FREIGHT ON RAIL GROUP

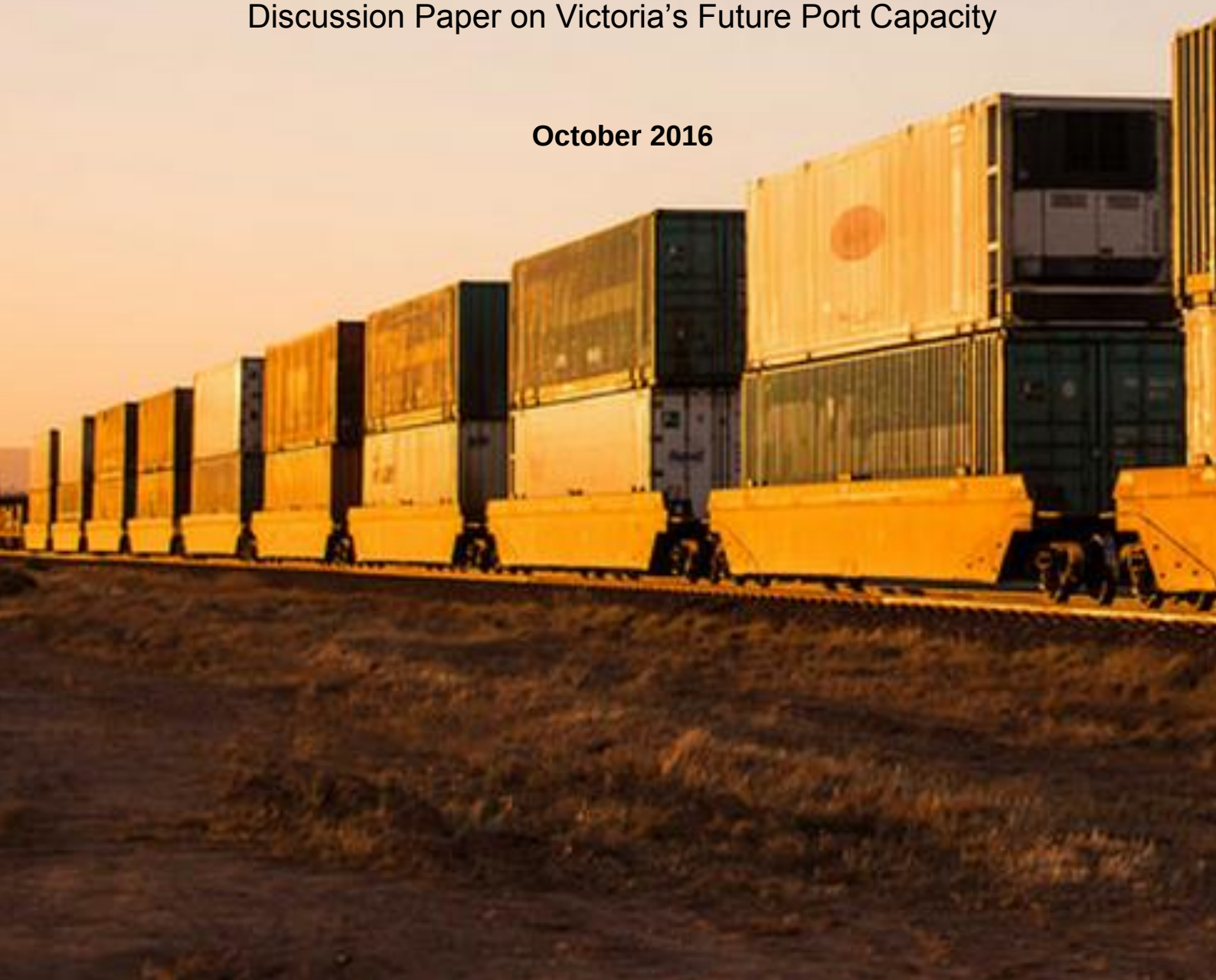
Submission to Infrastructure Victoria:

Infrastructure Victoria's draft 30-year infrastructure strategy

and

Discussion Paper on Victoria's Future Port Capacity

October 2016



This document has been prepared by the Freight on Rail Group (the Group). The Group is a rail freight focussed industry group established to engage with Government and key stakeholders on major public policy issues. It consists of the seven major rail freight businesses in Australia:

Aurizon
Aurizon has rail and road-based freight and infrastructure operations across Australia. Aurizon operates above-rail freight services from Cairns through to Perth, and manages the Central Queensland Coal Network made up of approximately 2,670km of heavy haul rail infrastructure.

Australian Rail Track Corporation (ARTC)
ARTC has responsibility for the management of over 8,500 route kilometres of standard gauge interstate track across Australia. ARTC also manages the Hunter Valley coal rail network, and other regional rail links.

Brookfield Rail
Brookfield Rail manages and operates a 5,500 kilometre open access, multi-user rail freight network extending throughout the southern half of Western Australia, providing access for intermodal, iron ore, grain, alumina and various other bulk commodities.

Genesee & Wyoming
G&W is a global vertically integrated rail freight company with a large Australian presence in SA, NT, Victoria and NSW. G&W owns nearly 5,000 kilometres of track in SA and NT, including the 2,200-km Tarcoola-to-Darwin railway.

Pacific National
Pacific National is one of the largest providers of rail freight services in Australia, providing intermodal, coal and bulk rail haulage services throughout Australia.

Qube
Qube is Australia's largest integrated provider of import and export logistics services. It offers a broad range of logistics services with a national footprint and a primary focus on markets involved in international trade in both the bulk and container markets.

SCT Logistics
SCT is a national, multi-modal transport and logistics company. It operates its own intermodal rail services from the eastern States to Perth, while also providing bulk rail haulage services. It has facilities in Brisbane, Sydney, Parkes, Melbourne, Adelaide and Perth.

Key contacts for this document:

Aurizon:	Mr Patrick Coleman, Principal National Policy Adviser 07 3019 7747, Patrick.Coleman@aurizon.com.au
ARTC:	Mr Adrian Teaha, Manager Industry Policy & Strategy 08 8217 4397, ATeaha@ARTC.com.au
Pacific National:	Mr Stuart Ronan, Manager Access and Regulation 02 8484 8056, stuart_ronan@pacificnational.com.au

Introduction

The Freight on Rail Group (FORG) values the opportunity to provide a confidential submission to Infrastructure Victoria on the state's 'Draft 30-Year Infrastructure Strategy' (Draft Strategy), as well as provide comments to the Discussion Paper on 'Victoria's Future Port Capacity' (Ports Paper).

FORG is a group of seven major freight rail companies established in August 2015 to engage with governments and key stakeholders on major public policy issues. FORG aims to contribute to a policy and regulatory environment that enables the development and operation of an efficient and commercially sustainable rail freight transport sector.

The members of FORG have extensive experience in issues associated with a broad scope of infrastructure, transport and supply chain matters similar to those being addressed in the Draft Strategy. We support the Victorian Government's establishment of Infrastructure Victoria as a body to provide independent advice on infrastructure projects and to identify and prioritise infrastructure needs in the state. FORG looks forward to working with Infrastructure Victoria on transport policies and priorities for the state.

The Draft Strategy and structure of the document is based on the need for good outcomes to be delivered for the state of Victoria and its people and FORG agrees that these needs cannot be resolved with just one solution. Instead, as outlined in the Draft Strategy, a combination of good planning, investment reform and infrastructure initiatives are required.

This submission focuses on rail's role in freight movement within Victoria and specifically addresses the recommendations and initiatives mentioned in this Draft Strategy. As FORG is a freight rail advocacy group this submission limits its comments to those matters in the Draft Strategy and Ports Paper relating to freight transport. To provide greater context around the positions put forward in the submission, FORG's 25 Year Infrastructure Strategy document has been included to reinforce our position, at Appendix A.

Rather than addressing individual items or each chapter of the Draft Strategy the FORG response to the Draft Strategy is structured under three Infrastructure Management categories given that Draft Strategy initiatives cross over different chapters (for example Land Use Planning). These categories used in this submission are:

- Changing behaviour, managing demand,
- Better use of existing assets, including through improved integration, and
- Expending assets or building new ones.

Where possible, the submission refers to the project / initiative name and the acronym used in the Draft Strategy and Ports Paper.

FORG understands the next stage of the Draft Strategy, following consultation, will be the development of a 'Final Strategy' document. As such, this submission provides observations throughout which are considered important for the next iteration of the Draft Strategy. We welcome the opportunity to meet with Infrastructure Victoria to discuss this submission further, noting that individual members have already met with Infrastructure Victoria, and may provide separate submissions.

The Freight Rail Industry

To be commercially viable, railways need to achieve significant economies of scale and freight density. Given Australia's low and dispersed population and vast geography, the primary challenge

for rail, in particular the non-mining networks, is achieving those economies. Rail is suited to high volume, bulk commodities, generally over long and shorter distances. The nature and strengths of the industry has meant it has traditionally handled the freight market for heavy high-volume products such as agricultural and mining commodities.

Within the provision of non-bulk freight services, rail is generally more suited to longer haul distances. This occurs because of the need to offset additional handling to facilitate inter-modal operations and the use of 'pick up' and 'delivery' freight movements between rail terminals and customer facilities. It is within this segment particularly where road freight has successfully captured market share from rail. This has largely been realised through the introduction of larger, higher productivity vehicles, which can be accommodated on Australia's national highways following decades of sustained, high value road investment.

Barriers to new industry players in the freight rail industry are high, with new entrants facing a myriad of challenges, including operating a high fixed cost business, the need for considerable capital outlay, the difficulty of attracting a skilled workforce and the requirements of various compliance, regulatory and safety accreditations and approvals across multiple jurisdictions.[1] FORG recommends that Victoria prioritise measures to streamline compliance and regulatory processes (including consistency between jurisdictions) in order to further facilitate efficiency in the rail sector. In addition Victoria should seek to create a level playing field for all transport modes, particularly in regard to transport infrastructure pricing.

Changing Behaviour, Managing Demand

Transport Network Price Regime (TNP) Versus Road Pricing Reform

FORG is generally supportive of transport network price regimes which reflect costs, but FORG is concerned that there is a lack of clarity regarding the Draft Strategy's proposed TNP (listed as a top 3 priority recommendation).[2] It is not clear if the TNP is intended to manage demand for peak and non-peak traffic across the transport network and / or if it is intended to address the cost associated with building and maintaining roads in Victoria. The TNP as outlined in the Draft Strategy does not seem to be designed to recover costs at the level required for freight and does not address the competitive neutrality issues between road and rail, which are discussed in more detail within this submission.

Reform to road pricing for heavy vehicles (and the associated arrangements for investing in road infrastructure) should be a priority for Infrastructure Victoria. This issue is particularly important where there is competition between road and rail freight (i.e. road pricing reform is needed on national highways and arterial roads). Aside from the long-term productivity and efficiency benefits that road-pricing reform would have on the overall transport system and broader economy, it will deliver significant social and environmental improvements by reducing congestion caused by increasing road freight.

Under the current road funding arrangements there is disconnect between heavy vehicle road charges and the future funding of transport infrastructure. Funding under the current arrangement does not go to those bodies responsible for maintaining or upgrading transport infrastructure. As a consequence, the right investments in key roads for freight transport may not be undertaken. FORG supports the view that a trial of direct user charging arrangements should occur in an effort

[1] Transport Research Support Program, 2015, Railway Cost Structures, The World Bank Group, Retrieved from: <http://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/railways_toolkit/ch2_1_2.html>

[2] Infrastructure Victoria, 2016, Victoria's Draft 30 Year Infrastructure Strategy, State of Victoria, p. 41.

to progress heavy vehicle pricing, taking into consideration mass, distance and location. This should demonstrate how the model would work in practice on designated freight corridors.

Reducing Road Congestion

It is clear that without the introduction of market reform or controls road congestion will continue to grow with estimates indicating it will double by 2020.[3] This increase will compound and adversely affect the impact of other negative externalities such as road accidents and environmental noise and pollution. From a freight perspective, increasing road congestion will only serve to further restrict capacity and the movement of freight in and around Australia's ports and major roads.

Road pricing reform is one mechanism available to the Victorian Government to address the issue by aligning the demand of road users with road space supply. Effective reform in this area would not only help to address congestion but could also be used as an instrument to resolve pricing inequalities and generate competitive neutrality between road and rail. Modal shift, initiated through competitive neutrality and effective market reform can then help diminish road congestion by reducing freight volumes on the road network. For example, research suggests that one freight train from Melbourne to Sydney could replace 110 semi-trailers travelling via road, thus easing congestion. It is estimated that the current over-reliance of the Australian road network costs the national economy around $15 billion per year in lost productivity and congestion cost. [4]

Recommending Heavy Vehicle Road Pricing Reform

FORG supports the introduction of the heavy vehicle pricing and investment reforms which are currently being developed for the Transport and Infrastructure Council by the Heavy Vehicle Road Reform Project.

The Council of Australian Governments agreed in December 2015 to accelerate these reforms and to transition to independent price regulation of heavy vehicle charges by 2017-18.

To allow the timetable for the transition to independent price regulation of heavy vehicle charges to be met, the following steps are recommended:

- An early decision and announcement by the Federal and State Governments as to which economic regulator (or regulators) is to be given responsibility for independent heavy vehicle pricing regulation.
- Agreement by governments on a clear set of overarching pricing and investment objectives and principles to guide comprehensive heavy vehicle pricing and investment reform.
- The development of a new pricing framework – consistent with the overall objectives of pricing and investment reform - with the independent economic regulator to provide detailed guidance, and the freight transport industry to be consulted, on the details of the pricing methodology.
- The reform should also involve the introduction of direct mass, distance and location charges to ensure that heavy vehicles operators are charged only for actual road use with charges to reflect the different mass of heavy vehicles.

A decision on an economic regulator in the near future would allow both the regulator and industry time to have arrangements in place to commence independent price regulation of heavy vehicle charges in 2017-18, as part of a transition to replace PAYGO with a new framework.

[3] Stevens, 2010, 'The Cost of Traffic', The Motor Report Retrieved from <http://www.themotorreport.com.au/49948/australian-traffic-congestion-to-cost-20-billion-by-2020>

[4] Department of Infrastructure and Regional Development, 2014, *Trends: Infrastructure and Transport to 2030*, Commonwealth of Australia, Canberra.

An established economic regulator, such as the ACCC, has experience and capabilities arising from the economic regulation of infrastructure provision in other industries which rely on infrastructure access and use. These industries include rail, electricity and telecommunications. Each of these industries has a pricing framework that incorporates a regulated asset base (RAB).

FORG strongly believes that this reform should be included as a separate item as a short-term priority (in the next five years, consistent with the recommendation by Infrastructure Australia), as it is a low cost initiative, which makes a significant contribution to addressing road congestion and investment in Victoria. See Appendix B for a summary of FORG's position on heavy vehicle road pricing.

Better Use of Existing Assets

One of the themes of the Draft Strategy is to integrate land use planning and infrastructure planning. FORG welcomes the proposals and recommendations made in the Draft Strategy relating to this topic.

Land use planning is central to achieving good outcomes in the development of intermodal terminals and freight precincts. Without land and corridor reservation, the cost and benefit of developing terminals will only increase and these terminals will become less viable. To support this, consistent land use planning needs to be considered as part of the development of an overarching strategy for rail. As part of this strategy, there should be a focus on improving rail supply chain integration.

This section primarily focuses on the issues of Land Use Planning, detailed under Common Themes in the Draft Strategy, as well as Need 1 'Addressing infrastructure demands in areas with high population growth' and Need 13 'Improve the efficiency of freight supply chains'.

Land Use Planning

FORG welcomes the recommendation (Recommendation 1.5 in the Draft Strategy) acknowledging the need for an integrated planning system in order to best support improved rail supply chain integration. However, while planning for future freight rail receives a consideration amount of attention in Victoria there is yet to be a state document that has established a framework for the industry since the Victorian Rail Freight Network Review released in December 2007.

We believe Infrastructure Victoria has an opportunity to **develop, in partnership with industry, the Victorian Government's long-term freight rail strategy to improve freight efficiency, grow productivity and better connect Victorian businesses with their markets, whether local, national or international**. The various rail infrastructure and land planning projects listed in the Draft Strategy suggest that rather than a project-by-project assessment, a whole network investigation and an approach is required – focusing on key priorities and how to get better use from existing rail assets.

Land Reservation

The opportunities to preserve long, linear corridors for future freight purposes are few and far between, and are reducing. It goes without saying that a continued scarcity of urban land will impact future investment in transport corridors and terminals. Although highways, rail lines and bus routes have previously been allocated in Victorian State Development Plans, these have largely been unattainable in practice as cities and towns have expanded.

Without planning and land reservation, increasing freight volumes and population growth will continue to place pressure on the network, creating further congestion and restricting economic

growth. **To address these challenges, FORG recommends Victoria prioritise land and corridor reservations as a means to create additional freight rail capacity and ensure effective linkages with terminal precincts.**

Freight Precincts (FPL)

FORG agrees that ensuring appropriately zoned land, which is available for freight and logistics activities around key freight infrastructure, should be a short term objective for Victoria and supports the position in the Draft Strategy that this item should be addressed by the Victorian Government in the next five years.

Freight hubs are important elements in addressing the freight task and play a key role in reducing congestion. Lessons learnt from previous freight hub and terminal development projects have shown there is a need to ensure planning is undertaken at very early stage. In Melbourne, freight hub centres are developing in and around Somerton and in Altona, Spotswood, the Dynon precinct, Swanson Dock and Dandenong. As such, FORG recommends Victoria facilitate the integration of rail freight and logistics / client activities with other land uses, such as freight hubs and main rail lines.

Consultation with industry suggests there is a current lack of relatively inexpensive and large industrial land parcels available for development which presents a significant barrier to future growth in the rail sector. To combat restrictions in corridor planning in the future, there is a need for sound land release policies together with land acquisition strategies to enable the development of freight precincts. While in some instances there is no practical solution for land acquisition there is likely to remain a role for Victoria around investing in ancillary infrastructure to enable terminals to develop.

For further discussion on Freight Precinct development see below, ‘New and Expanding Assets: Development of Intermodal Terminals’.

New and Expanding Assets

Investment in new infrastructure projects or network enhancements should be more responsive to freight rail requirements by aligning with other components of the supply chain, such as grain storage capacity, port capacity, terminal capacity, regional terminal operating restrictions and interstate rail capacity. Investing in freight rail capacity in isolation will not result in increased freight rail, or an ability to effectively meet future volume growth, if ongoing restrictions at other points in the supply chain exist.

This section covers primarily Need 13 ‘Improving the Efficiency of Freight Supply Chains’ and the options for industry to reduce its total business costs for freight. This section is supportive of the development of intermodal terminals and we believe that infrastructure investment needs to be focused on rail as opposed to road to ensure that there is a real modal choice.

Development of Intermodal Terminals

Investment in infrastructure needs to be focused on the location and potential development of large terminals and warehousing precincts with strong rail connections (including short-haul rail services) to and from ports. Terminal designs should take advantage of transport integration and open access principles to ensure the efficient and timely movement of freight in our cities and regions.

The performance of freight rail services is highly dependent on the availability and efficiency of rail freight terminals (relative to road). Existing terminals in key population centres are generally

constrained by adjacent land uses. Over time these terminals will need to be complemented by terminals located in areas which are now more consistent with the rail system and industry needs. This includes greater consideration of multi-user operations, land-use requirements, and options to facilitate economies of scale.

Growth in freight rail will be facilitated by new terminals reflecting the distribution patterns necessary to service Victorian population centres. Terminals need to be close to the distribution centres of major retailers and contain reliable rail access with sufficient rail paths to support increasing traffic volumes. FORG encourages the Victorian Government to work with the federal and local governments to support the preservation of potential terminal sites, along with planning for future rail connections. **FORG recommends Infrastructure Victoria support the accelerated investment plan for terminals, including work towards integrating freight rail and logistics freight hubs.**

FORG believes the Western Intermodal Freight (WIF) Terminal is an important project. FORG notes this project is listed as requiring development in the next five years and we are supportive of planning for the project continuing given the value it will provide to the wider transport industry.

FORG also supports the Outer Metropolitan Ring Road (OMR) project in Melbourne listed in the Draft Strategy and considers it will be important in future terminal development, particularly in the context of first and last mile for freight delivery.

Standardisation of the Victorian Rail Freight Network

Both track quality and gauge have a significant impact on freight services and create restrictions on a range of operational conditions, including maximum speed, loading and use of a single sets of rolling stock across the network. Due to the historical development of Australia's rail network, gauges were developed around a state-based transport need and today remain disjointed. **To begin to address this, FORG strongly recommends moving towards standard gauge conversion, where possible, when considering network enhancements.** Standard gauge track infrastructure has several benefits, including its capacity to:

- Facilitate intrastate and interstate supply chains and in turn enable greater economies of scale and scope in freight operations and asset utilisation,
- Reduce entry barriers for new freight rail operators to a region, in contrast to broad gauge infrastructure which can act as an obstacle for operators who do not have broad gauge rolling stock,
- Improve utilisation of rolling stock across regions; and
- Potentially increase axle loads leading to larger freight hauls.

The inconsistency in gauge classifications requires a commitment to move towards standardisation. This will have benefits not only to the industry by improving service quality, performance and cost, but more broadly to the Victorian economy. A strategic investment approach to standardisation will generate efficiencies for rail and support Victoria's regional centres which rely on cost-effective freight transport to support industry and business.

In this context, FORG supports the commitment made by the Victorian Government to the Murray Basin Rail Link project, which will deliver important standard gauge upgrades to Victoria's rail freight network and help meet the increasing demand for freight services in the Murray Basin region. Given this, FORG believes the listing of the Regional Rail Gauge Standardisation (RRG) initiative, which includes passenger along with freight (as requiring further development) should be more refined whereby it is focused on the standardisation of Victorian rail freight network, outside the core V/Line passenger network.

Port Rail Access

At this stage, rail freight isn't fully supported at the Port of Melbourne with sidings closed off and penalties imposed on rail freight users. In the last financial year, the market share for rail at the Port was only 8 per cent.

The Draft Strategy supports the planning works for a rail access policy to the Port of Melbourne within 5 years. This will assist in the assessment of potential proposals for a Port of Melbourne container shuttle and improve Web Dock freight rail access. The outcome of these works would provide an alternative mode for the movement of freight in and out of the port area. While FORG is supportive of this we believe this should be considered a more urgent priority.

As such, FORG recommends that Infrastructure Victoria acknowledge in the Draft Strategy the need for the Port of Melbourne to facilitate rail port access as a priority matter.

Webb Dock Freight Rail Access (WDF)

FORG is supportive of the Webb Dock Freight Rail Access (WDF) and believes it should be considered as a recommendation – especially given this project was originally listed as a priority item for the state. The opportunity cost implications this project has together with expected growth in volumes and the need to ensure that rail remains competitive with road, makes it an essential project to achieve effective freight productivity.

While Webb Dock expanded at a cost of $1.2 billion to create capacity for an extra one million shipping containers a year in the Port of Melbourne, it has no rail access. FORG understands that West Gate and Monash freeways provide the only link to and from Webb Dock, which is forecast to generate more than 10,000 daily trips within 10 years. This puts further strain on a freeway that already struggles to move more than 170,000 vehicles each day. This lack of rail access has only served to increase reliance on road transport and add to existing congestion.

Metropolitan Container Shuttle (PMM)

FORG suggests that Infrastructure Victoria recommend the Metropolitan Container Shuttle (PMM) as part of its Draft Strategy. This would signify a positive investment in port–rail shuttle in the short term and assist in the movement of international containers from the Port of Melbourne to hubs across the metropolitan area. Rail shuttles from ports to metropolitan intermodal terminals are used successfully at many other major ports overseas as well as in domestic settings in Sydney and Perth. Port shuttles in Melbourne currently compete for capacity with higher yielding interstate freight services or with passenger trains, who are afforded priority by the government.

Achieving effective competitiveness with road freight via short haul distances is important to manage freight corridor congestion in metropolitan Melbourne. Industry groups have long expressed concern that there is no compelling commercial proposition for this type of service. Analysis recently undertaken by BITRE suggests there are a number of factors that will determine the success of short haul (i.e. container size, origin/destination and empty container handling requirements). These are all considerations that need to be recognised when determining if short haul rail services can become a competitive option.

Rail will continue to struggle in the short haul market while there is a continued perception among the wider logistics sector that rail is more expensive and less reliable when compared to road transportation. Despite this perception, short haul rail does not suffer any market failure characteristics itself but is challenged by the ongoing need for competitive neutrality and a history of underinvestment and poor road interfaces.

FORG recommends greater government investment and planning in the use of port shuttle/short haul rail infrastructure as a means to improve supply chains and provide a solution to the management of freight corridor congestion. This, along with other initiatives, to improve technology and practices at stevedores, or common user terminals, together with enhancing the slot management system, will provide opportunities for short haul rail to become more competitive.

Melbourne to Brisbane Inland Rail

FORG notes that the Inland Rail project (listed in the Paper as Melbourne to Brisbane Freight Rail Line (MBF) is an important project for Victoria; however, it is disappointing that given the significant benefits the project will provide the state it was not included as a key supported project. This project is expected to provide significant benefits to Victoria, with the gross state product to increase by $7 billion during construction and operation.

Inland Rail is an investment in strategic infrastructure for the future, providing capacity to serve the east coast freight market for the next half century and beyond. The current route will provide access to northern markets to many highly productive agricultural regions in Victoria by delivering a transit time of less than 24 hours for freight between Melbourne and Brisbane that is as competitive as road.

The project is expected to provide improved safety and sustainability for the community, with around $1.8 billion in benefits associated from lower accident costs, reduced congestion, improved environmental sustainability, improved residential amenity and 200,000 fewer heavy vehicle movements on road each year in 2050.

The Inland Rail Project is critical project for Australia and Victoria, with continued support from the Commonwealth Government and local governments in Victoria. At the 2016 Federal Budget, the Commonwealth committed an extra $594 million in equity to ARTC, in addition to the $300 million provided in 2013, to deliver the next phase of works for the project.

Given this commitment, the Draft Strategy should support and recognise the project by including in the list of recommended projects for delivery in the next 10 years – to support more freight on rail.

Rail Productivity

In the context of a 30-year strategy, the Draft Strategy should consider strategies to help lower the unit cost of rail freight transport and in turn boost greater efficiency and productivity in the sector.

Double stacking demonstrated success along the Adelaide to Perth corridor to enhance rail productivity, improve efficiency and grow modal share. While the barriers for double stacking across the Victorian rail network are significant and centre largely on height and width clearances, they are not insurmountable and the long-term benefits to the economy outweigh the project's challenges and cost outlay. Among other impediments, the limitations of single stack clearance bridges and road tunnels, together with the need to operate in electrified metropolitan areas, have prevented double stacking opportunities. By introducing double stacking on the north-south corridor, long-term efficiencies and productivity benefits can be realised as trains with double stacking capability carry up to 40 per cent more freight by weight than single stacked trains using

the same locomotive power.5 Planning around double stacking, including project implementation options, will also be important in the sustainable management of increasing freight volumes.

Higher axle loads are another important consideration to improve freight train productivity as they impact on the cost structure of above rail operators. Although these improvements may require investment in track, bridges, and rolling stock FORG considers it is a reasonable long-term objective to implement standard 23-tonne axle load, shifting above the common 19-tonne axle loads, which will allow 115kph train speeds.

Despite the variance, and at times a fit-for-purpose rationale, there are some benefits from moving to heavier axle loads and longer trains to increase productivity and enhance capacity. **It is for this reason FORG recommends Infrastructure Victoria consider the advantages, at least under the category of 'projects for further development, for upgrading axle loads and implementing double stacking as a means to ensure the freight industry is able to effectively meet future demand, address capacity constraints and raise productivity.**

Technology and Innovation

Without question, technology will continue to play a key role in improving freight rail efficiencies. The Paper makes a number of assumptions for future operating conditions. This section would benefit from a focus on the government's role in proactively managing technology implications and impacts to ensure future directions are shaped appropriately, rather than delivered on an ad-hoc basis. Given the increasing role for governments in technology coordination, FORG suggests Infrastructure Victoria consider the inclusion of a section on how the adoption of technology could lead to better transport outcomes. In this context, the Draft Strategy could look at how smart technology, including smart cities, can support growth and transform the sector. In recognising the reliance and future dependence on technology in the industry, particularly in a globalised market, Infrastructure Victoria should consider ways to better understand the challenges this era will bring and opportunities that can be exploited now to bring forth meaningful change in the future.

Strategies to improve and lift workplace productivity are a priority for the industry and should be supported by government incentives. Achievement in this area could be made through schemes that encourage the development and implementation of innovative processes and systems and in the adoption of new technology, including the trial of emerging technologies. The implementation of new workplace technologies and systems, including automation processes, can support greater efficiency in transport operations and create a more agile and collaborative industry.

As such, **FORG proposes Infrastructure Victoria explore the concept of a state-based transport innovation fund specifically to provide seed funding for the development of technology projects that will boost efficiency / productivity in the industry**. This would help to encourage companies to innovate where there is a gap in market-led uptake due to high risk or barriers to adoption.

ARTC's Advanced Train Management System is also an example of government seed funding for a project that will revolutionise the freight rail industry in the interstate network once in operation.

[5] eex.gov.au, 2016 *Double Stacking*, Retrieved from: http://eex.gov.au/double-stacking-2/

Discussion Paper on Victoria's Future Port Capacity

Timing of a Second Port

Given current and future expected capacity, FORG believes a second port in Melbourne is likely to be needed in a 25-30 year horizon.

FORG understands the Port of Melbourne has room to expand, with the current capacity set to almost double to handle about 4.5 million containers and further capacity increases, in excess of 7 million containers, could be achieved through limited investment – particularly when compared with the capital required for a new port.

The primary focus should be on how best to maximise the existing capacity at the Port of Melbourne in order to gain the full benefits of greater economies of scale in the supply chain. This should include exploring strategies to more effectively and efficiently manage port access, manage containers at Melbourne Port (ie port shuttle) and develop freight terminal/s.

This current Infrastructure Victoria strategy process provides an opportunity for a Victorian Supply-Chain and Ports Strategy to be developed as part of this Ports Paper work to be finalised in early 2017 and this could potentially feed into a national supply chain document, which is recommended by the Australian Logistics Council and supported by FORG.

Location of a Second Port

FORG supports the planning for a second port with a location based on rail connections with access to appropriately zoned industrial land. We consider that the 10-15 year lead times articulated in the report are reasonable.

At this stage, FORG does not have a specific preference between the options (ie Hastings and Bay West), however we would note that the option of Hastings does not currently provide access to standard gauge rail infrastructure and rail freight access would currently need to use passenger lines.

Landside infrastructure and rail connectors will be critical to the success of the second port. FORG suggests that more detailed information on the two major ports being considered should be released including likely freight flows and the cost of new infrastructure required to connect to the port.

The construction of major infrastructure projects, like the Melbourne to Brisbane Inland Rail project (which is expected to be completed within the next 10 years), along with the investment underway by the Victorian and Australian governments to standardise the Murray Basin Rail lines, should be considered as an important factor for any new port development.

Regional Rail Eastern Corridor (RRE1)

FORG is supportive of planning works to be undertaken on the regional rail eastern corridor to ensure future proofing and growth of the Dandenong rail corridor. As mentioned in the Draft Strategy there is potential for the freight task from Gippsland to grow and as such, this would need to be supported for a second port.

Appendix A

FORG 25 Year Infrastructure Strategy Document

2015-2040
National Rail Freight Infrastructure Strategy

August 2015

2015-2040 National Rail Freight Infrastructure Strategy

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August 2015

Note the views expressed herein may not be representative of the entire Group's membership base.

Introduction

Purpose

This document has been prepared by the Freight on Rail Group (see page opposite) to set out the views of the rail freight industry on the future direction for the development of the Australian rail freight network. It is intended to provide context for policy makers looking to maximise the productivity and capacity of the national freight logistics system.

The FORG believes that there is benefit in an industry led analysis of the needs of the nationally significant rail network. As an industry group, FORG believes that it is well placed to provide a view that is driven by market need rather than political or sectoral agendas.

The nationally significant rail freight network

This document identifies and focusses on the nationally significant rail freight network. The basis for including a line in the nationally significant network is a volume of greater than two million gross tonnes per year.

While FORG acknowledges that other parts of the rail freight network are of high importance to particular groups, such as grain lines to rural communities, the economic significance of these lines is not of national scale. Issues with this secondary network are more appropriately a focus for individual states.

This document also focusses on the public rail network, that is, the lines owned by the various Governments of Australia. Many of these lines have been privatised through long term leases, but in contrast to the privately owned railways primarily located in the Pilbara, the Government owned lines are characterised by open access and in most cases are mixed traffic railways. The group feels that this is the appropriate network to focus on for the purposes of this document.

The public network includes the central Queensland and Hunter Valley coal networks. These are both highly commercial businesses that can fully recover all of their costs and are governed by a rigorous economic regulation framework, that regulates, among other things, the way in which capital projects are progressed. The network owners and the coal industry are well placed to identify and deliver appropriate development projects in response to business needs, without any requirement for Government involvement.

It is likely that a significant program of works will occur on these networks over the life of this Strategy. This Strategy assumes that these networks will continue to be commercially sustainable and that it is not necessary or helpful to include projects in this document that are likely to be required for these two coal businesses. Accordingly, while this document has regard to these networks they are not a primary focus.

Scope of the strategy

This strategy focusses on two inter-related challenges, growth and productivity.

Increased productivity is vital as a driver of increasing living standards. An environment of growth in many cases creates the opportunity to also use productivity initiatives as an efficient mechanism by which to accommodate growth. The combination of growing volumes and increasing productivity also helps support the economic case for investment.

For some sections of the network, primarily the coal lines, it is possible to fund all of the desirable investment through user charges.

For much of the network though, rail is limited in what it can charge by competition from road. The rail industry considers that it is essential for Government to reform the system of heavy vehicle charging. While the consequences for the rail industry of heavy vehicle charging reform are uncertain and depend heavily on the detail of any reform, it would go a long way toward providing clarity around the justification for capital investment.

In the meantime, the industry believes that Governments and the community are supportive of public funding of rail freight infrastructure projects. This document has assumed that in this environment the preference of Government will be that all projects with a net economic benefit should be progressed to construction, with Government contributing to funding of those projects to the extent that it is not possible to generate private sector funding.

In many cases, desirable projects have significant and complex interlinkages. Specifically, the rail system is genuinely a network and its future development should ideally be analysed having regard to its performance as a whole.

As such it is challenging to undertake an economic analysis of proposed projects in isolation. Rather, the appropriate methodology is to analyse the complete scope of projects together and to then test the contribution of each project by reassessing the complete package with individual projects removed.

Such an analysis is a major undertaking and while some high level assessment of benefit has been undertaken for this document, a full economic analysis has not been attempted. Consequently, this Strategy should be seen as primarily scoping the projects that the industry believes, based on its expertise and an overarching understanding of the costs and benefits of each project, provide the package that best represents the base case that warrants further detailed analysis.

Over time it is intended that further analytical work will be undertaken to validate and refine the proposed program.

Freight on Rail Group

This document has been prepared by the Australian Rail Track Corporation on behalf of Industry, the Freight on Rail Group (FORG). This group has been established to provide a rail freight focussed industry group to engage with Government on major public policy issues. It consists of the seven major rail freight business in Australia.

Asciano
Australia's only combined rail freight and port operator, Asciano brings together Pacific National's rail operations and Patrick's ports and stevedoring businesses to form the backbone of Australia's global trade.
Contact: Tim Kypers
Phone:

Aurizon
Aurizon has rail and road-based freight and infrastructure operations across Australia. Aurizon operates above-rail freight services from Cairns through to Perth, and manages the Central Queensland Coal Network made up of approximately 2,670km of heavy haul rail infrastructure.
Contact: John Short
Phone:

Australian Rail Track Corporation (ARTC)
The Australian Rail Track Corporation has responsibility for the management of over 8,500 route kilometres of standard gauge interstate track across Australia. ARTC also manages the Hunter Valley coal rail network, and other regional rail links.
Contact: Simon Ormsby
Phone:

Brookfield Rail
Brookfield Rail manages and operates a 5,500 kilometre open access, multi-user rail freight network extending throughout the southern half of Western Australia, providing access for intermodal, iron ore, grain, alumina and various other bulk commodities.
Contact: Paul Hammersley
Phone:

Genesee & Wyoming Australia
GWA manages nearly 5,000 kilometres of track in SA and NT, including the 2,200-km Tarcoola-to-Darwin railway. It provides intrastate haulage of bulk commodities and the Adelaide—Darwin intermodal service as well as short-haul shunting and terminal operations.
Contact: Greg Pauline
Phone:

Qube
Qube is Australia's largest integrated provider of import and export logistics services. It offers a broad range of logistics services with a national footprint and a primary focus on markets involved in international trade in both the bulk and container markets.
Contact: David Knight
Phone:

SCT
SCT is a national, multi-modal transport and logistics company. It operates its own intermodal rail services from the eastern States to Perth, while also providing bulk rail haulage services. It has facilities in Brisbane, Sydney, Parkes, Melbourne, Adelaide and Perth.
Contact:: Geoff Smith
Phone:

Background to the network

The Australian rail freight network has a diverse ownership and control structure. All of the track that is the subject of this Strategy is owned by Government. However effective control is a mix of Government and private, through long term leases. While there has been some consolidation of the interstate network under ARTC, much of the structure of control still reflects the historical construction and ownership of rail networks by the States.

At the time of Federation, the State's rail systems had been developed as a series of stand-alone networks, radiating from the major ports to serve the hinterland and bringing rural produce and passengers to the major cities along the coast. Three separate track gauges were adopted by the States, effectively making their networks incompatible. The railways in each state were massive, vertically integrated enterprises managing all aspects of the rail system, and in many cases manufacturing many of the major capital items and undertaking most new construction.

This structure remained largely unchanged until the 1960's when there was an increase in momentum for a common gauge for the national rail network. Over the next two decades Melbourne, Perth and then Adelaide were linked to Sydney and Brisbane on the "uniform gauge" network. This network was completed in the mid 1990s with the standardisation of the Melbourne - Adelaide line.

Management of the network also increasingly recognised the ongoing shift in logistics, from a hinterland to port system, to a more networked national system. The Australian Government take-over of the South Australian railways and improved co-operation between the State rail networks through the 1980s gave way to the creation of a single interstate rail freight operator, National Rail, in the 1990s.

Through the 1990's, two significant forces drove the evolution of the industry structure. On the one hand was a view that the future of rail freight lay in competition between rail freight operators and that the separation of the rail infrastructure from operations ("vertical separation") was the best environment to achieve effective competition. At the same time there was a strong belief that the introduction of private sector ownership into the industry would drive productivity and customer service. While this view was not incompatible with the argument for vertical separation, some States took the view that their rail freight businesses would be best privatised in whole or part as vertically integrated concerns, though with open access provisions to facilitate competition.

All rail freight operations have now been fully privatised, though the Tasmanian network and operations have reverted to state ownership following failure of the business to achieve sustainability as a private enterprise.

The rail industry structure has now largely stabilised with the following key characteristics:

- The interstate standard gauge network has been vertically separated and most of the network consolidated under ARTC control. The only vertically integrated parts of the non-urban public rail network are the central Queensland coal lines controlled by Aurizon, the Tarcoola—Darwin line and some SA grain lines controlled by GWA, and the Tasmanian network.

- As a result of mergers over the last decade, the above-rail freight business is dominated by two operators, Pacific National (a division of Asciano) and Aurizon. In the intermodal market SCT also has a significant presence. Qube and GWA are significant operators across a number of bulk markets along with a number of smaller, niche operators.

- All urban passenger railways remain run by State Governments as vertically integrated businesses, with the exception of Melbourne where management has been privatised on a franchise basis. All urban passenger networks are organisationally separated from freight operations, though private freight operators access urban track. With the exception of Queensland, there is institutional separation between urban passenger and regional rail networks.

Figure 1 shows the Australian rail network by the entity that has effective management control.

Figures 2 to 4 provide a snapshot of the size of the networks and the task that operates across them.

Figure 1 - Australian rail freight network by managing entity

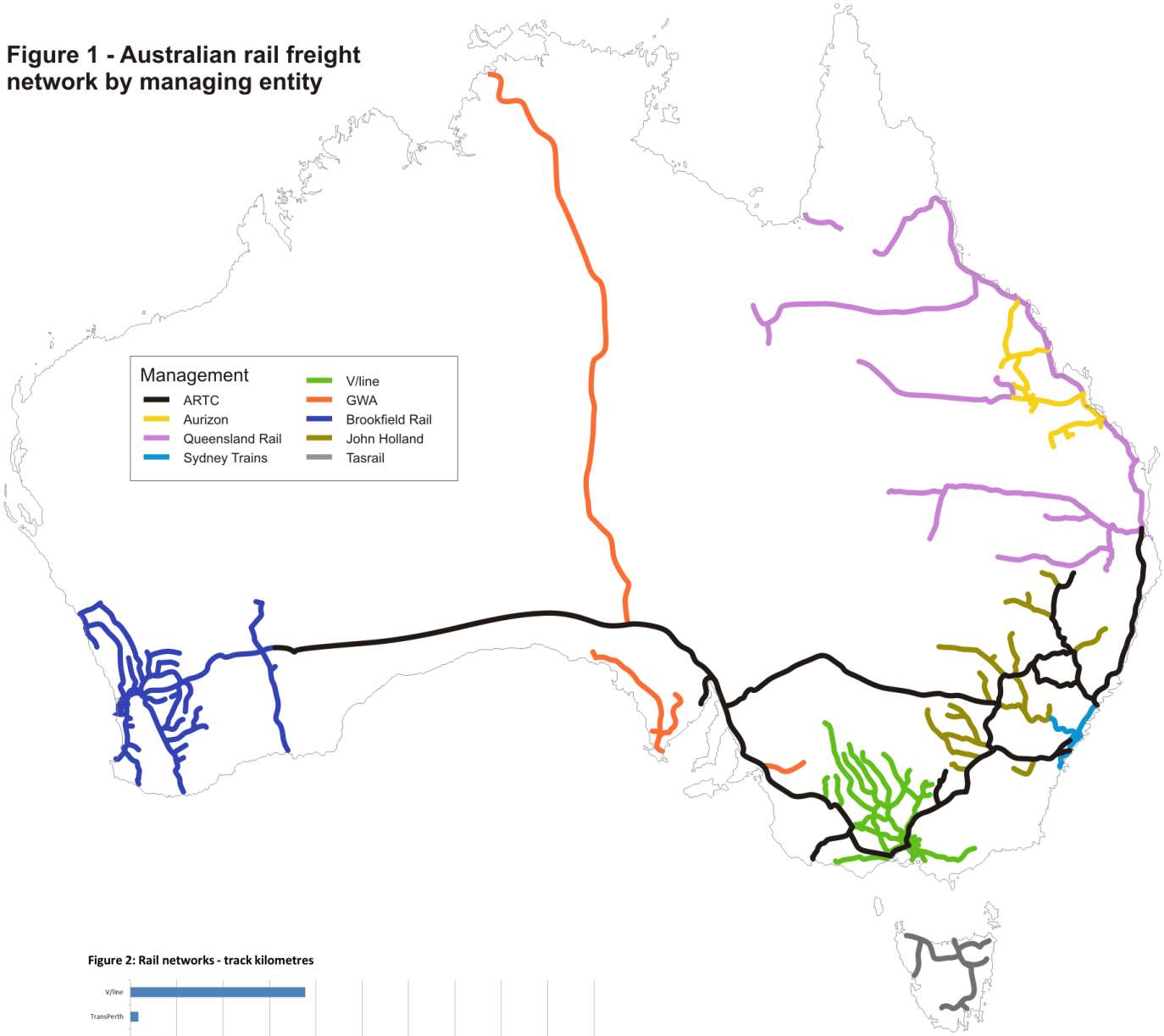


Figure 2: Rail networks - track kilometres

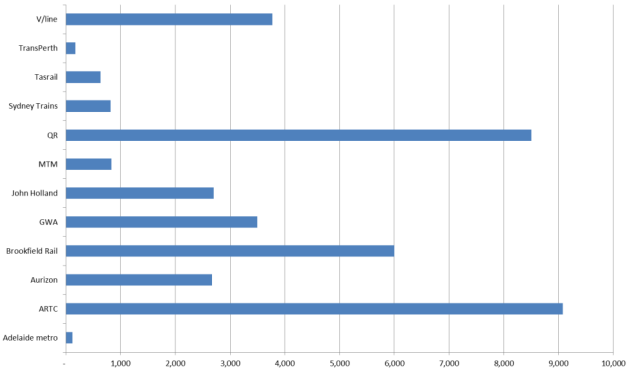


Figure 3: Rail networks - freight GTK (billion)

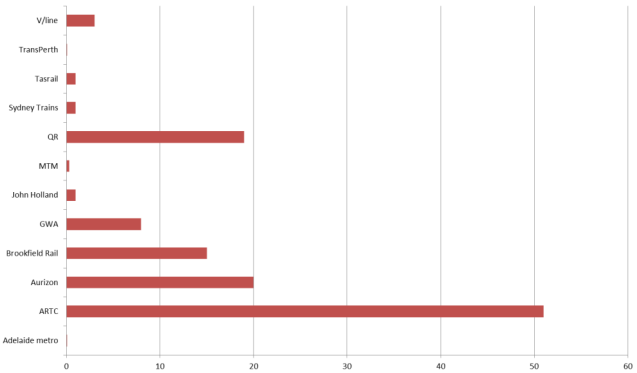
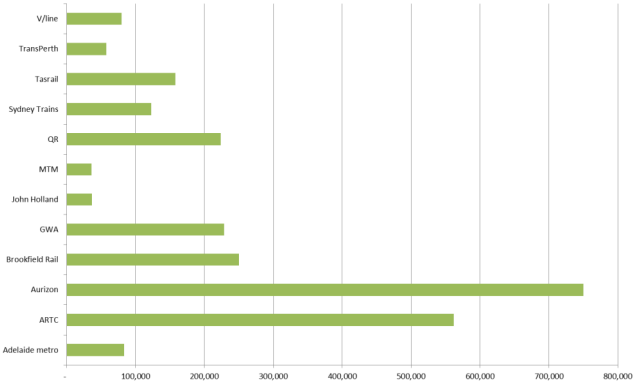


Figure 4: Rail networks - freight density (tonnes / km)



Volume and Growth

Rail freight markets

Figure 6 provides a snapshot of the national rail network and commodities carried by track owner.

The ARTC, Aurizon, Brookfield Rail and Queensland Rail networks represent xx% of total gtk across the Australian public rail network.

Other track owners provide either supporting regional networks or important interconnections.

The Sydney Trains network in particular is a critical connection, with freight needing to share the commuter rail network for access to and from the north, west and south coast.

The GWA Tarcoola – Darwin line is an important connection within the national intermodal network.

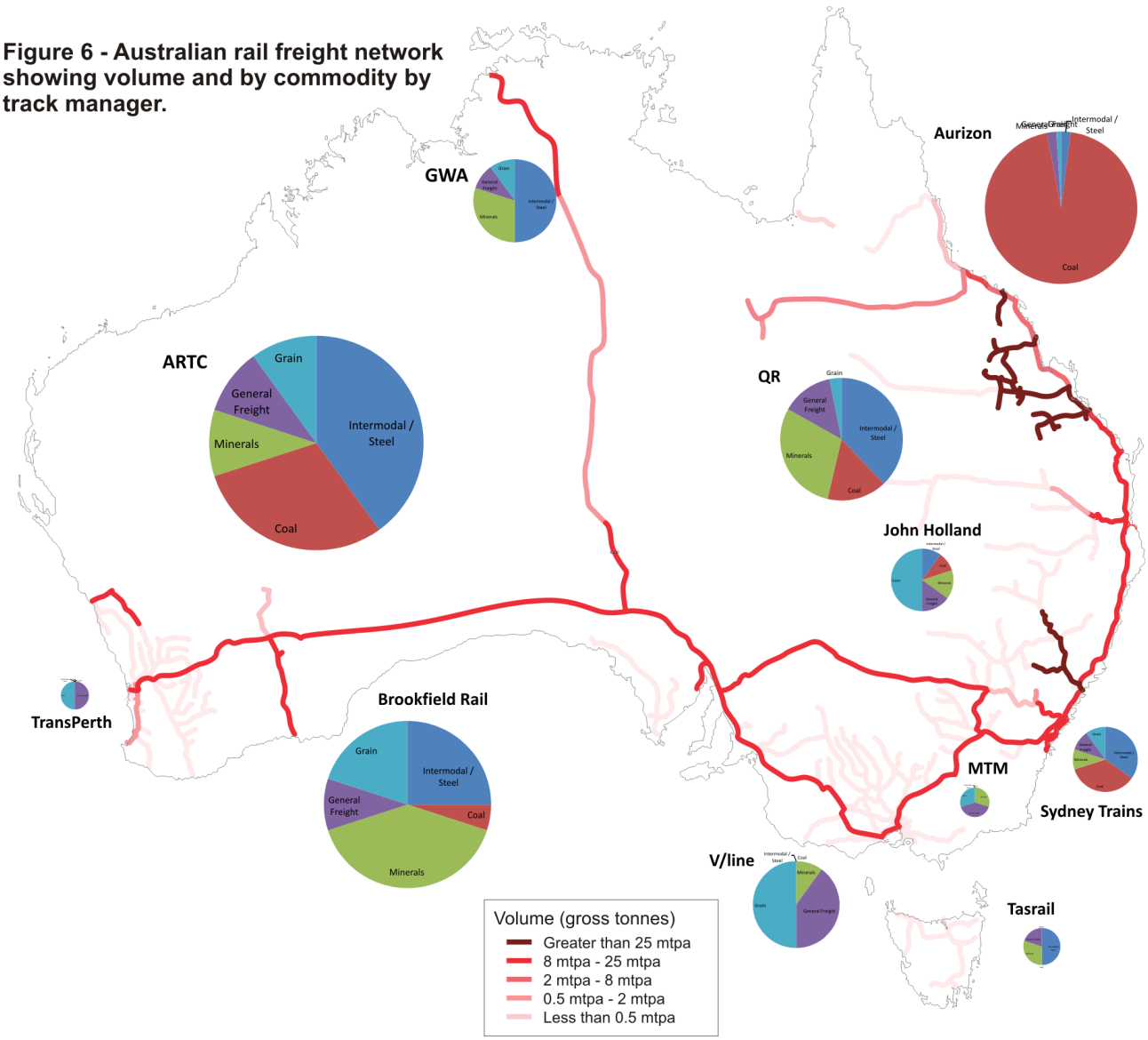
The Australian rail network is highly diverse in terms of the commodities carried on each of the networks.

Coal dominates the central Queensland network owed by Aurizon. Hunter Valley coal represents around xx% of gtk on the ARTC network. There is a comparatively small coal volume on the Queensland Rail network, from the West Moreton field.

Intermodal is around xx% of ARTC gtk and xx% of Queensland Rail gtk. It is also important for Brookfield Rail at xx% of GTK. While intermodal represents relatively small tonnages compared to bulk freight, the long distances it generally travels mean it generates significant gtk.

Iron ore generates the largest tonnages on the Brookfield Rail network at xx%. The decline in the iron ore price has recently seen the cessation of this traffic on the GWA and ARTC networks.

Figure 6 - Australian rail freight network showing volume and by commodity by track manager.



Base case volume growth

Figure 7 shows total GTK on the nationally significant network broken down into key commodity categories. This demonstrates the dominance of coal and intermodal on the freight flows on the nationally significant network. Importantly these two markets are also the ones with the most readily apparent potential for growth, though coal volumes will be highly dependent on future world demand and the relative competitiveness of Australian coal.

Base case growth expectations by market segment are as follows:

Intermodal - The group expects the interstate intermodal market to grow at an average of 3% per year for the next 25 years. This is lower than historical rates of growth, reflecting the income effect, that is, as people become more wealthy their consumption of goods increases at a decreasing rate. It also reflects a continuing decline in Australian manufacturing and more direct importing to the state of consumption, rather than the use of national distribution centres. The base case assumption is that rail market share remains constant. Issues around rail market share are discussed in more detail below. Note that intermodal volumes include steel.

Coal - The slowing of China and change in its growth mix from capital to consumption will contribute to a slowing of growth in metalurgical coal demand, particularly in the short term. In the thermal coal market, competition from unconventional gas and renewables has led to a significant softening of demand. In the medium term it is expected that demand from other developing countries such as India, and Australia's competitive advantages, may see a resumption of coal growth. Coal growth is best seen in terms of potential new or expanded mines. Figure 7 shows both contracted coal volumes and potential coal volume if all of the prospective mines proceeded in the timeframes and at the volumes currently proposed. Note that contracted volumes cease after 10 years as this is the maximum length of contracts.

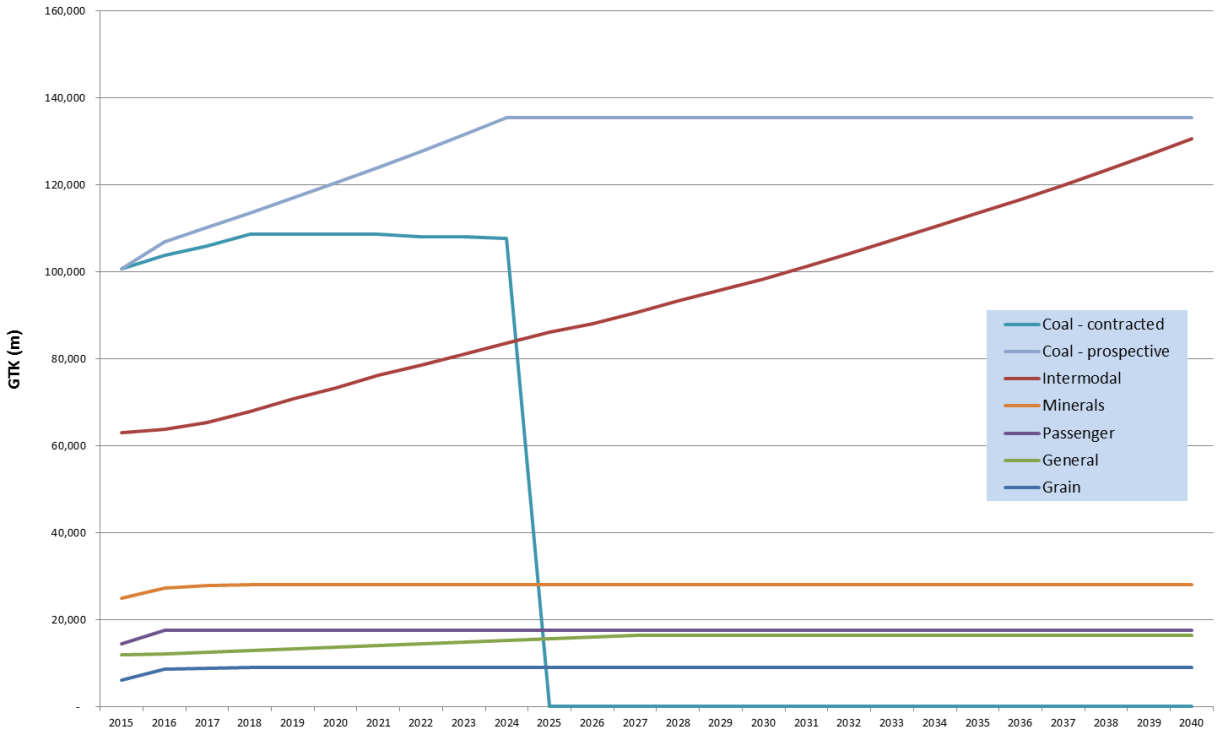
Import containers – Import containers are assumed to grow at the BITRE forecast rate of 5.1%. This reflects an assumed continuing relative decline of Australian manufacturing, but is slower than the rate of 6.5% per year growth achieved between 1999 and 2013. Growth of Brisbane, Adelaide and Perth will be higher than Melbourne and Sydney due to increased direct importing. Rail is expected to capture a rapidly increasing share of the cross metropolitan container market in Sydney and to a lesser extent Melbourne. However, while these are strategically important markets, the volumes do not generate sufficient GTK to have a material impact on national GTK. Import containers are included in the 'general' category in figure 7.

Other – Most other traffics are dependent on specific projects that have a high degree of uncertainty both as to whether new projects will proceed or existing traffics will continue. Iron ore volumes have been particularly volatile in recent years. There is little certainty around forward prices for minerals and the effect of climate change on agriculture, while passenger service frequency is a matter for Governments. Given that there is no strong basis to project volumes, all other traffic is assumed to remain constant in the medium term with grain volumes assumed to reflect the average for the past 5 year average.

These assumptions mean that growth on the network is essentially aligned to intermodal growth of 3%. At this rate, intermodal volumes will increase by a bit over 50% over 15 years. The growth rate for individual line sections will depend on the ratio of intermodal traffic to other traffic, but volumes on the core

Figure 7 - Base case volume forecast

Million GTK - Nationally significant network



intermodal network will generally increase by at least 25%.

High case volume growth

There are three potential drivers of a higher rate of rail freight volume growth: faster market growth; project specific new traffics, and; increased rail market share.

Faster market growth

There is a good chance that growth in the size of the intermodal market will be faster (or slower) than the 3% assumed. This may result in capacity projects being required sooner (or later) than expected.

While this would have a significant effect on total volume if sustained over a long period, it is unlikely to result in capacity problems. Analysis suggests that there is adequate capacity for around 25 year's growth at the base case rate of 3% with only minor capacity enhancements. As such, any looming capacity issues could be addressed by ensuring that the default capacity enhancement solutions, usually new or extended loops, are planned and funded to address capacity constraints as they arise.

The main impact of faster growth would be on transit times. Since most of the network is single track, growth translates fairly directly into increased crossing delay. Faster growth would mean that some of the projects discussed in this Strategy would ideally be accelerated to ensure that rail transit times remained competitive.

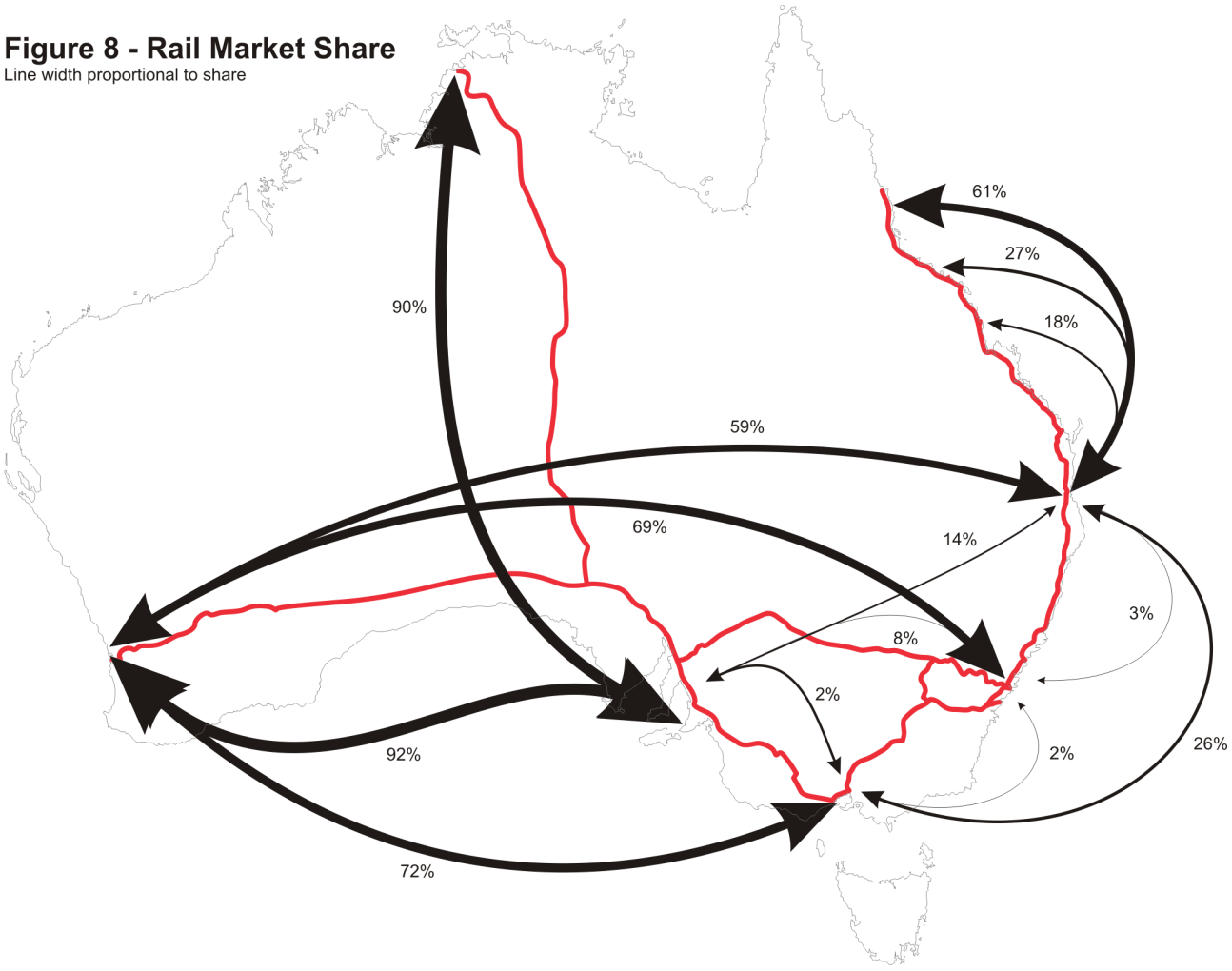
Specific new minerals traffics

It is difficult to predict which minerals projects will go ahead and in some cases whether rail will be the chosen mode. In the event that projects do go ahead, there may be a requirement for new lines or capacity enhancements on existing lines to service them. However, such investment will be well planned in the context of the mine development and in general will be financed by the track owner on the basis of the future revenue stream.

Significant projects that would impact on or add to the nationally significant network are:

- Iron ore projects in the Braemar region in the north west of South Australia, which would likely use the Broken Hill—Crystal Brook line.
- Iron ore projects on the Eyre Peninsular, which may use upgraded sections of the existing Eyre Peninsular network and / or new lines.

Figure 8 - Rail Market Share
Line width proportional to share



- The Carapateena copper-gold project in northern SA which may justify a new rail line, potentially also connecting the BHP Olympic Dam mine.

- Coal in the northern Galillee Basin, which would use the Mt Isa line to access the Port of Townsville, plus the Queensland North Coast line if it was to be exported from Abbott Point.

Increased intermodal market share

Rail market share on major general freight corridors has been a key long term issue both for the industry and politically. The introduction of B-doubles in the mid-1990's significantly increased road's competitiveness, which was further compounded by the decision of Government to subsidise road access charges to encourage B-double take-up. While rail has achieved significant reform over the past 20 years, road is now well entrenched on the short and medium haul corridors and rail continues to struggle to grow its market share.

Figure 8 shows estimated current rail market share for all of the key intermodal markets. Figure 9 shows estimated intermodal NTK by mode by market.

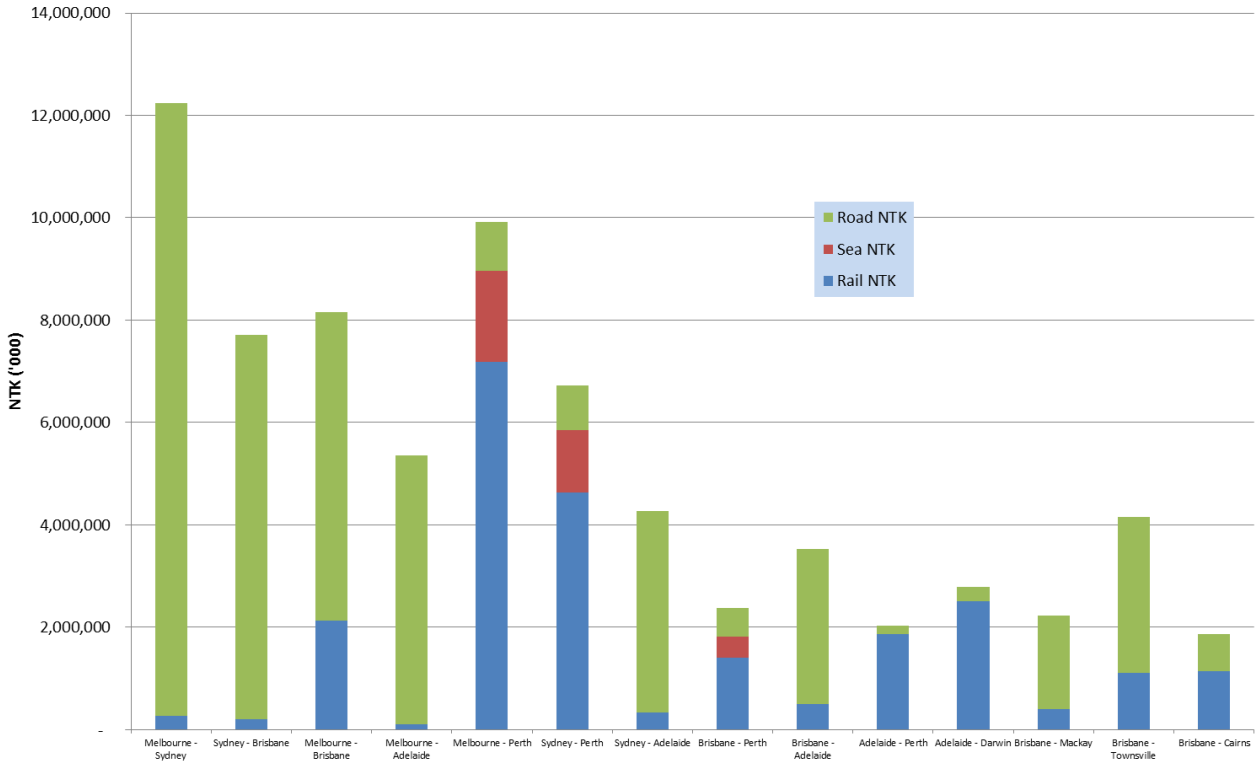
It should be noted that there is a high degree of uncertainty around the size of the general freight market and actual rail market share due to a lack of good data on road volume. The rail market shares shown are based on origin-destination pairs (rather than state to state volumes) and combine ABS, BITRE and separate rail industry data sources.

In the event that the projects described in this Strategy were to proceed it would lower rail's cost in all intermodal markets and in most markets improve rail's service quality. The productivity and service quality results of the potential investment are described in the final chapter of this Strategy.

However, while it is possible to predict the benefit to rail of this investment, the impact on rail's market share is largely dependent on Government decisions on road pricing. The rail industry believes that an economically efficient road pricing system would lead to a large shift in volume to rail. Equally though, if Government were to facilitate widespread access to B-triples without road pricing reform it would further erode rail market share. Also, continuing upgrade of the road system and improvements in truck performance will mean rail also needs to continuously increase its productivity just to remain at current levels of competitiveness.

Given these uncertainties, this document does not attempt to predict changes in market share.

Figure 9 - Net Tonne Kilometres by mode by market (2013/14)



Nationally significant freight network

The FRA has determined what it considers to be the nationally significant rail network in Australia, which is shown in Figure 10.

The key criteria for selection is volume. For inclusion, a rail line needs to carry a minimum of 2 m gross tonnes per year. At this volume, at track access charges consistent with that typically charged on the main Australian railways, a rail line is likely to make a positive direct economic contribution (DEC). This does not mean that they are capable of recovering fully allocated costs, but they are covering at least approximately their marginal costs.

This analysis does not necessarily align with the results of the National Infrastructure Audit undertaken by Infrastructure Australia (IA). The IA exercise needed to assess a large infrastructure portfolio in a short period and as such adopted a top down approach. The analysis used by FORG to identify the nationally significant network is a bottom up approach based on actual volume and as such is a more accurate analysis of the rail network.

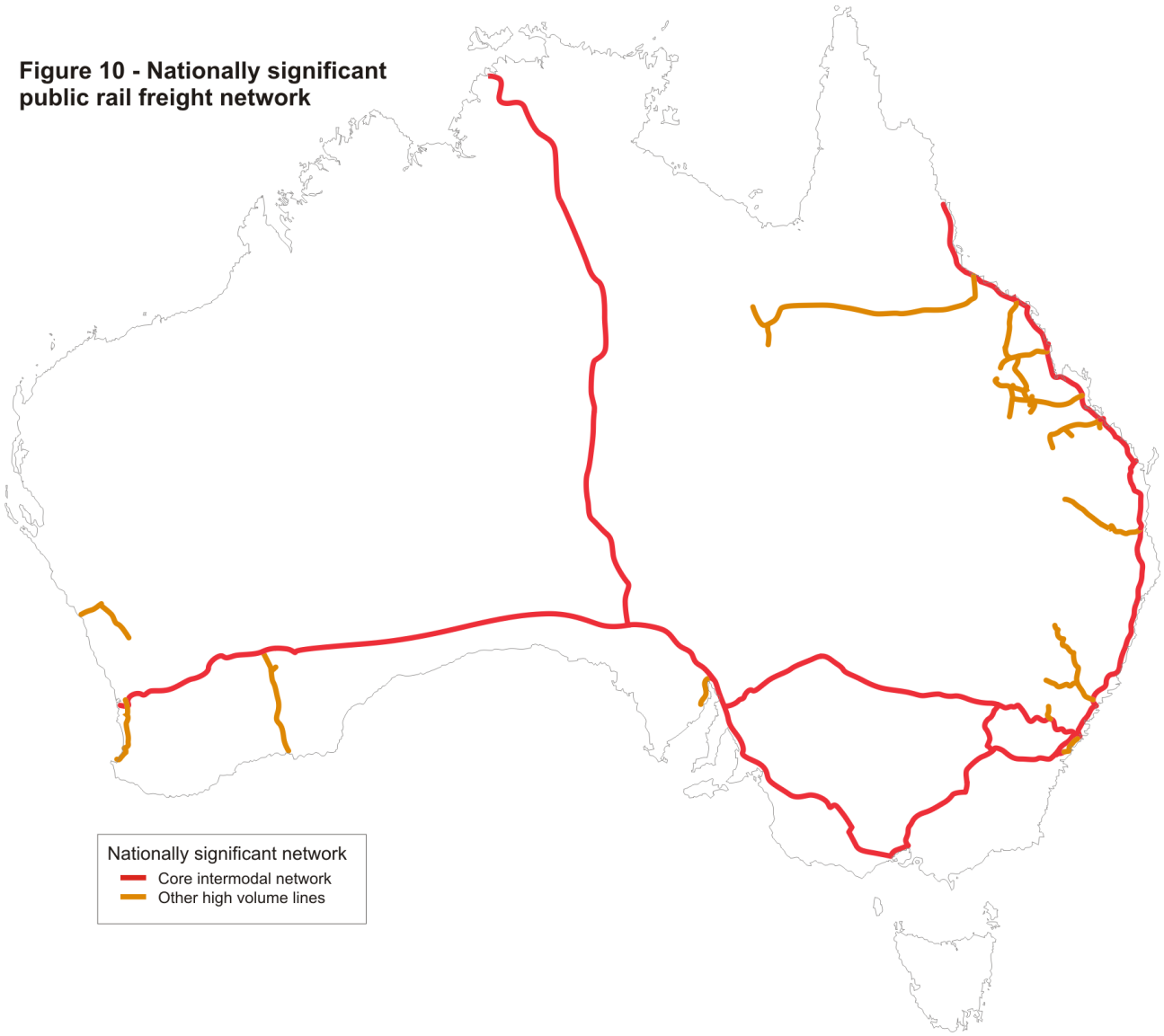
The rest of this document focusses on this nationally significant network. Note that figure 10 highlights both a 'core intermodal network' which is the network over which most growth is forecast, and other high volume lines, on which growth is uncertain.

The balance of the rail network is made up of dedicated urban passenger lines, which are not relevant to this freight Strategy, and low volumes lines, primarily for the purposes of grain transport.

FORG recognises that the grain industry is nationally significant in its own right and that these regional lines may be important at a local level and that there may be sound economic reasons for State Governments to support them on an ongoing basis.

While these lines do not warrant inclusion in a strategy at a national level, there may be benefit in developing a nationally consistent set of principles for how ongoing management and investment in these lines should be managed. This would provide greater certainty and direction for the industry. The members of the FORG would welcome working with Government to develop such a national approach.

Figure 10 - Nationally significant public rail freight network



Issues and opportunities

Context

The Australian railway network was originally developed as autonomous state-based systems. While many barriers have been broken down and operational characteristics aligned, there remain inconsistencies across the network and many areas of sub-optimal infrastructure capability.

This section outlines the current status of the main performance characteristics and the over-arching long-term performance objectives of the FORG members. It also discusses the issues for rail freight in each of the five mainland State capitals.

Transit time / reliability / distance

Distance is a key determinant of both transit time and cost. While rail often parallels competing road corridors, on a number of corridors rail suffers from an indirect route that makes it less productive and less competitive. This is particularly true for freight from Brisbane to Melbourne, Adelaide and Perth all of which currently transit through Sydney. Sydney—Adelaide is another route that has a notably indirect route.

Transit time is an important service quality issue in many intermodal markets and more generally as a driver of train cost.

Table 1 shows current intermodal transit times and average train speeds. In the long-haul intermodal market, transit times are generally meeting market requirements. In the short haul markets there is a large portion of the market that believes it requires next day delivery. While rail is close to road transit times in these corridors the effect of pick-up and delivery time makes it difficult for rail to compete in that part of the market. Rail competitiveness in medium haul markets is mixed. Rail is reasonably competitive on transit time for Melbourne—Brisbane and the far north Queensland markets. However, indirect routes and low service frequency on Brisbane—Adelaide and Sydney—Adelaide make rail uncompetitive. Note that the transit time sensitive market for Brisbane—Perth is roaded to Parkes and transhipped to rail, mitigating the indirect route via Sydney.

Reliability is generally recognised as the most important service quality issue. The industry has been working hard on significantly lifting service reliability levels and on the Melbourne—Brisbane corridor is now consistently achieving an on-time availability of freight of over 90%. An important element of this has been to increase the buffer between when a train is scheduled to arrive and when the freight is made available.

In this way, transit time has an important interaction with reliability. While current transit times may be generally achieving market needs, in some corridors it may be desirable to achieve further transit time reductions to boost reliability. Ultimately rail is likely to need to pursue reliability levels of greater than 95% to be competitive with road on this metric.

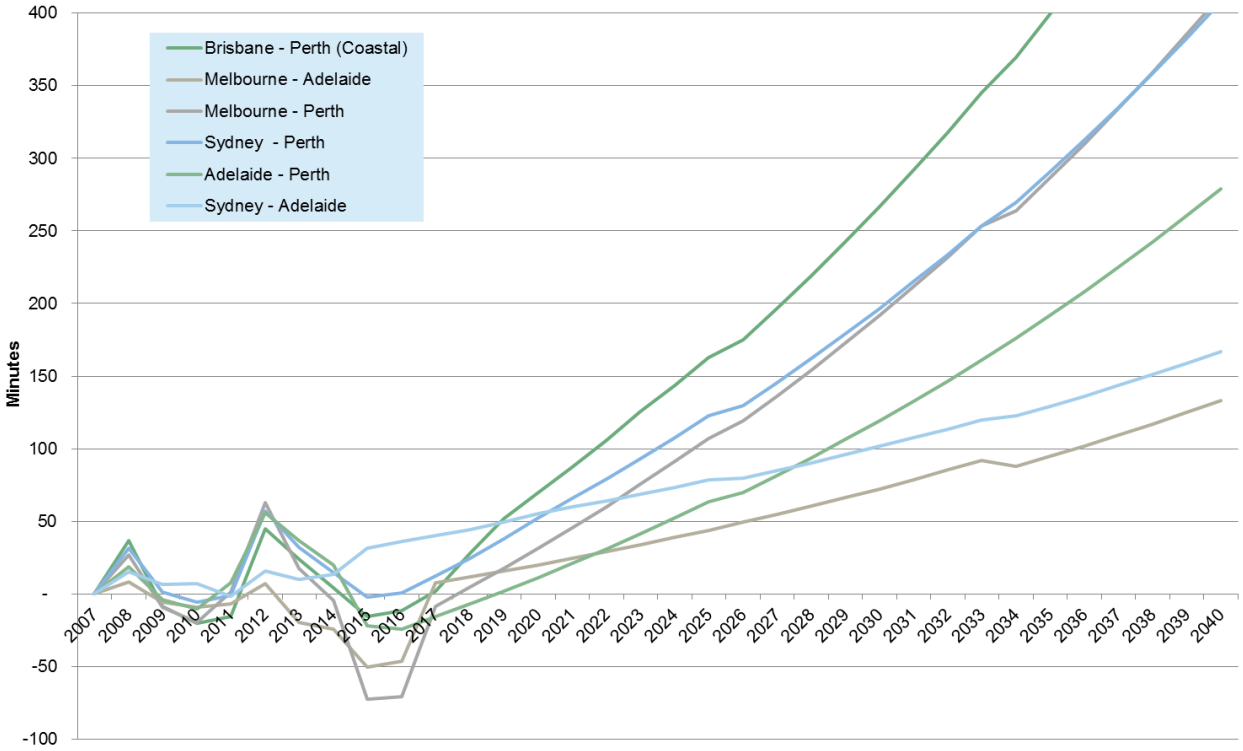
Growth in train numbers, particularly on single track corridors, translates directly into increased crossing delay and hence transit

Table 1—Intermodal performance comparisons	Current Rail Distance	Current Road Distance	Forward Direction		Back Direction		Average
			Target Train Transit Time	Approximate Current Transit Time[1]	Target Train Transit Time	Approximate Current Transit Time[1]	Approximate Current Speed (km/h)
Melbourne – Adelaide [2]	837	771	12.5	12.5	11.5	14	63
Melbourne—Sydney[2]	939	849	12	13	12	14	70
Sydney—Brisbane[2]	971	942	12	17.5	12	17.5	55
Melbourne—Brisbane	1910	1696	31	30.5	31	31.5	62
Melbourne—Brisbane Express	-		24	-	24	-	-
Sydney—Adelaide	1843	1385	31.5	29	30.5	29.5	63
Brisbane—Adelaide[3]	2814	2040	54.5	46	53.5	48.5	60
Adelaide – Perth[2]	2637	2715	54	38	49	41.5	66
Melbourne—Perth[2]	3474	3471	51	50	52.5	56.5	65
Melbourne—Perth Express	3474	3471	49.5	46	51.5	48.5	74
Sydney – Perth[2]	4103	3926	70.5	63	70.5	64.5	64
Sydney – Perth Express	3937	3926	49.5	53	51.5	59	70
Adelaide—Darwin	2971	3030					
Brisbane—Perth	5074	4342					
Brisbane—Mackay	978	972					
Brisbane—Rockhampton	1338	1360					
Brisbane—Cairns	1678	1710					

1 Average of directions. Refers to dwells for operational reasons at major nodes (Sydney, Melbourne, Adelaide, Broken Hill, Port Augusta, Cook, Parkeston). Does not exclude crossing delay.
2. Standard Superfreighters only. Excludes Express and General (80 km/h) trains.
3. Brisbane—Adelaide transit time is for a third morning availability transit, which is not road competitive.

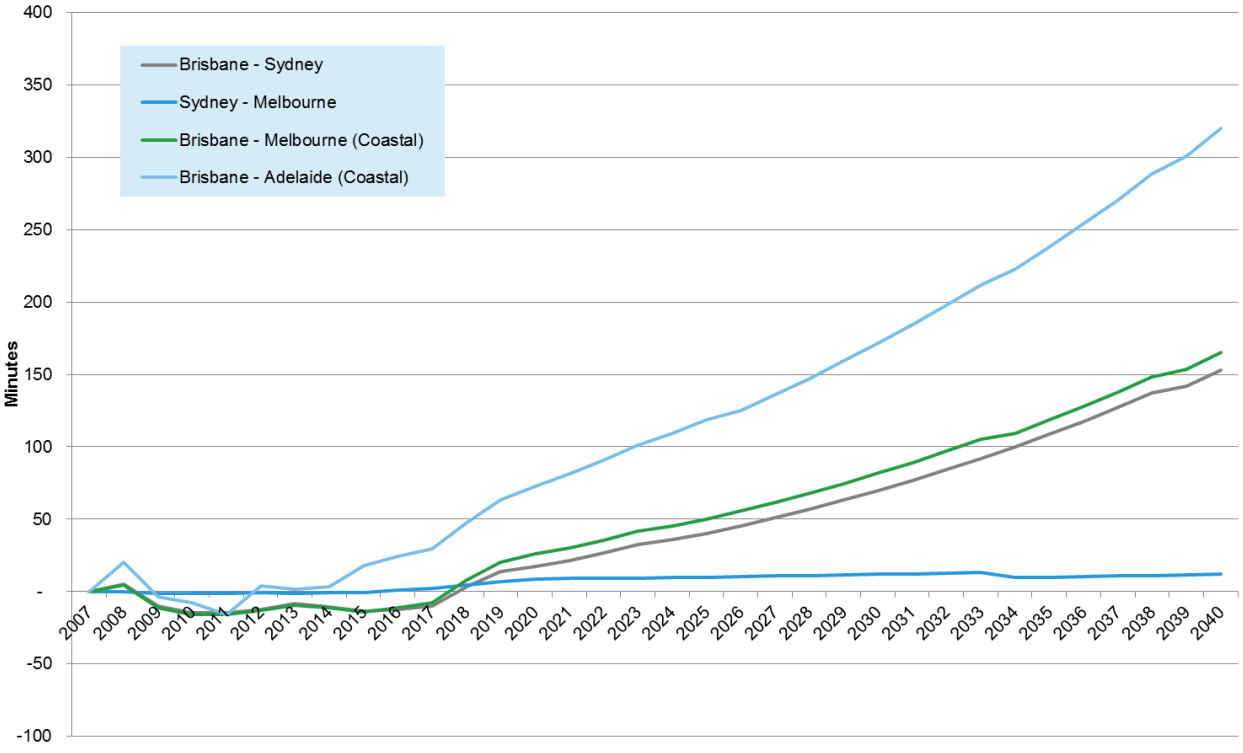
East West corridor forecast change in transit time

(assuming only minimum projects required for capacity)



North South corridor forecast change in transit time

(assuming only minimum projects required for capacity)



time. In the event that volumes grow as anticipated in this Strategy, and in the absence of specific initiatives to offset the increase in train numbers, there will be growing levels of delay. Figures 11 and 12 show the projected increases in transit time for traffics on the East West and North South corridors respectively. Most corridors are expected to experience transit time increases of 10% - 15% by 2040.

Signalling

The majority of the nationally significant network is currently signalled using the CTC system. CTC is a highly mature technology that facilitates efficient operations with good levels of safety and reliability. It is, however, high cost and highly inflexible.

A number of the more lightly operated sections of the network use train order systems in various forms. These are low cost to implement but restrict capacity and have greater scope for safety breaches.

ARTC has been working on a next generation, communications based safeworking system, the Advanced Train Management System (ATMS). ATMS was conceived more than 10 years ago when ARTC recognised that the technology to control trains using safety critical software and radio was mature enough for such a project to be a manageable development risk.

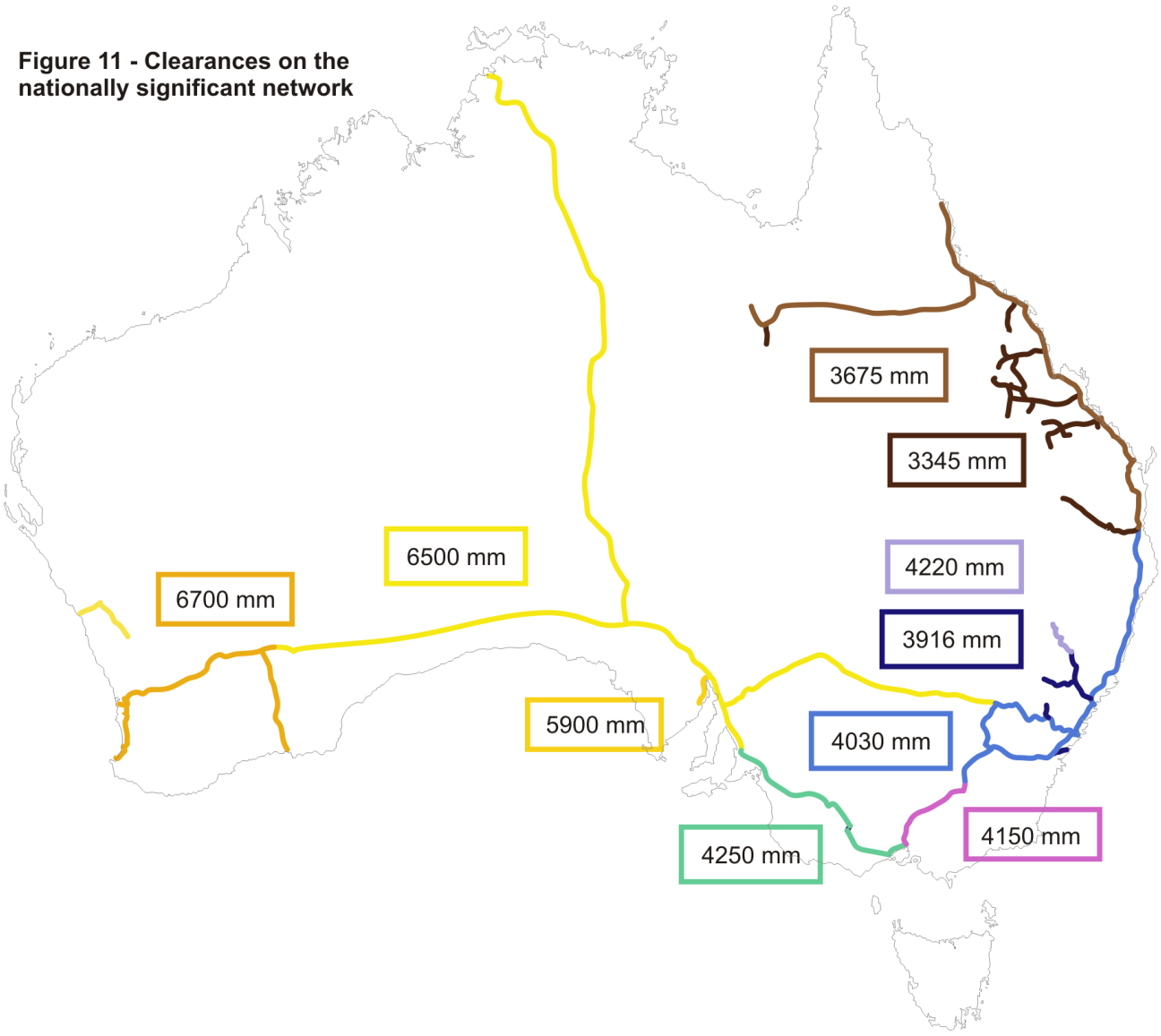
The project has completed the proof of concept phase and is now in a field trial phase between Port Augusta and Whyalla to demonstrate the functionality of the system in a live environment before commissioning the system for revenue operations.

An extensive review in 2014 by international experts confirmed that ATMS is significantly more advanced than any comparable system and remains the most suitable solution for communications based safeworking in the Australian operating environment.

ATMS is expected to deliver a wide range of benefits including increased safety as the system will directly intervene to stop a train that breaches its movement authority, increased capacity in the order of 10% (on single track) as a result of trains being able to follow each other at close headways, reduced capital and maintenance costs through the elimination of much of the on-ground infrastructure required under CTC, and reduced crossing delay through the ability to reduce physical safety buffers and greater granularity of train positioning.

While it has not been a primary focus of the ATMS project, the safety enforcement capability of the system will open up extensive

Figure 11 - Clearances on the nationally significant network



opportunities to rethink the way that trains are crewed, with the system ultimately a potential enabler of train automation.

Clearances

Figure 11 provides an overview of the current maximum height clearances on the nationally significant network. The long-term objective of the industry is to achieve double stacking clearances across the core intermodal network and the North American rolling stock outline across the entire nationally significant network.

Double stacking offers operating cost savings in the order of 5% to 10% and helps facilitate growth without the need to invest in other capacity projects. A height of 6500 mm is adequate though 6800 mm is preferred.

While in principle the industry would like to be able to offer double stacking for all intermodal origin-destination pairs, this is impractical. The need to operate in the electrified metropolitan area in Sydney means that double stacking to the north and west of Sydney is not realistically achievable. Inland Rail would allow this constraint to be bypassed for freight to and from Brisbane from Melbourne, Adelaide and Perth, but it is not realistic to achieve double-stacking Sydney—Brisbane.

In Queensland, double stacking of the North Coast line would be a very long term proposition requiring a dedicated freight line through Northern Brisbane and most likely conversion to standard gauge.

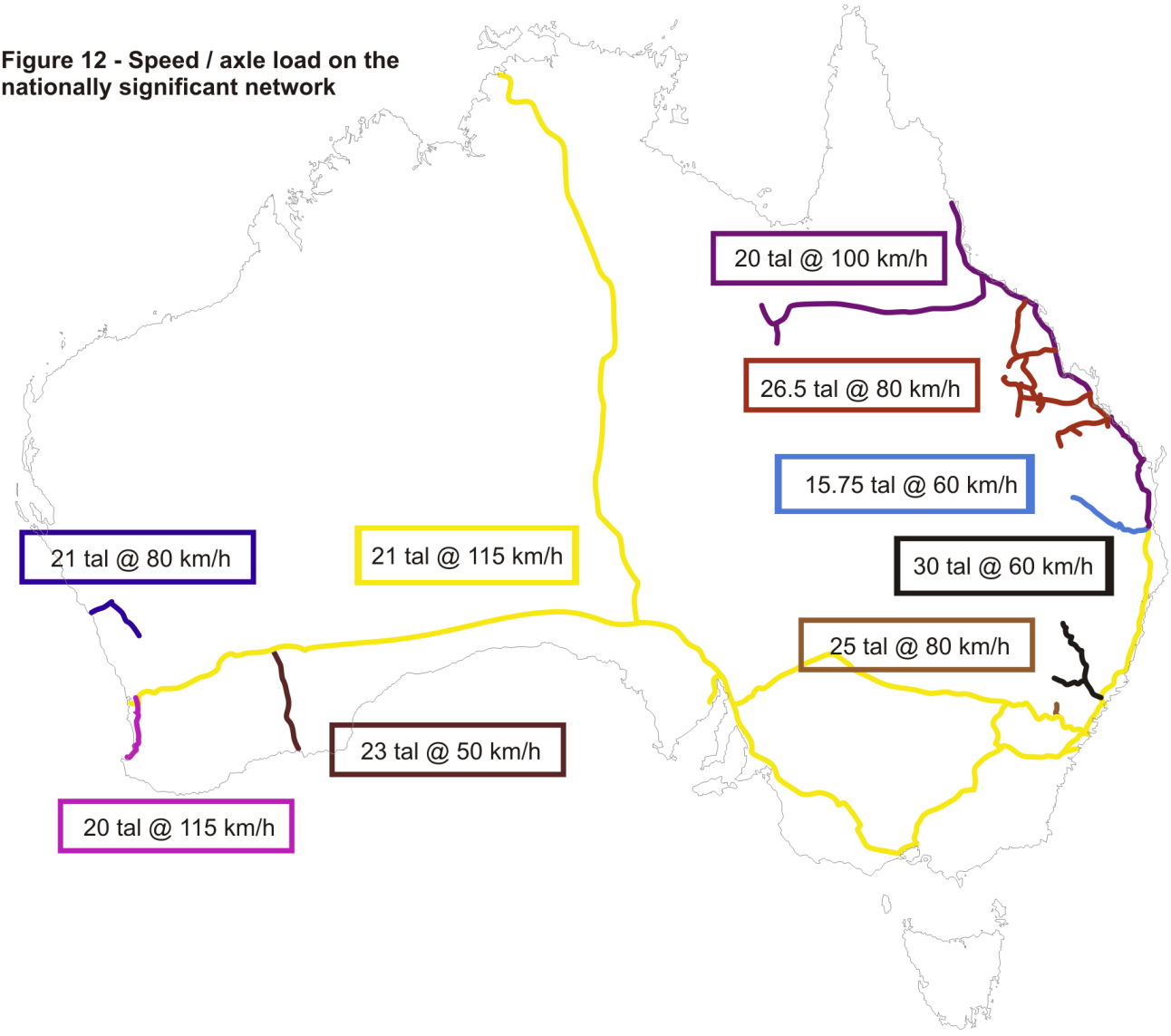
Double stacking also requires suitable terminals. In Melbourne it is necessary to avoid the Bunbury St tunnel immediately to the west of Dynon. The Southern Sydney Freight Line has been designed to accommodate double stacking only as far as Moorebank.

Elsewhere on the network it would be desirable to work toward achieving the North American rollingstock outline. This gives greater capacity for bulk wagons as well as being able to source rollingstock at considerably lower cost. To achieve this requires a height clearance of 4850 mm. It also requires a 50 mm increase in width. The increase in width has particular challenges due to the effect on passenger platforms while in general achieving the North American outline would involve a substantial scope of work on structures. Accordingly it is a long term aspiration.

Speed/Axle Load

Speed / axle load feeds directly into the cost structure of above-rail

Figure 12 - Speed / axle load on the nationally significant network



operations and is an important determinant of service offering. The current speed & axle load configuration of the network is shown in figure 12.

For intermodal services there is no strong case to operate at above 115 km/h or 21 tonne axle loads, though for a minority of traffic, particularly vans, a small increase to around 23 tonne axle load would have some benefit.

The main deficiencies are on the narrow gauge network in Queensland. It would be desirable to move to heavier axle loads for West Moreton basin coal, which may be possible in conjunction with the development of Inland Rail. Upgrading the Queensland North Coast line to 21 tal at 115 km/h would be desirable but is likely to only be practical in conjunction with gauge conversion, which would be a very long term project.

There is some enthusiasm for moving to heavier axle load grain trains. However, the constraints on grain train axle loads lie off the nationally significant network with the regional grain network and grain sidings being the key barrier to more efficient grain trains.

The main constraint to increased axle loads is generally rail weight, though restrictions on bridges and culverts are also sometimes material. Significant sections of the network in SA, Victoria and Queensland have 47 kg/m rail, where a minimum of 53 kg/m is desirable. Over time the light rail will need to be replaced due to wear, while poor quality bridges and culverts are also routinely replaced as part of stay-in-business capital expenditure. As the track is upgraded as a matter of course, axle load increases will become relatively straightforward. It would be ideal to accelerate the replacement and upgrading process, but it is generally difficult to justify this economically.

Train Length

Current maximum train lengths are shown in figure 13.

For the interstate network, 1800 m has become the de facto standard. Adopting this length consistently across the network has the advantage that trains can operate between any pair of locations at an optimal train size without needing to attach / detach wagons.

The corridor between Melbourne and Adelaide is currently transitioning from 1500 m to 1800 m. The main constraints to full 1800 m operations are level crossing issues at Torrens Junction in Adelaide which limit eastbound length, and a shortage of 1800 m loops between Murtoa and the Victoria / SA border.

Train lengths on the NSW North Coast are limited to 1500 m due to the high cost of extending loops on this corridor, which has difficult terrain, and constraints through Sydney.

The route between Sydney and Parkes via Lithgow is also length constrained, though 1500 m trains are now able to operate in the westbound direction. In this case it may be challenging to move to longer trains due to the steep grades through the Blue Mountains.

Coal train lengths to the West Moreton basin are inefficient. There may be an opportunity to address this in conjunction with Inland Rail, though level crossing issues in Brisbane are considered to be a constraint to trains over 100 m.

It would be highly desirable to increase intermodal train lengths on the Queensland North Coast from the current 670 m. This would require an extensive program of loop extensions.

In the long term it may be desirable to significantly increase train lengths across the interstate network, such as to 3600 m, for capacity and transit time reasons. The Inland Rail design is proceeding on the basis of future proofing the line by anticipating that loops will need to be extended to accommodate 3600 m trains, nominally in 2040.

It is also worth noting though that moves toward greater train automation may influence train length. The main benefit of longer trains is the reduction in crewing costs. To the extent that train automation reduces the crewing requirement it also reduces the productivity benefit of longer trains, while the infrastructure cost of increasing train length can be large.

Weather resilience

In general the nationally significant rail network has a good level of resilience to extreme weather. There are a number of areas though that tend to be susceptible to flooding in particular. This includes the NSW North Coast, particularly around the Hunter River, and areas that are generally dry but can experience extreme rainfall, including the Nullarbor and much of outback South Australia and NSW. While the impact of weather can be quite large, the occurrences are sufficiently infrequent that it is difficult to justify the cost of mitigations.

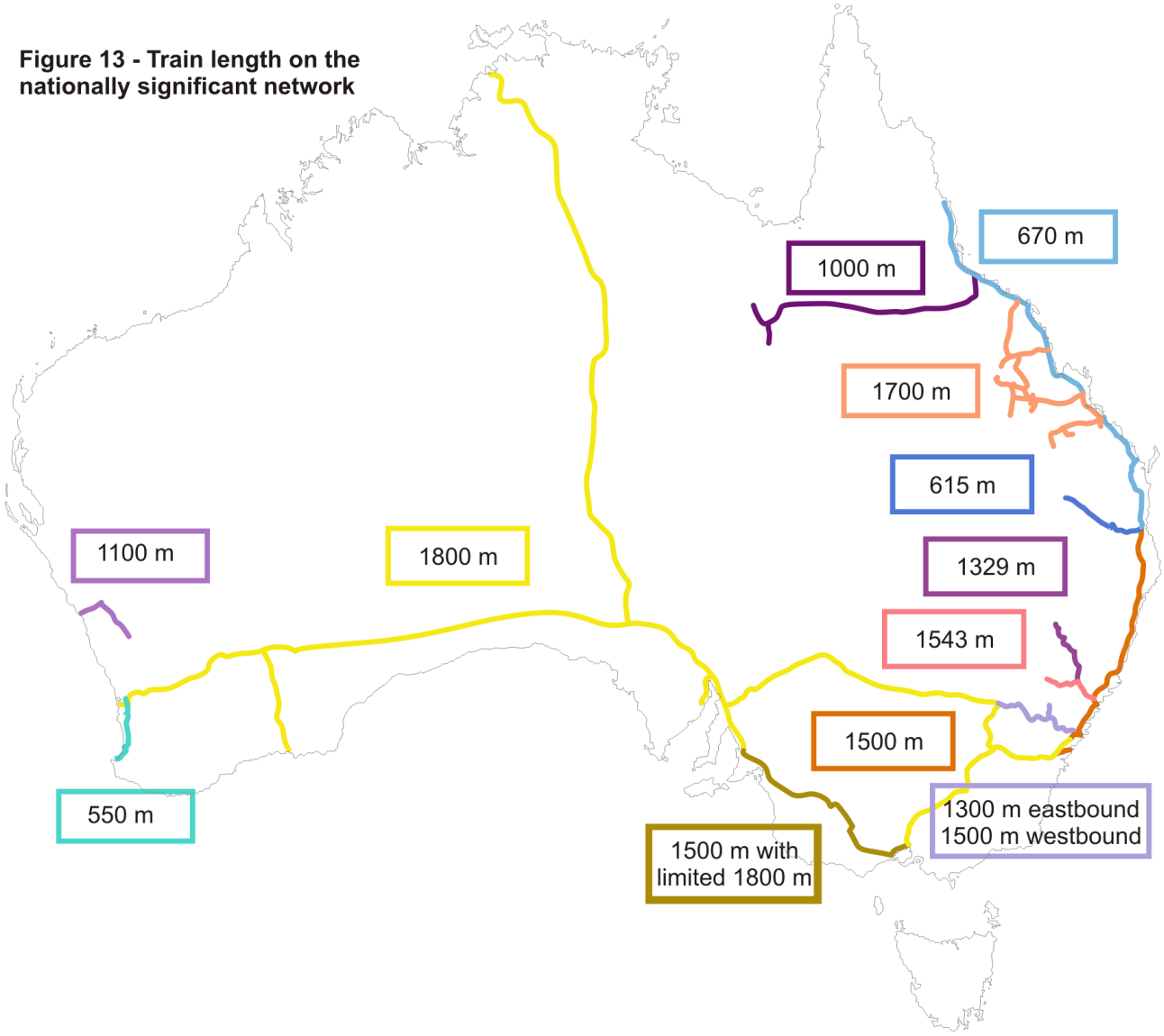
Much of the Queensland network is an exception to this. In general the Queensland network was built to a lower standard than the rest of the nationally significant network while the Queensland North Coast in particular suffers the most extreme weather, due to the susceptibility to cyclones. Closure of the rail line and consequent disruption to communities is not uncommon.

In Queensland therefore there may be a case for investment to improve the level of resilience of the network, potentially keeping costs reasonable by focusing on mechanisms to expedite the restoration of the track rather than eliminating the risk of flooding altogether.

Brisbane

Brisbane is a challenging city for rail freight. At present there is a dedicated standard gauge line in the south, and a partially dedicated dual gauge connection to the port. However, to the west and north rail freight shares the network with urban passenger services, including needing to operate virtually through the CBD to access the north.

Figure 13 - Train length on the nationally significant network



A solution to access to the west exists by way of the Southern Freight Rail Bypass which connects Rosewood in the west to Kagaru in the south and which would form part of Inland Rail.

However, access to the port remains a challenge. The Eastern Freight Rail Bypass (EFRB) proposed by the Port of Brisbane, which would essentially follow the Gateway motorway between Algester and Lytton, has been identified as the best option to achieve a double-track, double-stack capable rail corridor. However, analysis suggests that this project will be difficult to justify in the short to medium term. Initiatives to enhance capacity on this line are likely to represent the best short term solution, while in the medium term there are options to improve freight access in conjunction with a new cross-river passenger corridor.

There is also currently a cap on coal trains of 87 paths per week in each direction. In the event that demand were to increase this could be alleviated either through a project such as the EFRB or by going to longer and/or heavier axle load coal trains.

A plan for dedicated freight access to the north has never been developed and given the constraints will be highly challenging. Ultimately though it will be desirable to identify a feasible scheme both to achieve the benefits that come from separating freight and urban passenger services, and to ultimately facilitate standard gauge to the north.

Future development of terminals is the other key issue for Brisbane. The area around Acacia Ridge remains the preferred centre for freight. In the longer term, both Ebenezer and Bromelton offer a large quantity of suitable industrial land with good rail access (subject to Inland Rail being built). However, industrial development in the short to medium term appears more likely to move toward the east around the airport and port. On this basis, further development of Acacia Ridge may be the preferred solution for increasing intermodal capacity in the short to medium term.

Given the current and expected trend in the industrial geography of Brisbane it is unlikely that a significant cross-metro rail shuttle service for import / export containers will develop in the short to medium term.

Sydney

Recent years have seen considerable change in the rail freight landscape in Sydney. The Southern Sydney Freight Line offering dedicated access from the south has been completed and substantial investment has gone into the upgrade and enhancement of the line to Port Botany. The Northern Sydney Freight Works package is heading toward completion, which will offer a significant increase in saleable freight paths to the north.

The Moorebank terminal project is now about to get underway,

which will offer considerable opportunities in both the interstate and export / import shuttle market.

The major challenge for Sydney going forward is the future location of terminals and the rail infrastructure to access them. The direction in Sydney is for industry to increasingly consolidate in the Western Sydney Employment lands over the medium to long term. This area, which stretches from around Eastern Creek to the planned second Sydney airport at Badgerys Creek currently lacks rail infrastructure and is relatively difficult to develop a rail corridor to.

Another long-term issue is the future of freight on the Illawarra and western lines. These two lines already have significant pressure from the combination of freight and passenger volumes and the passenger task on both lines is likely to grow substantially. Both lines are challenging to increase capacity on.

Sydney already has a vibrant cross-metro import / export container shuttle market and current initiatives at Enfield (NSW Ports ILC), Chullora (Pacific National /Patrick), Villawood (Toll/DP World) and

Chullora (Pacific National /Patrick), Villawood (Toll/DP World) and Moorebank (Qube) are expected to substantially grow this market. This will start to have some impacts on track capacity in the Sydney area, with expansions on both the SSFL and Port Botany line likely to be required.

Melbourne

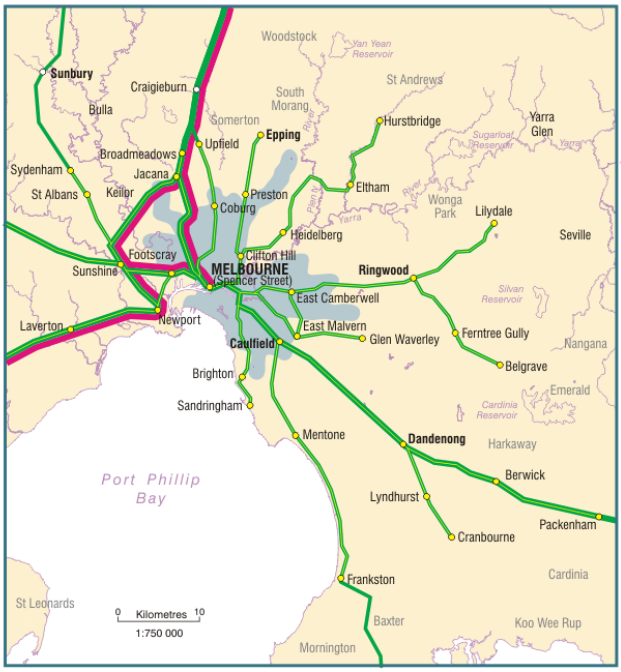
Melbourne is reasonably well positioned for rail freight with good access to the national network from the north and west, but faces significant challenges into the future.

A major issue is the existing interstate terminals located in the Dynon precinct. Given their proximity to the city and intense competition for land for port uses it will be desirable to relocate the terminals. The Bunbury Street tunnel also represents a major constraint to achieving double-stack access into Melbourne and relocating the terminals is important to ultimately achieve productivity growth through double-stacking.

The Victorian Government has made good progress with development of a longer-term strategy for terminals with a Western Intermodal Freight Terminal (WIFT) at Truguninna emerging as the preferred solution and potentially a second terminal in the north at Bevridge as a longer term opportunity. The major challenge in the short term will be to identify an appropriate corridor to provide a dedicated freight connection between Truguninna and the national standard gauge network.

The Victorian and Australian Governments have had a long-standing objective to foster port shuttles in Melbourne. The relatively good road network and proximity of the western industrial area to the port have meant that this business has not had significant success to date.

However, as industry moves further to the west and given the strategic positioning of WIFT and the potential for a major freight



precinct to grow around it, it is likely that this business will develop and grow in the medium term.

A major uncertainty for this growth though is the future of container port capacity in Melbourne. Current Melbourne port facilities have good rail access and help support the development of industry in the west. The proposed development of Hastings as a second port raises challenges for providing a dedicated standard gauge rail connection and even if such a connection is possible, it will be relatively remote from the main interstate network. It is also likely to act as a counterforce to consolidation and development of the freight industry in the west.

Adelaide

Rail freight access through Adelaide is excellent, with the freight

Adelaide

Rail freight access through Adelaide is excellent, with the freight network being almost entirely physically separate from the passenger network and having good access to the port.

The one remaining conflict with the passenger network is at Torrens Junction, immediately to the west of the city. This

represents a constraint to the operation of 1800 m trains as well

as creating operating inefficiencies. There is a funded project currently underway to eliminate this conflict by a grade separation.

The major issue for Adelaide is the Adelaide Hills immediately to the south east. These represent a significant constraint on efficient rail operations, needing bank engines due to the grades being significantly steeper than the rest of the east west corridor. Tunnels through the Hills also represent the main constraint to the implementation of double-stacking on the Melbourne—Adelaide corridor. Finally, there is considerable community resistance to the rail freight operations due to noise issues.

These considerations have led to various proposals and analysis of alternative solutions, generally envisaging a bypass of Adelaide. However, the most recent study found that there was no economic justification for the project.

For double-stacking of the Melbourne—Adelaide corridor to move forward it will be necessary to have a definitive position on the future rail corridor.

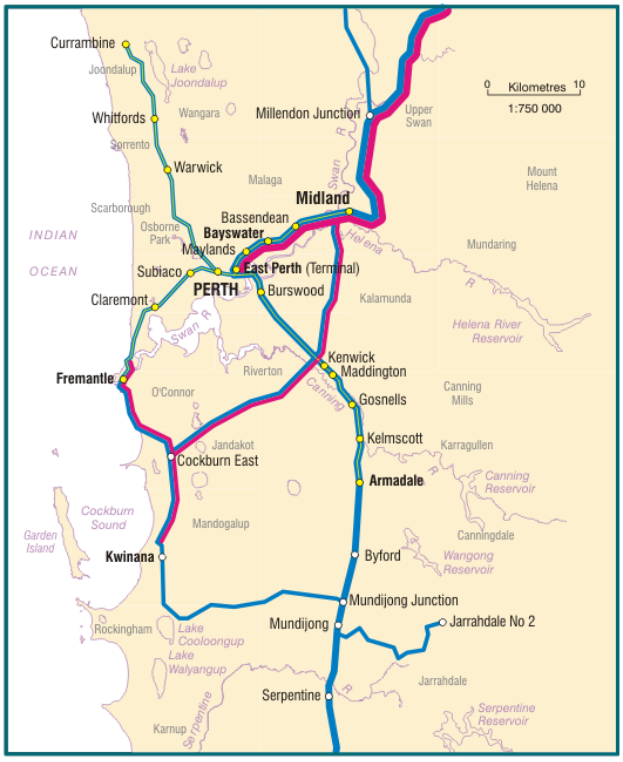
Adelaide is already relatively well served by terminals and given the nature of the city and its industrial geography there is no apparent medium term need to consider future terminal development.

Perth

Perth has a legacy of good planning and in conjunction with the rail facilities established as part of creating the trans-continental line and the significant rail market share of freight into Perth it leads the way as being the most rail freight oriented city. Nonetheless, as the city continues to grow increasing challenges are likely to emerge for rail freight.

Land in the traditional freight precinct around Forrestfield / Kewdale is increasingly scarce and new freight precincts are now being planned for future development. This includes the Latitude 32 development near Kwinnana and at xxx in the north of the city.

The future of port facilities is also likely to become a major issue with the container facilities at Fremantle becoming increasingly crowded out by residential and commercial development. Rail already has good access to Kwinana, which may see its role grow



already has good access to Kwinana, which may see its role grow over time.

There is already a rail import / export container shuttle in Perth, operating with subsidies from Government. The future of this service will be highly dependent on the growth of new freight precincts and the long term development of Fremantle. It will also be influenced by the expansion of the road network with the Freightlink road project in a position to significantly improve the quality of road access between the port and Forrestfield.

New Routes and Alignments

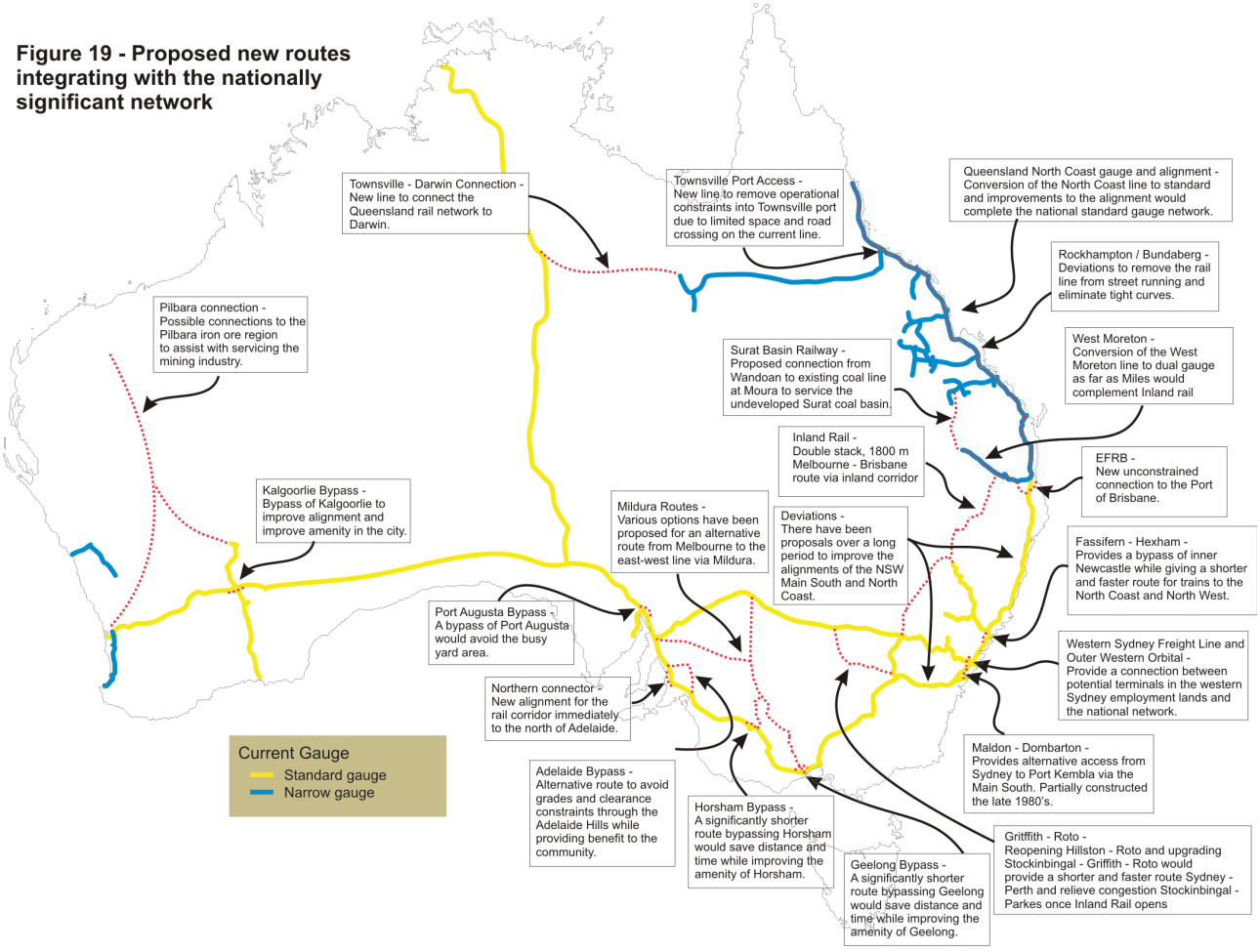
Improvements in productivity and rail's service offering could be achieved through construction of new rail lines and improvement of alignments.

Many options for new rail corridors, or improvement to the rail alignment within an existing corridor, have been suggested over time, often by the community. These projects are often very high cost with uncertain benefits and sometimes conceived to address social rather than commercial objectives.

The establishment of a national standard gauge network also arguably remains incomplete with the Queensland North Coast line remaining narrow gauge despite it connecting a number of important regional population centres and there being large freight flows between northern Queensland and the southern States.

All of the currently active and recent proposals identified for new lines and major deviations on the nationally significant network are shown in figure 19.

Figure 19 - Proposed new routes integrating with the nationally significant network



Heavy vehicle charging

Introduction

The current heavy vehicle charging system has a significant number of inefficiencies which are impeding productivity within the freight and logistics sector, with substantial implications for Australian industries and the wider economy.

There is the potential to achieve real gains in national economic productivity and Government efficiency via the implementation of a market-based road provision model that ties funding to user requirements, and the willingness of users to pay. Further, efficient use of the road network has broader social implications in the form of reduced congestion, fewer road accidents, and a cleaner environment.

FORG believes that reform of heavy vehicle charging is the single most important initiative that Governments should be considering and that it is a higher priority than any of the major infrastructure works identified in this Strategy.

The weaknesses of the current system and the potential benefits of reform

The current charging system has a significant number of inefficiencies which are impeding productivity within the freight and logistics sector, with substantial implications for Australian industries and the wider economy. The impediments also reflect inefficiencies within current Federal and State Government institutional structures.

The major impediments to improving the efficiency of heavy vehicle infrastructure investment and utilisation include:

- The National Transport Commission has acknowledged the consistent under-recovery of expenses attributed to heavy vehicle use, suggesting inefficient pricing signals and a lack of investment capital generation.
- There is no direct link between the road user funds received by governments and the investments that are made by State and Federal Governments in road infrastructure and related services. In particular, there is not a direct relationship between heavy vehicle users and road providers.
- Revenue streams are divided, with registration collected by the States, and the road user charge by the Federal Government.
- Heavy vehicle registration income received by each State bears no relationship to the costs incurred in that State due to heavy vehicle road usage. Local councils, which incur significant costs from heavy vehicle use of local roads, do not have a funding arrangement that reflects the actual costs of usage.
- Because the charges are calculated for the national network as a whole, there is no direct connection between the amount of road user charge paid per kilometre, and the condition or capability of the road being used.
- There is no customer–provider relationship between the heavy vehicle road user, and the road agency responsible for road infrastructure such as would drive efficiencies in service delivery, and enable the heavy vehicle industry to operate more effectively.
- There is a lack of direct accountability from road providers to heavy vehicle users for meeting the specific infrastructure and infrastructure service requirements of heavy freight vehicles.
- The current price determination methodology does not deal adequately with the timing and subsequent recovery of expenditure, and allocates only a minimal proportion of joint costs to heavy vehicles.

More broadly, there is a lack of publicly available information to assess performance of road providers in adhering to investment plans and meeting the requirements of heavy vehicle users.

The potential benefits from addressing impediments to efficiency in the provision, funding and financing of road infrastructure

Heavy vehicle charging and investment reforms would:

- Provide price signals to road freight operators, resulting in more efficient use of land freight infrastructure, and productivity benefits for freight transport and freight customers.
- Introduce an incentive to more efficiently use infrastructure, which would contribute to reducing congestion on major freight routes in capital cities such as road links to ports.
- Provide States with a more certain funding mechanism and greater control over how the funds are spent.
- Provide a direct link between revenue and infrastructure provision, giving State road agencies an incentive to improve their commercial focus and respond to customer requirements.
- Introduce competitive neutrality of price regulation on corridors where road and rail compete.

The potential benefit from the effective implementation of reform has been advocated by the Productivity Commission, The Australian Competition and Consumer Commission (ACCC), the National Competition Review, the National Commission of Audit

and Infrastructure Australia.

Rail industry proposal

The rail industry believes that heavy vehicle charging and investment reforms should in the first instance target:

- The introduction of mass-distance-location charging for heavy vehicles on arterial roads. This would involve rebating the current fuel excise for articulated vehicles when using these routes and a new regime of registration charges.
- The reforms would only apply to arterial roads (which includes National Highways).

Heavy vehicles which use smaller local, regional and remote roads would continue to pay the current fuel excise and registration charges for road access, i.e. the continuation of the existing arrangements.

Once the MDL charging system matured it is likely that there would be momentum for it to be extended to local roads despite the associated administrative challenges.

It is proposed that prices charged for road infrastructure access would over time be:

- Developed using a standard regulatory building block model, including a properly constructed regulated asset base. (The building block approach is a well-established arrangement for determining access prices in the rail, electricity and other sectors).
- Subject to approval by an independent economic regulator.
- Billed using technology systems, specifically telematics that use GPS technology, that record the mass, distance and location of each heavy vehicle journey.

Funds raised would be paid directly to the relevant State road agency or road fund, and would be available for future investment in freight transport infrastructure.

Overall it is proposed that the reforms should be tested in the short term through the introduction of trial projects to demonstrate how the pricing arrangements and the practical direct user charging arrangements would work in practice on designated freight corridors.

Investment Priorities

Context

FORG has identified those projects that it considers to be the highest priory across the nationally significant rail network.

The projects are at various stages of development. While some have had economic and financial analysis undertaken, others are purely conceptual at this stage. A number of the projects have important interdependencies, while it is also expected that the projects would be delivered over a relatively extended period of time. As such, the projects should not be considered as a series of discrete initiatives but rather as a roadmap of the general direction that the industry considers should be the focus of further project development and planning.

The following sections describe the projects considered by the group to be important priorities starting with ATMS as a national initiative and then working broadly from the Queensland far north coast clockwise around the continent.

ATMS

ATMS offers significant potential productivity improvements as well as increasing capacity and safety. Rollout of the system across the network is a high priority for the industry.

ATMS also offers savings in capital costs and in some cases it would be desirable that ATMS be in place before other works are undertaken, particularly on new corridors such as Inland Rail and where a significant program of loop works is proposed, such as on the Queensland north coast.

The specific sequencing of rollout should be driven by maximisation of benefit. This is closely linked to the number of trains operating but also needs to have regard to areas still using train orders, to the need to replace life expired signalling, and areas where significant investment may otherwise be made in signalling equipment that may become redundant.

Roll-out of ATMS will have two main elements, installation of the necessary trackside infrastructure, and the fitment of ATMS units into the required locomotive fleet. There will also be a number of system and project management costs.

It is anticipated that ATMS should be sufficiently developed to allow widespread roll-out to commence toward the middle of 2017. Funding is already in place to commence rollout on Tarcoola—Kalgoorlie. The existing business case that supported Commonwealth funding for development is currently being updated.

Rollout of the system across the nationally significant network excluding the Hunter Valley and Central Queensland coal networks is estimated at $735 m, made up of:

- $440 m for the ARTC network.
- $200 m for the Queensland North Coast, Mt Isa and Western line (assuming the ATMS cost Brisbane—Gowrie is covered by Inland Rail).
- $60 m for the Brookfield Rail nationally significant lines.
- $35 m for the Tarcoola—Darwin line.

Queensland North Coast crossing loop extensions

Train lengths on the Queensland North Coast line are currently limited to 670 m. The ability to operate longer trains is a key element in improving the productivity of the corridor and its ability to compete against road.

The group is not aware of a current specific proposal or business case for this project.

To lengthen all loops on the corridor would be cost prohibitive and unnecessary. An indicative program of 26 loop extensions between Brisbane and Townsville has been developed with a concept assessment cost of around $435m. This assumes that loops would be built to 1800 m though it is unlikely that trains could immediately increase to this length. The target would generally be a section time of no more than 40 minutes for a long train.

A smaller number of loops, which would then require a mix of short and long trains, or a shorter loop length, have both been assessed but at this stage appear to reduce the scale of benefits significantly more than they save in cost.

Queensland North Coast flood resilience

The Queensland North Coast is susceptible to weather events and has a long history of being closed by flooding and washaways, causing disruption to northern communities.

A program has been identified to target preventative works at the locations that have historically been affected by extreme weather events. This project would deliver limited commercial benefit and the economic benefits would be difficult to assess, but the importance of such work in providing increased robustness and reliability of operations is significant.

Weather events cannot be completely mitigated or prevented, but a program in the order of $250m has previously been identified that focusses on minimising damage and restoring the track to service quickly and would provide significant benefit following future extreme weather events.

Rockhampton and Bundaberg deviations

The North Coast rail line through both Bundaberg and Rockhampton has a level of interaction with roads that the industry considers inappropriate, as well as associated bridge, flooding and track curvature issues.

Solutions for Rockhampton may require an investment of up to $200m, though there are a range of potential options with varying levels of cost and benefit. Options at Bundaberg are more straightforward and depending on the requirements of Council may be able to be implemented for less than $10m.

Beerburrum - Nambour capacity

There are long-standing proposals for duplication of the single track Beerburrum – Nambour section to accommodate the combined needs of passenger and freight services. This section is currently a significant bottleneck.

There is some uncertainty however as to the longer term solution and whether the proposal for a long envisaged Sunshine Coast railway diverging at Beerwah may be a sensible option. A Sunshine Coast railway would be likely to divert a large proportion of the Nambour passenger demand and reduce pressure on the Beerwah—Nambour section.

There would be merit in considering three passing lanes of around four kilometres each as an alternative solution in the short term with either the Sunshine Coast Railway or full duplication as longer term aspirations. Analysis suggests that this configuration would allow an increase in passenger train frequency while accommodating longer freight trains. This project would be complementary to the passing loops project described above.

Queensland has undertaken a number of studies on this section over time including options for deviations to increase train speeds, but it is not believed that any studies have specifically assessed passing lanes. Concept assessment estimates suggest that a project providing for three passing lanes would have a cost in the order of $200m.

Northern Brisbane freight corridor planning and corridor preservation

The rail freight industry strongly supports working toward separation of freight and passenger services wherever feasible. Northern Brisbane is a particularly challenging area to attempt to achieve separation. However, in the long term it would be desirable to aim to achieve conversion of the line to Cairns to standard gauge and a dedicated freight track through Northern Brisbane is likely to be an essential element of such a project as well as providing unconstrained freight access.

Identifying a suitable corridor for such a track is already challenging. It is critical that work be undertaken sooner rather than later to identify a potential corridor for a dedicated freight track, ideally integrated with a long-term plan for the Port connection. Assessing and defining a potential corridor to enable necessary corridor reservation and planning activities to commence is an important priority to ensure that construction costs are minimised when the time is right to progress to construction. Around $50 m is likely to be required to progress the project to an appropriate stage.

Consideration would need to be given to how far north a dedicated corridor should extend, which as discussed above will depend on whether a Sunshine Coast railway is to be built. Assuming the corridor extended to Caboolture, a high level estimate suggests that a NBFL would cost in the order of $2.0 b.

Brisbane port connection

The requirements for a connection to the Port of Brisbane have been analysed by ARTC in the context of the Inland Rail project. This analysis found that to achieve an aspiration of a double track, double stack railway separated from passenger services the preferred solution was the 'Eastern Freight Rail Bypass' (EFRB) project which broadly follows the Gateway Motorway.

However, it also identified that there was a high degree of potential variability around future demand, mainly due to medium term uncertainty about the competitiveness of West Moreton / Surat Basin coal, and the future industrial development of Brisbane and whether it will support a significant cross-metro container shuttle business.

As such, the preferred solution would appear to be to aim to incrementally enhance capacity on the existing corridor, while it would also be highly desirable to separate freight and passenger services. The original Cross River Rail project was designed to achieve this by providing new passenger rail tunnels between Dutton Park and Yeerongpilly, allowing the existing dual gauge track to become dedicated to freight.

This approach may represent the best value for money solution to achieve dedicated freight access for the medium term before the long term solution of the EFRB. The Cross River Rail project had proceeded to concept design and costing but it is not possible to identify a discrete cost for the infrastructure provided specifically to benefit freight. With the cancellation of the BAT project developed as an alternative to Cross River Rail, it is unclear what the status of a future cross river solution for Brisbane is. However, any new solution should ideally have regard to the potential freight opportunities.

Inland Rail

ARTC has been requested by the Australian Government to develop the Inland Rail corridor between Melbourne and Brisbane with the intention of delivering the project by 2025.

Inland Rail offers the opportunity to get significant increases in productivity for the Melbourne—Brisbane, Brisbane—Adelaide and Brisbane—Perth corridors as well as providing new and more efficient access to ports for the Queensland South West and NSW North West agricultural industries.

Industry and the community are highly supportive of Inland Rail and ARTC has now prepared a business case for consideration by the Government. The Inland Rail program as scoped for the Business Case has a cost of $8.7b.

Inland Rail also offers a solution to performance and capacity issues through Sydney and to the North of Sydney. Inland Rail is the preferred way of addressing these future challenges and this document does not consider other potential options.

West Moreton basin upgrading

Inland Rail also offers an opportunity to improve the productivity of coal services from the West Moreton basin though increases in axle load and/or train length between Oakey and Miles. For the purposes of Inland Rail, train lengths of up to 1800m, and axle loads of up to 30 tonnes have been assessed. Conversion of the line to standard gauge would be necessary for the heaviest trains.

Many of the barriers to longer trains lie in the Brisbane area where concerns about level crossing wait times suggest that some level crossings may require grade separation. Conversion of coal trains to standard gauge would create additional operational constraints in the metropolitan area that may require additional capacity enhancements. Some axle load increases could be achieved through rail, bridge and culvert replacement as part of the normal capital program.

In general terms, any improvements in productivity and capacity should be borne by the coal industry and the optimum solution should be developed in conjunction with the industry. While an upgrading program is desirable, it is not included in the program described by this Strategy as it needs to be directly negotiated with the coal producers having regard to specific coal mine developments.

Future Brisbane intermodal terminals

The current major interstate terminal in Brisbane is at Acacia Ridge and is operated as a common user terminal. Acacia Ridge is under increasing pressure from encroachment by housing and is currently operating at close to capacity. However, it remains relatively central to the Brisbane industrial areas and there is potential for capacity enhancement at relatively low cost.

The group considers that terminal development is best left to the private sector, though Government has an important role to play in providing the land-use planning context and possibly facilitating land acquisition.

Three areas for future terminal development have been identified.

The closest to the current industrial area is Greenbank, where there is a significant area of military land directly adjacent to the rail corridor that could be repurposed for intermodal use and potentially industrial development. It is centrally located and has reasonable connections to the existing transport network.

To the south is the Bromelton development area, which has been zoned as the future heavy and noxious industry area for Brisbane. While Bromelton has good potential, road connections need upgrading.

The third area is Ebenezer, near Ipswich. Ebenezer would become a more viable location for a terminal in conjunction with Inland Rail. However, like Bromelton it is relatively remote from the centre of population and it is unclear when or if it will be attractive for industry to relocate to the region.

The potential for terminals at Bromelton and Ebenezer has already been taken into account in land-use planning and it is important that these sites be preserved. It would be helpful for Government and industry to jointly assess whether there is any potential to develop Greenbank.

SSFL / Botany line capacity

Aspirational volumes for the Sydney cross-metro container business will result in a need for some capacity enhancements on

the rail network within Sydney. These requirements are mitigated if Inland Rail is delivered according to the current timetable. However, they would increase in the event that NSW made a decision to redirect freight from the Illawarra line to accommodate increased passenger traffic.

The identified projects are a new 1300 m loop at Warwick Farm and completion of the Botany line duplication. Concept assessment has costed these two projects at $154.9 m. Further design and planning work is currently proceeding on these projects funded by the Australian Government. No business case has been prepared at this time.

Sydney intermodal terminals planning

The recently concluded deal for the construction of the Moorebank intermodal terminal will make a significant contribution to shifting cross-metro container traffic onto rail. It also has the potential to improve interstate rail competitiveness both by providing a high quality terminal and by reducing the cost of pick-up and delivery to the major industrial areas of Sydney. The scope for significant freight generating activities to co-locate in on-site warehousing has the potential to further enhance this.

Looking to the future there will however be a need for additional terminals in western Sydney. The Western Sydney Employment Lands are likely to emerge in future decades as the centre of the major freight generating activities in Sydney, particularly with the decision to proceed with a Badgery's Creek airport.

New terminals and the rail lines required to service them will have a very long gestation period and there is a need for planning for terminals in Western Sydney to be accelerated even if they are unlikely to be constructed within the timeframe of this plan. There is a need for a site to be identified and preserved through both planning instruments and property acquisition for a major interstate terminal as well as one and potentially two sites for cross-metro container shuttle terminals.

Western Sydney freight line and outer orbital planning and corridor preservation

Development of terminals in western Sydney will necessitate connecting rail infrastructure. The NSW Ports and Freight Strategy identified a western Sydney freight line and a rail line in the future M9 western Sydney orbital corridor as key future freight initiatives.

A western Sydney freight line will be critical and corridor definition and reservation is a high priority to ensure that delivery costs are minimised when it is ultimately constructed.

A rail line in the orbital corridor connecting a future interstate terminal to the southern and western lines is also highly desirable. It would also potentially provide an alternative route for western coal in conjunction with completion of the Maldon—Dombarton line though the long term future of western coal is uncertain.

Whether a new rail line in the orbital corridor to connect the western line to the central coast is necessary or desirable is unclear. It will to some extent depend on the alignment and capacity of the western Sydney freight line. Clearly port bound traffic to and from the north will prefer to continue to use the current corridor, which is more direct.

Sydney—Cootamundra double stacking

Development of Inland Rail will clear the line between at least Melbourne and Illabo (north of Junee) for double stacking.

A major challenge for rail in the medium term will be accommodating growth across the trans-continental railway to Perth without seeing a deterioration in transit times. A cost effective way to achieve this would be to provide for double stacking out of Sydney, as Sydney—Perth trains are currently single stacked only. This will also provide material operating cost savings. This would be an important driver for clearing the Sydney—Cootamundra section for double stacking.

While rail does not currently have a significant share of the Sydney—Melbourne freight market, the ability to double stack together with more rail friendly logistics flows through the development of new terminals in Sydney and Melbourne has the potential to bring rail much closer to achieving a road competitive offering.

Previous high level estimates have identified a cost in the order of $250 m to clear the line for double-stacking between Moorebank and Illabo. The appropriate timing for this project would be for it to follow on from the Inland Rail project, to leverage the investment in double stack clearances between Melbourne and Parkes.

Melbourne intermodal terminals planning and WIFT connection

The Victorian Government has been through a lengthy and exhaustive process to identify a preferred site for a future Melbourne intermodal terminal to support both the interstate and cross metro container markets. The preferred location is a site at Truganinna in Melbourne's west, commonly referred to as the Western Intermodal Freight Terminal (WIFT). The terminal project has had a detailed business case developed at the concept options level.

Current Victorian planning is to work toward its development in the mid-2030's to coincide with the expiry of the leases on the North and South Dynon terminals. However, there may be a good case for the project to be accelerated. Due to the difficulty of getting double stacking through the Bunbury Street tunnel immediately to the west of Dynon, WIFT is likely to be a desirable solution in conjunction with Inland Rail, and / or enabling double stacking to Sydney and Adelaide.

The WIFT site itself is a relatively straightforward development project and the industry preference is that it proceed as a private sector financed and funded project with Government acting as a facilitator of the project only. The major challenge will be connecting it to the interstate rail network. While a number of options have been looked at conceptually, there is at this stage no preferred solution. The concept assessment estimated a connection at an order of magnitude cost of $450 m.

Further development work on connection options is highly desirable in the short term to position WIFT for construction as soon as conditions warrant it.

Tottenham holding roads

In the shorter term, there is a proposal to redevelop part of the current Tottenham Yard area on the northern side to construct up to 4 long holding / marshalling roads. At present the North and South Dynon yards are too short to hold 1800 m trains and this causes considerable congestion. The Tottenham holding roads project would mitigate this. The project also has the potential to smooth the operation of cross-metropolitan container shuttles by both giving them a location to stand to smooth out fluctuations in the operating cycle and by relieving congestion around the Simms St Junction at the throat of the Dynon precinct.

The estimated cost of the project is $55 m. No business case for the project has been completed, but the relevant parties have agreed in-principle to the proposed configuration. The industry sees considerable advantage in this project proceeding in the short term to maximise the benefits in advance of the development of WIFT.

Melbourne—Adelaide double-stacking and Adelaide bypass

Double-stacking on the Melbourne—Adelaide corridor offers both significant productivity and capacity benefits. While this corridor does not face any immediate capacity constraints, a major medium term challenge will be to accommodate growth on the east west corridor to Perth while holding transit times at their current levels.

At present most trains dwell for over three hours in Adelaide while the single stack configuration required between Melbourne and Adelaide is changed to double stack to gain operating efficiencies between Adelaide and Perth.

By allowing trains to operate double-stacked from Melbourne, this dwell could be eliminated which would offset the inevitable growth in crossing delay as volumes increase on this corridor.

In the long term the major capacity constraints on this corridor will arise in the Adelaide Hills and for both geographic and environmental reasons extending loops or building new loops will be challenging. Accordingly, double stacking is also a desirable solution for capacity enhancement on this corridor.

Clearing the corridor for double stacking has an order of magnitude cost of $350 m based on a high level assessment of the required works, primarily tunnel enlargement. No business case has been prepared but a high level economic analysis undertaken in 2008 found that the project would have a positive NPV in 2035, not taking into account the transit time benefits.

The major constraint to double-stacking on the existing Melbourne—Adelaide line is five tunnels, one at Murray Bridge and the other four in the Adelaide Hills.

The Adelaide Hills also has significant sections of relatively steep gradient that necessitate the use of banking engines, adding to rail operating costs.

At the same time, there is a long-standing desire on the part of some residents of the Adelaide Hills to remove the existing rail line, primarily due to noise.

Since the 1980's there have been a number of studies to identify options for an Adelaide Hills bypass. These have focussed on options relatively close to Adelaide with the general preference being a route from Monarto South (near Murray Bridge) to somewhere north of Adelaide via the Barossa Valley.

More recently the Victorian Government has proposed a new railway from Mildura heading northwards to connect to the existing East West rail corridor in the vicinity of Broken Hill. This would allow mineral sands and potentially iron ore to use rail to Victorian ports as well as providing an alternative interstate route.

Following the proposal from the Victorian Government, ARTC undertook a broad analysis of its concept and extended it to include alternatives that broadly used the Mildura rail line as a base from which to build an Adelaide bypass. A total of seven options have been identified either via Broken Hill or following a more direct route to Crystal Brook. The direct routes to Crystal Brook give similar operating outcomes to the conventional bypass via the Barossa Valley whereas routes via Broken Hill add considerably to transit time and distance.

Although all of the alternative options involve considerably longer sections of greenfield construction than the conventional bypass option, they are primarily through undeveloped and relatively flat areas, which should allow for a relatively low per kilometre cost, though crossing the Murray River and flood plain will be a significant cost item.

The most recent economic analysis found that the conventional Adelaide Hills bypass had an estimated cost of $2.4 b ($2010) and generated a negative NPV of $1.6 b. It is unlikely that any of the alternative options would show a positive economic benefit. However, given potential environmental issues with a route via the Barossa Valley they may represent the most practical option for a bypass.

The primary objective of the rail industry is to achieve double stacking on the corridor and there is no obvious barrier to this using the existing alignment. It would appear to be the solution that generates the greatest economic benefit and it is likely to be desirable in the 2030—2040 timeframe. However, if for social reasons Governments want to redirect trains away from the Adelaide Hills it would be desirable to be firming up a preferred solution with a view to delivering the bypass project as the mechanism by which double stacking is achieved.

Torrens Junction grade separation

ARTC has been working through a staged process to allow trains on the Melbourne—Adelaide corridor to go from 1500m to 1800m. There is now a good population of 1800 m loops on the corridor with the last significant gap, in Western Victoria, to be addressed in 2016 through the extension of four loops.

The grade separation of Goodwood Junction in 2013 removed the major impediment to 1800 m trains in the westbound direction. Torrens Junction remains the major impediment in the eastbound direction as 1800 m trains held at the junction would block Torrens Road level crossing.

The Torrens Junction grade separation has concept design and is funded to a value in the order of $70 m and the industry looks forward to this project being completed in the short term.

Other base case capacity projects

As discussed above, many of the productivity improvement projects will make a positive contribution to network capacity. However, even if all of the projects were to proceed there would still be a need for a small program of new and extended crossing loops. The indicative program based on the base case growth rates and the projects assumed in this Strategy is as follows:

Table 2—Additional capacity projects	Required by	Cost $2015
Belair extension	2032	$15
Mambray Creek extension	2034	$4
Minindee extension	2039	$7
1216 km loop (Mundrabilla—Loonganna)	2040	$10
Western NSW??		
Walleroo extension	2039	$5
Queensland north coast???		

Summary

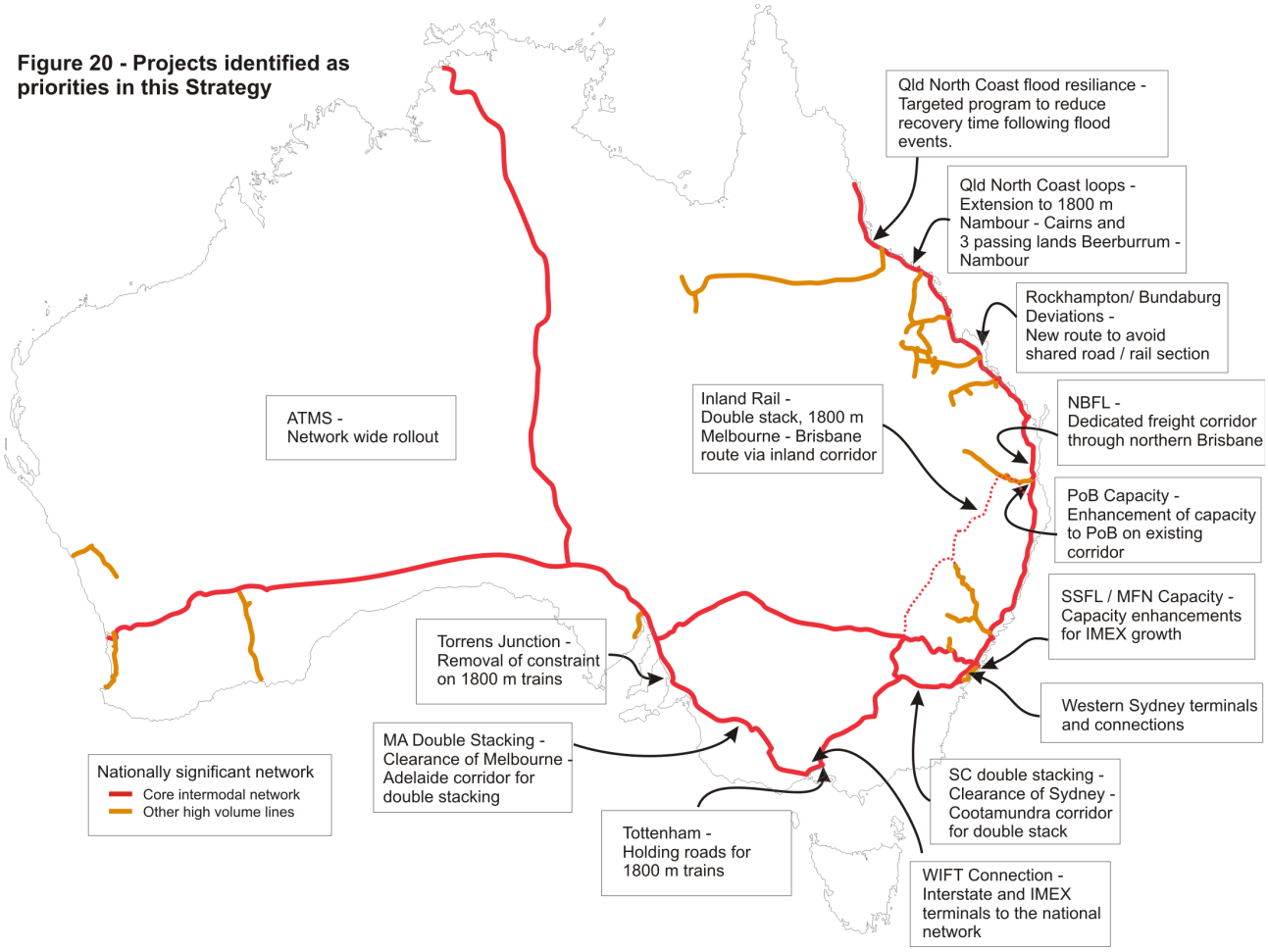
Table 3 shows the projects identified in this Strategy as being the desirable projects that should be progressed over the next 25 years.

Figure 20 shows the identified projects geographically.

Table 3 - Recommended investment projects	Desirable by	Importance	Cost [1]
Torrens Junction	2017	Medium	$70
Tottenham holding tracks	2020	Low	$55
ATMS rollout	2020	High	$735
WIFT connection	2024	High	$450
Queensland loop extensions	2021	Medium	$435
Melbourne - Adelaide double stacking	2030	Medium	$350
SSFL / Botany line capacity	2022	Medium	$155
Inland Rail	2025	High	$8700
Port of Brisbane dedicated access[2]	2035	Medium	TBD
Sydney - Cootamundra double stacking	2030	Medium	$250
Rockhampton / Bundaburg deviations	2020	Low	$210
Northern Brisbane freight line design and preservation	2020	High	$50
Northern Brisbane freight line construction	2040	Medium	$2000
Queensland North Coast flood resilience	2020	Low	$250
Beerburrum - Nambour passing lanes	2025	Medium	$200
Western Sydney Terminals and access corridor protection	2020	High	$50
Western Sydney Terminals and access construction	2035	Medium	TBD
Total			$13960

Notes
1. All costs are undiscounted, unescalated order of magnitude costs in $2015.
2. Refers to incremental enhancements including a freight contribution to a new cross river passenger line, not the EFRB.

Figure 20 - Projects identified as priorities in this Strategy



Overview & Conclusion

In summary, the priorities for the industry revolve around:

1. Governments implementing heavy vehicle charging reform to place road access pricing on a level playing field with rail access pricing.

2. Achieving productivity benefits through:

    - Roll-out of ATMS with consequent capacity, crewing, maintenance and capital cost savings (together with enhanced safety).

    - Double stacking on Inland Rail, Melbourne—Adelaide and Cootamundra—Sydney.

    - Shorter route lengths for Melbourne—Brisbane, Brisbane—Adelaide and Brisbane—Perth as a result of Inland Rail.

    - Longer trains through loop extensions on the Queensland North Coast, and Torrens Junction grade separation for Melbourne—Adelaide.

3. Ensuring capacity and functionality of the network is maintained or enhanced by:

    - Planning for medium term needs in cities, particularly to minimise pick-up and delivery costs by planning for terminals in the future major freight precincts together with further separation of freight and passenger services.

    - Ensuring minor capacity enhancements to the network are anticipated, planned and funded to the extent that productivity driven projects do not provide sufficient capacity enhancement.

As noted in the Introduction, this Strategy does not attempt to undertake a detailed analysis of the proposed projects.

However, a high level analysis has been undertaken focussing on the potential operating cost savings as a result of implementing the scope. Figure 22 shows the estimated operating cost saving in $ per tonne for each of the 14 intermodal corridors considered in this Strategy. The productivity benefits of the proposed scope of works range between approximately 3% and 40%.

Projects identified in this Strategy would also have consequential benefits for a number of other traffics that use the Nationally significant network.

Most of this benefit arises from:

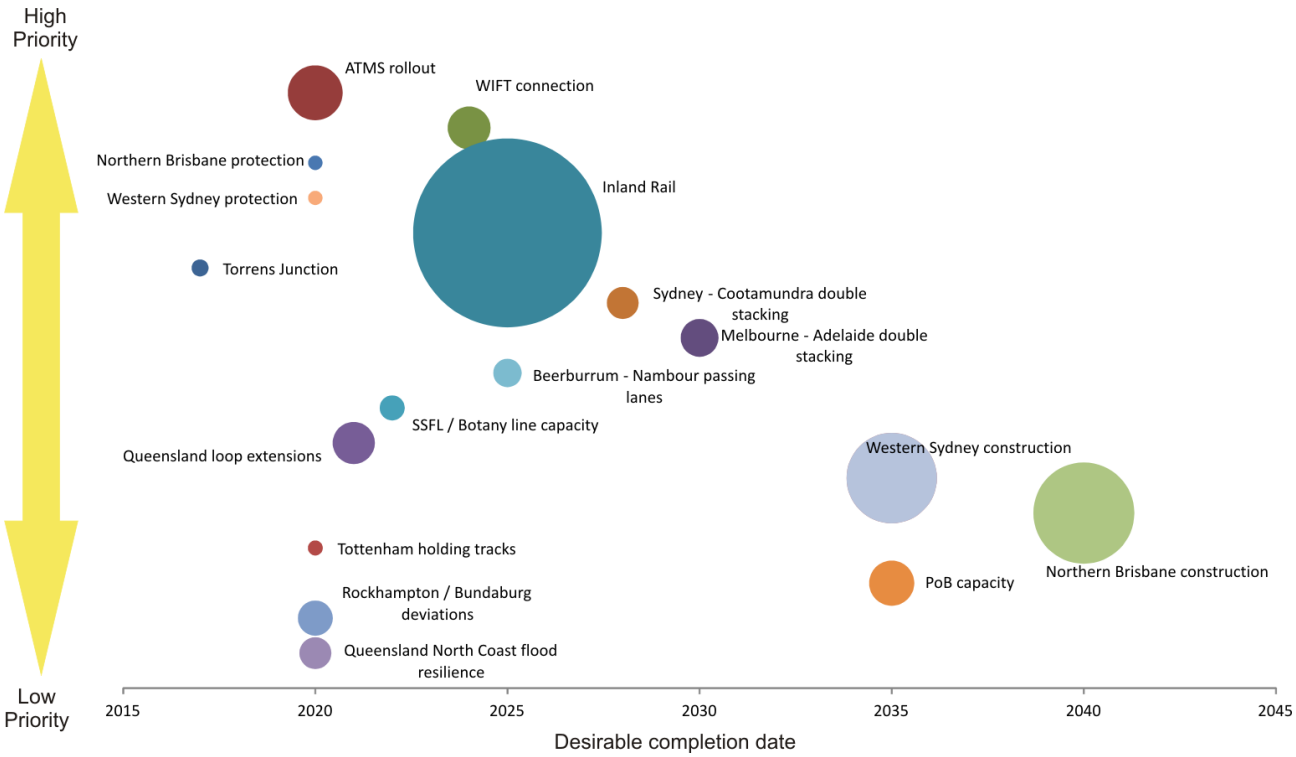
- An assumed reduction to single man crews as a consequence of ATMS.

- Shorter operating distances as a result of Inland Rail.

- Double stacking across most of South East Australia.

- Longer trains on the Queensland North Coast and Melbourne—Adelaide.

- Reduced pick-up and delivery costs by positioning terminals in the future major freight precincts within Sydney and Melbourne.



The works would also facilitate significant increases in track capacity to meet market growth and in some cases reduce transit time significantly.

As previously discussed, the impact that this has on rail market share is almost entirely dependent on the decisions of Governments around heavy vehicle charging and access. Accordingly this document does not attempt to forecast likely market shares.

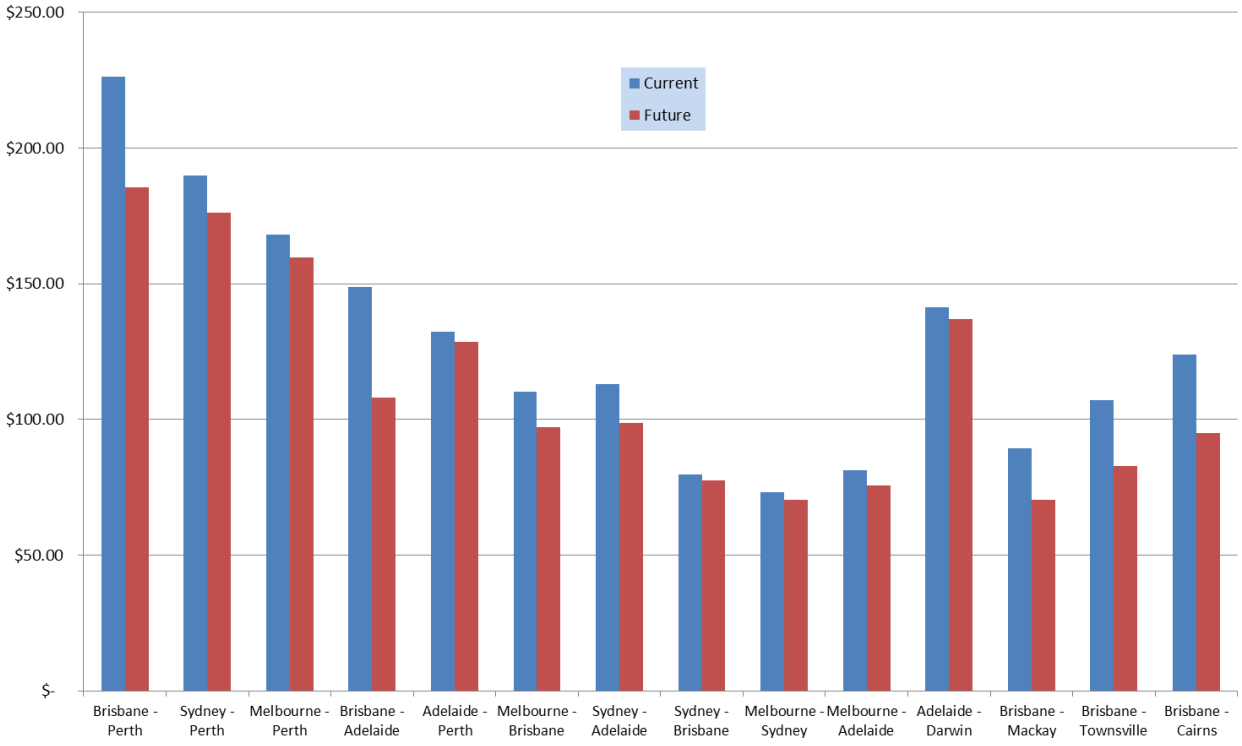
However, the rail industry believes that in an environment of economically rational heavy vehicle charges rail could achieve in the order of two thirds of total interstate NTK, up from approximately one third currently. In this scenario, intermodal rail volumes would double, with most of the growth in the south east corner.

In that scenario, and assuming a long term market growth rate of 3%, the productivity benefits alone of the proposed works would be worth in the order of $20 billion using a 100 year asset life at a 4% discount rate.

This compares to a total cost for the identified projects of $14.0 b.

In such an environment there is a reasonable probability that the rail industry could fund many of the proposed projects commercially.

Figure 22 : Origin - Destination Cost per Tonne



Appendix B

Heavy vehicle charging and investment reform principles

To guide the implementation of heavy vehicle charging and investment reforms, it is proposed that the following principles be adopted by Governments and industry and, thus, be the key reference point for all aspects of implementation of heavy vehicle charging and investment reform:

1. The reforms:

- Should enable improved productivity and contribute to more efficient investment in and use of road infrastructure by heavy vehicles.
- Should enable competitive neutrality between heavy vehicles operating on the key freight routes and intermodal rail freight operations.
- Should cover both Demand (pricing reform) and Supply (infrastructure provision/investment).
- Should only apply to heavy vehicles weighing more than 4.5 tonnes, and should be introduced as a matter of priority on key freight routes.
- Would not apply to light commercial vehicles or passenger vehicles.

2. Pricing reform should involve:

- Sending clear price signals to heavy vehicle users of road infrastructure based on the introduction of direct charges that fully reflect the actual costs of road infrastructure access and use, with prices for access to the road freight network determined by:
    - A building block regulatory pricing model (including Regulated Asset Base) and subject to approval by economic regulatory arrangements agreed by Governments and industry.
    - A direct mass, distance and location (MDL) charging system.
    - The use of in-vehicle telematics technology to measure road usage.

3. Infrastructure provision (Investment) reform should require:

- The development of road infrastructure plans and service standards that are consistent with commercial principles, and responsive to the current and future requirements of heavy vehicle users, including links to intermodal facilities, ports, airport and other significant freight infrastructure.
    - These arrangements should include a specific mechanism for heavy vehicle road users to propose infrastructure or service upgrades, and a process for the consideration and potential development of such proposals.
- State Government road infrastructure agencies/providers should be accountable for their performance in delivering infrastructure plans, including the provision of infrastructure service standards, with full transparency in these arrangements.

4. Revenue from direct MDL user charges:

- All revenue from direct MDL user charges should go directly to infrastructure owners/providers and be used for investment and other related costs directly associated with the infrastructure used by the heavy vehicles that incur direct MDL charges. Furthermore, it should be a requirement that revenue cannot be diverted to other uses.

5. The integration of pricing and investment reforms:

- Pricing reform based on direct user charging, and investment reform based on transparent infrastructure planning and provision, should be integrated from the commencement of the implementation process. This will promote the maximum productivity benefits from infrastructure investment by providers who will have an incentive to improve their performance in providing infrastructure and related services for the benefit of freight customers.


RAIL
CROSSING
WAY
STOP
LOOK
FOR
TRAINS