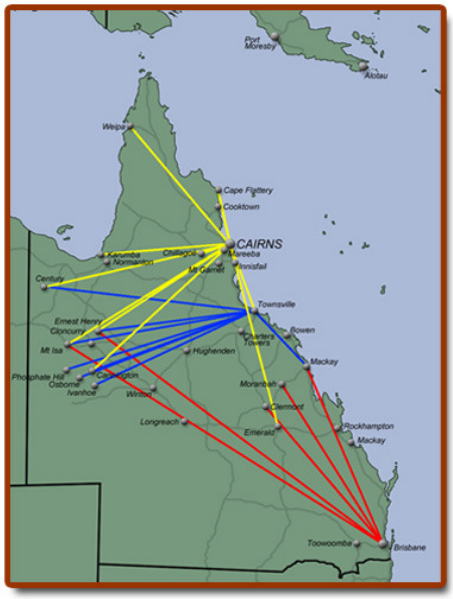


MINING & INDUSTRIAL SERVICES OPPORTUNITY STUDY

2010 UPDATE

Cairns/Far North Queensland

Ref: J2288
May 2010

MINING & INDUSTRIAL SERVICES OPPORTUNITY STUDY

2010 UPDATE

Cairns/Far North Queensland

Prepared by
W S CUMMINGS

Ref: J2288
May 2010
(Rev 1)

CUMMINGS ECONOMICS

W S (Bill) Cummings
Principal
PO Box 2148
CAIRNS QLD 4870
T: (07) 4031 2888 M: 0418 871 011
F: (07) 4031 1108
E: cummings@cummings.net.au
W: www.cummings.net.au

DEPARTMENT OF EMPLOYMENT, ECONOMIC DEVELOPMENT & INNOVATION

Local Project Manager
Cairns Centre
PO Box 2358
CAIRNS QLD 4870
T: (07) 4048 1189
F: (07) 4048 1122
E: deborah.maguire@deedi.qld.gov.au
W: www.deedi.qld.gov.au

TABLE OF CONTENTS

		Pg
	SUMMARY OF MAIN POINTS	**4-12**
	TEN PRIORITY ACTION AREAS	**13**
1.	**INTRODUCTION**	**14**
	1.1 General	14
	1.2 Treatment of Changes Since 2008	14
	1.3 Study Area	14
	1.3 Methodology	15
	1.4 Information Reliability	15
2.	**IDENTIFICATION OF MINING & INDUSTRIAL OPERATIONS**	**16**
	2.1 General	16
	2.2 Database	16
	2.3 Number of Projects Identified	17
	2.4 Maps	17
3.	**OBSERVATIONS ON FACTORS AFFECTING SERVICES TO MINES**	**22**
	3.1 Types of Workforce, Services & Service Providers	22
	3.2 Decision Making About Air Services	24
	3.3 Workforce Supplier Considerations	26
	3.4 Mining Company Considerations - Workforce	28
	3.5 Aviation Factors	31
	3.6 Summary of Cairns' Advantages & Disadvantages as a Workforce Provider	36
4.	**SEA CARGO ASPECTS**	**39**
	4.1 General	39
	4.2 Factors Affecting the Development of Shipping Freight Services	39
	4.3 Existing & Potential Shipping Freight & Services	42
5.	**ANALYSIS BY AREAS**	**48**
	5.1 General	48
	5.2 Cairns Area	48
	5.3 Cape York	57
	5.4 Gulf & North West	61
	5.5 Townsville/Charters Towers	72
	5.6 Mackay Region	74
	5.7 Northern Territory	79
	5.8 Western Australia	84
	5.9 Papua New Guinea	88
	5.10 Eastern Indonesia	115
	5.11 Some Overall Implications for a Strategy	118
6.	**STRATEGY DEVELOPMENT**	**120**
	6.1 An Appreciation of Changes in Economic & Finance Conditions Since 2008	120
	6.2 Future Demand for Mining & Industrial Project Workforce	122
	6.3 Supply Side & Training Issues	124
	6.4 Potential Air Services	125
	6.5 Potential Shipping Services	126
	6.6 Corporate Services	127
	6.7 Marketing the Region	128
7.	**ACTION PLAN**	**132**
	7.1 Policy	132
	7.2 Organisation	132
	7.3 Marketing Cairns as a Source of 'Fly-in' Services	132
	7.4 Supply Side and Training	133
	7.5 Corporate Attraction	133
	7.6 Transport Service Providers	133
	7.7 Infrastructure Needs & Development Opportunities	133

SUMMARY OF MAIN POINTS

INTRODUCTION

- The purpose of the study was to:
  - Identify opportunities for the provision of services from the Cairns/Tablelands/Cassowary Coast area to mining and industrial projects throughout northern Australia and adjacent areas to the north.
  - Identify opportunities to expand the range of aviation and other services to mining and industrial projects throughout this wider area.
  - Develop strategies/action plans to capitalize on these opportunities.

IDENTIFICATION OF PROJECTS

- Mining and industrial projects have been grouped in nine different areas:
  1) Cairns area.
  2) Peninsula.
  3) North West Queensland/Gulf area.
  4) Townsville/Charters Towers.
  5) Mackay.
  6) Northern Territory.
  7) Western Australia.
  8) Papua New Guinea (PNG).
  9) Eastern Indonesia.
- Projects have been classified as operating, under construction, advanced, and exploratory.
- Depth of identification of projects has varied with exploratory projects identified intensively in northern Queensland ranging through to currently operating projects only being identified in Western Australia.
- A total of 80 operating and 106 advanced projects (not including those in the Pilbara region of Western Australia and Indonesia, apart from Papua Indonesia), have been identified and listed in a database that includes further information about the projects including where available, contacts, locations, current transport arrangements, employment and production.
- Maps show the location of projects identified in Queensland and the wider area of Northern Territory, Western Australia, Papua New Guinea and Eastern Indonesia.

FACTORS AFFECTING LEVEL AND TYPES OF WORKFORCE & OTHER SERVICES

- There is a need to recognize the different types of workforce needed for mines – operations, construction, maintenance and specialist service personnel and ranging from trades people, plant operators, supervisory and training staff, office staff and professionals.
- There is also a need to recognize the range of suppliers of personnel and services involved, many on a contract basis.

- Decision making about air services normally has three key parties - the mining/industrial company, aviation companies, and service providers including labour/personnel supply firms. However, the final arbiter is usually the mining/industrial company itself.

- Air services range from international, domestic and regional RPT services, to regular charters, to casual charters. A few companies have their own aircraft.

- Labour/personnel suppliers identified:
  - A need for upskilling of the region's workforce and specifically for the mining industry, including availability of courses/inductions. They also identified potential use of some areas, eg. the coalfields and Pilbara as upskilling areas with less stringent initial requirements.
  - A need to improve perceptions of the Cairns area as a supplier of mining industry workforce.
  - Opportunities to use Cairns' superior air links for those types of businesses supplying sporadic services (eg. maintenance, shutdowns).
  - Opportunities to use lifestyle and employment opportunities for partners to attract workforce.

- Mining companies identified:
  - A need to differentiate strategy between professional, supervisor/training and trades/plant operator staff.
  - A need to expand workforce volumes available from the area if it is to be established as a 'point-of-hire' (PoH) for staff.
  - A need to improve 'mine readiness' of potential workers and the perception of Cairns as a volume source of suitable personnel.

- Aviation operators identified:
  - Cairns' superior flying distance to many mines compared with other major centres. (Mt Isa is as close to Cairns as Townsville, the Mackay coal fields closer to Cairns than Brisbane, the Kimberley as close to Cairns as Perth, Papua Indonesia closer to Cairns than Jakarta.)
  - Cairns' superior air hub position both in terms of connectivity to the rest of the north, the rest of Australia and internationally, and the range and capacity of local aviation companies both able and willing to respond to new opportunities to provide services.

EXISTING AVIATION SERVICES TO MINES & WORKFORCE INVOLVED

- A review of current extent of aviation services to mining operations indicated that Cairns has mining operation related air services to 18 different centres (Papua New Guinea and Papua Indonesia 7, Northern Territory 3, Far North Queensland 4, and North West Queensland and Central Queensland 5) with an estimated seat capacity of approximately 4,000 a week (about 200,000 per annum), making it the leading centre in northern Australia for air services to mining operations (eg. Townsville was identified as having 7 centres connected involving about 3,400 weekly seat capacity). Maps in the report plot centres connected.

- Workforce in mining in Far North Queensland and flying into mining operations ex Cairns is estimated at about 3,300 composed as follows:

Estimated Workforce Involved in Mining in Far North Q'ld			
		Estimate	
Estimated residential mining workforce in the region		1,150	} 1,300
Estimated workforce flying into mines in the region		150	
Estimated workforce flying in to mines outside the region		1,500	
North West Queensland	700		
PNG and NT	800		
Estimated equivalent full time workforce for construction and maintenance operations at mines		500	
Total		**3,300**	

Source: Cummings Economics from industry information.

The global financial crisis (GFC) led to some loss of mining employment in the region and 'fly-in' to north west Queensland, but estimated 'fly-in' to PNG was up and total numbers are almost back to the 2008 estimates.

ANALYSIS BY AREAS

Cairns Area

- Mining operations in the area initially suffered from the GFC but there are 9 new operations in an advanced stage of planning with most highlighting a need for urgent attention to rail and road infrastructure and Cairns and Mourilyan port infrastructure.

- Opening up containerized mining output seems likely to play a major role in opportunities for direct shipping services to Asia.

Peninsula

- The GFC led to a halt in plans for expanded mining in the area. However, planning is now back strongly that could see production rise to being worth $1bn a year and shipping developing from 3 and possibly 4 extra ports in the region.

  Issues include how local infrastructure will develop in the area and the inadequacy of the Peninsula Road if such a scale of development occurs.

Gulf Area

- This area has emerged as an area of substantial potential importance to Cairns, with prospects of the existing Century Mine being joined by copper, phosphate, iron ore and possibly uranium mining. Additional workforce (up around 500), are likely to be flown in (Cairns is closest). Development is likely to involve additional pipelines to the Gulf, port development in the Burketown area and other road infrastructure needs.

North West Queensland

- The GFC led to 5 operations being closed and put on care and maintenance. However, planning is now well underway for some 9 operations that would result in over 2,000 additional jobs on the 4,000 already in the area.

- Although closure of mines has affected a number of mines serviced by air, Cairns has held its services well with 'fly-in' services to 3 of the 5 larger mines in the area.

- There are infrastructure issues in the area including power, water, local roads and rail capacity.

Townsville/Charters Towers

- 5 existing operations were identified with a further 5 in an advanced state in gold, magnetite, nickel and uranium that would involve significant additional workforce, putting pressure on Townsville's ability to meet increasing needs elsewhere in the north.

Mackay Region

- Some 23 existing operations were identified involving a workforce of about 10,000 and 27 advanced projects with estimated workforce of about 5,000 identified in the Bowen Basin.

- On top of this, the Galilee Basin to the west, based on Alpha, is opening up with major new mines and a standard gauge railway to be built north to Abbot Point.

- On top of this again, is the development of coal seam gas pipelines into Gladstone with 3 new LNG plants being proposed.

- Incitec is also building a $935m ammonium nitrate plant at Moranbah and an upgraded airstrip at Moranbah.

- A number of the mines are residential. Substantial workforce comes from Mackay. 'Fly-in' workforce is mainly from Brisbane via Mackay airport and direct services ex Brisbane to Moranbah, Clermont and Emerald. One small regular charter was identified ex Cairns to the area.

- Sheer volume of existing and potential demand, proximity to Cairns, and the potential to use the area as a stepping stone for gaining mine workforce experience make it a potential target for 'fly-in' operations from the Cairns area. Direct flights to Cairns from Mackay have a potential role in strengthening use of flights ex Cairns to PNG and other overseas countries.

Northern Territory

- There are four sub areas of relevance – the three major mines in the eastern side (Gove, Groote and McArthur River), those around Darwin, those around Alice Springs and those in the central areas of Tennant Ck and Tanami Desert.

- Cairns has had traditional air links with the three eastern mines, but also has strong tourism and general traffic links with Alice Springs and Darwin. Since 2008, it has lost services to McArthur River, but regained services to Groote where it is now the major supplier of 'fly-in' workforce.

  The region should however, stay interested in McArthur River as current policy to source out of Darwin only may not be indefinitely viable. New iron ore mines in the Roper River area are also of potential interest.

  The potential to reestablish direct shipping links out of Cairns also needs to be kept in view.

- The Cairns area is well placed to provide workforce to Alice Springs area if major mining development takes place and to meet any shortfall in supply to growing on-shore and off-shore operations in the Darwin area.

Western Australia

- The Browse Basin LNG plant to be built north of Broome and a number of other recent and potential mining projects means that this area is also developing a need for additional 'fly-in' workforce. Cairns is as close to the east Kimberly area as Perth

- The Pilbara is one of Australia's 'Mega Hotspots'. Demand for 'fly-in' mining workforce is very large.

- The area is also a potential training stepping stone. It has already drawn sporadic 'fly-in' workforce from Cairns, especially for maintenance/construction work and there are a few large operators who could be targeted.

Papua New Guinea

- The PNG LNG project currently underway plus the prospect of a further 2 LNG projects is making PNG a further 'Mega Hotspot'.

- There are a further 7 gold and other mines in the area and a further 8 prospects in an advanced state.

- There are already direct air services ex Cairns to four operations in the area – Ok Tedi, Porgera, Moro and Lihir. Part of the traffic on Port Moresby flights will be mine related. Additional capacity is being created on the Port Moresby route by QLink. There are opportunities developing for direct workforce services to a number of additional mines.

- 'Fly-in' workforce is mainly at a supervisor/trainer level and higher, and substantial part of the traffic is R&R, business and connector traffic as opposed to 'fly-in' workforce.

- Apart from new mines coming on stream over the next five years, there will be a very large requirement for workforce that cannot be met from PNG sources for the construction of two major LNG plants near Port Moresby.

  The Cairns region is in an ideal position to be a source of workforce supply with potential need for a major increase in airline capacity on Port Moresby flights. It is also in a position to become a training centre for upgrading the PNG national workforce.

- The major expansion of mining in PNG is also opening up possibilities:
  - For establishment direct shipping services and increased use of Cairns as a supply base for mines and general development in PNG.
  - For further development of Cairns as a centre for corporate services/offices for mining operations.

Eastern Indonesia

- The major mining operation of Freeport Indonesia has its Australian buying base in Cairns shipping $330m of goods a year on a 10-day shipping cycle through Cairns seaport and has 6 flights a month. Both the shipping and air services are restricted to carrying the companies own goods and traffic.

  Air traffic is all R&R, business and connector, with no 'fly-in' workforce supplied ex Cairns.

- A major issue in this area is how to organize services into other mines in Eastern Indonesia.

STRATEGY DEVELOPMENT

Future Workforce Demand & Cairns' Position

Current and additional estimated mining company workforce needed in Queensland from the Mackay region north is as follows.

	Estimated Existing	Estimated Additional	Estimated % Increase
Cairns/Tablelands	500	800	160%
Peninsula	750	1,150	150%
Gulf	930	500 *	54%
North West	4,330	2,370 *	55%
Townsville/Charters Towers	650	500 *	77%
Mackay	10,000	5,000	50%
Total	**17,260**	**10,220 ***	**59%**

**Note*: *Includes some uranium projects that would be dependent on a change in current State Government policy.*
Source: Cummings Economics from industry information.

- The two major LNG projects near Port Moresby alone have been talking about an expatriate construction workforce need peaking towards 10,000.
- Major workforce expansion is likely in the Northern Territory and Western Australia and mining in Eastern Indonesia is likely to increase.
- Expanding workforce needs are likely to be increasingly met on a 'fly-in' basis with a preference for larger, more comfortable, aircraft.
- Mining industry's employment within the region can be expected to expand.

  Current employment of about 3,300 (1,300 within the region and 2,000 'fly-in' to centres outside the region) is likely to expand strongly. Expected expansion of mining within the region on a 5-year time frame would take this to about 5,000. Expansion of 'fly-in' activity to projects outside the region could take this to over 8,000, especially as Cairns develops as a source of workforce for the major LNG projects near Port Moresby.
- There are good reasons for the Cairns/Tablelands/Cassowary Coast area to keep pursuing an expansion of this type of employment activity.

  It can pursue this type of employment opportunity:

  1) Because of the size of its population and workforce, and its desirability as a place to live, in the context of northern Australia.
  2) Because of its strategic position and airport hub role.

  It should pursue it:

  1) As an opportunity to continue the diversification of the regional economy.
  2) Especially over the next few years, at a time when there are negative pressures on tourism and local construction activity.

Supply Side Training Issues

- If the region is to expand its role in this field, substantial development of workforce will need to take place involving local private enterprise training firms, TAFE, James Cook University and mining workforce training organisations at State and national levels.

Potential Air Services

- Cairns has a superior position as an air hub and a large competitive aviation sector eager to develop new services.
- The region's aviation operators will need to be key partners. The study found them both willing and able to respond.
- New mining related air services from Cairns provide an opportunity to strengthen Cairns' role as a national and international air hub by increasing traffic on national routes (eg. Perth), and international routes (eg. China, Japan and Singapore/India).
- Qantas Link are in the process of expanding capacity on the Port Moresby route and there is a range of new opportunities identified in PNG.
- With northern Australia, possible target services are:
    - Direct to Mackay and the 'Mega Hotspot' centres like Moranbah and Emerald.
    - To existing and new mines in the Gulf, North West, Eastern Northern Territory and the Peninsula.

Potential Shipping Services

- The major expansion in mining is opening up a range of opportunities to parallel Cairns' hub role for mining related air services with a hub role for shipping services.
- Opportunities are developing for a range of shipping links to PNG:
    - To Western Province (Ok Tedi).
    - To Gulf Province (Kikori with new road links to the Highlands).
    - Shuttle links to Port Moresby.
    - To Lae and north coast centres.
    - To Eastern Island centres, especially Rabaul, Lihir and Solomon Islands.
- There is a possible opportunity to extend shipping services to Gulf of Carpentaria centres.
- Hinterland mining developments are promising to underpin new shipping services especially container shipping services to Asia/China with ramifications for other sectors.
- The 3 ports currently handling mining exports in the region is likely to expand by 6 to 9.

ACTION PLAN

- Action plan needs to include:
    - A continuing policy decision by the Cairns Chamber of Commerce, Advance Cairns, and the State Government to recognize the opportunity and pursue a program to expand the area's capabilities.
    - For the Chamber to expand its organizational capacity and funding by continuing its existing taskforce aimed mainly at developing 'fly-in' workforce opportunities but work with Advance Cairns and DEEDI to establish and fund working groups and initiatives on:

- PNG (existing).
- Corporate attraction.
- Shipping development (with Ports North).
- Infrastructure needs in the region.

- The marketing effort will need to include elements of:
  - Engagement with key staff/persons in companies including:
    - Continuing use of events like Amateurs to host them in Cairns.
    - Targeted trade missions and visits to mines but also offices in places like Mt Isa, Perth, Brisbane, PNG, China.
  - Participation in industry conferences and trade shows.
  - Development of marketing material.
  - Use of media opportunities.
  - Establishment of good relations with governments and regional organisations.
- There needs to be a supply side/training program.
- Special attention needs to be paid to keep relevant air and sea transport operators updated on opportunities.
- A program of preparation of business cases for upgrading necessary infrastructure needs to be undertaken.
- It is recommended that while the core effort continues to be the development of 'fly-in' services and attendant workforce training initiatives, initiatives be expanded to include:
  - Paralleling air services with shipping services into key locations.
  - Attracting corporate offices/bases to the region.
  - Achieving investment in infrastructure necessary to support the development of mining within the region.
- Marketing needs to include getting the community and State and Federal Governments behind the initiatives.

CORPORATE SERVICES

- Mining corporate offices in the Cairns/Tablelands' area employ of the order of 150 – 200.
- There is a real opportunity to expand Cairns' role in this field with major targets:
  - New overseas companies coming into Cairns' wider sphere of influence (eg. from China, India, but also a significant presence from Canada).
  - A range of companies based in Perth, not just mining but also mining service companies, who need to develop operations in the Cairns and PNG region and can use new air services to link to Cairns and PNG.
  - A range of companies with heavy interests in PNG who could more efficiently service PNG operations from Cairns, including combining with use of Cairns as a supply hub.

MARKETING

- Realising the opportunity will need a substantial marketing effort:
  - To the relevant mining and other organisations in a Primary Area of Engagement within Queensland, Papua New Guinea and eastern Northern Territory, and
  - less intensively in a Secondary Area of Engagement further afield in the rest of the Northern Territory, Western Australia and Eastern Indonesia.
  - A special recognition of the 'Mega Hotspots' of PNG, Central Queensland and the Pilbara and Freeport Indonesia.
- While substantial progress has been made with existing mines, misconceptions about Cairns' role in mining remain widespread and deep and it is absolutely necessary to ensure that new players coming into the area are targeted.

TEN PRIORITY ACTION AREAS

The following lists ten immediate priority action areas:

AIR SERVICES

(1) Prepare and present cases for development of new air services ex Cairns:

a) To the 'mega hotspot' area of Mackay/Central Queensland including possible direct services in Mackay but also Moranbah/Emerald.

b) To the 'mega hotspot' of the Pilbara.

c) To support Lae's development as an international airport (also providing access to Wafi).

d) To PNG projects of: Simberi (PNG) to replace Brisbane as a 'point-of-hire' (PoH), Ramu Nickel, Kikori (Sciecapag Pipeline Project), Solwara (Rabaul).

(2) Pursue transit visa issues in relation to development of Cairns as an access point to PNG mines.

SHIPPING SERVICES

(3) Pursue achievement of direct shipping services to PNG based on business case currently being prepared.

(4) Initiate business case studies in association with Ports North into development of direct shipping services to Asia (China) using containerised minerals output as base cargoes including identifying transport infrastructure investment needs.

CORPORATE OFFICES/BASES

(5) Continue a program of targeting companies involved in mining and supply of mining services in PNG and heavily involved in mining in the north re locating corporate offices, 'point-of-hire' (PoH) and supply bases in Cairns including investigating availability of Queensland Government regional development incentives, with particular reference to businesses located in Perth and Brisbane.

INVESTMENT

(6) Collate further information on overseas companies investing in mining in the wider region – mainly from China but also especially from India, Canada and Japan, with a view to informing regional foreign contacts, programs and bodies like Cairns Airport and Ports North.

WORKFORCE DEVELOPMENT

(7) Assist local job market initiatives and related contractors and service suppliers to interest mining companies to look to the region as a source of workforce by providing information on companies they might approach.

(8) Assist local education and training organisations to develop markets for their services outside the region (especially in PNG) to contribute to very large upskilling needs in this field locally and throughout Australia and PNG.

MARKETING

(9) Step up general support for marketing the region as a service centre for mining through activities of the Chamber's Mining and Industrial Task Force, Advance Cairns and the special PNG initiative.

(10) Use this report as a base for bringing further general community and corporate attention to widespread opportunities developing in the mining sector, not just through the PNG LNG projects but otherwise.

1. INTRODUCTION

1.1 GENERAL

In 2008, *Cummings Economics* was retained by the *Department of Tourism, Industry and Regional Development* (DTRDI), in liaison with the *Cairns Chamber of Commerce Resource & Industrial Taskforce* to carry out a study of opportunities for the provision of services (especially by air) by businesses located in Cairns and surrounding districts, to mining and industrial projects.

In February 2010, the *Department of Employment, Economic Development and Innovation* (DEEDI) retained *Cummings Economics* to provide a 2010 update.

The 'Terms of Reference' and tasks were similar to those in the original study but extended to cover research into sea cargoes as well as air services.

The objectives of the study were to gather and analyse data to:

- Identify opportunities to expand the range of regional aviation and sea cargo services provided to the domestic and international resources and industrial sector by Far North Queensland, and
- Develop strategies to capitalize on these opportunities.

The tasks were as follows:

- Develop a database of resource and industrial projects currently operating and proposed in Northern Queensland, the Northern Territory, and Papua New Guinea, through desktop research and surveying of companies.
- Identify the opportunities for increasing regional aviation services to these projects.
- Identify opportunities for increasing regional sea cargo services from or to these projects.
- Prepare an action plan to capitalize on these opportunities.

1.2 TREATMENT OF CHANGES SINCE 2008

This report is to be read as an updated comprehensive report on the subject and not just as a record of changes since 2008.

There have been a great many changes since 2008 in actual company operations and ownership of mining properties. However, many of the aspects that were identified in 2008 remain much the same, such as types of workforce and service providers, processes of decision making about air services, workforce supplier and mining company considerations, and aviation factors.

Where aspects have not changed, they are simply repeated in this report along with comments about some changes that have taken place.

1.3 STUDY AREA

After consultation with the original study's Steering Committee, it was decided to include in the study, projects in the area:

- Queensland from Mackay region northwards.
- Northern Territory (NT) and Western Australia (WA), north of the Tropic, ie. the Pilbara and Kimberley regions.
- Papua New Guinea (PNG) (including Solomon Islands).
- Eastern Indonesia, especially Papua Indonesia.

For study purposes, the Queensland area is broken into six different areas:

- The immediate Cairns region out to Croydon and north to Cooktown.
- The Peninsula area.
- The Gulf area (including some mining just over the border in NT).
- North West Queensland.
- The Townsville/Charters Towers area.
- The Mackay region.

In the original study, the Mackay region boundary was taken to include mines south to Moranbah. We have included in this study, developments taking place to the south west of Moranbah in the major new coal province of the Galilee Basin west of Emerald, because of the export links it will have northwards to Abbot Point and the major coal seam gas projects taking place throughout central Queensland with LNG plants to be developed at Gladstone.

1.4 METHODOLOGY

The Update was carried out in two steps. Initial concentration was on identification of mining operations in PNG in some detail including the proposed LNG projects and subcontractors for the Exxon Mobil project as background for the major trade mission effort in March 2010. Findings were incorporated into a Preliminary Report PNG Mines.

Research was then extended to identifying existing, advanced mines and exploratory activity across the rest of the study area using:

- The Registrar of Australian Mining, 2009/10.
- Websites of State Mines Departments.
- Individual websites.

Contact was made with and information on existing air services gained from mining and aviation companies. Enquiries were made about changes in mining workforce and supplier aspects.

Contact was made with mines and information gathered on outbound and inbound freight movements for mines in areas relevant to port operations in the Far North Queensland region, PNG and Papua Indonesia.

1.4 INFORMATION RELIABILITY

Information in this report was collected in the first half of 2010. It should be noted that the sector can change very rapidly.

While care has been taken in obtaining information, much has been obtained from single source interviews, media reports and publications, often not able to be cross referenced. At times, figures given are estimates only.

It is advised that before information is relied upon for decisions, it should be further verified and cross checked.

2. IDENTIFICATION OF MINING & INDUSTRIAL OPERATIONS IN THE STUDY AREA

2.1 GENERAL

As in the original 2008 study, the intensity of identification of projects and the opportunities they present has varied in the different areas, depending mainly on distance from Cairns.

In the northern Queensland area, identification has included existing mining operations, advanced projects, and exploratory activity taking place, air services opportunities, sea cargo opportunities, especially relating to those in the Cairns' hinterland, Peninsula and Gulf area.

In the Northern Territory, the study has identified existing mines, major prospects and exploration with air and sea cargo opportunities in the eastern/Gulf area.

In Papua New Guinea, the study has also included existing mines and major prospects as listed by the PNG Chamber of Mines and Petroleum, along with air and inbound sea cargo service opportunities.

In Western Australia, the study has been limited to existing mines in the Pilbara, but includes advanced and exploratory activity in the Kimberley region.

In the case of Indonesia, concentration has been on Freeport's operation with limited comments about other operations.

2.2 DATABASE

The detailed database developed is provided as a separate document.

The database is set up in 9 separate areas:

1. Cairns Area.
2. Peninsula.
3. North West Queensland/Gulf area.
4. Townsville, Charters Towers.
5. Mackay Region.
6. Northern Territory.
7. Western Australia.
8. Papua New Guinea.
9. Eastern Indonesia.

It should be noted that in this study, we have included some advanced mines just over the Northern Territory border into the North West Gulf area. Their closest service centre is Burketown and closest access to the sea is on the Queensland side.

Stage of mine development is identified as:

1. O - Operating.
2. A - Advanced project.
3. E - Exploratory.
4. UC - Industrial project - Under Construction.
5. A - Industrial project - Advanced state.
6. E - Industrial project - Under consideration.
7. C&M Mine - Closed on Care and Maintenance.

The database also gives, where possible, minerals involved, more detailed locations, details of company contacts, where possible for operating mines information about workforce and production, whether open cut or underground, and relevant transport arrangements including cargo movements.

2.3 NUMBER OF PROJECTS IDENTIFIED

The study identified 80 operating mines not including those in the Pilbara and in Eastern Indonesia other than Papua Indonesia, and a further 106 classified as advanced projects.

	No. of Operating Mines	No. of Advanced Projects	Total
Cairns Area	6	13	19
Peninsula	1	5	6
Gulf	1	4	5
North West	6	9	15
Townsville/Charters Towers	5	5	10
Mackay	23	27	50
Northern Territory	19	24	43
Kimberley	7	9	16
PNG	10	10	20
Papua Indonesia	2	-	2
Total	**80**	**106**	**186**

Source: Cummings Economics from industry information.

Numerous projects at an exploratory level were identified.

2.4 MAPS

The following pages gives Maps (prepared for other uses), identifying approximate location of identified mines and projects listed as follows:

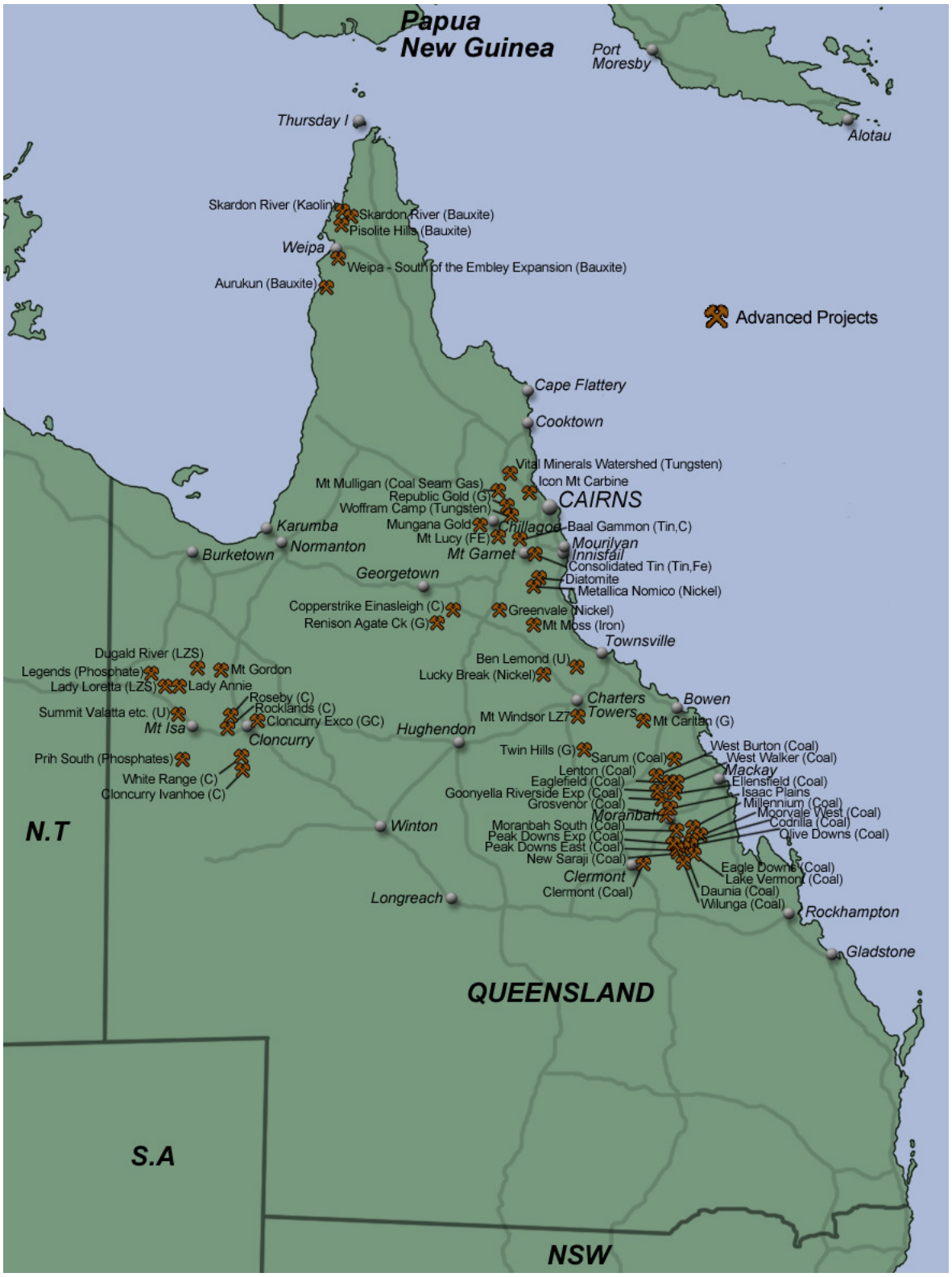
Page

1 Operating Mine Locations, Queensland 18
2 Advanced Mine Locations, Queensland 19
3 Mine Exploration Locations, Queensland 20
4 Mine Operation Locations, Outside of Queensland 21
5 Lines of Equal Flying Distance 32
6 Mining Related Air Services, Queensland Areas 37
7 Mining Related & Other Relevant Air Services, Interstate & Overseas. 38
8 Current & Potential Mineral Export Cargoes 43
9 Current & Potential Shipping Services ex Cairns to Mining Operations 47
10 Gulf Pipelines & Ports 64
12 Mining Projects, PNG 89
13 Petroleum Projects, PNG 90
14 Areas of Primary & Secondary Engagement 130

Map 1 – Operating Mine Locations, Queensland

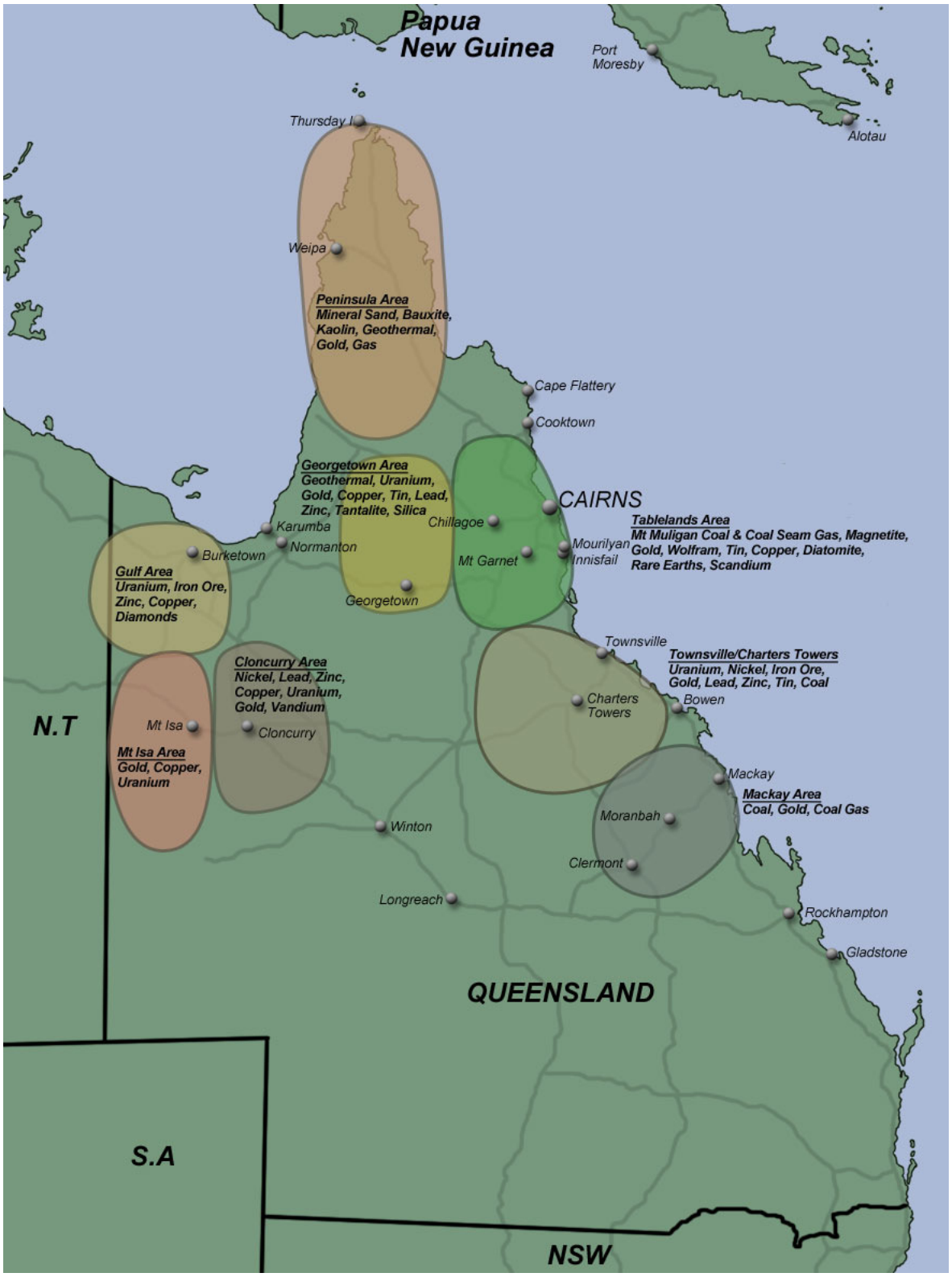
Source: Cummings Economics.

Map 2 – Advanced Mine Locations, Queensland



Source: Cummings Economics.

Map 3 – Mine Exploration Locations, Queensland



Source: Cummings Economics.

Map 4 – Mine Operation Locations, Outside of Queensland

Source: Cummings Economics.

3. OBSERVATIONS ON FACTORS AFFECTING LEVEL & TYPE OF WORKFORCE & OTHER SERVICES TO MINES

3.1 TYPES OF WORKFORCE, SERVICES & SERVICE PROVIDERS

As reported in the original 2008 study, the services supplied to mines tend to fall into a number of categories with a different range of service providers involved:

Type of Activity

1. Labour/personnel supply for mining operations including ancillary processing and operations.
2. Construction workforce.
3. Maintenance contract work including shut-down maintenance.
4. Specialist service personnel movements including repairs and services to equipment, business services and the like.

Type of Staff

The labour/personnel supply for mining operations can be broken into a number of categories:

1) Tradesmen, plant operators, etc.
2) Supervisory and training staff.
3) Office staff.
4) Professional staff including managers, accountants, geologists, engineers.

Non-'Fly-in' Workforce Movements by Air

It should also be noted that, apart from 'fly-in' of workforce, air services to/from some mining operations are heavily involved in providing opportunities for persons and families living in remote mining areas to access Cairns for R&R and other purposes. PNG Nationals are also buying properties in Australia and commuting regularly. Again, this varies with the type and situation of the mine.

Industrial Projects

Services supplied to major mining related industrial projects tends to relate to construction where there tends to be a similar hierarchy of labour/personnel needs:

1) Non-skilled.
2) Skilled workforce.
3) Supervisors/Trainers.
4) Management including professional and office staff.

In most cases, on-going staff requirements tend to be supplied locally. One exception to this however, is the Century Mines dewatering and port operations at Karumba where personnel are on a 'fly-in' basis from Cairns.

Type of Supplier for Various Activities

There are a range of suppliers for the above.

1) Some mines recruit directly but many use labour/personnel supply firms who supply direct to mining companies and to major sub contractors including:
    i) Mining contractors.
    ii) Catering contractors.
    iii) Health services contractors.
2) Civil, structural, electrical and other engineering contractors.
3) Mainly structural engineers including specialists, eg. relining.
4) Numerous types of service and repair providers including:
    i) Heavy machinery, vehicles, electrical, office equipment, telecommunications, catering equipment.
    ii) Business services, finance, insurance, valuers, unions, etc.
    iii) Health, training and safety services.
    iv) Trainers.

Implications of the foregoing for a strategy include:

a) There is a need to recognise that there is a range of 'players'/'stakeholders' involved in the provision of 'fly-in' services.

b) That the 'fly-in' requirements of different mines and mines in different areas vary considerably and that labour/personnel requirements for construction, although similar, vary from those of on-going mining operations.

c) There has been a trend in hire arrangements towards a shorter cycle (7 days on/7 days off), as opposed to longer cycles.

3.2 DECISION MAKING ABOUT AIR SERVICES

As reported in the 2008 study, organisation of services provision by air normally involves three key parties:

a) The mining/industrial company.
b) Aviation companies.
c) The service providers/including personnel labour supply firms.

By and large, the final arbiter is the mining/industrial company who will seek tenders from aviation companies for the supply of air services on a regular basis. Where public RPT services are available, the arbiter is the aviation operator who will assess likely market demand, although special arrangements between major mining companies and airlines can be important.

In practice, use of 'fly-in' services varies substantially over the study area.

There are four types of aviation services relevant to 'fly-in' services for mining/industrial project work:

1) Major airline domestic and international RPT services – usually aircraft of 100 pax capacity plus (eg. Qantas Link, Air Niugini, Airlines PNG).
2) Regional airline RPT services - usually 50 – 100 seats.
3) Regular scheduled charter flights (eg. Alliance, Skytrans, West Wing, Airlines PNG, Cobham/National Jet).
4) Ad hoc smaller charters to smaller nearby mines and to mining related industrial areas. (Some of these can develop into regular charters.)

There are a number of key factors driving decision making about whether a particular mine/project will use 'fly-in' services.

a) <u>The size and expected life of the mining operation</u>.

   Small operations may not have sufficient scale to support 'fly-in' services. On the other hand, large long-life projects (eg. Freeport Indonesia, Mt Isa, Weipa, and Gove) can opt for having permanent on-site workforce, infrastructure, and families.

b) <u>Distance from existing service centres.</u>

   Obviously, mines remote from district service centres will tend towards direct 'fly-in' from major service centres. Remoteness can be a factor of the level of ground transport infrastructure between the mine/project and a service centre. In places like Papua New Guinea and Papua Indonesia, safety conditions on the access road to a mine can be a factor.

c) <u>Existing RPT services to nearby airports/airstrips.</u>

   If a mine is close to an existing serviced airport, it will tend to use existing/expanded services to that airport. At times, there will be a balancing of cost considerations – the cost of building and operating an airstrip at the mine against the cost of upgrading road access to a nearby airport and the travel time penalties of workers travelling from the existing airport to the mine.

d) <u>Competition for skilled workforce.</u>

   The labour market situation in Australia has been such that many mines were finding in 2008 and are expecting to find in future, difficulties in attracting labour to live in remote areas and are finding they are having to resort more and more to 'fly-in' activities. This includes some large long established mines.

Our enquiries indicate that the general trend has been towards 'fly-in' services. 'Fly-in' services offer the following major advantages:

i. Avoidance of major infrastructure costs to cater for employees' families.

ii. Attraction of better quality, more skilled workforce.

A number of other trends are evident:

a) Better aircraft are making 'fly-in' services relatively less costly and safer with shorter travel times.

b) Workforce is looking for larger more comfortable pressurised aircraft.

c) Improvements in local road infrastructure is increasing the possibility of using local hub airports for mines in close proximity.

d) There was evidence of a trend towards operations where a central processing facility is established with ore being trucked in from a number of surrounding smaller deposits.

e) Mines only increase number of Points of Hire if there is insufficient workforce or increased competition from current Point/s of Hire. This can result in competition from larger sources of skilled labour, eg. Brisbane versus Cairns.

Implications of the foregoing for a strategy include:

a) Recognition of the key decision making role of selected key management personnel in the mining/industrial operations themselves about whether to use 'fly-in' services, extent of use and where to fly from and establish 'Points of Hire' (PoH).

b) Recognition of the range of mining/industrial projects and their varying need for 'fly-in' services, especially the difference between 'residential' mines and 'fly-in' mines.

c) Recognition of a possible variety of types of air services including trends to use larger more comfortable aircraft.

d) That the general underlying trend has been towards more, rather than less, 'fly-in' services with shorter 7 days on/7 days off cycles resulting in a need for more services.

3.3 WORKFORCE SUPPLIER CONSIDERATIONS

As reported in the 2008 study, there is a great deal of competition in the business. There are strong players in Cairns, Townsville and Brisbane that have been traditional suppliers who have strongly entrenched links with mining companies.

Most mines want qualified and experienced staff, not 'green' staff or 'clean skins'.

It has been recommended by some suppliers that new entrants start in WA, or NT, where standards are not as strict, before progressing to Queensland, or starting in the coal fields (which are expanding quicker and have a high turnover in open cut operations), before progressing to other mines.

Underground miners get higher pay for some operations, but are required to be highly skilled/experienced.

Best money is in PNG. However, there are safety factors to be considered. The well established mines in PNG (eg. Ok Tedi) have paid a great deal of attention to this and have an excellent record. In Indonesia, foreigners are required to have permits and report in to authorities when they arrive in a locality.

Mines in north west Queensland have traditional 'fly-in' links with Townsville but have been going further afield to access 'experienced' staff. Mines are willing to pay for 'experienced' staff including costs of flights from Brisbane, Melbourne, Perth, etc., especially for professional/supervisory level staff.

There is a public perception that mines will take anybody. In fact, workers need to obtain as much experience in mining or a similar heavy industry, and as many tickets as possible to get in the door, eg. Generic Induction to Coal and Metalliferous Mining, Confined Space, Working at Heights, Heavy Machinery, Tickets in First Aid (Senior) and Fire Fighting. There is a continuing need for training facilities in Cairns and Mareeba. Darwin is currently taking steps to become the research and training hub for the oil and gas industry in Australia and South East Asia through the Charles Darwin University.

To be work ready, besides having relevant inductions, training and experience, workers can increase their marketability by having current medicals. There are some medical centres in Cairns that offer specific mine medicals, usually for four years and paid by the company. Recruitment training companies ask workers to pay for medicals, but they usually only last for two years. Drug and alcohol testing is often done immediately prior to flight by labour recruiters or at site by mine.

Overall, it appears that a substantial part of the recruiting of labour and personnel from the Cairns area takes place by personnel supply firms based outside of Cairns.

The demand is such that personnel companies are likely to need to look further and further afield, especially for professional and qualified staff. It was identified that of workers in one mine in PNG, only a few were from the Cairns area and the great bulk were from elsewhere in Australia and only transited in Cairns.

In the category of shut down/maintenance type suppliers, Cairns has positioned itself well, especially through Dawson Engineering, Pacific Relines/ATIVO Maintenance & Project Services/Skilled Group, TME Group and others. Pacific Relines have their own aircraft based in Cairns. Apart from lifestyle advantages, for these types of suppliers, Cairns' superior air links are important, enabling them to more easily service mines right across the north, PNG, and throughout the world.

As a location for 'fly-in' mine workers, Cairns is seen to have advantages in attracting workers in this field (who are mainly but not totally males) to locate in the area which includes:

a) Lifestyle/Safety.

b) A good environment and education facilities for families.

c) Extensive local availability of full-time jobs for females and part-time jobs in industries like tourism, retailing, business offices, and health services, etc.

d) Maximum time with families due to Cairns' superior air links (i.e. rostered days off are not spent travelling home).

e) Ability to comply with Workplace Health & Safety in relation to travel time from miners' homes to mine sites due to Cairns' superior air links.

Overall, prior to the 2008 study, the Cairns area had not been seen as a strong recruitment area. There was a perception among some that Cairns' workers had no heavy industry experience and that experience in relevant trades (eg. diesel fitters) is in fields like fishing and agricultural machinery and not mining. Our perception in carrying out the 2010 study however, is that the activities of the Cairns Chamber Resource and Industrial Taskforce have substantially changed this perception among the major existing mines. Publicity on the high unemployment rates has also led to an awareness of the extent of the labour pool in the Cairns region. Publicity about the LNG projects and the potential role of Cairns as a location for workforce has also had an impact.

Implications of the foregoing for a strategy include:

a) A continuing need for training of the region's workforce specifically for the mining industry, including:

i. A need for availability of specialised short-term courses/inductions for locals who wish to enter in to mining work.

ii. Recognition of an opportunity to target different areas, eg. (WA, NT, coalfields) to provide up-skilling opportunities.

b) A need to continue to improve perceptions in the mining industry about what workforce and services are potentially available out of the Cairns area, especially among new entrants.

c) An opportunity to use Cairns' superior air links position for those types of businesses that supply intermittent services to individual mines (eg. maintenance, shut downs).

d) A continuing opportunity to sell the area's lifestyle/safety and job availability for partners to encourage workers seeking these types of jobs to locate in Cairns.

e) Recognition of an opportunity to attract R&R type traffic on flights established mainly to service 'fly-in' workforce, eg. PNG.

3.4 MINING COMPANY CONSIDERATIONS - WORKFORCE

Varying Skill Requirements & Volume Requirements

As reported in the 2008 study, mines need to juggle differing levels of skill requirements and volumes of personnel needed to economically fill aircraft from designated points of hire (PoH).

In the first place, operating and advanced planning stage mines find that for professional, supervisory and specialized staff they are needing to look further afield. This level of staff tend to be flown in from all capital cities in southern Australia and at times, from overseas. Cairns is generally not seen as a major source of this type of staff. If Cairns is going to position itself as a supplier of any significance in this type of field, a special different strategy will probably be needed.

In the past, for tradesmen/plant operators etc., mining companies have been able to source personnel from nearby major service centres, especially those with traditional mining/heavy industry backgrounds (eg. Townsville, Mt Isa) which have been traditional PoH locations. (The mine is responsible for employee travel costs from the PoH to the mine.) However, they find a need to spread the net further and to use multiple PoH's as a strategy to source experienced staff.

However, multiple PoH's increases the complexity of human resource management and can result in charter flights not being filled to capacity. Charter flights can be utilized by both mine employees and contractor staff. Generally, mine employees and contractor staff are on different rosters, further complicating flight arrangements.

The general perception is that all short-term labour requirements can be filled by throwing the net out wider and enticing the potential employee with an attractive package which would include salary, rosters, mine camp conditions and nearby PoH.

However, as discussed in a later section, there is every indication that the labour availability situation is going to get tighter over the next few years.

The mining industry across Australia is aware of the shortage of experienced labour and Federal and State governments in conjunction with industry have developed initiatives to address the looming shortage.

It is an indication of the success of the actions of the Cairns Chamber's Resource & Industrial Taskforce and the 2008 report that the Australian Government's Taskforce in this field recently visited Cairns and received an input.

To Charter or Block Book or Share a Charter

As reported in 2008, a mine company chartering their own plane has the benefit of maximum flexibility with regards to staff movements and rosters. The addition of another Point of Hire can result in empty seats on the new PoH or empty seats from existing PoH's.

In some locations, no RPT service is available and consequently block booking is not an option.

Some mining companies have, in the past, indicated their willingness to share either:

- a charter direct to a central airstrip.
- a charter that services multiple mine sites.
- a charter that would allow a mine to drive to another mine's airstrip to pick up employees.

If an RPT cannot be developed allowing mines to block book, sharing a charter can be an option.

Fatigue and Safety Record

As reported in 2008, mines and their contractors need employees to arrive work ready to start their shift. In some mines employees arrive the night before their shift or have 12 hours rest before the start of a shift. However in many situations employees start their shift after arriving at the mine site. The issue of work readiness is dependent on how the employee has coped with the travel to the Point of Hire and between the PoH and the mine site. Travel time, mode (whether air direct to mine or combination of road, air and road) and level of comfort can be critical to work readiness and safety. Travel time, mode and comfort is determined by the proximity of the mine to PoH, road conditions, proximity and certification of the nearest airstrip and cost of 'fly-in'. Increasingly in a tight labour market experienced labour is taking into consideration travel time and comfort when choosing a mine.

A recognized Standard on Fatigue Management is being developed by the Coal Mining Safety & Health Advisory Council and the Mining Safety & Health Advisory Council.

Rosters

As reported in 2008, rostered time on and off can vary between mines, between contractors and the mining companies on the same mine site and between different trades on the same mine site. More favourable rosters are increasingly being used as a tool to attract experienced staff. More recent research confirms that many mines are opting for even time rosters (7 days on 7 days off) for direct mine employees whilst contractor labour is more commonly a 14/7 roster. Another common roster is 8/6.

The problem arising from the increasing prevalence of the 7/7 roster is that it exacerbates the labour shortage. Experienced crew are effectively only working half the year necessitating the employment of another experienced crew. However, it increases the number of aircraft movements.

Ability to Retain Staff and Maintain a Stable Workforce

It was reported in 2008 that to recruit and train new staff can range in cost from $5 000 to $50 000 per employee. With prospects of a diminishing pool of experienced labour, mines are keen to keep experienced staff and to train less experienced staff for supervisory roles.

Mines have been very clear – the mining life is not for everyone. Staff need to be able to cope with a mine site workplace – isolation, dust, dirt and long hours. Staff are also selected for their ability to work as a team and to be safety conscious. The personal characteristics of a mine employee are just as important as their qualifications.

Some mines that were experiencing high turnover were actively recruiting non traditional sources of labour such as women and it seems likely that women will play an increasing role in mining workforce.

A stable reliable workforce in an isolated site is easier to manage particularly in a 'fly-in' operation. If an unreliable employee does not turn up for their flight, the next charter flight may not be until next week and commercial flights are not available into some locations.

Perceptions of Cairns

It was reported in the 2008 study that Cairns had been a regular PoH for some mines for a considerable period of time and some were re-establishing links with Cairns. However, the bulk of operating mines and advanced projects did not at that time consider the Cairns region to have mining 'type' staff. The Cairns region was not viewed as having any significant heavy industry other than sugar mills. Farming experience was not highly regarded as transferable skill to the mining industry.

Mines look for the skill set (the full range of mining skills from a PoH). Mines also require volume of workers. Both were perceived not to be on offer in Cairns.

In addition, the majority of mines had a perception that any 'green labour' interested in joining the mining industry would be sourced from the tourist industry and therefore not suitable for mining work.

The activities of the Cairns Chamber Resource and Industrial Taskforce has improved the situation but there are still misconceptions among new players, especially in relatively new areas of focus, eg. PNG Gas, Gulf Phosphates, Central Coalfields, etc.

Training

The 2008 study reported that as the labour pool diminishes, mines indicated that they would look favourably at an inexperienced individual who had taken the initiative to seek training.

However, most mines state they would still conduct their own mining inductions regardless of any prior mining induction qualifications. The exception being if the Registered Training Organisation is accepted by the mining company as providing quality mining inductions and training.

Courses such as "Working in Confined Space", "Working at Heights", "Heavy Machinery Tickets" and "Senior First Aid" were looked on favourably.

Special Requirements PNG

By and large, PNG requirements for unskilled or moderately skilled staff are met by Nationals.

PNG mines will also tap overseas sources of supply like the Philippines for some moderately to highly skilled categories. The demand from Australia tends to be in the more highly skilled categories including management, professional, supervisory and training and ancillary services like health. The LNG construction projects will stretch PNG's ability to source even moderately skilled National staff. There will be an opportunity for Cairns in three directions:

a) As a source of a wider range of workforce skills than previously required from outside PNG.
b) Cairns Airport as an access point for expatriate workforce moving to and from the rest of the world.
c) In a back-up role to PNG institutions, in meeting a major need to train PNG Nationals.

Implications of the foregoing for a strategy include:

a) There needs to be a differentiation between strategy for professional supervisory and training staff from tradesmen/plant operators, etc.

b) An expansion of availability (volumes and skill sets) of personnel out of Cairns will help generate volumes to compete as a PoH and viability of direct flights using larger aircraft in competition with other sources.

c) Responses from mines reinforce the need to improve 'mine readiness' of potential workers from the area.

d) There is a need for Cairns to continue to improve its perception as a suitable volume source of labour/personnel for mining operations, especially among new players in new areas, eg. PNG Gas, Gulf Phosphates, Central Coalfields, etc. In this regard, contact needs to be maintained with the Australian Government's Taskforce.

e) The opportunity to develop facilities to train Australian mine staff could be boosted by a need to also train PNG Nationals. Cairns' proximity, regular air services and cultural/climatic similarities will be an advantage. The $8.5 million Great Barrier Reef International Marine College currently under construction in Cairns may offer an opportunity for the mining and marine industries to work in synergy, eg. an advanced fire fighting facility could be utilised by both industries (eg. training simulators).

3.5 AVIATION FACTORS

Flying Distance Factors

As the 2008 report recorded, Cairns' location gives it, often unrecognised, flying distance advantages.

The following **Map 5** shows approximate lines of equal flying distance – Cairns/Townsville, Cairns/Brisbane, Cairns/Darwin, Cairns/Perth and Cairns/Jakarta.

It can be seen that Mt Isa is the same distance from Cairns as from Townsville. Mines north of Mt Isa are closer to Cairns.

All the north west mining province and central Queensland coal fields down to Clermont are closer to Cairns than to Brisbane. Longreach is closer to Cairns than to Brisbane.

Alice Springs is almost the same distance from Cairns as from Darwin. McArthur River is almost as close to Cairns as to Darwin.

Much of the Kimberley area is marginally closer to Cairns than to Perth.

Almost all of Papua Indonesia is closer to Cairns than to Jakarta.

Aviation Capacity Factors

By and large, aviation capacity based at Cairns Airport is superior to any other centre in the north.

There is a suitable range of existing operators who are willing and able to respond to expanded mining industry service requirements across the study area, ranging across international, domestic, regional and smaller charter operations.

Cairns Airport also has the best connector RPT services of any centre in the north, both to centres within the north, and to the rest of Australia and overseas, making it an excellent PoH at which workforce and personnel can be assembled not just from the immediate region, but from other parts of the north and other parts of Australia, and where applicable, from overseas.

It should be noted however, that there seems to be a tendency for specialist operators to develop in this field such as Alliance who have now expanded their operations from Townsville to include Cairns' operations. Strategic Airlines have commenced using large Airbus A320 and A330-200 to service the very large workforce demands in the Pilbara out of Sydney and other major metropolitan centres.

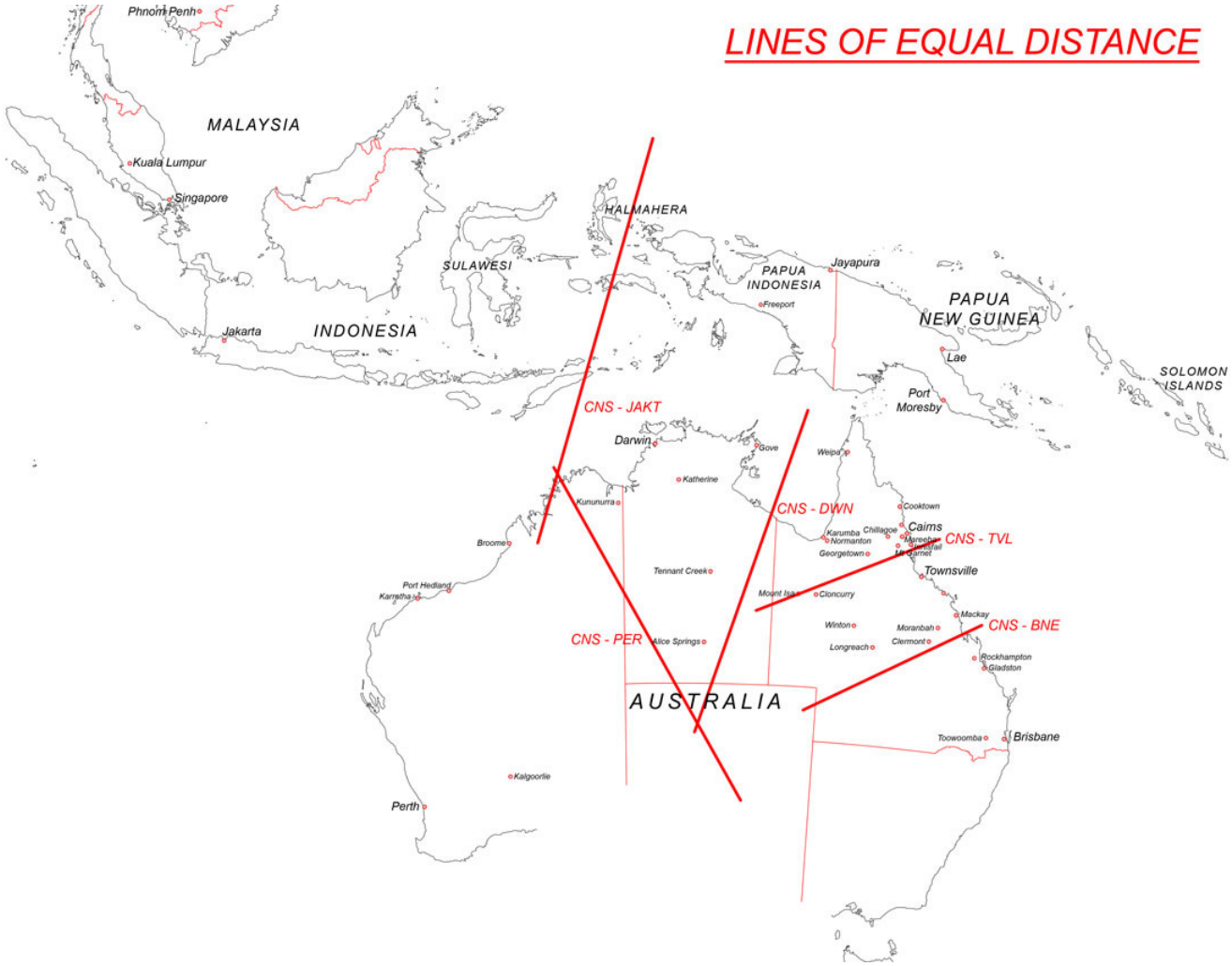
Airport Capability Factors

Airport capacity at mining centres can affect the size and type of aircraft that can be used in workforce fly-in operations.

Some significant recent developments have been:

- BHP Billiton who own the Moranbah airport have announced a study into potential for the airport to be relocated and/or upgraded.
- It is believed that a strip is being developed in the PNG Highlands to service the Exxon Mobil project that will be capable of taking large freight aircraft, eg. Antonovs.
- Proposals have been developed to upgrade terminals at Jackson International Airport, Port Moresby

Map 5 – Lines of Equal Flying Distance



Source: Cummings Economics.

Current Extent of 'Fly-In' Activity

Statistical Data

The following gives 2006 Census data for employment in mining by place of usual residence and place of employment for statistical divisions across the north.

Employment by Industry – Mining, 2006 Census			
	Place of Usual Residence	Place of Employment	Difference
Far North	1315	695	+620
North	2815	1277	+1538
Mackay	8478	8055	+423
Fitzroy	5898	5862	+36
North West	2885	4128	-1243
NT	1706	1930	-224
Kimberley	547	1041	-494
Pilbara	5748	8523	-2775

Source: ABS, 2006 Census data.

The difference is an indication of the extent of 'fly-in' activity. It indicates that the Queensland coastal regions are major suppliers of 'fly-in' labour to mines.

It should be noted however, that the definition of mining used in this table, is fairly narrow.

For instance, Rio Tinto indicate that they employ over 700 at Weipa. The ABS data for Weipa however, records only 120 of its workforce being classified as mining. About 400 are classified in manufacturing.

Thus, the above tends to understate the employment by mining companies, especially where significant additional processing takes place, eg. at Weipa, Gove, Mt Isa, etc.

Airline Seats

The following gives a summary of current air services ex Cairns to relevant mining centres and individual mines identified to date and that identified from Townsville. **Maps 6 and 7** illustrate. The following gives details.

Summary of Number of Mining Centres Linked by RPT on Charters to Mines ex Cairns & Townsville and Estimated One Way Per Week Seat Numbers

		One Way – Seats Per Week	Total
Ex Cairns	**Overseas**		**1,281**
	▪ Lihir	300	
	▪ Port Moresby 2,606 [4] (Part 20%) [1]	(est) 521	
	▪ Mt Hagen	88	
	▪ Moro	36	
	▪ Tabubil	108	
	▪ Timika (Papua Indonesia)	216	
	▪ Kiunga	12	
	Northern Territory		**900**
	▪ Gove	[3] 700	
	▪ Groote I	200	
	Queensland – Far North		**951**
	▪ Weipa	740	
	▪ Cape Flattery	80	
	▪ Chillagoe	36	
	▪ Karumba	95	
	Queensland – North West		**1,010**
	▪ Century	600	
	▪ Ernest Henry	74	
	▪ Mt Isa	136	
	▪ Cannington	200	
	Central Queensland		**12**
Total 18			**4,154**
Ex Townsville	**Overseas**		**Nil**
	Northern Territory		**Nil**
	Queensland		
	▪ Century	600	
	▪ Mt Isa	[2] 814	
	▪ Cloncurry	[2] 370	
	▪ Ernest Henry	74	
	▪ Cannington	800	
	▪ Osborne	300	
	▪ Phosphate Hill	400	
	▪ Ivanhoe	36	
Total 7			**3,394**

[1] *Note: Much of the Port Moresby traffic out of Cairns would not be mining related but a significant amount would be. We have brought an estimated 20% of seats to account.*

[2] *Note: Some of the 370 seats to Cloncurry are on the way to Mt Isa and thus represent something of an overlap.*

[3] *Note: The 700 seats to Gove are on flights en-route to Darwin and thus represent something of an overlap with Darwin.*

[4] *Note: Includes 12 services a week by Qantas Link from July 2010.*

Source: Cummings Economics from industry information.

The above indicates that there are regular services to 18 mining centres out of Cairns and 7 out of Townsville. Seat numbers are about 4,057 out of Cairns and about 3,394 out of Townsville.

In addition to services out of Cairns and Townsville, a further 144 seats were identified as moving ex Mt Isa or other Gulf centres to Century 72, Cannington 36, Ivanhoe 36.

A higher proportion of the traffic to and from Cairns would be other than 'fly-in' workforce, including R&R, general business and joining other flights. It is likely that actual 'fly-in' workforce ex Townsville is higher than ex Cairns.

An extra 1,034 seats were identified out of Brisbane to Clermont 360, Moranbah 600 and Ernest Henry 74.

There are also large movements into the central Queensland coalfields via air services ex Brisbane to Mackay and some of the traffic on services Cairns, Townsville to Mackay could also be mining traffic.

The total number of seats identified ex Cairns and Townsville are very similar to those identified in 2008 and indicate that after some falls, numbers are back to about the same level as in 2008.

Ex Cairns .....2010 – 4,154 .....cf 2008 – 3,996
Ex Townsville.....2010 – 3,320 .....cf 2008 – 3,380

A major change in composition ex Cairns has taken place however with major national mining 'fly-in' operator Alliance extending its operations to Cairns using its 100 seat aircraft and Qantas Link entering into the market with flights to Mt Isa (replacing MacAir) flights to Ernest Henry, and from July, flights to Port Moresby.

Estimated Employment Involved in 'Fly-in' Services

The following estimates are of current direct employment by:

a) mining companies in the region (including major contractors carrying out mining operations).

b) 'fly-in' personnel living in the region employed by mining companies (including major contractors carrying out mining operations).

c) construction and maintenance workforce living in the region, employed by non-mining companies, but flying in to various mines on short to medium-term construction and maintenance contracts. This includes personnel of Dawson Engineering, Cairns, Cairns based Pacific Relines/ATIVO Maintenance & Project Services/Skilled Group who carry out relines and have their own aircraft and personnel and the TME Group that also provide relines and are based in Cairns.

There is some overlap between (a) and (b) above of workforce living in the Cairns/Tablelands/Cassowary Coast area and flying into more remote mines in the region (eg. Cape Flattery, Chillagoe).

Employment in (c) above can be transitory and the following estimate is of equivalent full-time employment.

		Estimate	(cf est 2008)
Estimated residential mining workforce in the region	1,150	1,300	(1,600)
Estimated workforce flying into mines in the region	150		
Estimated workforce flying in to mines outside the region		1,500	(1,400)
North West Queensland	700		(970)
PNG and NT	800		(480)
Estimated equivalent full time workforce for construction and maintenance operations at mines		500	(500)
Total		**3,300**	**(3,500)**

Source: Cummings Economics from industry information.

It should be noted that this is direct employment at mine site and does not include off-site employment in providing a wide range of goods and services to mines.

Total workforce based in Cairns on a fly-in basis is estimated at about 2,100 (cf 2008 – 1,900).

Changes since 2008 are not large – employment in mines in the region is down about 200 reflecting especially some reductions by Kagara and at Weipa. Estimated 'fly-in' in the north west is down due to some mine closures in that area but up strongly in PNG and eastern Northern Territory (services to Groote). Overall employment will have fallen in 2009, but is estimated to be back to about the level of 2008.

Implications of the foregoing for a strategy include:

a) *Cairns' existing role as an air services centre for mining operations continues to be much larger than is generally recognised.*

b) *As indicated in the 2008 report, the Cairns area can use its flying time superiority to advantage in a number of areas.*

c) *As indicated in the 2008 report, the Cairns area can use its superiority as an aviation hub both in terms of local availability of aircraft capacity and wider connectivity to great advantage.*

d) *The aviation sector is substantial and competitive and is a major partner in the process. However, there is evidence that larger and specialist companies have been entering the field.*

3.6 SUMMARY OF CAIRNS' ADVANTAGES & DISADVANTAGES AS A WORKFORCE PROVIDER

Cairns' advantages as a provider of 'fly-in' services appear to include:

a) Superior living conditions/lifestyle factors for workforce and their families.

b) Its dominant regional, national, and international air services hub position in northern Australia and adjacent Asia Pacific area.

c) Arising from (b), its superior back-up facilities for servicing aircraft and as an operational base for aviation companies.

d) The superior size and diversity of the business services the Cairns region offers.

e) Arising out of (a), (b) and (d), its increasing attractiveness as a base for mining services operators.

f) The size and diversity of its workforce including availability of jobs for partners in industries with high female employment opportunities.

Cairns' main disadvantage is that its immediate regional area is not as strong in mining activity as some others, although this turns into an advantage of less strains of past strong demand from the mining sector on its workforce in other sectors. However, as is commented upon elsewhere in this report, the past history of lower mining activity leads to a perception problem of the workforce potentially available from the area.

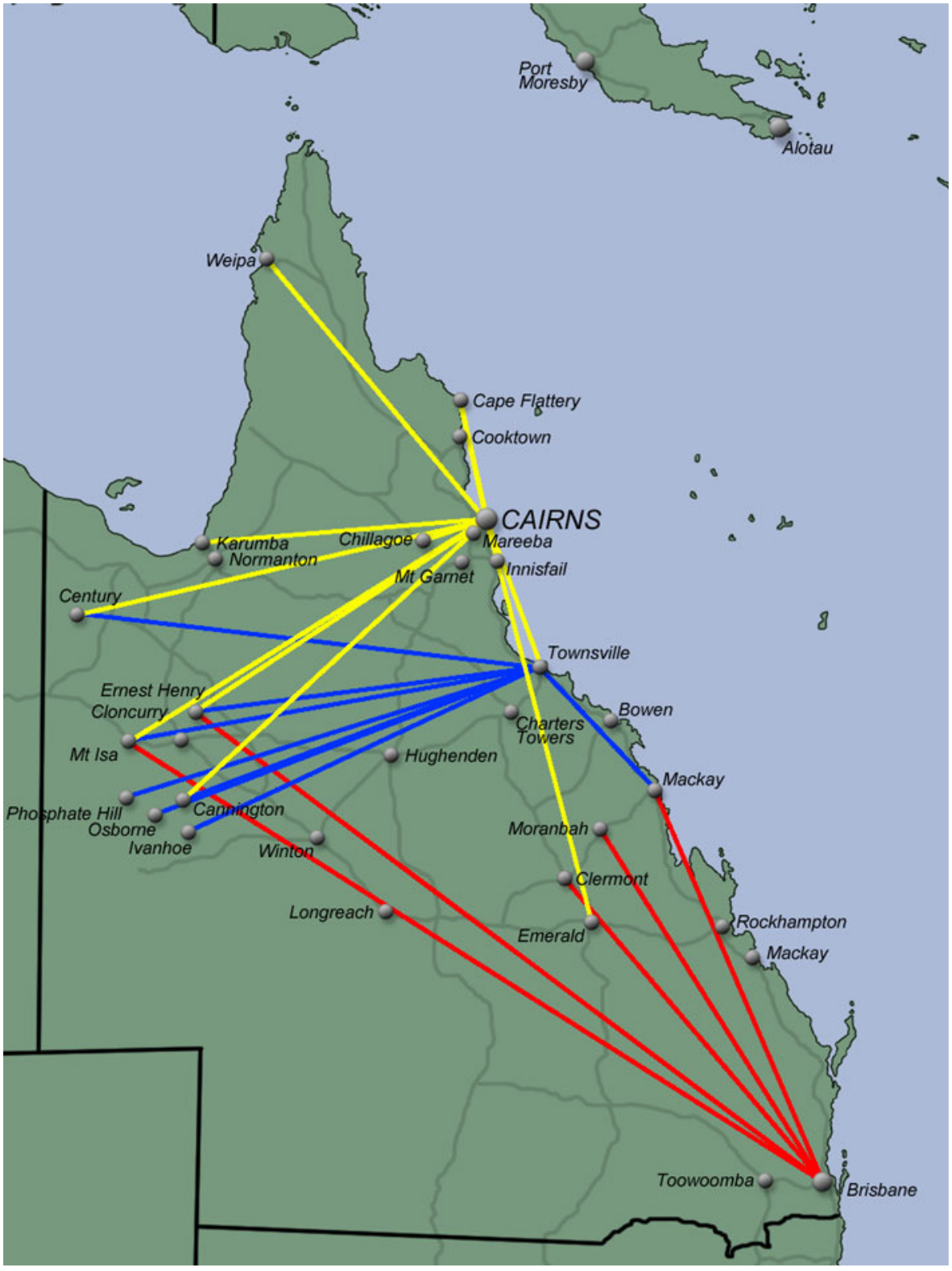
The following gives an idea of the comparative levels of mining production from various areas.

Value of Mineral Production, 2007/08 (unless indicated otherwise)		
Northern & Central Qld		
Far North (Cairns)		$0.7 bn
North (Townsville)		$0.2 bn
North West (Mt Isa)		$7.2 bn
Mackay (Mackay)		$10.0 bn
Fitzroy (Rockhampton)		$6.7 bn
Northern Territory		$4.3 bn
Papua New Guinea	(2007)	$7.5 bn
Freeport Indonesia	(2009/10)	$6.0 bn
Total		$42.6 bn
cf Western Australia	(2008/09)	$61.0 bn

Source: Cummings Economics from various sources.

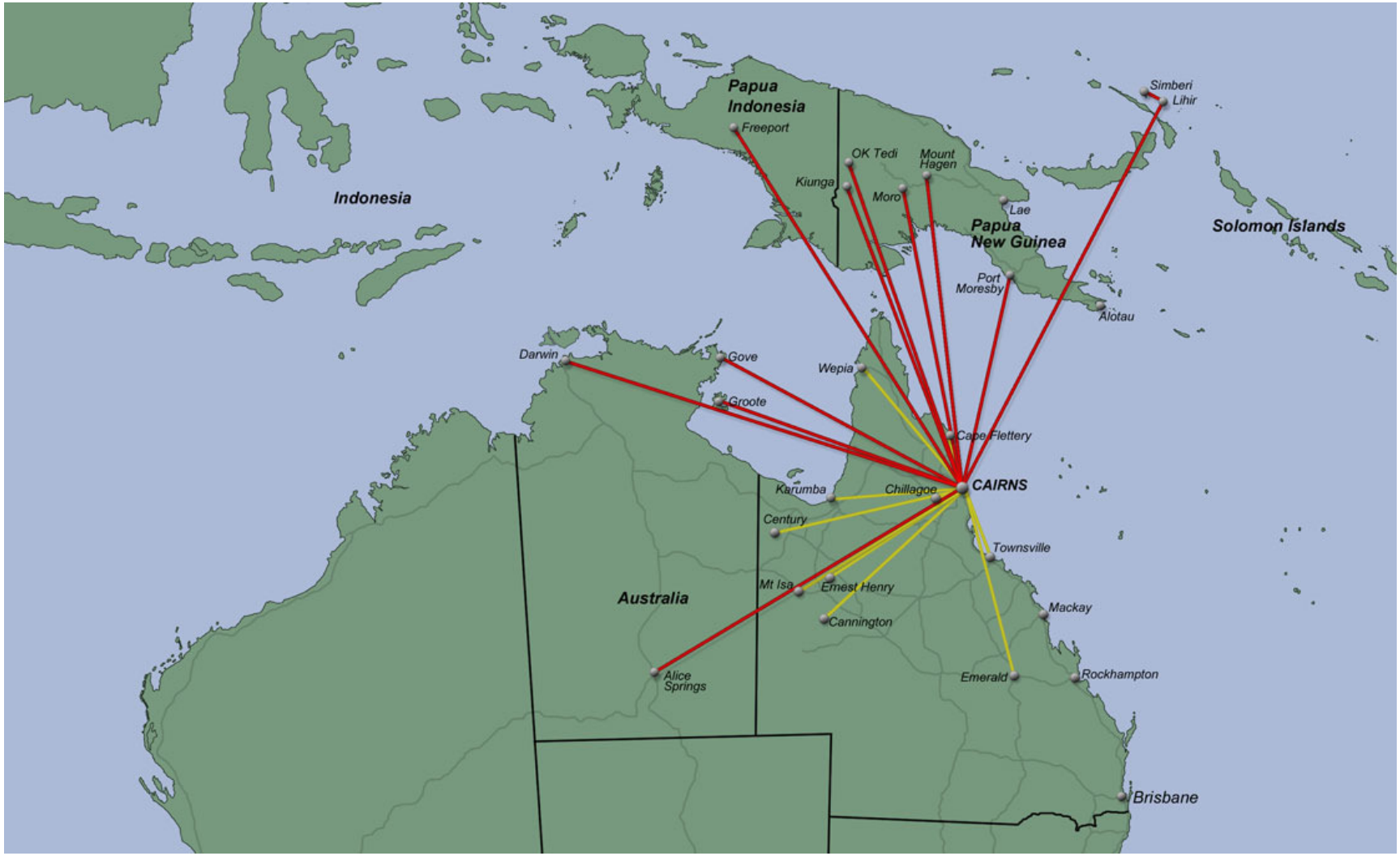
Combined value in areas potentially serviced out of Cairns is up towards that of Western Australia.

Map 6 – Mining Related Air Services, Queensland Areas



Source: Cummings Economics.

Map 7 - Mining Related & Other Relevant Air Services, Interstate & Overseas



Source: Cummings Economics.

4. SEA CARGO ASPECTS

4.1 GENERAL

The objective was to collect information that related to the existing trade through Far North Queensland regional seaports, and trade that might be developed through the region's seaports.

a) Export of mine output – mines and projects located in the Cairns' hinterland, Peninsula, Gulf and North West.

b) Supply of fuels, mining supplies and general inputs from the region's seaports to mines and projects in the Peninsula and Gulf area, plus those in eastern Northern Territory, Papua Indonesia and Papua New Guinea.

4.2 FACTORS AFFECTING THE DEVELOPMENT OF SHIPPING FREIGHT SERVICES

Cairns Area Mines

Most of the output of minerals from the Cairns' hinterland in the last 30 to 40 years has been tin, wolfram and gold; commodities that generate small shipment volumes only. The tin and wolfram produced has been transported by road to Brisbane for shipment overseas.

On two occasions, there has been a need to export relatively small amounts of high grade copper ore (from Diane and Red Dome deposits) and both of these have been transported to Cairns by road and handled in bulk through existing wharfside sheds.

However, if substantial output volumes were to be exported, the existing road, rail and port infrastructure and the constraints surrounding them pose problems that need to be addressed.

Mine inputs can be brought into the area from the south by road, rail or sea.

Peninsula

The Peninsula area offers a range of port sites for bulk outward shipment including the deep water port at Weipa. Because of depth of water in the Gulf, some will be constrained to shipping via barges to offshore bulk ships. An option for mines close to Weipa port could be to consolidate cargo in Weipa by barge for export in larger vessels.

Lack of road development in to the Peninsula area means that general cargo inputs need to be brought in by sea with Cairns (as the far northern terminus of the efficient east west coast rail and road network), the sourcing point.

Lower Gulf

The major constraint in this area relates to depths. As a result, shipments need to be double handled via barges to bulk carriers standing offshore.

While road access into the area is better than for the Peninsula, access by sealed road to the Gulf shore is currently confined to Karumba on the Queensland side and Port Bing Bong on the Northern Territory side.

The low lying area around the lower Gulf is flood prone and this can cause problems for inbound road transport at some times of the year.

Over the years, there have been sporadic inbound shipping ex Cairns to lower Gulf ports.

Karumba has also been sporadically used as a supply point for coastal shipping running up to Weipa to Mornington Island and other Gulf ports including Groote and Gove.

The other factor affecting Gulf ports is the capacity and reliability of the railway line from Mt Isa to Townsville that provides an alternative for using Gulf ports for outward shipping and bringing in inputs. Information during the research for this report indicated that the line and the Townsville port are facing capacity constraints.

However, slurry pipelines are offering a cheaper alternative than rail to Townsville when deposits are relatively close to the Gulf.

Eastern Northern Territory

This area is of significance to this study only as it relates to possible provision of inputs from the Cairns/Far North Queensland region ports.

There are established port facilities at Gove and Groote Island. Roper River is currently just a boat ramp landing.

Two possibilities are: – ex Cairns direct or via Weipa or ex Karumba.

There have been sporadic movements in the past, especially from Cairns up until the late 1980's.

Amalgamation of the ownership of both Weipa and Gove mines offers some opportunities.

Perkins Shipping (now part of the Toll group) who are operating from both Cairns and Darwin could provide services ex Cairns into this area. Perkins Shipping's international schedule from Darwin to Singapore would also allow Cairns to link to the important transhipment port of Singapore if Perkins developed a Cairns to Darwin service.

Papua Indonesia

In this study, this area is of interest only for shipping of mine inputs from Cairns and possibly other Far Northern seaports.

Cairns has the advantage of offering the most efficient route for Freeport Indonesia mines. The route allows Freeport to draw from the nearest Australian metropolitan centres, Brisbane and Sydney. This compares with the route via Darwin that would draw from more distant Adelaide and Melbourne. Greater local availability of local products including food in the Cairns area is also an advantage.

However, this competitive advantage over Darwin in Indonesia probably does not extend west of the Freeport mine.

Papua New Guinea

As the far northern terminus of the relatively efficient east coast road and rail network, Cairns is an obvious supply point for goods to Papua New Guinea drawn from elsewhere in Australia and locally.

Up to the early 1990's, shipping sporadically ran out of Cairns to Port Moresby and there has been periodic charter activity to PNG.

Townsville became the port for Consort services because of a number of factors:

- Onerous waterside worker arrangements in Cairns in the 1980/90's and ability to negotiate a better deal in Townsville as 'new traffic'.
- Better rail port transfer arrangements in Townsville.
- More recently, possibilities of bringing in overseas cargoes for transhipment to PNG.
- Superior wharf cranage at Townsville.
- Less quarantine constraints on timber imports.

Cairns' advantages lie in proximity and shorter steaming distances, less congestion and potentially greater availability of local supplies.

The PNG economy is composed of a number of relatively disconnected regional economies, and potential competitive factors vary.

Western & Gulf Province

The Cairns based coastal shipping network (via Horn I) already runs within a few kilometres of the PNG coastline at Saibai and Boigu Islands in the Torres Strait. Crossing the border however, imposes major additional costs in crewing arrangements, quarantine, customs, and immigration.

However, comparative direct distances to Daru and Kikori are as follows.

	Daru	Kikori
Port Moresby	441 km	397 km
Cairns	907 km	1,059 km

The prospects of establishing direct shipping out of Cairns are probably best in this area.

A major strategic factor coming into place is the construction taking place (as part of the Exxon Mobil project), of the road from Kikori to the southern Highlands. This will provide a possible much shorter direct access route from Cairns to the major population of PNG located in the Highlands area compared with the current access route via Lae.

This route also opens up prospects of drawing back loading out of the Highlands area for the Australian market of products like coffee.

Comparative Estimated Distances, Cairns/Mt Hagen

	Sea	Road	Total
Via Kikori	990 km	200 km	1,190 km
Via Lae	1,440 km	400 km	1,840 km
(Difference Kikori over Lae)	(-450 km)	(-200 km)	(-650 km)

Port Moresby

Distance Cairns/Port Moresby is 837km. Quantities of cargoes required for Port Moresby, especially during the PNG LNG construction period, seem likely to demand extra shipping capacity. Distances are similar to the Torres Strait and a weekly scheduled shuttle service would be easily achievable provided congestion was not a problem at Port Moresby.

Maximum efficiency would be achieved by being able to use wharf cranes at either end.

Little backloading is likely out of the Port Moresby area. A triangular service with Kikori could be envisaged – to Port Moresby (upbound) – Kikori (upbound and additional from POM) – Cairns (backload from Highlands for Cairns). Cabotage restraints would mean that this would need to be carried by PNG shipping.

Milne Bay Area

This part of PNG is almost as close to Cairns as Daru in Western Province. Apart from direct services to Alotau and mines in the area, it can be included as a port of call for routes through to the north coast Oro Bay, Lae, Madang and Wewak, or through to Rabaul, Bougainville, New Ireland. The port of Alotau in this area is potentially an entrepot point.

North Coast

Services to this area are more likely to pick up backloading cargo direct through multiple ports of call or direct to Lae as the main north side entrepot.

Rabaul – Eastern Group

Again, services to this area could pick up backloading (especially copra and timber), direct or through multiple ports of call or using Rabaul as an entrepot.

4.3 EXISTING & POTENTIAL SHIPPING FREIGHT & SERVICES

4.2.1 Outward Shipping of Minerals

Map 8 illustrates existing and potential mineral export movements from ports in the Cairns, Peninsula, Gulf and eastern Northern Territory area. The following table summarises existing and potential tonnages.

Existing Potential Mineral Shipments via Ports Cairns/Mourilyan Area, Peninsula, Gulf Eastern

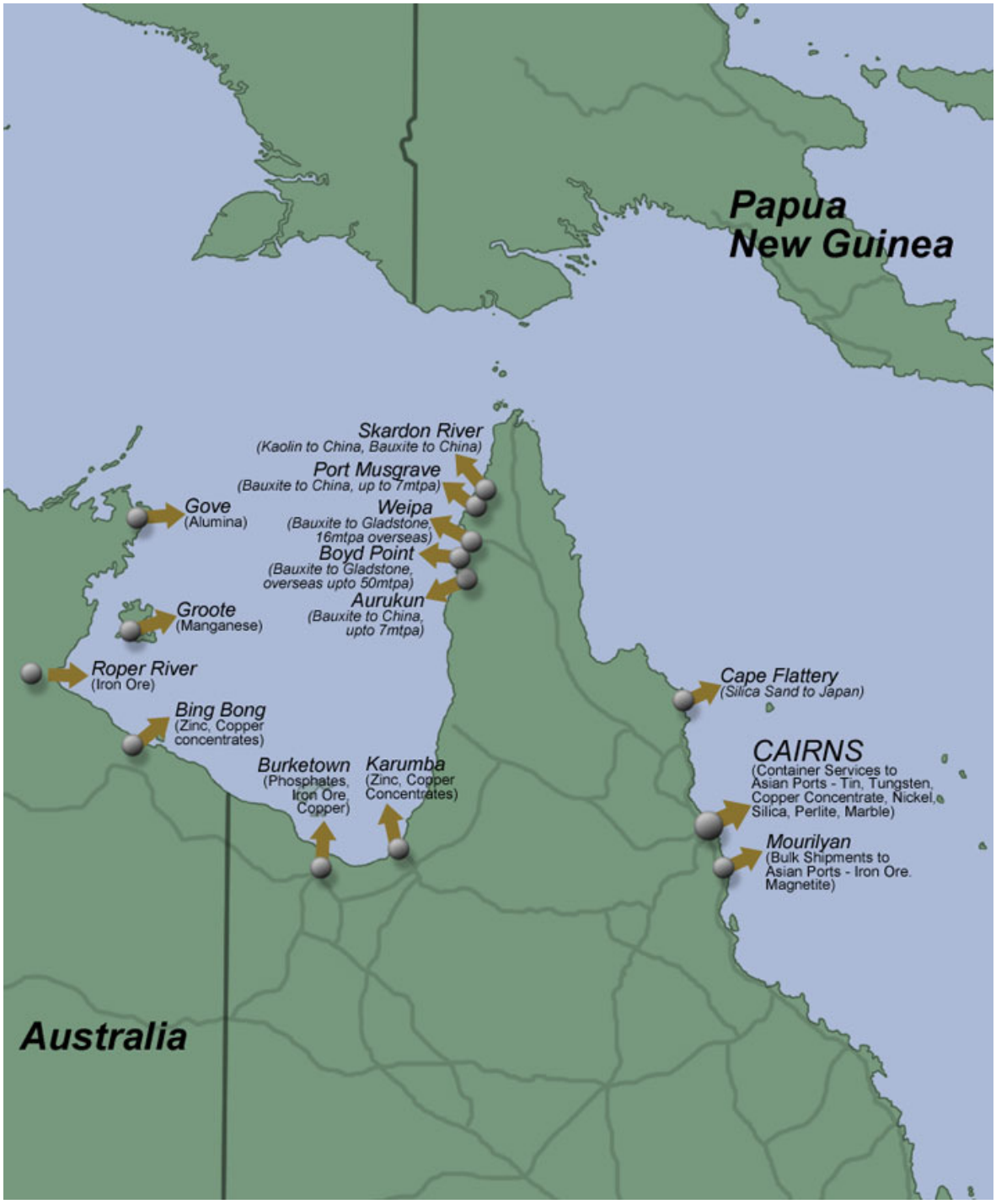
Mine	Commodity	Annual Quantity (tonnes)	Likely Port
Cairns Area - Bulk			
Mt Lucy	Iron Ore	500 000	Mourilyan
Mt Ruby	Iron Ore/Copper	500 to 750 000 (mainly iron ore)	Mourilyan
Mt Garnet area	Magnetite	300 000	Mourilyan
Copper Strike	Copper concentrate	60 000	Mourilyan
Cairns Area - Container			
Mt Garnet area	Tin concentrate (combination low & high grade)	10 to 20 000	Cairns
Herberton area	Copper concentrate	unknown	Cairns
Mt Garnet area	Copper concentrate	60 to 90-110 000	Cairns
Chillagoe	Perlite	unknown	Cairns
Mt Garnet area	Diatomite	Inferred Resource 10 m tonnes	Cairns/Mourilyan
Mt Garnet area	Nickel sulphur/Nickel metal, cobalt, scandium	50 000	Cairns
Wolfram Camp	Tungsten/Molybdenum	unknown	Cairns
Einasleigh	Silica (Quartz)	5 to 25 000	Cairns
Mt Carbine	Tungsten	2 000	Brisbane
Chillagoe	Marble	unknown	Cairns
Almaden	Lime (Lihir)	45 000	Cairns
Peninsula Area			
Cape Flattery (existing)	Silica sand	unknown	Cape Flattery
Weipa (existing)	Bauxite	16 m	Weipa
Weipa	Bauxite	15 m rising to 50 m	Boyd Point
Skardon River	Kaolin Bauxite	250 000 1 – 2 m	Skardon River
Pisolite Hills	Bauxite	6.5 m	Port Musgrave
Aurukun	Bauxite	6.5 m	Aurukun [(1)]
Gulf Area			
Century (Qld) (existing)	Zinc Lead	1 m 60 000	Karumba
Highland Plains (NT)	Phosphate	3 m	Burketown
Constance Range (Qld)	Iron ore	3 – 4 m	Burketown
Redbank (NT)	Copper concentrate	20 – 30 000	Burketown [(2)]
Roper River (NT)	Iron ore	Initial 3 m	Roper River
Aurukun	Bauxite	6.5 m	Aurukun

[(1)] *Note: May eventually be via Boyd Point.*
[(2)] *Note: Initial output Cathode copper by road via Darwin.*
Source: Cummings Economics from industry information.

In summary, there are three existing ports shipping minerals in the Far North Queensland region, Cape Flattery, Weipa and Karumba.

Number of ports shipping minerals can be expected to expand over the next decade by six (Cairns, Mourilyan, Skardon River, Port Musgrave, Boyd Point, Burketown) and also Aurukun if the bauxite there is not shipped via Boyd Point.

Map 8 – Current & Potential Mineral Export Cargoes



Source: Cummings Economics.

4.2.2 Shipping Services to Supply Mines

Map 9 illustrates existing and potential services ex Cairns to supply mining operations in the Peninsula, Gulf, Eastern Northern Territory, Papua Indonesia, Papua New Guinea and Solomons' area.

The following gives information by ports by mines.

Peninsula

Cape Flattery – Seaswift has an existing service providing fuels and general cargo.

Weipa – Perkins Shipping and Seaswift have existing services to Weipa ex Cairns for general cargoes. Fuel is imported directly from overseas.

Skardon River

Kaolin – Fuel requirements will be 10.5 million litres per annum into main storage tank of 2ml. Barges that can enter the Skardon River hold up to 1ml per barge. General cargo 22 Fcls per week.
Bauxite – Fuel and general cargo needs to be advised.

Pisolite Hills – fuel and general cargo needs - still to be advised.

Aurukun – Not available.

Gulf

Century – fuel and general cargo come via rail and road transport.

Highland Plains (Phosphate Australia) – General cargo by road transport.
Fuel preliminary estimate 3 – 4ml.
Sodium silicate 2 000 tonnes in minitainers.

Redbank Copper – General cargo by road. Inputs needed include diesels and sulphuric acid (or sulphur to make own acid).

Westmoreland (uranium) – General cargo by road.
Inputs – lime 30 – 40 000 tonnes in bulk
Fuels - if not gas from Boorooloola 300 000 litres of diesel per annum.

Constance Range – General cargo by road.
Inputs – 22,000 tonnes of acid/reagents & 1,200 tonnes of grinding balls.

PNG

Ok Tedi – The company currently is hubbing shipping/supply services out of Brisbane with grinding balls out of Newcastle, to the Fly River Port of Kiunga using the Kiunga Chief on a 28-day cycle.

They are looking at basing in Cairns including:

- A commercial support office of 20 personnel in Cairns.
- Continuing Cairns as their main port of hire (PoH) with service flights (108 seats a week) and air cargo.
- Concentrating their supply requirements in Cairns. The company estimates that of imports from Australia to PNG of $500m per annum, they account for $300m.
- Basing shipping in Cairns to provide a regular service to Cairns/Kiunga on a 14-day cycle. Total need is for 240 containers a month.

Cargoes can be concentrated by rail to Cairns (similar to Freeport) and a need for grinding balls can now be met by road transport from Townsville.

A major issue is a need for permission to load 100 containers per month of ammonium nitrate explosive at Cairns (at present being drawn from Newcastle) and lack of a port container crane.

Lihir – Shipping is currently mainly ex Brisbane with 20% direct from overseas and some ex Lae. The service ex Brisbane is weekly.

Input is about 500 – 800 per month. It was reported that 10% are 40ft containers.

About 150_– 200 containers a month are lime which is believed to be carried by the Sofrana's service from New Zealand to Townsville, then by Consort to Lae and then on a Bismark shipping service ex Lae to Lihir that also carries freight from PNG.

The company is believed to be looking at doubling the amount of lime imported.

Lihir is also believed to be taking 500kg of freight on their air services from Cairns.

There is a major potential opportunity to source the lime more cheaply from Ootann and to explore possibilities of using Cairns as the main shipping hub.

Porgera – Some 200 containers a month are shipped ex Townsville to Lae and it is believed that this represents three-quarters of the cargo carried on the Consort service, Townsville/Lae. Of the 50 containers a week, 35 – 40 are believed to be bulk commodities, mostly chemicals.

Porgera is believed to source lime from within PNG.

Porgera were reported to be reviewing their logistics arrangements.

Summary

Thus, all three major existing mines are taking all or most of their input requirements from Australia, mainly from Brisbane, otherwise via Townsville.

Mine	Monthly Container Numbers
Ok Tedi	240
Porgera	200
Lihir	500 – 800
Total	940 – 1,240

With requirements for smaller mines of Tolokuma, Morobe Joint Venture, Sinivit, and Simberi, total demand is probably of the order of 1,000 – 1,400 per month.

Future Demand

Some difficulty was experienced within the scale of this study in determining future likely needs.

PNG LNG were unable to give details and said it was a matter for major sub contractors. The major subcontractors in turn have subcontracted most elements.

It is clear however, that much of the major items (eg. pipes/sections of the LNG plant) will be imported direct from fabricators overseas, mostly into Port Moresby.

Major ports will be:

1) Port Moresby
2) Kopi (Kikori) pipes
3) Lae (via Highlands Hwy) to the Southern Highlands.

Likely other major mine requirements will orient to the following ports:

1) Morobe Joint Venture – current Hidden Valley and prospective Wafi Golpu – via Lae.
2) Yandera – via Madang.
3) Ramu Nickel – via Lae or Madang.
4) Freida River – Wewak/Sepik River.
5) Solwara – Rabaul.

Advanced mining projects in the Milne Bay area are well located to be supplied ex Cairns direct or en-route to Lae or en-route to Rabaul and Lihir.

The shipping company Silent World based in the Solomons has recently set up in Cairns and would be in position to commence services to the Solomons and possibly the Bougainville area.

Implications of the foregoing for a strategy include:

a) Major opportunities have been identified to help get more mining projects off the ground in the Cairns Mourilyan hinterland, Peninsula and Gulf (with wider implications for diversifying the region's economic base) by developing shipping services out of the region's ports.

b) However, to achieve this will require investment in upgrading:

i. Infrastructure of the ports of Cairns and Mourilyan and up to four new ports to be developed in the Peninsula and Gulf.

ii. The road and rail transport infrastructure, from the hinterland to Cairns and Mourilyan.

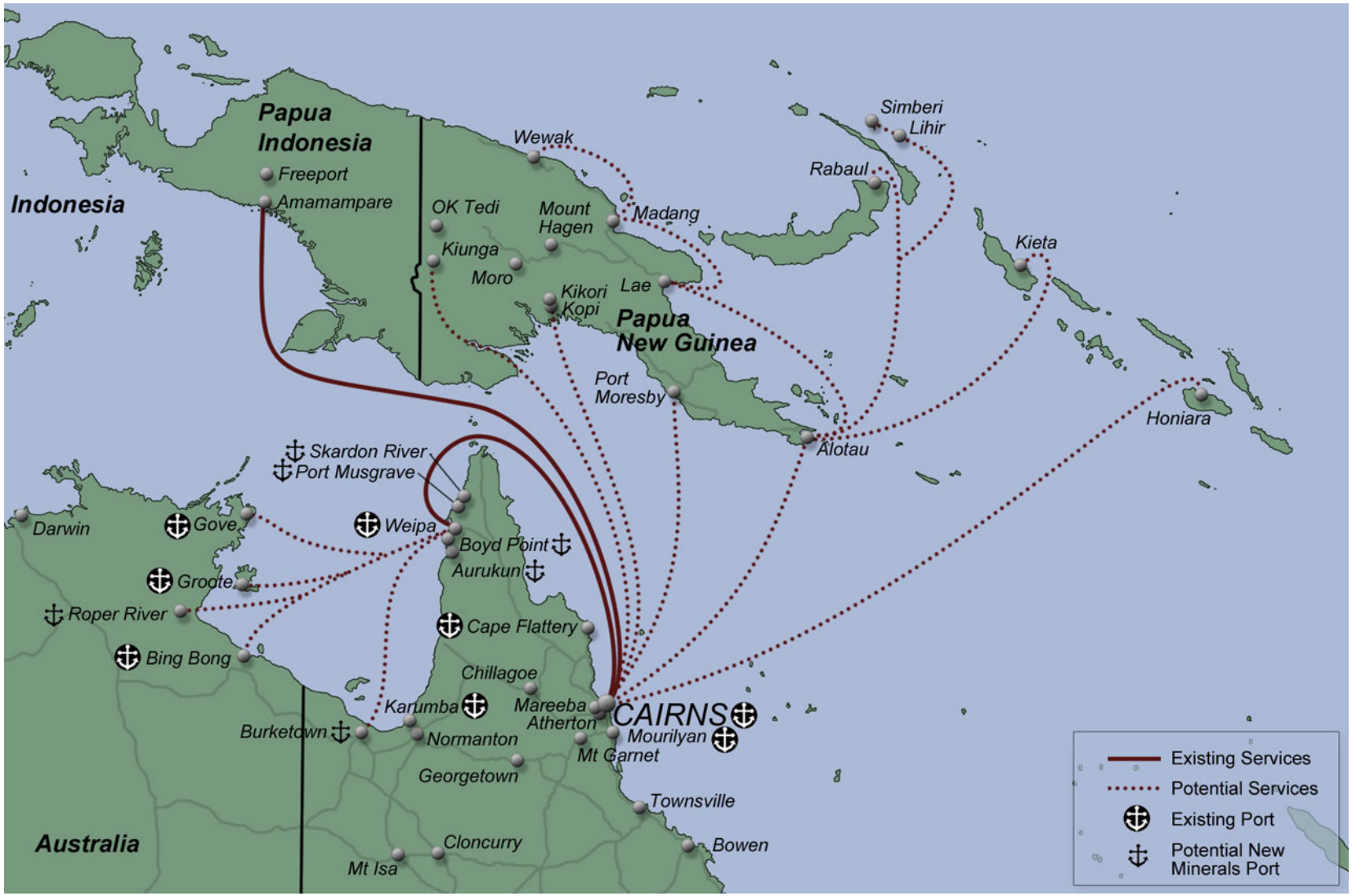
c) Apart from new bulk shipments (from ports like Mourilyan, Skardon River, Port Musgrave, Boyd Point and Burketown), mining development in the Cairns' hinterland has the potential to underpin direct general cargo services to Asian ports, especially China, with attendant significant additional benefits for:

- *Development and diversification of markets for other industries, especially primary industries.*
- *Direct import of manufactured goods and establishment of Cairns as a distribution port for imported cargoes. (One shipping company is already interested.)*

d) The highly increased need for mine inputs in PNG and the Solomon Islands provides an opportunity to re-establish a number of shipping services to those areas. This would be enhanced by the prospect of some base cargoes out of the region's mining sector providing a base cargo (eg. lime to Lihir). There are distinct possibilities of such services obtaining backloading of products like coffee, copra, cocoa and timber.

e) There could also be opportunities to expand services ex Cairns in the Gulf and eastern Northern Territory area.

Map 9 – Current & Potential Shipping Services ex Cairns to Mining Operations



Source: Cummings Economics.

5. ANALYSIS BY AREAS

5.1 GENERAL

The following looks at mining and industrial activity in detail in the study area.

Previous Maps 1 to 4 chart the relevant mines.

5.2 CAIRNS AREA

Area Covered

This area covers south to the Lynd Junction area, west to Georgetown/Croydon area, then north to the Palmer River and up to Cape Flattery north of Cooktown.

Except for Cape Flattery silica sands operation, mining in this area has been small, sporadic, and short lived over recent decades. However, with high world mineral prices, a surge of development has been taking place.

For this report, mining operations and prospects tend to fall into the following sub areas:

Mareeba/Chillagoe

Mt Garnet area/Herbert Valley area/Innisfail area

Georgetown/Croydon

Cooktown area

There are a number of small sand, gravel, limestone, dolomite and slate mines operating in the area and listed in the database that are not likely to involve air services and are not covered further in the report.

In this field however, it should be noted that Mirriwinni Lime, owners Wilkens, apart from having interests in the Cairns area, also have gypsum deposits listed in the Winton area of the North West.

Mareeba/Chillagoe

There are a number of existing mining operations in the area.

Solomon Mines - Tartara Copper Sulphate mine, just north of the 2nd Walsh River crossing, west of Chillagoe. Workforce has been about 10. The operation is supplying copper sulphate for zinc processing and other purposes.

Chillagoe Perlite - small perlite mine at Nychum (north of the 2nd Walsh River crossing), with the perlite being processed at Mareeba (workforce about 5). A major potential market has been identified in the supply of perlite for insulation in the large LNG storage tanks to be developed in PNG and Queensland. Details have been passed on to the company.

Marble - The marble deposits at Chillagoe are reported to be world class. Only small scale mining is taking place by Cairns Marble and Miriwinni Lime & Marble. Potential overseas markets exist but transport infrastructure and lack of direct shipping is a problem.

Slate - River of Gold have been sporadically mining high grade slate just west of the Mulligan Highway in the Palmer River area.

Lime – Phoenix Lime (100% owned by Metallica Minerals).

Phoenix Lime is currently producing approximately 40,000 tonnes of limestone (road base for road construction) and 5,000 tonnes ag-lime (for North Queensland agricultural industries) from its Ootann limestone quarry near Almaden. Prior to the Etheridge railway closure in about 1989 the Ootann lime works sold lime to all the sugar mills in North Queensland. (Current consumption approx 1,000 tonnes per mill, or 12 to 15,000 tonnes per year). The lime was either transported in belly dump rail wagons supplied by the sugar mills, or road transport. The Ootann quarry also supplied 4,000 tonnes of lime to the Kidston gold mine on rail in pod containers (would be similar to 2 pods in the current isotainer). Should Stage 1 of Metallica Mineral's Nornico Nickel Project, located at the old Greenvale mine site proceed, Phoenix Lime could double its current output of both limestone and lime. If Stage 2 proceeds, the tonnage transported from Ootann to Nornico's Greenvale and/or Bells Creek processing plant/s could increase to approximately 420,000 tonnes of limestone and 30 000 tonnes of lime. The lime and limestone would both travel on the Sundowner/Ootann Road, the Kennedy Highway/Gregory Development Road and/or the Gunnawarra Road.

Phoenix Lime recently completed a feasibility study into a $20 million upgrade of the Ootann operation that would significantly increase their production capacity. If this project received finance the upgrade would allow Phoenix Lime to supply both local and potential overseas markets. The lime could provide Cairns with a base cargo for a shipping service from Cairns to PNG.

Depending on the lime price, other future mining operations (e.g. Copper Strike at Einasleigh) could utilize lime. Most mining deposits in North Queensland contain sulphur and sulphur in water causes acidification of water. Lime added to acidic water produces neutral or non acidic water. Lime is therefore an important input to mining operations but its abundance makes it price (freight) sensitive.

The Ootann deposit has a JORC compliant proven resource of >53 million tonnes at approximately 55% CaO (>98% $CaCO_3$).

Development of new mines are underway.

Icon Resources, Mt Carbine – There is a long history of wolfram (tungsten) mining at Mr Carbine. Icon Resources are advanced in their proposals to reopen the mine with a target date given in September 2009 of three years, ie. 2012. Various options are being studied that would result in a capital investment of $53m to $66m. Employment possibly to be in the 70's.

It is envisaged output would be in one tonne bulka bags loaded in 20-tonne containers for shipment via the port of Cairns at a rate of two containers per week (approximately 2000mt/year).

Mungana Goldmines, Chillagoe – Mungana Goldmines was formed in early 2009 as a vehicle for Kagara's gold interests in the Chillagoe region. Mungana Goldmines listed on the Australian Stock Exchange on 8th June, 2010. Funds raised from the IPO will be used to purchase the partially completed Mungana treatment plant, to reimburse Kagara for underground development completed to date, the purchase of gold ore stock piles and to further define gold resources additional to the 1.85 million ounces already defined. To date more than $130 million has been spent on decline access and ancillary development.

Kagara retains a majority interest (62%) in Mungana Goldmines whilst Guangdong Foreign Trade Group has invested nearly $24 million to acquire an interest of 16 percent.Guangdong Foreign Trade Group is the major shareholder in Kagara at 19.8 percent.

The following projects are in an advanced position.

Wolfram Camp - The Wolfram Camp mine near Dimbulah was under construction at the time of the 2008 report with an expected workforce of 50 to operate. Technical problems with the plant and the GFC led to closure soon after opening. New owners, Planet Metals (76% owned by Metallica Minerals), continues to evaluate the project with the view to reopening the mine and its 150,000 tpa processing plant.

Watershed – In the first quarter of 2010, Vital Metals completed a review of the Watershed Pre Feasibility Study. An internal document has been developed identifying possible pathways to enhance the economic viability of the Watershed Project. Issues include grade variability, environment footprint, strip ratio (high mining cost) and access road. Vital Metals has successfully completed a A$2.4m fund raising of which part will go towards the Watershed Project. At present, the camp (not mine) is on care and maintenance.

Mt Lucy, Iron Ore – Chinese company Australian Jinhua Mining International Group took an option from InterMet Resources over magnetite (iron ore) leases at Mt Lucy near Almaden in about 2008 and have been evaluating the deposit and have made preliminary inquiries about the possibilities of shipment through Mourilyan at an indicated rate of about 500,000 tonnes per annum.

The Mt Lucy deposit is not large and there is no JORC compliant resource estimate but indications are between 1 – 3 million tonnes. There are other non JORC compliant iron ore prospects in the Mt Lucy Area which could be mined after or simultaneously with Mt Lucy. Jinhua will decide by about August 2010 whether to take up the leases.

InterMet Resources (Subsidiary of Hillgrove Resources) holds extensive tenements in the Almaden/Mt Garnet area.

Mt Mulligan – Mantle Mining are seeking to develop a coal bed methane gas operation from the coal seams at Mt Mulligan either to power local electricity generation or to pipeline gas to a local market. Their plans are to finalise some legal issues & an indigenous land use agreement in 2010, carry out drilling/exploration in first half 2011 and complete the evaluation and financing of the project by the second half of 2011. This would allow construction and generation in 2012 of 1MW building up to 5MW utilising 1MW bolt on gen sets. A 40km transmission line would need to be constructed to the grid at Dimbulah.

Hodgkinson Goldfield – Republic Gold holds a number of tenements in the old Hodgkinson goldfield north of Dimbulah. Tregoora, Northcote & Atric potentially form part of a larger scale project that could produce 35 – 45 000 ounces of gold for several years from 2012. If 2010 drilling results prove successful, mining of high grade pods could commence by 2011 for 10 – 20 000 ounces of Gold.

There is substantial exploration going on in this area including:

Whumbal West, wolfram (tungsten) – Republic Gold, 50km NW of Mt Carbine.

Mt Mulligan, coal and coal seam gas.

Fulford Creek, rare earths - 65km south south west of Chillagoe, Orion Metals Limited.

Cardross, copper, gold, zinc, silver – 52km west north west of Chillagoe, Axiom Mining.

Mt Molloy, copper – Mt Molloy, Axiom Mining.

OK Mines, copper, gold – 110km West North West of Chillagoe, Axiom Mining.

Crystalbrook, gold copper – Chillagoe area, Gulf Resources.

Khartoum, tin and base metals – 100km south west of Mareeba, Auzex Resources & Hillgrove Resources.

Khartoum, molybdenum – 100km south west of Mareeba, Supersorb Environmental.

Kangaroo Creek, tin – 70km south west of Chillagoe, Republic Gold.

Mt Carbine Extension, tin – north of Mareeba, Kangaroo Resources.

Kangaroo Metals, uranium – Chillagoe Uranium, Chillagoe area, Anchor Resources.

Nightflower, gold, silver, zinc, lead – Axiom Mining.

Black Springs – Dicksons Creek, rare earths – 70km Southwest of Chillagoe, Orion Metals Limited.

Major transport issues in this area are a need:

- To complete the sealing of the Burke Developmental Road through to Chillagoe, on to Mungana.
- To upgrade the Sundown/Gingerella/Ootann road (The unsealed road from Almaden to the junction of the Kennedy Hwy 15km's west of Mt Garnet).
- To upgrade the Etheridge railway including rail sidings at Kagara's Chillagoe processing plant and Phoenix Lime's Ootann mine.

Mt Garnet Area/Herbert Valley/Herberton/Innisfail Area

Kagara has three operating mines in North Queensland; Mt Garnet (underground), Balcooma (underground) and Mungana (underground). There are also plans to operate an open pit mine at Thalanga with site works commencing shortly. The mines supply three treatment plants located at Mt Garnet (1 polymetallic & 1 copper plant) and Thalanga (1 copper plant to be converted shortly to a polymetallic plant). The polymetallic plant at Mungana is only 50 percent complete and whether it remains as a polymetallic plant or is converted to a gold plant will depend on the success of the Mungana Goldmines development drilling programme.

Mt Garnet is Kagara's main operational centre receiving ore from:

- Balcooma mine, 140 km south of Mt Garnet in B Quads via the Kennedy Developmental Road (mine road meets the Kennedy Developmental Road 18 km north of The Lynd). Balcooma ore is processed in the Mt Garnet copper plant.
- Mt Garnet mine, with ore being processed in the Mt Garnet polymetallic plant.
- Mungana mine, 160 km northwest of Mt Garnet in triple road trains via the Sundown/Gingerella/Ootann road (which includes approx 115 km of unsealed road). Mungana ore is currently processed in the Mt Garnet polymetallic plant.

In the future it is possible that the Mt Garnet copper plant will receive ore from the Maitland deposit, 190 km southwest of Mt Garnet via the Gregory and Kennedy Developmental Roads. Mt Garnet copper plant produces approx 60 000 tonnes copper concentrate that is currently transported in B Quads via the Kennedy and Gregory Developmental Roads for export via Townsville. In February/March 2009, due to load limitations on this route Kagara transported the copper concentrate in B Doubles to Townsville via the Palmerston & Bruce Highways.

Depending on the type of treatment plant/s eventually decided upon for Mungana, it is possible that the Mt Garnet polymetallic plant may also receive ore from the King Vol deposit (a further 20 km along the largely unsealed Burke Development Road from the Mungana mine or 180 km from Mt Garnet via the Sundown/Gingerella/Ootann road). The Mt Garnet polymetallic plant produces approx 30 000 tonnes of copper & lead concentrate for export through Townsville port in B Quads via the Kennedy & Gregory Developmental Roads. It also produces 130 000 tonnes of zinc concentrate for the Sun Metals refinery in Townsville.

The Thalanga plant will eventually receive ore from the Surveyor East, West 45, Waterloo and Liontown deposits which are located between 120 to 330 km from the Thalanga plant. Prior to its closure for conversion from copper to a polymetallic plant, Thalanga produced 94 000 tonnes of copper concentrate that was transported in B Quads via the Flinders Highway to Townsville for export. Once the Thalanga plant is converted to a polymetallic plant, the 63 000 tonnes of copper, lead and zinc concentrate will be exported via Townsville port.

In addition to its current production of mineral concentrates the development of the Mungana/King Vol deposits could result in a further 146 000 tonnes of copper & zinc concentrate for export from either a Mt Garnet or new Mungana treatment plant.

At the time of the 2008 study, Kagara Zinc had become a substantial mining company with a total workforce at Mt Garnet, Balcooma, Mungana and Thalanga (Charters Towers) of 625.

At that time, they expected to go to a workforce of 850 over the next two years with increases likely to be mainly at Chillagoe.

Current workforce is believed to be as follows: Mungana (110), Mt Garnet (144), Balcooma (146), Thalanga (49) – Total 449.

Advanced projects in the area include:

Metallica Mineral's Nornico Nickel Project, (Bell Creek/Minnamoolka/Kokomo). The nickel deposits commence about 30km south of Mt Garnet and are part of a series of deposits held by the company that stretch south to Greenvale area and Lucky Break, north of Charters Towers.

At the time of the 2008 report, it was proposed that the nickel ore would be upgraded and transported to the Nickel Refinery at Yabulu near Townsville.

The company had hoped to be operational by late 2010. CAPEX was expected to be $350m. Construction workforce was expected to peak at 250 and construction take two years. Permanent workforce of 100 was planned in an on-site village.

The project was put on hold by the GFC and a review of the cost of processing options. The project has been revised and is now proposed to be developed as follows;

An initial smaller Stage 1 will involve setting up a plant at Greenvale to treat ore from that area using an agitated acid leach process with acid from Townsville and an operating staff of 70 – 90, with output of about 12,000 tonnes of nickel sulphate, some cobalt sulphide and maybe scandium. The company will be able to use the existing town infrastructure at Green vale.

The next larger scale project would be at Bell Creek, south of Mt Garnet and involve a CAPEX of $600m and an operating staff of 200 to ship out 30,000 tonnes a year. Sulphuric acid is planned to be drawn form Townsville and output exported ex Townsville.

The process will require lime from Ootan near Almaden of:

Stage 1 .....40,000 tonnes

Stage 2 .....200,000 tonnes

Consolidated Tin - Consolidated Tin Mines Ltd have been acquiring tenements in the Herberton/Mt Garnet area. They are proposing to establish a processing centre 6km east of Mt Garnet based on output from three major deposits (Gillian Pinnacles & Windemere) in the Mt Garnet area and a number of smaller alluvial deposits.

The aim is to establish a 1 Mtpa central processing facility in the Mt Garnet area that is expected to produce 10 – 20,000 tonnes of tin concentrate to be shipped in bulka bags in containers, employ 200 in construction, and 50 in operational mining and processing. The central processing plant will require 6MW of electricity and discussions have been held re upgrading the line by late 2012.

It is also proposed that the operation would produce:

- 300,000 tonnes per annum of magnetite (iron ore) for shipment via Mourilyan.
- 50 – 100,000 tonnes per annum of flourine for aluminium smelters in Australia.

It is at pre-feasibility stage with a view to commence shipment late 2012/early 2013.

North Queensland Metals - North Queensland Metals is an Australian based and listed mining company with a focus on activities in the North Queensland. In addition to its mining activities at the Pajingo gold mine near Charters Towers, the company has the Baal Gammon copper/tin exploration tenement near Herberton. North Queensland Metals is currently seeking a partnership to further develop the Baal Gammon deposit. Copper concentrate could be transported to Cairns Port for export.

Diatomite – There are world class diatomite deposits in the area south of Mt Garnet at Glen Eagle and further south in the Conjuboy area near Greenvale. A Queensland Department of Mines Report (2003) stated that although the Glen Eagle deposit was not JORC compliant it had a total inferred mineral resource of 10 million tonnes. The Glen Eagle deposit could be in excess of 200 million tonnes but this has not been verified.
Diatomite has a range of uses from soil conditioner used in the banana, sugar, pawpaw and avocado industries to a raw material for insulation bricks. One development that is being investigated is its use in the rehabilitation of mining areas.

At present the main market for the Glen Eagle diatomite is in the sugar cane industry in the Burdekin and Ingham areas & the banana industry around Innisfail. Prospective containerised (in bulka bags) export markets include Malaysia, Chile, India, Pakistan and the Emirates. Diatomite has a low density therefore transport costs will have a high impact on the ability to access export or domestic markets. Diatomite must also be kept dry.

The Conjuboy deposit has been listed by the Queensland Department of Mines and Energy as advanced but it is believed the company has been dissolved.

The following exploratory phase project is included because of its potential scale and impact.

Volcan Holdings (Bauxite) - Volcan Holdings has acquired an extensive portfolio of exploration tenements in Eastern Australia. Two large exploration tenements recently granted (South Johnstone and Ravenshoe) offer potential for bauxite mining. The company applied for the tenements after a company review of historic Queensland Department of Mines and Energy reports from 1961.

The exploration tenements cover land intensively farmed by industries such as bananas, cane, dairy and beef. The tenements cover thousands of freehold properties as well as other land tenures. It has been suggested that large tonnages (in excess of 50 million tonnes) could be mined from a relatively small area and that one prospect within one tenement could yield in excess of 200 million tonnes. It has further been suggested that top soil removed for mining could be replaced after the mining activity resulting in the previous farming enterprises returning to normal production levels.

Volcan has indicated that exploration will be required to achieve a JORC compliant resource and to narrow the area of interest within its multiple and geographically extensive tenements.

The company has reported that in areas of mineable bauxite reserves in excess of 200 million tonnes, it is the intention of Volcan to build an alumina refinery. Volcan believe that the project areas being explored are close to infrastructure (parts of the South Johnstone bauxite prospect are located within 20 km of Mourilyan Port) and potentially available sources of water and power.

To put the prospect of an alumina refinery into perspective, it is useful to understand the raw materials and utilities used by Queensland Alumina Ltd (QAL), one of the two alumina refineries in Queensland. QAL produces 3.95 million tonnes of smelter grade alumina and requires:

- Bauxite – shipped from Weipa, 8.8 million tonnes per year
- Coal – railed from Callide coalfields, 1.5 million tonnes per year
- Caustic soda – shipped from world suppliers, 830 000 tonnes per year
- Natural gas – Piped from Central Queensland, 16.04 petajoules per year
- Lime – trucked from Central Queensland mines, 105 000 tonnes per year
- Fresh water – Piped from Awoonga Dam, Central Q'ld, 30 megalitres per day
- Electricity – Average 76 Megawatts from the Queensland Grid & 16 Megawatts internally

Other exploration taking place in the area includes:

- Mt Ruby, magnetite – west of Mt Isa, Intermet.
- Lynd River, gold – west of Mt Garnet, Queensland Minerals.
- Various areas to Mt Surprise, gold and molybdenum – Auzex Resources.
- Rudy Creek, gold – 175km w south west of Cairns, Echo Resources.
- Tate River, gold – 200km west of Cairns, Sovereign Metals.
- Greenvale, lead silver zinc – Greenvale area, Glengarry Resources.
- Greenvale East, tin – Greenvale area, Anchor Resources.
- Silver Valley and Stannary Hills, tin, tungsten and iron ore – Herberton area, Kangaroo Metals.

Georgetown/Croydon Area

There has been no substantial mining in this area since the closure of the Kidston and Croydon gold mines a decade ago. In May 2009, Deutsche Rohstoff Australia acquired the CIP gold plant and Georgetown mining and exploration leases of Plentex Limited. Deutsche Rohstoff Australia is a subsidiary of Deutsche Rohstoff AG, a diversified mining company in Germany. A small gold mining operation has recently recommenced. Deutsche Rohstoff Australia focuses on the acquisition and development of gold projects in Australia. The Georgetown gold mine is their first Australian project with plans to commence production in 2010. However significant delays have been experienced complying with environmental requirements despite the gold deposits being covered by an existing mining lease. A workforce of 18 is envisaged being 10 in the processing plant and 8 involved in contract mining. Production target is 10 000 ounces of gold.

The Georgetown/Croydon area is currently the subject of a great deal of exploration. There are a number of advanced projects that seem to be rapidly approaching construction go-ahead, depending on finance.

Copper Strike's Einasleigh Copper/Gold/Silver and Zinc/Lead/Silver Project The proposed mine is just north of the old kidston gold mine whose workforce was flown in from the Tablelands. One deposit is close to the Einasleigh airstrip and another within 800m of the Etheridge railway line. The deposit was discovered four years ago and with finance it is possible to be in production in 2012. Currently Copper Strike are derisking the project by increasing the JORC compliant resources and finalising the environmental studies required for a mining lease. An expected mine life of 10 years is hoped to extend to 20 years with further drilling. Current production plans are for 50 to 60 000mt of copper concentrate per year for the first 5 years increasing to 100 to 120 000mt from the 9th year onwards of a combination of copper, lead and zinc concentrate.

Renison's Agate Creek Gold Project Exploration is well progressed however, Renison's expenditure has now reached a level where Barrick Gold's continuing interest in the project reverts to the receipt of a 1% smelter royalty on the ores and minerals mined and a 100% interest in the tenements will be transferred to Renison. The project like others in the Georgetown area has power supply problems. The project would have a construction workforce of 100 and an operational workforce of 80-90, 50% being contractors, A "Fly In" operation is envisaged to Forsayth of Old Robin Hood Station, however road access from airstrips to the mine is a problem in the wet season. A power supply problem to mines in the Georgetown area has been identified.

Koolgarra Mining's Lighthouse Silica Quartz project near Einasleigh was earlier listed as being advanced. A small amount of quarrying has taken place and they have made preliminary inquiries regarding the shipment of bulka bags in containers. Current advice is 5 to 10,000 mt in 2010 and up to 25,000 mt ex Cairns in 2012. International shipping connections to Asia and Europe would be required.

Exploration taking place in the area includes:

- Eveleigh, geothermal – west of Mt Surprise, KUTh Energy.
- Malcolm Creek, gold – 40km south west of Forsayth, Orion Metals Ltd/Newmont.
- Buchanans Creek, rare earths – 40km southwest of Georgetown, Artemis Resources.
- Georgetown, gold/copper – 25km north of Georgetown, Mega Uranium.
- Normanton, gold/copper – 40km west of Normanton, Mt Isa Metals.
- Georgetown's Base Metals, lead/silver/zinc – Georgetown area, Far West Mining.
- Red River, silver/tin – north of Georgetown, Buffalo Gold.
- Georgetown, uranium, Mega Uranium.
- West Georgetown, uranium – Georgetown area, Indago Resources/BH Billiton.
- Croydon, zinc/gold – Gold Aura Ltd.

Note: There is an observable trend in other areas towards establishing regional treatment plants (eg. Mt Garnet, Mungana, Charters Towers, Ravenswood, Cloncurry) drawing on smaller surrounding deposits. It seems likely that Georgetown area could move in this direction.

Cooktown Area

The only major operating mine in the area is Mitsubishi's Cape Flattery Silica Mine at Cape Flattery, north of Cooktown. The workforce is 80 with 7 being based at the cairns office. The company owns a 10 seater Cessna Caravan which operates a Fly In operation from Cairns & Cooktown. The current schedule is 2 flights/day for 4 days or 8 flights per week.

A decision was made in 2008 to close Metal X's Collingwood tin mine (workforce 80), near Helenvale south of Cooktown due to unexpectedly poor grades.

Exploration activity in the area includes:

Alice River, gold – west of Laura, Australia Gold Corporation.

Laura Basin, coal – south west of Cooktown in Laura area, Waratah Coal (Minerology).

Jeannie River, tin – Cooktown area, Nucoal Resources and Independence Group.

Workforce

Summary of the workforce in the area (not including the quarrying operations), is as follows:

Current	
Cape Flattery	80
Kagara (Mt Garnet/Balcooma/chillagoe area)	400
Solomons Mines	10
Nychum Perlite	5
Total	**495**
Prospective Additional (operating 5-year time frame)	
Kagara Chillagoe	200
Renison Agate Ck	80
Copper Strike Einasleigh	100
Icon Resources Mt Carbine	70
Nornico Stage 1	80
Nornico Stage 2	200
Wolfram Camp	50
Consolidated Tin	50
Jinhua Mt Lucy	est 50
Total	**600 to 800**

Thus, the current workforce of about 500 could more than double over a five-year time frame.

'Fly-in' workforce is relatively minor at present (mainly Cape Flattery and some Chillagoe), but is likely to increase especially to the Georgetown area mines.

Cargoes & Shipping

Table Section 4.3, summarises outward potential cargoes. By and large, inputs would be delivered by road/rail.

Implications of the foregoing for a strategy include:

a) *There are major transport infrastructure problems facing the area in being able to efficiently export bulk and container cargoes efficiently through the region's ports – both in the transport corridors from hinterland mining centres to the ports and at the ports themselves for both bulk and container cargoes.*

b) *There is still a problem of perceptions of Cairns as a centre of supply of services like construction, engineering, mine supplies etc. among new companies planning developments in the area.*

c) *There are major electricity supply problems already facing the area with an existing mine investing in 2 x IMW generators to ensure reliable supply to mining and processing operations.*

5.3 CAPE YORK

Area Covered

This is taken to include the area down to about Coen and the old Ebagoola mineral field. Cooktown district including Alice River is included in the Cairns area.

General

The global financial crisis (GFC) saw the shelving of some immediate expansion plans in the area, especially Rio Tinto Alcan's major new port project at Weipa and the Chalco project.

It is clear however, that the current global expansion in demand for minerals is likely to see the western Cape area emerge as a major minerals producing region over the next decade with the number of bauxite and other mining operations expanding strongly.

Bauxite

Weipa - Rio Tinto Alcan (A)

The Weipa bauxite mining operation commenced initially in 1961. Commercial production commenced in 1964 and it remains the largest mining operation in the Cairns/Far North Queensland region.

It has long been established as a 'residential' mine with a 2009 workforce of 745 full-time employees. (Note: The company reduced its contractor workforce following the GFC but has more recently put workers back on.)

In the mid-2000's, the company expanded capacity that saw annual bauxite output increase from about 11 million tonnes per annum to over 18 million tonnes per annum in 2007. The GFC saw production in 2009 cut back to 16.3 million dry product tonnes. Around this time, it also purchased Alcan that had additional leases in the area.

In 2007, the company announced a $US30 million feasibility study into developing bauxite operations south of Weipa. (Previous production has been from the immediate Weipa area and north across the Mission River at Andoom.)

The project would require construction of new infrastructure approximately 50km south of Weipa township, including a benefication plant, power station, warehouses, workshops, barge and ferry facilities. It would also involve the development of new port facilities at Boyd Point capable of taking 'Post Panamax' size vessels and possible 'Capesize'. It is currently proposed to have a project start up in 2015 with tonnages commencing at 15mtpa and rising to 50mtpa over itme.

Operational workforce would be residential based at Weipa and commute to site on a daily basis.

Once a decision is made, it is expected to take two to three years to construct, involving 360 jobs.

Aurukun – Chalco (A)

In the mid-2000's, the Queensland Government cancelled bauxite leases in the Aurukun area held by Aurukun Associates for failure to proceed with mining operations and invited tenders to develop the leases. The preferred tenderer selected was Chinese company Chalco.

The proposal being developed would have involved development of mining and shipping from a port in the Aurukun area to supply a $2.2 billion alumina refinery either at Gladstone or Abbot Point.

The GFC saw the progress being made towards development of this project stall.

It is believed that Chalco have decided that construction of a new refinery would not be viable but this was a condition of the tender process. In November 2009, they asked for an extension of six months. The situation should become clearer once the extension period is completed on 30th June 2010.

Previous proposals involved the mining and shipping of 6 to 7 million tonnes per annum with a workforce for construction 1,000, operating mine 300 to 400, and port 50. The port is proposed to be located at Aurukun which presumably would also take inward movements of general cargo and construction material. However, the Queensland Government is believed to favour one port only and there are prospects that the bauxite would be exported through the new Boyd Point port.

Estimated port tonnages are bauxite 6.5 mtpa.

Cape Alumina (A)
Cape Alumina's Pisolite Hills mine is proposed to export up to 7 million tonnes per annum (est av 4.5 mtpa) over a 15-year period with prospects of extension.

The deposit is located north east of Weipa and is proposed to transfer ore to Port Musgrave via a conveyor to a treatment plant and port where it will be transhipped via barge to larger vessels up to 'Cape size' offshore.

Workforce will come from the nearby community of Mapoon and fly-in from Cairns via the Mapoon airstrip and ferry km up to the processing and port site.

Construction workforce is estimated at 500 and on-going employment 350.

The company's time-line envisages construction being carried out between 2012 and 2013 with production commencing 2013/14.

The project is being heavily opposed by conservation interests and is potentially impacted by the Wild Rivers legislation with the potential to hold up the project.

Largest shareholder in Cape Alumina is Metallica Minerals Ltd. Shareholders include Chinese company Xinfa.

Estimated port tonnages are bauxite up to 7 mtpa (average 4.5 mtpa)

Gulf Alumina (A)
Gulf Alumina (majority interest Chinese Shandong Nansham Alum Ind) have entered into an agreement with Skardon River Kaolin whereby they will take bauxite ore overlaying the kaolin being mined in the Skardon River area and invest in a treatment plant and loading facilities at the Skardon River port site and barge output to offshore vessels for the Chinese market. (There have been some suggestions of transhipping via Daru off Papua New Guinea's south coast.)

They have completed a third drilling campaign and earlier had indicated they were hoping to start a 1 – 2 mtpa output in mid-2010.

Estimated workforce:

Construction	=	130
On-going	=	90

Estimated port tonnages are bauxite 1 - 2 mtpa

Kaolin

General
There are extensive high grade deposits of kaolin in the western Cape area generally underlaying the extensive bauxite deposits.

Attempts in the 1990's by the Weipa bauxite mining operation of Comalco (now operated by Rio Tinto Alcan) to process and export kaolin failed but have left a shed at Weipa port that was originally built for this purpose.

Subsequent development of kaolin mining operations north of Weipa and Port Musgrave at Skardon River have proved marginal. The following looks at the current and prospective situation.

Kaolin, a white non-swelling clay, has a range of uses. Traditional major uses have been in the production of high grade pottery/china and paper sizing.

Other uses are in paint, polymer, cosmetics and pharmaceuticals.

Skardon River (A)
The Skardon River mine commenced being developed during the 1990's but has been plagued by logistics' problems with production and shipment sporadic.

The mine has an office in Cairns and when operational has had a fly-in workforce of about 40.

Production capacity is 180,000 tonnes. It would be shipped in 1 tonne bulka bags or 25 kilo bags in containers, ie. 9,000 containers a year. Most recent shipping has been via Cairns.

The sandbar at the mouth of the river limits loads to a maximum of about 12 containers. Last shipment was 12th October 2008.

Two developments improve the prospect of kaolin mining starting again.

Minerals Corporation Ltd have advised they are looking at a new product that combines kaolin with slag to produce a 'green cement' involving lower carbon emissions.

The company announced in March 2010 it had signed an agreement with a Chinese steel mill to produce the kaocem product and had signed a preliminary agreement with a leading construction company in Guangzhou for a distribution agency subject to a successful pilot plant being established. Earliest development would be 2011 and involve up to 250,000 tonnes bulk kaolin processed to a lower level than the current production and barged to offshore ships.

The second development relates to the agreement with Gulf Alumina to export bauxite that lays over the top of the kaolin (see previous section under bauxite). This will improve the economies of the kaolin mining.

Expected workforce for both projects would be of the order of 80 – 100.

Estimated port tonnages for kaolin operations are:

Export	=	Kaolin – bulk	250,000 tonnes per annum
		Containers	180,000 tonnes per annum – 180 FCL per week
Import	=	Fuels	10.5 million litres
		General Cargo	20,000 tonnes per annum
			22 FCL's weekly

Kendall River (E)
Kaolin deposits in the Kendall River area south of Aurukun for over 15 years. Gulf Minerals have an inferred resource (to be confirmed) of 100 million tonnes of kaolin.

Some secondary bauxite production is a possibility.

The company is trying to come up with the right process. Building a pilot plant is likely to be at least 18 months away. No logistical plans have been developed.

Mineral Sands

General
There has recently been a great deal of exploration and evaluation for mineral sands mining along the Peninsula west coast.

Matilda Zircon (E)
Matilda Zircon have taken up 300km along the western and northern Cape (from Weipa upwards) that they report as highly prospective. Main target would be zircon and Rutile.

Demand out of China for zircon used in tile manufacture is reported to be increasing strongly.

Corvette Resources (E)
Corvette Resources have taken up exploration permits for mineral sands along the Peninsula west coast from north of Karumba to south of Weipa in their Inkerman project. There are native title issues and little exploration has taken place.

Energy

General
Over the years, substantial effort has been invested in seeking local energy resources including offshore drilling for oil and gas. It would appear there may be some low quality coal in the Olive River area. The following gives details of current prospects.

Geothermal (E)
Kuth Energy are carrying out exploration at Jackin Ck south east of Weipa.

Natural Gas & Oil (E)
Gulf Energy Pty Ltd have been undertaking an offshore exploration programme in the Bamaga Basin at the top of the Peninsula. Seismic Surveys in 2010 are planned to lead to drilling target selection in 2011.

Mid-Peninsula

Archer River Tin (E)
Transol Corporation are currently assessing historic alluvial tin producing areas in the Archer River area.

Ebagoola Gold (E)
Gulf Mines is planning a 2,500 meter drilling program of gold mineralisation.

Workforce

Summary of workforce implication is as follows:

Current	Rio Tinto (Weipa)	745	
	Total	**745**	
Prospective Additional (Operating)	Rio Tinto (Weipa)	300	(est)
	Chalco (including port 50)	400	
	Cape Alumina	350	
	Minerals Corp & Gulf Alumina (Skardon River)	100	
	Total	**1,150**	

More than a doubling of workforce seems likely on a 5-year time frame.

Implications of the foregoing for a strategy include:

a) *The current indications are that extensive new port development will take place in the area. Apart from the existing Weipa port, a major new direct loading port will be developed at Boyd Point and additional export shipping ports will be developed using barges to offshore ships at Skardon Rive and Port Musgrave. Aurukun deposits seem likely to be exported via Boyd Point. There will be a total of 4 ports in the area.*

b) *There is a question about the degree to which infrastructure can be developed in the area to use Weipa as a services base and workforce residential location for mines other than those of Rio Tinto and whether Rio Tinto will find workforce availability such that it will draw part of the additional workforce needed on a 'fly-in' basis.*

c) *There is a question about the degree to which indigenous workforce can be mobilised and trained affecting the extent of need for 'fly-in' workforce.*

d) *There will be a need to strengthen/establish working relationships with the mines in the area.*

e) *The prospective development of the area raises major transport issues in relation to the Peninsula Road and the possibility of using prospect of containerised cargoes to and from China to help support shipping links to and from Cairns.*

5.4 GULF & NORTH WEST

5.4.1 Area Covered

Area covered is west of Charters Towers (including Hughenden) to the Northern Territory border, south to the Winton area and north to the Gulf and including the Woolgar area, north of Richmond.

Woolgar gold prospects are marginally closer to Cairns than to Townsville, however the current road system makes access via Richmond easier.

It should be noted that some of the exploration prospects are close to the Northern Territory border and there are prospects across the Northern Territory border that might access ports in Queensland. A number of the new prospects are likely to orient more towards the Gulf than the Mt Isa area and in this report consideration is broken into two sub areas - the North West and the Gulf, the dividing line being approximately at Riversleigh.

5.4.2 Gulf

General

There is only one major existing mine in the area - the Century Zinc mine now operated by Chinese company, MinMetals, sometimes referred to as MMG.

There are however, a number of advanced projects that could transform the area into a significant mining province related to expanded port development for direct shipment via the Gulf.

Phosphates

General

The whole area west of Mt Isa, in the McArthur River Basin, north up towards the Gulf and south to the Georgina Basin is currently alive with phosphate mining prospects.

The following looks at those on the northern side of this area that might relate to Gulf ports.

Phosphate Australia – Highland Plains (A)

Phosphate Australia holds major phosphate deposits at Highland Plains just off the Northern Territory border from the Century Zinc project. It has other deposits further inland. The deposits are closer to the Gulf than to Mt Isa and are about the same distance from Cairns as Darwin.

Inferred resources is 56 million tonnes and they are targeting the production of 3 million tonnes per annum of premium grade beneficiated rock phosphates.

They have been investigating construction of slurry pipelines to four port sites (see **Map 10**) where dewatering facilities would be located and phosphates transhipped by barge to larger offshore carriers. Drilling has indicated plenty of water in the mining area.

Three locations being looked at are:

1) Calvert River in the Northern Territory ($266m).
2) Tully Inlet on the Queensland side of the Northern Territory border ($220m).
3) Burketown ($224m).

A fourth possibility was to pipe to Century and use their existing pipeline when it closes down.

Although more expensive, the Calvert River option has a benefit of keeping the project within the Northern Territory jurisdiction.

Workforce estimates are in the range 100 to 200.

Fuel and general cargo for the mine could be brought in by road from the rail head at Mt Isa, from the Barkly Highway to the south or from the roads leading into Century Zinc or via Burketown.

Quantities are not known at this point in time.

Redbank Copper Mine (A – Op later 2010)

Exploration and testing by Redbank Copper Ltd is leading to the imminent reopening of the Redbank Copper mine in a hilly area just over the Northern Territory border almost equidistant between Burketown and Boorooloola on the Savannah Way road.

The company have advised that they intend to commence mining and commission a plant in the second half of 2010.

It will be an open cut mine with a 10-year life. Initial output will be of copper cathode (99.9%) copper at a rate of 2,000 tonnes per annum followed by start up in 2012 of production of 20,000 tonnes per annum of copper concentrate increasing to 30,000 tonnes per annum.

Capital investment will be a total of $55m (2010 $17.25m, 2012 $20.35m and 2013 $17.20m).

Workforce requirement is estimated at 40 for Phase 1.

Estimated port tonnages are initially 2,000 tonnes of cathode copper (route unknown) and from 2012, 20,000 to 30,000 tonnes of copper concentrate per annum.

Woolgorang (E)

Gulf Mines have a copper prospect "Packsaddle Dome" at Woolgorang (east of Redbank) with tenements surrounding Redbank Copper.

Uranium

Westmoreland (A)

The Westmoreland Uranium deposit on the Queensland/Northern Territory border west/southwest of Burketown has long been recognised as one of Australia's top prospective deposits of uranium.

It is held by Laramide Resources who continue to carry out exploration on the deposit.

RMA Resources are also carrying out exploration in the area at Cliffdale Creek.

If the Queensland Government lifted its ban on uranium mining, it seems likely that mining would commence.

Direct and indirect capital expenditure is estimated at $214m. Mine life would be 11 years with likely extension to 15 years. It would be open pit and processing by acid leech.

Unless arrangements could be made to ship output through a Gulf port, nearest approved uranium port is Darwin.

Workforce is to be advised.

Cliffdale Ck (E)

RMA Energy hold a prospect in the Westmoreland area that they believe may contain uranium mineralisation.

Iron Ore

Constance Range (A) (Kimberley Metals)

Kimberley Metals are well advanced in developing proposals for production from their prospects at Constance Range.

They have two grades being looked at:

1) DSO (Direct Shippable Ore) 30 to 50 million tonnes deposit which would be trucked to Burketown at a rate of 3 – 5 million tonnes per annum over a 10-year period.
2) Non-DSO Ore (236 million tonne deposit) that would involve establishing a grinding operation with pipeline to port at Burketown at a rate of 10 – 15 million tonnes per annum.

There are some complications with a buffer zone with Lawn Hill National Park and native title issues to be resolved.

Likely capital costs and imported fuels and general cargo to be advised. Operational employment is estimated at 100 – 130.

Constance Range (E) (M M Mining)

There has been long standing interest in the major iron ore (Hematite) deposits at Constance Range.

M M Mining have leases. The ore however would not be direct shippable.

Constance Range (E) Icon)

Icon also have tenements at Constance Range but also further north being targeted for iron oxide/copper/gold/uranium and rare earths.

Zinc

Century (O)

The Century Mine is currently operated by MMG (owned by China's MinMetals Corporation).

The zinc ore is ground and pipelined to a dewatering facility at Karumba where it is barged to offshore bulk carriers at a rate of 480,000 to 500,000 tonnes of zinc per annum.

Current employment is given as 970 with fly-in services from Townsville and Cairns.

Mine life is expected to extend to 2015, but the company is vigorously seeking further deposits. Alternatives seem to be:

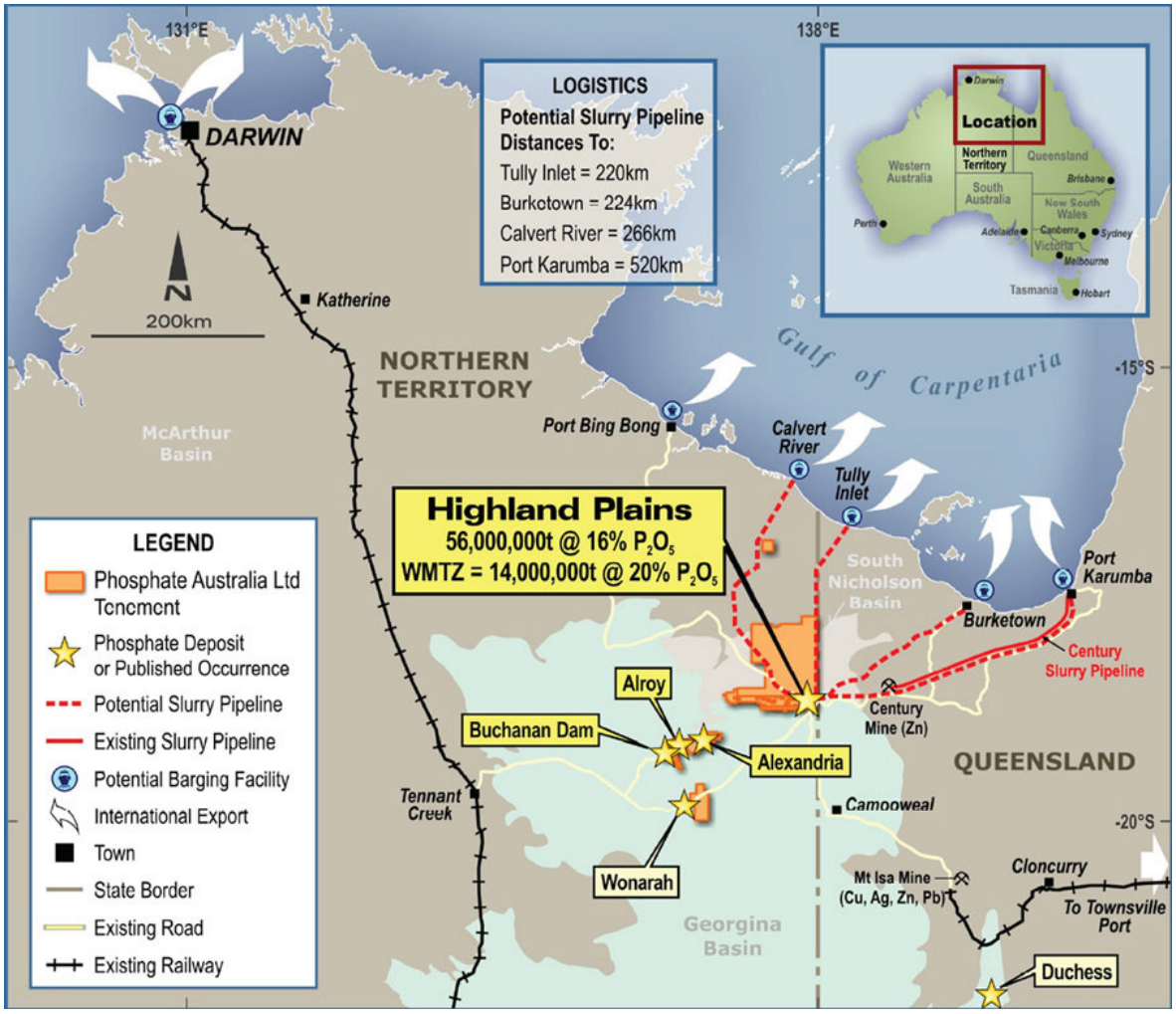
1) Link a pipeline down form the company's zinc deposits at Dugald River.
2) Use the pipeline to carry another ore from a different deposit.
3) Complete a deal with Phosphate Australia for transport of their Highland Plain's phosphate.

Inputs are brought in by road ex Cloncurry to Gregory Downs.

New Century (E)

Icon Resources have tenements near the existing Century deposit.

Map 10
Gulf Pipelines & Ports



Source: Phosphates Australia Website.

Summary Workforce

The following gives summary of existing workforce in the area and workforce that would be generated by advanced projects that could be on stream within a five-year period (although it should be noted that on current indications, the Century Zinc mine will wind down in 2015).

Workforce

Existing Mines

Century Zinc (MMG) 930

Possible New Mines

Phosphate Australia Highland Plains ..... TBA
Redbank Copper Ltd ..... 40 (Phase 1)
Westmoreland Uranium (Laramide) ..... TBA
Constance Range (iron ore) ..... 100 - 130
(Kimberley Metals)

It is estimated that potential new mines' workforce in this area will be about 500.

Summary Cargoes

The following summarises cargoes to be shipped out through Gulf ports.

Exports:

Current

Century Zinc 500,000 tonnes pa.

Prospective

Phosphate 3 million tonnes pa.
Copper concentrate 20 – 30,000 tonnes pa.
Iron Ore 3 – 5 million tonnes pa.

Implications of the foregoing for a strategy include:

a) *There is a strong possibility that this lower Gulf area will emerge as a significant mining area with major implications for port and township development in the Gulf area. Indeed, it would appear that the possibilities of coordinating projects to share new port facilities to be developed along with roads and service townships should be investigated as a matter of urgency. There will be a question of the role of the existing designated ports of Karumba and Burketown in this.*

b) *The Queensland/Northern Territory boundary running through the middle of this area will complicate matters and there is a need for liaison in infrastructure development between the two governments.*

c) *All the mines in this area are closer to Cairns than Townsville and marginally closer than to Darwin. In general, they represent a good area to target for fly-in services ex Cairns as the mines develop.*

d) *In examining port development possibilities in the area, mining operations further afield in the North West Queensland area and the Northern Territory might be considered. Such Gulf port facilities will be closer to Cairns than alternatives of Townsville and Darwin.*

5.4.3 North West

Up until about a decade ago, mining in the area was dominated by the Mt Isa Mines (MIM) operation at Mt Isa.

At the time of the 2008 survey, a total of 16 operating mines were identified in the area including some small raw material mines.

Operating Mines

The GFC had an impact of closing the Aditya Birla Mt Gordon mine (employment 290), Copper Co's Lady Annie mine (employment 160), Breakaway's Eloise mine (employment 200), Matrix Metals' Mt Cuthbert Leichhardt mine (employment 140), and Exco Resources' Great Australia mine at Cloncurry (employment 15), a total loss of over 700.

They have been put on care and maintenance and are included with the advanced category of likely to reopen in the future.

Main existing operating mines in the area are:

* Xstrata Mount Isa mines comprise:

Copper:	Enterprise	underground
	X41	underground
Silver Lead Zinc:	George Fisher	underground
	Handlebar	open cut
	Blackstar	open cut

A $133m project is being proposed to extend the life of Blackstar to 2016. Enterprise is Australia's deepest. The company employs approximately 2,500 at Mt Isa, ships by rail to Townsville including supply to their copper refinery located at Townsville. The company has a policy of being a residential mine.

* Xstrata – Ernest Henry Mine - 38kim north east of Cloncurry has had employment of 500, mainly on a fly-in/fly-out basis. The mine produces gold (120,000 ounces in concentrate) and 115,100 tonnes of copper in concentrate which is trucked to Mt Isa for smelting or railed to Townsville for export. There are large deposits of magnetite (iron ore) in the area and it is proposed to commence mining and railing to Townsville for export. The operation is seeing the workforce rise to 700 but will drop back to 400 after 2013. Fly-in operations are being provided from Cairns, Townsville and Brisbane.

BHP Billiton – Cannington Mine – 85km south west of Cloncurry (silver, lead and zinc), is a fly-in mine with employment of 900. Fly-in services are from both Townsville and Cairns. Output of 334,000 tonnes of lead concentrate and 112,000 tonnes of zinc concentrate are exported via Townsville.

Barrick/Placer Dome – Osborne – 100km south west of Cloncurry – gold and copper, employment 430. Fly-in ex Townsville. An underground mine producing 43,000 ounces of gold and 91m pounds of copper exported as concentrate via Townsville. Note: There have been reports that the mine is expected to close in mid to second half 2010. However, there have also been reports that they are looking at mining and shipping magnetite involving $74m capital expenditure.

Incitec – Phosphate Hill – Incitec Pivot mines phosphate from its mine at Phosphate Hill and has a sulphuric acid plant at Mt Isa, an essential ingredient in the manufacture of ammonium phosphates at Phosphate Hill.

Phosphate Hill has an annual capacity of 975,000 tonnes. The company also uses ammonium from gas coming into the Mt Isa area from the south. Workforce is 500 'fly-in' workforce. Air services operate out of Townsville with a weekly seat capacity of 400 per week.

Advanced Projects

Projects identified in the advanced category are as follows.

Base Metals

Ivanhoe – Cloncurry Project – a major Canadian company have been carrying out major exploration projects in the Cloncurry area and have defined significant potential mining operations. Their key focus is on the development of the Merlin high grade molybdenum and rhenium deposits near Mt Dore. Rhenium is required in aero space industry due to a very high melting point. Scoping study is near completion.

Looking at plans to produce 6,000tpa molybdenum and 6 – 7tpa rhenium in two years time.

Their next projects would be:

- Mt Elliott – large scale copper/gold project.
- Mt Dore – copper, heap lead project.

Prior to the GFC, expected workforce was 500.

Aditya Birla – Mt Gordon Copper Mine – the mine is in the Mt Oxide area north of Cloncurry and has traditionally shipped copper concentrate ex Cloncurry and Townsville to India. The GFC led to it being placed on care and maintenance. However, the possibility of reopening is under review and in February, the company announced it had negotiated a USD100 million facility with the Bank of India.

Lady Annie – copper – north of Mt Isa. The mine was closed by the GFC and put on care and maintenance. Cape Lambert took over Copper Co's interests but recently announced Chinese company China Sci-Tech would buy it for $135m. Workforce in the 2008 report was 160.

Eloise – Breakaway/FMR Resources – copper. A decision was made in 2008 to put the mine on care and maintenance. Breakaway are continuing exploration in this area. Employment in the 2008 report was 200.

Mt Cuthbert Leichhardt – copper – Matrix Minerals was placed under administration and operations ceased. At end 2009, Cape Lambert purchased the 9,000tpa plant. Workforce in 2008 was 140.

MMG – Dugald River – zinc – 60km north west of Cloncurry. In the 2008 report, production from underground mining was expected to come on stream in 2011 of 40,000 tonnes of zinc concentrate per annum with employment 400. Ownership has now passed to the Chinese group MMA who also own and operate the Century mine.

Cudeco Rocklands – copper – 15km north west Cloncurry. Announcements were made of 15% interests being taken each by Chinese companies Sinosteel Equipment and Engineering and DJ Xiangguang Copper and more recently. The company have announced that they are targeting and commencing exports later in 2010 of about 350,000 tonnes of mineral concentrate via the port of Townsville. Expected workforce is construction 400 – 500 and operating 200.

Exco's Cloncurry project involves various deposits in Cloncurry/Ernest Henry area (copper). In 2008, a prefeasibility study was looking to start production, January 2010, 1 to 2mtpa operations producing 15,000 – 25,000 tonnes of copper concentrate. Open pit and underground with about 200 employees. However, this was affected by the GFC. Exco indicates they have been in discussions with third parties (including Chinese investors) in relation to investment and potential off take arrangements.

Altona Mining (merger of Universal and Vulcan)/Xstrata Roseby Mine, 60km NW of Cloncurry (next to Dugald River) – copper initially 5mtpa expanding to 8mtpa. Estimated 150 employees. Development decision 2011.

Queensland Mining White Range - copper, 50km S of Cloncurry. In the 2008 report, construction estimated to commence in the first quarter 2010 and operating workforce about 120. The GFC saw the property pass to Queensland Mining Corp. Resource inventory is of copper, cobalt and gold.

Phosphates

PHM South – Krucible Metals Ltd is well advanced with proposed development of a phosphate mine just south of Incitec Phosphate Will mine. They propose to be in production by 2011 with sale of 600,000 tonnes per annum – approximately 60% by rail to Townsville with the balance to the domestic market. Capital cost is expected to be $42m. Workforce is not known at this point in time.

Legend – Legend holds a number of phosphate leases in the area previously known as Lady Annie in the area north west of Mt Isa. The deposits are known as Paradise North and D Tree. The deposit is estimated at about 1 billion tonnes. Proposed development is to:

- Commence shipping from 2010, 0.5 to 1m tonnes per annum of DSO (direct shippable) grades.
- Construct a benefication plant in 2011.
- Ramp up shipments to 5m tonnes per annum in 2012.
- Start producing value added fertiliser products and phosphoric acid from 2013.

There is potential to construct a dam on Gunpowder Creek. They are carrying out scoping studies into either constructing a rail spur line to Mt Isa or a slurry pipeline to Mt Isa.

Earlier investigation of a slurry pipeline to the Gulf was not proceeded with. Workforce estimates are not known.

Uranium

Summit Resources - Vahalla and others - 40km north of Mt Isa – still exploring. Reported potential employment of 500. If a change in policy by Queensland Government occurs, it is a leading contender with Ben Lomond, Maureen and Westmoreland to proceed. Current State Government policy would not allow uranium mining to proceed.

Other activity in the north west area includes:

Intermin Resources Julia Ck Vanadium – were expected to commission engineering and scoping studies 2008.

Oxiana/Strategic Minerals Woolgar (including Lost World) Gold, 120km N of Richmond – Still drilling – no size and start up information – dam constructed preliminary to mining.

Summary Workforce

Current workforce* in the area is estimated as follows:

Xstrata Mt Isa	2,500
Ernest Henry	700
Cannington	900
Osborne	430
Phosphate Hill	500
Total	**5,030**

*Note: This is mining company workforce. Contractors may be extra.

Identified prospective additional operating employment is as follows:

Exco Cloncurry	200
Dugald River	400
Ivanhoe	500
Summit Valhalla, etc	500
White Range	120
Roseby	150
Lady Annie	160
Eloise	140
Rocklands	200
Total	**2,370**

Also listed as advanced, but with prospective workforce not identified in the above list are PMH South Legends and Lady Loretta.

We thus have a substantial increase in prospective workforce demand of the order of over 2,000, ie. about a 40% increase.

Other Exploration Recorded

- G&M Resources, Brightlands Project – copper, gold - S of Cloncurry.
- Krucible and Deep Yellow, Pilgrim – copper, gold - 25km N of Phosphate Hill.
- Summit Resources, Bronco, Mt Kelly and others – copper. Metals Ltd - gold and other metals - Mt Isa area.
- Superior Resources, Kingfisher and others – copper – Djarra area and uranium – Mt Isa area.
- Paladin Energy – uranium – Anderson South – Mt Isa.
- Platsearch, Lilleyvale – copper, gold – 80km S of Cannington.
- Cape Lambert, Mt Isa Regional – gold, copper
- Queensland Mining – gold, copper – Selwyn area, S of Cloncurry.
- Syndicated Metals – good, copper – Mt Remarkable, NE of Mt Isa.
- Queensland Mining – gold, copper – N and NW of Cloncurry.
- GBM Resoruces, Bingallen – NE of Phosphate Hill.
- Bondi Mining – uranium – Mt Hogan.
- Deep Yellow & Universal Resources, Leichhardt JV & Malakoff – uranium – Mt Isa area.
- Falcon Minerals, Saxby – nickel - 150km NNE.
- Pegmont Mines, Pegmont – lead, zinc - 180km S.
- Fate Energy, Millenium – copper, 35km WNW.
- Minotaur, Naraku – copper - 50km N.
- U308, Ardmore – uranium – Mt Isa
- Bowen Evergy, Glen Isla – uranium - 45km NNW.
- Goldsearch – uranium, Mary Kathleen.
- Goldsearch – copper, gold – SW Cloncurry
- King Minerals – gold, copper - Cloncurry area
- Rubicon Resources, Canobie – gold – 80km NW Cloncurry
- Krucible Metals, Ardmore & Diamontina – copper – SSW Mt Isa
- Paradgm, Blue Bush – uranium
- Mt Isa Metals, Toole Buc – uranium
- Glengarry, Snake Ck – uranium - 30km S.
- Orion Metals, Top Camp – gold - 35km SW.
- GBM Resources, Horse Ck/Lilleyvale – copper - SW of Cannington
- Krucible, Squirrel Hills – copper – 180km SE of Mt Isa
- Superior Resources, Victoria Ck – copper – 180km NW Mt Isa
- China Yunnan, Cloncurry North – copper – Cloncurry
- Gateway Mining, Surprises – gold, copper -100km NNE Mt Isa
- Perilya, Mt Oxide – copper - 100km NW Mt Isa
- Red Metal, Mt Isa – copper - 20km NE Mt Isa
- Salmon River Resources, Trikay – gold, copper - 53km E Mt Isa
- Deep Yellow – uranium - around Mt Isa
- Liontown Resources. Fort Constantine – gold, copper - 25km W Mt Isa
- Malachite Resources, Mt Lidster – copper - E Mt Isa
- Glengarry, Mt Guide – gold - 35km S Mt Isa - Snake Ck – uranium - Cloncurry.
- Diatreme, Tick Hill – gold - 110km S Mt Isa.
- Cullen Resources/Minotaur – Duchess – copper, 100km SE Mt Isa
- Activex, Florence Ck – 50km SW Cloncurry
- Cloncurry Metals, Toolebuc – lead, zinc, silver – Kennedy Hwy S Cloncurry
- Cloncurry Metals, Perisher – lead, zinc, silver – near Cloncurry

Geographical Layout & Air Services

Road and rail infrastructure patterns have meant that services to the North West Mineral Province have been predominantly delivered from Townsville.

However, previous **Map 5** illustrates that in flying distances, Mt Isa is the same distance from Cairns as it is from Townsville, and Cloncurry is only marginally further from Cairns.

Qantas direct flights from Brisbane provide a conduit for workers from the south east to Mt Isa.

Extent of demand for 'fly-in' workers in the area however has been such that companies have been experiencing difficulties in getting sufficient workers from Townsville and have been increasingly been looking to the Cairns/Tablelands/Tropical Coast area. Flights ex Cairns to the North West area after being affected by the GFC are now occurring into Mt Isa, Ernest Henry and Cannington.

Relatively poor regional service roads and distances from the main regional airports of Mt Isa and Cloncurry lead to a pattern of direct flights, especially into the larger mines distant from the main airports.

Mines not being serviced ex Cairns are Cloncurry, Phosphate Hill, Osborne and Ivanhoe.

Future Development

The GFC lead to five mines being placed on care and maintenance and loss of two services out of Cairns. New services to Cloncurry announced just prior to the 2008 report did not last long. However since then, the Cairns area has done well with establishment of services to Cannington and Qantas Link establishing services to Ernest Henry.

Demand for 'fly-in' services in the area is set to re-expand with new capital coming in from China and India being a significant factor.

Some of the operations will involve reopening of mines that were previously serviced from Cairns, eg. Mt Gordon, Mt Cuthbert.

Skytrans have direct services into Mt Isa that can also carry tourism and R&R traffic.

Any new Gulf area mining (eg. Westmoreland Uranium, Constance Range Iron Ore) is well within Cairns area of flying time advantage.

Lady Annie and Lady Loretta are within Cairns' area of flying time advantage and might be targeted.

Implications of the foregoing for a strategy include:

a) *A major part of the mining workforce in North West Queensland is supplied on a 'fly-in' basis and most new developments are likely to be based on 'fly-in' services.*

b) *Many of the comments in Section 3.4 "Mining Company Considerations" and 3.3 "Labour/Personnel Supplier Considerations" relate to this area.*

c) *To establish and maintain services ex Cairns, volume is needed to establish Cairns as a PoH (point of hire) and enabling use of larger aircraft. Availability of volume out of Brisbane is a threat.*

d) *There is a need to assist Skytrans further consolidate its direct air services to Mt Isa with tourism and R&R traffic and TTNQ should be asked to assist.*

e) *There is a range of prospective new mining operations in the are (some being reopenings), and there is a need to keep in touch with the relevant companies.*

f) *There have been new entrants to the aviation companies providing services ex Cairns. The Resources & Industry Taskforce needs to ensure that it extends its contacts and involvement to include them.*

g) *There are still substantial infrastructure issues in this area, especially delivery of cheaper power to mines, roads and in some cases, water supplies.*

5.5 TOWNSVILLE/CHARTERS TOWERS

Area Covered

Area covered is northwards of Collinsville to the Lynd Junction area and west to Pentland. Abbot Point, Bowen and Collinsville are becoming increasingly oriented towards being an outlet for the Bowen Basin coal west of Mackay and the newly developing Galilee Basin and are included with the Mackay area.

Operating Mines

Four operating mines were identified apart from three limestone/dolomite operations.

Charters Towers Area

Citigold, Charters Towers, gold mine with workforce 120. They have attracted investment from Chinese company Henan Jinqu Gold and are looking at a super mine project being developed over the next 24 months. If this proceeds, there is likely to be a large rise in the workforce.

NQ Metals/Helmskirk Pajingo Gold operation, 60km SSE Charters Towers. (Note: NQ Metals purchased the mine from Newmont who had a recorded workforce of 400 before 2008. These became redundant. AVKO Mining were brought in as mining contractor and production is continuing. Current employment is believed to be about 150.

The company is currently undertaking a feasibility study into reopening the Twin Hills gold mine, 190km south, and trucking ore to Pajingo for treatment. If this proceeds and the mine goes to open pit, workforce will increase by a further 80.

Resolute Minings, Ravenswood Regional processing plant takes ore from various deposits in the area. Workforce 100.

Kagara's, Thalanga Copper mine and processing plant, 65km west of Charters Towers also takes ore from Balcooma. Workforce 50.

Advanced Projects

Conquest Mt Carlton

This mine is at the southern extremity of the region, 20km north west of Collinsville. Stage 1 is to commence first quarter 2011 is to produce gold and silver concentrate with Stage 2 (Q1 2012) to involve secondary bacterial leaching. They expect to ship 90 – 100 containers a month to Asia initially out of Townsville but through Abbot Point when available.

Employment will involve:

Mining contractor	60 – 70
Company	50 – 60
Shutdowns (contractors)	
SAG Mill	3 – 4 per annum
Jaw Crusher	6 – 8 persons

Mega Uranium's Ben Lomond Uranium project, 50km west of Townsville. A project concept study by Golder Associates and GRD Minproc is due for completion 2nd quarter 2008. A go ahead would be dependent on a government decision to allow uranium mining.

Mettalica Mineral's Nornico Lucky Break Nickel deposit, 90km north of Charters Towers (see also Cairns area – Bells Ck and Minnamoolka deposits) was due to commence shipping ore to the nickel refinery in Townsville late 2008, but this has been delayed and new proposals are being developed.

Curtin Bros' Mount Moss Iron Ore, 105 km west of Townsville, status – proposed to open provided transport issues can be sorted out. (Note: Latest information is that these issues have been resolved and shipments are taking place.)

Liontown Resources, Mt Windsor Copper Lead, Zinc, Silver, Gold deposit, 35km south of Charters Towers has been listed by Queensland Mines as advanced and continuing high gold prices could see it emerge as a development over the next few years.

Other Exploration

Pentland Coal

There have been proposals from time to time to develop a base load power station based on the relatively low quality coal deposits at Pentland with transmission lines to Mt Isa.

However, this would compete with a proposal to develop a power station based on the Gallilee deposits at Alpha with a power line to the north west from there. It appears at this stage, that this alternative would proceed.

Other exploration reported in the area includes:

Uranium – Matrix (Ewan), Pepinnini Resources (Plain Ck), Hawthorn Resources (Clarke River), Epsilon (Pandanus West).

Tin – Meridien Minerals at Running River.

Tin & Uranium – RMA (Coane), Kangaroo Metals (Ewan).

Nickel – Resource Mining (Three Rivers).

Copper Lead Zinc & Uranium – RMA (McCauley Ck).

Iron Ore – RMA Energy – New Moon.

Gold – Mantle (Granite Castle), Maximus (Selheim), Golden Cross Resources (Bowen Gold), Cloncurry Metals (Burdekin), Diatreme (Burdekin), Lynch Mining (Cancl Ck), BMA (Dingo Range), Drummond Gold (Glen Eva), Meritus Minerals (Homested), China Yunnan Copper (Ravenswood), Orion Metals (Rutherfords), Queensland Minerals (Sybil Graben).

Note: Chinese giant corporation, China Railway Resources, has taken a 53% interest in RMA Energy.

Air Services

Cairns has excellent air services to Townsville.

Most of the mines in the area are within drive range of Townsville.

There is a concentration of activity around Charters Towers and Collinsville. However, it is difficult to see viability of direct services from Cairns to these centres.

Current workforce is as follows:

Current	
Citigold	120
Ravenswood	100
Thalanga	50
Pajingo	150
Total	**650**

There is substantial prospective additional workforce demand.

The other prospective projects of Ben Lomond, Lucky Break, Mt Moss and Mt Windsor are likely to involve a substantial increase in workforce demand out of Townsville. Full prospective additional workforce has not been fully researched and an interim estimate of 500 has been included.

Implications of the foregoing for a strategy include:

a) *Increasing demand for mining workforce in the immediate region would put pressure on Townsville's ability to meet increasing needs elsewhere in the north.*

5.6 MACKAY REGION

Area Covered

The area has been taken to extend north towards Charters Towers, including the Abbot Point, Collinsville area, and south to the Clermont area. Because of the proposed rail link from the emerging major new Galilee Basin coal field west of Emerald around Alpha to use Abbot Point as the main outlet, information is also provided on developments in that area. Information is also included on proposed new coal seam gas developments to feed from the area into the proposed new LNG plant at Gladstone.

Existing Operations

Some 21 existing operations (4 more than in the 2008 report) have been identified in the Bowen Basin south to the Clermont area as follows.

Coal

Peak Downs/South

- BHP/Mitsubishi's Peak Downs Coking Coal mine, south of Moranbah.
- BHP/Mitsubishi's Saraji Thermal Coal.
- Rio Tinto's Blair Athol Mine near Clermont.

Moranbah Area

- BHP/Mitsubishi's Alliance Goonyella/Broadmeadows coking coal mine, 30km north of Moranbah.
- Vale – Broadlea North, open cut coal mine, 24km NE Moranbah (formerly owned by AMCI).
- Peabody's – Millenium Thermal Coal, 20km E Moranbah.
- Anglo Coals - Foxleigh Mine.
- Anglo Coals, Moranbah North, coking coal mine.
- Anglo Coals – Capcoal Mine.
- Peabody's, North Goonyella, coking coal, 40km north of Moranbah.
- Peabody's – Burton Mine.
- Vale's Isaac Plains Mine near Moranbah – 50% Aquila Resources.
- BHP's Poitrel Mine near Moranbah.
- Vale Broadlea.
- Vale Carborough.
- Felix Resources, Yarraben.

East of Coppabella

- Macarthur Coal's, Coppabella Thermal Coal mine between Coppabella and Nebo.
- Macarthur Coals, Moorvale PCI Thermal Coal mine, 10km south of Coppabella.
- BHP/Mitsui, South Walker Ck Thermal Coal mine.

Glendon Northern Area

- Rio Tinto's Hail Creek Coking Coal mine, near Glendon.
- Xstrata's Newlands Thermal Coking Coal mine, north of Glendon.

Collinsville Area

- Xstrata – Collinsville Coal.
- QCoal Sonoma P/L's – Sonoma Mine between Collinsville and Newlands.

A further 25 advanced projects were identified in the Bowen Basin, some 13 more than in the 2008 report.

The Twin Hills gold mine had been closed at the time of the 2008 report but is looking at being reopened to supply Pajingo near Charters Towers (see previous section).

Advanced Prospective

Clermont ..... (RT)
Caval Ridge ..... (BMA)
Codrilla ..... (MC)
Eagle Downs ..... (V)
Duania ..... (BMA)
Goonyella Riverside ..... (BMA)
Grosvenor etc ..... (A)
Isaac Plains ..... (V/AQ)
Olive Downs ..... (MC)
Peak Downs (expansion) ..... (BMA)
Peak Downs East ..... (V)
Ellensfield ..... (V)
Lenton ..... (NH)
Millenium (expansion) ..... (PE)
Moorvale (expansion) ..... (MC)
Eagle Field ..... (PE)
Eagle Downs ..... (AQ)
Moorvale West (expansion) .... (MC)
Moranbah South ..... (A)
New Saraji ..... (BMA)
Sarum ..... (X)
West Burton ..... (MC)
West Walker ..... (MC)
Wilunga ..... (MC)
Vermont ..... (MC)

Codes Company Names

(A) ..... Anglo Coal
(AQ) ..... Aquila Resources
(BMA) ..... BHP/Mitsubishi Alliance
(MC) ..... Macarthur Coal
(NH) ..... New Hope Corporation
(PE) ..... Peabody Energy
(RT) ..... Rio Tinto
(V) ..... Vale
(X) ..... Xstrata

Current workforce is estimated at about 10,000 and the advanced projects are estimated to add a need for over 5,000.

Galilee Basin

In addition to the Bowen Basin developments, the Galilee Basin in the Alpha area west of Emerald is about to be developed. There are two major companies involved:

Waratah Coal – owned by Minerology (Clive Palmer).

Hancock Coal Pty Ltd – (Gina Reinhardt).

It is proposed that a standard gauge rail link will be built north to Abbot Point where facilities are to be expanded.

Each project is expected to cost $7.4bn with an ambitious target to be exporting by 2013.

Waratah Coal's plans indicate an initial annual export capacity of 25m tonnes per annum, construction workforce of 2,200 and on-going employment of 760.

Hancock Coal's plan indicate an annual shipment of 30m tonnes per annum, construction workforce of 2,500 and operation workforce of 1,600.

Coal Seam Gas

There is already a coal seam gas pipeline from Moranbah to Townsville as a power station feed.

Arrow Energy propose to construct a further pipeline from Moranbah to Gladstone.

LNG export plants are being developed to take gas from the pipeline from the north existing pipeline west from Gladstone and south to Roma and a further new pipeline to be built from Chinchilla in the south to Gladstone (see map).

Three LNG plants are being developed by the following in order of how advanced they are:

Britain's BG Gas/Queensland Gas – (Q'ld Curtis LNG)

Malaysia's – Petronas/Santos – (Australia Pacific LNG)

US – Conoco Phillips/Origin

The BG Group have chosen Bechtel to build their LNG plant at Gladstone.

The projects have been canvassed to involve an investment of $40bn and the creation of 18,000 jobs.

Apart from coal seam gas, there is likely to be investment in coal seam waste gas plants at mines. Technology is also being canvassed for conversion of coal itself into gas.

Other Projects

Cairns' company, Industrial Marine & Electrics, recently won a contract to build a small power station at Moranbah.

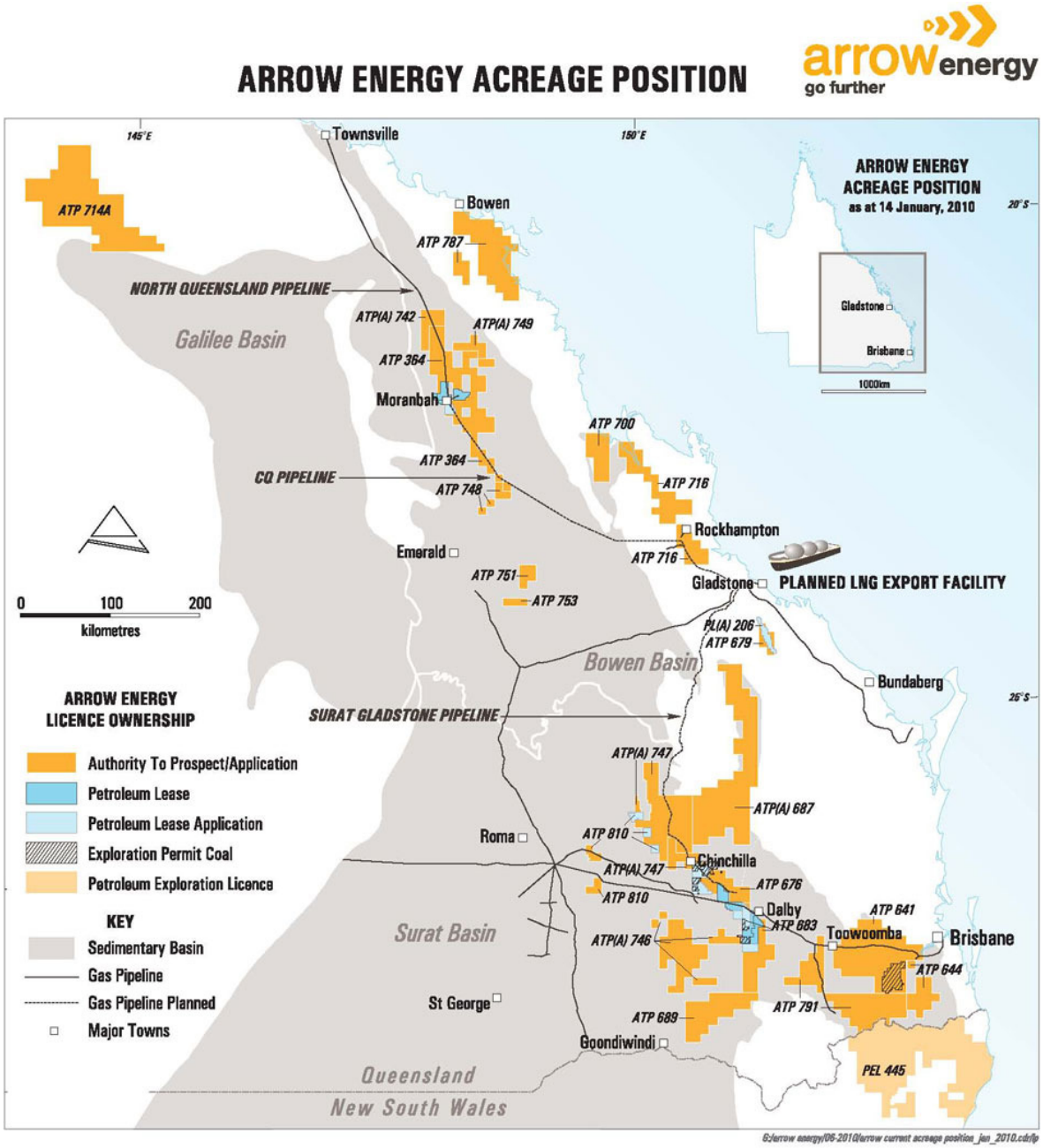
The aviation section records proposals to expand the airport at Moranbah.

Incitec, after putting the project on hold at the commencement of the GFC, are proceeding with their $935m ammonium nitrate plant at Moranbah. Ammonium nitrate is used as a major mining industry explosive but also used as a major fertiliser.

Overall Assessment

The Mackay/Galilee Basin/Central Queensland area could thus be regarded as a 'Mega Hotspot' where not only will there be a need for a major rise in workforce but also in business opportunities.

Map 11 – Proposed Pipeline Central Queensland



Source: Arrow Energy Website.

Air Services

Much of the Mackay region's demand for labour is met from local residents from Mackay but also in centres like Moranbah, Glendon etc and some companies have definite policies for developing residential capacity.

However, substantial 'fly-in' activity is taking place.

Apart from flights and drive-in from Mackay to Moranbah, Clermont, and the coal fields, QLink are flying from Brisbane to Moranbah and Skytrans from Brisbane to Clermont. Small regular charters were identified from Cairns to Emerald.

It would seem that direct flights from Cairns to Mackay and possibly Moranbah and Emerald could be worth exploring on four grounds:

1) The sheer volume of workforce required and business opportunities for Cairns' based firms.
2) The prospects, in relation to Mackay, of services being supplemented by tourism movements.
3) The ownership synergies of the Mackay and Cairns airports.
4) The possibility of linking through Cairns, flows between the 'Mega Mining Hotspots' of Mackay/Central Queensland with other 'Mega Hotspots' of PNG and the Pilbara (but especially the PNG 'Mega Hotspot').

In relation to the last mentioned, it should be noted that a very substantial mining industry service capability has grown up around Mackay.

Direct services from Mackay by carriers like Skytrans and QLink could feed straight into their services to PNG.

Cairns also potentially represents a more efficient route for business and other travellers from/to Mackay to access international flights to Asia, than flying a first leg south to Brisbane.

Volumes of tourist movements justify direct Cairns/Hamilton I flights. The question is whether potential volumes of mine, workers, business and tourism traffic would justify direct Cairns/Mackay flights as opposed to the current Cairns/Townsville/Mackay services.

Implications of the foregoing for a strategy include:

a) With the Mackay/Central Queensland area becoming a 'Mega Hotspot' for mining development, there are major opportunities opening up for the Cairns region to pursue workforce supply and other business opportunities in the area.

b) The past links between the two regions have been weak except for tourism links with the Whitsundays, and there is a need for a major concentration on:

   i. Pursuing direct airlinks as outlined above in the section on air services.
   ii. Undertaking a programme to educate businesses in the Cairns region on the opportunities in the Mackay region.
   iii. A program of engagement with Mackay region organisations.

c) A further reason for interest in the Mackay area comes from comments about skill requirements generally being lower in this area. This raises the possibility of 'green' workers using the area to upskill.

d) Because different mining companies have different policies, approaches to the industry in this area should be selective, and confined to those companies that look to source 'fly-in' workforce.

5.7 NORTHERN TERRITORY

Area Covered

Mining in the Northern Territory has been divided into six areas for this study:

Eastern NT.

Tennant Creek Area.

Alice Springs.

Tanami Desert.

The Darwin/Pine Ck Area.

Offshore Darwin.

Eastern NT

There are three major long-term mines in this area that are important to NT's value of mineral production.

Alcan's Gove operation, involving its mining of bauxite and processing into alumina - 1,200 employees.

Gemco's (BHP Billiton) Groote Eylandt manganese mine - workforce 600.

Xstrata's McArthur River Minings, lead, zinc, silver mine at McArthur River, 45km west of Boorooloola - workforce 400.

There have been air links from Cairns to each of these mines. **Map 5** (Section 3.5) shows equal distance line that runs approximately east of Alice Springs, McArthur River, Groote and Gove.

Gove is serviced by regular Qantas Link services Cairns/Gove/Darwin.

Groote is currently being serviced by flights out of Cairns – 2 pw with a total of 200 seats representing about 70% of the fly-in workforce.

An important recent development has been the announcement by Groote Resources that they have also taken up manganese leases at Groote I both on-shore and off-shore.

McArthur River were being serviced by one flight a week ex Cairns by Regional Pacific at the time of the 2008 report, but currently there are no services.

There have been some significant developments in the area since the 2008 report that may have implications for the Cairns region.

The developments in the area just over the border in the Gulf area in relation to the Redbank Copper mine, Australian Phosphates and potentially Westmoreland Uranium are canvassed in Section 4.4.1. Other developments are:

Phosphates

Wonarah (A) – Minemakers Ltd is advanced with exploration and development of an Environmental Impact Statement for proposed development of a phosphate mine in the vicinity of the Barkly Highway, about half way between the Queensland border and Tennant Creek. The project has been granted Major Project Status. The deposit contains 1.2bn tonnes of phosphate ore of varying grades.

Transport is likely to be west by road to the Adelaide/Darwin line for shipment out of Darwin. Likely workforce is not known.

Iron Ore – Roper Bar & Mountain Ck

Western Desert Resources in partnership with IMEA (subsidiary of Japanese company ITOCHU) are planning for export of iron ore (Hematite) from their mine 50km from the Gulf at Roper River. Propose to initially move 3m tonnes per annum and then progress to higher tonnages. Transport to port could be by slurry pipeline. Propose to barge in 10,000 tonne barges (20,000 tonne pr day to handymaxer panamax vessels.

Inward supply ex Darwin involves 200 – 300km sealed roads and then 100km unsealed. They envisage the barge export jetty would be able to take imports of general cargo by sea.

Workforce, estimated at initially 120 rising to 140 to 150 in 3rd year, would be fly-in.

There are bauxite deposits further west of Gove at Vashon Head, but no development activity identified.

However, there is substantial exploration activity taking place in the McArthur River area and further south.

Diamonds

North Australian Diamond's Merlin deposit. There are proposals to reopen the mine in one to three years' time.

Copper, Lead, Zinc etc

Admiralty Resources (Bulman Exploration), Hydromel Corp (Stanton – Exploration (cobalt), Rox Resources, Myrtle (lead & zinc), Xstrata's Coxco (zinc & lead) and CooleyII (copper).

Manganese

Finching Pty Ltd.

The extent of this exploration activity and its location almost equidistant from Darwin reinforces the potential interest of this area for 'fly-in' services.

Tennant Ck Area

Operating mines in the Tennant Ck area are:

OM Manganese's Bootu Ck - manganese, 125km north of Tennant Ck - workforce 110 (2008).

Peko's, Tailings, Magnetite - gold, copper - Cobalt Mine at Tennant Ck - workforce 30 (2008).

Exploratory activity in the area includes:

Western Desert Resources, Rover - gold copper prospect.

Territory Resources, Warrego - magnetite tailings/iron ore.

Westgold's Explored 8 - gold prospect.

Excalibur Mining's Juno - gold prospect.

Westgold's Prospect D – nickel cobalt – south of Tennant Ck.

Mount Peake – magnetite - south of Tennant Ck.

Air services even to Darwin are poor. It would need a large development to occur to be of interest for 'fly-in' services from Cairns.

Alice Springs

Alice Springs area is almost equidistant from Cairns, Darwin and Adelaide.

Because of tourism flows, Cairns' air links are every bit equal to those from Darwin and Adelaide.

There are the Mereeni gas operations south west of Alice Springs (with a small workforce only) and the small Mud Tank vermiculite mine north of Alice Springs in the Harts Range area.

Advanced projects listed include:

Matilda Zirco/Olympia Resources, Harts Range, Garnet Mine - workforce 60.

Thor Mining, Molyhil, wolfram, molybdenum – workforce, construction 100, production 70 (2008).

Arafura Resources/Jiangsu Eastern China, Nolans Bore, Rare Earths – working to 2013 start up.

Deep Yellow's Napperby Uranium – north of Alice Springs.

Arafura Resources Nolans Bore – rare earths – north of Alice Springs.

Reward Minerals Jervois – iron oxide, copper and gold – east of Harts Range.

Energy Metals, Bigrlyi, uranium - (340km NW Alice Springs).

Western Desert Resoruces – Meuller Ck & Blueys.

Other exploratory prospects scattered around the region include uranium, nickel, copper, lead and zinc, vermiculite, vanadium.

Alice Springs is also a road and air services gateway to the Tanami Desert area.

Tanami Desert

Newmont's Tanami Desert gold nine (the Granites) is a large operation with a 'fly-in' workforce of about 600.

It is supplied by road ex Alice Springs with some coming in from the north via Halls Ck. Workforce is 'fly-in'.

There is also some gold and uranium exploration recorded in this area with two deposits listed by the Northern Territory Government, Oberon near the Granites and Crusade to the north.

Darwin/Pine Ck Area

Operations include:

Energy Resources Australia, Ranger uranium mine – workforce 400 (2008).

Crocodile Gold's Tom's Gully gold mine – workforce 70 (2008).

HNC Australia's Browns - copper, cobolt, nickel.

Territory Resources, Frances Ck, iron ore – exporting 2.2 mtpa through Darwin.

Brocks Ck – gold.

Crocodile Gold's Brown's Sulphides – gold, silver, copper, zinc and lead.

Advanced projects include:

Crocodile Gold's, Maud Ck and Cosmo Deeps - gold.

Arafura Resources, Mt Porter - gold.

Vista Gold's – Mt Todd - gold.

Exploration in the area includes iron, uranium, gold, copper, lead and zinc, diamonds, tin and tantalin.

Cairns has excellent Jet Star and Qantas Link connections with Darwin.

Darwin Offshore

Minerals

Matilda Minerals' Tiwi Islands mineral sands operation has ceased. A new company is believed to be looking at restarting operations.

Oil & Gas

Existing operations are:

Woodside, Laminara/Corallina oil. Supplied ex Darwin by vessel and helicopter.

PTTEP Thailand/Coogee Resources, Jabiru, Challis and Puffin oil.

Black Tip Gas has since come on stream since 2008 with a pipeline via Wadeye to Darwin.

Other projects underway are:

PTTEP Thailand/Coogee Resources, Montara/Skua oil.

Other projects being explored are:

Darwin Clean Fuels – Condensate processing facility producing gas and lime, diesel, LPG and jet fuels - $450m – workforce construction 200. Commence construction 2011.

Woodside's Sunrise Gas Project – $7bn project involving a floating LNG facility.

Sinopec/AED, Puffin and Talbot oil field (expected 2012).

MEO Australia – Timor Sea LNG project involving an offshore LNG plant located offshore in 44 meters of water at Tassie Shoal.

Various other companies are involved in oil and gas search in the area.

An access to these developments would be via the Cairns/Darwin flight.

Comparative distances of Darwin from Cairns and major metropolitan centres:

Darwin from	Approx Distance
Cairns	1700 km
Perth	2500 km
Adelaide	2600 km
Brisbane	2900 km
Sydney	3400 km
Melbourne	3400 km

Implications of the foregoing for a strategy include:

a) The three major mines in the eastern NT area need to be the target for marketing the Cairns area as a source of workforce. Although there are no scheduled flights to McArthur River, it will be important not to lose contact with this area. It is not certain that drawing all workforce ex Darwin will work and there is strong exploration activity in the area.

b) Attention also needs to be expanded to include potential new mines in the eastern NT area including Roper Bar iron ore, phosphate mines in the area, and Redbank copper near the border.

c) Conditions could be coming into place to re-establish direct shipping links ex Cairns to ports in this area including Gove, Groote and the prospective development in the Roper River area along with ports in the lower Gulf.

d) Good relations need to be established with the NT Government and industry.

e) A watching brief is appropriate for the Alice Springs area for any significant developments in that area in view of Cairns' excellent services to Alice Springs. This could include using Alice Springs as a gateway to the large "The Granites" mine on the Tanami Road.

f) A watching brief should be maintained on operations in the Tennant Ck area.

g) Obviously, a substantial increase in workforce requirements in the Darwin area is taking place which may not be able to be met out of Darwin. Some limited contact that alerts companies in this area to the excellent connections to Cairns and its potential to act as an alternative supply source of workforce could be appropriate.

5.8 WESTERN AUSTRALIA

Area Covered

Only that part of Western Australia north of the tropic has been included.

There are two distinct areas:

a) The massive mining operations in the Pilbara region.

b) The Kimberley area

Identification of operations in this area has mainly been restricted to operating mines.

Pilbara

This area along with Mackay/Central Queensland and PNG is a 'Mega Hotspot' for mining development.

We have not analysed the mining activity in this area in detail for this report. However, the area's mining activity is mainly in iron ore, offshore gas, salt and some other base metals. While checked by the GFC in 2008/09, growth is back again, especially with the major LNG plants. Mining is extensive and growing and is Australia's major generator of 'fly-in' jobs.

Major on-going employers are the iron ore mines.

The offshore oil and gas sector generates large construction work but much less on-going operational employment.

The companies themselves have developed large residential capacity for mine employees but have some 'fly-in' of specialist employees. However, most of their contractor workforce is 'fly-in'.

Interviews in 2008 with mining companies confirmed the information from local labour/personnel suppliers that the industry in that area was geared to taking workforce without prior experience, confirming its potential role as a stepping stone for inexperienced workforce out of the Cairns area. This applies especially to construction.

The mines have highly developed airstrips capable of taking 100 seater jets, which at present, come almost exclusively out of Perth. Direct flights have recently been established from Sydney and other metropolitan centres by specialist carrier Strategic using airbus A320 and A300 – 200 aircraft.

There is an expectation that the area will need to increase the 'fly-in' component and extend it from specialist to general workforce.

Very high rentals are a contributing factor.

Currently, Cairns' major air access to these mines is via Perth. Qantas/Jetstar recently introduced daily flights to Perth.

In terms of flying distances to Perth, Cairns is closer to Perth than Brisbane and the same distance as Sydney.

Direct distances between Cairns and the Pilbara are further than from Perth, but almost as close as from Adelaide and closer than Melbourne, Sydney and Brisbane.

Currently, there are some regular services between Darwin and the Pilbara that could provide shorter access than via Perth, but frequency would be lower and cost probably higher.

Earlier comments indicate an opportunity to use the Pilbara as an upskilling area. Cairns' firms have done business in the area.

Implications of the foregoing for a strategy include:

h) The volumes of workforce demand in the Pilbara 'Mega Hotspot' for mining are such that if Cairns is to seriously position itself as a 'fly-in' workforce supply area, it is appropriate to target some marketing effort to the area. There are a few very large operators to be targeted.

i) The companies operating in the Pilbara are based in Perth and approaching them could be coordinated with approaches about Cairns as a corporate and shipping base for their interests in PNG and Queensland.

Kimberley

Mining activity has been an important element in the Kimberley region economy over a long period of time (see map).

The following table gives value of mineral production over the five years to 2007/08 by local government area indicating current value is running at about $1.5bn per annum.

	Value – Mineral Production ($ Millions)				
Local Government Area	**2003/04**	**2004/05**	**2005/06**	**2006/07**	**2007/08**
Broome	2.7	2.7	4.4	4.4	6.3
Derby-West Kimberley	83.5	94.0	98.9	163.4	683.7
Halls Creek	0.0	135.9	194.3	439.1	343.1
Wyndham-East Kimberley	505.1	575.6	646.1	578.8	511.4
Kimberley	591.3	808.2	943.6	1,185.7	1,544.5

Source: Department of Mines & Petroleum.

Value of production in 2003/04 was dominated by the Argyle Diamond Mine in the southern section of the Shire of Wyndham East Kimberley. Rio Tinto's Argyle Mine commenced operation in 1985 and is in the process of going underground to extend the life of the mine to 2019. The Argyle Mine is the world's largest supplier of diamonds and has produced USD6 billion in revenue. The mine is in a process of 'localising' its workforce and by 2010 aims to have 80% of its workforce based in the area, with half being indigenous.

Other production in 2003/04 included iron ore from Yampi Sound area (Cockatoo and Koolan Islands).

New projects since then have included:

- Coyote Gold Mine on the Tanami Road. The Coyote operation is smaller with a production in 2008/09 of about 23,000oz valued at $27m. The operation includes both open pit and underground operations. It has a workforce of about 120 employees and 30 contractors which is on a fly-in basis out of Perth and Darwin. Average on-site on any one day is about 80. The Coyote Mine currently has a projected mine life of a further 5 years, but is exploring actively for additional lode. It projects that it will increase its production rapidly over the next three years from 23,000 to 300,000oz a year with workforce increasing from 150 to 750.
- Savannah Nickel Mine along the Great Northern Highway north of Halls Creek - milling 680,000 tonnes a year, and shipping concentrates through Wyndham (2008/09 – 103,228 tonnes).
- Ellendale Diamond Mine, east of Derby (Gem Diamonds Ltd). Since Gem Diamond's acquisition of Kimberley Diamond Company in December 2007, processing capacity has been enhanced. In 2008, Ellendale was able to process 8.3m tonnes (6.3Mt in 2007) to recover 588,645 carats (475,306 carats in 2007). The Ellendale Mine consists of a number of lampriotic pipes of which the E9 pipe is currently being mined. The E4 pipe was previously mined but due to recent market conditions, was put on care and maintenance in February 2009. This resulted in the Ellendale Mine production being 145,298 carats for the nine months ended 30 September 2009.

Approximately 50% of the global supply of fancy and vivid yellow diamonds (sought after for their rarity) are mined at the Ellendale Mine. Current resource statements for Ellendale show a resource of 98 million tonnes. Sampling and exploration programs are on-going at Ellendale with numerous lamproites that may be developed in the future. Ellendale currently operates a 'fly-in' operation with Strategic Airlines Perth/Derby/minesite and Qantas, Perth to Broome and Broome Aviation, Broome to minesite.

- Blina, Boundary, Sundown and West Terrace small oil production, east of Derby.

This has resulted in a value of mining output tripling.

Given continuing strong world demand for minerals, mining production in the Kimberley region is expected to grow strongly over the project period.

Identified advanced projects are as follows:

Oil and Gas	○ Point Parker LNG Plant north of Broome tapping gas from the Browse Basin (Woodside), 50km north of Broome. ○ Stokes Bay, north of Derby – onshore gas. ○ Yuleroo, east of Broome – onshore gas.
Lead/Zinc/Gold	○ Sorby Hills – Approx 50km north of Kununurra- Kimberley Metals Limited. Total expenditure since inception of Sorby Hills approx $50 million. Prior to 1990 resource estimation, mine feasibility studies and attempted decline development. Post 1990 little work completed. Listing planned for first quarter 2010 to raise $25 million. Need $5-7 million to be spent to complete a bankable feasibility study and environmental approvals. Operating life 15 years with total initial capital investment of $150 million. Potential export 40 000 tpa of lead via Wyndham. Construction workforce 300 operation workforce 150.
Platinum	○ Panton - 60km north of Halls Creek – Platinum Australia. Project not viable at current metal prices but further recovery could render the project commercially viable. The company developed a new metallurgical process for the recovery of PGMs as part of a Feasibility study on the Panton project.
Copper/Zinc	○ Koongie Park – Approx 25 km southwest of Halls Creek – Anglo Australian Resources NL. Total expenditure since 1972 on Koongie approx $13 million. A Pre- Feasibility study was completed in October 2008 highlighting the potential to develop an underground and open pit operation from the Sandiego and Onedin prospects. The Sandiego resource estimation completed in April 2009 supports a 7 year mine life and a 500 000 tpa processing plant. The Onedin resource estimate could extend the mine life. Annual production from Sandiego is estimated at 40 000 mt zinc concentrate and 20 000 mt copper concentrate. Capital cost $70 million.
Zinc/Lead	○ Pillara – Approx 40km southeast of Fitzroy Crossing – Xstrata and Teck Cominco. Pillara mine was restarted in early 2007 and produced 42 100 tonnes of zinc metal and 12 400 tonnes of lead metal in 2007. It was supposed to produce 70 – 80 000 tpa of zinc metal and have a mine life of 4 years. The mine was put on care and maintenance in August 2008 due to poor grades, lower than expected output, low metal prices and the rising Australian dollar. The mine had a workforce of 300. ○ Kapok – Approx 40km southeast of Fitzroy Crossing – Meridian Minerals Limited. Recently commenced drill program as a key component into re-opening the Kapok mine and developing the Kapok West mineral resource. Initial results should be available January/February 2010.
Coal	○ Liveringa, west of Fitzroy Crossing.
Uranium	○ Ootogoona, north of Derby.
Bauxite	○ Mitchell Plateau, north Kimberley coast.

Extensive exploration activity taking place includes:

Copper	○ Halls Creek – 3D Resources. ○ Mt Angelo – 3D Resources. ○ McIntosh – 3D Resources.
Diamonds	○ Seppelt 1 & 2 & Ashmore – Approx 200 km northwest of Kununurra. North Australian Diamonds Limited (previously Striker Resources). Inferred resource 450 000 carats. Seppelt continues to have economic potential but not in current market thus the company holds these resources under mining lease.
Platinum Group Metals (PGM)	○ McIntosh –Joint venture with 3D Resources and Sally Malay Mining (now Panoramic Resources)
Nickel/Copper	○ Keller Creek – Breakaway Resources. South of Warmun. ○ East Kimberley – Thundelarra Exploration. South of Warmun.
Nickel/Copper/PGM	○ Laura River – Magma Metals Limited (70 percent interest). 35 km southwest of Halls Creek.
Nickel/Copper/PGM/Lead/Silver/Zinc/Gold	○ Eastman – Magma Metals Limited. 115 km southwest of Halls Creek. Eastman Bore for nickel, copper and PGM & Koongie Park for copper, zinc, lead, gold & silver.

In addition to the above, exploration in the Halls Creek area is as follows.

Navigator Resources is exploring for rare earths in the Cummins Range area west of the Tanami Road, south west of Halls Creek. An independent resources estimate (released recently), indicates deposits comparable to Mt Weld near Laverton. Mt Weld is planing to process the rare earths in Malaysia. Phosphate is likely to be a by-product of the mine and could result in a need to be transported to Wyndham for further processing. The Cummins Range rare earth deposit is one of only four in Australia. The rare earth market is dominated by China (95% of the world's supply). Rare earths are essential to the new green economy (eg. hybrid cars and wind turbines).

AusQuest's Wolfe Manganese Project currently involves drilling to the east of Ruby Plains homestead and also west of the Tanami Road down to the Billiluna area.

Atomic Resources are actively exploring for uranium in the Sturt Creek pastoral lease area east of Billiluna.

Northern Uranium's Gardiner Tanami Super Project is located on and north of the Tanami Road and extends into the Northern Territory in the Browns Range area. It involves exploration for uranium and is described as the company's "flagship project". The company believes the area is prospective for a large high grade high value uranium deposit.

Northern Uranium has also reached agreement with Manhattan Corporation Limited for Northern to earn a 60% interest in Manhattan's Gardiner Range project by expenditure of $1.05 million.

Excalibur Mining Corporation/Palace Resources are also exploring for uranium in the Browns Range area north of the Tanami Road straddling the Western Australia/Northern Territory border.

Air Links

The East Kimberley area is closer to Cairns than to Perth and there are prospects of some tourism synergies. Immediate access would be via services out of Darwin or via Perth. Broome is keen to develop direct overseas tourism links with Asia and also with Alice Springs. If this occurred, it would provide a second route from Cairns via Alice Springs.

Implications of the foregoing for a strategy include:

a) *Mining is expanding quite rapidly in the area, especially due to the LNG plant to be built just north of Broome and mines in the area (eg. Argyle Diamond) are reported to be experiencing some difficulties in obtaining fly-in workers. There are possibilities of establishing tourism links between the area and Cairns. It is unlikely that direct air services would be developed but there would be some value in encouraging better direct links via Darwin and possibly via Alice Springs to Broome.*

5.9 PAPUA NEW GUINEA

Since the 2008 report, there has been a major rise in interest in PNG, especially as the major LNG projects have developed.

A preliminary report prepared in March 2010 gave a great deal of information on mining developments in the area and forms the basis of this section.

5.9.1 Areas Covered

The following section covers Papua New Guinea in a number of sub regions:

- Papua Southside and Western Province (main city, Port Moresby).
- Morobe Province, Highlands and North West (main city, Lae).
- North East Islands Area (main city, Rabaul).
- Milne Bay/Oro Province (main centre, Alotau).

Maps 12 & 13 show locations as given by the PNG Chamber of Mines and Petroleum.

5.9.2 Papua/Southside/Western Province & Southern Highlands

General

This area includes Central Province and the city of Port Moresby, Gulf Province, Western Province and because of the oil and gas links, the Southern Highlands.

Main activity in the area relates to oil and gas and the LNG projects to be located in the Port Moresby area.

OIL & GAS

General

The following gives details of:

10. The old Kutubu oil fields development in the Southern Highlands under the heading of "Oil Search". By and large, the oil fields production has been declining.
11. The new gas fields developments:
    (i) The PNG LNG development involving a pipeline from the Southern Highlands to an LNG plant at Port Moresby.
    (ii) Interoil's development of its Elk and Antelope fields in eastern Gulf Province with pipeline to an LNG plant next to their oil refinery at Port Moresby.
    (iii) Talisman's plans in the Western Gulf Province to bring together a number of smaller gas finds to establish a smaller LNG operation.

The Established Kutubu Oil Fields

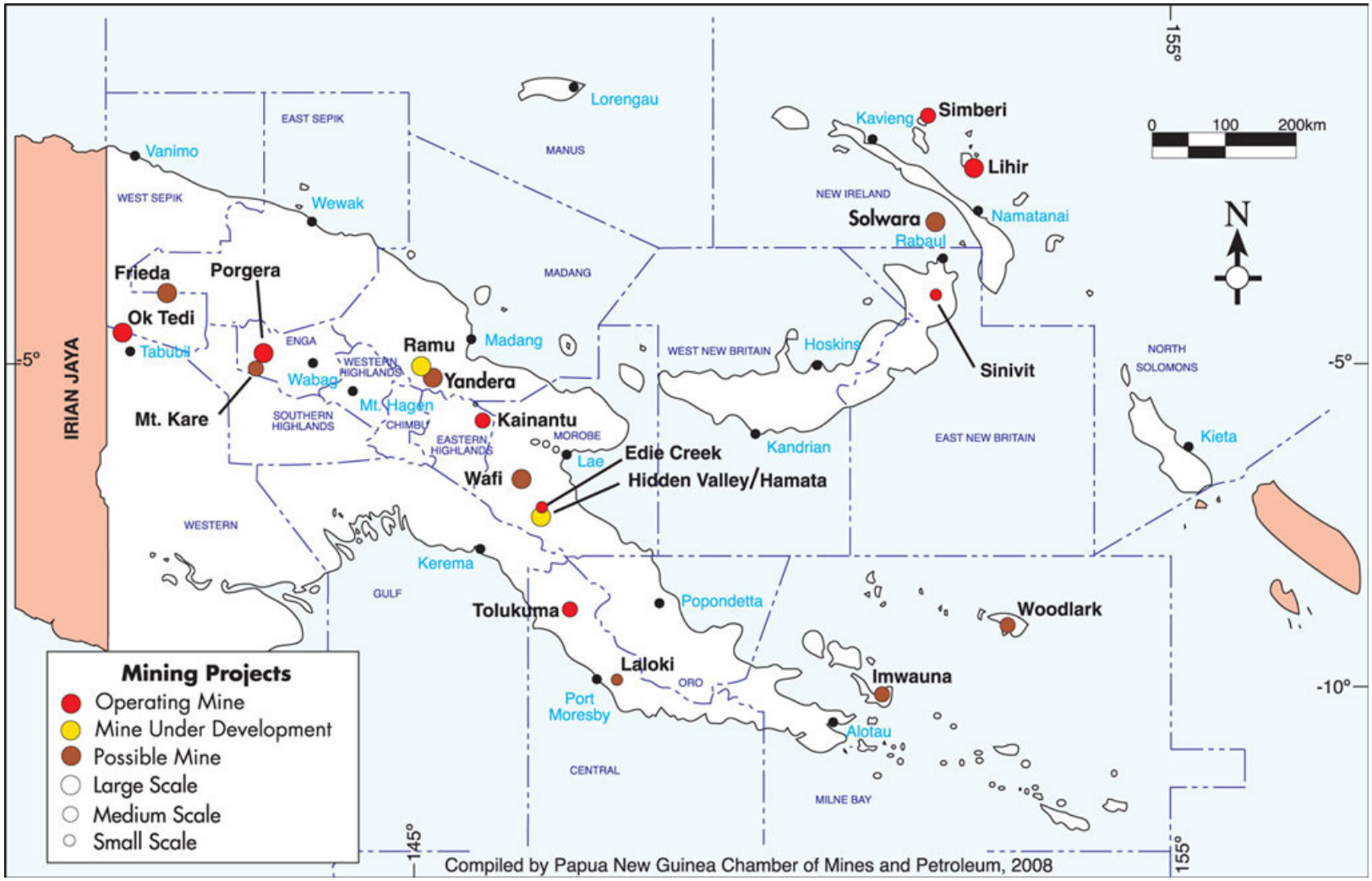
Oil Search

Status	Oil & Gas production and exploration, Coal Seam Gas exploration
Commodities	Oil, Diesel & Naphtha Production
Location	Provinces of Southern Highlands, Gulf and Western (Fly)
Contact details	

Comment

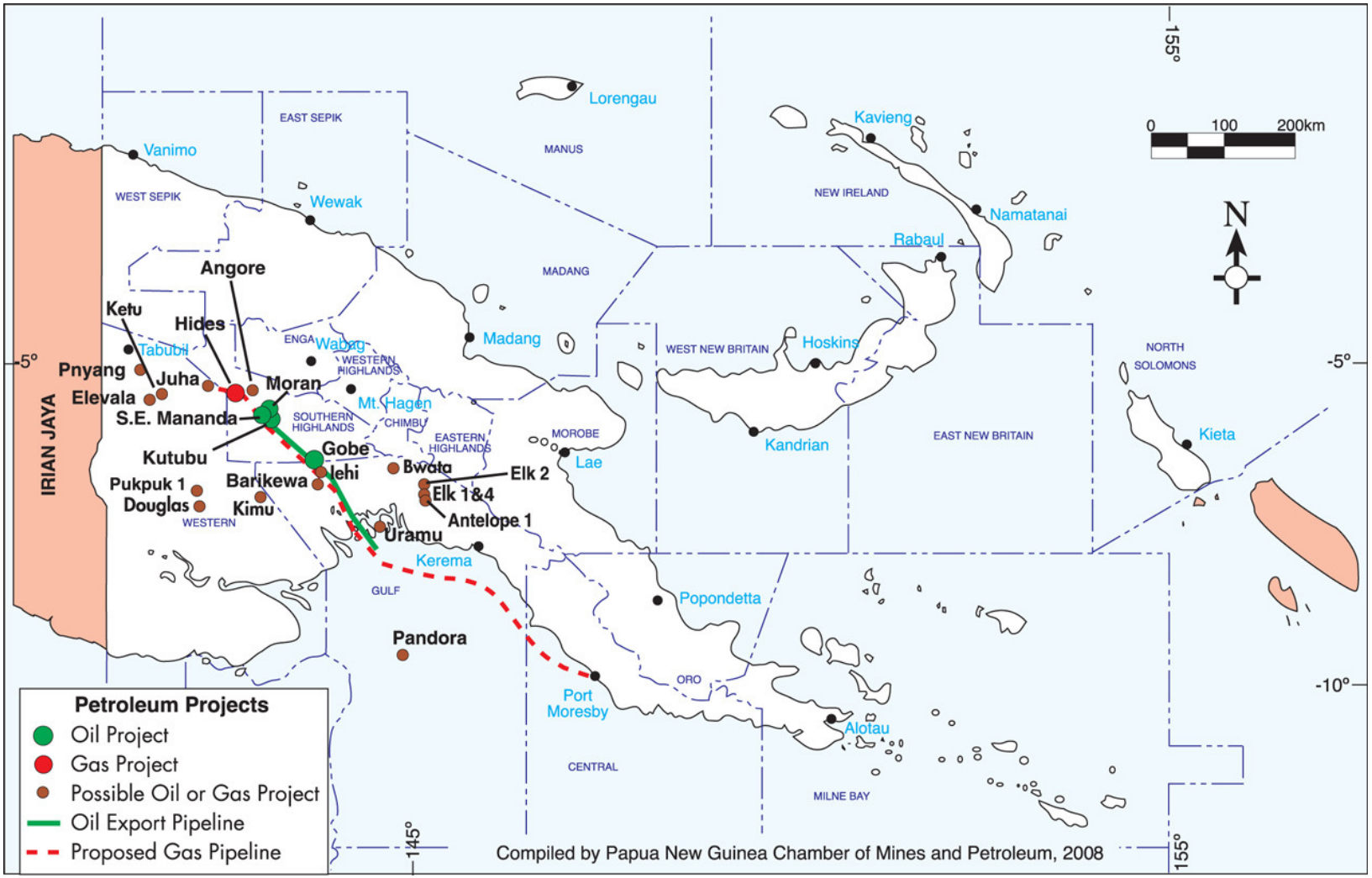
The **Kutubu Oil Project** is Papua New Guinea's first commercial oilfield development. Discovered in 1986 its' first commercial production commenced in June 1992.

Map 12
Mining Projects, PNG



Source: PNG Chamber of Mines & Petroleum.

Map 13
Petroleum Projects, PNG



Source: PNG Chamber of Mines & Petroleum.

The Kutubu development comprises a network of wells that produce oil from the Lagifu-Hedinia, Usano and Agogo fields, a gathering system and on site processing facilities (Agogo and Central Processing Facilities) and supporting infrastructure, as well as a 265 km export pipeline to the coast and a marine loading terminal in the Gulf of Papua.

Production from the Kutubu field peaked in 1993 at 130 000 bopd and although a strong contributor to Oil Search's profitability, is in its decline phase due to natural field depletion and increasing gas production. Efforts to arrest the production decline over the last 3 years have been highly successful and a number of additional wells were drilled in 2008 together with an ongoing program to fully exploit untapped oil reserves that are believed to exist in the Kutubu field.

At the time the Kutubu licence (Petroleum Development Licence 2 or PDL2) was issued, the Kutubu Project fields were estimated to contain proved plus probable reserves of approximately 170 million barrels.

As of 31 December 2008, Kutubu had produced 313 million barrels and the gross proved plus probable ultimate recovery was estimated at 353 million barrels with 41 million barrels remaining. The Kutubu field produced an average of 19 963 bopd in the fourth quarter of 2009.

The Kutubu Oil Project is a joint venture: Oil Search (60.05%), Exxon Mobil (14.52%), Merlin Petroleum Company (18.69%) and Petroleum Resources (Kutubu) Ltd (6.75%). Oil Search is the operator of the Kutubu Oil Project.

The **Gobe Oil Project** is located 85 km southeast of the Kutubu Oil Project and comprises of two producing oil fields, the South East Gobe oil field (PDL-3 and PDL4) and the Gobe Main oil field (PDL-4). Oil is exported via an 8 km pipeline which adjoins the Gobe Processing Facility to the Kutubu Export Pipeline and marine loading facilities in the Gulf of Papua. The first crude oil flowed from the Gobe Main field in March 1998 and the South East Gobe field in April 1998. Production peaked in December 1998 at 18 500 bopd from South East Gobe and at 20 000 bopd from the Gobe Main in September 1999. Both fields are now in their decline phase but active well management and facility optimization is ongoing to mitigate the fields natural decline rates.

As of 31 December 2008, the Gobe Oil Project had produced a total of 65.7 million barrels and the gross proved plus probable ultimate recovery was estimated at 71.7 million barrels with 6 million barrels remaining. The Gobe field produced an average of 5 422 bopd in the fourth quarter of 2009.

The Gobe Oil Project is a joint venture:

- PDL-3 : Oil Search (36.36%), Southern Highlands Petroleum Ltd (40.15%), Santos (15.92%), Cue PNG Oil Co Ltd (5.57%), Petroleum Resources (Gobe) Ltd (2.0%).
- PDL-4 : Oil Search (10%), Merlin Petroleum Company (73.48%), Exxon Mobil (14.52%), Petroleum Resources (Gobe) Ltd (2.0%)

Oil Search operates the Gobe Main and South East Gobe fields and is the operator for PDL-4. Santos operates PDL-3.

The **SE Mananda Oil Project** is 10 km northwest of the Kutubu Oil Project. Following the PNG Government's introduction of a marginal tax regime to encourage the development of smaller oil fields and the transfer of Operatorship, Oil Search commenced detailed studies on the SE Mananda field in 2003. The studies confirmed that the field was economic based on a low cost development and incorporating an appropriate fiscal regime. A regulatory and fiscal framework was agreed in early 2005 and the SE Mananda oil field (part of PDL-2) commenced production in early 2006. The development has opened up further exploration opportunities west along the Mananda ridge.

As of 31 December 2008, the SE Mananda Oil Project had produced 2.3 million barrels and the gross proved plus probable ultimate recovery was estimated at 3.5 million barrels with 1.2 million barrels remaining. The SE Mananda field produced an average of 436 bopd in the fourth quarter of 2009 down from 675 bopd in the third quarter due to production problems.

The SE Mananda Oil Project is a joint venture; Oil Search (72.26%), Merlin Petroleum Company (19.84%), Petroleum Resources Kutubu Ltd (7.9%). Oil Search is the operator of the SE Mananda Oil Project.

The **Greater Moran Oil Project** straddles three licence areas; PDL-2, PDL-5 and PDL-6. Production commenced from the PDL- 2 section in January 1998 and the PDL-5 section in April 2000. In March 2001, the Central Moran Unit Agreement between the PDL-2 and PDL-5 Joint Venture partners was executed and full field development of the **Central Moran Project** was completed in September 2002. The Central Moran Oil Project was developed as a single Unit and was designed and installed based on:

Oil production capacity – 24 000 bopd
Gas injection capacity of up to 105 mmscfd and
Oil recovery by injection of Moran solution gas supplemented by Agogo gas to maintain reservoir pressure

Production from the Central Moran Project is processed at the Agogo Production Facility and liquids are then piped to the Central Production Facility for further processing, storage and export through the export pipeline.

The discovery of the NW Moran field (23 km northwest of the Moran field into PPL 219) resulted in the PDL-2, PDL-5 and PPL 219 joint venture partners' agreement to establish a single Greater Moran Unit across the Moran and NW Moran fields. The NW Moran field has now been granted Petroleum Development Licence 6 (or PDL 6).

As of 31 December 2008, the Greater Moran Oil Project had produced 56 million barrels and the gross proved plus probable ultimate recovery was estimated at 110 million barrels with 53 million barrels remaining. The Greater Moran field produced an average of 16 207 bopd in the fourth quarter of 2009. Production rates have continued to improve due to strong contributions from new wells and gas re-injection of existing wells with gas from the Agogo Facility which maintains reservoir pressure.

The Greater Moran Oil Project is a joint venture: Oil Search (49.52%), Exxon Mobil (26.82%), Eda Oil Limited (11.28%), Merlin Petroleum Company (8.3%), Petroleum Resources Kutubu Limited (2.97%), Petroleum Resources Moran Limited (1.1%). Oil Search is the operator of PDL-2 and the Moran Unit and Exxon Mobil is the operator of PDL-5.

The **Hides GTE Project** is 80 km northwest of Kutubu and is Petroleum Development Licence 1 (PDL-1). Oil Search owns 100 percent of the Hides GTE project and is the operator. Discovered in 1987, gas production commenced in 1991 with the development of the Hides Gas To Electric (GTE) Project. The Hides GTE Project consists of a pipeline connecting Hides-1 and Hides-2 wells to a small gas conditioning plant at the Hides Production Facility. Gas is bought by the Porgera Joint Venture to generate electricity in an adjacent facility for supply by overhead transmission lines to Porgera Gold Mine. The gas supply contract which expires in October 2011 is likely to be extended in line with the Porgera mine life.

Condensate produced along with the gas is distilled into naphtha and diesel and sold locally or utilized as a back up fuel for the power station.

The Hides field contains total proved plus probable reserves and resources of approximately 5.3 tcf of sales gas, with production up to the end of 2008 at approx 77 bcf. As at 31 December 2008 reserves attributable to the Hides GTE Project are 70.5 bcf and 1.6 million barrels of condensate. The remaining volumes are committed to the **PNG LNG Project**. Oil Search's highest priority is the PNG LNG project.

One of Oil Search's primary objectives is to prove up more gas to underwrite the construction of additional LNG trains beyond the initial PNG LNG Project. Oil Search has an **exploration portfolio** of 20 600 square kilometers which is relatively underexplored and highly prospective, particularly for gas. In 2009 it farmed into PPL 260 adjacent to the Hides licence.

In August 2009, Oil Search was awarded 7 mineral exploration licences covering 17 500 square kilometres in the PNG Foreland area of the Western (Fly) Province (west of the Hides & Kutubu gas fields). The purpose of the licences is to investigate the potential for **Coal Seam Gas**. Oil Search will spend $5 US million over the next two years on the evaluation of existing data and sampling of three shallow wells. It is very early grass roots exploration that could result in another significant source of gas for PNG. Any successful discovery of coal seam gas could be integrated with supply from nearby conventional gas fields reducing the risk of any developments.

PNG LNG

Status Advanced LNG Project
Commodities LNG
Location Provinces of Southern Highlands, Western (Fly) & Gulf
Contact details

Exxon Mobil is the operator of PNG LNG and has awarded major contracts to Chiyoda-JGC JV, CB&I-Clough JV, SPIECAPAG, Saipem, McConnell Dowell-CCC Group JV and Clough-Curtain Bros JV. Oil Search separately awarded a contract to Aker Solutions.

Comment

On 8 December 2009 Esso Highlands Limited, a subsidiary of Exxon Mobil Corporation and operator of the PNG LNG Project, announced on behalf of the Project participants that the PNG LNG Project had been approved pending completion of Sale and Purchase agreements (SPAs) with LNG buyers and finalization of financing arrangements with lenders. In addition, Exxon Mobil, the PNG LNG operator, awarded five major contracts for engineering, procurement and construction (EPC) for the Project (see below for contract details). Oil Search separately awarded an engineering, procurement, construction and management contract to Aker Solutions for the construction of facilities to deliver gas from the existing oil fields to the PNG LNG Project.

Prior to the Project approval announcement, binding Sale and Purchase Agreements for the supply of LNG were signed with:

- Sinopec of China for 2 million tonnes per annum for 20 years to Sinopec's yet to be constructed LNG terminal in Qingdao, Shandong Province. China Petroleum & Chemical Corporation ("Sinopec") is listed in Hong Kong, New York, London and Shanghai and is a fully integrated energy and chemical company
- TEPCO of Japan for 1.8 million tonnes per annum for 20 years. Tokyo Electric Power Company Limited (TEPCO) is the largest power utility company in Japan and is one of the world's largest LNG importers.

Subsequent to the Project approval, a further binding SPA was signed with Osaka Gas from Japan for 1.5 million tonnes per annum for 20 years. This takes the total SPAs for LNG to 5.3 million tonnes per annum over a 20 year term. The LNG plant has a capacity of 6.6 million tonnes per annum and the Project lifetime or production phase is expected to be around 30 years.

In December 2009, the lenders to the PNG LNG Project and the Project participants signed the various financing documents that make up the PNG LNG Project financing. Up to US$14 billion of commitments from lenders were secured, more than sufficient to meet the estimated US$13 billion of debt required for the Project, on an agreed 70%:30% gearing basis.

Other milestones achieved include:

- All landowner licence based sharing agreements in place
- PNG Government approval of the Environmental Impact Statement
- PNG Government approval of new production licences, pipeline licences and a licence for the LNG plant

The PNG LNG Project remains on track to achieve financial close in the first quarter of 2010 and is targeting first LNG sales in 2014.

Participating interests in the PNG LNG Project include affiliates of Exxon Mobil Corporation (including Esso Highlands as operator, 33.2%), Oil Search Limited (29%), Independent Public Business Corporation (PNG Government, 16.6%), Santos Limited (13.5%), Nippon Oil Exploration (4.7%), Mineral Resources Development Company (PNG landowners, 2.8%) and Petromin PNG Holdings Limited (0.2%).

Exxon Mobil is the operator of the PNG LNG Project and is one of the few companies in the world with the expertise and financial strength to pursue an integrated approach to LNG, from well head to customer. Exxon Mobil, together with partners in its world wide LNG business, currently produces nearly 35 million tonnes per annum of LNG with an anticipated 65 million tonnes by 2010. Beyond 2010 the Exxon Mobil's target is 100 million tonnes per annum. Economies of scale are critical to a cost intensive business like LNG. Exxon Mobil, together with joint venture partners, is building the world's largest LNG trains able to process 7.8 million tonnes/year (in the past ten years trains have increased from 2 to 5 million tonnes per year). Shipping accounts for a significant portion of bringing LNG to market. Exxon Mobil working with Qatar Petroleum has developed the Q-Flex and Q-Max ships capable of carrying about 45 and 80 percent respectively, more LNG than the average carrier currently operating and can access LNG terminals in all of the world's major LNG markets. Exxon Mobil is also using its technological expertise to develop regasification terminals like the first offshore gravity based regasification terminal in the Adriatic Sea, Italy.

Exxon Mobil has approved the following engineering, procurement, construction and management contracts on behalf of the PNG LNG Project:

EPC3

Chiyoda Corporation and **JGC Corporation** for the 6.6 million tons per year LNG plant including facilities for processing and treating natural gas, liquefaction, storage and loading. Chiyoda Corporation/JGC Corporation's joint venture is a collaboration of two successful and internationally proven contractors both based in Yokohama, Japan. Chiyoda and JGC have constructed plants that have produced more than 60% of the global LNG capacity in the last 10 years. The joint venture is under Chiyoda's leadership. Chiyoda Oceania is based in Perth. Peak employment levels for the construction of the plant will be 8 500 workers.

JGC Corporation is the main company for 32 subsidiary and 14 affiliated companies in Japan and overseas including the manufacture of catalysts and other chemical products & ceramics. JGC has a Perth office.

EPC4

A joint venture between **CB & I** and **Clough** for the Hides gas conditioning plant. The contract scope includes the EPC (engineering, procurement and construction) work for the gas conditioning plant, nearby wellheads and associated piping and infrastructure in the Southern Highlands of PNG. The joint venture between CB&I (65%) and Clough (35%) expects approximately 1 200 workers to be employed during peak construction. CB & I designs, engineers and constructs some of the world's largest energy infrastructure projects and has approx 18 000 employees in more than 80 locations.

US contractor CB&I's corporate headquarters are in the Netherlands, worldwide administration office in Texas with offices in Perth, Brisbane and Blacktown (NSW).

Clough is a publicly listed Australian based engineering, construction and asset support contractor providing full project life cycle solutions primarily to the upstream oil and gas sector in Australia, Asia, the South Pacific and the Middle East. Clough employ about 2 000 people around the world with approx 600 Australian placements. Clough's head office is Perth with other offices located in Darwin and Brisbane.

EPC5 A
SPIECAPAG for onshore pipelines and infrastructure. French company that is a fully owned subsidiary of Entrepose Contracting. Spiecapag provides full life- cycle support to the oil and gas industry in onshore pipelines and facilities, from conception and financial assistance through to engineering, procurement, construction, training, commissioning, operation and maintenance. Spiecapag headquarters are near Paris with a worldwide network including an office in Adelaide. Total number of employees in 2005 was 1 400.

EPC2
Saipem for the offshore pipeline. The scope of the work will consist of the engineering, transportation and installation of a 407 km long 34 inch gas sealine connecting the Omati River landfall point on the southern coast of PNG to the onshore point located near Port Moresby where the new LNG plant will be located. The works also encompass the shore approach excavation and backfilling at Port Moresby and the trenching and backfilling of a 75 km section of the sealine at the Omati River landfall , 25 of which inside the Omati River. Activities will be completed in the third quarter of 2012.

Saipem is 43 % owned by **Eni.** Eni is one of the world's leading integrated energy companies, operating in the oil and gas, power generation, oilfield services and engineering industries. It is an Italian multinational company (active in 70 countries), currently one of Italy's largest industrial companies and employs about 71 500 people. The Blacktip gas field in the Bonaparte Gulf (110 km offshore from the Northern Territory) is 100 percent owned and operated by Eni. The Blacktip field will deliver gas processed through an onshore gas plant at Wadeye to the NT's Power and Water Corporation for over a period of 25 years. The pipeline works for Blacktip were carried out by Saipem. Eni have offices in Perth, Darwin and Sydney.

EPC5 B
A joint venture between **McConnell Dowell Constructors** and **Consolidated Contractors Group Offshore** for support infrastructure. The joint venture has the contract to procure and construct the Komo Airfield in PNG. Komo is located 10 km southeast of the Hides gas conditioning plant and the future Juha developments. The works which are due to begin in December 2009, will include the construction of the Komo airfield to accommodate Dash 8 operations and limited Antonov AN 124 operations and the upgrade or construction of roads and bridges along two main logistics routes. Duration of construction 24 months.

McConnell Dowell is an Australian based engineering, construction, building and maintenance company owned by Aveng Limited, a company listed on the Johannesburg Stock Exchange. Aveng has 25 361 employees operating in 29 countries. McConnell Dowell has offices in Melbourne, Brisbane, Perth and NSW.

Consolidated Contractors Group Offshore is part of the Consolidated Contractors Group Holding Company (CCC). CCC is the largest engineering and construction company in the Middle East with 140 000 employees (60 nationalities) in over 25 countries.

C1
On 4 June 2009 a joint venture between Clough Niugini (65%) and Curtain Bros Papua New Guinea Limited (35%) was awarded a $64 million contract for early works (to start immediately). For this upstream project, multiple work fronts were to operate from the river port of Kopi to Hides with an anticipated workforce of 900. The scope includes the construction of roads, bridges, wharf, laydown and camp areas and other critical infrastructure.

Recruitment Contracts
All recruitment for the PNG LNG Project is conducted by the following recruiting agencies:

Within Papua New Guinea:
- Placements PNG
- JDA Wokman
- Pacifica HR

Outside of Papua New Guinea:
- Orion Engineer Project Services (PNG) Ltd
- Brunel Energy
- Air Energi
- Bond Personnel
- NES Global Pty Ltd
- Fircroft
- Link Project Services

Interoil

The Interoil LNG project will be similar to the PNG LNG project, but draw from Elk and Antelope gas fields over a shorter land and sea pipeline to an LNG plant next to their existing oil refinery near Port Moresby.

Apart from the pipeline, the project involves a $6.0bn two train LNG facility.

Current plans are for first production of LNG towards the end of 2014 or beginning of 2015.

Interoil currently have about 60 staff in Cairns. They also operate service stations throughout PNG.

Talisman & Other

Talisman is a Canadian company that is involved in energy developments but unlike BP, Shell etc., does not get involved in retail.

There has been a series of gas finds in Western Province and it has been negotiating arrangements with the smaller companies involved (including RIFTOIL and Papua Petroleum) with a view to bringing together the output for a possible third LNG plant in that area. They are reported to be planning to base an office in Cairns.

In 2010, Talisman planned to spend $200m of which $85m on drilling.

Eaglewood Energy is exploring in PNG with offices in Newcastle and Port Moresby.

New Guinea Energy and Horizon Oil are also exploring.

Mining

General

There are three mining operations in this area:

a) Ok Tedi in Western Province.

b) The Tolokuma gold mine in a remote poorly serviced location north of Port Moresby (see Petromin PNG Holdings below).

c) There are also prospective gold operations at the old Laloki gold field just outside of Port Moresby but are only likely to involve small operations.

Ok Tedi Mining Limited

Status	Producing
Commodities	Copper concentrate, gold
Location	Western (Fly) Province
Contact details	

Comment

The Ok Tedi mine started operations in 1984 and is operated by Ok Tedi Mining Limited (OTML). Annually the Ok Tedi mine produces an average of 160 000 tonnes copper in concentrate and 540 000 ounces of gold. In 2008, 70 percent of Ok Tedi's revenue was from copper and 30 percent from gold. In 2007, Ok Tedi's export earnings represented approx 32 percent of PNG's export earnings.

The mine site is located on remote Mount Fubilan, 18 km from the PNG/Indonesia border. The ore is mined from an open pit where it is crushed and conveyed to the mill for processing. The resulting concentrate slurry is transported through a 157 km 150 mm diameter pipeline to the port of Kiunga on the Fly River, where the concentrate is filtered and dried. The concentrate is then barged more than 800 km down the Fly River to be stored in a silo vessel anchored in the Gulf of Papua or in Port Moresby (depending on weather conditions), for loading onto ocean going ships. OTML headquarters are in the town of Tabubil.

OTML employs about 2 000 people directly (95 percent being PNG Nationals) and a further 1 500 contractors. Each day 78 000 tonnes of ore and 80 000 tonnes of overburden (waste rock) are mined with the mill treating 78 000 tonnes daily. The mine operates 24 hours per day 365 days a year and its mining equipment fleet includes 23 haul trucks with a 170 mt capacity and 3 with a 100 mt capacity.

OTML is owned by the PNG Government (30%), PNG Sustainable Development Program Limited (52%) and Inmet (18%). The PNG Government's 30 percent consists of direct equity (15%), on behalf of Western Province (12.5%) and on behalf of the landowners from the mine area (2.5%).

In 2002, BHP Billiton divested its 52 percent shareholding in OTML by transfer of its shares to the Papua New Guinea Sustainable Development Program Limited (PNGSDPL). The OTML dividends paid to PNGSDPL are being used to generate sustainable development projects for the benefit of the people of the Western Province and Papua New Guinea.

In November 2009, the PNG Government announced its decision to approve OTML's purchase of Inmet's equity in OTML for consideration of a Net Smelter Return and a cash payment. This would result in Inmet having no further rights or funding obligations in respect to OTML. once the transaction is completed within the next several months.

The transaction allows the remaining shareholders (the State and PNG Sustainable Development Program Limited) to push ahead with exploring the options for mine extension beyond the predicted closure date of 2013. The two scenarios currently under assessment include:

- A Feasibility Study of an extension of the Ok Tedi mine life to 2020 and
- The possible development of Tabubil as an educational centre of excellence post 2013, a study of which is being undertaken by PNG Sustainable Program Limited

Both studies should be completed in 2010 and the mine plan will be updated to reflect the outcomes of these studies.

Should the mine life be extended the mine will be a lot smaller in size than the current operations producing 90 million tonnes of ore over a seven year period (approx 35 000 tonnes ore per day) and will convert to a combination of underground mining and an open pit.

Any decision to extend the closure of Ok Tedi mine to 2020 requires the approval of the State and the informed consent of the communities that are impacted by the existence of the mine. The most significant impact will be the requirement for disposal of an estimated 280 Mt of waste rock and tailing from open cut mining and mill processing.

Tolokuma

Petromin PNG Holdings

Status	Producing
Commodities	Gold, Silver
Location	Central Province (100 km NW of Port Moresby)

Comments

Petromin PNG Holdings (PNG Government owned entity) acquired 100 percent of the **Tolukuma Gold Mine** in February 2008**.** The Tolukuma began open pit production in 1995 and underground mining in 1997. The current production is sourced approx 92 percent from underground mining and 8 percent from a small open pit. The mine is a low capacity, high grade operation and employs 650 people including 130 contractors.

The Tolukuma mine produced 44 181 ounces of gold in 2006/07. According to the previous owners, Emperor Mines, the resources were estimated at 410 000 ounces in June 2007. Silver production has not been detailed in recent years but output in 2000 shows the silver component to be four times greater than gold.

The Tolukuma mine is in a remote area and is serviced by helicopter only. Power is supplied by both diesel driven generators and 1.5 Megawatts of hydro generation. After September 2008 plant improvements have decreased downtime (especially downtime caused by power problems).

5.9.3 Morobe Province Central Highlands, North West

General

There are already major mining operations in the area and a number of large prospective new ones. These can be grouped in a number of areas.

a) Marobe/Wau/Bulolo
The area south east of Lae includes PNG traditional gold mining area of Edie Creek. The new major Harmony Mine at Hidden Valley (see Morobe Mining Joint Venture). This area is serviced by a road out of Lae. Back towards Lae is the Wafi prospect and further up the Markham Valley is the Kainantu prospect currently on care and maintenance.

b) Madang Area
A road links Lae with Madang via the Markham and Ramu Valleys. There are two major projects developing in the Madang hinterland, the Ramu Nickel project and Marengo Mining's Yandera project.

c) Highlands
The Porgera gold project is already operational in Enga Province and Barrick Gold have a workforce supply office in Cairns. To the north west and in Sundaun Province on the northern side of the Watershed from Ok Tedi is the Xstrata Frieda River prospect.

Morobe Hidden Valley/Wafi

Morobe Mining Joint Ventures

Status	Producing & exploration
Commodities	Gold, Silver
Location	Morobe Province, 90 km SSW of Lae
Contact details	

Note: In a recent development, Newcrest have recently taken over Lihir.

Comment

The Morobe Mining Joint Venture (MMJV) is a 50:50 joint venture between Harmony Gold Mining Company and Newcrest Mining Limited. MMJV has three joint ventures in the Morobe Province; Hidden Valley, Wafi-Golpu and an exploration program.

Hidden Valley is the first joint venture project to enter into production and is PNG's first major new gold mine development in 15 years. The capital cost estimate is approximately A$605 million. Given current estimates, annual production at Hidden Valley mine is expected to be around 255 000 ounces of gold and 4 million ounces of silver over a 10 year mine life.

The operation will process an estimated 4.2 million tonnes of ore annually from two open pits located 5 kilometres apart; the Hamata pit which exploits the Hamata gold orebody and the larger Hidden Valley and Kaveroi gold and silver ore bodies. The Hidden Valley pit is linked to the processing plant by a 5 km overland conveyor.

Manning peaked in June 2009 with 3 300 personnel and construction personnel started to demobilize in August 2009. The permanent workforce has been recruited with 90 percent of the 731 employees being PNG Nationals.

The first gold pour occurred in June 2009, September quarter 2009 production was 6 300 ounces, with production ramping to the original design capacity 250 000 ounces during the fourth quarter of 2010.

Hidden Valley is located in a highly prospective area with a resource development drilling program currently underway to support potential resource expansion. Potential plant constraints are being reviewed eg a study into increasing the plant capacity to 4.8 million tonnes of ore per annum.

The **Wafi-Golpu Project** has focused on defining additional mineral resources and expanded its footprint during the 2008/09 financial year to include the Nambonga copper/gold prospect. Together with Wafi (gold) and Golpu (copper-gold) the project now contains 11.1 million ounces of gold, 47 million pounds of molybdenum and 4.1 billion pounds of copper. Concept studies to investigate development alternatives are a priority for 2010.

It is believed that Wafi Golpu is looking like being as large s Ok Tedi.

Morobe Kainantu

Barrick Gold Corporation

Status Care and maintenance
Commodities Gold
Location Eastern Highlands Province
Contact details

Comments

Barrick Gold Gold Corporation purchased the **Kainantu Gold Mine** in December 2007 from Highlands Pacific for A$141 million. The mine was put on care and maintenance in January 2009 due to low ore grades. The Kainantu deposit is estimated to contain 5 million ounces of gold.

Madang – Ramu Nickel Joint Venture

Status Commissioning in 2009 with view to production in 2010
Commodities Nickel, Cobalt
Location Madang Province
Contact details

Comment

The **Ramu Nickel & Cobalt Project** is a US$1.4 billion project. Progressive commissioning commenced late in the December quarter 2009 and is expected to continue through to June quarter 2010. Production expected to commence in mid 2010 with a staged ramp up through to the December quarter 2010.

The Ramu Nickel & Cobalt Project is premised on mining and beneficiating the nickel and cobalt ore at Kurumbukari, 75 km southwest of Madang. The upgraded ore will be pumped as a slurry through a 134 km pipeline to a acid leach processing facility at Basamuk Bay, with the resulting intermediate hydroxide product being exported for refining.

The Basamuk plant will have an annual production of 31 150 tonnes of nickel and 3 300 tonnes of cobalt. The current known reserves will sustain a minimum 20 year mine life with the potential to increase the mine life by a further 15-20 years.

The current ownership structure is:

- a Chinese syndicate (85%) with the following interests; MCC Ramu NiCo Limited -a subsidiary of China Metallurgical Construction Corporation known as MCC(61%), Jinchuan Group Limited (13%), Jinlin Ji'en Nickel Industry Corporation Limited (13%), Jiuquan Iron and Steel Group (13%)
- Ramu Nickel Limited -a subsidiary of Highlands Pacific (8.56%)
- Mineral Resources Ramu Limited – a subsidiary of MRDC (3.94%)
- Mineral Resources Madang Limited (2.5%) – a landowner company

MCC Ramu NiCo Limited is the operator. Its parent company China Metallurgical Construction Corporation (MCC) is a major Chinese owned construction and operating company with over 70 subsidiaries and 50 000 employees. MCC is a major force behind the growth of China's steel industry and a major contractor on a number of key projects in China and the Asia Pacific region.

During operation the Ramu Nickel and Cobalt Project is expected to employ 1 300 people directly, with 910 or 70 percent being PNG Nationals. More than 3 000 people will be indirectly employed in Project related businesses such as catering, security, camp service, good suppliers etc.

Outstanding issues as of October 2009 were:

- Import of heavy fuel oil by the Project
- Land title disputes in both Kurumbukari and Basamuk regions
- Illegal immigrants with the Project mining lease area
- Upgrading and construction of the Northern and Southern roads

Madang – Yandera

Marengo Mining

Status Advanced
Commodities Copper, Molybdenum, Gold
Contact details

Comment

Marengo Mining Limited is an international mineral exploration and development company listed on the Australian and Toronto Stock Exchange. The company's principal asset is the Yandera copper-molybdenum-gold project.

Phase 1 of the Definitive Feasibility Study (DFS) was completed in April 2008 and Phase 2 commenced in May 2008. An expanded DFS is now expected to be completed by December 2010 instead of the initial mid 2009 completion date. The cost of completing the DFS is currently estimated at A$12.5 million. Marengo Mining is also planning an exploration program to identify any discoveries that could increase the Yandera resource. Depending on exploration results, amounts allocated to exploration may be re-allocated to the DFS.

The DFS is based on the following:

- Open cut mining over an initial 10 year time frame with initial focus on the higher grade zones of the deposit
- Ore processing commencing at 25 Mtpa with capacity for increased throughput
- Crush and grind at mine with ore slurry line to a coastal concentrator producing separate copper and molybdenum sulphide concentrates
- Detailed investigation of local rivers for the generation of hydro power

Marengo Mining will require further capital from external sources to develop any newly discovered mineral deposits, and/or if the DFS, is positive, to develop the Yandera Project. Commodity price fluctuations may significantly affect the ability to fund the development of the Yandera Project and impact the economic viability once mining commences. Marengo intends to raise funds through debt and/or equity financing.

Highlands - Porgera

Barrick Gold Corporation

Status Producing
Commodities Gold
Location Enga Province
Contact details

Comment

The Porgera gold mine is a joint venture between Barrick Gold Corporation (95%) and the Enga Provincial Government and the local Ipili landowners who own the land contained in the mining lease. The open pit and underground mine is located 680 km from the Port of Lae from which all materials are freighted. In 2008, the mine produced approx 660 000 ounces of gold by moving approximately 160 000 mt of ore from the open pit and 2 200 mt ore from underground. As at 31 December 2008 Porgera had proven and probable mineral reserves of approx 8.2 million ounces of gold. These reserves would allow a mine life to 2020.

Over the life of the mine it is estimated that Porgera will account for 12 percent of PNG's national export earnings. Local procurement was estimated to be valued at USD342 million in 2007.

The Porgera Joint Venture (PJV) employs 2 500 employees and over 500 contractors. Currently, 93 percent of PJV employees are PNG Nationals, with the majority from the Porgera region.

Since the mine commenced in 1990, there has been very significant in-migration to the Porgera Valley and an escalation in crime and violence. During this period, the population in the valley has increased from 10 000 to about 40 000 people today, with a large influx of migrants and squatters from other areas of Enga, the Southern Highlands and beyond.

On a daily basis local police are faced with armed individuals illegally invading the mine to steal gold bearing ore. Frequently illegal miners enter the mine site in large groups prepared to come into direct conflict with security personnel.

Social and law and order issues represent the greatest risks to the operation but steps are being taken to address the problems eg increased police presence although this has brought strong condemnation by Amnesty International.

Highlands – Frieda River

Highlands Pacific Limited

Status	Project in pre-feasibility stage
Commodities	Copper, Gold
Location	Sanduan (West Sepik) Province or 170 km NW of Porgera mine
Contact details	

Comment

The Frieda River Copper Gold Project is one of the world's largest undeveloped copper and gold resources. The project owners are Xstrata Frieda River Limited (76.3%), Highlands Pacific (16.95%) and OMRD (6.75%).
The project is currently the subject of an 18 month Pre-Feasibility study due in the third quarter of 2010 and a Feasibility Study is proposed shortly afterwards. Studies to support an Environmental Impact Assessment are nearing completion. In 2010 Xstrata's budgeted expenditure on the Frieda Project is US$77.5 million bringing the total investment by the end of 2010 to more than US$150 million.

The results of an extended scoping study were released in early 2009 and envisaged a 40 Mtpa plant with production over an initial 27 year mine life averaging 160 000 tonnes copper metal and 240 000 ounces of gold per year. The project was defined as open pit, with a two line concentrator delivering concentrate via a pipeline to a new port on the north coast of PNG. Electricity supply would be by on site hydro generation. The scoping study envisaged construction commencing in 2012 and production commencing in 2017.

The current Pre-Feasibility Study is reviewing mill throughput to in excess of 40 Mtpa as the revised resource estimate in January 2010 increased resource tonnage by 26% to 200 000 tpa of copper metal. Xstrata is the manager of the project and has appointed Bechtel to provide technical services in relation to the overall project evaluation.

The adjacent Nena project is 100 percent owned by Highlands Pacific, however Xstrata have an option to move to the same percentage as the Frieda Project by paying Highlands US$10.8 million.

Highlands Pacific has two copper gold exploration leases 20 km from Ok Tedi mine, Nong River and Tifalmin. Tifalmin is 100% owned by Highland Pacific and Nong River is a joint venture with Xstrata (72%). Planning has commenced for a US$3 million exploration program on these exploration leases.

Highlands – Gold Anomaly Limited

Status	Advanced
Commodities	Gold
Location	Milne Bay Province (Fergusson Island), Eastern Highland Province

The **Crater Mountain Project** in the Eastern Highlands Province (50 km SW of Goroka), is currently 51 percent owned by Gold Anomaly but a further expenditure of A$900 000 will increase its equity to 70 percent. Crater Mountain is an advanced exploration project with the potential to host a world class gold deposit. One of the four prospects (Nevera) has the potential to produce 5 million ounces of gold. Road access will commence in January 2010 which will significantly reduce logistics costs incurred by the current helicopter only access. Road access will also enable channel sampling and geological mapping to precede drill target selection. Following test work Gold Anomaly will make an application for a mining lease enabling initial small scale gold production. A high grade zone in the Project area has been the site of artisanal mining (small scale or subsistence mining by locals) since 2005. Local buyers estimate annual production at 1 600 ounces. A local Project Manager and Chief Geologist have been engaged.

5.9.4 North East Islands Area

General

There is a range of existing and proposed major projects in this area that can be broken down into four groups:

a) New Ireland Area - There is the existing Lihir operation and the new Simberi mine off the north eastern coast of New Ireland.
b) The Solwara seafloor prospect offshore from Rabaul and the adjacent Neptune minerals seafloor prospect.
c) A number of mines and prospects on New Britain Island including the small Sinivit operation near Rabaul and the Coppermoly project near Kimbe.
d) There are moves to reopen the Bougainville copper operation near Kieta.

New Ireland - Simberi

Allied Gold Limited

Status	Producing
Commodities	Gold
Location	New Ireland Province (Simberi Island, Big Tabar Island, Tatau Island; part of Tabar Islands Group)

Comment

Allied Gold Limited is an Australian based company listed on both the Australian Stock Exchange and the London Stock Exchange. Allied Gold's **Simberi Oxide Gold Project** commenced gold production in February 2008, producing 72 609 ounces of gold in 2008/09. The oxide expansion (currently underway) and the sulphide expansion Pre-Feasibility Study (due in March 2010) together with a resource upgrade (in the coming months), aims at lifting gold production to more than 200 000 ounces of gold per annum by 2012 from both Simberi's oxide and sulphide open pit sources. Simberi currently hosts Measured, Indicated and Inferred Mineral Resources of approximately 4.7 million ounces of gold. The expected resource upgrade and expansion plans should result in mine life of 10 years.

Allied Gold currently holds 100 percent of Simberi and 100 percent of exploration licences on the nearby Big Tabar and Tatau Islands. During 2008 Allied Gold entered into a A$20 million farm-in to Allied Gold's exploration licence over Big Tabar and Tatau Island with Barrick Gold Corporation. Barrick will earn in 50% once it incurs A$8 million, then 70% once a total of A420 million is incurred. Until these milestones are achieved Allied Gold retains 100% of the exploration licences on these islands.

Allied Gold has had samples analysed by Australian laboratories and has a charter arrangement with Airlines of PNG.

In January 2010 Allied Gold rejected outright the allegations against it in recent press publications in Papua New Guinea relating to the hiring of mercenaries in relation to its Simberi Gold Project. Allied Gold stated that it had engaged certain contractors/employees to assist with security but it was all within terms and conditions of its operating permits in PNG.

New Ireland – Lihir Gold Limited

Status	Producing and expanding
Commodities	Gold
Location	New Ireland Province (Lihir Island)

Note: In a recent development, Newcrest have taken an interest in Lihir. Newcrest are also heavily involved in Morobe Mining.

Comments

Lihir Gold Limited is a major global producer with operations in Papua New Guinea, West Africa and Australia (although the Victorian Ballarat gold mine sale should be completed in early 2010).

The **Lihir Gold Mine** on Lihir Island in the New Ireland Province commenced construction in 1995 with the first gold pour in May 1997. The mine consists of a single ore body with three linked open pits. Material moved in 2008 was more than 50 million tonnes. The processing plant is currently capable of treating more than 6 million tonnes of ore per annum to produce in excess of 800 000 ounces of gold. Mining is scheduled to continue until 2021 at current rates with processing of lower grade stockpiles to continue beyond 2030. The Lihir Gold mine has produced 7.09 million ounces of gold since operations begun in 1997.

In 2008 Lihir Gold Limited approved a major expansion of the Lihir processing plant to increase annual gold processing capacity to approximately one million ounces of gold per year. Annual processing throughput will increase to a maximum of 11 to 12 million tonnes of ore. The Million Ounce Plant Upgrade (MOPU) progressed into construction in 2009 with the project on track to lift production to an average of one million ounces from 2012. Site earthworks have commenced, with good progress on the wharf upgrade and preparations for leach area, thickener, oxygen plant, pre-oxidation and pressure oxidation civil works. Civil and structural, mechanical and piping contract packages are being tendered and awarded. The crushing and cyanide leaching circuits are expected to be near completion by the end of 2009. Total expenditure commitments to the end of 2009 amounted to approx A$370 million including an interim power station. It is expected the final capital expenditure for the Million Ounce Plant Upgrade will be A$943 million when complete in late 2011. The mine life will continue until well after 2030.

Lihir Gold's workforce totals 4 251 people being 2 079 employees (Lihirian 36% and PNG Nationals & others 64%) and 2 172 business partners (PNG Nationals 95% and Expatriates 5%).

The Lihir mine generated US$4.5 million in revenue in 2008 by selling Certified Emission Reductions on global markets. The Lihir mine is located in an inactive volcanic caldera which retains remnant geothermal energy in the form of steam. Lihir Gold harnesses this steam to generate 56 Megawatts, approximately 75 percent of the mine's needs. Lihir Gold's geothermal power plant was the first project in Papua New Guinea to be registered for carbon trading under the Clean Development Mechanism of the Kyoto Protocol.

Rabaul – Solwara & Neptune Seafloor Prospects

Nautilus Minerals

Status	Advanced
Commodities	Copper, Gold, Silver, Zinc
Location	New Ireland Province(Bismarck Sea), East New Britain Province (Lassul Bay)

Comments

Nautilus Minerals is proposing to develop the **Solwara 1 Project,** the extraction of ore from a Seafloor Massive Sulphide (SMS) system in the Bismarck Sea of New Ireland Province. SMS deposits produce high grades of copper, gold, zinc and silver and scientists estimate that thousands of SMSs exist.

The Project is the first full scale deepwater mineral extraction project in the world and the successful start up of this project will launch a new industry. The first generation of deepwater mineral extraction projects will focus on mild ocean conditions such as those experienced around Papua New Guinea.

Among the Nautilus shareholders are three of the world's largest resource companies; Anglo American (11.1%), Teck Resources (6.8%) and Gazmetall Holding (Cypruss) Limited (21%). Nautilus is listed on the Toronto and London Stock Exchange and has raised $340 million in equity capital.

The Solwara 1 Project is a high grade copper/gold resource that lies in 1 600 metres of water 30 km from New Ireland. Nautilus will use existing offshore oil technologies to cut ore from the seafloor and pump it to the surface as seawater slurry. Once the ore is dewatered it will be shipped to shore for processing. Processing is conventional froth flotation and smelting/refining, all of which will be contracted from existing facilities. Phase 1 of the Project will barge ore to the shore for stockpiling and export. Phase 2 is the processing of the ore on shore and the export of concentrate. Nautilus has a contract to purchase a 1 500 ha inactive plantation at Lassul Bay (East New Britain Province), it has a natural deep water port for barges and concentrate export.

The Environmental Permit was granted in December 2009 and the Mining Lease is expected to be granted in 2010. Engineering is advanced with world class offshore contractors and suppliers.

Nautilus has been exploring in Papua New Guinea for four years. In addition to the Solwara 1 Resource, 17 other prospects have been sampled and tested in the Bismarck Sea near Solwara 1. Golder Associates completed the world's first Seafloor Massive Sulphide N143-101 compliant resource estimate for Solwara 1. The Indicated Mineral Resource is 870 kt @ 6.8% copper, 4.8 g/t gold, 23g/t silver and 0.4% zinc, the Inferred Mineral Resource is 1 300 kt @7.5% copper, 7.2g/t gold, 37g/t silver and 0.8% zinc. Full scale mining of Solwara 1 will produce 1.5 million tonnes per year of ore. The drilling program is ongoing in 2010 with laboratory analyses being carried out by ALS Laboratory Group in Brisbane and Townsville.

Geothermal power possibilities – follow through.

Neptune Minerals

Status	Exploration
Commodities	Copper, Gold, Silver, Zinc
Location	New Ireland Province (Bismarck Sea, Tabar & Feni Island Group)=

Comments

Neptune Minerals is a UK registered public company founded in 1999 to explore, develop and commercialise Seafloor Massive Sulphide (SMS) deposits. Neptune Mineral's operation office is based in Sydney.

Neptune Mineral's has 278 222 km2 of exploration leases in Papua New Guinea, New Zealand, Vanuatu and the Federated States of Micronesia. In June 2007 Newmont Mining invested 2 million pounds in Neptune with plans to place staff and provide technical expertise to assist Neptune's exploration activities. Neptune submitted its first mining licence application for Kermadec in New Zealand in July 2008.

Neptune has 14 granted exploration licences within the territorial waters and Exclusive Economic Zone of Papua New Guinea. Two Exploration Licences – Klostu and Namel – totaling 495 km2 are adjacent to Nautilus Minerals in the Bismarck Sea. Another 5 Exploration Licences totaling 7 549 km2 surround the island groups of Tabar and Feni.

New Britain - Sinivit

New Guinea Gold Corporation

Status	Producing and exploration
Commodities	Gold, Silver, Tellurium
Location	East New Britain Province (New Britain I), Milne Bay Province (Normanby I)

Comment

The New Guinea Gold Corporation (NGG) is focused on two projects; Sinivit mine expansion (New Britain Island) and Weiko (Normanby Island).

The **Sinivit** mine is an open pit, vat leach, oxide gold mine that has yet to produce to expectations. Gold production commenced in May 2008, with production of 6 753 ounces of gold in 2008 and 14 153 ounces of gold in 2009. The original envisaged production was 2 500 - 3 000 ounces per month (up to 36 000 ounces per year). This target is unlikely to be achieved on a consistent basis without a change in the processing method. The vat leach method has been shown to have significant shortcomings in difficult terrain and high rainfall areas. NGG is considering converting the processing route to Carbon In Column (a variation of Carbon In Pulp), the capital and operating costs are currently being assessed.

A recent review of historic exploration reports has revealed details of the presence of metal tellurium within the Sinivit system. The vast majority (about 80 %) of the tellurium produced globally is a by-product of copper smelting and electrolytic refining. Tellurium is the scarcest of all by product metals except for gold.

Tellurium has a range of applications including rubber processing, Blu Ray discs and potentially in photovoltaic cells for solar power. NGG believes the historic assays to be accurate but the assaying was carried out prior to the requirement of accreditation of laboratories. NGG is now assessing the tellurium potential. NGG owns 93 percent of the Sinivit mine.

New Britain - Coppermoly

Coppermoly Limited & Barrick Joint Venture

Status	Exploration
Commodities	Copper, Gold, Molybdenum
Location	West New Britain Province (New Britain Island)

Comment

New Guinea Gold Corporation also has a 23% interest in Coppermoly Limited, an Australian based company listed on the Australian Stock Exchange. Coppermoly has a 100 percent interest in the **Mt Nakru** and **Simuku** copper/gold/molybdenum projects on New Britain Island. Barrick Gold Corporation Barrick Gold can earn 72% of Coppermoly's three existing projects (Mt Nakru, Simiuku & **Talelumas**) by spending A$20 million within 8 years. Barrick are currently establishing their own office and staff at Kimbe on New Britain Island and have begun preparations for the upgrade of the track access to the Mt Nakru site. All three projects are close to essential infrastructure including roads, an airfield and an operating deep water port at the provincial capital of Kimbe.

Simuku contains 700 000 tonnes of copper, 12 000 tonnes of molybdenum, 400 000 ounces of gold and 13 million ounces of silver.

Bougainville Copper

Bougainville Copper, PO Box 1274, Port Moresby, Papua New Guinea

Comment

During his recent visit to Cairns, the head of the Bougainville Government (PNG), indicated that his government was paving the way for reopening of the Panguna mine, wished to reestablish direct flights to Cairns and was seeking Australian help in the development of the Bougainville economy.

Solomons – Gold Ridge

Comment

Consideration of the needs of this mine needs to be included in any strategy.

5.9.5 Milne Bay/Oro Province

General

There has traditionally been mining in this area with servicing from Cairns (eg. Misima).

A number of new mining operations are shaping up including New Guinea Gold's Imwauna project on Normanby I and the Woodlark I project.

Further up the north coast is the Niugini Nickel prospect that could be a potential supplier to the Yabulu Nickel Refinery at Townsville.

Ferguson I - Imwauna

Gold Anomaly Limited

Status	Advanced
Commodities	Gold
Location	Milne Bay Province (Fergusson Island), Eastern Highland Province

Comments

The **Fergusson Island Gold Project** consists of two gold deposits, Wapolu and Gameta, which are located 30 km apart on the NW and NE corners of Fergusson Island. Since 1996 A$15 million has been spent on the Project. Both properties are accessible by low cost water access due to their close proximity to the coast. Landowners are supportive of the Project and its potential development.

A 2004 Pre-Feasibility Study indicated the potential for economic gold development from the production of 600 000 to 1 million tonnes of ore per annum. A combined Wapolu and Gameta could sustain operations for at least 7 to 12 years with an annual production of 32 to 55 000 ounces per annum.

Gold Anomaly intends to commence a Bankable Feasibility Study on the Fergusson Island Gold Project which is in the process of becoming 100 percent owned by Gold Anomaly.

Woodlark Mining Limited

Status	Advanced
Commodities	Gold
Location	Milne Bay Province (Woodlark Island)
Contact details	

Comments

Woodlark Mining Limited owns 100 percent of the **Woodlark Island Gold Project.** The parent company is Kula Gold Pty Ltd, a private Australian company.

The three gold deposits of Kulumadau, Busai and Watou on Woodlark Island have an estimated

1 385 000 ounces of gold. The Scoping Study is complete and a Feasibility Study and EIS initiated.

Oro Province – Niugini Nickel Limited

Status	Advanced
Commodities	Nickel, Cobalt
Location	Oro (Northern) Province
Contact details	

Comments

Niugini Nickel Limited is 100 percent owned by Resource Mining Corporation. Resource Mining Corporation is listed on the Australian Stock Exchange.

On 22nd February 2010, Resource Mining released a prospectus with the aim of raising A$2.6 million. The funds raised will be applied towards the exploration and Feasibility Study update of the Wowo Gap Project, the generation of new exploration projects and working capital.

The preliminary results of the Feasibility Study into the **Wowo Gap Nickel Laterite Project** was completed in February 2010 as a requirement for the 2008 renewal of tenement EL1165 (WoWo Gap).

Main features of the Feasibility Study were:

- HPAL to process limonite ore utilizing saprolite ore to neutralize acid
- HPAL plant designed to process 1.25 Mtpa of limonite and 0.25 Mtpa of saprolite ore over a 20 year operation life
- Anticipated annual production of 13 000 tpa of nickel metal and 1 300 tpa of cobalt metal equivalent
- Calculated pay back of capital within 5 years following ramp up to full production

Preliminary outcomes of the Feasibility Study estimated the capital cost US$772 million (+/- 30 percent) with cost distribution;

- Mine/Plant/Utilities/Services 45% of total cost
- Infrastructure/Indirect 21 % of total cost
- EPCM/Owners costs/Contingencies 34% of cost

The Renounceable Rights Issue Prospectus which will be primarily used to update the Wowo Gap Project's Feasibility Study closes on 29th March 2010.
It is also possible that the further development of Interoil gas operations exploration and extraction operations in Gulf Province could reach a level where direct services out of Cairns were developed.

Regency Mines & Direct Nickel

Status	Exploratory
Commodities	Nickel, Cobalt
Location	Oro (Northern) Province

Comments

Regency Mines and Direct Nickel are forming a joint venture to pursue further proving work on the Mambare Plateau in Oro Province (north of Kokoda). There are suggestions that the deposit could be twice the size of Ramu Nickel and would be exported form a deep water port at Oro Bay.

5.9.6 Papua New Guinea Workforce Summary

The following provides information about sizes of workforce in mines in PNG.

Ok Tedi

Total workforce is estimated at 3,600 composed of 2,100 employees and 1,500 contractors. It is estimated that of the employees, 95% are PNG Nationals. Estimated expatriates is in the range of 150 – 200. Main air link for expatriates is with a Cairns point of hire (PoH).

Porgera

Total workforce is estimated at 3,000 employees, 2,500 and contractors 500. It is likely that expatriates are again in the range of 150 – 200. Main expatriates' air link is via Mt Hagen with a Cairns point of hire (PoH).

Lihir

Estimated workforce is 5,000 with about 20% expatriates, ie. about 1,000 with main air link with a Cairns point of hire (PoH) - 6 services a week of a 50-seat Dash 8.

Simberi

Operational workforce is 400 with about 50 expatriates. Current PoH is Brisbane with use of commercial services to Port Moresby, 6 charters per week to the mine. A switch to a PoH Cairns could provide substantial savings to the company (Allied Gold).

Gold Ridge (Solomons)

The mine is being refurbished over the next 12 months with a workforce of 500 (60 – 80 expats). Operationals' workforce is expected to be 450 with expatriates 30 – 40. Current PoH is Brisbane.

Morobe Joint Venture – Hidden Valley

Workforce peaked at 3,300 during construction. Operational workforce is expected to be about 730 with expatriates probably around 73 of which 60 from Cairns, being a long-term mine at least as large as Ok Tedi. They believe it will probably ramp up over next 5 years to a workforce need of 1,500 – 2,000.

Tolokuma

Overall workforce is estimated at about 500.

PNG LNG

The workforce during construction is expected to peak at about 12,500 in 2012 but drop to 850 when operational. Information on break up between contractors is as follows.

- LNG Plant Port Moresby – Chiyoda and JGC Corp – peak of 8,500.
- Hides Gas Conditioning Plant – CBI and Clough – peak of 1,200.
- On-shore Pipeline – Spiecapag – 2,000 Nationals and 300 expats - will start putting on workforce August/September 2010.
- Offshore Pipeline – Saipen – workforce not known.
- Support Infrastructure – Komo Airfield – McConnell Dowell Constructions and Consolidated Group Offshore – workforce not known.
- Support Infrastructure – CBI and Clough – road port of Kopi to Highlands – workforce 900.

Thus, overall current mine workforce is estimated at about 13,000 with expatriate workforce estimated at about 1,600 with most coming through air services from Cairns.

Apart from workforce increases around Port Moresby, it is likely that there will be a substantial increase in workforce accessed via Lae strengthening the case for Lae to achieve international airport status and take direct flights out of Cairns.

5.9.7 Mine Inputs – Freight & Shipping

The following provides information about mine inputs, shipping and transport arrangements.

Ok Tedi

Ok Tedi have been carrying out a logistics study. Currently, they supply out of Brisbane to the port of Kiunga well up the Fly River with shipping also ex Newcastle (grinding balls), but have been looking at the possibility of making Cairns their main supply centre.

Requirement is to handle 240 x 20ft containers per month composed of general cargo, grinding balls and explosives (ammonium nitrate).

Current output from the mine of 700,000 tonnes of concentrates per annum is barged in shipments of 4,400 tonnes to offshore, 62,000 tonne vessels anchored in the Gulf of Papua (sometimes in Port Moresby when weather conditions not favourable).

It has been suggested that of the $500m of goods shipped from Australia to PNG, $300m are for Ok Tedi.

Lihir

Current main supply point is Brisbane with shipments of 60 – 100 containers per week (10% are 40ft containers).

The mine has a heavy lime requirement which is believed to be coming from New Zealand at a rate of 150 – 200 containers a month via Sofranis Shipping to Townsville, Consort to Lae and Bismark Shipping to Lihir. The Bismark service is believed to carry PNG goods also. The company is looking to double the intake of lime,

The Dash 8 air services ex Cairns also carries 500kg of freight.

Porgera

Porgera ships in 200 containers per month (ie. 50 per week, of which 10 – 15 general cargo and 35 – 40 bulk commodities, mostly chemicals).

It is estimated that three-quarters of the cargo carried by the Consort service out of Townsville is for Porgera.

Morobe Joint Venture

Quantities not yet known but supply seems to be ex Consort, Townsville to Lae.

PNG LNG

It has not been possible to obtain a comprehensive picture of cargo requirements for the project. Arrangements are with the major contractors who then subcontract, including to caterers.

It is believed that requirements for the onshore pipeline will include:

- Direct inward shipment of the pipe material direct from overseas with offshore unloading to barges into Kopi port.
- General cargo via Consort to Port Moresby and coastal shipping to Kopi.

Issues

Inquiries among the mining companies resulted in the following issues being raised.

Quarantine/Customs

If goods are not shipped via Port Moresby, there can be an issue of availability of quarantine/customs services.

Explosives

Lack of ability to ship substantial amounts of explosives through Cairns Port is an issue that could potentially result in failure to gain trade. Solutions need to be sought.

Chemicals
These form a major part of the trade. In the case of Lihir, the requirement is very large. Enquiries about the possibility of supplying ex Ootan lime works raised the issue, that at best, B Doubles could be used via the Palmerston unless solutions could be found for use of the railway.

Grinding Balls
Production has been established at Townsville but road transport to Cairns does not seem to be a problem.

Foodstuffs
Very large quantities of food are required by mines, not just for their own large workforce but because of the large populations that have moved into the surrounding areas (eg. Ok Tedi feeding 10,000 people, Porgera population risen from 5,000 to 45,000).

This factor is a potential plus for shipping services ex Cairns.

Distances & Areas of Advantage
Cairns has an advantage of proximity to PNG. Timing saving for shipping to and from Cairns compared with Townsville and return is estimated at 3 days.

Cairns' advantage is particularly strong in relation to Western Province and Gulf.

Congestion
Congestion and delay times in Townsville appears to be emerging as a problem.

Port Charges
Port charges are a factor, eg. one commodity cited Gladstone $15,000, Townsville $30,000.

Transport Developments within PNG
The construction of a road from Kopi (near Kikori in Gulf Province) to link with the Highlands road system is of potential strategic importance to Cairns. The Highlands area is the most populous in PNG. This road potentially provides direct access for exports to that area and a potential route for backloading. The alternative is via Lae and the badly deteriorated Highlands Highway.

A constraint is the depth of the port at Kopi (indications are that it is 2 meters).

It is believed that an Asian Development Bank funded project is being developed to upgrade the Highlands Highway.

5.9.8 Analysis

Internal transport difficulties tend to make Papua New Guinea a series of separate regional economies and it is evident that if the Cairns region is going to engage with PNG mining opportunities, it needs to recognize this.

The scale of the LNG projects in dollar terms and construction activity mean that they will dominate the opportunities. A great deal of the focus on exploring opportunities in PNG has necessarily been on these projects and this needs to continue. However, it needs to be recognized that the LNG projects will also have major secondary impacts:

- of raising opportunities outside the mining sector through their impact on growth of the PNG economy overall.
- of drawing workforce and resources away from other mining developments.

The following looks at opportunities for workforce and supply/services from the Cairns/Far North Queensland region in four broad PNG regions away from Port Moresby.

Western & Gulf Provinces

The Far North Queensland region has a joint boundary with Western Province with advantages of sea supply and air access.

The two key players in the area – Ok Tedi and Talisman have both been looking at locating offices in Cairns. Ok Tedi already has direct flights out of Cairns and is looking at switching its shipping out of Brisbane to being out of Cairns.

There is already substantial contact between the Torres Strait Regional Authority and Western Province over border issues and it could be worth looking at some form of cooperative development mechanism between the wider Far North Queensland region and Western Province.

In any event, there is probably a need to engage more directly with the Western Province provincial government and the Sustainable Development Fund.

The building of the PNG LNG pipeline will result in building of a road from the Southern Highlands to the Kikori area in Gulf Province and there is a case for direct contact being established with that Province..

There is an opportunity for Queensland Transport and Main Roads to help with the planning/design of this road. This road has the potential to provide access to PNG's area of largest population in the Highlands as an alternative to shipping via Lae and the Highland's Highway.

A company has been established with contracts from the PNG LNG project to mobilize local producers supply food grown in the Highlands.

Contact needs to be made with that company to explore the possibility of organizing backloading of Highland's output to Cairns and using FNQ produce to supplement Highland supplies where appropriate.

Morobe/Madang/Highlands/North West

This is the main non-government economic powerhouse area of Papua New Guinea. The Highlands has the largest population and Lae is PNG's largest port and manufacturing centre.

A major target should be to help Lae achieve its ambitions to open up a second international gateway into PNG including direct services out of Cairns.

More direct services might be pursued into Wau/Bulolo to service the Harmony project.

Madang is PNG's main tourism centre for diving and this provides a potential linkage with Cairns.

However, given the Chinese ownership of Ramu Nickel and likely links in that direction, it is not certain that it represents a good opportunity. Ways of building links with it would need to be investigated including the possibility of using superior air links between Cairns and China as a route for personnel moving to and from the mine.

Frieda River's links with Xstrata and remote situation similar to Porgera (which has a personnel supply office in Cairns), could make it suitable for development of similar linkages from this area.

The possibility of shipping links direct from Cairns into this area needs to be part of any PNG shipping development strategy.

North East Island Area

There are already flights ex Cairns to Lihir carrying workforce. The potential availability of a major input 'lime' could provide a basis for achieving direct shipping links and freight services out of Cairns and possible other corporate services being located in Cairns.

There is a definite opportunity to achieve 'fly-in' services to Simberi from Cairns.

The Solwara project (and neighbouring Nautilus) Seafloor Massive Sulphides (SMS) is an exciting one and because it is a pioneering seafloor mining operation, could be of substantial interest to the Cairns maritime servicing sector. The project is likely to be a global first and spread south west into the Pacific and north up into Asia.

The operation represents a further opportunity for Cairns to act as a 'fly-in' supply and corporate services centre with strong prospects of backloading especially of copra for stockfeed.

The head of the Bougainville Government has already been to Cairns seeking to develop direct links.

The prospects of developing 'fly-in', supply and corporate services for the Solomon Islands and the Gold Ridge mine needs to be explored.

It is recommended that a separate special strategy be developed for this area that features:

a) Direct engagement with Rabaul Chamber of Commerce and East New Britain Provincial Government.

b) Direct engagement with the relevant mining companies.

c) Engaging with the Bougainville Provincial Government.

d) Achieving restoration of direct air services into Kieta and possibly better more direct links into Rabaul.

e) Engaging with the Solomon Islands Government and business community.

f) Developing shipping into Rabaul and other ports in the area.

Milne Bay/Oro Province

Alotau airport has been developed to enable it to take direct international flights out of Cairns and the community there talks about this happening. There are existing Cairns' businesses and family links with the community. The area has a number of tourist attractions. There have been direct flights into past mines in the area (Misima). Yabulu is seen as a potential customer for the Oro Province Nickel.

There are good reasons for a distinct separate strategy being developed in relation to this area. Any shipping links could be coordinated with links to the Rabaul/north eastern islands and those through to Lae.

Implications of the foregoing for a strategy include:

a) *There is a continuing need to recognise the major opportunity developing for supply of services to PNG, especially the major LNG construction projects developing around Port Moresby, but more broadly in other areas of PNG.*

b) *There is a need to recognise that the opportunities are expanding beyond provision of 'fly-in' services to provision of supplies through establishment of new shipping services and provision of corporate office services located in Cairns.*

c) *Supply of workforce services into PNG involve a different pattern to those into mines and projects in northern Australia. The PNG Government wishes to maximise use of Nationals. This is mainly possible at lower skill levels. The emphasis of provision of services is thus at higher skill levels including provision of training and supervision. However, the workforce demand for the LNG projects will involve moving down the scale into 'fly-in' of skilled trades persons.*

d) *The differences in dealing with PNG require establishment of a special response effort and the coordinating group established needs to be continued.*

e) *Any special response effort needs to be sensitive to PNG national interests, and coordinate with the Australian/PNG Business Council and the Queensland/PNG Business Council and involvement of those companies operating in PNG but with a strong corporate presence in Cairns. The PNG Government decision to re-establish a consulate in Cairns needs to be encouraged.*

f) *Although the LNG project will dominate opportunities in PNG, sight should not be lost of the other significant mining and industrial projects and opportunities need to be pursued in five different areas:*

    1) *Port Moresby and the LNG projects.*
    2) *Western and Gulf Province areas.*
    3) *Lae/Morobe/Highlands/North West.*
    4) *North East Inland areas including Bougainville and Solomons.*
    5) *Milne Bay/Oro Province..*

g) *The Cairns Chamber of Commerce should continue to work with the Port Moresby Chamber of Commerce to assist Cairns' companies establish themselves in PNG.*

5.10 EASTERN INDONESIA

Area Covered

Distances from Cairns limit consideration to:

- Papua Province
- Halmahera (Maluku)
- Sulawesi (Makassar)
- The eastern section of the main line of islands including operations at Wetar off East Timur and one large operation on Sumbawa Island east of Bali and Lombok with Australian links.

There are a number of operational or mines in advanced stages, but much of the major activity is taking place further west, especially the gold and coal mining operations in eastern Kalimantan (Borneo), mainly accessed via the long standing oil producing centre of Balikpapan.

Existing Services to the Area

There is a sharp contrast in the level of service into this area between the most easterly, the Freeport-McMoRan Indonesia's giant Grasberg mine in Papua Indonesia and the other operations further west.

Cairns has dominated Australian services to the Freeport mine since about 1974.

Freeport-McMoRan Indonesia's buying agent, International Purveyors, is located in Cairns and employs about 30 persons. They assemble cargo from throughout Australia by rail and road (road has probably become more important in recent years).

Their ship, the Java Seas. departs Cairns for the mine's seaport every 10 days. The cargo carried is 'general cargo' ranging over a great many items most of which are purchased from outside the Cairns region.

Total cargo shipped is about 50,000 tonnes with a value of about $330m. Amount bought locally has been estimated at $66m. The cargo out of Cairns is believed to represent about 40% of total general cargo purchased for the Freeport operation, the rest coming from within Indonesia and Singapore.

After switching air services to Darwin for a number of years, Freeport returned to Cairns about 2007. Currently a service is operated by Airfast Indonesia with aircraft leased by Freeport every Monday and every 2nd Thursday.

The following seeks to identify why this pattern exists.

Freeport Indonesia

The first thing to recognise about Freeport Indonesia is its far eastern location at Tembagapura in Papua Indonesia, in a location that is east of Darwin in relation to shipping services.

Although the air distance to Cairns is more than to Darwin, it is not that much more. The combination of factors of:

- The buying base being in Cairns.
- Cairns' domestic and international connections being superior.
- Cairns R&R facilities being better.
- Cairns' range of air transportable goods and service personnel being superior

has won the Freeport services back.

The second thing that should be noted about the Freeport operation is its sheer size. It is the biggest copper and gold mine in the world. Value of production is about $6bn per annum. The operation involves mining and processing of about 300,000 tonnes of ore a day.

The company has a workforce and dependents of over 20,000.

It is also a permanent mine. The current mine has a further 35 years to operate and a vigorous exploration program is underway that is likely to see mining continue in the area beyond this time frame.

The scale and permanence of the operation means that workforce is permanent and not heavily on a 'fly-in' basis.

The workforce is almost entirely Indonesian including a program of employment of Papuans. Only 400 to 500 are expatriates. Increasingly, the project has on-site support facilities and specialist staff.

Given the sheer size of the operation however, it generates about 80,000 air passenger movements a year. It contracts with Airfast to handle much of this traffic, mainly through daily flights from Jakarta, through Surabaya and through Makassar.

Another factor that affects operations in the area is remoteness from other development and infrastructure. This applies to almost all mining in eastern Indonesia and PNG, except those mines close to major centres.

Compounding the remoteness factors are security fears in these areas that restrict travel to mines by vehicle from regional centres. It usually means that travel is direct into the mine area and travel is restricted to company or company approved personnel.

The aircraft that comes to Cairns is a 144 seat MD82 and mainly carries company personnel moving to and from the mine, contractor and service staff, and R&R traffic to Cairns.

The aircraft is leased by Freeport who in turn contracts with Airfast Indonesia to operate it. It carries only company traffic.

Although Garuda fly from various parts of Indonesia to Timika and there is a hotel at Timika owned by Freeport and operated by Sheraton, access to the mining operations is by invitation only.

Other Mines

By comparison, the other mining operations identified, are further west. Cairns' competitive position as a service centre vis a vis Darwin is poorer.

The possibility of using the shipping and air services from Cairns to Freeport as a stepping stone to servicing other Indonesian mines has been explored.

Airfast specialise in servicing mines and also has services to:

- Tangguh gas fields (where a 2 'train' British Petroleum LGG plant is almost completed),
- Gosowong (Halmahera) Newcrest Gold mine,
- Manado in North Sulawesi, a resort town, but close to Archipelago Resources' Toka operations is under construction at Tindung, and
- Balikpapan in eastern Kalimantan (Borneo) near to gold and extensive coal mining operations.

However, Freeport's policy is not to have non-company usage of its aircraft or its ship and possibilities of using Freeport as an access point into the Indonesian transport system is not possible unless Freeport changed their policy. Apparently, they have been approached to do this by various parties. Given their size and the fact that they can get full utilisation of their aircraft and ship, it is probably not worth the bother to them.

Possibilities of gaining dedicated shipping to the other mines seems slim. (The Chamber did have an unsuccessful attempt a number of years ago when the new Newmont BatuHijau mine was being established.)

Implications of the foregoing for a strategy include:

a) *Freeport is of significant importance to the Cairns' economy and especially to its role as a general cargo seaport and every effort made to ensure that it maintains Cairns as its Australian buying base.*

b) *There is a need to explore transport links to service other mines and centres in eastern Indonesia either through:*

- *convincing Freeport to allow non-company traffic on its sea and air services destined for other mines and centres.*
- *developing links via Darwin especially to those mines further west, perhaps in cooperation with the Northern Territory Government.*
- *developing direct air links into the Indonesian system, possibly via centres in Papua Indonesia that might include a tourism and general business element.*

However, unless evidence emerges that would suggest otherwise, it is suggested that this would be a low priority.

5.11 SOME OVERALL IMPLICATIONS FOR A STRATEGY

Implication for a strategy arising from the foregoing analysis by areas includes the following.

The study area can be divided into a series of zones of competitive advantage.

ZONE A Closest Major Centre

- Cairns Area.
- Peninsula Area.
- North West (north of Mt Isa).

Comment

Cairns dominates 'fly-in' services in this area except the area north of Mt Isa where land transport factors favour links with Townsville and there is some penetration of Townsville based air services.

Townsville services also penetrate into the southern part of the Cairns area. The Cairns area's competitiveness in this area, especially on the southern margins, can be enhanced by promoting the nearby Tablelands area as a workforce centre.

The strategy needs to be a regional one.

ZONE B Relatively Close, but not Closest major centre

- North West (Cloncurry and south of Mt Isa).
- Eastern Northern Territory.
- PNG.

Comment

Cairns competes in these areas against Townsville, Darwin and Port Moresby. Services are in existence to Mt Isa and to one of the mines south of Mt Isa. Cairns has long established links with Gove. Services to Groote have returned. Currently there are no services to the McArthur River.

In Papua New Guinea, services run into 4 mining centres and Port Moresby.

Cairns' competitive position throughout these areas is heavily linked to its superior air hub position and ability to attract traffic other than 'fly-in' workforce, including on-site worker R&R.

The massive construction projects in the form of LNG plants near Port Moresby have the potential to provide large scale opportunities during the construction period.

"Fly-in' services, especially to the NT and PNG mines but also to those in the north west face 'political' issues and there is a need for the Cairns region to have good relations with government structures in those areas.

ZONE C Relatively Close, but Mines Very Close to Another Major Centre

- Townsville/Charters Towers.
- Mackay region.

Comment

There are excellent air links with Townsville.

Possibilities of drive-in/drive-out to mines in this area from Townsville and Charters Towers and the relatively small size of mining in the area means that extra services ex Cairns to Charters Towers or the individual mines are not likely to be viable.

In the case of the Mackay region however, mining activity is much larger and growing rapidly. Most 'fly-in' labour is coming out of Brisbane to Mackay and via direct services to Moranbah. Cairns' current links are via Townsville and the possibility of direct links into Mackay could be looked at, including possible residential and visitor traffic from Mackay to link with international servicing from Cairns.

First step of gaining more direct access to Moranbah would be to establish a service from the north – Cairns/Townsville – Moranbah.

ZONE D Distant Mining Activity

- Darwin Area.
- Kimberley.
- Alice Springs, Tennant Ck, Tanami.
- Pilbara.
- Eastern Indonesia.

Comment

Cairns' potential competitive position in the Darwin/Kimberley area stems from it being closer as a source of supply than the major metropolitan centres including Perth. There are excellent services into Darwin and strong traditional tourism synergies with Darwin and increasingly with the Kimberley/Broome area.

Strategy in this area would be to encourage mines/labour supply firms to look to Cairns as an alternative supply centre to the major metropolitan centres.

Cairns has excellent air services into Alice Springs. Mining is not strong in the area and Adelaide is a competitive source, although developments in that State (Olympic/Roxby), are making heavy demands on existing supply of workforce in South Australlia. Strategy would be simply to draw attention to Cairns' proximity.

Cairns' competitive position in the Pilbara is not strong. However, the sheer size of demand in this area makes it of some interest to include in the strategy.

Cairns' superior international gateway, R&R strengths, and location of Freeport's Australian buying base has led to Cairns regaining air services to Timika. The strategy in Eastern Indonesia needs to be one ensuring Cairns holds on to Freeport's Australian buying base and of finding more direct transport routes into other mines in the area.

'Mega Hotspots'

It needs to be recognised that within this wider area are three current 'Mega Hotspots' that are requiring major growth in workforce and services in order of size.

1) Pilbara - The major LNG projects in this area add to an already high level of activity based on iron ore mining.
2) Central Queensland - On top of the major coal expansion in the Bowen Basin, a major new Galilee Basin is to be opened up with main links north to Abbot Point and a major expansion is taking place in coal seam gas and LNG plants.
3) PNG - The two and possibly three LNG projects to be constructed in PNG against a background of expanding metals mining sector.

Comment

The PNG 'Mega Hotspot' is close to Cairns in Zone B and represents a major opportunity.

The Mackay Central Queensland hotspot is in Zone C and must command attention.

The Pilbara is in Zone D and while the Cairns region is not in a good competitive position, opportunities may occur.

One of the basic points that needs to be recognised is that these 'Mega Hotspots' represent major vortexes dragging in workforce and other resources that will impact on the availability of workforce and resources for other projects scattered through the area and for some Cairns' businesses the best opportunities could arise from filling service voids to mining away from the 'Mega Hotspots'.

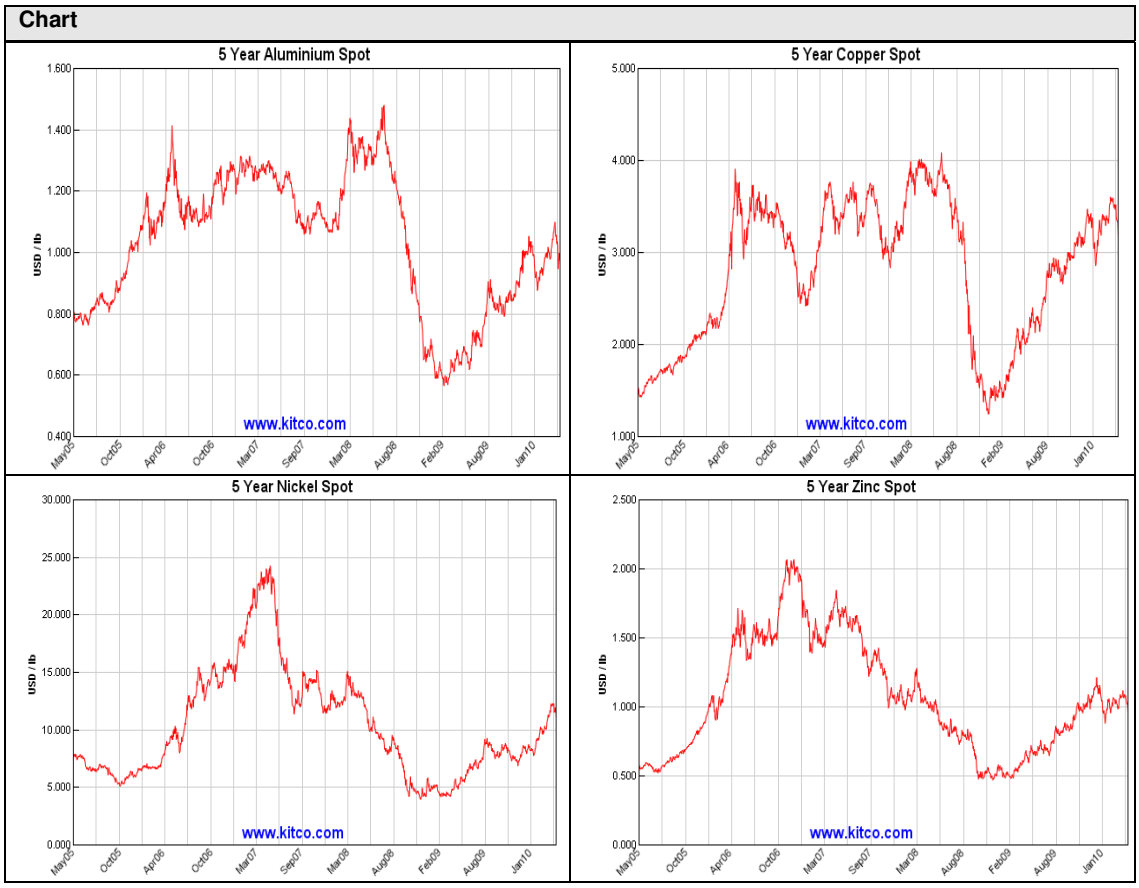
6. STRATEGY DEVELOPMENT

6.1 AN APPRECIATION OF CHANGES IN ECONOMIC & FINANCE CONDITIONS SINCE 2008

The dramatic changes in global economic conditions that have taken place since 2008 have had a major impact on the sector.

The 2008 study was carried out at the peak of activity and mineral prices just before the global financial crisis (GFC).

The following chart of copper and other metal prices illustrates the dramatic impact of the GFC on mineral prices with prices falling dramatically in the second half of 2008 but recovering somewhat in 2009 and generally plateauing in recent months.



Source: KITCO, May 2010.

The GFC had an immediate dramatic impact leading to the closure of some mines. Some of these have gone on care and maintenance and given better conditions seem likely to reopen.

Some of the operating mines reduced staff, but most in this category appear to have gone back to about former levels.

A number of the advanced projects were put on hold because of difficulties of raising finance and price uncertainty. The indications are that raising finance within Australia is still difficult, but we identified a widespread trend for corporations from China and India to become involved in ownership, partnerships and financing advanced projects.

All the indications at this stage point to the uplift in commodity prices and demand for minerals from Australia being sustained over the next decade and these developing overseas links have ramifications for international air services into Cairns.

Implications of the foregoing include:

a) *Cairns Airports Ltd needs to be alerted to the implication of likely increased movement of international corporate staff to strengthen viability of international air services into Cairns, especially, in the first place, from China via Hong Kong and from India via Singapore to mines in northern Australia and PNG.*

b) *The Department, Advance Cairns and the Chamber need to be alerted to this development in formulating their dealings with these countries.*

c) *A special exercise needs to be carried out to consolidate into one list the details of known overseas companies who have taken up interests in mining developments across the study area.*

d) *There is an issue to be addressed of the ease with which such staff can obtain visas to transit Cairns to mines in PNG.*

Numerous statements at national level indicate a belief that the continuing growth of the Chinese and Indian economies will see major expansion in demand for mining and industrial projects over the next decade and that massive workforce shortages are going to occur in the sector along with massive need for infrastructure development.

The majority of the workforce growth is likely to take place in northern Australia with two 'Mega Hotspots' of:

a) The Pilbara LNG projects in Western Australia adding to already high levels of iron ore and other offshore gas.

b) The Central Queensland Galilee Basin coal west of Emerald to be exported via Abbot Point and coal seam gas to supply LNG plants at Gladstone coming on top of the existing major coal mining activity in that area.

Added to this will be the further 'Mega Hotspot' of the LNG plants in PNG.

Apart from these 'Mega Hotspots', substantial development is shaping up to occur in:

PNG

- Papua New Guinea – especially on the northern side based on a range of metals and the north east islands area.

QLD

- Western Cape – around Weipa based on bauxite and kaolin.
- The Cairns' hinterland based especially on tin, wolfram, magnetite, nickel, copper, gold and possibly uranium.
- The Gulf area of the north west stretching across into the Northern Territory based on phosphates, copper, iron ore and uranium.
- The Mt Isa/Cloncurry based on base metals and possibly uranium.
- The Townsville Bowen area based on magnetite, gold and possibly uranium and the Abbot Point outlet for Mackay region and Gallilee coal.
- The Mackay hinterland coal and coal seam gas LNG projects.

NT

- Eastern Northern Territory area based on magnetite in the Roper River area adding to Gove bauxite and Groote.
- The Tennant Creek area – base metals.
- Darwin area onshore and offshore.

6.2 FUTURE DEMAND FOR MINING & INDUSTRIAL PROJECT WORKFORCE & THE CAIRNS AREA'S POSITION

In the northern Queensland regions, prospective increases in mining company workforce demand in projects in an advanced state and likely to come on stream in about a 5-year time frame has been estimated as follows compared with existing levels.

	Estimated Existing	Estimated Additional	Estimated % Increase
Cairns/Tablelands	500	800	160%
Peninsula	750	1,150	150%
Gulf	930	500 *	54%
North West	4,330	2,370 *	55%
Townsville/Charters Towers	650	500 *	77%
Mackay	10,000	5,000 (1)	50%
Total	**17,260**	**10,220**	**59%**

* *Note: Includes some uranium projects dependent on approval of uranium mining.*

(1) *Note: Does not include Galilee Basin and LNG plants.*

Source: Cummings Economics from industry information.

The two major LNG projects near Port Moresby alone are talking about an expatriate construction workforces need peaking towards 20,000 in this time frame. Other new mines are under construction or likely to be brought on stream in PNG.

Major expansion is likely in the Northern Territory on-shore and off-shore in the Pilbara and Kimberley regions in Western Australia and in Eastern Indonesia.

All the indications are that this expanding workforce need will be met increasingly on a 'fly-in' basis. The sector already struggles to attract major workforce and especially skilled workforce to mainly remote underdeveloped locations.

The research indicated that even those large long-term mines with a substantial local residential capacity were finding it difficult to attract staff and were having to turn to 'fly-in' workforce.

In recent decades, the mining industry has not been a large contributor to the Cairns/Far North regional economy. However, that has been changing rapidly.

By the early 2000's, the region had got down to a mining company employment of about 700. That has already changed to now be running at about 1,300. Kagara Zinc alone now employs over 400 within the region.

The indications are that new and expanded operations will take mining company workforce in the immediate Cairns/Tablelands/Georgetown area and the Peninsula up by almost 2,000 over the next five years or so.

A significant part of this increasing workforce demand will need to be met on a 'fly-in' basis.

However, as the 2008 report identified, the region is in a special position to meet wider needs for expanded mining and associated workforce demand across northern Australia and to the immediate north.

The Cairns/Far North Queensland region is now the most populous in the north, with the largest overall workforce (especially non-government).

In this wider regional context, it offers excellent lifestyle and service advantages for families and an ability to attract and hold population.

Cairns is the major air hub in northern Australia with a large, flexible and competitive aviation sector.

Although its own regional mining activity is not as strong as some other regions, it is located in a strategic position to service mining activity in northern regions of Queensland, Northern Territory, Papua New Guinea and across to Western Australia and Eastern Indonesia.

Not surprisingly, this has already given it a significant role in providing air services to service mining activity in this wider area.

The region has already expanded its role in this field.

There are good reasons why the Cairns/Cassowary Coast/Tablelands area can and should continue, and in fact, accelerate its pursuit of an expansion of this type of employment opportunity.

It can pursue this type of employment opportunity:

3) Because of the size of its population and workforce, and its desirability as a place to live in the context of northern Australia.
4) Because of its strategic position and airport hub role.

It should pursue it:

3) As an opportunity to continue the diversification of the regional economy.
4) Especially over the next few years, at a time when there are negative pressures on tourism and local construction activity.

To achieve success in expanding its role in this field, there will be a number of avenues that will need attention that both come out of the area's relatively low level of recent mining activity, including:

a) Workforce development and training.
b) Marketing to overcome perceptions about the size and suitability of workforce available from the region.

A successful program of promoting 'fly-in' activity could see total employment in mining within the region conservatively rise to about 8,000 composed of about 3,000 at mines within the region, and the 2,000 currently flying into mines outside the region rising by an additional 3,000.

6.3 SUPPLY SIDE & TRAINING ISSUES

As the 2008 report found, there is some truth in the perceptions that Cairns was not a suitable centre for recruiting mining workforce, that its workforce (especially its tradesmen). have limited mining experience and come from farming, fishing and tourism backgrounds rather than mining and heavy industry backgrounds.

As commented on below, this common perception grossly overstates the position.

However, it underlines the importance of a concerted effort to continue to make workforce not previously engaged in the industry, mining industry ready.

At State level, the Mining Industry Skills Centre is addressing issues of mining training and the Australian Mining Industry Council supports the ARAMS (Australian Regional Agricultural and Mining Skills) program.

At the Commonwealth level, the need to address the question has been recognised through the Taskforce led by Gary Grey MP, who recently visited Cairns. It will be important to maintain contact with and influence outcomes.

The local TAFE has raised its involvement in this field and this needs to continue.

Private training takes place through organisations like Dawson's Engineering and Australian Drilling Institute (ADI), and there are some private individuals involved in specialist fields.

Various suggestions were made in the course of the survey ranging from adult apprenticeships in the field through to development of a full Mining School.

One avenue to develop training in the area for plant operators would be to have simulators located in the area. Consultation with major equipment suppliers indicates that entry level simulators are anywhere between $8,000 and $30,000 and some mining companies have simulators costing up to about $500,000. It is believed that simulator capacity is to be installed at the new Marine Training College being established in Cairns. It is suggested that the possibility be looked at of extending this to meet the needs of the mining industry.

There is a special opportunity developing to train workforce from remote indigenous communities. Companies like Century have moved a long way in this direction.

There is a massive need for training of PNG Nationals at a range of levels for mining related activities. This represents a major opportunity for Cairns' TAFE and University to play a role in meeting this need.

The expected development of mining and related aviation services in the study area is likely to continue to underpin a need to expand the demand for courses offered by the Cairns Aviation Skills Centre located in Cairns.

6.4 POTENTIAL AIR SERVICES

We observed in Section 3.5, aviation capacity based at Cairns Airport is superior to any other centre in the north and that there is a suitable range of existing operators who are willing and able to respond to expanding mining industry service requirements across the study area. There seems to be no need for any special action to build up or attract aviation capacity. In fact, events since 2008, have attracted additional players in the form of Alliance expanding its operations from Townsville to Cairns and Qantas Link entering the market with services to Ernest Henry and services to Port Moresby.

Papua New Guinea

The need for a major expansion of capacity on the Port Moresby route has been happening with the entry of Qantas Link onto the route. Potential additional direct mine services to be explored are Kikori/Kopi as a base for the pipeline project and Oil Search (Elk in the Eastern Gulf), Solwara (Rabaul), Ramu Nickel, Simberi, and Alotau.

The congestion occurring at Port Moresby airport and the likely development in the Lae area of Ramu Nickel, Yandera, Wafi Golpu and with Hidden Valley now on stream increases the case for Lae airport to achieve international status.

Peninsula

Additional services are likely to develop over time to cater for Weipa expansion. Direct services are likely to become viable to Mapoon (Pisolite Hills) and Skardon River.

North West/Eastern NT

Gemco at Groote had called tenders ex Cairns to service their mine expansion in 2008. These are now in place.

Although McArthur River/Cairns services have ceased, contact needs to be retained with the company as the policy of drawing exclusively ex Darwin may not be able to be sustained.

There are existing services to Century. The potential new mines in the Gulf area represent a major prospective target. Prospective additional direct services to North West Queensland mines include reinstatement to Mt Gordon and Mt Cuthbert and as they come on stream Dugald River, Lady Annie/lady Loretta, Rocklands (either direct or via Cloncurry), Eloise and Ivanhoe. Of the mines south of Cloncurry, services have been achieved since 2008 to Cannington. Osborne and Phosphate Hill might be encouraged to establish Point of Hire ex Cairns and establish direct services.

There is a need to continue to support Skytrans' Cairns/Mt Isa services.

Cairns Area

New charter services could develop into the Georgetown area to Einasleigh (Copper Strike) and Agate Ck/Kidston area (Renison).

Mackay Region

The Cairns area needs to explore the possibility of achieving direct flights into Mackay to provide a route for 'fly-in' workforce but to enable Mackay businesses to access PNG via Cairns and direct to Moranbah and Emerald.

Outer Area

Mining development in the Alice Springs and Tennant Ck area could have the potential to increase traffic on existing Cairns/Alice Springs flights. Nothing prospective seems big enough to generate direct flights at this stage.

Mining development in the Darwin area, Kimberley region and Eastern Indonesia has the potential to generate additional traffic on Cairns/Darwin Flights.

The massive demands of the Pilbara have the potential to increase traffic on Cairns/Perth, Cairns/Ayers Rock/Perth and Cairns/Darwin/Port Hedland/Karatha flights. Recent moves by major project companies to recruit workforce ex Cairns could provide the basis for direct services.

Cairns has an interest in seeing better service links into Broome and the Kimberley region via Darwin.

The possibilities of developing further links with mining and other centres in Eastern Indonesia, especially Papua Indonesia, need to be explored with local and possibly Indonesian aviation operators.

6.5 POTENTIAL SHIPPING SERVICES

It is clear from Section 4 that a range of opportunities exist for the development of shipping services related to mining:

- For delivering regional bulk mining output to markets.
- For containerised mineral cargoes to underpin new direct container shipping services to China.
- For delivery of inputs to mines in the wider region serviced by Cairns, especially in PNG and the Gulf area.

It is clear that if the levels of possible mineral production within the region are to be achieved, there needs to be a major emphasis on transport infrastructure, not just in upgrading and developing new ports but on the land transport infrastructure to ports.

Just as Cairns' airport was becoming a major bottleneck during the 1970's to the development of tourism and its redevelopment opened the way for the major tourism growth that took place subsequently, the region will not realise full potential benefits from the current mining expansion unless it recognises and addresses the following major infrastructure needs.

- Upgrading Cairns Port to handle shipping of inputs direct to PNG and containerised mineral exports to Asian markets, especially China.
- Upgrading Mourilyan to handle bulk mineral exports.
- Developing new ports at Skardon River, Port Musgrave, Boyd Point and Burketown.
- Upgrading the Cairns to Chillagoe and Forsayth railway line to take bulk and containerised minerals.
- Upgrading the Palmerston Highway to at least take Double road trains, the Kuranda Range road to at least take B Doubles, and sealing the road link from Almaden to Mt Garnet.
- The sealing of the Peninsula Road to service what could be a $1bn a year mining province in the future.

The railway especially needs to be looked at. It was built to meet the needs of the last great global boom in demand for minerals as Europe and America industrialised in the late 1800's and early 1900's. It is now 'third world'. Ways of overcoming constraints of heritage listed tunnels or using containers that have been canvassed include:

- = Use of half containers.
- = Use of low load wagons (such as used to carry double containers elsewhere).

In relation to shipping services of inputs to mines in Cairns' wider service area it is noted that:

- As in the aviation field, there are existing service providers based in Cairns operating in a competitive environment and willing and able to take up opportunities (although crossing international borders into PNG pose some problems).
- Ports North have initiated studies into the feasibility of developing services to PNG.

It is also noted that Asian based shipping companies have expressed interest in calling at Cairns.

It would seem appropriate that feasibility studies be undertaken into the development of container services to Asia/China.

6.6 CORPORATE SERVICES

Developments since the 2008 report, and especially the go ahead for the LNG plants, have emphasised the potential for Cairns to develop as a corporate hub for the mining and mining services activity in the wider catchment area:

- For administrative services in relation to mining throughout the wider service area.
- For coordination of workforce supply to mining projects throughout the wider service area.
- For supply of mining inputs both by air and sea into mining projects throughout the wider service area.
- For delivery of a myriad of services like exploration, drilling, supply and servicing of equipment, financial and insurance services.

The region is already the location of offices for Kagara, Cape Flattery and Skardon River and a number of smaller mining companies operating in the northern Queensland area, PNG related companies, Interoil and Barrick and the long standing Freeport operation servicing their mine in Papua Indonesia. Total corporate office staff are probably in the range of 150 to 200.

Cairns' advantages lie in:

1) Services and lifestyle.
2) Global and regional airlinks.
3) Its position as the northern terminus of the relatively efficient Australian east coast road and rail network and proximity to mining mines located to the north.

It also has advantages on the shipping side at present of its existing port infrastructure being relatively uncongested and underutilised.

Many of the corporate offices and supply bases that deal with mines to the north of Cairns have corporate offices and supply bases in Brisbane and the State Government could well adopt a policy of encouraging them to decentralise and shift further north.

A focal point for corporate offices for mining in Australia is Perth. The increase in mining in PNG along with recent announcements of increased air services between Perth and Cairns provides an opportunity to interest Perth based mining companies, but also many of the firms delivering associated services in Cairns as a gateway to PNG, but also as a possible base for providing services to the wider area.

Other international and national companies, especially those entering fresh into the area, should be targeted. As noted in a previous section, Chinese and Indian involvement in mining in the wider service area is increasing and apart from a possible implication for air services, possible future corporate office links might be explored.

In the process of research, it was found that many of these 'new players' still harboured the small 'tourism town' perception of Cairns with little appreciation of its current and potential future role in the mining sector.

6.7 MARKETING THE REGION

6.7.1 General

The activities of the Cairns Chamber of Commerce's Resources and Industry Taskforce and the contacts with the sector made through the research in 2008 and more recently, have clearly had an impact in raising an awareness of Cairns as a potential source of workforce and to some degree other services among existing mining operations in Cairns' wider service area. The State Government's recent PNG initiatives have also assisted.

However, it is important to recognise:

- That company personnel change.
- That new projects and players are coming into the area and that the misconceptions about Cairns and its potential in the mining sector are deep and widespread.

This report also suggests an opportunity to move beyond the development of the Cairns region as a location for 'fly-in' workforce alone. Although promoting 'fly-in' workforce and services needs to remain the core of any marketing effort, there are opportunities to expand the initiative to:

- Reinforcing the development of mining within the region.
- Paralleling air services with shipping services to key markets.
- Attracting corporate offices/bases to the region.

It is thus recommended that the marketing effort be broadened to include:

a) The Cairns region as a base for 'fly-in' workforce – key targets are mine managers and HR managers.

b) The Cairns Region as a supply base – key targets are mine managers and purchasing/logistics staff.

c) The Cairns Region as a corporate base – key targets company head office management.

There is a need as a subset of (a) and (c), to have a program to market Cairns as a place to live.

There is a need as a subset of (b) and (c), to market Cairns as a base for shipping services to parallel air services.

There is also a special need for regional organisations to market the opportunities to government. A major breakthrough has occurred especially through the State Government becoming heavily involved in the PNG initiatives.

There is a need for regional organisations to market the opportunity to both the State and Federal Governments and especially the critical need for infrastructure upgrading to support

- development of mining opportunities within the region, and
- shipping services to supply inputs from the region into mining operations in Cairns' wider service area.

6.7.2 Primary Area of Engagement

Area of primary engagement needs to be in the arc of five major contiguous areas around Cairns (see **Map 14**).

Local mining companies in the Cairns area

Aus IMM (Australian Institute of Mining and Metallurgy) provides a focal point for these mines and mining personnel in the area to meet together. It represents a potential special engagement point with the local industry in the Cairns area.

Local mining companies need to be engaged in relation to marketing to government the infrastructure needs of the region.

Some without offices in the region are becoming so heavily involved in the region that the advantages of establishing corporate offices should be presented (eg. Metallica).

Peninsula Mining Companies

Cape Flattery and Skardon River both have offices in Cairns and can almost be treated with the local company group.

The lack of close engagement between the Cairns' business community and Rio Tinto is still a matter for concern. It is suggested that at an appropriate time, Rio Tinto Weipa be asked to present its future plans to a Chamber luncheon or some such event.

North West Qld Mining Companies plus those in the Eastern Northern Territory

This still needs to be the major area for marketing of Cairns as a 'fly-in' source of workforce. In this area, Cairns faces competition out of Townsville and Darwin. There are new players coming into the area that need special attention. The possibility of extending port development and shipping services to the Gulf area needs to be part of the engagement. Congestion developing on the Townsville railway and the port is a positive to this occurring.

The Mackay Region/Townsville Charters Towers Area

The Townville/Charters Towers area seems unlikely to generate a demand for 'fly-in' services ex Cairns, although some Cairns' workforce might find jobs in that area.

However, the Mackay region coal fields' requirements are so large and with such a large workforce expansion underway that they could be a future area for workforce sourcing out of Cairns. They have a second attraction. The area has a reputation for taking 'green' workforce. It can be used as a stepping stone into other areas.

Papua New Guinea

Marketing in this region needs to be targeted at two levels:

1) The major short-term opportunity provided by the construction of the two large LNG projects at Port Moresby.
2) The other existing and new mines coming on stream. The need to address this by the sub regions is set out in Section 4.9.

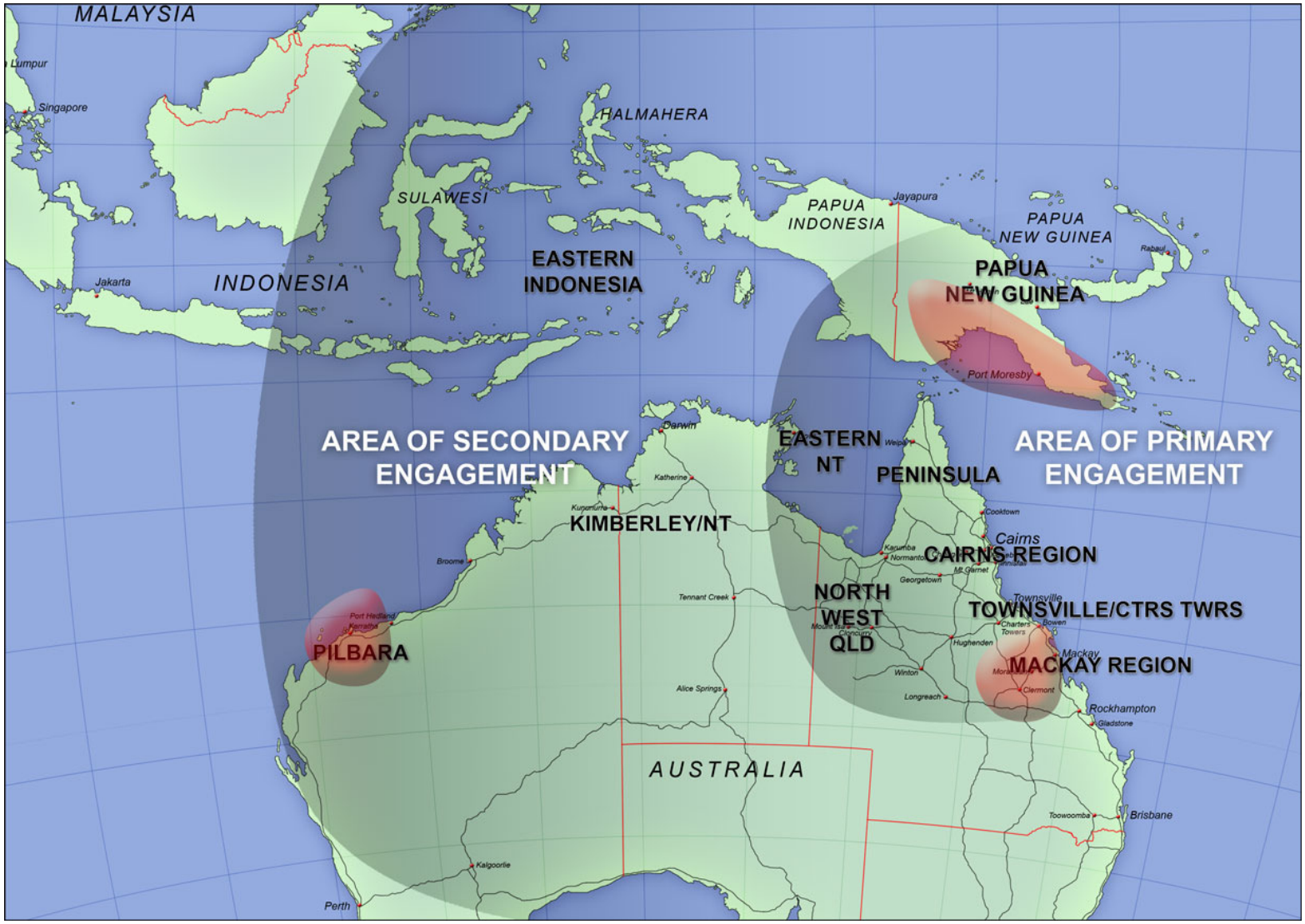
The Working Group set up between the Department, Chamber of Commerce, Advance Cairns, and Ports North needs to continue and include Cairns Airport.

Apart from workforce location, marketing needs to be aimed at:

a) Achievement of direct shipping.
b) Corporate office and supply bases.

The State Government needs to be encouraged by regional organisations to continue its interest in promoting Cairns as a service hub for PNG.

Map 14 – Areas of Primary & Secondary Engagement



Source: Cummings Economics.

6.7.3 Secondary Area of Engagement

Marketing to the other mines covered in this report falls into three areas:

1. Indonesia.
2. Northern Territory/Kimberley area.
3. Pilbara.

Marketing in this area is of lower priority (except for Freeport Indonesia) and tends to be one of simply drawing attention to the possibility of the area as a supplementary supplier of services and providing information to Cairns' based mining services providers about developments occuring that might be of interest.

Indonesia

As recorded in the 2008 report, the key marketing requirement is to look after and hold on to Freeport's Australian buying base in Cairns and if possible convince them to allow the use of their existing air and sea services as a stepping stone into other Indonesian mines.

There are severe limitations in the type of 'fly-in' services that might be supplied out of Cairns.

Some material sent to the other mines in the area could be aimed at just placing the Cairns area 'on their radar screen' as a back up to services offered out of Darwin and with a heavy emphasis on R&R and wider air connections from Cairns.

The main emphasis in establishing contact with these mines needs to be to find ways of getting more direct transport access.

Northern Territory/Kimberley Area *(excluding Eastern NT mines)*

As recorded in the 2008 report, in the Alice Springs and Tennant Ck area, it would be more a matter of keeping an eye on any developments that might be of a scale that required substantial 'fly-in' of workforce. If this occurred, such mines might be treated in a similar way to the eastern Northern Territory mines.

In the Darwin/Kimberley area, marketing should simply be aimed at drawing attention to Cairns as a potential supplier of workforce supplementary to Darwin and closer than the southern metropolitan centres.

There is a need to engage with the Northern Territory government and industry.

Pilbara

This area is of interest simply due to the sheer extent of demand and possibility of using it as a stepping stone for 'green' workforce.

The objective of marketing in this area would be simply to draw attention to Cairns as a potential supplementary supplier to Perth, that is in a quite good flying distance range compared with the major eastern metropolitan centres.

6.7.4 Other Action

One of the key on-going requirements if a marketing program is to be sustained is to recognise that this is a very dynamic and changing industry. The changes since the 2008 report have been large and even during the course of this study, changes in corporate structures, personnel and plans were challenging to keep up with.

There is a fundamental need to have an on-going program just to keep breast of developments taking place. The existence of the "*Mining Advocate*" is very helpful in relation to northern Queensland and the Northern Territory. The publication "*PNG Resources*" fulfils a similar role for PNG and needs to continue to be subscribed to. However, resources need to be devoted to just keeping well informed about what is happening in the sector. It is recommended that funding be sought for this.

7. ACTION PLAN

7.1 POLICY

The Cairns Chamber of Commerce representing the Cairns region's business community, Advance Cairns and DEEDI need to continue to:

- ❑ Recognise that development of mining in the region and 'fly-in' and other services to mining throughout Cairns' wider catchment area represent an opportunity over the next five to ten years to expand the region's economy, and
- ❑ Pursue a major program aimed at expanding the area's capabilities and participation in this field.

7.2 ORGANISATION

7.2.1 Continuation of Taskforce

The Cairns Chamber of Commerce needs to continue its Resource and Industrial Taskforce initiative with a key focus on marketing the Cairns' workforce location but to work with Advance Cairns and the State Government to establish special working groups:

- On PNG (existing)
- On corporate office attraction.
- On shipping development (with Ports North).
- On infrastructure needs in the region.

7.2.2 Funding of Additional Staff Capacity

The Cairns Chamber's funding of staff capacity in this direction needs to be supplemented by funding of staff capacity by Advance Cairns and the State Government.

7.3 MARKETING CAIRNS AS A SOURCE OF 'FLY-IN' SERVICES

7.3.1 Engagement with Key Staff

There are a few key staff in each mining/industrial operation who are mainly responsible for decisions about where to source services from.

The Chamber's program of engaging with and educating key staff by bringing them to Cairns for the Amateurs Racing Carnival and other special events are highly effective and needs to be continued.

7.3.2 Industry Conferences & Trade Shows

The Chamber's participation in these is also effective and raises the area's profile, especially if it is a team effort with local supply firms coordinating their efforts under the Chamber banner. (TTNQ has been effectively taking this approach for the last 30 years in tourism promotion.)

7.3.3 Marketing Material

The Chamber has already attended to producing basic brochure material and DEEDI has developed material especially for PNG. This needs to be extended as necessary in other directions.

7.3.4 Media Material

This report will again help provide material for media generation. Media material needs to be continuously targeted at:

a) Local media briefing and stories.
b) Mining trade press.
c) General media in target areas and nationally.

It is recommended that discussions be initiated with the Cairns Post on the means of achieving a greater flow of information about opportunities in the field to local businesses and the community in general.

It is desirable to also set up a capacity to sustain media stories aimed at increasing the pool of mine workforce (see Section 7.4 below).

7.3.5 Government/Regional Relations

As in 2008, there is a need for a good relations program with the Papua New Guinea Government and Northern Territory Government through bodies like the Australia Papua New Guinea Business Council, the new Office of Northern Development, and Queensland Government/Northern Territory Government liaison arrangements.

7.4 SUPPLY SIDE & TRAINING

7.4.1 Training

The Chamber and others need to engage with the education and training sector (private as well as public) with a view to quickly ramping up the region's effort and capability in this field relating to supply of mining workforce and taking opportunities to provide training especially in PNG.

7.4.2 Attracting Workforce to Cairns

The main thrust of the marketing/media effort (see 7.3.4 above) should be to highlight Cairns as an area of increasing job opportunities in this field.

7.5 CORPORATE ATTRACTION

7.5.1 Target Material

Presentation material should be developed to target mining and other service companies identifying the extent of mining corporate presence in Cairns and inviting those companies to consider setting up offices in Cairns.

7.5.2 Target Areas

Marketing efforts need to be targeted especially at companies in Perth and Brisbane. The need for contact with mining companies from China and India needs to be included with any general contacts being planned.

7.6 TRANSPORT SERVICE PROVIDERS

The aviation sector and shipping companies based in Cairns have the capacity and will to react to opportunities presenting themselves in this field. It will be of value to inform them of the results of this study and keep them informed about developments taking place in the industry. The development of links between Cairns and mining operations throughout the target area stands to assist in the development of new air and shipping services from overseas into Cairns and this opportunity needs to be recognised and form part of the promotion of such services by Cairns Airport and Ports North.

7.7 INFRASTRUCTURE NEEDS & DEVELOPMENT OPPORTUNITIES

7.7.1 Infrastructure Need Identification

Companies in the Cairns, Georgetown, Peninsula region and the Gulf and North West Queensland area are looking for support in having infrastructure developed, including road, rail, port and power. There is a need to build on this study to engage with the relevant mining companies to ascertain their requirements and help focus attention on their needs.

7.7.2 Achieving Infrastructure Investment

There is a need for studies to be carried out and business cases prepared on the infrastructure needs of the region to support its response to mining opportunities for presentation to the State Government and Infrastructure Australia, especially in relation to Cairns and Mourilyan seaports, the Palmerston, Kuranda Range, Gingerella and Peninsula Development Roads and the Cairns – Forsayth railway line.