Executive summary

The Shire of Roebourne is currently serviced by an extensive transport infrastructure network including road, rail, air and maritime facilities to meet current transport demands across the long distances involved for travel to and within this region. The regional road network is designed to accommodate the largest categories of vehicles permitted on Western Australian roads, two mining company railway lines transport huge quantities of iron ore to two of the state’s highest export tonnage ports at Dampier and Cape Lambert, and Karratha Airport is the state’s busiest regional airport.

A lot more development is planned and current forecasts indicate significant growth in all sectors of transport demand.

Two more mining company railway lines are planned from mine sites to the planned new Anketell Port and Strategic Industrial Area located between Karratha and Cape Lambert. Coordinated infrastructure corridor planning including upgrading road and rail access to port areas will be vital for expanded pit to port operations, therefore a new infrastructure corridor will provide road and rail access to the new port and SIA including an access road from North West Coastal Highway. Minimising traffic delays with the increasing number of train movements will be one challenge to be addressed on each railway line. Promotion of multi-user access to the rail network and use of rail for a wider range of products has been identified as a goal in many strategic planning documents.

Dampier Port had a throughput of 168 million tonnes in 2011 and is projected to increase to 230 million tonnes per annum by 2030. Port Walcott at Cape Lambert handled 68 million tonnes in 2011 and RTIO plans for the port’s capacity to increase by 120 million tonnes per annum by 2030. The new Anketell Port will be capable of expanding to 350 million tonnes per annum if required. The recently constructed Port Preston (approximately 60km southwest of Dampier) could potentially be expanded in future as well. For the proposed Forge Resources Magnetite project near Whim Creek one of the options under consideration would involve potential new port facilities at Balla Balla (approximately 100km east of the planned Anketell Port).

Karratha Airport is projected to grow from its current 800,000 passengers per year to 1.3 million by 2028. The Shire’s Karratha Airport Master Plan identifies three phases of enhancements to accommodate that growth. Phase one is complete and phases two and three will be implemented between 2013 and 2028. The benefits of a second access road between Karratha and the airport have also been raised.

Upgrading of Dampier Highway to dual carriageway standard from Karratha to Burrup Road was required for the current traffic volumes of 10,000 to 12,000 vehicles per day on this road. Planning of the future Karratha Western Bypass is in progress although construction is currently indicated as a long term project (2020+). A potential future northwest bypass of Roebourne has also been suggested.

Planning studies for the future growth of Karratha (Karratha City of the North) considered a potential future population of 50,000 people and projected the future traffic demands and road network requirements in this city. The need to plan for future public transport, taxi services and pedestrian and cyclist facilities in this city has also been identified. The proposed road network, bus routes and shared path network recommended in Karratha City of the North are reproduced in this evidential analysis report for information but will need to be reviewed when future growth scenarios are finalised.
This current Shire of Roebourne Local Planning Strategy study will identify future growth scenarios for each of the towns in the Shire and will then include regional traffic modelling to identify the road network upgrades that will be required between those centres as well.
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### Appendices

Appendix 1: Transport Challenges and Opportunities
**Reporting acronyms and abbreviations**

ABS  
Australian Bureau of Statistics

BHPB  
BHP Billiton

DOP  
Department of Planning

FIFO  
Fly-in, fly-out

GFC  
Global financial crisis

m  
million

PICC  
Pilbara Industry Community Council

RDA  
Regional Development Australia

RTIO  
Rio Tinto Iron Ore

Settlement  
Refers to urban settlements in the study area i.e. Dampier, Wickham and Point Samson

SIA  
Strategic industrial area

SOR  
Shire of Roebourne i.e. administrative and governance body

TAFE  
Technical and Further Education

The Pilbara  
The Pilbara region i.e. geographical region where the study area is located

The Shire  
Shire of Roebourne i.e. the geographical study area

Town centre  
“CBD” activity centres within the Shire

Township  
refers to the activity centres within the Shire i.e. Karratha and Roebourne

TWA  
Temporary worker accommodation

WAPC  
Western Australian Planning Commission
1 Introduction

This paper on transport and infrastructure integration has been prepared by Transcore as part of the Shire of Roebourne Local Planning Strategy (LPS) project. It provides an overview of existing transport infrastructure and a summary of future transport infrastructure proposals and strategies put forward in other state and local government documents. It also discusses transport challenges and opportunities facing the Shire of Roebourne in future.
2 Current and Future Transport Infrastructure

2.1 Existing Transport Infrastructure

The existing regional road network linking town sites within the Shire of Roebourne and beyond is illustrated in Figure 1.

Figure 1. Existing regional road network
The road hierarchy in the Dampier to Point Samson section of the Shire of Roebourne is shown in Figure 2, according to the Main Roads WA functional road hierarchy. The Roebourne-Wittenoom Road shown in Figure 1 is outside of the area shown in Figure 2 but is classified as a Regional Distributor road in this road hierarchy.

Figure 2. Existing road hierarchy.
Source: Main Roads WA road information mapping system
Vehicles larger than a 19m long semi-trailer are restricted access vehicles (RAV) and require permits from Main Roads WA. The roads on which these vehicles can be permitted are shown in Figure 3. Those shown in brown are RAV network 10, which is the highest category and allows triple road trains and other truck-trailer combinations up to 53.5m long. The Roebourne-Wittenoom Road within the Shire of Roebourne is RAV network 8, which allows truck-trailer combinations up to 38.5m long.

Figure 3. Restricted access vehicles road network.
Source: Main Roads WA restricted access vehicles mapping system
Existing traffic volumes on the road network are illustrated in Figure 4. This highlights the much higher traffic flows of 10-12,000 vehicles per day (vpd) on Dampier Highway compared to most other roads in the Shire. The high proportion of heavy vehicles is also noted.
There are existing port facilities at Dampier and Port Walcott at Cape Lambert (just north of Point Samson on Figure 1) and a new iron ore port (Port Preston) recently constructed at Cape Preston approximately 60km southwest of Dampier. There are also harbour facilities catering for fishing, prawning and recreational craft at John’s Creek (Point Samson), as well as recreational boating facilities including boat ramps and parking at Dampier’s Hampton Harbour.

Dampier and Port Hedland are the two highest volume ports in Western Australia with Dampier ranked highest in terms of value of exports ($34.4 billion in 2011) and second in terms of tonnage (168 million tonnes in 2011). Port Walcott ranks third in the State on both counts ($10.5 billion and 83 million tonnes in 2011).

There are two existing rail lines within the Shire of Roebourne. The Paraburdoo-Dampier and Pannawonica-Cape Lambert railways are operated by Rio Tinto’s Hamersley Iron and Robe River Iron operations, respectively, as shown in Figure 5. They are constructed as heavy-duty, standard gauge (1435mm) railways to transport iron ore from the mine sites to port facilities.

Figure 5. Existing rail network.
Source: Regional Profile: Pilbara Framework (WAPC, 2009)
There are currently four airports in the Pilbara Region located at Karratha, Port Hedland, Newman and Paraburdoo. Karratha is currently WA’s busiest regional airport for passenger movements with 800,000 passengers per year and like Port Hedland it can accept Code 4C (B737 / A320) aircraft. There is also a CASA Code 3 airstrip at Roebourne as well as a number of smaller airstrips throughout the Shire as shown in Figure 6.

![Existing airports and airstrips](image)

Figure 6. Existing airports and airstrips.
Source: Regional Profile: Pilbara Framework (WAPC, 2009)

2.2 Future Transport Infrastructure
A number of future transport infrastructure projects are currently planned within the Shire of Roebourne. Some of these are highlighted in Figure 7. In particular it shows two new railway lines proposed to link to the planned new Anketell Port and Strategic Industrial Area, which is located 30km east of Karratha and 10km west of Cape Lambert.
Figure 7. Planned transport infrastructure

Source: Pilbara planning and infrastructure framework (WAPC, 2012)
The Pilbara planning and infrastructure framework (WAPC, 2012) lists a number of transport priorities by 2015. Many of these relate specifically or more generally to the Shire of Roebourne. The Western Australian Regional Freight Transport Network Plan (2013) by the WA Department of Transport (DOT) also identifies a number of regional freight network priorities relevant to the Shire.

2.2.1 Ports
For marine transport the WAPC noted that trade tonnage at the region’s seaports is set to expand significantly over the next decade. This will include expanded seaport facilities at Dampier and ore export terminals at Cape Lambert, Anketell and Cape Preston. Future priorities include:

- Facilitating berth capacity expansion;
- Promoting multi-user port facilities;
- Upgrading road and rail access to port areas;
- Providing sufficient port related land for storage and processing; and
- Providing facilities for general cargo as well as bulk commodities.

The planned new Anketell Port and access corridor will have a terrestrial footprint of 3,465 hectares. The adjacent Strategic Industrial Area is an additional area of 838 hectares is for future industrial use. It is to include a multi-user port capable of expanding to at least 350 million tonnes per annum. Other proposed infrastructure includes a multi-user infrastructure corridor to accommodate utilities and transport links including roads and rail lines.

RTIO has recently completed its Port Upgrade Project at the Dampier Port, which will increase its iron ore export capacity to 140 million tonnes per year (Mt pa). Woodside Energy has completed construction of its Pluto liquid natural gas plant with dredging complete and jetty constructed. While there are plans for additional berths, Dampier Port Authority (DPA) forecasts that the port will experience severe congestion by 2014, mainly due to an increase in rig tender activity. Strategic planning being undertaken by Dampier Port Authority will investigate major expansions to its trade and a broadening of its function, inclusive of corridor planning from the mineral source to port (‘pit to port”).

The DOT notes that throughput at Dampier Port is expected to increase to approximately 230 million tonnes per annum by 2030, primarily in iron ore and natural gas exports, with commensurate import growth in general and project cargo. Imports through Dampier Port are expected to reach 955,000 tonnes per annum by 2030. It notes the current inadequate availability of laydown areas adjacent to the wharf as a major constraint and therefore identifies as a priority to construct the proposed Dampier Marine Services Facility. This facility involves reclamation of 22ha of land and creation of land-backed wharves and a 300-metre jetty. Over the next five years the Dampier Port Authority will continue upgrading the King Bay Estate (refer Figure 8) and has also identified potential for linkages to the Maitland Industrial Estate south of the port and use of other industrial areas around Karratha for port-related support activities. In addition, the proposed Dampier Marina project, which will be a significant recreational boating facility with residential and tourist accommodation, also has potential to support commercial and light work vessels, which would potentially place additional demand on transport links and access to the marina.

Proposed expansion at Port Walcott is another part of RTIO plans to increase their iron ore production, with Port Walcott port capacity to be expanded to handle an additional 120 million tonnes per annum.

There is also the proposed Forge Resources Magnetite project near Whim Creek and the potential for a new port at Balla Balla (approximately 100km east of the planned Anketell Port). Options considered for
that project include transport of the product by slurry pipeline to Port Hedland or Anketell Port, or transhipment by barge from Balla Balla.

**Marine and Landside Facilities Developments**
- Construction of Dampier Marine Services Facility, including land backed berth, seawall and associated reclamations and dredging works
- Extension of Dampier Cargo Wharf area

**King Bay Industrial Estate - Infrastructure Upgrades**
- Upgrade access roads - MOF and King Bay Roads
- Upgrades of King Bay Estate services and utilities

![Figure 8. Dampier Port.](source: Western Australian Regional Freight Transport Network Plan, Map 8 (DOT, 2013)]

It is also worth noting that the DOT report foreshadows plans to consolidate Western Australian port authorities, including creation of a Pilbara Ports Authority comprising the ports of Port Hedland and Dampier, the proposed ports at Anketell and Ashburton North, and the ports at Cape Preston, Port Walcott, Varanus Island, Barrow Island, Airlie Island, Thevenard Island and Onslow.

### 2.2.2 Railways

For rail transport the WAPC noted the region’s rail system will expand from three privately-owned networks to five, during the next decade. Ore tonnages carried by rail will increase significantly, resulting in more frequent and longer trains travelling between mine and port. Future priorities include:

- Promoting multi-user rail network;
- Minimising excessive delays at road/rail crossings resulting from longer and more frequent trains; and
• Investigating opportunities to carry non ore products on the region’s rail networks.

2.2.3 Road Network
In terms of road transport the WAPC noted there is a need to develop a regional road network that provides safe all-weather connections between the region’s centres of activity. Key future road transport priorities identified by the WAPC include:

• Investigation of a coastal road between Karratha and Wickham;
• Investigate a link between Karratha and its airport.
• Port access enhancements including Dampier, Cape Lambert and Anketell;
• Road pavement upgrades along heavily trafficked sections of North West Coastal Hwy; and
• Development of viable public transport systems in the two Pilbara cities (Karratha and Port Hedland) and upgrade taxi services in cities and main towns.

Early planning for the proposed Anketell Port and SIA included investigation of a new coastal road link between Karratha and Wickham but the decision has since been made not to pursue this as a project. Current planning is for Anketell Port and SIA to be accessed via a new road link from North West Coastal Highway within a new infrastructure corridor as shown in Figure 9.

Figure 9. Anketell Port and Strategic Industrial Area.
Source: Western Australian Regional Freight Transport Network Plan, Map 8 (DOT, 2013)
**Figure 10** provides an indication of road freight growth from 2012 to 2030 within the Shire, although it should be noted that this is based on the existing road network and does not include the planned Karratha Western Bypass and the new access road planned from North West Coastal Highway to Anketell Port and SIA.

The DOT report also indicates a proposed High Wide Load (HWL) route on North West Coastal Highway from Onslow to Port Hedland and beyond, including a HWL route to Dampier Port via Maddigan Road and Dampier Road west of Karratha. It notes that the North West Coastal Highway will play a significant role in accommodating the region’s transport needs into the future. The highway will be an investment priority for the State Government, although the priority section identified for upgrading (widening and flood-proofing) is further to the south (from Minilya to the Gascoyne region boundary).

Upgrading of Dampier Road (underway) from Balmoral to Burrup Road to four-lane divided road standard is considered a priority “to upgrade access to the port of Dampier and the Burrup Peninsula.” Another priority listed by DOT is “Karratha Western Bypass - construct a new road south-west of Karratha to provide a heavy haulage link from the North West Coastal Highway to Dampier Road, replacing Madigan Road as the primary freight route to the port of Dampier and Burrup Peninsula.”
Dampier Road upgrading is indicated as a short term project (2012+) and Karratha Western Bypass is shown as a long term project (2020+).

Other future transport infrastructure needs have been identified in other reports as well. The Shire of Roebourne Karratha Final Strategic Plan 2009-2013 identified the need to investigate the current capacity of the Karratha road system and plan for the future, including the Searipple / Balmoral Road link (an east west connection on the north side of Karratha townsite).

The *Karratha Regional Hotspots Land Supply Update* (WAPC, 2010) flagged several road and transport projects around Karratha:

- Expansion of Karratha Airport (planning for expansion of terminal building and helicopter facilities).
- Airport access road – a proposed second access road to the Karratha Airport (single carriageway standard) linking Balmoral Road West with the airport.
- Dampier Hwy – stage 2 involves duplication of Dampier Road to Burrup Road and construction of a new bridge at Seven Mile.
- Karratha Western Bypass (North West Coastal Hwy to Dampier Hwy west of Madigan Rd) – further planning to ensure integration with land development proposals in the area.
- Potential Karratha to Wickham road connection.

The *Karratha City of the North* reports (LandCorp and Shire of Roebourne, 2010) provide a growth strategy and implementation plan for development of Karratha, potentially to an ultimate population of 50,000 people. The study considered short, medium and long-term staging and includes recommendations on road network, airport, public transport, pedestrian and cyclist facilities and parking strategy for Karratha.

The *Roebourne Town Centre Structure Plan Traffic Report* (Riley Consulting, Feb 2013) favours a northern bypass of the town (on the northwest side of town between North West Coastal Hwy and the Point Samson-Roebourne Rd) rather than a southern bypass (around the southwest side of town). It also recommended improved intersection treatments at several intersections on North West Coastal Hwy in the town and recommends a boulevard treatment (6m wide median) on Northwest Coastal Hwy west of Point Samson-Roebourne Rd.

### 2.2.4 Airports

In terms of air transport the WAPC noted that airport passenger throughput has increased significantly over the past five years, particularly at Karratha. More recently, there has been increased connectivity between the region’s airports and other Australian centres, with direct flights to Brisbane Sydney and Melbourne. In future, there may be demand to support greater connections between the region and selected international destinations. Future priorities include:

- Investigating the viability of intra-regional regular passenger air services;
- Maintaining the integrity of flight paths to the region’s airports (i.e. take into account airport growth requirements and flight paths around the region’s airports when undertaking land development); and
- Investigating demand for connections between the region and selected international destinations.
The WAPC also commented in relation to fly-in-fly-out workers, encouraging urban-based transient worker accommodation close to the facilities offered by those centres. However, they also support the use of on-site transient worker accommodation during the construction stage of projects. Locating construction workforce close to their projects has significant benefits in terms of transport, as the traffic load associated with construction workforce is generally much larger than the subsequent operational workforce.

Karratha Airport is forecast to increase from the current 800,000 passengers per year to up to 1.3 million passengers by 2028.

The Shire of Roebourne’s *Karratha Airport Master Plan* (KAMP) 2009 has identified a three stage program for expansion of Karratha Airport. The KAMP is funded through landing fees, Regional Airports Development Scheme and other sources and proposes:

- **Phase 1 (2009–2013):** Structural changes in the terminal, review car park capacity, and construct new long-term car park, which are now complete.
- **Phase 2 (2013–2020):** Expanding airside helicopter facilities, extending concession area and departures lounge and expanding luggage claim in the terminal. Further expanded car parks and subdivision to create development sites in southern airport precinct.
- **Phase 3 (2020–2028):** Introduction of international services to Karratha Airport, upgrade runways, expand operational areas as required by domestic and international demand and expand car park, develop hotel accommodation site, and develop lease land for commercial / tourism.
3 Benefits and principles of land-use / transport integration

Urban centres around the world are sustained because they provide sufficient access to different land uses, activities and opportunities distributed in the urban area but as these land uses grow this integration becomes more difficult to maintain. Transport routes to outer areas become more congested, dispersed and costly. Increasing the proximity of land uses, including more mixed use centres, to each other as well as technology can improve accessibility to the city without increasing car usage.

Karratha is one of Australia’s fastest-growing mining towns and the current economic growth pattern indicates this would continue. Therefore providing sustainable transport infrastructure in line with the land use growth is essential.

Movement between different land uses in the town depends on their location and available transport. In the past, improving transport links such as duplication of Dampier Highway has improved access but this is becoming more expensive to maintain, not only in financial terms but also in environmental and social terms, as different centres in the Shire of Roebourne grow.

Integrating land uses and transport can deliver a more sustainable town with a high quality of life for current and future residents. Within the next 30 years, the Shire of Roebourne population is planned to increase to more than 50,000 people. The locations chosen for development to accommodate these people, and the transport available to them, will determine whether the current high rate of car use can be regulated. As the city grows, more land is cleared for urban use and more motor vehicles impact on the air quality. However, people generally want home, work and essential services including schools, medical facilities, shops, public transport and parks to be within a 10-20 minute trip, as shown in Figure 11.

A conceptual model for integrating land use and transport is shown in Figure 12. This shows an existing context of urban form, planning practice, government policy and demographic and economic forces. These extant characteristics are the foundation on which future planning can be built. This isn't to say these characteristics can't be changed but that they need to be taken into account as relatively stable elements of the existing urban fabric. Within this context, planning may have a land use focus, transport focus, or something in-between. There are a range of valid actions along this continuum to achieve integrated land uses and balanced transport systems.
Figure 11. Preferred activities close to work and home.
Source: Greater Perth integrating land use and transport discussion paper 5.

Figure 12. Integrating land use and balanced transport.
Source: Greater Perth integrating land use and transport discussion paper 5.
4 Transport challenges and opportunities

The cycle of mining boom and bust in the Pilbara presents a number of threats and opportunities for many aspects of this region. Boom times bring rapid development that can stretch existing facilities to the limit and the development of new or expanded facilities can lag several years behind during periods of rapid growth. In the case of transport facilities this can result in traffic congestion and road safety issues due to higher traffic volumes than roads have been designed for (particularly at mining shift change times) and conflict between freight traffic and passenger vehicles including tourist traffic. Increasing numbers of heavy vehicles transporting over-size loads over long distances is a recent trend that has been noted in this region and must inevitably cause delays for other traffic using the same roads.

The Western Australian Regional Freight Transport Network Plan (DOT, 2013) notes, “In the Pilbara, potential new private heavy haulage rail lines will require strong emphasis on corridor planning to ensure efficient interfaces at port authority ports and to mitigate conflicts with the region’s road network. The future rail freight task will also require the operation of more, longer and larger trains. This may necessitate grade separations at heavily trafficked level crossings.”

Boom times do bring opportunities as well, particularly in terms of bringing in the funding required for new and upgraded infrastructure. This includes public as well as private sector funding. New ports, upgraded highways, new access roads, new railway lines and expanded airport facilities are all examples that are being seen in the Shire of Roebourne. More extensive all-weather road links are a particular example of this as they are highly desirable but might be considered less essential than some other projects competing for public sector funding, so it is desirable for this aspect to be incorporated into bigger infrastructure projects during boom times.

Naturally, times of economic downturn have the opposite effect. Contraction of mining activity during the lean times means fewer construction projects and scaling back of the mining workforce. This can result in lower traffic demand in some cases so the need for road upgrading will sometimes diminish. However, sometimes this results in underutilised infrastructure and ongoing maintenance costs without an adequate revenue source to fund them. The impact of heavy haulage road vehicles on aging road infrastructure is an example of this.

The DOT report notes that “freight growth and the overall trend towards larger ship size will translate into larger cargo transfers per visit and thus a significant increase in peak periods of high intensity landside transport operations. This, combined with the increase in inbound project cargo to the regions, and the corresponding number of high-wide loads, will underpin the need for larger lay-down areas for cargo handling, staging and distribution at or near ports.”

A range of other high-level transport challenges and opportunities are listed for each transport mode in Appendix 1. Some of the items that are likely to be relevant in the Shire of Roebourne include:

- Rail – explore the potential for common-user access to the rail corridors, which may lead to requirements for additional intermodal transfer hubs (eg. road to rail).
- Road – future provision of public transport between centres and in major urban centres (especially Karratha).
- Ports – expansion and additional facilities for increasing exports and inbound cargo, which may include a need for a future container hub with road (and potentially rail) access.
- Airports – upgrading and expansion of airports for larger aircraft, increasing passenger numbers and heavier cargo.

However, most of these items are outside of the control of the Shire of Roebourne and beyond the scope of the Local Planning Strategy. The Shire can only manage or control development on privately owned (or non-State Government owned) land. The Shire needs to be an informed partner in the wider mining and industrial development of the Shire and in State Government policy development that has implications for the Shire.

Most of the transport-related challenges and opportunities for the Shire relate to roads rather than the other modes discussed here. Previous reports for Karratha, in particular, have identified a range of transport-related challenges and opportunities relevant to the Shire, which also relate to the principles of land use / transport integration discussed in the section 3 of this report.

The Karratha City of the North reports (2010) included analysis of movement network requirements for Karratha for an ultimate population of 50,000. The recommended road network for Karratha from that study is illustrated at Figure 13. It provides an initial indication of future road requirements but will need to be reviewed based on the population and land use proposed for Karratha in this Local Planning Strategy.

![Figure 13. Karratha townsite future road network and traffic projections.](source)
Karratha City of the North noted that lack of effective and viable public transport and bus services in Karratha has contributed to the total dominance of motor vehicles. It recommended a basic public transport service (bus route 1 on Figure 14) in the form of a high frequency bus service that would connect the far east and far west ends of the town and pass through the town centre. It suggested this service may be further expanded to new residential areas in future (bus route 2).

Figure 14. Proposed public transport routes for Karratha townsite.
Source: Karratha City of the North, Volume 2: City Growth Plan (2010) Figure 83.
Karratha City of the North also recommended provision of pedestrian and bicycle facilities in accordance with Liveable Neighbourhoods principles, including the network of shared paths shown in Figure 15.

Figure 15. Proposed shared path network for Karratha townsite. Source: Karratha City of the North, Volume 2: City Growth Plan (2010) Figure 82.

Other towns in the Shire of Roebourne will remain much smaller than Karratha, so non-motorised transport modes such as walking and cycling remain a viable option for movement around the town. Public transport would not be warranted in those smaller centres but good pedestrian and cyclist facilities should be provided in those smaller towns as well.
5 Conclusion

The Shire of Roebourne is currently serviced by an extensive transport infrastructure network including road, rail, air and maritime facilities to meet current transport demands across the long distances involved for travel to and within this region. The regional road network is designed to accommodate the largest categories of vehicles permitted on Western Australian roads, two mining company railway lines transport huge quantities of iron ore to two of the state’s highest export tonnage ports at Dampier and Cape Lambert, and Karratha Airport is the state’s busiest regional airport.

A lot more development is planned and current forecasts indicate significant growth in all sectors of transport demand.

Two more mining company railway lines are planned from mine sites to the planned new Anketell Port and Strategic Industrial Area located between Karratha and Cape Lambert. Coordinated infrastructure corridor planning including upgrading road and rail access to port areas will be vital for expanded pit to port operations. Minimising traffic delays with the increasing number of train movements will be one challenge to be addressed. Promotion of multi-user access to the rail network and use of rail for a wider range of products has been identified as a goal in many strategic planning documents.

Karratha Airport is projected to grow from its current 800,000 passengers per year to 1.3 million by 2028. The Shire’s Karratha Airport Master Plan identifies three phases of enhancements to accommodate that growth. Phase one is complete and phases two and three will be implemented between 2013 and 2028. The benefits of a second access road between Karratha and the airport have also been raised.

Planning studies for the future growth of Karratha (Karratha City of the North) considered a potential future population of 50,000 people and projected the future traffic demands and road network requirements in this city. The need to plan for future public transport, taxi services and pedestrian and cyclist facilities in this city has also been identified.

Planning of the future Karratha Western Bypass is in progress and other projects such as a potential future northwest bypass of Roebourne have been suggested.

This current Shire of Roebourne Local Planning Strategy study will identify future growth scenarios for each of the towns in the Shire and will then include regional traffic modelling to identify the road network upgrades that will be required between those centres as well.
The following Transport Challenges and Opportunities tables prepared by MacroPlanDimasi provide high-level information relating to transport challenges and opportunities relevant to a broad range of stakeholders and planning environments. Many items are relevant to the Shire of Roebourne and will provide ideas for further investigation.

**Table 1 - Road Network**

<table>
<thead>
<tr>
<th>Issue</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Challenges</strong></td>
<td>Planning for the road network in the medium to long-term will need to address (for example):</td>
</tr>
<tr>
<td></td>
<td>• ways to improve reliability and safety, provide more freight capacity, better efficiency and greater reliability;</td>
</tr>
<tr>
<td></td>
<td>• ways to reduce impacts of long distances between the region’s settlements and connections to other regions;</td>
</tr>
<tr>
<td></td>
<td>• ways to provide active and public transport in expanded urban areas; and</td>
</tr>
<tr>
<td></td>
<td>• reduce the cost of transport, particularly in freight, to improve competitiveness.</td>
</tr>
<tr>
<td><strong>Desired outcome</strong></td>
<td>It is important to plan and deliver an effective, efficient and safe road network in the medium to long-term:</td>
</tr>
<tr>
<td></td>
<td>• to facilitate economic growth and accommodate population expansion;</td>
</tr>
<tr>
<td></td>
<td>• as population grows more options will be required within the region's settlements;</td>
</tr>
<tr>
<td></td>
<td>• continue to improve road safety in line with the State “Towards Zero” Road Safety strategy; and better accommodate tourist oriented traffic and scenic overland routes</td>
</tr>
<tr>
<td><strong>Investment</strong></td>
<td>Ongoing capital works investment in the region’s road network in the medium to long-term will be required to:</td>
</tr>
<tr>
<td></td>
<td>• enhance the road network to improve safety, capacity and connectivity;</td>
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<td></td>
<td>• improve road freight efficiency and opportunity;</td>
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<tr>
<td></td>
<td>• provide tourism facilities and accommodation which do not conflict with mining and freight transport activities; and</td>
</tr>
<tr>
<td></td>
<td>• provide passenger transport connections between major cities and towns.</td>
</tr>
<tr>
<td>Issue</td>
<td>Response</td>
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<tr>
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</tr>
</tbody>
</table>
| **Improvement strategies** | Alternative strategies to improve the region’s road network include:  
  - reducing road freight demand and improve safety with the mix of heavy and light vehicles;  
  - reducing passenger road demand via other transport modes and non-physical means (e.g. teleworking);  
  - improving public transport options;  
  - improving urban transport;  
  - improving pipe and conveyor connections to decrease road demand; and  
  - defined corridors which protect access and common-user interests. |
| **Emerging technologies** | Emerging technologies that could be utilised to improve the road network include:  
  - creation of “freightways” (dedicated freight roads) with larger road freight vehicles;  
  - utilisation of more efficient road freight vehicles, including the use of biofuels and renewables;  
  - more efficient passenger bus networks, including vehicles that use biofuels and renewables;  
  - utilisation of advanced passenger vehicles (e.g. driverless cars) or autonomous vehicles (e.g. Ultra); and  
  - tele-working or use of technology to reduce physical travel demand. |
| **Policy and program requirements** | Policy/program options to address failures include:  
  - freight pricing reform through COAG;  
  - incentives/subsidies for use of biofuels by the transport industry;  
  - inclusion of the Pilbara in TransWA coverage; and  
  - require/encourage major employers in town centres to support public transport services; and  
  - provide public transport to community groups who are disconnected from educational and medical and other essential community services. |
| **Lessons from other areas** | Locations where similar strategies in road transport are taking place:  
  - Europe GPS/Distance based road charging particularly for freight based travel; and  
  - zero tolerance road safety campaigns in Europe – no tolerance for road fatalities. |
### Table 2 - Rail Network

<table>
<thead>
<tr>
<th>Issue</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Challenges</strong></td>
<td>Planning for the rail network in the medium to long-term will need to address (for example):</td>
</tr>
<tr>
<td></td>
<td>• existing rail infrastructure is all privately owned and operated by mining companies for the purpose of transporting bulk commodities such as iron ore from mine to port</td>
</tr>
<tr>
<td></td>
<td>• the scale of the rail network as it only suits bulk commodities</td>
</tr>
<tr>
<td></td>
<td>• improving access to all rail infrastructure</td>
</tr>
<tr>
<td></td>
<td>• high capital costs of providing rail compared to other modes</td>
</tr>
<tr>
<td></td>
<td>• reduce delays particularly those at intermodal terminals and open level crossings</td>
</tr>
<tr>
<td></td>
<td>• it should be acknowledged that passenger rail services are unlikely to ever be achieved in the Shire of Roebourne due to private ownership, heavy freight movement and low population density in the Shire.</td>
</tr>
<tr>
<td><strong>Desired outcome</strong></td>
<td>It is important to plan and deliver an effective, efficient and safe rail network in the medium to long-term to:</td>
</tr>
<tr>
<td></td>
<td>• facilitate economic growth.</td>
</tr>
<tr>
<td><strong>Investment</strong></td>
<td>Ongoing capital works investment in the region’s rail network in the medium to long-term will include:</td>
</tr>
<tr>
<td></td>
<td>• creation of intermodal hubs.</td>
</tr>
<tr>
<td><strong>Improvement strategies</strong></td>
<td>Alternative strategies to improve the region’s rail network include:</td>
</tr>
<tr>
<td></td>
<td>• improvements to freight rail capacity and access</td>
</tr>
<tr>
<td></td>
<td>• plant/machinery and container transport</td>
</tr>
<tr>
<td></td>
<td>• improve pipe and conveyor connections to decrease rail demand</td>
</tr>
<tr>
<td></td>
<td>• intermodal transfer hubs.</td>
</tr>
<tr>
<td><strong>Emerging technologies</strong></td>
<td>Emerging technologies that could be utilised to improve the rail network include:</td>
</tr>
<tr>
<td></td>
<td>• freight transfer hubs to get freight onto the more appropriate mode of transport;</td>
</tr>
<tr>
<td></td>
<td>• scheduling software to assist intermodal logistics; and</td>
</tr>
<tr>
<td></td>
<td>• improving Freight Data architecture to monitor/improve system performance</td>
</tr>
<tr>
<td><strong>Policy and program</strong></td>
<td>Policy/program options to address failures include:</td>
</tr>
<tr>
<td>requirements</td>
<td>• explore common-user access in strategic corridors.</td>
</tr>
<tr>
<td>Issue</td>
<td>Response</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Approvals</td>
<td>Possible ways to streamline approvals in the mid- to long-term to provide better outcomes, include:</td>
</tr>
<tr>
<td></td>
<td>• single rail infrastructure owner/manager with multiple operators</td>
</tr>
</tbody>
</table>
### Table 3 - Sea Ports

<table>
<thead>
<tr>
<th>Issue</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Challenges</strong></td>
<td>Planning for sea ports in the medium to long-term will need to address (for example):</td>
</tr>
<tr>
<td></td>
<td>- requirements for additional berths at the region’s ports;</td>
</tr>
<tr>
<td></td>
<td>- on-going potential for conflicts with recreational vessels which increase with more commercial shipping and greater population;</td>
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<td></td>
<td>- substantial costs associated with constructing and operating ports;</td>
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<tr>
<td></td>
<td>- environmental impacts associated with port construction;</td>
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<td></td>
<td>- potential for conflicts with freight vehicles;</td>
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<td></td>
<td>- coordinated management of ports across the region</td>
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<tr>
<td></td>
<td>- lack of coordination of sea ports with road, rail and air freight; and</td>
</tr>
<tr>
<td></td>
<td>- poor cost management and reliability as a disadvantage of Pilbara location.</td>
</tr>
<tr>
<td><strong>Desired outcome</strong></td>
<td>It will be important to plan and deliver effective, efficient and safe ports in the medium to long-term to:</td>
</tr>
<tr>
<td></td>
<td>- facilitate economic growth.</td>
</tr>
<tr>
<td><strong>Investment</strong></td>
<td>Ongoing capital works investment in the region’s ports in the medium to long-term will include:</td>
</tr>
<tr>
<td></td>
<td>- expansions of existing ports at Onslow, Dampier and Port Hedland;</td>
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<tr>
<td></td>
<td>- creation of more accessible Intermodal Hubs with Road and Rail</td>
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<tr>
<td></td>
<td>- consider the role of container hubs and need for a dedicated facility with land-side connections; and</td>
</tr>
<tr>
<td></td>
<td>- examine shipping as a viable alternative to road and air freight.</td>
</tr>
<tr>
<td><strong>Improvement strategies</strong></td>
<td>Alternative strategies to improve the region’s ports include:</td>
</tr>
<tr>
<td></td>
<td>- improve port facilities to enable capacity and ability to import containerised freight; and</td>
</tr>
<tr>
<td></td>
<td>- develop capacity to transport large plant / machinery by sea (compared with road based travel).</td>
</tr>
<tr>
<td><strong>Emerging technologies</strong></td>
<td>Emerging technologies that could be utilised to improve ports include:</td>
</tr>
<tr>
<td></td>
<td>- utilisation of biofuels and renewable energy techniques for shipping;</td>
</tr>
<tr>
<td></td>
<td>- shipping technology to improve energy efficiency</td>
</tr>
<tr>
<td></td>
<td>- more efficient stevedoring; and</td>
</tr>
<tr>
<td></td>
<td>- more efficiently located laydown and storage areas with conveyors</td>
</tr>
</tbody>
</table>
### Issue | Response
--- | ---
**Policy and program requirements** | Policy/program options to address failures include:
- promote development of multi-user port facilities that can accommodate a wide range of goods and materials for export and import. This should include clearly articulated access arrangements, provision of multi-user infrastructure corridors and appropriate terrestrial and marine areas for development.

**Approvals** | Possible ways to streamline approvals in the mid- to long-term to provide better outcomes include:
- review the environmental approvals process for ports as it can cause considerable delay (mix of State and Federal legislation); and
- combined port authorities and control for multiple ports in the Pilbara
### Table 4 - Air Infrastructure

<table>
<thead>
<tr>
<th>Issue</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Challenges</strong></td>
<td>Planning for the region’s air infrastructure in the medium to long-term will need to address (for example):</td>
</tr>
<tr>
<td></td>
<td>- limited capacity for heavy loads</td>
</tr>
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<td></td>
<td>- operations are heavily based on servicing FIFO;</td>
</tr>
<tr>
<td></td>
<td>- the need for detailed planning at airport sites;</td>
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<tr>
<td></td>
<td>- impacts of flight paths and noise</td>
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<tr>
<td></td>
<td>- high costs of providing infrastructure</td>
</tr>
<tr>
<td></td>
<td>- landside infrastructure and road transport to remote areas presents delays and risks in terms of OSH; and</td>
</tr>
<tr>
<td></td>
<td>- limited interconnection between towns and cities (but long distances).</td>
</tr>
<tr>
<td><strong>Desired outcome</strong></td>
<td>It will be important to plan and deliver an effective, efficient and safe air infrastructure network in the medium to long-term to:</td>
</tr>
<tr>
<td></td>
<td>- facilitate economic growth;</td>
</tr>
<tr>
<td></td>
<td>- accommodate population expansion; and</td>
</tr>
<tr>
<td></td>
<td>- improve air travel between towns and cities, which makes for positive commerce between centres.</td>
</tr>
<tr>
<td><strong>Investment</strong></td>
<td>Ongoing capital works investment in the region’s air infrastructure network in the medium to long-term will include:</td>
</tr>
<tr>
<td></td>
<td>- expansion of airports including Karratha;</td>
</tr>
<tr>
<td></td>
<td>- intermodal hubs to improve connections with air freight; and</td>
</tr>
<tr>
<td></td>
<td>- investigation of a regional air-shuttle service between population centres.</td>
</tr>
<tr>
<td><strong>Improvement strategies</strong></td>
<td>Alternative strategies to improve the region’s air network include:</td>
</tr>
<tr>
<td></td>
<td>- focus on air transport as an intra-regional transport mode with increased use of alternative fuel sources;</td>
</tr>
<tr>
<td></td>
<td>- heavy freight to be lifted by aircraft; and</td>
</tr>
<tr>
<td></td>
<td>- reduce FIFO demand via non-physical means (e.g. Rio Tinto process automation).</td>
</tr>
<tr>
<td><strong>Emerging technologies</strong></td>
<td>Emerging technologies that could be utilised to improve aviation infrastructure include:</td>
</tr>
<tr>
<td></td>
<td>- development of bio fuels and renewables for utilisation in the aviation sector;</td>
</tr>
<tr>
<td></td>
<td>- remote control of mining operations (e.g. Rio Tinto); and</td>
</tr>
<tr>
<td></td>
<td>- using heavy lift airships for large and oversize freight</td>
</tr>
</tbody>
</table>
| Policy and program requirements | Fragmented interests in aviation services, airports and landside logistics – little evidence of coordination or common-purpose.  
- no post-mining policy vision for aviation; and  
- difficulty in the ownership of airports being local government. May need more commercial focus to widen market appeal. |
|----------------------------------|--------------------------------------------------------------------------------------------------|
| Lessons from other areas         | Locations where similar strategies in air transport are taking place:  
- successful trials of bio aviation fuel in Australia and overseas.  
- airports treated as major intermodal interchanges with strong transport connections. Have the ability to become “Hubs” for Australia (similar to Dubai etc.)  
- trial systems currently underway subject to funding. (skylifter.com.au, www.varialift.com); and  
- Lockheed Martin developing cargo airship for defence purposes. |