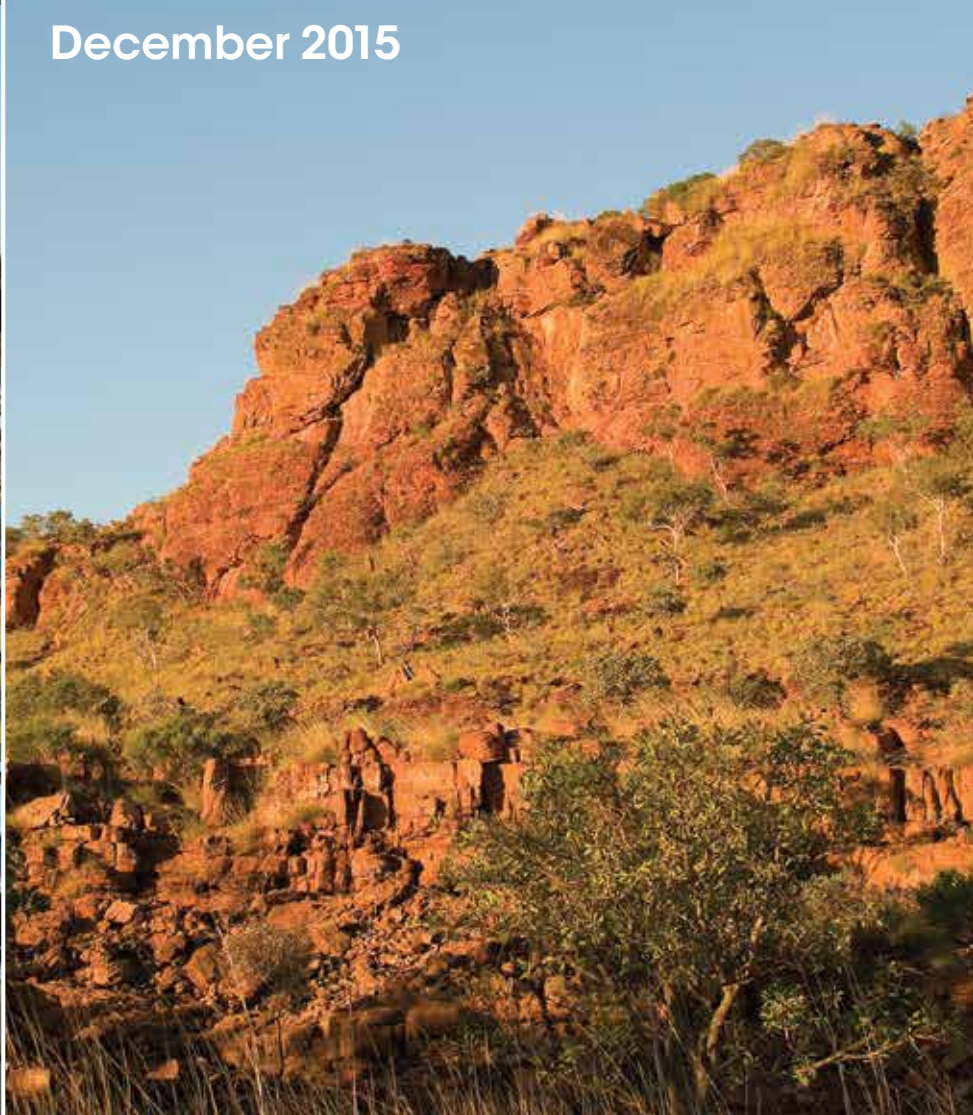


Kimberley

Regional Planning and Infrastructure Framework

Part B: Regional Infrastructure Planning

December 2015



Department of
Planning



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1 Utility infrastructure

1.1 Strategic direction

1.1.1 Overview

The Kimberley region's urban places are serviced by utility service networks consisting of: water; power; wastewater; telecommunications; and waste management (refer to Map 1.1). The configuration of services is based on key drivers of demand such as population and economic requirements. Large-scale industry and commercial activities in the agricultural, horticultural and resource sectors consume significant amounts of water and electricity. Emerging economic opportunities, as outlined in Part A – Chapter 5, will impact on the capacity of utility services across the region.

1.1.2 Goal statement

Ensure there are sufficient water supplies, waste water treatment plants, power generation, waste management facilities and telecommunications across the Kimberley and embrace new infrastructure approaches and technologies to achieve this where it is efficient and effective to do so.

1.1.3 State Planning Strategy

The State Planning Strategy contains relevant principles relating to the provision of utility infrastructure:

- **Physical infrastructure** – to coordinate physical infrastructure with development for community betterment.
- **Water** – to support Western Australia's growth and development by sustainably managing the availability and quality of water while maintaining a healthy, diverse and well-managed water environment.
- **Energy** – to enable secure, reliable, competitive and clean energy that meets the state's growing demand.
- **Waste** – to ensure our waste streams are managed as a resource.
- **Telecommunications** – to enable access to affordable services and the digital economy on an equitable basis.



1.1.4 Demand data

Timely access to data that informs anticipated demand across the region will be a key requirement for future infrastructure planning. This will assist service agencies with the ongoing requirement to undertake strategic infrastructure planning; and will include information on economic developments and the location and magnitude of population growth. Understanding the impact of the Kimberley's seasonal population on the region's infrastructure networks is essential to future utility infrastructure provision.

1.1.5 Identified utility infrastructure projects and coordination

The effective delivery of utility infrastructure to meet future demand requires strong coordination across government. Given the costs and long lead times required to plan and implement infrastructure projects it is imperative that utility infrastructure planning for the state progresses in line with identified needs.

In developing the KRPIF, the anticipated direction for regional infrastructure has been contemplated. As a result, a range of infrastructure projects has been identified that could achieve the region's vision. However, there are competing funding needs across the State, and the identification of projects in this KRPIF should not be taken as a commitment for Government funding. Individual projects will still be subject to normal budgetary and Treasury processes.

There will be an ongoing need to assess utility infrastructure to accommodate growth. It is, therefore, envisaged that new utility infrastructure projects will arise as a result of the KRPIF being periodically reviewed and updated.



1.2 Issues relating to utility infrastructure

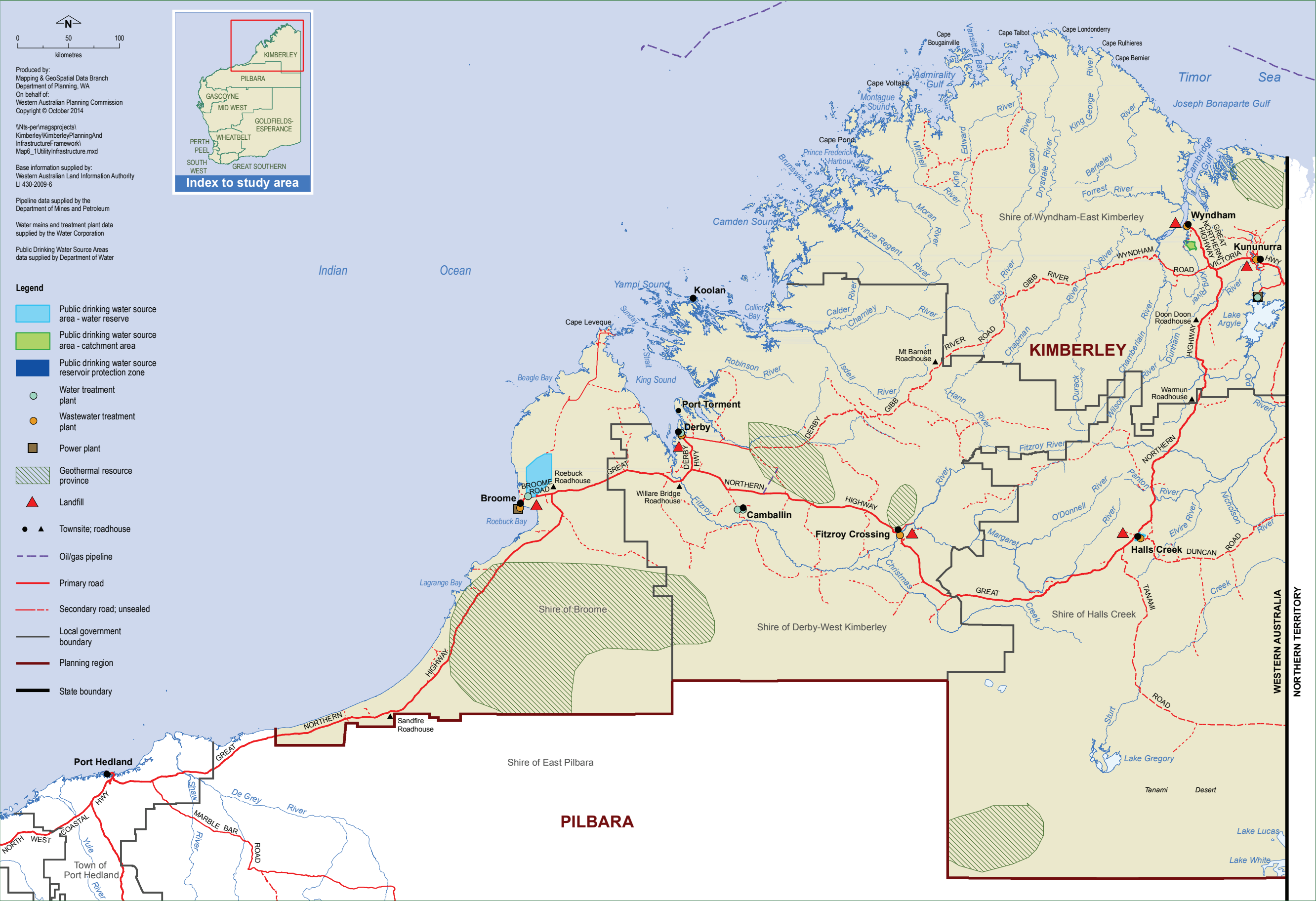
The key utility infrastructure issues in the region are:

- service populations within the Kimberley's urban places change markedly depending on time of year, placing significant pressure on utility infrastructure networks;
- Aboriginal settlements and communities are not adequately serviced;
- uncertainty surrounding ongoing funding of services to remote settlements;
- future economic development proposals are likely to impact on utility infrastructure networks in some urban places;
- development within the Canning Basin may impact on existing infrastructure;
- population and economic growth will place greater demands on collection and disposal capacity at the region's land fill sites;
- development opportunities in a number of the region's urban places are restricted due to insufficient water, wastewater and energy capacity;
- infrastructure costs can be high given remoteness and servicing, and the small scale nature of incremental growth from small centres;
- anticipated population and economic growth will place greater demands on collection and disposal capacity at the region's land fill sites;
- telecommunications infrastructure across the region is inadequate and it is expected that anticipated population and economic growth will place greater demands on its capacity in the future; and
- a clear set of utility infrastructure projects that are required to guide replacement/upgrading of infrastructure.

1.3 Planning for the future

The following general opportunities have been identified to plan for each type of utility infrastructure:

- promote demand assessment based on up-to-date information about key drivers, to plan for growth;



Map 1.1: Utility infrastructure

- understand the impacts of temporary population increases on local utility infrastructure networks and identify susceptible locations;
- identify communities where this is an issue and plan for future utility infrastructure requirements;
- understand the impacts of population attributable to resource projects on local utility infrastructure networks and identify susceptible locations; and
- devise strategies to manage increases in demand for water, wastewater and energy that can be attributed to proposed and/or committed resource projects.

Specific opportunities have been identified for each type of utility infrastructure.

1.4 Water

1.4.1 Water resources in the Kimberley

The Kimberley's water resources consist of surface and groundwater. Water supplies for the region's urban places are mostly sourced from groundwater. In the future, there may be opportunities to utilise alternative water sources such as recycled water and desalination. The Kimberley region annually recycles over half of its total wastewater. Water recycling from Water Corporation wastewater treatment plants in Broome and Derby supply more than one billion litres of water annually to golf courses, public open spaces, wetlands and irrigation schemes. The opportunity to continue to expand the use of recycled water and other alternative water sources, such as desalination, will be important to the region's future.

The availability of surface water for commercial use depends on capture and storage, which requires engineering solutions and substantial investment. Storage efficiencies can be difficult to achieve given high rainfall variability, very high temperatures and evaporation rates in northern regions.

While it is estimated there is enough water to cater for current and projected demands in the key resource areas, careful management will be required. At present, the regional centres and towns are supplied by water supply schemes, managed by the Water Corporation. Further details are provided in the Kimberley Profile.

The following opportunities have been identified to address future planning and provision of **water services** across the region:

- ensuring there is a secure supply of potable water, sufficient treatment and adequate distribution infrastructure in the region's urban places to service future population and facilitate economic growth;
- investigating and implement greater use of emerging technologies need to be implemented across the region to ensure there is sustainable water capacity across the region;
- promoting total water cycle management as it relates to water infrastructure capacity, including the identification of opportunities for water recycling and reuse;
- adopting and incorporating water sensitive urban design principles; and
- protecting groundwater in Aboriginal towns and settlements from incompatible land uses through the preparation of drinking water source protection plans for some of the larger communities.

In Aboriginal towns and settlements (where population is above 50 persons), water and sewer are managed by the Department of Housing's Remote Aboriginal Essential Services Program (RAESP) via an engineering firm, which in turn sub-contracts to remote service providers such as the Kimberley Regional Service Providers.

All aspects of control, maintenance, testing and reporting are however, generally undertaken by RAESP. Some local governments do provide associated municipal services and have arrangements with RAESP to test drinking water.

1.4.2 Future demand for water resources

The Department of Water has undertaken demand analysis to better understand the region's potential water requirements between 2011 and 2041. The analysis has identified a range of potential future demand drivers and generated indicative water use growth using three scenarios (low, medium and high). The information is summarised in Figures 1.1 and 1.2.

Figure 1.1: Current and estimated future water demand by sector in the West Kimberley

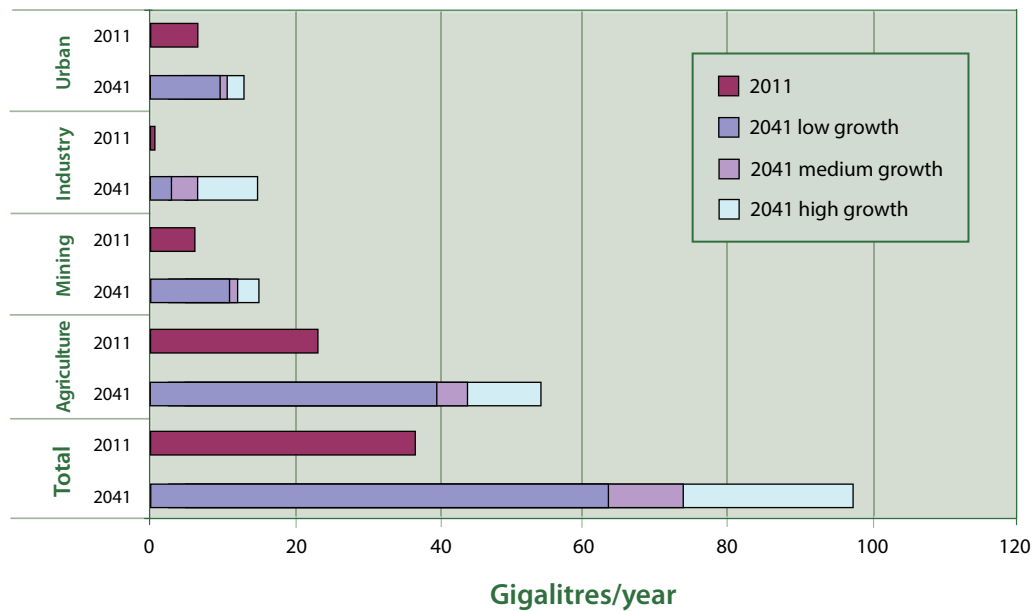
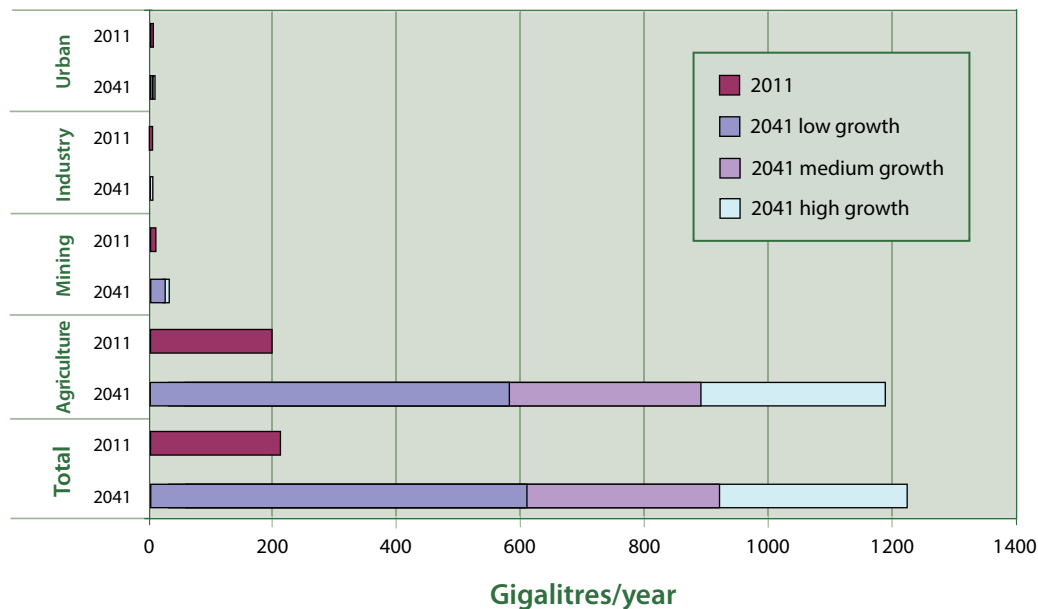


Figure 1.2: Current and estimated future water demand by sector in the East Kimberley



Agriculture

Significant increases in demand for water will arise from future expansion of Ord River Irrigation Area. These activities are expected to account for the most significant proportion of water use growth in the East Kimberley between 2011–2041.

The La Grange groundwater is one of the initiatives of Water for Food and has been identified for potential development of irrigated agriculture. This is expected to account for the most significant proportion of water use growth in the West Kimberley between 2011–2041. There are other areas currently being investigated through Water

for Food for expanded agricultural development in the West Kimberley that are expected to see growth in irrigated agriculture and subsequent water use (possibly beyond the predicted values in Figure 1.1 but has yet to be estimated).

New agricultural precincts essential to broadening the economic base and maximising the region potential will be mostly driven by ground water aquifers.

Pastoral diversification

Development of irrigated agriculture and horticulture on pastoral lands has been identified as a key growth sector in the Kimberley. These uses will require additional water sources. Growth is expected to range by between 1.8–2.3 per cent per annum in both the West and East Kimberley between 2011–2041.

Mining

Further development of the region's resources sector may increase demand for water associated with processing, dust control for mineral resources and on-site water supplies. Management of waste water is also an issue to be taken into considered when undertaking future planning for utility infrastructure.

Domestic

Increased demand for potable water within the region's urban places as a function of population growth (e.g. service population) and new economic activities and opportunities (commercial and industry).

1.4.3 Future supply of water resources

Water for Food is a four-year, \$40 million Royalties for Regions funded program to accelerate water investigations and optimise pastoral land tenure across the State. It will create the potential for new irrigation precincts and the expansion of agricultural and pastoral opportunities in existing districts across the State.

Agriculture

The Department of Water's *Ord Surface Water Allocation Plan* (2013) provides 865GL downstream of Lake Argyle, mainly for the ORIA, of which 750GL is available from the Main Ord sub area, and a further 115GL available from the Carlton – Mantinea sub area.

As of January 2013, 335 GL/yr of the water allocated for the Ord Sub Main has been licensed to the Ord Irrigation Cooperative (OIC) to supply its members in the Ord Stage 1 area. Most of the extra water for irrigation expansion will be diverted from the Ord River within the Main Ord subarea. This includes water to supply the Goomig, Knox Plain and West Bank areas in Western Australia, and the Keep River Plain in the Northern Territory. Small amounts of water will also be required to supply minor infilling of the Stage 1 area and new self-supply pumpers who divert from the river (DOW, 2013).

Most of the 115 GL/yr of water entitlements available from the Carlton-Mantinea subarea (starting 56 km downstream of the Kununurra Diversion Dam) is expected to be granted for new irrigated agriculture proposals on either side of the lower Ord River, near House Roof Hill.

This management plan also makes provision for environmental water requirements as well as release requirements for the existing hydro-power, which currently provides power to the townships of Kununurra and Wyndham and the Argyle Diamond Mine.

There has been, and will continue to be, considerable debate about the possibility of constructing new dam infrastructure on the Fitzroy River. Commitment to such works is likely to create opportunities for growth in crops that are irrigated by surface water. Any move to dam the Fitzroy River, will be complex and require considerable planning and consultation.

The Department of Agriculture and Food of Western Australia has commenced land and water planning and pre-feasibility assessment for irrigated agricultural precincts within the La Grange sub region within the Shire of Broome and ORIA 3 (Cockatoo Sands) (refer to Part A – Chapter 5 – Economy for further description). The project aims to define appropriate water and land resource development options and strategies to support additional irrigated agriculture.

In addition, there is significant research being undertaken to improve water efficiency in the agriculture sector, for example: sandalwood producers, including:

- trickle irrigation,
- tail water return,
- more water-efficient host species,
- best practice production (e.g. soils) and
- more targeted watering.

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Pastoral

Irrigated horticulture and fodder production that may be developed on pastoral leases will require significant volumes of water.

Mining

Some of the key areas of focus for the industry are the increased cost of water, water use efficiency, effective monitoring and better planning for water resources. There may be opportunities for reuse of process water in some sectors which could have significant benefits in terms of sustainable use of resources.

Domestic water

Estimates of future water availability show that water resources are sufficient to accommodate predicted regional centre and town growth for the next 25 years. There is also a need for water services planning to accommodate significant and short term increases in some town and community populations at particular times of the year.

Encouraging a domestic water ethos that values and does not waste water will help to meet current demands and facilitate development in a cost effective manner. While more can be achieved, the community response to a range of Waterwise initiatives operated by the Water Corporation is promising.

Competition for available water is likely to increase as demand grows and monitoring and regulation will be required to ensure water allocation is consistent with legislation and water resources are sustainably managed. Other issues that have significant implications for water service planning within urban places include the requirement to factor in significant increases in use due to the service population that locates in some of the region's settlements during particular times of the year.

Broome

The Water Corporation has defined a staged approach to infrastructure development in Broome based on current growth forecasts that are contained in *Western Australia Tomorrow* (WAPC, 2012). Should growth exceed these forecasts in the longer term (16–25 years) it may be necessary to identify additional water sources and infrastructure to augment supply.

Kununurra

Analysis by the Water Corporation has indicated that there is spare capacity in the current system to provide new connections. This is likely to be sufficient in the short-term (0–10 years). Should growth exceed these forecasts in the longer term it may be necessary to identify additional infrastructure within the existing borefield. While relocation of the town water supply might enable some further urban development of Kununurra, the future of Kununurra is also dependent on a safe and secure water supply being maintained. Moving the water supply might not be practical or economically viable and the existing borefield and water source protection zone must be maintained until such a time as a new source is fully investigated and in operation.

Water Corporation has completed planning and identified staged water services infrastructure development to supply growth in Kununurra for at least the next 20 years. The relocation of the town's bore fields, which are situated on the Lake Kununurra foreshore, has been proposed as an option to facilitate the growth of Kununurra as a regional centre. However, the current bore field is a secure and safe water supply for Kununurra. Water Corporation is currently equipping two new bores in this bore field to meet projected town growth.

Derby

The Water Corporation has defined a staged approach to infrastructure development in Derby (based on the Shire of Derby/West Kimberley Local Planning Strategy 2013; and Derby Regional Hotspots – Land Supply Update November 2008). Should growth exceed these forecasts in the longer term (16–25 years) it may be necessary to identify additional water sources and infrastructure to augment supply.

Fitzroy Crossing

The town's domestic water source is close to or has reached capacity. Water Corporation is in the process of identifying new sources, however, these are subject to land constraints (heritage, Native title, and flooding risks). Detailed planning has been initiated and the issue is expected to be resolved in the medium term. Should the town grow at a natural rate (2.2% per annum) it is expected that the new source will have sufficient capacity to meet townsite demand through to the long-term.

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Halls Creek

Development of the town was put on hold in 2010 pending confirmation that an alternative water source was available. Sources have now been identified and will provide approximately 176 connections to 2015 and another 90 connections beyond 2016.

There are existing constraints for further development of Halls Creek township, due to water source protection zones. These need to be acknowledged in town planning strategies and scheme amendments.

Wyndham

Source has sufficient capacity for additional growth however, conveyance and treatment assets require upgrades over time.

Aboriginal towns and settlements

Groundwater in some towns and settlements is at risk of contamination from incompatible land uses including landfill sites and wastewater treatment plants. An important step to protecting drinking water sources has been the preparation of drinking water source protection plans in some larger Aboriginal communities and the inclusion of these into layout plans. Drinking water source protection plans need to be prepared as a priority in Aboriginal towns and settlements where there are potential contamination issues.

1.4.4 Water infrastructure projects

Identified water infrastructure projects and studies are outlined in Table 1.1 (a & b).

Table 1.1(a): Water infrastructure projects

Project	Description / Objective
Water	
Water sources for expanded Ord Irrigation Scheme	Increase available water to meet the needs of an expanding Ord Agricultural Area through considering options including increasing storage of Lake Argyle, among other options.
Water service planning	Infrastructure upgrades and expansions (as identified) in: <ul style="list-style-type: none"> • settlements: Broome, Derby, Fitzroy Crossing, Kununurra, Wyndham, Halls Creek • identified locations as part of the Water for Food Initiative: La Grange, Knowsley, Mowanjum, Fitzroy Valley and Bonaparte Plains • Ord River Irrigation Area

The above projects are at various stages of planning and will be subject to detailed cost benefit evaluation and business case development as part of agency asset planning programs.

Table 1.1 (b): Water infrastructure related studies

Project	Description / Objective
Studies / Investigations	
Water services planning	Infrastructure upgrades and expansions (as identified) in Broome, Derby, Fitzroy Crossing, Kununurra, Wyndham and Halls Creek
Kununurra bore field relocation	The relocation of the town's bore field has been proposed as a means of accommodating Kununurra's growth as a regional centre. This needs an evaluation of the benefits and costs so government can make a decision that addresses the town's needs and well as ensuring a safe and reliable water supply
Water sources for agricultural precincts	Identify water sources and associated infrastructure requirements to service agricultural projects as part of the Water for Food Program at La Grange, Derby (Knowsley), Mowanjum, the Ord Irrigation Area and the Fitzroy Valley

1.5 Wastewater

1.5.1 Wastewater services in the Kimberley

Wastewater services in the region's major urban places are provided by the Water Corporation. There is spare capacity in the region's wastewater networks (Table 1.2).

In some cases, this should be sufficient in the short to medium terms to meet base line population growth scenarios (E-Band projection) and possibly the various aspirational population rates that have been determined for the regional and sub-regional centres. In the longer term, augmentation of wastewater networks may be required. It is important to note that there is significant seasonal variation in demand, particularly in Broome, Kununurra, and Wyndham, which escalates requirements. This issue needs to be considered when planning for future service provision.

Alleviating capacity issues in Halls Creek and Fitzroy Crossing is closely linked to water services planning that currently is underway as detailed in Section 1.4. It is expected that the identification and implementation of respective solutions in these settlements will address this issue.

All Aboriginal towns have a reticulated sewer system including evaporative ponds and pump stations of varying standards whereas Aboriginal settlements are serviced with limited onsite sewerage systems to varying standards. Evaporative ponds in a number of these towns and settlements have reached capacity and upgrades are a priority.

1.5.2 Future demand for wastewater services

Future demand for wastewater services in the region is expected to come from a number of sources, including:

- population growth and development in regional centres, major towns and towns;
- connection to and provision of wastewater services to previously unconnected urban places and population growth within these areas;
- industrial development of various types and purposes;
- increased visitation to the region's tourism sites, particularly those that provide accommodation options, will require additional wastewater services; and
- remote workforce camps to service the mining industry.

The following opportunities have been identified to address future planning and provision of **wastewater services** across the region:

- ensuring there is sufficient wastewater treatment and conveyance capacity in the region's urban areas and places future population and facilitate economic growth;
- promoting total water cycle management as it relates to wastewater infrastructure provision and capacity, including the identification of opportunities for wastewater recycling and reuse;
- adopting and implementing environmentally sensitive wastewater treatment methodologies; and
- investigating and implementing greater use of emerging technologies to ensure there is sustainable water capacity.

Table 1.2: Current wastewater service demand and capacity

Settlement	Current demand	Licence capacity
Broome	South – 2600 kL/d on average, subject to seasonal variation North – 1000-2000kL/d on average, subject to seasonal variation	South – 3 500 kL/d North – 3 500 kL/d
Kununurra	~1450 kL/d, on average, subject to seasonal variation	2 000 kL/d
Derby	~900 kL/d on average, subject to seasonal variation	1 500 kL/d
Fitzroy Crossing	~270 kL/d on average, subject to seasonal variation	700 kL/d
Halls Creek	~480 kL/d on average, subject to seasonal variation	800 kL/d
Wyndham	~200 kL/d on average, subject to seasonal variation	550 kL/d

Source: Water Corporation (2012)

1.5.3 Future capacity of wastewater services

Future strategies to supply wastewater services in the region are outlined below.

Broome

The Water Corporation has adopted a staged approach to planning wastewater infrastructure based on current growth forecasts for Broome. There is sufficient capacity to service forecast population growth in the short to medium terms. Should actual growth exceed forecasts there will be a need to reassess requirements in the mid to longer term.



Kununurra and Derby

Water Corporation has advised that Kununurra and Derby's wastewater requirements are well understood. Defined planning is underway in relation to Wastewater Treatment Plant expansion and Treated Wastewater Management requirements.

The 2015/16 State budget has allocated \$7.3 million to improve wastewater infrastructure in Derby.

Kununurra's water treatment plant may need be relocated to facilitate urban growth.

Fitzroy Crossing and Halls Creek

Water Corporation has completed planning for Fitzroy Crossing which indicates that the existing wastewater treatment plant has sufficient capacity to cater for future flows until 2028. Should growth rates change the Corporation will continue to assess system and upgrade requirements. Long term planning for Halls Creek wastewater treatment plant is currently underway and scheduled to be completed in 2015.

Aboriginal towns and settlements

The status of many wastewater systems in remote settlements is not well understood. Many are in need of upgrades or capacity expansion. In some settlements there are also issues of potential contamination of the drinking water source. An important step to protecting drinking water sources has been the preparation of drinking water source protection plans and the inclusion of these into layout plans. The drinking water source protection

Table 1.3 (a): Identified waste water infrastructure projects

Project	Description / Objective
Wastewater	
Infill sewerage	Provision of infill sewerage to urban centres and areas identified with a sewerage network (in accordance with identified priorities).
Provision of sewerage to the Broome Road Industrial Area	Provision of sewerage to the Broome Road Industrial Area

The above projects are at various stages of planning and will be subject to detailed cost benefit evaluation and business case development as part of agency asset planning programs.

Table 1.3 (b): Waste water infrastructure related studies

Project	Description / Objective
Studies / Investigations	
Wastewater services planning	Investigate wastewater services planning options for Halls Creek, and Fitzroy Crossing
Remote wastewater services	Provision of localised wastewater services in remote destinations to facilitate development of the tourism industry where identified. Investigation and provision of wastewater services to Aboriginal settlements and communities.

plans need to be prepared as a priority in Aboriginal towns and settlements with potential contamination issues.

1.5.4 Waste water infrastructure projects

Identified waste water infrastructure projects are outlined in Table 1.3 (a) and required waste water infrastructure related studies are outlined in Table 1.3 (b).

1.6 Energy

1.6.1 Energy services

Energy in the Kimberley is not supplied through an integrated/interconnected network. Service providers, including Horizon Power, Argyle and Energy Developments Ltd and Ord Hydro provide 'isolated' and self-contained systems across the region. Mine sites, remote settlements and camping grounds generally are supplied by onsite generation capacity.

The following opportunities have been identified to address future planning and provision of **energy services** across the region:

- ensuring there is sufficient energy generation, transmission and distribution capacity in the region's urban areas and places to reduce current impediments to development, service future population and facilitate economic growth;
- promoting and, where feasible, utilising renewable energy technologies to ensure there is sustainable energy capacity across the region; and
- promoting and adopting energy efficiency methodologies and practices as part of urban design.

1.6.2 Future demand for electricity

Horizon Power routinely undertakes demand modeling for its systems throughout the Kimberley region. It has prepared two (medium and high) growth scenarios for inclusion in the KRPIF (Figures 1.3 and 1.4) with greater growth rates and more project commencements being factored into the 'high'.

1.6.3 Future capacity of electricity

Horizon Power has identified the following key capital works that are required in the short (0–5 years – 2013–2018) and medium (6–15 years – 2019–2028) terms. These projects identify new capacity and other upgrades to distribution, generation and transmission in response to key demand drivers (Table 1.4).

The 2015/16 State budget has allocated \$9.2 million on upgrades and maintenance of power infrastructure in Broome and Kununurra.

Industry proponents will identify future electricity requirements to service industry. Given the size and scale of potential industry, it is anticipated that supply to meet specific user demands will be generated onsite although there may be some opportunities to supply surplus power into existing networks should this be economically viable.

There is an identified need to provide electricity to remote locations, including camp sites, to facilitate development of opportunities within the tourism sector.

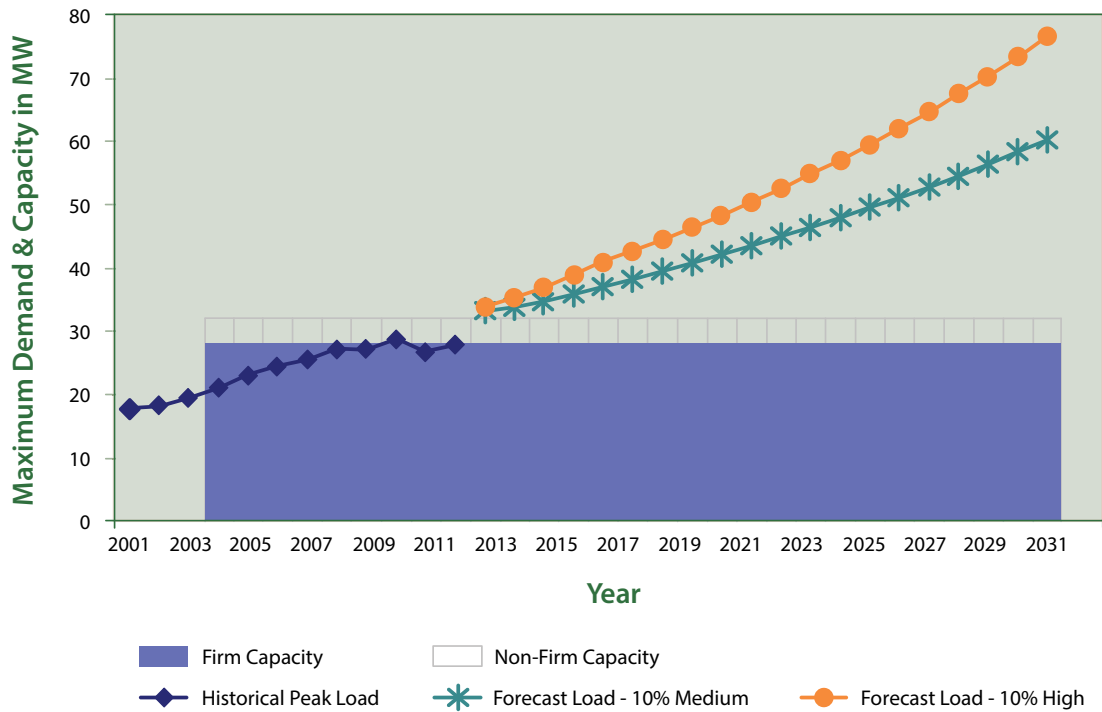
Development of Canning Basin gas resources may offer additional opportunities for greater utilisation of domestic gas in some settlements.

Table 1.4: Future supply of electricity – identified projects

Timing	Location	Project Title	Reason
2013	Kalumburu	Generation expansion	new power station
2013	Yungungora	Generation expansion	new power station
2013-14	Warmun	Network upgrades	reliability
2013-2015	Broome	Network upgrades	reliability, network capacity shortfall
2013-2027	Broome	Generation expansions	generation capacity shortfall
2013	Derby	Network upgrades	reliability, network capacity shortfall
2013-2027	Derby	Generation expansions	generation capacity shortfall
2013-2027	Fitzroy Crossing	Generation expansions	generation capacity shortfall
2014-2024	Fitzroy Crossing	Network upgrades	reliability, network capacity shortfall
2013-2027	Halls Creek	Generation expansions	generation capacity shortfall
2013-2018	Kununurra	Generation expansions	generation capacity shortfall, reliability
2014-2016	Kununurra	Network upgrades	network capacity shortfall
2014	Looma	Generation expansion	generation capacity shortfall
2013-2020	Wyndham	Network upgrades	reliability, network capacity shortfall

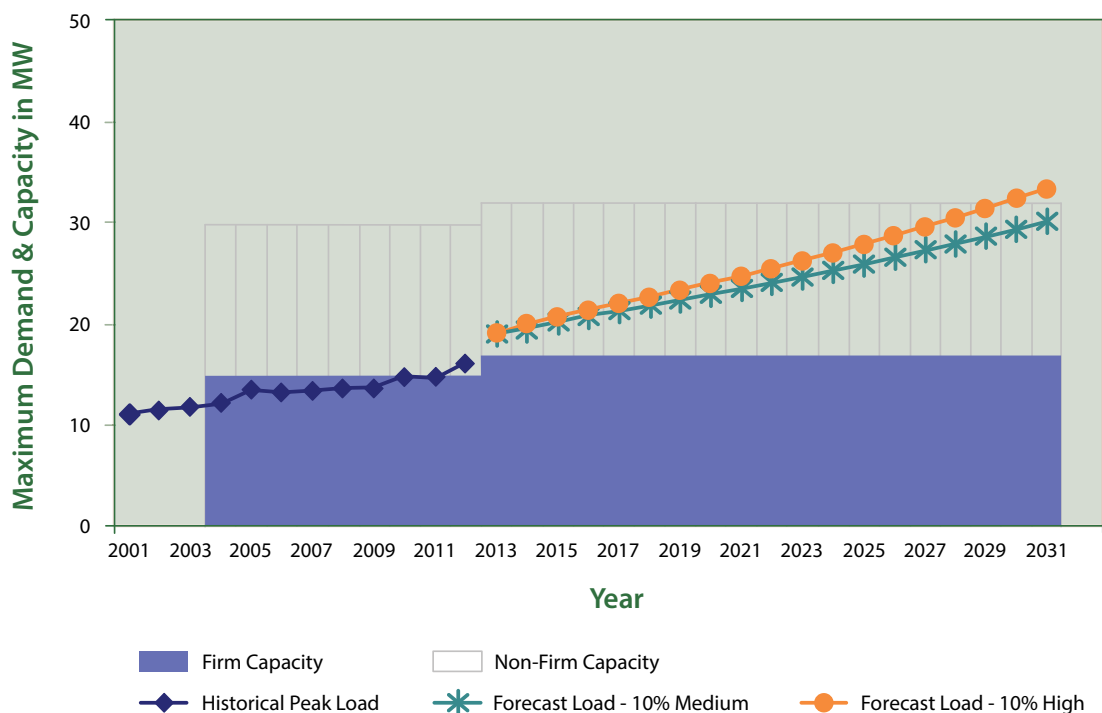
Source: Horizon Power (2013)

Figure 1.3: Future electricity demand (Broome)



Source: Horizon Power (2013).

Figure 1.4: Future electricity demand (Kununurra)



Source: Horizon Power (2013).

1.6.4 Renewable energy

With the forecasted growth and increase in demand for energy to support a growing population in the region, renewable options will need to be investigated. There are significant opportunities for the development of a renewable energy sector. In particular, the region's substantial solar energy resources could be harnessed but current policy and contractual issues are preventing this from being resolved. A comprehensive study of viable renewable energy resources will need to be completed to identify priority areas for development.

Installing a 10 megawatt hydro plant on the Kununurra Diversion Dam may be an option for Kununurra. Tidal power presents long term renewable options for Kununurra, Wyndham and Derby. For example, the State's Environment Minister has recently given approval for the Tidal Energy Australia (TEA) to build a tidal energy power station at Doctor's Creek, near Derby. The station is designed to generate 40 megawatts of electricity, enough to power 10,000-15,000 homes.

Kununurra, Wyndham and the Argyle Diamond mine are supplied with electricity by the Ord River Hydro Power Plant, operated by Pacific Hydro under the *Ord River Hydro Energy Project Agreement Act 1994*. The project provides base-load power delivered via its own 132 kV transmission network and remains the largest generator of renewable energy in Western

Australia, generating over 210 GWh of energy each year which are purchased by Horizon Power and the Argyle Diamond Mine. It is estimated that as many as 40,000 houses use the electricity created by the power station.

1.6.5 Energy infrastructure projects

Identified energy infrastructure projects are outlined in Table 1.5.

Planning for the future

Potential resource projects in the Kimberley will require infrastructure strategies and planning to support future development. The Canning Basin holds what is possibly the largest onshore resource of unconventional gas in Australia, and as further exploration and development into this resource takes place, means of transporting the gas will be required.

Buru Energy and Mitsubishi's *Natural Gas (Canning Basin Joint Venture) Agreement Act 2013* includes a Domestic Gas Project which requires construction of a pipeline for the transport of gas. This necessitates the identification of a pipeline corridor for the Domestic Gas Project. This corridor will potentially follow the road reserve of the Great Northern Highway, and facilitate the creation of the Great Northern Pipeline, joining the Canning Basin to Port Hedland.

Table 1.5: Energy infrastructure projects

Project	Description / Objective
Energy	
Electricity upgrades	<p>Upgrades to address network reliability issues and capacity shortfalls across the region. This includes:</p> <ul style="list-style-type: none"> Distribution Network Voltage Conversion – converting aging 6.6 kV network to 22 kV network to increase capacity and improve reliability and operation safety of distribution network. Replace aging generators – existing generators are past their useful life posing a safety risk for operation. Investigate opportunities to implement solar power projects in the region.
Sink power line grid	<p>Lower operational costs by 15%.</p> <p>Replaces aged infrastructure.</p> <p>Enables greening of towns</p>

The above projects are at various stages of planning and will be subject to detailed cost benefit evaluation and business case development as part of agency asset planning programs.

1.7 Solid waste management

1.7.1 Solid waste management services

Solid waste management in the region is generated from:

- domestic land uses;
- construction and demolition;
- council works including green waste from parks and road construction; and
- commercial/industrial activities.

Solid waste (infill) facilities are located within many of the region's settlements. Each local government collects waste from ratepayers, including commercial and industrial customers, within respective settlements (Table 1.6). A number of private waste management companies also provide services for commercial organizations, including removal of waste generated from fly-in fly-out camps and mining activities. Bulk and green waste collection services are also offered during the year in major towns.

Aboriginal towns and settlements have basic standards of solid waste management facilities. Some disposal sites are located in close proximity to community living areas and water sources, creating potential health risks. Most waste disposal systems in these towns and settlements are community managed. Water source protection plans (and community layout planning) assist with siting waste management.

The following opportunities have been identified to address future planning and provision of **solid waste management services** across the region:

- minimising solid waste and associated environmental impacts;
- providing adequate collection and disposal capacity at the region's land fill sites and where necessary identify new sites;
- identifying a suitable site for a regional/ sub-regional waste management facility as appropriate; and
- maximising re-use and recycling of land fill materials in a sustainable manner through the use of best practice technology and waste disposal minimisation

Table 1.6: Solid waste management capacity

Service	Shire of Broome	Shire of Derby/ West Kimberley	Shire of Halls Creek	Shire of Wyndham/East Kimberley
Frequency	Weekly refuse collection service for residential, light industry and heavy industry	Bi-weekly (Oct–Feb) and weekly (Mar–Sep) rubbish collection service	Bi-weekly rubbish collection service	Weekly rubbish collection service to residents and commercial and industrial operators
Location	Refuse site is 9kms from town	Two waste management facilities in Derby and Fitzroy Crossing	Rubbish tip located 3 km from town	Two landfill sites in Wyndham and Kununurra
Recycling	Comprehensive recycling service. E-Waste collection points	Four household verge collections per year	Subsidised compost bin program	Green waste recycled into mulch. Used in council gardens and available to public

Source: local government agency websites (2012)



1.7.2 Planning for solid waste management capacity in the future

Future demand for solid waste management services

Servicing projected economic and population growth in line with the WA Tomorrow forecasts and aspirational targets will mean generation of significantly more solid waste materials. This will trigger the need for upgrading existing stations or the commissioning of new facilities.

Future capacity requirements

At present, there is a pressing need to upgrade or relocate existing landfill sites in the existing settlements of Broome, Kununurra, Derby, Halls Creek and Wyndham along with some of the Aboriginal towns and settlements. These new facilities should be strategically located so as not to impinge upon future urban expansion options but could also include the option to expand as demand dictates. One key issue that needs to be addressed is the manner by which tourism sites – camping grounds, national parks and other attractions – are provided with a rubbish removal service.

Waste minimisation is also a critical concern and will assist in increasing the life expectancy of existing landfill sites, minimising environmental damage, reducing operational costs and supporting resource recovery. However, high levels of contamination, the cost of recovery and the generally free access by households to dump trailer waste at landfills is an inhibiting factor to economically sustainable recycling operations. Green waste separation and treatment for use as mulch is not common place.

There may be opportunities for the development of a regional waste facility to improve waste management through recycling and green waste composting.

1.7.3 Solid waste infrastructure projects

Identified solid waste infrastructure projects are outlined in Table 1.7.

Table 1.7: Solid waste infrastructure projects

Project	Description / Objective
Other (Waste Management)	
Solid waste management facilities	Provide new solid waste management facilities, including the ability to handle increased recycling and liquid wastes, in regional centres including Broome, Derby and Kununurra

The above projects are at various stages of planning and will be subject to detailed cost benefit evaluation and business case development as part of agency asset planning programs.

1.8 Telecommunications

1.8.1 Telecommunications services

Telstra's NextG network is the primary mobile phone network in the Kimberley. Currently, other providers have only limited access. Generally, broadband access is considered to be a significant impediment to development in the Kimberley. A 2008 telecommunications needs assessment for Western Australia found that:

- the main population centres have good mobile telephone coverage but long stretches of main highways have very limited coverage; and
- ADSL broadband availability is limited to major towns and to within only a few kilometres of ADSL-enabled exchanges.

These findings particularly apply to the Kimberley, where telecommunications services for households and businesses in the region are generally of a lower standard than in other urban locations in the south west of the State. In particular, broadband access is problematic away from the major towns, with slower and less reliable satellite broadband often the only alternative. Resources companies close to the optic fibre cable that passes through the region have good access to capacity for data and telephone, but capacity is limited at remote sites. There is limited competition and where this exists it is usually limited to major towns. Apart from Telstra, Vodafone and Optus have limited network coverage in the region. Mobile phone reception is generally poor or non-existent along the region's major roads and at road houses.

Planning for **telecommunications infrastructure** to meet the region's future needs must ensure there is sufficient telecommunications infrastructure capacity across the region to reduce current impediments to development and to service future population and economic growth.

1.8.2 Planning for the future

Future demand

The anticipated increase in the region's population will significantly increase demand for telecommunications infrastructure – phone cover and high capacity broadband. This likely to be centred on existing population centres.

Future capacity requirements

As part of the Federal Government's National Broadband Network initiative, there is a \$250 million budget to address black spots across regional Australia. The Kimberley may be identified as a priority region given its rate of growth. Broadband is considered essential to building new communities in the region, since without competitive broadband and mobile telephone services they would be at a significant disadvantage, lacking the capacity to attract residents and workers. Government intervention may be needed to assist the rollout of the National Broadband Network.

The Department of Commerce is also working to facilitate the improvement of digital infrastructure within the Kimberley region. At present, major resource companies access high end communications needs via satellite linkages that provide little benefit to surrounding communities and have limitations in poor weather. It is pursuing the optimal deployment of next generation communications networks, such as the National Broadband Network to the region. Fibre optic based solutions would also foster the delivery of government and private services, such as health via digital applications that will improve social and economic outcomes.

The Regional Mobile Communications Project (RMCP) funded through the Royalties for Regions Program, is an agreement between the State Government and Telstra to provide for improved mobile phone and data coverage on the Great Northern Highway. The rollout of the program will see nine new towers and sixteen upgraded towers to significantly improve coverage along the highway through the Kimberley, fully implemented by mid-2014.

Research and technological innovation is important in solving the unique local issues affecting environmental, social and health needs; and the competitiveness of the resources industry in the region. Government agencies and strategic research organisations should consider Pilbara-based testing facilities and research infrastructure where there is a direct research link to the region.

1.8.3 Telecommunication infrastructure projects

Identified energy infrastructure projects are outlined in Table 1.8.

1.9 Planning initiatives

Planning initiatives relating to provision of utility infrastructure are presented below in Table 1.9

Table 1.8: Telecommunications infrastructure projects

Project	Description / Objective
Science & Communications (Telecommunications)	
Improve mobile phone coverage	Works required to provide greater region wide coverage
National Broadband Network rollout	Rollout of National Broadband Network in the Kimberley

The above projects are at various stages of planning and will be subject to detailed cost benefit evaluation and business case development as part of agency asset planning programs.

Table 1.9: Planning initiatives - utility infrastructure

#	Planning initiative	Lead	SPS strategic direction	Blueprint alignment
1a	Share data that enables forward planning to be based on accurate demand assessments leading to a better understanding of potential supply gaps relating to utility infrastructure.	service providers	Physical infrastructure	Infrastructure, services and governance
1b	Ensure that scenario planning is undertaken in consultation with industry so that impacts are minimised in a timely manner.	relevant agencies and industry	Physical infrastructure	Infrastructure, services and governance
1c	Implement water sensitive urban design principles as part of subdivision, development approval processes and as provisions in town planning schemes.	LG/DoP	Physical infrastructure	Housing and land
1d	Incorporate renewable energy techniques into planning and development throughout the region.	LG/DoP/HP	Physical infrastructure	Housing and land
1e	Implement energy efficient urban design principles as part of subdivision and development approval processes.	LG/DoP/service agencies	Physical infrastructure	Housing and land
1f	Investigate water sources to develop new irrigation areas and increase the size and productivity of existing irrigation districts by implementing initiatives of <i>Water for Food</i> .	DoW DAFWA	Physical infrastructure, Agriculture and Food, Water	Infrastructure, services and governance
1g	Investigate the potential for consolidating and investing in larger regional waste and recycling facilities, potential in the form of a 'Resource Recovery Park', to service both industry and communities. If such a facility is considered feasible, reserve and zone land as required.	LG	Physical infrastructure	Infrastructure, services and governance
1h	Implement water, wastewater, regional energy, land fill and telecommunications infrastructure priorities, as indicated in Sections 1.4.4, 1.5.4, 1.6.5, 1.7.3 and 1.8.3.	relevant agencies	Physical infrastructure	Infrastructure, services and governance
1i	Investigate and identify utility infrastructure needs for Aboriginal settlements and implement strategies to address these.	relevant agencies	Physical infrastructure Remote settlements	Aboriginal advancement
1l	Investigate and prepare regional variations to relevant SPPs to encourage and allow for incorporation of renewable energy techniques and water sensitive urban design into subdivision, planning and development approval processes.	DoP/LG	Physical infrastructure Remote settlements	Housing and land

2 Community services infrastructure

2.1 Strategic direction

2.1.1 Overview

Growth of the Kimberley's population and potential expansion of settlements will provide the impetus for establishing a higher threshold of community facilities and services across the region (refer to Map 2.1). The enhancement of these facilities and services will assist greatly in attracting and retaining workers and their families and help build a strong sense of community.

2.1.2 Goal statement

Create communities that are safe, healthy and enjoyable places to live in, work and/or visit; and offer a wide range of cultural, health, education and recreational opportunities.

2.1.3 State Planning Strategy

The State Planning Strategy contains relevant principles relating to the provision of community infrastructure:

- **Social infrastructure** – to provide enable liveable, inclusive and diverse communities.
- **Health and wellbeing** – to encourage active lifestyles, community interaction and betterment.

2.1.4 Demand data

Timely access to data that informs anticipated demand across the region will be a key requirement for future community services infrastructure planning. This information will assist service agencies with the ongoing requirement to undertake strategic infrastructure planning; and will include information on economic developments and the location and magnitude of population growth. Understanding the impact of the Kimberley's seasonal population on the region's infrastructure networks is essential to future community services infrastructure planning.

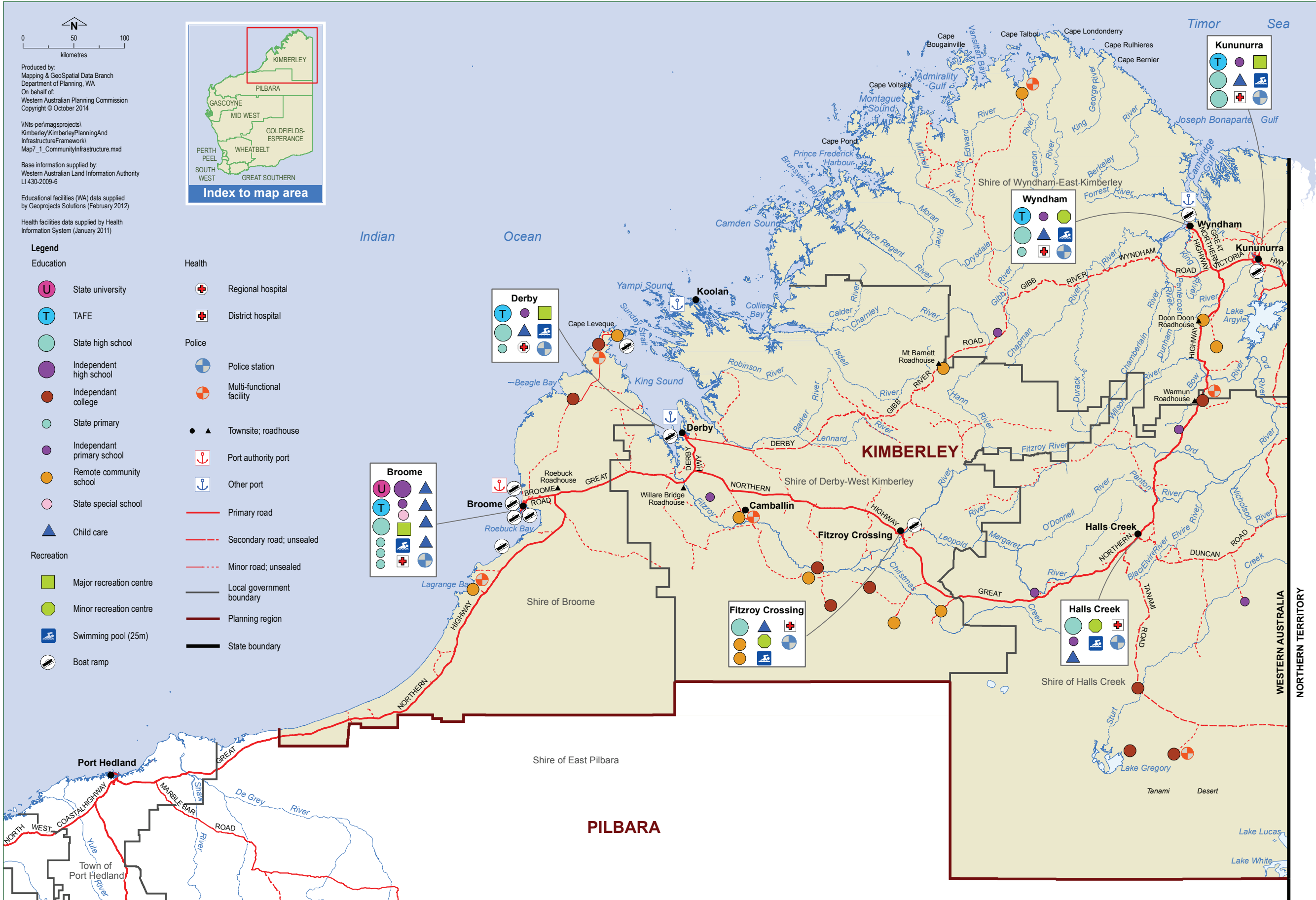
2.1.5 Identified community services infrastructure projects and coordination

The effective delivery of community services infrastructure to meet future demand requires strong coordination across government. Given the costs and long lead times required to plan and implement infrastructure projects it is imperative that community services infrastructure planning for the state progresses in line with identified projects.

In developing the KRPIF, the anticipated direction for regional infrastructure has been contemplated. As a result, a range of infrastructure projects has been identified that could achieve the region's vision. However, there are competing funding needs across the State, and the identification of projects in the KRPIF should not be taken as a commitment for Government funding. Individual projects will still be subject to normal budgetary and Treasury processes.

There will be an ongoing need to assess community services infrastructure needs to accommodate growth. It is, therefore, envisaged that new community services infrastructure requirements will arise as a result of the KRPIF being periodically reviewed and updated.

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Map 2.1: Community services infrastructure

2.2 Issues relating to community services infrastructure

The key community services infrastructure issues in the region are:

- in the past, planning has not been comprehensive and coordinated;
- planning has not been based on detailed analysis of key drivers, such as population and economic growth, which has led to sub-optimal servicing outcomes;
- local government is not allocating sufficient funding for asset renewal, replacement and upgrades;
- health services across the region will need to be expanded to meet the demands of increased population, economic growth and diversification across the region;
- the quality and choice of private and public school education services will play a significant role in retaining the region's population;
- in future, more passive/active open spaces, recreation services and entertainment/cultural facilities will be required in the region's urban places; and
- a clear set of community service infrastructure projects is required to guide replacement/upgrading of services across the region.

2.3 Planning for the future

The following general opportunities have been identified to plan for each type of community service infrastructure:

- promote comprehensive and coordinated community infrastructure planning that meets the requirements of all providers;
- promote demand assessment, based on up-to-date information about key drivers, to plan for growth.
- enhance growth centre planning;
- enhance involvement in townscapes, built form and quality of life initiatives; and
- ensure community infrastructure and services match growth.

Specific opportunities have been identified for each type of community services infrastructure.

2.4 Health

2.4.1 Planning for the future

Future demand

At the present time, the lack of critical population mass is a disincentive for private sector investment in health and other community services. This increases the demands and expectations placed on existing services. Future demand for health services relates directly to expansion of economic activity and associated population growth within the Kimberley's settlements. The anticipated future demographic profile of the region's population points to some important considerations for health planning, including:

- relative youth of populations (the Kimberley has a higher proportion of people aged 0–14 and 25–44 years);
- lower proportion of people aged 45 years and over compared to the WA-wide profile;
- the region's significant Aboriginal population has significant and specific health needs;
- relative remoteness of many settlements;
- the paucity and quality of transport routes for general public use;
- extreme climatic conditions; and
- lack of affordable housing and short-stay accommodation for those needing to access health services (e.g. hostels).

Future capacity requirements

Managing growth will require careful forward planning by the Department of Health in terms of the services that are provided as well as addressing issues relating to capacity building, addressing barriers to service delivery and retention of staff. The most pressing short-term needs include: finalising upgrades to the region's major health facilities; provision of additional services and capacity (e.g. GPs, aged care facilities and mental health services); and greater utilisation of new technology and innovations. In the mid to long term, key priorities relate to the ongoing need to match services against the needs of the population. The 2015/16 State Budget allocated \$8.1 billion for the delivery of health services to the state.

Other important considerations include:

- identification of sufficient land for future health care facilities;
- provision of housing to accommodate workers and patients travelling to centres to access health services; and
- opportunities to provide investment/incentives for private or not-for-profit health sector expansion to meet future projected demand.

Providing these services will need to be supported by appropriate human resources and capital infrastructure.

The following opportunities have been identified to address future planning and provision of **health services** across the region:

- provide a comprehensive range of accessible health services infrastructure and support facilities to meet the needs of the future population.

2.5 Education

2.5.1 Planning for the future

Future demand

Anticipated population growth over the next 25 years will have significant implications for the provision of education services across the region. The expansion of urban places caused by in-migration, mostly by young families seeking to access economic opportunities, will require an equivalent increase in the level of education services. The quality of education services is a significant factor in population retention.

Facilitating future economic development will require additional training capacity aligned with key growth sectors (e.g. resource, pastoral and tourism). Enhancing training opportunities for the Aboriginal population is an important factor for improving future economic outcomes.

Future capacity requirements

In most cases, the Education Department of Western Australia provides schools based on the number of people in an area. However, the need to ensure future provision of education services is also scrutinised during structure planning for new developments (for example: two primary school sites have been provided for in Broome North). Future development proposals will result in consultation between developers and the Education Department resulting in the reservation of sites to accommodate additional education infrastructure. The 2015/16 State budget allocated \$4.8 billion for the delivery of education services.

The Kimberley Training Institute's *'Strategic Plan - Towards 2015'*, identifies a number of key training initiatives in the pastoral and tourism sectors that are currently being implemented. Opportunities to appropriately skill the local workforce to meet the needs of the resource sector need to be realised.

Kimberley Training Institute has identified the following broad strategies to meet this objective:

- Invest in vocational training infrastructure that meets the requirement of an industry-led training system.
- Ensure current technology and best practice in the provision of vocational education and training.
- Ensure world-class technology infrastructure to optimise education and training opportunities across the region.

The 2013/14 State Budget allocated \$16.3m towards campus and institute upgrades at the Kimberley Training Institute campuses (i.e. West Kimberley, Broome, Derby and Halls Creek), and the 2015/16 State budget allocates and additional \$4 million to complete the construction of the Halls Creek and Kallari Training campuses

Providing sufficient land and housing will be required to attract, accommodate, and ultimately, retain education providers in the region.

The following opportunities have been identified to address future planning and provision of **education services** across the region:

- provide a comprehensive range of accessible education services and support facilities to meet the needs of the future population.

2.6 Recreation infrastructure

The region is serviced by a range of recreation infrastructure facilities and services as outlined in the Kimberley Profile.

2.6.1 Planning for the future

Future demand

Population and economic growth will precipitate the need for additional recreation infrastructure across the region. The most significant demand is expected to occur in Broome and Kununurra given projected increases in resident population as well as visitor numbers.

Future capacity requirements

Future planning for recreation infrastructure will need to:

- meet demands from anticipated population growth;
- provide additional public open space and parks and identify water sources for irrigation purposes (e.g. recycled wastewater);
- expand and diversify the region's recreation infrastructure to improve amenity and attractiveness of urban places; and
- provide and maintain facilities that will encourage families to stay in the region.

Recreation infrastructure benchmarks (Table 2.1) provide a degree of guidance as to the types of recreation infrastructure that will be required to service anticipated population growth.



Table 2.1: Benchmarks for recreation infrastructure

Service	Population thresholds					
	10 000	20 000	25 000	30 000	40 000	45 000
Open space (parks & gardens)	10	20	25	30	40	45
Boat ramps	1	3	4	5	7	8
Sub-district ovals	5	6	7	9	11	13
Neighbourhood ovals	1	1	1	2	2	3
Tennis court	10	20	25	30	40	45
Basketball	10	20	25	30	40	45
Swimming centre	1	1	1	1	1	2
Sub-district indoor recreation centre	2	2	3	3	4	5
Skate park	2	3	4	4	6	6
District golf course	1	1	1	1	1	2

Source: AEC Group (2012)

This data highlights that while services are generally adequate at the present time there is likely to be a requirement for significant future investment, particularly in Broome (Regional City) and Kununurra (Regional Centre) as population levels exceed benchmarks. Recreation infrastructure in Aboriginal settlements needs to be addressed in the short, medium and longer terms to alleviate relatively poor access to recreation infrastructure (e.g. basketball courts, ovals, and swimming pools).

The following opportunities have been identified to address future planning and provision of **recreation services** across the region:

- provide active and passive open space and recreation infrastructure for formal and informal sport and recreation to enable community activity and healthier life styles.

The short, medium and long term recreation projects for the region are identified in Section 2.8. Planning initiatives to guide delivery of recreation infrastructure are presented in Table 2.2.

2.7 Other community services infrastructure

The region is serviced by a range of community safety infrastructure facilities and services as outlined in the Kimberley Profile.

2.7.1 Planning for the future

Future demand

Provision of community safety infrastructure and facilities will reflect the population growth in towns and communities, but will also respond to temporary population influxes and to situations that impact on community safety.

Table 2.2: Community services infrastructure projects

Project	Description / objective	Funded / unfunded
Community Infrastructure		
Kununurra recreation upgrades	Relocation of the current recreation centre and swimming pool, and provide an additional oval in Kununurra. (also frees up town centre for commercial re development).	Unfunded
Integrated primary health care facilities	Construction of Primary Health Care facilities in regional centres including Broome and Derby.	Unfunded
Allied health services	Provide allied health care services to meet the needs of the population.	Unfunded
Aged care facilities	Provision of additional aged care facilities to address current shortfalls.	Unfunded
Hostel development	Seek and facilitate investment in hostels in regional centres including Broome, Derby, Fitzroy Crossing and Halls Creek.	Unfunded
Primary and secondary school	Provide education services to meet the needs of the population.	Unfunded
Expansion of TAFE	Expand current TAFE facilities and services to accommodate a growing population.	Unfunded
Expansion of work ready	Expand current work ready facilities and services to accommodate a growing population.	Unfunded
Maritime Training Centre	Enhancement of the Maritime Training Centre in Broome and provide specialist training for oil and gas; and construction industries.	Unfunded
Broome foreshore redevelopment	Development of Broome foreshore including the Chinatown and marina areas, area between the jetties and reinstate the jetty and town beach development.	Unfunded
Kununurra commercial boating facility	Finalise implementation of Stage 1 of the Kununurra commercial boating facility and coordinate and implement Stage 2.	Unfunded
Wyndham oval relocation	Relocate the Wyndham oval to a more suitable site.	Unfunded
Additional boat ramps	Provide additional boat ramps in coastal towns including Broome Wyndham and Derby and others as required for recreation purposes.	Unfunded
Fitzroy Crossing recreation facilities	Construct a new recreation centre and upgrade the existing skate park in Fitzroy Crossing.	Unfunded
Passive recreation	Provide passive recreation, which includes walking and running trails within the region's settlements	Unfunded

The above projects are at various stages of planning and will be subject to detailed cost benefit evaluation and business case development as part of agency asset planning programs.

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Future capacity requirements

While current initiatives to develop facilities at Fitzroy Crossing, Looma and upgrades to the West Kimberley Regional Prison and Work Camp will ensure adequate community policing for the short to medium term, it is likely that the region's service profile will need to be monitored and new services identified. It is likely that older facilities will need to be upgraded or replaced in the medium to long term. In addition, there will be a need to identify land on which to provide additional community safety facilities.

The following opportunity has been identified to address future planning and provision of **community safety** infrastructure across the region:

- provide a comprehensive range of community safety infrastructure throughout the region.



2.8 Community infrastructure projects

The KRPIF has identified a series of community infrastructure projects for health, education and recreation.

As outlined in Table 2.2, these projects have been derived by assessing items against agreed criteria and through consultation with the Kimberley Regional Planning Committee and the Infrastructure Coordinating Committee.

2.9 Planning initiatives – community services infrastructure

Planning initiatives relating to the provision of community infrastructure are presented in Table 2.3.

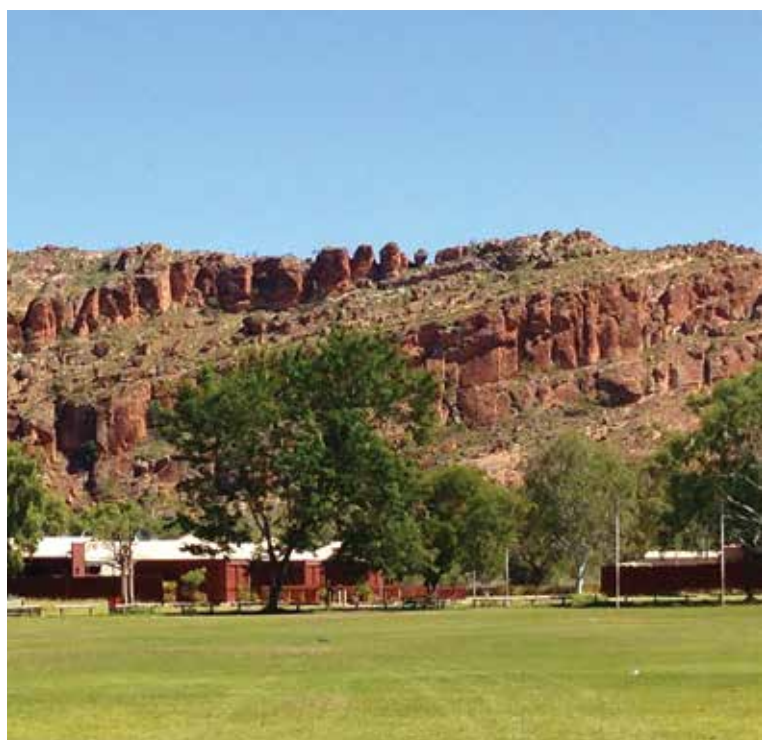


Table 2.3: Planning initiatives - community services infrastructure

#	Planning initiative	Lead	SPS strategic direction	Blueprint alignment
2a	Share data that enables forward planning to be based on accurate demand assessments leading to a better understanding of potential supply gaps relating to community infrastructure.	service providers	Social infrastructure	Infrastructure, services and governance
2b	Address health infrastructure requirements in the region by: <ul style="list-style-type: none"> • providing investment/incentives for private or not-for-profit health sector expansion to meet future projected demand; • providing accommodation for short-stay patients and visitors at regional centres; • expanding existing population health services to include drug and alcohol counselling, mental health and general psychological services; • investing in housing for health workers at regional centres and small hospital facilities; • expanding ambulance services and provide appropriate physical infrastructure to support the additional capacity; and • ensuring identified initiatives are adequately funded. 	DoH	Social infrastructure	Health and wellbeing
2c	Addressing education and training infrastructure in the region by: <ul style="list-style-type: none"> • ensuring education services match population requirements; • assessing and identifying training requirements to meet the needs of the growing population and the diversified economy; • undertaking evaluation of university sub-campus opportunities; and • providing educator and administrator housing to retain staff. 	EDWA/KTI	Social infrastructure	Education and training
2d	Support these education infrastructure requirements by highlighting issues, identifying land requirements and making provisions to improve services in local planning strategies and schemes.	LG	Social infrastructure	Education and training
2e	Identify major upgrades required for recreation infrastructure and reflect these investigations in local planning strategies and schemes.	LG	Social infrastructure	Health and wellbeing
2f	Investigate and identify community infrastructure needs for Aboriginal settlements and implement strategies to address these.	relevant agencies	Social infrastructure Remote settlements	Aboriginal advancement
2g	Implement regional health, education and recreation infrastructure priorities in accordance with Section 1.7.	relevant agencies	Social infrastructure	Infrastructure, services and governance

3 Transport infrastructure

3.1 Strategic direction

3.1.1 Overview

The Kimberley region's transportation network is significant. Its development has been shaped by the substantial distances between urban places and the needs of the region's economic sectors, including the pastoral, agricultural and resources sectors. The region's remote settlements are serviced by roads of varying standards while the larger places have local road networks that range in complexity (refer to Map 3.1).

The region's transport infrastructure will continue to play a crucial role in facilitating economic growth by providing connections to State, interstate and overseas markets within the region. At present, there is no rail network, which places increasing pressure on the region's roads. This issue is likely to be exacerbated further in the future with the potential commencement of additional resource projects and agricultural opportunities. Growth of the region's tourism industry is also likely to place greater pressure on road networks in terms of increased traffic volumes which will increase the potential for conflict between different types of traffic.

To meet future challenges it is desirable to develop a transport network that is integrated, efficient and safe; and that services the needs of both community and industry. Road and aviation infrastructure must provide a high degree of connectivity between the region's centres of economic activity, settlements, tourism and recreation nodes. Capacity at the region's ports may need to be augmented on an incremental basis, and options for a new port near James Price Point will need to be considered to ensure economic opportunities can be realised, particularly from the Browse LNG Precinct which is currently being developed. Population increases in larger centres could also facilitate implementation of additional public transport infrastructure.

3.1.2 Goal statement

A transport system that provides safe, practical, affordable and equitable opportunities for intra-regional, intra-state, inter-state and international movement of people and goods.

3.1.3 State Planning Strategy

The State Planning Strategy contains the following relevant principles relating to the provision of transport infrastructure:

- **Movement** – to manage the movement of people, goods and services through an integrated network connected nationally and globally.
- **Population targets** – to manage the impacts of population growth on infrastructure planning.
- **Settlement hierarchy** – identifying settlements that will require additional connections to road transport infrastructure.
- **Economic development** – where is this likely to occur and what are the implications for the road transport network.

3.1.4 Current initiatives

State government transport infrastructure providers, such as Main Roads Western Australia, the private sector and the region's local governments, continually undertake detailed investigations to ensure transport infrastructure networks have the capacity to meet current demand and can be developed to address future requirements.

Western Australian Regional Freight Network Review

The Department of Transport led Western Australian Regional Freight Network Review (WARFNR), argues that as Western Australia's population and economy continue to grow strongly, so too does the scale of the freight task in WA's regions. This places added pressure on the regional transport network and detailed forward planning is required to ensure future transport requirements can be met.

A key role for the State Government is to manage these pressures and provide a clear strategic direction about how it will ensure an effective regional freight transport network exists in the future. To gain the full advantage of the economic and social benefits associated with the provision of adequate transport infrastructure and services, current and future freight transport needs must be identified and a plan that determines the State's regional freight transport priorities developed.

The WARFNR is a comprehensive and integrated strategic plan for all modes of freight transport across regional Western Australia. The plan's scope is extensive and it articulates strategic planning, policy and capital project priorities to meet the freight transport demands of regional Western Australia to 2031 (mainly outside of the Perth and Peel regions) across State roads, State-owned rail lines and port authorities.

The review makes a number of recommendations that are directly relevant to the Kimberley and these will be presented, where relevant, throughout this section.

Port Governance Review

On 2 February 2012, the State Government announced that seven of the State's eight port authorities would be consolidated into four regional port authorities and 12 smaller ports currently controlled by the Department of Transport which would henceforth come under the jurisdiction of the new regional port authorities.

The review was driven by recognition that growing demand for the State's resources and commodities has created the opportunity to formulate a new vision for the State's ports. For example, since 2000, the value of Western Australia's merchandise exports has risen by more than 300 per cent - from \$25.4 billion to \$112.2 billion - and Western Australia's share of merchandise exports increased from 26 per cent to 46 per cent of the nation's total.

However, the increasingly complex and sophisticated environment in which ports operate is making it more and more difficult for WA's smaller ports to marshal the skills and resources that they require. The new vision followed a comprehensive review of Western Australian ports governance commissioned in 2010.

The scope of the review was to look at all matters concerning ports, port governance and port performance so that Western Australian ports could continue to respond to the demands of the State's rapidly growing economy.

Other key review recommendations that will be implemented include:

- developing, for the first time, a State port strategic plan;
- improving port planning by requiring all ports to develop long term master plans, consistent with the State and national ports strategies;
- strengthening the WA buffer zone policy to ensure that the development of our ports is not constrained by inappropriate urban encroachment;
- requiring ports to better align their port strategic development plans with the broader objectives of government;
- requiring that ports should identify and actively pursue opportunities for the private sector to invest in port infrastructure and to deliver port services;
- improving channels of communication between the port authorities and government agencies;
- developing an environmental approval regime for ports that takes into consideration the longer term development of ports and provides approvals for a program of port development rather than individual port projects; and
- continued development of improved frameworks, mechanisms and accountability to control safety and environmental performance of tenants and port service providers.

In December 2013, the State Government announced that the Kimberley Ports Authority will include Broome, Derby, Cockatoo and Koolan islands, and the proposed port near James Price Point.

The 2015/16 State budget allocated \$11.3 million on infrastructure and maintenance for the newly established Kimberley Ports Authority

3.1.5 Demand data

Timely access to data that informs anticipated demand across the region will be a key requirement for future infrastructure planning. This will assist service agencies with the ongoing requirement to undertake strategic infrastructure planning; and will include information on economic developments and the location and magnitude of population growth. Understanding the impact of the Kimberley's seasonal population on the region's infrastructure networks is essential to future transport infrastructure provision.



Map 3.1: Transport infrastructure

3.1.6 Identified transport infrastructure projects and coordination

The effective delivery of transport infrastructure to meet future demand requires strong coordination across government. Given the costs and long lead times required to plan and implement infrastructure projects it is imperative that transport infrastructure planning for the state progresses in line with identified projects.

In developing the KRPIF, the anticipated direction for regional infrastructure has been contemplated. As a result, a range of infrastructure projects has been identified that could achieve the region's vision. However, there are competing funding needs across the State, and the identification of projects in the KRPIF should not be taken as a commitment for Government funding. Individual projects will still be subject to normal budgetary and Treasury processes.

There will be an ongoing need to assess transport infrastructure requirements to accommodate growth. It is therefore envisaged that new transport infrastructure requirements will arise as a result of the KRPIF being periodically reviewed and updated.

3.2 Issues relating to transport infrastructure

The key transport infrastructure issues in the region are:

- expansion/upgrading the region's road network to ensure future population and economic growth opportunities can be maximised;
- upgrading of the region's air transport network and supporting infrastructure to ensure future population and economic growth opportunities can be maximised;
- port expansion and supply base options for the region need to be more clearly articulated;
- barriers to an improved direct supply chain between Asia and the region need to be addressed and upgrades to support a more direct supply chain need to be encouraged;

- public transport networks in the region's the region's principal towns, key service centres, local service centres, and other settlements need to be improved;
- transport services and related infrastructure require greater integration across the region and within population centres, towns and Aboriginal settlements/communities; and
- provision of suitable land for freight and logistics industries.

3.3 Planning for the future

The following general opportunities have been identified to plan for each category of transport infrastructure:

- promote comprehensive and coordinated transport infrastructure planning that meets the requirements of all providers; and
- promote demand assessment based on up-to-date information about key drivers to plan for growth.

Specific opportunities have been identified for each type of transport infrastructure.

3.4 Roads

3.4.1 Road infrastructure

An extensive network of more than 7,700 kilometres of roads service the Kimberley's settlements, Aboriginal settlements/communities, economy, and tourism attractions. The Great Northern Highway provides a sealed link across the region and connection to the Pilbara while the Victoria Highway links the Kimberley's population centres with Darwin. The region's population centres and urban places are serviced by local road networks and connections that provide access to major roads.

The following opportunities have been identified to address future planning and provision of **road transport infrastructure** across the region:

- planning for and providing a regional road network that provides safe all-weather road connections between the region's centres of activity, the rest of the State and nationally;
- planning for and providing a road network that services the needs of the region's population centres, towns and Aboriginal settlements;
- establishing a hierarchy of roads to service Aboriginal towns, settlements and remote communities; and
- bituminising and sealing primary roads to 'service hubs' that exist in Aboriginal towns and settlements.

3.4.2 Future planning for road infrastructure

General road requirements

Road traffic volumes are highly responsive to economic activity cycles. As a result, further development of the tourism sector, commencement of resource projects and growth in the agricultural/horticultural industry all have the potential to significantly increase traffic on the region's road networks and, hence, the level of future investment required. Growth of the region's urban places will also place significant pressure on local transport networks and this will require detailed network planning. There is also a strong argument that improvements in quality of transport infrastructure can also increase investment and economic activity, particularly from the resources sector. In the future a second link to the Northern Territory via the Tanami Road could provide additional linkages for economic development of the Kimberley.

The continued reliability of the Great Northern and Victoria Highways, as the region's main sealed freight routes, will be paramount. These roads will continue to service the needs of the region's communities and industries by providing a sealed link between the

major population centres of the Kimberley, remote Aboriginal communities, the Ord East Kimberley Development and the gateway to the Northern Territory.

At the present time, Main Roads Western Australia is undertaking flood-mitigation works, including constructing new bridges and upgrading existing bridges across flood-prone sections of the highway. Stage 1 of this project relates to the Big McPhee Bridge, where works currently are being undertaken.

Existing road networks within the region's settlements are generally inadequate to cater for major increases in heavy truck traffic that may occur as a result of economic and associated population growth. Modifications to roads and construction of bypasses may be required to separate heavy trucks from local traffic to improve efficiency and mitigate risks. Increasing the region's road capacity must be implemented through a 'whole-of-government' approach to an appropriate road maintenance program and funding.

It will be important when planning for the future to address critical issues like flood mitigation in high-risk areas. Heavy rains in the wet season can cause serious damage to roads, isolating communities and making consistent road freight delivery difficult. Industry relies heavily on the road network as a major supply route and for moving goods to local and interstate markets and exports to regional ports, particularly given there is no rail transport in the region.

The WARFNR identifies the need to focus investment to 2031 on integrating Great Northern Highway and Victoria Highway improvements with large scale bridge works to provide a holistic flood mitigation program targeting flood prone sections of the routes, sections with proven crash history and other high-risk locations.

Roads servicing Aboriginal towns and settlements

Most access roads to Aboriginal towns and settlements require upgrading. In most cases, the roads are the responsibility of the community and not local government, which has resulted in many unsealed roads and varying levels of upkeep. This can cause serious issues during the wet season due to flooding and some settlements can be completely isolated for lengthy periods.



Future planning for the standards of these roads would be to establish a road hierarchy to service Aboriginal towns, settlements and remote communities. Generally, Aboriginal towns and some larger settlements function as ‘service hubs’ that provide the greatest levels of servicing. Residents from smaller settlements in the vicinity regularly commute to these ‘service hubs’. All roads to these ‘service hubs’ require bituminising and sealing, and should be classified as primary roads.

Roads servicing the tourism industry

Supporting the tourism industry will also be of critical importance. As already outlined, it is anticipated that access to many of the region’s inland tourism attractions will be via road. Facilitating road access for the tourism industry will require additional investment over and above the upgrade requirements for major roads. Some of the key improvements are outlined in Tourism Western Australia’s North West Destination Strategy, including:

- upgrading of Fairfield-Leopold Road from the Gibb River to the Great Northern Highway to allow access to the Windjana Gorge and Tunnel Creek National Parks;
- upgrading Carranja Road (Wolfe Creek Crater Road);
- sealing of Broome–Cape Leveque Road to provide all weather access to sites on the Dampier Peninsula;
- widening Geikie Gorge Road;
- upgrading Tanami Road from Halls Creek to the Northern Territory border; and
- upgrading Gibb River–Kalumburu Road.

The State budget has allocated \$4.3 million on improvements to maintain the Gibb River Road.

The KSCS outlines the need to develop and promote self-drive journeys through the region by linking and interpreting sites of interest, including investigation and development of four-wheel-drive expedition routes showcasing Aboriginal and non-Aboriginal history, and linking with remote accommodation and tourism activities.

3.4.3 Road infrastructure projects

Table 3.1 identifies short, medium and long term projects for road transport provision.

Table 3.1: Road infrastructure projects

Project	Description / objective	Funded / unfunded
Road Transport		
Kununurra bypass and bridge	Commence construction of a new road link from Victoria Highway to Weaber Plain Road (Stage 1 after 2015) and construct a second link from Weaber Plain Road to Victoria Highway (Stage 2 after 2020). Federal funding is required to complete the project (approx. \$150m)	unfunded- Federal funding needed approx \$150m
Road network to support expansion of ORIA	Undertake the following new road works and upgrades: <ul style="list-style-type: none"> construct a new bridge over the D4 drain to permit freight across. The current bridge is aged and cannot service requirements (\$6m required); seal Valentine Springs Road to service the new West Bank horticultural precinct (\$20m required); and implement other identified road upgrades in the vicinity of ORIA to facilitate further development (\$15m required). 	Unfunded
Tanami Road	Upgrade Tanami Road from Halls Creek to the Northern Territory border.	Unfunded
Manari Road	Interim upgrade to Manari Road pending sealing of Cape Leveque Road. This is a local road priority.	Unfunded
Broome-Cape Leveque Road	Seal Broome-Cape Leveque Road to provide all weather access to sites on the Dampier Peninsula. Main Roads WA to assist Shire with upgrades subject to funding.	Unfunded
Kalumburu Road	Survey, upgrade and gazette to facilitate tourism opportunities in accordance with Kimberley Science and Conservation Strategy. This road will also be required to service cattle trucks and access to Aboriginal towns. This local road priority.	Unfunded
Bidyadanga Road	Provide legal status and upgrade. This is a local road priority.	Unfunded
Great Northern Highway	Undertake flood-mitigation works, including constructing new bridges and upgrading existing bridges across flood-prone sections of the highway. The WARFNR identifies Stage 1 as consisting of works to the Big McPhee Bridge (2012+) with Stage 2 being implemented after 2015 and Stage 3 after 2020.	Unfunded (Stage(s) 2 and 3)
Carranja Road (Wolfe Creek Crater Road)	Upgrade Carranja Road (Wolfe Creek Crater Road) to a formed road to improve access to Wolfe Creek Meteorite Crater. This is a local road priority.	Unfunded
Fairfield-Leopold Road	Upgrade from the Gibb River to the Great Northern Highway to an all-weather gravel standard to allow for reliable access to the Windjana Gorge and Tunnel Creek National Parks. This is a local road priority.	Partially funded
Wyndham bypass	Investigate the construction of bypass roads around Wyndham by realigning Great Northern Highway to reduce conflicts between standard and heavy vehicles. Subject to planning investigations by MRWA.	Unfunded

The above projects are at various stages of planning and will be subject to detailed cost benefit evaluation and business case development as part of agency asset planning programs.

3.5 Rail

3.5.1 Rail services across the region

At the present time, the resource, agriculture, and pastoral sectors exclusively use the region's road network to transport goods through and out of the region. There is not currently a rail network.

While demand is not sufficient to warrant construction of a **rail network** in the short-term there may come a time in the future when it may be required (most likely to occur in the mid to long term):

3.5.2 Future rail capacity

Future economic opportunities, particularly resource projects, may be sufficient to substantiate construction of a rail way network to export mineral deposits from the region's ports. Implementing this initiative will, however, be very costly and is likely to attract significant scrutiny to determine environmental impacts. It is currently unclear which of the region's deposits may trigger a project of this magnitude.

The most likely scenario for construction of a railway network will be through commitments made by one or a number of major resource proponents. As has occurred in other regions across Western Australia, an access regime that permits use by additional parties will be a requirement. There will be implications for the region's ports should a rail network be established.

3.6 Marine

3.6.1 Marine infrastructure across the region

Port facilities operating at Broome, Derby, Wyndham and Yampi Sound currently act as gateways for the importation and exportation of goods. Live cattle, mining and agricultural commodities account for most of the volume exported with general cargo and fuel being the most significant imports. Additionally, naval vessels, fishing boats and other marine craft associated with the pearling and tourism sectors utilise the region's ports. Resource industry ventures operate dedicated port facilities on Koolan and Cockatoo Islands.

Broome Port

Broome Port is the main intermodal cargo and passenger gateway of the Kimberley and supports a diverse range of industries and uses including:

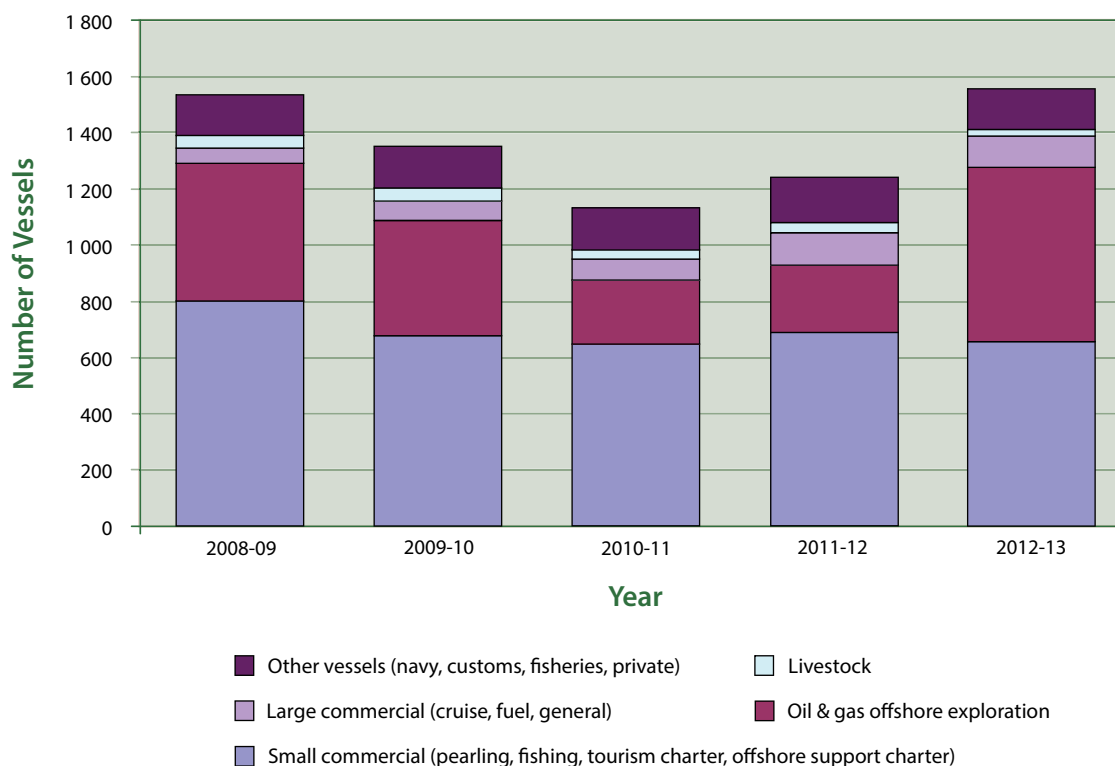
- small commercial (e.g. pearling; fishing; tourism charter; and offshore support charter);
- oil and gas exploration;
- large commercial (cruise; fuel and general);
- other vessels (navy; customs; fisheries; and private use); and
- livestock exports.

The port is currently undergoing a \$24.15M refurbishment, funded by Royalties for Regions, that allows the structural integrity of the wharf to be restored enabling the port to operate at full capacity into the long term.

Derby Port

The Shire of Derby/West Kimberley manages and operates the Derby Wharf under a lease agreement with the Department of Transport. It is used by locals for recreation purposes and is a tourist destination. The facility currently services barging operations associated with offshore mining operations at both Koolan and Cockatoo Islands in addition to servicing the needs of the aquaculture industries and Aboriginal communities that are located to the north of Derby. The port is subject to significant tidal variations, which will need to be factored into any future planning.

Figure 3.1: Breakdown of vessels visiting the Broome Port by year (2007/08 to 2011/12)



Source: Broome Port Authority (2012).

The Shire of Derby-West Kimberley is actively pursuing improvements to the wharf to support encourage diversification of the local and regional economy. It will also facilitate private investment in the region is appropriate supply chain solutions are achieved through enhancement of the wharf.

Wyndham Port

Wyndham Port is privately operated under licence from the Department of Transport. The facility can accommodate vessels up to 26,000 tonnes with barge landing infrastructure available as well as facilities to accommodate small craft.

In July 2010, the State Government undertook a \$10 million renovation of the jetty as part of Commonwealth's East Kimberley Development Package. These works aimed to maintain or increase trade in livestock, nickel concentrate, fuel, ammonium nitrate and general cargo while meeting

the future needs of the expanding ORIA. This expansion may also potentially be used by resource sector proponents to export products such as iron ore. Future expansion of Wyndham Port may include upgrading of facilities to cater for larger cruise ships.

Broome Boating Facility

Between 2010 and 2013, the Department of Transport progressed a number of technical studies that responded to the requirements for a boating facility in Broome to service the needs of commercial and recreational boat users. The following requirements were identified:

- improved boat launching facilities (safety, shelter and tidal availability);
- increased capacity to remove boats from the water for repairs and maintenance; and
- passenger and cargo handling for charter and commercial operators, preferably at all levels of tide.

While the facility received Royalties for Regions funding, the funding was withdrawn following a State budget review in late 2013. State financial pressures and cost increases to deliver the project were contributing factors.

The following opportunities have been identified to address future planning and provision of **marine infrastructure** across the region:

- promoting the development of multi-user port facilities that are highly accessible;
- encouraging the diversification of the region's ports; and
- ensuring planning accords with regional initiatives such as the Port Review.

3.6.2 Planning for the future

As outlined in Part A – Chapter 5 – Economy, there are a number of proposed economic activities that may place greater demands on the region's marine facilities including:

Resource sector

Minerals

- Export of the region's mineral deposits will occur through one of the region's ports (depending on transport costs). To service this, port facilities may require additional berth capacity and landside capacity in the form of stockpiles and laydown area.

Oil/gas

- Future oil and gas production will require improved port, airport and supply chain infrastructure which will generate significant opportunities for the region.
- It is anticipated that the proposed Kimberley Port Authority will have jurisdiction over port facilities associated with supporting the oil and gas industry particularly the Browse LNG Precinct near James Price Point.

Exploration

- Broome Port will continue to provide marine support for the offshore oil and gas industry, with investment in lay down and materials handling facilities ongoing. Jetty and Wharf infrastructure maintenance work has been approved.
- Future development of the region's resource sector may require development of additional logistics capacity to support key exploration activities in the minerals and oil/gas sectors. A number of options for this expanded capacity exist, including through investment in existing infrastructure and potentially greenfield sites

Tourism

Port facilities at Broome continue to accommodate marine craft associated with the tourism industry including larger commercial vessels, such as cruise ships, and also smaller tourism charter boats. Other places such as Derby also support smaller vessels. In the long term, as the industry expands, there may be a need to develop a marina and a safer boat harbour that permits mooring of these vessels in Broome and additional moorings in the vicinity of Derby (i.e. King Sound).

Agriculture/pastoral

Potential intensification of the agriculture sector and diversification of the pastoral sector are likely to require the export of produce to overseas markets through the region's ports. For example: investigation into the possible reestablishment of Derby Wharf as a live export facility may be a significant benefit to the west Kimberley pastoral industry. Such changes may also complement rangelands reform and could form part of preparation of a strategic plan for the Derby Wharf.

Future planning/requirements

One of the significant recommendations of the WA Ports Review was the requirement to consolidate port authorities. In terms of the Kimberley, the following specific action was identified:

- Create a Kimberley Ports Authority comprising the ports of Broome, Derby, Wyndham, Cockatoo Island, Koolan Island and the proposed Port of Browse near James Price Point. The Kimberley Ports Authority commenced operation in 2014 and the State budget 2015/16 allocated \$11.3 million on infrastructure and maintenance for the Kimberley Ports Authority.

Broome

The current \$24.15M refurbishment will extend the design life of the port enabling it to operate at full capacity into the longer term. There are a number of supply bases at the port to support the oil and gas industry. In addition, there is land available adjacent to the port to support expansion of this role as required.

The port is currently completing a demand analysis and infrastructure and services assessment of the port's capacity to meet the demands generated by activities in the Browse Basin and this information will be used to inform the port's master plan.

Derby

Possible opportunities for future development include:

- improve wharf to provide opportunities to encourage diversification of the local and regional economy;
- evaluate opportunities for the provision of facilities for general cargo; and
- provide adequate facilities to process and export produce from the agriculture and pastoral sectors.

Wyndham

Possible opportunities for future development include:

- evaluate opportunities for the provision of facilities for general cargo; and
- provide adequate facilities to process and export produce from the agriculture and pastoral sectors.

3.6.3 Marine infrastructure projects

Short, medium and long term projects for provision of port infrastructure have been identified in Table 3.2.

3.7 Aviation

3.7.1 Current aviation infrastructure

Existing statistics For the airports in the Kimberley, show that between 2000/01 and 2010/11 the Broome International Airport handled the most travellers, followed by Kununurra and Derby (Figure 3.2). The majority of these trips originated from intrastate destinations for employment or recreational purposes.

Table 3.2: Marine infrastructure projects

Project	Description / objective	Funded / unfunded
Marine Transport		
Port of Browse	Investigate opportunities for development at Port of Browse.	Unfunded
Broome Port upgrades	Refurbishment of Broome Port to enable it to operate at full capacity into the longer term.	\$24.14M from Royalties for Regions
Derby and Wyndham Port upgrades	Continue to upgrade Derby and Wyndham port to facilitate regional trade. Major upgrades will be dependent on commercial agreements and private funding and subject to necessary government approvals.	Partially funded
Point Torment Port Development	Point Torment to be developed as a port only if a private sector requires and funds.	Unfunded
Kimberly Ports authority	Maintenance and infrastructure	\$11.3 million allocated from the 2015/16 State budget

The above projects are at various stages of planning and will be subject to detailed cost benefit evaluation and business case development as part of agency asset planning programs.

The Kimberley's airports and airstrips are located at Broome, Derby South (RAAF Curtin Airbase), Derby Aerodrome and Kununurra. Broome International Airport has an extended landing strip to cater for large jet aircraft. The Mangalalu Truscott RAAF base in the North Kimberley, which is located north west of Kalumburu, is utilised as an air supply base for offshore petroleum operations in the Browse Basin. There are sealed regional airstrips across the region.

A network of landing areas for general aviation aircraft provide capacity to deliver essential services such as: mail to Aboriginal towns, settlements and communities, pastoral stations; and Royal Flying Doctor Services. Many Aboriginal towns and settlements have airstrips. The condition of the infrastructure varies: some are unsealed, unlit and day only operations; while others are sealed with all-weather-24 hour services.

Seasonal air services are provided by carriers between the region and major interstate (Darwin, Brisbane, Sydney and Melbourne) and intrastate (Perth, Port Hedland, Karratha) destinations. Within the region, connections are available between Broome, Derby, Kununurra, Fitzroy Crossing, and Halls Creek. Local charter services offers access to the region for corporate or private purposes. There are numerous aviation companies that offer scenic flights in the region. These are vital in providing access to the many elements of the region's natural environment.

The following opportunities have been identified to address future planning and provision of **aviation services infrastructure** across the region:

- provide a comprehensive range of accessible aviation services infrastructure and support facilities, including Aboriginal towns and settlements; and
- manage impacts of aviation services upon local communities.

3.7.2 Planning for the future

Future demand

As highlighted in Part A – Chapter 4 – Settlement the region's airports will be required to service increasing amounts of traffic to service economic growth and associated employment opportunities (e.g. FIFO

workforces associated with the resources sector and an increasing number of tourists), possibly the provision of direct air services to Asia; and more frequent traffic from interstate.

Future capacity requirements

To support economic and population growth there will be a need for significant upgrades to the region's airport facilities. In summary, these include:

Broome

- upgrades/improvements to terminal facilities (quarantine/customs);
- upgrades to airstrip capacity to accommodate larger planes (e.g. planes from interstate and overseas);
- provide for a wider array and number of services (e.g. light aircraft, helicopters) to support the resources and tourism sectors; and
- relocation of the Broome Airport beyond 2025.

Kununurra

- upgrades to airstrip capacity to accommodate larger planes (e.g. planes from interstate).

Derby (Curtin)

- upgrades/improvements to terminal facilities;
- upgrades to airstrip capacity to accommodate larger planes (e.g. planes from interstate);
- Improve air freight services/logistics between the Kimberley region and Asia;
- RAAF Defence force upgrade requirements should be allowed for; and
- potential development of Derby aerodrome into an offshore/onshore fixed and rotary supply base.

There is a need to assess the need for new and upgraded existing air transport infrastructure in Aboriginal towns, settlements and remote locations to provide access to services in larger centres and to ensure appropriate access for emergency services, in line with the State Aviation Strategy that is currently being developed.

3.7.3 Aviation infrastructure projects

Aviation infrastructure projects are identified in Table 3.3.

Figure 3.2: Total passengers through Kimberley airports (2000/01 - 2010/11)



Table 3.3: Aviation infrastructure projects

Project	Description / objective	Funded / unfunded
Air Transport		
Broome International Airport relocation and redevelopment	Redevelopment of Broome International Airport including terminal and runway as aviation gateway to the North West. Eventual relocation of Broome International Airport beyond 2025 (commencement is dependent on commercial considerations and agreements, and regulatory approval).	Unfunded
New runway at Kununurra Airport	Construct new 2,500 metre runway. Subject to justification / business case and funding.	Funded
Continue to develop the 'Kimberley Aerial Highway' concept	Continue to develop upgrade regional aviation infrastructure to provide access by air to world-class visitor experiences in, and improve access to, remote areas of the Kimberley in accordance with the Kimberley Science and Conservation Strategy	Phase 1 funded through RADS program – 5 airstrips
Upgrades to Derby, Fitzroy and Halls Creek Airports	Provide upgrades to terminal and runway as required in line with airport master plans.	Unfunded

The above projects are at various stages of planning and will be subject to detailed cost benefit evaluation and business case development as part of agency asset planning programs.

3.8 Public Transport

3.8.1 Current public transport infrastructure

The region's public transport infrastructure is summarised in Table 3.4.

The following opportunity has been identified relating to **public transport**:

- provide an equitable and efficient public transport system in the region's population centres.

Future capacity requirements

Provision of additional public transport capacity in the region will represent a development opportunity for the private sector with existing providers able to expand existing fleets and services. Expansion of capacity is most likely to occur in the regional and sub-regional centres, particularly the provision of town buses and additional taxis. The private sector is unlikely to meet this demand, at least in the short term, without incentives.

3.9 Planning initiatives – transport infrastructure

Planning initiatives relating to transport infrastructure are presented below in Table 3.5.

3.8.2 Planning for the future

Future demand

Population forecasts and aspirational growth targets highlight the potential for significant population growth in Broome, Kununurra and Derby. Development within these centres is likely to produce greater demands for public transport in the region's urban places. Access to public transport is particularly important for the many residents that do not have financial capacity for personal transport options.

Table 3.4: Summary of current public transport infrastructure

Public transport				
Town centre	Town bus	School bus	Taxi	Bus between towns
Broome	Pearl Town Bus Service	School buses available in most parts of the Kimberley	2 Peak period 24 Conventional 1 Multi-purpose	Regular coach services are available to Perth and Darwin between all major towns
Derby	No		5 Conventional 2 Multi-purpose	
Fitzroy Crossing	No		4 Conventional	
Halls Creek	No		2 Conventional	
Kununurra	No		6 Conventional 1 Seasonal	
Wyndham	No		2 Conventional	

Table 3.5: Planning initiatives – transport infrastructure

#	Planning initiative	Lead	SPS strategic direction	Blueprint alignment
3a	Share data that enables forward planning to be based on accurate demand assessments leading to a better understanding of transport infrastructure requirements.	DoT, LG	Physical infrastructure	Infrastructure for driving growth
3b	Identify industrial zones in local planning strategies and schemes for transport related industry.	LG	Physical infrastructure Economic development Land availability	Infrastructure for driving growth
3c	Implement recommendations of the Regional Freight Network Review and the State Aviation Strategy.	DoT	Physical infrastructure Economic development	Infrastructure for driving growth
3d	Implement regional road transport projects, as indicated in Section 3.4.3.	relevant agencies	Physical infrastructure Economic development	Infrastructure for driving growth
3e	Identify expansion options for existing ports across the region, such as infrastructure to facilitate supply chain completion, as part of diversifying the region's economy.	BPA, LG, DoT	Physical infrastructure Economic development Security	Infrastructure for driving growth
3f	Implement regional marine transport projects, as indicated in Section 3.6.3.	relevant agencies	Physical infrastructure Economic development	Infrastructure for driving growth
3g	Identify airport growth requirements and adjoining land uses when preparing local planning schemes and strategies.	LG	Physical infrastructure Economic development	Infrastructure for driving growth
3h	Investigate the viability of regular intra-regional, inter-state and international passenger services to enhance connectivity and accessibility of the region to key intra- and inter-state and international markets.	DoT	Physical infrastructure Economic development	Tourism
3i	Implement identified regional aviation projects, as indicated in Section 3.7.3.	relevant agencies	Physical infrastructure Economic development	Tourism
3j	Investigate and identify transport infrastructure needs for Aboriginal settlements and implement strategies to address these.	relevant agencies	Physical infrastructure Economic development	Aboriginal advancement
3k	Investigate opportunities for public transport provision within and between regional cities, towns and centres	relevant agencies	Physical infrastructure Economic development	Health and wellbeing