

HEAVY VEHICLE ACCESS STRATEGY

Port Hedland

February 2020

FINAL



Heavy Vehicle Access Strategy

KC01000.000 Port Hedland Heavy Vehicle Access Strategy

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1. Executive Summary

The purpose of this document is to develop a heavy vehicle access strategy that will serve the Town of Port Hedland as the Town continues to grow and enhance its reputation as one of the key infrastructure hubs in Australia. The document examines in detail the existing road network and highlights existing deficiencies in the network, in terms of accessibility with heavy vehicles and outlines areas where there are current safety and planning risks in the network and where there are issues with the sizing of infrastructure that limits access / egress by various heavy vehicle configurations. The document then examines in detail the current potential conflicts between different transportation modes and types.

The document then examines the future road network planning and provides a gap analysis against any of the previously nominated deficiencies, offering priorities for construction of road infrastructure upgrades, new sections of road, road train assembly areas which strategically improve the performance and functionality of the network, requirements for Over Size Over Mass and RAV Network vehicles and reviewing each industrial area and its specific requirements within the Town of Port Hedland to present a holistic argument for the future infrastructure development within the Town.

The report then collates a thorough framework for the design, approvals and implementation phases associated with the suggested works scopes in this document, offering guidance on the compliance documentation, the regulatory authority requirements of such major infrastructure works programmes and clear descriptors on the future roles and responsibilities of each of the stakeholders in the process. Finally, a series of further recommended actions provides a concise summary of works that will provide benefit to the Town in the implementation of this Strategy.

The Town of Port Hedland has a major requirement to ensure it has a safe, legible road network for all road users within the Town boundaries. The importance of the mining and agricultural sectors is not only of local or regional importance, they are national priorities as Port Hedland is a major engine in Australia's economic health and growth as a nation.

The collation of accurate traffic data is therefore vital to the ongoing implementation of this strategy. In the past, some of the data collated did not provide an accurate picture of the issues. However, the purpose of this strategy document is to provide clarity and certainty on many of these issues, and where this may not have been possible, to prescribe specific remedies.

The Town of Port Hedland has an extensive RAV network that is of critical importance to the function of the Port of Port Hedland and to the future expansion of the Port Hedland Airport. There are a series of road networks through Port Hedland that are designated at RAV10 level even though some geometric requirements at key intersections and infrastructure crossing points, (such as, insufficient kerb radii, low HV power lines, insufficient widths at level railway crossings etc) are presently of insufficient size for safe access / egress. With relation to the level railway crossings, this is an item of major importance for High Wide Loads and other permit / escorted vehicles. The removal of these assets is envisioned within the strategy over the coming 12 to 24 months.

The report provides details on the requirements of major existing nodes such as the port, Wedgefield Industrial Area, Port Hedland Airport and the role of the existing Road Train Assembly Area, with commentary on a preferred future additional location to improve overall safety within the town. This is one of the major premises of this report – to address the existing perceived and actual safety conflicts between residential and freight traffic, with key focus on Wilson Street and roads around South Hedland and Wedgefield of high importance to this strategy due to their historical conflicts between uses.

For the Town of Port Hedland, a key finding from this strategy was the assessment of new projects within and external to the Town, but that have a major impact on the Town's road infrastructure networks. Many of these projects do not have robust Transport Impact Assessments, therefore it was not possible to assess either the individual, or the cumulative impact of these projects upon the network. New mining tenement applications should be assessed against maintenance requirements when determining future road strategies and new freight links.

This information is crucial in determining the viability and the need for new freight networks. The costs of major infrastructure upgrades in a location such as Port Hedland can be prohibitive due to the costs of local supply of materials, labour and the subgrade conditions for such works that are particular to the Pilbara region. This integral understanding of the road network, the current needs of the Town's constituents, the future opportunities for infrastructure improvements will enable the Town of Port Hedland to develop robust policies into the future.

1.1 Summary of recommendations

1.1.1 Develop Traffic Monitoring Program (5 years)

The Town of Port Hedland has predominantly dated information on traffic volumes on key roads. In order to implement any significant project, solid database is required. Therefore, it is recommended that traffic monitoring program is followed for a minimum of 5 years. This should garner solid data which may enable preparation of town wide transport model should it be required.

1.1.2 Develop Asset Register and Asset Management Plan

Register of existing assets and the condition of assets is crucial in implementing any maintenance cost sharing policy. Useful life of asset should be recorded as well as planned maintenance and upgrades.

1.1.3 Develop a Cost Sharing approach to support Asset Management

Strong percentage of heavy vehicle on local roads increases cost of maintenance quite dramatically. It is important to consider cost sharing approaches to create effective and achievable asset management plan. Developing internal maintenance cost sharing policy is the first and essential step. In parallel to this, lobbying to the government agencies to legislate cost sharing policies would help with policy application and actioning.

1.1.4 Apply Changes to the Planning Framework in Wedgefield to Address Safety Issues Between Sensitive Land Uses and Heavy Vehicles

In order to achieve precinct objectives outlined in the Strategic Plan, restriction of permitted uses must occur. Deepening of land-use conflict between transportation businesses and caretakers, dwellers must be prevented and therefore land use in established parts of Wedgefield will revert to historical light industry.

1.1.5 Continue to Review RAV Status of Roads in Wedgefield Considering Data Collected and Movement of Transport Business Over Time

Given impending change of approved land-use in parts of Wedgefield, transport businesses relying on RAV 10 vehicles will become incompatible with approved land-use. Therefore, as businesses relocate to a more suitable location with appropriate network, portions of existing road network in Wedgefield should be downgraded or fully removed from the RAV network to ensure compatibility of adjoining land-uses in the precinct.

1.1.6 Develop and Implement an Engagement Plan With Transport Industries in Wedgefield

Ongoing communication will help reduce ongoing land-use conflicts between transport-operators and caretakers.

1.1.7 Develop a Funding Strategy to Upgrade Heavy Vehicle Road Network and Its Assets

In order to create appropriate budgets to keep up with this on-going requirement the Town of Port Hedland should consider developing a funding strategy to create revenue streams.

Three key options should be considered:

- 1) Developing maintenance cost sharing policy
- 2) Development contribution schemes
- 3) Funding through State and Federal government programs or other agencies

1.1.8 Evaluate Mining Tenements and Crown Leases and Negotiate Road Maintenance on Impacted Local Roads

All new applications for mining tenements and crown leases should consider impact of heavy vehicles on the road network and associated cost of maintenance. Once this agreement is in place, maintenance works can be completed either by the Town of Port Hedland, or by the proponent. In the latter case, the Town of Port Hedland would carry out regular inspections to ensure that roads are maintained to the agreed level.

1.1.9 Monitor Industry Development and Consider Developing Strategy for Application of Smart Technologies in Freight

Given the importance of freight of all modes in the Town of Port Hedland, it would be beneficial to develop a general strategy for deployment of smart and emerging technologies in freight management.

2. Introduction

2.1 Purpose and Scope of the Study

The Town of Port Hedland is known as a key hub for iron ore mining and distribution, with assets that are exported through the port to several locations worldwide. The Town of Port Hedland services the mining operations of several large-scale miners, most notably BHP, Fortescue Metals Group and Roy Hill with BHP and Fortescue Metals Group railway networks terminating in Port Hedland.

Town of Port Hedland road network also contributes a significant number of heavy vehicles onto key road networks between Port Hedland and Newman and Port Hedland and Marble Bar. Smaller miners rely on the road network to export their ore; with all miners relying on the road network to get supplies and construction materials to the mines around the Pilbara.

This study aims to provide an overview of the existing heavy vehicle network and guidance on possible network improvements. The goals with any proposed interventions are to enhance the efficiency and safety in the overall network. Further to this, the strategy seeks to provide guidance on growth strategies and effective management of assets.

This strategic approach to heavy vehicle access needs and requirements will help ensure safety and efficiency in context of the: -

- existing heavy vehicle network
- future heavy vehicle networks
- relevant existing design standards to be observed
- standards, procedures and policies to be developed
- procedure to be followed for extending the restricted access network
- procedure to be followed for upgrading the restricted access network
- roles and responsibilities in managing the network
- roles and responsibilities in managing the first and the last mile

In providing the strategic priorities for heavy vehicle access, this Strategy aims to document potential improvements to the freight network efficiency, safety, capacity and sustainability.

Core scope of this document is: -

- Assess road hierarchy and the existing and emerging RAV network in close consultation with Main Roads WA to develop existing and future road classifications within the local government area
- Develop an approach for the Town's assessment of RAV application referrals from Main Roads WA
- Develop clear land use definitions and zone permissibility's for Local Planning Scheme 6 based on heavy vehicle access requirements
- Investigate strategies to resolve issues with the caretakers dwelling and heavy vehicle conflicts in Wedgefield

Outside of this scope is analysis of the correlation and effect which freight modes (sea, air, rail and road) might have on each other. Currently there are plans for expansion of the port area and freight activity at Port Hedland Airport. The potential impact of these interventions on road freight should be a subject of an over-arching freight strategy.

2.2 Location

The Town of Port Hedland is located in the Pilbara Region of Western Australia approximately 1800km north east of Perth. It is comprised of twelve (12) localities, namely: Boodarie, De Grey, Indee, Marble Bar (part), Mundabullangana, Pippingarra, Port Hedland, Redbank, South Hedland, Strelley, Wallareenya and Wedgefield. Two main residential localities are Port Hedland and South Hedland, while at present there is notable residential activity in Wedgefield as well. Key existing industrial (and employment) centres are located in Wedgefield and the west side of Port Hedland, while new Industrial Areas are planned in Boodarie and East Wedgefield.

There are four rural living estates: Twelve Mile, Turner River, Bosna Estate and Redbank. The Twelve Mile rural residential estate is located approximately eight kilometres east of South Hedland, within the locality of Pippingarra. The rural residential estate within the locality of Redbank is located approximately halfway between Port Hedland and South Hedland, off Wilson Street.

The Town has a well-established privately-operated freight railway connecting to bulk port facilities from regional mining operations. This is shown in Figure 1 below.

Figure 1 - Key Regional Rail Network with Connectivity to Port Hedland and Karratha / Cape Lambert

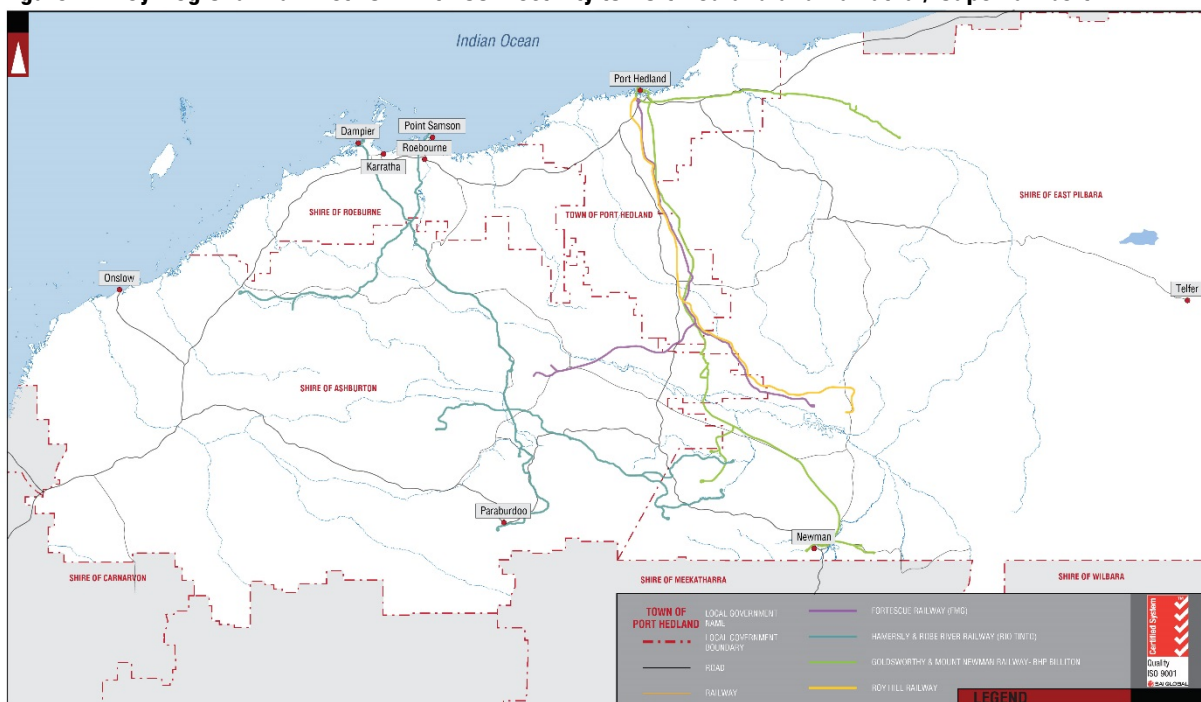


Figure 2 - Key Regional Road Network (Pilbara Region)

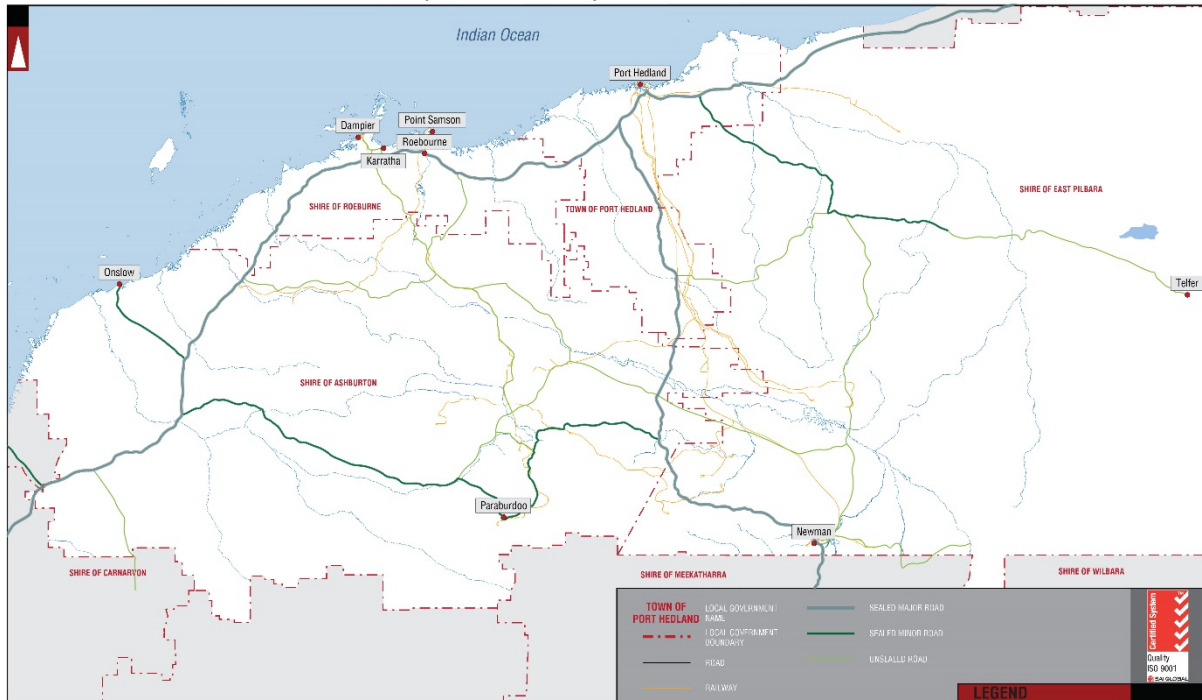
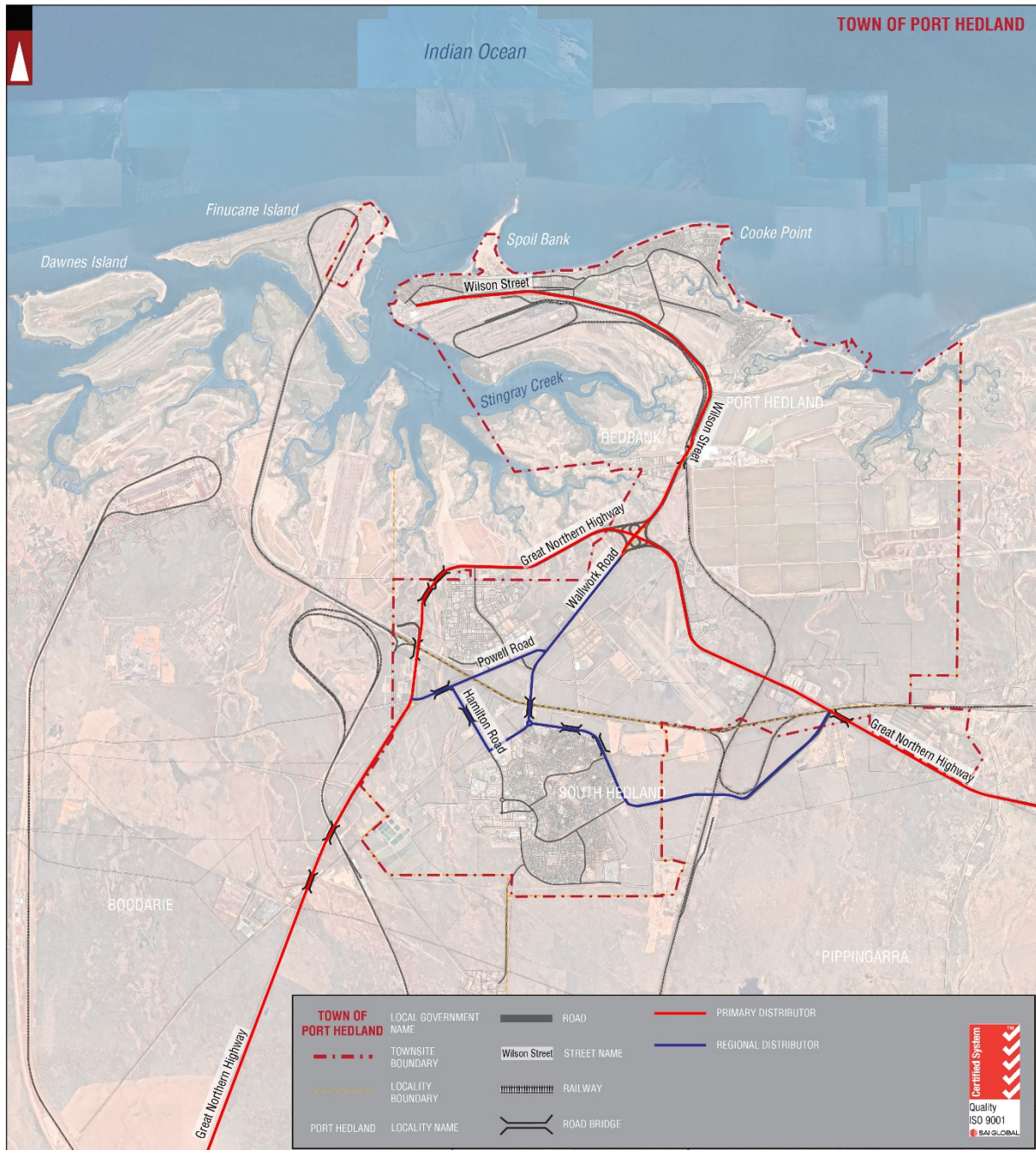


Figure 2 above shows the national road freight network within the Town of Port Hedland, and surrounding local governments LGA areas.

The main road network for heavy vehicles within the Townsite includes Great Northern Highway and Wilson Street and several other access roads to port facilities which are shown in Figure 3 on the following page.

Figure 3 – Port Hedland Major Road Network



2.3 Importance of Heavy Vehicles in the Town of Port Hedland Transportation Network

Mining, transport, postal and warehousing related activities are the most significant contributors to the total income in Port Hedland with 25% of all jobs in the Town being in mining according to Profile.id website. Transport, postal and warehousing are the next largest economic drivers given that 10.2% of all jobs are in these fields.

There are two major industrial areas within the Town of Port Hedland: south of the historic town centre in the West End (Port Hedland), including a large portion of the port facilities; and the suburb of Wedgefield, accessed from Great Northern Highway, between Port Hedland and South Hedland.

The zone south of the town centre is classified as light industry while the BHP owned portion of the port zoned as heavy industry. Wedgefield is made up of a combination of light and heavy industry for mining support services, transportation-related businesses, construction yards, pre-fabricators, maintenance and repairs.

The flow of vehicles between these locations, and then into the wider network in the Pilbara is therefore key to the function of Port Hedland as one of Australia's major export ports. The key road networks at present are therefore Wilson Street and Great Northern Highway. There are several other roads of significant importance for movement of heavy vehicles as they allow access to industrial precincts and to the Port (Pinga Street, Wallwork Road, Utah Road etc).

2.4 Background Documentation Review

This section provides a succinct review of the key background information which is pertinent to the outcomes of this report.

- **Port City Growth Plan 2012**

- ***“ Freight & Logistics Networks***

- *The Growth Plan notes substantial mining activity and the fact that Port Hedland is a major distribution port results in a high level of heavy vehicles on the strategic road network connecting the mines to the port. The main access to the port is via the Great Northern Highway and Wilson Street. Access to the BHPIO facilities at Finucane Island is via Finucane Island Access Road, and access to the FMG facilities at Anderson Point is via a spur road off Finucane Island Access Road, just west of Wedgefield. Vehicles range from triple road trains down to passenger work vehicles.*

- *Several railway level crossings and lack of priority for the key freight routes is reducing safety and efficiency. The requirement for port-bound traffic to travel through the Port Hedland Town Centre causes conflict between port and local traffic. This was highlighted in the 2010 Community Survey (ToPH, 2010). The routes to the port provide no passing opportunities and limited rest stops which impacts the overall efficiency of traffic movement and safety.*

- *The Main Roads designated heavy vehicle routes within the Town at the time included: -*

- *Great Northern Highway;*
 - *BHP Access Road into the Boodarie Industrial Estate;*
 - *The road network in the Wedgefield Estate;*
 - *Wilson Street Port Access Road; and*
 - *Finucane Island Access Road extending from the Wedgefield Estate/ Great Northern Highway to Finucane Island.”*

- **Wedgefield Precinct - Road, Traffic and Drainage Master Plan -Town of Port Hedland - 3 July 2015**

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“ Various Reports and Plans have been prepared for the expansion of the Town and include reference to Wedgefield. These reports were reviewed to better understand the Town’s existing and future transport infrastructure and land use requirements.

In addition, the Town has undertaken a stakeholder review. The initial approach was a user survey of existing tenants within Wedgefield and a discussion with other key stakeholders including Main Roads, Pilbara Ports Authority and the Town planners.

This highlighted several issues, which would make improvement to the precinct difficult, not least of which was the lack of any road hierarchy within Wedgefield. The Main Roads’ Restricted Access Vehicle (RAV) network has almost blanket coverage of roads within the precinct (to Category level 10). Though there are concerns expressed by stakeholders it is unlikely that support for reducing the RAV coverage will be obtained without viable alternative routes being provided.

A traffic analysis was undertaken, and the information obtained added to the identified location of the RAV user lots within the precinct. A key outcome of the review was to use this information to develop a virtual hierarchy of roads within Wedgefield. This hierarchy would consist of Pinga Street as the main District Distributor road and a series of loops which will be designated as Local Distributor roads. These Local Distributor roads were recommended to be upgraded to a standard which allows for RAV Category 10 vehicles to operate and turn within their own lane.

The strategy is to upgrade the District Distributor and Local Distributor network to encourage use by all through vehicles which would then allow some restrictions on the Local Access road network to discourage through traffic.”

Therefore, the key points from the background study include: -

- **Wilson Street:**
 - Wilson Street is the spine of the movement network within the townsite of Port Hedland.
 - It is the key connection point between Great Northern Highway and the Town of Port Hedland,
 - It also acts as the key connection to the Port (public berths);
 - Further to this, it is the key connection between Port Hedland and South Hedland carrying commuter traffic on a daily basis.

- **Access to private berths in the Port:**
 - Finucane Island Access Road provides access to BHP and Fortescue to the private berths with the Port;
 - Utah Road (private road) is an important distributor of traffic to the Port.
 - Various lower level access roads from Great Northern Highway to the Port enable additional access options for Roy Hill and Fortescue Mining from the Great Northern Highway.

- **The Wedgefield Industrial Area**
 - At present requires access / egress via Pinga Street, Great Northern Highway and then either Great Northern Highway Bypass to the Port Hedland Town Centre to the north, or Great Northern Highway southbound toward Newman;
 - There is an existing conflict between residential and industrial land uses.

- **Future demand for freight network:**
 - The vehicular access to the Port Hedland International Airport from Great Northern Highway east of Port Hedland provides access to travellers and freight;
 - Access to the potential cattle holding station near Pippingarra needs to be considered;

- There is a requirement for regional access to Boodarie Industrial Area for future access to an expanded port facility on the Finucane Island side of the port;
- Comprehensive review of impact of all of these projects on existing network is required.

2.5 Relevant Data to be Considered

This section provides a base review of currently available data on vehicular traffic volumes and heavy vehicle percentages. Analysis of available crash data from the Main Roads WA database was performed in order to determine whether any locations have high crash rates and apparent safety issues.

2.5.1 Traffic Volumes

As shown in the table below, most roads with available traffic data carry a high percent of heavy vehicles. This finding is consistent with the conclusions derived from background review of other available historical documentation.

Each road carrying more than 10% of heavy vehicle traffic is highlighted in yellow.

Table 1 – Port Hedland Traffic Volumes on Key Roads

S08 ***	Road Name	Location of Traffic Count	Vehicles Per Day (VPD)	Vehicles per Peak Hour (VPH)				Heavy Vehicle % <i>If HV count is Not Available, are HV likely to be in higher volumes than generally expected?</i>	Date of Traffic Count
				AM Peak Time	AM Peak VPH	PM Peak Time	PM Peak VPH		
1.	Anderson Street	Between Short Street and Darlot Street (Westbound) *	1,548	08:00 – 131		12:00 – 125		7.4%	May 2017
2.	Buttweld Road	Between Flashbutt Yard and Great Northern Highway *	596	05:00 – 41		17:00 – 62		22.9%	Jun 2017
3.		South of Great Northern Highway **	723	05:30 – 46		16:45 – 80		18.1%	2018
4.	Cajarina Road	N/A *	7,707	06:00 – 630		17:00 – 744		23.5%	Sep 2010
5.	Cooke Point Drive	North of Tindale Street *	3,738	07:00 – 335		17:00 – 360		11.2%	Jun 2016
6.	Dalton Road	N/A *	2,455	07:00 – 172		17:00 – 199		21.1%	Sep 2010
7.	Forrest Circle	South Hedland N/A *	7,308	11:00 – 473		17:00 – 612		15.3%	Feb 2013
8.	Great Northern Highway	East of Madigan Road **	1,181	11:00 – 84		16:00 – 84		54.4%	2018
9.		East of Utah Point Road **	3,214	05:15 – 230		16:45 – 215		33.6%	2017

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S08 ***	Road Name	Location of Traffic Count	Vehicles Per Day (VPD)	Vehicles per Peak Hour (VPH)				Heavy Vehicle % <i>If HV count is Not Available, are HV likely to be in higher volumes than generally expected?</i>	Date of Traffic Count
				AM Peak Time	AM Peak VPH	PM Peak Time	PM Peak VPH		
10.		South of Port Haven Village Access Road**	2,549	05:15 – 204	17:15 – 237	30.0%	2015		
11.		South of Port Hedland Airport Access Road**	9,124	07:45 – 676	17:00 – 799	15.2%	2015		
12.		East of Wilson Street**	4,750	05:45 – 384	17:30 – 437	27.7%	2014		
13.	Hamilton Road	South of Great Northern Highway**	5,389	05:30 – 676	17:30 – 629	20.1%	2014		
14.		North of North Circular Road**	4,226	05:45 – 346	16:45 – 397	13.7%	2009		
15.	Harwell Way	Feldspar Street to Munda Way*	598	11:00 – 39	15:00 – 63	17.9%	Dec 2004		
16.	Leehey Street	Moorambine Street to Trig Street*	300	10:00 – 23	15:00 – 25	27.7%	Nov 2004		
17.	Madigan Road	500m east of Great Northern Highway*	52	10:00 – 6	16:00 – 3	3.6%	Sep 2004		
18.	McGregor Street	West of Crawford Street**	2,159	10:45 – 182	16:15 – 189	10.8%	2018		
19.	Moorambin e Street	Between Peawah Street and Draper Street*	967	11:00 – 76	16:00 – 71	25.0%	Mar 2016		
20.		Between Pinga Street and Peewah Street*	1,521	10:00 – 87	16:00 – 100	30.1%	Mar 2016		
21.		East of Pinga Street*	1,327	09:00 – 90	15:00 – 101	17.9%	Feb 2017		
22.	Moore Street	West of Jacoby Street**	106	09:15 – 13	12:30 – 11	22.6%	2018		
23.	Murdoch Drive	East of Captains Way Roundabout*	4,934	11:00 – 313	16:00 – 419	7.9%	Sep 2016		
24.	North Circular	East of Hamilton Road*	4,948	11:00 – 313	17:00 – 439	11.4%	Apr 2017		
25.	West	East of Parker Street*	5,909	11:00 – 376	17:00 – 515	3.4%	Apr 2017		
26.		South of Hematite Drive*	6,263	06:00 – 541	16:00 – 462	N/A	Dec 2016		

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S08 ***	Road Name	Location of Traffic Count	Vehicles Per Day (VPD)	Vehicles per Peak Hour (VPH)				Heavy Vehicle % <i>If HV count is Not Available, are HV likely to be in higher volumes than generally expected?</i>	Date of Traffic Count
				AM Peak Time	AM Peak VPH	PM Peak Time	PM Peak VPH		
27.	Pinga Street	South of Manganese Street*	7,479	06:00 – 548		16:00 – 548		N/A	Dec 2016
28.		North of Pinnacles Street*	4,065	06:00 – 291		16:00 – 314		20.5%	Jan 2017
29.		South of Great Northern Highway**	4,092	07:45 – 285		16:30 – 279		29.1%	2015
30.	Powell Road	West of Hamilton Road**	2,260	05:00 – 336		17:15 – 319		20.2%	2015
31.		East of Hamilton Road**	4,991	05:45 – 404		16:45 – 469		32.8%	2009
32.		West of Pinga Street**	4,191	05:45 – 357		16:30 – 368		19.4%	2009
33.		East of Pinga Street**	9,191	08:45 – 691		16:30 – 840		29.2%	2012
34.	Robinson Street	East of Thompson Street**	605	07:45 – 41		17:00 – 61		7.6%	2018
35.	Schillaman Street	East of Pinga Street*	1,495	06:00 – 113		16:00 – 122		11.0%	Feb 2017
36.		Between Pawan Street and Yanana Street*	982	06:00 – 83		17:00 – 69		38.9%	Mar 2016
37.	Utah Point Road	West of Great Northern Highway**	3,628	05:15 – 356		17:15 – 354		41.1%	2015
38.	Wallwork Road	South of Great Northern Highway*	12,052	06:00 – 1,013		17:00 – 1,063		N/A	Mar 2011
39.		South of Great Northern Highway**	16,449	07:30 – 1,151		16:30 – 1,582		15.8	2011
40.		South of Quarry Road**	9,427	06:00 – 731		16:45 – 747		16.9%	2012
41.		South of Pinga Street**	10,574	07:30 – 736		16:30 – 987		11.0%	2016
42.	Wilson Street	South of Cooke Point Road**	11,722	07:30 – 887		17:00 – 1,069		12.3%	2018
43.		West of Short Street**	6,986	05:15 – 631		17:00 – 604		16.6%	2018
44.		East of Short Street**	5,556	11:30 – 442		12:00 – 434		19.7%	2016

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S08 ***	Road Name	Location of Traffic Count	Vehicles Per Day (VPD)	Vehicles per Peak Hour (VPH)				Heavy Vehicle %	Date of Traffic Count
				AM Peak Time	AM Peak VPH	PM Peak Time	PM Peak VPH	<i>If HV count is Not Available, are HV likely to be in higher volumes than generally expected?</i>	
45.		North of Great Northern Highway**	11,605	06:45 – 867		15:45 – 1,059	11.7%	2016	
46.		West of Cooke Point Road**	9,167	07:45 – 673		17:15 – 808	15.2%	2015	
Wedgefield roads									

*Note: These traffic counts were received from the Town of Port Hedland.

**Note: These traffic counts were obtained from the Main Roads WA Traffic Map

*** Note: The number represent the location of the existing traffic counts on drawing S08.

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2.5.2 Crash Data

The following table provides a listing of crash incidents recorded on key road networks within the Town of Port Hedland. This analysis forms a preliminary baseline for the assessment of safety issues.

Period of crash data collection

01/01/2014 - 31/12/2018

Table 2 - Crash Data on Key Road Networks in Port Hedland

Road / Intersection Name	SLK	Functional Classification	Road Hierarchy	Speed Limit	Crash Statistics			
					No of KSI Crashes	No of Medical Attention Crashes	No of PDO Major Crashes	No of PDO Minor Crashes
Great Northern Highway	1602.97 - 1611.27	Inter Capital City Highway / Inter Capital City Highway	Primary Distributor / Primary Distributor	80kph / 80kph	0	1	2	1
Wilson Street (Port Hedland Road)	0.00 - 10.38	Urban Highway / Inter Capital City Highway / Inter Capital City Highway	Primary Distributor / Primary Distributor	60kph - 90kph	4	1	11	3
Great Northern Highway / Powell Road	N/A	Inter Capital City Highway / Inter Capital City Highway / Rural Local Road / Rural Local Road	Primary Distributor / Primary Distributor / Regional Distributor	80kph / 80kph / 80kph	1	0	0	0
Great Northern Highway / Pinga Street	N/A	Inter Capital City Highway / Inter Capital City Highway / Rural Local Road / Rural Local Road / Local Road	Primary Distributor / Primary Distributor / Local Distributor / Local Distributor	80kph / 80kph / 70kph / 70kph	1	0	1	0
Hamilton Road / North Circular Road West	N/A	Rural Local Road / Rural Local Road / Rural Local Road / Local Road	Local Distributor / Local Distributor / Regional Distributor	50kph / 50kph / 80kph / 80kph	0	0	1	4
Hamilton Road / Forrest Circle	N/A	Significant Urban Local Road / Significant Urban Local Road / Rural Local Road	Local Distributor / Local Distributor / Local Distributor	50kph / 50kph / 60kph / 60kph	0	0	3	1

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Road / Intersection Name	SLK	Functional Classification	Road Hierarchy	Speed Limit	Crash Statistics			
					No of KSI Crashes	No of Medical Attention Crashes	No of PDO Major Crashes	No of PDO Minor Crashes
		Rural Local Road	cal Distributor					
Powell Road / Hamilton Road	N/A	Rural Local Road / Rural Local Road	Regional Distributor / Regional Distributor	80kph / 50kph	0	4	4	1
Powell Road / Pinga Street	N/A	Rural Local Road / Rural Local Road	Regional Distributor / Local Distributor	80kph / 70kph	1	0	3	1
Wilson Street (Port Hedland Road) / Gray Street	N/A	Urban Highway / Rural Local Road	Primary Distributor / Access Road	90kph / 50kph or State Limit 50kph or State Limit	1	0	0	0
Wilson Street (Port Hedland Road) / Cooke Point Road	N/A	Urban Highway / Rural Local Road	Primary Distributor / Local Distributor	90kph / 80kph	1	1	1	0
Wilson Street (Port Hedland Road) / McGregor Street	N/A	Urban Highway / Significant Urban Local Road	Primary Distributor / Local Distributor	80kph / 60kph	0	0	3	2
Wilson Street (Port Hedland Road) / Short Street	N/A	Urban Highway / Rural Local Road	Primary Distributor / Local Distributor	70kph / 50kph	0	0	2	0
Wilson Street (Port Hedland)	N/A	Urban Highway / Urban Highway	Primary Distributor / Primary	70kph / 70kph	0	0	2	1

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Road / Intersection Name	SLK	Functional Classification		Road Hierarchy	Speed Limit	Crash Statistics			
						No of KSI Crashes	No of Medical Attention Crashes	No of PDO Major Crashes	No of PDO Minor Crashes
Road) / Hardie Street		Rural	Local	Distributor / Access RoadAccess Road	50kph5 0kph				

The following are the key points from the tabled information above: -

- The number of KSI and PDO crashes in Wilson Street is too high for the number of vehicles utilising this road. Average of 3 serious or major incidents per annum was recorded on this 10km stretch of road between 2014 and 2018.
- The intersection of Powell Road and Hamilton Road has a high number of medical attention and major incidents for an intersection with this volume of traffic.

3. Existing Network

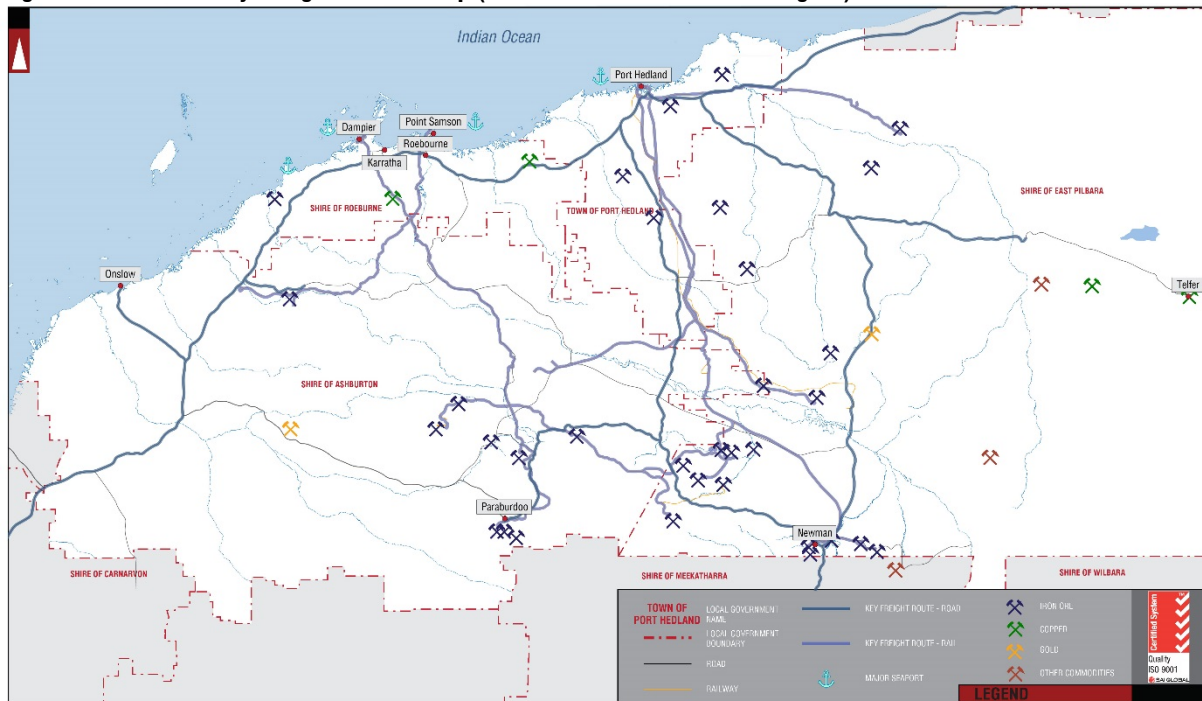
3.1 Existing Heavy Vehicle Network

3.1.1 Existing Restricted Access Vehicle (RAV) Network

This section provides an overview of the key roads forming Restricted Access Vehicle network around and in Port Hedland.

The map below shows the National Key Freight Routes Map as shown on the Australian Government's Department of Infrastructure and Regional Development mapping. It is evident that the Town of Port Hedland is an important freight node on national level. While the roads shown on the map below are mostly State roads, they allow access of heavy vehicles to RAV network on roads controlled by the Local Government.

Figure 4 - National Key Freight Routes Map (Port Hedland and Pilbara Region)

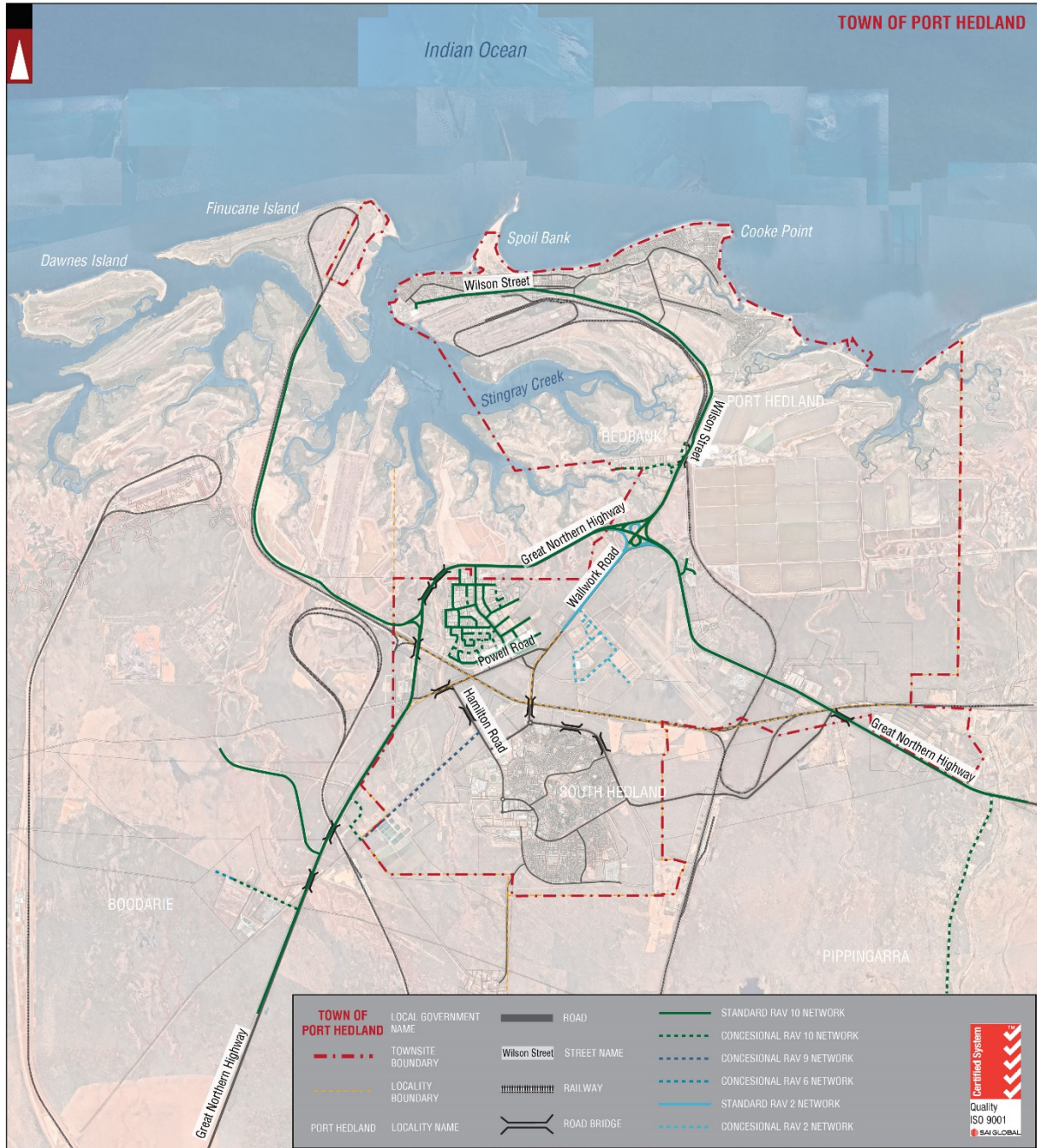


The key State freight routes allowing access of heavy vehicles to the Town of Port Hedland include the following roads:

- Wilson Street
- Great Northern Highway (south of Port Hedland to Newman)
- Great Northern Highway (east of Port Hedland to Broome)
- North West Coast Highway (west to Karratha)
- Marble Bar Road to Ripon Hills Road and Ripon Hills Road (connects Roy Hill to Great Northern Highway east of Port Hedland)
- Marble Bar Road (Ripon Hills Road to Great Northern Highway – connects Newman, Nullagine and Marble Bar to Great Northern Highway)
- Karijini Drive (connects Tom Price to Great Northern Highway)
- Tom Price to Paraburdoo Road (connects Tom Price to Paraburdoo)

Current approved Restricted Access Networks within the townsite are shown on the image below.

Figure 5 - RAV networks within Port Hedland Townsite



A list of roads within the Town of Port Hedland currently approved as RAV roads is in Appendix 2.

3.1.2 Existing Oversize Over Mass (OSOM) network

The Oversize Over Mass (OSOM) network is a freight network designed to accommodate vehicles exceeding standard, approved dimensions. The OSOM network is not the same as the RAV network, as the RAV network deals with standardised vehicular configurations. The key aspect of the OSOM network is that it is designed for carrying and transportation of abnormally sized loads, such as: -

- Oversized machinery being transported between sites
- Oversized machinery parts being transported for servicing and / or replacement
- Transportable housing options
- Various agricultural products etc.

Planning for the OSOM routes across the State is underway currently.

MRWA provides design guidance for OSOM networks where desirable minimum clearances (horizontal and vertical) should be approximately 10m.

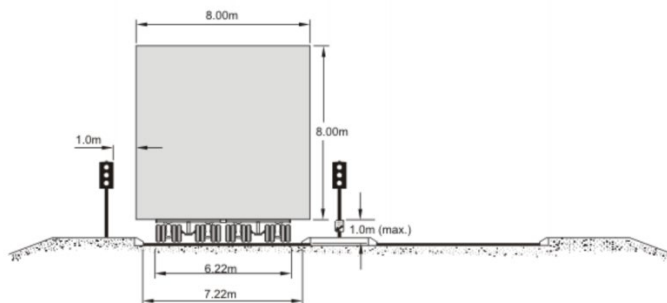


Figure 6 - MRWA requirements for appropriate horizontal and vertical clearance for Oversize Over Mass

Recently built grade separated intersection of Great Northern Highway and Wilson Street does not meet specified vertical clearance criteria for vehicles travelling on Great Northern Highway under the Wilson Street overpass. Based on MRWA structures data base, the maximum vertical clearance this overpass offers is 7.2m. Therefore, Great Northern Highway Bypass around South Hedland and Wedgefield cannot presently be used as an unrestricted OSOM. MRWA confirmed this route is compliant for Over Size Over Mass Vehicles Category 1 requiring 5 x 5 m clearance envelope. For larger loads individual trip permits are issued where the exact route and conditions are determined on a case-by-case basis.

The following bridges are noted on the Main Roads WA website in the Pilbara as being unsuitable for “block trucks” or OSOM vehicles: -

- Bridge 0812 – Marble Bar Road (Fortescue River Crossing Roy Hill)
- Bridge 5320 – Rocklea Road Paraburdo

From the available information, the majority of the Key Freight Routes noted in Section 2.1.1 of this report can be converted into OSOM routes pending investigation of the intersections for required upgrades.

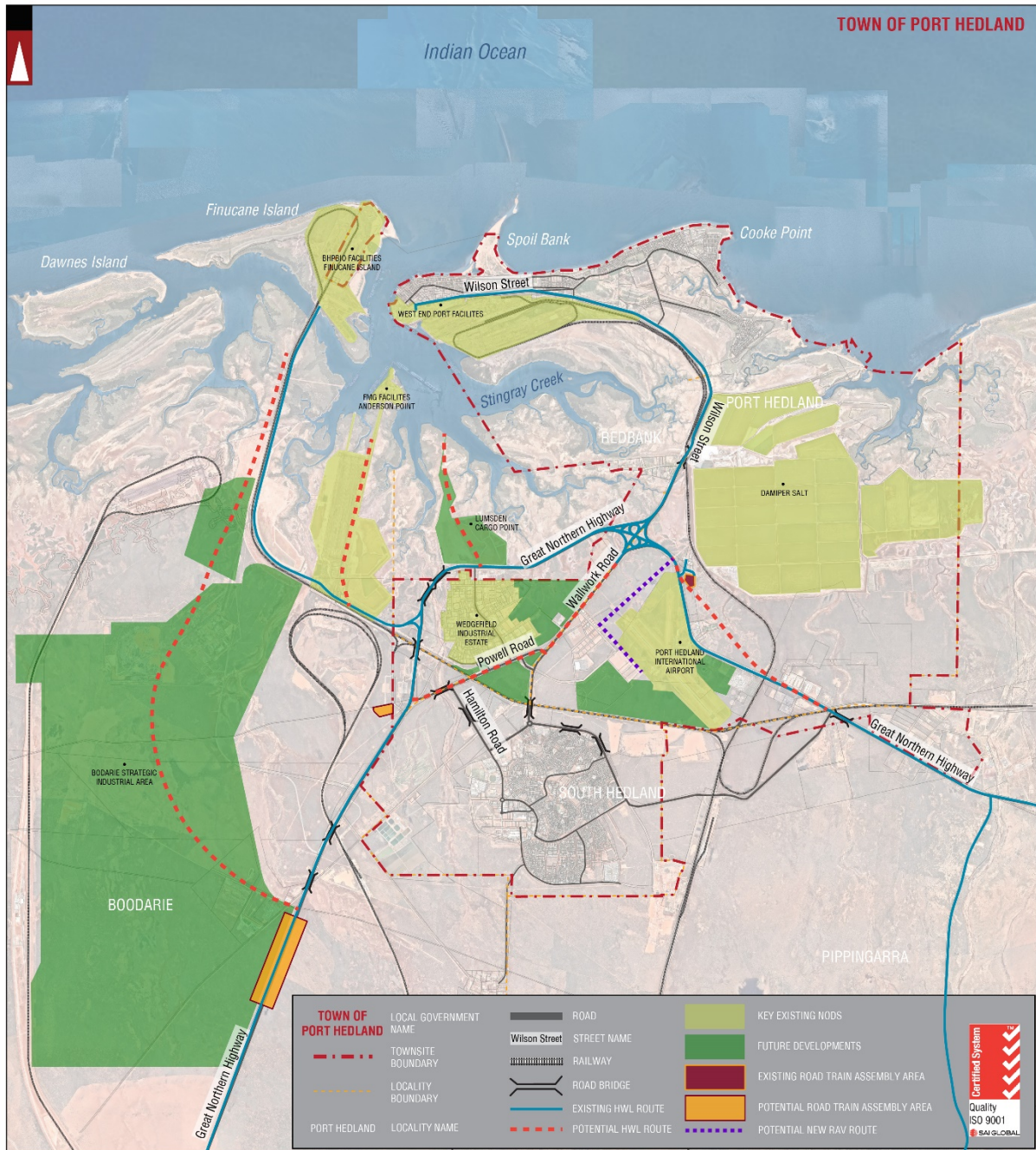
3.2 Key Existing Industrial and Freight Nodes to be Considered

The Town of Port Hedland plays a significant role as a regional freight transport hub. The economy is heavily reliant on mining activities in the Pilbara region with goods transported from mining sites by road or rail to the Port for worldwide shipping. Further to this, Port Hedland airport is the only one in the north-west region accommodating large freight aircrafts, therefore it is pivotal for air freight in the area.

The key existing network nodes to be considered when assessing the need for heavy vehicle access are as follows:

- Port Hedland Port – Town-side Entrance (Wilson Street)
- Wilson Street to Great Northern Highway interchange (noting OSOM issues with Great Northern Highway underpass)
- Port Hedland International Airport (accessed from Great Northern Highway, east of Wilson Street)
- Marble Bar Road and Ripon Road (access to Roy Hill and mining infrastructure east of Port Hedland)
- Great Northern Highway (South Hedland Bypass around the northern and western side of Wedgefield)
- Great Northern Highway (section to Wilson Street between Wedgefield and South Hedland)
- BHPIO port facilities and access – Utah Point Road and Finucane Island Road accesses
- FMG Port access – Anderson Point
- Wedgefield Industrial Estate (Pinga Street Access – Great Northern Highway)
- Port Hedland Road Train Assembly Area (Great Northern Highway, Bell Street east of Port Hedland Town Centre)
- There is a number of sites under various mining licences within the Town of Port Hedland and within surrounding Local Governments requiring access to the Port and to National freight network via local roads
- Pipingarra Road is approved RAV 10 network servicing several mining sites.

Figure 7 - Key existing and anticipated freight nodes



3.3 Current Potential Conflicts Between Transportation Modes

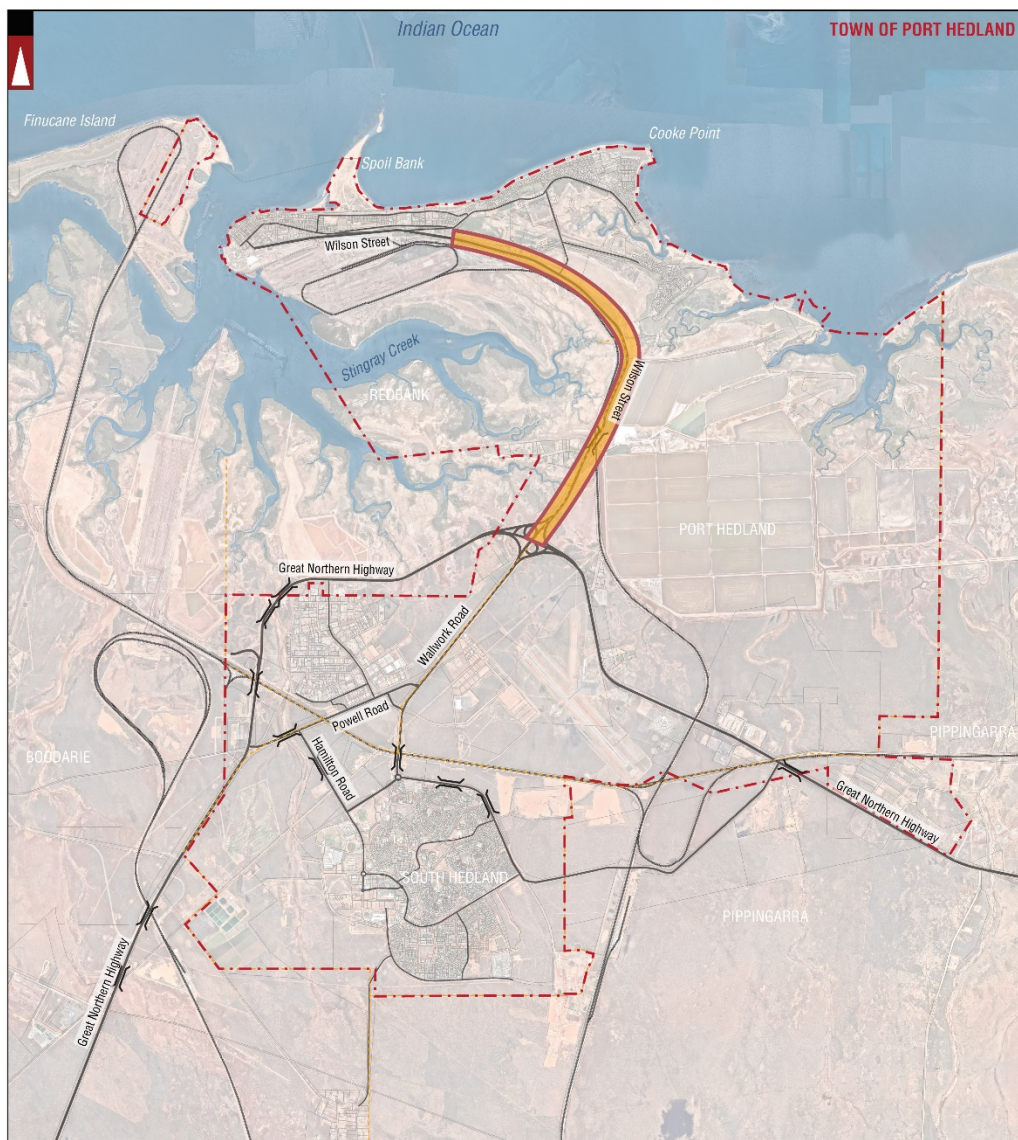
This section of the report focuses on locations where there is a forced “merging” of traffic requirements between heavy vehicles and standard passenger vehicles which could be addressed as part of a Heavy Vehicle Access Strategy: -

- Wilson Street Port Access (West End – Port Hedland Town Centre)
- Powell Road / Pinga Street (Wedgefield Industrial Area)
- Powell Road / Wallwork Road (residential access to South Hedland)

Corridor where the conflict between residential and freight traffic occurs is shown on the figure below.

Main Roads Pilbara Region has developed plans for duplication of Wilson Street inclusive of the Redbank Bridge. This intervention will expand the capacity of Wilson Street and to a degree alleviate existing conflict between commuter traffic and freight traffic. Timeframe for implementation of this project is unknown at present.

Figure 8 - Area of key conflict between residential traffic and freight



3.4 Existing Level Rail Crossings

Numerous government agencies have written about the issues caused by level rail crossings in terms of road safety and crashes as the highest priority, but also in terms of the economic costs of freight traffic delays. Existing level rail crossings are causing considerable time delays due to the length of trains in the Pilbara.

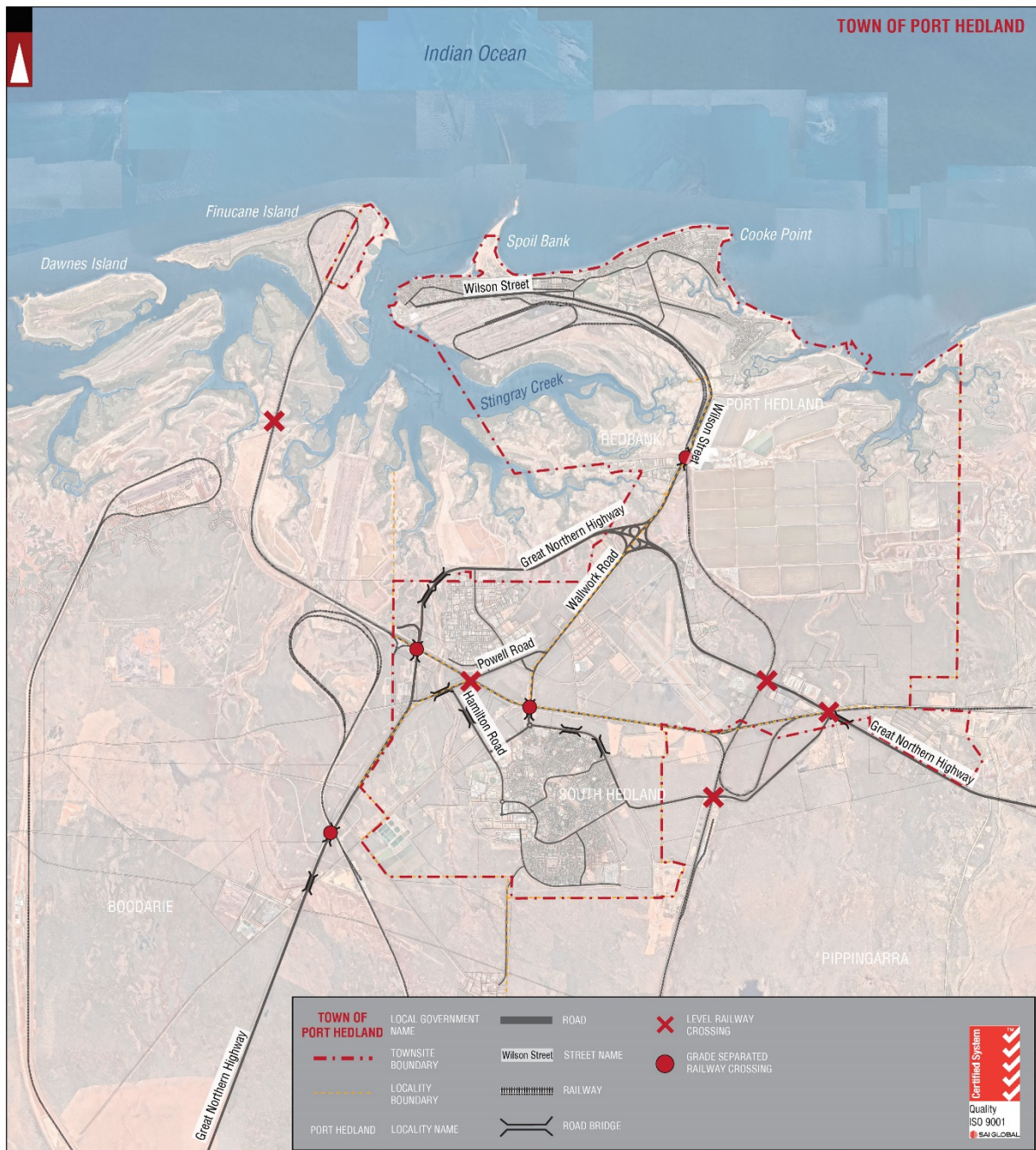
Currently there are four (4) level rail crossings within the Town of Port Hedland townsite:

- Two level crossings on Great Northern Highway (between Port Hedland to Wittenoom Road and Wilson Street intersections)
- Powell Road level crossing (Wedgefield, between Hamilton Road and Dalton Road / Finucane Island Road) *(There is currently an application before the Town to close this road, which if approved would remove the conflict)*
- Buttweid Road between North Circular Road and Great Northern Highway (South Hedland to Pippingarra)

Additionally, several bridges have been constructed in order to separate the rail lines from road traffic. These grade-separated rail crossings include: -

- Redbank Bridge (Wilson Street)
- Great Northern Highway Bridge (south of Quartz Quarry Road)
- Great Northern Highway Bridge (north of Powell Road)
- Wallwork Road Bridge (north of North Circular Road)

Figure 9 - Existing rail crossings (at grade and grade separated) within the townsite area



Options for upgrading level railway crossings to grade separated crossings must be considered from the OSOM perspective, with the safety and financial cost / benefit ratio of the project a key consideration.

Given that OSOM vehicles cannot travel on grades steeper than 8% (with desirable maximum being 5%), the incline of the grade separated crossing must be appropriate. Low grade in turn increases the footprint and land take of the grade separated crossing.

Due to the proximity of intersections and properties, grade crossings on Great Northern Highway and Powell Street do not allow grade separation which would be suitable for heavy vehicles. The impact on properties due to the

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required intersection sizing is significant due to the land-take required for the intersection road geometries, the earthworks batters and drainage storage requirements of such adjustments in vertical alignment. Closure of Powell Street crossing is currently underway.

A quick measurement on Google Maps shows that the existing level railway crossings will not support the minimum horizontal clearance requirements for unrestricted OSOM criteria shown in Section 2.1.2 of this report.

Given that existing grade crossings appear to have appropriate signage and control, they do not pose safety threats and therefore can remain. Crossings are navigable by standard passenger vehicles and standard RAV vehicles. In order for crossings to become navigable by Oversize Over Mass, roadside infrastructure needs to be relocated to allow 10m horizontal clearance. This would require replacement of boom gates.

Consideration also needs to be given to the fact that the Port Hedland to Yarrie rail link is not operational at present. This would allow minor for adjustments to the existing level rail crossing on Great Northern Highway which could be achieved while the rail is not being used at an economic benefit.

3.5 Culverts, Overhead Power Lines and Bridges

The presence of culverts and overhead power lines crossing road reservations can have an impact on the ability to develop a Heavy Vehicle Access strategy, particularly where the access strategy requires use of OSOM vehicles and loads. Utilising Google Walk, we have located the following key heavy haulage routes where existing assets may cause an issue with the potential Heavy Vehicle Strategy: -

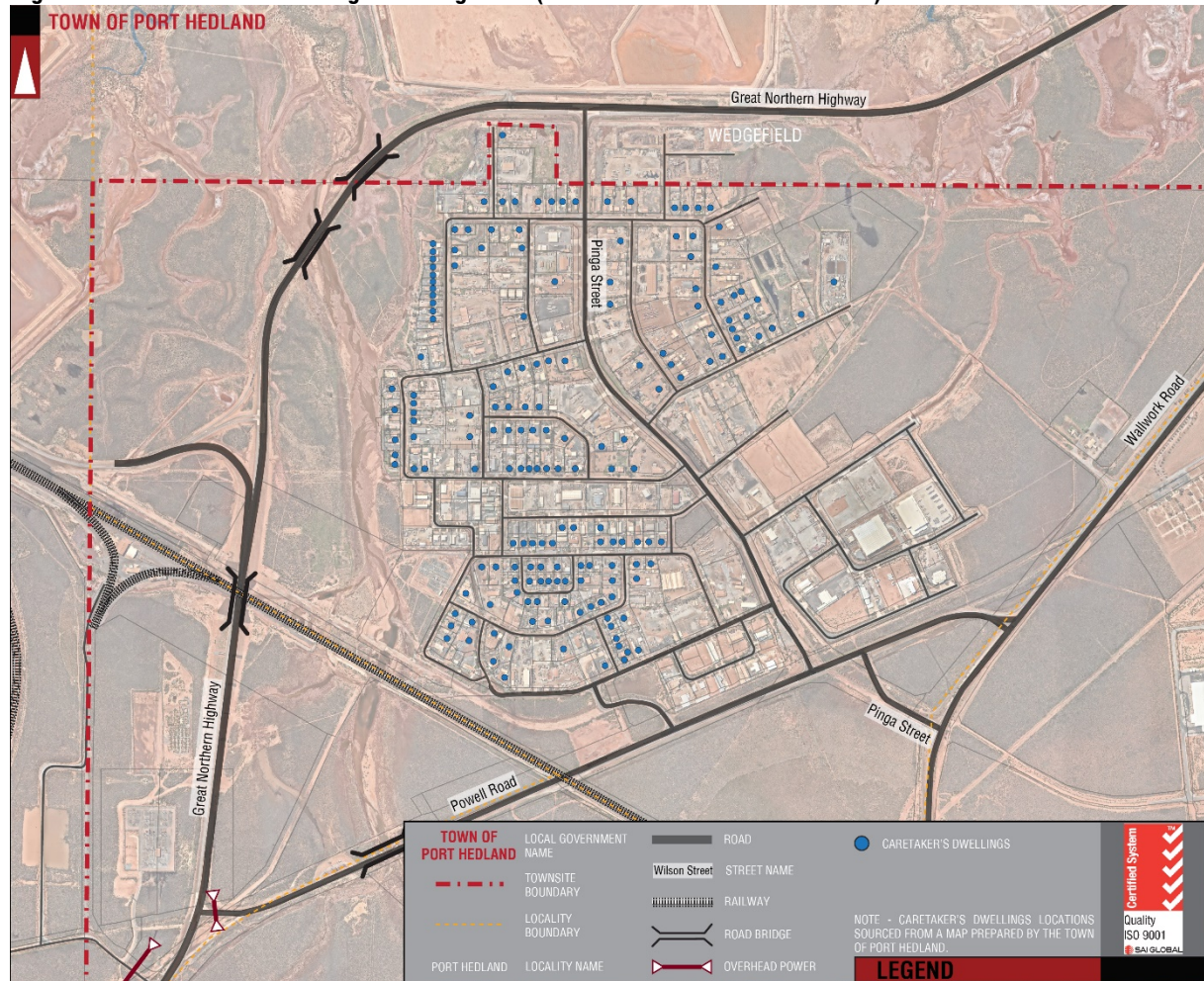
- The BHPIO Port access / egress points at the intersection of Wilson Street – 66kV overhead power
- Wilson Street – Port heavy vehicle access south of McGregor Street – 66kV overhead power
- Powell Street in vicinity of the intersection with Great Northern Highway – 66kV overhead power
- The Wilson Street bridge over the railway line does not meet the clear width requirements of the MRWA OSOM requirements

3.6 Wedgefield – Existing State

Wedgefield (or Wedgefield South) was conceived as an industrial hub predominantly focused on transportation and logistics related activities. Wedgefield Stages 1, 2 and 3 (old part) are considered to be sections generally west of Pinga Street and east of Pinga Street and north of Anthill Street. Over time, residential use was developed on a number of lots in various forms – as caretakers' dwellings, transient or short-term accommodation, as detached dwellings etc. Simultaneously, transport industry has advanced and the demand for larger vehicles is constantly rising.

This inevitably gave rise to conflict between inherently incompatible uses – industrial use and residential use. While the primary function of Wedgefield is an industrial hub, the impact of noise, traffic, odour etc on residential activities cannot be denied.

Figure 10 – Caretaker’s dwellings in Wedgefield (source – Town of Port Hedland)



In this older part of Wedgefield dated network is geometrically substandard although it has historical classification of RAV10. RAV10 vehicles cannot make lane correct movements on most of the intersections and bends in old part of Wedgefield.

Hedland Junction is an industrial estate in Wedgefield located east of Pinga Street and south of Anthill Street. This estate is still undergoing construction works. Road network was appropriately designed for RAV10 vehicles, meeting current standards.

In order to minimise existing land-use conflict further applications for caretaker dwellings in Wedgefield should not be considered. Old part of Wedgefield will be restored to a light industry zone and applications inducing intense industrial and transport activities will be encouraged to settle in new, purpose-built expansion of Wedgefield.

As general industry and transport operators relocate, existing Restricted Access Network should be reviewed and progressively downgraded to ensure land use conflicts stay at its minimum.

4. Future Networks

4.1 Known Committed Projects Requiring Heavy Vehicle Access

4.1.1 Upgrade and redevelopment of Port Hedland airport

Port Hedland Airport master plan predominantly deals with accommodating aspirational growth in passenger travel and attracting major airlines which would further bolster tourism in the Port Hedland and Pilbara region, however the Masterplan reserves significant portions of airport land for business purposes leveraged on expanded air freight function.

Among the desirable land uses and or activities, the following items were mentioned as goals in the redevelopment of the Port Hedland Airport: -

- Bulk freight;
- Service stations;
- Freight storage sheds;
- Laydown yards;
- Vehicle servicing;
- Freight forwarding facilities;
- Ground transport access for freight vehicles;
- Warehousing;
- Distribution facilities;
- Parking for freight vehicles; and
- Any other ancillary freight uses as permissible in the 'Transport Depot' or 'Industry – Transport' uses outlined in the Planning Scheme.

Proximity to Great Northern Highway can support these activities. Potential realignment of Great Northern Highway will allow for better separation of general aviation related traffic and freight and industry related traffic.

Increased air freight traffic will induce additional road freight traffic as the goods need to be distributed further.

4.1.2 Lumsden Point General Cargo Facility and Logistics Hub

Lumsden Point General Cargo Facility will be developed within the port area at Port Hedland to expand export opportunities for general cargo, lithium and agriculture related products. The logistics hub will accompany new berths, referred to as Wedgefield North. This complex enjoys direct access from Great Northern Highway and can enable easy access to new berth locations. There are indications this location is likely to feature some public berths, therefore the mix of standard passenger vehicles and freight vehicles again becomes a major planning consideration.

As a minimum, a direct route from Great Northern Highway to the port area should be designed for OSOM vehicles.

4.1.3 Boodarie Strategic Industrial Area

The Boodarie Strategic Industrial Area is located approximately 10km south west of Port Hedland. This area provides for the nationally significant, long term strategic industrial development of the area.

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Focus in this industrial area is on heavy industries and appropriate buffer uses. The Boodarie Strategic Industrial Area is positioned to accommodate strategic downstream resource processing industries related to the iron ore and petro-gas resources of the Pilbara region.

The Boodarie Strategic Industrial Area will leverage on its proximity to the Port and expanded port facilities to create a *“world-class heavy industrial estate which specialises in multi-product, downstream resource processing”*¹. Additional direct access points from Great Northern Highway will be sought, with key corridors designed to accommodate Oversize Over Mass.

The first stage of Boodarie Strategic Industrial Area will include upgrade of the Boodarie Station Access Road / Great Northern Highway intersection. The intersection will subsequently cater for RAV10 and OSOM vehicles.

4.1.4 Pippingarra Holding Yards and Washdown Facilities

The Town of Port Hedland commissioned studies in 2017 to identify the best possible location for cattle holding yards and truck wash down facilities. The studies found that the most appropriate location would be Pippingarra Station as it satisfies most of the requirements listed by the experts.

Cattle would be transported from various stations to Pippingarra holding yards, and subsequently exported via the port. A-triple road trains are the largest vehicles which will be used to transport livestock, therefore access to RAV 10 network was one of the key criteria for assessors.

Access to the port will depend on the berth used to transport livestock onwards. At present, livestock is exported from Berths 1, 2 and 3 which are accessed via Wilson Street. Lumsden Cargo Point intends to allow shipment of agricultural products and livestock among other products. This future development will be accessible directly from Great Northern Highway via the newly proposed road network.

4.1.5 Kingsford Business Park

Kingsford Business Park will provide for a variety of uses and form an important part of Port Hedland’s continued growth into the future. It will provide a range of lot types and sizes and thereby encourage a diverse mix of light and service industrial, warehousing and bulky goods commercial business opportunities. In addition, Kingsford Business Park will include sites for Transient Workforce Accommodation to assist in accommodating the additional people required to temporarily reside in Porth Hedland.

It is not expected that Kingsford Business Park will require reclassification of Restricted Access Network levels on surrounding road network. Once Great Northern Highway is realigned and new business precinct is established in vicinity of the airport, there may be an opportunity to provide additional RAV connection from current alignment of Great Northern Highway to Kingsford Smith Business Park along airport land.

4.1.6 Wedgefield Estate - Expansion

Wedgefield Estate was envisaged as a light industry hub predominantly facilitating logistics. In planning this estate had a blanket application of RAV 10 networks and was intended to facilitate movement of large vehicles such as A-triple road trains (up to 53.5 metres long). Upon implementation of early phases of the estate, it became evident that such a blanket approach eliminates road hierarchy. Furthermore, geometric configuration of most of the

¹ Boodarie Strategic Industrial Area Strategic Plan, Urbis 2017, page 5

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intersections and bends and does not meet current standard allowing two RAV 10 vehicles to bypass each other. This is a mandatory requirement on all unrestricted access networks.

An additional access location from Great Northern Highway to the proposed Wedgefield expansion area (east of Pinga Street) has already been constructed however currently it provides no further connection to Wedgefield.

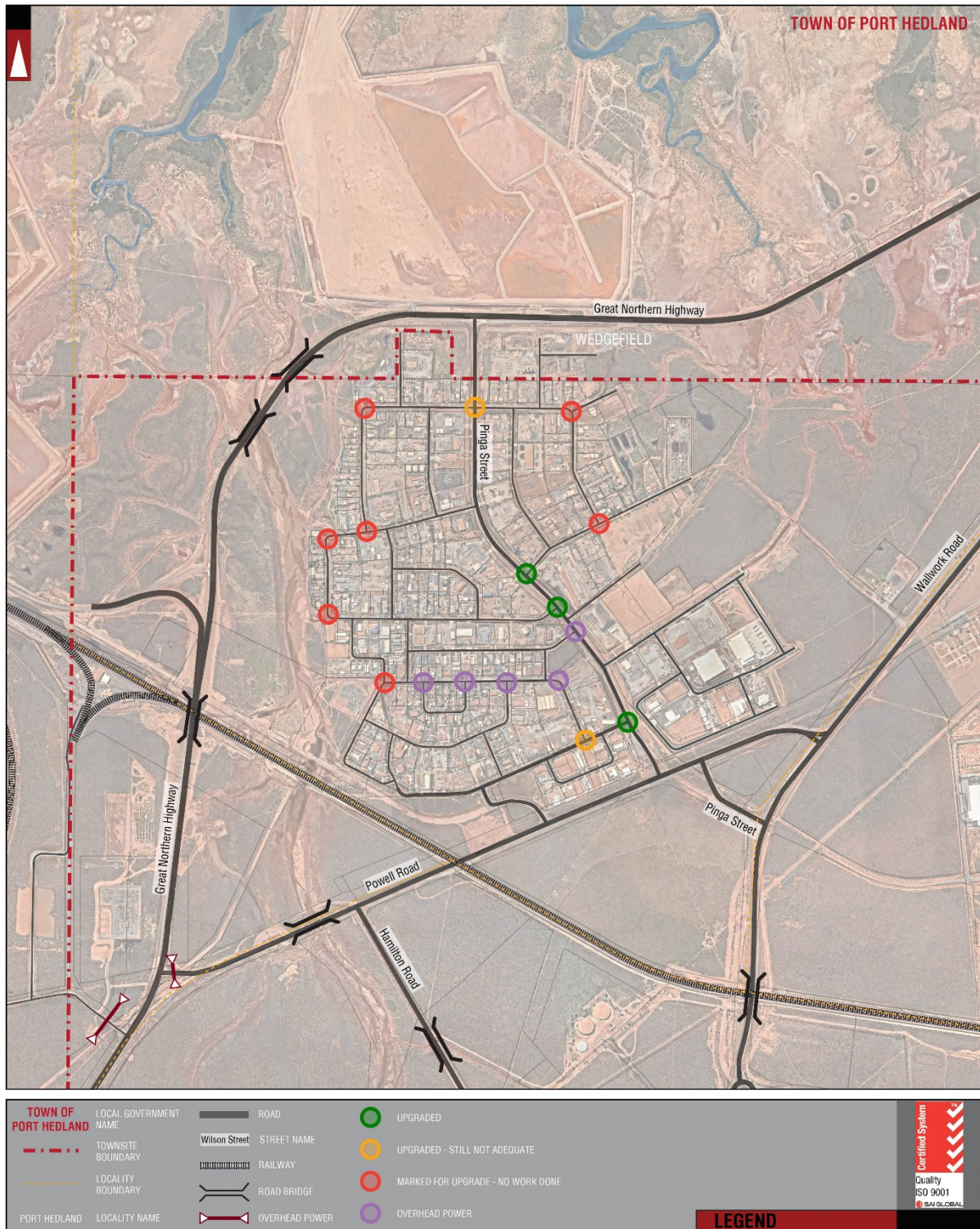
Previous studies for older part of Wedgefield prepared by Hyder and Shawmac in 2015 proposed RAV 10 compliant loops and listed the intersection improvements required to achieve design response meeting current standards. The Figure 11 shows a summary of the navigability for RAV10 and status of intersections and bends recommended for upgrade in 2015.

Most recently developed section of Wedgefield, Hedland Junction estate, is nearly complete and at this stage all intersections are facilitating RAV 10 manoeuvres.

Further expansion of Wedgefield South to the east indicated that another access point to Great Northern Highway will be sought. This may allow for a new main distributor in the precinct which will enable traffic on Pinga Street to be reduced and therefore impacts on the caretaker's dwellings minimised. In order to create appropriate connections, Moorambine Street and Schillaman Street must be upgraded to appropriate standard.

Any connection points allowing RAV 10 vehicles on Wallwork Road should be discouraged as this will further exacerbate existing conflicts between freight traffic and residential traffic.

Figure 11 - Summary of the proposed and implemented intersection upgrades in Wedgefield



4.1.7 Mining Tenements

There are several applications for various mining leases in the Town of Port Hedland and surrounding Local Governments (City of Karratha, Shire of Ashburton and Shire of East Pilbara) which will require access to Port facilities. This will inadvertently create additional heavy vehicle traffic on some of the local roads in the Town of Port Hedland. Some of these roads are already a part of the RAV network, while others will require reclassification or upgrade.

The Town of Port Hedland should negotiate road maintenance agreements as per the Maintenance Cost Contribution Policy through the mining tenement process.

4.2 Key Freight Network Links Required

The Town of Port Hedland area has an extensive network of freight routes, some of which are of national significance. Any expansion of the network should be built upon the existing assets.

Key regional freight routes include: -

- Great Northern Highway connecting various townsites in Pilbara and other regions and allowing primary access to Port Hedland townsite;
- Marble Bar Road allowing for regional connectivity;
- Wilson Street, allowing access to the Port area;
- Pippingarra Road, allowing access to Great Northern Highway;

In this classification all other roads belonging to RAV networks can be considered secondary (Pinga Street, Utah Road (private road)) and tertiary (all other local access RAV routes).

4.2.1 Expansion of the RAV Network

In general, all existing key freight roads form a network with Great Northern Highway acting as a “spine”, with no other direct connections. All future proposed routes will connect to Great Northern Highway and perform a role of local / district distributor allowing heavy vehicle access to a designated commercial precinct.

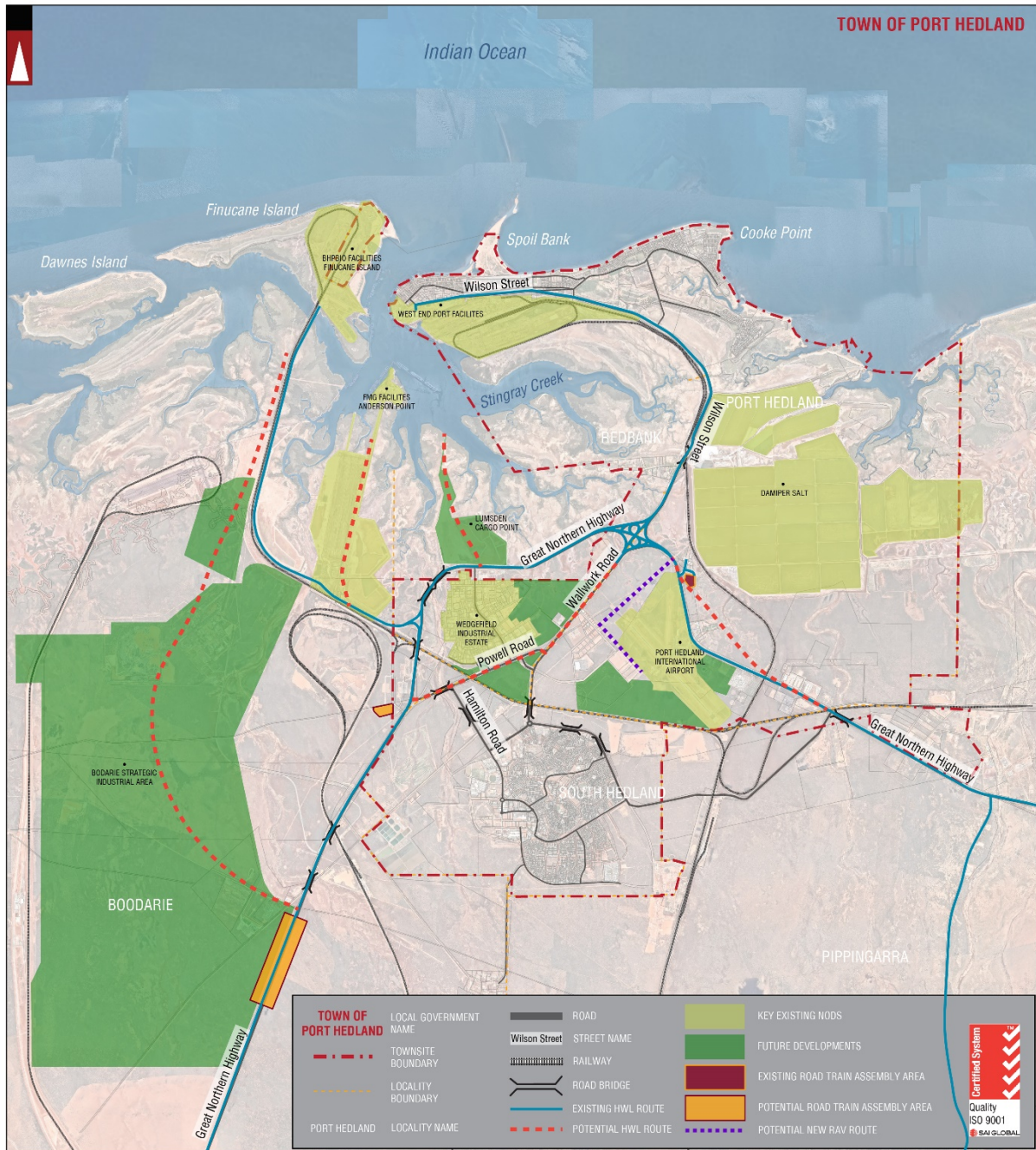
As seen from the Figure below, indicative key proposed freight routes include: -

- Central access to Boodarie Strategic Industrial Area;
- Central access to Lumsden Cargo Point / North Wedgefield;
- Realignment of Great Northern Highway near PHIA;
- Connection between current alignment of Great Northern Highway and Kingsford Smith running along north-eastern boundary of Airport land;
- Duplication of Wilson Street and Redbank Bridge.

These routes should be designed to carry OSOM and enable access to other local RAV Roads.

The scheme below shows general desire lines and directions of key routes. Routes shown are indicative only and will be adjusted to suit planning requirements at the time of application and engineering requirements.

Figure 12 – Key existing and key (indicative) proposed freight routes



4.2.2 Enhancement of the Existing Network

Existing roads and infrastructure elements requiring upgrade to continue functioning as designated include: -

- Boodarie Station Access and Boodarie Drive – Expansion of the industrial area will warrant an upgrade to this road and intersections with Great Northern Highway to allow appropriate levels of access. The carriageway must be upgraded to appropriate RAV standards stipulated in Appendix 3.
- Dualling Wilson Street carriageway – MRWA already prepared concept designs for dualling carriageway on Wilson Street, north from the interchange with Great Northern Highway. This upgrade will include expansion of the Redbank Bridge.
- Quartz Quarry Road – Existing carriageway and intersection with Great Northern Highway does not correspond with requirements for designated RAV 10 network.
- Shoata Road – Mostly unsealed road which is classified as RAV 9 network has direct connectivity to Quartz Quarry Road (RAV 10). Confirmation of traffic counts is required to determine whether an asphalt seal, (or other approved surfacing measure) is mandatory (>150 vpd).
- Pippingarra Road – Mostly unsealed road classified as RAV 10. Similarly, to Shoata Road, confirmation of traffic counts is required to confirm if sealing is required, however given this road services more than one mine site (construction material mining) it can be assumed that some form of wearing course to protect the base course is necessary. Any further intensification of the activity in the area will require significant upgrade and contribution to maintenance costs.
- Redbank Road – Sealed road classified as RAV 10 will require upgrade of carriageway if the intensification of commercial activities is to continue.
- It was noted that there are several construction material mines in and around the basin of the Turner River, however none of the existing roads connecting the basin to the Great Northern Highway are classified as RAV network. Therefore, consideration should be given to whether these roads require reclassification.
- Airport Access Road – Once Great Northern Highway is realigned; current alignment will remain to service industrial zone in vicinity of the airport. Given this section is already constructed to a RAV 10 standard, the classification should remain provided all new intersections are constructed to the same standard.
- Wedgfield - Moorambine Street, Schillaman Street and Hematite Drive east of Pinga Street should be considered as connections between existing sections of Wedgfield and newly proposed. Moorambine Street and Schillaman Street will require upgrades to the carriageway to meet RAV 10 standards.
- Upgrade of the Pippingarra Road / Great Northern Highway intersection.
- Redbank Road / Wilson Street intersection will need to be upgraded to meet RAV 10 requirements if this classification is to remain.

Currently known privately led proposals:

- Buttweld Road grade separation – Buttweld Road crosses one of BHP owned rail lines. Given this is one of three roads providing South Hedland with connection to wider road network, grade separation will improve safety on Buttweld Road.
- Powell Road crossing closure – Given the proximity of Hamilton Road / Powell Road and Pinga Street / Powell Road, Powell Road crossing cannot be grade separated as it would affect traffic distribution severely in the area. Therefore a portion of Powell Road will be closed to remove at grade rail crossing. This will see remnant Hamilton Road acting as dedicated South Hedland connection to Great Northern Highway

4.2.3 Restricted Access Networks (RAV)

At present Main Roads WA distinguishes 10 standard Restricted Access Network Levels and additional concessional networks.

Figure 13 - MRWA classification of RAV networks and approved typical vehicles associated with each network



Currently the main connector roads leading to the Airport, the future Lumsden Point General Cargo Facility and the Logistics Hub have RAV 10 classifications. While there is a general tendency to apply blanket RAV 10 classification approaches to all new networks, we believe the planning for future RAV network classifications requires greater scrutiny.

Intersections accommodating legal RAV 10 manoeuvring are approximately three (3) times the size of the standard intersection, therefore the land requirement is significant. Given that the Town of Port Hedland has a significant number of heritage sites and native title sites, land acquisition can be complicated and costly. Provision of lower order RAV networks combined with Road Train Assembly Areas should be considered.

Detailed geometric requirements for compliant RAV networks on rural and urban roads is provided in Appendix 3 of this report.

4.2.4 Oversize Over Mass (OSOM) Routes

At present Main Roads WA do not have a designated Oversize Over Mass route map as the state-wide OSOM strategy is being developed.

OSOM routes allow for travel of Oversize Overmass Vehicles (OOV) therefore they require higher vertical and horizontal clearances than standard RAV routes.

Unrestricted OSOM routes should allow for minimum 10 metre horizontal clearance (inclusive of roadside elements) and 10 metre vertical clearances. Given the nature of industry in Pilbara, Main Roads Pilbara Region require 15 x 15 metre clearances for OSOM routes to safely accommodate oversized vehicles. These requirements are significantly higher than the RAV design requirements, therefore the following local roads should be designed as OSOM routes:

-

- Central road connecting access to Boodarie Strategic Industrial Area from Great Northern Highway to future port facilities; and
- Central road connecting access to Lumsden Cargo Point to future port facilities. Given this section of the port will contain some public berths, this type of access will prevent requirement for OSOM to be transported via Wilson Street to access the Port, however the mix of standard vehicular traffic and heavy vehicles should be considered in the design.

Unrestricted OSOM access should not be contemplated on Wilson Street, even though there may be arguments for the provision of more convenient Port access. Wilson Street is an important link between Port Hedland and South Hedland carrying significant volume of passenger traffic on daily basis, therefore introduction of OSOM routes would pose significant risk on a road network already exhibiting safety issues in terms of elevated crash rates.

Should OSOM access be required on any other local roads, applications for each should be assessed as a temporary access permit or a single trip permit. These applications for temporary OSOM access may require pilot vehicles and/or police escorts, however this will be determined on a case by case basis by Main Roads WA and is not a requirement for this Strategy to stipulate methodologies on the approvals processes.

4.2.5 Road Train Assembly Areas (RTAA) Requirements

At present there is only one official Road Train Assembly Area (RTAA) in the vicinity of Port Hedland. It is located on Bell Street, south east of Port Hedland and east of Wedgefield. Review of aerial imagery shows that there are other locations in Wedgefield which appear to function as informal road train assembly areas. The location of the

official RTAA is shown on the following Figure and is denoted as a blue box in Port Hedland. The Figure also includes insets of RTAA facilities in the Perth Metropolitan Region.

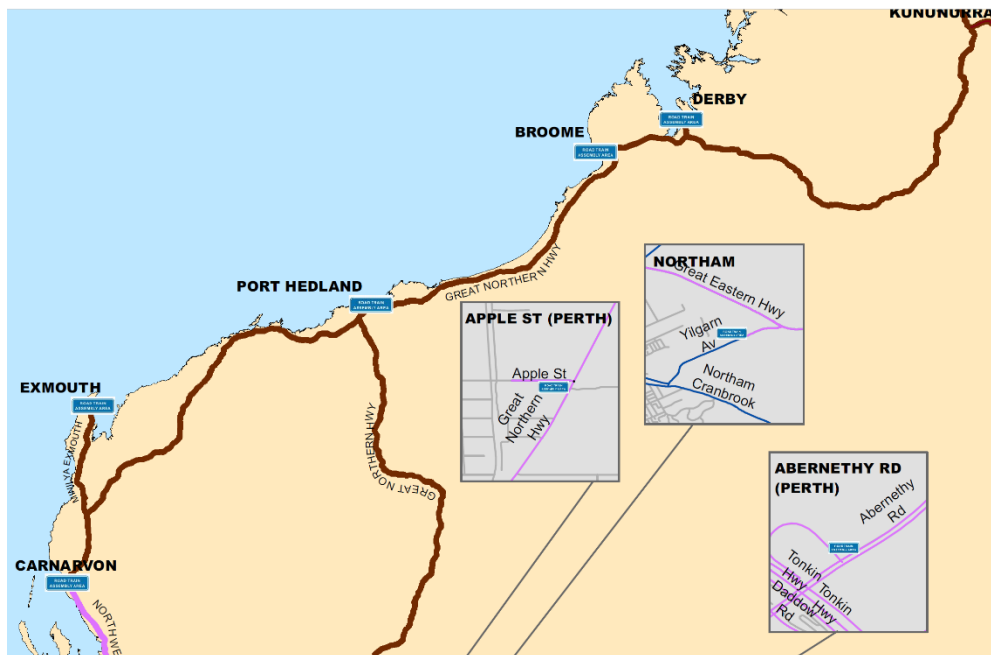
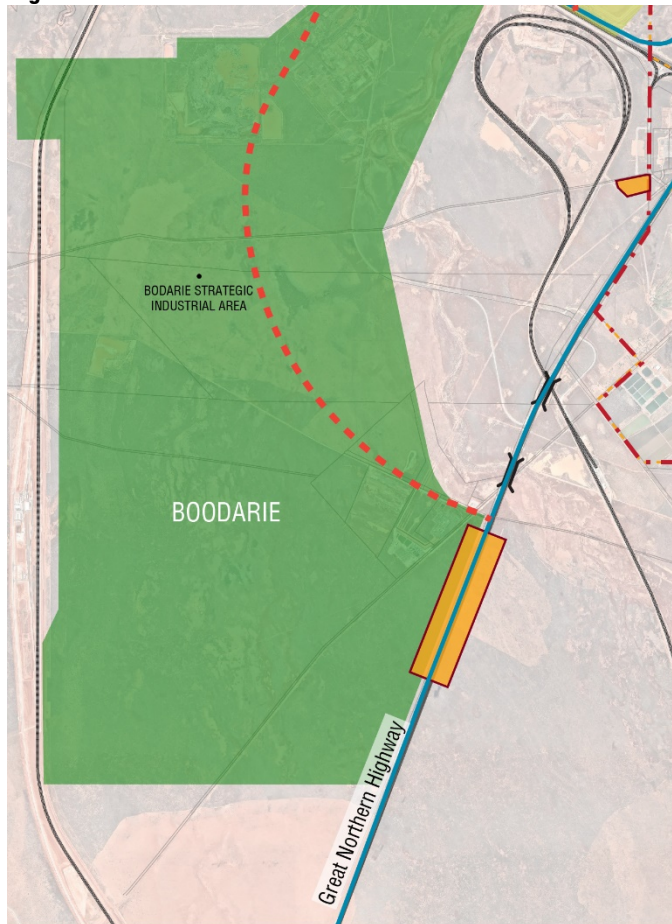


Figure 14 – Location of RTAAs in the region

Based on Main Roads WA traffic volume maps, Great Northern Highway carries approximately 1,172 vehicles on the eastern approach to the Town of Port Hedland, while there are twice as many vehicles on the western approach. A rise in vehicular volume numbers is noticeable on Great Northern Highway in the vicinity of Bell Street (almost 5,000 vpd).

This implies that many vehicles approaching the Town from the west travel past the existing industrial nodes to access the current RTAA, subsequently traveling back to their desired location. This logistical exercise is incurring unnecessary expense in unwarranted additional kilometers travelled (vehicles need to drive away from their destination and then drive back), pavement wear, CO₂ production and risk associated with keeping heavy vehicles on road for longer than necessary. The Figure on the following page shows an option for the location of a new RTAA.

Figure 15 - Potential location for RTAA



The introduction of an additional RTAA area on the western approach to the Town is a logical choice. Given that the current RTAA has an area of approximately 45,780m², an area of similar size should be dedicated in planning for the new RTAA in approach to Port Hedland townsite.

Providing a second RTAA at the western approach to the Town of Port Hedland with RTAAs operating in parallel. Use of the currently existing RTAA can then be monitored over time and if required, the area can be reduced and repurposed to suit the usage patterns.

Ideally, the RTAA should be located prior to the entrance point to the Boodarie Strategic Industrial area as the location would service all industrial areas. In this area there are already two road train rest areas, which provides an indication that this location offers convenience. The RTAA can be strategically positioned and combined with these truck rest areas. This co-location would allow for additional uses to be developed (potentially a petrol station or other commercial activity). Given that obligatory use of Electronic Work Diaries (EWD) is imminent, the new RTAA area can be designed and built as a mandatory check point.

While the construction cost of a new RTAA area could be in vicinity of \$5M (for similar size and specification to the current RTAA facility), this facility can be constructed and implemented incrementally to reach desired capacity.

Further to this, the RTAA area may be considered within the Lumsden Cargo Point / North Wedgefield locality. This locality is above the 1 in 100-year flood level and has direct access to Great Northern Highway.

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Main Roads WA had developed plans and has the intention to construct an additional RTAA near Whim Creek Road. During the consultation process Main Roads Pilbara indicated there might be an opportunity in near future to provide another Road Train Assembly Area in Wedgefield, however this potential project is still in preliminary discussions phase.

An RTAA in Wedgefield would alleviate many of the current issues with substandard network and is considered a prudent and cost-effective solution.

4.3 Opportunities and Constraints for Providing Network

Figure 16 - Opportunities and constraints map



In considering expansions of the freight network, existing natural and built form constraints were considered.

4.3.1 Opportunities

A section of the Great Northern Highway was upgraded by Main Roads WA west of the townsite, including the intersection between Wilson Street and Great Northern Highway which was grade separated as part of these works. This infrastructure upgrade is an example of the geometric standard for freight networks catering for Oversize Over Mass. The carriageway pavement width exceeds 10 metres with additional clearances provided on bridges and overpasses. Vertical obstructions in the form of high voltage power lines were removed. Grade separation of the intersection provided separation of passing heavy vehicle traffic on Great Northern Highway and daily commuters.

The high standard of this infrastructure allows for RAV network expansion for future industrial precincts, including (Boodarie and Lumsden Cargo Point) with excellent connectivity to the regional network and access to areas of the Port that are yet to be developed.

The pending realignment of Great Northern Highway east of the townsite will include appropriate grade separation of the State Route with freight rail. The current alignment of Great Northern Highway can be downgraded to a local distributor or access road, minimising delays caused by existing at-grade rail crossings. Given that current alignment is constructed to a such high standard it can retain current RAV level to enable access to the Highway Precinct at Port Hedland International Airport.

The majority of the land east of the townsite is over the 1 in 100-year flood plain allowing for expansion of the RAV road network should it be required.

4.3.2 Constraints

Key existing physical constraints include remnant overhead high voltage power on Wilson Street, Powell Road and other roads in Wedgefield, existing rail crossings and some of the existing bridge structures which do not have sufficient horizontal and/or vertical clearance to accommodate Oversize Over Mass to Main Roads WA standards. Upgrading these elements will incur significant cost and detailed financial modelling is required to determine its feasibility. However, these should also represent lessons learned in planning for new future industrial areas.

Lack of overtaking opportunities on Great North Highway and Wilson Street can cause significant driver frustration resulting in undesirable and unsafe behaviour. A simple consideration to alleviate these issues is to consider the provision of passing lanes in locations with clear sight distances in accordance with the relevant Austroads Guidelines and Main Roads WA supplements to those guidelines.

Proximity of residential areas is another significant constraint for any network expansion or enhancement in the West End of Port Hedland and Wedgefield. Given that Wilson Street and Wallwork Road act as key links for daily commute, intensification of heavy vehicle traffic on these routes are not desirable.

South Hedland, as the largest residential area requires appropriate buffers from intensive industrial uses. Connections for passenger traffic from South Hedland include Wallwork Road, Hamilton Road and to a lesser extent Buttweid Road. Intensification of heavy vehicle traffic on these roads should be discouraged.

4.4 Key Critical Safety and Operational Issues to be Addressed

4.4.1 Heavy Vehicles and Passenger Vehicles and Other Residential Traffic

Wilson Street and a section of Great Northern Highway are the main linkages between Port Hedland and South Hedland. This is the travel path of many residents and workers. At present, passenger vehicles travel along this significant freight link where the first opportunity for separating freight and non-freight is at the intersection with McGregor Street, as it is deemed that not many drivers looking to access the town centre will take the option to travel along Cooke Point Road.

Given the spatial constraints it is not feasible to consider provision of separate carriageways for freight traffic. This is a situation which is likely to continue in the short to medium future therefore it must be carefully managed. The lesson to be learnt for future planning is to ensure that this combination of important freight and residential linkage is not repeated.

Implementation of overtaking opportunities on Wilson Street is likely to reduce the frustration of drivers and contribute to overall safety. This corridor is generally clear of obstructions and has sections that allow appropriate sight distances as explained in the previous section.

Main Roads have prepared plans for the duplication of Wilson Street which would improve safety and efficiency however there are no timeframes nor budgets associated with this project.

4.4.2 Heavy Vehicles and Freight Rail

At present there are two at-grade railway crossing points on Great Northern Highway within the townsite of Port Hedland, both located east of Port Hedland airport approximately 1.3km apart. Desktop visual inspections show that both crossings have active control implemented inclusive of the boom barriers with the most western crossing featuring ramble strips on the approaches. Both crossings feature advanced warning signs alerting drivers to the presence of crossing points.

Appropriate warning signage and line marking should be implemented on side roads as well, particularly Buttweid Road given the short stacking distance on the approach.

Ideally, given the extraordinary length of trains in Pilbara all rail crossings should eventually be grade separated. While appropriate sight distances for road freight vehicles can usually be accommodated for the at-grade crossings, the delay in stopping vehicles, waiting for trains to pass, starting the vehicle and achieving cruise speeds can represent delays on the network of up to 15 to 20 minutes for each vehicle stopping at the crossing. This is a significant cost imposition to the national economy.

Given the grade of any overpass must allow for the safe travel of heavy freight vehicles, the footprint of any overpass, (inclusive of the required batters, allowance for stormwater drainage detention within the road reservation and other supporting structures) is likely to affect other existing intersections and access to properties. The proposed indicative realignment of Great Northern Highway is likely to resolve this issue once it is implemented, as freight vehicles will only have to cross an at-grade rail crossing in one location. This crossing can be designed and built as grade separated as a stage of works on the new alignment.

Main Roads Pilbara are working with the Town of Port Hedland to grade separate Buttweid Road crossing and close Powell Road crossing. Grade separation of Great Northern Highway and BHPIO rail near the airport is planned as a part of the Great Northern Highway realignment stage two (airport deviation). Anticipated timeframe for completion is next 12-24months.

4.5 Priority Construction Projects

Below is the list of committed and suggested network improvements. Notwithstanding, there will be additional private developments, the list below focuses on enabling projects.

Table 3 - Priority Construction Projects

Project	Importance / Impact	Value	Responsibility / Driver	Notes / Status
Sealing Pippingarra Road	High	\$5M - \$10M	ToPH / MRWA	Pippingarra Road is over 60km long. Focusing on key areas will enhance safety and operability of the road. Upgrade of intersection with Great Northern Highway is underway.
Upgrade of Great Northern Highway / Boodarie Station Access Road intersection	Medium	\$0.5M-\$1M	ToPH / MRWA / Development WA	This intersection will enable functioning of the remainder of industrial estate. The intersection needs to be upgraded to cater for movement of RAV 10 vehicles and OSOM vehicles.
Upgrade of Redbank Road / Wilson Street intersection and sections of Redbank Road or downgrade of RAV Status	High	\$1M - \$5M	ToPH / MRWA	This intersection and section of Redbank Road are classified as RAV10, although road geometry does not meet criteria. If there is a genuine requirement for RAV 10 network, upgrades are required (may require relocation of overhead power). However, if there is no genuine requirement for RAV 10 access, the road should be downgraded.
Powell Road crossing closure	Medium	\$1M - \$5M	MRWA / ToPH	This is a privately initiated proposal supported by MRWA and ToPH. Crossing should be closed within next 12 months.
Buttwell Road grade separation	Medium	\$10M - \$50M	MRWA / ToPH	This is a privately initiated proposal supported by MRWA and ToPH. Crossing should be grade separated within next 12-24 months.
Great Northern Highway Realignment	High	\$50M+	MRWA / ToPH	Great Norther Highway (GNH) realignment Phase 2 will include construction of two grade separated crossings. Current alignment of GNH will be retained and used as access road to airport business precinct.
Wilson Street Duplication	High	\$50M+	MRWA / ToPH	MRWA has prepared plans for duplication of Wilson Street inclusive of Redbank Bridge. This intervention would help reduce conflicts between

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				commuters' traffic and freight traffic. At the moment there are no budgets or timeframes associated with this project.
Whim Creek Road Train Assembly Area	Medium to High	\$1M - \$5M	MRWA	MRWA has already prepared plans for this facility and secured the budgets. It is expected that the facility will be operational by March 2021.
Wedgefield – connecting the old and the new Wedgefield	Medium to High	\$5 - \$10M	ToPH Development WA	Moorambine Street, Schillaman Street and Hematite Drive east of Pinga Street should be considered as connections between existing sections of Wedgefield and newly proposed. Moorambine Street and Schillaman Street will require upgrades to the carriageway to meet RAV 10 standards

5. Framework for Design, Approvals and Implementation

5.1 Relevant Design Standards to be Observed

The standards described below are to be read in conjunction with the RAV application checklist provided in Appendix 3.

5.1.1 Main Roads WA Classification of Standard RAV Vehicles

Main Roads WA - Standard Restricted Access Vehicle (RAV) Route Assessment Guidelines outline the steps for assessing the suitability of routes proposed for the operation of “standard” Restricted Access Vehicles (RAVs).

Standard width of the RAV vehicle will not exceed 2.5m while standard height will not exceed 4.6m.

On 25 September 2019 Austroads announced results of the research concerning expansion of allowed RAV vehicle width from 2.5m to 2.55m. The report also indicated that expansion to 2.6m is possible in the future. Main Roads WA have not commented on this as at the time of writing of the report.

Standard RAVs are those vehicle combinations specified as Category 1 to 10 vehicle combinations under the Prime Mover, Trailer Combinations and Truck, Trailer Combinations Notice.

The standard RAV Categories have been grouped into four (4) assessment levels, as follows: -

- Level 1 - RAVs Categories 2-4 (e.g. pocket road train, B-Double, and other RAVs with a maximum length of either 25.0 m or 27.5 m);
- Level 2 - RAVs Categories 5-6 (e.g. RAVs with a maximum length of 36.5 m and a maximum mass of 87.5T);
- Level 3 - RAVs Categories 7-8 (e.g. RAVs with a maximum length of 36.5 m and a maximum mass of 107.5T); and
- Level 4 - RAVs Categories 9-10 (e.g. RAVs with a maximum length of 53.5 m).

Roads being assessed for a Tri-drive Restricted Access Vehicle (RAV) Network are required to meet the requirements under the Standard Restricted Access Vehicle (RAV) Route Assessment Guidelines, with the exception of the structures assessments, gradient assessments and swept path assessments, which must be assessed in accordance with these Tri-drive Route Assessment Guidelines. Generally, if a road meets the requirements for a Tri-drive RAV Network, it will meet the requirements for a Standard RAV Network (i.e. RAV Networks 1 to 10).

The Tri – drive RAV Categories have been grouped as follows: -

- Level 1 – Tri Dive RAV Category 1 (e.g. a vehicle that would otherwise be a general access vehicle if it was tandem drive, this category has access to the tandem drive RAV Network 2)
- Level 2 – Tri Drive RAV Category 2 (e.g. RAVs with a maximum length of 25.0 metres).
- Level 3 – Tri drive RAV Category 3 (e.g. RAVs with a maximum length of 27.5 metres).
- Level 4 – Tri drive RAV Category 4 (e.g. RAVs with a maximum length of 36.5 metres).
- Level 5 – Tri drive RAV Category 5 (e.g. RAVs with a maximum length of 53.5 metres).

An application for concessional loading road access should not be considered unless the requested road is already approved on the equivalent base RAV Network. The quantitative limits recommended provide additional safety

margins for concessionally loaded RAVs, as the extra mass has a considerable impact on the vehicle's performance characteristics. For this reason, additional road width, stopping distances etc. are required.

Concessionally loaded RAVs are grouped in the following categories: -

- Level 1 - RAVs operating under a concessional loading scheme allowing up to 17 tonnes on a tandem axle group and 21.5 tonnes on a tri axle group.
- Level 2 – RAVs operating under a concessional loading scheme allowing up to 17 tonnes on a tandem axle group and 22.5 tonnes on a tri axle group.
- Level 3 – RAVs operating under a concessional loading scheme allowing up to 17.5 tonnes on a tandem axle group and 23.5 tonnes on a tri axle group.
- Level 4 – RAVs operating under other concessional loading schemes.

5.1.2 Main Roads WA classification of Over Size Over Mass Vehicles and Performance Based Standards (PBS) Vehicles

PBS Schemes have been developed through Australia to improve effectiveness of freight transport. The PBS Scheme allows transport operators to present non-standard vehicle combinations which can improve productivity of the transportation system.

Based on Austroads Research from 2014², High Productivity Vehicles (HPV) approved under the PBS scheme can bring numerous benefits to the economy of the state. This research suggests that HPV vehicles significantly lower accident rates to their standard counterparts (HPVs had only 25% incident rate when compared to standard configurations of the scale); they have environmental benefits as they emit less CO₂; and they allow more freight to be moved with a commensurate lower number of vehicles allowing for better productivity while reducing community exposure to freight vehicular movements.

Over Size Over Mass vehicles must have relevant Main Roads WA permits and may require pilot vehicles and/or police escorts if they exceed Main Roads WA specified size thresholds.

5.1.3 Traffic Data

Traffic Counts

The latest traffic count data can be obtained through Main Roads WA or the Town of Port Hedland. If existing traffic data is outdated, new data should be collected, with data having a minimum collection period of one week to ensure the data is robust.

Accident Statistics

The latest crash data can be obtained through Main Roads WA portals. Crash incidence and density needs to be assessed on the designated section of each road. Crash data is available in 5-yearly blocks and is updated once per annum.

5.1.4 Structures

Load Capacity

All bridges and load restrictive culverts on the requested route will be assessed by Main Roads Structures Engineering Branch, via Heavy Vehicle Services.

² Quantifying the Benefits of High Productivity Vehicles, Austroads 2014

Structure Width Requirements

Minimum widths between kerbs/carriageway on a structure should meet the requirements set out in Main Roads WA - Standard Restricted Access Vehicle (RAV) Route Assessment Guidelines.

5.1.5 Overhead Clearance

Route assessments must confirm that adequate overhead clearances between the top of the RAVs and the overhead obstructions are available, as follows: -

- Overhead obstructions (except power lines) - 300 mm clearance.
- Power lines - at least the minimum clearance required by telecommunications and electrical transmission cable providers, which may be more than 300 mm.

Where telecommunications and/or electrical transmission cables cross the route, the minimum overhead clearance available must be obtained from the relevant controllers listed in the “Contact Details for Other Agency Approvals”.

5.1.6 Rural Road Widths

To safely accommodate the swept width of RAVs, adequate road widths must be provided to ensure the RAV does not encroach on adjacent lanes or road shoulders. To be suitable for RAV access, a road should be sealed if AADT is over 150 and annual freight tonnage is over 300,000 tonnes per annum.

Off-tracking of a vehicle combination is more severe at high speeds; therefore, minimum seal widths may be reduced where speeds are controlled to 60 or 70 km/h. The seal widths for such roads are shown clearly in the relevant Austroads Guide to Road Design, and should be checked against Main Roads WA’s supplements to those guidelines for any additional requirements in the state of Western Australia.

Minimum seal widths may also be reduced on roads where all other users are familiar with the operator of multi-combination vehicles, e.g. farm access roads and mine access roads. Again, the widths should be in accordance with the relevant Austroads Guidelines and Main Roads WA supplements to those guidelines.

5.1.7 Urban and Townsite Road Widths

There are several width requirements to be considered for RAVs travelling in urban and town site areas. As well as accommodating the additional swept width of RAVs, the width requirements for activities such as cycling and kerbside parking also need to be considered.

5.1.8 Provision for Overtaking

RAVs tend to operate at lower average speeds than light vehicles. If the road does not have enough overtaking opportunities, drivers of light vehicles may experience delays behind slower moving RAVs and in some cases may form “queues” of vehicles waiting to overtake. This may cause driver frustration and thereby increase the risk of drivers attempting to overtake when it is not safe. Therefore, it is essential, from a road safety perspective, to have adequate overtaking opportunities on a RAV route.

5.1.9 Steep Ascending Grades

The speed of RAVs ascending long and steep grades can be reduced to the extent that the speed differential is hazardous for vehicles approaching from behind. Where possible, steep ascending grades should have overtaking lanes.

5.1.10 RAV Acceleration Lanes

To avoid an undue hazard or obstruction to traffic, the length of any acceleration lanes provided on the route should be sufficient to allow RAVs, when fully loaded, to accelerate to within 70% of the operating traffic speed at the point where the lane merges with the through road.

5.1.11 Turning at Intersections

It is essential that intersections can be safely negotiated, with minimal or no interference to other traffic.

The vehicle turning radius is directly related to the maximum turning speed of the vehicle.

Where there is any possibility that the RAV may have insufficient clearance from kerbs or other nearby objects, standard turning templates shall be used to accurately check the swept path of the RAV. Using Autoturn, the appropriate vehicle combination must be used to check all turning movements at all required intersections and any clearance problems should be noted on the assessment form.

5.1.12 Railway Level Crossings

The following points highlight the main considerations for RAVs at railway crossings for the various levels of protection: -

- Appropriate level of control;
- Adequate sight distances and stopping distances;
- Adequate signage and forward warning;
- Sufficient stacking distance; and
- Speed limit not exceeding 80km/h on sealed roads

5.1.13 Off-Road Parking

In rural and remote areas, the route should have adequate off-road truck parking facilities at sufficient spacings along the route. Adequate off-road parking facilities are defined as any: -

- service station or roadhouse, (or other commercial establishment), with provision for public truck parking;
- signed parking bays, truck bays, and / or designated rest areas; or
- designated road train assembly areas;

5.1.14 Other Road Users

RAVs can affect the flow of other traffic and contribute to congestion issues. The volume of RAVs can reduce the speed of other traffic and in worst cases frustrate other motorists. Assessors should examine the traffic flow on the route and recommend solutions to reduce risks resulting from traffic disruption.

Vehicles towing caravans or trailers are a significant issue in that they can find it difficult to pass RAVs. This situation is more prevalent during school holidays. Therefore, the assessor should consider the impact of seasonal traffic changes during the assessment and make assessment of any "platooning" issues of vehicles.

5.1.15 Slowing and Stopping

The ability of vehicles to safely pull off the carriageway, e.g. to allow following vehicles to pass or to make repairs, should be examined. Continuous sections of the route with narrow shoulders and/or deep drains within the clear zones should be noted and comments made on all such safety implications.

Inappropriate batters, v-drains and / or other natural or man-made features within the clear zone is a risk factor on all existing road networks in the Town of Port Hedland. The clear zone of any road can be determined using Austroads Guide to Road Design for the various speed limits, with reference to the appropriate Main Roads WA supplement to those guidelines.

5.1.16 Precinct Specific Considerations

No route should be approved as follows: -

- 1) Anywhere within locality of South Hedland;
- 2) North of Wilson Street within the locality of Port Hedland; or
- 3) In any other emerging residential precinct.

Roads providing access to residential developments

Hamilton Road and Powell Road should remain outside of the RAV network as they are important links for South Hedland residents.

RAV classification of Wallwork Road should be maintained as a maximum, preferably downgraded in the future as this is the main link for residents of South Hedland to Port Hedland town centre.

Buttweld Road is another link between South Hedland and Great Northern Highway. While it is not an intensive link, it should not be considered for RAV status beyond RAV4.

Wedgefield Stage 1, 2 and 3 (Old Wedgefield)

Routes in Wedgefield stages 1, 2 and 3 should not be upgraded any further, as the Town of Port Hedland will seek to remove roads in Wedgefield from the RAV10 network as Transport Depot businesses relocate.

The following roads east of Pinga Street should be considered as RAV 10 connections between existing portions of Wedgefield and future expansion to the east: -

- Moorambine Street – Pending kerb amendment to allow lane-correct left turn movements from Pinga Street;
- Schillaman Street – Pending upgrade of the carriageway to a sealed width of 7.2m (currently less than 6m wide according to aerial imagery)
- Hematite Drive

Roads west of Pinga Street should be considered for incremental RAV status downgrade.

Wedgefield – Future Stages

Given this development is in planning stages, all roads should be constructed to an appropriate RAV standard as outlined in Appendix 3 of this report.

The development will have additional access to Great Northern Highway, therefore Pinga Street should become a secondary access for heavy vehicles.

Redbank Precinct

While Redbank Road is classified as RAV 10 road on the Main Roads WA network, the intersection with Wilson Street, its road geometry and carriageway widths are not compliant for this level of RAV.

Further to this, aerial imagery shows that some residential activity is occurring in this area, therefore future direction of the precinct should be considered to avoid land-use conflicts.

Pippingarra

Pippingarra Road is classified as RAV 10 road on Main Roads WA networks, however the majority of this road is unsealed and the intersection with Great Northern Highway does not allow for lane-correct movements.

At present, traffic volumes are unknown on this section of road, however any rural RAV routes carrying more than 150 vehicles per day must have a sealed section of carriageway. Any intensification of activity in this area will require upgrade to the road network and reasonable contributions to maintenance cost.

Boodarie, North Wedgefield and other new industrial and logistic developments

Road networks in areas designated for strategic industrial and logistic development should be designed in accordance with RAV requirements specified in Appendix 3 of this report.

Boodarie Drive and Boodarie Station Access Road are already classified as RAV 10 networks, although the intersections with Great Northern Highway do not allow for fully lane-correct movements. For any intensification of commercial land use, existing roads need to be upgraded to appropriate RAV standards.

Roads providing connection between the Port (existing or proposed berths) and Great Northern Highway should be designed to cater for Oversize Over Mass.

5.2 Standards, procedures and policies to be developed

5.2.1 Collection of Traffic Data

In order to track maintenance requirements and responsibilities, regular data collection is required. Data should be collected repeatedly on the same locations to allow monitoring any fluctuations or increases in traffic volumes.

Collection of data every year	Collection of data every 3 years	Collection of data every 5 years
North Circular West	East of Hamilton Road	
	East of Parker Street	
Pinga Street	South of Hematite Drive	
	South of Manganese Street	
	North of Pinnacles Street	
	South of Great Northern Highway	
Powell Road	West of Hamilton Road	
	East of Hamilton Road	
	West of Pinga Street	
	East of Pinga Street	

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Robinson Street	East of Thompson Street
Schillaman Street	East of Pinga Street
	Between Pawan Street and Yanana Street
Utah Point Road	West of Great Northern Highway
Wallwork Road	North of Great Northern Highway
	South of Great Northern Highway
	South of Quarry Road
	South of Pinga Street
Wilson Street	South of Cooke Point Road
	West of Short Street
	East of Short Street
	North of Great Northern Highway
	West of Cooke Point Road
Hamilton Road	South of Powell Road
	North of Forrest Circle
Forrest Circle	West of Hamilton Road
	North of Murdoch Drive
Murdoch Drive	West of Forrest Circle
	East of North Circular Road
North Circular Road	East of Wallwork Road
	West of Wallwork Road
	North of Murdoch Drive
	South of Murdoch Drive
Cottier Drive	West of North Circular Road
	North of Kennedy Drive
	East of Forrest Circle
Pippingarra Road	South of Great Northern Highway
Buttweld Road	South of Great Northern Highway
	East of North Circular Road
Boodarie Drive	West of Great Northern Highway
Redbank Road	West of Wilson Street
Styles Road	West of Cooke Point Road
Cooke Point Road / Athol Street	North of Wilson Street
	West of Thomson Street
	West of Corney Street
Corney Street	North of Athol Street
Keesing Street	North of Athol Street
Thompson Street	North of Athol Street
Sutherland Street	West of Thomson Street
	West of Rodoreda Street
McGregor Street	West of Cook Point Road
	West of Crawford Street
	North of Wilson Street
Crawford Street	North of McGregor Street
Lukis Street	West of McGregor Street

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Anderson Street	West of McGregor Street
	West of Rodoreda Street
	East of Darlot Street
	East of McKay Street
	East of Wedge Street
Wedge Street	North of Anderson Street
Richardson Street	East of Wedge Street

The schedule was developed so it can be achieved by the Town of Port Hedland with its current resources. If additional resources become available in future, data can be collected at higher frequency.

Traffic counts should not be taken during school and public holidays while data base is being established.

5.2.2 Financial Models for Establishing and Maintaining Roads Used by Freight Vehicles

State Roads

Main Roads WA has established the Concessional Loading Road Maintenance Contribution Policy for significant freight tasks (300,000 tonnes per year per task or larger). The purpose of this policy is to help maintain key parts of the State network affected by significant freight tasks. The characteristics of this policy are as follows: -

- Main Roads WA will enter into a Deed of Agreement with the task generator, not the operator.
- Designated freight task routes will be clearly defined, and any contribution collected from the freight generator will be utilised only for maintenance of a task-related route.
- Contributions collected will be used for maintenance of State-owned roads on the designated freight task route.
- Contributions are calculated and agreed with the freight generator and can take form of a financial contribution or “in kind” contribution where the freight generator maintains the road directly.
- Concessional Loading Road Maintenance Contribution Policy is deemed voluntary and cannot be a direct condition of access.

Local Roads

Given that responsibility for maintenance of Local Government owned roads forming part of RAV routes is with Local Government, Local Governments have an opportunity to develop similar policies for cost recovery. Local Governments can enter into a Deed of Agreement with a freight generator where contributions should be given (direct or in-kind as explained above) to maintain a designated freight route located within the territory of the Local Government. Such Deeds of Agreement should contain the following information: -

- The type and axle configuration of the vehicles to be used for the task;
- The annual quantity of vehicle passes and the payload tonnage. If freight task is seasonal then this must be described;
- Direct specification of the route, inclusive of return journeys;
- The duration of the subject single freight task;
- The annual and unit rate charge and method of calculation;
- Payment terms and conditions;
- The obligations of the parties including works records, expenditure, evidence and audit requirements in relation to the determination of actual payload tonnages and notifications of changes to vehicles, payload or routing;
- Conditions on expiry of the agreement;

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- Hours and conditions of operation;
- Breaches and terms of remedy for the Local Government and Proponent; and
- Duties of Local Government and the Proponent.

Under the present legal framework, contributions under this type of Deed of Agreement are deemed voluntary and may not be imposable as a condition of access unless: -

- there is evidence that infrastructure is unsuitable for a freight task; and / or
- there is evidence that a freight task is likely to damage the infrastructure to the extent it is not serviceable under periodic maintenance.

All funds collected for the maintenance of a freight route are to be kept in a designated fund account. Upon completion or discontinuation of a freight task the funds are to be retained for up to 12 months. In this period any final damage to the road is to be assessed and repaired using the funds collected for that purpose. Any remaining funds are to be returned to the freight generator.

Calculating appropriate charges

WALGA has commissioned studies to determine the most appropriate methods for the calculation of charges pertaining to maintenance of heavy vehicle routes.

Calculation of these charges is based on Equivalent Standard Axle (ESA) values for sealed roads and Axel Passes (AP) for unsealed roads. These measures standardise the assessment of damage done to a road surface by an axle group of a heavy vehicle and are in accordance with Austroads Guidelines for Road and Pavement Design.

Instructions for the calculation of appropriate charges is provided in the Appendix 4 of this report.

Developing the policy

Based on the guidelines prepared by WALGA and background research by ARRB, a policy can be developed for recovering maintenance costs on RAV networks administered by Local Governments.

While the advocacy for creation of appropriate state-wide enforceable policies must continue, developing local policies will enable commencement of the scheme.

Marginal cost schemes developed by WALGA and ARRB for sealed roads date from 2015, while marginal cost calculations for unsealed roads date from 2017. Prices should be reviewed annually and updated to reflect current cost movement. As mentioned, cost schemes for sealed roads need to be adjusted for asphalt surfaced, cement stabilised roads or roads with asphaltic seals.

Development of cost recovery policies should be a priority, given the planned expansion of existing freight nodes and establishment of new freight nodes envisaged in this Strategy.

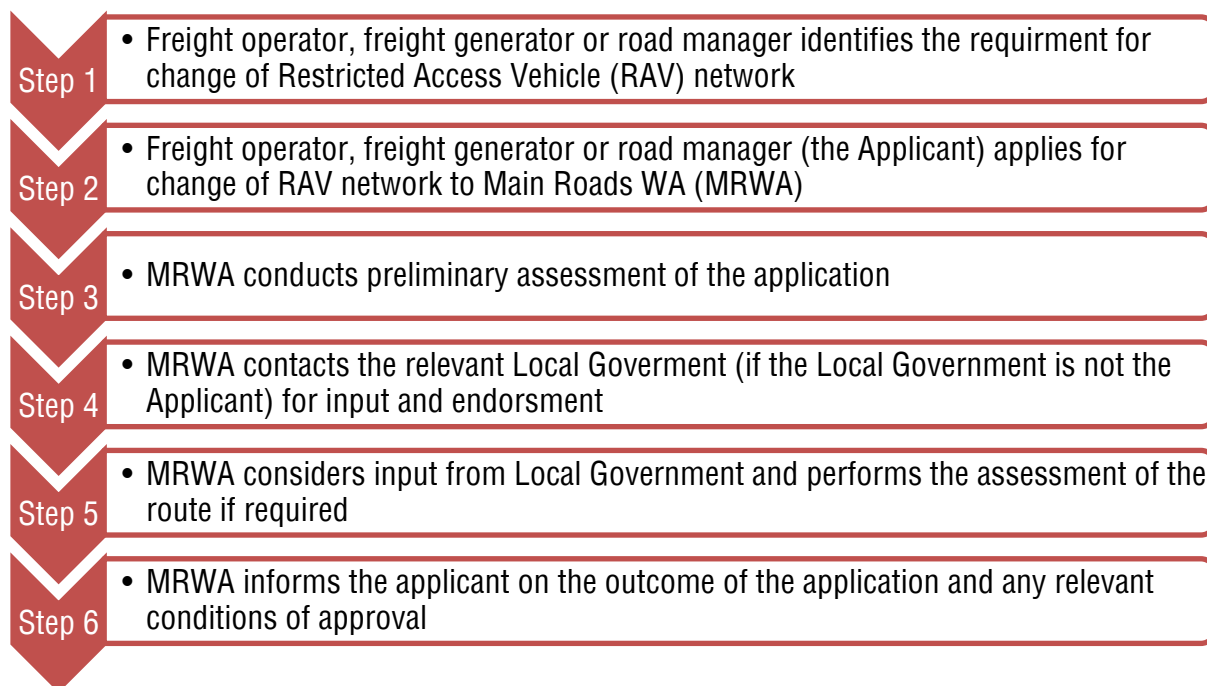
5.2.3 Performance Based Asset Management of Roads Servicing Freight

In order to adequately manage any financial agreements, a robust asset register and asset management plan must be developed. As a part of the policy, any participant to this agreement should report annual tonnages and confirm the route/s used.

Development of an electronic reporting system should be considered to expedite the exchange of information allowing for an effective management of this policy.

5.3 Procedure to be Followed for Extending, Upgrading or Downgrading Restricted Access Network

At present Main Roads WA is updating procedures for extending, upgrading and downgrading Restricted Access Networks. The framework for these processes in future is as follows: -



If the application does not satisfy the requirements for unconditional RAV routes, Restricted Local Access Route (RLAR) can be considered. RLAR might be more suitable for local operators (as the “first and last mile” means of access) or for seasonal freight requirements.

Absence of road maintenance contributions agreements cannot preclude the award of RAV status, however if the road is unsuitable to carry certain levels of load and there is no indication that an appropriate standard of road can be constructed by any party (proponent or the road manager), then RAV access may be denied.

5.3.1 Roles and Responsibilities in Managing Network

Administrative responsibilities

The final authority for adding and removing roads to RAV network lays with the Commissioner of Main Roads. The Heavy Vehicle Operations (HVO) branch of Main Roads WA administers this responsibility under delegated authority. This responsibility cannot be delegated further.

Main Roads WA Regions will provide assistance in assessing the application and perform route assessments when required.

Local Government can perform its own assessment of the proposed route and submit their findings to Main Roads WA.

Maintenance responsibilities

Main Roads WA will maintain only the state-owned parts of RAV Networks, while Local Government is responsible for maintenance of local roads forming part of the RAV network.

Local Government may form an agreement with a freight generator to transfer maintenance responsibility to the freight generator. Conditions, time periods and standards of maintenance can be set to ensure appropriate levels of access. Alternatively, Local Government may collect contributions for road maintenance under appropriate policy as explained in earlier sections of this Strategy.

5.3.2 Roles and Responsibilities in Managing the Local Access

Main Roads WA do not assess individual access points to each property for compliance to RAV standards. This responsibility sits with Local Government and the owner / tenant of the subject site. According to AS2890.02 which is prevalent in the absence of any other local policy, the crossover must be designed to suit movements of the largest vehicle accessing the site, allowing for appropriate vehicle storage.

Updates of existing access and crossover policies to address heavy vehicle requirements would be beneficial to the Town of Port Hedland. While information exists in various Main Roads WA documents and AS2890.02, consolidation of information would be helpful for easy reference and would expedite the assessment and approvals process.

6. Further Recommended Actions

6.1 Develop Traffic Monitoring Program (5 years)

At present the Town of Port Hedland does not have strategic traffic or transport models which can be used for the interrogation of development scenarios. Developing one would significantly help in assessing any new applications or initiatives submitted to the Town. This model should examine the impact of changes in traffic volumes at strategic locations and differentiate between heavy and light vehicles to assist in determining required intersection and road construction standards and RAV classifications.

Traffic monitoring program is to be developed for various locations within a 5-year period. Key locations are to be monitored every year, secondary locations should be monitored every three years, as a minimum, while tertiary locations can be monitored every five years, as a minimum. Please refer to section 6.2.1 Collection of traffic data for strategic locations and time periods of monitoring for each location. The schedule has been developed so that the Town of Port Hedland can easily manage collection with its current resources. If additional resource becomes available, collection can occur more frequently.

6.2 Develop Asset Register and Asset Management Plan

Register of existing assets and the condition of assets is crucial in implementing any maintenance cost sharing policy. Useful life of asset should be recorded as well as planned maintenance and upgrades. Asset Register and Asset Management Plan should be as a minimum annually reviewed in full to ensure that maintenance expense is managed and planned for.

Active management of the asset register and the asset plan would require regular data collection documenting exploitation of the asset and periodical review against planned expenditure and scheduled maintenance. The collection of data in the Town Traffic Monitoring Program and Asset Management Plan would assist the Town of Port Hedland to demonstrate to Industry and Government the cost burden of maintaining road networks frequently used by the heavy vehicle industries.

6.3 Develop a Cost Sharing approach to support Asset Management

The Town of Port Hedland is one of Pilbara's hubs for commercial activities strongly reliant on heavy vehicles. High percentage of heavy vehicle on local roads is impacting general lifecycle of pavement and other road amenities. In order to maintain appropriate levels of service and road safety ongoing maintenance is required. This places a significant strain on the Town of Port Hedland's resources.

a.) Develop cost sharing policy to inform a fair approach to request asset maintenance contributions from heavy vehicle road users

Framework for developing cost sharing policies pertaining to road maintenance has been developed by WALGA. Given that the Town's economy is strongly dependant on the road freight, developing such policy makes sense and ensures that road network is properly maintained.

While at present, legal framework does not allow application of the policy to be binding in the Development Application process, if the evidence exists that road network cannot be adequately maintained without contribution, voluntary agreements are likely.

The policy should be reviewed annually or biannually in order to adjust rates or threshold freight values in accordance with overall fluctuations in the economy and developing standards.

b.) Advocate and lobby to government to legislate cost sharing for road users to ease burden of asset management cost on local government

Maintenance cost sharing policy is well established in other States, therefore it precedents already exist.

WALGA is already working with Main Roads and State Solicitors Office on creating environment where maintenance cost sharing policies are a standard procedure.

National Transport Commission is currently reviewing The Heavy Vehicle Charges Model Law. While this law is not enforceable in Western Australia, it is likely that some areas will slowly be implemented in standard practice.

Freight and Logistics Council WA and Department of Transport (Freight) could support this idea as it is a common goal to have a well maintained and safe network.

6.4 Apply Changes to the Planning Framework in Wedgefield to Address Safety Issues Between Sensitive Land Uses and Heavy Vehicles

Recently updated planning framework for Wedgefield lists following objectives for the precinct:

- To resolve land use conflicts between industrial and sensitive land uses;
- To provide a safe and efficient road network to support transport logistics;
- To provide sufficient industrial land to meet long term requirements for industry;
- To improve the general amenity of industrial areas over time.

In order to achieve these objectives, further establishment of caretakers' dwellings must be prohibited in Wedgefield. Conversely, to minimise conflicts with the existing caretakers', established portions of Wedgefield (apart from Hedland Junction) will be restored to Light Industry land use, therefore establishment of general industry and transportation orientated businesses will not be permitted in this area.

6.5 Continue to Review RAV Status of Roads in Wedgefield Considering Data Collected and Movement of Transport Business Over Time

Maintenance of roads and intersections constantly exposed to heavy vehicle traffic, where majority of vehicles are likely to have concessional loading can become very costly. Providing strategically placed Road Train Assembly Locations may be more cost-effective solution.

Monitoring of RAV status is of great importance as sizes of approved vehicles have generally increased over time inducing change in geometric requirements. In strategic industrial areas, safe and efficient movement of heavy vehicles is dependent on appropriate geometric requirements being met.

Given impending change of approved land-use in parts of Wedgefield, transport businesses relying on RAV 10 vehicles will become incompatible. Therefore, as businesses relocate to a more suitable location with appropriate network, portions of existing network in Wedgefield should be downgraded or fully removed from the network to ensure compatibility of adjoining land-uses in the precinct.

6.6 Develop and Implement an Engagement Plan With Transport Industries in Wedgefield

Develop and implement an ongoing engagement plan with existing transport industries in Wedgefield. The purpose of the engagement is to monitor, review and rationalise traffic routes and continue to review and rationalise RAV status of roads in Wedgefield considering planned road upgrades, location of required traffic routes and the movement of transport businesses over time.

Ongoing communication will help reduce ongoing land-use conflicts between transport-operators and caretakers.

6.7 Develop a Funding Strategy to Upgrade Heavy Vehicle Road Network and Its Assets

To maintain position of the Town of Port Hedland as one of key commercial hubs in Pilbara, ongoing maintenance of existing structures, upgrade some of elements of the existing infrastructure and provision of new infrastructure is ongoing requirement.

In order to create appropriate budgets to keep up with this on-going requirement the Town of Port Hedland should consider developing a funding strategy to create revenue streams.

Three key options should be considered:

- 4) Developing maintenance cost sharing policy

This revenue stream can be used for maintenance of existing road network and ensuring that levels of service and safety remain high despite high volume of heavy vehicles on local roads

- 5) Development contribution schemes

This model can be considered for new commercial developments which will result in creation of new roads under management of local government or will directly require upgrade of existing roads and/or intersections.

- 6) Funding through State and Federal government programs or other agencies

Some of funding opportunities to be considered are as follows

- Roads to Recovery program
https://investment.infrastructure.gov.au/infrastructure_investment/roads_to_recovery/
- Northern Infrastructure Facility <https://naif.gov.au/about-naif-finance/eligibility-criteria/>
- Black Spot (can be considered for smaller elements of network)
https://investment.infrastructure.gov.au/infrastructure_investment/black_spot/index.aspx
- Heavy Vehicle Safety and Productivity Program
https://investment.infrastructure.gov.au/infrastructure_investment/heavy_vehicle_safety_and_productivity.aspx
- Roads of Strategic Importance (ROSI)
https://investment.infrastructure.gov.au/key_projects/initiatives/roads_strategic_importance.aspx
- Northern Australia Roads Program
https://investment.infrastructure.gov.au/infrastructure_investment/northern_australia_roads.aspx

- Northern Australia Beef Roads Program (there is emerging tendency to develop livestock trade in Port Hedland)
https://investment.infrastructure.gov.au/infrastructure_investment/northern_australia_beef_roads.aspx
- State Road Funds to Local Governments Agreement
<https://www.mainroads.wa.gov.au/Documents/State%20Road%20Funds%20to%20Local%20Governme nt%20Agreement%202018-19%20to%202022-23.RCN-D18%5E23957281.PDF>
- Bridges Renewal Program
https://investment.infrastructure.gov.au/infrastructure_investment/bridges_renewal.aspx
- Commodity Route Supplementary Fund Applications <https://walga.asn.au/Policy-Advice-and-Advocacy/Infrastructure/Funding.aspx>

6.8 Evaluate Mining Tenements and Crown Leases and Negotiate Road Maintenance on Impacted Local Roads

All new applications for mining tenements and crown leases should consider impact of heavy vehicles on the road network and associated cost of maintenance. Maintenance cost sharing agreements should be put in place to allow for maintenance of roads such as Pippingarra Road, Yandeyarra Road and Wodgina East Road.

Impact of the vehicles on the road network should be determined in accordance with the schedule shown in Appendix 4 of this report.

Once this agreement is in place, maintenance works can be completed either by the Town of Port Hedland, or by the proponent. In the latter case, the Town of Port Hedland would carry out regular inspections to ensure that roads are maintained to the agreed level.

6.9 Monitor Industry Development and Consider Developing Strategy for Application of Smart Technologies in Freight

Given the importance of freight of all modes in the Town of Port Hedland, it would be beneficial to develop a general strategy for deployment of smart and emerging technologies in freight management. This can pertain to supply chain management, to road use or access management. While the Town recently developed Smart City strategy, freight was not considered on that occasion.

Expansion of industry and population in the Town of Port Hedland will require capital investment in road infrastructure. The investment may be proponent led. While no investment can be completely future-proof, consideration, budgeting and creating strategic partnerships for implementing smart technologies enabling more efficient and safer movement is prudent.

7. References and related documents

- Port Hedland Port Authority Lumsden Point Access Corridor, August 2013
- Lumsden Point General Cargo and Logistics Hub, Pilbara Port Authority
- Guidelines for Planning and Assessment of Road Freight Access in Industrial Areas, Austroads 2014
- Estimating the Incremental Cost Impact on Sealed Local Roads from Additional Freight Tasks, WALGA, May 2015
- Heavy Vehicle Cost Recovery Policy Guideline for Sealed Roads, WALGA, July 2017
- RAV Access Approval Process Road Managers' Guide, Main Roads Western Australia, April 2019
- National Freight and Supply Chain Strategy August 2019
- Guide to Design and Operation of High Wide Load Corridors, MRWA
- Quantifying the Benefits of High Productivity Vehicles, Austroads, 2014
- Planning and Assessment of Road Freight in Planning Areas, Austroads, 2014
- Local Road Access for High Productivity Freight Vehicles, Austroads, 2018
- Improved Railway Road Design For Heavy Vehicles, Austroads, 2017
- Key Freight Routes Heavy Vehicle Usage Data Project, Austroads, 2017
- Effect of Heavy Vehicle Traffic in Sprayed Seal Design, Austroads, 2017
- Technical Basis for Estimating the Cost of Road Wear on Unsealed Local Government Roads in Western Australia, ARRB 2019
- Technical Basis for Estimating the Cost of Road Wear on Unsealed Local Government Roads in Western Australia, ARRB 2015
- Standard Restricted Access Vehicle (RAV) Route Assessment Guidelines, MRWA 2018
- Boodarie Strategic Industrial Area, Structure Plan
- Wedgefield Industrial Estate Development Plan (2019)
- PDC - Pilbara Truck Wash Facility Report (2017)
- Wedgefield Road, Traffic & Drainage Master Plan (2015)
- Port Hedland International Airport Masterplan (2019)
- Various data collected from Main Roads WA and Department of Mines portals