	IFO – Port Tonne/day	2
Cost MDO USD/Tonne (Syd/Melb)	$170	Cost IFO USD/Tonne (Syd-Melb)	$75
Type of Charter	Time	Rate per Day USD	$11,500
Cargo	Rock Aggregate	Deadweight Tonnes (DWCT)	50,000
Exchange Rate AUD/USD	0.75	Brokerage Commission & Taxes (USD)	$2,500
Load Port Data Name	Bell Bay	Pilotage Hours	5
Load Rate Tonne/Hour	3,000	Load Rate Tonne/Day	54,000
Delays Hours	6	Port Charges Fix (USD)	$16,900
Total Port Time Days	1.38	Port Charges Var (USD)	$52,604
Effective Hours Worked/Day	18	Marine Navigation Levies (USD)	$5,846
		Agent's Fees (USD)	$2,076
Voyage Data Voyage Distance Nautical Miles	9,750	Voyage Time Days + 15%	34.61
Discharge Port Data Name	Yokohama	Pilotage Hours	6
Disch Rate Tonne/Hour	1,000	Discharge Rate Tonne/Day	15,000
Delays Hours	6	Port Charges Fix (USD)	$14,500
Total Port Time Days	3.83	Port Charges Var. (USD)	$45,000
Effective Hours Worked/Day	15	Miscellaneous Charges (USD)	$4,063
		Agent's Fees (USD)	$7,188

Summary Total Round Voyage Time Days	39.82	**Rates (USD) Per Day**	**Freight Rate (USD/Tonne**	**Freight Rate AUD/Tonne**
Load Port Charges (USD)	$77,426	$10,500	$12.87	$17.16
Disch. Port Charges (USD)	$66,715	$11,000	$13.27	$17.69
IFO (Fuel) Voyage Cost (USD)	$77,349	$11,500	$13.67	$18.22
MDO (Fuel) Voyage Cost (USD)	$1,354	$12,000	$14.06	$18.75
Brokerage Commission & Taxes (USD)	$2,500	$12,500	$14.46	$19.28

and therefore move up and down continually, and are high at present. (Changes in oil prices also affect road trucks).

For a particular company the shipping arrangements can evolve, as markets develop. For example, Foster Yoeoman initially used chartered ships built in South Korea and owned in Norway, but now owns four vessels, Yeoman Brook, Yeoman Bank, Yeoman Bridge and Yeoman Bontrop, and they can be assumed to make a profit.

An informed source gave the information that CRA can move coal and iron ore to Japan for about AUD10 per tonne, but that is achieved by using ships of about 200,000 tonnes and deep harbours and approaches built especially for such superships. It is not known whether amortisation of the port costs is included in the shipping cost.

Shipping costs require more investigation, preferably by people experienced in the shipping of coal and iron ore from Australia to overseas ports, and experienced in handling shipments in the Australian scene, such as bauxite from Weipa to Gladstone, alumina from Gladstone to Bell Bay, and iron ore to Port Kembla. Shipping across Bass Strait benefits from subsidies, because the Strait and the highway from Bell Bay to Hobart are part of national highway 1.

MARKETS

INTRODUCTION

The project was aimed initially at the Sydney market which is over 4 Mtpa of first-grade rock and 3 Mtpa of lower grades. It was realised later that many other markets would be accessible by using sea transport, and data were collected on the ground in Sydney, Melbourne, Adelaide, Brisbane, Gladstone, Auckland, San Francisco, Los Angeles, San Diego and Chile. Some Asian markets proved to be more difficult to study because most of the statistical information is in languages other than English. The quarry industry is not "highly-regarded" and is not considered very interesting (although it certainly is) and consequently there are almost no books and monographs dealing with it. However, Austrade produced a large Overview Study of the Japanese market for us. Some potential markets in Asia remain to be studied. Data for selected potential markets are given below. In a most interesting way the recognition of new export markets occurred, and is occurring, faster than we can assemble data and prepare summaries. More detailed notes are given about the Sydney market than others because it was the first to be studied in detail and we learned so much from that study, and then realised that other export markets could be better and are far bigger. The Japanese market alone is equal to 142 Sydneys in size, but only part of it is coastal. Tokyo – Yokohama uses 300 Mtpa, or roughly 40 times more than Sydney.

SYDNEY

Statistical data for New South Wales and the Greater Sydney region are as good as, or better than, any in the world. They are collected by the Geological Survey Branch of the N.S.W. Department of Resources and Energy, but publication can lag for several years. Much of the latest information is in a large report prepared in the year 2001 with the title "*Supply and Demand for Construction Sand in the Sydney Planning Region*". (Sand is used in conjunction with rock and has similar supply problems). Data have been published also in many planning enquiries, because it has been recognised that major problems were arising on the reservation of rock resources. The resultant reports include "*Draft Sydney Regional Environmental Plan – Extractive Industry – Technical Working Papers*".

For a century rock was quarried from a deposit of dolerite near Prospect Reservoir, west of Parramatta, and 28 km from the Sydney central district. The first-grade rock has been used. Quarries have been opened elsewhere, the main hard-rock ones being south of Wollongong at Bombo and Dunmore and other locations towards Kiama. The market is dominated by three companies. All three opened gravel pits along the Nepean-Hawkesbury River below Penrith. An uncontrolled mess was such a possibility that the State Government actually got the companies to combine in the Penrith Lakes Scheme. (The effect, if any, on prices is left to the reader's imagination). The workings generally produce a deficiency of gravel (rock) and an excess of sand. They cannot extend easily downstream because of interference with the historic Windsor-Richmond district, and in any case the Hawkesbury system has become a publicised environmental problem.

So in 1989 CSR Readymix began to develop a large new quarry well away from Greater Sydney in the Southern Highlands near Mittagong. It is 105 km from Sydney, one-third of the way to Canberra. A newcomer, Amatek Ltd., then appeared from Brisbane, wishing to open a quarry even further into the highlands at Mt Misery near Berrima, 130 km from Sydney. The Mt Misery site has been re-named Compton Park.

The residents of the Berrima district were opposed to quarrying of any kind and tried to force CSR Readymix and Amatek to open only one quarry under joint management. CSR refused and the matter went to a lengthy Land and Environment Court hearing in 1991 at which major written submissions were made, and passed into the public record. The most relevant were from the Department of Minerals and Energy, from Professor Donald Barnett of Macquarie University and from managerial and technical staffs of the two companies. Some of the salient points that emerged during the hearing were:

- The consumption of hard aggregate in the Sydney region fluctuates with the economic cycle but is normally about 7 Mtpa (7 million tonnes per annum), and the official base has been taken as 8 Mtpa. It is expected to increase because road maintenance and construction have suffered neglect, public demand will force increases in construction, and the population is growing.

- About 4.6 million tonnes of production is first-grade rock.

- The Penrith Lakes Scheme has supplied 2 Mtpa of high quality gravel and can continue to do so for some time (unless there is earlier strong environmental opposition). Extraction downstream from the Wallacia Bridge has already been prohibited.

- Imports to Sydney by road, rail and sea from south of Wollongong have been about 1 Mtpa and are likely to decrease because the Wollongong demand is growing and the deposits have limited lives. Another 0.5 Mtpa is imported to Sydney from quarries north of Sydney in the Newcastle Mining District, and the quantity is likely to fall because local demand is growing and supplies are limited.

- Without the new quarries near Mittagong and Berrima a shortfall in supply of 3.2 Mt is expected, rising to perhaps 5.2 Mt.

- The quarries at Mittagong and Berrima are being developed to planned production rates of 500,000 tonnes rising to 1,000,000 tonnes. They will capture some of the shortfall market especially in the far western suburbs of Sydney, but road transport costs will be higher as they get towards the inner suburbs, the CBD, Botany Bay and the North Shore. (In those areas rock brought in by sea would be a serious competitor because of lower costs).

- Gravel from the Penrith Lakes Scheme will retain a market share in competition with the new quarries for about a decade. The prices of crushed and screened gravel at the three Penrith Lakes workings are known because they are "posted" for spot buyers, and are all similar, with examples below:

Size	Pick-up Price (ex-bin)	Delivered Price (to CBD)
40mm	$24.62/t	$34.50/t
30mm	$24.62/t	$34.50/t
14mm	$24.62/t	$34.50/t
10mm	$26.62/t	$35.15/t
5mm	$24.62/t	$34.50/t

More is charged for 10mm stone because it is the most popular size in all quarries. It is likely that the pick-up price includes a high profit. The transport charge is $9.88 for say 52 km, which is 19 cents per tonne kilometre, and it also includes a profit. The prices might or might not be dropped to meet competition when the new Mittagong and Berrima quarries are opened. Spheres of influence could be decided, or might be decided by costs.

- Quarry costs into the bin are often in the range $5.50 to $6.50 per tonne and normally are not really critical. The prices charged ex-bin are commonly around $11 to $12 in Australia, but are double that at Penrith, if given the posted prices of $24.62 to $26.62 (see above).

- Road transport costs are the critical costs, and are carefully guarded. No published figures have been found but at present they are known to be commonly in the range 15 cents to 20 cents per tonne kilometre, with or without a $1 flag fall, and varying with the road, traffic density, bridge loadings, truck size and type, the presence or absence of a trailer, fuel oil charges, taxes and tolls. The prices mostly charged are 19.2 cents per tonne kilometre to the CBD, or thereabouts.

  It is thought that road transport from the Berrima and Mittagong quarries will be at least $20 per tonne to the Sydney CBD, and more to the northern suburbs, at present costs and taxes, which is equivalent to 38 cents, with more and less factors.

- Marine sources of rock could be competitive within 10 or 20 km of harbours. Consequently several attempts have been made to copy the offshore dredging methods used in the English Channel region, but have come to nothing. Applications for offshore leases in the vicinity of the mouth of the Hawkesbury River caused an outcry, and were defeated by complex legislation. Lease applications further south have been granted over sand and gravel at depths of 30 to 50 metres. The marine aggregates could probably be raised by a "Severn and Scheldt" class trailing suction dredger and delivered to shore at the rate of 2,300 tonnes per day or approximately 675,000 tonnes p.a., but would have to be washed with fresh water to remove salt, and screened, with the disposal of waste being a problem.

  The quantity could possibly be increased to 1 million tpa. Most of the product would be sand. It could help to solve Sydney's sand problem (which is like its rock problem), but the product would contain undesirable broken shell, silt and clay.

MELBOURNE

Over half of the rock quarried in Melbourne is from basalt which is abundant in parts of the region and is sometimes a high quality rock. Statistics are excellent, along with regional planning overviews.

In the planning region termed the MSA (Melbourne Supply Area) there is adequate rock for a long time ahead but blending of materials from different quarries is often necessary to meet specifications because some rock is bluntly of poor quality.

Road transport costs are as usual the most important costs and are very similar to those in Sydney at $1 flag fall, 15 to 20 cents per tonne kilometre, and competition is high because most of the 900 heavy trucks have owner-drivers. The prices of rock delivered to the consumer are usually 40% lower than in Sydney because quarries are closer to the city.

Hard-rock production in the MSA is higher than in Sydney, ranging from 9.5 Mtpa to 12.5 Mtpa, about 80% of it being by the usual three majors. The main subdivisions of the market are the same as elsewhere, namely aggregate for concrete, aggregate for asphalt, aggregate for sprayed seal surfacing, prepared or unprepared road base and sub-base, railroad ballast, filter and bed material for pipe laying, armour stone and rip rap for protection works. (Sand and rock are together termed aggregate in the industry because they are mixed or aggregated with tar or cement to form a product).

The present supply situation is generally satisfactory, being weakest in the Mornington Peninsula along the eastern side of Port Phillip Bay, because it is furthest from the supply areas. There are predicted shortfalls in that rapidly growing sub-region of Melbourne, but they are of uncertain size. That sub-market is nicely accessible from Port Phillip Bay, either through the Port of Melbourne or through the use of self-unloading ships and it is regarded as a significant potential niche market, of a size to be determined by a more detailed study.

ADELAIDE

Quarrying in Adelaide is dotted along the Hills Face Zone behind the city, and consequently has severe "visual problems" because people object to the disfiguring scars on the background to the city. The problems and solutions are discussed in a major "*Report on the Enquiry into Quarrying in the Hills Face Zone*", (for the Environment Protection Council by the Department of the Environment).

The whole report can be summed up by the statement "the people want the quarries removed and re-vegetated" despite the fact that they provide cheap rock because of short transport distances.

The best alternative resource of first-grade material is in the Kulpara area 130 km from Adelaide, and the report includes a financial study of it. To transport the rock to Adelaide required a fleet of 1500 trucks, and a four-line summary of the capital costs is:

Quarry and crushing plants	$77,000,000
1500 trucks	$58,000,000
Working capital	$5,000,000
	$140,000,000

Part of this market is open to attack through Port Adelaide, but again a detailed sales study will be required.

PERTH

In many ways the supply problems for Perth are similar to those in Adelaide. The city is on a coastal plain with virtually no hard-rock resources. The four main quarries are in the inland Darling Scarp, and there are distance problems (transport costs) especially in the Fremantle-Kwinana part of the built-up region.

Again it seems that the market is open to attack through the Port of Fremantle but no detailed study has been made so far.

BRISBANE

This city is also different because its supply was dominated by gravel taken from the Brisbane River by clam-shell dredges and drag-lines and then screened and washed. All of the river plants have been closed down by Government dictat. New hard-rock quarries have been opened in the D'Aguilar Range north of the city. The rapidly-expanding coastal belt 20 km and more from the city has transport cost problems but is accessible by motorway from the Brisbane River port, which is being extended seawards for a long distance to become even more important than it is now. That northern region is a potential market.

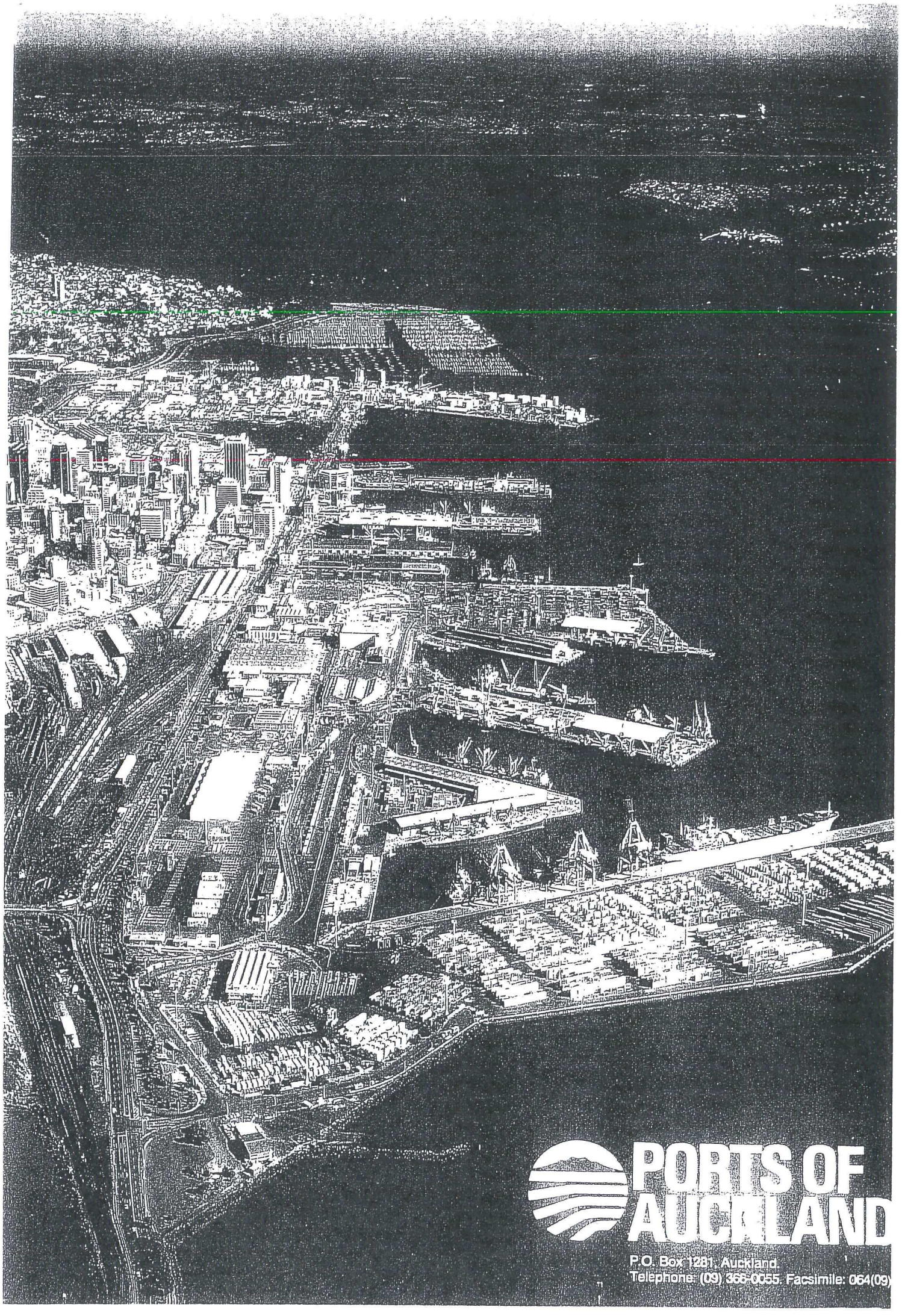
To the south the Gold Coast region uses gravel from the Coomera River and has no shortage of hard-rock resources. The same remarks apply to the Sunshine Coast to the north of Brisbane.

GLADSTONE

This excellent and rapidly-growing port was examined in case it had a rock supply that could compete with Bell Bay. None was found. The port has abundant low to medium-grade rock but has a problem with first-grade rock. It is a market for later detailed research partly because it offers potential back-loading of alumina to Bell Bay. The two ports need not be in competition; they could be complementary, with advantages for B3.

AUCKLAND

In practical terms, Auckland can be included with the Australian city markets. Three weeks were spent examining it, with assistance from government geologists, because it looked like a much easier market than Sydney.



P.O. Box 1281, Auckland.
Telephone: (09) 366-0055. Facsimile: 064(09)

The city has a population of about 1 million people, and is comparable with Brisbane and is expanding rapidly to north and south in the same way as Brisbane is expanding to the Gold Coast and the Sunshine Coast. It grew originally as three separate cities which merged and are now administered by the ARA (Auckland Regional Authority). The ARA commissioned a review of the aggregate resources of its region and for that purpose a leading firm of consultant engineers prepared a report which stated:

> "A number of the large quarries providing the bulk of the industrial material for the Auckland region are now tending towards the end of their economic life".

It is unusual in that it is not dominated by 3 or 4 majors. Instead there is only one major producer (Winstones, now owned by an Australian company) and its output was 1.47 Mt, or 25% of the total, from its Lunn Avenue quarry. This is popularly known as the Mt Wellington Quarry, and it is in an extinct basalt volcano, and produces some first-class rock. It is in an inner-suburban location and is a real money-maker, but the ARA wants it closed, to use it for a city dump. Some of the other quarries are in greywacke and argillite in the Hunua Hills 30 to 50 km south of Auckland City, and they have weathered-rock problems, but can supply the southern third of the ARA far into the future.

Like Sydney, the city is bisected by a harbour. The area north of the harbour and the harbour bridge once had a lot of rock but it was not reserved and is now covered by housing. This area is the equivalent of the Sunshine Coast and is actually called the Hibiscus Coast officially. Basically, this large region on the north side of the harbour has no hard-rock quarries. It is estimated that it uses about 2 Mtpa of which perhaps half is from the Mt Wellington Quarry. The other half has to come from further south and is open to capture by rock exported from Bell Bay to Auckland Harbour. Its capture up to the amount of 1 Mpta, would be almost certain if a dedicated unloading jetty is built on the sheltered east coast north of the harbour. There is another suitable harbour where sites will remain available for a few more years. An additional 1 Mtpa will be open for capture when the Mt Wellington Quarry is exhausted, making a potential total of about 2 Mtpa.

Auckland is therefore regarded as a prime target for exports from Bell Bay. The ships that are used should be able to get full back-loadings of paper (mainly newspaper) or timber from the Port of Tauranga, a short distance to the south, which adds very greatly to the attractiveness of the Auckland market. The back-loading potential makes the Auckland market particularly attractive.

JAPAN

Tokyo and Japan have been visited by H.J. Harrington for Tasmanian Hardrock and a large Market Overview Survey (42 pages) has been made for us by Mr Tim Overton-Clarke (Trade Commissioner) and Mr Hiroshi Gunji of Austrade, Tokyo. There is space for only some salient points to be given here:

- Statistical data are excellent but are in Japanese script. The total Japanese market is 1000 million tonnes (equivalent to 142 markets of Sydney size).

- MITI specialists and other estimated that in some areas the supplies will last for about 10 years and a minimum of 5 years. It is no wonder that they are being rapidly exhausted, given the awesome production per annum. (MITI is now termed METI which in April 2004 was incorporated in JOGMEC, Japan Oil, Gas and Metals National Corporation).

- The market in the Tokyo – Yokohama area is 300 Mtpa. Because of narrow roads it has to be distributed through the urban region in 10 tonne trucks (which are often over-loaded).

- The proposed Bell Bay production of 1 Mtpa is insignificant compared with the size of that market, and so is its capital requirement.

- Austrade tried to establish ex-bin prices by interviews, and by collecting delivered prices from consumers. There were difficulties because trucking costs are based on the time taken to deliver to the user from the quarry, and not distance. That is logical in areas of crowded traffic and traffic jams. They concluded that ex-quarry prices seem to vary between AUD 16 and AUD 20 per tonne (about twice the Australian prices and more than twice the Bell Bay FOB cost). Prices after delivery are guarded, and could not be established reliably by Tasmanian Hardrock or Austrade. Amusingly, dump truck organisations quoted $470 for a return trip to a distance not greater than 25 km for a 10 tonne truck, which equates to $47 per tonne or nearly $2 per tonne kilometre (and that must be questioned). Austrade thought the figure could be close to 39.16 cents per tonne kilometre.

  The trucking costs need more investigation, but seem to be roughly more than twice those in Australia, probably because only 10 tonne trucks are allowed whereas 20 and 40 tonnes are the norm in Australia. Tasmanian Hardrock has adopted a view that a viable strategy would be to target niche markets closest to ship-discharge points so as to undercut producers who have to truck through the cities from declining quarries to the north of Tokyo – Yokohama. Given the total consumption of 300 Mtpa, a niche market of 1 Mtpa would be relatively minor. One target could be near-shore cement factories. Onoda and other companies expressed interest. The market is worth a real effort, especially as existing quarries become exhausted.

  It is worth noting that harbour depth at Yokohama is almost the same as depths at Bell Bay, Melbourne and some other ports, but berthing and storage difficulties can be considerable. Berths are privately owned.

  The solution to the difficulties could be an alliance with a cement company, an existing quarry company or a Japanese trading house. It might assist to make a further study of the methods used successfully by iron ore and coal companies, and their shipping costs.

THE PHILIPPINES

It is said that there is a market in Manila but no study has been made by Tasmanian Hardrock.

CHINA

Shanghai is built on the delta of the Yangtse River. It might provide a market but no study has been made by Tasmanian Hardrock, although a short familiarisation visit has been made to China. Limestone is abundant in south China and about 1 Mtpa is back-loaded to Australia for steel-making processes, and despite sea transport competes with local limestone. It is a softer and less durable rock than bluestone, and Is not used in Australia for roads or concrete, but is used in China where it is available and other rocks are not. It could possibly be back-loaded to be used in the base and verges of major roads and for other lower-quality uses. It is not seen as a threat to Bell Bay but as an asset.

MATTERS FOR CONSIDERATION CONCERNING THE IRON ORE AND COAL EXPORT INDUSTRIES IN AUSTRALIA

Tasmanian Hardrock considers that the superquarry industry could become very big and could develop in much the same way as the coal and iron ore industries.

About 1960 there were roughly 90 coal companies in Australia and not one was taking the step into large-scale exporting, even though some had mines close to ports at Newcastle, Port Kembla and Brisbane. Perhaps the reasons were that markets were not recognised, or developed, and that shipping costs were assumed to be so high that exports were not practical. Perhaps there was inertia. There was no lack of capital. In that setting four men from Utah arrived, inspected the undeveloped Bowen Basin of inland Queensland, explored, started very large open pit mines, and built a town, a railway and port, and exported to Japan. Later they sold to BHP. The coal export business keeps expanding, and attracting overseas buyers and investors. Charbonnage de France approached H.J. Harrington for information about where to obtain deposits for a mine and were advised that they would now have to go inland to the Galilee Basin, far west of the Bowen Basin. They did so and acquired part-ownership of leases which had been partly explored at a cost of $49 million. If they are worked it will be necessary to extend a railway and build a town, and to equip an open-pit mine. (French coal mines were working at great depths and the last coal mine in France was closed on 23 April 2004).

There was a similar situation with iron ore. BHP had comparatively small mines at Whyalla and on islands off the Kimberley coast. Deposits had long been recognised by the Geological Survey of Western Australia, in the Pilbara region, but they were up to 400 km inland and companies considered that they were therefore unworkable. Two men, Hancock and Wright, did some investigation and started a rush which was won almost completely by two companies, CRA and BHP. Other companies were slow off the mark, perhaps through inertia, and missed out.

CRA and BHP essentially operate superquarries far inland with the associated railway and shipping transport systems, and do it profitably and are still expanding.

The rock export industry is likely to have a similar growth.

Coal has many contract prices because there are many differing contracts, but an accepted average price at present for steaming coal is AUD 61 per tonne fob Australia, and about AUD 77 plus discharge costs at a port in Japan. The cost in Australia includes long-distance rail freight in most cases.

Lump iron ore has an accepted average price of AUD 63.91 fob at a Hamersley port, and about AUD 81.91 plus discharge costs in Japan, and about AUD 91 plus discharge costs in Rotterdam. The cost in Australia includes rail freight, usually for longer distances than for coal (up to 400 km).

BUSINESS PLAN

A Business Plan has been prepared but should be revised by independent experts. Its list of Contents is given below merely to show its scope.

CONTENTS

SUMMARY

Superquarries operate profitably in the north Atlantic region.

Sea transport is so low-cost that rock can be moved across the Atlantic. The costs of moving coal from Australia to Japan and Rotterdam indicate that rock can also be moved in the same way in the Pacific.

A site very suitable for a superquarry has been found by Tasmanian Hardrock adjacent to Bell Bay, which means adjacent to a working harbour and adjacent to essential infrastructure.

The deposit of bluestone at the site is of superquarry size and of high quality and can be worked easily because it has almost no weathered overburden. The purpose of the visit is to inspect it so that people can form their own opinions.

Capital required for quarry equipment and for the transport of rock to the shore is estimated at $20M for productions at rates of 1Mtpa up to 3Mtpa. No capital is needed for shipping except for mooring dolphins and a loading conveyor.

The initial target markets are Sydney, Auckland and especially Japan because consumption in Tokyo-Yokohama is about 300Mtpa.

It is suggested that the business is ready for development by a new company, perhaps named B3 (Bell Bay Bluestone), with a management of experienced business people who can handle the capital raising and the operations and sales at a profit.

For a production of 1 Mtpa the costs and profits per tonne for exports to Japan have been estimated broadly, but not too broadly as:

Quarry costs	$ 6	or possibly less, including royalty.
Loading and port charges	$ 4	could be less.
Shipping to Japan	$18	variations are probable, can be $16.
Discharge in Japan	$ 4	variable.
	$32	
Sales	$40	variable in place and time.
Profit	$ 8	could increase as existing sources of rock are exhausted.

For exports to Sydney the shipping cost would be less, but the selling price would probably be less also. For productions over 1Mtpa the costs would decline significantly. The figures can be assembled differently, as in the table on page 2.

The industry seems to have a future like the superquarry industry in the north Atlantic, and like the coal and iron ore industries in Australia, given good management.

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DISCLAIMER

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APPENDICES

1. Tests (2 pages) by Boral laboratories of a sample from the preferred quarry site in Williams Creek, Bell Bay.

2. Summary of tests of Tasmanian dolerite assembled by Tasmania Department of Mines.

3. Japanese Industry Standards Sheet for Reporting the Results of Tests on Crushed Stone (1 page).

BORAL CONCRETE & QUARRIES

Materials Testing & Environmental Services
Boral Resources (NSW) Pty. Ltd.
A.C.N. 000 756 507
Greystanes Rd (PO Box 42)
Wentworthville NSW 2145 Australia
Telephone: (02) 688 9901 Facsimile (02) 688 9813

Registration No: 547

CLIENT: Tasmanian Hardrock Pty. Ltd. FILE NO: 288/95
PROJECT: Testing of Dolerite Spalls ex Bell Bay Tasmania
TEST PROCEDURE: AS1141 - Sampling and testing aggregates

Laboratory sample No:		3887
Date sampled:		August 95
Sample Description		Dolerite Spalls
Test Method	**Test**	**Results**
AS1141.6.1	Particle Density (Dry) kg/m^3	2900
	Particle Density (SSD) kg/m^3	2920
	Apparent Particle Density (Dry) kg/m^3	2970
	Water Absorption (%)	0.8
AS1141.22	Dry Strength (kN)	396
	Wet Strength (kN)	302
	Wet/Dry Str. Var. (%)	24
	Fraction tested (mm)	-19.0+9.5
AS1141.41/42	Polished Aggregate Friction Value (PAFV)	49

Sample submitted by client.

H.R. Harrington, File, Ref: 589.Rep

Authorised Signatory Richard Bawer

Date 23.8.95 *Serial No.* 010770

BORAL CONCRETE & QUARRIES

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Greystanes Rd (PO Box 42)
Wentworthville NSW 2145 Australia
Telephone: (02) 688 9901 Facsimile (02) 688 9813

Registration No: 547

CLIENT: Tasmanian Hardrock Pty. Ltd. FILE NO: 288/95

PROJECT: Testing of dolerite spalls ex Bell Bay Tasmania

SAMPLE DESCRIPTION: Dolerite Spalls

DATE SAMPLED: August 95

TEST METHOD:
AS1141 Section 39 - Potential Reactivity of Aggregates (Chemical Method)
Determination of Reduction in Alkalinity
Dissolved Silica by Gravimetric Method

Field No:	1
Laboratory sample No:	3887
Reduction in Alkalinity (millimoles/L)	93.1
SiO_2 Concentration (millimoles/L)	32.8
The aggregate is considered :	Innocuous

H.R. Harrington, File, Ref: 589.Rep

Authorised Signatory Jovan Janackovic J. Janackovic.

Date 23. 8. 95. *Serial No.* 010768

SUMMARY OF TESTS ON TASMANIAN DOLERITE

(Abbreviated from a large report commissioned from the Tasmania Department of Mines)

DENSITY
Average 2.9 – 2.95 t/m3

POISSONS RATIO
0.3 – 0.4

BULK MODULUS
90 – 100 gpA

RIGIDITY MODULUS
10 – 50 gpA

UNIAXIAL COMPRESSIVE STRENGTH
40 MPa

WATER ABSORPTION
0.28% to 1.09%

SCHMIDT HARDNESS
43-44

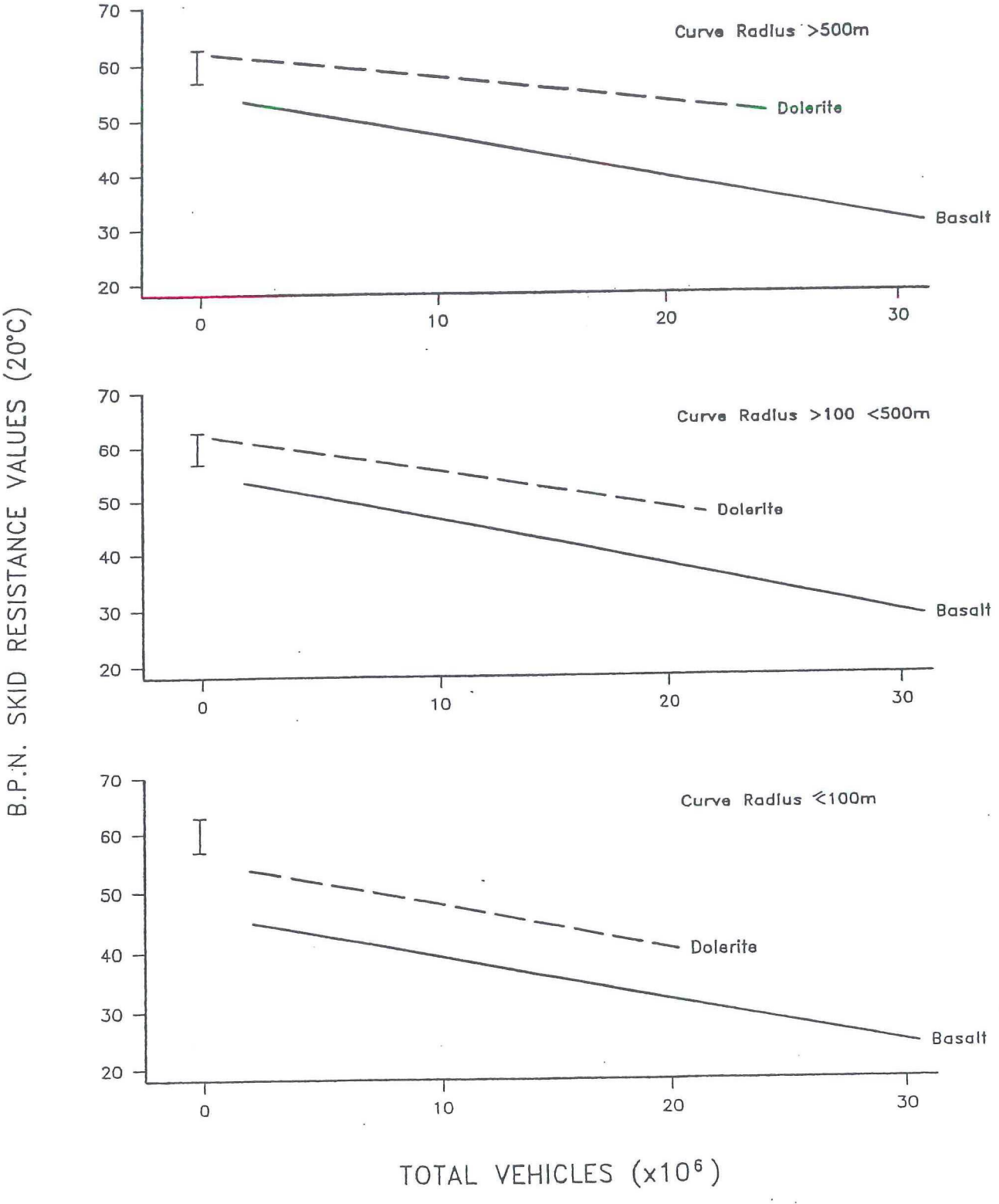
LOS ANGELES TEST VALUES

Test 'A'	16.5% (37mm)	
Test 'B'	% Loss	RQD%
	13.7	95
	9.7	95-100
	6.3	100

POLISHED AGGREGATE FRICTION VALUES
45 (10mm) – 52

PAVEMENT SKID RESISTANCE
See graphs next page. Normal basalt is considered to be a superior rock, but dolerite is significantly better.

SKID RESISTANCE VERSUS TOTAL VEHICLES



Photocopy of Japanese Industry Standards Sheet for Reporting The Results of Tests on Crushed Stone.

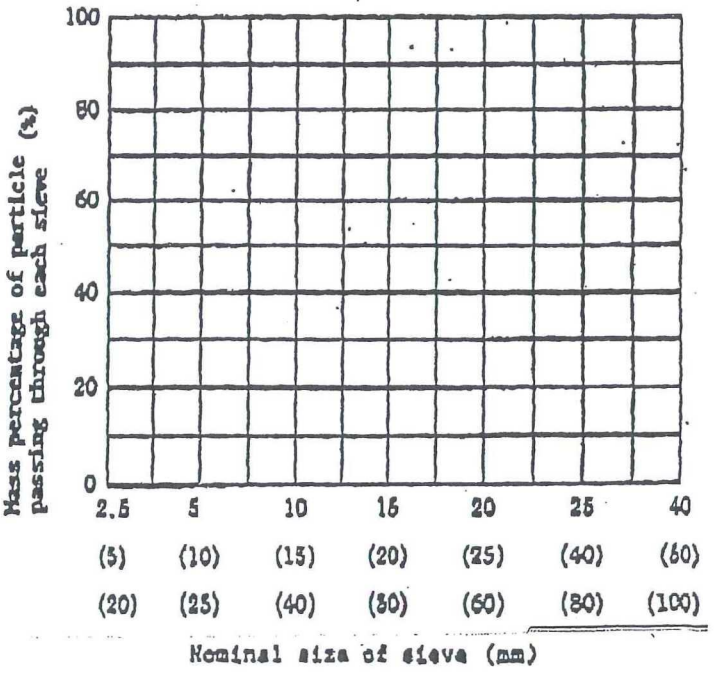
(The Japanese and Australian tests and standards are very similar).

Test Report of Crushed Stone for Concrete

Class		Kind of raw stone	
Name of manufacturer		Name and number of digging site	
Name of factory		Date of test	Physical test: Alkali-silica reaction test:

Test items (Physical test)	Standardized value	Test value	Remark
Absolute dry specific gravity (JIS A 1110)	2.5 min.		Specific gravity in saturated surface dry condition
Water absorption test (JIS A 1110)	3 % max.		
Soundness test (JIS A 1122)	12 % max.		
Abraded quantity (JIS A 1121)	40 % max.		
Amount lost in washing test (JIS A 1103)	10 % max.		
Absolute volume percentage for assessment of grain shape (JIS A 5005)	55 % min.		For only crushed stone 2005

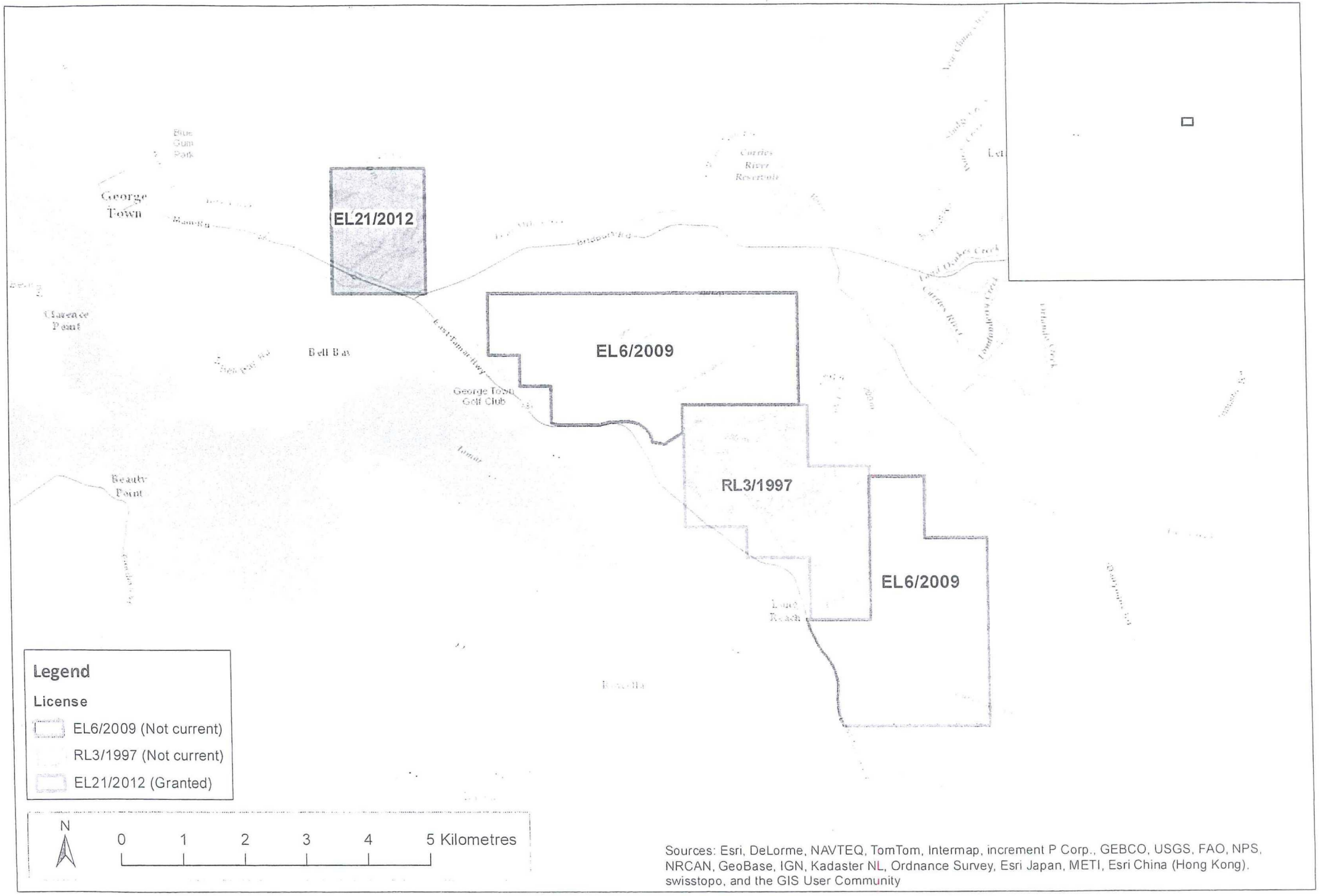
	Nominal size of sieve	Mass percentage of particles passing through each thieve (%)
Sieve analysis test	100	
	80	
	60	
	50	
	40	
	25	
	20	
	15	
	10	
	5	
	2.5	
f.m.		



Alkali-silica reaction test (JIS A 5308)	Test result*	
	Test method	

* A: Judged as harmless B: Not judged as harmless or not tested yet.

Name of testing organization	Physical test:
	Alkali-silica reaction test:
Transferer from original text	Name of manufacturer:
	Name of person in charge:


EL21/2012
EL6/2009
RL3/1997
EL6/2009
George Town
Blue Gum Park
Currie River Reservoir
Clarence Point
Bell Bay
George Town Golf Club
Beauty Point
Legend
License
EL6/2009 (Not current)
RL3/1997 (Not current)
EL21/2012 (Granted)
N
0 1 2 3 4 5 Kilometres
Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

Pacific Basin Bluestone Pty Ltd
ACN 156 204 134
491 Smollett Street
ALBURY NSW 2640

CONFIDENTIAL

Monday, 11th May, 2015

Andrew McNeill Esq
Manager Geoscience
Mineral Resources Tasmania
POB 56
ROSNY PARK TASMANIA 7018

By email to andrew.mcneill@stategrowth.tas.gov.au

Dear Mr. McNeill,

EL21/2012 PACIFIC BASIN BLUESTONE PTY LTD (MT. GEORGE)

I acknowledge receipt of your letter dated 30th April last. Thank you for your letter and the warning it contained. I am most grateful to you.

It does indeed appear correct that we failed to submit the documents referred to in your letter. I apologize unreservedly for this. It seems our agents (Messrs. Pitt and Sherry of Launceston) were not properly instructed. Mr. Douglas Tangney (dtangney@pittsh.com.au) is acting for us, but did not receive any copy – correspondence from MRT on our behalf. We thought those arrangements were in place. I apologize for that oversight.

We have contacted Mr. Tangney to deal with the issues you've raised as a matter of urgency. He has complete authority to represent the company's interests as far as our business with MRT is concerned. Instructions have been given to Pitt and Sherry to see that payment (in the sum of $107.44) for the annual rental (due 21st March last) reach MRT forthwith.

I have been absent my post (interstate and overseas) on other business, on and off, over the last couple of years, and, to be frank, much of my company's correspondence was archived pending my review. I accept that your emails were sent, but they went adrift in my absence. They were indeed archived, but I have been, and I am now, for whatever reason, unable to retrieve them.

Naturally, given the scale of operations now envisaged by our company in respect of commercializing the dolerite contained, not only in EL21/2012 (Mt. George) but also in RL 3/1997, and EL 6/2009 (Tippogoree Hills) – presently under Application by us: we would not wish to see such a very large project jeopardized (indeed fail) because of an administrative oversight.

I trust the foregoing goes some way to explaining our position. It should be noted that we have secured the interest of a syndicate which has indicated its preparedness to finance a dolerite super-quarry in the vicinity Mt. George – Bell Bay, predominantly to satisfy export demand.

This syndicate has been conducting its due diligence since 7th January last and is to return to Bell Bay and George Town, Tuesday 26th May next in order to meet with Pitt and Sherry, John Martin and Bridget Archer of The George Town Council, Kevin Moore, Captain Charles Black and Craig Wilson of TasPorts, and Mr. John Perry, Co-ordinator General in respect of large projects, the morning of Friday 29th that same week.

Our negotiations are well-advanced and this large project is intended to dove-tail with another very large undertaking in Queensland for the export of high grade silica sand.

Your forebearance at this time would be of great assistance in finalising these arrangements.

Yours sincerely,

Simon E. Staughton
Director

COMMERCIAL-IN-CONFIDENCE

BELL BAY MEETING AGENDA

TUESDAY 26 MAY 2015 AT 0830 HRS

AIM To further consider the development of a Super Quarry vicinity Bell Bay – George Town Tasmania.

BACKGROUND

Pacific Basin Bluestone Pty Ltd (PBB) (ACN 156 204 134) holds approximately 26 Sq. Km. of valuable dolerite terrain under EL 21/2012 George Town (granted) and RL 3/1997 and EL 6/2009 Tippogoree Hills (under Application) administered by Mineral Resources Tasmania on behalf of The Crown.

- EL 21/2012 George Town
- RL 3/1997 Tippogoree Hills
- EL 6/2009 Tippogoree Hills

Messrs Hearne, Speer, Storrier et al were introduced by Mr. Les Jass to the prospect of developing a super-quarry business to satisfy the domestic and export markets.

This meeting aims to further consider the commercial merits of this project in light of the additional ground taken up (under Application) by PBB since 18 JAN, 2015, and the capacity of TasPorts at Bell Bay, The George Town Council, The Government of Tasmania and others to support the undertaking.

PARTICIPANTS

1 Fred Speer
2 Brian Hearne
3 Paul Storrier
4 David McDonald
5 Douglas Tangney
6 Bill McAuley

TIMINGS AND LOCATIONS

0830 Rendezvous Pitt and Sherry's office 113 Cimitiere Street Launceston to confirm the status of matters and objectives of the visit

0900 Travel to George Town

0945 Meet Mr. John Martin (GM) and Ms. Bridget Archer (Mayoress) of George Town Council

1200 Meet Mr. Kevin Moore (Commercial Manager Trade), Mr. Craig Wilson (Commercial Resources Manager) and Captain Charles Black (former Director TasPorts) at Bell Bay over lunch

1430 Travel Bell Bay to Launceston stopping to gain a better appreciation of the scale of proposed operations including proximity to rail, road, water and electricity supply to The Port of Bell Bay and George Town

1730 McAuley decamps with Virgin from Launceston airport

CONTACTS

1	Douglas Tangney	Environmental Scientist Pitt & Sherry	0458 710 098
2	John Martin	GM George Town Council	03 6382 8800
3	Kevin Moore	Commercial Manager Trade	0416 189 824
4	Bill McAuley	Geologist	0428 486 018
5	Fred Speer	Investor	0400 654 260
6	Brian Hearne	Investor	0409 680 084
7	Paul Storrier	Investor	0427 157 577
8	David McDonald	Investor's Advisor	
9	Captain Charles Black	Former Director TasPorts	
			Charles.Black@tasports.com.au
10	Craig Wilson	Commercial Manager Resources	0419 007 020
11	John Perry	Co-ordinator General	03 6777 2804
12	Bridget Archer	Mayoress George Town	0419 859 142
13	Les Jass	Interlocutor and Commission Agent	0413 743 604

W.J.W. McAuley

Convenor
27 APR 15

AGENDA

Office of Co-ordinator General – State Office, Level 1 Transit Centre, Cornwall Square, Launceston
29 May 2015, 0930

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1. Attendees

John Perry	Coordinator General, Department of State Growth
Stuart Clues	Regulation Reduction Coordinator, Department of State Growth
Simon Staughton	Pacific Basin Bluestone
Bill McAuley	Pacific Basin Bluestone
Douglas Tangney	pitt&sherry

2. Objectives

1. Seek high level support for proposed Bell Bay Super Quarry to ensure smooth and timely transition from concept to commencement of mining
2. Confirm support can be called upon at short notice to assist with specific elements of the project or commercial negotiations
3. Make parties known to each other

3. Timings

28 May 2015	Staughton and McAuley arrive in Launceston
29 May 2015 0830	Staughton and McAuley to meet Tangney at pitt&sherry, Level 4, 113-115 Cimitiere Street, Launceston
0915	Staughton, McAuley and Tangney depart pitt&sherry to meeting venue
0930	Meeting with Coordinator General

4. Brief Summation on PBB Activities

5. Open discussion

6. Directions to pitt&sherry office from Launceston Club (for Staughton and McAuley only)

Walk down Tamar Street to intersection of Tamar and Cimitiere Streets, turn left and walk along Cimitiere Street for 400 m. pitt&sherry is on your left, opposite spotlight. We are on Level 4.