

Pilbara Karratha

Regional HotSpots Land Supply Update

December 2010



Karratha

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Department of
Planning

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1 Executive summary

1.1 Context

Karratha was established in 1968 on the central coast of the Pilbara region, 1557 kilometres north of Perth and 240 kilometres south-west of the region's other major town, Port Hedland. Karratha's genesis was the need for a centre to service and accommodate iron ore mining company employees working in the Hamersley Ranges inland, as well as on the freight rail and the port facilities at Dampier. Another major wave of growth in the 1980s, driven by the North Shelf West Venture, boosted Karratha's role as a service centre for on and off-shore oil and gas facilities. Renewed investment in resource projects during the 2000s, again boosted Karratha's role as a major service and administration centre. Recent development in the suburbs of Tambrey, Nickol and Baynton has accommodated significant residential growth since 2006. Today Karratha is home to an estimated 14 000 residents, and provides services to an estimated 4000 - 6000 fly-in fly-out (FIFO) workers.

In November 2009, the Western Australian Government announced its Pilbara Cities vision to build on the resource boom to improve life in the Pilbara and turn Karratha and Port Hedland into diverse, 21st Century cities. This report is a component of the essential planning process to enable that vision, pinpointing what is being done, what needs to be done and the constraints that have to be overcome if the town is to grow into an attractive new era Pilbara City.

This report is one of a suite of Regional HotSpots that focus on areas of the State most impacted by changing economic and social conditions. They are prepared for the Infrastructure Coordinating Committee (ICC) of the Western Australian Planning Commission (WAPC) by the Department of Planning (DoP) with contributions from the ICC agencies. The HotSpots inform on availability of land for future residential, industrial and commercial uses and identifies the planning and infrastructure coordination needed to meet demand.

1.2 Key points

- Population growth, serviced land, housing scarcity and constrained infrastructure are among Karratha's greatest current challenges.
- The limited capacity of Karratha's infrastructure is imposing critical constraints on residential, industrial and business growth, although major upgrades are in progress or planned.

Economic outlook and business investment

- Karratha is at the centre of some of the world's richest resource deposits of iron ore, natural gas and oil. This drives major business investment in mining, processing and transport infrastructure to feed export and domestic markets. Karratha acts as a hub for accommodation, goods and services supporting the construction and operational phases of those capital investment projects, requiring additional residential, industrial and commercial land.
- A round of massive investment in the 2000s to increase the throughput capacity of existing operations and to open up new resources, meant a corresponding increase in demand for developed land and infrastructure. Throughout the challenging economic conditions of the Global Financial Crisis, the committed investment projects maintained strong direct employment and wages in the town. This project investment also has considerable multiplier effects for ancillary employment, goods and services. Many of the projects currently under construction are scheduled to be commissioned during 2010 and 2011.
- Iron ore royalties which have been the backbone of Western Australia's economy for over forty years will increase as a result of many of these business investments which enable the export of significantly greater tonnages.
- The positive economic outlook for commodity demand and prices may trigger a new round of expansion as long as there is access to investment capital.
- As projects move from construction to operational phases, workforces are likely to shift from a predominance of FIFO employment to higher levels of resident workforces, which will maintain pressure

for additional residential land and housing. Business decisions regarding the mix of FIFO and resident employees are therefore critical to determining the impact on land and housing demand.

- Attracting and maintaining workers will remain a high priority in Karratha for the medium-term. Incentives such as housing and social amenity will be an essential part of keeping key workers in the town. Normalisation of Karratha will potentially offer additional opportunities for business investment.

Employment and wages

- Estimates of resource related employment for Karratha are highly variable, due in part to the volatility of resource sector investment, and are exacerbated by difficulties accessing projected employment numbers from resource companies due to commercial confidentiality.
- Government and industry projections show that even after taking the Gorgon project into account, the Pilbara's construction employment is likely to peak at approximately 28 000 in 2012, and decline as the capital investment phases of these projects is completed. Resource companies indicate that this may be a sharp decline across the region with a loss of around 25 000 workers over six years representing nearly 90 per cent of the current construction workforce. However, the actual rate of this decline will depend on whether resource companies commit to new investment on projects that are currently under consideration. These industry estimates may be overly conservative as a number of resource companies reported only construction employment for new and existing projects that are at an advanced planning or approvals stage, and excluded the more speculative projects.
- In contrast, operational, maintenance and service employment will increase. The 2010 Pilbara Industry Community Council (PICC) data indicates that the Pilbara region's resource related employment (excluding construction workers) is projected to grow from 31 000 in 2010 to 47 000 in 2015, and reach 54 000+ by 2020. Figures include residential employment increasing

by 28 per cent over the period 2010 to 2015, and FIFO employment increasing by 83 per cent between 2010 and 2015, and by a further 23 per cent to 2020. Increasing operational, maintenance and service employment related to resource projects will underpin demand for local housing, depending on the proportion of workers who are resident versus FIFO.

- The Pilbara region has a large number of transient workers (including FIFO) who are not included in estimates of the resident population. This group accounts for a significant proportion of the population in many Pilbara towns, adding approximately 10 to 25 per cent to the resident population. The PICC data suggests that the contribution of FIFO workers to the total resource related employment will increase over time, from 49 per cent in 2010 to more than 61 per cent of total resource related employment in 2020. This larger component of FIFO workers is an increase over 2008 figures.
- Resource related employment in Karratha has also resulted in a highly competitive market for skilled construction workers. This has created labour shortages in the local housing construction industry, contributing to the high cost of housing. There is also a shortfall in employment in the tertiary (service) sector; particularly health care and social assistance occupations in comparison to Perth.
- Compared to Western Australia as a whole, Karratha has a relatively large number of residents on very high incomes. Few Karratha households are in the State's middle-income bracket.
- Income disparity between those who are, and those who are not, employed by the resource companies is having a direct affect on housing affordability. Growing numbers of people outside the resource industry are finding Karratha housing difficult to afford. Karratha is in critical need of affordable accommodation to house employees in the retail, hospitality, tourism and general service sectors.

Population

- The Shire of Roebourne had an estimated resident population of 18 828 persons in June 2009 (based on Australian Bureau of Statistics estimates), and recorded an average annual growth rate of 2.8 per cent over the period 2004 to 2009. Karratha accounts for more than 71 per cent of the shire's population, and had an estimated resident population of 13 435 persons in June 2009. The Pilbara Industry's Community Council (PICC) estimates a total service population of 29 391 persons for the Karratha/Dampier/Burrup/Roebourne locality by 2015.
- The population structure of Karratha differs from the rest of the state: there are more young people, more males and less elderly persons than the state average. Karratha's population is also more mobile, and many Karratha residents have either moved to different addresses within the same statistical local area or had moved from other parts of WA within the last 5 years.
- The WAPC, in its role as State demographer, has endorsed the use of the population projections prepared by the PICC by all agencies for forward planning in the Pilbara. PICC estimates a resident population of 16 282 for the Karratha/Dampier area by 2015.
- Population growth in Karratha has traditionally depended on the investment cycles for major projects and has generally stagnated when there has been no new construction. Pilbara Cities vision is a departure from project-led population growth to a policy-led position to normalise Karratha and will require significant Government intervention to achieve aspirational growth targets. The Pilbara Cities vision targets a population for both Karratha and Port Hedland of 50 000 people by 2035, which would require each centre achieving an annual average population growth of 4 to 5 per cent maintained over the next 25 years.

Zoned land

- There is currently more than 1160 ha of undeveloped land zoned for residential/urban uses in the Karratha area. Most of this land is located south of the Karratha Hills (840 ha) and requires significant infrastructure investment for development to proceed. Recent consultation for the Pilbara Cities growth scenario shows a community preference to keep Karratha's development north of the hills and conceptual plans indicate it is possible to accommodate the target of 50 000 people without having to develop any of the already zoned land that is south of the hills. Land will need to be developed at higher minimum densities if this target is to be achieved.
- An additional 1156 ha has been identified for potential future residential development in the draft *Karratha City Growth Plan* (areas not currently zoned residential or urban development).
- As at June 2010, there was approximately 61 ha zoned for commercial, retail and mixed business uses in Karratha, of which approximately 5 ha was undeveloped.
- There is 276 ha of undeveloped industrial zoned land in Karratha, with 362 ha identified as developed.

Subdivision approvals

- At 30 June 2010, there were more than 511 residential lots with conditional approval for subdivision. A large portion of these lots will likely reach final approval stage in the short-term, improving the supply of residential lots to the market.
- Analysis of the residential land development pipeline data reports a current lack of subdivision applications at the application stage, indicating a potential shortfall of lots (beyond Baynton West lots) flowing through the pipeline to final approval stage in the short-term. Subdivision applications for developments at Madigan Road and Nickol West are likely to be lodged before the end of 2010.

- Over the last 10 years, Karratha has experienced relatively low levels of industrial subdivision activity, although activity has increased sharply in the last two years. There were 124 industrial lots with conditional approval for subdivision at 30 June 2010.

Residential land and housing demand

- There is a backlog of unmet land and housing demand from the previous investment boom and during 2009 only 229 new houses and 18 other residential dwellings received building approval - well short of meeting the potential demand. On a positive note, a large number of residential building lots are currently under construction (Baynton West) and will reach the market in the short-term.
- The housing shortage means house prices will remain a major challenge in the short-term. While residential land prices during 2009 were less than those recorded in metropolitan Perth, Karratha's median house price was significantly higher. In December 2009 the median house price was \$716 500 compared with Perth's \$455 000. This can be attributed to increased demand and constrained supply.
- Scarce housing limits diversity in the economy, the ability for private and public organisations to provide services and the opportunity for the towns to develop mature, functioning housing and labour markets. In Karratha this causes a high turnover of workers and the displacement of lower-income households from town.
- The volatility of house prices acts as a disincentive to prospective longer term residents, and investors from making a financial commitment to living or investing in Karratha.
- There is a critical need for a more diverse range of housing in the region including more affordable accommodation for service workers (to support the retail, hospitality, tourism and general service sectors) and increased levels of medium and higher density dwellings.
- Developing and selling residential land does not have an immediate effect on increasing housing supply due to dwelling construction delays.

- Building costs experienced in the Pilbara region are significantly higher than that of the Perth metropolitan region. This is due to a number of factors including a lack of competition, distance and freight costs and high labour costs as a result of labour shortages. The availability of house and land packages is likely to increase in the short-term.

Land release

- Residential land and housing releases likely to become available in the short-term include the remaining stages of Baynton West, Madigan Road, Tambrey Primary School surplus land and the Tambrey Mixed Use Precinct. Analysis indicates that more than 1000 lots/dwellings will become available to the market in the short-term (0-2 yrs) and an additional 4500 dwellings over the two to five year period. The release of land and dwellings will be subject to demand and resolution of a number of planning, environmental and servicing issues.
- The private sector is expected to become increasingly involved in land and housing development in Karratha, with the release of a number of development superlots via expression of interest processes.
- Assuming an unmet demand of approximately 1500 dwellings, supply of housing is not expected to meet demand until 2013 to 2014. Areas identified in the *Karratha City Growth Plan* are expected to easily meet dwelling demand if developed in the timeframes reported.
- Demand for general and light industrial land is expected to be met in the short to medium term with the development of the Gap Ridge Industrial Estate. Additional sites have been identified in the *Karratha City Growth Plan*, which should cater for demand into the future.
- Additional retail and commercial floorspace will be required in Karratha under medium and Pilbara Cities growth scenarios. Recent planning work suggests that this demand could be met through sites identified in the *Karratha City Centre Master Plan* and *Karratha City Growth Plan*.

- There is strong demand for development of additional tourist accommodation facilities in Karratha, with very high occupancy rates currently being recorded. There are a number of projects in the planning stage that will offer additional short-stay accommodation. Provision for additional accommodation facilities has also been identified in the *Karratha City Centre Master Plan*. Continuing demand for residential and transient workforce accommodation will influence the availability of rooms for short stay purposes.

Infrastructure

- Major upgrades to utility infrastructure are on the critical path to ensure growth can be serviced beyond 2010. Limitations in infrastructure capacity currently constrain residential and industrial growth.
- Substantial residential and industrial growth forecasts for the area indicate that the existing water allocation may be reached within the short-term. The Water Corporation is currently undertaking water source planning for the West Pilbara scheme, and is considering several options including alternative groundwater sources and a seawater desalination plant on the Burrup Peninsula.
- The current capacity of wastewater treatment plant No. 1 (Mulataga) is likely to be sufficient in the short-term. The capacity of wastewater treatment plant No. 2 (Gap Ridge) has some spare capacity, but its operation is limited by the capacity of the treated wastewater storage and disposal system. The location of wastewater treatment plant No. 2 limits further expansion of this plant, given conflicting land uses in the area.
- Horizon Power's load in the Pilbara has grown significantly in recent years. The current demand supply balance is becoming increasingly tight and does not cater for expansion in the region. Horizon Power is presently evaluating a range of options to procure this capacity.
- Distribution networks may also need upgrading if there are substantial increases in density within existing suburbs, such as those proposed in the *Karratha City Growth Plan* and *Karratha City Centre Master Plan*.

- Limitations to the supply of and access to, sufficient quantities of basic raw materials increases construction costs and may potentially pose a constraint to some developments.

1.3 Regional HotSpots and the Urban Development Program

The Regional HotSpots series assess land for future residential, industrial and commercial uses and identifies the planning and infrastructure coordination needed to meet demand across selected regional centres in Western Australia. The series has been prepared by the DoP, for the WAPC.

Key aspects of these reports are:

- demand drivers specific to each regional centre including an assessment of the major economic factors that influence employment and population growth – and therefore the demand for land and housing;
- assessment of zoned land supply for residential, commercial, industrial and tourism uses;
- detailed infrastructure assessments coordinated with land development;
- planning and environmental approvals assessments including Native Title agreements as well as environmental heritage and subdivision approvals; and
- infrastructure mapping indicating sites, buffer areas and corridors required for existing and future infrastructure.

This Regional HotSpots series has been prepared as part of the Urban Development Program (UDP) and is the result of consultation with a number of stakeholders, including local governments and servicing authorities. The series will also act as a key component of the forthcoming Pilbara Planning and Infrastructure Framework.

The most recent edition of all the Regional HotSpots publication editions can be accessed online at: www.planning.wa.gov.au.

1.4 Pilbara Cities

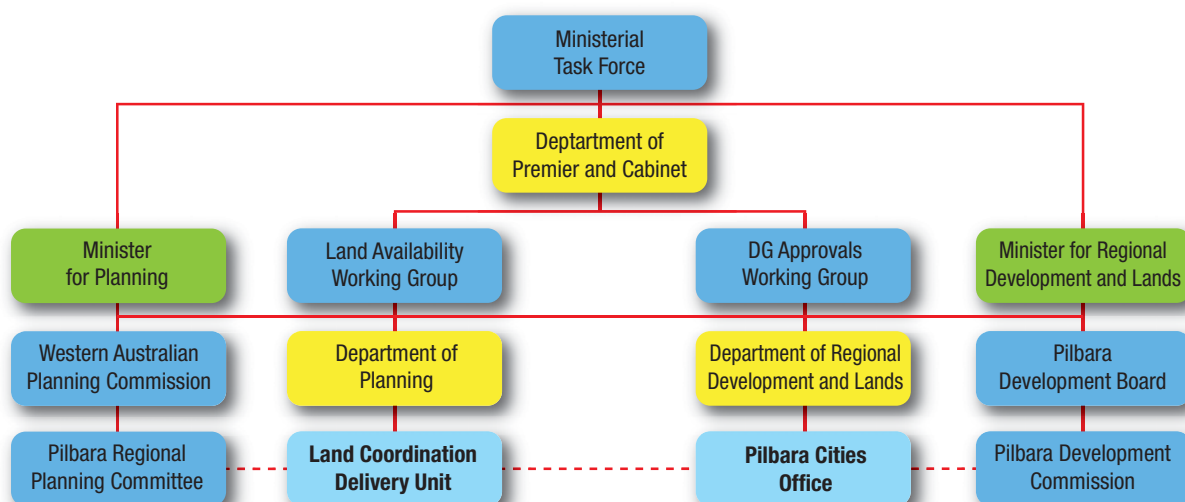
On 27 November 2009, the State Government announced the Pilbara Cities blueprint, an initiative to encourage more people to live and settle in the Pilbara. The State Government's vision for Pilbara Cities is for modern vibrant regional centres that can support and deliver a skilled workforce for major economic projects in the Pilbara. The realisation of this vision rests on the promotion of quality regional living with modern services and facilities which will encourage the development of strong local communities. The blueprint includes proposals for major revitalisations of South Hedland, Karratha, Newman, Dampier, Tom Price and Onslow town centres, in addition to plans to create new marinas and improved waterfronts at Port Hedland, Dampier and possibly Onslow. New infrastructure and facilities such as schools, TAFEs, medical facilities, leisure and entertainment facilities and retail precinct are also proposed as part of the plan. The initiative also aims to maximise opportunities for indigenous communities.

Critical to the success of the plan is the attraction of residents and businesses not involved in the traditional mining, oil and gas sectors to the region, creating places where people choose to settle on a permanent basis with access to high standards of services.

To be successful, the Pilbara Cities vision must build on the joint contribution of the private sector, State Government and Federal Government to support the development and prosperity of the region. The private sector will play a crucial role in achieving the plan, including assisting with the delivery of affordable accommodation solutions by the release of development sites and superlots for the development of land and housing, including opportunities in the private rental market.

The relationship between key State Government agencies and groups is outlined in Figure 1.

Figure 1: Pilbara Cities governance structure (State Government)



1.5 Karratha overview

The establishment of iron ore operations in the Pilbara region followed the lifting of Commonwealth restrictions on the export of iron ore in 1960 due to growth in world demand. The Hamersley Iron State Agreement was signed with the Western Australian government in 1963. In 1966 the Tom Price to Dampier railway was completed allowing the first shipment of iron ore at Parker Point in Dampier.

Karratha was established in 1968 by a joint agreement with the Western Australian Government and Hamersley Iron to support new iron ore operations in the Hamersley Ranges. The construction of the suburb of Bulgarra began in 1969, followed by Pegs Creek in 1975, Millars Well (1980), Nickol (1981) and Baynton (1987). Karratha was gazetted in 1969 and extends from south of the hills to the North-West Coastal Highway. Following continued operation and expansion of mineral, gas and oil resource projects, Karratha has evolved into the administrative centre of the West Pilbara.

The operations of the nearby Dampier Salt project (located 14 kilometres west of Karratha) commenced in 1972. The production capacity of Dampier Salt was increased in stages during the 1990s to more than 5 million tonnes of salt per year. Currently some 3.8 million tonnes is exported annually.

The first phase of the Woodside operated North West Shelf gas fields began in 1980 with construction of the Karratha gas plant and export facilities. The Karratha gas plant was officially opened in September 1984, marking the first sale of gas to the State Energy Commission of Western Australia. In August 1989 exporting of liquefied natural gas (LNG) to Japan began following the completion of processing trains and storage gas tanks at the Karratha gas plant. The North West Shelf Venture currently provides about 65 per cent of total State production and accounts for about one per cent of Australia's gross domestic product.

The recent development of the suburbs of Tambrey, Nickol West and Baynton West has accommodated significant residential growth since 2006. Today the town has developed into the largest and most economically diverse community in the Pilbara and is home to an estimated 14 000 residents. Karratha also provides services to an estimated 4000 – 6000 FIFO workers.

Overview > for more information see the following links:

Australian Bureau of Statistics: www.abs.gov.au
see 2006 Census QuickStats: Karratha (urban centre/locality)

Pilbara Development Commission:
www.pdc.wa.gov.au

Shire of Roebourne: www.roebourne.wa.gov.au

Spotlight on the Pilbara:
www.regionalspotlights.com.au

2 Economic outlook and business investment

Key points

- Karratha is an economic hub supporting inland mines, gas/oil fields; Dampier's port and off-shore oil and gas production in the North-West Shelf.
- Karratha's proximity to the rapidly growing Asian region gives it a significant and sustainable competitive advantage over many other of the world's resource centres.
- The world's long-term outlook for commodity and energy demand justifies the record investment taking place in the Pilbara for mineral (principally iron ore) and energy resources.
- Business investment by resource sector companies is the primary growth driver for increased land and housing demand in Karratha.
- Karratha's growth has been driven by capital investment upgrades by major resource companies over the past seven years and many of these projects have been recently commissioned or will be during 2010-11.
- Iron ore royalties to the State Government are forecast to grow from \$1.9 billion in 2009-10 to \$3 billion in 2012-13.
- The long-term economic outlook for commodity demand in the region is underwriting major investment decisions in new projects.
- The impact on the town of Karratha by these various projects is largely determined by their physical proximity, the proportion of FIFO workers employed by each project and whether the project has on-site or work camp accommodation for its employees.
- As well as long-term benefits, major investment by the State and Federal Government in infrastructure projects will also bring short-term economic benefits to Karratha during the construction phase.

The Pilbara region plays a key role in the economy of the State and the nation. The region is dominated by resource industries including iron ore, oil and gas extraction and processing. Based on data from the Department of Mines and Petroleum, in 2008-09 the Pilbara accounted for 47.6 per cent of the value of State's mining production.

In its Australian Commodities report for the June quarter of 2010, the Australian Bureau of Agricultural and Resource Economics (ABARE) forecasts that iron ore exports will increase by 9 per cent to 396 million tonnes in 2010. This increase primarily reflects the ramp-up of BHP's Rapid Growth Project 4 expansion (completed late 2009) and Rio Tinto's Mesa A development (completed early 2010). Projects such as Fortescue Metal Group's Chichester Hub expansion and CITIC Pacific's Sino Iron Project are expected to increase iron ore exports further still in 2011 with a forecast rise of 7 per cent to 422 million tonnes.

ABARE also predicts that over the 2009-2010 period, the volume of LNG exported will increase by 13 per cent to 17.5 million tonnes. The increase reflects the start-up of the fifth processing train at the North West Shelf project. In 2010-11, Australian LNG exports are forecast to increase by 3 per cent to 18 million tonnes. The start-up of Woodside Energy's Pluto project will underlie this growth, and will increase Australia's LNG exporting capacity by an additional 4.3 million tonnes per year.

ABARE's Australian Mineral Statistics for the June quarter of 2009 indicate that the country's total earnings from mineral exports increased by 37 per cent to \$159.7 billion in 2008-09. Increased export earnings primarily reflected the higher contract prices in the first nine months of 2009 and the effect of a 16 per cent depreciation of the Australian dollar. In line with higher production and export prices, the value of Australia's iron ore exports increased by 67 per cent to \$34.2 billion.

The economic outlook for the Western Australia is for a return to strong growth over the next few years as business investment recovers strongly and takes the place of public investment as the primary stimulus for the State's economy. This is demonstrated by the components to the Gross State Product as shown in Table 1: Key economic forecasts, statistics and assumptions for Western Australia.

Table 1: Key economic forecasts, statistics and assumptions for Western Australia

	2008-09 actual	2009-10 estimated actual	2010-11 budget estimate	2011-12 forward estimate	2012-13 forward estimate	2013-14 forward estimate
Gross State product (GSP) and selected components	%	%	%	%	%	%
Real gross State product growth	0.7	3.75	4.5	4.75	3.0	3.0
Real State final demand growth	4.4	3.5	6.0	5.75	3.0	3.0
Business investment growth	10.5	1.25	11.5	12.25	1.25	1.5
Dwelling investment growth	-4.2	3.25	7.25	4.25	3.5	3.75
Public investment growth	8.1	18.5	10.0	-6.75	3.5	0.0
Key economic statistic forecasts						
Employment growth (% p.a.)	3.2	0.25	1.75	2.25	2.5	2.75
Unemployment rate (%)	3.7	5.25	5.0	4.75	4.75	4.5
Wage price index growth (% p.a.)	5.2	3.5	3.75	4.0	4.5	4.5
Average weekly earnings growth (% p.a.)	5.2	5.25	5.25	5.5	5.5	6.0
State population growth (% p.a.)	3.2	2.6	2.3	2.2	2.2	2.2
Other key economic forecasts and assumptions						
Oil price (US\$ per barrel)	68.9	82.5	86.8	88.4	89.2	89.8
\$US / A\$ (cents)	74.6	92.0	88.5	83.5	79.0	74.5
Iron ore price (\$US per tonne)	--	61.7	107.4	96.5	85.7	74.9
Iron ore royalties (A\$ m p.a.)	1 933	1 720	2 676	2 970	3 062	2 929
Petroleum royalties (A\$ m p.a.)	21	30	40	42	43	41

Notes: Growth figures are annual averages over the respective period. Forecasts assume no Commonwealth policy changes.

Source: WA State Budget Papers 2010-11, Economic and Fiscal Outlook, Budget Paper No. 3, 20 May 2010, pages 3, 12, 50 & 80 (2010)

The contribution of iron ore royalties to the State's economy will be boosted by more than 50 per cent (see Table 1) by several factors as identified by the Western Australian Department of Treasury and Finance, including:

- a recent surge in prices indicating that iron ore royalties are set to rebound sharply in 2010-11, reflecting strong international demand, especially in China, against a backdrop of a relatively limited global supply response;
- agreements between major producers and a number of Asian steel mills to abandon the traditional annual benchmark pricing system in favour of shorter-term contracts with direct links to spot prices; and

- a substantial increase in production volumes of Pilbara iron ore producers as a result of major capital investment in over the past several years, particularly by Rio Tinto and BHP Billiton.

The outlook (above) was prepared by the Western Australian Department of Treasury and Finance before the Federal Government under Prime Minister Julia Gillard announced agreement with certain major mining companies for a new minerals resources rent tax. Consequently the figures do not take into account any possible effects the tax will have on mining investment decisions.

2.1 Dampier Port trade statistics

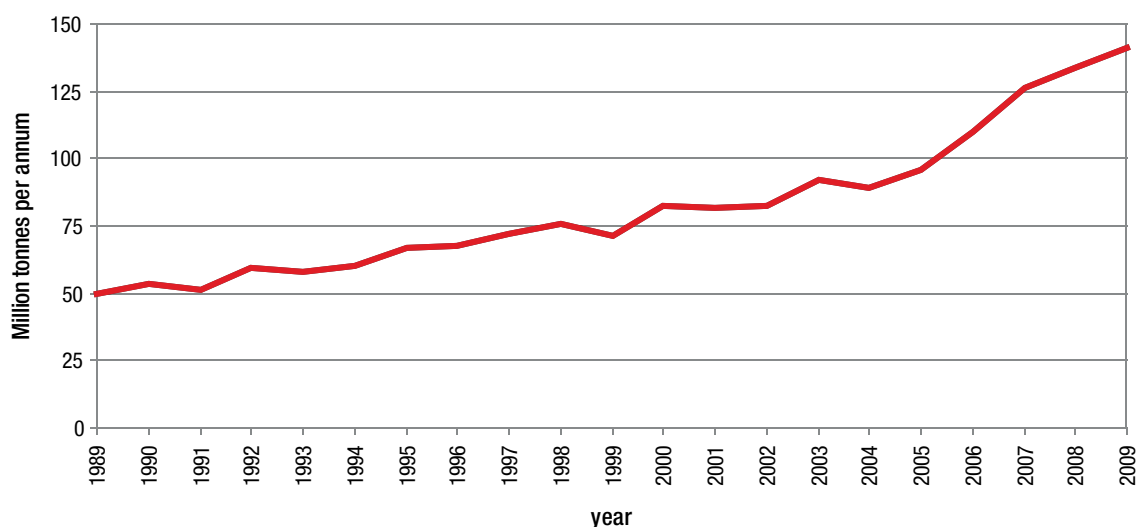
Cargo statistics from the Dampier Port Authority show that for the year ending 30 June 2010, 170 million tonnes of cargo was exported through the port. Some 83 per cent or 141.3 million tonnes was iron ore, 10.1 per cent LNG, 2.4 per cent condensate, 2.7 per cent salt, and 1.2 per cent LPG.

Although trade through the port has risen steadily over the last 20 years, it rose 58 per cent between 2004 and 2009 (Figure 2).

The 2008 Dampier Port Development Plan estimated throughput of iron ore to increase by 4 per cent annually to 2040, LNG by 5.8 per cent and condensate by 6.1 per cent. A revised port development plan was being prepared at the time Regional HotSpots was published.

Figure 2: Dampier Port – total cargo throughput (1989-2009 financial years)

Source: Dampier Port Authority (2009)



Economic outlook > for more information see the following links:

Australian Bureau of Agriculture and Resource Economics
- Bureau of Rural Sciences: www.abare-brs.gov.au see
Australian Commodities Report 2009, Australian Mineral
Statistics latest edition; Minerals and Energy – Major
development projects and Economic Outlook

Australian Bureau of Statistics: www.abs.gov.au see
Catalogue 8635.5.55.001 - Tourist Accommodation, Small
Area Data, Western Australia

Dampier Port Authority: www.dpa.wa.gov.au see
Cargo Statistics

Department of Treasury and Finance: www.dtf.wa.gov.au
see Treasury - Economic Indicators and State Budget

Tourism WA: www.tourism.wa.gov.au see
Research and Statistics

2.2 Business investment

Karratha is at the epicentre of major business investment in natural gas, petroleum, petrochemicals, iron ore and infrastructure. While many of these projects are too far from Karratha for the town to offer employee accommodation, Karratha still acts as a hub for goods and services supporting the construction and operational phases of those projects. In addition, Karratha and nearby Dampier Port are pivotal in the export of minerals, LNG and petroleum.

In its March 2010 edition of Investment Monitor, Access Economics reported that overall the region's economic conditions were likely to encourage a lift in business investment and that the resources sector was likely to lead the way. Mining investment did soften during the worst of the global financial downturn, but more recently strong demand and price increases for iron ore have reinvigorated investment plans. In fact investment interest in the State's mining sector hardly faded during the downturn and recent months have seen a lift in project announcements and approvals.

ABARE reports that expenditure on mineral exploration in 2009-10 in Australia is estimated at \$5.5 b, the third highest on record, and nearly double the average exploration expenditure of the past 30 years. Iron ore exploration expenditure is estimated to decline by 6 per cent to \$555 m in 2009-10, following a 31 per cent increase in expenditure in 2008-09. New capital expenditure in the mining industry in 2009-10 was the highest on record, at \$41.3 b, with indications that this may increase further in 2010-11. These figures provide a positive indication of the pace and scale of development in the mineral and energy sector across the nation.

Rio Tinto Iron Ore commenced a \$9 b expansion strategy in the Pilbara in 2003. The benefits of this capital investment have come to fruition since 2009, with the completion of the Hope Downs Stage 2 expansion project. Other major projects completed in 2010 include Mesa A (completed early 2010) and Brockman 4 at Tom Price (completed mid 2010). The investment provided a significant economic stimulus for the Pilbara, including employment for up to 3900 people. As these projects move into the production phases, maintenance, servicing and operation of these capital investments will continue to generate new employment opportunities.

The planned West Pilbara Iron Ore Project which includes a new deepwater port at Anketell Point near Cape Lambert; mine-sites near Pannawonica; and a connecting railway through the west Pilbara, will significantly enhance the region's iron ore export capacity. Capital expenditure for the project is estimated at approximately \$4 b. This project, combined with the current phase of Rio Tinto capital investment and its potential joint venture with BHP Billiton will stimulate a further capital investment for a quantum ramp-up of West Pilbara production capacity.

The Gorgon gas project is being developed by Chevron, ExxonMobil and Shell based at Barrow Island located 100 kilometres north-east of Onslow. The Gorgon project is expected to result in \$43 b capital expenditure. Based on a 30 year, three train LNG and domestic gas project, peak construction employment in Western Australia may reach 10 000 direct and indirect jobs. Construction and commissioning of the trains is expected to be staggered over an 18 month period. The domestic gas pipeline from Barrow Island will connect with the Dampier to Bunbury natural gas pipeline.

Woodside Energy's Pluto LNG project is currently under construction with first gas from the Pluto and Xena gas fields (Carnarvon Basin) expected in late 2010 and the first shipment of LNG planned for early 2011. The onshore facilities comprise a single LNG processing train with a production capacity of 4.3 Mtpa, storage facilities and an export jetty. In late 2009, Woodside announced plans to expand the Pluto project to five processing trains, capable of producing more than 20 Mtpa. Woodside is currently undertaking further exploration in order to support the project's expansion.

Table 2 lists proposed major investments that are likely to affect demand for land and housing in Karratha. In the short to medium term, all projects now under construction or committed will have some impact on the town - but the degree of impact is highly variable. Much depends on the proximity of the project to the regional centre, the proportion of FIFO workers verses local employees and whether the project has on-site or work camp accommodation for its employees.

Understanding the local impact is a critical factor in determining the timing and quantum of future demand for land and housing in regional centres. It is not always possible to accurately determine these demand factors as they are driven by investment decisions which are most often commercial-in-confidence.

Table 2: Major projects (selected)

Proponent / Project	Resource / commodity	Location	Nearest Centre	Production	Capital investment	Construction workforce ¹	Additional permanent workforce ¹	Start	Status / comment
Under construction / committed									
Apache Energy / Santos – Devil Creek Development Project (processing gas from Reindeer gas field) – Phase 1	Natural gas, gas processing for domestic use	Devil Creek, 65 km south-west of Karratha	Karratha	Gas - 220 TJ per day Condensate – 80 to 160 kl per day	\$686 m	200	20	Sept 2009 (construction) End of 2011 (commissioning)	Construction commenced Sept 2009, commissioning due by end of 2011. Project will boost domestic gas supply by 20 per cent.
Clitic Pacific – Cape Preston Siro Iron Ore Project (magnetite mine and processing plant)	Iron ore (magnetite)	Cape Preston, 100 km south-west of Karratha	Karratha	27.6 Mtpa	\$5.2 b (USD)	4 000	500	2010	First production of concentrate planned for the Q4 2010.
Gorgon Joint Venture / Chevron Australia Pty Ltd – Carnarvon Offshore Basin – Gorgon LNG	Natural gas	Barrow Island, 150 km west of Dampier	Karratha	15 Mtpa	\$43 b	3 440	330	2015	On island activity commenced late 2009. Construction of processing plant scheduled to commence 2011.
Hanley Iron Pty Ltd / Robe River Mining Company Pty Ltd (power station to Cape Lambert) and subsidiary	Electricity infrastructure	Karratha / Cape Lambert	Karratha		\$700 m	unknown	unknown	Construction commenced late 2008	Due to be commissioned Q3 2010.
Woodside Energy – Carnarvon Offshore Basin – Pluto LNG	Natural gas	Burrup Industrial Estate	Karratha	4.3 Mtpa	\$12 b	4 000	300	First shipment of LNG by end of March 2011	Under construction. First LNG scheduled early 2011.
Woodside / BHP Billiton / BP / Shell / Chevron / Japan Aust LNG - NWS CMLH Redevelopment project	Natural gas, oil	135 km north-west of Karratha	Karratha	60 kbpd oil 35 PJpa gas	\$1.8 b	unknown	unknown	2011	Expansion, under construction. A significant proportion of the investment is for a new floating production, storage and offtake vessel
Woodside / BHP Billiton / BP / Chevron / Shell / Japan Aust LNG - North West Shelf Venture – NWS North Rankin B Redevelopment project	Natural gas	150 km north-west of Dampier	Karratha	967 PJpa	\$6.1 b	unknown	unknown	2013	Under construction. New platform (North Rankin B, adjacent to existing North Rankin A platform).
Total investment / workforce (projects under construction / committed)						11 640+	1 150+		
Under consideration									
Aurox Resources – Balla Balla project	Iron concentrate, titanium	90 km east of Karratha	Karratha	6 Mtpa iron concentrates (10 Mtpa ultimately) 280 000 tpa titanium concentrate (470 000 tpa ultimately)	\$2 b	680	860	2012 Expand to 10 Mtpa by 2015	Two 15 yr sales contracts in place (6 Mtpa).
Australasian Resources Ltd – Cape Preston Balmoral South Iron Ore Project	Iron ore (magnetite)	30 km south of Cape Preston	Karratha	24 Mtpa	\$2.7 b	2 500	800	Commission 2011, first shipment 2012	Bankable feasibility study completed 2008.
Australian Premium Iron Joint Venture - West Pilbara Iron Ore Project	Iron ore	50 km south-west of Pannawonica, Mount Anketell	Pannawonica	30 Mtpa	\$4 b	4 000	900	Mid-2013	Subject to successful completion of feasibility and environmental studies, government approvals.
Burrup Nitrates Pty Ltd – Burrup Ammonium Nitrate Plant	Petrochem-talis	Burrup Peninsula	Karratha	350 000 tpa	\$600 m	600	65	Q4 2013	Regulatory approvals in progress. Construction anticipated to commence Q3 2010.
Dampier Nitrogen/Dyno Nobel – Ammonia Urea Plant	Petrochem-talis	Burrup Peninsula	Karratha	230 ktpa ammonium nitrate	\$900 m	1 000	130	2013	Investigating finance options.
Helix Resources NL – Platinum and Palladium Deposit	Platinum, palladium	Murrumbidgee, 50 km south of Karratha	Karratha		\$71 m	unknown	unknown	unknown	Joint venture partner being sought.
MCC Mining Pty Ltd – Cape Lambert Iron Ore Project	Iron ore	Cape Lambert	Wickham	15 Mtpa	\$3.7 b	3 000	1 000	Mid-2013	Feasibility and environmental studies ongoing. Formal native title negotiations commenced March 2010.
Total investment / workforce (projects under consideration)						11 780+	3 755+		
Prefeasibility									
Apache Energy Ltd – Julimar Devil Creek - Phase 2	Natural gas	Devil Creek, 50 km south of Karratha	Karratha	75 – 155 PJ	\$1.37 b	unknown	unknown	2013	New project, early feasibility completed 2006, prefeasibility under way.
Australasian Resources - Sherrock Bay Nickel Project	Nickel	120 km east of Karratha	Karratha	2 Mtpa	\$34 m	unknown	unknown	unknown	Expansion, prefeasibility under way. \$200 m (USD) approved July 2010.
Rio Tinto / Robe River – Cape Lambert Port expansion	Port infrastructure	40 km north-east of Karratha	Karratha	100 Mtpa capacity increase (Cape Lambert)	unknown	1 800	500	50 Mtpa increase by mid-2014. Additional 50 Mtpa by mid-2016	
Sasol Chevron Australia – GTL Project	Natural gas	Barrow Island	Karratha		unknown	3 000	300	2015	Final investment decision for second LNG train anticipated end of 2010, third train end of 2011.
Woodside Energy – Carnarvon Offshore Basin – Pluto LNG Expansion	Natural gas	Burrup Industrial Estate	Karratha	Up to 5 LNG trains (20 Mtpa+)	unknown (\$10 b+ per train)	unknown (~3500 per train)	unknown	2013 - 2014	Contingent on identification of economically viable gas resource (possible third party supply).
Total investment / workforce (projects at prefeasibility)						4 800	800		

¹Workforce is the anticipated number of people who will be employed by a project during construction or operational (permanent) phases. These figures may differ to the number at commencement of the project and should be read as indicative. In some cases workforces may be split across various project elements and therefore various locations.
Mtpa – mega tonnes per annum
ktpa – kilo tonnes per annum

2.3 Tourism

Throughout the challenging economic conditions of the Global Financial Crisis, the Pilbara has maintained a number of resource projects which has kept demand for land and housing high. The current “under construction” projects around Karratha have maintained both strong employment and wage income in the town. These factors are the foundation of high demand for land and housing in the town. In addition, the number and scale of “committed” projects drives strong business and private confidence in the area. This directly influences investment decisions of both businesses and individuals for commercial, industrial and residential land.

Table 2 also includes projects that are “under consideration”, typically meaning future stages of projects that are not yet committed or projects in the pre-feasibility stage. While these projects can be in the very early stages of consideration or be quite speculative, they provide an indicator of the potential long-term project investment that could take place.

The continued operation of major resource projects in the Pilbara will maintain resource related employment and drive demand for housing in Karratha. The establishment of new resource projects is also likely to generate additional demand for residential, commercial and industrial land in Karratha.

The timing of existing and new resource projects will also influence the level of demand for land in Karratha. As projects move from construction to operational phases, workforces are likely to shift from a predominance of FIFO employment to higher levels of resident workforces.

According to Tourism WA's Overnight Visitor Fact Sheet for the Shire of Roebourne, on average 112 400 overnight visitors came to the Shire of Roebourne each year across 2007, 2008 and 2009. Business was the main purpose of visit for domestic visitors at 56 per cent, and holiday/pleasure for international visitors at 41 per cent. The annual average for room occupancy for hotels, motels and serviced apartments with 15 or more rooms for both 2007 and 2008 was in excess of 88.2 per cent. Overnight visitors spent a total of \$94 m annually (average of period 2004-05 to 2006-07), with domestic day trip visitors spending another \$15 m annually over this time period.

Research by the Tourism Forecasting Committee shows that between 1999 and 2009 the annual growth rate for visitor nights in regional Western Australia (excluding Perth) was -1.2 per cent. Total visitor nights in regional Western Australia are predicted to increase by 0.4 per cent each year between 2009 and 2019, which is lower than that forecast for Perth, at 2.5 per cent. Domestic visitor nights in regional Western Australia are forecast to fall by -0.5 per cent annually over the period 2009 to 2019.

Development of the tourism industry in Western Australia relies on the provision of appropriate infrastructure, which services the needs of tourists and encourages investment by the private sector. Tourism WA facilitates infrastructure development through its reports *Tourism Development Priorities*, which identify key infrastructure projects for tourism development across the State.

Tourism WA monitors private and public sector tourism development activity across the State, maintaining a comprehensive database that tracks the progress of tourism accommodation projects. A summary is published annually in the *Tourism Accommodation Development Register*. At June 2009, the register reported 10 projects at the planning stage in the north-west tourism region, with an estimated cost of \$150 m.

Business investment > for more information see the following links:

Access Economics: www.accesseconomics.com.au see Investment Monitor

Department of Mines and Petroleum: www.dmp.wa.gov.au see Prospect magazine

Pilbara Development Commission: www.pdc.wa.gov.au see Pilbara Projects Update

3 Employment and wages

Key points

- Demand for skilled labour in Karratha will be at a premium, given that most of the State's record \$112 b worth of under construction or committed projects are in the Pilbara. High demand will sustain high wages for these workers and high house prices.
- In addition to the direct construction and operational workforces, project investment has considerable multiplier effects for ancillary employment, goods and services.
- Business decisions regarding the mix of FIFO and resident employees are critical to determining the impact on land and housing demand.
- Wage disparity between resource company employees and other workers in Karratha create challenges for land and housing affordability.
- Very high labour force participation rates in Karratha contribute to strong demand for housing.

Actions and priorities

- Attracting and maintaining workers will remain a high priority in Karratha for the medium-term. Incentives such as housing and social amenity will be an essential part of keeping key workers in the town.

3.1 Industry of employment

Census 2006 data indicates the following trends with employment and wages in Karratha:

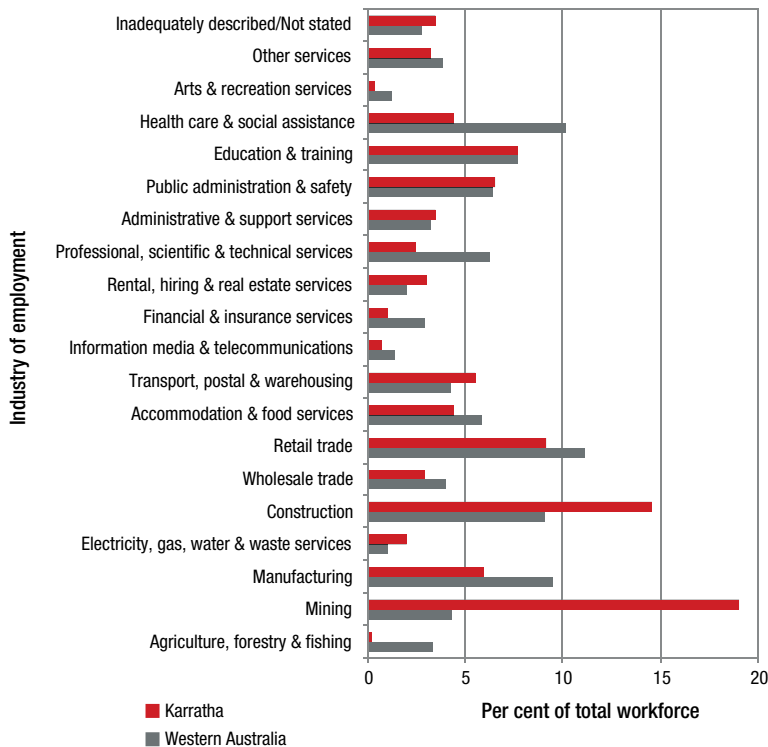
- mining and construction employment accounts for 35 per cent of all employment in Karratha (based on place of usual residence);
- employment in the mining and construction industries is tied heavily to the price of commodities and the decisions of major resource companies;
- there is a shortfall in employment in the tertiary (service) sector; particularly health care and social assistance occupations in comparison to Perth;
- public administration and safety (7 per cent) and education and training (8 per cent) employment proportions are equivalent to those recorded in Perth;
- a lower proportion of residents were working in the professional, scientific and technical services sector in comparison to Perth;
- an increase in predominance of FIFO workers;
- a total labour force (including unemployed persons) of 6153 at the 2006 Census, of which 72 per cent were employed on a full-time basis.

Industry of employment data collected from the 2006 Census is shown in Figure 3.

Karratha's high demand for both skilled workers and accommodation has led to increased wages, higher property prices and high rents. Flexible work practices such as extended shift rosters, plus greater use of temporary housing, have made FIFO arrangements common.

3.2 Income distribution

Figure 3: Census 2006 industry of employment – Karratha and Western Australia



Source: Catalogue 2068.0 Census Tables – Industry of employment by occupation, Australian Bureau of Statistics (2007)

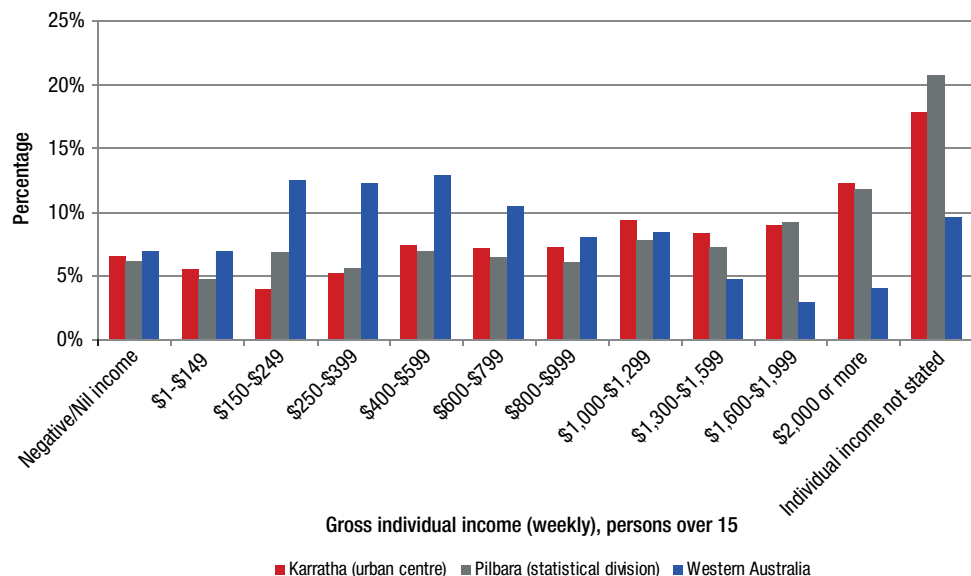
Compared to Western Australia as a whole, Karratha has a relatively large number of residents on very high incomes. Few Karratha households are in the State's middle-income bracket.

Based on data collected in the 2006 census, in Karratha (urban centre), the median weekly individual income for persons aged 15 years and over who were usual residents was \$940. The equivalent median weekly individual income across Western Australia was \$500. The median weekly household income in Karratha was \$2078, compared with \$1066 in Western Australia. Approximately 40 per cent of Karratha residents reported a gross weekly income above \$1000, compared to 20 per cent across the State as a whole.

Income distribution for Karratha, Pilbara and Western Australian residents is shown in Figure 4.

Figure 4: Census 2006 income distribution - Karratha, Pilbara and Western Australia

Source: Catalogue 2068.0 Census Tables – Gross individual income (weekly) by age by sex, Australian Bureau of Statistics (2007)



3.3 Working patterns

The 2006 Census showed 51 per cent of employees in the Shire of Roebourne worked more than 40 hours per week, which was higher than that of the State at 31 per cent (Figure 5). When broken down by industry, about 14 per cent of the Shire's mineworkers and 12 per cent of its construction workers were working extended hours (i.e. 41 or more hours per week).

The Small Area Labour Markets data produced by the Department of Education, Employment and Workplace Relations indicated an unemployment rate for the Shire of Roebourne at 3.9 per cent for the March 2010 quarter. This is a significant rise over the 2 per cent recorded at the same time in 2009. In the March quarter 2010, there was a total labour force of 10 167 with 392 unemployed.

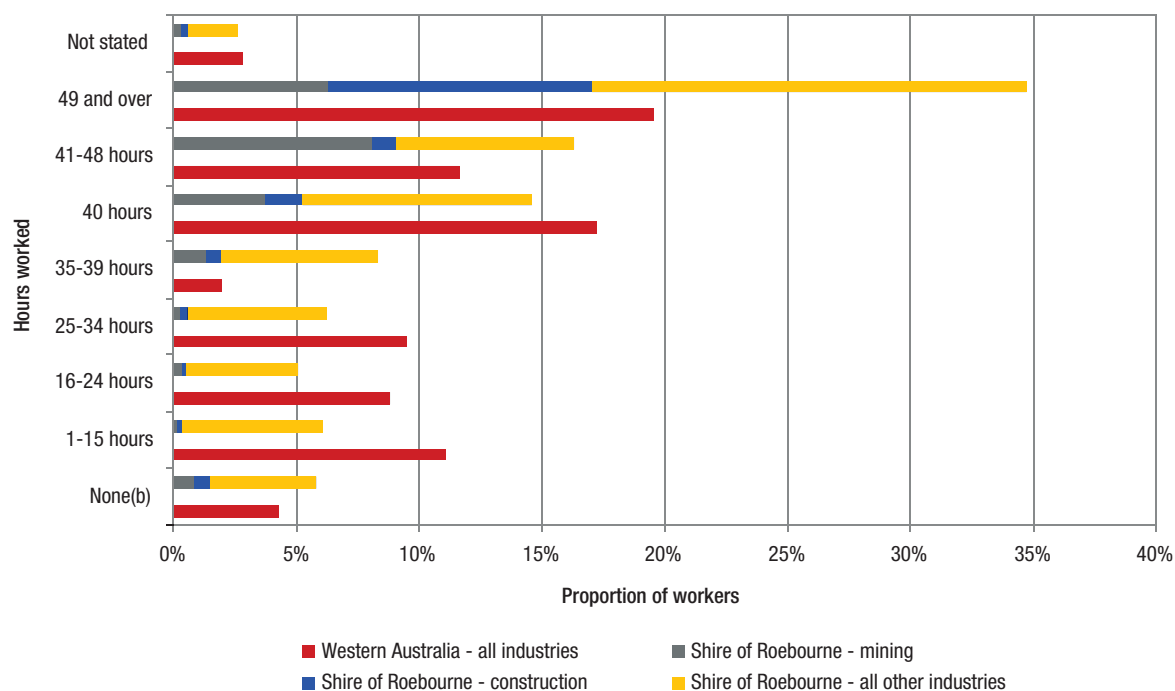
3.4 Labour force

The 2006 Census showed Karratha's residents formed about 60 per cent of the Shire of Roebourne's labour force. About 20 per cent of the total workforce were employed in mining compared to 5 per cent for Western Australia as a whole. According to the ABS report *Towns of the Mineral Boom*, Karratha's labour force participation rate was 82 per cent - based on people's responses on census night.

Income disparity between those who are, and those who are not, employed by the resource companies is having a direct affect on housing affordability. Growing numbers of people outside the resource industry are finding Karratha housing difficult to afford.

With so many resource projects now being built, Karratha's own skilled construction workers operate in a highly competitive market. Anecdotal evidence suggests that many local tradesmen are lured away by mining wages. Consequently the skills needed for residential construction are in short supply with the result that Karratha homes not only cost more but they also take longer to build.

Figure 5: Census 2006 working patterns by industry - Shire of Roebourne and Western Australia



(b) Comprises employed persons who did not work any hours during the week prior to census night.

Source: Spotlight on the Pilbara, Census of population and housing – Working patterns by hours worked, Australian Bureau of Statistics (2009)

Employment and wages > for more information see the following links:

Australian Bureau of Statistics: www.abs.gov.au see
Catalogue 2068.0 (2006 census tables): Karratha (urban
centre/locality) - Industry of employment by occupation
(place of usual residence and location on census night)
Industry of employment by gross individual income
(weekly) (place of usual residence)

Department of Education, Employment and Workplace
Relations: www.deewr.gov.au see
Small Area Labour Markets - Australia

Department of Mines and Petroleum: www.dmp.wa.gov.au
see Western Australian Mineral and Petroleum Statistical
Digest

4 Employment projections

Key points

- Estimates of resource related employment for Karratha are highly variable; however, both government and industry projections show that construction employment will peak in 2010 and decline over the period to 2015 as the capital investment phases of these projects is completed. In contrast, operational, maintenance and service employment will increase.
- There are difficulties in estimating employment numbers due to the changeable and confidential nature of employment estimates by resource companies.
- Varying assumptions are made regarding consequential and indirect workforce multipliers, single/family status of workers and the FIFO/ resident workforce components.
- There is no single comprehensive database currently available to source resource related employment information (especially for projects at earlier or pre-feasibility stages of development).

Actions and priorities

- Establishment of a single comprehensive database to source resource related employment information (especially for projects at earlier or pre-feasibility stages of development)
- Comprehensive employment projections need to include the construction workforces employed on existing projects that are coming to completion.

The Pilbara region has a large number of transient workers (including FIFO) which are not addressed through estimates of the resident population. This population accounts for a significant proportion of the population in many Pilbara towns, adding approximately 10 to 25 per cent to the resident population. Estimates of the size of this workforce are critical in order to plan for the demand for services in both the town and region. It is currently estimated that the FIFO population numbers approximately 4000 - 6000 persons in Karratha.

Resource related employment information is not currently available in a single comprehensive database, making it difficult to estimate the size and nature (resident/FIFO) of the workforces associated with future resource and/or infrastructure projects. The most current source of this information is employment projections data prepared by Heuris Partners Ltd for the Pilbara Industry's Community Council (PICC). This data is summarised below.

4.1 Pilbara Industry's Community Council (PICC)

The Pilbara Industry's Community Council (PICC) is undertaking joint planning for major growth in the output of the resources sector in the Pilbara region to 2020. As part of this work, PICC is looking to broaden the understanding of the implications of this growth for service and infrastructure provision arising from the resulting employment and population changes in the region. In 2008, PICC engaged Heuris Partners Ltd to compile a bottom up picture of major planned and potential resource projects and model the resulting direct and multiplier impacts on Pilbara employment and population growth out to 2020. These figures build on the WAPC's population projections by providing projections on townsite populations and assumptions about service and FIFO populations. Completion of this work coincided with the onset of the global financial crisis, which resulted in the delay or cancellation of a number of projects. Recent economic activity has seen a return of strong interest in new or expanded resource projects in the Pilbara region. In light of the renewed investment outlook in the Pilbara region, a review of the employment and population projections was prepared and published in May 2010.

The PICC approach involved estimating workforce numbers and then applying multiplier assumptions to determine the total

workforce and resident population. The projections produced in 2008 represent the impact from PICC members, and not the total impact from all resource and infrastructure investment in the region. The projections prepared in 2010 however, include input from a broader range of sources, including non-PICC member projects.

The 2008 figures were considered by Government and industry, and stakeholders reached a consensus to use an agreed set of population figures. The WAPC supported the use of the PICC figures for planning purposes but notes that the WA Tomorrow figures should be used for predicting resident population growth in the region.

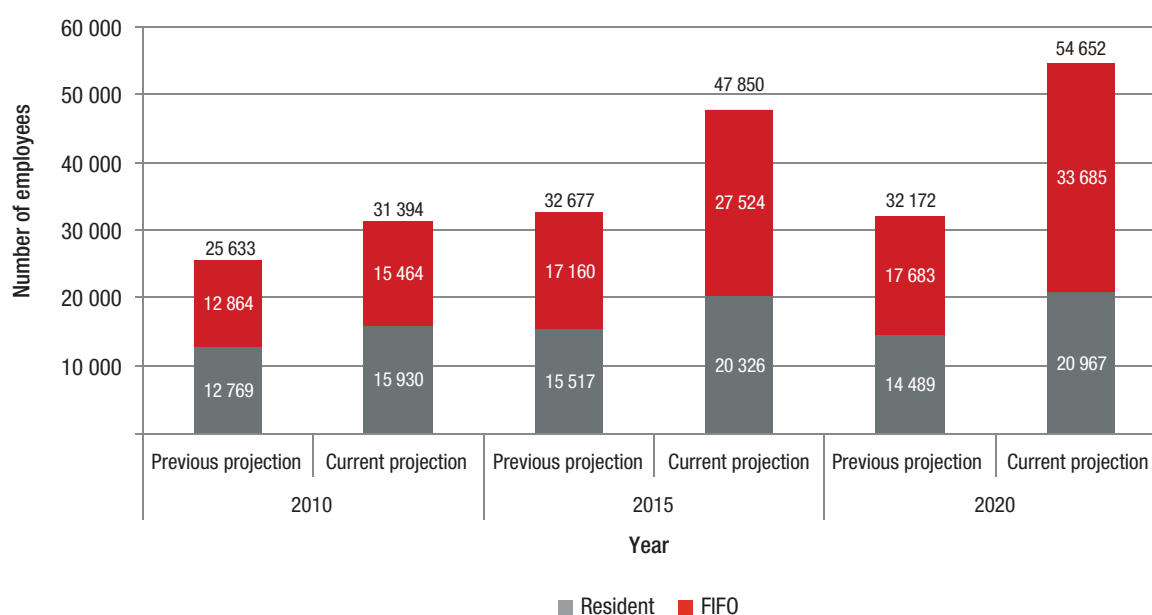
The 2010 PICC data indicates that, at a regional level, resource related employment is projected to grow from 31 000 in 2010 to 47 000 in 2015, and reach 54 000+ by 2020 (excluding construction workers). These figures are significantly higher than the 2008 projections (an additional 15 000 workers by 2015). Other key points include residential employment increasing by 28 per cent over the period 2010 and 2015, and FIFO employment increasing by 83 per cent between 2010 and 2015, and by a further 23 per cent to 2020. This information is detailed in Figure 6.

The PICC data suggests that the contribution of FIFO workers to the total resource related employment will increase over time, from 49 per cent in 2010 to more than 61 per cent of total resource related employment in 2020. This larger component of FIFO workers is an increase over 2008 figures.

Construction employment is anticipated to peak at approximately 28 000 in 2012 and drop away sharply from 2015 onwards. These estimates are likely to be conservative due to a number of resource companies choosing only to include construction employment for new and existing projects at an advanced planning or approvals stage. The estimated construction employment for the Pilbara region over the period 2008 to 2020 is shown in Figure 7.

Combined resident, FIFO and construction workforce projections by location are shown in Figure 8. This data indicates that the combined population for the Pilbara region reaching more than 103 000 persons by 2012 before stabilising to approximately 98 000 persons over the period 2015 to 2020. This is significantly higher than the 2008 projections which estimated a peak of 75 000 persons.

Figure 6: PICC resource related employment (2008 and 2010 projections) - Pilbara region

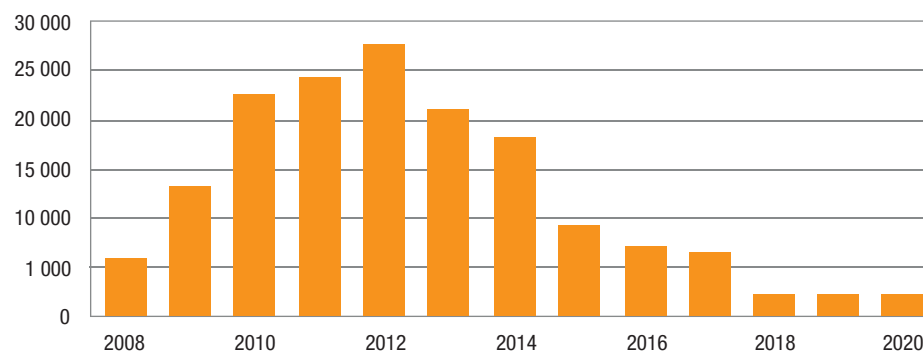


Source: Pilbara Industry's Community Council (PICC): Revised employment and Population Projections to 2020 (2010)

Data for Dampier/Karratha/Burrup is shown in Table 3. This data reflects the total service population for the Dampier/Karratha/Burrup locality, including resident, FIFO and construction workforces. An estimate of the total service population is important in determining the total population who access services and facilities in an area, especially in planning for future service delivery.

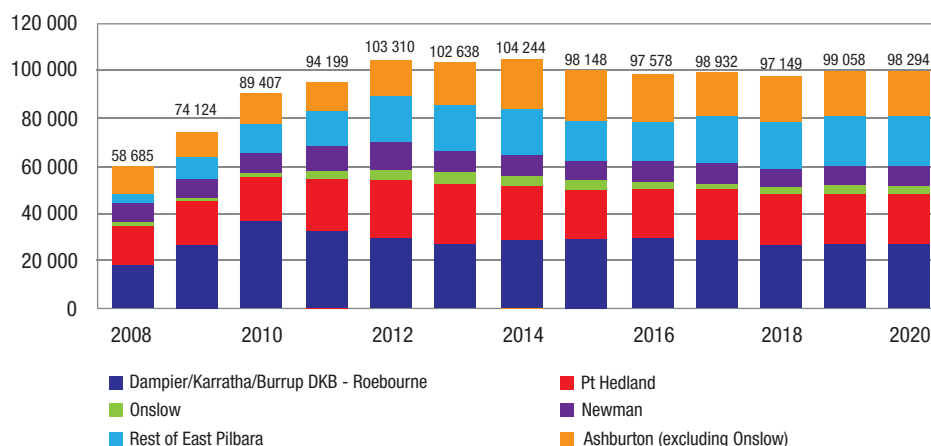
The population share for FIFO workers is expected to rise steadily over the period 2010 to 2015 in line with resident population growth. A significant decrease in the total construction workforce is anticipated over the period 2010 to 2015, decreasing from 15 100 to 3800 persons. This non-resident element accounts for 44 per cent of the total population in 2010, falling to 22 per cent by 2015 as construction activity included in the projections falls away.

Figure 7: Construction employment projections (2008 to 2020) - Pilbara region



Source: Pilbara Industry's Community Council (PICC): Revised employment and Population Projections to 2020 (2010)

Figure 8: Combined resident, FIFO and construction workforce projections by location



Source: Pilbara Industry's Community Council (PICC): Revised employment and Population Projections to 2020 (2010)

Table 3: PICC settlement population projections 2010 to 2015 - Dampier/Karratha/Burrup

	2010	2011	2012	2013	2014	2015
Resident	20 210	20 359	20 830	21 792	22 627	23 424
FIFO	1 076	1 235	1 299	1 361	1 511	1 591
Construction	15 100	11 500	7900	4 800	4 450	3 800
Total	36 386	33 094	30 029	27 953	28 588	28 815

Source: Pilbara Industry's Community Council (PICC): Revised employment and population projections to 2020 (2010)

The PICC projections use local multipliers between 0.2 and 1.0 to estimate additional indirect employment generated from the resource projects.

The use of local employment multipliers from resource industry projects needs to be treated with caution. A true local employment multiplier relies on an employee spending enough of their income to support other businesses and employees in the local economy. Even with the high incomes of resource workers, it is practically impossible for a single employee to spend enough of their gross income in the local Karratha economy to *fully* support the wages of another 1.2 or 1.6 workers. Instead, the multiplier benefits of resource projects rely primarily on the contracting practices of the resource company itself and whether it buys goods and services locally, or whether it sources them from other locations.

4.2 Employment at 50 000

The Pracsys (2010) report indicates that for a population of 50 000 persons, Karratha would need a resident working population base of approximately 22 500 or an increase in local employment of approximately 16 690 (or 287 per cent). The report also suggests that higher growth in employment in the retail/consumer and knowledge intensive consumer services would be required for Karratha (functioning as a city of 50 000), with a relative decline in the proportion of persons employed in the export/driver and producer services category (Table 4).

Table 4: Current and projected employment levels by category – Karratha

Employment category	2006	Projection for population of 50 000	Per cent increase
Export/driver products	1 051	3 311	215
Retail/consumer services	1 585	8 332	426
Producer services	2 257	6 715	197
Knowledge intensive consumer services	561	2 810	401
Knowledge intensive producer services	357	1 332	274
Total	5 810	22 500	

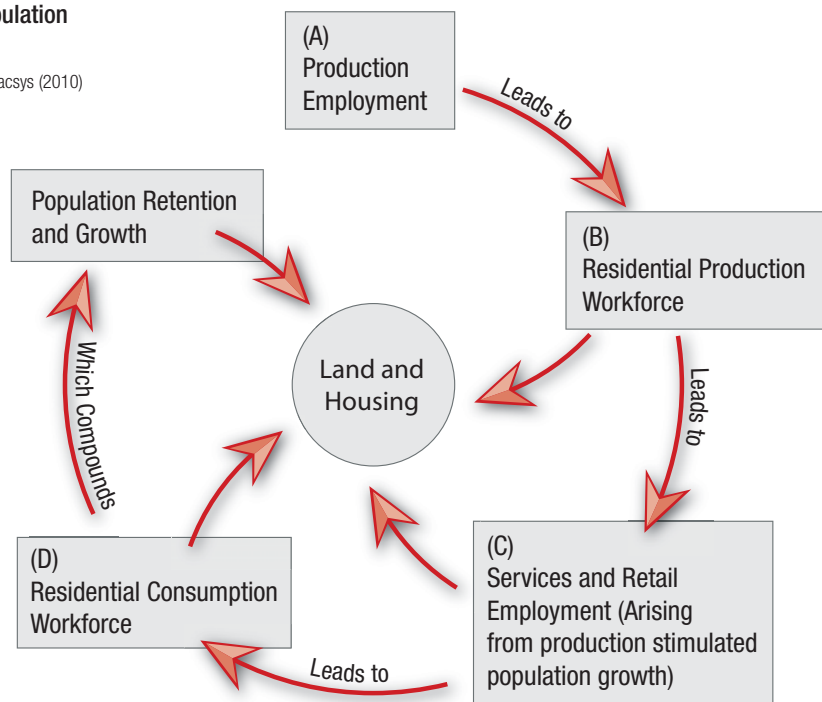
Source: Source: Karratha Town Revitalisation – Economic Analysis, Pracsys (2010)

Employment generated by export/driver projects (e.g. resource and infrastructure) is referred to as strategic employment. Population driven employment occurs as a result of population growth (as a result of the generation of strategic employment), and generally includes retail and consumer services and government services such as education and health.

The relationship between strategic project development and employment generation, population driven employment and service provision, and population growth is shown in Figure 9. The availability of land and housing is central to this continuum, and acts as a fundamental enabler.

Figure 9: Employment generation and population growth continuum

Source: Karratha Town Revitalisation – Economic Analysis, Pracsys (2010)



Employment projections > for more information see the following links:

Australian Bureau of Statistics: www.abs.gov.au see
ABS - 4102.0 Australian Social Trends 2008 Article - Towns
of the Mineral Boom

Chamber of Minerals and Energy Western Australia:
www.cmewa.com.au see
Pilbara Industry's Community Council (PICC)

Department of Education, Employment and Workplace
Relations: www.workplace.gov.au see
Labour Market Analysis

Department of Planning, Western Australian Planning
Commission: www.planning.wa.gov.au see
WAPC Statement - Agreement to use PICC population
and employment projections for forward planning in the
Pilbara

Regional Development Australia Pilbara - (formerly Pilbara
Area Consultative Committee): www.pacc.pilbara.net see
Pilbara Plan

5 Population and demography

Key points

- Data indicates that the Shire of Roebourne's resident population grew at 2.8 per cent per annum between 2004 and 2009.
- At 30 June 2009, the Shire of Roebourne had an estimated resident population of 18 828 persons. Karratha accounted for approximately 71 per cent of the Shire's population, at 13 435 persons.
- WAPC projections suggest that the resident population will increase by 1.7 per cent annually between 2010 and 2020 - which is higher than that for WA as a whole.
- There are ongoing issues with population counts, estimates and projections – including undercounts and underestimates.
- Determining the total service population is critical for service provision, but this can be difficult to estimate.

5.1 Estimated resident population

Population data from the Australian Bureau of Statistics for the Shire of Roebourne is detailed in Table 5 and Table 6. Data for the estimated resident population, place of usual residence and place of enumeration is shown. Further information on these different count methods is detailed in the glossary of this document.

The Shire of Roebourne had an estimated resident population of 18 828 persons in 2009. Between 2004 and 2009, the shire experienced an annual average growth rate of 2.8 per cent - 0.3 per cent higher than the State. Based on estimates of the resident population by census collection district, Karratha had a resident population of 13 435 persons at 30 June 2009. This equates to 71 per cent of the shire's population.

Karratha accounted for more than 71 per cent (11 725 persons) of the shire's population in the 2006 census (place of usual residence). However, the number of persons present in Karratha on census night 2006 (place of enumeration) was larger, with 13 255 persons recorded. This figure includes residents, tourists, visitors and service populations.

In the 2006 census, Western Australia recorded a net undercount of 3.2 per cent, higher than the national average of 2.7 per cent. While regional figures are not available, it is understood that the undercount is more significant in areas where there is a higher population of indigenous people and young males aged 20 to 29. The Shire of Roebourne is one such area. After adjustments to accommodate the undercount and discrepancies associated with multiple places of residence, the estimated resident population was increased (intra-censal update). These figures reflect only the resident population, not the total service population (i.e. resident plus FIFO and construction workers). Current census methods do not adequately identify FIFO and construction workforces.

Current estimates of the FIFO population in Karratha range between 4000 and 6000 persons.

Table 5: Estimated resident population 2001 to 2009 - Shire of Roebourne

Local government	2001 no.	2002 no.	2003 no.	2004 no.	2005 no.	2006 no.	2007 no. (r)	2008 no. (r)	2009 no. (p)	2004-2009 (p)a	2008(r)-2009(p)	
											no.	per cent
Shire of Roebourne	15 058	15 469	16 005	16 371	16 927	17 650	18 278	18 456	18 828	2.8	372	2.0

Source: Catalogue 3218.0 Regional Population Growth, Australian Bureau of Statistics (2009)

p preliminary r revised a average annual growth rate

Table 6: Census 2006 locality populations - Shire of Roebourne

Locality	Census locality population 2006 (place of usual residence)	Locality population 2006 (per cent of local government)
Dampier	1 370	8.3
Karratha	11 725	71.4
Pt Samson	274	1.7
Roebourne	857	5.2
Wickham	1 825	11.1

Source: Catalogue 2068.0 Census Tables, Australian Bureau of Statistics (2007)

5.2 Population structure

The age sex profile for the Shire of Roebourne (Census 2006) highlights the significant differences in the age spread of residents when compared to WA as a whole (Figure 10 and Figure 11). In the shire, 29.5 per cent of the population were aged between 30 and 44, compared to 22.1 per cent for the State. The shire also had a larger proportion of the population aged between 0 and 9 (17.7 per cent). The statewide figure was 13.1 per cent. Interestingly, the proportion of the shire's population at retirement age or older (65+) was only 1.9 per cent - significantly lower than the State's 12 per cent. A higher proportion of the population in the shire was male (54 per cent), compared to 49.8 per cent in the State. The median age of the Karratha population was 30, which is a year younger than for the Pilbara as a whole. Across WA the median age in 2006 was 36.

Figure 10: Census 2006 age sex profile - Shire of Roebourne

Source: Catalogue 2068.0 Census Tables - Age by sex, Australian Bureau of Statistics (2007)

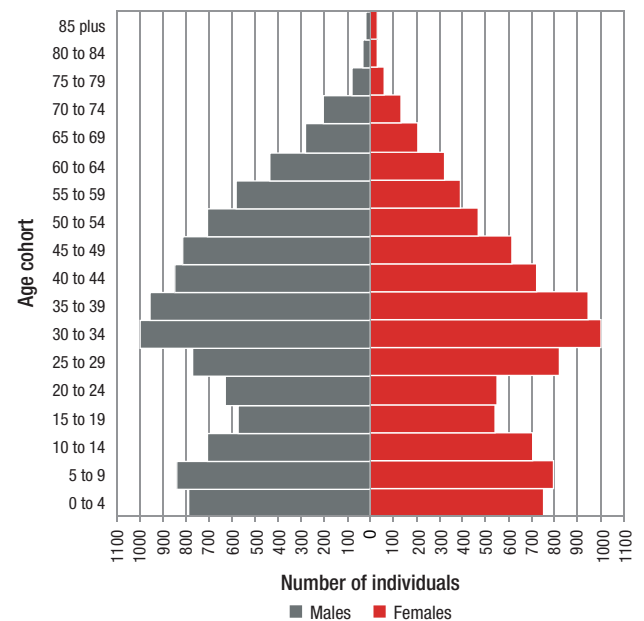
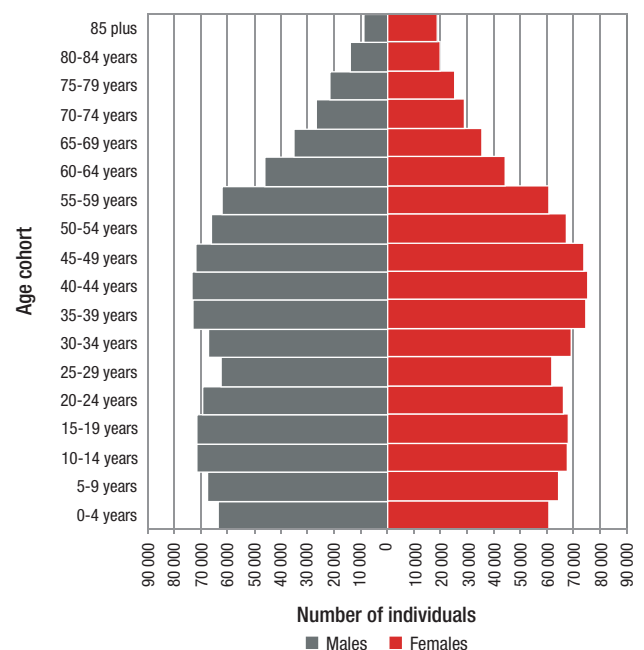


Figure 11: Census 2006 age sex profile - Western Australia

Source: Catalogue 2068.0 Census Tables - Age by sex, Australian Bureau of Statistics (2007)



5.3 Population stability

Compared to the rest of WA, Karratha has a high resident churn factor, recording a lower proportion of usual residents who resided at their current address one and five years ago. Approximately 56 and 24 per cent of Karratha residents lived at their current address one and five years ago respectively, compared to 75 per cent and 48 per cent for the State (Figure 12 and Figure 13). Many Karratha residents had either moved to

different addresses within the same statistical local area of had moved from other parts of WA. In terms of Karratha residents who previously resided in other states (5 years ago), the largest number were from Queensland (2.8 per cent), followed by Victoria (2.2 per cent).

Figure 12: Census 2006 - Place of usual residence 1 and 5 years ago - Karratha

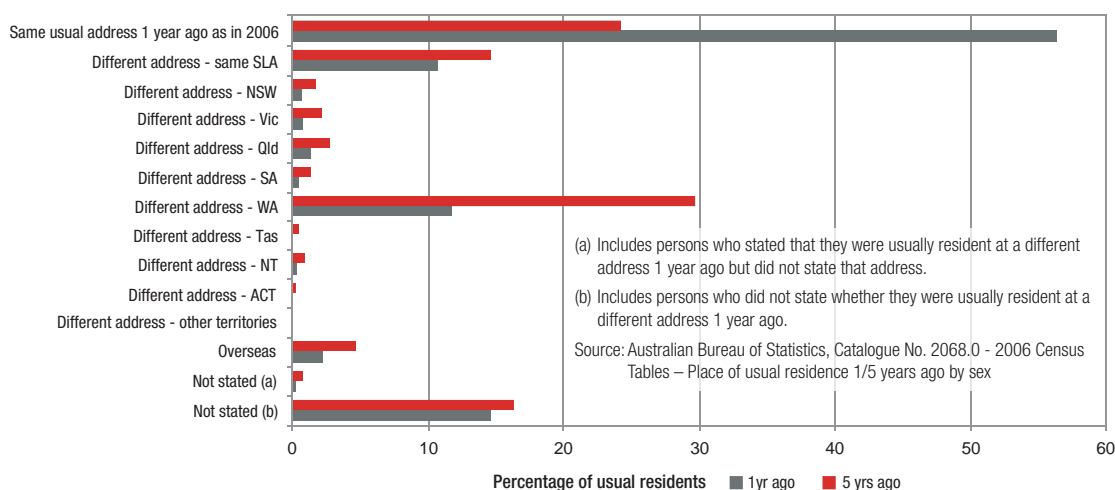
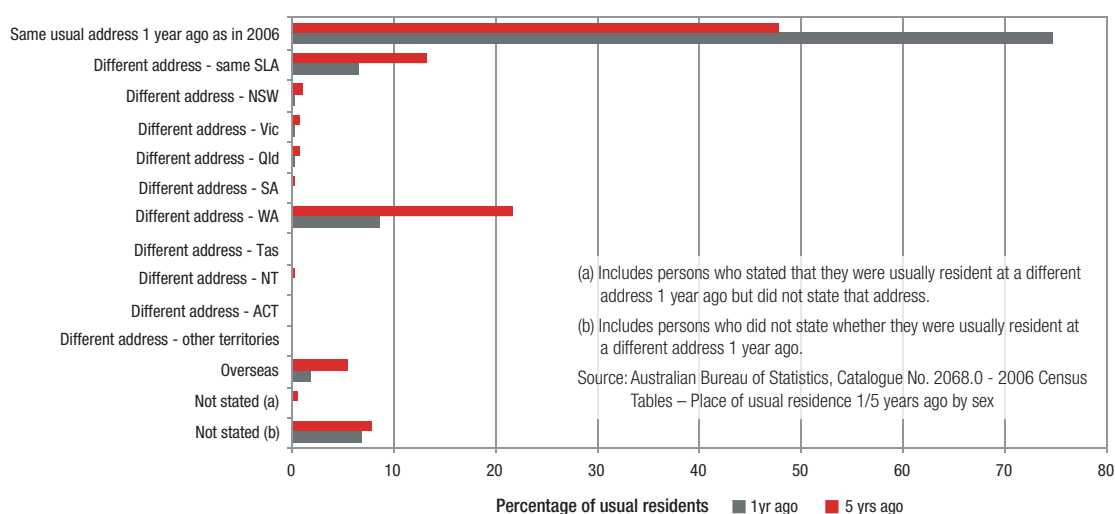


Figure 13: Census 2006 - Place of usual residence 1 and 5 years ago - Western Australia



5.4 Household formation

In terms of household structure, the majority (78.7 per cent) of occupied private dwellings recorded at the 2006 census in Karratha were family households (Table 7). People living alone accounted for 17.4 per cent of private dwellings, and a further 3.9 per cent were identified as group households. Group households are defined as two or more unrelated people above the age of 15 living together. In comparison to averages for the State, Karratha has a lower proportion of family and lone person households, and a higher proportion of group households. Evidence suggests that the proportion of group households reported in the 2006 census may have been understated in the Pilbara region.

Based on census data the average household size in Karratha was 2.8 persons and the average number of persons per bedroom was 1.1. This compares with the WA average of 2.5 persons and again 1.1 per bedroom.

Table 7: Census 2006 household types – Karratha

Household type	Family household type	Number of households	% of total households
Family households	Couple families with children	1 517	44.1
	Couple families without children	947	27.5
	One parent families	223	6.5
	Other families	19	0.6
	Total family households	2 706	78.7
Lone person households		598	17.4
Group households		136	3.9
Total households		3 440	100.0

Source: Catalogue 2001.0 Basic Community Profile – Karratha urban centre/locality, Australian Bureau of Statistics (2008)

Census 2006 Quick Stats, Australian Bureau of Statistics (2007)

5.5 Population projections - WAPC

In its role as the State's demographer, the Department of Planning produces forecasts of the State's resident population for the WAPC. These forecasts are based on assumptions about fertility, mortality and migration.

According to projections released in 2005, the Shire of Roebourne's resident population is expected to grow at a rate of 1.7 per cent annually over the next 5 and 10 years respectively (from 2010). This is higher than the 1.5 per cent increase forecast for the whole of WA (Table 8).

Figures in Table 8 reflect a 'business as usual' approach and do not take the Pilbara Cities initiative into account. The State government's intention is to encourage growth and support initiatives which will grow the twin Pilbara Cities of Karratha and Port Hedland. If these initiatives are delivered, the DoP/WAPC would anticipate higher growth rates in both the resident and service population than those shown in Table 8.

While population projections are often represented as average annual growth rates, in Pilbara towns, population and employment growth tends not to occur at a steady annual rate, but rather as step change in response to other factors, such as resource project construction cycles.

There are significant population pressures in the Pilbara caused by FIFO workers and short-term contract workers which are not represented by the WAPC forecasts. This additional service population is significant and could add up to 25 per cent to the resident population. The impact of these extra people is not uniform and it is likely that those living in remote areas will exert different pressures to those in regional towns. These issues are addressed in the ABS report, *Towns of the Mineral Boom*. Population figures in this document reflect the best available data. The use and interpretation of this data is complex (see Australian Bureau of Statistics information paper – catalogue 3107.0.55.006, *Population Concepts*, 2008) and will be subject to ongoing review and discussion with stakeholders.

An update to the *WA Tomorrow* projections is due to be released in late 2010 (long-term projections, 25 yrs). Future updates will include both short-term and scenario based projections (25 yrs+), which are particularly relevant for the Pilbara region.

Table 8: WAPC population projections¹ 2010 to 2030

Local government authority	Projected population 2010	Projected population 2015	Projected population 2020	Projected population 2030	Average annual growth 2010 - 2015 (per cent)	Average annual growth 2010 - 2020 (per cent)	Average annual growth 2010 - 2030 (per cent)
Ashburton	6 000	6 000	6 000	5 700	0.0	0.0	-0.3
East Pilbara	7 700	7 500	7 100	6 300	-0.5	-0.8	-1.0
Port Hedland	14 300	15 000	15 700	16 700	1.0	0.9	0.8
Roebourne	16 200	17 700	19 100	21 300	1.8	1.7	1.4
Total Pilbara region	44 200	46 200	47 900	50 000	0.9	0.9	0.6
Total Western Australia	2 177 630	2 343 380	2 503 690	2 778 310	1.5	1.4	1.2

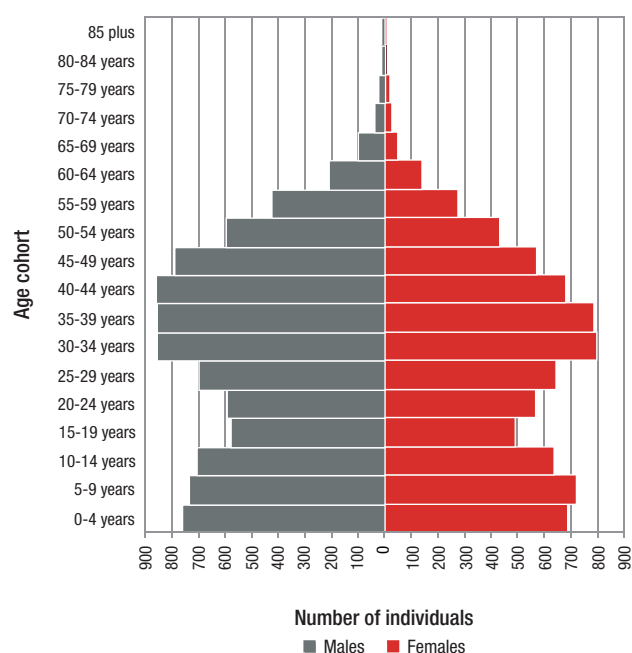
Source: Western Australia Tomorrow, Western Australian Planning Commission (2005)

¹ Projection for resident population

Age sex profiles based on WAPC projections for the Shire of Roebourne (Figure 14) show similar characteristics to that prepared for the 2006 census (i.e. a larger proportion of the population in the working age range). It is also expected that a larger proportion of the population will be aged 60 and above, in line with general trends of an ageing population.

Figure 14: WAPC age sex profile 2021 - Shire of Roebourne

Source: Western Australia Tomorrow, Western Australian Planning Commission (2005)



5.6 Population projections - PICC

Projections prepared by Heuris Partners Ltd for the PICC (see section 4.1) include an estimate of the resident population in addition to the employment projections. These have been prepared by applying indirect employment and family multiplier assumptions to the projected resident employment data. Projections are available for townsites, although in the case of Karratha, data is available only for the combined areas of Karratha, Dampier and the Burrup (areas were aggregated where the location of employment was unclear). Preparation of this data utilised the 2008 ABS estimated resident population data which is available at local government level only, and not by townsite. Townsite populations were therefore estimated by applying a pro-rata share of the total increase in estimated resident population on the basis of their share in the 2006 census.

The PICC data reports a 2010 resident population of 16 017 for the Dampier/Karratha area, rising slightly to 16 282 in 2015 and remaining stable to 2020. Estimates of the total service population for the Dampier/Karratha area only (excluding other settlements in the Shire of Roebourne) are unavailable.

5.7 Population targets - Pilbara Cities

The Pilbara Cities initiative, announced in November 2009, aims to encourage more people to live and settle in the Pilbara. The State Government's vision is for modern vibrant regional centres that can support and deliver skilled workforces for the Pilbara's major economic projects. Realising the vision rests on the promotion of quality regional living with modern services and facilities which will encourage the development of strong local communities.

Resident population growth is critical to achieving the Pilbara Cities vision, with targets of 50 000 persons set for each of Karratha and Port Hedland by 2035. To achieve this target, both centres would need to sustain an average population growth of approximately 4 to 5 per cent annually over the next 25 years.

Population and demography > for more information see the following links:

Australian Bureau of Statistics: www.abs.gov.au see
Catalogue 3218.0 - Regional Population Growth, Australia, 2008-09
Catalogue 3107.0.55.006 - Information Paper, Population Concepts, Australia (2008)
Catalogue 3206.0 - Household and Family Projections, Australia, 2001 to 2026
Catalogue 2001.0 - 2006 Census Basic Community Profiles, Karratha (urban centre/locality)

Chamber of Minerals and Energy Western Australia: www.cmewa.com see
Pilbara Industry's Community Council (PICC)

Department of Planning/Western Australian Planning Commission: www.planning.wa.gov.au see
Western Australia Tomorrow - Population Report 6
WAPC Statement - Agreement to use PICC population and employment projections for forward planning in the Pilbara

6 Land and housing demand

Key points

- Karratha has a housing shortage - as evidenced by median house/unit prices and rentals costs, both of which are considerably higher than the Perth metropolitan region.
- Due to the nature of the local industry, demand for land and housing is volatile and difficult to measure. However, it is likely that housing demand will rise further due to increased activity in the resources sector.
- Landgate data indicates that the current median sales price of vacant residential lots is \$198 000 which is less than that recorded in the Perth metropolitan region (\$224 000).
- December 2009 data indicates a median house price of \$716 500 for Karratha which is significantly higher than that recorded for the Perth metropolitan region at \$455 000. The median price in Karratha has increased by more than 2.5 times in the last five years.

Actions and priorities

- A greater diversity of housing is needed, including more affordable accommodation for service workers. More medium and higher density dwellings should also be established.
- A study investigating building costs in the region is needed to determine which of the construction component costs account for the overall increased costs experienced in the region, and how these costs could potentially be reduced.

6.1 Pilbara Towns Housing Study

The *Pilbara Towns Housing Study* (2009, unpublished) assessed the housing market conditions and unmet housing needs (to 2015) in the Pilbara towns of Karratha, Port Hedland, Onslow, Newman, Roebourne and Tom Price.

A joint initiative of the Department of Housing and the Pilbara Development Commission, the study reported the following:

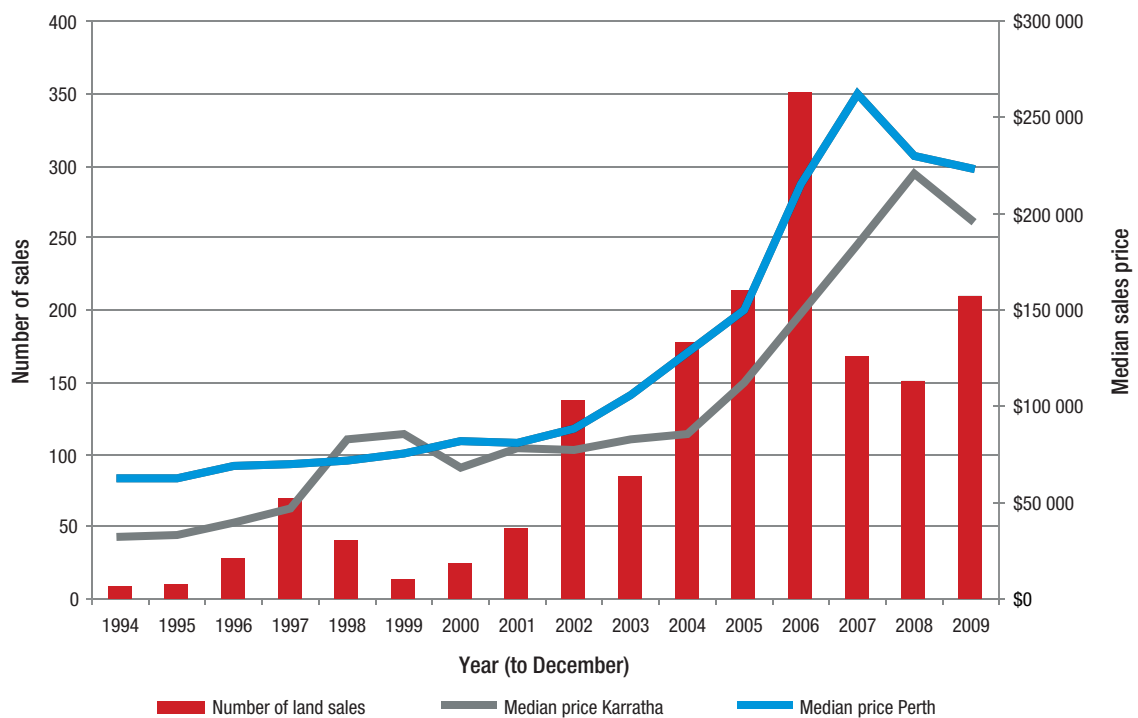
- a current apparent demand for 1433 dwellings across the Pilbara region (613 dwellings for Karratha). This includes unmet housing needs from existing residents.
- a latent demand for 2445 dwellings (918 for Karratha). This includes populations outside the region whose residence in the Pilbara region is constrained by a lack of available housing.
- a future demand of 1014 dwellings across the region in a low growth scenario, 3037 and 4736 dwellings for medium and high growth scenarios respectively (560, 668 and 1125 under low, medium and high growth scenarios respectively for Karratha).

The report also provides information on affordability, overcrowding and homelessness, and puts forward a number of recommendations to improve the quantity, quality and affordability of housing in the region. The study is yet to be published.

6.2 Land sales

Between 2001 and 2009 vacant land sales in Karratha increased rapidly, reaching a peak of more than 350 in 2006 (Figure 15). The median sales price for vacant residential lots has increased over time, in line with trends experienced in the metropolitan region. In the year to December 2009, the median sales price for Karratha was approximately \$26 000 less than that recorded for the metropolitan region, at \$198 000.

Figure 15: Land sales 1994 to 2009 - Karratha



Source: Real Estate Institute of Western Australia (2010)

6.3 House and unit sales

Karratha's median house price is significantly higher than that recorded in Perth. In December 2009 it was \$716 500 compared with Perth's \$455 000. In fact Karratha's prices have increased more than 2.5 times in the last five years - up from \$250 000 in 2004 (Figure 16). This can be attributed to increased demand and constrained supply. Similar trends can be found in home unit sales (Figure 17).

High housing costs make it difficult for employees to live in Karratha unless employees receive significant accommodation support from their employer. Resource companies often provide staff with this assistance; however many retail, personal services, hospitality and tourism companies are unable to provide this level of accommodation support.

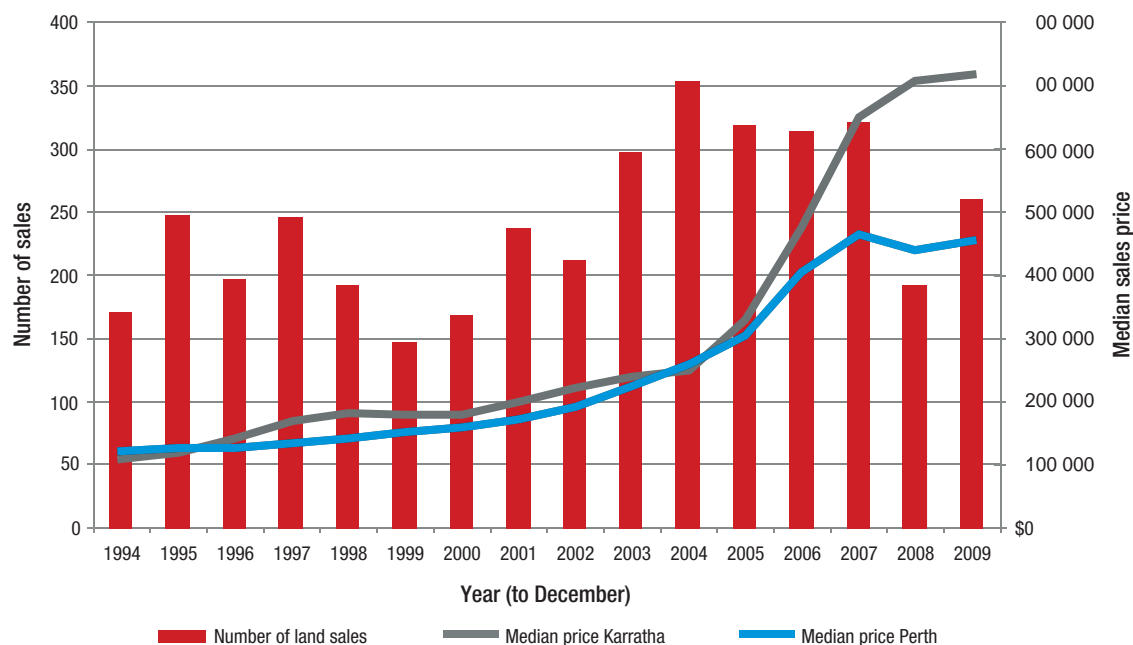
A significant amount of Karratha's dwelling stock is either owned or controlled by resource companies. As well as purchasing new

homes, the companies rent privately owned properties as they become available. Resource company schemes are also offered to employees to either buy or rent houses on the open market.

Scarce housing limits diversity in the local economy and hampers the ability of private and public organisations to provide the services and opportunities for the town to develop mature, functioning housing and labour markets. In Karratha this causes a high labour turnover as workers and their families tend to only stay in the town for as long as jobs last. High-cost housing also displaces lower-income households whether they are renters or potential buyers.

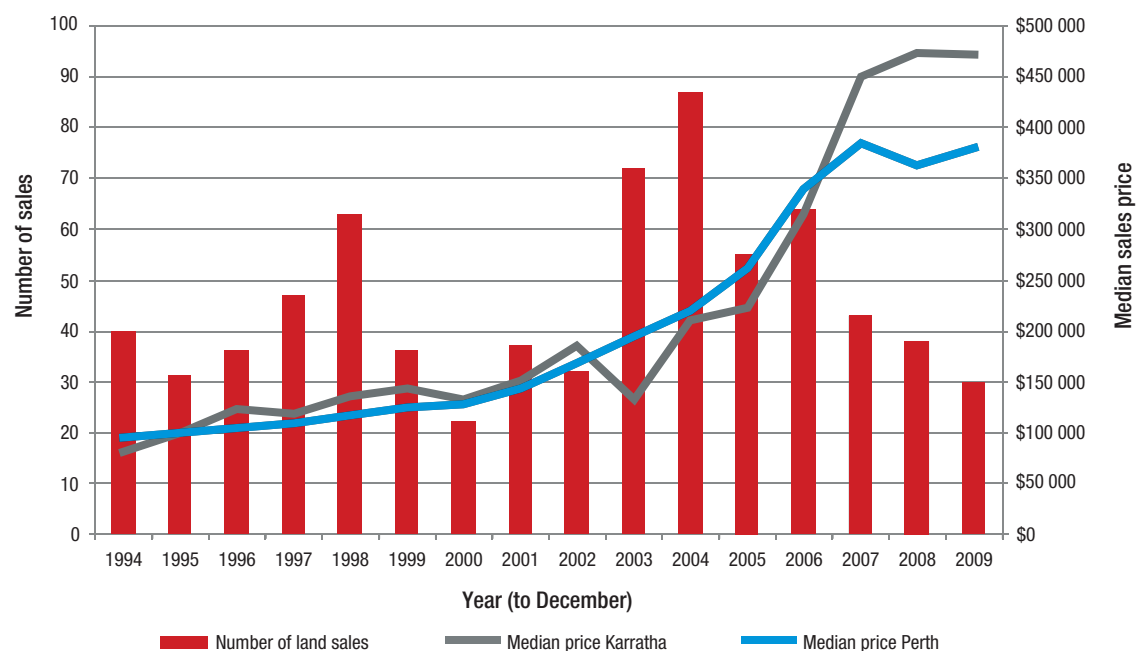
Volatile house prices are a disincentive to prospective, longer-term residents and deter them from making a financial commitment to Karratha. Market volatility also works against the private property sector, with high levels of uncertainty making it difficult for developers to attract finance for both residential and large-scale commercial projects.

Figure 16: House sales 1994 to 2009 - Karratha



Source: Real Estate Institute of Western Australia (2010)
Excludes properties >1 ha

Figure 17: Unit sales 1994 to 2009 - Karratha



Source: Real Estate Institute of Western Australia (2010)
Excludes properties >1 ha

6.4 Building approvals

On average, 165 building approvals were recorded per annum in Karratha over the period 2002 to 2009 (Figure 18). Building approvals have generally increased since 2006, recording an average of 206 approvals per annum over the last five years (2005 to 2009). Approvals for new houses peaked in the September quarter 2008 with approvals for 114 new dwellings recorded, with the largest number of total building approvals (306) also recorded in the 2008 calendar year. A total of 229 new houses and 18 other residential dwellings received building approval in the 12 months to December 2009.

6.5 Residential building costs

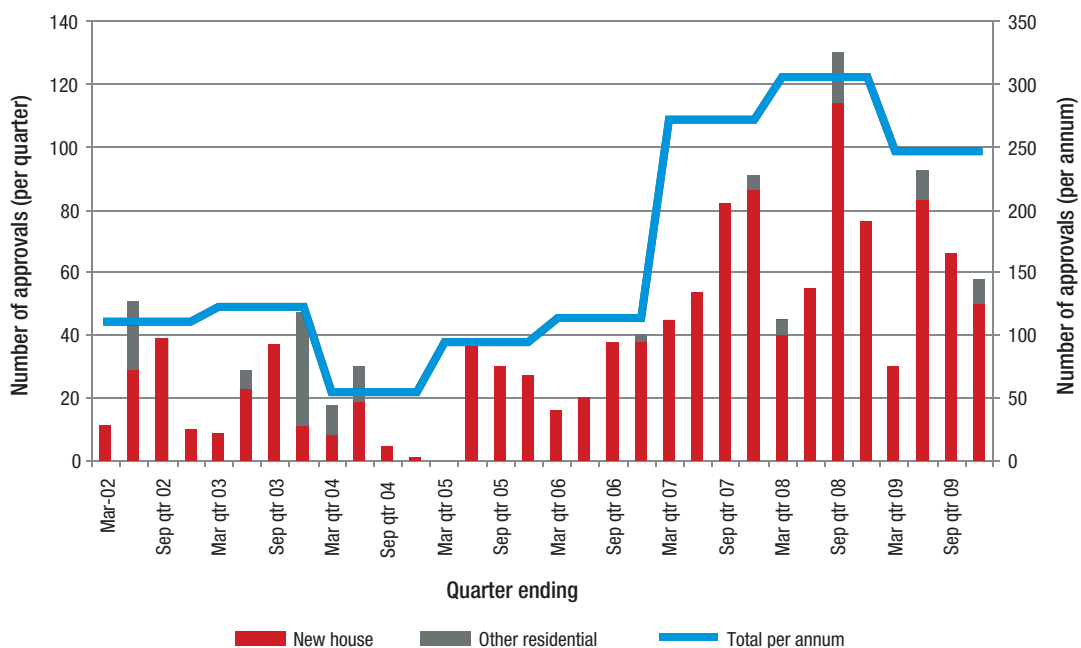
Relative to other states, Western Australia along with the Northern Territory experienced the largest increases in house building costs over the five years to September 2009, at 8 per cent growth per annum. This was likely due to the boom in the mining and construction sectors. Macromonitor's Australian Construction Cost Trends report (2010) forecasts construction costs in Western Australia to increase by five to six per cent per annum over the period 2011 to 2013 before slowing to two per cent by 2015.

Building costs experienced in the Pilbara region are significantly higher than that recorded for the Perth metropolitan region. Anecdotal evidence suggests that the cost of building a standard home in Pilbara towns (four bedroom, two bathroom) is approximately \$400 000 - \$500 000 (excluding land costs). A typical standard dwelling costs approximately \$180 000 - \$250 000 to construct in the metropolitan region, therefore the costs for a similar product in the Pilbara are approximately double that of the Perth metropolitan region.

Building approval data obtained from the ABS indicates that the average cost per square metre for new houses has almost doubled over the last 10 years (Figure 19). Costs per square metre in the March quarter 2010 were calculated at \$955 for the Perth statistical division and \$1101 for the balance of the State (for new houses). A peak of \$1260 per square metre was recorded in the December quarter 2008 for the balance of the State.

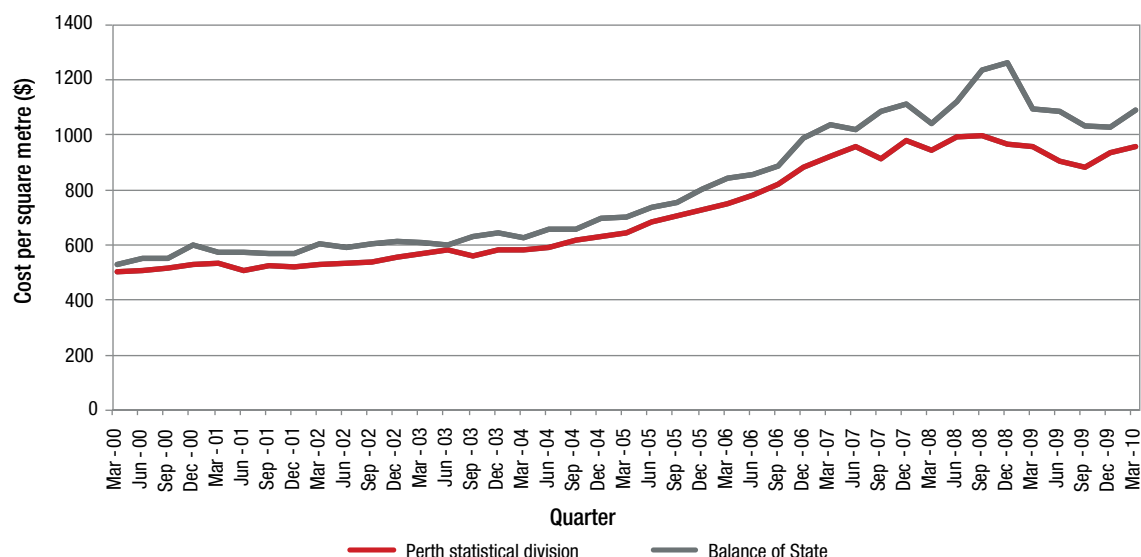
The National Housing Supply Council's 2008 State of Supply report indicated that the average cost per square metre of new work for detached houses in 2008 was \$961 for Perth and \$1092 for the balance of WA. The total figure for WA at \$1006 per square

Figure 18: Building approvals 2001 to 2009 - Karratha



Source: Building approvals (data available on request), Australian Bureau of Statistics (2010)

Figure 19: Average building costs per square metre for new houses - 2000 to 2010



Source: Building approvals (data available on request), Australian Bureau of Statistics (2010)

metre was the second most expensive in the country, second only to the Northern Territory. Costs per square metre for semi-detached dwellings were slightly higher at \$1186 and \$1354 respectively. Analysis undertaken by the DoP using data sourced from the Town of Port Hedland indicate an average cost per square metre of \$2205 for new single houses. Average cost per square metre was calculated using building licence data over the period January 2009 to April 2010.

Information in the Pilbara Towns Housing Study (unpublished) notes that the cost differential may be due to a lack of competition amongst builders, distance and freight costs, and high labour costs as a result of labour shortages. Difficulties in securing affordable accommodation also impacts upon the availability of tradespersons, which therefore impacts upon labour costs. These costs are generally passed on to the purchaser.

The Pracsys (2010) report identifies the lack of a local construction capability as one of the primary reasons for high construction costs, reporting that local producer services capability is taken up with servicing resource and infrastructure projects at the expense of civil infrastructure and housing projects. High housing and accommodation costs for employees who don't have access employer subsidies or employer housing makes it difficult for this type of workforce to establish themselves in Pilbara towns.

A detailed study into building costs in the Pilbara would be beneficial in determining which of the construction component costs account for the overall increased costs experienced in the region, and how these costs could potentially be reduced.

6.6 Residential rentals

Data on residential rentals compiled by the Pilbara Development Commission shows that the cost of renting three and four bedroom dwellings has remained relatively consistent over the last two years (Figure 20). The average cost of renting a three-bedroom dwelling in Karratha during the June quarter of 2010 was \$1308. This was up \$158 on the same period of 2009. Dwellings with four or more bedroom cost \$1999 on average in the June quarter 2010 - up \$349 on the same period in 2009.

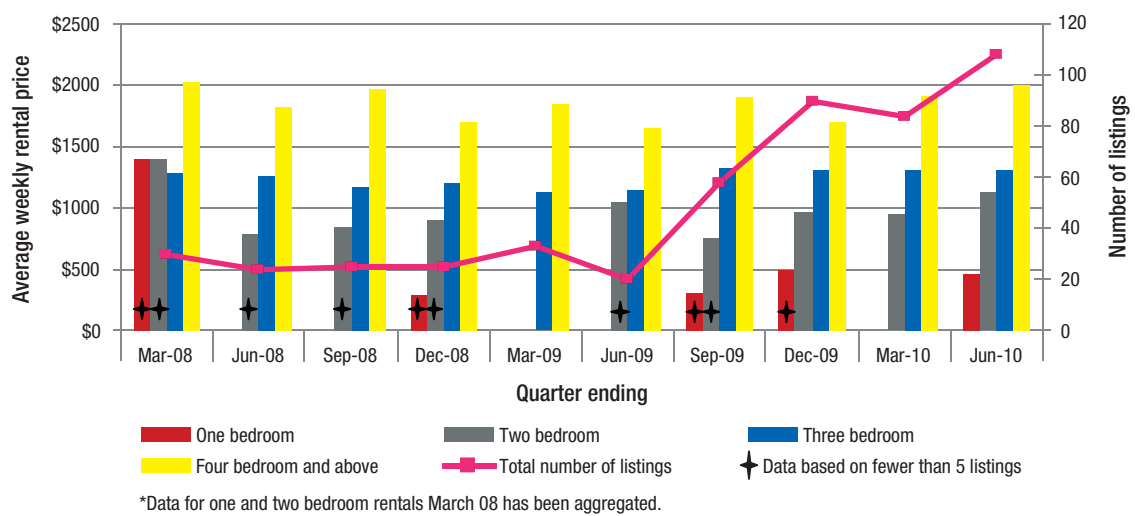
Rental listings increased by more than five times in the year to June 2010, with large increases recorded in the last two quarters of 2009. Most listings were for three and four bedroom dwellings, with listings for smaller properties scarce.

Anecdotal evidence suggests that many properties are being leased at a per room rate and are being occupied mainly by resource sector staff.

The 2006 Census reported Karratha had 2109 rented dwellings. Of all rented dwellings, 935, or about 44 per cent, were classed as being rented through “other landlord type” which included government and private employers and “residential parks”

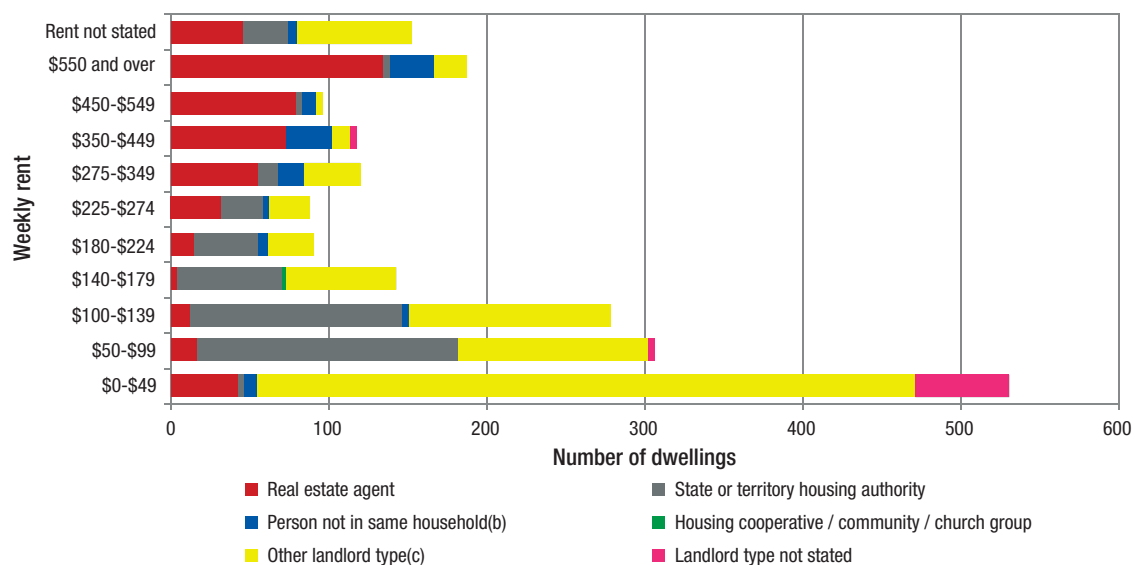
(including caravan parks). Where rents were below \$225 a week “other landlord type” provided 764 dwellings and “state or territory housing authority” supplied 410 (Figure 21).

Figure 20: Average cost of advertised rental properties 2008 - 2010 - Karratha



Source: Housing and Land Snapshot – Karratha, Pilbara Development Commission (2010)

Figure 21: 2006 Census weekly rent by landlord type (occupied private dwellings being rented^(a)) - Karratha



(a) Excludes “visitors only” and “other not classifiable” households.

(b) Comprises dwellings being rented from a parent/other relative or other person.

(c) Comprises dwellings being rented through a “residential park (includes caravan parks and marinas)”, “employer-government (includes Defence Housing Authority)” and “employer-other employer” (private).

Source: Catalogue 2068.0 Census Tables – Weekly rent by landlord type, Australian Bureau of Statistics (2007)

6.7 Demand for State Government housing

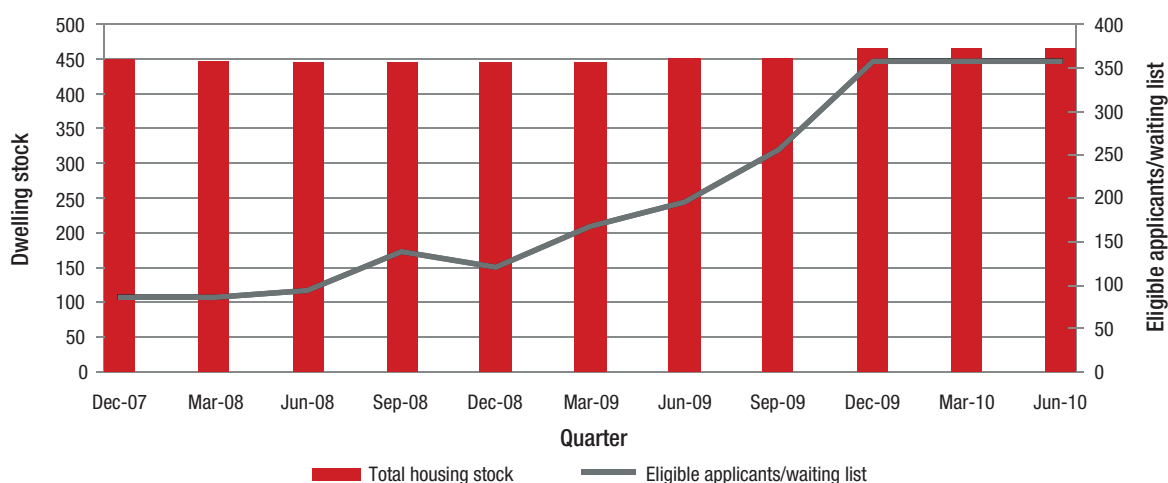
Information on Department of Housing dwelling stock and waiting lists is shown in Figure 22 and Figure 23. Social housing stock in Karratha has remained stable at about 450 dwellings but the waiting list of eligible applicants has risen from 86 in December 2007 to 358 for the June quarter of 2010 – a quadrupling of demand.

Government Regional Officers' Housing (GROH) stock has increased in the last two years from 473 dwellings (December 2007) to 534 dwellings (June 2010). The stock comprises both dwellings fully owned by Authority and leases over private

dwellings. The proportion of private leases compared to the overall housing stock has remained relatively stable. Outstanding demand for additional GROH housing has decreased since December 2007.

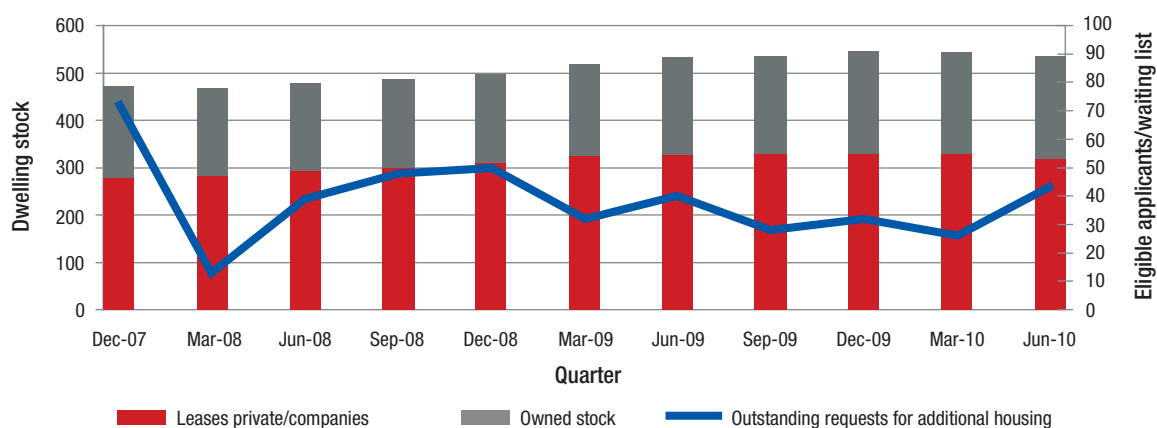
As part of the Royalties for Regions initiative GROH will deliver approximately 120 dwelling units in the Pilbara region by June 2011. GROH is also actively seeking opportunities to secure additional land to facilitate construction projects in Karratha, Port Hedland and Tom Price.

Figure 22: Social housing dwelling stock – Karratha



Source: Housing and Land Snapshot – Karratha, Pilbara Development Commission (2010)

Figure 23: Government Regional Officers' Housing (GROH) dwelling stock – Karratha



Source: Housing and Land Snapshot – Karratha, Pilbara Development Commission (2010)

6.8 Demand for industrial land

Many factors influence demand for industrial land and quantifying it is a complex process. Demand for industrial land cannot only be derived by analysing population growth as there are additional factors which may influence this demand. Demand generally derives from local, national or international demand for goods and services, with value adding to both locally generated products and products generated in other regions. The *Industrial Land Needs Study* (2008) identified industrial land supply and demand cycles as having three main drivers:

Population and settlement growth

- Increased population growth and labour force participation rates equating to more jobs and increased demand for industrial land (20 per cent of jobs across the State are likely to be in the industrial sector)

Economic growth and decline cycles

- High levels of economic growth and productivity will result in an increased demand for land for industrial activity. This is particularly true for the Pilbara region, given the contribution of the mining industry to the economy of the region.
- The cyclical nature of economic growth can make short-term predictions difficult, therefore long-term predictions provide the best indication of demand.
- An additional supply (land bank) of 25-30 per cent above the long-term requirements creates flexible market choices, provides a response to short-term hyper growth situations and encourages emerging and inward investment opportunities.

Location criteria and market preferences

- Industry will seek sites that offer the type of amenity and location advantages that make their activities more competitive. For example a site could offer competitive advantages through its proximity to services and transport as well as roads and ports. There might also be advantage in a site that is protected or buffered and where the industry can expand.

- When land is in short or limited supply industries may be forced to limit expansion plans, seek alternative sites (interstate or overseas) or cease trade altogether. Industry may also experience increased levels of competition from all land uses, particularly retail and commercial uses.

Strong growth in the resource and building and construction industries, coupled with limited land releases have led to Karratha's current strong demand for industrial land. While no detailed analysis has been undertaken to determine demand for industrial land in Karratha, LandCorp has conducted surveys in order to determine market demand and specific end user requirements.

In the short to medium term, demand for land suitable for transport and light and general industrial uses will likely be met through future land releases at the Gap Ridge industrial estate. The estate will cater for businesses serving the mining and support industries, with larger lot sizes suitable for industries requiring areas for manufacturing, assembly, lay down or storage uses. Beyond sites offered on the estate, Karratha has no additional undeveloped land zoned for industrial uses. However, additional sites have been identified through planning work being undertaken as part of the *Karratha City Growth Plan*.

6.9 Demand for commercial/retail floor space

Karratha is a key regional centre in the West Pilbara and as such, provides a high level of commercial, retail and administrative services. The main commercial area (town centre) is located adjacent to Dampier Road and west of Searipple Road. Smaller zoned sites are scattered to the west of the town centre. Karratha's shopping area - the largest and most diverse in the Pilbara - is concentrated in the town centre. The major shopping centre, Centro Karratha, has a total retail floorspace of 23 600m². The town centre area also accommodates a number of offices and hotel accommodation. The town has a total retail floorspace of approximately 41 000 m² and commercial floorspace of approximately 29 700 m².

There is currently a high demand for both commercial and retail floorspace, with few premises currently available for lease.

Karratha's growth and its implications on retail and commercial land use were investigated in the *Karratha Primary Trade Area Retail and Commercial Strategy*. Issues identified during consultation included:

- the limited provision of convenience retail in outlying suburbs;
- the lack of range in higher order retail products;
- the need to consolidate uses in the Karratha industrial area by relocating some uses in town;
- the need to upgrade and expand commercial premises with a view to accommodating new businesses and to attract the administrative functions of mine operations into town.

The strategy reports that by 2020, Karratha will require an additional 20 150 m² of retail floorspace and 16 200 m² of office floorspace (further detail provided in Table 9 and Table 10). Note that these estimates are based on a resident population of 22 795 persons and a FIFO population of 2400 persons by 2020. The strategy supports the need to expand Karratha's town centre, establish a neighbourhood shopping centre in Nickol, and establishment of a bulky goods retail area at Gap Ridge.

Planning is currently underway for the Tambrey mixed use site which will include a supermarket, other retail and residential uses. This is referred to as the Nickol retail centre in the strategy. The site was released through an expression of interest process.

A recent study by Pracsys estimates that as a major regional centre with a population of 50 000, Karratha may require the following:

- a total retail floorspace of 123 400 m², which is an increase of more than 80 000 m² on the existing retail floorspace. This includes 54 700 m² of convenience retail, 55 700 m² of comparison retail and approximately 13 000 m² of café/restaurant/fast food floorspace.
- a total commercial/office floorspace of approximately 63 000 m² across commercial, government and institutional uses (equating to an additional 33 300 m²).

Table 9: Additional retail floorspace requirements 2020 – Karratha

Category	Additional floorspace requirements by 2020 (m ²)
Retail	
Supermarkets	4 500
Other food	600
Department stores	2 500
Clothing	650
Household goods	5 500
Other retail	3 900
Hospitality and services	2 500
Total increase	20 150
Total floorspace	61 150
Net increase	68%
Commercial	
Commercial or office	6 300
Government	5 400
Community services	4 500
Total increase	16 200
Total floorspace	42 781
Net increase	61%

Source: Karratha Primary Trade Area Retail and Commercial Strategy, SGS Economics and Planning (2009)

Table 10: Proposed additional retail floorspace allocation 2020 – Karratha

Retail category	Karratha CBD	Karratha industrial	Nickol retail centre	Gap Ridge bulky goods centre	Total (m ²)
Supermarkets	0	0	4 500	0	4 500
Other food	0	0	600	0	600
Department stores	2 500	0	0	0	2 500
Clothing	650	0	0	0	650
Household goods	0	0	0	5 500	5 500
Other retail	1 900	0	2 000	0	3 900
Hospitality and services	1 500	0	1 000	0	2 500
Total	6 550	0	8 100	5 500	20 150

Source: Karratha Primary Trade Area Retail and Commercial Strategy, SGS Economics and Planning (2009)

- a total of 134 100 m² of health, welfare and community service floor space (additional 118 000 m² over 2006 estimates).
- a total of 89 000 m² of entertainment/recreational/cultural floorspace (additional 57 600 m² over 2006 estimates).

Note that this information is an estimate only, and is based on benchmark floorspace provision in a range of regional centres across Australia. The estimates do not include provision for areas such as car parking, landscaping and setbacks, and are based on an average per square metre of floor space per employee. The projections incorporate employment estimates based on aspirational population targets.

The following variables (over and above resident population), identified by Pracsys as part of the *Karratha City Centre Master Plan*, may also influence the demand for floorspace, in particular retail floorspace:

- the nature and extent of the tourism sector and visitor base to Karratha;
- the extent of the FIFO population;
- the extent to which Karratha as a major regional population centre will act as an attractor for Pilbara residents in general; and
- the extent of expenditure leakage, which is partly a function of the range of retail, commercial and institutional services on offer in Karratha.

The report also notes that rather than being driven by population growth, demand for non-retail floorspace is driven by commercial and strategic service delivery and resourcing decisions of business, companies, government agencies and institutions.

The *Karratha City Growth Plan* promotes the development of the town centre as the primary retail and trade centre for Karratha and the surrounding region. Lower order district centres are identified at Tambrey and Mulataga as well as several local centres in other areas, providing local retail and other services and facilitating local employment generation. The release of retail floorspace across Karratha will need to be carefully phased and managed in a way that does not undermine the activity centre status of the city centre.

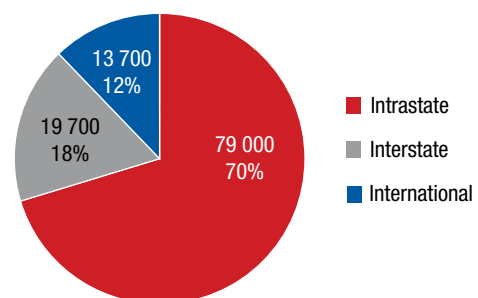
The *Karratha City Centre Master Plan* estimates a total yield of 44 464 m² of core retail, 15 264 m² of other retail and 51 480 m² of office uses across the four precincts in the town centre.

6.10 Demand for tourist accommodation

North West visitor summary

In the 12 months to December 2009, WA's North West – which encompasses both the Pilbara and Kimberley regions – had an estimated 500 600 visitors. The figure was down on the previous two years with visitors in 2007 numbering 568 900 and in 2008, 540 400. In 2009, international visitors stayed the longest – an average 25.2 days. Interstate visitors followed with an average stay of 8.6 days while intrastate visitors averaged 5.7 days. Data for the Shire of Roebourne indicates that domestic visitors averaged 8.1 days and international visitors 19.6 days for the same period. Average visitor numbers are shown in Figure 24.

Figure 24: Average annual visitors to Shire of Roebourne 2007 to 2009

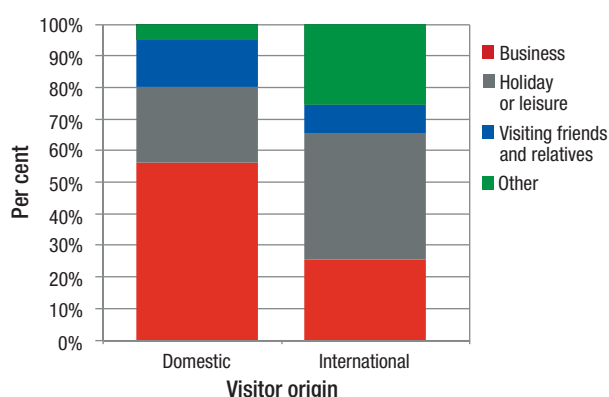


Source: Australia's North West Overnight Visitor Fact Sheet (years ending December 2007/08/09), Tourism WA (2010)

Data sourced from Tourism Research Australia's National and International Visitor Surveys

Data collected by Tourism WA shows that the leading purpose of visit to the Shire of Roebourne for domestic visitors was business (56 per cent). Holiday or leisure visits were prominent among international visitors (41 per cent). This data is shown in Figure 25.

Figure 25: Main purpose of visit to Shire of Roebourne, visitors 2007 to 2009¹



¹Based on visitor numbers averaged over 2007/08/09. Purpose of visit is a multiple response question - totals may not add up to 100 per cent.

Source: Shire of Roebourne Overnight Visitor Fact Sheet (years ending December 2007/08/09), Tourism WA (2010)

According to Tourism WA, all forms of visitor accommodation in Karratha have at least a 90 per cent occupancy rate during the year. Availability of short-stay accommodation has been reduced in recent years as a result of housing and workforce accommodation supply shortages. Much of the available tourist accommodation is occupied by long-term guests such as resource company employees (contractor block bookings) or lower paid service workers unable to afford more permanent accommodation (caravan parks). Long-term guests staying two months or more occupy about a third of sites in caravan parks.

The high level of permanent occupancy of the visitor accommodation means that many visitors face difficulty finding affordable accommodation, requiring them to book months in advance of their stay. As a result of the crowded nature of caravan parks, visitors are now seeking alternate, more remote camping locations.

Research by the Tourism Forecasting Committee shows that between 1999 and 2009 the annual growth rate for visitor nights in regional Western Australia (excluding Perth) was -1.2 per cent. Total visitor nights in regional WA are predicted to increase by 0.4 per cent each year between 2009 and 2019, which is lower than that forecast for Perth, at 2.5 per cent. Domestic visitor nights in regional Western Australia are forecast to fall by -0.5 per cent annually over the period 2009 to 2019.

Development of the tourism industry in Western Australia relies on the provision of appropriate infrastructure, which services the needs of tourists and encourages investment by the private sector. Tourism WA facilitates infrastructure development through its reports *Tourism Development Priorities*, which identify key infrastructure projects for tourism development across the State.

In December 2009, a study by Tourism WA indicated strong demand for new tourist accommodation in Karratha. Early analysis suggests that there may be demand for an additional 300 to 700 rooms. Anecdotal reports indicate that caravan park accommodation is also in heavy demand.

Land and housing demand > for more information see the following links:

Australian Bureau of Statistics: www.abs.gov.au see Catalogue 2001.0 - 2006 Census Basic Community Profiles, Karratha (urban centre), Roebourne (local government area)

Australian Housing and Urban Research Institute: www.ahuri.edu.au see Housing market dynamics in resource boom towns (July 2009)

Pilbara Development Commission: www.pdc.wa.gov.au see Housing and Land Snapshots

Real Estate Institute of Western Australia: www.reiwa.com.au see Regional Centres Profile

7 Land and housing supply

Key points

- Karratha is in critical need of affordable accommodation to house employees in the retail, hospitality, tourism and general service sectors.
- The town has more than 1200 ha of undeveloped land zoned for residential/urban uses and much of it - 840 ha - is south of the Karratha Hills.
- The *Karratha City Growth Plan* identifies another 1156 ha for future development in areas not currently zoned for residential or urban development. Many of these areas will require resolution of issues before development can proceed, including native title and heritage, further planning, zoning, environmental and servicing issues.
- Areas identified in the *Karratha City Growth Plan* could potentially accommodate a population of 50 000 persons if developed at medium and higher densities. The plan reflects community preference to contain development north of the Karratha hills.
- Development of areas beyond Baynton West will trigger substantial infrastructure upgrades.
- Difficulties have been experienced in meeting 30-month development conditions for lots due to limited capacity for construction in the building industry. Initiatives to address these issues include use of alternative building materials and pre-fabricated housing, establishment of builders display villages and incentives to attract other builders to the market. House and land packages have also become increasingly available.
- A key feature of the Pilbara Cities blueprint is to attract private developers to the market through the release of development sites and super lots for the construction of medium and high-density housing.

Actions and priorities

- Native title negotiations are progressing, but there is a need to clear additional land for future development.

7.1 Issues affecting delivery of land and housing to market

Many issues affect the delivery of land and housing to the Karratha market. These can be summarised as follows:

- inadequate capacity in potable water, wastewater, energy and power distribution networks is affecting the release of residential, commercial and industrial land. Funding has been sought from Infrastructure Australia and agencies capital works programs may need to be revised.
- highly volatile house prices create difficulties in attracting the finance necessary to develop new residential areas or to undertake larger scale commercial projects.
- difficulties and high cost of obtaining supplies of basic raw materials.
- difficulties and long timeframes associated with progressing government approvals. The Ministerial Taskforce on Approvals, Development and Sustainability is investigating these issues and developing initiatives to address the problems.
- indigenous heritage and native title issues.
- clearance under the Mining Act enabling Crown land to be released for development.
- construction capacity is hampered by Karratha's various industries competing for skilled and unskilled labour and other resources.
- lack of short-term accommodation for contractors and builders.

- long construction timeframes.
- issues with population estimates and determining agreed land supply requirements. Agreed growth rates are required to assist infrastructure agencies with their forward planning. There is also inadequate information available relating to employment numbers for major resource projects.

7.2 Planning context

State and regional planning

State Planning Strategy (1997)

The *State Planning Strategy* provides a strategic guide for land use planning through to the year 2029, Western Australia's bicentenary. The strategy is aimed at developing a land use planning system to help the State achieve a number of key goals. These include generating wealth, conserving and enhancing the environment, and building vibrant and safe communities for the enjoyment of this and subsequent generations of Western Australians. The strategy assists strategic decision making and provides a basis for coordinating and promoting regional land use planning and land development, and for guiding government departments and instrumentalities and local governments on those matters.

The strategy is currently being reviewed, with a draft due to be released for public comment in 2011.

State planning policies

State planning policies are prepared and adopted by the WAPC under statutory procedures set out in part 3 of the *Planning and Development Act 2005*. These policies are concerned with broad planning controls and can be made for matters which may be the subject of a local planning scheme or which relate to a specific region or area of the State. Examples include state policies for coastal planning; rural land use planning; and residential design codes (R-Codes). The WAPC and local governments must have due regard to the provisions of state planning policies when preparing or amending local planning schemes and when making decisions on planning matters. Further information can be accessed at the Department of Planning's website, www.planning.wa.gov.au.

Blueprint for Pilbara Cities (2009)

The State Government's Pilbara Cities initiative is designed to encourage more people to live and settle in the Pilbara. The Pilbara Cities blueprint provides a framework to transform the region by creating modern higher density centres, supported by infrastructure and amenity upgrades and improvements. The blueprint includes proposals for major revitalisations of South Hedland, Karratha, Newman, Dampier, Tom Price and Onslow town centres, in addition to plans to create new marinas and improved waterfronts at Port Hedland, Dampier and possibly Onslow. New infrastructure and facilities such as schools, TAFEs, medical facilities, leisure and entertainment facilities and retail precincts are also part of the plan.

Critical to the success is the attraction of new residents and businesses not involved in the region's traditional sectors of oil, gas and mining, creating places where people choose to settle on a permanent basis with access to high standards of services. The private sector is expected to play a crucial role in achieving the plan, including assisting with the delivery of affordable accommodation solutions by the release of development sites and superlots for land and housing, including opportunities in the private rental market.

Pilbara Planning and Infrastructure Framework (under way)

The Pilbara Planning and Infrastructure Framework defines a strategic direction for the future development of the Pilbara region over the next 25 years. It addresses the scale and distribution of future population growth and housing development as well as identifying strategies for dealing with: economic growth, environmental issues, transport, infrastructure, water resources, tourism and the emerging impacts of climate change. It seeks to ensure that development and change in the Pilbara region is achieved in a way that improves people's lives and enhances the character and environment of the region.

The Framework sets out regional planning principles together with goals, objectives and actions to achieve these. The strategy also addresses the Pilbara's priority infrastructure needs over the next five years.

The Framework represents an agreed 'whole of government' position on the broad future planning direction for the Pilbara and will guide the preparation of local planning strategies and local planning schemes. It will be particularly important in informing government of infrastructure priorities in the Pilbara and giving the private sector confidence to invest in the region.

It is anticipated that the draft framework will be released for public comment in early 2011.

Pilbara Framework: Regional Profile (2009)

The *Pilbara Framework: Regional Profile* provides a spatial planning profile for the Pilbara region. The document provides a background and rationale for the Pilbara Planning and Infrastructure Framework, which will set out the spatial strategic direction for the region. This will inform State Government investment in infrastructure and provide the context for local government planning in the region.

The document provides detailed information on the existing settlement structure within the region. The regional profile was released in August 2009.

Pilbara Regional Water Plan 2010 - 2030 (2010)

Released by the Department of Water in June 2010, the *Pilbara Regional Water Plan 2010 - 2030* provides a strategic and long term approach to sustainable water resource planning and management for the Pilbara region. The plan presents a strategic overview of the region's water resources and the major challenges facing the region, both today and in the future. Included in the document is an action plan which lists priority actions for water planning in the region for the next five years.

Actions included in the plan are intended to address the current shortage of regional, district and local water management plans and strategies that are necessary to guide future developments, and demonstrate the lands capability to support these developments from a water perspective.

Better Urban Water Management (2008)

Better Urban Water Management (BUWM) provides guidance on the implementation of *State Planning Policy 2.9 Water Resources* and has been adopted as the state policy approach in integrating land and water planning and working towards water sensitive urban design. This approach was collaboratively developed by the Department of Planning and Infrastructure, Department of Water (DoW), the Western Australian Local Government Association and the Australian Government Department of Environment, Water, Heritage and the Arts.

BUWM is designed to facilitate better management and use of water resources by ensuring an appropriate level of consideration is given to the total water cycle at each stage of the planning system. The document intends to assist regional, district and local land use planning, as well as subdivision phases of the planning process. The document is to be used by all stakeholders and decision makers and has statewide application for new urban, commercial, industrial and rural-residential developments.

Local planning

Karratha Revitalisation Plan (2010)

The Karratha Revitalisation Plan provides an overall framework for the future development of Karratha and its evolution into a city, through the coordination of State and local governments and other stakeholders in a coherent plan to improve the quality of life for all people living in the area. The three components of the plan are:

Implementation Blueprint

The *Implementation Blueprint* is a business plan for delivering the Pilbara Cities vision, describing an integrated approach for local, state and federal government, the private sector and the community. The document provides an overview of the project, summarises the key conclusions drawn from the analysis of the current situation, key drivers and pressures, outlines the project goals and objectives, and sets out the implementation strategies and action projects. The plan identifies specific responsibilities, time and costs to ensure delivery can be coordinated and monitored.

Karratha City Growth Plan

The *Karratha City Growth Plan* identifies a series of neighbourhood precincts, setting out how and when land should be used and developed, how the environment should be protected and the associated infrastructure and servicing requirements. The plan identifies key facilitating actions that over time will have flow on affects to ensuring that Karratha and its communities are vibrant and safe places that people will be born into as well as attractive for retirement years.

The *Karratha City Growth Plan* adopts a growth model that accommodates a much more diverse housing typology that will ensure there are a variety of housing choices available, facilitating a diverse community demographic. The plan focuses growth north of the Karratha hills.

Karratha City Centre Master Plan

The *Karratha City Centre Master Plan* outlines the principles, objectives and strategies for delivering a robust city centre commensurate of a regional centre with a population of 50 000 or more persons. The plan will guide the development of future housing, open spaces, commercial activities, tourist accommodation, entertainment and retail areas, as well as service infrastructure, transport, education and community facilities. Preparation of the master plan involved the consideration, examination and assessment of a wide range of issues at both the regional level and the Karratha urban area context. The plan includes urban and landscape design guidance and also includes a phasing plan identifying how and in what sequence land for development and supporting infrastructure will be provided. Specific responsibilities, time and costs are also identified, ensuring delivery can be coordinated and monitored.

Each of the above documents were adopted by the Shire of Roebourne in May 2010. It is intended that these plans will be forwarded to the WAPC for consideration of endorsement.

Karratha 2020 Vision and Community Plan (2008)

Prepared in response to anticipated population growth, the plan assesses the infrastructure and service needs of Karratha around six key themes, these being;

- business, entrepreneurialism and economic development
- infrastructure investment and transport
- leadership and capacity
- liveability and lifestyle
- environmental capital
- community health and wellbeing

The plan was prepared by the Shire of Roebourne in conjunction with Rio Tinto and Woodside.

Karratha Area Development Strategy (1998)

Released in 1998, the Karratha Area Development Strategy is a sub-regional development strategy formulated to resolve conflicting land and water use demand, guide and control the use of land and water, and coordinate infrastructure provision and urban expansion for the next 25 years. The strategy is based on a desktop compilation of about 30 different studies and initiatives.

Shire of Roebourne Town Planning Scheme No. 8

Local planning schemes set out the way land is to be used and developed. They classify areas for land use and include provisions to coordinate infrastructure and development in a locality. They also include controls to ensure long-term strategic planning objectives are achieved. The Shire of Roebourne's Town Planning Scheme No. 8 was gazetted on 22nd August 2000 and identifies the following objectives for Karratha:

- facilitate the continued growth of Karratha as the regional centre of the West Pilbara, in accordance with the Karratha Townsite Structure Plan (as amended);
- develop Karratha as the tourist entry for the West Pilbara built upon and taking into account the levels of commercial travellers associated with resource developments;

- preserve the key landscape and heritage values of the Karratha Hills;
- develop the Town Centre as the civic and commercial node for Karratha, the Shire and the West Pilbara;
- create an identity for the Town Centre through enhancing the built form and creating an identifiable central focus and improving legibility;
- develop Tambrey as a district commercial centre that does not compete with the regional catchment of the Town Centre and its facilities;
- develop a mixed business area within the suburb of Tambrey that embodies current design principles;
- develop local commercial centres so as to provide convenience goods and services to the local community;
- enhance the high level of residential amenity within Karratha in both existing suburbs and the residential expansion areas;
- encourage residential development that will accommodate a greater range of lifestyles and needs to reflect the broadening population base;
- prevent the proliferation of extractive industries in this precinct;
- retain the Karratha Industrial Estate as the regional service industry centre whilst improving its presentation as part of the entry statement to Karratha.

Preparation of a new local planning scheme and local planning strategy will commence following finalisation of the Karratha Revitalisation Plan documents.

Shire of Roebourne local planning policies

Local planning policies are prepared to provide guidance on the preparation of development applications and to communicate the objectives of the Shire in relation to development and use of land. The Shire of Roebourne has prepared a number of policies which provide guidance on development requirements in various areas and assist with decision making for various land use proposals. Further information can be found on the Shire of Roebourne's website www.roebourne.wa.gov.au.

7.3 Role of LandCorp

LandCorp is Western Australia's government land development agency, acting commercially to identify, design and implement major land, tourism and infrastructure projects which have a lasting and positive impact for Western Australians.

Projects are State wide and fall into industrial, metropolitan and regional categories. LandCorp works with all levels of Government and business on projects ranging from discrete residential subdivisions to the creation of whole new towns, industrial infrastructure and tourism development to support the long term growth of the State.

Principle services include:

- providing sufficient industrial land to assist the growth of WA's economy;
- urban development and renewal projects where unique opportunities or constraints exist;
- optimising triple bottom line outcomes from government-owned land;
- providing asset management and expert services to government; and
- supporting the growth of regional towns State wide by providing suitable land.

LandCorp operates with an independent board and is responsible to the Minister for Regional Development; Lands.

7.4 Role of Department of Regional Development and Lands

State Land Services within the Department of Regional Development and Lands is responsible for the administration, assembly and allocation of Crown land. Operating under the *Land Administration Act 1997*, the department has the following functions in dealing with Crown land:

- administer Crown land;
- conduct land assembly for Government land;
- support and advise other agencies in relation to Government land tenure issues under the *Land Administration Act 1997*;

- provide advice and input on land solution over Government land;
- liaise with LandCorp to complement the roles of the respective agencies; and
- sell Crown land to other government agencies, local governments and private customers.

The Department of Regional Development and Lands also delivers and oversees the Pilbara Revitalisation Plan funded under the *Royalties for Regions Act 2009*. The Pilbara Revitalisation Plan includes initiatives to provide housing for workers accommodation and sustainable housing for Aboriginals.

7.5 Residential

Existing dwelling stock

Approximately two-thirds of Karratha's occupied private dwellings recorded in the 2006 Census were separate houses (Table 11). More than 500 'other dwellings' were also recorded including caravans, cabins or houseboats, tents or sleep outs, or houses or flats attached to shops and offices. Approximately 63 per cent of occupied dwellings had three or more bedrooms. Just over half of the dwellings were rented which is comparable to that of the Pilbara region (at 49 per cent).

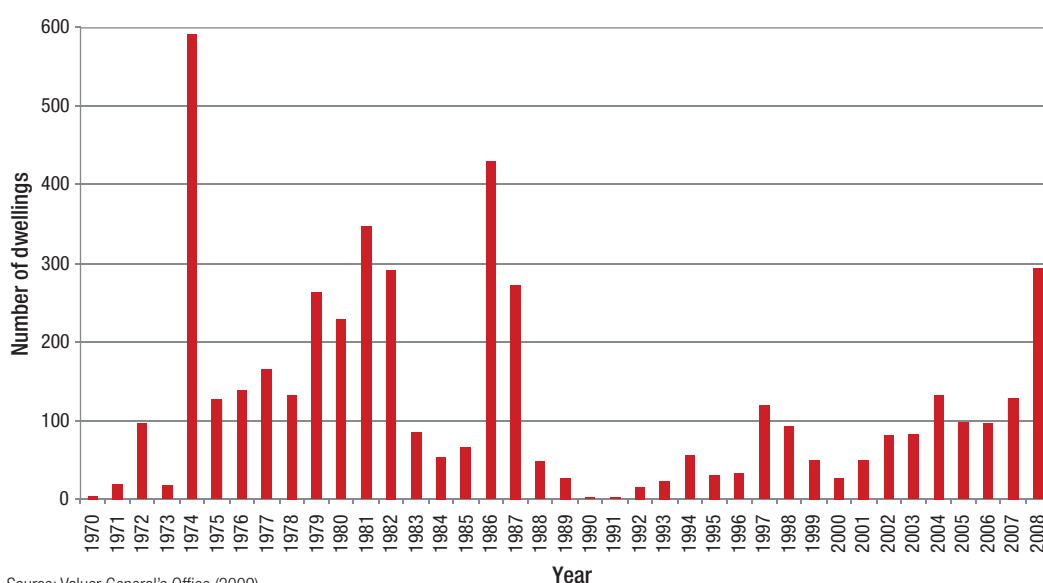
Significant housing stock owners in Karratha include resource companies (Rio Tinto, Woodside and other companies involved in the North West Shelf projects), the Department of Housing (social housing and GROH housing), Commonwealth government and the Shire of Roebourne.

Table 11: Census 2006 dwelling stock – Karratha

Dwelling type	Number of dwellings	Per cent of total occupied private dwellings
Total private dwellings (including unoccupied private dwellings)	4914	-
Occupied private dwellings	4334	-
Separate house	2851	65.8
Semi-detached, row or terrace house, townhouse etc	811	18.7
Flat, unit or apartment	156	3.6
Other dwellings	516	11.9
Not stated	0	0

Source: Census 2006 QuickStats, Australian Bureau of Statistics (2007)

Figure 26: Dwellings built per year (1970 to 2008) - Karratha



Source: Valuer General's Office (2009)

Much of Karratha's housing was built between the mid-1970s and mid-1980s (Figure 26). Dwelling construction peaked in 1974 when almost 600 dwellings were built in 12 months. Over the past ten years housing construction has steadily increased, with almost 300 dwellings completed in 2008. A map showing a decade of construction (all land uses) has been prepared for Karratha (see Map 3).

Existing development density/lot size and additional development potential

Development density and the potential for Karratha to absorb additional development has been assessed using the DoP's Integrated Land Information database (ILID). The database is a net land use assessment and capability model that is generated at a cadastral level for the whole of Western Australia. Outputs from this spatial model are shown in Table 12 and Map 4.

The data indicates that there may be opportunities for infill development in some of Karratha's more established suburbs where larger lots exist with higher density codes. Additional infill development utilising existing infrastructure should be encouraged where possible.

Existing vacant lots

Analysis of satellite imagery capture on 1 June 2010 revealed a total of 369 vacant residential lots across Karratha. The majority are in recently developed areas of Baynton West (263 lots) and Nickol West developments (68 lots). There are few vacant lots in the established suburbs of Bulgarra, Millars Well and Pegs Creek (25 lots total).

Table 12: Integrated land information database outputs – Karratha

Suburb	R-code	No. of lots	No. of dwellings ¹	Vacant lots	Average net density	Additional dwelling potential ²	Average area per dwelling
Baynton	Null ³	416	363	41	11.7	47	853
	R20	276	279	2	14.0	13	712
Total		692	642	43	12.6	60	792
Bulgarra	R20	732	740	0	13.6	40	734
	R30	251	467	3	16.7	280	598
	R40	3	96	0	45.0	11	222
Total		986	1303	3	15.4	331	648
Millars Well	Null ³	201	175	12	12.8	13	784
	R20	448	530	0	14.4	35	695
	R30	82	194	2	21.1	78	473
Total		731	899	14	15.0	126	664
Nickol	Null ³	264	207	57	7.2	63	1379
	R20	742	796	4	14.0	41	715
	R30	125	223	3	19.1	99	523
Total		1131	1226	64	12.6	203	792
Pegs Creek	R20	513	570	2	14.1	46	710
	R30	90	175	6	19.9	82	503
Total		603	745	8	15.1	128	662

Source: Integrated Land Information Database, Department of Planning (July 2009)

¹ Only includes those dwellings that are within residential zones of the current local planning scheme.

² Additional dwelling potential refers to existing developed lots and is based on current R-codes and lot size. In the case of split R-codes the highest R-code is used (i.e. maximum potential) to calculate the additional dwelling potential.

³ Refers to areas zoned urban development that do not have an R-code applied.

Recent subdivision activity

Residential subdivision activity has increased in recent years, with increases in both conditional and final subdivision approvals being recorded (Figure 27). Conditional approvals peaked in 2008-09 and final approvals in 2006-07. At 30 June 2010, there were 511 residential lots with conditional approval for subdivision. Almost all of these approvals relate to LandCorp's Baynton West subdivision. Remaining lots in this development will reach final approval stage in the short-term, improving the supply of residential lots to the market.

Residential zoned land supply

Data in Table 13 details the area of developed and undeveloped residential zoned land in Karratha. The analysis focused on undeveloped greenfield areas, and as such, single vacant lots in the existing urban area have been classified as developed. Large areas of undeveloped zoned land are located in Mulataga (160ha), Baynton and Gap Ridge. The Regals area (south of the Karratha Hills), has more than 840 ha zoned for urban development, but is unlikely to be developed for some time, given the preference to contain development north of the Karratha hills. Development of this area would also require resolution of a number of issues (such as the preparation of a native title agreement) and significant infrastructure investment.

The *Karratha City Growth Plan* identifies an additional 1156 ha for future residential development which does not already have a residential or urban development zoning. These areas will require an amendment to the local planning scheme along with the resolution of a number of other development issues before development can proceed. An omnibus amendment (no. 21) was initiated at the council meeting on 19 July 2010, which proposes rezoning of these areas to urban development. Further information on the *Karratha City Growth Plan* is available on the Shire of Roebourne's website, www.roebourne.wa.gov.au.

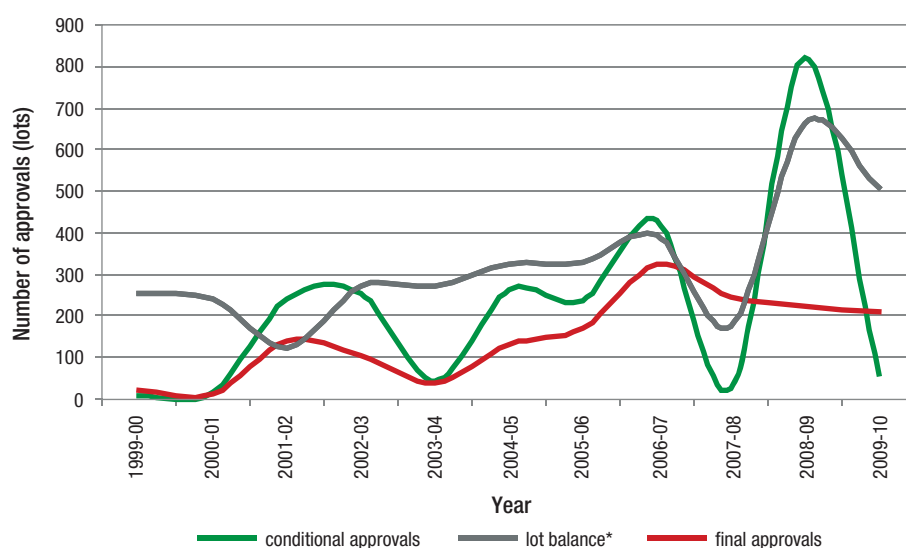
Table 13: Residential zoned land supply – Karratha

Zone	Developed (ha)	Undeveloped (ha)	Total (ha)
Residential R20	210.1	0	210.1
Residential R30	56.2	1.0	57.2
Residential R40	1.8	0	1.8
Urban development	228.8	1162.9	1391.7
Total	496.9	1163.9	1660.8

Source: Internal databases, Department of Planning (2010)

The Shire of Roebourne has recently released the *Karratha Open Space Strategy*. Developed in consultation with the DoP, the strategy provides a framework for the provision of public open space in Karratha. It also identifies potential residential

Figure 27: Residential conditional and final approvals¹ 1999-00 to 2009-10 – Karratha



¹ Includes subdivision/strata approvals for the purposes of subdivision, amalgamation, boundary realignment, resubdivision and road purposes.

* As at 30 June each year. Refers to conditional approvals for which construction or servicing has not yet commenced, or is currently under way (i.e. has not reached final approval stage).

Source: Approvals database, Department of Planning (2010)

development areas resulting from the excision of approximately 19.8 ha of land from open space areas across the town. Collectively, the areas identified could accommodate a significant number of dwellings.

As part of the Karratha Revitalisation Plan, a master plan has also recently been prepared for the Karratha town centre. The master plan identifies four distinct precincts in the city centre, these being the retail, commercial, accommodation and entertainment precincts. The master plan identifies a yield of 2516 dwellings, 718 hotel rooms and additional retail, commercial and community floorspace across the city centre (Table 14). The precincts are shown in Figure 28 and Map 5.

Further information is available in the *Karratha City Centre Master Plan*, available on the Shire of Roebourne's website, www.roebourne.wa.gov.au.

Residential land development pipeline

The residential land development pipeline detailed in Figure 29 presents data for key points of the land development process, from identification of land in strategic plans, through to subdivision and building approvals. Regular monitoring of the amount of land and approvals flowing through the pipeline will assist with identifying bottlenecks in the development process, and potential periods of over or under supply.

The pipeline data identifies a current lack of subdivision applications flowing through the system with only one application lodged and no applications awaiting determination at the end of the March quarter 2010. Few residential lots were granted conditional approval in 2009, indicating a potential shortfall of lots flowing through the pipeline to final approval stage in the short-term. The majority of lots with conditional approval (end of March quarter 2010) are for the remaining stages of Baynton West. Subdivision applications for Madigan Road (KA17) and Nickol West (KA07B) are likely to be lodged before the end of 2010.

Table 14: Precinct yield table - Karratha City Centre Master Plan

Precinct/ features	Dwelling yield	Core retail/ cafes NLA (m ²)	Other retail NLA (m ²)	Office, health, community NLA (m ²)	Hotel rooms
Retail precinct Main street shopping, mixed uses, public plazas and specialty stores	358	33 400	1 481	10 786	181
Commercial precinct Offices and small showrooms, community, youth and cultural focus	1 509	5 224	9 033	98 468	0
Accommodation precinct Short-term accommodation and ancillary entertainment uses	561	2 855	4 246	16 662	492
Entertainment precinct Restaurants, cinemas, bars, theatre and amusement facilities	88	2 985	504	2 785	45
Total	2 516	44 464	15 264	128 701	718

Source: Karratha City Centre Master Plan, LandCorp (2010)

NLA = net lettable area

Figure 28: Karratha City Centre Master Plan - precinct and land use plan

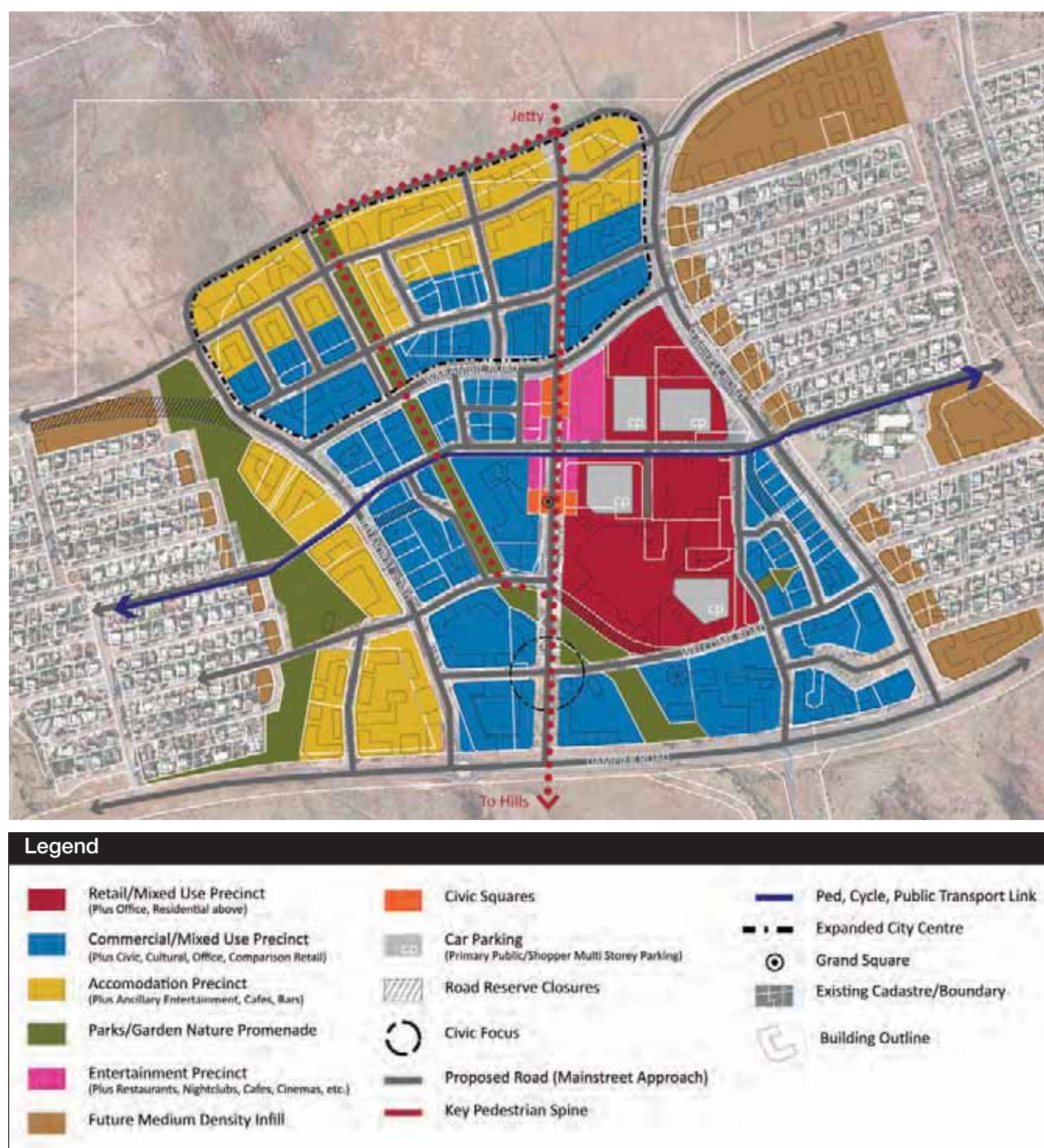
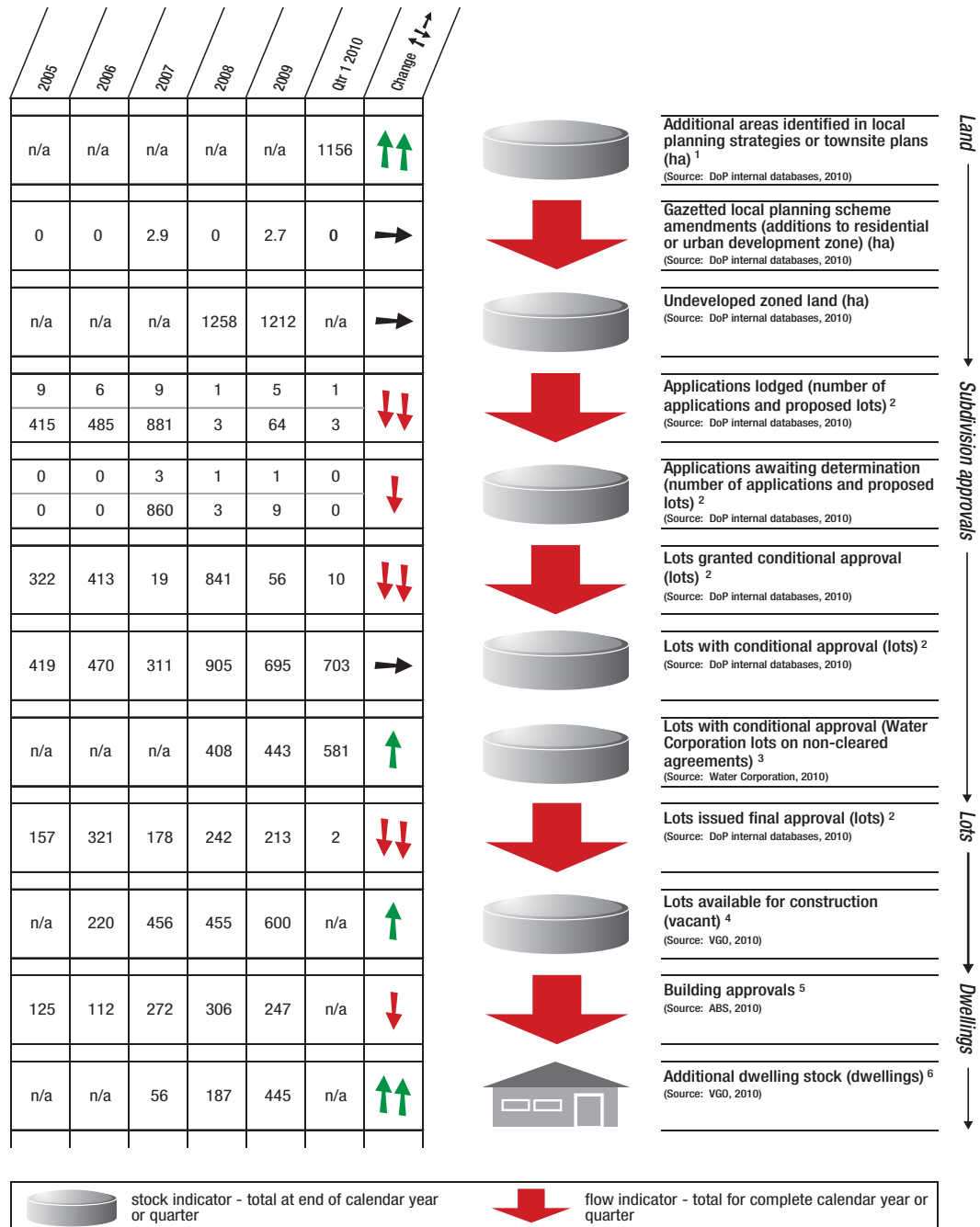


Figure 29: Residential land development pipeline – Karratha



¹ Additional residential development areas (not currently zoned) identified in draft Karratha City Growth Plan adopted by the Shire of Roebourne in May 2010.

² Includes subdivision and strata applications/approvals for the purposes of subdivision, amalgamation, boundary realignment, road purposes etc.

³ Refers to conditionally approved lots where a servicing agreement (agreement to construct) has been signed between the Water Corporation and the developer. These are termed lots on non-cleared agreements.

⁴ Vacant lot data as at July of each calendar year.

⁵ In some cases approvals have not been coded to a specific census collector district. These records have been excluded from this data.

⁶ Calculated from Valuer General's Office data (variance between total number of residential dwellings between each year). May include transient workforce accommodation if identified as residential dwelling by VGO. As at July of each calendar year.

Residential land release summary

In summary:

- The remaining stages of Baynton West (KA03) are likely to be completed by late 2010/early 2011.
- Other sites that are likely to be developed in the short-term include Madigan Road (KA17), Tambrey Primary School surplus land (KA35), Nickol West (KA07B) and Tambrey Mixed Use Precinct (KA24/KA24A). These sites require further planning (structure planning and subdivision approvals) and finalisation of local planning scheme amendments. Such development will also trigger upgrades to water and wastewater services.
- The *Karratha City Growth Plan* identifies a number of additional sites for future residential development. If developed at medium/high densities, a population of 50 000 persons could potentially be accommodated north of the Karratha Hills, therefore avoiding the need to develop the Regals area (south of Karratha Hills).

If these densities are not achieved, additional greenfield land may be required. The majority of the sites require resolution of a number of issues including native title, heritage, zoning, planning, environmental and servicing issues.

- The *Karratha City Growth Plan* proposes a range of residential densities (average of R40 or 40 dwellings per hectare) and a variety of housing types to improve housing diversity.
- There are ongoing accommodation and housing shortages, particularly for social housing, government housing and service populations.
- Development of higher density housing is emerging with the release of higher density group housing sites and proposals to develop multi-level projects in the town centre and Tambrey area.

Land and dwelling release information is summarised in Table 15. Further project specific information is available in Table 27 and Map 5 and 6.

Table 15: Residential land and dwelling release summary – Karratha

Project	Short-term (0-2yrs)	Short-term (2-5yrs)	Medium-term (5-10yrs)	Long-term (10yrs+)	Total
Town centre – additional residential dwellings	0	696	807	1 013	2 516
Baynton West (KA03)	457	0	0	0	457
Baynton West site (KA03A)	114	114	0	0	228
Nickol West (KA07B)	0	250	0	0	250
Nickol (KA07C)	0	0	926	927	1 853
Mulataga (KA15)	0	1 250	1 250	0	2 500
Mulataga (KA15A)	0	546	547	0	1 093
Mulataga (KA15B)	0	83	84	0	167
Mulataga Hills (KA15C)	0	0	315	0	315
Madigan Road (KA17)	200	400	0	0	600
Tambrey mixed use – residential component (KA24/KA24A)	0	300	0	0	300
Seven Mile (KA28A)	0	0	893	893	1 786
Seven Mile (KA28B)	0	0	211	0	211
Uniting Church site (KA31)	14	14	0	0	28
Balmoral Apartments - residential component (KA33)	0	21	0	0	21
Tambrey Primary School surplus land (KA35)	80	0	0	0	80

Table 15: Residential land and dwelling release summary – Karratha (continued)

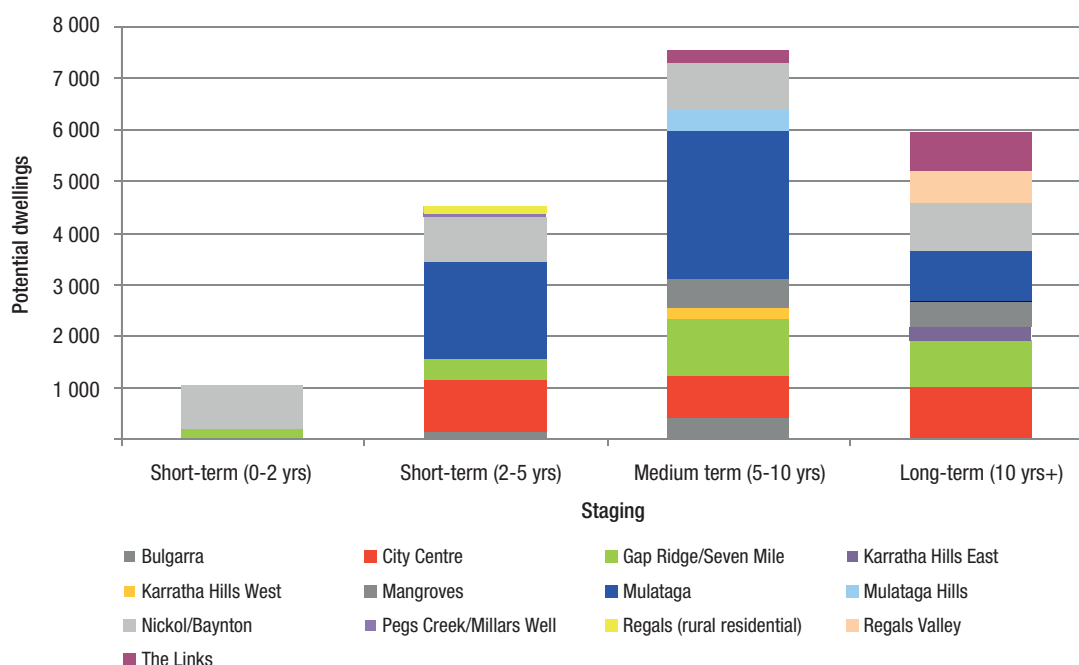
Project	Short-term (0-2yrs)	Short-term (2-5yrs)	Medium-term (5-10yrs)	Long-term (10yrs+)	Total
Tambrey Luxury Apartments – residential component (KA37)	40	0	0	0	40
Galbraith Road (KA38)	5	0	0	0	5
Grouped housing sites (KA39)	35	0	0	0	35
Regals (KA42) (beyond 20 years)	0	0	0	Not determined	Not determined
Regals Rural Living (KA43)	0	171	0	0	171
Karratha Open Space Strategy sites (KA47)	0	0	426	0	426
Bulgarra (KA47A)	0	131	0	0	131
Karratha Open Space Strategy sites (KA48)	0	41	0	0	41
Karratha Open Space Strategy sites (KA49)	0	99	0	0	99
Karratha Open Space Strategy sites (KA50)	0	119	0	0	119
Warambie Road High Rise (KA52)	0	300	0	0	300
Lot 309 Perentie Road (KA53)	10	0	0	0	10
Lot 403 Gardugarli Drive (KA54)	72	0	0	0	72
Regals Valley (KA55)	0	0	0	629	629
Mulataga/Mangroves (KA57)	0	0	1 462	1 462	2 924
The Links (KA58)	0	0	0	428	428
The Links (KA59)	0	0	245	0	245
The Links (KA60)	0	0	0	334	334
Karratha Hills East (KA65)	0	0	0	210	210
Karratha Hills West (KA67)	0	0	0	Not determined	Not determined
Karratha Hills West (KA68)	0	0	209	0	209
Mulataga Hills (KA84A)	0	0	98	0	98
Mangroves (KA84B)	0	0	93	0	93
Karratha Hills East (KA84D)	0	0	0	70	70
Baynton West additional lots (KA86)	27	0	0	0	27
Total residential	1 054	4 535	7 566	5 966	19 121

Adequacy of supply

Data presented in Table 15 indicates that if land were to be released as planned, approximately 5600 dwellings could be developed over the next five years, and an additional 7500 over the following five years (Figure 30). This equates to the development of 500 dwellings each year over the next two years, followed by 1500 dwellings each year thereafter. Fast tracking the resolution of development constraints may however enable a larger number of lots and/or dwellings to be released over the short to medium term. Furthermore, the potential for an additional

6000 dwellings has been identified for the period beyond 10 years. This data has been generated by researching existing project information and analysing data prepared as part of the *Karratha City Growth Plan*. Staging information presented in the *Karratha City Growth Plan* has been modified somewhat with more conservative staging used for the larger Mulataga (KA15A/B/C, KA57), Nickol (KA07C) and Seven Mile (KA28A/B) projects.

Figure 30: Potential future dwelling release by precinct



Source: Internal databases, Department of Planning (2010)

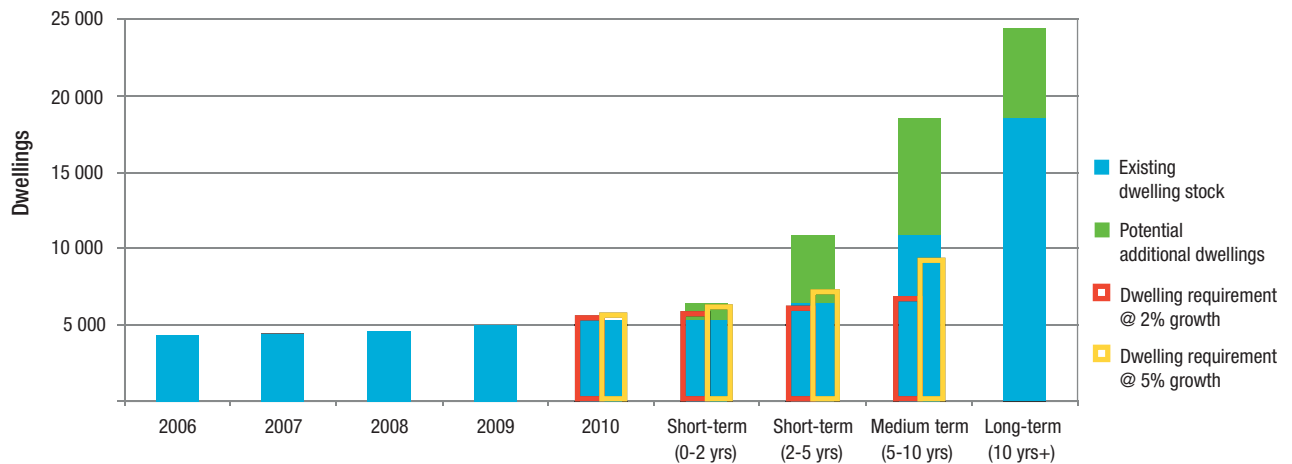
Note that in many cases, the release and development of land is subject to resolution of a number of issues, such as Native Title, planning, environmental and servicing issues. Demand is also a critical factor, with land and dwellings unlikely to be developed unless considerable demand is evident.

Projected future dwelling requirements have been calculated using a range of average annual growth rates (as an indication of demand) and assumptions regarding existing unmet demand (Table 16). This information has been compared to potential supply using existing dwelling stock information and potential supply data presented in Table 15.

Assuming no existing unmet demand and potential supply as detailed above, supply is expected to easily meet demand over the short, medium and long term (Figure 31). Assuming an existing unmet demand for 1500 dwellings (as determined by the Pilbara Towns Housing Study), there is a potential undersupply in the short-term, with supply meeting demand over the medium and long-term. This information is displayed graphically in Figure 32. The unmet demand was calculated determining

the current apparent and latent demand for housing. Apparent demand was determined by analysing waiting lists for social and Government Regional Officer's Housing and estimating the extent of primary, secondary and tertiary homelessness in Pilbara communities. Latent demand was estimated using an input/output model to determine the gap in the supply of workers, which was then converted to dwelling requirements.

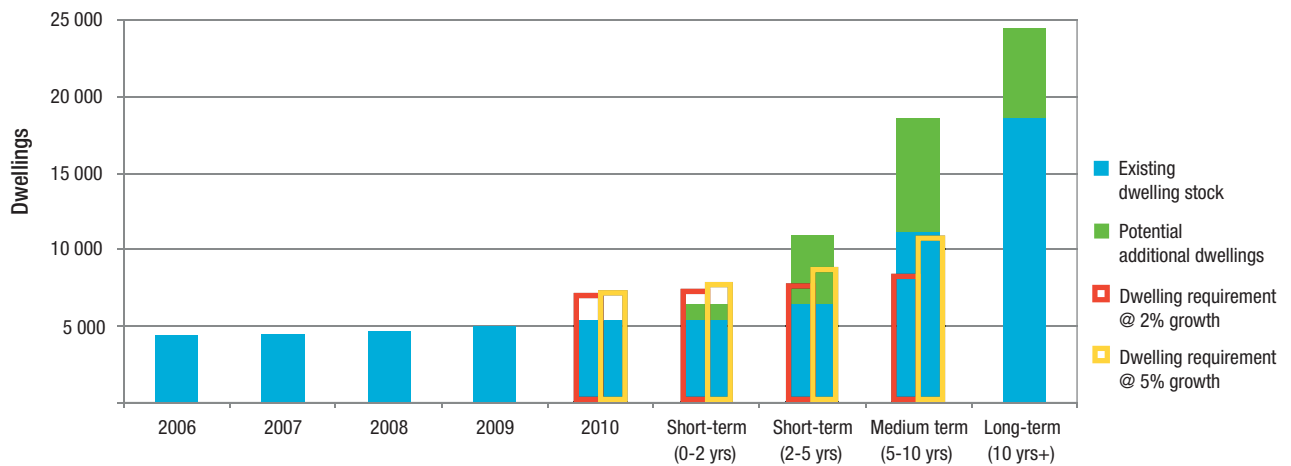
Figure 31: Potential future dwelling supply and requirement¹ (assuming no existing unmet demand)



Source: Internal databases, Department of Planning (2010)

¹ Calculated using assumption of 2.5 persons per dwelling, and dwelling stock in mid-2010 at 5372 dwellings. Population and dwelling requirement calculated as at end of each time period (i.e. 0-2 yrs calculated as at mid-2012, 2-5 yrs calculated as at mid-2015 etc).

Figure 32: Potential future dwelling supply and requirement¹ (assuming existing unmet demand²)



Source: Internal databases, Department of Planning (2010)

¹ Calculated using assumption of 2.5 persons per dwelling, and dwelling stock in mid-2010 at 5372 dwellings. Population and dwelling requirement calculated as at end of each time period (i.e. 0-2 yrs calculated as at mid-2012, 2-5 yrs calculated as at mid-2015 etc).

² Assumes existing unmet demand of approximately 1500 dwellings (as identified in Pilbara Towns Housing Study).

7.6 Transient workforce accommodation

As at September 2009, the Shire of Roebourne had transient workforce accommodation facilities to accommodate more than 10 300 persons (Table 17). Known proposals for additions to facilities or new facilities could potentially accommodate an additional 9000 persons, taking the potential occupancy of workforce accommodation in the shire to more than 19 000 persons.

Karratha currently has workforce accommodation facilities to accommodate more than 4500 persons. Larger facilities include the Gap Ridge Village on Madigan Road (2100 persons), the Searipple Village (1500 persons) and Bay Village (500 persons).

A number of smaller facilities are located in the Karratha Industrial Estate. Note that this data does not include the proposed MAC Services village to be established on Madigan Road.

Many of the current facilities operate as gated or stand alone facilities having their own recreational and hospitality facilities, meaning that many FIFO workers do not integrate into the broader community, and have a minimal social and economic impact on the town.

Table 16: Projected residential dwelling requirements¹

Growth rates/ assumptions	Short-term (0-2yrs)	Short-term (2-5yrs)	Medium-term (5-10yrs)
Assuming no existing unmet demand			
1.5% average annual demand growth	5 620	5 876	6 330
Projected over/under supply	+806	+5 085	+12 197
2.0% average annual demand growth	5 702	6 052	6 682
Projected over/under supply	+723	+4 909	+11845
3.0% average annual demand growth	5 872	6 417	7 439
Projected over/under supply	+554	+4 544	+11 088
4.0% average annual demand growth	6 045	6 800	8 273
Projected over/under supply	+381	+4 161	+10 254
5.0% average annual demand growth	6 221	7 202	9 191
Projected over/under supply	+205	+3 759	+9 336
Assuming existing unmet demand of 1500 dwellings			
1.5% average annual demand growth	7 120	7 376	7 830
Projected over/under supply	-694	+3 585	+10 697
2.0% average annual demand growth	7 202	7 552	8 182
Projected over/under supply	-777	+3 409	+10 345
3.0% average annual demand growth	7 372	7 917	8 939
Projected over/under supply	-946	+3 044	+9 588
4.0% average annual demand growth	7 545	8 300	9 773
Projected over/under supply	-1 119	+2 661	+8 754
5.0% average annual demand growth	7 221	8 702	9 773
Projected over/under supply	-1 295	+2 259	+7 836

¹ Calculated using assumption of 2.5 persons per dwelling.

Assumes dwelling stock in mid-2010 at 5372 dwellings.

Population and dwelling requirement calculated as at end of each time period (i.e. 0-2 yrs calculated as at mid-2012, 2-5 yrs calculated as at mid-2015 etc).

Source: Internal databases, Department of Planning (2010)

Table 17: Occupancy of transient workforce accommodation facilities - Shire of Roebourne

Location	Approved occupancy	Proposed occupancy
Cape Lambert/Wickham	2 354	4 531
Cape Preston/Mardie Station	2 459	8 466
Dampier	709	804
Karratha	4 539	5 210
Other remote camps	100	275
Roebourne	114	78
Whim Creek	116	203
Total	10 391	19 567

Source: Shire of Roebourne (2009)

Transient workforce accommodation zoned land supply

As at June 2010, there was 22 ha of land zoned specifically for transient workforce accommodation in Karratha, of which approximately 5 ha was undeveloped (Table 18). Only two areas are zoned for this purpose, one being the site of the Bay Village on Rankin Road and the other in the Karratha Industrial Estate. There are some undeveloped parcels in the industrial estate, some of which are in State government ownership. Some of the existing workforce accommodation facilities are located on tourism zoned land in Karratha.

Table 18: Transient workforce accommodation zoned land supply – Karratha

Zone	Developed (ha)	Undeveloped (ha)	Total (ha)
Transient workforce accommodation	16.8	5.5	22.3
Total	16.8	5.5	22.3

Source: Internal databases, Department of Planning (2010)

Transient workforce accommodation development summary

In summary:

- There are a number of existing sites accommodating transient workforces in Karratha, and planning is progressing for the development of additional sites (at Gap Ridge, Karratha town centre and Karratha Industrial Estate).
- Funding (\$30.4 m) was announced in November 2009 for the construction of a workers village located adjacent to the existing town centre. The village will provide approximately 100 units, accommodating up to 250 persons. Offering rental accommodation (\$350 - \$450 per week) for private sector service workers (e.g. retail, hospitality and tourism workers), development of the village will assist employers with staff attraction and retention and provide an interim solution to the high rental costs currently being experienced in the town. The first units are expected to become available in mid-2010, with completion anticipated early to mid-2011.
- Service workers accommodation is not considered an appropriate long-term use for the town centre area.

Land and dwelling release information is summarised in Table 19. Further project specific information is available in Table 27 and Map 5 and 6.

Table 19: Transient workforce accommodation development summary – Karratha

Project	Short-term (0-2yrs)	Short-term (2-5yrs)	Medium-term (5-10yrs)	Long-term (10yrs+)	Total
Karratha Service Workers Accommodation (KA19)	100	0	0	0	100
Gap Ridge – MAC Services (KA27)	1180 (beds)	0	0	0	1180 (beds)
Gap Ridge (KA27B) ¹	0	181	0	0	181
Velocity Village (KA56)	92	0	0	0	92
Gateway (KA63) ¹	0	0	231	0	231
Gateway (KA64) ¹	0	143	0	0	143
Bulgarra (KA71) ¹	0	126	0	0	126
Cherratta Road (KA85)	94	0	0	0	94
Cherratta Road (KA87)	13	0	0	0	13
Total	299 (units) 1180 (beds)	450	231	0	980 (units) 1180 (beds)

¹ Estimates are based on Karratha City Growth Plan data, which calculates a yield based on residential densities of R40.
Actual yield for workforce accommodation uses will be determined by further detailed planning.

7.7 Industrial

Adequacy of supply

Without affordable accommodation available, the key service sector will continue to experience staff shortages and a high employee turnover. The *Pilbara Towns Housing Study* (unpublished) reports a latent demand of 710 dwellings for key service workers and 208 dwellings for residential construction workers in Karratha (as at 2008).

A number of projects are currently under construction, which will likely meet existing unmet demand in the short-term. While no figures are available regarding future demand for this type of accommodation, proposals for new facilities (Gateway precinct) or expansion to existing facilities (Bulgarra) should meet demand if developed in timeframes specified in the *Karratha City Growth Plan*.

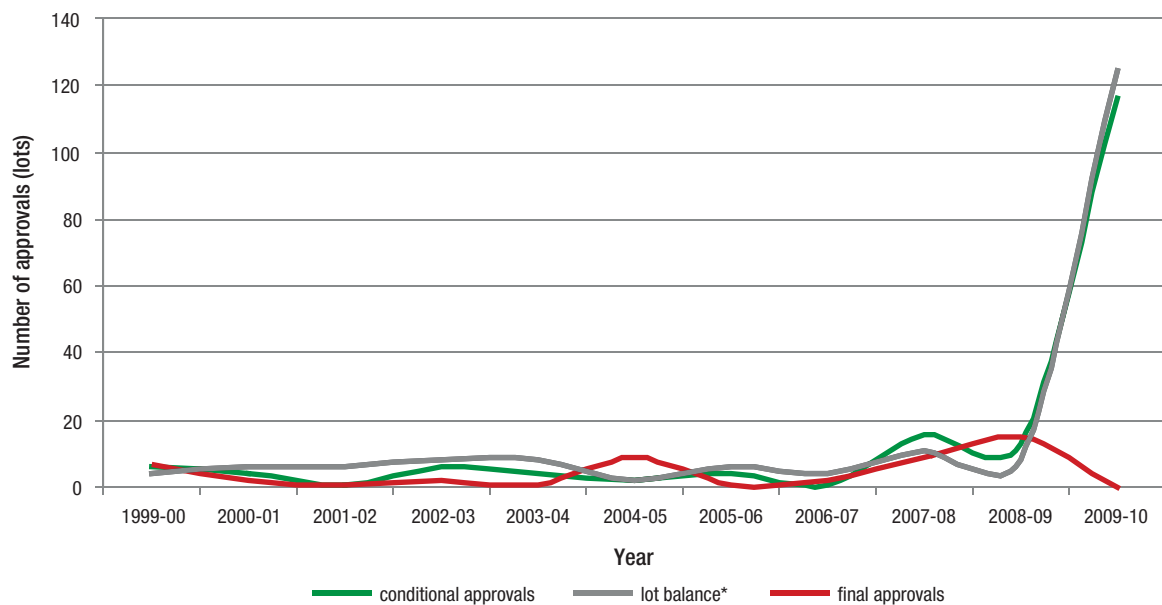
Recent subdivision activity

Over the last 10 years, Karratha has experienced relatively low levels of industrial subdivision activity, with the majority of activity relating to minor subdivision and amalgamation in the Karratha industrial estate. Activity increased sharply in 2010 with the granting of approval for subdivision of lots in the Gap Ridge Industrial Estate (Figure 33). At 30 June 2010, there were 124 industrial lots with conditional approval for subdivision.

The data shown below does not include lots released in 2009 at the Karratha Industrial Estate. These existing Crown lots (39) were recently serviced and released to the market, and were not subject to typical subdivision processes.

Industrial zoned land supply

As at the end of June 2010, Karratha had about 640 ha zoned for industrial uses, of which about 276 ha was undeveloped (Table 20). The zoned land supply includes 182.9 ha of industry zoned land at the Karratha Industrial Estate. The estate is now fully

Figure 33: Industrial conditional and final approvals¹ 1999-00 to 2009-10 – Karratha

¹ Includes subdivision/strata approvals for the purposes of subdivision, amalgamation, boundary realignment, resubdivision and road purposes.

* As at 30 June each year. Refers to conditional approvals for which construction or servicing has not yet commenced, or is currently under way (i.e. has not reached final approval stage).

Source: Approvals database, Department of Planning (2010).

subdivided although some lots are not yet built out. The existing estate contains 306 lots at an average lot size of ~5900 m² (ranging from 1500 to 56 000 m²).

Also included in the zoned land supply is 196.6 ha of land zoned industrial development at Seven Mile (proposed Gap Ridge Industrial Estate) and 259.4 ha of strategic industry zoned land also at Seven Mile. This area accommodates Rio Tinto's rail operations and Seven Mile power station.

Additional zoned areas in the vicinity of Karratha include the 4500 ha Maitland Industrial Estate south of Dampier (strategic industry), approximately 6500 ha on the Burrup Peninsula and surrounds near Dampier (strategic industry and industrial development zones), and 4900 ha at Mount Anketell, west of the townsite of Wickham (strategic industry).

Table 20: Industrial zoned land supply – Karratha

Zone	Developed (ha)	Undeveloped (ha)	Total (ha)
Industrial development	0	196.6	196.6
Industry	182.9	0	182.9
Strategic industry	179.5	79.9	259.4
Total	362.4	276.5	638.9

Source: Internal databases, Department of Planning (2010)

Industrial land release summary

In summary:

- LandCorp has recently released lots at the Karratha Industrial Estate and is progressing planning for the Gap Ridge Industrial Estate (light and general industrial uses). Stage one (37 lots) of this estate is anticipated to be completed in August 2011, and stage two (26 lots) by December 2012. Further stages will be developed subject to demand.
- Beyond the Gap Ridge estate, Karratha has no further undeveloped land zoned for industrial purposes.
- The *Karratha City Growth Plan* identifies a future development area at Seven Mile - a site south of the airport. This site could potentially accommodate future industrial development, but is subject to further detailed investigation. Additional sites for future general and light industrial development (adjacent to the Karratha Industrial Estate) have also been identified.

Land release information is summarised in Table 21. Further project specific information is available in Table 27 and Map 6.

Adequacy of supply

While it is difficult to calculate actual demand for industrial land, anecdotal evidence suggests there is high demand for industrial land in Karratha. Demand for general and light industrial land is anticipated to be met in the short to medium term with the release of lots at the Gap Ridge Industrial Estate. A variety of lot sizes are included in the plans for the estate, which includes 114 lots in total. Additional land will be released subject to demand.

Beyond sites offered on the estate, Karratha has no additional undeveloped land zoned for industrial uses. However, additional sites have been identified through planning work being undertaken as part of the *Karratha City Growth Plan*, with large areas identified to the west and north of the existing Karratha Industrial Estate.

Table 21: Industrial land release summary

Project	Short-term (0-2yrs)	Short-term (2-5yrs)	Medium-term (5-10yrs)	Long-term (10yrs+)	Total
Gap Ridge general industrial estate (KA30)	37	59	18	0	114 lots
Gateway Industrial (KA45A) - light	0	0	0	451 000 m ² NLA	451 000 m² NLA
Gateway Industrial (KA45B) - general	0	0	0	319 000 m ² NLA	319 000 m² NLA
Gateway Industrial (KA66A) - light	0	0	207 000 m ² NLA	0	207 000 m² NLA
Gateway Industrial (KA66B) - general	0	0	259 000 m ² NLA	0	259 000 m² NLA
Total industrial (light/general industrial)	37 lots	59 lots	18 lots 466 000 m² NLA	770 000 m² NLA	114 lots 1 236 000 m² NLA

NLA = net lettable area

7.8 Commercial/retail

Commercial/retail zoned land supply

The shire's local planning scheme includes commercial, mixed business and town centre zones. As at June 2010, Karratha had some 61 ha zoned for commercial, retail and mixed business uses, of which approximately 5 ha was undeveloped (Table 22). Almost all of the zoned areas are located in the Karratha town centre, with a few smaller sites scattered through Pegs Creek, Millars Well and Nickol. Most of the town centre land is developed, with few sites currently vacant. The majority of lots in the town centre are in government ownership.

As part of the Karratha Revitalisation Plan, a master plan has also recently been prepared for the Karratha town centre. The master plan identifies four distinct precincts in the city centre, these being the retail, commercial, accommodation and entertainment precincts. The master plan identifies a yield of 2516 dwellings, 718 hotel rooms and additional retail, commercial and community floorspace across the city centre (Table 14 on page 61). The precincts are shown in Figure 28 and Map 5.

Table 22: Commercial/retail zoned land supply – Karratha

Zone	Developed (ha)	Undeveloped (ha)	Total (ha)
Commercial	5.2	0.1	5.3
Mixed business	3.7	0	3.7
Town centre	47.7	4.7	52.4
Total	56.6	4.8	61.4

Source: Internal databases, Department of Planning (2010)

Commercial/retail land release summary

In summary:

- Planning is progressing to develop commercial and mixed-use precincts in the short to medium term, including a bulky goods precinct at Gap Ridge.
- In May 2010, the preferred proponent was announced to develop the Tambrey mixed use precinct, which will include a neighbourhood shopping centre (capped at 8100m²), residential accommodation and tourism facilities. Final uses and yields will be determined by further planning.
- There are proposals for additional mixed use projects which will likely include a commercial and/or retail component.
- As part of the *Karratha City Centre Master Plan*, work is underway to enable more land to be released for commercial, retail and residential development (see yield estimates in Table 14).
- The *Karratha City Growth Plan* includes proposals to establish lower order district centres at Tambrey and Mulataga as well as several local centres (providing local retail services). The timing and scale of retail and commercial development in these centres will need to be at a level that does not undermine the activity centre status of the city, and will need to be carefully managed. The *Karratha City Growth Plan* notes that the ultimate size should not exceed 8000 m² in the long-term, and development should be initially be kept to 3000 – 4000 m² with the potential to double in size over the long-term.

Land release information is summarised in Table 23. Further project specific information is available in Table 27 and Map 5 and 6. Further information is also available in the *Karratha City Centre Master Plan*, available on the Shire of Roebourne's website, www.roebourne.wa.gov.au.

Table 23: Commercial/retail land release summary

Project	Short-term (0-2yrs) (m ²)	Medium-term (2-5yrs) (m ²)	Medium-term (5-10yrs) (m ²)	Long-term (10yrs+) (m ²)	Total (m ²)
Karratha Town Centre -Core Retail ²	4 700	7 000	12 200	20 600	44 500 m²
Karratha Town Centre -Other Retail ²	800	1 200	5 600	7 800	15 400 m²
Karratha Town Centre –Commercial, office, health, community ²	10 500	15 800	58 000	40 300	128 700 m²
Mulataga District Centre					
Tambrey mixed use – retail component (KA24/24A)	0	8 100	0	0	8 100 m²
Balmoral Apartments – commercial component (KA33)	0	710	0	0	710 m²
Gap Ridge Bulky Goods Precinct (KA51)	13 (lots) 5 500	0	0	0	13 (lots) 5 500 m²
Warambie Road – commercial/retail component (KA52)	0	3 000	0	0	3 000 m²
Gateway (KA63)	0	0	74 000	0	74 000 m²
Gateway (KA64)	0	46 000	0	0	46 000 m²
Airport (logistics) (KA80)	0	0	0	25 400	25 400 m²
Airport (KA80A)	0	0	13 000	0	13 000 m²
Total	21 500	81 810	162 800	94 100	592 710 m²

¹ Data for many of the projects is an estimate only. Actual floorspace will be determined by further detailed planning.

² Estimates include existing uses in the town centre.

Adequacy of supply

The *Karratha Primary Trade Area Retail and Commercial Strategy* reports that Karratha will require an additional 20 000 m² of retail and 16 000 m² of commercial floorspace by 2020. These figures are based on a resident population of 22 795 and FIFO population of 2400 persons in 2020.

The retail shortfall may be met in part by the development of retail uses at the Tambrey mixed use site (KA24/KA24A), Warambie Road site (KA52) and the Gap Ridge Bulky Goods Precinct (KA51). It is likely that other development sites identified in the master plan will be released and developed over the medium term, which will likely meet the shortfall for both retail and commercial floorspace.

Based on the assumption of 50 per cent site coverage for buildings and five storey height, the *Karratha City Centre Master Plan* estimates that the total land requirement for retail/office uses at 10 703 m² at 2020 and 20 896 m² at 2041. Assuming retail

being developed on the ground floor only results in the modified requirement of 40 300 m² at 2020 and 164 888 m² at 2041.

For a population of 50 000 persons, Pracsys (2010) estimates that an additional 80 000 m² (total 123 000 m²) of retail floorspace will be required. The *Karratha City Centre Master Plan* estimates the yield for retail floorspace (core retail and other retail) in the city centre at 60 000 m². The potential retail floorspace from other projects identified in the *Karratha City Growth Plan* is estimated at 105 000 m² (district centre, local centres, airport precinct, bulky goods precinct etc), therefore a total floorspace of 165 000 m² across Karratha is estimated. This estimate is therefore well above the Pracsys estimate of 123 000 m².

Pracsys estimates an additional 33 000 m² (total 63 000 m²) of commercial/office floorspace, and an additional 175 500 m² (total 223 000 m²) of health/community/cultural/entertainment floorspace will be required to service a population of 50 000.

7.9 Tourism

Analysis completed as part of preparation of the *Karratha City Centre Master Plan* estimates the yield for office/commercial floorspace at 51 500 m², and the yield for health/community/cultural/entertainment floorspace in the city centre at 77 000 m². The potential yield for these uses from other projects identified in the *Karratha City Growth Plan* are estimated at 28 000 m² for office/commercial and 207 500 m² for health/community/cultural/entertainment floorspace. These total yield estimates for floorspace across Karratha are therefore above the Pracsys estimates.

Note that the floorspace data presented in this document are estimates only. Actual floorspace data will become available as a result of further detailed planning.

Accommodation/occupancy summary

Karratha has a range of tourist accommodation options, summarised in the Table 24 below.

According to Tourism WA, all forms of visitor accommodation in Karratha had at least a 90 per cent occupancy rate over the year. Given the constrained housing supply, much of the accommodation is occupied by long-term guests such as resource company employees (contractor block bookings) or lower paid service workers unable to afford more permanent accommodation (caravan parks). Some facilities have agreements in place with resource companies to accommodate FIFO staff.

The high level of permanent occupancy of the visitor accommodation in the area means that many visitors face difficulties in securing affordable accommodation, requiring them to book months in advance of their stay. As a result of

Table 24: Tourism accommodation summary

Site	Accommodation type	Capacity
Karratha Caravan Park	Caravan park	26 chalets/units 100 permanent caravan sites 2 powered caravan sites 2 unpowered tent sites
Pilbara Holiday Park	Caravan park (including cabins/chalets)	62 cabins/units 28 permanent caravan sites 86 short stay caravan sites
Balmoral Holiday Park	Long term caravan park (3 months+)	31 permanent on-site caravans 9 short stay on-site caravans 186 long term powered van sites 16 short stay caravan sites
Best Western Karratha Central Apartments	Serviced apartments	85 serviced apartments
All Seasons Karratha	Hotel	60 rooms
Comfort Inn and Suites Karratha	Serviced apartments	23 serviced apartments
Karratha Apartments	Serviced apartments	10 serviced apartments
Karratha International Hotel	Hotel	79 rooms
Total		139 hotel rooms 118 serviced apartments 97 chalets/units 314 permanent caravan sites 104 short stay caravan sites 31 permanent on-site caravans 9 short stay on-site caravans 2 tent sites

Source: Tourism WA (2010)

the crowded nature of caravan parks, visitors are now seeking alternate, more remote camping locations, or bypassing Karratha altogether.

According to data from the Pilbara Development Commission, during the quarter ending March 2010, there were a total of 574 caravan sites, on-site vans and cabins/chalets/motel rooms in Karratha. The dominant site type was powered with 391 sites (68 per cent), followed by cabin/chalet at 101 sites (18 per cent). The average occupancy rate for the period for powered sites and cabin/ chalet was around 90 per cent, with on-site vans (81 per cent) and donga/motel (79 per cent). This data is shown in Figure 34.

Tourism zoned land supply

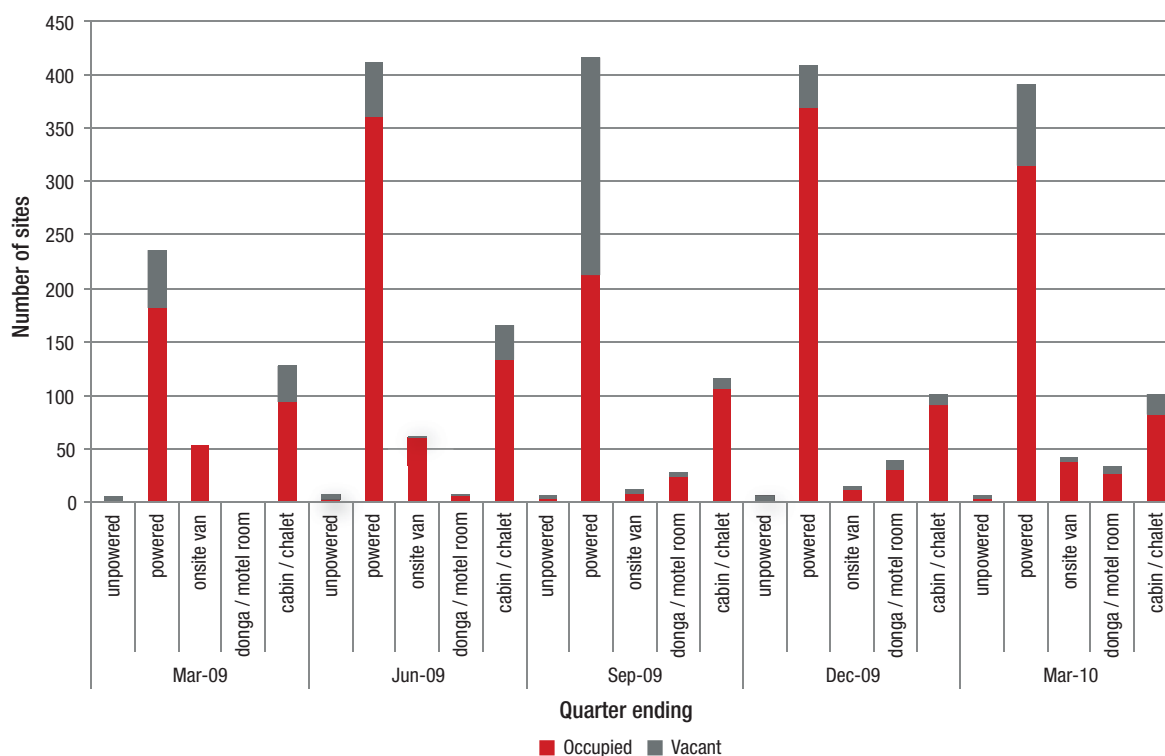
Karratha has 35 ha zoned for tourism uses and about 90 per cent is developed (Table 25). Undeveloped sites include the former drive-in on Karratha Road and a small lot adjacent to the Balmoral Holiday Park. Some of the developed land accommodates transient workforce facilities.

Table 25: Tourism zoned land supply

Zone	Developed (ha)	Undeveloped (ha)	Total (ha)
Tourism	30.9	3.6	34.5
Total	30.9	3.6	34.5

Source: Internal databases, Department of Planning (2010)

Figure 34: Capacity and site availability of caravan parks in Karratha



Source: Land and Housing Snapshot – Karratha, Pilbara Development Commission (2010)

Tourism accommodation development summary

In summary:

- Karratha has several tourism projects in the planning stage that will offer a mix of short and long stay accommodation.
- Development of additional hotels, serviced apartments and resort facilities is identified in the *Karratha City Centre Master Plan*. The plan identifies the potential for an additional 718 hotel rooms in the town centre.

Land release information is summarised in Table 26. Further project specific information is available in Table 27 and Map 5 and 6.

Tourism WA continually monitors the State's private and public sector tourism development activity, maintaining a comprehensive database that tracks the progress of tourism accommodation projects. The department publishes an annual summary in the *Tourism Accommodation Development Register*.

Adequacy of supply

Research by Tourism WA in late 2009 identified a strong demand for additional tourist accommodation in Karratha, suggesting a demand for an additional 300 to 700 rooms, as well as additional caravan park accommodation. Given the high occupancy rates, many visitors experience difficulties in obtaining accommodation, and therefore may bypass Karratha altogether or seek more remote camping locations, which in turn impacts the local economy.

Additional short-stay accommodation is expected to become available in the short-term with the development of the Ranges Complex (KA32) and the Tambrey Luxury Apartments (KA37). The *Karratha City Centre Master Plan* identifies the potential for an additional 718 hotel rooms, the majority of which are within the accommodation precinct, on the western and northern perimeter of the town centre. If a portion of these rooms are developed in the short-term (as suggested by analysis of master plan data), the existing/latent demand should be met. This is however subject to sites being made available in the town centre. While future demand is difficult to quantify, it should be noted that the continuing demand for residential and transient workforce accommodation will influence the availability of rooms for short stay purposes (given existing levels of permanent occupancy of visitor accommodation).

Table 26: Tourism accommodation development summary

Project	Short-term (0-2yrs)	Short-term (2-5yrs)	Medium-term (5-10yrs)	Long-term (10yrs+)	Total
Karratha Town Centre – additional hotel rooms	0	305	181	232	718 (rooms)
Tambrey mixed use precinct – tourism component (KA24/KA24A)	0	Not determined	0	0	Not determined
Ranges Apartment Complex (KA32)	103	0	0	0	103
Balmoral Apartments - short-stay component (KA33)	0	49	0	0	49
Tambrey Luxury Apartments (KA37) (short-stay component of project)	40	69	0	0	109
Nickol (KA70) ¹	0	341	0	0	341
Airport (KA80A) ¹	0	0	312	0	312
Total	143	764	493	232	1632 (261 units) 718 (rooms)

¹Estimates are based on Karratha City Growth Plan data, which calculates a yield based on residential densities of R40. Actual yield for tourism uses will be determined by further detailed planning.

Additions to caravan park facilities have not been captured by DoP research of land development projects. Information from Tourism WA indicates that no new caravan parks are currently proposed, which is of concern, given the extremely high occupancy currently being experienced by existing facilities.

Table 27: Project summaries – Karratha

Location	Land ownership ¹	Existing tenure ²	Purpose	Zoning/planning		Area/yield		Subdivision approvals ³		Anticipated release ⁴ (commencing July 2010)				Constraints ⁵				Comments			
				Current zoning	Amendment required/initiated	Other planning	Area (ha)	Yield (lots)	Yield (units or ha net leasable area - MLA)	Approvals pending	Current approvals	Lots on non-cleared agreements ⁶	Short term (0-2yrs)	Short term (2-5yrs)	Medium term (5-10yrs)	Long term (10+yrs)	Resolved		Concern but resolution anticipated	Critical but resolution anticipated	Critical and resolution not definite
K403	G	WA Land Authority	Residential	Urban development	No	Baynton West Development Plan prepared and endorsed by WAPC. DP variation approved by council 19 Oct 2009, further variations anticipated	46.6	457	509	0	457	457	574	0	0	0	H L NT P Pw S W Z			Baynton West: Project likely to be completed by end of 2010/early 2011 (stages 5-8 remaining). Stage 5 (202 lots) to be released by end of 2009-10, with remaining lots to be released late 2010/early 2011. A portion of lots will be sold as house and land packages, with the remainder allocated to local residents and allocated to resource companies, government agencies, small business and native title claimants. Standard 30 month construction timeframe and design guideline conditions apply. Remainder of project includes 2 group housing sites (stage 6 x 1, stage 8 x 1), yielding ~50 dwellings.	
K403A	G	WA Land Authority	Residential	Urban Development	No		4.2	1	228	0	0	0	114	114	0	0	P Z			LandCorp expression of interest process closed 25 August 2009. Current proposal includes 228 dwellings - comprising townhouses, apartments and single houses.	
K407B	G	State of WA (DCL)	Residential	Rural	Yes (amendment no. 20 -> urban development initiated July 2010)	Development plan approved for this site as part of previous Nickol West development (may require modification)	20.6	250+	250+	0	0	0	0	250+	0	0	NT	H L P Z	Pw S W	Nickol West Native title agreement currently being finalised. Local scheme amendment required (initiated July 2010) and further planning. Site contains place of Aboriginal heritage significance - may require heritage survey. North-west portion within airport special control areas (height/noise). EO closed March 2010, announcement of preferred proponent anticipated mid-2010 (superlot sale - structured sale agreement). Proponent required to deliver lots within 36 months of rezoning approval (likely to be developed in 2-5 year timeframe). Proposed Development Area 5 under scheme amendment no. 21 (initiated July 2010).	
K407C	G	State of WA (DCL)	Residential	Rural Parks, recreation and drainage	Yes (amendment no. 21 -> urban development initiated July 2010)		76.2		1853	0	0	0	0	0	926	927		P Pw S W Z	E NT	Site identified in draft Karatha City Growth Plan for residential uses. Dwelling yield based on 60% developable land at density of R40 (220 m ² lot size). Requires local scheme amendment (initiated July 2010), and resolution of native title. Proposed Development Area 27 & 28 under scheme amendment no. 21 (initiated July 2010), requiring approved development plan and preparation of coastal vulnerability study.	
K415	G	State of WA (DCL)	Residential	Urban development	No	Concept plans prepared	137.4		2500	0	0	0	0	1250	1250	0	NT Z	L P	H Pw S W	E	Site identified in draft Karatha City Growth Plan for residential uses (short to medium-term). Development may also include a neighbourhood centre and short-stay accommodation. Yield based on development of single and multiple residential uses at an average lot size of 300m ² (P40). Site has Aboriginal heritage constraints. Site clear of native title. Initial feasibility works under way. Requires further planning and resolution of servicing and heritage issues. Superlots to be released by structured sale. Concept plans prepared. Proposed Development Area 10 under scheme amendment no. 21 (initiated July 2010), requiring a district level development plan, approved development plan and economic impact assessment to determine retail floorspace.
K415A	G	State of WA	Residential	Conservation, recreation and natural landscapes	Yes (amendment no. 21 -> urban development initiated July 2010)		39.6		1093	0	0	0	0	546	547	0		H L P Pw S W Z	E NT	Site identified in draft Karatha City Growth Plan for residential uses (short-term). Yield based on development of single and multiple residential uses at an average lot size of 220m ² (P40). Requires further planning, local scheme amendment (not initiated) and resolution of servicing issues. Proposed Development Area 10 under scheme amendment no. 21 (initiated July 2010), requiring a district level development plan, approved development plan and economic impact assessment to determine retail floorspace.	

Table 27: Project summaries – Karratha (continued)

Location	Land ownership ¹	Location ²	Existing tenure ²	Zoning/planning			Area/yield		Subdivision approvals ³		Anticipated release ⁴ (commencing July 2010)				Constraints ⁵			Comments		
				Current zoning	Amendment required/ initiated	Other planning under way	Area (ha)	Yield (lots)	Yield (units or ha net leasable area - NLA)	Approvals pending	Current approvals	Lots on non-cleared agreements ⁵	Short term (0-2yrs)	Short term (2-5yrs)	Medium term (5-10yrs)	Long term (10+yrs)	Resolved		Concern but resolution anticipated	Critical but resolution anticipated
KA15B	G	Lot 4218 Dampier Road (CR 41013)	Residential	Yes (amendment no. 21 -> urban development initiated July 2010)			10.8		167	0	0	0	0	83	84	0		H L P Pw S W Z	E NT	Site identified in draft Karratha City Growth Plan for residential uses (short-term). Yield based on development of single and multiple residential uses at an average lot size of 220m ² (#40). Requires further planning, local scheme amendment (not initiated) and resolution of servicing issues. Proposed Development Area 10 under scheme amendment no. 21 (initiated July 2010), requiring a district level development plan, approved development plan and economic impact assessment to determine retail floorspace.
KA15C	G	Crown land Dampier Road, Lot 4218 Dampier Road (CR 41013), Lot 1933 (CR 35053)	Residential	Yes (amendment no. 21 -> urban development initiated July 2010)			44.3		315	0	0	0	0	0	315	0		H P Pw S W Z	E NT	Site identified in draft Karratha City Growth Plan for residential uses (medium-term). Yield based on average lot size of 500m ² (#20). Requires further planning, local scheme amendment (not initiated) and resolution of servicing issues and native title. Proposed Development Area 10 under scheme amendment no. 21 (initiated July 2010), requiring a district level development plan, approved development plan and economic impact assessment to determine retail floorspace.
KA17	G	Lot 500 Madigan Rd	Residential	No			68.3	600	600+ (ultimate yield 1100 dwellings)	0	0	0	200	400	0	0	NT Z	H P S W	Pw S W	Likely to be next development area beyond completion of Baynton West. Site is clear of native title. Preparation of structure plan under way – subdivision application and structure plan to be progressed in 2010-11. Site contains Aboriginal heritage sites. Requires further traffic analysis and upgrades to power, water and wastewater infrastructure. House and land packages to be made available as part of this development. Development may ultimately reach yield of more than 1100 dwellings in future through provision of medium and high density sites. Proposed Development Area 12 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan, conditions for public bus transport linkages and retail floorspace commensurate with a local centre.
KA19	G	Lot 553 Warramie Road (OC)	Transient workforce accommodation	No			6.9	1	100	0	0	0	100	0	0	0	P Z	Pw S W		Site is clear of native title. Land released by EO in 2009 for development of workers accommodation. National Lifestyle Villages appointed as preferred proponent, and cabinet funding (\$3.4m) approved (funding through Royalties for Regions Plaza Renovation Plan). The facility will include a mixture of one, two and three bedroom self contained rental units, with first units expected in mid 2010 and completion of village anticipated by end of 2010/early 2011. Village will provide affordable rental accommodation to eligible service workers, assisting local businesses to attract and retain staff.
KA19A	G	Lot 551 & 552 Belmore Road Cell	Mixed use	Yes (not initiated)			4.9	Not determined	Not determined	0	0	0		To be determined				P Pw S W Z		Identified in draft Karratha Town Centre Plan for mixed uses. Local scheme amendment required and further planning required. Site is clear of native title.
KA24	G	Lot 3860 & 4634 Tambrey Drive, Lot 500 Bathgate Road	Mixed use	Yes (for portion – Lot 4634, amendment no. 21 -> urban development initiated July 2010)	Concept plans prepared		6.1		300 (dwellings) + 8100 m ² (com/retail)	0	0	0	0	300 (dwellings) + 8100 m ² (com/retail)	0	0	NT Z	H P S W	Pw S W	EOI released December 2009, closed 11 March 2010. Preferred proponent (Karratha Consortium comprising FJM Equities Pty Ltd, Regley Wilkinson and Regdale Holdings Pty Ltd) announced May 2010. Requires further planning – preparation of outline development plan. Development to include neighbourhood shopping centre (capped at 8100m ²), medium density residential and mixed uses (townhouses, low-rise apartments, short-stay apartments and potentially a backpackers hostel). Native title resolved. Identified as Nickel Retail Centre in Karratha Primary Trade Area Retail and Commercial Strategy with recommended floorspace of 8100m ² maximum. Proposed Development Area 7 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan and economic impact assessment to determine retail floorspace.
KA24A	G	Lot 4634 Tambrey Drive	Mixed use	Yes (amendment no. 21 -> urban development initiated July 2010)	Concept plans prepared		3.6			0	0	0			0	0	NT Z	H P S W	Pw S W	Comments as per KA24. Requires local scheme amendment (likely to be initiated before end of 2010). Native title resolved over lot 4634.

Table 27: Project summaries – Karratha (continued)

Location	Land ownership ¹	Location ²	Existing tenure ²	Purpose	Zoning/planning			Area/yield		Subdivision approvals ³		Anticipated release ⁴ (commencing July 2010)				Constraints ⁵			Comments	
					Current zoning	Amendment required/ initiated	Other planning	Area (ha)	Yield (lots)	Yield (units or ha net lettable area - NLA)	Approvals pending	Current approvals	Lots on non-cleared agreements ⁶	Short term (0-2yrs)	Short term (2-5yrs)	Medium term (5-10yrs)	Long term (10+yrs)	Resolved		Concern but resolution anticipated
K427	G	Lot 506 Madigan Road	State of WA (OJ)	Transient workforce accommodation	Urban development	No		Other planning	15.0	1180 beds	0	0	0	1180 beds	0	0	0	P NT Z	P S W	Negotiations over lease of site with MAC Services Group terminated (1740 rooms were progressing through SoR development approval process). MAC Services Group announced as preferred proponent to build and manage workforce accommodation on this site. Thirty per cent of accommodation at this site will be set aside specifically for construction workers. Development (1180 beds) will also include facilities such as pool and gym. To be developed in four stages (Stage 1 - 200 beds). Vehicular access and provision of utility services needs to be agreed in conjunction with development of abutting bulk retail sites. Proposed Development Area 13 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan (any expansion of existing TWA to illustrate how development can be adapted for future permanent residential development).
K427B	G	Lot 300 & 507 Madigan Road	State of WA (OJ)	Transient workforce accommodation	Urban development, Rural	Yes (amendment no. 21 -> urban development initiated July 2010)	11.1		11.1	181	0	0	0	0	181	0	0	P Z	P S W	Site identified in draft Karatha City Growth Plan for workforce accommodation (short-term). Yield based on development at an average lot size of 220m ² (840). Requires further planning, local scheme amendment (not initiated) and resolution of servicing issues and native title. Proposed Development Area 13 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan (any expansion of existing TWA to illustrate how development can be adapted for future permanent residential development).
K428A	G	Lot 506 Dampier Road, Crown land Dampier Road	State of WA (OJ)	Residential	Rural	Yes (amendment no. 21 -> urban development initiated July 2010)	110.2		1786	0	0	0	0	0	0	883	883	H P P S W Z	E NT	Site identified in draft Karatha City Growth Plan for residential uses. Site was previously identified for future aquaculture/horticultural uses in Karatha Area Development Strategy (1998). Site is within airport buffers that will be reviewed as part of airport master plan currently being prepared (buffers may be amended). Site may also contain mining leases. Dwelling yield based on 60% developable land at density of R40 (220 m ² lot size). Proposed Development Area 26 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan, preparation of coastal vulnerability study, conditions for public bus transport linkways, retail floorspace commensurate with a local centre and design of TWA to transition to permanent accommodation over time.
K428B	G	Lot 506 Dampier Road	State of WA (OJ)	Residential	Rural	Yes (amendment no. 21 -> urban development initiated July 2010)	13.6		211	0	0	0	0	0	0	211	0	H P P S W Z	E NT	Site identified in draft Karatha City Growth Plan for residential uses. Dwelling yield based on 60% developable land at density of R40 (220 m ² lot size). Proposed Development Area 26 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan, preparation of coastal vulnerability study, conditions for public bus transport linkways, retail floorspace commensurate with a local centre and design of TWA to transition to permanent accommodation over time.
K430	G	Pt Lot 300 & 507 Dampier Road	State of WA (OJ)	Industrial (light and general)	Industrial development, Strategic industry	Yes (amendment no. 16 -> industrial development initiated September 2009)	267.7	114	114	111	0	114	37	59	18	0	0	NT Z	P S W	Gap Ridge Industrial Estate. Construction commenced mid-2010. Stage 1 (37 lots) – completion anticipated August 2011. Stage 2 (26 lots) – completion anticipated December 2012. Stage 3 (33 lots) – completion anticipated December 2014. Stage 4 (18 lots) – completion anticipated December 2016. Proposed timing is dependent on market demand, power supply etc. Requires clearance of native title (progressing). Development plan and subdivision application approved. EOI for stage 1A closed March 2010, stage 1B currently available for sale. Servicing stage one of estate requires a substation to be temporarily located within the estate. Development of stages 3 and 4 requires relocation of 132 kV overhead power lines. Proposed Development Area 24 under scheme amendment no. 21 (initiated July 2010).
K430B	G	Lot 300 & 302 Dampier Road (CR 303948), Lot 506 Dampier Road, Lot 4599 Dampier Road (leasehold)	State of WA (OJ, –portion)	Development investigation area	Rural, Public purposes - airport	Yes (not initiated)	530.1	Not determined	Not determined	Not determined	0	0	0	To be determined	To be determined		NT	P P S W Z	Site identified in draft Karatha City Growth Plan as development investigation area (future non urban city uses, long-term beyond 20 years). Potential industrial uses. Site is clear of native title. Requires further investigation.	
K431	P	Lot 72 Padbury Way	Uniting Church in Australia Property Trust	Residential	Residential R30	No	1.0	1	28	0	2	2	14	14	0	0	0	P Z	P S W	Scheme amendment finalised. Subdivision application to create 2 lots (1 church, 1 residential balance lot) granted conditional approval April 2009. Construction not yet commenced.
K432	P	Lot 1090 Karatha Road	Generalway Asset Pty Ltd	Tourism	Tourism	Yes (amendment no. 21 -> urban development initiated July 2010)	2.3	1	103	0	148	0	103	0	0	0	0	P Z	P S W	The Ranges Karatha. Original planning approval for 148 serviced apartments expired. Site is a non-strategic tourism site. Draft Karatha City Growth Plan identifies site as 'institutional', with tourism and short-stay accommodation as preferred land uses. Stay restriction (75% of apartments restricted to short stay) waived for 5 yrs from commencement of occupation. Current proposal is for 98 single bedroom and 5 two bedroom dual key self contained serviced apartments. To be developed by Realey Wilkinson. Development approval granted June 2010. Proposed Development Area 42 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan.

Table 27: Project summaries – Karratha (continued)

Location	Land ownership ¹	Existing tenure ²	Zoning/planning			Area/yield			Subdivision approvals ³		Anticipated release ⁴ (commencing July 2010)					Constraints ⁵			Comments
			Current zoning	Amendment required/ initiated	Other planning under way	Area (ha)	Yield (lots)	Yield (units or ha net leasable area - NLA)	Approvals pending	Current approvals	Lots on non-cleared agreements ⁶	Short term (0-2yrs)	Short term (2-5yrs)	Medium term (5- 10yrs)	Long term (10+yrs)	Resolved	Concern but resolution anticipated	Critical but resolution anticipated	Critical and resolution not definite
K433	P	Lot 1550 & 1552 Balmoral Road, P.O. Box 4472 Balmoral Road (CA 35210)	Mixed use	No		0.5	1	70 (49 short- stay) + 0.07NLA	0	0	0	0	70 (49 short- stay) + 0.07NLA	0	0	P Z	Pw S W		Balmoral Apartments. Original developer (Moon Properties) did not proceed with approved development. Requires closure of public access way and amalgamation into adjoining sites. Revised application lodged and development approval granted for 49 serviced apartments, 21 multiple dwellings, guest and residents facilities, a cafe/restaurant and 7/10m ² commercial floor space within a 7 storey building. No building licence applied for. Land surplus to school requirements (initially planned as site for district high school). Local planning scheme amendment no. 11 initiated to rezone to urban development (advertising period closes 15 July 2010). Further planning required. To be released by structured sale late-2010. Likely to be developed as medium density style development. Proposed Development Area 31 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan.
K435	G	Lot 4225 Tambrey Drive (CA 40378)	Residential	Yes (amendment no. 11 initiated December 2007 -> urban development)		5.3	68	80	0	0	0	80	0	0	0	P Z	Pw S W		Land surplus to school requirements (initially planned as site for district high school). Local planning scheme amendment no. 11 initiated to rezone to urban development (advertising period closes 15 July 2010). Further planning required. To be released by structured sale late-2010. Likely to be developed as medium density style development. Proposed Development Area 31 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan.
K437	P	Lot 4227 Tambrey Drive	Residential/ tourism	No		1.4	1	149 (109 short- stay)	0	0	0	80 (40 res, 40 short- stay)	69 (short-stay)	0	0	P Z	Pw S W		Tambrey Luxury Apartments. To be developed on perimeter of Tambrey Centre site. Mix of residential (40) and short-stay (109) apartments (2 & 3 bedroom). Currently pre-selling stage one of the project (80 apartments of which 40 are short-stay). Selling of stage two to commence after stage one is sold. Stage one due for completion late 2011. Project has development approval.
K438	P	Lot 1710 Gairath Road	Residential	No		0.2	1	5	0	0	0	5	0	0	0	P Z	Pw S W		Site can yield up to 5 dwellings. Development application lodged November 2009. Proposal is for development of 5 dwellings, each containing six bedrooms with ensuite and a common living areas (suitable for single workers). Development approval granted July 2010.
K439	GP	Lot 503 & 504 Falcon Parade, Lot 339 Desert Pea Boulevard Housing Authority (Lot 503), Busberry Northwest Pty Ltd (Lot 339)	Residential	No		1.0	3	35	0	8	0	35	0	0	0	P Z	Pw S W		Remaining grouped housing sites in Nicko West and Tambrey Estates. Tenders closed October 2008. Development approval issued to Pridgen for lot 339 Desert Pea Boulevard. Development approval granted for lot 504 (16 grouped dwellings) and lot 503 (11 grouped dwellings).
K442	G	Lot 508 Madigan Road, Lot 330 North West Coastal Hwy, Crown land Stowell Road	Residential	Yes (for portion - amendment no. 21 -> urban development initiated July 2010) Public purposes - community, District roads		324.8	Not determined	Not determined	0	0	0		To be determined			Z	P Pw S W H	NT	Site identified in draft Karratha City Growth Plan for future residential uses (long-term, beyond 20 years). Previously identified in Karratha Urban Development Strategy (KAUS) as Regal 1. Portion of area zoned urban development. Requires further detailed planning. Requires clearance of native title. Significant infrastructure costs to service. Development may include larger lot sizes that will better suit location. Proposed Development Area 14 under scheme amendment no. 21 (initiated July 2010), providing for long-term residential development following completion of development generally north of Karratha Hills and requiring an approved development plan.
K443	G	Lot 508 Madigan Road, Lot 330 North West Coastal Hwy, Crown land Stowell Road	Rural residential	Yes (amendment no. 21 -> urban development initiated July 2010)		478.2	171	171	0	0	0	0	171	0	0		H P Pw S W Z	NT	Site identified in draft Karratha City Growth Plan for rural residential (rural living) uses. Previously identified in Karratha Area Development Strategy (KAUS) as Regal 2 & 3. Lot yield based on development at average lot size of 2ha. Requires further detailed planning. Requires clearance of native title. Significant infrastructure costs to service. Proposed Development Area 13 under scheme amendment no. 21 (initiated July 2010), providing for short to medium term rural residential opportunities and long-term (bure urban expansion and requiring an approved development plan). Lot sizes to be based on land capability, proposed use and availability of services.
K445A	G	Crown land Karratha Road, Lot 970 Venn Road, Lot 3898 Karratha Road	Industrial (light)	Yes (amendment no. 21 -> urban development initiated July 2010)		200.5		45.1 NLA	0	0	0	0	0	0	45.1 NLA	L	H P Pw S W Z	MT	Site identified in draft Karratha City Growth Plan for light industrial uses (medium-term, 5-10 years). Area is within power station Mox buffer (2000 m). Requires further planning, local scheme amendment (initiated July 2010) and resolution of native title. Proposed Development Area 43 under scheme amendment no. 21 (initiated July 2010), providing for medium and long-term light industrial development (KA66A prior to KA45A) and requiring an approved development plan.
K445B	G	Crown land Karratha Road, Lot 970 Venn Road, Lot 3898 Karratha Road	Industrial (general)	Yes (amendment no. 21 -> industrial development initiated July 2010)		182.3		31.9 NLA	0	0	0	0	0	0	31.9 NLA	L	H P Pw S W Z	NT	Site identified in draft Karratha City Growth Plan for light industrial uses (medium-term, 5-10 years). Area is within power station Mox buffer (2000m). Requires further planning, local scheme amendment (initiated July 2010) and resolution of native title. Proposed Development Area 17 under scheme amendment no. 21 (initiated July 2010), providing for medium and long-term general industrial development (KA66B prior to KA45B) and requiring an approved development plan.

Table 27: Project summaries – Karratha (continued)

Location	Land ownership ¹	Location ²	Existing tenure ²	Purpose	Zoning/planning				Area/yield			Subdivision approvals ³		Anticipated release ⁴ (commencing July 2010)				Constraints ⁵			Comments			
					Current zoning	Amendment required/ initiated	Other planning under way	Area (ha)	Yield (lots)	Yield (units or ha net leasable area - MIA)	Approvals pending	Current approvals	Lots on non-cleared agreements ⁵	Short term (0-2yrs)	Short term (2-5yrs)	Medium term (5-10yrs)	Long term (10+yrs)	Resolved	Concern but resolution anticipated	Critical but resolution anticipated		Critical and resolution not definite		
K447	G	Lot 500, 1147 & 3000 Seaplane Road (CR 3235), Lot 1926 Ridley Street (CR 36952)	State of WA	Residential	Parks, recreation and drainage	Yes (not initiated)			9.4		426	0	0	0		0	0	426	0		L P Z	Pw S W		Bulgara candidate areas for residential development identified in the draft Karatha Open Space Strategy. Requires further investigation/ planning. Includes potential single residential and group housing lots. Yield based on 85% developable area at average lot size of 220m ² (R40).
K447A	GP	Lot 500, 1147 & 3000 Dampier Road (CR 3235), Lot 1483 Samson Way	State of WA, Trustees of the Diocese of North-West Australia	Residential	Parks, recreation and drainage, Public purposes - community	Yes (not initiated)			4.2		131	0	0	0		0	131	0	0		L P Z	Pw S W		Sites identified in draft Karatha City Growth Plan for residential uses (short-term). Yield based on development at an average lot size of 220m ² (R40). Requires further planning, local scheme amendment (not initiated) and resolution of servicing issues.
K448	G	Lot 1650, 1680 & 3840 Galbraith Road (CR 40081)	State of WA	Residential	Parks, recreation and drainage	Yes (not initiated)			1.46		41	0	0	0		0	41	0	0		L P Z	Pw S W		Pegs Creek candidate areas for residential development identified in the draft Karatha Open Space Strategy. Requires further investigation/ planning. Includes potential group housing lots. Yield based on 85% developable area at average lot size of 300m ² (R30).
K449	G	Lot 2205 Dampier Road (CR 40080), Lot 4809 Balmora Road (CR 40041), Lot 4618 Battagise Road (CR 40041)	State of WA	Residential	Parks, recreation and drainage	Yes (not initiated)			3.50		99	0	0	0		0	99	0	0		L P Z	Pw S W		Millers Well candidate areas for residential development identified in the draft Karatha Open Space Strategy. Requires further investigation/ planning. Includes potential single residential and group housing lots. Yield based on 85% developable area at average lot size of 300m ² (R30).
K450	G	Lot 500 Delembre Drive (CR 50112), Lot 2804 & 4822 501 Tambrey Drive (CR 40041), Lot 2900 Balmoral Road (CR 38153), Lot 4622 Hazel Court, Lot 3264 Nickel Road	State of WA	Residential	Parks, recreation and drainage	Yes (not initiated)			4.23		119	0	0	0		0	119	0	0		L P Z	Pw S W		Nickel candidate areas for residential development identified in the draft Karatha Open Space Strategy. Requires further investigation/ planning. Includes potential single residential, group housing and community use lots. Yield based on 85% developable area at average lot size of 300m ² (R30).
K451	G	Lot 505 & pt 506 Dampier Road	State of WA (MCL)	Commercial	Urban development	Yes			13.4	13	13	0	0	0		13	0	0	0		P Z	Pw S W		Gap Ridge Bulky Goods Precinct. LandCorp to develop and release lots in 2011. Strong demand for these lots. Development will facilitate relocation of these users from town centre. Requires local planning scheme amendment. Access arrangements to be modified following construction of new heavy haulage route (Madigan Road). Proposed Development Area 13 under scheme amendment no. 21 (initiated July 2010), requiring approved development plan and possible separate development plan addressing interface issues, shared access and servicing arrangements prior to approving any showroom development.
K452	G	Pt Lot 553 Waramble Road (MCL)	State of WA (MCL)	Mixed use	Town centre	No			1.3	2	300 + 3000 m ² (commercial)	0	0	0		0	300 + 3000 m ² (commercial)	0	0		P Z	Pw S W		Karatha Town Centre - multi level mixed use development. Released as structured sale opportunity to private sector. Preferred proponent (Fisher Group) announced March 2010. Development will likely include mix of commercial, retail, office and residential uses. Planning approval will require a local scheme amendment. Construction anticipated to commence in mid-2011. Site is clear of native title.
K453	G	Lot 309 Perentie Road	WA Land Authority	Residential	Urban development	No			0.3	1	10	0	0	0		10	0	0	0		P Z	Pw S W		R40 development site. Development approval granted June 2010 for 10 grouped dwellings.
K454	G	Lot 403 Gardlagari Drive	WA Land Authority	Residential	Urban development	No			0.8	1	72	0	0	0		72	0	0	0		P	Pw S W		R40/80 development site. Yield 72 dwellings. To be developed by Midcoro Pty Ltd.

Table 27: Project summaries – Karratha (continued)

Location	Land ownership ¹	Existing tenure ²	Purpose	Zoning/planning			Area/yield			Subdivision approvals ³		Anticipated release ⁴ (commencing July 2010)					Constraints ⁵				Comments
				Current zoning	Amendment required/initiated	Other planning under way	Area (ha)	Yield (lots)	Yield (units or ha net leasable area - NLA)	Approvals pending	Current approvals	Lots on non-cleared agreements ⁶	Short term (0-2yrs)	Short term (2-5yrs)	Medium term (5-10yrs)	Long term (10+yrs)	Resolved	Concern but resolution anticipated	Critical but resolution anticipated	Critical and resolution not definite	
KA55	G	Lot 508 Rosemary Road (Q.C.)	Residential	Conservation, recreation and natural landscapes	Yes (for portion – amendment no. 21 -> urban development initiated July 2010)		87.3		629	0	0	0	0	0	0	629		H	P	NT	Site identified in draft Karratha City Growth Plan for residential uses (long-term, 10-20 years). Requires local scheme amendment (initiated July 2010) and resolution of native title. Proposed Development Area 14 under scheme amendment no. 21 (initiated July 2010), providing for long-term residential development following completion of development generally north of Karatha Hills and requiring an approved development plan.
KA56	GP	Lot 1064, 1065, 1066, 1074 & 4614 King Way (less-shed)	Transient workforce accommodation	Transient workforce accommodation	No		2.3	1	92	0	0	0	92	0	0	0	P	Z			Velocity Village Karratha. Development of 92 two bedroom units available for lease terms 1-3 yrs. Completion anticipated September 2010.
KA57	G	Crown land (Q.C.) - portion) Myley Road, Lot 4218 Dander Road (CR 41013)	Residential	Rural, Conservation, recreation and natural landscapes, District roads, State and regional roads	Yes (amendment no. 21 -> urban development initiated July 2010)		256.2		2924	0	0	0	0	0	1462	1462		H	P	NT	Site identified in draft Karratha City Growth Plan for residential uses (medium and long-term). Development would also include a neighbourhood centre. Yield based on average lot size of 300m ² (630). Requires further planning, local scheme amendment (not initiated), resolution of servicing issues, heritage and native title. Proposed Development Area 10 under scheme amendment no. 21 (initiated July 2010), requiring a district level development plan, approved development plan and economic impact assessment to determine retail floorspace.
KA58	G	Lot 135 CR 36708 & 1991 (CR 35776) Coral Road	Residential	Conservation, recreation and natural landscapes	Yes (amendment no. 21 -> urban development initiated July 2010)		26.8		428	0	0	0	0	0	0	428		P	Pw	E	Site identified in draft Karratha City Growth Plan for residential uses (long-term, 10-20 years). Area identified as possible Goli Links estate, comprising villas and low-rise apartments. Requires further planning, local scheme amendment (initiated July 2010) and resolution of servicing issues. Proposed Development Area 10 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan, preparation of a coastal vulnerability study and provision for future city bypass causeway link.
KA59	G	Lot 4211 Seapole Road (CR30872), Crown land Seapole Road	Residential	Parks, recreation and drainage	Yes (amendment no. 21 -> urban development initiated July 2010)		10.2		245	0	0	0	0	0	245	0		P	Pw	E	Site identified in draft Karratha City Growth Plan for residential uses (medium-term, 5-10 years). Area identified as possible Goli Links estate, comprising villas and low-rise apartments. Requires further planning, local scheme amendment (initiated July 2010) and resolution of servicing issues. Proposed Development Area 10 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan, preparation of a coastal vulnerability study and provision for future city bypass causeway link.
KA60	G	Lot 4211 (CR30872) & 4929 (34922) Seapole Road, Lot 4932 (CR 36788) Myley Road	Residential	Parks, recreation and drainage, Conservation, recreation and natural landscapes	Yes (amendment no. 21 -> urban development initiated July 2010)		13.9		334	0	0	0	0	0	0	334		P	Pw	E	Site identified in draft Karratha City Growth Plan for residential uses (long-term, 10-20 years). Area identified as possible Goli Links estate, comprising villas and low-rise apartments. Requires further planning, local scheme amendment (initiated July 2010) and resolution of servicing issues. Proposed Development Area 10 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan, preparation of a coastal vulnerability study and provision for future city bypass causeway link.
KA63	G	Crown land (Q.C.) Karara Road, Lot 276, 3596, 4935 & 4946 Karara Road, Lot 1136 Sovereil Road	Mixed use (commercial + transient workforce accommodation)	Parks, recreation and drainage, Conservation, recreation and natural landscapes	Yes (amendment no. 21 -> urban development initiated July 2010)		47.1		221 + 7.4 NLA	0	0	0	0	0	221 + 7.4 NLA	0		H	Pw	NT	Site identified in draft Karratha City Growth Plan for mixed uses (offices and transient workforce accommodation, short-term). Requires further planning, local scheme amendment (initiated July 2010), resolution of servicing issues and native title. Proposed Development Area 41 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan and preparation of a landscape master plan.
KA64	G	Crown land (Q.C.) Karara Road, Lot 4936 & 4937 Karatha Road	Mixed use (commercial + transient workforce accommodation)	Conservation, recreation and natural landscapes	Yes (amendment no. 21 -> urban development initiated July 2010)		29.1		143 + 4.6 NLA	0	0	0	0	143 + 4.6 NLA	0	0		H	P	NT	Site identified in draft Karratha City Growth Plan for mixed uses (offices and transient workforce accommodation, short-term). Requires further planning, local scheme amendment (initiated July 2010), resolution of servicing issues and native title. Proposed Development Area 41 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan and preparation of a landscape master plan.
KA65	G	Crown land (Q.C.) Milstream Road, Lot 3806 Milstream Road (CR 31191)	Residential	Conservation, recreation and natural landscapes, Public purposes - energy	Yes (amendment no. 21 -> urban development initiated July 2010)		12.8		210	0	0	0	0	0	0	210		H	P	NT	Site identified in draft Karratha City Growth Plan for residential uses (long-term, 10-20 years). Yield based on development at an average lot size of 220m ² (640). Requires further planning, local scheme amendment (initiated July 2010) and resolution of servicing issues and native title. Proposed Development Area 38 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan (having regard for the interface and buffer to any power substation and protection of ridgelines).

Table 27: Project summaries – Karratha (continued)

Location	Land ownership ¹	Location ²	Existing tenure ²	Purpose	Zoning/planning			Area/yield			Subdivision approvals ³		Anticipated release ⁴ (commencing July 2010)					Constraints ⁵				Comments
					Current zoning	Amendment required/ initiated	Other planning under way	Area (ha)	Yield (lots)	Yield (units or ha net leasable area - NLA)	Approvals pending	Current approvals	Lots on non-cleared agreements ⁶	Short term (0-2yrs)	Short term (2-5yrs)	Medium term (5- 10yrs)	Long term (10+yrs)	Resolved	Concern but resolution anticipated	Critical but resolution anticipated	Critical and resolution not definite	
K466A	G	Lot 1078 & 3821 (CR 4007) Robins Road, Crown land Karratha Road	State of WA (ULC - portion)	Industrial (light)	Conservation, recreation and natural landscapes, Rural	Yes (amendment no. 21 >> industrial development initiated July 2010)		118.3		20.7 NLA	0	0	0	0	0	20.7 NLA	0		L	H P Pw S W Z	MT	Site identified in draft Karratha City Growth Plan for light industrial uses (long-term). Requires further planning, local scheme amendment (initiated July 2010), resolution of servicing issues and native title. Proposed Development Area 43 under scheme amendment no. 21 (initiated July 2010), providing for medium and long-term light industrial development (K466A prior to K465A) and requiring an approved development plan.
K466B	G	Crown land Karratha Road, Lot 3884 (CR 38287 & 4218 38287 & 4218) (CR 41013) Karratha Road, Lot 1133 (CR 31834) & 1935 (CR 35098) Keating Road, Lot 1934 (CR 35097) Cowle Road	State of WA (ULC - portion)	Industrial (general)	Conservation, recreation and natural landscapes, Public purposes - waste disposal and treatment	Yes (amendment no. 21 >> industrial development initiated July 2010)		148.0		25.9 NLA	0	0	0	0	0	25.9 NLA	0		L	H P Pw S W Z	MT	Site identified in draft Karratha City Growth Plan for general industrial uses (long-term). Requires further planning, local scheme amendment (initiated July 2010), resolution of servicing issues and native title. Proposed Development Area 17 under scheme amendment no. 21 (initiated July 2010), providing for medium and long-term general industrial development (K466B prior to K465B) and requiring an approved development plan.
K467	G	Crown land Damper Road	State of WA (ULC)	Residential	Conservation, recreation and natural landscapes	Yes (amendment no. 21 >> urban development initiated July 2010)		10.1	Not determined	Not determined	0	0	0		To be determined					H P Pw S W Z	MT	Site identified in draft Karratha City Growth Plan for residential uses (possibly campus style development, long-term, 10-20 years). Requires further planning, local scheme amendment (initiated July 2010) and resolution of servicing issues and native title. Within buffer of power station which may impact on ultimate uses. Proposed Development Area 32 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan which shall have respect for heritage sensitive areas, ridgelines, and areas of visual amenity.
K468	G	Crown land Damper Road	State of WA (ULC)	Residential (low density)	Conservation, recreation and natural landscapes	Yes (amendment no. 21 >> urban development initiated July 2010)		65.2		20.9	0	0	0	0	0	20.9	0			H P Pw S W Z	MT	Site identified in draft Karratha City Growth Plan for low density residential (medium-term). Yield based on average lot size of 2000m ² (RS). Requires further planning, local scheme amendment (initiated July 2010), resolution of servicing issues and native title. Within buffer of power station which may impact on ultimate uses. Proposed Development Area 32 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan which shall have respect for heritage sensitive areas, ridgelines, and areas of visual amenity.
K470	G	Crown land Balmoral Road, Lot 4210 Balmoral Road	State of WA (ULC)	Tourism	Tourism, Parks, recreation and drainage	Yes (amendment no. 21 >> urban development initiated July 2010)		20.8		341	0	0	0	0	0	341	0			H P Pw S W Z	E NT	Site identified in draft Karratha City Growth Plan for residential uses (transient workforce accommodation, short-term). Requires further planning, local scheme amendment (initiated July 2010), resolution of servicing issues and native title. Proposed Development Area 29 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan and subject to preparation of a coastal vulnerability study.
K471	G	Lot 4929 (CR 34922) Seapole Road, Lot 4932 (CR 36708) Mystery Road	State of WA	Transient workforce accommodation	Conservation, recreation and natural landscapes	Yes (amendment no. 21 >> urban development initiated July 2010)		7.8		126	0	0	0	0	0	126	0			P Pw S W Z	E	Site identified in draft Karratha City Growth Plan for residential uses (transient workforce accommodation, short-term). Requires further planning, local scheme amendment (initiated July 2010) and resolution of servicing issues. Proposed Development Area 35 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan, preparation of a coastal vulnerability study and provision for future city bypass causeway link.
K480	G	Lot 4641 Damper Road, Lot 302 (CR 30948) & 4564 (CR 44922) Damper Road	State of WA (ULC - portion)	Commercial (logistics)	Rural, Public purposes - airport	Yes (amendment no. 21 >> urban development initiated July 2010)		127.0		25.4 NLA	0	0	0	0	0	25.4 NLA				H P Pw S W Z	E NT	Site identified in draft Karratha City Growth Plan for service commercial/logistics use (long-term). Requires further planning, local scheme amendment (initiated July 2010), resolution of servicing issues and native title. Also requires further investigation regarding storm surge issues. Proposed Development Area 30 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan and preparation of a coastal vulnerability study.
K481A	G	Lot 302 Bayly Avenue (CR 30948), Lot 86 Australian Maritime Safety Authority (Lot 319) 40457, 320 (CR 43303) & 4823 (CR 40457) Norman Road, Lot 319 Rowell Street	State of WA (ULC - portion), Australian Maritime Safety Authority (Lot 319)	Commercial + tourism	Public purposes - airport	Yes (not initiated)		19.0		1.3 NLA + 312	0	0	0	0	0	1.3 NLA + 312	0			H P Pw S W Z	E	Site identified in draft Karratha City Growth Plan for commercial uses (airport allied uses and hotel), short-medium term. Development would build on existing airport uses. Also requires further investigation regarding storm surge issues.

Table 27: Project summaries – Karratha (continued)

Location	Land ownership ¹	Location ²	Existing tenure ²	Purpose	Zoning/planning			Area/yield			Subdivision approvals ³		Anticipated release ⁴ (commencing July 2010)				Constraints ⁵				Comments
					Current zoning	Amendment required/initiated	Other planning	Area (ha)	Yield (lots)	Yield (units or ha net leasable area - MLA)	Approvals pending	Current approvals	Agreements ⁵ Lots on non-cleared	Short term (0-2yrs)	Short term (2-5yrs)	Medium term (5-10yrs)	Long term (10+yrs)	Resolved	Concern but resolution anticipated	Critical but resolution anticipated	
K484A	G	Crown land (Dampier Road, Lot 4218 Dampier Road (CR 41013))	State of WA (UCL -portion)	Residential (low density)	Conservation, recreation and natural landscapes - Public purposes - water and drainage	Yes (amendment no. 21 -> urban development initiated July 2010)		24.1	98	98	0	0	0	0	98	0		H P Pw S W Z	NT	Site identified in draft Karratha City Growth Plan for low density residential (medium-term). Yield based on average lot size of 2000m ² (R5). Requires further planning, local scheme amendment (initiated July 2010), resolution of servicing issues and native title. Proposed Development Area 10 under scheme amendment no. 21 (initiated July 2010), requiring a district level development plan, approved development plan and economic impact assessment to determine retail floorspace.	
K484B	G	Lot 4218 Dampier Road (CR 41013)	State of WA	Residential (low density)	Conservation, recreation and natural landscapes	Yes (amendment no. 21 -> urban development initiated July 2010)		51.9	93	93	0	0	0	0	93	0		H P Pw S W Z	NT	Site identified in draft Karratha City Growth Plan for low density residential (medium-term). Yield based on average lot size of 2000m ² (R5). Requires further planning, local scheme amendment (initiated July 2010), resolution of servicing issues and native title. Proposed Development Area 10 under scheme amendment no. 21 (initiated July 2010), requiring a district level development plan, approved development plan and economic impact assessment to determine retail floorspace.	
K484D	G	Crown land (Dampier Road, Lot 1143 Dampier Road, Lot 1094 (CR 37140) Dampier Road)	State of WA (UCL - Broadcast Australia Pty Ltd Lot 1143)	Residential (low density)	Conservation, recreation and natural landscapes - Public purposes - energy, telecommunications	Yes (amendment no. 21 -> urban development initiated July 2010)		22.0	70	70	0	0	0	0	0	70		H P Pw S W Z	NT	Site identified in draft Karratha City Growth Plan for low density residential (long-term, 10-20 years). Yield based on average lot size of 2000m ² (R5). Requires further planning, local scheme amendment (initiated July 2010), resolution of servicing issues and native title. Proposed Development Area 38 under scheme amendment no. 21 (initiated July 2010), requiring an approved development plan (having regard for the interface and buffer to any power substation and protection of ripelines).	
K485	P	Lot 3 & 4 Cherratta Road Pty Ltd	Karratha JV Pty Ltd	Transient workforce accommodation	Transient workforce accommodation	No		0.6	1	94	0	0	0	94	0	0	P Z	Pw S W	Planning approval granted May 2010 for development of 94 single occupancy rooms, manager's residence and shared facilities. Final approval granted June 2010 for amalgamation of lots.		
K486	G	Lot 507 Dampier Road	State of WA (UCL)	Residential	Parks, recreation and drainage	Yes (amendment no. 20 initiated July 2010 -> urban development)		3.1	20	27	0	0	0	20	0	0	H NT P Z	Pw S W	Requires local scheme amendment (amendment no. 20 initiated July 2010) and further planning (subdivision application, modification of Baynton West outline development plan). Site contains place of Aboriginal heritage significance - may require heritage survey. Requires clearance of native title (currently being negotiated).		
K487	G	Lot 1072 Cherratta Road (leasehold L376756)	State of WA	Transient workforce accommodation	Transient workforce accommodation	No		0.5	1	13	0	0	0	13	0	0	P Z	Pw S W	Proposed workforce accommodation facility consisting of 11 four person accommodation units and 2 two person accommodation units. Development approval granted March 2010.		

¹ CR = Crown reserve² UCL = unallocated Crown land³ Refers to the number of lots/units with current subdivision or strata approval, and the number of lots/units for which a subdivision/strata application has been lodged but which is yet to be determined (pending). Does not include local government development approvals.⁴ In some cases the anticipated release of lots is yet to be determined. This could be for reasons such as market conditions, demand/supply of services or a requirement to resolve issues and constraints.⁵ Constraints and issues codes: Environmental (E), heritage (H), land assembly (L), native title (NT), planning (P), power (Pw), sewer (S), water (W) and zoning (Z).⁶ Refers to conditionally approved lots where a servicing agreement (agreement to construct) has been signed between the Water Corporation and the developer.

This gives further indication of lots likely to become available to the market in the short-term. As at 30 June 2010.

Land and housing supply > for more information see the following links:

Australian Bureau of Statistics: www.abs.gov.au see

Catalogue 2068.0 (2006 Census tables): Dwelling structure

(location on census night), Karratha (urban centre/locality)

Government of WA Ministerial Media Statements:

www.ministatements.wa.gov.au see

Blueprint for Pilbara Cities (27 November 2009)

LandCorp: www.landcorp.com.au see

Karratha projects (Land Search > Karratha)

Shire of Roebourne: www.roebourne.wa.gov.au see

Karratha City Growth Plan

Karratha City Centre Master Plan

Western Australian Planning Commission:

www.planning.wa.gov.au see

Shire of Roebourne local planning scheme

8 Infrastructure

Key points

- To supply the infrastructure Karratha needs to meet its expansion will require significant government funding and improved coordination between agencies and service providers.
- Much of the town's essential service infrastructure – particularly water and wastewater – is operating close to capacity. Upgrades are necessary if the pressure for new housing and new land developments are to be met.
- Karratha's power generating capacity and transmission lines will need upgrading in the short to medium term to ensure enough electricity to meet current and projected demands. Distribution networks may also require upgrading if there are substantial increases in density within existing suburbs, such as those proposed in the *Karratha City Growth Plan and Karratha City Centre Master Plan*.
- A key feature of the Pilbara Cities blueprint is to improve the liveability of regional centres by investing in community infrastructure.

Actions and priorities

- Karratha's expansion is being held back by its water supply limitations and a series of infrastructure upgrades will be needed in all serviced areas as the town grows.
- It is critical that long-term electricity supplies are secured and that they are ready to meet forecast demand beyond 2012.
- Obtaining basic raw building materials can be difficult and expensive. The problems not only force up construction costs but also have the potential to constrain Karratha's long-term growth. Short-term solutions must be found – including identifying alternative sources of supply.

8.1 Water

Karratha is supplied with potable water by the Water Corporation from two main sources:

- Harding River Dam (surface water) – primary source;
- Millstream aquifer (groundwater) – secondary source.

Harding River Dam is located 23 kilometres south-east of Roebourne and was formed by the construction of two embankments. Originally the dam could only be used for six to eight months of the year because high turbidity caused quality problems. These were solved in 2004 by the installation of a \$31.5 m micro-filtration water treatment plant that enabled the dam to be used all year round – providing that it held sufficient water. In 2009–10, 1343 ML was drawn from the dam.

Millstream aquifer is located 96 kilometres south of Karratha and has been the town's secondary source of supply since 2000. In 2009–10 270 ML was drawn from the aquifer but there is now growing concern about its sustainability and the amount of water that can be drawn from the system without effecting Millstream's ecology. The Department of Water is currently investigating the issue.

Together the dam and aquifer make up the West Pilbara Water Supply Scheme and service domestic and industrial customers in Karratha, Dampier, Roebourne, Wickham, Cape Lambert and Point Samson. Both sources rely on rainfall associated with summer cyclones for recharging. The Water Corporation is licensed to draw up to a total of 15 GL a year from the two sources operating them either together or independently. Actual draw depends on dam storage and aquifer level. Information on the total scheme draw is shown in Table 28.

Table 28: Total scheme draw¹ - West Pilbara Water Supply Scheme

Year (ending March)	Millstream Aquifer	Harding River Dam	Total draw ¹ (GL)
2001-02	9.34	0	9.34
2002-03	9.35	0	9.35
2003-04	9.66	0	9.66
2004-05	3.26	8.0	11.26
2005-06	0.55	9.75	10.30
2006-07	0.57	10.86	11.43
2007-08	0.93	11.89	12.82
2008-09	3.42	9.50	12.92
2009-10	0.27	13.43	13.70

Source: Department of Water (2010)

¹ Data does not include system losses.

Bulk water from the scheme is transferred into service storage tanks in the Karratha Hills. It is carried there in the Harding River main pipeline that runs underground in a south-easterly direction from Harding Dam to the junction of the North West Coastal Highway and Karratha Road. The 600 mm main is located either in or adjacent to road reserves or vested pipe reserves for the majority of its route. Water supply for Karratha is gravity fed from storage tank no.3. The tank has a storage capacity of 25 ML (water level 65.6 AHD). Chlorination dosing takes place at the outlets of tank no. 3 and LIA tank no. 1.

Two 9 ML tanks (water level 65.7 AHD) located on Karratha Road, south of the town centre have previously been decommissioned and are not currently operational. The Water Corporation is currently investigating the recommissioning of these tanks over the short to medium term, to alleviate the current water storage constraints with the existing scheme.

The existing water supply network is shown on Map 7.

Future requirements and planning

The Water Corporation advised in June 2010 that the West Pilbara Water Supply Scheme is under extreme pressure to supply sufficient water to the towns and industry. Current demands are being met, but with a high level of risk to supply security. Without optimal rainfall, Karratha's water supply cannot meet existing demands. The West Pilbara Water Supply Scheme was originally

expected to supply 15 GL/a, but the Department of Water now considers the sustainable yield is to be 10 GL/a. The history of rainfall in the area shows that three to five years can pass before the system is recharged. The scheme currently has only enough water to last less than 4 years without a recharge. As the current demand is put at 14+ GL/a, there is little capacity to manage a drought, or extended period of less than average rainfall.

Under Pilbara Cities growth projections, demand on the scheme is forecast to rise rapidly above 15 GL a year in the very short term. The Water Corporation has committed to service an additional 1400 equivalent residential services, including Baynton West, Gap Ridge and Nash Stage 1 (120 services - Roebourne). In addition, there are more than 300 equivalent residential services (registered as vacant lots) across the West Pilbara towns and these will effectively absorb all current capacity within the scheme. Although these commitments will be honoured, the Water Corporation has stated that no additional subdivisions can now be considered until there is a commitment to develop a major new source.

The existing water distribution and reticulation network may also require significant upgrade if there are substantial increases in housing density, such as those proposed in the *Karratha City Growth Plan*. A new major water source is required as soon as practicable to avoid constraining domestic growth in the West Pilbara towns. Water source planning has therefore become a critical task.

To solve the problem the Water Corporation is considering several options including alternative groundwater sources and the construction of a desalination plant on the Burrup Peninsula. An expression of interest process was announced in late July 2010 to formally identify all viable water source options for the West Pilbara Water Supply Scheme, including third party supply proposals. A report identifying all viable water source options will be submitted to State Cabinet.

The Water Corporation is also continuing its water efficiency campaign in the West Pilbara to target community behavioural change, retrofitting properties, industrial efficiency and reducing leaks. Although cost will vary dependant on the option that is adopted, the expansion and upgrade are expected to cost in the region of \$470 m.

8.2 Wastewater

Karratha's residential and commercial areas are fully serviced by deep sewerage, with sewerage from Pegs Creek east treated at a wastewater treatment plant (WWTP No.1) located in the Karratha Hills between Mulataga and the light industrial area. Wastewater is transferred through a gravity sewer reticulation network connecting to wastewater pumping stations, located on Balmoral Road and Searipple Road which is then pumped via pressure main up to the WWTP.

Sewerage from the western portion of the town is treated at the Gap Ridge WWTP (WWTP No. 2). A further small treatment plant supports the industrial accommodation area adjoining the light industrial area, however the remainder of the light industrial area remains unsewered.

The current capacity of WWTP No. 1 (Mulataga) is 2300 kL/d, which is sufficient in the short term. The capacity of WWTP No. 2 (Gap Ridge) is 3000 kL/d and, although the plant currently has some spare capacity, its operation is currently limited by the capacity of the treated wastewater storage and disposal system. The Water Corporation is currently examining options and funding opportunities for a treated wastewater management standpipe system for dust suppression, which may provide a short-term solution.

Options for expansion of WWTP No. 2 are limited by its location and conflicting land uses in the area. However, given the direction of town site growth and the lack of available alternative sites, there may be a need to expand the site and the odour buffer. Residential density increases proposed as part of the *Karratha City Growth Plan and Karratha City Centre Master Plan* will also result in increased flows and therefore the requirement for pumping station and pressure main upgrades.

Wastewater is treated to a secondary standard and is used by the Shire of Roebourne to reticulate ovals in Karratha or is contained within evaporation ponds. The treated wastewater re-use scheme is in need of significant upgrade works.

The existing wastewater network is shown on Map 8.

Future requirements and planning

Estimated costs to upgrade WWTP No. 1 to 8000 kL/d is approximately \$122 m. This includes \$51 m for facility upgrade, \$40 m for wastewater conveyance (upgrade to 11 000 kL/d) and \$31 m for treated wastewater management.

Depending on the magnitude of growth in Karratha, a new wastewater treatment plant may be required in the future.

8.3 Power

Electricity generation

Today Karratha receives its electricity supply from Horizon Power through the North West Interconnected System (NWIS). The NWIS covers thousands of square kilometres extending 400 kilometres east to west and 350 kilometres north to south. It serves Dampier, Wickham, Pannawonica, Paraburdoo and Tom Price through the Pilbara Iron (Rio Tinto) network and Port Hedland, South Hedland, Karratha, Roebourne and Point Samson through the Horizon Power Network. The interconnected system is owned and operated by numerous companies including Horizon Power, Pilbara Iron (Rio Tinto), Alinta and BHP Billiton. Since the 1970s, the system has developed from a series of stand-alone networks to an interconnected system first launched in 1985.

Rio Tinto's power stations at Dampier and Cape Lambert provide Karratha with its primary source of electricity with Horizon Power buying much of Rio Tinto's output under a power purchase agreement and then on-selling it to domestic and business customers. That agreement began to 'roll off' in March 2010 and the power produced at the new ATCO power station (see below) will be purchased by Horizon Power under a 100 per cent power purchase agreement. Rio Tinto has recently made the decision to develop a new 250 MW gas turbine power station near its Seven Mile railway workshop west of Karratha. It is understood this will enable the company to close its ageing Dampier and Cape Lambert power stations.

The Karratha terminal is located south of the Karratha Hills with transmission lines linking distribution substations at Pegs Creek and Bulgarra.

New ATCO power plant

A new power station has been constructed adjacent to Horizon Power's base facility on Stove Hill Road, south of the Karratha Hills. The plant developed by ATCO Power, employs two 43 MW high-efficiency gas turbines, and was fully commissioned in April 2010. The new power station, with a capacity of 86 MW, has been designed to meet the growing needs of the region, and has current capacity to cater for the power needs of 75 000 households (excluding other activity usage). The power station could, in the future, be expanded to 150 MW generation capacity to meet the future energy demands on the NWIS.

Additional power sources

A similar plant is planned for Port Hedland. Power from this source would be available to the Karratha area via the NWIS. Citic Pacific is developing a major power plant at Cape Preston, which will have the ability to generate 450 MW, but at this stage there is no plan for Citic Pacific to interconnect to the NWIS.

Electricity distribution

Power is supplied to Karratha via an 11 kV network of overhead and underground power cables fed from zone substations located on Millstream Road and Dampier Highway. A change in voltage from 11 kV to 22 kV is needed to support Karratha's future load growth in residential and commercial areas. The changeover will cost an estimated cost \$25 m and funding has already been allocated as part of the Pilbara Underground Power Project, with construction anticipated to commence in July 2010 and completion by the end of 2011. Upgrading the high voltage network to 22 kV will enable the existing zone substations to provide adequate power for some time without the need for a new zone substation to be established. Design of the new 22 kV underground network should also include provision for potential significant additional load resulting from increased residential and commercial development proposed as part of the *Karratha City Centre Master Plan*.

Underground power

Horizon Power has begun placing Karratha's existing power distribution network underground - starting with the older suburb of Bulgarra. All recent residential and industrial subdivisions have been supplied with underground power. The Pilbara Underground Power Project will improve the reliability of power supply during cyclones as well as reduce maintenance costs. Funding was made available through the Pilbara Revitalisation Plan – a Royalties for Regions initiative.

Future requirements and planning

Horizon Power's load in the Pilbara has grown significantly in recent years. The current demand supply balance is becoming increasingly tight and does not cater for expansion in the region. A further 100 MW of new generation capacity will be required by December 2012 to meet existing known loads. It is estimated that a total of 380 MW and power transmission upgrades will be required to meet the power requirements of Karratha and Port Hedland over the next 10 years. Horizon Power is presently evaluating a range of options to procure this capacity.

Unless additional power supplies and/or upgrades to transmission lines are provided prior to 2013 there exists a possibility that demand may exceed supply during peak times if the projected growth in demand is realised.

Additional funding will be required for the region to continue to grow, and costs are estimated at:

- Stage 1 - new power station to meet Pilbara demand (\$370 m)
- Stage 2 - Roebourne to Karratha transmission line (\$70 m)
- Stage 3 - Cape Lambert to Port Hedland transmission line upgrade (\$20 m)

Actual funding costs and staging of upgrades will be dependant on the outcomes of more detailed assessments by Horizon Power and business cases presented to Government.

The existing power network is shown on Map 9.

8.4 Transport

Existing transport networks are shown on Map 10.

Roads

Karratha is strategically located on Dampier Highway - a national highway connected to other national and State highways including the North West Coastal Highway, Burrup Peninsula Road and Madigan Road. Dampier Highway is the primary link to Dampier Port, the major industries of the Burrup and the regional airport.

Ongoing regional expansion - including inland and offshore oil and gas projects - is expected to increase traffic substantially. There will be more heavy vehicles and road trains in double and triple truck configurations, which will cause both safety hazards and congestion, particularly in peak periods.

About 80 per cent of the Pilbara region's inputs are transported by road. At the same time, much of the region's outputs are carried by rail. Just three per cent go by road. The inputs that include large-sized equipment, consumables, construction materials and transit freight, mainly originate from Perth, Port Hedland and Dampier. Road freight volumes are likely to increase to meet the needs of a growing number of smaller scale resource projects, which do not have rail access. The major new offshore projects are also expected to generate more road traffic.

The *Pilbara Freight Study* found that in the long term road freight would increase significantly. Traffic volumes on Dampier Highway and Burrup Peninsula Road were expected to increase from the present 9000 - 10 000 vehicles a day to 30 000 - 35 000 long-term.

General road transport issues include:

- growing traffic pressure will put pressure on the road network's safety, efficiency and reliability. Regional through traffic including very large heavy vehicle will come into increasing conflict with local traffic - particularly during peak hours in townsites;
- operational conflicts will grow with the increased movement of pre-assembled large module transport across the road network to service the resource sector.

To assist with addressing these issues, stages 1A and 1B of the Dampier Highway duplication project have recently been completed with the result that there is now a dual carriageway between Balmoral Road east and west, and roundabouts at Broadhurst, Bathgate Road, Gailbraith and Balmoral Road west.

Other improvements are now in progress. Stages 2 - 6 of the project involve the design and construction of 12.3 kilometres of dual carriageway highway from Balmoral Road west to the Burrup Peninsula Road. It involves several intersections, strengthening work and a new bridge at Seven Mile Creek. The project will improve the road network's safety and efficiency by minimising the conflict between residential, business and heavy haulage vehicles and optimising traffic flow. The project is due to commence in late 2010 and be complete by late 2012. It will cost an estimated \$90 m (including a Federal Government contribution of \$80 m). There are also numerous road works associated with new residential subdivisions occurring near by. Work has also recently commenced on improvements to Dampier Highway near the Karratha Industrial Area.

Work on a key road connection from Karratha to Tom Price is now in progress and Stage 2 was opened in August 2008. When complete, the road will provide a valuable link between Karratha and the central Pilbara as well as improve road safety and boost tourism. The road now extends 115 kilometres from Karratha to Barowanna Hill. Completion of Stages 3 and 4, which extends the road 158 kilometres from Barowanna Hill to the Nanutarra-Munjina Road, is subject to funding availability.

Other road upgrades are being planned for the short and medium-term including the \$14 m reconstruction of Burrup Peninsula Road to provide a number of passing lanes, and the provision for a truck breakdown area at Two Mile at a cost of about \$4 m.

Medium to long-term road proposals include construction of a second airport access road, upgrading the Burrup Peninsula Road to four lane divided road standard and a new Karratha Western Bypass route to replace Madigan Road as the primary freight route to the Burrup Peninsula. The development of a more direct road link between Karratha and Wickham/Mount Anketell is also being considered.

Rail

There are currently three mineral export rail systems operating in the Pilbara region. These heavy duty standard gauge railways transport iron ore to port facilities in the region and are operated by BHP Billiton, Rio Tinto and Fortescue Metals Group. These railways are on leased land and subject to Agreement Acts. The leases are 60 metres wide to accommodate service roads as well as railway facilities.

Within the Karratha area, the Rio Tinto Iron Ore rail system covers 1300 kilometres of track, servicing 11 mines and connects to the Dampier iron ore processing plant and export berths. The company has started duplicating the trunk line to increase its capacity. Rio Tinto maintains its locomotives and rolling stock at the Seven Mile railway maintenance facility near Karratha airport but there are plans to build a new facility closer to Dampier. The increased frequency of ore trains will have implications for road traffic at road crossings.

A new West Pilbara railway is planned by the Australian Premium Iron Joint Venture as part of the West Pilbara Iron Ore Project. It will have a capacity of 30 Mtpa, and retain an expansion potential to cater for the significantly larger tonnages to be shipped from the new port at Anketell.

Neither general rail freight nor passenger services operate in the area.

Ports

The Pilbara region has three major ports at Dampier, Port Hedland and Cape Lambert. Dampier Port is located 16 kilometres from Karratha.

The port caters for exports of iron ore, LNG, salt, condensate, LPG and other general commodities and imports of petroleum and general goods. About 80 to 83 per cent of the export trade is iron ore, and 15 per cent gas products (LNG, LPG and condensate). The remainder is salt, petroleum products, general cargo and anhydrous ammonia.

Dampier Port facilities include:

- Dampier Port Authority
 - cargo wharf
 - barge ramp
 - bulk liquids berth
 - heavy load out facility
- Rio Tinto Iron Ore
 - East Intercourse Island (including lay-by berth)
 - Parker Point 1, 2, 3, 4 and 5
- Dampier Salt Limited
- Woodside Energy Limited
 - Whithnell Bay (LNG jetty, LPG/condensate jetty)
 - King Bay supply base
- Mermaid Marine Australia

Dampier Port Authority released its *Port Development Plan* in 2008 and is proposing to issue an update in 2010. The revised plan will accommodate the expected rise in ships calling at the port and the planned introduction of a vessel management system to handle the extra movements within the port's four channels. As well as the overall increase in trade, the extra navigational movements will include traffic from rig tenders and a higher level of recreational boating.

The *Port Development Plan* includes provision to increase berth capacity at the cargo wharf. Subject to final funding approvals, work is expected to start in mid-2010 and be completed by 2014.

In March 2010, plans were announced for a new multi-user deepwater port and industrial precinct to be built at Anketell, 30 kilometres east of Karratha. It will be designed to complement existing facilities at Dampier and Port Hedland, and have an annual export capacity of more than 350 million tonnes. It will accommodate a range of users and mineral commodities and include an industrial area of more than 1400 ha. Access to the port will be via a dedicated infrastructure corridor for transport and services.

Potential foundation investors in the new precinct include:

- API Management for its 30-40 Mtpa West Pilbara Iron Ore Project
- Fortescue Metals Group Ltd for its 30-60 Mtpa Solomon Project
- China Metallurgical Group Corporation for its 15 Mtpa Cape Lambert Iron Ore Project.

The port will be built by a private proponent under agreement with the State Government and aim to start operations by 2015. A cap will be placed on the new port to ensure the viability of existing ports into the future.

Airport

Karratha airport is located 15 kilometres to the west of Karratha, near Dampier. It is the busiest regional airport in the State, offering both intrastate and interstate services. There are currently 73 scheduled regular passenger transport services per week, operated between Qantas and QantasLink, Skywest and Virgin Blue. While the majority of services operate between Karratha and Perth, there are scheduled interstate services, operating weekly to Brisbane, Sydney and Melbourne and twice weekly to Darwin.

The airport also provides for regular passenger transport, off-shore helicopter and general aviation services. The airport is one of the busiest helicopter airports in the country, servicing facilities in the North West Shelf. Since late 2009, Cobham has provided a workers' shuttle service to the Barrow Island gas project using two BAE-146s based at Karratha.

The airport currently experiences the highest number of air passenger arrivals in the Pilbara, with the majority being FIFO workers. The airport has experienced growth of approximately 9 per cent per annum over the past ten years, with 2008-09 passenger throughput reaching approximately 497 000 passengers, and throughput for 2009-10 expected to reach 620 000 passengers. As at May 2010, the airport was servicing approximately 56 000 passengers per month. Runway expansion works were completed in March 2009 to cater for this growth, with the runway lengthened from 1850 m to 2200 m and widened

from 30 m to 45 m. Helicopter and general aviation aprons were also expanded. The runway was expanded to ultimately accept B767 type aircraft.

Upgrades to be completed by the end of 2010 include improvements to the car park (increase from 300 to 680 parking bays) and terminal building including dedicated bus and taxi lanes and passenger drop off zones. Check in operations and baggage handling systems will also be improved. Planning is also under way to further expand the western helicopter apron, expand the terminal building and upgrade electrical and water services.

The *Karratha City Growth Plan* includes proposals for development of commercial/logistics uses within the airport precinct. The Shire of Roebourne completed the *Karratha Airport Master Plan* in June 2009, to plan for future development of the airport precinct. The master plan includes revenue passenger forecasts out to 2027-28. The master plan can be accessed at www.roebourne.wa.gov.au.

Future requirements and planning

Costs for ongoing airport upgrades are estimated at \$24.3 m, with \$7.2 m required for the 2009-2013 period. A terminal upgrade is also proposed (~\$60 m).

Public transport

The Shire of Roebourne advise that a community bus service currently operates on Tuesday and Saturday on a twice daily and return timetable. The bus services Dampier, Karratha, Roebourne, Wickham and Point Samson, and is funded by the Shire of Roebourne and the Public Transport Authority. The Shire is currently in discussions with Rio Tinto regarding the sponsorship and provision of a Sunday bus service.

Greyhound operates a Karratha to Perth service three times weekly. The cost per passenger is approximately \$300.

8.5 Education

Karratha has the most extensive range of educational facilities in the Pilbara region. There are six primary schools (five State and one Catholic), an education support centre and two high schools (one State and one Catholic). Enrolment details for primary and secondary schools are shown in Table 29. The primary schools are located on sites ranging from two to three hectares with the exception of Tambrey Primary School which has 3.3 ha site part of which is earmarked for future development.

The location of existing facilities is shown on Map 11.

Table 29: Karratha school enrolment trend: 2005 - 2009 (semester one)

School	2005	2006	2007	2008	2009
Karratha Primary School	383	374	374	355	331
Millars Well Primary School	350	403	427	366	374
Pegs Creek Primary School	178	166	191	210	217
Tambrey Primary School	371	361	371	375	400
St Paul's Primary School	280	290	304	279	283
Karratha Senior High School	719	720	701	682	683
St Luke's College	308	337	371	355	402
Total primary students	1562	1594	1667	1585	1605
Total secondary students	1027	1057	1072	1037	1085

Source: Schools Online, Department of Education and Training (2010)
Annual Reports 2005, 2006, 2007, 2008, Directory of Catholic Schools 2009, Catholic Education Office

The primary schools have seen a steady increase in enrolments, in contrast to the high schools where enrolments have remained relatively steady. The reason for the lack of growth in secondary school students may be the result of an exodus of company and government employees when their children reach high school age. When parents do remain in Karratha after their children reach high school age, some send their children out of the town to boarding schools.

Karratha Senior High School's year 11 and 12 students were relocated to the Karratha Education Leisure and Training Precinct (adjacent to the TAFE campus) in 2010. Years 8 to 10 (currently accommodated at the high school site in Bulgarra) are expected to be relocated by 2013, as part of stage two of the development (\$46 m was allocated in the 2010-11 State Budget for this project). The project will create an education hub combining the high school, a community library, TAFE, Curtin University and Australian Technical College facilities.

The relocation of Karratha Senior High School has also opened up the opportunity for the redevelopment of Karratha Primary School. The replacement of the primary school is under way at a cost of \$22.5 m.

Future requirements and planning

Based on current demand, it is not anticipated that Karratha will require a third high school, with demand being met through the two existing facilities. Additional sites have been identified in the Mulataga and Nickol areas as part of the *Karratha City Growth Plan*. Additional facilities will be developed subject to local demand.

Current growth is placing pressure on Tambrey and Millars Well Primary Schools. A site has been allocated in the Baynton West estate for development of a primary school, but funding (~\$23 m) has not been allocated at this stage. It planned that a new primary school will be constructed in the Baynton West development in the next two to three years.

Tertiary education

In 2009, Pilbara TAFE recorded a total of 969 987 student contact hours (SCH) for mainstream institutional delivery. The College delivered 147 405 SCH in employment based training and 549 582 SCH for institution based training. Pilbara TAFE enrolls over 6000 students each year, including residents and FIFO workers, and operates within a competitive training market alongside other private training providers.

The College is the largest trainer of apprentices in the region, and also trains personnel across a broad range of industries. In terms of training products, Pilbara TAFE delivers programs which range from entry-level certificates through to advanced diplomas,

as well as community capacity-building programs (literacy and numeracy, Work Ready and return to work) and customised programs for business. Pilbara TAFE is scoped to deliver 162 qualifications in 68 different industry areas. In 2009, Pilbara TAFE had approximately 200 full time equivalent academic and support staff.

The *Karratha City Growth Plan* reports that TAFE facilities are in need of an upgrade, particularly in relation to trade workshops. An upgrade to facilities will enable a broader range of courses to be provided.

Limited university courses are available at the Karratha and Port Hedland TAFE colleges through Curtin University, primarily in areas related to business and humanities. Some Pilbara TAFE diplomas and advanced diplomas also provide students with advanced standing towards Curtin university degrees. Development of university facilities will allow a greater range of courses to be available to students.

Commencing operation in 2007, the Australian Technical College offers courses to year 11 and 12 students. Students enter into an Australian school based apprenticeship in various trades, providing incentives for more students to stay on at school and encouraging more students to pursue trade qualifications. An initiative of the Department of Education, Employment and Workplace Relations, the college locations were selected based on areas experiencing gaps in the skills required for local industry. The colleges are supported locally through the involvement of local industry, such as Rio Tinto, BHP Billiton, Woodside Energy and Chevron Australia, and offer courses in metal and engineering, construction, automotive, electrotechnology and commercial cookery.

Future requirements and planning

Pilbara TAFE has plans to build a new trade training centre. Construction is due to commence in 2010.

8.6 Health

Karratha's main medical facility is the Nickol Bay Hospital on Dampier Road (see Map 11). It caters for accident and emergency cases and offers acute inpatient care. There are obstetric services (including caesarian section) and general surgery however patients requiring major surgery are referred to Port Hedland or Perth. Bed numbers for each of the Pilbara's hospitals is detailed in Table 30.

The hospital's facilities include:

- general beds including multi-day surgical cases and midwifery units;
- beds for same day surgery;
- treatment bays in accident and emergency department plus resuscitation bed; and
- operating theatres.

Karratha is also the base for delivering comprehensive, district-wide health services including immunisation, school health screening, community and child health, allied health and therapy services. Most of the services are offered through the Warambie Centre on Warambie Road, Karratha.

Table 30: Hospital facilities - Pilbara region

Hospital facility	Same day (number of beds)	Overnight (number of beds)
Newman Hospital	n/a	8
Nickol Bay Hospital (Karratha)	8	20
Onslow Hospital	n/a	6
Paraburdoo Hospital	n/a	2
Port Hedland Hospital	16	39
Karlarra House Aged Care (Port Hedland)	n/a	56
Roebourne Hospital	n/a	8
Tom Price Hospital	n/a	8
Pilbara total	24	147

Source: Government of Western Australia Department of Health
Data as at 25 February 2010

Beds: The total number of beds allocated for use by a hospital patient within the hospital or facility. Where n/a is displayed, data is not available or the bed count does not apply to these hospitals or facilities.

Aged care

Aged care services are delivered through Pilbara Aged Care Services (PACS), a regional service specialising in non-residential care services across the Pilbara, including Karratha. PACS provides access to Aged Care Assessment (ACATs), Home and Community Care (HACC) services and the Commonwealth Aged Care Packages (CACPs) along with the Commonwealth Care Link and Respite Service.

Other health services

There are currently three medical centres operating in Karratha, and two dental surgeries.

Future requirements and planning

The 2010-11 State Budget includes a \$150 m allocation to replace the Nickol Bay Hospital with construction expected to start in 2011-12 with completion in 2014-15.

This complements funding already provided in the 2009-10 budget which included a \$10 m allocation to enhance existing services at the Nickol Bay Hospital and plan for the future. The funding covered:

- \$7 m for housing for new and existing staff through construction or lease;
- \$2 m for upgrades to obstetric services; and
- \$1 m for facility master planning.

In 2009 under the Royalties for Regions initiative, a partnership was formed between the State Government and the Pilbara Industry Community Council (PICC) to identify funding priorities. As a result, the *Pilbara Health Initiative* was established with a long-term budget of \$32.96 m. Karratha was allocated \$5.28 m to be spent over the next three years on urgently needed equipment and services. Funds will be spent on:

- Improved emergency transport services including the employment of rural paramedics to support volunteer ambulance services

- Construction of an all-weather 24-hour helipad with remote-controlled lighting at Nickol Bay Hospital
- Advanced training for hospital staff to enhance the region's ability to respond to large-scale emergencies
- Installation of a CT scanner at Nickol Bay Hospital to reduce the need for patients to travel to Perth and Port Hedland for diagnostic tests
- Enhancement of vital signs emergency monitoring equipment through electronic networking at Nickol Bay Hospital
- Improved emergency, surgical and paediatric services through employment of specialists in the West Pilbara.

The Department of Health has also recently finalised the *WA Health Clinical Services Framework 2010-2020* which will guide the delivery of public health services across the State for the next 10 years. The blueprint is available at www.health.wa.gov.au/publications/subject_index/

The Department is also currently preparing a State Health Infrastructure Plan which will outline the management and development of capital assets over the next 10 years.

8.7 Police, justice and emergency services

Police

The Pilbara District Police Complex is a new facility designed to meet the anticipated needs of the expanding community. The new complex has been built to replace the old regional headquarters, and was opened in May 2010. The station provides 24 hour policing to Karratha and strategic support for Dampier, Wickham and Roebourne police stations. The station caters for up to 62 staff and has been designed to enable additional police officers to be based at the facility in the future.

Justice

The Karratha Courthouse adjacent to the police station, provides services to the surrounding region and acts as a district court registry for civil actions.

Emergency services

Emergency response facilities in Karratha include a fire station, State Emergency Services unit and a St John ambulance station. They are co-located in the town centre on the corner of Balmoral Road and Welcome Road.

The location of police, justice and emergency service facilities is shown on Map 11.

Future requirements and planning

The *Karratha 2020 Vision and Community Plan* identifies the need for Karratha to have a Fire and Emergency Services (FESA) regional office and headquarters, encompassing an emergency management command centre and a fire station for career officers. The plan also found the need to identify more spaces for emergency evacuation.

8.8 Telecommunications

Karratha's telecommunications exchange and tower is located in the town centre on Balmoral Road, south of Morse Court. A communications reserve is also located on View Road, south of Millstream Road. This site accommodates the Telstra satellite station.

There are a number of mobile phone towers located across Karratha. Both Telstra and Optus have recently installed, or are planning to establish additional towers to improve coverage and address reliability issues.

Future requirements and planning

Projects to improve the existing mobile phone coverage, and access to the National Broadband Network have been identified as part of the Pilbara Cities initiative.

8.9 Other community infrastructure

A problem faced by all communities - especially fast growing ones like Karratha - is the need for good social infrastructure to enhance people's general health and wellbeing. At present, this type of infrastructure is often planned, funded and delivered in an uncoordinated manner through federal, state, local Government and private sector mechanisms, and is, in some cases not adequately aligned with population growth and urban expansion. There is now significant pressure to ensure that social infrastructure is delivered in line with population growth, and a need to better define the roles and responsibilities of federal, state, and local Governments and the private sector in the delivery of this type of infrastructure and services. More effective outcomes may also be realised as a result of more integrated land use and infrastructure planning.

Karratha's community services are struggling to meet current demands. Services delivered by non-government organisations are especially affected by the high cost of living and resultant difficulty to attract and retain staff. The lack of affordable housing for non-government community workers contributes to the high turnover of staff, and this, combined with a low rate of volunteering due to shift work, and fly-in fly-out work rosters, has stressed provision of essential community services.

In recent times, local government has experienced an increasingly expanding role in the provision of community infrastructure. Local governments however, are often constrained by their revenue raising capacity and limitations due to staff and other resources. Limited funding, coupled with evolving community demands, increased expectations and lifestyle changes continues to put pressure on state and local governments to maintain existing infrastructure and develop new infrastructure.

In response to issues in Karratha, the Shire of Roebourne has recently developed the *Karratha 2020 Vision and Community Plan* and the *Karratha City Growth Plan* which has been developed jointly by Landcorp and the Shire of Roebourne to guide future development in Karratha. These reports identify a number of challenges and opportunities to address community infrastructure needs, including provision of additional community, cultural, civic and youth facilities. The plans identify costs and set the priorities for what community infrastructure should be rolled out over the next decade.

Open space and recreation

Open space in Karratha performs dual roles, these being recreation and amenity and drainage functions. The arid climate of the region impacts on the use patterns and provision of open space and recreation facilities.

Karratha has four main ovals, located in Bulgarra, Pegs Creek, Millars Well and Tambrey, and a number of smaller parks and drainage corridors. Indoor sporting facilities are provided through the aquatic centre and entertainment centre. Recreation infrastructure in Karratha is shown in Table 31.

The *Karratha Open Space Strategy* was recently prepared to provide a framework for the provision of public open space in the urban areas of the Karratha townsites. The strategy will also assist council rationalise its open space system in the context of overall need, function and operation. The strategy identifies significant opportunities across Karratha for the excision of land from the open space system for potential residential purposes.

Table 31: Recreation infrastructure – Karratha

Facility	Number
Swimming pool 50m	1
Swimming pool 25 m	1
Tennis courts outdoor	8 (lit)
Basketball courts indoor	2
Basketball courts outdoor	8 (lit)
Netball courts indoor	1
Netball courts outdoor	4 (lit)
Golf course	1 (18 holes)
Lawn bowling green	1

Future requirements and planning

Arising through the *Karratha 2020 Vision and Community Plan*, the Karratha Education Leisure and Training Campus is a joint project with the State Government to co-locate Karratha's key educational infrastructure and to provide additional cultural and recreational facilities. The project includes indoor and outdoor sporting facilities including a new aquatic centre, performing arts facilities, community meeting spaces and childcare facilities. The facilities are intended to be constructed to a standard so as to operate as Karratha's main evacuation centre in the case of a natural disaster. The objectives of the project include:

- To address ageing infrastructure issues for community sporting organisations
- To provide a modern and effective evacuation centre for the town
- To provide additional youth meeting spaces
- To cater for children and families.

A draft master plan was prepared in 2009 in consultation with the community and key stakeholders. The community was invited to comment on the project in late 2009. Construction is anticipated to commence in August 2011 with completion anticipated April 2013. The total project cost is approximately \$112 m, with more than \$66 m committed through Royalties for Regions allocations and the Department of Education and Training. There is a current shortfall of approximately \$46 m.

Other projects include the development of the Bulgarra Community Centre and Baynton West Family Centre. The Bulgarra Community Centre project is a \$12 m mixed use recreational facility including family day care, function centre, storage space, meeting rooms and kitchen facilities. The Baynton West Family Centre is a \$13m multi-purpose family centre to include family services (i.e. child health and associated services), conference rooms and workshops for the community, child care centre, playgroup facilities, offices for not for profit groups and a coffee shop.

The tenders for both of the above projects are anticipated to be released in October 2010, with construction anticipated to commence in November 2010 and completion by December 2011 – January 2012.

Youth services

Currently, there are limited youth services, activities and facilities in Karratha. The *Karratha 2020 Vision and Community Plan* found that currently only limited space had been set-aside in the town for young people. Ideally, the plan suggests future facilities should be located in the town centre and have a combination of outdoor/indoor, informal and programmed activities. A skate plaza has been proposed for Sharpe Avenue as part of a town centre enhancement scheme.

Future requirements and planning

The *Karratha City Centre Master Plan* notes that three potential sites have been identified for the development of a youth centre, which is urgently required. A site in close proximity to the retail core is preferred, with the capacity to accommodate 500 to 700 m² of indoor space with an adjacent area for sporting facilities. A feasibility study will be required to select the preferred site. A more cohesive approach to youth development is also required.

Arts/cultural facilities

Karratha's arts and cultural facilities include the multi-purpose Walkington Theatre with its outdoor amphitheatre, and the Karratha Entertainment Centre. The entertainment centre has poor access and design limitations that restrict its uses.

Future requirements and planning

The Shire of Roebourne has prepared a draft cultural plan that identifies a number of arts and cultural needs including proposals for a multi-purpose creative arts and cultural space with wet and dry workshop spaces, music studios, a gallery and exhibition areas. Some of these facilities may be developed as part of the Karratha Education Training and Leisure Precinct.

The *Karratha City Centre Master Plan* notes that the preferred location for the establishment of a cultural arts centre and gallery is a site on the south eastern corner at the intersection of the main street and Welcome Road. An external sculpture garden could also be established in this location.

Libraries

Karratha has one public library co-located at the TAFE campus and jointly serviced by the Shire of Roebourne, Pilbara TAFE and the State Library of Western Australia.

Childcare

Childcare services are in critical short supply across the Pilbara region and the situation is exacerbated by the region's demographic profile. Additional factors include the high workforce participation rate and this, coupled with the low number of extended families, means relatives are not normally present to offer traditional childcare support. The Shire of Roebourne estimates a current shortfall of around 300 day care places. The prime issues governing the provision of childcare include licensing, land and building, staff attraction and retention and industry engagement.

Karratha has two long day care centres (74 places), two occasional care centres (35 places), seven family day care centres and one outside school hours facility. In December 2009, construction commenced on the new Tambrey Early Learning and Care Centre. The centre is being built on the grounds of Tambrey Primary School and will provide 120 long day care places. The Federal Government and Woodside jointly fund the project. Additional family day care services as proposed as part of the development of the Bulgarra Community Centre.

8.10 Waste management

Every year each Pilbara resident generates about 731 kilograms of waste and in 2007, the Shire of Roebourne produced some 13 500 tonnes of waste. At present, only one per cent is recovered for recycling, and the bulk is sent to landfill. Therefore, there is significant potential to divert wastes away from landfill.

The Shire of Roebourne has experienced considerable growth in recent years and reports an increase of over 50 per cent in waste volumes over the last five years. Karratha's main disposal facility, the Seven Mile Waste Disposal Facility west of Karratha (see Map 11), permits the disposal of general, effluent, hazardous and green waste, and includes a recycling facility.

Future requirements and planning

Anticipated population growth will result in significant increases in waste quantities. The Pilbara local governments, through the Pilbara Regional Council, completed a Regional Waste Management Plan in 2008 to improve the management and use of landfills, extend the life of existing landfills, and if possible replace the smaller landfills with transfer stations equipped to meet the needs of the people and the environment. The report recommended further investigation into waste management processes, practices and requirements in the Shire of Roebourne. A review of waste management services was completed in April 2010, and includes a number of recommendations regarding upgrades to existing facilities, resourcing and investigations into emerging technologies. The Pilbara councils are also considering options to divert waste to recycling and also using waste to produce energy.

The *Karratha 2020 Vision and Community Plan* also identified the need to redevelop part of the landfill disposal site for recycling purposes, and to acquire additional plant and collection trucks.

8.11 Basic raw materials

No comprehensive regional assessment has yet been made of the availability and source of all the basic raw building materials needed for Karratha's expansion. These include sand, clay, hard rock, limestone, metallurgical limestone, gravel and other construction and road building materials. The materials themselves are relatively cheap to produce, but to keep building costs down it is essential that supplies are identified as close to the town as possible.

Karratha's expansion will consume large quantities of basic raw materials. For example, several proposed industry and residential sites will need large quantities of fill to raise them above flood levels.

There has not been a comprehensive regional assessment of basic raw materials. Although some site-specific studies for Karratha were undertaken - notably Gozzard (1989), and Martinick (1997), the information is limited and data for some resource extraction areas may be out of date. The studies that have been completed have revealed a shortage of materials suitable for fill. The sites that have been located where sand may be available are often constrained by environmental considerations or the fact that it is located in significant heritage sites. To date the utilization of potential substitutes not been fully explored.

This has become a critical issue to be addressed in the Pilbara. It is essential that a program be introduced to determine the availability of supplies and consider the cost effectiveness of using alternative sources where supplies are limited.

Infrastructure > for more information see the following links:

Department of Treasury and Finance: www.dtf.wa.gov.au see Western Australian State Budget 2010-11: www.ourstatebudget.wa.gov.au

Infrastructure Australia: www.infrastructureaustralia.gov.au see Government Infrastructure Plans - Western Australia

Shire of Roebourne: www.roebourne.wa.gov.au see Karratha 2020 Vision and Community Plan
Karratha City Centre Master Plan
Karratha City Growth Plan

9 Royalties for regions

Each year the State Government's Royalties for Regions initiative will see the equivalent of 25 per cent of the State's annual revenue from mining and resource royalties reinvested in regional communities. The initiative will provide additional investment to help regional communities plan for their longer term sustainable development. Funds will be available for regional infrastructure, services and capacity building projects.

Funds will be invested in rural and regional Western Australia based around six policy objectives, these being:

- building capacity in communities;
- retaining benefits in local communities;
- improving services to achieve equality with metropolitan communities;
- attaining sustainability;
- expanding employment and growth opportunities; and
- growing prosperity.

9.1 Delivery mechanisms

Royalties for Regions distributes benefits to regional communities through three funds as follows:

Country Local Government Fund

Funding of \$101.7 m for 2010-11 will be provided to assist country local governments to build and maintain community infrastructure. Local governments in the nine Regional Development Regions, as defined by the *Regional Development Commissions Act 1993* are eligible for funding.

Regional Community Services Fund

The fund is designed to improve the access to services in the regions. Some of the projects supported by the fund include the Patient Assisted Travel Scheme, Boarding Away From Home Allowance, Royal Flying Doctors Service, Community Resource Centres and Country Age Pension Fuel Card.

Regional Infrastructure and Headworks Fund

The fund supports large scale, strategic regional infrastructure and headworks projects. The fund also includes an annual allocation for the Regional Grants Scheme which offers contestable funds for private and public organisations to improve and develop infrastructure and services in the regions.

9.2 Decision-making criteria

Country Local Government Fund

Funding in 2010-11 will be provided to individual local governments and regional groups of local governments to promote strategic infrastructure development and asset preservation and renewal. Funding for the Shire of Roebourne is shown in Table 32.

Regional Community Services Fund

- Allocations will be provided to programs that:
 - assist regional communities achieve improved access to a range of community services;
 - assist regional communities overcome disadvantages caused by remoteness;
 - attract and retain essential regional government employees.

Regional Infrastructure and Headworks Fund

- Funds will be allocated to projects that:
 - are acknowledged as being of strategic importance to Western Australia;
 - apply broadly to a region;
 - do not fall neatly into the responsibilities of one State Government department or local government for implementation.
- The Regional Grants Scheme will be administered by the nine Regional Development Commissions, including assessing applications and determining grants.

9.3 Funded projects

Table 32: Country Local Government Fund allocations

Local Government	Allocation	2010-11 (\$ excluding GST)
Roebourne	Direct to local government	989 836
Roebourne	Regional groups of local government	532 988

Source: Country Local Government Fund Allocations 2010-11, Department of Regional Development and Lands (2010)

Royalties for regions > for more information see the following links:

Department of Regional Development and Lands:
www.rdl.wa.gov.au

Royalties for Regions:
www.royaltiesforregions.wa.gov.au

10 Glossary

Crown land

Alienated land is land held in freehold.

Crown land is defined as all land, not being alienated land, within the limits of the State of Western Australia that form the airspace, seabed and subsoil of marine waters and coastal waters as defined under the Commonwealth's *Coastal Waters (State Powers) Act 1980*. Crown land is referred to as State land in Western Australia.

Freehold land is land held in fee simple, whether absolute, conditional or otherwise, of that land.

Notice of intention to take is a notice issued under section 170 of the *Land Administration Act 1997* and served on a landowner and any person affected by land the subject of a proposed public work. The notice provides interest holders with the opportunity to formally object to the taking of the land for the public work.

Tenure means the manner of possessing or holding Crown land for a specific purpose or purposes, for example: reserve tenure, road tenure.

Unallocated Crown land (formerly known as vacant Crown land) is Crown land that is not subject to any interest (other than Native Title interests under the *Native Title Act 1993*) and which is not reserved or declared or otherwise dedicated under the *Land Administration Act 1997* or any other Act.

Population

Estimated resident population (ERP) - Available for local government areas only, this figure represents the number of people counted in an area on 30 June. It is calculated by:

- adding the people who were temporarily absent from the area on census night;
- subtracting the overseas visitors counted in the area on census night;
- augmenting the figure for estimated net undercount in the census;
- adjusting for difference between census night and 30 June; and
- updating each year using administrative data from a variety of sources.

ERPs are the official population figures for Australia. They are widely used as a basis for Government decision-making, including the allocation of seats in federal parliament and distribution of Commonwealth grants.

Net undercount - Immediately following the census, the Australian Bureau of Statistics (ABS) conducts a post-enumeration survey in randomly selected households to get a picture of the net undercount. This factors in the human error associated with collection of census data. Factors contributing to undercount include geographic location, ethnicity, people travelling, errors with the census form, confidentiality. People may also be counted more than once if they were away from home on census night, but were included on the census form at their usual residence. In the 2006 census the estimated net undercount in Western Australia was 3.2 per cent. This figure was 4.4 per cent for the balance of Western Australia, and 2.7 per cent for Perth.

Place of enumeration - this count includes every person who spent census night in Australia based on where they were on census night. The figure includes residents, tourists, visitors and service populations. This data is available for towns, localities and postcode areas.

Place of usual residence - the number of people who state an area on the basis of where they usually live, rather than where they were on census night. This can be a subjective measure as it depends where people consider their home to be. This data is available for towns, localities and postcode areas.

Service populations - people who demand goods or services from providers of such commodities. Such persons may be permanent or temporary residents of the area from which the service is sought, or they may be daytime visitors (including commuters), overnight or short-term visitors to the area or fly-in fly-out workers. Service populations are not counted separately at the census but may represent up to 25 per cent (in the Pilbara) of the number of people enumerated in a town or locality on census night.

Subdivision approvals

Conditional approval is granted by the Western Australian Planning Commission (WAPC) for subdivision to begin subject to certain conditions being met. The approval is preceded by an assessment of the proposed subdivision plan by statutory referral agencies, including servicing authorities. On receipt of conditional approval, the proponent may commence subdivision development in accordance with the conditions of approval. A conditional approval remains valid for three years where five lots or less are approved and for four years where six lots or more are approved.

Current valid conditional approvals refer to those conditional approvals that are still valid but have not yet been issued with final approval. In general, these are approvals for which construction/servicing has not yet commenced or is currently under way (see **active conditional approvals**).

Active conditional approvals refer to conditionally approved lots where a servicing agreement (agreement to construct) has been signed between the Water Corporation and the developer. These are termed lots on non-cleared agreements.

Inactive conditional approvals are where conditional approval has been granted and the approval is still valid, but where a servicing agreement (agreement to construct) has not been signed between the Water Corporation and the developer.

Lapsed conditional approvals are those where the approval has expired and the conditions have not been met.

Final approval is the WAPC endorsement of the proponent's submitted plan/diagram(s) of survey describing the now complete

subdivision; constructed in accordance with the conditions set down in the conditional approval. Final approvals are then registered with the Office of Titles where certificates of titles for the newly created lots can be issued.

Planning

Local planning schemes are detailed planning schemes developed by local governments to identify the range of permitted land uses within specified locations. Within the Metropolitan Region Scheme and Peel Region Scheme areas, local planning schemes must be consistent with the provisions identified within the relevant region scheme.

Local planning strategy contains the strategic plan and policy context of a local planning scheme. The strategy sets out the general aims, intentions and desired outcomes for long-term growth and change, having regard to social, economic and environmental factors. An assessment of the capacity of infrastructure such as water, sewerage, electricity and roads is also usually considered in a local planning strategy. Residential densities and commercial centres may also be identified.

A **scheme amendment** is the process of changing zones or reservations from one use to another. The amendment process requires proposed amendments to be advertised for wider community and government comment. The amendment process is regulated by the *Planning and Development Act 2005*, allowing for extensive community consultation to review the proposal before a final decision is made.

Structure plan refers to a document including spatial plans that details the proposed layout of a future development area. The preparation of a structure plan is one of the first steps in progressing proposals for the development of new areas. In addition to illustrating details such as road configuration and the location of retail and community facilities such as shops, schools and public open space, a structure plan can also show details such as housing density, land use classifications and buffer zones. Structure plans highlight opportunities and constraints in an area, and can provide the basis for amendments to local planning schemes. Structure plans can generally be categorised as either region, district or local structure plans.

Building approvals

A **house** is a detached building primarily used for long-term residential purposes. It consists of one dwelling unit. For instance, detached 'granny flats' and detached dwelling units (for example, caretaker's residences) associated with a non-residential building are defined as houses. Also includes 'cottages', 'bungalows' and rectories.

Other dwellings include all dwellings other than houses. They can be created by: the creation of new other residential buildings (for example, flats); additions/alteration work to an existing residential building; either new or alteration/addition work on a non-residential building; conversion of a non-residential building to a residential building creating more than one dwelling unit.

Dwelling commencements - a dwelling unit is a self-contained suite of rooms, including cooking and bathing facilities and intended for long-term residential use. Units (whether self-contained or not) within buildings offering institutional care, such as hospitals, or temporary accommodation, such as motels, hostels and holiday apartments, are not defined as dwelling units. A building is commenced when the first physical building activity has been performed on site in the form of materials fixed in place and/or labour expended (this includes site preparation but excludes delivery of building materials, the drawing of plans and specifications and the construction of non-building infrastructures, such as roads).

Other

Vacant lots refer to those lots that are undeveloped (i.e. have no premises constructed on the lot) and that are located on residential or special zones as designated under the various local planning schemes in Western Australia. The base information is provided by the Valuer General's Office.

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www.accesseconomics.com.au

Australian Bureau of Agricultural and Resource Economics - Bureau of Rural Sciences

www.abare-brs.gov.au

Australian Bureau of Statistics

www.abs.gov.au

Australian Housing and Urban Research Institute

www.ahuri.edu.au

Chamber of Commerce and Industry Western Australia

www.cciwa.com

Chamber of Minerals and Energy Western Australia

www.cmewa.com

Dampier Port Authority

www.dpa.wa.gov.au

Department of Education

www.det.wa.gov.au

Department of Education, Employment and Workplace Relations

www.deewr.gov.au

Department of Fisheries

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Department of Health

www.health.wa.gov.au/home

Department of Housing

www.housing.wa.gov.au

Department of Local Government

www.dlg.wa.gov.au

Department of Mines and Petroleum

www.dmp.wa.gov.au

Department of Planning, Western Australian Planning Commission

www.planning.wa.gov.au

Department of Regional Development and Lands

www.rdl.wa.gov.au

Department of State Development

www.dsd.wa.gov.au

Department of Treasury and Finance

www.dtf.wa.gov.au

Department of Water

www.water.wa.gov.au

Horizon Power

www.horizonpower.com.au

Infrastructure Australia

www.infrastructureaustralia.gov.au

LandCorp

www.landcorp.com.au

Main Roads Western Australia

www.mainroads.wa.gov.au

Pilbara Development Commission

www.pdc.wa.gov.au

Real Estate Institute of Western Australia

www.reiwa.com.au

Royalties for Regions

www.royaltiesforregions.wa.gov.au

Shire of Roebourne

www.roebourne.wa.gov.au

State Government Media Statements

www.mediastatements.wa.gov.au

Tourism Western Australia

www.tourism.wa.gov.au

Water Corporation

www.watercorporation.com.au

13 Acknowledgements

This document was prepared in consultation with the following government agencies and infrastructure providers and private sector stakeholders:

Australian Premium Iron JV
Chamber of Minerals and Energy WA
Dampier Port Authority
Dampier Salt
Department of Education
Department of Health
Department of Housing
Department of Mines and Petroleum
Department of Regional Development and Lands
Department of State Development
Department of Transport
Fire and Emergency Services Authority WA
Government Regional Officers' Housing
Horizon Power
LandCorp
Main Roads Western Australia
Rio Tinto
Shire of Roebourne
Tourism WA
Water Corporation
Western Australia Police
Woodside Energy Ltd

Legend

- Potential expansion areas**
- commercial/logistics
 - industrial
 - residential/workforce
 - accommodation/tourism
 - mixed use
 - rural residential
 - public purpose/community

- Existing zoned area (by zone category)**
- residential/development
 - retail/business
 - industrial

- wastewater treatment plant
- wastewater treatment plant buffer

Road network

- highways (sealed)
- local roads (sealed)



MAP 1:

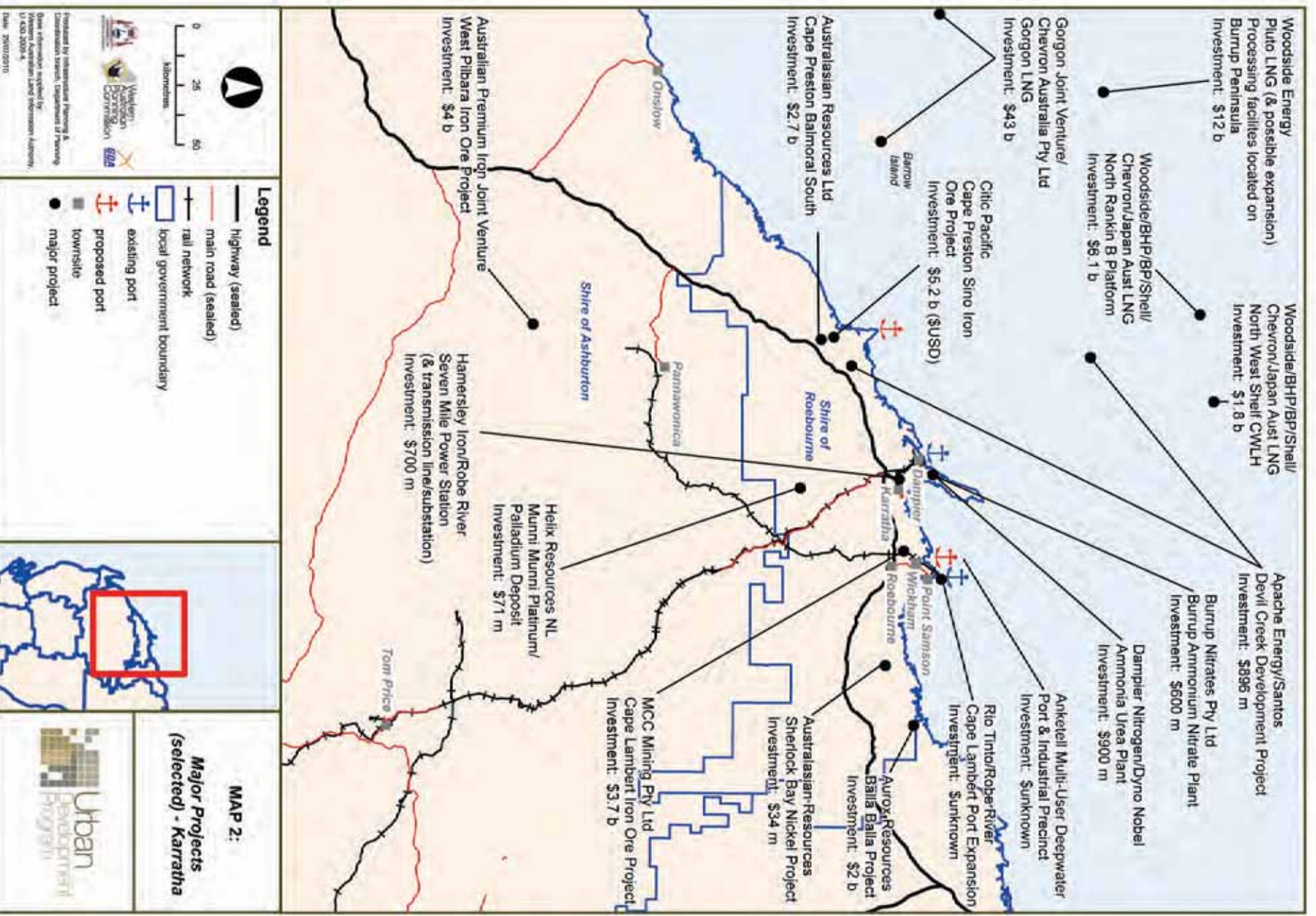
Future Development Overview - Karratha

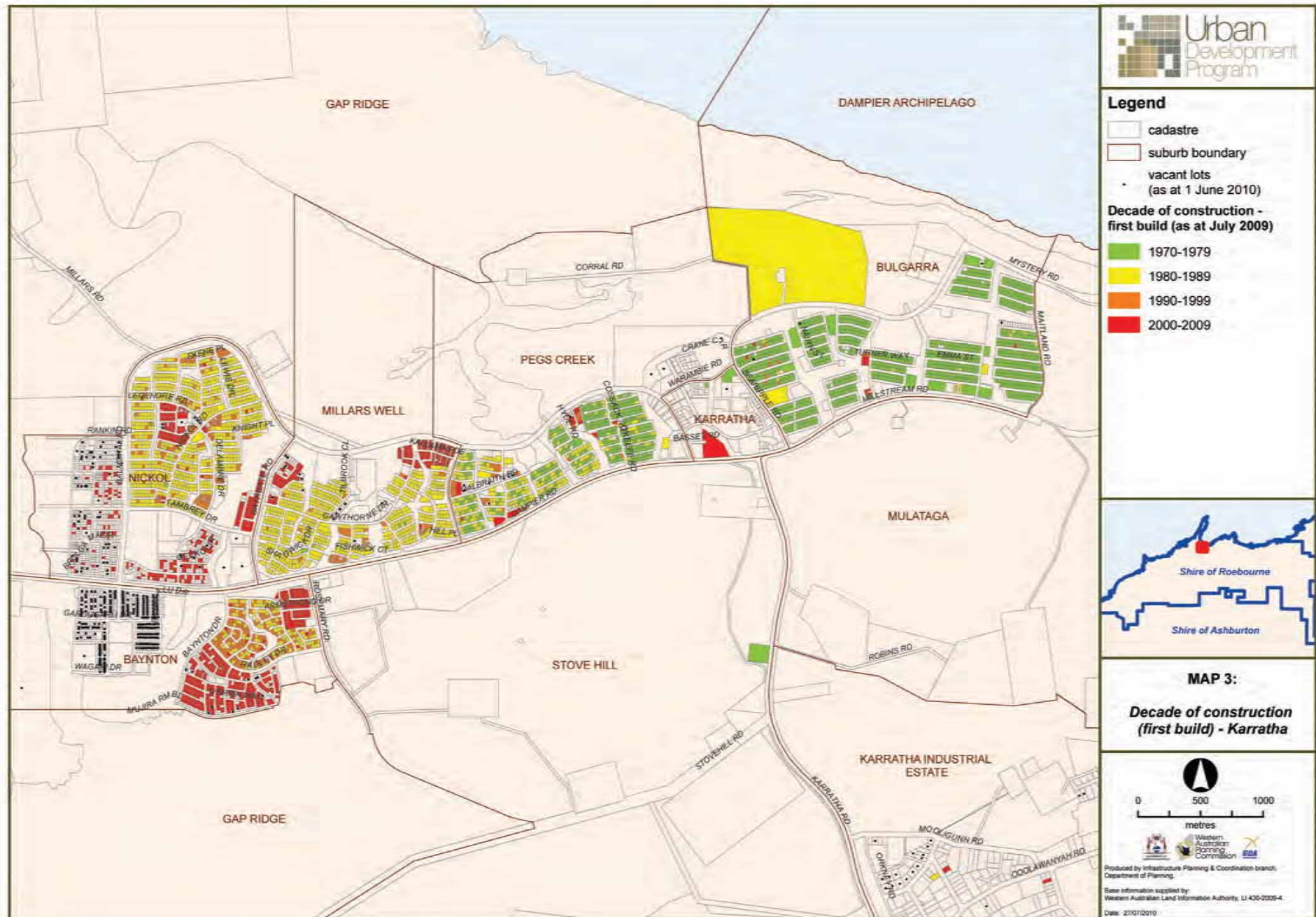


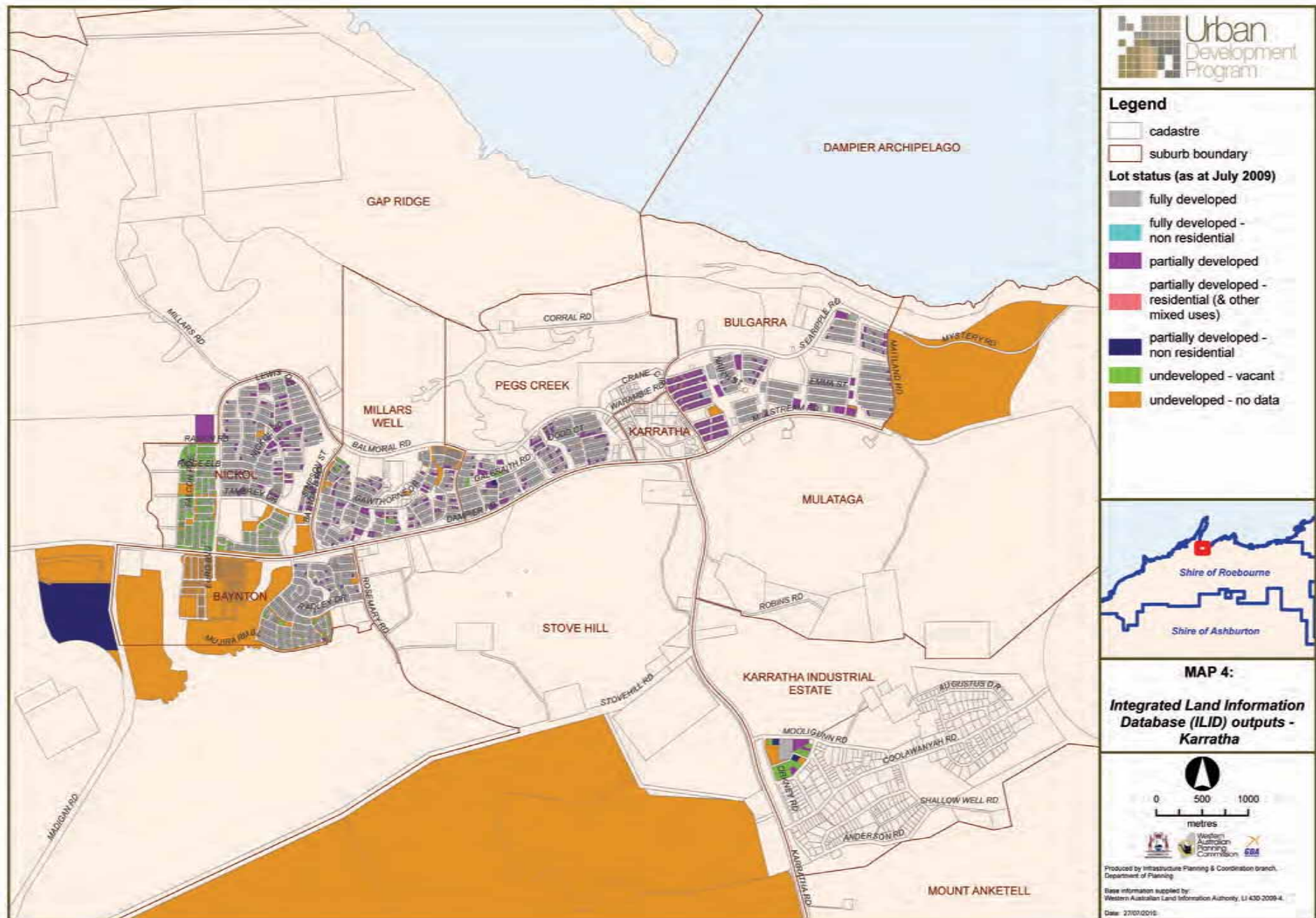
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Department of Planning

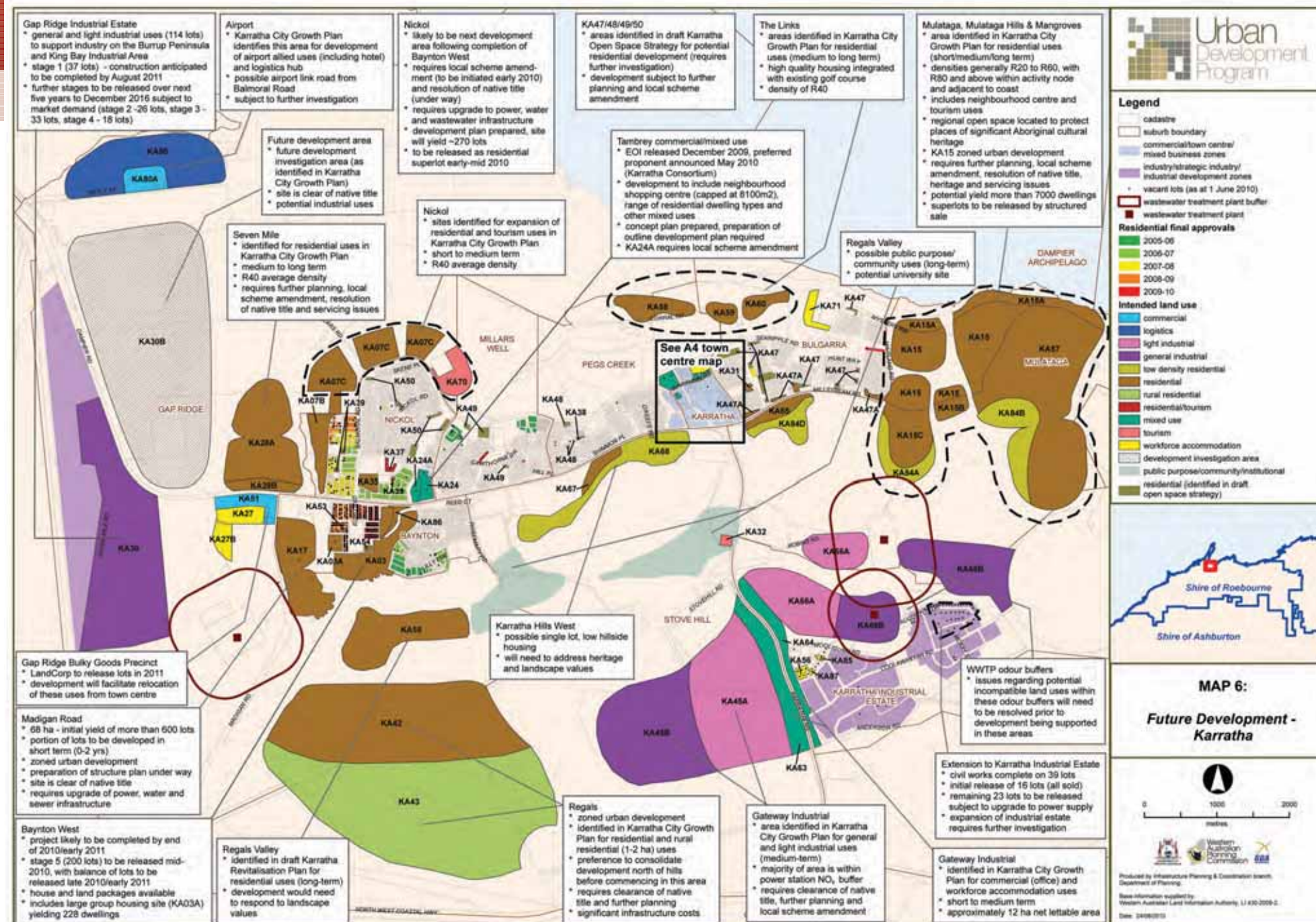
Base information supplied by:
Western Australian Land Information Authority, L1 430 2009-2

Date: 5/10/2015









West Pilbara Water Supply Scheme

- * primary source Harding River Dam
- * secondary source Millstream Aquifer
- * recharged by cyclonic events
- * Water Corporation licenced to draw 15 GL from these sources (combined)
- * existing allocation likely to be reached in short-term
- * water source planning under way
- * estimated costs for West Pilbara Scheme approximately \$470 m

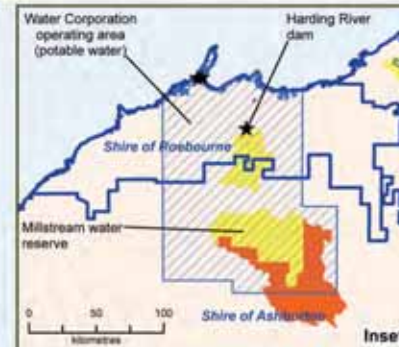
Tanks 1 & 2

- * 2 x 9ML tanks
- * water level 65.7 AHD
- * currently out of commission
- * one to be recommissioned to come on-line within next 5 yrs
- * other tank to follow 5+ yrs
- * possible heritage issues

Tank 3

- * 25 ML tank
- * water level 65.6 AHD

* LIA tanks 1 & 2



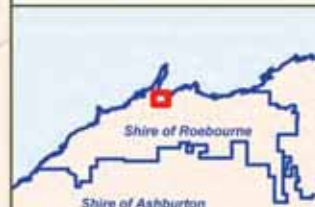
Legend

Inset

- ★ water treatment plant
 - operating area - potable water
 - local government boundary
- Public Drinking Water Source Areas**
- priority 1 area
 - priority 2 area
 - priority 3 area
 - priority unassigned

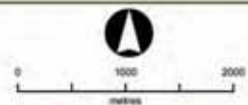
Main

- cadastre
- possible expansion areas
- water storage
- pump station
- operating area - potable water
- water main



MAP 7:

Water Infrastructure - Karratha



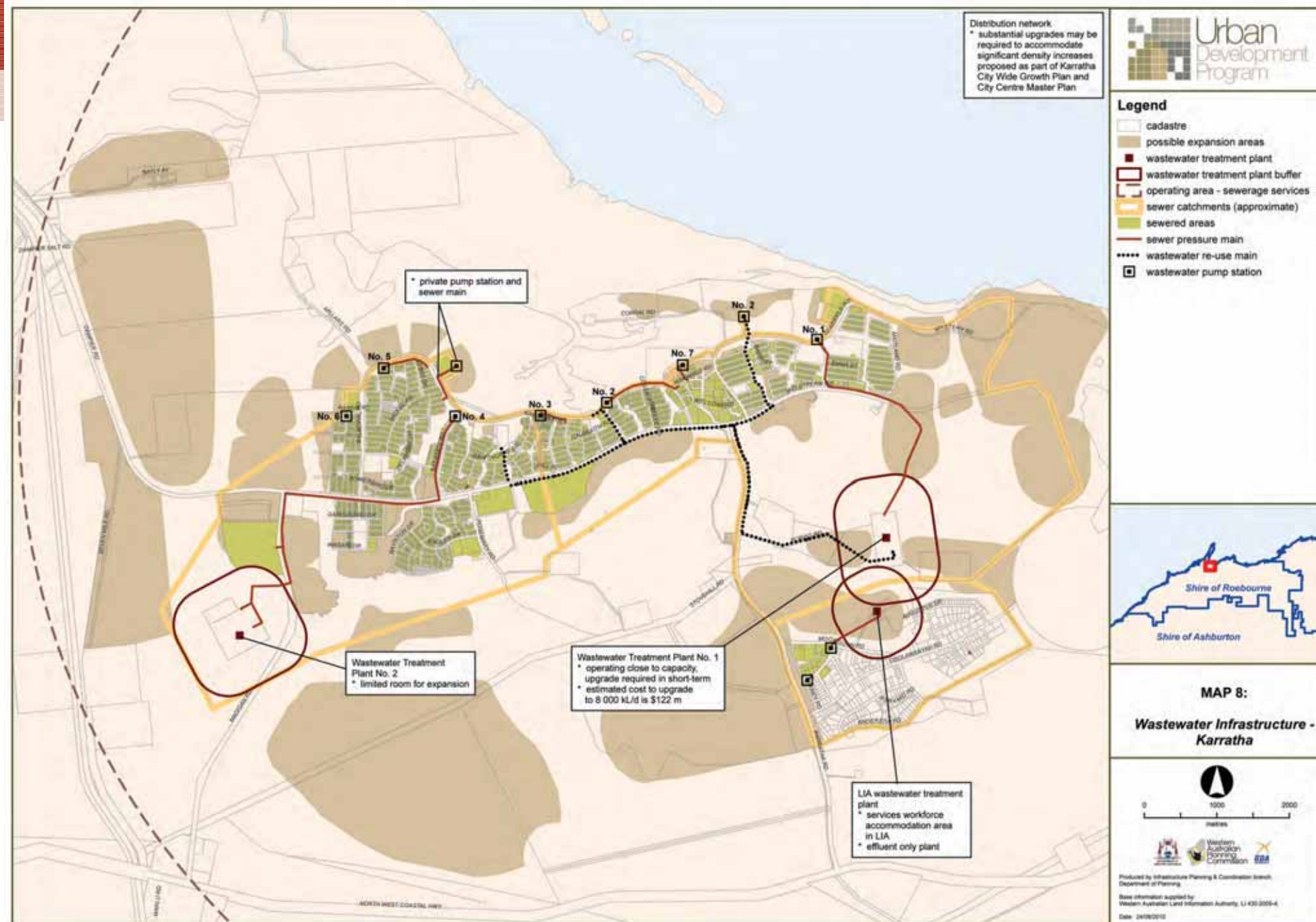
Produced by Infrastructure Planning & Coordination Branch, Department of Planning.

Base information supplied by: Western Australian Land Information Authority, LI 430-2009-4.

Date: 25/08/2010

Distribution network

- * substantial upgrades may be required to accommodate significant density increases proposed as part of Karratha City Wide Growth Plan and City Centre Master Plan



Power supply

- * primary source of Karratha's power is currently Rio Tinto's Dampier and Cape Lambert power stations
- * Horizon Power purchases majority of power under a power purchase agreement (expiring March 2010)
- * additional 100 MW of generation capacity required in Pilbara region by December 2012

Seven Mile power station (Rio Tinto)

- * 250 MW power station under construction (gas fired)
- * will support port and mine operations
- * will facilitate closure of Dampier and Cape Lambert power stations
- * 220 kV line from power station to Cape Lambert to be constructed

Pegs Creek substation

- * planned upgrade to support Woodside camp and development of Gap Ridge Industrial Estate

Underground Power Program

- * funding through Royalties for Regions
- * works anticipated to commence 2010
- * will improve system reliability during cyclones and adverse weather and reduce network maintenance costs

Karratha terminal station

Power station buffer

- * 2000m buffer for NO_x emissions
- * may impact on planned land uses in Regals area

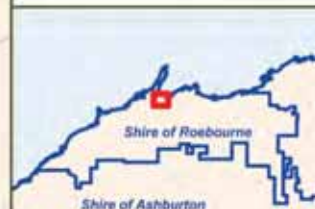
West Pilbara power station (ATCO Power)

- * fully commissioned April 2010
- * 2 x 43 MW gas turbines
- * designed to allow expansion via additional turbines and steam cogeneration units
- * Horizon Power currently purchases power from Rio Tinto (generated at Dampier and Cape Lambert)
- * power purchase agreement expired March 2010



Legend

- cadastre
- possible expansion areas
- transmission lines
- overhead power (distribution)
- underground power (distribution)
- substation/terminal station
- existing power station
- proposed power station
- buffer - 2000 m



MAP 9:

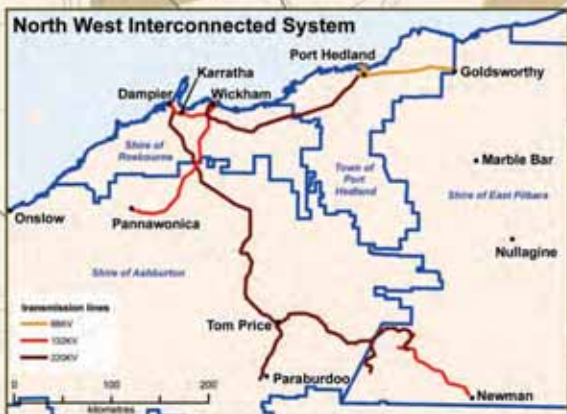
Power Infrastructure - Karratha



Produced by Infrastructure Planning & Construction Unit, Department of Planning

Base information supplied by: Western Australian Land Information Authority (L) 430 2008-4

Date: 27/07/2010



Legend

- cadastre
- possible expansion areas
- airstrip

Road network

- national highway (sealed)
- state road (sealed)
- main road (sealed)
- minor road (sealed)
- minor road (unsealed)
- track (unsealed)
- potential future main road
- restricted access vehicle (RAV) network (all categories)

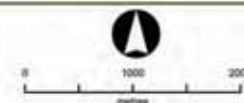
Rail network

- railway network (Rio Tinto)



MAP 10:

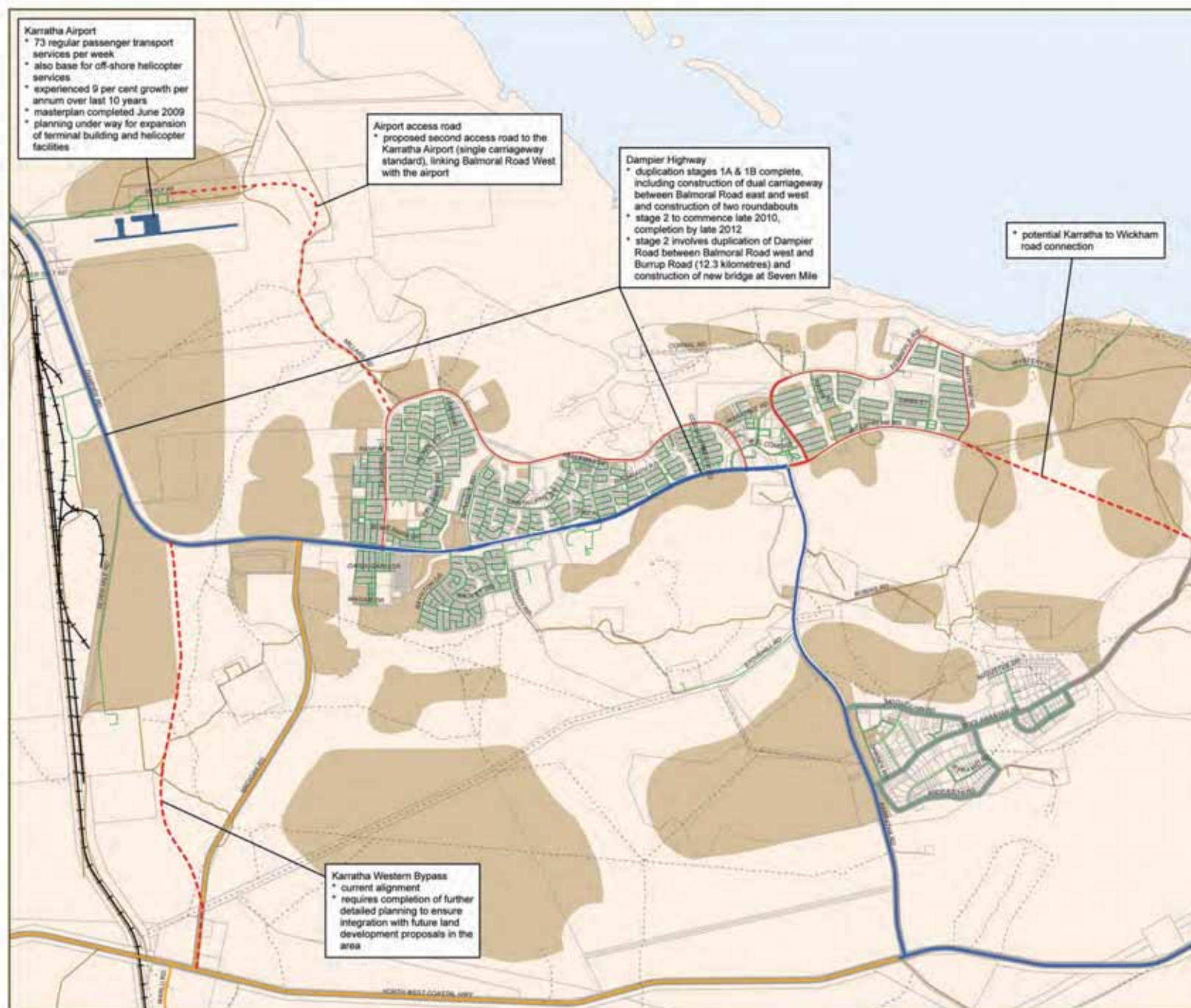
Transport Infrastructure - Karratha

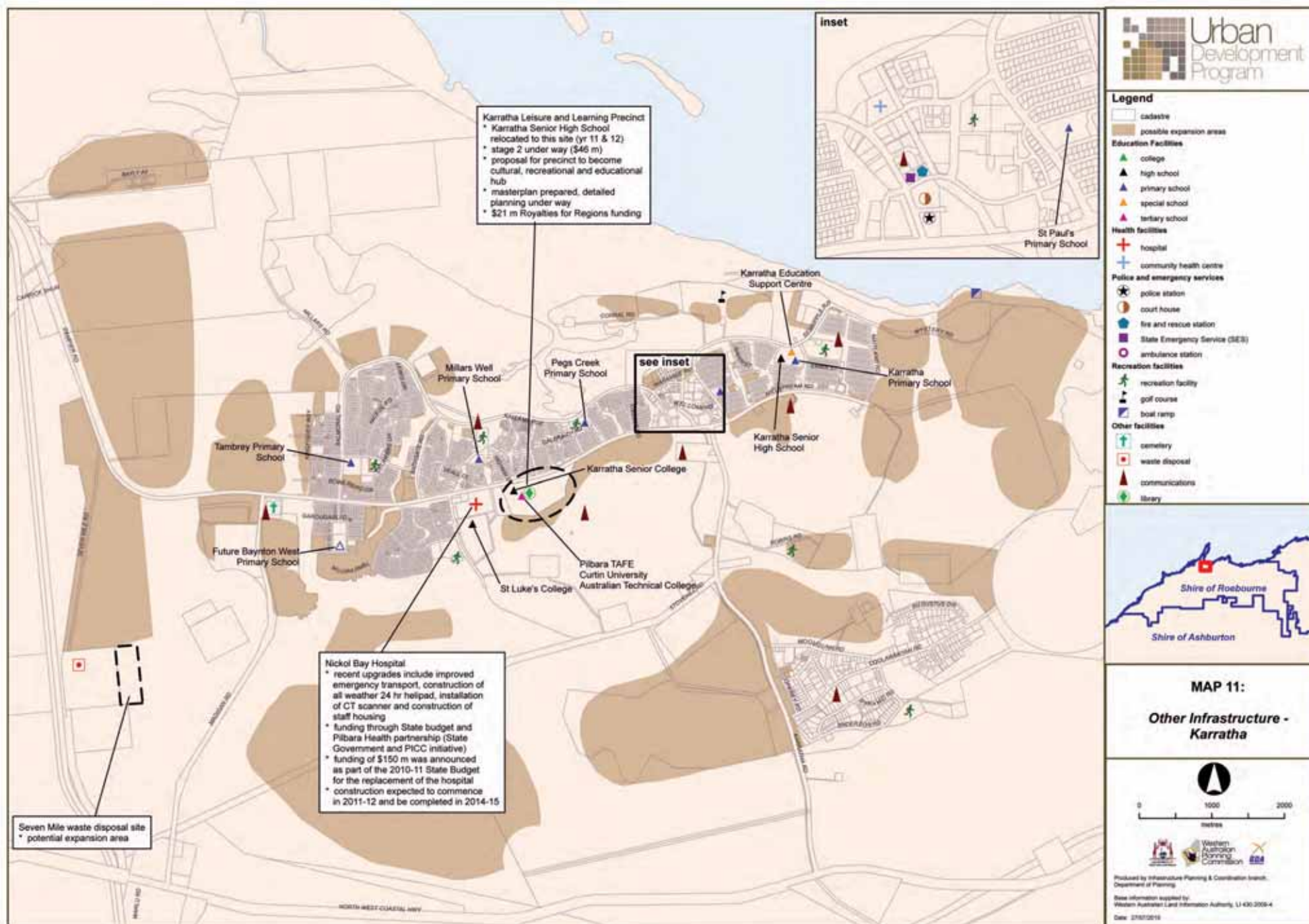


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Western Australian Land Information Authority, LI 430 2008-4

Date: 15/08/2010










Legend



Potential expansion areas

-  commercial/logistics
-  industrial
-  residential/workforce
-  accommodation/tourism
-  mixed use
-  rural residential
-  public purpose/community

Existing zoned area (by zone category)

-  residential/development
-  retail/business
-  industrial
-  wastewater treatment plant
-  wastewater treatment plant buffer

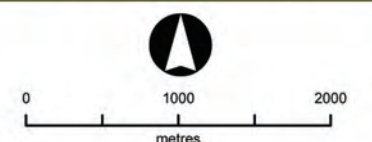
Road network

-  highways (sealed)
-  local roads (sealed)



MAP 1:

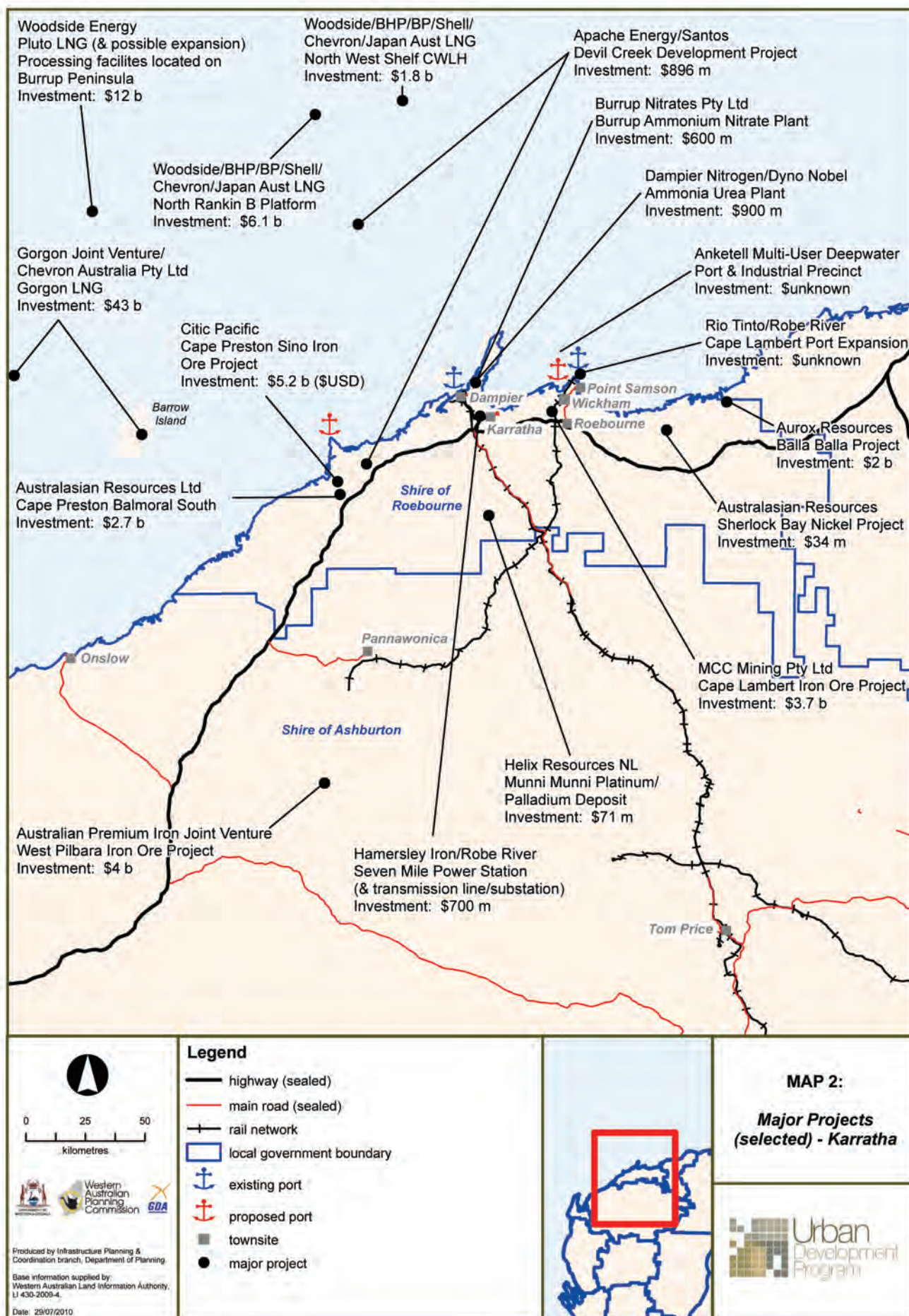
Future Development Overview - Karratha



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Base information supplied by:
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Date: 5/08/2010





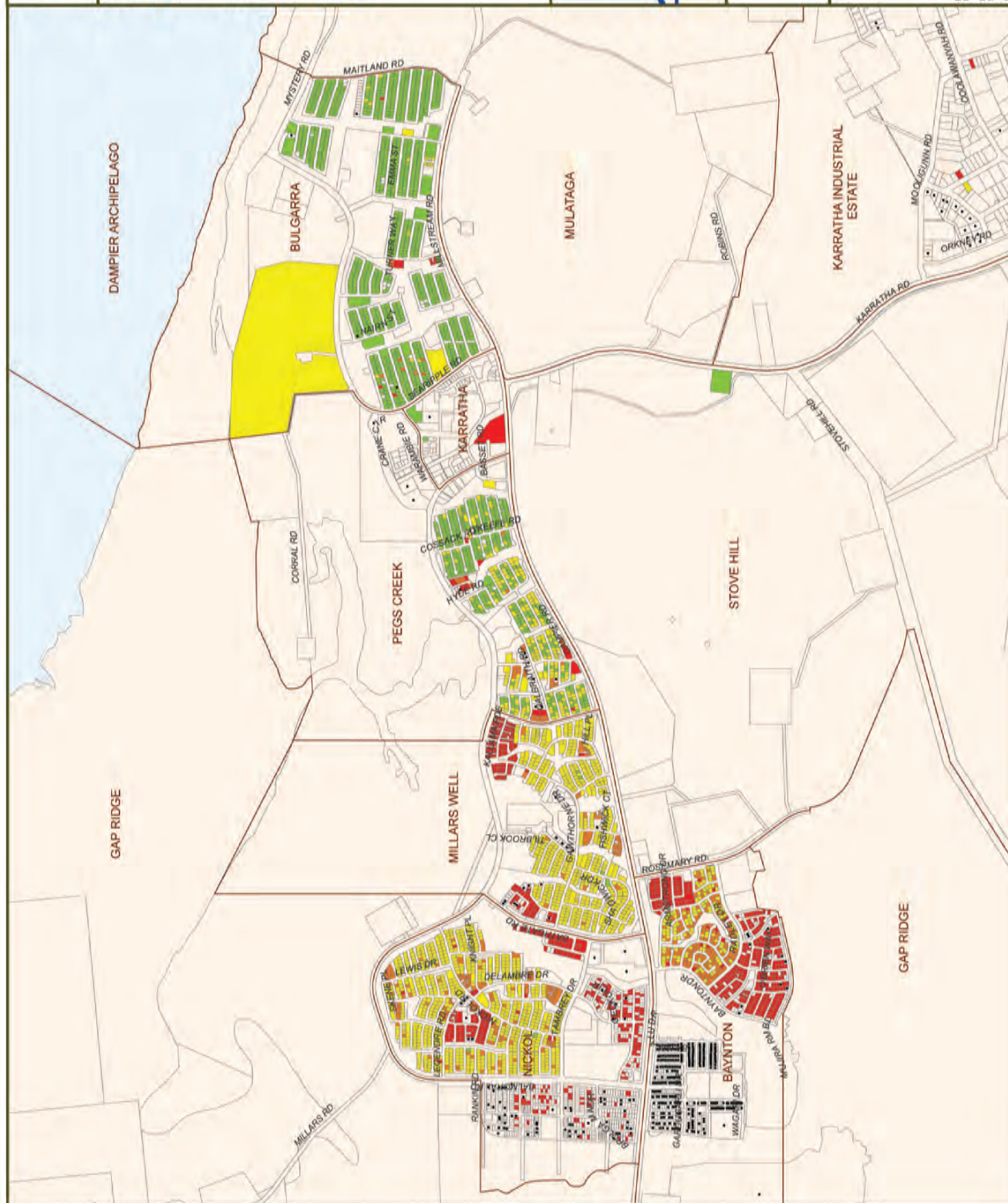
MAP 3:
*Decade of construction
(first build) - Karratha*

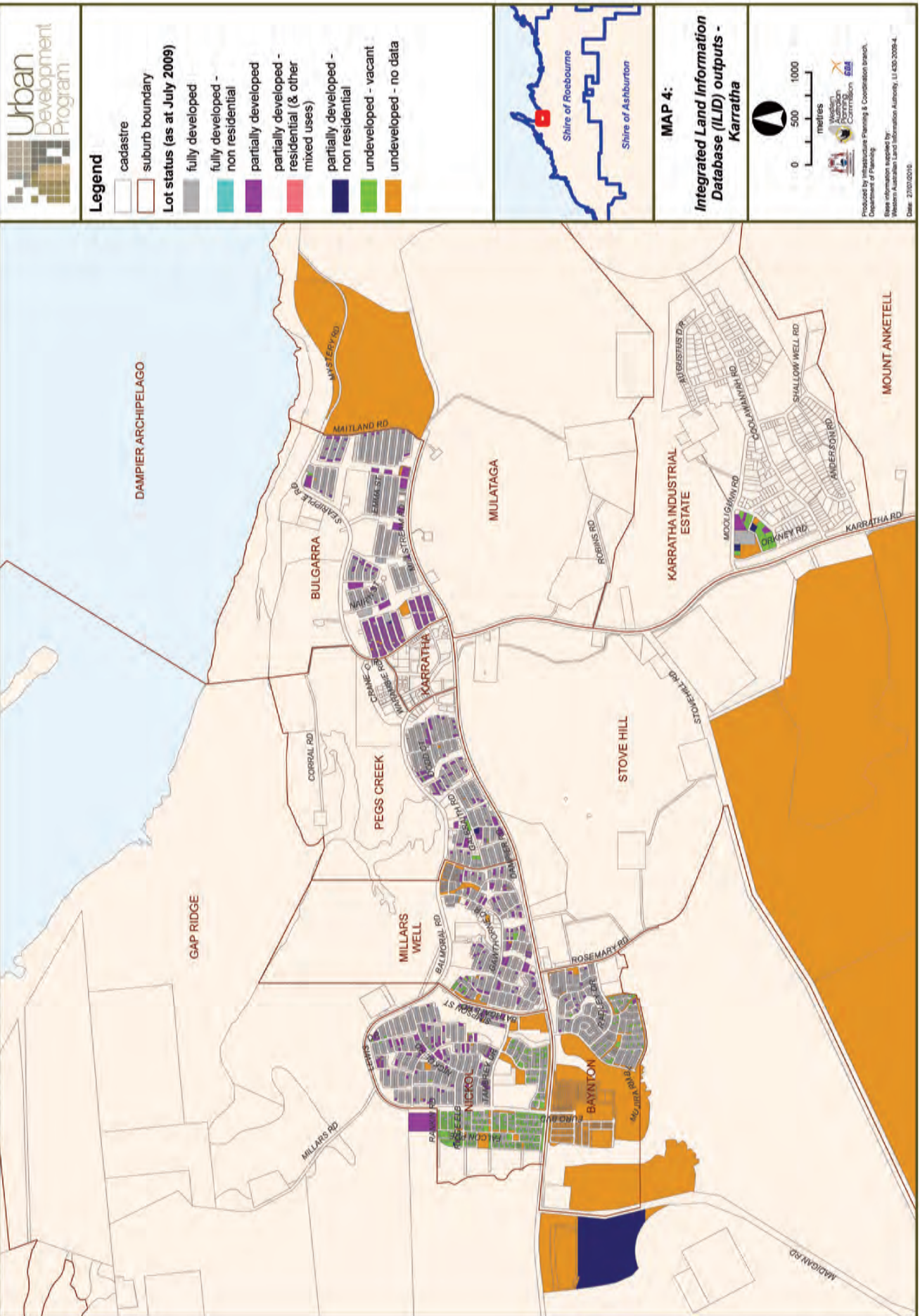


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www.27/07/2010







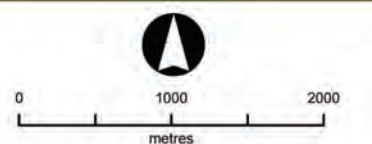
Legend

- cadastre
 - suburb boundary
 - commercial/town centre/
mixed business zones
 - industry/strategic industry/
industrial development zones
 - vacant lots (as at 1 June 2010)
 - wastewater treatment plant buffer
 - wastewater treatment plant
- Residential final approvals**
- 2005-06
 - 2006-07
 - 2007-08
 - 2008-09
 - 2009-10
- Intended land use**
- commercial
 - logistics
 - light industrial
 - general industrial
 - low density residential
 - residential
 - rural residential
 - residential/tourism
 - mixed use
 - tourism
 - workforce accommodation
 - development investigation area
 - public purpose/community/institutional
 - residential (identified in draft
open space strategy)



MAP 6:

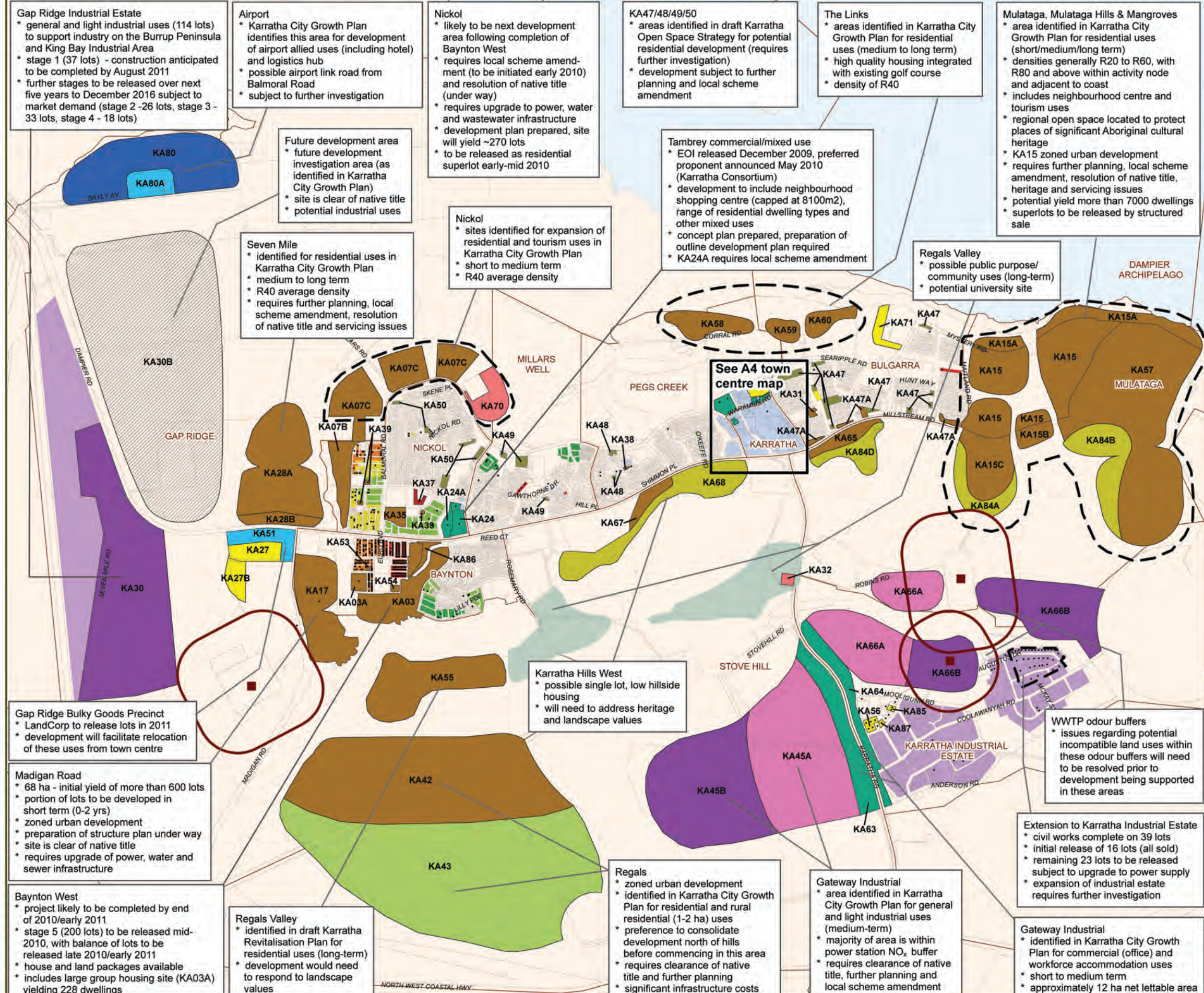
**Future Development -
Karratha**

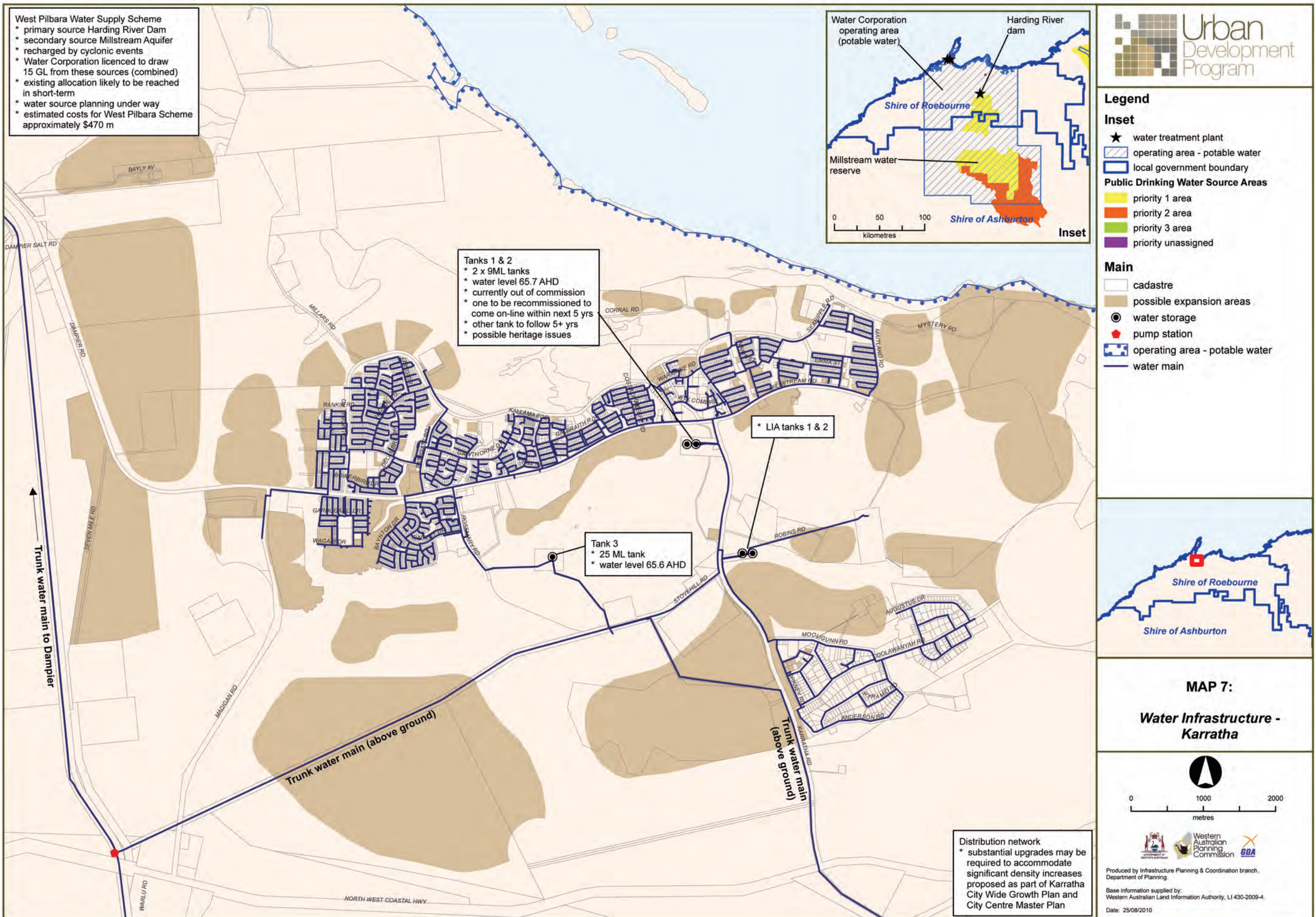


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Base information supplied by:
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Date: 24/08/2010





Distribution network
* substantial upgrades may be required to accommodate significant density increases proposed as part of Karratha City Wide Growth Plan and City Centre Master Plan

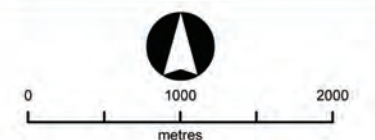
Legend

- cadastre
- possible expansion areas
- wastewater treatment plant
- wastewater treatment plant buffer
- operating area - sewerage services
- sewer catchments (approximate)
- sewered areas
- sewer pressure main
- wastewater re-use main
- wastewater pump station



MAP 8:

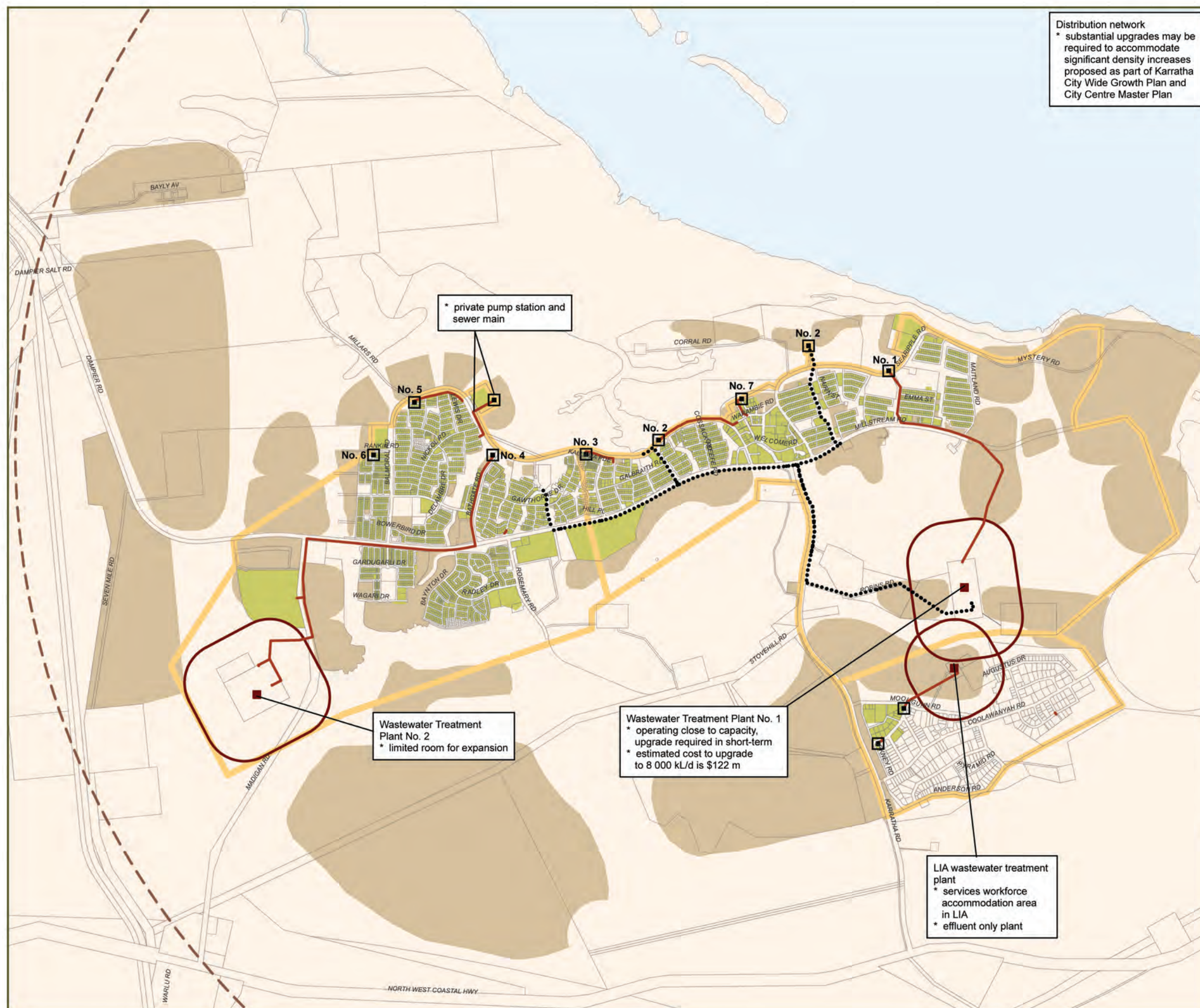
Wastewater Infrastructure - Karratha

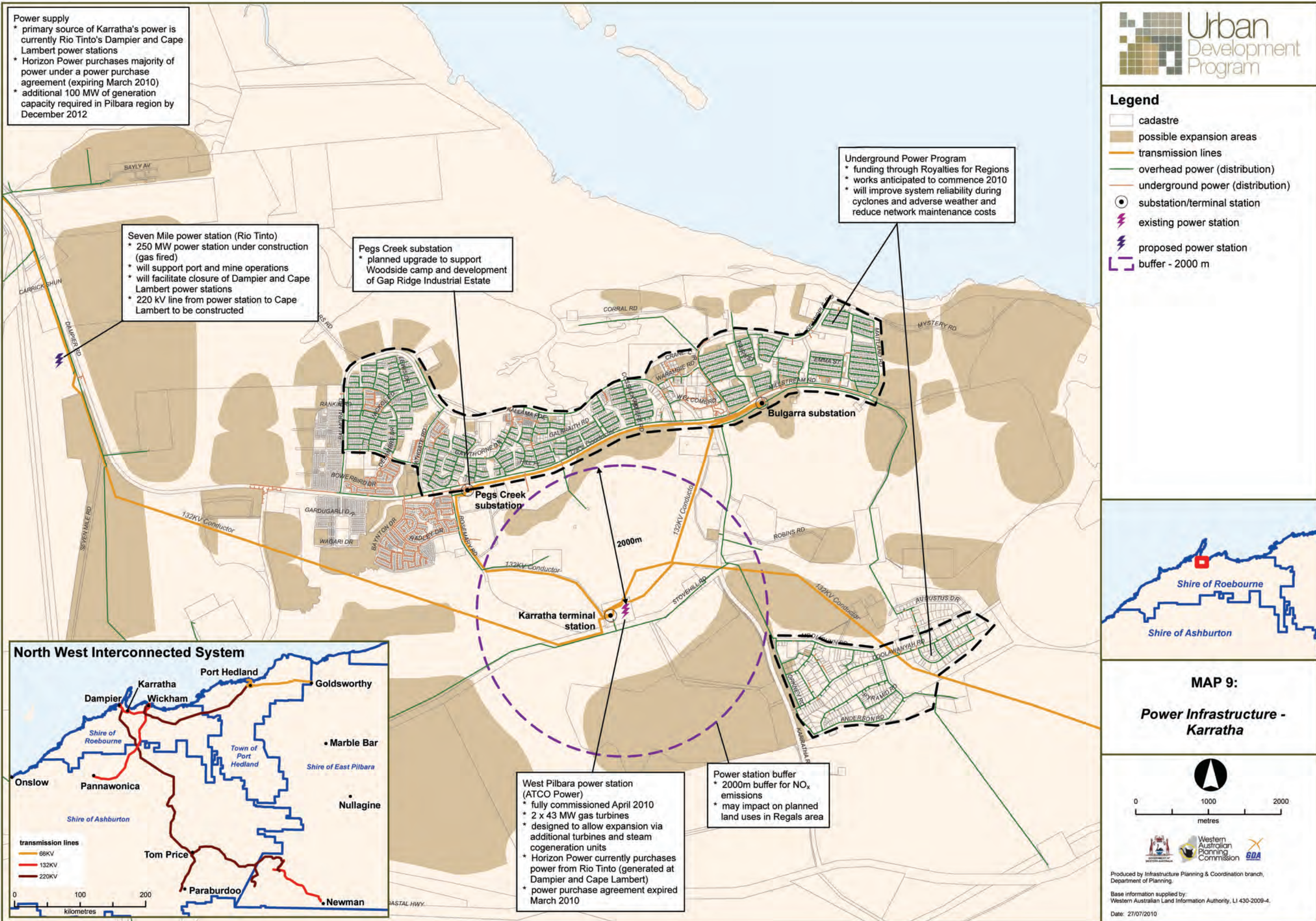


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Date: 24/08/2010





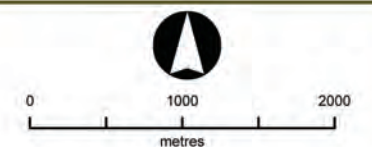
Legend

- cadastre
- possible expansion areas
- airstrip
- Road network**
 - national highway (sealed)
 - state road (sealed)
 - main road (sealed)
 - minor road (sealed)
 - minor road (unsealed)
 - track (unsealed)
 - potential future main road
 - restricted access vehicle (RAV) network (all categories)
- Rail network**
 - railway network (Rio Tinto)



MAP 10:

Transport Infrastructure - Karratha



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Base information supplied by:
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Date: 16/08/2010

