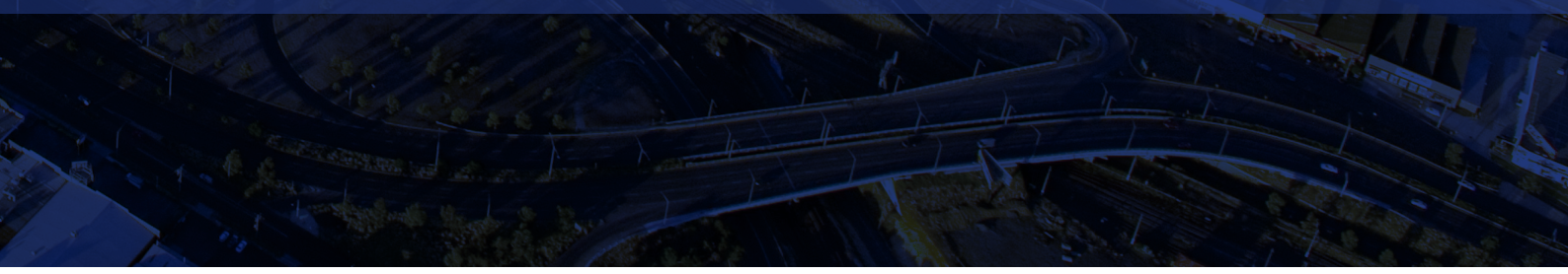
Geelong Port-City 2050

Final report of the Geelong Port and Land Infrastructure Plan



GeelongPort

Midway

Incitec Pivot Fertilisers

COMMITTEE FOR GEELONG

GrainCorp

CITY OF GREATER GEELONG

Contents

Final: July 2013

Purpose of this report

This report documents the findings of GHD and Juturna Consulting following their engagement to the City of Greater Geelong (COGG) to assist with the development of a Strategic Assessment for the Geelong Port and Land Freight Infrastructure Plan.

The report begins the process of developing Geelong's port and its host city seamlessly to meet global benchmarks and understandings of what an optimised 'Port-City' should be. There is a wide body of best practice in this respect, principally flowing from the Organisation for Economic Cooperation and Development (OECD Global Port-Cities project) but there are also world leading Australian examples of strategic port planning in a city setting. Achieving this was the client's express objective.

At a more functional level, the report is also intended to provide data and highlight key infrastructure investment and planning issues that should be considered by the client as part of any future business cases and environment and public amenity considerations associated with further development of the Geelong Port.

The preparation of this report was funded with the assistance of the City of Greater Geelong, GeelongPort, the Committee for Geelong, GrainCorp, Incitec Pivot and Midway. The Victorian Regional Channels Authority (VRCA) also made available technical assistance to the consultant team using the existing VRCA port development model. All of these parties came together with a commitment to maximise the growth and success of Geelong's port and of Geelong as a supportive' port city' in the decades ahead.

Glossary

PoMC	Port of Melbourne Corporation
PoM	Port of Melbourne
PoG	Port of Geelong
VRCA	Victorian Regional Channels Authority
IPL	Incitec Pivot Limited
PHVZ	Port Heavy Vehicle Zone
GGL	Geelong Grain Loop
CIGL	Corio Independent Goods Line
ARTC	Australian Rail Track Corporation
DoT	Department of Transport
GREP	Geelong Ring-road Employment Precinct

Executive Summary

In Summary: Geelong Port City 2050

- The port of Geelong, its customers, the City of Greater Geelong and its business community want to make the port of Geelong a lead sector for its future economy, as a means of stabilising the economy following a significant and ongoing withdrawal of traditional manufacturing employment in the region. This report has examined the likely trade types and volumes that can be attracted to and/or retained at the port of Geelong by mid-century. 10 different likely trade scenarios were developed. The economic impacts of these trades would be significant, as follows:
- The analysis of market potential for the Port of Geelong indicated that if all of the nominally identified trades were captured and retained in Geelong then the tonnage through the Port of Geelong would grow from 12.5 million tonnes in 2011-12 to approximately 50-60 million tonnes by 2050, becoming south-east Australia'a dominant bulk commodity port;
- In 2050, Port activity is estimated to expand by over 150 per cent relative to a 'business as usual' strategy for the port. To put such an expansion in perspective, such an increase in 2011 activity at GeelongPort would:
  - generate, in very broad terms, approximately 1,800 jobs for the City of Greater Geelong;
  - generate approximately $300 million extra in value added, or approximately $1,400 per person in Geelong; and
  - add approximately an additional $100 million to household incomes for the Geelong community, or approximately $500 per person.
- There are almost 800 ship visits to Geelong per year now. Every additional ship visit to Geelong generates approximately $560,000 in economic output and every hundred ships visits generates approximately 170 jobs for Geelong.
- The report examined in some detail the particular shipping channel, berth, road and rail infrastructure upgrades that would most likely facilitate the attraction and retention of these trades at port of Geelong. Road freight solutions in particular have been developed to offer greater productivity but also greater community safety and public amenity, by reducing the presence of high productivity road freight to fewer places.
- A series of recommendations have been offered to achieve these outcomes, centred around the closer cooperation of city and port in attracting new trades, accommodating these trades with effective freight infrastructure, planning and protecting the port's future development and developing service sector complements to the port activity, as well as forging closer links with Geelong's port trading partner cities and regions overseas.

Introduction

Geelong: a community in transition, with ambitious plans for its port

The City of Greater Geelong and its wider region are home to around 180,000 people. Most economies are in constant transition of one form or another, but Geelong faces some particularly volatile challenges in the decades ahead:

- Geelong has a traditional large-scale manufacturing and heavy industry base which is experiencing change, with a significant amount of jobs and investment transitioning out of this sector in recent times.
- Geelong's wider job growth is not as strong as that of the state capital Melbourne, with a recent report forecasting that Geelong job share will contract as a total share of the Victorian labour force in the decade ahead.
- At the same time, the proximity of Geelong to the state capital combined with lower land values and a high standard of living makes the city an attractive expansion zone for further residential development: current state and local government plans alike aim for a considerable increase in the Geelong population in the decade ahead. This comes with risks if future local employment strategies cannot be secured.

Geelong's Port is a positive part of Geelong's economy at a time of change: for over 150 years Geelong's port has provided trade access for several major industries in the Geelong area and beyond and it has served as a base for bulk commodity imports and exports for Victoria. This has enhanced the business opportunities in Geelong with steady port growth experienced over recent years.

Accordingly, the Port of Geelong's future growth and success is viewed as a lead sector in a structural adjustment for the city to cope with these changes and emerge with an even stronger economy and community in future.

Geelong is therefore looking to take greater active control of its port development to drive that positive economic growth. As this report outlines, the latent demand opportunities and infrastructure setting suggests that the Port of Geelong is justified in pursuing a strategy of becoming the dominant bulk goods port of south east Australia in the years ahead.

A demand driven local partnership

Local government, the port owners, port users, customers and the wider business community have combined to deliver this report. In line with observed global best practice, it is driven first and foremost by market demand. It will be used to inform market plans and investments as well as to shape supportive policy and funding actions by local, state and federal government for the decades ahead.

The Challenge Ahead

The City of Geelong is facing considerable challenges ahead, as the profile of its economy changes, brought on by a decline in some traditional employment sectors of the city. The city needs to adapt and develop more productive growth sectors for a future Geelong economy.

The Port of Geelong has been identified by the city's local government and business leaders, as well as by the port owners and managing authorities, as a lead sector for the city's future job and wealth generation.

The City of Greater Geelong and Geelong Port itself, port users and freight providers have worked collaboratively with a professional consultancy on the objective of making Geelong a world-leading Port-City – one in which the Port of Geelong grows its trade significantly in coming decades and becomes the acknowledged dominant bulk port for south-eastern Australia: a high-volume, high-efficiency international port located in a vibrant city, supported by a strong and complementary service sector.

In seeking to achieve this objective, Geelong hopes to deliver on a challenge set down by Infrastructure Australia in 2012: to develop a plan for the Port of Geelong that will protect its future and maximise its contribution to a future Geelong economy and to the nation.

Geelong wants to achieve its Port-City objective through sound long-term planning: this planning will maximise the trade growth on offer to the port, but do so in a way that also improves the urban amenity of Geelong for its community – even as port operations become larger-scale and more intensive. This plan has therefore been developed in line with the best practice suggestions of Infrastructure Australia's National Ports Strategy and the Organisation for Economic Cooperation and Development's Global Port-Cities project. It has also drawn on the existing strategies and knowledge base from earlier Port of Geelong plans and analysis.

Importantly, the plan acknowledges leading port thinking in realising that the future is not about creating coping strategies for the city to deal with its port expansion – the best future lies in a comprehensive development strategy that sees the port as a leader for Geelong's future economy. The strategies outlined here are developmental: they are quite consciously based on nothing less than 'the search for new business designs that will deliver superior value'[1] to the Geelong community, the state and the nation.

Plan Objectives

This project is first and foremost about growing the Geelong economy through the port. To that end, it set out to examine:

- What current and new trades were feasible for Geelong to retain or capture (in the short and longer terms)?
- What facilitating freight infrastructure and planning settings would be needed to attract and retain this growth (in the short and longer terms)?
- How could the city, in its planning and zoning choices for the future, better support the sustainable development of a stronger port sector?
- Through recourse to a very detailed economic impact model, how much economic benefit would flow to the port and the city from pursuing these trades?

The project presents a series of realistic and staged commercial infrastructure investment and economic growth opportunities for the Port-City of Geelong, as well as offering detail on the specific road, rail, berth and shipping channel infrastructure improvements that are most likely to unlock different stages of this available growth. These growth opportunities have been subjected to detailed modelling for their impact on Geelong jobs and the port economy.

The Port of Geelong 2013: at a glance

The Port is located in the city of Geelong, Australia's 12th largest city, on Corio Bay, 75 kilometres west of Melbourne. The port is centrally located to serve regional and rural Victoria, South Australia and parts of New South Wales (refer figure 1).

It is a specialised bulk goods port, trading in petroleum, chemicals and crude oil as well as grains, fertilizers woodchips and logs and a range of other bulk and break-bulk goods.

The Port is the largest bulk port in Victoria and the second largest port in the state behind Port of Melbourne.

The port assets are owned by port operator Geelong Port (except for Point Wilson Explosive Pier, which is owned by the Commonwealth Government and Bulk Grain Pier No. 3 Berth, which is owned by GrainCorp). Key uses of the port include GrainCorp, Incitec Pivot, Midway, Shell, Alcoa, Omya and Terminals Pty. The key berths and facilities are included in figure 3.

Port activity 2011-2012[2]

In 2011-12 the Port of Geelong created or hosted:

- 12.5 million tonnes of cargo throughput worth $7.6 billion
- 782 commercial vessel visits
- An estimated economic impact of $489 million on the state economy
- An estimated 1,600 direct and flow-on jobs in the state economy

Supporting logistics

The port is adjacent to a 6-lane section of the Princes Highway that connects to the Princes Freeway, and which is rated for High Productivity trucks like the B-triple. It also has standard and broad gauge freight rail connections, with the standard gauge rail connecting Geelong by direct rail to all mainland states of Australia (see figure 2).

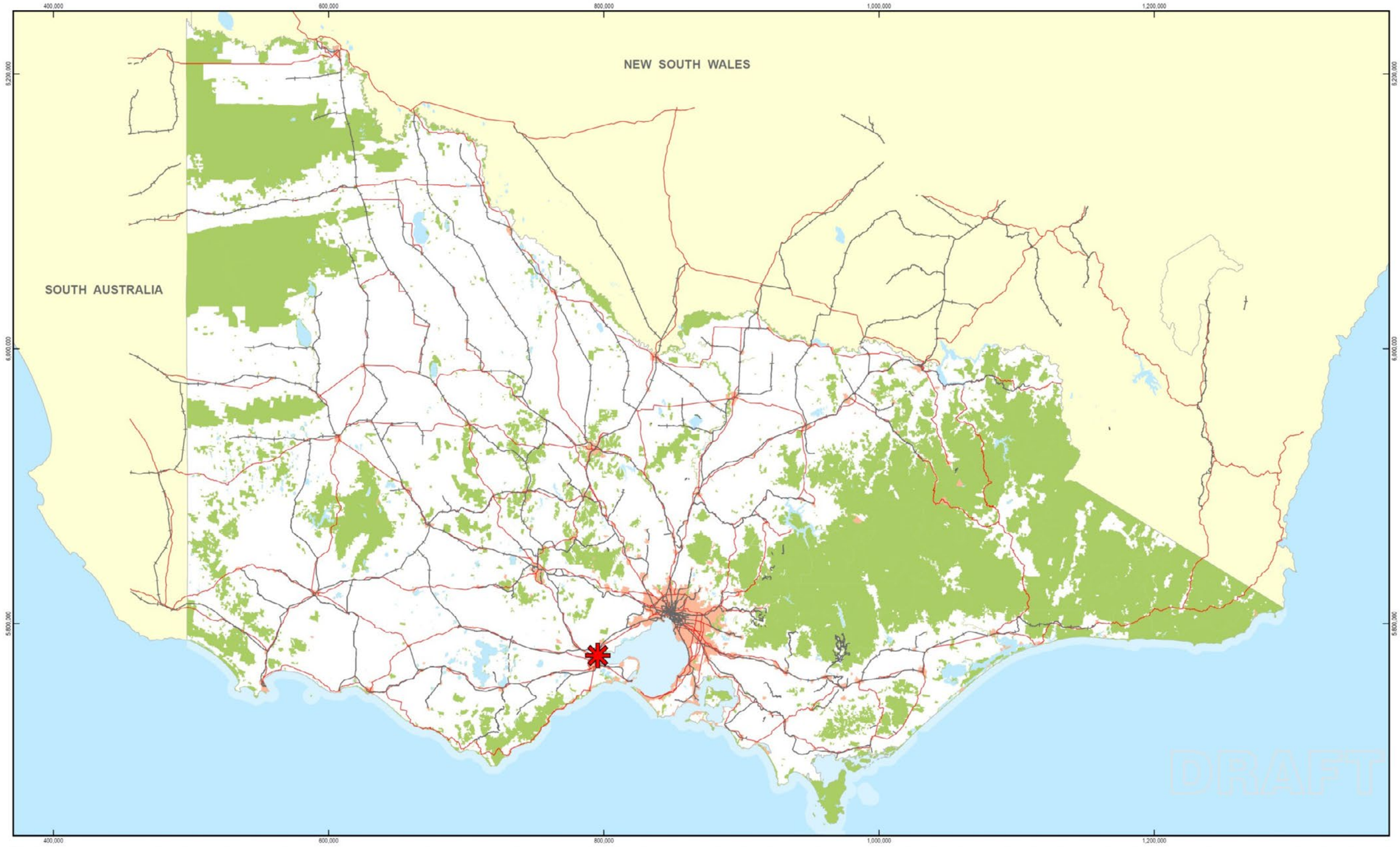
The City of Greater Geelong has developed a large scale logistics and distribution centre to service the port nearby, adjacent the main freeway and railway alignments (the Geelong Ring Road Employment Precinct, GREP) (see figure 3).

Infrastructure

The port in 2012 has:

- A channel suitable for Handymax – Supramax or partial loaded Panamax class shipping (the main channel has a declared depth of 12.3m providing access for vessels of 10.8m draft at all tides and up to 11.7m with tidal assistance. However, the channel cannot accomodate vessels with beam greater than 45m.)
- Access to the port for B-double truck-trailer combinations
- Access to the port for both broad and standard gauge trains
- A dual gauge rail connection at Corio Quay

14 operational ship berths including a heavy load berth (excludes lay-up berths).The port also has a number of vacant plots around the port environs that would be suitable to new industrial and commercial operators associated with trade or port operations. The recognised berths are identified in figure 3.



Scale 1:2,500,000 (At A3)

0 12.5 25 50 75 100 125

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

N

LEGEND

- Geelong Port
- Township area
- Railway Line
- Major Road
- Park

City of Greater Geelong
Port of Geelong Strategic Assessment

Job Number 31-30033
Revision A
Date 02 Jul 2013

Regional Context Map

Figure 1

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Data source: DSE, VicMap Planning Zones, VicMap Navigation Points and VicMap Water Structrue Lines, 2013. Created by:lrsmith

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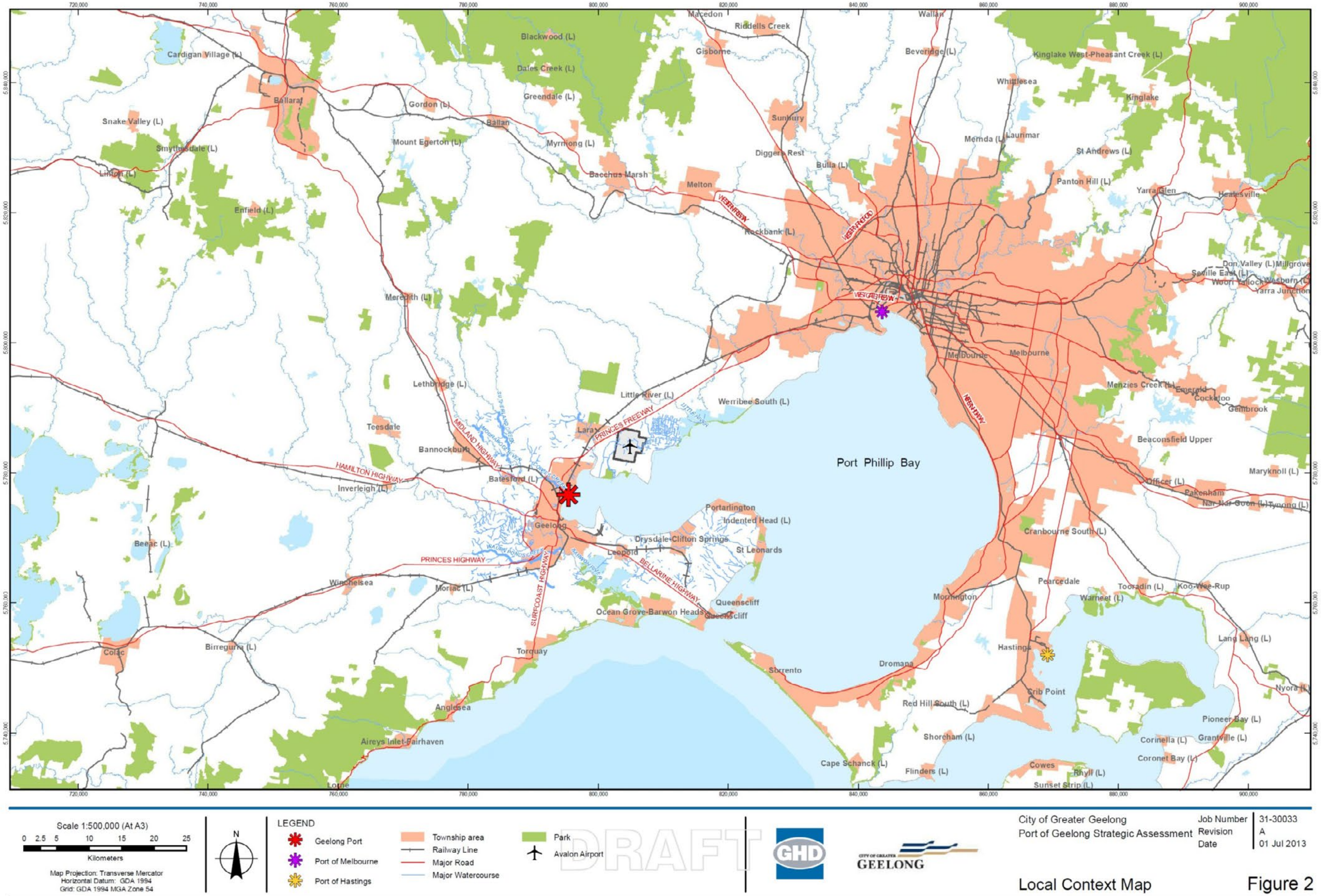

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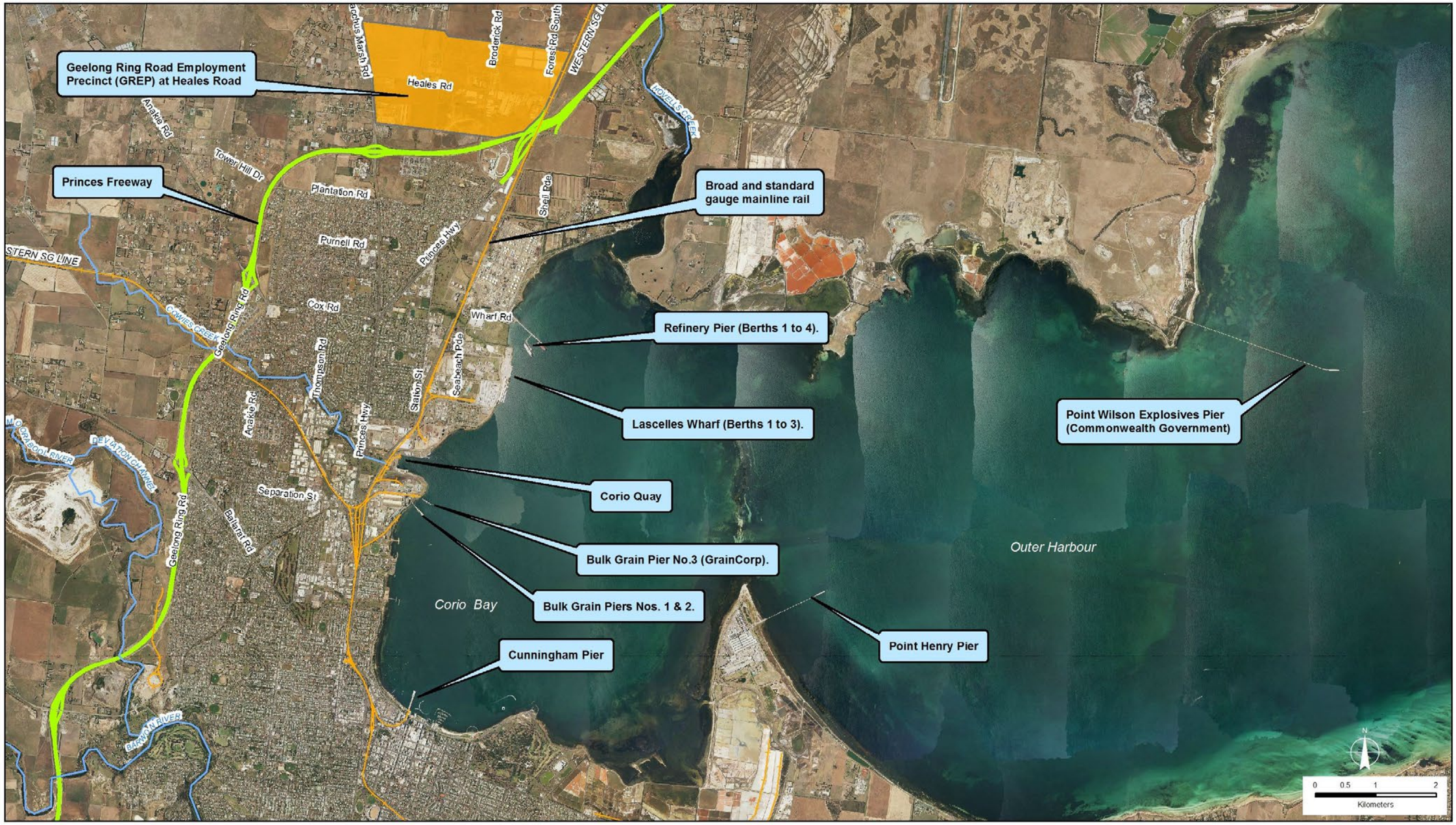
Data source: DSE, VicMap Planning Zones, VicMap Navigation Points and VicMap Water Structure Lines, 2013. Created by:lrsmith



Source: DSE Imagery & VicMap 2013

Figure 3 GeelongPort and Intermodal Transport Infrastructure

Geelong Port-City: Key Issues and Opportunities

Geelong was founded primarily because of its port and indeed, up until the 1850s was in fact the principal port of Victoria, overshadowing Melbourne. The city and the port share a long history of interdependence.

But global best practice suggests that the mere presence of a port in a city alone does not maximise its potential: thorough planning and investment strategies are required to protect and grow the port in a way that meets community expectations. For the best outcome, the city has to see the port as central to its future. It needs to understand the port's prospects and challenges and work with the port to maximise success. In turn, the city needs to build a valuable service sector on port success. It also needs to balance port development with urban amenity and the environment: the expansion of port activities should be carefully planned to maximise growth but also to protect the city's aspirations. The city also needs to understand what other parts of the world trade with its port, and nurture these important trading relationships.

In more detail, some of the key issues that face Geelong in becoming a world-leading Port-City are listed below (in no particular order):

The Port of Geelong is likely to face an increasingly competitive and entrepreneurial national ports sector in the future

The Port of Geelong is growing as a competitive bulk commodities destination. But this growth occurs in an increasingly competitive environment for port services: Geelong might be the destination for some goods today, but long-term growth cannot be taken for granted in a competitive environment. Recent events in New South Wales – where the Ports of Sydney and Kembla were sold to a superannuation fund investor for over $5 billion – suggest that there is strong interest in private capital investment into port infrastructure.

Port user feedback to this report suggests that some grain trade in particular has in the past been lost to other ports due to such constraints as channel depths.

If continued improvement occurs at rival ports to Geelong without smart efficiencies being secured for Geelong itself, the city may suffer accordingly with the competitive advantage that new investments elsewhere will bring. In this respect, the City of Greater Geelong needs to work with the port to understand some of the key planning and investment matters that will shape a competitive and successful port city for the long-term. In turn, Geelong's port and landside freight task itself can become a leading and profitable investment candidate.

Scale efficiencies are vital for a bulk commodities port

Freight and logistics for bulk commodities – which are often of low value per tonne - benefit greatly from economies of scale – that is, where costs per unit of output fall as the scale of operations increases. Economies of scale can come through higher freight volumes: higher volumes pay for better infrastructure, which costs less per unit of goods moved to operate. Geelong can look to increasing the scale of its operations in order to out-compete its rivals by offering the best freight rates for goods imported to and exported from Geelong.

Scale issues are likely to be of particular importance to the future grains and fertiliser import and export trade, where the east coast of Australia – which produces millions of tonnes of hard grains annually - might be expected to want to reduce the number of seaport destinations and concentrate on fewer, larger, higher-productivity grain export ports. As Geelong is already the largest bulk port in Victoria, it is well placed to become the pivotal grain export port for southern Australia, but this will only happen with a dedicated port-city planning and investment effort.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Higher productivity vehicles and vessels can and should serve the port, safely and sustainably

The same economies of scale apply to the ships, trains and trucks that service the Port of Geelong. International shipping profiles are changing rapidly. Today's ships together with the current order book of new vessels are bigger than before[5] and can move more goods more cost effectively, but to remain competitive, the port needs shipping channels and berths that are deep enough and wide enough to accommodate these new vessels. If the port loses its competitiveness for shipping, the Port-City objective is fatally compromised.

Equally, longer trains and the latest high productivity trucks towing a longer trailer or extra trailer represent the future of efficient port servicing. Consequently, the port's future success relies on ensuring that the key road and rail arteries of the port are at the leading edge of vehicle productivity.

The whole supply chain is important to Geelong, not just the port facilities

In previous decades, the success of Geelong's port depended mostly on the port infrastructure itself – its berths, shipping channels, tug and pilot vessels and wharfside infrastructure.

In 2013, success depends also on a growing emphasis on the adequacy of road and rail infrastructure that bring the Port of Geelong's commodities to the port itself. In some cases road and rail infrastructure vital to the Geelong port freight task can lie hundreds of kilometres away from Geelong, but its role in the success of Geelong's port is just as crucial as the roads, shipping channels or rail tracks that go into the port itself.

A major example of this is the road and rail linkages into northern Victoria and southern NSW around Shepparton and the Riverina. Geelong's future grain and fertiliser growth can come substantially from this rich cropping region, but both the Port and City of Greater Geelong will need to realise that this region's road and rail freight infrastructure is a key piece of their own port supply chain. This presents the opportunity for Geelong to work constructively with these regions, their state and local governments and rail and road operators to make the future supply chain requirements a reality. Geelong's port success is tied to this regional infrastructure.

This focus on city/port/regional cooperation is a feature of leading global port cities according to the Organisation for Economic Cooperation and Development, and it is one Geelong will need to emulate.

Geelong's labour market appears to be in transition

Geelong is a city in economic transition: some of its traditional major employment sectors are declining. While many of these sectors are not directly related to Port of Geelong traffic this opens up space for new opportunities. Geelong as global port-city is a key opportunity for the future.

It is important for any city to take these productive opportunities when they present themselves. The best available labour forecasts for Geelong indicate that – all other things being equal - health care services will become the dominant employers in Geelong[3]. Local government and industry planning can influence this positively so that port and logistics and their service sectors become a larger share of the future workforce and economy. But this involves making active and entrepreneurial choices now about how the port is planned and developed for the future.

The planned relocation of the Port of Melbourne can offer direct growth opportunities for the Port of Geelong

In the coming two to three decades, the Port of Melbourne, which is currently Australia's largest container port, is expected to move in at least large part to a new site, away from its current home, which occupies around 500 hectares of land in the central-west of Melbourne.

Port of Melbourne Corporation (PoMC) container operations are likely to reach capacity in the mid to late 2020's and growth throughout the port precinct will be restricted by the available land footprint and pressure from a developing city.

Container traffic will move towards Hastings as a major port although the trade will continue at PoMC.

The port capacity for other trades will be continually under pressure as has been the case with many city-based ports around the world.

The port of Geelong provides a substantial alternative to PoM in the future for bulk and break bulk trades in particular, offering an overflow function for some products and over time the progression of specific trades more suited to Geelong's future growth and efficiency.

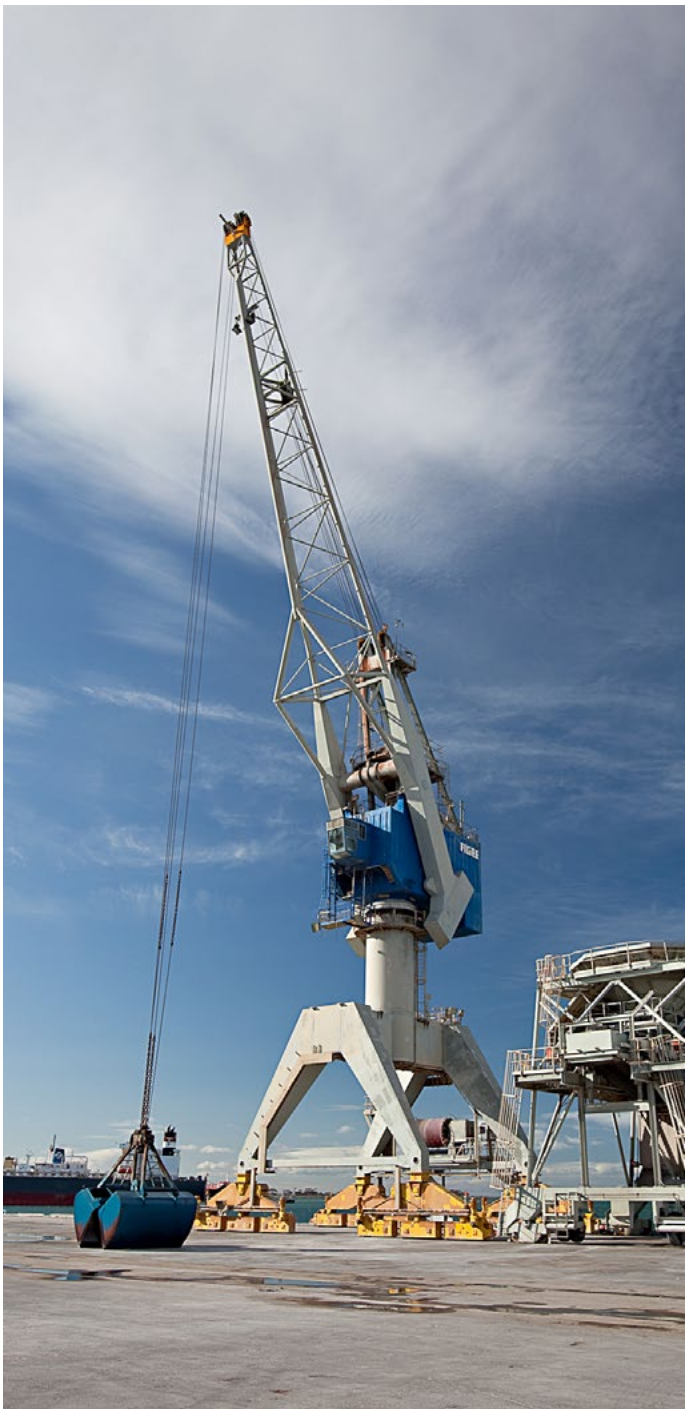
The move and change will be as a consequence of capacity issues at the current site: put simply, the present location will not accommodate the likely significant growth in containers and container vessel size that Melbourne and Victoria's economy is expected to generate in the decades ahead.

Present planning solutions to this growth challenge would see Melbourne's predominant container trade being moved to a new container terminal development at Hastings, south east of Melbourne. However, the considerable amount of bulk commodities in Melbourne are not planned to be accommodated at the Hastings site for the long term, all of the available space of which will, it is understood, be required for container operations.

This situation represents a trade growth opportunity for Geelong in the longer term. Geelong will be a compelling long-term destination for many of the non-containerised trade tenants on the Port of Melbourne site, provided that Geelong can put in place the right facilitating infrastructure, land planning and nearby logistics infrastructure, this scenario could see bulk operations with greater economy of scale at Geelong, with much of the Port of Melbourne's former bulk commodity sites liberated for remediation and use as inner-city residential developments, in a move that would also reduce the very considerable heavy vehicle traffic around the port of Melbourne, which is a contributor to Melbourne's road congestion overall.

This scenario forms a major part of the Port of Geelong growth strategies that follow. By planning to create the right commercial and operational setting for these bulk trades in Geelong, the Port and City allow the State Government to reorient the bulk sites at the Port of

Melbourne for higher-value land uses. In any event, these bulk trades offer further complementary scale to such operations as are already at Geelong and align with the port's objective of becoming the dominant bulk port in south eastern Australia.



As the port grows, negative impacts of that growth need to be reduced

On the physical level, a growing Geelong port needs space – both at its ship berths and in terms of its land freight corridor connections, warehousing and distribution land nearby. As a port grows, freight operations become more intensive.

But this extra activity, even though it brings greater financial activity, can harm the wider economic activities of Geelong: truck and train noise, pollution, environmental challenges and especially road safety can suffer with the greater financial success of the port, if not planned appropriately. These matters have been addressed directly in this plan (see below), with a recommendation that higher productivity vehicles operate only within a restricted network to service the Port.

In defining the following growth strategies, it should be noted that future infrastructure solutions aligned to these are provided indicatively. Such future solutions will be subject to further detailed planning study, consultation and business case assessment.

Road freight should be more actively limited and 'pathed' to protect the community

In particular, communities in and around the port - and in the suburbs that approach the port which are used frequently by trucks going to and from the port - can have their land values and community safety eroded when growing road freight throughput in particular is simply allowed to 'happen' rather than being planned and managed actively.

Global best practice in this field suggests that cities need to plan their port development more actively and to give a clearer and higher-productivity network for transport to and from the port. The network used by these higher productivity vehicles should be controlled resulting in reduced truck activity in most places, but more efficient and denser truck activity in a well-

designed, special higher productivity corridor, away from other transport users and the community.

This approach is known as seeking the **least financial and economic cost pathway for freight**, and it will need to be a high priority in Geelong's planning goal of becoming a leading port-city of the future.

Higher volumes of freight in future means access arrangements to maximise capacity usage will need to be practical and transparent

As the Port of Geelong's operations grow in volume and intensity the port and its customers will need to have a clear approach developed around commercial access to key infrastructure. Maximising the use of capacity will become more and more important. For example the Geelong Grain Loop (GGL) at the port of Geelong – a rail line which currently services the grain facility close to Corio Quay and allows rail wagons to unload close to Corio Quay South - is a piece of critical infrastructure. It is in the interests of all parties to maximise usage levels of this loop before new and potentially expensive new rail loading investments are considered. Feedback suggest that current access arrangements work quite well, with the managing party – GrainCorp – organising access for third parties as necessary.

This informal coordinated access process is far preferable to a regulated outcome. But when larger volumes, new commodity types and greater infrastructure usage levels are anticipated for the future, there will be room for improved supporting structures around the port of Geelong's current third party access arrangements. Best practice approaches to this sort of infrastructure would normally suggest that a simple independent and suitably transparent coordination process be developed to ensure that capacity usage is maximised on existing infrastructure, so that amongst other things, upgrades to existing infrastructure can then take place in a more timely way, on a more reliable user pays basis. This offers a reliable and durable alternative to formal regulation and feedback from port users is that this sort of coordination approach to managing growing capacity is the preferred approach for capacity management of key infrastructure at the port of Geelong.

New commercial road access arrangements for more productive heavy vehicles, operating on limited routes, are a key strategy for driving sustainable growth for the port of Geelong

As volumes of product being moved to and from the port of Geelong grow, it will become ever more important to extract more efficiency out of road freight movements. This is particularly the case for Geelong, which at least at present, is a road freight dominant port: many of the freights moved to and from Geelong are not moved a sufficient distance for rail freights to be viable (although this might change in future, particularly as volumes and operational certainty for some trades increase, and the corresponding density functions around rail freight might be expected to improve).

At the present time, new higher productivity commercial road freight access arrangements are becoming available to state road agencies – where larger, more productive vehicles (such as B-triples and 'Super B doubles', which are the same size as B triples but which can carry 2 x 40-foot shipping containers at once, or 4 x 20-foot shipping containers) can gain better access to key freight facilities like ports.

The port of Geelong will benefit from being a 'first mover' in taking up innovative commercial road access arrangements

Infrastructure Australia has led policy thinking in introducing these higher productivity road freight vehicles under commercial arrangements, where those operators and customers that wish to access the better freight efficiencies on offer from such trucks contribute to the required road upgrades on an efficient 'user pays' basis – utilising third party access and

improvement arrangements under Australia's Competition and Consumer Act (previously the Trade Practices Act). This innovation in road freight infrastructure financing has significant promise for Geelong's port task. Geelong stands to be an early adopter of this commercial approach, which is currently being considered for the Hume Highway between Melbourne and Sydney.

Port and city have the opportunity to forge a closer, more allied future

For the port to thrive and for the city to thrive with it, both need to link themselves together more closely. In particular, the city has a role in developing the service sectors around the port to make Geelong a leading source of expertise for its freight and port activities; the city can also assist the port in negotiations with major potential customers or investors, or state and federal governments.

The OECD has highlighted this challenge in its Global Port-Cities project :

"This is a challenge because successful ports are 'club goods' where clustering is needed to share infrastructure among a few large industrial players, but where interaction (of these players) is avoided because of competitive pressures; whereas successful cities are agglomerations that maximise the opportunities for interaction between a very large number of people mostly employed in service industries. Not all cities with successful ports have good economic performance".

The challenge for Geelong as an aspiring leading Port-City is thus, in the words of the OECD, 'to find a way to use the port cluster as an asset for a wider urban economic development and a more high value-added services economy', such as headquartering arrangements for the port customers, and offering partnered courses, research and development in its tertiary institutions that can build on the port's presence and offer commercialised spinoffs to the port's activities.

A new structure will be needed to facilitate the Port-City partnership

It will also be necessary to consider a formal structure for coordination of port, port user and operator and investor matters with other levels of government. In this respect, there are lessons to be learned from port and hinterland freight coordination model such as the Hunter Valley Coal Chain coordinator, which is a forum for capacity planning, management and investment in the coal trade of the Hunter Valley and the Port of Newcastle – the world's largest coal port.

Even relatively informal structures will be of benefit in the early years of a Geelong port-city plan. It is important that all parties, including new trades at the port, have a single forum supported by city planning and research.

This structure will also offer the city and its port and port users a single body with which to discuss the port's development objectives with state and federal governments and other potential infrastructure investors.

The City of Geelong and the Port, along with other major port users and the Victorian Regional Channels Authority, already hold Port User Group meetings on a regular basis. This forum is an excellent beginning that can be built on to keep structure, process and governance to a minimum but offer the right forum for dealing with the opportunities ahead.

Some best practice Port-City examples are close to home

The port of Gladstone in Queensland is regarded by Infrastructure Australia as a best practice example of a global port-city, where the economic development of this major global port and the city's own development objectives are very well aligned. Gladstone remains a state-owned port, but the efficiency of its port-city relationship lies in its close partnership with the city in all aspects of sustainable planning and trade development: the port has published and maintained a 50-year development plan for many years now and the city works closely to support all aspects of sustainable and sensitive port development, and to act as a trade ambassador for port business. Geelong therefore has ready-made Australian examples to follow in setting out to be a leading Port-City.

A changing industry profile means Geelong has land planning opportunities ahead

Part of the requirements for the port of Geelong's expansion is for more land for the warehousing, distribution and value-added activities that greater port imports and exports will need. Geelong needs to be able to provide this 'back-end infrastructure' if the port is to market itself successfully as a sustainable destination of choice for bulk and break bulk commodities in particular.

The changing face of Geelong's manufacturing sector – much of which is adjacent to the port - will mean that at least some land is likely to become available in the future. It will be important for Port-City objectives that the long-term requirements of the port are considered and planned for when considering alternative uses for such sites– such considerations might be made in conjunction with the departing tenants, in some cases.

Methodology

This project was initiated in March 2013, in part being a collegiate response from the port, its users and the city to a recommendation from Infrastructure Australia in 2012 that Geelong should seek to develop a long-term plan for the future of its port.

This project, which sees the port, its customers and tenants, the local government and the wider business community working in alliance, has involved several distinct work areas and phases. The following sections outline progress towards this final report:

- Project inception;
- Analysis phase;
- Future modelling; and
- Development of growth scenarios.

Project Inception

An initial round of meetings was conducted with clients and other interested parties and arrangements were agreed for the consultancy's coordination with the City of Geelong's economic strategy and planning office. The project since this time has in effect seen the city work as a member of the consultancy team, seeing the issues develop and having direct input into trade and infrastructure analysis and development of new growth and planning scenarios for the Port. This places the city extremely well in responding quickly and efficiently to the final report. It resembles best Australian practice in this respect, which at this point is generally acknowledged to be the *Port of Gladstone 50-Year Plan*. This plan sees city and port in lockstep in terms of planning, investment, managing port operations and working to attract new business.

Analysis Phase

Identification of current port trades and operating arrangements

The existing operations of the port were interrogated: what trades now, in what quantities, berth utilisation, present freight flows to and from the port by rail and road and emerging trades and opportunities as they were viewed by the owner and tenants and through the wider market research conducted by the consultancy.

Current port infrastructure arrangements

Berths, channels, road and rail approaches that underpinned the current operations at the port were examined. Landside availability and major vehicle access approaches for road - (principally: Bacchus Marsh Road; Cox's Road; Western Ring Road; Shell Parade; Latrobe Terrace) and rail (Gheringhap loop, GGL and CIGL, other rail spurs easterly), were examined, with both broad gauge (i.e. Victorian passenger trains and freight network) and standard gauge (i.e. the national rail freight network) alignments and train pathing arrangements considered. (Refer figure 2 and 3 above).

Current planning and zoning arrangements affecting the port

Consideration was given to the availability of land for port expansion and prospects for land parcels becoming available in future that might need to consider port activity as highest and best use, if the aspirations of trade growth were to be realised at the port.

Current access arrangements affecting the port

Freight operators and the port and its tenants were interviewed to appreciate what size of trucks had access to the port, what size of trains, access restrictions, the arrangements for third parties obtaining effective access to the essential infrastructure of the port (such as the Geelong grain loop on Corio Quay south).

Least cost-financial and economic pathway identification for freight in Geelong

The preferred pathways for entering the port from the port user perspective were considered – this equates to the least cost financial pathways for port freight; put simply: what made the most money for the freight sector and customers.

These current or industry-preferred outcomes were then compared with possible alternative arrangements that might best manage the impact of port operations on environmental and public amenity – road safety, noise, pollution, etc. This is known as the least cost economic pathway for freight.

The two pathways were compared to each other for analysis of overlays that would inform better freight infrastructure pathing and infrastructure decisions for the future development of the port.

Potential future trades for the Port of Geelong

Analysis was undertaken on the full range of port trades available to Geelong (both prospects for expansion/closure of existing trades and new entrants), realistically, into the future. In several cases, the relevant industry personnel in potential future trade categories were interviewed for their views on the likelihood of trade relocation to Geelong, including what infrastructure and planning issues might need to be addressed.

Analysis of necessary new infrastructure for new trades

Time was taken in consultation with industry – especially freight operators and the port tenants – to examine the roads and rail and berth and channel investments or land use arrangements that would potentially satisfy and accommodate the different new/expanded current trades in the port into the future.

This consultation might be expected to be continued by a port-city management structure in future, but discussions to date have offered good insight into key issues and opportunities. These being subject to future investment certainty, consultation and planning study.

Current hinterland arrangements for the Port of Geelong are examined

One of the limitations of traditional state government port plans is that thinking about the port's trade connections tends to stop at the state border. To avoid this shortcoming, the assessment of infrastructure vital to the growth of operations at the Port of Geelong was extended to take into account key pieces of road and rail infrastructure further afield, particularly in the grain growing areas of northern Victoria, southern NSW, north west Victoria, the mineral sands product supply lines from northern Victoria and coal and other product line supply chains from regional Victoria and Gippsland.

Future Modelling

Input-Output Model Quantitative Economic Model for Port and City developed

This model represents the likely outputs that port activity generates for the economy of the City of Greater Geelong. It is a recognised basis for making public policy decisions around infrastructure funding or planning.

A model of unprecedented depth and accuracy was developed for port and city thanks to the close support of Asciano and the port users, which offered great assistance in providing input data. The resulting model allows the economic impacts of different port growth scenarios to be developed to a plausible degree of accuracy.

Channel and berth activity modelling

A review of previous ship simulation studies related to the existing port channels and port operations model outputs conducted by the VRCA was undertaken in conjunction with the development of a new port model (by the consultant) to understand the infrastructure limits that are met under different trade and growth scenarios, and what this means for the facilitating channel, berth, road and rail infrastructure in terms of timely and prioritised upgrade options.

The new port model developed as part of this study considers and estimates future berth requirements (by commodity type) and vessel movements for each scenario.

Development of Growth Scenarios

This phase of work involved looking at the plausible potential trade growth at the Port of Geelong from worst case scenarios to best - out to the year 2050, examining the likely impact on the city from increased trade under each scenario and cataloguing the sorts of freight infrastructure and planning requirements that are likely to be needed to make each scenario happen. This analysis offers leaders of city and port alike the growth potential available to Geelong and what sort of infrastructure is likely to be needed to unlock constraints on growth. Importantly it also models a scenario of no or very low growth – thereby highlighting the dangers of doing nothing (i.e. the worst case scenario).

Trade Growth Opportunities

This report involved consultation with the Geelong Port, major port users such as GrainCorp, Midway, Incitec Pivot, Terminal Pty, Shell and many others, as well as Geelong road, rail and shipping freight providers, to identify two main sources of realistic growth opportunities for the Port of Geelong. A list of consultees is given at the end of this report.

Existing Trades – these are commodities that are already traded through the Port of Geelong at some level, and which might be better protected or grown for the future

Emerging Trade Opportunities – these are trades that, based on feedback from interested parties, have realistic prospects for future location (either whole or in part) at the Port of Geelong that can deliver new lines of trade growth to the Port-City

These trades are summarised below. They have been quantified, and their future likelihoods have been assessed to inform the economic impact analysis for the Port that follows in the next chapter:

Existing Trades

- Woodchips
- Timber
- Logs
- Fertiliser
- Grain including wheat, Soya bean, Canola, Barley
- Steel products
- Aluminium products
- Crude Oil
- Petroleum products / Bitumen
- Chemicals
- Mineral sands, Gypsum, Cement

Emerging Trade Opportunities

Exports

- Mineral sands
- Brown coal
- Black coal
- Iron ore
- Grain (including new supplies and existing PoM share)
- Soya Bean Meal / Oil
- Copper concentrate
- General cargo (steel, construction products etc)
- Pulp
- Containers – Tasmanian based service
- Containers – coastal shipping service to Hastings
- Bio fuels

Imports

- Fertiliser
- Automotive units (vehicles)
- Containers
- Cement
- Sugar
- Chemicals
- Petroleum products (including Bitumen and LPG)
- General cargo

This indicated breakdown of trade values by type is provided in the Annex to this report.

Infrastructure Barriers and Solutions to Trade Growth

To achieve the potential trade growth on offer and become a long-term destination of choice for more bulk and break-bulk customers, the stakeholders must address some infrastructure constraints. However, doing so can be inordinately expensive if attempted all at once.

The parties to this project have been in clear agreement that new infrastructure investments at the port should not be considered on a speculative basis, but only on the basis of a clear sight of future trade growth as a means of paying for each new infrastructure development.

New infrastructure investing should be on merit

With the clear objective being the development of cost effective new infrastructure, it is very important to understand not only where the specific infrastructure barriers to growth might lie, but also in what order or with what size of opportunity these constraints should be attended to, in order to unlock smooth and untroubled trade growth at the port in an affordable fashion. The merits of this approach apply equally to whether the funding comes from the private sector (where return on investment has always been a foremost consideration) or the taxpayer (where demonstrated value for money is increasingly important in an era of scarce taxpayer funding).

Identified infrastructure constraints on further growth at port of Geelong

The key constraints and challenges are listed below, and are described further in Table 1.

- There is no recognised heavy freight operations zone around the port.
- High capacity vehicle access to all port precincts from the Princes Freeway is limited. Port exit routes for trucks heading west are different to those for trucks heading east.
- Truck access to/from the port through or around Geelong is not managed and there is no recognised (dedicated) heavy vehicle route across the city of Geelong.
- There is a lack of third party commercial access models to achieving infrastructure improvements.
- Rail access and volumetric capacity (by rail) to port berths is limited, there are no long term high-capacity rail solutions planned for the port precincts.
- Access to Standard Gauge rail is complicated. The port does not yet connect easily to the national standard gauge network in an operational sense, despite its very close proximity to this infrastructure.
- Port zones suitable for stockpiling dry bulk materials appear to be limited especially when combined with rail connectivity shortcomings.
- The port has limited transport connectivity with the GREP Industrial Area; this has the potential to restrict growth in fertiliser / grain-based industries and future intermodal operations.
- The port navigation channel depth and breadth limits the maximum size of vessel that can service the port.
- The port has berths and infrastructure that are nearing the end of their service lives.

  (i) this further limits the maximum size of vessels that can safely access the port; and

  (ii) it restricts the operations that can occur across the berth.

This project has examined the road, rail, berth, land zoning and shipping channel challenges. Key shippers (current and potential) infrastructure owners and managers have been consulted to understand where the infrastructure barriers lie.

The project considers that solutions to these infrastructure barriers can be arranged in a broad logical chronology if the market for each new or augmented trade is consulted on what infrastructure barrier(s) is most important to securing their future trade.

The following mode-specific infrastructure priorities for trade growth have been developed drawing on expert road, rail and portside engineering and operational expertise. In addition, the analysis has benefitted from the different trade volumes being simulated through a model, to assess where the different trigger points for new berth and channel capacity arise vis-à-vis growth in new and augmented trades through the port.

These projects are linked to the growth scenarios in this report. Embarking on these projects in a timely fashion, under commercial demand driven arrangements, offers Geelong the opportunity to pursue a dominant role as a regional bulk port. Ignoring these projects is very likely to lead to other ports establishing an irreversible competitive infrastructure advantage over the port of Geelong in the longer term, leading to far lower growth prospects for the port and the city:

Road infrastructure growth projects for the port and city

By the nature of its task, Geelong relies heavily on efficient road freight: much of the grain moved through the port, for example, is harvested within 400kms of the port, making rail densities and distances more challenging to be commercial on such short distances (in rail economics terms). However, looking ahead, more efficient road freight should be considered in a continuum: the more volumes that can be brought to Geelong, the healthier the economics for eventual large aggregations of commodities on rail.

Road freight in Geelong can move cost-effective trade volumes forward significantly by taking advantage of the introduction of more modern, safer and higher productivity truck-trailer combinations, operating into and out of the port and extending on key networks like the Princes and Hume/Goulburn Highways to extend the trade footprint of the port much further north in future. At the same time, these higher productivity vehicles should be actively 'channelled' by city planners into a single port access and egress route, reducing the number of trucks moving in and around Geelong and interacting with passenger vehicles.

Geelong stands to become a leading example of how dedicated heavy road freight improvements can both lower the cost of freight and reduce the prevalence of heavy vehicles across the public road network.

Higher Productivity Vehicle freeway/highway linkages are essential for Geelong's growth

To become the principal bulk port of South-Eastern Australia, it is essential that Port of Geelong takes advantage of the latest opportunities in high productivity road freight on a limited but core freight network connecting the port to its hinterland.

Vehicles such as the B-triple and Super B-double would create considerable freight efficiencies for the Port of Geelong. Particularly in the grains sector, the presence of a major fertiliser hub at the port of Geelong means that high productivity road freight can bring large amounts of grain in from the hinterland and return to these regions with the next season's fertiliser loads. This puts the load ratio of these trucks at optimal efficiency, making Geelong's grain logistics prospects an extremely attractive proposition in a competitive market for grain ports.

Geelong was the first place in Australia to introduce modern High Productivity Vehicles on a regular urban highway service – the B-triple combination has run between Ford Geelong and Ford Broadmeadows safely and extremely efficiently for over 20 years. In future, this network will need to be linked directly to the Port and extended to a number of key hinterland connectors to grow the Port of Geelong to its optimum:

- The route from the Riverina (i.e. Numurkah, south via Shepparton bypass on the Goulburn Valley Highway to the Hume/Western Ring Road/Princes Highway/Port is the most critical high productivity vehicle network for the Port of Geelong's future.
- The eventual extension of High Productivity Vehicles on to the Princes Highway duplication to Colac and back to the Port of Geelong is a second emerging route supporting port growth; it can take advantage of the Geelong ring road to avoid transit through Geelong, moving to and from the port via a dedicated Port Heavy Vehicle Zone.

A Port Heavy Vehicle Zone (PHVZ) is required

High Productivity Vehicles such as the B-triple are vital to the future trade growth and efficiency of the Port of Geelong – they can unlock greater trade flows to Geelong through the competitive freight advantage they would offer to this port. But these vehicles need dedicated infrastructure in order to operate effectively in urban areas. A straightforward and comprehensive solution in this respect involves creating a dedicated Port Heavy Vehicle Zone – in essence the road that follows the port coastline and services the main port precincts and recognised loading points, given over to exclusive port heavy vehicle traffic operations - allowing for greater opportunity and operational safety to be achieved.

Under these arrangements, vehicles would need a permit to enter this zone and the interface of port and non-port traffic, pedestrians and other parties would be managed. In a similar fashion to the mining sector, safety arrangements in this zone would be increased: speeds could be expected to be reduced and various safety technologies would regulate the movement of vehicles and pedestrians in this precinct .

Importantly, this concept has been developed in conjunction with council land use and planning objectives in mind. It is not anticipated that the proposed arrangements would create access and egress difficulties for local residents or those passenger vehicles in transit through this area (eg parents taking children to the Geelong Grammar school.
Discrete aspects and benefits of a Port Heavy Vehicle Zone (PHVZ) are illustrated in figure 4 and would be as follows:

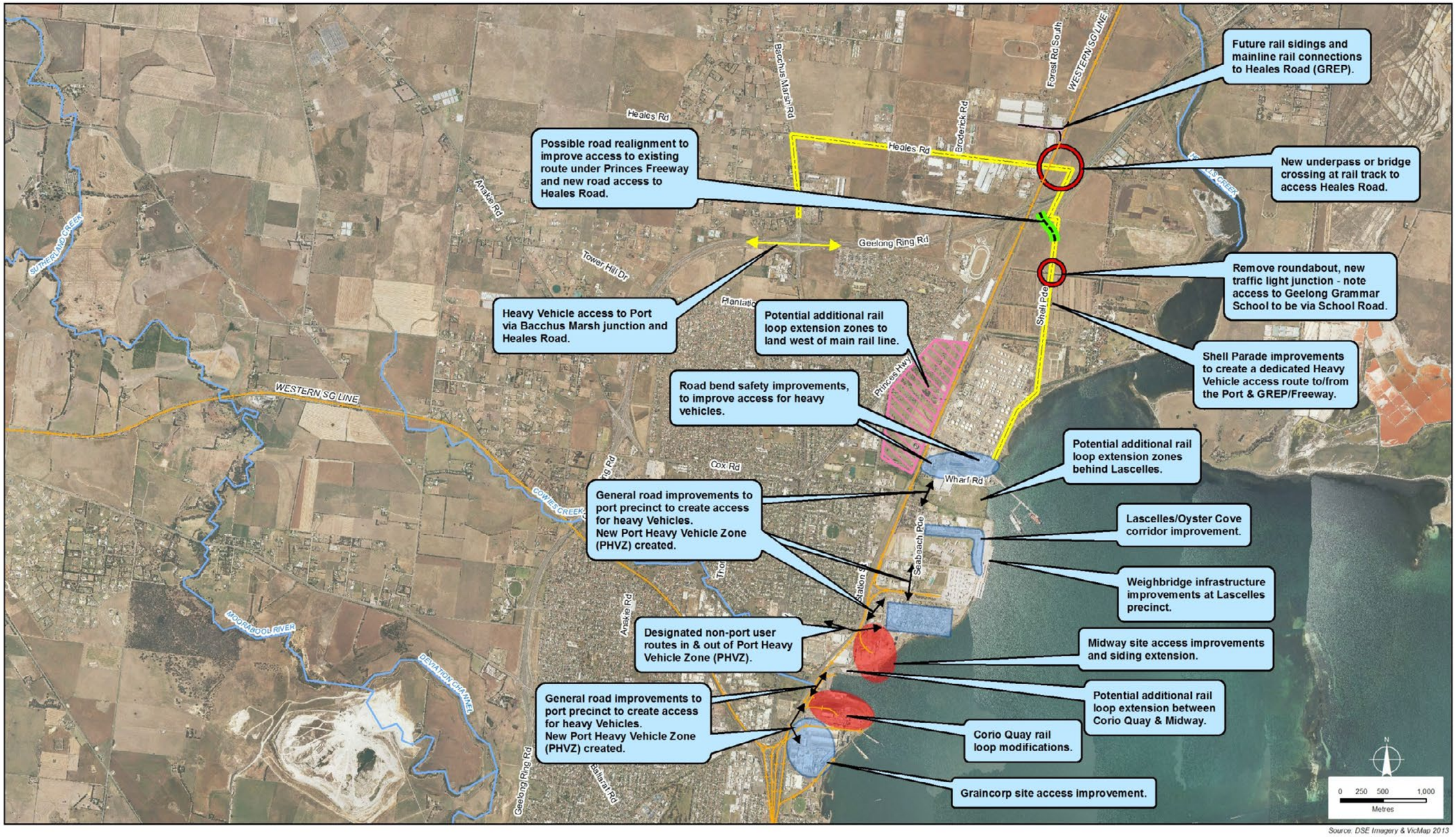


Figure 4 Key Infrastructure Improvement Options identified in the Study
(Note: feasibility is subject to further study, consultation and assessment)

- **Entrance and use restricted to permitted port heavy vehicles and other port vehicles only**
  In effect, this zone would be closed to all other public traffic. An initial assessment was undertaken at a desktop stage to assess the impacts on nearby local residents and through traffic other than port traffic, and this appears manageable, although it will require further more detailed planning consultation of assessment. The key principle is to separate the largest heavy vehicles in an intensive operational zone from other forms of public traffic, in the same way that mine sites and other operational areas are segregated for safety and productivity dividends.
- **Reduction in heavy road freight on Latrobe Terrace, Cox's Road and Bacchus Marsh Road**
  Land values, public amenity and safety for the Geelong community are lessened by the presence of many large heavy vehicles on these key community roads. By offering trucks servicing the port an opportunity to upgrade to a higher productivity vehicle such as the B triple in return for only accessing the Port via the Geelong Ring Road or Princes Highway, very considerable amounts of heavy vehicle traffic would be reduced on Cox's and Bacchus Marsh Roads and Latrobe Terrace in particular. This outcome would achieve Infrastructure Australia's stated best practice in road freight planning, of creating least cost financial pathways for freight operators and customers while also creating the least economic cost pathway of freight for the wider community. It might be expected that not all heavy freight will be removed from these routes – for example, some grain traffic from the Bellarine peninsular might seek a different route to access the port efficiently – but overall the opportunity to gain access with better freight vehicles on a more limited route will encourage much road freight away from these thoroughfares.
- **IPL weighbridge and safety/operational issues**
  The import and distribution operations through Lascelles wharf are extremely constrained by the areas roads being open to general traffic and the fact that there is only one weighbridge currently in the port precinct. For IPL, this limits the utility of the truck weighbridge sites at the port and means that the port must maintain constant road sweeping operations to manage grain or fertiliser spillages on these roads. A PHVZ would unlock significant operational efficiencies for this major port user and allow for higher productivity vehicles to operate at this site without risking community interaction with cars, motorcycles and pedestrians.
- **Maximise use of Midway site**
  Midway's forestry products site is another major user with the capability to expand its operations and (potentially) consider sub-tenancy arrangements. However, the lack of a PHVZ means that the entrance and exits to the site can be dangerous to traffic, constrain the future sub-tenancy use of the site and have limited turnout opportunities for heavier vehicles. A PHVZ would resolve this situation and allow for works to make this site accessible to the highest productivity road freight in a location that maximises the value of the land.
- **Maximise HPV access to GrainCorp site**
  The present alignments for truck access to the GrainCorp elevator site could be improved on and realigned to create a new High Productivity entrance for trucks within a PHVZ that is away from the adjoining public thoroughfare of the Princes Highway.
- **Open new road freight servicing options on other sites in the Geelong PHVZ**
  Work with City of Greater Geelong planning and strategy staff shows that there are other sites in and around the port that could be unlocked for servicing by High Productivity Vehicles under a PHVZ arrangement. This offers considerable expansion drivers to the wider land in and around the current main port user tenancies.

- **A PHVZ can link the maritime freight task with Geelong's logistics and distribution zone**
  At present, Geelong's main logistics and distribution zone at Heales Road (GREP) is not linked to the Port by a route that is direct and/or suitable for high productivity vehicles. A PHVZ which was extended to uniquely connect to Heales Road in effect offers Geelong a seamless berthing and hinterland logistics capability using the highest efficiency road freight possible. The availability of a PHVZ linked to Heales Road that is connected to the Princes Freeway, would mean that the Port of Geelong could service customers in the west of Melbourne, regional Victoria and beyond directly at superior levels of freight efficiency. This could potentially combine bulk, break-bulk and container commodity trades through a common logistics platform.
- **New Shell Parade truck access/egress arrangements to the PHVZ**
  The entrance to the Port Heavy Vehicle Zone would be from Shell Parade, which links to the Princes Freeway at Corio (or via Heales Rd and Bacchus Marsh Road). This route would require some upgrade to allow for the route to be dedicated to heavy vehicle port operations whilst also still servicing local passenger and general traffic effectively. A logical solution for this outcome would involve local road improvements and the removal of the existing roundabout on the junction of Shell Parade and School Road, and its replacement with traffic lights with pedestrian crossing facilities, thereby allowing passenger vehicles to interact more safely with heavy vehicles using the port.

Rail infrastructure growth projects for the port and city

Geelong is already served by both the Victorian broad gauge rail system and the national standard gauge freight system. It is important to understand the main difference: the national standard gauge freight system connects into other states, linking Geelong's port with Perth, Darwin, New South Wales and southern Queensland. The broad gauge network is limited to Victoria, and this network is also Victoria's passenger rail network. This is important in operational efficiency terms, because it means freight trains can often find it difficult to access paths for moving freight, as passenger train operations are usually afforded priority on the network. Some parts of the port are serviced by dual gauge (i.e. a third rail that allows both gauges to be accepted).

There are a number of rail constraints both at the port of Geelong and 'up country' in the hinterland rail connections to Geelong that if addressed would allow a much more viable and heavier tonnage rail freight service to be considered into Geelong. As pointed out in the roads discussion (see above), this is likely to occur as a continuum, with heavier road freight introducing some new trades and greater tonnage to Geelong, and volumes eventually becoming viable for a more cost effective rail solution. In other cases, such as mineral sands and ore's, rail is practically the only viable transport mode in any case for bringing some trades to the Port of Geelong.

Key infrastructure treatments to unlock constraints on growth in rail operations at Geelong are as follows and illustrated in figure 5a to 5g:

- **Signalling constraints for trains accessing the CIGL and Geelong Grain Loop**
  Geelong's rail infrastructure has two main approaches to the Port: from the east, via what is known as the Corio Independent Goods Line (CIGL), and the Geelong Grain Loop (GGL).
  The existing train signalling infrastructure between the CIGL and the main broad and standard gauge lines limits the access for trains to access the port and requires manual controls. Railtrack authorities in Victoria are already considering an automated technology solution to this issue through what is known as the North Geelong C-Box signalling project. This project is already funded and will optimise design for future rail access within the GGL and CIGL.

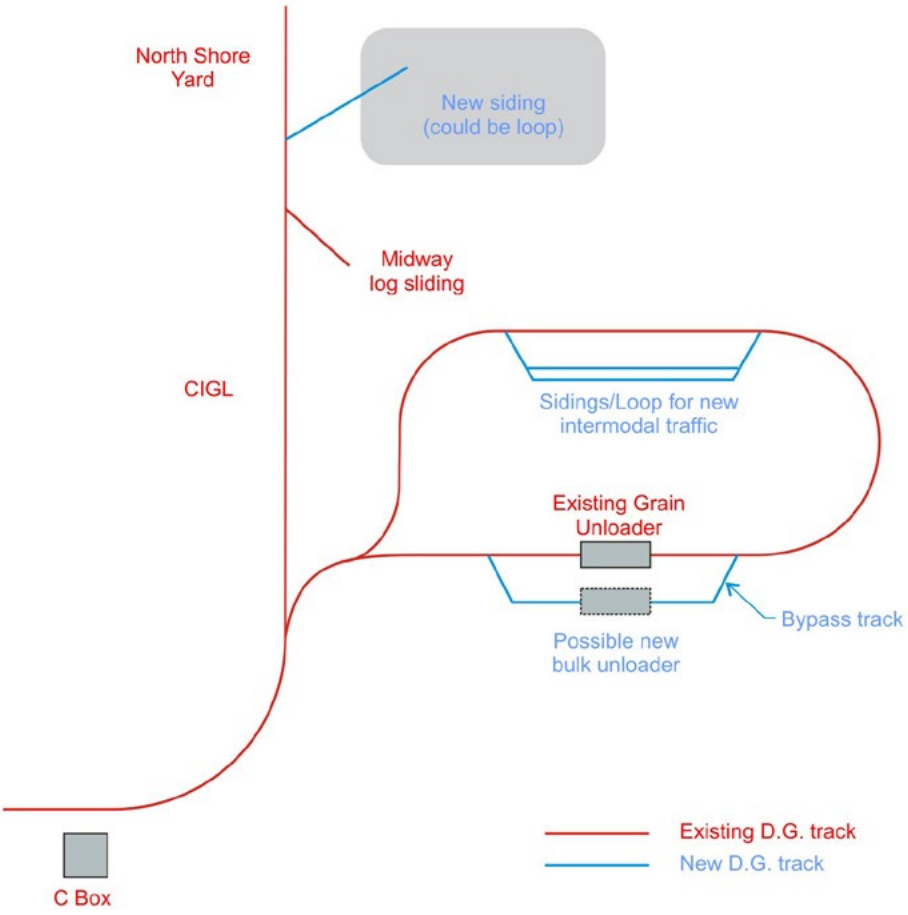


Figure 5a

(5b) Midway siding extension.

(5c) Rail loop to 'One Steel' to service Lascelles or a loop to the Graincorp bunker site. (As contemplated by Fig 5a)

(5d) Rail loop extending through the existing CIGL. (Grade crossing exemption required).

(5e) New siding extension to the west of the existing mainline rail tracks, bulk materials transfer solution to port required.

(5f) New rail loop to the west of the existing mainline rail track, bulk materials transfer solution to port required

(5g) New rail loop to service Lascelles wharf. Bridge crossing required across existing mainline.

Source: DSE Aerial imagery & VicMap 2013

Figure 5b to 5g Rail Infrastructure Options for GeelongPort

- **Grain Loop rail extensions to accommodate multiple operations**
  The routing of the rail trade (figure 5a) across GrainCorp land and through GrainCorp unloading facilities restricts the use of this section of rail track for alternative products, primarily due to AQIS controls relating to the potential for grain contamination but also in relation to train length.
- Construction of a series of additional rail turnouts or sidings within the existing loop would allow rail wagons to bypass the Grain unloading infrastructure as and when necessary and facilitate multiple train use, increasing the operational rail capacity of this part of the Port (figure 5a). That includes berths at Corio Quay South and the Bulk Grain Piers of Geelong Port and GrainCorp (noting that GrainCorp has 12.3m alongside depth).
- In addition, (and as contemplated within the C-Box signalling design) a new rail loop extension could be considered around to the nearby GrainCorp bunker grain storage site that exists further to the North of the Corio Quay port precinct (figure 5c).
- **Midway rail siding extension**
  The Midway forestry products company is another major port user which would benefit from an upgrade to its rail capacities. The Midway site currently contains a dual gauge rail siding that is served by the CIGL, but its short length (ie only 200m) restricts the operational efficiency of trains that can access the site.

A potential improvement would be extending these sidings to 400m in length and consider a further extension towards Corio Quay Grain Loop that in turn could provide a further rail loop capacity solution for the Corio Quay precinct (figure 5b).

- **Rail loop to service Lascelles wharf *via* CIGL**
  The shipping berths at the refinery pier and Lascelles wharf currently have some of the deepest berths available in the the Port of Geelong, but there is at present no opportunity to export goods via rail from these facilities. Rail access to the Corio Independent Goods Line is currently undertaken via inefficient train 'run arounds'.
  These berths could be opened to rail access through a range of options, combining either:
  - rail sidings/loop and new stockpile zones for dry bulk material on land to the west of the main rail line that is currently owned by Shell (see figure 5e or 5f). This solution could be considered in conjunction with temporary structures and conveyor/pipe based infrastructure;
  - rail sidings/loop and zones for material stockpiles on land to the east of the main rail line that is currently adjacent to the Terminals site (this option requiring a rail bridge connection over the existing mainline) (figure 5g).
  - A potential new rail loop around the 'One Steel' site, with connection to the existing IPL rail spur or future Graincorp Bunker loop (NB) this may require an application for an exemption for an 'at grade' rail crossing within the port precinct (figure 5c or 5d).
  - An elevated 'stockpile to berth' conveyor arrangement as seen in other ports (notably the Port of Newcastle NSW) which would be considerably less expensive than building new rail alignments into and out of the berthing areas.
- **Rail does not yet connect from the Port to Geelong's main logistics precinct (GREP)**
  The Geelong Ring Road Employment Precinct (GREP) is considered by the City of Greater Geelong as the principal warehousing and distribution centre for Geelong's future. It is in close proximity to the Princes Freeway and the main rail lines, but this industrial park is currently not connected to the main rail line, although provision exists to do so. This limits the opportunities for intermodal operations significantly: it is one thing for Geelong's port to attract new trades to the port with available berthing, but it is another matter to retain long term customers: the latter achievement will require a transport system that links logistics facilities to the port seamlessly. Provision exists for this connection to be made (refer figure 4).

Shipping channel and berthing infrastructure growth projects for the port and city

Geelong's port is depth and breadth constrained, as are other parts of Port Phillip Bay, but the extent of constraint appears to have been overplayed in policy thinking to date: a clear example being the recent channel deepening project that provides for vessels up to 14m draft to access Port Phillip Bay but proceed only to the Port of Melbourne.

An examination of likely bulk vessel ship sizes into the future for the sort of trades that Geelong will command and interviews with customers in these trade sectors, combined with feedback from the Victorian Regional Channels Authority and the Port Phillip Sea Pilots, suggests that there is a more manageable and staged series of approaches that need to be considered to address channel capacity. Berth capacity and new berth development has similarly been considered by way of industry consultation, port modelling and analysis of the sort of trade profiles and shipping congestion levels that different anticipated levels of trade will have on the port's existing berths.

A notable exception to this lack of depth constraint is the grain sector: this fundamental trade for Geelong is at present constrained to operate less than fully-loaded Panamax bulk carriers, where fully-loaded Panamax vessels are immediately desirable. This is a significant competition-eroding factor for the grain sector at Geelong. Dredging options are discussed below but there appear to be a range of other shipping channel and berth developments that offer value to building some trades through the port.

A range of plausible infrastructure development priorities have subsequently been developed in this respect:

1. New berth(s) at Lascelles wharf

The three berths presently in operation in the Lascelles precinct reach operational capacity during peak periods, to the extent that the amount of additional cargo that can expect to be shipped through the berths is extremely limited. This is a key factor when considering this project's plausible trade growth scenarios. The designation of Lascelles berths 1 & 2 to fertiliser operations, the proximity of storage sheds behind Lascelles berth and the number of cranes restrict performance.

Options identified that would expand operational capacity for the Lascelles precinct are presented in figure 6 and include:

a. Lascelles berth 4, as a linear extension to berth 3 providing a new quay in front of existing port land;

b. Lascelles Berth(s) 4 / 5 / 6 developed through creation of a basin that is formed from the installation of a new berth on a perpendicular alignment from the end of berth 3, with berths 5/6 running parallel to berth 3 to create the basin as a new finger jetty. Indicatively, berth 5 would be located inside the basin, with berth 6 being located on the outside of the jetty finger. The jetty finger could be developed as a dedicated export finger pier or multipurpose berth as necessary.

c. Consideration could be given to the conversion of refinery pier berth (4) to a dedicated export pier, connected to the shore with a trestle and conveyor loading system, which might complement a rail stockpile to berth elevated conveyor system. Such a solution would allow this berth to become a dedicated export berth serviced by long trains on the national standard gauge network. These options could be considered in conjunction with A and B above. Under this scenario, consideration would be given to the needs and use of Refinery Pier berths 1, 2 and 3, in case this upgrade is required to ensure no loss of liquid bulk handling capacity.

2. Additional berths at Corio Quay

The existing berths at Corio Quay restrict the amount of additional cargo that can be shipped through the port. They are depth constrained, in relation to the channel and vessel capacity, and also constrained in terms of their age and condition. Identified options to provide more berth capacity at Corio Quay precinct are illustrated in figure 7 and include:

a. The extension of Corio Quay South to the east as a linear extension to berth 1, with additional land areas created behind the berth using dredged spoil;

b. Corio Quay berth(s) 5 through extension of the existing northern jetty to the north of the woodchip loading berth parallel to the coastline. This could be created as a dedicated export pier, connected to the shore with a trestle and conveyor loading system to the Midway site that would again take advantage of an elevated conveyor stockpile to berth arrangement from the standard gauge eastbound railhead.

c. the creation of a new berth along the western end of the Corio Quay basin and/or modification of existing berths and assets in Corio Quay to accept new trades and vessel types (e.g vehicle carrier vessels).

d. The creation of a new grain export pier to the south of Corio Quay either as a new berth alongside the existing Graincorp facility or through refurbishment / replacement of the redundant pier adjacent to this location.

3. Restricted navigation channel – implications for bulk carriers

The dredged depth and width of the channel at the entrance to Port Phillip Bay limits the maximum vessel draft to 14m and constrains accessibility for some vessel types. This is an overarching conditioner of depth potential and vessel size for future shipping profiles and trade flows considered for Corio Bay. For future bulk commodities (and international containers), it might be expected that the priority for unlocking constraints on access to Port Philip Bay would involve a focus on modifications to address vessel manoeuvring requirements (e.g *widening* the entrance) over and above deepening aspects. The rationale being that depth aspects are most aligned with growing sizes of container vessels, while larger bulk carriers, which typically have less powerful engines than container vessels, will correspondingly need more room to manoeuvre through this dynamic entrance.

4. Restricted navigation channel

The existing Geelong port channel (width and depth) limits the maximum size of vessel that can service the port. The channel depth restricts vessel loaded drafts to between 10.8m and 11.7m (tide dependant), while the channel width restricts vessels to 45 maximum beam. This by degrees acts as a barrier to attract new port users and offer efficiency gains to current users and is expected to be a growing constraint as larger vessels enter the market. This is most important for future trades, in particular alternate and new trades. As time progresses, more users will seek larger Panamax style carrier access and this will necessitate some dredging. If this were not to occur Geelong would surrender efficiency parity to other south eastern Australian ports such as Kembla, Melbourne and Portland.

A solution to these issues is therefore to widen and/or deepen the main channel servicing the Lascelles and Corio Quay berths to a minimum that will meet the future needs of the port. Currently, this is expected to include Panamax vessels of up to 14m draft, however the depth requirements may be more if port users and/or commodity types require greater efficiencies.

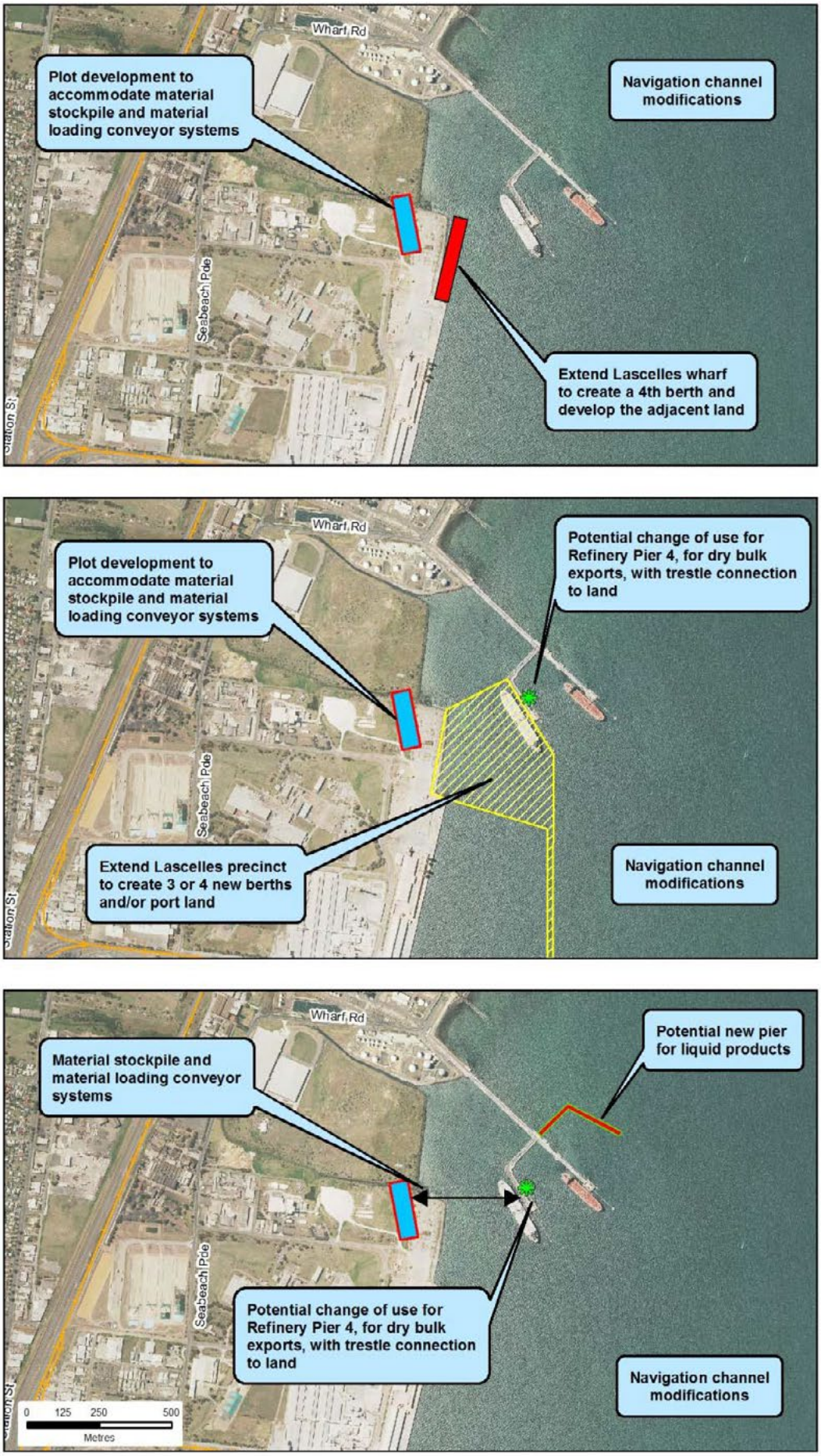


Figure 6 Example berth infrastructure solutions for Lascelles Wharf and Refinery Pier

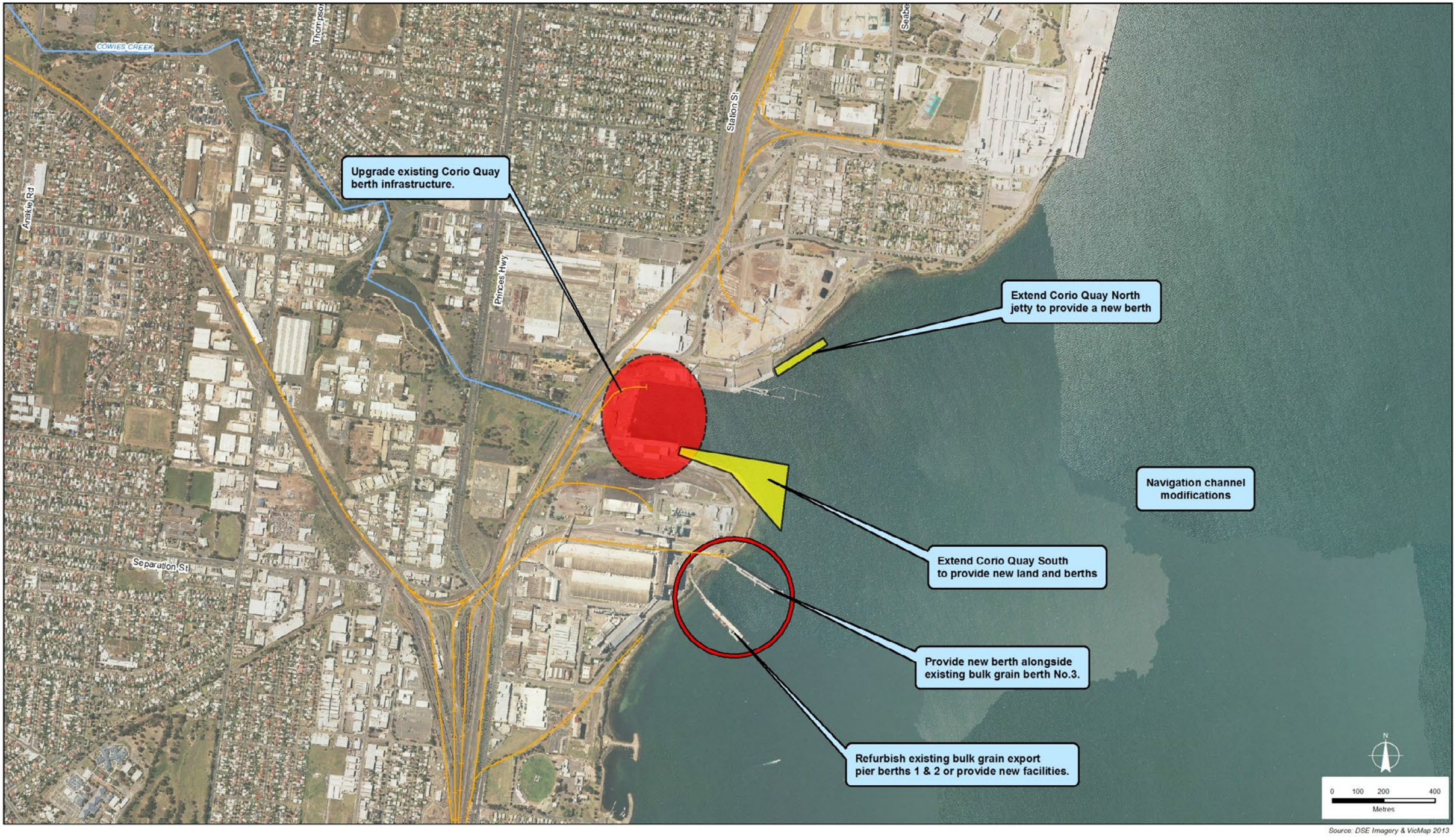


Figure 7 Example Berth Infrastructure Solutions for Corio Quay

5. Local deepening of the Midway berth and CQN (3)

The woodchip loading berth at Corio Quay North and the adjacent Corio Quay North (3) and Corio Quay basin are shallower than the adjacent navigation channel. This limits the depth and size of vessels that can be loaded on these berths. Midway would like to be able to load 60,000 DWT capacity size vessels. Additionally, this acts as a trade attraction constraint for new tenants on the Midway site. A local dredge could resolve this by making the berth depths match the channel depths adjacent, but in the first instance a structural assessment of the existing berth infrastructure would be necessary.

A solution to these issues is therefore to locally deepen the berth pockets and quay basins to match the adjacent channel declared depths. The restructured depth of some berths restricts berth utilisation and leads to further inefficiency.

The following tables summarise the challenges and constraints, options to address the challenges, net benefits and indicative cost estimates that result.

The Cost Estimate has been prepared for the purpose of 'order of magnitude pricing' only and must not be used for any other purpose. The Cost Estimate is an indicative estimate. Actual prices, costs and other variables may be different to those used to prepare the Cost Estimate and may change.

Port precinct road improvements and improved access for heavy vehicles to the Port. Management of port traffic (dedicated truck routes) and there is a lack of third party commercial access to infrastructure improvements.

	Constraint Title	Constraint	Options to unlock constraint	Basis for change					Indicative Capex ($)
				Increase land value	Safety	Operational efficiency	Freight efficiency	Lower Opex	
One of the overarching constraints for more efficient truck access is a lack of dedicated heavy road freight operations zone which can exclude non-operational vehicles (such as passenger vehicles) from heavy intensive road operations. Such a zone would offer the benefit of access for higher productivity trucks than can presently service the port									
1	Inadequate entrance/exit to Midway site	The current entrance to the Midway site is separate from the exit. This limits access to large vehicles and options for the sub lease of the site for alternative uses.	Develop a combined entrance / exit on either the Esplanade or Corio Quay Rd. New entrance to be designed for Super B double truck access.		x	x	x		$ 150 k
2	Truck access to Graincorp GrainCorp facilities is remote from the Port	Access for trucks from Mackey Street, pushes trucks out onto the Princes Highway, and the turn into Mackey Street is difficult.	a) Consider an alternative truck access route into GrainCorp from McLeod St or b) access from Langdon St across the existing rail loop via an at grade crossing.		x	x	x		$ 1 M
3	Oyster Cove / Lascelles connection improvements	The shortest route from Lascelles to Oyster cove is not used following an accident 2 years ago. IPL also have to have a street cleaning vehicle permanently working to clear roads.	a) Consider zoning a section of the port precinct as a dedicated heavy freight zone (PHVZ) to restrict non-port users and allow higher capacity vehicles to operate; b) consider closure of this road and connect adjacent land areas with Lascelles wharf. (see also Rail options)		x	x	x	x	$ 510 k
4	Additional weighbridge at Lascelles	The single weighbridge at Lascelles can delay the departure of trucks from the berth leading to congestion.	Consider the provision of a new weighbridge either a) at Lascelles wharf; b) on the (new) port traffic only route corridor to Oyster Cove (see 3 above); c) at Oyster Cove.			x	x		$ 280 k
5	Road alignment safety improvements on Wharf Rd	The alignment of the road at Wharf Rd is not suitable for the regular transit of large trucks.	Local safety / road alignment improvements to the road bends.		x	x	x		$ 60 k
6a	No dedicated heavy vehicle access route	Higher productivity freight vehicles cannot currently service the port	Upgrade the Shell Parade route from the Princes Freeway to the Port. Remove the existing roundabout at the School road intersection and provide a new traffic light junction.		x	x	x	x	$ 8 M
6b	Transport linkage to Heales Rd and westbound traffic	Westbound access for trucks onto the Freeway from Shell Parade, and/or direct access to Heales Rd from Shell Parade does not exist..	Provide a new road connection between Rennie Street and Heales Rd / Forest Rd by way of a box culvert or bridge crossing.		x	x	x	x	$ 80 M
7	Hinterland constraints	Upstream locations associated with the Origin and destination of goods may be constrained with respect to access for Higher Productivity Freight Vehicles.	Undertake road infrastructure assessments and upgrades to unlock HPFV constraints		x		x	x	Not Costed

Port precinct rail improvements to provide rail based (high volume capacity) transport connections to port facilities and/or Heales Road.

	Constraint Title	Constraint	Options to unlock constraint	Basis for change					Indicative Capex ($)
				Increase land value	Safety	Operational efficiency	Freight efficiency	Lower Opex	
1	Signalling constraints for trains accessing the CIGL and Geelong Grain Loop	The existing signalling infrastructure between the CIGL and the main BG and SG lines limits access for trains to the port and requires manual controls.	Implement the proposed rail infrastructure improvements that are being contemplated under the 'C-Box' signalling design.			x	x	x	Signalling Already Funded.
2	Grain Loop rail extensions.	The routing of the GGL through the Graincorp unloading facilities restricts the use of the rail track for alternative bulk products, due to AQIS controls.	Consider additional rail turnouts or sidings within the existing loop to allow rail wagons to bypass the Grain unloading infrastructure. Consider a new rail loop extension to the Graincorp Bunker storage site.			x	x	x	$ 3.5 M
3	Midway Rail siding extension	The siding length restricts the length of trains that can access the site. Access to DG siding requires use of additional rail sidings to the North.	Extend the rail siding within the Midway site to accept longer trains. Consider a further extension back towards Corio Quay to provide a further rail loop solution.			x	x	x	$ 0.5 M
4	Rail loop to service Lascelles and mainline rail connection to/ from the CIGL from the North	There is currently no opportunity to export goods via rail through Lascelles wharf or the Refinery piers without vehicular intervention. These berths have the greatest alongside depth of all berths in the Port.	Provide rail infrastructure in combination with conveyor transfer systems. Options comprise a) rail sidings / loop and zones for material stockpiles on land to the west of the main rail line. b) rail sidings / loop and zones for material stockpiles on land to the east of the main rail line (this option requiring a rail bridge connection over the existing mainline). c) consider a rail loop around the 'One Steel' site, with connection to the existing IPL rail spur or Graincorp Bunker loop (this may require exemptions for an 'at grade' rail crossing).			x	x	x	$ 11 M
5	Rail to Heales Rd	The Heales Rd precinct is currently not connected to the main rail line, although provision exists to do so. This limits the opportunities for intermodal operations.	Install rail sidings to the mainline rail, consider the connection in association with (4) to provide better rail access to the Port from the North.	x		x	x	x	$ 1.5 M

Depth constrained channel and ageing berth infrastructure limit the maximum size of vessels that can access the port.

	Constraint Title	Constraint	Options to unlock constraint	Basis for change					Indicative Capex ($)
				Increase land value	Safety	Operational efficiency	Freight efficiency	Lower Opex	
1	New berth(s) at Lascelles.	The three berths presently in operation in the Lascelles precinct reach operational capacity during peak periods. The designation of Lascelles berths 1 & 2 to fertiliser operations, the proximity of storage sheds behind Lascelles berth and the number of cranes restricts performance further.	A. Lascelles berth 4, as a linear extension to berth 3; B. Lascelles Berth(s) 4 / 5 / 6 developed through creation of a basin that is formed from the installation of a new berth on a perpendicular alignment from berth 3, with berths 5/6 running parallel to berth 3 to create the basin as a new finger jetty. The jetty finger could be developed as a dedicated export pier or multipurpose berth. C. Option B (as above) could also be considered in conjunction with an area of reclamation behind berth 4, the extended port precinct benefits from additional land. D. Consideration the conversion of refinery pier berth (4) to a dedicated export pier, connected to the shore with a trestle and conveyor loading system, which might complement a rail stockpile to berth elevated conveyor system. This options could be considered in conjunction with A, B and C above.	x		x	x	x	$ 50 M
2	Additional berths at Corio Quay	The existing berths at Corio Quay restrict the amount of additional cargo that can be shipped through the port. They are depth constrained, in relation to the channel and vessel capacity, and also constrained in terms of their age and condition.	A. The extension of Corio Quay South to the east as a linear extension to berth 1, with additional land areas created behind the berth using dredged spoil; B. Corio Quay berth(s) 5 through extension of the existing northern jetty to the north of the woodchip loading berth parallel to the coastline (i.e in front of the Port of Geelong offices). This could be created as a dedicated export pier, connected to the shore with a trestle and conveyor loading system to the Midway site that would again take advantage of an elevated conveyor stockpile to berth arrangement from the standard gauge eastbound railhead. C. The creation of a new berth along the western end of the Corio Quay basin and/or modification of existing berths and assets in Corio Quay to accept new trades and vessel types (e.g vehicle carrier vessels).	x	x	x	x	x	$ 250 M
3	New export berth (single) - CQN		The creation of a new grain export pier to the south of Corio Quay either as a new berth alongside the existing Graincorp facility or through refurbishment / replacement of the redundant pier adjacent to this location.	x		x	x	x	$ 40 M
4	Restricted navigation channel entrance	The dredged depth and width of the channel at the entrance to Port Phillip Bay limits the maximum vessel draft to 14m and constrains accessibility for some vessel types. This is an overarching conditioner of depth potential and vessel size for future shipping profiles and trade flows considered for Corio Bay.	Widen and deepen the entrance channel to Port Phillip Bay. For future bulk commodities, it might be expected that the priority for unlocking constraints on access to Port Philip Bay would involve a focus on modifications to address vessel manoeuvring requirements (e.g widening the entrance) over and above deepening aspects.		x	x	x	x	Not Costed
5	Restricted navigation channel	The existing Geelong port channel (width and depth) limits the maximum size of vessel that can service the port. The channel depth restricts vessel loaded drafts to between 10.8m and 11.7m (tide dependant), while the channel width restricts vessels to 45 maximum beam. This acts as a barrier to attract new port users and offer efficiency gains to current users.	Widen and/or deepen the main channel servicing the Lascelles and Corio Quay berths to a minimum depth that will meet the future needs of the port. Currently, this is expected to include Panamax vessels of up to 14 m draft, however the depth requirements may be more if port users and/or commodity types require greater efficiencies.	x		x	x	x	$ 321 M
6	Local deepening of the Midway berth and CQN (3)	The woodchip loading berth at Corio Quay North and the adjacent Corio Quay North (3) are shallower than the adjacent navigation channel. This limits the depth and size of vessels that can be loaded on these berths. Midway would like to be able to load 60,000 DWT capacity size vessels. Additionally, this acts as a trade attraction constraint for new tenants on the Midway site.	Locally deepen the berth pocket to match the adjacent channel. Structurally assess and refurbish CQN (3), for local deepening.	x		x	x	x	$ 450 k (dredge)

Future Growth Scenarios for Geelong Port-City

As outlined in the methodology (see above) the future trade prospects for the Port of Geelong have been arranged into a series of different scenarios, as set out below and in the following tables. In turn, these scenarios have been subjected to economic impact analysis to show what the effect of different scenarios will be on the Port and the City of Greater Geelong economy.

Scenario	Description
1	Business as usual, considering no change to existing operations and growth at a 'medium' rate.
2	Low volume outlook, considering the loss of Shell and Alcoa based operations, with no other changes at the port.
3	Moderate change outlook, considering business as usual, medium growth with Shell operations reverting to a 'Terminal' model.
4	Moderate change outlook, considering business as usual, medium growth with Shell operations reverting to a 'Terminal' model and additional custom arising as a result of the implementation of some local port precinct improvements.
5	Moderate change outlook, considering business as usual, medium growth with Shell operations reverting to a 'Terminal' model and additional custom arising as a result of the implementation of a PHVZ takes hold.
6	Moderate change outlook, considering business as usual, medium growth with Shell operations reverting to a 'Terminal' model and additional custom arising as a result of rail improvements being implemented.
7	Moderate change outlook, considering business as usual, medium growth with Shell operations reverting to a 'Terminal' model and some additional custom arising as road and rail constraints are unlocked, and new dedicated export berths are provided.
8	Moderate change outlook, considering business as usual, medium growth with Shell operations reverting to a 'Terminal' model and some additional custom arising as road and rail constraints are unlocked, and new import berths are provided.
9	High change outlook, considering business as usual, medium growth with Shell operations reverting to a 'Terminal' model and some additional custom arising as all port constraints are unlocked with new import and export berths being provided – bar the main channel being deepened.
10	High change outlook, considering business as usual, medium growth with Shell operations reverting to a 'Terminal' model and significant additional custom arising as all port constraints are unlocked.

Model Scenarios Considered

Scenario	Description	Existing goods	Growth case	Lost Trade					Additional Trade					Transport constraints unlocked				
				Crude products	Aluminium products	Mineral sands (refer note 2)	Coal	Iron Ore	Grain / Fertiliser	Cement (refer note 3)	Refined Petroleum products	Port of Melbourne Trade (see note 1)	Containers	Port precinct improvements	Heavy Freight Truck Access	Rail capacity increased	Additional Port berths	Deepened channel
1	Business as usual (BAU)	✓	Med															
2	Low volume outlook	✓	Low	✓	✓													
3	BAU + Shell as a Terminal (ST)	✓	Med	✓							✓							
4	BAU + ST + port precinct improvements	✓	Med	✓						✓	✓	✓		✓				
5	BAU + ST + HFVP	✓	Med	✓		✓			✓	✓	✓	✓		✓	✓			
6	BAU + ST + local Rail access	✓	Med	✓		✓				✓	✓	✓		✓		✓		
7	BAU + ST + PHVZ + Rail + export berths	✓	Med	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
8	BAU + ST + PHVZ + Rail + import berths	✓	Med	✓						✓	✓	✓	✓	✓	✓	✓	✓	
9	BAU + ST + PHVZ + Rail + new berths	✓	Med	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
10	BAU + ST + PHVZ + Rail + Berths + channel	✓	Med	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

1. POMC trades include 25% of future automotive forecasts, existing bulk forecasts and chemicals. Allocation across scenarios 4 to 10 varies. Source: Feasibility Study for relocating Vehicles to the PoG; PoMC PDS 2009.
2. Mineral sands volume includes prospects from Iluka Resources, Australian Zircon and Astron Ltd as defined on the DPI website. The allocation of volume stream between scenarios varies.

BAU = Business as usual;
ST = Shell as a Terminal;
PHVZ = Port Heavy Vehicle Zone

Economic Impact of Future Growth Scenarios

The economic effects on the port and the city of the various trade scenarios outlined above were, as outlined in the methodology section earlier, examined through an input output analysis which benefitted from close cooperation with GeelongPort and the Victorian Regional Channels Authority.

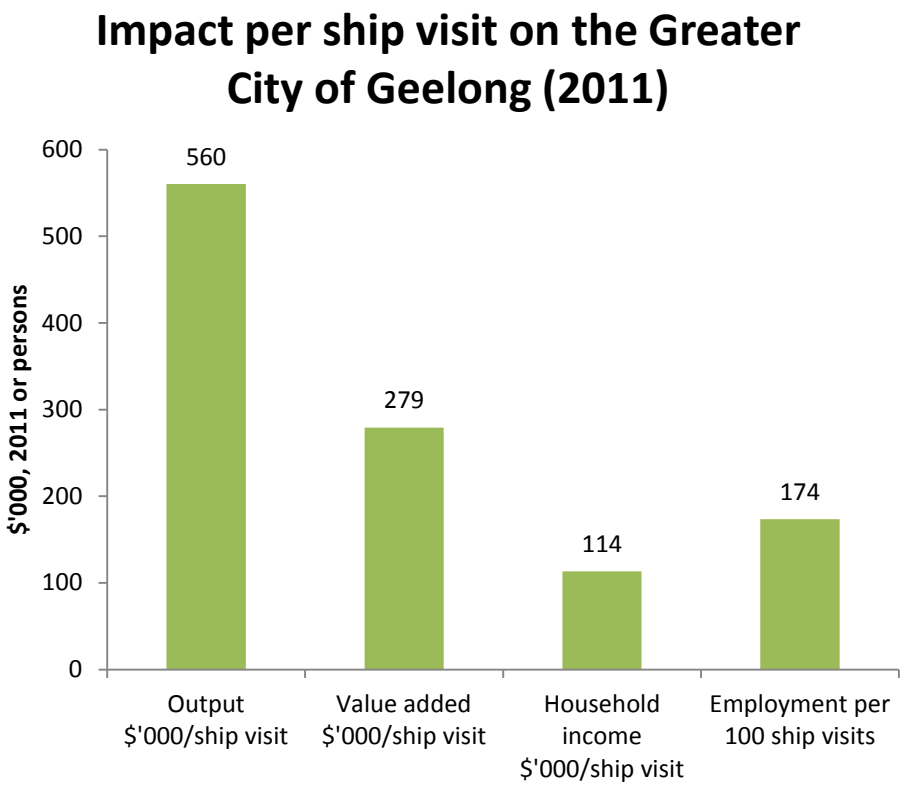
To gain insight into the broad economic effects of the possible expansion in port activty under the different trade scenarios, results from the trade scenarios were used to calculate the percentage increase in ship visits to the port of Geelong under each scenario compared to a "business as usual" scenario.

The calculated percentage increase in ship visits were then analysed using input output multipliers expressed on a per ship visit basis. The multipliers related to 2011 costs and GeelongPort activity levels.

Before considering the results generated it is important to understand the limitations of input output analysis. Such analysis provides only a broad indication of the effects modelled. Technological change is assumed to remain constant over the period analysed. In addition, no account is taken of any economy wide effects of the scenarios modelled. This may be a significant factor in the current study as quite large increases in port activity are indicated in some scenarios evaluated in this study.

While techniques are available to account for the economy wide effects of large changes in activity in particular sectors, the use of such techniques in the current project was not possible given the available project budget.

Bearing these reservations in mind the analysis indicates that Geelong's port could grow its annual tonnage throughput from 12.5 million tonnes in 2011-12 to around 50 million tonnes (with a peak perhaps 20% higher still) by 2050 if all of the nominally identified trades were captured and retained in Geelong.



The scenario with the greatest increase in trade through GeelongPort indicates that ship visits to the port could expand by approximately 155 per cent in 2050 compared to a business as usual scenario.

To put the calculated increase in port activity into perspective, similar percentage increases in 2011 activity at GeelongPort were evaluated using the input output multipliers.

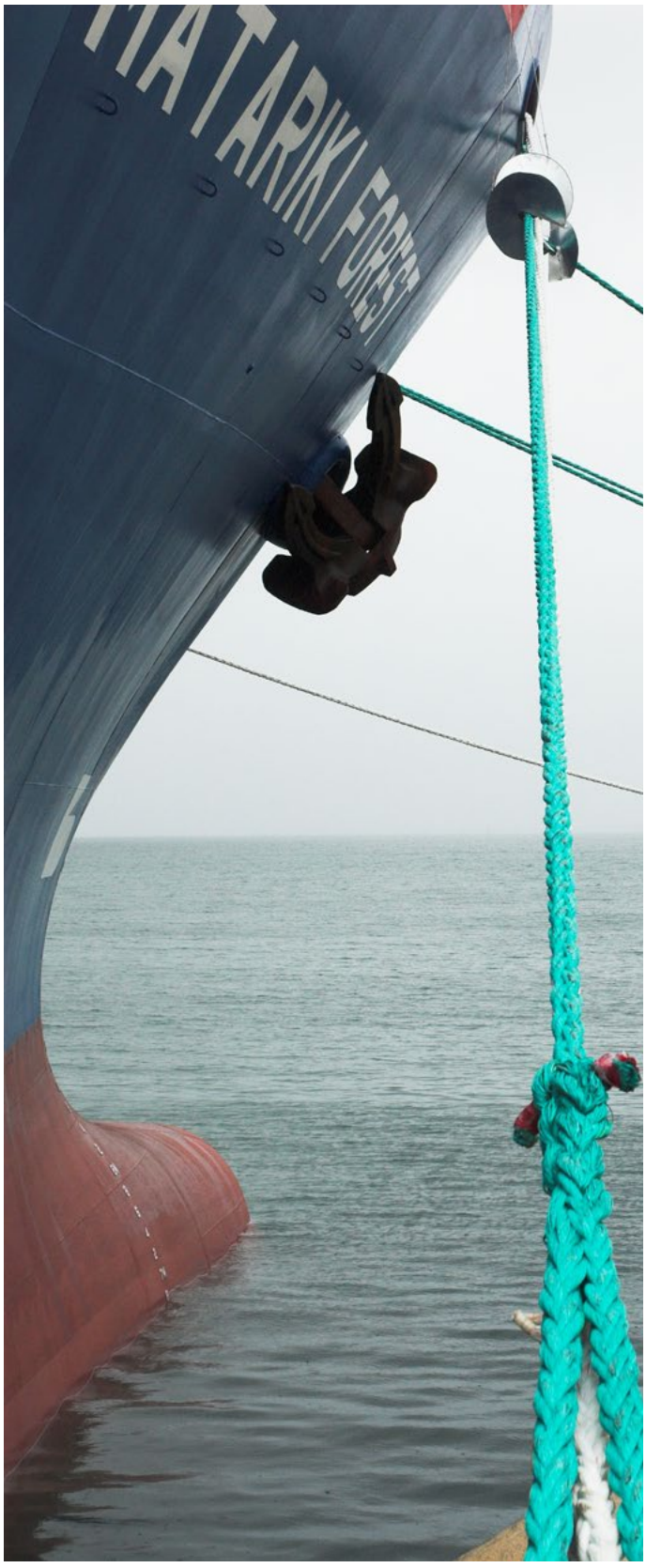
It is important to understand what the economic effect charts (overleaf) represent. They are long-term impacts (year 2050 impacts) of the trade scenarios modelled, but expressed as 2011 port costs and port activity levels.

Thus the results provide a very broad indication of the relative long term economic effects of the alternate trade scenarios evaluated.

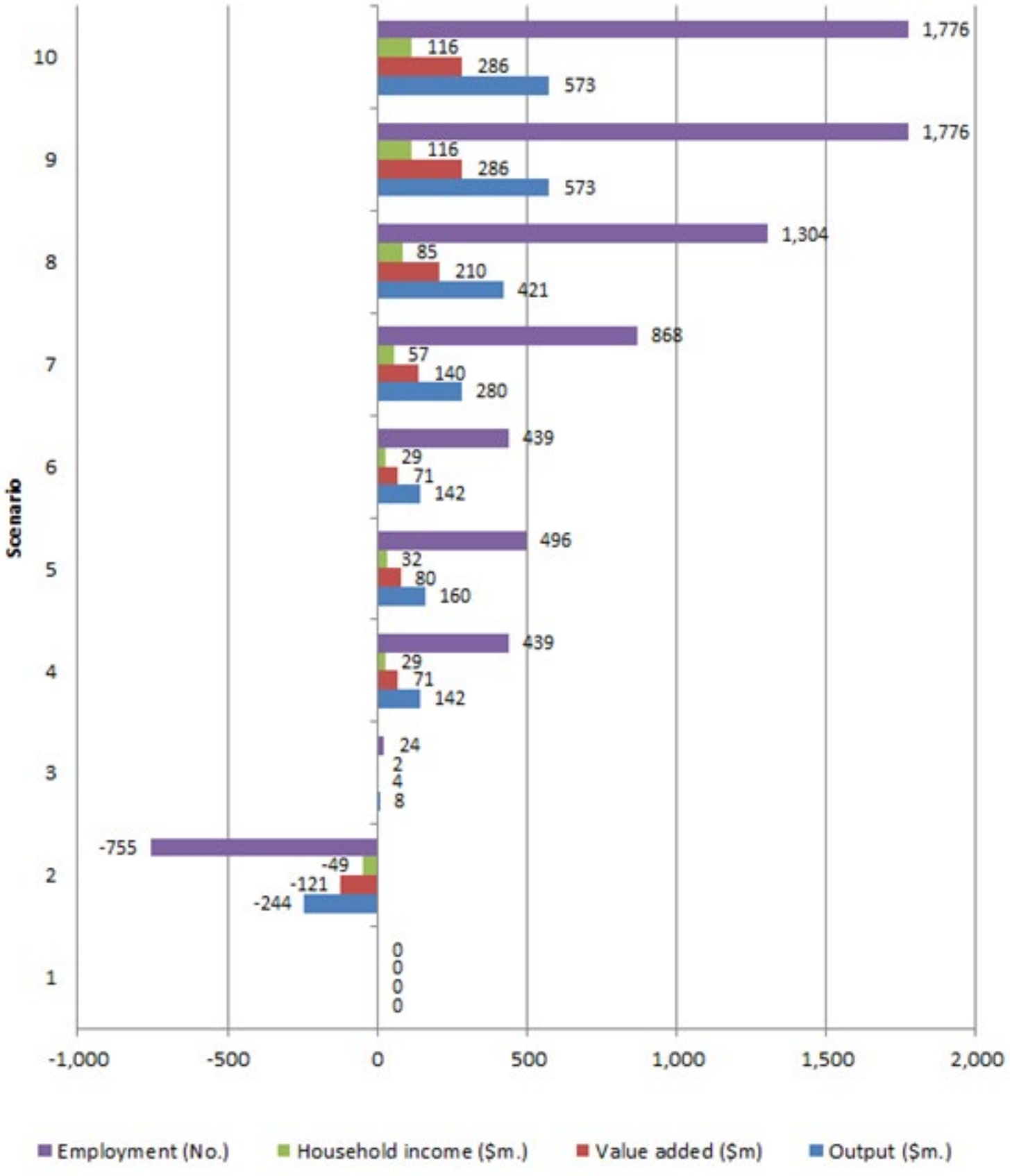
For example, of the 10 different likely trade scenarios developed, the greatest increase in trade through the port was recorded in scenario 10. Under this scenario total trades available would see tonnage through the Port of Geelong grow from 12.5 million tonnes in 2011-12 to 50-60 million tonnes in the decades ahead. In 2050 the expansion in trade would require a 155 per cent increase in port activity, compared to business as usual activity. To put this gain in perspective, a 155 per cent increase in 2011 activity at GeelongPort was calculated to:

- generate approximately 1,800 extra jobs for the City of Greater Geelong;
- generate approximately $300 million extra in value added, or approximately $1,400 per person in Geelong; and
- add approximately an additional $100 million in household income for the Geelong community, or approximately $500 per person.

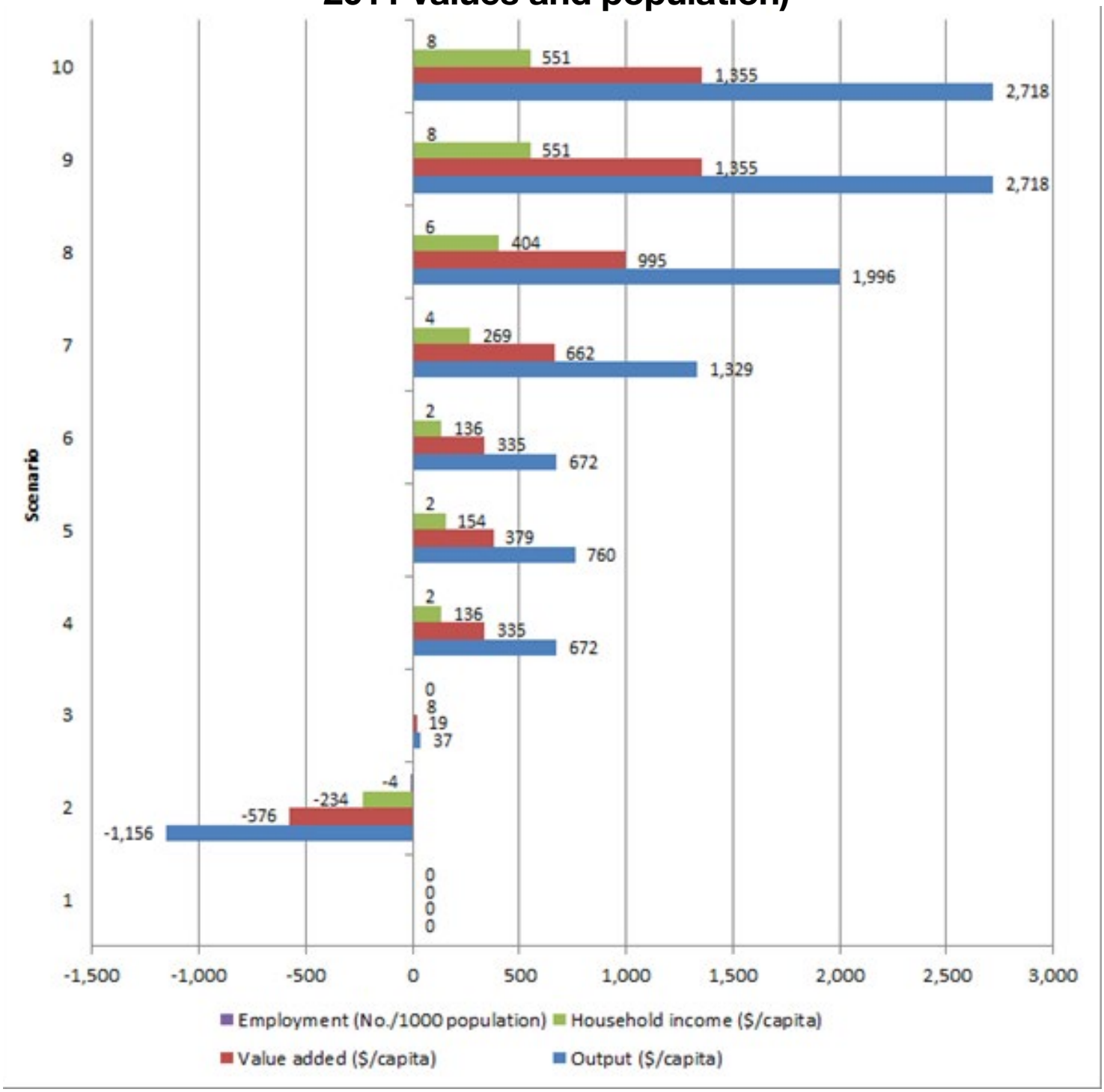
There are almost 800 ship visits to Geelong per year now. Every additional ship visit to Geelong generates approximately a further $560,000 in economic output and every hundred ships generates approximately 170 jobs for Geelong.



Indicators of the relative effects on City of Greater Geelong of alternative development outcomes for Geelong Port



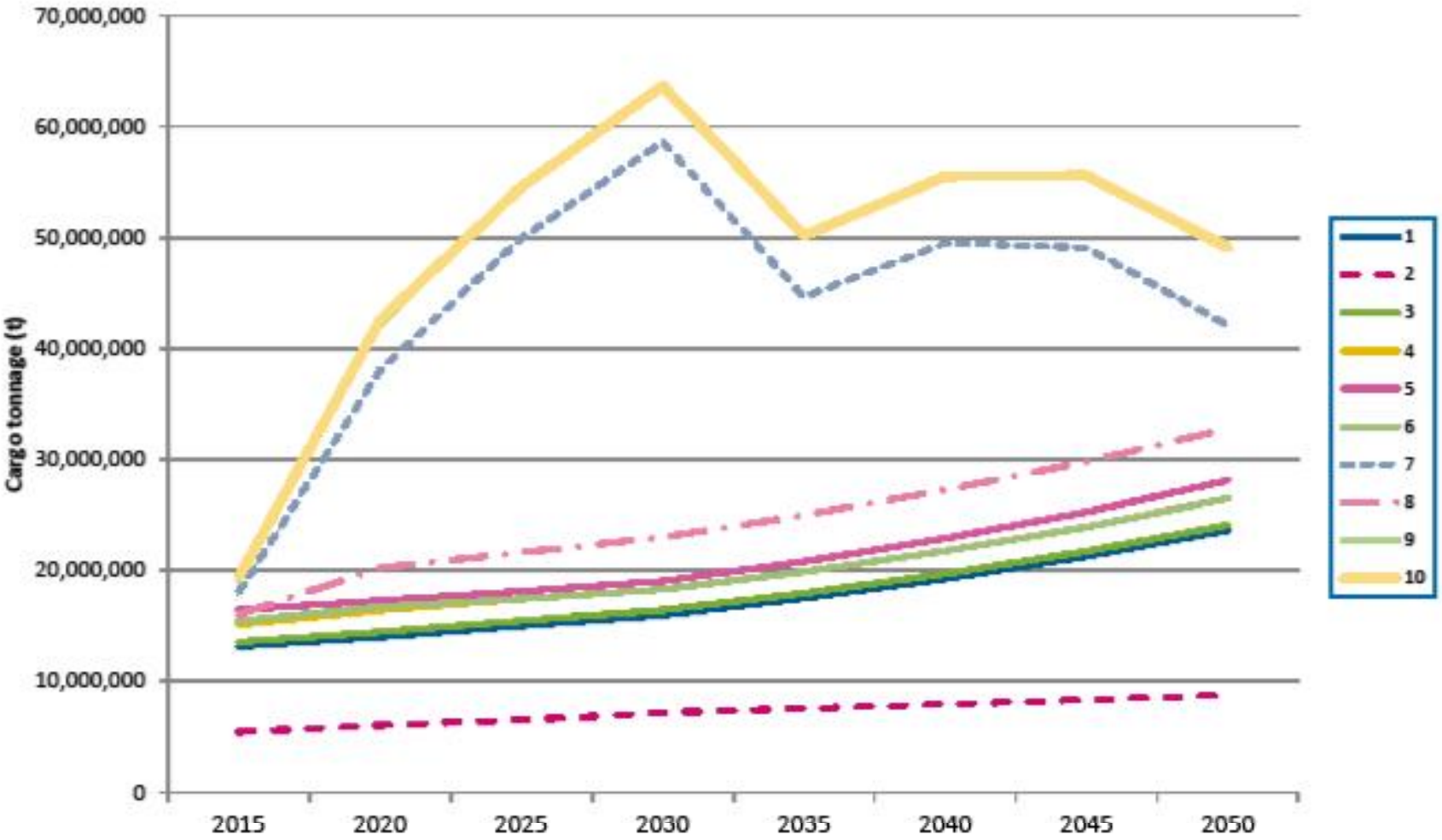
Indicators of the relative economic effects on City of Greater Geelong of alternative port development options (per capita, 2011 values and population)



Making growth-enhancing infrastructure investments in a timely way: a likely time profile of volume growth available at Geelong)

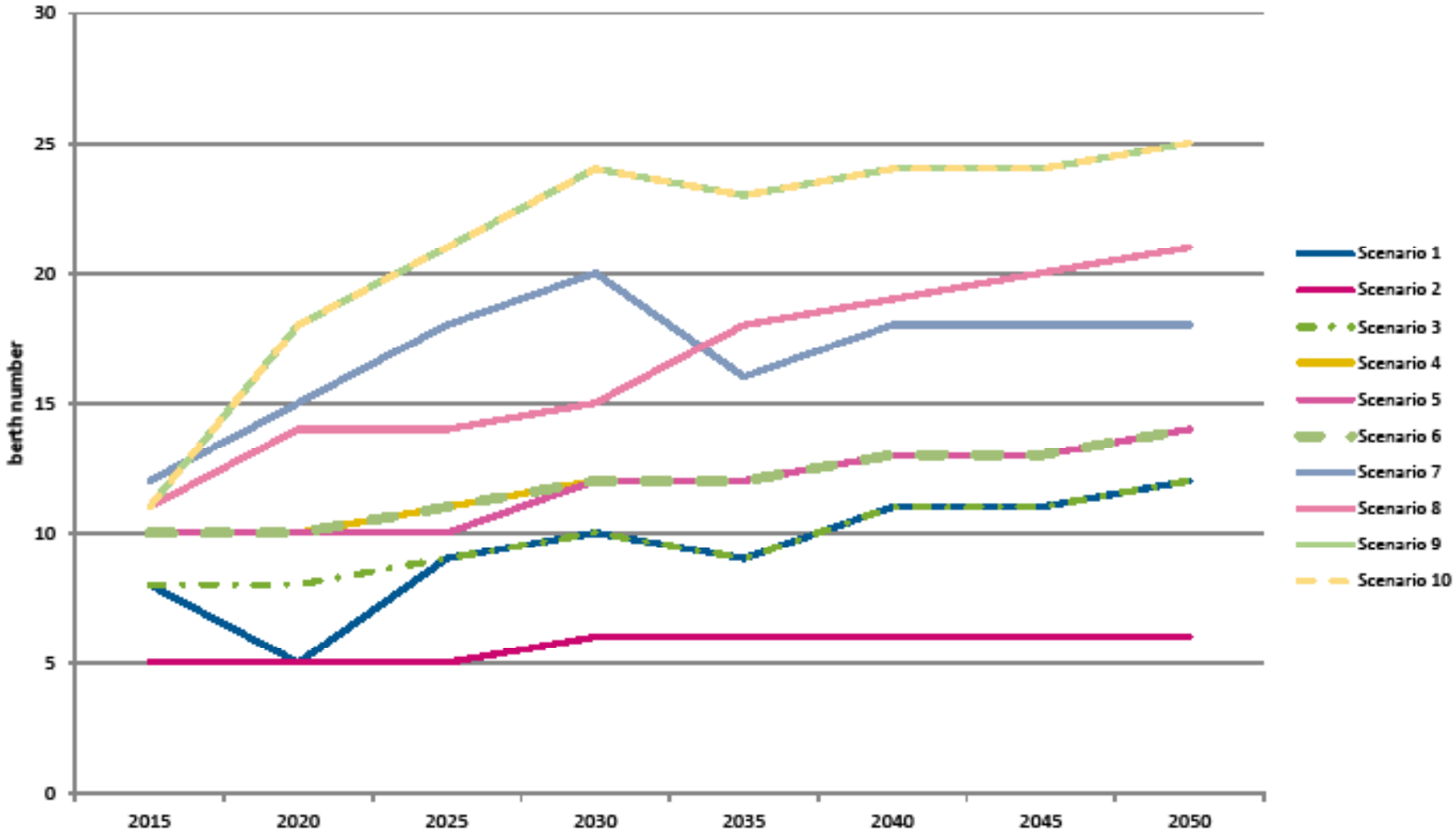
Not all of the trades identified are available today: there is a time factor assumed for the necessary infrastructure to be put in place to attract and retain or build on these trades, and indeed, in the case of products such as mineral sands, some of these trades are themselves only at the development stage. Nevertheless the trades appear plausible to plan for. A key aspect of developing the port and landside infrastructure is financing. The key to financing is understanding the stepwise changes in trade demand so that infrastructure can be developed in a timely and cost-effective fashion. The following charts offer this project's view of an indicative time scale for different volumes grown and attracted to the port of Geelong, as well as berth utilisation in this respect and vessel numbers:

Estimated Throughput by Scenario



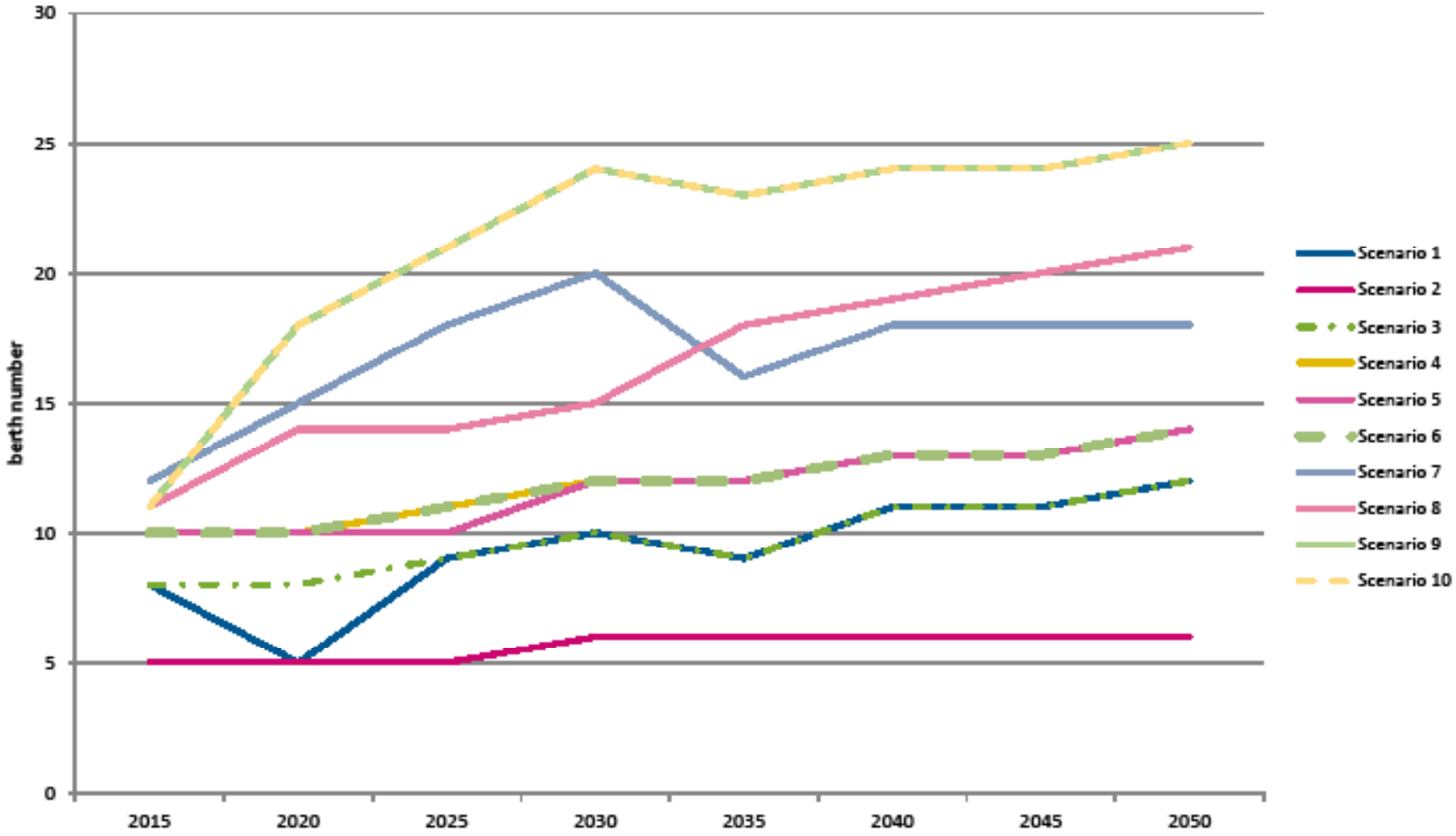
This chart simply describes the volume of cargo (trade) that is potentially attracted to the port over time under each scenario. The chart is intended to highlight the relevant opportunities that exist and the importance that the 'unlocking' of transport constraints has for the port. It can be seen that the provision of new export berths and/or a deepend channel has the greatest import potential.

Estimated Berth No.'s by Scenario



This chart describes the estimate of future berths that may need to be provided under each scenario. It demonstrates that effective planning for future capacity needs to commence now, so that berth capacity is not a future constraint.

Potential Vessel No.'s by Scenario



This chart describes the estimate of future vessel visits, and is intended to help inform the economic modelling assessment and demonstrate how future planning of the channel infrastructure needs early consideration.

Next Steps

This document is intended to be the first iteration of an ongoing plan to steward the maximum growth of the port of Geelong while also improving the public amenity of the city.

Independent assessment of this plan by Infrastructure Australia

In the first instance it is understood that the document will be presented to Infrastructure Australia, which laid down the initial challenge to the city and port to develop such an approach. This approach will seek Infrastructure Australia's independent professional opinion on:

- its alignment to best practice infrastructure planning objectives.
- the merits of the proposed facilitating infrastructure investments contained in this plan as they link to identified trade development opportunities.
- Guidance on securing High Productivity Vehicle commercial access for the port.
- Suggestions for next steps in the development of this approach, including means of securing greater support from government and private investors in delivering on the plan's objectives.

Subject to receiving this feedback, the following appear to be logical next steps in implementing this port-city plan and its identified opportunities:

A *Port-City Coordinator* should be developed, which is a structure rather than an individual, need not be costly or complex and can grow out of the current Port User Group structure

A coordinating structure should be agreed to facilitate this plan – one that recognises that the port is made up of commercial interests, sometimes in competition with each other, but where on some matters a forum for planning on common ground is worthwhile. Key planning discussions between the port and its current and future tenants, users and potential investors, and the City of Greater Geelong, businesses and community groups could be managed through this coordination function, which would be a structure rather than an individual, and need not involve much expense – the current Port User Group meetings and membership forms a sound basis for further development. A Port-City Coordinator might involve a two-tier structure allowing for strategy, planning and trade expansion matters to be considered at executive level and an operational coordination group might manage more day-to-day and expert matters of the port as it seeks to expand.

Newcastle's coordinator will be a good source of knowledge for getting this private commercial/public coordination balance right for the port and city

This structure would not manage all aspects of port operations and it will be important to recognise and respect the need for commercial interests to be allowed to carry out their own business at the port. A good source of managing this balance effectively will be found in the Hunter Valley Supply Chain Coordinator, which balances private commercial interests with a joint coordination function very successfully in managing the world's largest coal export port at Newcastle.

Do more to explain the port and its economic importance to its community

Building on examples from leading port-city relationships elsewhere, a stronger engagement strategy for the port with the community could be developed, to make the community more aware of the port's importance to Geelong and to educate the public on how amenity matters can be improved while also increasing port operational intensity. The Victorian Regional Channels Authority already runs a very popular high school-level education and engagement program of port visits and this might be extended to the wider community.

Port and city to open discussions with the Victorian and Federal Governments

The City will play a vital role in helping the commercial actors at the port in advocating the trade, planning and investment objectives of Geelong. This role can be expected to be made easier by first allowing Infrastructure Australia to consider the merits of this plan.

The port is seen by Geelong as a lead business sector for securing a prosperous future. In this context, the city should consider engaging with the Victorian Premier and Ports Minister, in their roles as owners of the port of Melbourne, to outline the bulk trade relocation aspirations for the port of Melbourne's bulk trades. The Port-City Coordinator should aspire to work with the state government and the bulk trade tenants at the Port of Melbourne on facilitating an effective solution for this relocation.

Specifically, it will be important for the City of Greater Geelong and its port to engage with the Victorian government as the owner of the port of Melbourne on the prospect of maintaining sufficient port capacity and liberating this port of Melbourne real estate for higher value uses, If a relocation of these bulk trades to Geelong were to be seen as desirable by the Victorian government, and assuming that facilitating infrastructure was in place or in the process of being developed for these trades to relocate, the Victorian government might, on the evidence of benefit cost analysis, consider assistance payments or liquidation of leasing arrangements to the affected trades to facilitate a smooth commercial transition of these trades to Geelong in a staged manner, supported by the necessary infrastructure investments at Geelong.

Equally, the city might be expected to begin discussions with traditional tenants that might be exiting from current Geelong operations to consider how any of their land that might be in the port zone could best be developed productively to assist the port's growth.

Ensure that the port's land use development aspirations are represented and protected in local government and state government plans

The future of the port lies in part on the landside space afforded to its further development: if options for sustainable expansion and consolidation for further efficiencies are taken away, the long-term growth of Geelong as an effective Port-City is put in question. The City of Geelong and the state government both need to ensure that their plans for the port, its zoning and state freight and transport plans are duly updated to reflect how Geelong's port as a lead sector for the city has its future development potential best reflected in zoning and especially in the identification of key sites of future significance to the port.

This review of the city plans as they relate to the port might begin with an agreed layout being prepared of the port as it is now and the port and its land use footprint as it would look with the proposed facilitating infrastructure arrangements outlined earlier imposed on the port zone. Key sites adjacent port operations that might become available in the years ahead for port use should be weighed for their efficiency in achieving a highest and best economic use as port related infrastructure, before wider commercial disposal actions are taken; this might best be achieved with sympathetic local government planning arrangements in the first instance.

Incorporate environmental and amenity aspects of port development in wider city plans

Greater trade volumes through the port of Geelong and the facilitating infrastructure investment and higher operational tempo involved should be guided by a clear environmental and community amenity plan for the port. This does not appear to require the development of any new plan, but simply for these aspects to be fully expressed in current City of Greater Geelong and state government plans. Much of the necessary information already exists through various City of Greater Geelong and Victorian Regional Channels Authority research and policies and many of the regulatory aspects will be enshrined in state legislative requirements. The identification and preservation of least financial and economic cost freight corridors will be an important aspect of this plan.

Access arrangements surrounding the port should be reviewed and clarified to maximise capacity use in a transparent and collaborative manner

Geelong's port appears open to considerable growth in the range of trades and volumes of product moved. Capacity management will become more important in the future.

The users of the port appear comfortable that provided they remain transparent and non-preferential, the arrangements for maximising current capacity and accessing key infrastructure should remain informal and based on transparent negotiation arrangements, rather than becoming burdened by complex and time consuming formal regulation.

The several land, transport infrastructure and export interests and the investor interests will require both guiding principles and authoritative sounding out of requirements.

Thus it is recommended that the Port-City Coordinator (growing out of the current Port User Group) consider:

- an initial identification of the ownership and controls over the port land and road and rail services to the port, including over their development.
- an initial, general, identification of exporters, infrastructure operators and investors with a present or potential interest in the port and the rail and road services to the port. State and possibly other government plans or commitments in relation to the operation or development of the port would be located, for possible detailed later consideration.

- an initial identification of schemes for development of the port and the road and rail services to the port from the hinterland and for supply chain management and control from the hinterland to the port, to be used as guides or models for the Port User Group to draw on in managing increased capacity as trades grow. The application of open access to road development, including immediately around the port, and to the possibility of rail routes serving the port from the hinterland being under the control of the port may need examination. The large international grain traders, which now own the eastern Australian grain export terminals, will need to be considered for their requirements and their appetite to invest.

Private investment structures should be developed to assist in the flow of capital in pursuing trade growth at the port of Geelong

Given the shortage of taxpayer funds for infrastructure projects, it will become increasingly important in future that developments such as port and freight infrastructure can be easily invested in by private capital.

In any event, the port is not an item of State monopoly infrastructure which only the State government can determine the future of. The multiplicity of commercial interests have to be recognised. This will condition how the State government considers future planning for the Port of Geelong in its state-wide freight strategies.

The process for arriving at what development takes place needs to be authoritative and commercial in order to attract investors; a discretionary process will deter interest.

Geelong would be well served to consider developing a structure for considering these sort of investments through its Port-City Coordinator in the first instance, perhaps with state government assistance where necessary. Such a body could undertake a more detailed and commercial sounding out of the above matters, where in the future commercial investments such as channel dredging, new rail or conveyor alignments or landside freight infrastructure developments on the approaches to the port were identified. The sounding out and the expressions of interest would relate to both the guides and models developed and to investors' or users' own plans.

Deakin University and Gordon TAFE should consider research and development complementarity with the port and its operations

The value-added service sector is known to be a significant complement to well-functioning global port cities. Evidence elsewhere, such as in Newcastle NSW and through the OECD's European Port-City case studies, suggests that the Port-City can benefit further when its education and research capabilities start to offer complementary research and expertise to port operations that can be commercialised to form a supportive service sector for the port in the longer term. With this in mind, Geelong's leading education institutions might consider opening discussions with the port and the Victorian Regional Channels Authority on areas that would benefit from postgraduate research and development, with a view to establishing service sector areas of excellence that will benefit port operations and which might contain later commercial opportunities.

Major Port-City sister ports and supply chains should be identified and engaged

The port of Geelong trades with the world, but Geelong as a Port-City does not have a clear understanding of which ports in the world represent the key trading partners with the port of Geelong. The Port-City Coordinator should make this knowledge gap a priority to resolve: a report could be commissioned to examine where the current and emerging partner ports are for the port of Geelong and its customers. The City of Geelong could then develop a broader relationship with these places internationally as a more practical basis for trade development generally.

Geelong should engage with other experienced Port-City exemplars

Some involvement with acknowledged leaders in Port-City planning is to be encouraged, such as with the port of Gladstone and the port of Newcastle, both of which have highly-regarded and sophisticated structures for coordinating the port supply chains and ensuring that the city and public amenity matters are at the forefront of port development. The port of Newcastle and its Hunter Valley Supply Chain Coordinator would be a good source of knowledge for the Geelong Port-City Coordinator to learn from, as well as to drawn on Newcastle's experience of private investment in port and freight operations.

Develop feasibility studies to gather evidence

Specific feasibility level studies may be needed to evaluate and consider potential opportunities and constraints further, in order for benefit-cost analyses and project rates of return to be prepared. These studies may be guided by the Port-City Coordinator and port or port users as appropriate. The studies should seek to analyse data, develop concepts, cost estimates and appraise ideas in detail. The findings of these studies would be used to refine the Port and Land Freight infrastructure plan.

Scope and Limitations

The services undertaken by GHD and Juturna in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations agreed between GHD, Juturna and CoGG.

Alcoa and potential cruise shipping matters not considered in this report

At this point Alcoa Geelong has not been interviewed, as the current focus of port development operations has been on infrastructure at and around the Lascelles and Corio Quay sites and the approaches to this area, rather than the self-contained Alcoa port facilities at Point Henry. This omission should not be read as passing comment on Alcoa's operations, which are assumed to be ongoing.

Additionally, the prospects for cruise shipping and its infrastructure requirements were not considered in this report, as it was acknowledged that separate work had already been commissioned in this respect, and in any event the nature of that infrastructure and cruise operations did not impact significantly on the operational expansion of core port of Geelong infrastructure.

The cost estimates provided reflect only direct construction cost components and therefore exclude: professional fees, risk factors, profit and other commercial factors. They are provided for "order of magnitude" purposes only and should not be used for any aspect of business case planning.

Disclaimer

This report has been prepared by GHD and Juturna Consulting for The City of Greater Geelong (CoGG) and may only be used and relied on by CoGG for the purpose agreed between GHD, Juturna and the CoGG as set out above.

GHD and Juturna otherwise disclaims responsibility to any person other than CoGG arising in connection with this report. GHD and Juturna also excludes implied warranties and conditions, to the extent legally permissible.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD and Juturna has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared. Further discussion of the agreed limitations of this report is set out at the end of the document.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD and Juturna described in this report. GHD and Juturna disclaims liability arising from any of the assumptions being incorrect.

GHD and Juturna has prepared this report on the basis of information provided as part of the Tender for these services and others who provided information to GHD and Juturna (including Government authorities), which GHD and Juturna has not independently verified or checked beyond the agreed scope of work. GHD and Juturna does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

GHD and Juturna has as part of the services, prepared an indicative cost estimate ("Cost Estimate") using information reasonably available to GHD and Juturna; and based on assumptions and judgments made by GHD and Juturna. The Cost Estimate has been prepared for the purpose of 'order of magnitude pricing' only and must not be used for any other purpose. The Cost Estimate is an indicative estimate. Actual prices, costs and other variables may be different to those used to prepare the Cost Estimate and may change. Unless as otherwise specified in this report, no detailed quotation has been obtained for actions identified in this report. GHD and Juturna does not represent, warrant or guarantee that the relevant works can or will be undertaken at a cost which is the same or less than the Cost Estimate.

List of Consultations

The following parties were interviewed either in person (usually on site) or via teleconference. At this point Alcoa Geelong has not been interviewed, as the current focus of port development operations has been on infrastructure at and around the Lascelles and Corio Quay sites and the approaches to this area, rather than the self-contained Alcoa port facilities at Point Henry. This omission should not be read as passing comment on Alcoa's operations, which are assumed to be ongoing. It is intended that consultation on this report through the accompanying recommendations now be expanded to a much wider group of interested parties.

- Asciano Geelong (Port of Geelong)
- GrainCorp Geelong
- Incitec Pivot Limited
- Midway
- City of Greater Geelong
- Committee for Geelong
- Shell (Refinery Corio)
- Boral
- Terminals Pty Ltd
- Wettenhalls
- Riordan Grains
- Clearwater Transport
- Vicroads
- Department of Transport Victoria
- Golden Plains Shire Local Government Association
- Deniliquin Freighters
- Barlow Agricultural PL
- Port Phillip Sea Pilots
- Victorian Regional Channels Authority
- Iluka
- Infrastructure Australia
- Victorian Farmers Federation (initial discussions)

Annex A

Checklist: Geelong port and landside infrastructure project

Project objectives and project status compared - June 2013

Objective: What Juturna-GHD committed to deliver.

Status: What has been delivered in practice - and how.

Objective: Must shape higher government investment and reform as well as private investment and it must inform key planning documents.

Status: Delivered.

Prioritised road, rail, berth and sea channel infrastructure investment candidates have been identified and developed, in light of a thorough and practical examination of all known available trades that Geelong port could service in future – some of this involves servicing existing trades better, some involves being entrepreneurial about attracting new trade and having confidence in the infrastructure solutions that will bring these port trades to Geelong and keep them here. The plan makes clear to local, state and federal governments and the market that Geelong seeks to be the premier bulk port in south eastern Australia and has a clear investment and planning strategy to achieve that status. The plan acts as an effective tool for the city and the port to lobby for facilitating outcomes that can be demonstrated to grow the Geelong economy.

Objective: Geelong has been challenged to live up to its port and freight potential. Geelong's own history shows the way forward for the port task ahead.

Status: Delivered.

All of the main users and other interested parties in the port and its task have been consulted. The City of Geelong's planning and strategy area have been involved in this work at every step. The City and the Port therefore have a much closer understanding and appreciation of what needs to happen to grow the port sustainably and make Geelong more liveable at the same time.

Objective: The potential significance and scope of Geelong's port trade has been underappreciated at the state and national level by freight planning to date and this needs to be addressed.

Status: Delivered.

The plan will outline the full range of potential commodity flows that can grow port trade. The scale of additional and augmented trades on offer is significant. This work makes it clear that given the facilitating infrastructure, Geelong will become south east Australia's dominant bulk port.

Objective: An effective plan must confront Geelong port and freight trade risk as much as opportunity.

Status: Delivered.

The project will model a 'doomsday' scenario for the Geelong port, which will show the effect on the port and City of Greater Geelong economy of a range of traditional trades exiting the port through industry decline and other trades slowing as competitor ports elsewhere are anticipated to offer more efficiency and service in future. This will be an important aspect of the report to underline the dangers of the city ignoring port growth in the face of Geelong's wider industry challenges. It will offer public policy makers a 'worst case scenario' that when compared with a 'best case scenario' reinforces the case for reform, investment and growth.

Objective: Geelong's port future rests on upstream and downstream efficiency (road, rail sea-channels etc) and competitive freight costs - and the regulatory arrangements underpinning freight vehicle access to and from the port have a big influence on efficiency and deserve attention.

Status: Delivered.

The project has examined efficiency improvements on offer for road, rail berth and sea channel infrastructure to drive volume and customers up and drive costs to users down.

The upstream and downstream supply chain analysis stretches to the road and rail connections into the Riverina grains sector and western New South Wales mineral sands opportunities. The sea channels servicing Geelong have been subject to a range of computer simulations based on the trades emerging. Legislative and regulatory settings that determine the level of efficient vehicle access to the port have been considered expressly and clear recommendations offered on where the arrangements need to change in order to drive the port forward.

Objective: Geelong needs a picture fo what 'best practice' port and freight planning looks like - and its benefits.

Status: Delivered.

The proposed planning, management and investment structures being recommended for the Port of Geelong will mean that the port owner, sub tenants, customers, users, local government planners and higher governments and capital markets will have a clear structure for driving growth and new investment in the ports that will meet or exceed recognised global best practice, as outlined in the *OECD Global Port Cities Project*.

Annex B

Cargo Prospects and Forecasts Data, Charts and Assumptions

The following tables describe the cargo/trade prospects that have been identified as part of the study along with the source of data and assumptions that have been employed with respect to their likely transport mode and period of throughput, as follows:

- Existing trades – based on the forecasts that are presented in the report titled 'Economic Impact of the Port of Geelong', prepared by EconSearch Pty Ltd, April 2010.
- Export prospects – Containers and other product classes as defined by the reference source.
- Import prospects – as defined by the reference source.

Existing Trades

Product class	Product	Transport mode	2015	2020	2030	2040	2050
dry bulk	Woodchips	Road / Rail	1,356,000	1,670,000	2,219,000	*2,982,150*	*4,007,761*
dry bulk	Fertiliser	Road	1,100,000	1,250,000	1,600,000	*2,150,266*	*2,889,778*
dry bulk	Grain	Road / Rail	1,837,000	1,906,000	2,253,000	*3,027,844*	*4,069,169*
dry bulk	Other	Road	1,180,000	1,299,000	1,570,000	*2,109,949*	*2,835,595*
Break Bulk	Aluminium products	Road	375,000	397,000	444,000	*596,699*	*801,913*
Break Bulk	Steel products	Road	250,000	318,000	488,000	*655,831*	*881,382*
Liquid bulk	Crude Oil	Road / Pipe	6,500,000	6,500,000	6,500,000	*6,500,000*	*6,500,000*
Liquid bulk	Chemicals	Road	410,000	476,000	641,000	*861,450*	*1,157,717*
Break Bulk	Other	Road / Rail	188,000	215,000	281,000	*377,641*	*507,517*
Total (t)			**13,196,000**	**14,031,000**	**15,996,000**	**19,261,830**	**23,650,832**

Notes:1. Figures presented relate to a medium growth scenario, as per the EconSearch report, 2010

Container Prospects (TEU) by 10 year time step

Product	Company	Comment	Mode	Likelihood	2020	2030	2040	2050
Containers	Toll / SeaRoad	One of the current Tasmanian services	Rail	High	129,128	190,698	256,081	310,141
Containers	new	Coastal shipping to Hastings, Deloitte forecasts 2013. & Discussions with GrainCorp / Barretts malted grain exports	Rail	low		509,760	774,564	1,018,246
			Sub total		129,128	700,458	1,030,645	1,328,387

Notes: 1. Container coastal volume based on CLCS 2009 data where 17% of international exports originate from outer western, north west, west and south west Victoria. Also that approx 300,000 t (20,000 TEU) is forecast to be exported from GrainCorp via Melbourne in 2013/14, this demand is expected to grow. Additional regular local container exports include IPL (bagged fertiliser) and Cement (Boral) to Tasmania. Tasmanian share taken as 30% of Tasmanian forecasts.

Export Prospects (tonnes per annum) by 10 year time step

Product	Company	Comment	Mode	Likelihood	2020	2030	2040	2050
Dry Bulk Products								
Minerals sands	Iluka	Murray Basin supply, process at Hamilton, option for bulk materials to Geelong via rail.	Rail	High	300,000			
Minerals sands	Aus Zircon	Broken Hill supply, current process at Bunbury or site, port links exist to Port Pirie, forecast capacity is 20 mtpa	Rail	low		5,000,000	5,000,000	5,000,000
Minerals sands	Astron	Donald sands mine supply, Murray Basin, option for bulk materials to Geelong via rail.	Rail	med	5,000,000	10,000,000	10,000,000	10,000,000
Iron Ore	Carpentaria	Hawson Iron, Magnetite pellets - Murray Basin	Rail	high	5,000,000	10,000,000		
Brown Coal	Mantle mining	Bachus Marsh coal seam, export to India	Rail	med		7,500,000	10,000,000	
Brown Coal	Others	Latrobe Valley	Rail	med	2,500,000	3,000,000	3,000,000	
Black coal	Others	Oaklands	Rail	med	6,000,000	6,000,000		
Grain (PoM)	various	Existing Port of Melbourne forecast	Road	med	2,087,000	2,653,000	3,299,000	3,859,000
Grain (NSW)	various	existing volumes going to Kembla	Road	med	518,781	613,228	1,067,112	1,738,213
Copper concentrate	Independence Group	Stockman project, Mine SE of Benambra	Road / Rail	high	150,000			
Soya bean			Road	high	300,000	300,000	403,175	541,833
			Sub total		21,855,781	45,066,228	32,769,287	21,139,046
Soya bean oil			Road	high	200,000	200,000	268,783	361,222
			Sub total		200,000	200,000	268,783	361,222
Automotive Products								
Vehicles	various	Existing Port of Melbourne forecast	Road/ Rail	low	110,000	110,000	110,000	110,000
			Sub total		110,000	110,000	110,000	110,000
Break Bulk								
woodchip	TBC	Latrobe Valley (Gippsland)	Rail	low	None identified			
General		Existing PoMC forecast	Road / Rail	med	103,600	General		Existing PoMC forecast
Pulp	various	Existing PoMC forecast	Road	med	267,000	Pulp	various	Existing PoMC forecast
			Sub total		370,600	415,000	444,000	472,000

Import Prospects (tonnes per annum) by 10 year time step

Product	Company	Comment	Mode	Likelihood	2020	2030	2040	2050
Dry Bulk Products								
Sugar	various	existing volumes through Port of Melbourne	Road	med	513,000	633,000	764,000	895,000
Fertiliser	various	Port of Melbourne	Road	med	182,000	225,000	271,000	318,000
Fertiliser	various	NSW (Grain backloads)	Road	med	383,333	483,333	649,560	872,954
Cement	Boral	Boral meeting	Road / Rail	high	800,000	850,000	900,000	1,000,000
Gypsum	Various	existing volumes through Port of Melbourne	Road	med	904,000	1,116,000	1,346,000	1,577,000
Cement	Various	existing volumes through Port of Melbourne	Road	med	1,452,000	1,730,000	2,038,000	2,360,000
Cement	new entry	New product into Victorian market	Road	med	500,000	500,000	500,000	500,000
			Sub total		**4,734,333**	**5,537,333**	**6,468,560**	**7,522,954**
Liquid Bulk Products								
Chemicals	various	existing volumes through Port of Melbourne	Road	Med	150,000	150,000	150,000	150,000
Refined products	Shell	Shell (Terminals operation)	Road / Pipe	Med	6,350,000	6,350,000	6,350,000	6,350,000
Refined products	Terminals	Terminals	Road	High	350,000	350,000	350,000	350,000
Bitumen	Terminals	Terminals	Road	High	150,000	150,000	150,000	150,000
LPG	Shell / terminals	Shell	Road	med	100,000	100,000	100,000	100,000
			Sub total		**7,100,000**	**7,100,000**	**7,100,000**	**7,100,000**
Break Bulk								
Steel	Various	existing volumes through Port of Melbourne	Road	med	774,000	865,000	926,000	987,000
			Sub total		**774,000**	**865,000**	**926,000**	**987,000**
Automotive								
Automotive		existing volumes through Port of Melbourne	Road / rail	med	118,000	166,250	233,500	313,000
			Sub total		**118,000**	**166,250**	**233,500**	**313,000**

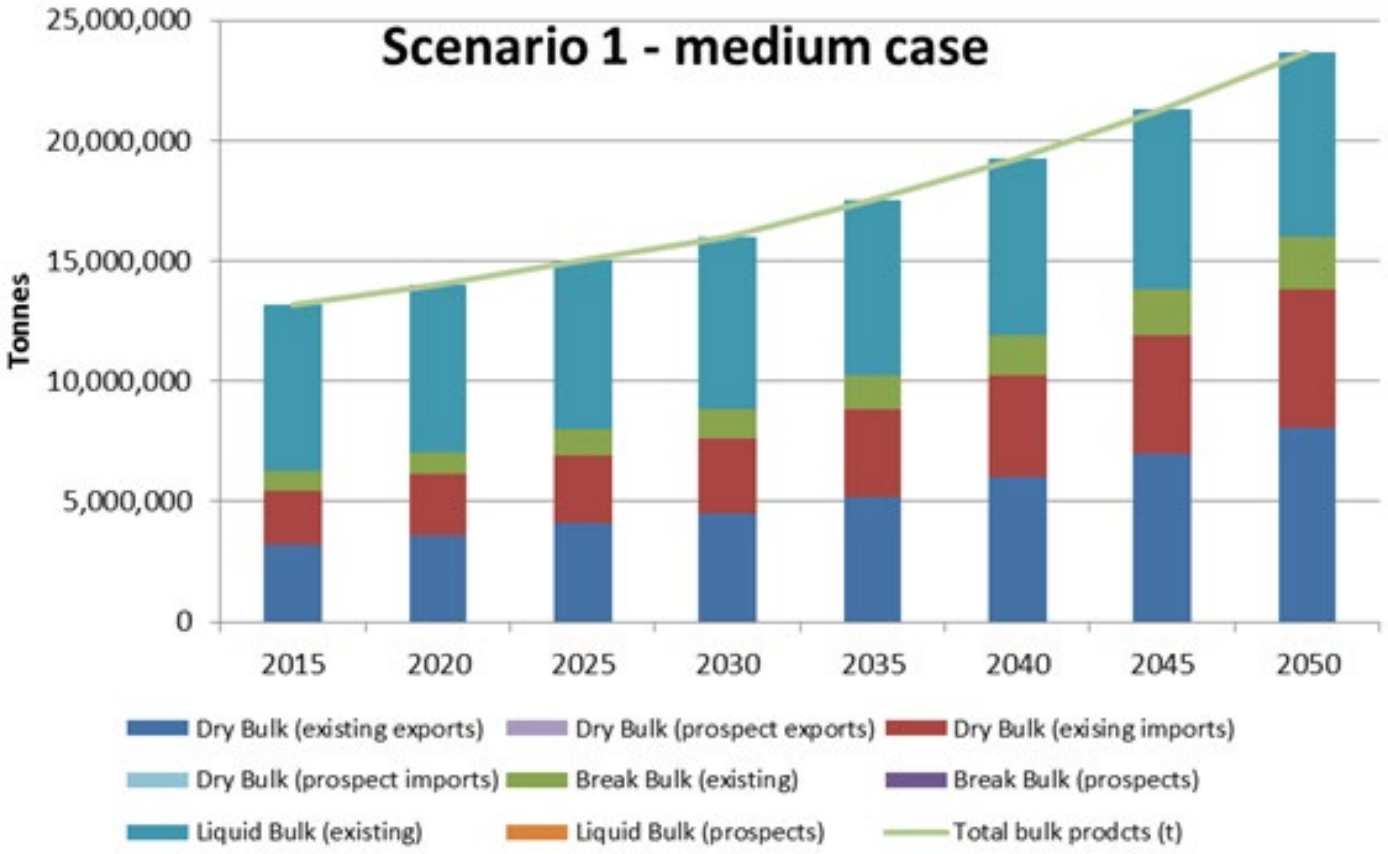
Notes:

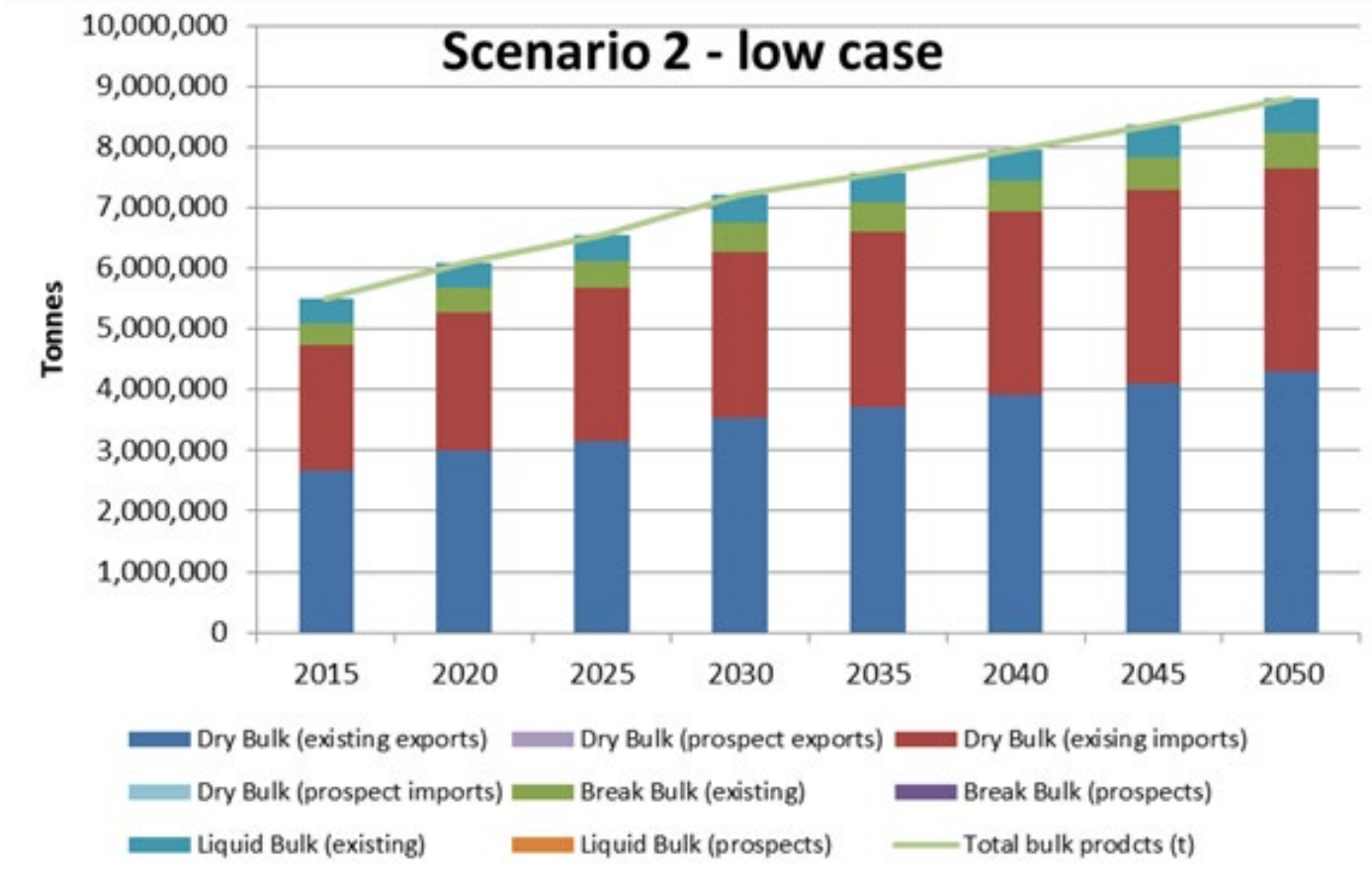
1. Automotive share assumed as max 25% of PoMC forecast figures;
2. Fertiliser volume based on pro-rata alignment with existing balance of grain/fertiliser. Growth at 3% CAGR modelled.
3. Total refined product throughput estimated at 94% of forecast Crude imports (existing yield) (source Shell). 5% share assumed to Terminals. Total crude volume matched to Ibid forecast summary (medium case).
4. Bitumen forecast is based on the volume that is currently supplied by Shell into the Victorian market. Assumed as future import by others.

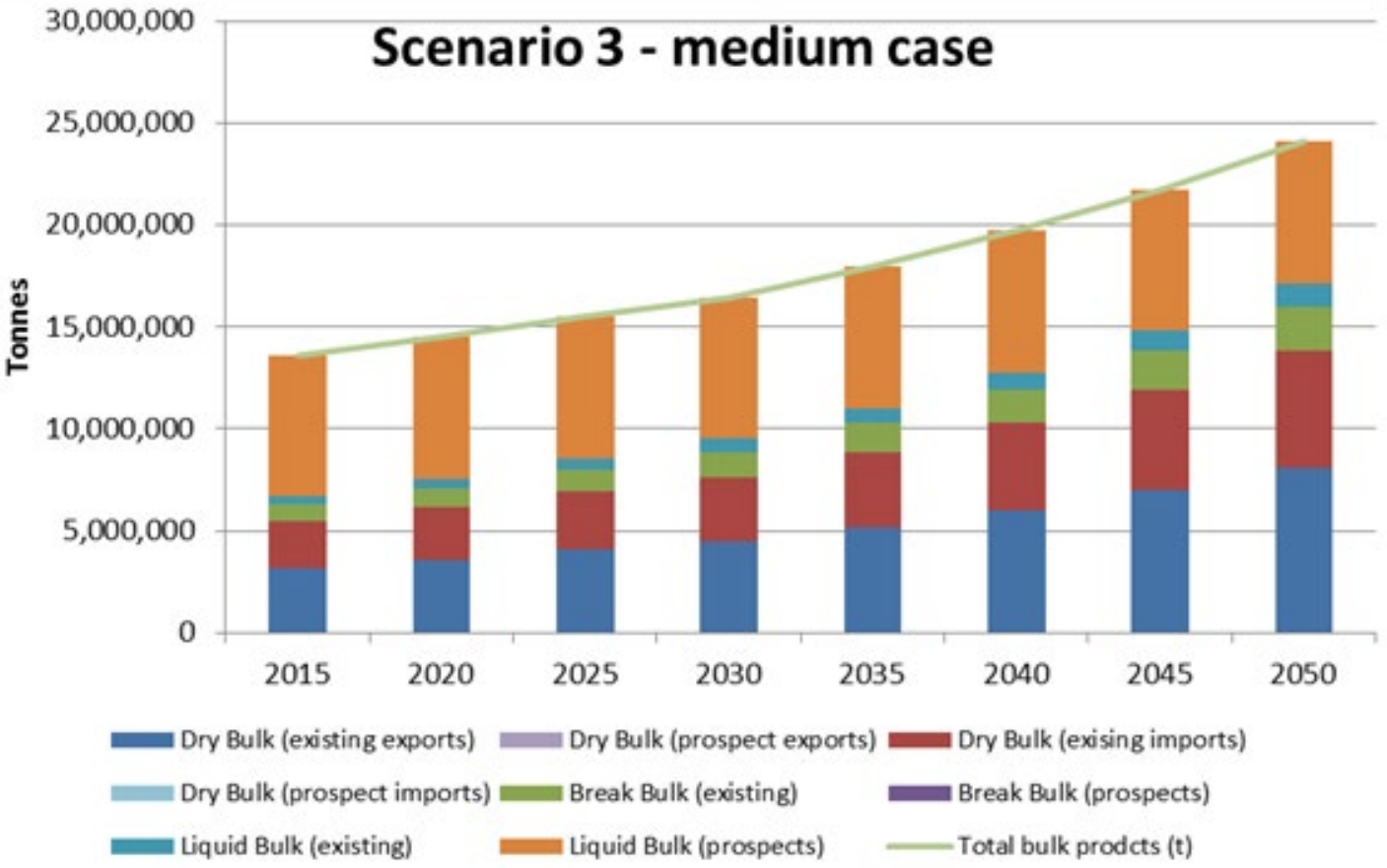
Summary import and export prospect volumes by product class and trade catergory in 5 year time steps

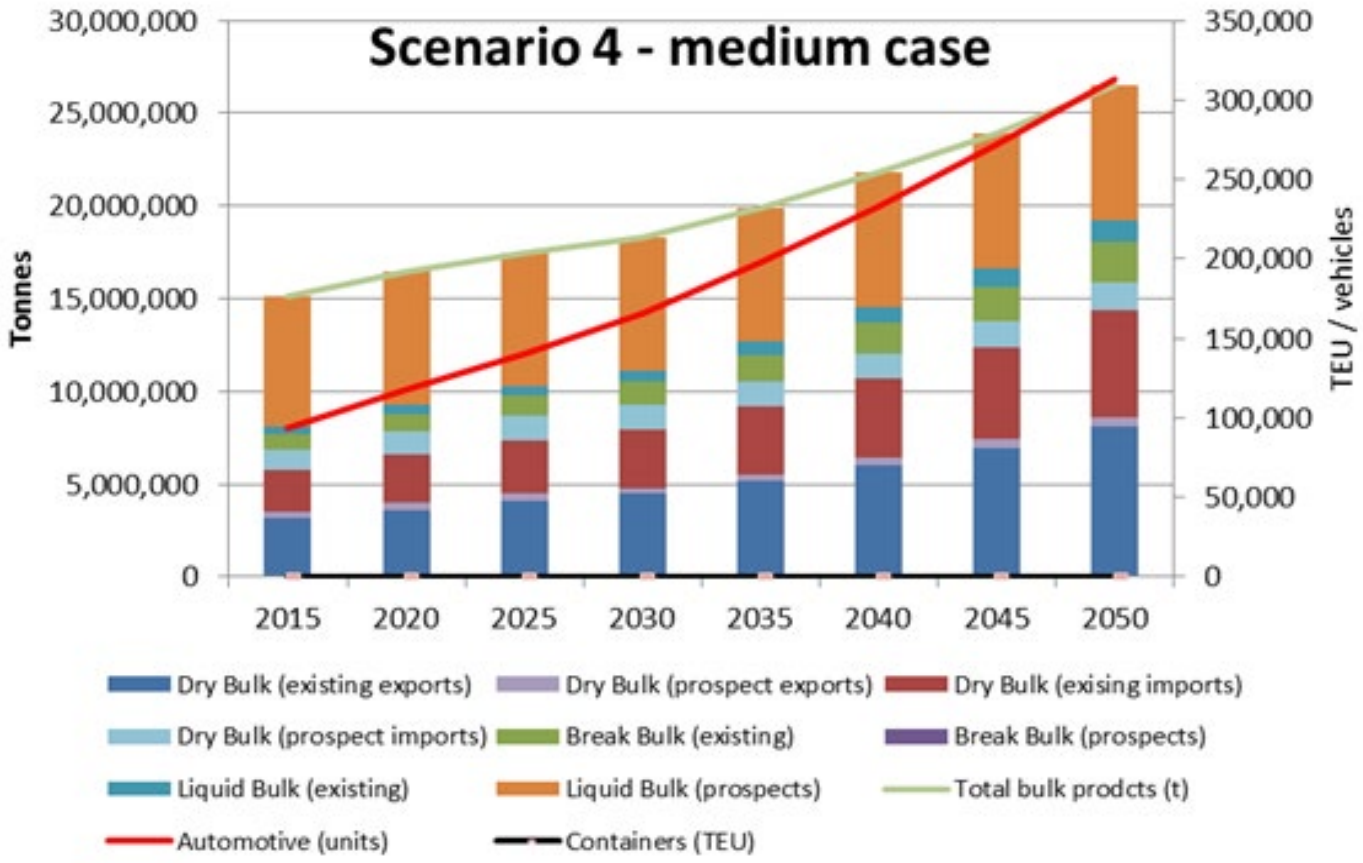
The resulting combined import and export prospects for both existing trades and future trades are summarised in the following table. These figures are then used to develop the volumes under each scenario. The break-down of cargo by product class for each scenario is subsequently presented below in chart form.

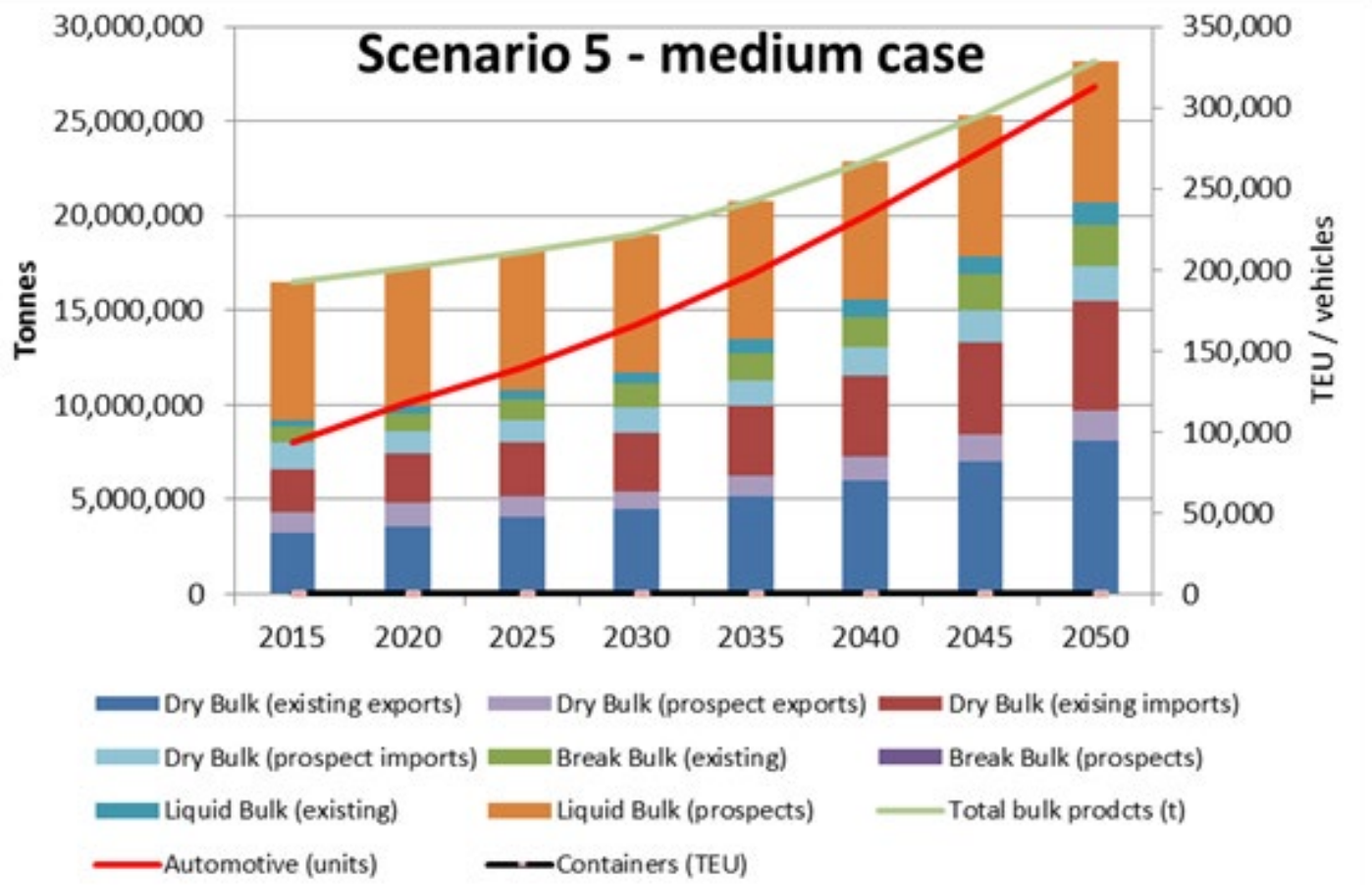
Class	Trade	2015	2020	2025	2030	2035	2040	2045	2050
Dry Bulk export	Existing	3,193,000	3,576,000	4,102,000	4,472,000	5,184,274	6,009,994	6,967,230	8,076,929
Dry Bulk export	Prospect	2,958,000	21,855,781	32,393,542	40,066,228	24,534,682	27,526,302	25,023,780	15,508,392
Dry Bulk import	Existing	2,280,000	2,549,000	2,828,000	3,170,000	3,674,899	4,260,215	4,938,757	5,725,373
Dry Bulk import	Prospect	1,433,333	4,734,333	5,102,333	5,537,333	5,967,316	6,468,560	6,927,018	7,522,954
Break Bulk	existing	813,000	930,000	1,061,000	1,213,000	1,406,199	1,630,171	1,889,814	2,190,813
Break Bulk	prospects	1,052,200	1,144,600	1,220,000	1,280,000	1,328,000	1,370,000	1,412,000	1,459,000
Liquid Bulk	existing	6,910,000	6,976,000	7,052,000	7,141,000	7,243,095	7,361,450	7,498,657	7,657,717
Liquid Bulk	prospects	7,225,000	7,300,000	7,300,000	7,300,000	7,331,855	7,368,783	7,411,593	7,461,222
sub total	tonnes	25,864,533	49,065,714	61,058,876	70,179,561	56,670,319	61,995,475	62,068,849	55,602,400
Vehicles		93,750	118,000	140,000	166,250	197,500	233,500	272,500	313,000
Container		0	129,128	158,112	190,698	224,238	256,081	285,019	310,141

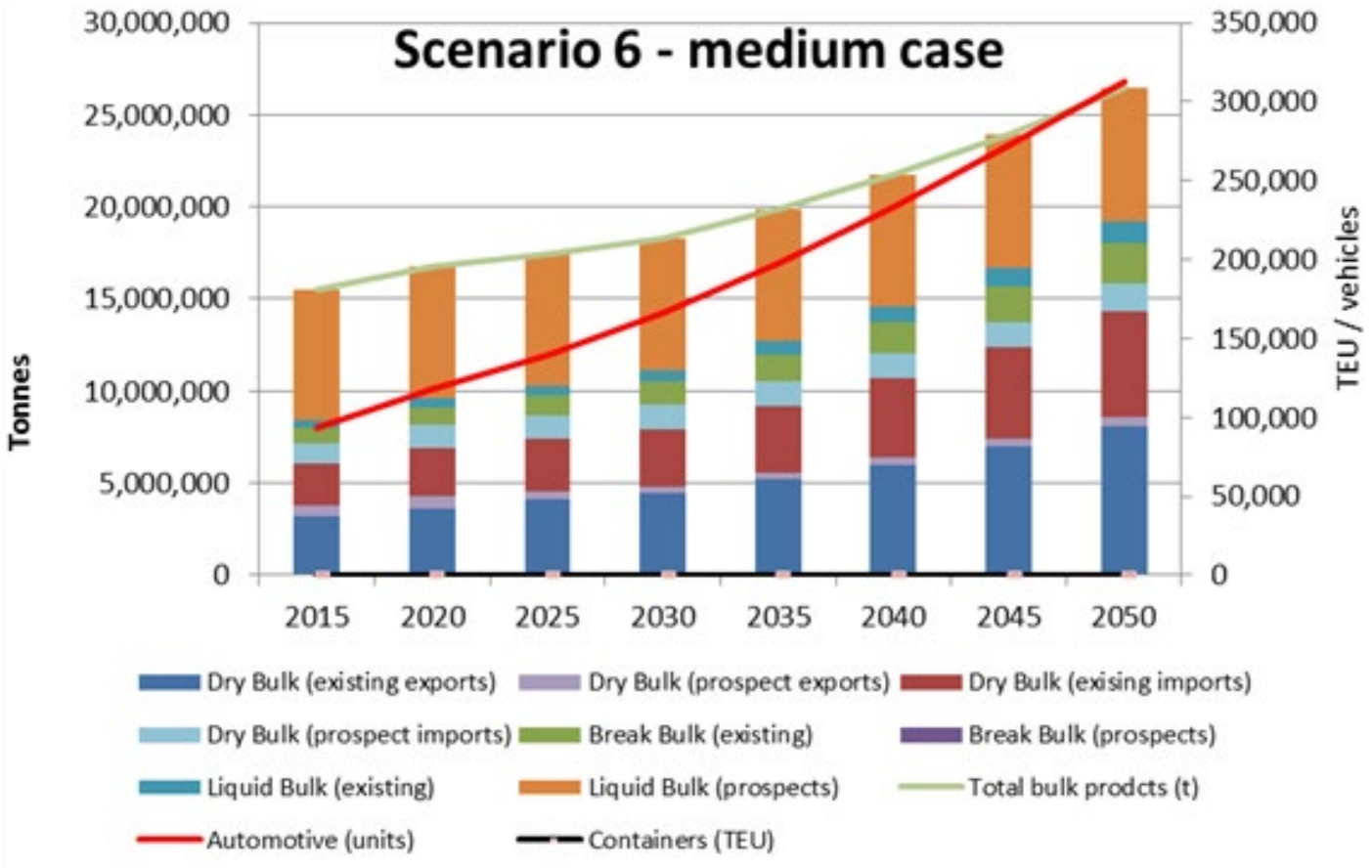

Scenario 1 - medium case
Tonnes
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
2015
2020
2025
2030
2035
2040
2045
2050
Dry Bulk (existing exports)
Dry Bulk (prospect exports)
Dry Bulk (exising imports)
Dry Bulk (prospect imports)
Break Bulk (existing)
Break Bulk (prospects)
Liquid Bulk (existing)
Liquid Bulk (prospects)
Total bulk prodcts (t)

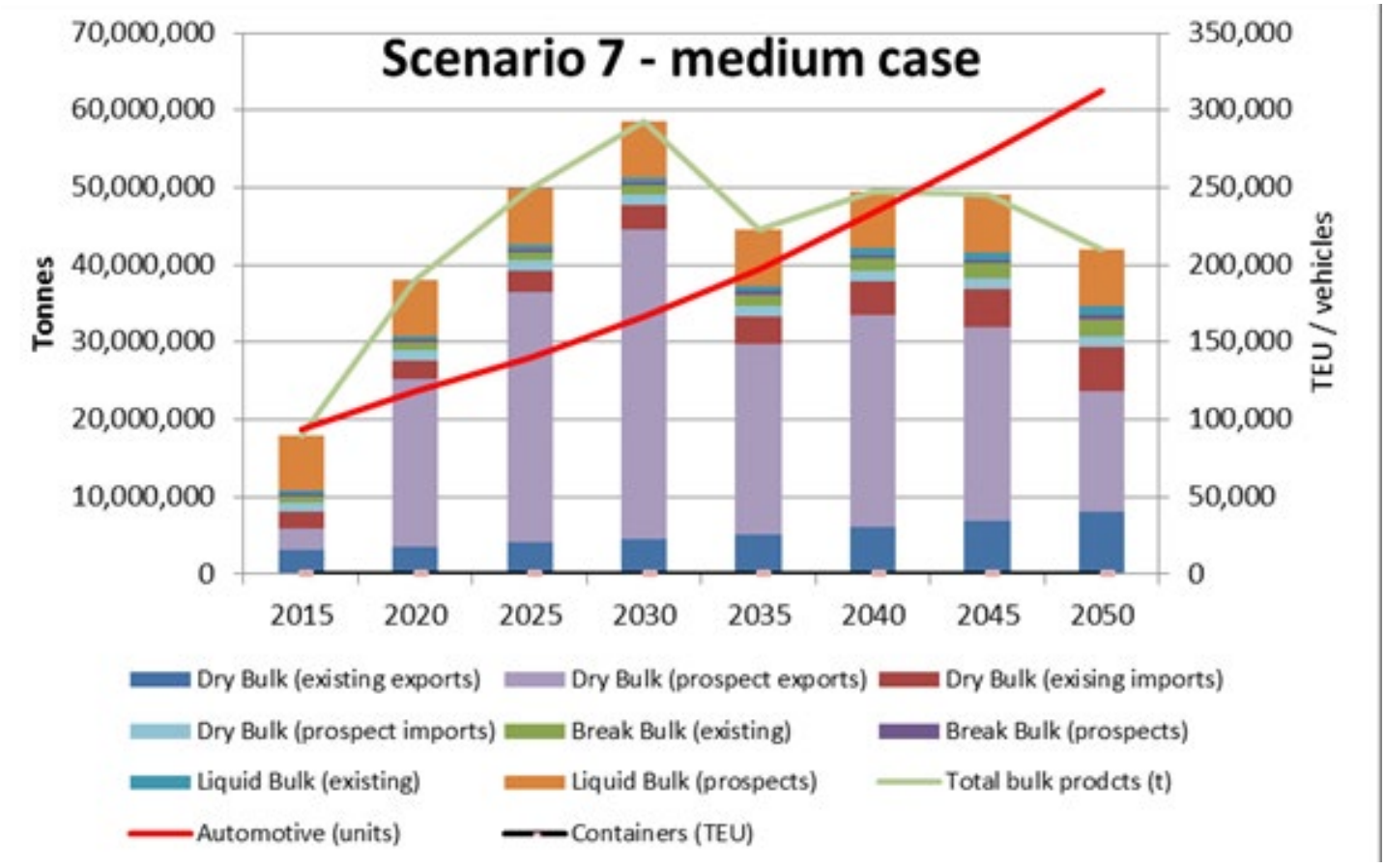

Scenario 2 - low case
Tonnes
10,000,000
9,000,000
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
2015
2020
2025
2030
2035
2040
2045
2050
Dry Bulk (existing exports)
Dry Bulk (prospect exports)
Dry Bulk (exising imports)
Dry Bulk (prospect imports)
Break Bulk (existing)
Break Bulk (prospects)
Liquid Bulk (existing)
Liquid Bulk (prospects)
Total bulk prodcts (t)

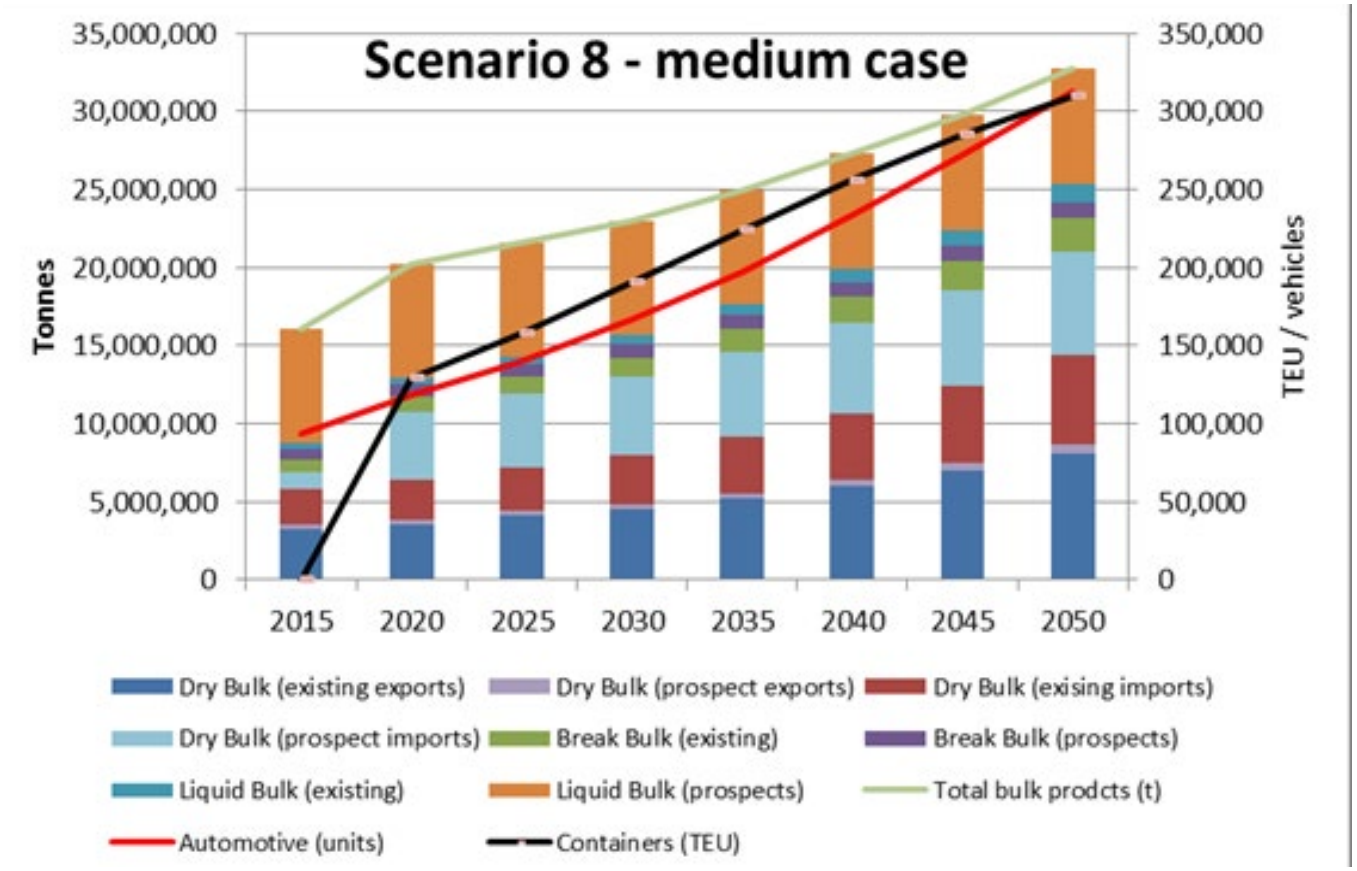

Scenario 3 - medium case
Tonnes
30,000,000
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
2015
2020
2025
2030
2035
2040
2045
2050
Dry Bulk (existing exports)
Dry Bulk (prospect exports)
Dry Bulk (exising imports)
Dry Bulk (prospect imports)
Break Bulk (existing)
Break Bulk (prospects)
Liquid Bulk (existing)
Liquid Bulk (prospects)
Total bulk prodcts (t)

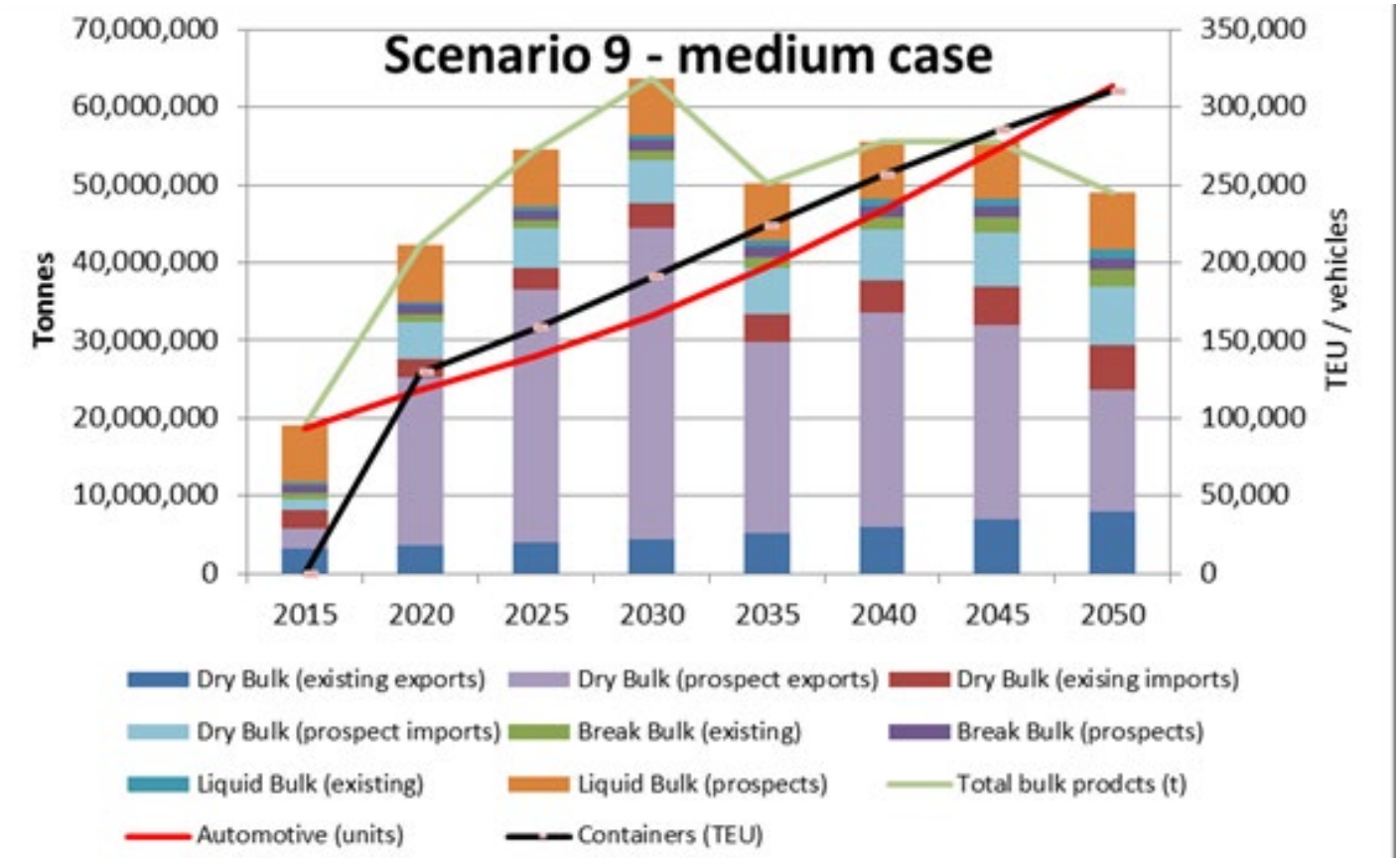

Scenario 4 - medium case
Tonnes
TEU / vehicles
30,000,000
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
2015
2020
2025
2030
2035
2040
2045
2050
Dry Bulk (existing exports)
Dry Bulk (prospect exports)
Dry Bulk (exising imports)
Dry Bulk (prospect imports)
Break Bulk (existing)
Break Bulk (prospects)
Liquid Bulk (existing)
Liquid Bulk (prospects)
Total bulk prodcts (t)
Automotive (units)
Containers (TEU)

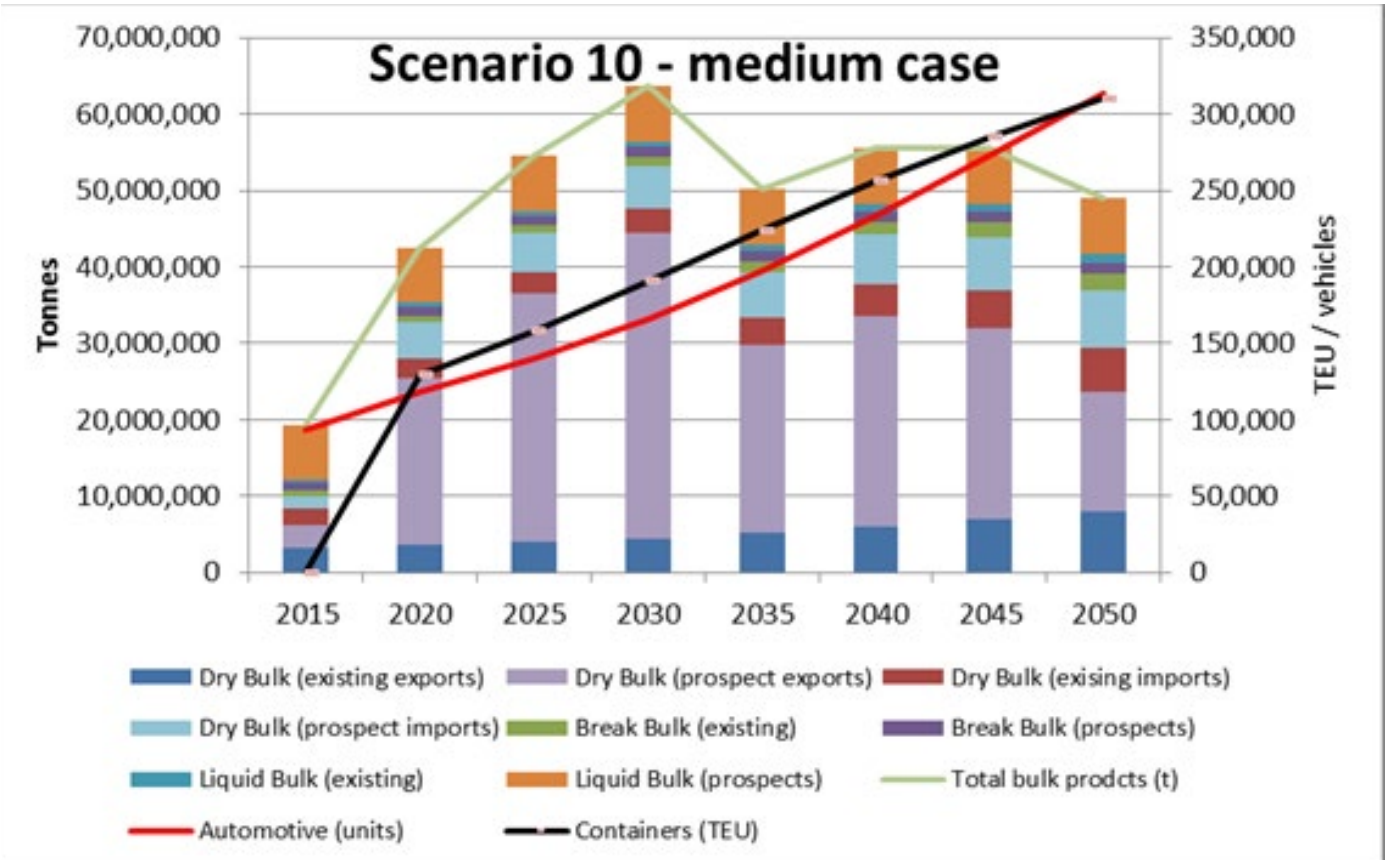

Scenario 5 - medium case
Tonnes
TEU / vehicles
30,000,000
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
2015
2020
2025
2030
2035
2040
2045
2050
Dry Bulk (existing exports)
Dry Bulk (prospect exports)
Dry Bulk (exising imports)
Dry Bulk (prospect imports)
Break Bulk (existing)
Break Bulk (prospects)
Liquid Bulk (existing)
Liquid Bulk (prospects)
Total bulk prodcts (t)
Automotive (units)
Containers (TEU)


Scenario 6 - medium case
Tonnes
TEU / vehicles
30,000,000
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
2015
2020
2025
2030
2035
2040
2045
2050
Dry Bulk (existing exports)
Dry Bulk (prospect exports)
Dry Bulk (exising imports)
Dry Bulk (prospect imports)
Break Bulk (existing)
Break Bulk (prospects)
Liquid Bulk (existing)
Liquid Bulk (prospects)
Total bulk prodcts (t)
Automotive (units)
Containers (TEU)

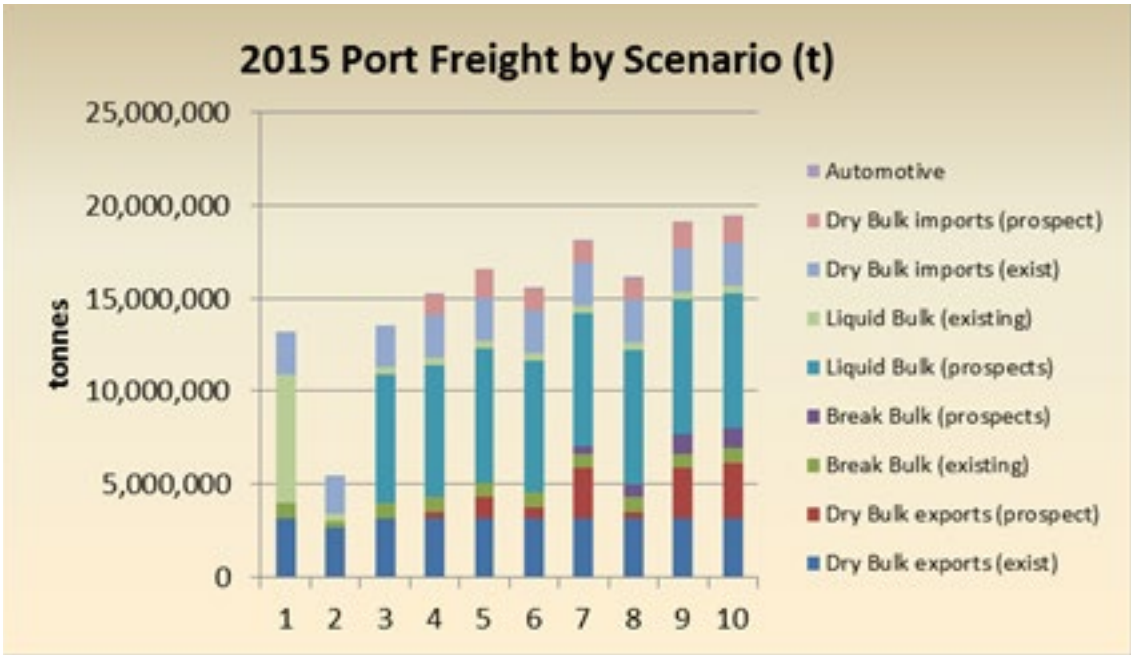

Scenario 7 - medium case
Tonnes
TEU / vehicles
70,000,000
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
0
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
2015
2020
2025
2030
2035
2040
2045
2050
Dry Bulk (existing exports)
Dry Bulk (prospect exports)
Dry Bulk (exising imports)
Dry Bulk (prospect imports)
Break Bulk (existing)
Break Bulk (prospects)
Liquid Bulk (existing)
Liquid Bulk (prospects)
Total bulk prodcts (t)
Automotive (units)
Containers (TEU)

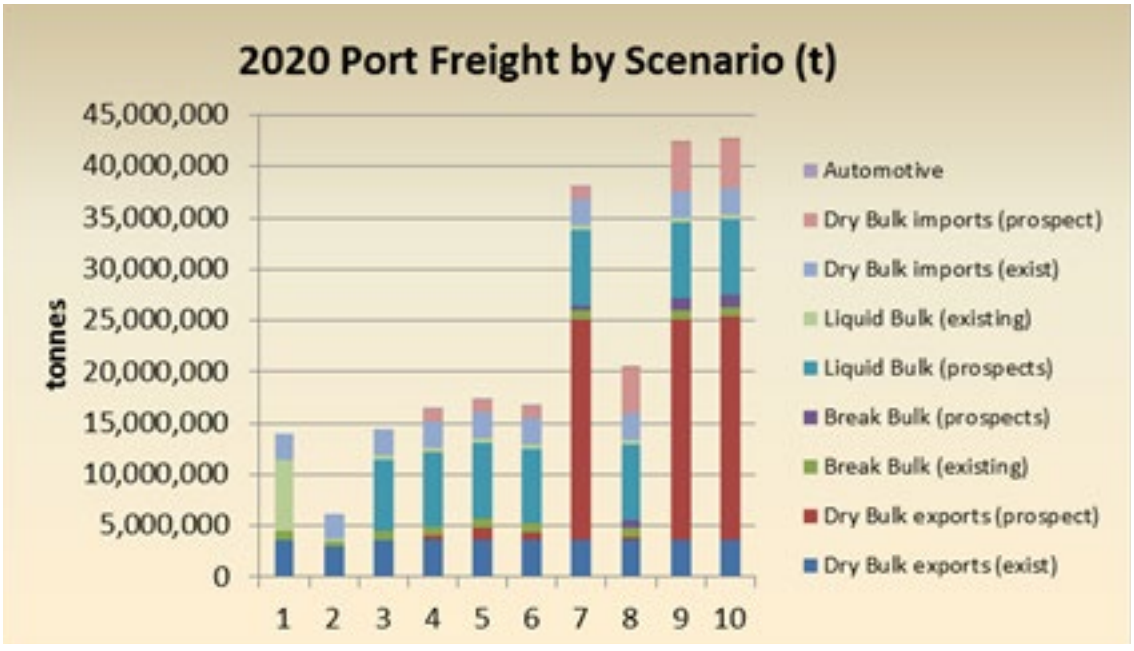

Scenario 8 - medium case
Tonnes
TEU / vehicles
35,000,000
30,000,000
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
2015
2020
2025
2030
2035
2040
2045
2050
Dry Bulk (existing exports)
Dry Bulk (prospect exports)
Dry Bulk (exising imports)
Dry Bulk (prospect imports)
Break Bulk (existing)
Break Bulk (prospects)
Liquid Bulk (existing)
Liquid Bulk (prospects)
Total bulk prodcts (t)
Automotive (units)
Containers (TEU)

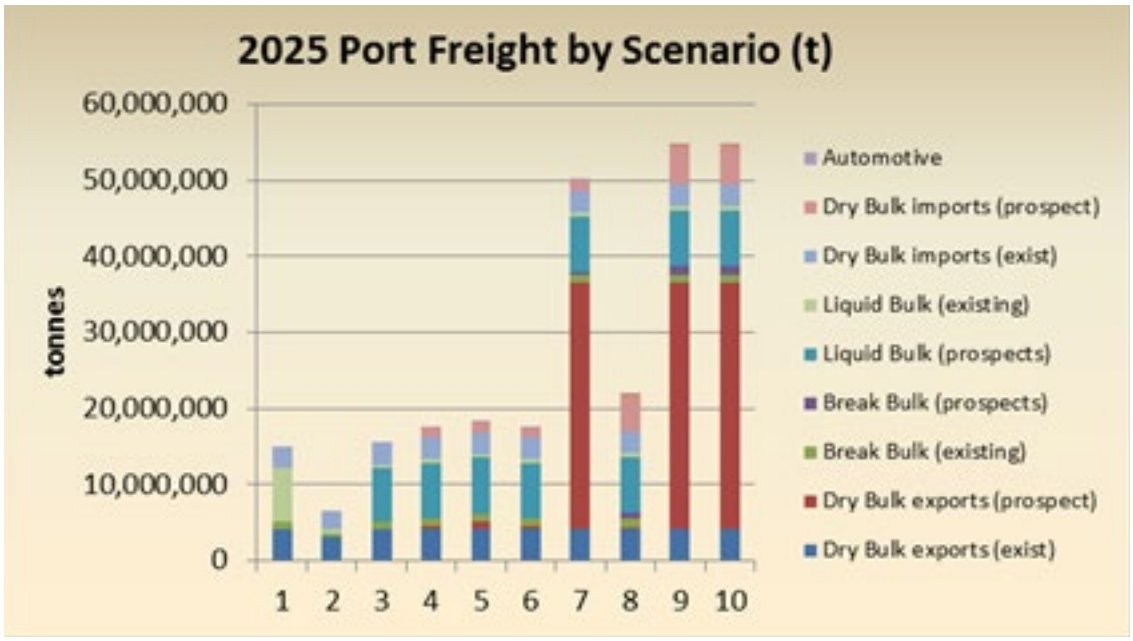

Scenario 9 - medium case
Tonnes
TEU / vehicles
70,000,000
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
0
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
2015
2020
2025
2030
2035
2040
2045
2050
Dry Bulk (existing exports)
Dry Bulk (prospect exports)
Dry Bulk (exising imports)
Dry Bulk (prospect imports)
Break Bulk (existing)
Break Bulk (prospects)
Liquid Bulk (existing)
Liquid Bulk (prospects)
Total bulk prodcts (t)
Automotive (units)
Containers (TEU)

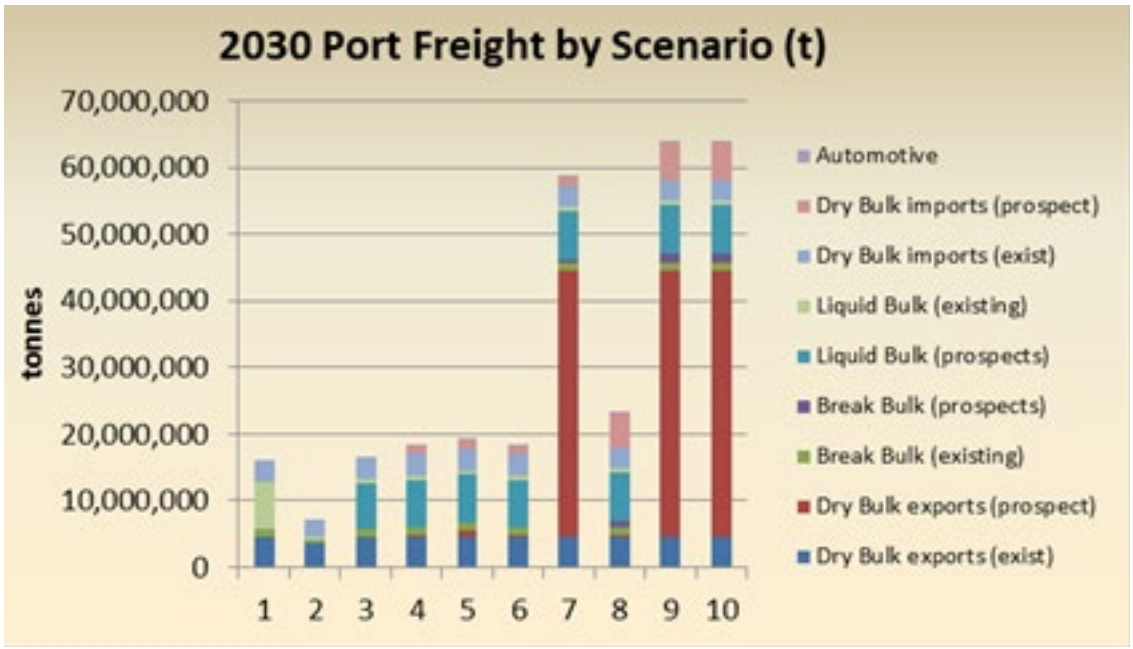

Scenario 10 - medium case
Tonnes
TEU / vehicles
70,000,000
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
0
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
2015
2020
2025
2030
2035
2040
2045
2050
Dry Bulk (existing exports)
Dry Bulk (prospect exports)
Dry Bulk (exising imports)
Dry Bulk (prospect imports)
Break Bulk (existing)
Break Bulk (prospects)
Liquid Bulk (existing)
Liquid Bulk (prospects)
Total bulk prodcts (t)
Automotive (units)
Containers (TEU)

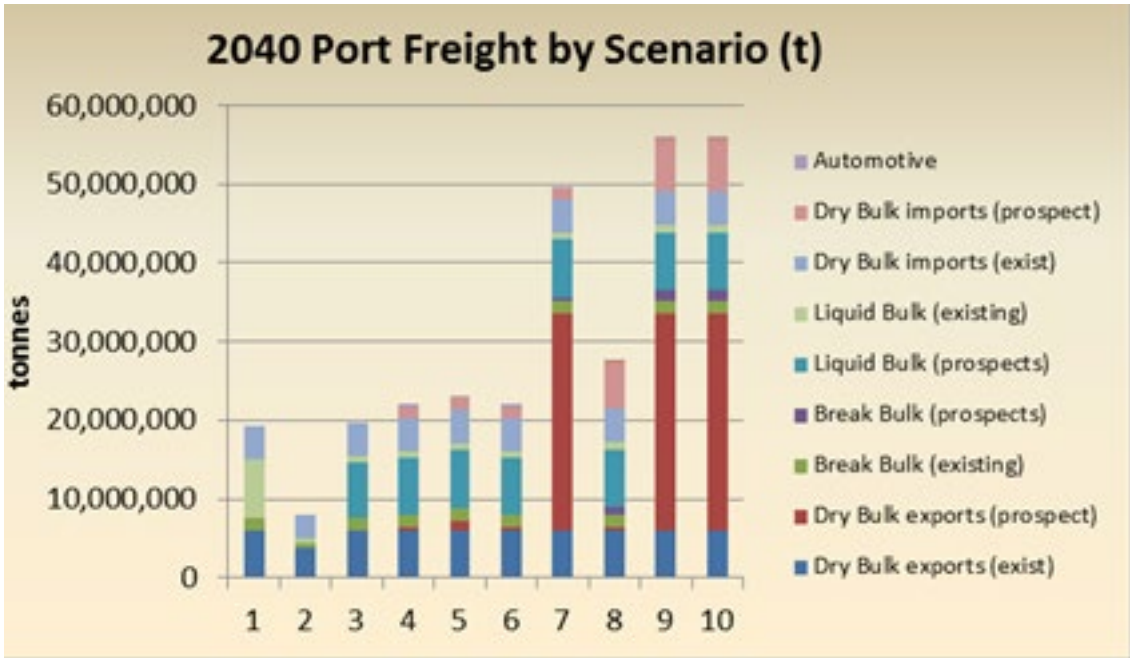
The following charts illustrate the breakdown of cargo by product class under each scenario for each of the 5 year time steps considered.

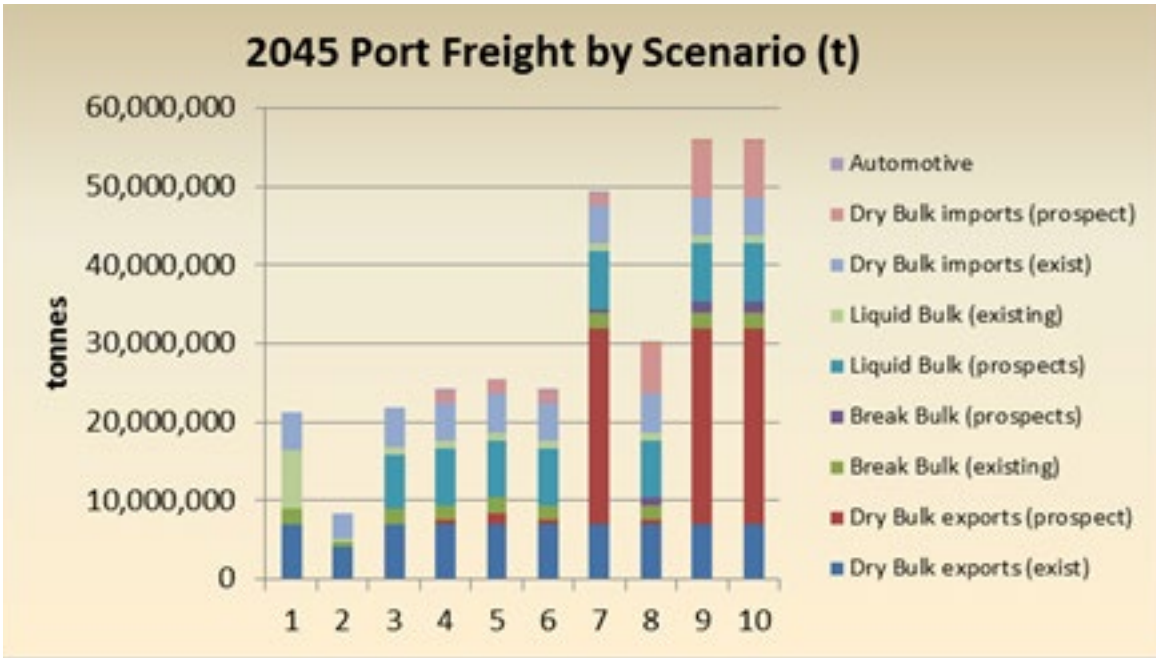


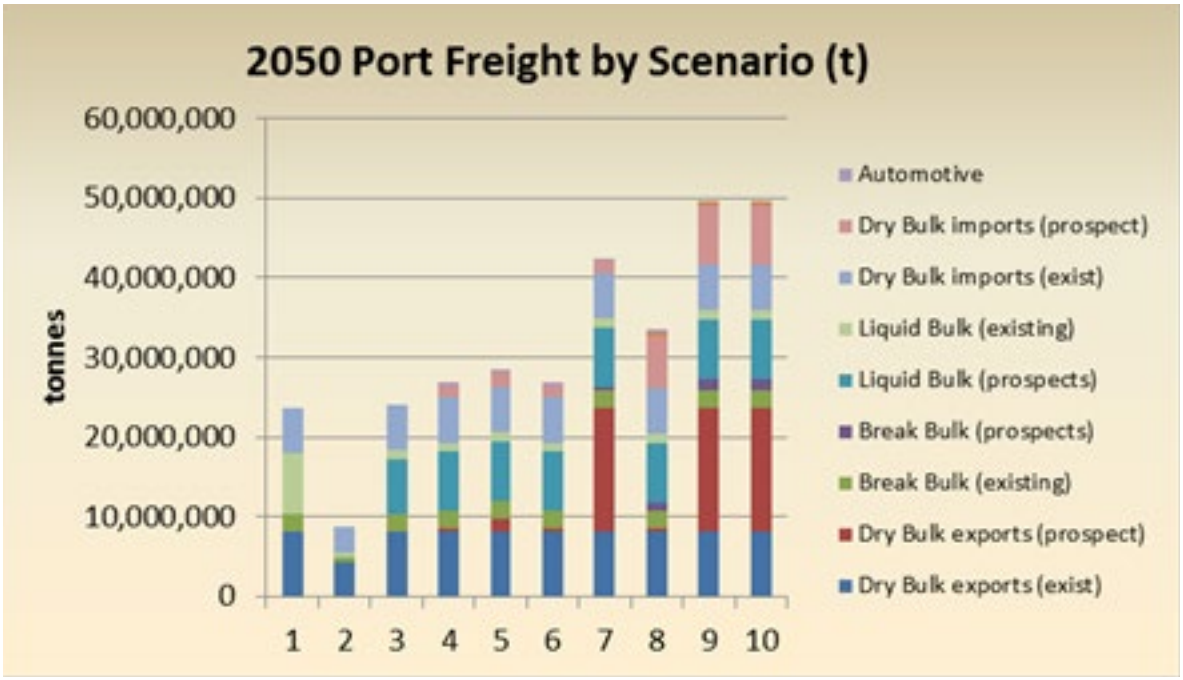



2025 Port Freight by Scenario (t)
tonnes
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
0
1 2 3 4 5 6 7 8 9 10
Automotive
Dry Bulk imports (prospect)
Dry Bulk imports (exist)
Liquid Bulk (existing)
Liquid Bulk (prospects)
Break Bulk (prospects)
Break Bulk (existing)
Dry Bulk exports (prospect)
Dry Bulk exports (exist)


2030 Port Freight by Scenario (t)
tonnes
70,000,000
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
0
1 2 3 4 5 6 7 8 9 10
Automotive
Dry Bulk imports (prospect)
Dry Bulk imports (exist)
Liquid Bulk (existing)
Liquid Bulk (prospects)
Break Bulk (prospects)
Break Bulk (existing)
Dry Bulk exports (prospect)
Dry Bulk exports (exist)


2040 Port Freight by Scenario (t)
tonnes
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
0
1 2 3 4 5 6 7 8 9 10
Automotive
Dry Bulk imports (prospect)
Dry Bulk imports (exist)
Liquid Bulk (existing)
Liquid Bulk (prospects)
Break Bulk (prospects)
Break Bulk (existing)
Dry Bulk exports (prospect)
Dry Bulk exports (exist)


2045 Port Freight by Scenario (t)
tonnes
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
0
1 2 3 4 5 6 7 8 9 10
Automotive
Dry Bulk imports (prospect)
Dry Bulk imports (exist)
Liquid Bulk (existing)
Liquid Bulk (prospects)
Break Bulk (prospects)
Break Bulk (existing)
Dry Bulk exports (prospect)
Dry Bulk exports (exist)


2050 Port Freight by Scenario (t)
tonnes
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
0
1 2 3 4 5 6 7 8 9 10
Automotive
Dry Bulk imports (prospect)
Dry Bulk imports (exist)
Liquid Bulk (existing)
Liquid Bulk (prospects)
Break Bulk (prospects)
Break Bulk (existing)
Dry Bulk exports (prospect)
Dry Bulk exports (exist)

Endnotes

[0] Juturna Consulting Geelong and Wyndham labour market trends and initial analysis A report for Regional Development Australia Barwon South-West Division (2013)

[1] Professor Ross Robinson (Australian Centre for Integrated Freight Systems Management, School of Enterprise, The University of Melbourne) pointed out the major difference between coping strategies and developmental strategies for ports in Port Oriented Landside Logistics in Australian Ports: A Strategic Framework (Maritime Economics and Logistics 2006, 8 (40-59)). This distinction is nowadays recognised in the literature as a 'best practice' approach to port and landside infrastructure planning in cities and accords with the objectives of Infrastructure Australia's National Ports Strategy. A Geelong Port-City plan puts this developmental structure into practice in a conscious way.

[2] Econsearch Economic Impact of the Port of Geelong 2012

[3] See Deloittes-Access Economics Victorian Employment Projections Report (2013)

[4] Organisation for Economic Cooperation and Development The Competitiveness of Global Port-Cities: The Case of Rotterdam/Amsterdam – the Netherlands Working Paper (2013) p.11

[5] A Desktop Study of Global Shipping Trends in the Trades currently linked to the Port of Geelong, Thompson Clarke Shipping Pty Ltd, January 2013.

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