3 April 2017

Second Container Port Advice
Discussion Paper
Infrastructure Victoria

Avalon Airport Australia Pty Ltd’s Submission to Infrastructure Victoria on the Site for the Next Port

We enclose Avalon Airport Australia Pty Ltd’s (AAA) submission to Infrastructure Victoria regarding the appropriate location of Victoria’s next container port.

AAA engaged Deakin University to undertake an independent detailed comparative analysis on Bay West or Hastings based on the options provided by Infrastructure Victoria in a discussion paper released in March 2017. The resultant Report by Deakin University is the foundation of the submission by AAA.

The Report clearly demonstrates that Bay West is the far superior option. Furthermore, the Report highlights that time is of the essence. It is imperative that the Government moves now to determine when the next Port is to be built and where it is to be located. It is our Submission that these factors are crucial to the decision making process of the Government on this vitally important issue.

Please note that we did not ask Deakin University to specify a precise site within Bay West for the location of the Port. Rather and if Bay West is the preferred option of the Government then a separate analysis should be undertaken to ensure the new port is part of a comprehensive air, sea, road and rail intermodal hub.

Thank you for the opportunity to make a Submission. AAA together with Deakin University would welcome the opportunity to present the Report and its findings to Infrastructure Victoria or to provide additional information as may be required.

Yours faithfully

Justin Giddings
Chief Executive Officer
A second container port for Melbourne? Build it in the west for 2036

CENTRE FOR SUPPLY CHAIN AND LOGISTICS
MARCH 2017

SCHOOL OF ENGINEERING
FACULTY OF SCIENCE, ENGINEERING AND BUILT ENVIRONMENT
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About the Centre for Supply Chain and Logistics

The Centre for Supply Chain and Logistics (CSCL) is a research centre at Deakin University specialising in freight logistics, international trade, food and agribusiness and supply chain strategy. Before the CSCL Team joined Deakin University (February 2017) they, as the Institute for Supply Chain and Logistics team at Victoria University, produced Build it but will they come? A pre-mortem analysis of the Port of Hastings Development Project to encourage alternative integrated planning (2014), which is appended to this document.
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Attachment 1: Institute of Supply Chain and Logistics, Victoria University: Build it - but will they come? 2014 report.

Executive Summary

1. Overview

Infrastructure Victoria is seeking submissions to prepare advice to government on the need, timing and location of a second container port in Victoria – at either Hastings or Bay West.

In this submission, we present evidence to demonstrate that Bay West is the only feasible location for a second container port.

Melbourne is the fastest growing city in Australia and its ongoing economic and population growth relies on a world-class port. The Port of Melbourne abuts Melbourne’s central business and activity district. Twice it has moved downstream, away from the city, to develop additional port capacity at Swanson and Webb Docks, but further expansion is problematic.

It is increasingly unlikely that the Port of Melbourne will retain its license to operate as a city port when the proposed expansion projects are scrutinised by the community given the ongoing concerns about livability and social amenity.

2. Timing is important and we cannot delay the decision

Our research demonstrates that a new container port will be required in 15 to 20 years. Given the long lead time for building a new port, policy decisions, planning, transport corridor reservation and investment need to start now, with a clear decision on the location and the likely time frame. The time to identify the location for the facility is now.

Our analysis also indicates that the maximum achievable container throughput at the Port of Melbourne is around five million TEU per year. This capacity is likely to be reached by around 2036. The investment needed to address the significant landside logistics and maritime infrastructure challenges to expand capacity to meet demand over the coming decades is unlikely to provide a positive return on investment for Victoria.

It will take at least 10 to 15 years to plan, design, gain approval for, and construct a new port facility. Postponing the decision on the location of a new port will create uncertainties in investment, economic activity and employment and will be detrimental to trade and the Victorian economy. The associated landside transport and logistics systems also require investor confidence and lead times to adapt to a new port location.

The Port of Melbourne (even if expanded) has a limited life span and an alternative should be considered sooner rather than later.

3. The time to identify the location of the second port is now

Equally, or arguably even more important, is a clear decision on the location of the second port. A timely decision is vital in guiding private sector investment that will enhance the efficiency of Victorian exporters and importers and their freight dependent supply chain and logistics businesses.

Bay West (as defined by Infrastructure Victoria) provides a rare opportunity to ensure Victoria’s next container port is established on the ‘right’ side of town in a greenfield location where the use of Victoria’s existing road and rail networks to connect with metropolitan, intra- and interstate import and export trade will be optimised to best support Victoria’s supply chain and logistics businesses.

Bay West offers the opportunity to develop a world-class landside and maritime port system whilst an expanded Port of Melbourne or a new port at Hastings are each severely compromised by cost, landside logistics issues, environmental impact and loss of urban amenity. Gaining the social license for a second
A second container port for Melbourne? Build it in the west for 2036

port at Hastings will be more difficult than at Bay West due to greater environmental and social impacts. Identifying the location of the second port as soon as possible is vital to its successful development.

4. The changing landscape of Melbourne

Presently, nearly half of Melbourne’s population lives in the north and west, and this proportion is increasing. Over 80 per cent of rural and regional Victoria, including the largest regional cities of Geelong, Bendigo and Ballarat, will continue to rely on access to Melbourne from the north and west for the supply and export of goods.

With this shift in Melbourne’s population, the geographical distribution of markets for imported goods, and warehouse and distribution centres will also change.

A significant proportion of Melbourne’s freight distribution centres are already concentrated in the north and west. Relatively cheap land suitable for logistics related activities and construction of freight and intermodal terminals is readily available near Bay West.

5. Contestability

A number of major ports on the eastern seaboard of Australia, in particular Adelaide and Sydney, are competing with Melbourne for contestable cargoes (mainly exports). A significant proportion of export containers originate in northern and western regions of Victoria or interstate. Relocation of the port to Hastings is likely to cause significant increases in travel times and costs, and risks the loss of exports to other Australian ports.

Critically, a port’s capacity to attract importers and exporters to use its services is influenced by land transport mode related factors, in particular the availability, price and reliability of alternative landside transport modes (e.g. road, rail), and the comparative cost of accessing competing ports. All these factors favour the location of the port at Bay West over Hastings.

6. Road-based container transport and externality costs

More than 80 per cent of the Port of Melbourne’s import containers are destined for locations within the Melbourne metropolitan area. Approximately 95 per cent of container freight to and from the Port of Melbourne, including all metropolitan container freight, is transported by road.

Congestion on arterial roads servicing the Port of Melbourne is at a tipping point. It is clear that even with possible expensive network enhancements to service both Swanson Dock and Webb Dock, congestion will remain at high or critical levels.

Capacity enhancement of key arterial roads, and their operation as tolled roads, is expected to continue. This means that the comparative distance and associated travel and externality costs between the port and origins and destinations of export and import containers will become a critical determinant in selecting the location of the second port.

The Bay West location will have direct access to current and proposed road networks, providing excellent long-term port access to regional corridors. Import container destinations and export container origins are concentrated in the west and north-west and to a lesser extent, the south-east area of Melbourne. Travel times and total costs for road-based container movements between these areas and a second port at Bay West will be around 35 per cent less than for a port at Hastings. These differences could amount to several billion dollars over the life of the port. Externality costs will also be around 40 per cent less for a port at Bay West than at Hastings.

7. Rail network connections

The IV Discussion Paper mentions a target of 10 per cent rail mode share; however, this is a conservative target and for port efficiency the target should be more like 20 to 30 per cent. A greater rail share of
container freight will be easier and cheaper at the Bay West location than at an expanded Port of Melbourne or Hastings.

If a port were developed at Hastings and it were to reach design capacity of nine million TEU, assuming 30 per cent of the freight is transported by rail to and from importers and exporters in Melbourne’s west and north, the resultant demand on the freight rail system would be untenable. One freight train would need to pass through Flinders Street and Melbourne’s other busiest commuter railway stations (Caulfield, Richmond and Southern Cross stations) every 15 minutes, every day and night of the year.

8. Vessel size and port capacity

Vessels are sent to markets, not individual ports. The Australian port with the most restricted infrastructure limits on the size of vessels coming to Australia is currently the Port of Melbourne. Air draught restrictions under the West Gate Bridge and the physical restrictions of Swanson Dock (width, quay length and swinging basin) will severely restrict larger container vessels from berthing in the future, affecting the capacity of the Port of Melbourne to continue as Australia’s leading container port.

We expect these restrictions will become a major impediment in 10 to 15 years when the majority of container vessels will be unable to pass under the West Gate Bridge or access Swanson Dock, thereby threatening Melbourne’s position as Australia’s leading container port.

Five million TEU is generally accepted as the upper limit of capacity at the Port of Melbourne using the current quay line and some enhancements to Swanson Dock. However, in the future the restrictions of Swanson Dock mean it will only be able to handle the smaller container vessels. The forecast capacity of eight million TEU per year for an expanded Webb Dock is highly aspirational. Moreover, transporting these containers to importers and exporters would mean that four million TEU would need to be transported over a 12-hour window at night on 360 days a year (if moving 50 per cent of the road freight to night operations as proposed by Infrastructure Victoria). Assuming the use of high productivity vehicles this equates to one million truck trips, or 230 truck trips per hour, moving to and from Webb Dock across the road network (including through a built-up residential area) each night, seven days per week.

Globally, vessel size is increasing and shipping lines are looking to send larger vessels to Australian ports. However, given Australia’s small market we will most likely see vessels of only up to 8,000 to 10,000 TEU coming here on a regular basis. Access to Port Phillip is currently suitable for these vessels to enter the bay at most times.

Whilst Hastings has been considered a natural deep-water port, a significant amount of dredging is required to construct a container terminal suitable to handle large container vessels. Further, the orientation of the quay line and approach channels will be adversely affected by the prevailing westerly winds, severely affecting the handling and safe berthing of large container vessels.

9. Environmental impacts

The two locations canvassed for the second container port have significant biodiversity and ecological value, with the total area for the proposed port at Hastings and part of the proposed location of Bay West (a much smaller area than at Hastings) recognised under the Ramsar Convention on Wetlands of International Significance.

The Hastings option is likely to have unacceptable impacts on flora and fauna, in particular with damage to seagrass habitat in Western Port and associated marine and terrestrial fauna. On the other hand, the Bay West location would have fewer biodiversity and ecosystem impacts. The access route to Bay West is primarily through agricultural land, which is likely to have comparatively low biodiversity values. The
proposed location of the port is offshore in an area that offers the potential for minimising impacts on a number of key habitats with significant biodiversity and ecological value.

10. The ‘social licence’ for a second port

A ‘social license’ represents community acceptance that the sum of the benefits (e.g. trade, economic activity and employment) of operating and expanding an existing port or building a new port outweighs the aggregate of actual or perceived disbenefits (e.g. poor visual amenity, congestion, noise, adverse environmental impacts, and business and employment dislocation).

Hastings lacks the required rail connection and a suitable rail connection would cost more than $5 billion. Most of Western Port, including Hastings, is covered by the Ramsar Wetlands Convention and requires major mitigation measures to avoid damage to the environment.

Large volumes of trucks or trains moving along particular corridors have detrimental impacts including visual amenity, noise and air quality. The need to move significant volumes from a port at Hastings to the distribution centres in Melbourne’s north and west will create greater impacts than under the Bay West option.

The aggregate of these social and environmental considerations make a new port in Bay West more likely to receive a 'social license' than a port at Hastings.

11. Reasons for Bay West to be the location for the second port: salient points

1. Bay West can easily be connected to existing and proposed metropolitan and intra- and interstate road and rail networks.

2. Relatively cheap land suitable for logistics related activities and for the construction of a rail terminal, required for the breakup of long interstate trains, is readily available near the suggested port location.

3. The design provides for a contiguous quay line of 4,100 meters, suitable for efficient container handling operations and on-dock rail with adequate back-up land available directly behind the quay line.

4. Access to Bay West through the Heads, the Great Ship Channel and Port Phillip is currently suitable for 8,000 to 10,000 TEU vessels to enter at most times.

5. Bay West requires the least amount of dredging with the least environmental impact. The area of Bay West covered by the Ramsar Convention on Wetlands of International Significance is much smaller than the Ramsar area at Hastings.

6. Road-based container transport travel times and transport and externality costs for both Hastings and Bay West would increase with a move from the Port of Melbourne, but the increases for Bay West will be significantly smaller than the increases for Hastings.

12. The Way forward

Infrastructure Victoria, through its evidence based research and advice to the Victorian Government, is performing a vital role for the people of Victoria, and can lead the way so that the idea of building the next container port at Hastings is put to rest. Moreover, the ‘inconvenient truth’ about the Port of Melbourne’s prohibitive limitations to building the necessary capacity to last 50 years needs to be recognised.

Commercial arrangements with an existing port operator do not abrogate the responsibility of the Victorian Government to manage sovereign risk and strategic long-term planning for Victorians.
Planning and corridor reservation for a second container port at Bay West needs to occur without delay to ensure Victoria’s economic and social wellbeing is future-proofed.

**A comparative assessment of each potential port location**

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<thead>
<tr>
<th>Criteria</th>
<th>Port of Melbourne (expanded)</th>
<th>Hastings</th>
<th>Bay West</th>
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<td><strong>1. ECONOMIC</strong></td>
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<td>Victoria meets its economic development objectives</td>
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<td>Port contestability</td>
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<td>Multi-generation impact</td>
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<td><strong>2. PORT AND LANDSIDE LOGISTICS</strong></td>
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<td>Roads</td>
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<td>Truck numbers, truck utilisation</td>
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<td>Traffic and road congestion impact</td>
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<td>Intermodal connectivity</td>
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<td>Multimodal port shuttling</td>
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<td>Integrating the port with an effective land transport system</td>
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<td>Accepting larger vessels (10,000 TEU and possibly 14,000)</td>
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<td>Air draught limitations</td>
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<td>Dredging required</td>
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<td>Storage and distribution capabilities</td>
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<td><strong>3. SOCIAL AND ENVIRONMENTAL</strong></td>
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<td>Vehicle emissions</td>
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<td>Noise, reverberations</td>
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<td>Safety through the clear separation of land use</td>
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<td><strong>4. PLANNING FOR THE FUTURE</strong></td>
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<td>Freight corridors, freight terminals</td>
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<td>Marine berths and channel development capability</td>
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**Key:**
- Red: Negative
- Orange: Moderate
- Green: Positive
1. Introduction

In March 2017, Infrastructure Victoria (IV) released a discussion paper documenting the current evidence base for when and where a second container port should be built in Victoria (Infrastructure Victoria, 2017). This paper (henceforth referred to as the IV Discussion Paper) provides important new research that the Centre for Supply Chain and Logistics (CSCL) at Deakin University welcomes and values.

A short history of Melbourne’s new container port

Over the last few years CSCL has become a leader through its research on the subject of Melbourne’s next container port. In 2014, the team, in partnership with the independent Supply Chain Advisory Network, responded to the then Victorian Government’s decision to invest $110 million to extend the Port of Hastings Development Authority to enable it to secure the necessary approvals to develop the port at Hastings to become Victoria’s next container port (Attachment 1: Institute for Supply Chain and Logistics, 2014). In doing so, the proposed Port of Hastings would eventually replace the Port of Melbourne and then be relied upon to serve the commercial interests of exporters and importers across the port hinterland (i.e. Melbourne, regional Victoria, southern New South Wales, South Australia and Tasmania). Yet, at the time of this investment, no detailed consideration had been given to landside logistics nor the social and environmental issues and approvals required to build a nine million TEU container port, costing $18 billion, to attract the world’s largest megaships. Ships are sent to markets, not ports, and Australia and Victoria are small markets in global shipping terms, so much so that the cost for multinational shipping lines to send the world’s largest vessels, upwards of 10,000 TEU, to serve a small market far from the major east-west trade routes is too great and highly unlikely to occur.

In 2014, with the change of state government, the Port of Hastings Development Authority project was effectively shut down. In 2015, the Victorian Government created Infrastructure Victoria and in 2016 invited IV to provide advice about the development of Victoria’s next container port. Specifically, IV was asked to provide advice on when a new container port is required and where it should be located – Bay West or Hastings.

In 2016 however, the Victorian Government privatised the lease for the management of the Port of Melbourne. The lease is for 50 years and the Government provided a warrantee not to sponsor the operation of a competing port within the first 15 years of the lease. Ministers of the Victorian Government and the Chief Executive Officer of the Port of Melbourne promote the view that the Port of Melbourne will not reach capacity until the 50-year lease expires. For this reason, this report considers future port capacity in relation to three alternatives for location of the port: the Port of Melbourne, Hastings and Bay West (see Figure 1).

When and where should the new port be built?

The first question of ‘when’ a next container port is required encourages research into the current capacity of the Port of Melbourne and how that capacity could be increased to extend the current life of the port as an effective and cost competitive international container port. Our research indicates the investment required to manage and mitigate the significant landside logistics and maritime infrastructure challenges presented by its current location are unlikely to provide a positive return on investment for Victoria. Instead, a new port away from inner city pressure is required in approximately 15 to 20 years, that is by 2036.

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1 TEU, or twenty-foot equivalent unit, is the standard unit of measurement for shipping containers.
A second container port for Melbourne? Build it in the west for 2036
The second question about the location of Victoria’s next container port – Bay West (as defined by IV) or Hastings – provides a rare opportunity to ensure Victoria’s next container port is established on the ‘right’ side of town in a greenfield location where the use of Victoria’s existing road and rail networks are optimised. This new port would connect effectively with metropolitan, intra- and interstate import and export trade to best support Victoria’s supply chain businesses and the state; and to respond to demographic and consumer growth trends across Melbourne. According to successive government growth strategies most of these enterprises will be located in the west and north of the metropolitan area.

Planning for a new port

Melbourne is a port city, which increases complexity for port planning and construction process. The Port of Melbourne abuts Melbourne’s central business and activity district and since the advent of freight containerisation in the 1970s has twice moved downstream to develop new port capacity (at Swanson and then Webb Dock) and to utilise new generations of port infrastructure. The relocation of port infrastructure downstream is an ongoing worldwide phenomenon for port cities and in part is necessary to escape the mounting pressure of, for example: expanding central business/activity districts; new and competing land-use priorities; urban residential encroachment; traffic congestion; amenity issues and freight related externalities and environmental issues. As cities grow, expand and ‘turn to face the sea’ for lifestyle and property reasons, ports are relocated to escape inner-urban pressure and to gain the necessary social approvals for port construction, maintenance and operations.

Port planning is also complex for commercial reasons. While essential, sea-ports are but one point in international supply chains; they link exporters with customers in global markets, and importers with goods for consumers and are used by businesses of all types in all industries. For ports to serve supply chain businesses, port planning needs to be firmly based on realistic, commercial and operational whole of supply and logistics chain imperatives and processes. To compete internationally importers and exporters require cost competitive landside and maritime transportation, reliable fit for purpose services, and efficiency along the whole chain. If costs are too high, corporate business and the small and medium enterprises (SMEs) that can, will relocate. Australia’s location far from overseas markets plus the well-recognised intensification of market competition globally, results in Australian business sensitivity to any landside transportation cost increases, especially those related to accessing the essential service provided by monopolistic ports.

An opportunity for a world-class port for Melbourne

World-class port systems provide reliable, streamlined and cost effective use of multimodal landside and maritime transport. Optimal landside logistics becomes possible when importers, exporters and their transport and logistics service providers can use reliable and high-functioning road and/or rail networks linking the port to its hinterland. For various reasons, most notably its location on the port city interface and the lack of investment in fit for purpose road and rail infrastructure, the landside task at the Port of Melbourne remains sub-optimal: there is no on-dock rail connection to its main container terminals at Swanson Dock; Webb Dock has no rail; and the road networks leading to and from the port precinct often are congested with city traffic. Congestion is likely to increase when the Western Distributor channels non-port traffic into the port precinct, and become extreme when road incidents block traffic particularly in relation to the West Gate Bridge.

The development of the next port therefore provides an opportunity to ensure increasing freight volumes are transported efficiently and effectively (away from the inner city) to and from the port’s hinterland. Road and rail connectivity should be a high priority in the decision-making process, and protection of road and rail freight corridors is essential. So too is the location, and protection of land
necessary for the development of logistics terminals away from the port which serve the port’s landside system.

An optimum landside port system is feasible at Bay West. The opportunity for the development of a world class port system at an expanded Port of Melbourne or a new port at Hastings are severely compromised by cost, landside logistics, environmental impact and loss of urban amenity.

International sea-ports are well understood as significant economic enablers for regions and nations. International container ports are also significant infrastructure investments, lasting at least half a century. The decision about port capacity and port location is therefore of multigenerational consequence and will impact every man, woman and child in Victoria for the next 15 to 100 years.

IV, through its evidence based research and advice to the Victorian Government, is performing a vital role for the people of Victoria, and can lead the way so that the idea of building the next container port at Hastings is put to rest. Moreover, the ‘inconvenient truth’ about the Port of Melbourne’s prohibitive limitations to building the necessary capacity to last 50 years can be publicly recognised.
2. When

2.1 Container growth and port capacity

The number of containers (expressed in TEU) through Melbourne, Sydney and Brisbane ports increased over the 2006 to 2015 period (Figure 2), with some intermittent fluctuations. The total number of containers (TEU) through the Port of Melbourne has grown at a slightly lower rate than that through Port Botany in Sydney. This might suggest a shift in the respective container markets and in container shipments already being relocated for better services at lower prices from the Port of Melbourne to Port Botany. Corporate businesses with national footprints seek cost minimisation as a priority.

**Figure 2: Observed total annual TEU through the ports of Melbourne, Sydney and Brisbane**

Forecast container demand

Based on historical trends, growth in total shipping container demand through the Port of Melbourne is likely to continue to move upwards, driven by future domestic economic growth and favourable economic conditions with our trading partners.

Figure 3 illustrates the possible future trends in the Port of Melbourne’s container growth under three plausible growth scenarios, namely low, medium and high. These scenarios provide broad insights into a wide spectrum of likely future outcomes of container demand patterns.

- **Low growth scenario: Compound growth of 1.8 per cent per year.** Historical growth rates of container throughput indicate that a compound annual (year on year) growth rate (CAGR) of 1.8 per cent per year for total containers through the Port of Melbourne is feasible, giving the future trend indicated by the purple line in Figure 3.

- **Medium growth scenario: Compound growth of 2.9 per cent per year.** Historical year on year growth rates for containers through the Port of Melbourne ranged from about two per cent per year in FY 2013 to about minus three per cent per year in FY 2015. Given this wide variation, we have assumed a growth rate of 2.9 per cent per year for the medium growth scenario (indicated by the green line in Figure 3).
• **High growth scenario: Compound growth of 3.5 per cent per year.** Growth rates for containers through the Port of Melbourne in recent years have been around 3.5 per cent per year (indicated by the red line in Figure 3).

**Figure 3: Possible growth scenarios for total TEU through the Port of Melbourne and port capacity**

![Graph showing possible growth scenarios for total TEU through the Port of Melbourne and port capacity](image)

**Port of Melbourne capacity and the need for a new port**

In 2015/2016, the Port of Melbourne handled 2.64 million TEU. The Port of Melbourne’s current capacity is about five million TEU per year split between about three to four million TEU at Swanson Dock East and West and 1.4 million TEU per year at the new Webb Dock terminal (Infrastructure Victoria, 2017, p. 58).

A comparison of current capacity of Port of Melbourne and the estimated medium to long-term containerised demand indicates a potential gap under various scenarios. IV has used three growth cases, stating that:

“The central case will be used as the demand forecast input to other parts of our advice. The high and low forecasts will be used to test different scenarios, often referred to as a ‘sensitivity analysis’. “ (Infrastructure Victoria, 2017, p. 26)

The IV forecasts predict an estimated total containerised demand in 2031 of 4.3 million TEU under the central case scenario, 4.2 million TEU under the low case scenario and 5.5 million TEU under the high case scenario. By 2046 container demand is estimated to reach 5.6 million, 6.5 million or 8.0 million TEU under the under the low, central and high case scenarios, respectively (Infrastructure Victoria, 2017, p.27).

Our scenario analysis and other available information indicate that the maximum achievable yearly throughput for containers at the Port of Melbourne is around 5.5 million TEU per year, shown by the dashed orange line in Figure 3. The figure indicates that capacity in the Port of Melbourne might be reached by the year 2036 with the high growth rate of 3.5 per cent, 2042 with the medium 2.9 per cent growth rate and 2055 for the low growth rate scenario of 1.8 per cent.

There is a recognition that significantly increasing Port of Melbourne capacity is likely to be economically inefficient and may cost more for each additional TEU than building capacity at a second port location (Infrastructure Victoria, 2017, p. 71).
The Preparing advice on Victoria’s future ports capacity – Discussion paper (Infrastructure Victoria, 2016) posed the question: “If and when we need to build a second container port...?” The above findings strongly support the case for a second container port for Melbourne, possibly as early as 2036, underlining the need for a decision sooner rather than later.

2.2 The decision cannot be delayed

Long lead times

According to IV the lead time for large infrastructure projects can vary between ten and twenty years, from conception to commencement of operation. Where a project requires the creation of a financing vehicle and involves three tiers of government, particularly planning for broader regulatory arrangements, a longer lead time would be expected.

Examples from North America are the new port terminals in New York and Vancouver that took 12 and 19 years, respectively, to gain approval and complete construction. The processes of gaining community permission and negotiating offsets to port impacts were perhaps the most challenging elements of this process.

Discussion and pre-feasibility work regarding options for a second container port have been underway since 1999 in Victoria, when the need was identified through the Victorian Ports Strategic Study (Victorian Department of Infrastructure & Department of Treasury and Finance, 2000).

We are now coming to a watershed period, when the realities of exceeding capacity at the first container port are in the foreseeable future. Given these long lead times involved in port development and articulation with land transport networks, the time should be allocated to undertake thorough planning and preparation.

Government is responsible for the long-term strategic planning of the state and its trade gateways. The horizon for this activity is around 25 years, in which transport infrastructure projects and the shorter horizons of port master planning and infrastructure project delivery can be conducted. An example of the importance of this long-term strategic planning is the reservation of buffer areas for Melbourne Airport, where planning commenced in the 1980s and was legislated in 1993 to protect the airport that is still benefitting Victorians today.

“Operators of ports and freight distributors need certainty and predictability for commercial decision-making. For the ports sector, long term plans visible to those who need to make commercial decisions or career choices, to regulators and to the community, are recommended as the cornerstone. It is considered that this is largely achievable within the existing jurisdictional frameworks.” (Infrastructure Australia, 2011, p. 14)

The current new owners of the Port of Melbourne believe the port will not reach capacity for another 50 years (i.e. the entire duration of its new lease) and the Victorian Government is committed to not sponsoring a new port for the first 15 years of the lease. Over the next few decades, however, the decision on the location of the new port will be critical to guide private and public sector investment to support supply chain and logistics efficiency, productivity and Victoria’s economic development.

Potential negative impacts on Victoria if the decision is postponed

A range of negative impacts on Victoria could arise if the decision on where and when to build the second port is postponed. Three key factors – the economy, social factors and the environment – are important drivers to consider in making a decision, and all will be compromised in the medium to long term if the decision is delayed. Furthermore, uncertainty will add complexity to investment, production, employment and trade-related private and public policy decision-making in Victoria.
A clear decision is needed now to positively encourage investment in Victoria’s supply chain industries, and to end the current climate of investment uncertainty due to the drawn-out debate over the location and timing of the next container port.

**Investment uncertainty**

Continuation of investment uncertainty in Victoria will adversely affect our comparative and competitive advantage and will hinder intra- and interstate integration, thus inhibiting economic growth and lowering living standards of Victorians. The downside costs of postponing the port decision include more congestion at existing port facilities and lack of access to additional port services when required. This issue is particularly relevant to supply chains most affected by greater traffic congestion around the Port of Melbourne.

Critical areas of investment that could be affected by uncertainty around the port location include:

- Road and rail upgrades required to meet capacity in future port facilities and increasing population growth and traffic flows.
- Intermodal facilities in Melbourne: key interstate competitors have integrated intermodal facilities but Melbourne is falling behind in port efficiency without such a facility; and rail infrastructure into the port is currently underused.
- Disruptive technologies such as advanced distribution technology and transportation (e.g. driverless vehicles) could enable greater economies of scale and productivity, whilst reducing cost and congestion.
- Large-scale equipment such as automated handling systems for containers to improve efficiency of landside port operations and vessel turnaround, without which the competitiveness of exporters with overseas may be compromised.

**Impacts on growth in economic and employment activity**

There is a symbiotic relationship between the performance of the Victorian economy and its ports. Well-designed and adequate port infrastructure reduces maritime transport related costs and promotes freight specialisation and efficiency in delivering tradable goods. Investment in the second port infrastructure can stimulate economic activity through direct jobs created through construction, and indirect jobs in the construction supply chain, including manufacturing, transport and logistics and professional services.

The strong growth in Victoria’s population, expected to reach 9.4 million people in the next 30 years, makes the decision on the location and timing of the new port imperative. Growth across Victoria is uneven and centred in metropolitan Melbourne. This trend is expected to continue, with the main growth corridors in Melbourne’s west and north-west. Recent projections indicate that the workforce will increase most in Melbourne-inner (2.25%) followed by Melbourne-west (1.75%) and Melbourne-south-east (1.5%) (Deloitte, 2016).

The areas of employment predicted to grow most in Victoria over the coming decades are business services (professional, scientific and technical services, and finance and insurance services) and construction; at least a proportion of these business services will be linked to movement of goods within and outside Victoria using the port.

A timely decision on the second port will encourage job development in the port construction and associated industries, which could go some way to mitigating unemployment in the most economically disadvantaged areas of Melbourne.
Impacts on imports and exports

With a rapidly increasing population comes growth in demand for imported consumables and manufacturing inputs, all relying on efficient port services. The recent reduction in relative prices of imported consumables such as clothes, motor vehicles, electrical appliances and computing equipment due to technological improvements and low wage costs in Asia has also encouraged greater consumption. The transition towards e-commerce and the growth in large volume online retailers will continue to exert pressure on supporting infrastructure for imports, including port facilities. Lack of planning for adequate port infrastructure to manage this increased demand could put upward pressure on the price of imported consumables.

To leverage opportunities to maximize economic prosperity, and to develop its position as a key agricultural exporter, Victoria will need to maintain international competitiveness. This means being efficient in the way goods are produced and exported overseas, in particular with adequate multi-model port infrastructure. Victoria is in a strong position to increase exports to emerging economies in the Asian region but this will be hampered by uncertainties around future port infrastructure and what these delays mean to relative cost.

Given the potential gap between current port capacity and potential demand in the future, the second port will be needed to facilitate international trade. This means increased demand for related transport infrastructure that allows freight to be efficiently moved around the state in metropolitan Melbourne and in regional Victoria.

A decision is needed in 2017/2018

The Victorian Government needs to make a clear decision in 2017/2018 in favour of Bay West as the site of Melbourne’s next or complementary container port in preparation for when the current port reaches capacity. Deferring the decision would be detrimental to Victoria’s importers and exporters and freight dependent supply chain and logistics businesses. Good planning requires the procurement and protection of land corridors as well as allied infrastructure investment to enhance landside logistics efficiency.
3. Why

3.1 Vessel size and port capacity

**Vessel size now and in the future**

The size of container vessels visiting Australia has increased over the years with the average vessel size now about 4,500 TEU. In Australia, container vessels do not call at one port only, but usually three or four. Vessels are sent to markets, not ports, so the port with the most restricted infrastructure determines the size of vessel used for a particular national market. Consequently, the Australian port with the most restricted infrastructure limits the size of vessels coming to Australia; currently that is the Port of Melbourne. The ports of Brisbane and Sydney (Port Botany) are able to accept vessels in the 8,000 to 10,000 TEU range. For vessels larger than 10,000 TEU there would need to be major infrastructure upgrades by the port owner, such as dredging and wharf strengthening, and by the container terminal operators, such as larger quay cranes and more container handling equipment. As these ports and the container operators are privately owned, it is unlikely that these upgrades will occur in the near future as the owners won’t see a reasonable return on investment for the large capital outlays required to handle these larger vessels.

Air draught restrictions under the West Gate Bridge and the physical restrictions of Swanson Dock (width, quay length and swinging basin) will severely restrict larger container vessels from berthing in the future, affecting the capacity of Melbourne to continue as Australia’s leading container port. We expect these restrictions will become a major impediment in 10 to 15 years when the majority of container vessels will be unable to pass under West Gate Bridge or access Swanson Dock.

Globally, vessel size is increasing. With a lower unit cost, shipping lines are looking to send larger vessels to Australian ports. In global terms Australia is currently a small market (approximately 7.5 million TEU per year across all ports) and even if this triples, these large vessels would still be travelling half empty. Therefore, we will most likely see vessels of only 8,000 to 10,000 TEU coming to Australia on a regular basis in the foreseeable future. Infrastructure Victoria considers it possible that vessels of 14,000 TEU will call here (Infrastructure Victoria, 2017), but we believe this could only be in the very distant future if ever. These large vessels currently operate in the East West trades where they call at ports servicing large populace markets, in the order of 250 million people, both at origin and destination. The total Australian population in 2016 was 24 million people. By 2050, the population should reach 37.6 million. The total Victorian market was 5.9 million people in 2016 and is predicted to reach 10 million in 2050. Neither market now or in the future is likely to be served by the world’s largest container vessels.

**The Port of Melbourne in 2017**

Figure 4 shows the Port of Melbourne as it is today. Swanson Dock, which is currently handling 95 per cent of the international container traffic, is located up-river and vessels must pass under the West Gate Bridge. Air draught restrictions under the bridge and the physical restrictions of Swanson Dock (width, quay length and swinging basin) will severely restrict larger container vessels from berthing in the future.

The largest vessel to currently visit the Port of Melbourne on a regular basis is the E.R Long Beach (300 metres long and a design draught of 15 metres), with a capacity of 7,500 TEU. It normally berths at East Swanson Dock under strict conditions, including daylight berthing, taking on additional ballast and only when a limited number of other vessels are berthed there. However, for the most recent visit (March 2017) E.R. Long Beach had to berth at the new container terminal at Webb Dock East as the ship was too high out of the water to fit safely under the West Gate Bridge.
As described in section 2.1, five million TEU is generally accepted as the upper limit of capacity at the Port of Melbourne using the current quay line (including the new container terminal at Webb Dock East) and some enhancements to Swanson Dock. With enhancements to Webb Dock, IV states that a capacity of nine million TEU (8 million TEU at the expanded Webb Dock and the remaining 1 million TEU at Swanson Dock) for the Port of Melbourne would be achievable (Infrastructure Victoria, 2017). However, as stated earlier the use of Swanson Dock will be restricted by the limited access for larger vessels.
Swanson Dock could potentially be enlarged and upgraded, at great cost and severe disruption, but the height of the West Gate Bridge would still prevent large vessels accessing Swanson Dock and will severely limit access of future larger container vessels.

For the Port of Melbourne to manage nine million TEU, IV indicates that at least eight million TEU would be handled at Webb Dock. This poses risk for Victoria’s supply chain industries given that the only proposed rail option is problematic. Trucks will need to negotiate West Gate Bridge, the Monash Freeway and local residential traffic pressures. Extending Webb Dock to handle more ships would require significant dredging and maritime construction in the bay, with environmental and social issues and concerns potentially preventing a license to build.

3.2 Population growth and shifts to the north-west of Melbourne

Melbourne is Australia’s fastest growing city with the population increasing by around 100,000 per year. With the reputation as the world’s most liveable city (for the sixth year running), over the coming decades this trend will continue. It is likely that the population of Melbourne will grow to equal that of Sydney and will exceed Sydney’s rate of growth over a 40-year generational period (Figure 5). Similarly, Infrastructure Australia and the Australian Bureau of Statistics anticipate the regional cities of Geelong, Ballarat and Bendigo will exhibit strong population growth to 2031, increasing their respective populations by upwards of 35 per cent (Infrastructure Australia, 2015).

Figure 5: Australian capital city population expansion

![Graph showing population growth for various Australian cities from 2011 to 2061.]

Source: Infrastructure Australia analysis of ABS (2013b) – Series B data (Infrastructure Australia, 2015, p. 22)

Economic activity in Victoria is highly dependent on this projected population growth. The key industry sectors to benefit are construction, retail and service industries with construction and retail increasingly dependent on imported materials. From 1990 to 2015, the value of articles of apparel and clothing accessories imported increased from $82 million to $831 million (2015 AUD), and the value of imported prefabricated buildings and sanitary, plumbing, heating and lighting fixtures and fittings increased from $11 million to $142 million (2015 AUD). Both sets of imported products experienced a tenfold increase in value over this 25-year period (Australian Bureau of Statistics, 2015).
Future population growth has direct implications for the Port of Melbourne. The Victorian Government is planning for an increased residential population density in inner Melbourne. With the increased competition for land, port rents will rise and urban encroachment may threaten future port operations.

Demand for affordable housing will encourage settlement in the north and west of metropolitan Melbourne and in the regional centres within a 100-kilometre radius of central Melbourne. Future population growth forecasts indicate a likely shift in population distribution between the south-east and western and northern metropolitan areas. By 2031, IV suggests the shift will be of the order of 3.4 per cent from the south-east to the north and west. Based on these forecasts, it is reasonable to assume that the distribution of the additional containers to service future demand will also reflect the population shift, particularly for import containers.

Table 1 indicates the significance of the western and northern metropolitan areas for Melbourne’s forecast residential development over the next 25 years. The growth in population will be accompanied by an increase in freight and the consumption of goods.

**Table 1: Housing distribution between established areas and growth area greenfields**

<table>
<thead>
<tr>
<th>Region</th>
<th>Total</th>
<th>Established</th>
<th>Greenfields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner metro</td>
<td>215,000</td>
<td>215,000</td>
<td>0</td>
</tr>
<tr>
<td>Western</td>
<td>385,000</td>
<td>150,000</td>
<td>235,000</td>
</tr>
<tr>
<td>Northern</td>
<td>355,000</td>
<td>175,000</td>
<td>180,000</td>
</tr>
<tr>
<td>Inner south-east</td>
<td>110,000</td>
<td>110,000</td>
<td>0</td>
</tr>
<tr>
<td>Eastern</td>
<td>175,000</td>
<td>175,000</td>
<td>0</td>
</tr>
<tr>
<td>Southern</td>
<td>310,000</td>
<td>185,000</td>
<td>125,000</td>
</tr>
<tr>
<td><strong>Total Melbourne</strong></td>
<td><strong>1,550,000</strong></td>
<td><strong>1,010,000</strong></td>
<td><strong>540,000</strong></td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>65%</td>
<td>35%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Region</th>
<th>Total</th>
<th>Established</th>
<th>Greenfields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner metro</td>
<td>230,000</td>
<td>230,000</td>
<td>0</td>
</tr>
<tr>
<td>Western</td>
<td>365,000</td>
<td>160,000</td>
<td>205,000</td>
</tr>
<tr>
<td>Northern</td>
<td>340,000</td>
<td>180,000</td>
<td>160,000</td>
</tr>
<tr>
<td>Inner south-east</td>
<td>125,000</td>
<td>125,000</td>
<td>0</td>
</tr>
<tr>
<td>Eastern</td>
<td>190,000</td>
<td>190,000</td>
<td>0</td>
</tr>
<tr>
<td>Southern</td>
<td>300,000</td>
<td>195,000</td>
<td>105,000</td>
</tr>
<tr>
<td><strong>Total Melbourne</strong></td>
<td><strong>1,550,000</strong></td>
<td><strong>1,080,000</strong></td>
<td><strong>470,000</strong></td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>70%</td>
<td>30%</td>
</tr>
</tbody>
</table>


Our assessment of container growth, and that of Infrastructure Victoria, indicates that future growth could be of the order of two to three per cent per year. In this scenario, the net ‘shift’ in containers
Towards the north-west of Melbourne will be relatively small by 2031, perhaps one to two per cent or approximately one million TEU per year. Despite this relatively small shift, however, the differences in the increases in estimated travel time, travel costs and externality costs between Hastings and Bay West are significant now (Table 2), and will only increase in the future. Moreover, the population shift to the west and north could cause container logistics facilities to locate further northward and westward with associated increases in travel costs to the Port of Melbourne and reductions in travel costs to Bay West.

Table 2: Estimated road-based container transport travel times and costs for alternative port locations, FY2016

<table>
<thead>
<tr>
<th>Item</th>
<th>Port of Melbourne</th>
<th>Port of Hastings</th>
<th>Change from Port of Melbourne</th>
<th>Bay West</th>
<th>Change from Port of Melbourne</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel time (hours)</td>
<td>609</td>
<td>1299</td>
<td>113%</td>
<td>852</td>
<td>40%</td>
</tr>
<tr>
<td>Travel cost (^1)</td>
<td>$91,304</td>
<td>$194,861</td>
<td>113%</td>
<td>$127,753</td>
<td>40%</td>
</tr>
<tr>
<td>Toll cost (^2)</td>
<td>$8,417</td>
<td>$8,937</td>
<td>6%</td>
<td>$6,628</td>
<td>-21%</td>
</tr>
<tr>
<td>Total cost</td>
<td>$99,721</td>
<td>$203,798</td>
<td>104%</td>
<td>$134,381</td>
<td>35%</td>
</tr>
<tr>
<td>Externality cost (^2)</td>
<td>$28,700</td>
<td>$89,765</td>
<td>213%</td>
<td>$53,556</td>
<td>87%</td>
</tr>
</tbody>
</table>

\(^1\) Times and costs are in ‘000 units. Costs are in 2017 values
\(^2\) Externalities are for container destinations and origins in the Melbourne metropolitan area

3.3 Demand and trade growth

Consumption and housing construction

Immigration and natural population growth will increase household consumption. Immigration has been found to increase household size and the additional 1.5 million households in Melbourne by 2051 (Table 1) will need an efficient supply of goods.

The construction of new suburbs in growth corridors and suburban infill housing requires building materials. Much of this will be manufactured overseas and require shipment and storage, typically in the west or north of Melbourne, where 740,000 homes are to be built, compared to 485,000 in the south and east of Melbourne during the same period (Table 1). Transport of construction materials is a cost paid for by the home purchaser, so it becomes a factor in housing affordability from a Victorian Government policy perspective. Any reduction in cost for the supply of materials should be pursued, which is directly related to the port location and transport costs.

Trade regulation

Australia’s trade is increasingly benefiting from the implementation of free trade agreements (FTAs), particularly in growing Asia Pacific markets. There are currently 10 FTAs in force with another seven under negotiation. Victoria, as a producer and processor of food and manufactured goods, stands to benefit from export opportunities as a result of these agreements. For example, the 25 per cent reduction on beef tariffs to China will assist Victorian beef producers to increase exports. However, as FTAs are reciprocal and access to Australian consumers motivates trading partners, we can also anticipate an acceleration of the flow of products into Australia through our ports as tariffs are decreased.

The removal of duties from shipments valued below $1,000, which comes into force in July 2017, is a policy measure aimed at levelling the playing field between domestic and international online retailers. This regulatory change will support the entry of global online suppliers in Australia, using their
transaction platforms to harness significant economies of scale. These retailers and suppliers are now also major logistics operators. Agglomeration of less than full container load shipments by major online retailers such as Amazon and Alibaba, will result in shipment of freight by sea becoming more competitive than air freight for online purchases. These global retailers are creating significant trade through Australia’s container terminals. They supply business to business (B2B) and business to consumer (B2C) transactions, and provide logistics services for general merchandise, fast moving consumer goods (FMCG) and fresh food.

**Asia-Pacific market growth**

The Victorian Government has identified the growth of the Asia-Pacific market as a key factor influencing the future Victorian economy. The majority (73%) of Australia’s trade is with Asia-Pacific Economic Cooperation (APEC) nations, and our top five import and export markets are APEC members. In the past five years, China has grown to become our most significant trading partner with exports to China growing by an annual average of 5.8 per cent. Short and long term planning is required for these new and growing trade opportunities.

3.4 An optimised port system

Traditionally the concept of a port system is limited to shipping channels and activities confined to port land such as stevedoring and road and rail connections up to the point of the port gate. World-class ports, however, recognise the need to fully integrate activity within the port precinct with the physical movement of goods along commercially constructed supply chains beyond the port gate. Road and rail networks, freight terminals, the management of empty containers, information technology (such as vehicle and container booking systems) and government regulation are all involved in the port system and optimisation is required to deliver import and export supply chain efficiency along the logistics chain. World-class ports are ambitious and invest in innovative and high-quality facilities and services both within and beyond the port gate to ensure development of an optimal port system.

**Problems with developing an optimised port system in Victoria**

In Victoria, developing an optimised port system is limited primarily by the close proximity of the port to the city, where competing land use and amenity issues are ever present. Despite the last 15 years of strategic endeavour on the part of the previous port owners, the Port of Melbourne Corporation and the Victorian Government, Melbourne’s optimal port system has not yet eventuated. They do, however, exist elsewhere in Australia; for example, Port Botany in NSW is making significant progress towards achieving this goal. It has a dedicated freight rail network connecting the port to large intermodal facilities away from the port in the main industrial areas of Sydney as well as the rest of NSW and interstate.

Optimised landside logistics only becomes possible when importers, exporters and their transport and logistics service providers are able to use reliable, well-functioning, road and/or rail networks linking the port to the hinterland. For various reasons, most notably: the port’s inner city location; Melbourne’s congested inner city and arterial road network; and the location of empty container parks (ECPs) away from the port in Melbourne’s western suburbs, the landside transport and logistics task at the Port of Melbourne remains sub-optimal. There is no on-dock rail connection to the container terminals at Swanson Dock; Webb Dock has no rail connection and the probability of it being constructed is low; and the road networks leading to and from the port precinct are increasingly congested with inner-city traffic. While the Victorian Government should be congratulated for its ongoing investment in Melbourne’s road and rail networks, its priority is commuter transportation and the port’s location in the heart of a large, rapidly growing urban area is its greatest disadvantage.
The new port – an opportunity for an optimal port system

The development of the next port provides an opportunity to create the optimal port system for Victoria’s exporters, importers and the society’s economic future. Road and rail infrastructure development and connectivity to the hinterland are high priorities, and the protection of road, rail and port-related freight corridors is essential. A greenfield site in the right location provides the opportunity for freight terminals and road/rail network development to cater for the efficient and effective transport of existing and forecast freight volumes to and from the port across the hinterland.

More than 80 per cent of the Port of Melbourne’s import containers are destined for locations within Melbourne metropolitan area. These containers are transported directly from the port to importers, or ‘staged’ via transport depots, before being transported to their final destination. Staging is necessary as there is a mismatch of operating hours between the container terminals and the receivers of the cargo. Many transport depots, distribution centres and importers are located to the north and west of Melbourne and they require efficient road access to the metropolitan arterial network (i.e. Monash Freeway and the Western Ring Road) and to the port. These are highly congested roads.

Forty per cent of the export container freight originates from regional Victoria or interstate (i.e. Riverina, South Australia). Currently around 50 per cent of export containers are transported via the major regional arterial corridors from the north and west of Melbourne to the port. They are either transported directly to the port (via the Hume, Calder, and Western Highways) or staged in metropolitan transport depots in the west of Melbourne. Reliable, regular and cost-effective transport of export products (mainly perishable agricultural products) to the port is essential to ensure exporters remain competitive in a global market.

A small proportion of empty containers ‘exported’ or repositioned for use overseas originates from the importers, transport depots and distribution centres, but most come from ECPs. These parks should ideally be located in or close to the port with good road and rail access, so they are able to operate 24 hours, seven days a week, to efficiently transport containers to the port.

More than 95 per cent of container freight to and from the Port of Melbourne including all metropolitan container freight is transported by road. Over time the quality of road access has been a significant factor in the success and cost-competitive position of the present Port of Melbourne. However, road congestion in the port precinct and surrounding road networks is increasing, particularly in peak periods (Figure 6), and the system is vulnerable to the impacts of road incidents.

An efficient port system includes effective road networks with:

- Unfettered access to freeway/tollway corridors and intermodal terminals serving the port
- Mass limits on the road network that permit access by high productivity freight vehicles (HPFVs) of more than 30 metres long and capable of carrying more than 100 tonnes.
- Improved transport management strategies and systems, including capacity enhancement, time based tolling to manage demand by both light and heavy vehicles, and priority lanes for high value freight vehicles.
- Proximity of the port to key intermodal terminals and logistics businesses. This limits transport costs and increases the flexibility of transport operator services.
- Proximity to the freight rail network and intermodal terminals to facilitate the transfer of import/export containers. To be effective, intermodal terminals need direct links to the road network.
The limitations of the roads servicing the Port of Melbourne

We agree with the findings of the IV Discussion Paper that service levels on arterial roads servicing the present port are at a tipping point; however, it is clear that even with possible expensive network enhancements to service both Swanson Dock and Webb Dock, congestion will remain at high or critical levels.

Inter-peak and off-peak usage of the network by trucks servicing the port is feasible, as noted by IV. However, any shift to inter-peak or off-peak usage is limited by the hours of operation of customers, export businesses and other links in the port logistics chain. There is often a mismatch between hours of operation, requiring container staging and other services. Regulations to change usage patterns may succeed where businesses can change operating hours, but for SMEs (both exporters and importers) this is likely to increase costs.

Much of the arterial network to and from the port is subject to tolling, adding to the cost of port related freight. Significant increases in toll charges for heavy vehicles have been proposed and an extension of tolled roads will further add to these costs. ‘Toll avoidance’ by trucks will increase the use of secondary roads, with associated increased travel times and vehicle operating costs, and impact on amenity for people living near these roads.

Capacity enhancement of key arterial roads in Melbourne increasingly involves tolling, as envisaged for the Western Distributor, North East Link and the Outer Metropolitan Ring (OMR) Road. This means the distance travelled between the port and logistics facilities becomes an even more critical determinant of the location of a future port.

Mass limits on the West Gate Bridge and the Bolte Bridge prevent the use of higher mass and greater dimensions HPFVs, increasing the number of trucks needed to service the port, especially for transportation to and from Webb Dock to the west, and causing diversion of HPFVs to other routes including cross-city movements.

Increasing curfews (school peak, night and weekend) on the inner west road network also contribute to trucks having to take longer routes to and from the port or to use routes during sub-optimal times for port operations.
ECPs are also progressively relocating further from the port due to a combination of curfews and mixed land use and conflicting zoning adjacent to the port.

Various relevant government reports have been published over recent years, including the Eddington *Investing in Transport East West Link Needs Assessment* report (2008) and the *Victorian Freight and Logistics Plan* (VFLP, Victorian Department of Transport, Planning and Local Infrastructure, 2013). Whilst policy drivers have varied, there remains a consistent theme that includes:

- Continued capacity enhancement of existing links (e.g. Monash Freeway, Western Ring Road, Tullamarine Freeway), to maintain or increase operating speeds and cater for demand growth.
- Development of a new North East Link connecting the present Western Ring Road to the Eastern Freeway.
- Construction of a second east-west link to the north of the city centre, connecting the Eastern Freeway with the Western Ring Road/Monash Freeway corridor to reduce reliance on the ageing, congested and mass restricted West Gate Bridge.
- Medium to long-term development of a second metropolitan ring road, the OMR, which includes a link to the standard gauge interstate rail corridor. The OMR will connect the Monash Freeway in the west to the regional corridors to the north-west and north, and the Eastern/Monash Freeway corridors in the east. A corridor for the OMR has already been reserved as part of the government planning process.
- The VFLP also proposed a long-term linkage between the Monash Freeway corridor and the Port of Hastings via the existing Western Port Highway. However, unlike the OMR, land has not yet been identified for acquisition.

Short-term government planning provides for the development of a western link from the city (the proposed Western Distributor), and a likely link from the north to the east (the North East Link) connecting the Hume Highway corridor with the Eastern Freeway.

A second cross-city corridor (the eastern arm of the East West Link) has been postponed. This places significant, high-risk dependence on the West Gate Bridge. Congestion and network reliability will require investment in a completed East West Link within a 10 to 15-year time frame to support the development of a second major Victorian container port. Complementary investment in local road corridors to intermodal terminals and logistics facilities will also be required to avoid ‘last kilometre’ issues, which limit access for freight vehicles.

On occasion the West Gate Bridge becomes unavailable through a range of incidents that cause major traffic flow impacts across Melbourne’s entire road network. Severe congestion results in and around the central business district (CBD), the Port of Melbourne, the inner and middle suburbs and along each arterial network to and from the port (Figure 7). Currently no alternative to the West Gate Bridge (including the proposed Western Distributor) can mitigate the risk of this disruption for the city or the Port of Melbourne.
A second container port for Melbourne? Build it in the west for 2036

The proposed expansion of the Port of Melbourne at Swanson Dock and Webb Dock to handle nearly four times the current freight volume would increase traffic risk and escalate the economic impact for supply chain businesses across the hinterland. The consequences include: exports missing planned vessel departures; imports delayed at the port; additional transport costs; the use of alternative routes; and loss of productivity. With or without an alternative to the West Gate Bridge, the Port of Melbourne’s current inner city location ensures its susceptibility to road incidents stopping or delaying traffic and landside port operations.
4. Where

4.1 Defining the requirements for the location of the second port

The IV Discussion Paper outlines the current evidence behind the possible new port locations in either Port Phillip to the west of Melbourne at Bay West, or in Western Port to the south-east of Melbourne at Hastings.

The design capacity of Victoria’s next port has been set at nine million TEU and is to be built in three stages (depending on container growth), each of three million TEU. The container terminal operator(s), once selected, will need to build equipment capable of handling this capacity.

To be successful, the location of a port needs to meet the following criteria to enable a smooth flow of goods on the waterside and the landside, and resulting in cost-effective supply chain opportunities for customers. Therefore the following is required:

- Sufficient (natural) water depth and shelter to accommodate vessel arrivals/departures and allow for efficient loading and unloading
- Sufficient hinterland and a trade related business case
- Sufficient land and water space for the initial development, growth, maintenance and the future expansion of the port
- Access to efficient transport modes.

The following sections of the report describe the potential for extending capacity at the existing Port of Melbourne and developing the proposed second ports at Hastings and Bay West, to effectively deliver on the following:

- Land use: supply of industrial land for warehousing and distribution centres; setting aside land and buffers for port related activities; and setting aside land for major road and rail transport corridors
- Connectivity: ship, road and rail
- Externality costs: including transport, emissions and congestions costs
- Access to markets and contestability
- Managing environmental and social impacts.

4.2 An expanded Port of Melbourne

Proposed enhancements to the Port of Melbourne

Given Swanson Dock’s limitations for handling the potentially larger vessels of the future, significant expansion of Webb Dock is required and Figure 8 illustrates IV’s proposed enhancements to increase Webb Dock’s throughput to eight million TEU and to handle vessels up to 14,000 TEU.
The IV Discussion Paper expects considerable expansion in port capacity through port enhancement and productivity gains (Figure 9). However, a throughput of eight million TEU at Webb Dock is highly aspirational and extremely unlikely for the following reasons:

1. The quay line is not contiguous, hampering vessel berthing. A throughput of 2,400 TEU per metre of quay line per year is required but unlikely to be achieved and currently the best practice in Melbourne is only 1,400 TEU per year (and Melbourne is the most efficient port in Australia in this regard).

2. The planned enhancement includes the relocation of the Bass Strait and automotive trades that are currently operating at Webb Dock and the conversion of these vacated areas into container terminal operations. Although this is feasible for the area currently occupied by the Bass Strait trade at Webb Dock East, Webb Dock West has limited land available behind the quay line. This makes it unsuitable for conversion into a container terminal operation as it limits the effective working of container vessels.

3. The suggestion to further increase Webb Dock’s capacity by reclaiming and extending Webb Dock East to the southern end by 750 metres is unlikely due to the significant social and environmental impact of the necessary dredging and land reclamation activity, making it difficult to gain approval.
Figure 9: Infrastructure Victoria’s timeline for the Webb Dock expansion

Source: Infrastructure Victoria, 2017, Figure 21, p. 67

The Webb Dock expansion plans are based on the unlikely scenario that 14,000 TEU vessels will be coming to Melbourne in the foreseeable future. If 14,000 TEU vessels were to make regular calls at a nine million TEU terminal and each vessel exchanged about 60 per cent capacity, there would be only 1,071 vessel calls per year, or just over three vessels calling each day. This would not satisfy the demands of importers nor Victoria or interstate’s main group of exporters (especially those exporting perishable agricultural produce), who need a reliable frequent shipping service to access the global market.

Landside restrictions to Port of Melbourne expansion

Webb Dock’s proposed expansion to replace East and West Swanson Docks is critical to the successful transition for the future Port of Melbourne. However, landside restrictions limit Webb Dock’s capacity to handle eight million TEU. Transporting containers to importers and exporters in Victoria and interstate is severely restricted by the road network and the current lack of rail to Webb Dock. The proposed on-dock rail terminal is situated at the back of the terminal area necessitating a long travel distance from the container yard to the rail terminal. The IV Discussion Paper (p. 74) states that an on-dock rail terminal capable of handling containers equal to 30 per cent of mode share, or about three million TEU per year once the port reaches its ultimate capacity of nine million TEU, would require a six-track terminal 100 metres wide, running the length of the berth. Figure 8 does not accurately depict the on-dock rail terminal as described; its present location (as indicated on the map) would negatively impact the efficiency of container stevedoring operations.

To manage the increase in container movements, the IV Discussion Paper suggests that building a new landside transport network called ‘Freight Link’ (at an estimated cost of $3.4 billion) would connect Webb Dock to the existing and proposed road and rail networks. The five-kilometre Freight Link would run through Wirraway (an area recently earmarked by the Government as a family-friendly neighbourhood in Fishermans Bend), cross the Yarra River and join the proposed Western Distributor.

Existing operators at Webb Dock would also need to relocate but this will be costly and may not be feasible; for example, Melbourne International Ro-Ro Automotive Terminal has just signed a 25-year lease and has recently made a substantial investment to create a new automotive facility. Moreover, relocating existing operators and expanding Webb Dock East into the bay would cause major
interruptions to current operations, even if it received the necessary environmental and social approvals to proceed.

The IV Discussion Paper also suggests moving 50 per cent (an aspirational figure according to IV) of the road freight to night operations. This means that four million TEU would need to be transported in a 12-hour window per night, 360 days a year. Assuming each truck will carry four TEU (currently the average is less than two TEU), this equates to one million trucks, or 230 trucks per hour travelling across the road network each night every day of the week. Moreover, this would be through a built-up residential area and most of these containers would need to be staged at transport yards to match delivery times to customers who do not operate during the night and weekends, increasing supply chain costs. If a rail link is built to Webb Dock and 10 per cent of the eight million TEU is moved by train, with each train carrying 90 TEU, nearly 9,000 train trips would need to leave the precinct every year, equating to more than 24 trains per day running through a built-up residential area day and night. In its Discussion Paper (p. 68), IV argues that increasing rail mode share may be part of the solution, but even 10 per cent rail mode share (also an aggressive target) is improbable and would have a detrimental effect on urban amenity.

Apart from the unacceptable impact on amenity caused by the increased numbers of containers on Melbourne’s road and/or rail, it is unclear how these infrastructure improvements will be funded and implemented. In addition to the $3.4 billion required for the ‘Freight Link’, more than $3 billion would be needed to upgrade Webb Dock East and Webb Dock West.

4.3 A container port at Hastings

The history of Hastings as the site for a new container port

Three thousand hectares of land surrounding the port at Hastings was reserved in the late 1960s for processing, manufacturing and port-related uses. Then Premier Henry Bolte’s government reserved the land to attract economic development to Gippsland; it was thought mass production manufacturing at Hastings would enable Gippsland to become Australia’s ‘Ruhr Valley’. To manage the export of these manufactured goods, a deep-water port would need to be developed.

Since then, successive Victorian governments have supported the development of the port at Hastings to become Victoria’s next container port. In May 2013, the newly established Port of Hastings Development Authority was allocated $110 million for planning the proposed port, with all necessary planning and environmental approvals to be completed by 2017.

The Port of Hastings development project and the development of a new multimodal freight network were key elements in the 2013 VFLP (Victorian Department of Transport, Planning and Local Infrastructure, 2013). While the road and rail corridor between Hastings and Dandenong were included in the plan, land was not set aside for major road transport task and corridors beyond Dandenong. Exporters and importers located across the port hinterland would need to rely on the existing road and rail infrastructure, even though the port was being designed to move nine million TEU landside.

In 2014 the new Victorian Government recognised that the current freight rail network could not cope with the substantial increase in traffic, and developing a port at Hastings was unlikely to succeed. Soon after, the Port of Hastings Development Authority was reduced to a skeleton staff, the consultancy research underpinning design work and the approvals process ended, and the work that had been completed was handed to IV.

With the current proposal for Hastings, the total cost for dredging, road and rail connections to the existing network and construction of the container terminal at Hastings is approximately $7.9 billion. Total costs including the new Regional Rail East (RRE) are approximately $12.9 billion.
Maritime considerations

By current national and international shipping standards Hastings is not a ‘natural deep water port’ and significant construction and ongoing maintenance dredging would be required to enable large container vessels to safely enter the port. Figure 10 identifies the location and layout of the proposed container terminal.

Figure 10: Hastings concept – terminal and port environs

![Map of Hastings concept terminal and port environs](image)

Source: Adapted by Infrastructure Victoria from GHD, Second Container Port Advice – Concept options – Bay West and Hastings, 2017

Access to the current Hastings port (a low volume bulk shipping port) is via the Western and North Arm Channels, which would need only minor modifications to accept large container vessels, involving the removal of about 2.6 million cubic metres of dredged material.

To construct the proposed container terminal, a total of 47 million cubic metres of the channel would need to be dredged (with associated environmental impacts), comprising:

- 24 million cubic metres for the channel and port area
- 5 million cubic metres to be removed for the reclamation footprint
- 18 million cubic metres of sand from Bass Strait to build the reclamation.

Strong tidal flows in Western Port could increase the possibility of environmental damage due to dredging, and tidal conditions will require ongoing dredging for port maintenance. The dredging task is further complicated as dredge sediments will need to be transported about 50 kilometres offshore into Bass Strait and the sand required to construct the terminal would also need to be harvested and
transported from Bass Strait. Weather and/or sea state conditions in Bass Strait could severely disrupt the dredging program and add additional costs.

The terminal could be built in three stages and has a design capacity (once completed) in excess of nine million TEU per year. The quay line would be 4,100 metres long (noncontiguous) with a backup area of 250 hectares with on-dock rail. The terminal would be directly connected to the existing and proposed road and rail network. Land suitable for logistics related activities and for the construction of a rail terminal, required for the breakup of long interstate trains, is readily available.

Significantly, the orientation of the quay line and approach channels would be adversely affected by prevailing westerly winds, severely affecting the handling and berthing of large container vessels in the berthing pocket and approach channels. This would be exacerbated by strong tidal flows in Western Port.

There are currently only limited sheltered vessel anchorages available in Western Port and additional dredging would be required (at additional cost and potential environmental damage) to ensure sufficient safe anchorages are available for waiting vessels near the new port. Bass Strait cannot be used for the safe anchoring of vessels.

Landside considerations – rail

The efficiency and cost competitiveness of a port are enhanced by having access to an efficient rail network. However, rail networks are expensive to develop and are built for a range of purposes (e.g. passenger services, international freight and domestic freight), and are not usually designed exclusively to service container ports.

The 2013 VFLP (Victorian Department of Transport, Planning and Local Infrastructure, 2013) included the development of the South East Rail Line (SERL) to satisfy the landside logistics task. It was designed to provide a land transport link between Hastings and Melbourne’s industrial west and north. The aim was to alleviate congestion on Melbourne’s road network, with the associated cost and efficiency implications for Victoria’s supply chains and Melbourne’s rail commuters. However, SERL was found to be cost prohibitive and not feasible.

More recently the RRE project (Figure 11) to support the development of a container terminal at Hastings has been costed in excess of $5 billion. The RRE is designed to access the wider intra- and interstate rail network predominantly located to the west of Melbourne. To accommodate a 10 per cent rail mode share at Hastings, an additional one track with passing loops would be required between Dyon (in the Port of Melbourne precinct), the Melbourne CBD, and Dandenong to Lyndhurst. To accommodate the target 30 per cent rail mode share quoted by IV (Infrastructure Victoria, 2017, p. 82), an additional two tracks would be required. This possible upgrade was described in IV’s 30-year strategy noting that it is a particularly high-cost solution.
A second container port for Melbourne? Build it in the west for 2036

Figure 11: Hastings concept: elements including costing

The cost estimate for the Hastings concept includes:
- Dredging of channels and manoeuvring areas
- Reclamation to create land for container terminal
- Construction of quay and container terminal
- Road corridor to the Western Port Highway and upgrade of the Western Port Highway to the Cranbourne-Frankston Road
- Two track rail corridor to Lyndhurst
- Regional Rail East – two new freight tracks from Dynon to Lyndhurst along the Dandenong corridor.

Source: Adapted by Infrastructure Victoria from GHD, Second Container Port Advice – Concept Options – Bay West and Hastings, 2017

The construction of these railway tracks would need to negotiate the new sky-rail developments between Dandenong and Caulfield stations impacting on historic railway stations and other urban amenity issues through the narrow railway path from Caulfield to Flinders Street and Southern Cross stations in the heart of the city. From Southern Cross Station trains would be able to access the existing rail network to the west of Melbourne as well as Victoria’s major intra-state and Australia’s interstate rail networks. Melbourne’s south-east metropolitan rail corridor is already constrained and adding these new tracks would be expensive and unlikely because of social disruption and amenity impact.

When the proposed container port at Hastings reaches its capacity of nine million TEU, assuming 30 per cent of the freight is transported to and from importers and exporters in Melbourne’s main western
industrial district by rail, this rail proposal would require 30,000 freight train trips (carrying 90 TEU per train) on the RRE per year. One freight train would pass through Flinders Street and Melbourne’s other busiest commuter railway stations (Caulfield, Richmond and Southern Cross stations) every 15 minutes, every day and night of the year to move container freight from Hastings to the port hinterland.

If as expected many of the freight related businesses located in the west of Melbourne remain in their current locations, the increased transport and externality costs associated with the movement of freight to and from Hastings would be significant.

_Landside considerations – road_

Given the difficulties involved in construction of the RRE, the landside task could potentially involve the movement of 4.5 million TEU annually by road to and from Melbourne’s main western industrial district to and from the port at Hastings. This would require 1.5 million B-double truck trips annually or over 4,000 trucks moving across Melbourne’s road network daily (ISCL, 2014).

A second port at Hastings also poses significant road challenges given its location at the end of a transport corridor:

- The proposed site would require development of new logistics hubs with associated infrastructure, including roads such as the Western Port Freeway and efficient links to the existing EastLink – Mornington Peninsula Freeway – Monash Freeway route, an already congested corridor.
- The historical trend of developing the Melbourne road network to the west (e.g. Western Ring Road) prior to similar development to the east means that Hastings is highly dependent on the Monash Freeway corridor link and exposed to disruption in the event of incidents and closure of the corridor.
- A connection is also required to the proposed North East Link to enable truck access from the Hume and other western corridors.
- A large proportion of freight would still have to travel from the port to the west of Melbourne. This travel would incur significant additional road freight costs and generate additional heavy truck traffic along the present Monash Freeway – West Gate Bridge corridor, and/or the likely future alternative, East-West Link.
- Export and import containers from/to the Riverina, South Australia and Victoria’s northern and western regions would have to travel increased distances (about 85 km) compared to the proposed Bay West or the present Port of Melbourne.

4.4 A container port at Bay West

_The proposed location_

A location in Port Phillip, south of the Werribee River, is deemed to be the most suitable for a new port. Figure 12 shows the location and layout of the proposed container terminal. A road and rail bridge would connect the proposed 240-hectare container terminal with a 4,100-metre quay line with associated berthing pocket and approach channel. The terminal could be built in stages and has a design capacity (once completed) in excess of nine million TEU per year.

Access to Bay West through the Heads, the Great Ship Channel and Port Phillip (see Figure 1, p. 11) is currently suitable for 8,000 to 10,000 TEU container vessels to enter at most times (and potentially 14,000 TEU container vessels).
The advantage of this location is that it requires the least amount of dredging with the least environmental impact. Dredging and reclamation operations will occur in the calmer waters of Port Phillip with less chance of interruptions due to weather and/or sea-state conditions and potential for environmental damage.

A container terminal at Bay West can easily be connected to existing and proposed metropolitan and intra- and interstate road and rail networks. Relatively cheap land suitable for logistics related activities and for the construction of a rail terminal, required for the breakup of long interstate trains, is readily available near the suggested port location. The design provides for a contiguous quay line of 4,100 metres, suitable for efficient container handling operations and on-dock rail with adequate back-up land available directly behind the quay line. Given that Bay West is located within the protected waters of Port Phillip, it would be ideal for barge or small vessel container transport operations to other locations such as Geelong, Portarlington and the Port of Melbourne in future.

The orientation of the quay line provides the best protection against the prevailing westerly winds and facilitates the safe berthing of large container vessels. Suitable existing safe vessel anchorages are already available nearby in Port Phillip. To construct the new port in this location would require dredging and reclamation of approximately 29 million cubic metres. The total cost for the dredging, road and rail connections to the existing network and construction of the container terminal has been estimated at approximately $6.4 billion (Infrastructure Victoria, 2017).
The geography of Victoria favours a port in the west

The topography of Melbourne and Victoria has a major bearing on transport networks to and from the port and the location of import and export businesses.

For Victoria, the Great Dividing Range (including the Yarra and Dandenong Ranges) restricts the road and rail transportation of freight to the state’s western and northern transport corridors. The Great Dividing Range constitutes a major physical barrier resulting in most truck and train transportation from rural Victoria accessing Melbourne via the following major transport corridors: the Hume, Calder, Western and Princes Highways (west of the CBD) and the intra- and interstate rail lines.

For Melbourne’s topography the Dandenong and Yarra Ranges also limit industrial land use and road and rail freight transportation to the west and north of the metropolitan area. In future, the transportation limitations in the east and south-east of Melbourne may be reduced if and when the North East Link is built linking the Western Ring Road, the Eastern Freeway and EastLink.

The western and northern suburbs of Melbourne effectively comprise a single geographic region based on topography, land use and economic activity. The north and west rely on common road and rail infrastructure networks to access the port. Expansion of Melbourne further to the east has been limited by the Yarra (Dandenong) Ranges and therefore the east and south-east of Melbourne have far less industrial activity. Further, freight transport connectivity between the east and west of Melbourne is limited by the lack of suitable road and rail infrastructure.

Importers and exporters in New South Wales, South Australia, rural Victoria and metropolitan Melbourne (i.e. the Port of Melbourne hinterland excluding Tasmania) also must access the port and Melbourne via the road and rail networks passing through the west and north of metropolitan Melbourne. As a result the western and northern suburbs of Melbourne have become Victoria’s ‘freight heartland’ and this investment (including the road and rail infrastructure) can be optimised through a second port at Bay West.

Figure 13 shows that the growth of transport, postal and warehousing industry activity is weighted to the north and west of Melbourne and this growth trend is expected to continue because these areas are better suited to freight and import export business needs.
Figure 13: Transport, Postal and Warehousing investment and growth trajectory in Greater Melbourne, 2011

Legend

- Red: Decline
- Blue: Growth


**Land planning**

The selected greenfield site at Bay West allows for careful planning of the freight corridor and the port. There are several land use planning and supply chain issues that need particular attention and careful management. The rail terminal location for the Werribee South option is on green-wedge land adjacent to the OMR and outside the urban growth boundary. This area is covered by Public Acquisition and Environmental Significance overlays, the latter relating to the environmental value of, and desire to preserve and rejuvenate, the western grassy plains. Whilst the area in question is three kilometres long, it constitutes a small proportion of the total area of the grassland reserves.

The IV Discussion Paper notes that land set aside for manufacturing goods for export is concentrated in Melbourne's north and west, with only small parcels of land in the outer east and south-east. Furthermore, warehousing and distribution activity is also concentrated in Melbourne's north and west due to the proximity to the port and transport networks; supply of suitable (i.e. large and flat), industrially zoned land; proximity to a skilled workforce; and growing markets for the consumption of imported goods.

If a rail terminal were to be built at the proposed location there would be considerable work required to rehabilitate and offset the loss of land to comply with the Environment Protection and Biodiversity Conservation Act 1999. However, there are opportunities to comply, and the quality of grasslands is
higher along waterways and in areas further to the north, which would benefit from further rehabilitation and protection. Alternatively, there may be options to relocate the terminal immediately south, between the railway line and the Monash Freeway.

Planning regulations give government the power to reserve land for transport corridors. Long-term planning is being undertaken for the movement of goods and people in Melbourne's north and west with the reservation of land for the outer metropolitan transport corridor. The transport corridor accommodates both rail and road, and connections to proposed intermodal freight terminals at Truganina and Beveridge and various alternatives. The proposed location is situated in a relatively sparsely populated area and should therefore be free from curfews.

**Landside considerations – rail**

The Bay West location offers several benefits for the development and enhancement of on-dock port rail services. Given its location to nearby existing standard and broad gauge networks, it is well positioned to connect into this network. This will enhance and expand regional, interstate and domestic rail traffic and improves the prospects for the development of a metropolitan intermodal freight shuttle system. The on-dock rail connection on the container terminal would negate the additional truck move currently a feature of the container terminals in the Port of Melbourne.

The proposed port location will allow a relatively easy connection into the proposed OMR road/rail corridor. The construction cost of a port connection to the main line will be modest. The planned OMR corridor is closely aligned to the site of the proposed new Interstate Freight Rail Terminal in the Truganina precinct (the Western Interstate Freight Terminal), which is understood to include provision for a metropolitan intermodal rail connection.

**Landside considerations – road**

The proposed Bay West site is well located for connection to current and planned road networks. Once new access roads are constructed, the port would have immediate connection to the existing Monash Freeway/Princes Freeway (Melbourne/Geelong) corridor, and the Western Ring Road, servicing the Calder, Western and Hume corridors. The proposed location also provides direct access to the future OMR leading to regional corridors and in close proximity to logistics hubs currently situated in the north and west of Melbourne.

Connection to the east and south-east regions would rely on the present Monash Freeway corridor with the associated mass constraints on the West Gate Bridge. However, construction of a complete East-West Link would provide an alternative corridor for HPFVs to these regions and will facilitate the use of HPFVs with higher mass and greater dimension on new road corridors and on the Monash Freeway corridor west of the West Gate Bridge.

### 4.5 Comparison of container freight transport costs and externalities

**Travel time, transport and externality costs – Hastings compared to Bay West**

Travel times (Table 2, p. 23) for container movements to/from a port location at Hastings or Bay West will be higher than for movements to/from the Port of Melbourne, since each of Hastings and Bay West port options are located towards the outer areas of Melbourne. However, the increase in travel time for Bay West is smaller than the increase in travel time for Hastings.

Figure 14 illustrates a comparison of travel, toll and externality costs for container movements in FY2016, for Hastings and Bay West relative to that of the Port of Melbourne. Total transport costs (travel and toll costs) and externality costs for container movements to/from Hastings and Bay West are
higher than for the Port of Melbourne. However, the percentage changes of these cost increases are greater for Hastings than Bay West.

**Figure 14: Various costs for the proposed ports compared to the Port of Melbourne (% change)**

The externality costs reflect the external impact of road-based container movements, in particular noxious emissions (e.g. nitrous oxides), greenhouse gas emissions, noise, and marginal congestion costs for other vehicles (see *Transport Economic Appraisal Guidelines* (Transport for NSW, 2016) for a discussion of externality costs).

**Access to markets and contestability**

A port’s geographic market or hinterland (i.e. the area from which products are delivered to/from the port) is defined by the set of importers and exporters who use the port for the movement of commodities. The market’s geographic boundary is marked by the outer boundary of the destinations (for importers) and origins (for exporters) for commodities (e.g. bulk grain, containerised products). Critically, the port’s capacity to attract importers and exporters to use its services is influenced by land transport factors, in particular the availability, price and reliability of alternative landside transport modes (e.g. road, rail), and the comparative cost of accessing competing ports.

A number of major ports on the eastern seaboard of Australia, in particular Adelaide and Sydney (Port Botany), are competing for contestable cargoes (mainly exports) with Melbourne. Port of Melbourne plays a significant role in handling export containers from regional Victoria and interstate. These containers account for nearly 40 per cent of export volumes that originate in regional Victoria and interstate entering metropolitan Melbourne from the north and west (Table 3). Bay West is closer to the origins of export volumes and the road/rail corridors linking exporters to the port than Hastings.
Table 3: Estimated import and export containers to/from the Port of Melbourne and other regions, FY2016

<table>
<thead>
<tr>
<th>Origin or destination of full containers</th>
<th>TEU number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Imports</td>
</tr>
<tr>
<td>Regional Victoria (north, west)</td>
<td>26,012</td>
</tr>
<tr>
<td>Interstate</td>
<td>114,042</td>
</tr>
<tr>
<td>Total regional and interstate</td>
<td>140,054</td>
</tr>
<tr>
<td>Total through the Port of Melbourne</td>
<td>1,135,350</td>
</tr>
<tr>
<td>Share of total for regional/interstate containers</td>
<td>12%</td>
</tr>
</tbody>
</table>

Our analysis also indicates that compared to Port of Melbourne, a second port in Hasting will result in increases of about 30 per cent or 10 per cent in container freight transport costs and 60 per cent or 40 per cent toll costs from regional Victoria or interstate, respectively.

4.6 Port and transport related social and environmental impacts

Social impacts relevant to a port and associated infrastructure include noise, air quality, visual amenity, employment and community connectedness. IV (Infrastructure Victoria, 2017) recognises that the mitigation of social impacts will influence the decision about whether to increase capacity at the Port of Melbourne or invest in a second port. If the Port of Melbourne expands its operations there will be significant pressure on transport infrastructure and reduced amenity for those living near the port.

**Noise**

The proposed RRE, planned as part of the Hastings project, will require noise attenuation initiatives that will not be socially acceptable. The volume of freight needed to be transported by rail from Hastings to distribution centres in Melbourne’s west would result in noise levels exceeding planning guidelines through nearly 60 kilometres of Melbourne’s built-up residential areas. Homes within 200 to 300 metres of the rail corridor would need noise ameliorating measures.

Although the Bay West proposal has a rail corridor next to proposed residential development east of the OMR, there is greater discretion as to the location of the rail line. Moreover, as housing is not yet built for much of the length of the corridor, there is capacity to include the required acoustic performance in new home designs rather than to ‘retrofit’.

In terms of noise from freight transport by road, the Monash Freeway both west and south of the city would likely require further noise attenuation treatments, but this would be for much greater distances in the south-east. In the approach from the west, the transport corridor abuts land with less sensitive farm, institutional and industrial uses than in the south-east.

**Air quality**

Common harmful air pollutants related to transport are airborne particles, ozone, nitrogen dioxide and carbon monoxide. There has been a deterioration (whilst still remaining in the ‘good’ range) of air quality along the Monash Freeway between Dandenong and the city related to fine airborne particles, of which diesel vehicles are the major emitters (Environment Protection Authority, 2013, p. 23). This is most likely to be further exacerbated if a second port were to be located at Hastings.
**Visual amenity**

Visual amenity impacts relate to both the port itself, and shipping and transport movements to and from the port. Expanding the Port of Melbourne includes extending Webb Dock further into Port Phillip, which will impact on the city skyline views from Williamstown and be visible from Sandridge to St Kilda.

The construction of noise walls to ameliorate the noise from freight movements on road and rail corridors will be detrimental to the visual amenity of adjoining communities and greater lengths of noise walls required for Hastings than Bay West. The rail corridor between Caulfield and South Yarra is particularly densely populated and contains a number of heritage railway stations. The noise walls necessary if dedicated freight lines are built through this corridor will likely cause an unacceptable detraction to amenity.

**Occupation and workforce issues**

Considering the social impact of employment availability is important in determining the location of the second port. A higher proportion of people in Melbourne’s west and Geelong work in transport and warehousing compared with the south-east. The number of people working in technical and trade occupations in the two regions is comparable. The number of people working as machine operators and drivers is higher in the south-east than the west, but it is most likely this difference is narrowing given the large number of distribution centres being developed in the west, in part to access the intra and interstate road and rail networks.

If Hastings were chosen as the second port, the size of the labour market in Melbourne’s south-east would appear to be able to meet labour demand. Notwithstanding the range of difficulties associated with relocating distribution centres from the north and west to the south-east, the social impacts of this major structural adjustment warrants greater consideration than has been afforded to date. The disruption to employment, families’ lives and local communities would appear to be far greater with a decision to locate a second port in Hastings, given how important these jobs and industry are to Melbourne’s west (and probably north).

**Environmental impacts**

The two locations canvassed for the second port have high biodiversity and ecological value, and part or all of these areas are recognised under the Ramsar Convention on Wetlands of International Significance, which represents a matter of National Environmental Significance under the Environment Protection and Biodiversity Conservation Act.

The Hastings option is likely to have unacceptable impacts on flora and fauna, in particular with damage to seagrass habitat in Western Port and associated marine and terrestrial fauna.

The western Port Phillip options (i.e. for Bay West) vary greatly in their likely impact on biodiversity and ecosystem value. Seagrass, avian and other biodiversity values increase toward the south-west from Werribee River, and are generally extremely high on the western side of Port Phillip Bay, particularly in the sub-tidal marine, coastal and in the coastal wetlands, south-west from Werribee River. Therefore, the Werribee River option would be likely to cause fewer biodiversity and ecosystem impacts than the other Port Phillip Bay options for the following reasons:

- The proposed location of the port is offshore in an area that offers the potential for minimising impacts on a number of key habitats with significant biodiversity and ecological value (coastal wetlands, mudflats, seagrass beds and rocky reefs).
• The access route is mostly through agricultural land, which is likely to have comparatively low biodiversity values compared with routes further south, particularly the route across the Spit Nature Conservation Reserve.

The development of a port at the Werribee River site should not only consider the immediate impacts of port development, but also ongoing threats and impacts to the surrounding areas once a port has been established. There are some risks that will be acute during the construction phase, but may be less so post-construction (e.g. turbidity), and vice versa (e.g. road/rail/marine traffic). Smart engineering may mitigate these effects and possibly even promote desired biodiversity outcomes.

For more details of the biodiversity and ecosystem impacts, see the technical report in Attachment 2: A preliminary assessment of biodiversity issues related to Infrastructure Victoria’s Discussion Paper on Melbourne’s Second Cargo Port, March 2017.

A ‘social licence’

A ‘social licence’ to build and operate a port refers to broad community acceptance that the sum of benefits of operating and expanding an existing port, or building a new port, outweigh the aggregate of actual or perceived disbenefits. It relates to both activities at the port and getting freight to and from the port. Benefits include trade, economic activity and employment, both direct and indirect. Actual and perceived disbenefits relate to visual amenity, congestion, noise, environmental impacts, business and employment dislocation, and risks to people and the environment of catastrophic events.

Broadly speaking, the community understands that ports provide a critical function for our island nation; most of our imports and exports are transported by ship. Imports form a significant portion of our consumer goods that contribute to our high standard of living, including cars, white goods, electrical goods and clothing. Increasing volumes of exports leave the country in containers, contributing to our economic prosperity and generating substantial employment.

Hastings lacks the required rail connection and a suitable rail connection would cost more than $5 billion. Most of Western Port, including Hastings, is covered by the Ramsar Wetlands Convention and requires major mitigation measures to avoid damage to the environment. Large volumes of trucks or trains moving along particular corridors have detrimental impacts including visual amenity, noise and air quality. The need to move significant volumes from a port at Hastings to the distribution centres in Melbourne’s north and west will create greater impacts than under the Bay West option.

The aggregate of these social and environmental considerations make a new port in Bay West more likely to receive a ‘social license’ than a port at Hastings.
Conclusion: Bay West – start planning now

The greatest opportunity to develop a world-class port system for Melbourne is at Bay West.

When deciding on the future port for Melbourne and Victoria, all requirements for an optimal port system need to be taken into account. Our analysis of both maritime and landside considerations, now and in the future, shows that the only option is to plan now to develop a new container terminal at Bay West in the next 20 years.

Measured against the requirements of a successful port operation, Bay West ticks many of the boxes, as summarised in a comparative assessment of each potential port location (Table 4). Bay West is easily connected to existing and proposed metropolitan and intra- and interstate road and rail networks. It also has relatively cheap land suitable for logistics related activities and for the construction of a rail terminal, required for the break-up of long interstate trains, available close to the suggested port location.

The design of Bay West provides for a contiguous quay line of 4,100 metres, suitable for efficient container handling operations and on-dock rail with adequate back-up land available directly behind the quay line. Access through the Heads, the Great Ship Channel and Port Phillip, is currently suitable for 8,000 to 10,000 TEU vessels to enter at most times.

Compared to other options, Bay West requires the least amount of dredging with the least environmental impact. As for the proposed development site at Hastings, the Bay West area is covered by the Ramsar Convention on Wetlands of International Significance; however, the area likely to be affected is much smaller.

Hastings is on the ‘wrong side’ of town for exporters, importers and logistics service providers who are mainly located, with their fixed assets, to the west and north of the city and the state. This means that large volumes of container freight would need to cross the congested metropolitan area daily. Hastings is also unlikely to be awarded the social and environmental approvals and social licence to operate. These approvals are mandatory for major construction projects in Victoria and Australia and act to protect amenity and pristine and nationally significant environments, such as those at Western Port.

It is clear that the planned expansion of Webb Dock at the Port of Melbourne and the proposed development of rail at Fisherman’s Bend to service the port hinterland until 2066 are highly improbable because each proposal is severely compromised by landside logistics, cost, environmental impact and urban amenity issues. Road-based container transport travel times, transport and externality costs for both Hastings and Bay West are higher than for the Port of Melbourne, but Bay West rates significantly better than Hastings on these measures.

The Port of Melbourne (even in its expanded version) has a limited life span and an alternative should be considered sooner rather than later. Internationally ports have all tended to move away from city locations; for example, the Port of Rotterdam keeps extending further seawards away from its old location close to the city, to ensure that urban encroachment does not interfere with the 24-hour operations required for an efficient port. To avoid negative impacts on the container trade to and from Melbourne and its hinterland, any plan to expand the Port of Melbourne should be discarded.
Table 4: A comparative assessment of each potential port location

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Port of Melbourne (Expanded)</th>
<th>Hastings</th>
<th>Bay West</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ECONOMIC</td>
<td></td>
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<tr>
<td>Victoria meets its economic development objectives</td>
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<tr>
<td>Port contestability</td>
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<tr>
<td>Trade expansion</td>
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<tr>
<td>Supply chain investor confidence</td>
<td></td>
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<tr>
<td>Multi-generation impact</td>
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<td></td>
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</tr>
<tr>
<td>2. PORT AND LANDSIDE LOGISTICS</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Roads</td>
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</tr>
<tr>
<td>Truck numbers, truck utilisation</td>
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<tr>
<td>Traffic and road congestion impact</td>
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<tr>
<td>Rail</td>
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<tr>
<td>Intermodal connectivity</td>
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<td>Multimodal port shuttling</td>
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<tr>
<td>Integrating the port with an effective land transport system</td>
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<tr>
<td>Accepting larger vessels (10,000 TEU and possibly 14,000)</td>
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<tr>
<td>Air draught limitations</td>
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<tr>
<td>Dredging required</td>
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<tr>
<td>Importers access</td>
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<tr>
<td>Exporters access</td>
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<tr>
<td>Storage and distribution capabilities</td>
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<td></td>
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<tr>
<td>3. SOCIAL AND ENVIRONMENTAL</td>
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<tr>
<td>Social impact and the license to operate</td>
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<tr>
<td>Urban amenity and preserving Melbourne’s liveability</td>
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<tr>
<td>Gaining and retaining the port’s community licence to construct and operate</td>
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<tr>
<td>Environmental impact</td>
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<tr>
<td>Vehicle emissions</td>
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<tr>
<td>Noise, reverberations</td>
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<tr>
<td>Safety through the clear separation of land use</td>
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<tr>
<td>Transport accidents impact</td>
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<tr>
<td>4. PLANNING FOR THE FUTURE</td>
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<td></td>
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<tr>
<td>Freight corridors, freight terminals</td>
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<tr>
<td>Buffers</td>
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<td></td>
<td></td>
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<tr>
<td>Available and affordable land</td>
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<td></td>
<td></td>
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<tr>
<td>Marine berths and channel development capability</td>
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</table>

Key:
- **Negative**
- **Moderate**
- **Positive**
**Optimising public investment**

Governments are responsible for optimising the value derived from investment of public monies. In this submission we propose that while expenditure on port development is largely a private sector investment, the connecting transport network infrastructure tends to be a blend of public and private funding with the associated investment responsibilities.

Investments to build network infrastructure in the south-east of Melbourne, for access to a port at Hastings, will benefit one transport node. However, investment in connecting infrastructure to deliver access to a port at Bay West will provide a shared benefit for the ports of Geelong, Bay West and Melbourne, the airports at Tullamarine and Avalon, and the burgeoning populations of western and northern metropolitan Melbourne. In addition the west of Melbourne will continue to host storage facilities and container staging for businesses located in the south-east of Melbourne.

The total cost for the dredging, road and rail connections to the existing network and construction of the container terminal at Hastings is approximately $7.9 billion. Total costs (including the new RRE) are approximately $12.9 billion, nearly twice the amount required for the Bay West option (Infrastructure Victoria, 2017).

**The way forward**

Infrastructure Victoria, through its evidence based research and advice to the Victorian Government, is performing a vital role for the people of Victoria, and can lead the way so that the idea of building the next container port at Hastings is put to rest. Moreover, the ‘inconvenient truth’ about the Port of Melbourne’s prohibitive limitations to building the necessary capacity to last 50 years needs to be recognised.

Commercial arrangements with an existing port operator do not abrogate the responsibility of the Victorian Government to manage sovereign risk and strategic long term planning for Victorians.

Planning and corridor reservation for a second container port at Bay West needs to occur without delay to ensure Victoria’s economic and social wellbeing is future-proofed.
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>APEC</td>
<td>Asia-Pacific Economic Cooperation</td>
</tr>
<tr>
<td>ARC</td>
<td>Australian Research Council</td>
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<tr>
<td>AUD</td>
<td>Australian dollars</td>
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<td>B2B</td>
<td>Business to Business</td>
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<tr>
<td>B2C</td>
<td>Business to Customer</td>
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<tr>
<td>CAGR</td>
<td>Compound Annual Growth Rate</td>
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<td>CBD</td>
<td>Central Business District</td>
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<td>CSCL</td>
<td>Centre for Supply Chain and Logistics</td>
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<tr>
<td>ECP</td>
<td>Empty Container Park</td>
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<tr>
<td>FMCG</td>
<td>Fast Moving Consumer Goods</td>
</tr>
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<td>FTA</td>
<td>Free Trade Agreement</td>
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<tr>
<td>FY</td>
<td>Financial Year</td>
</tr>
<tr>
<td>HPFV</td>
<td>High Performance Freight Vehicle</td>
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<td>IV</td>
<td>Infrastructure Victoria</td>
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<td>OMR</td>
<td>Outer Metropolitan Ring Road</td>
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<tr>
<td>RRE</td>
<td>Regional Rail East</td>
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<tr>
<td>SMEs</td>
<td>Small and Medium Enterprises</td>
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<tr>
<td>TEU</td>
<td>Twenty-foot Equivalent Unit(s)</td>
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<tr>
<td>VFLP</td>
<td>Victorian Freight and Logistics Plan</td>
</tr>
</tbody>
</table>
References

Attachments

Attachment 1: Institute of Supply Chain and Logistics, Victoria University: Build it – but will they come? 2014 report.

Build it – but will they come?

A pre-mortem analysis of the Port of Hastings Development Project

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The Institute for Supply Chain and Logistics
Victoria University

9 July 2014
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Build it – but will they come?

Introduction

The Victorian Government is committed to expanding the Port of Hastings as Victoria’s next container freight port. An allocation of $110 million was made in May 2013 to fund the planning of the proposed port by the newly established Port of Hastings Development Authority, with all necessary planning and environmental approvals to be completed by 2017. The plan is for construction to begin in 2018 and to be completed by 2027 at the latest, excluding major road and rail construction across Metropolitan Melbourne, at an estimated cost of $12 billion.

Planning for the alternatives to the Port of Hastings ceased in May 2013, yet long lead times in planning for and delivering new port capacity requires a continuation of planning for alternatives, should for any reason, the Port of Hastings development project fail.

The Port of Hastings Development Project is a significant response by the Victorian Government to potentially significant increases in the size of vessels serving global supply chains and the current capacity of the Port of Melbourne. The success or failure of the Port of Hastings development will affect every Victorian, and many Australians, over the coming decades.

The Victorian Government is also planning to develop a new multimodal freight network to support the use of the Port of Hastings and to meet the future freight task, which in 2050 is predicted to be three to four times larger than in 2013. The proposed development of the Port of Hastings, as Victoria’s next container port, is the key element in the 2013 Victorian Freight and Logistics Plan. The plan includes the construction of new road and rail networks to facilitate the safe and efficient transportation of containers to and from the Port of Hastings. Three thousand hectares of land surrounding the Port of Hastings was reserved in the late 1960s for processing manufacturing and port-related uses.

We hope this paper will encourage all relevant stakeholders to respond with the vast experience, imagination and knowledge available, on either the overall concept or on details of any aspect of the project. It is vital that expert industry and community advice underpins every phase of the Port of Hastings Development Project, to support the Victorian Government in its work to provide for the future port-related infrastructure needs of the State.

A Pre-mortem Analysis

It is difficult to separate projects of this scope from the economic, environmental, political and social realities, which influence the planning, design, consultation and communications procedures, and may affect the government approvals process. Critical discussion of a project of this scale during the early planning stages can face a major obstacle where, as Gary Klein suggests “…subjective overconfidence is determined by the coherence of the story… not by the quality and amount of information that supports it”. We decided therefore to follow Klein’s pre-mortem technique, as discussed in Daniel Kahneman’s “Thinking Fast and Slow” (Penguin, 2011) to explore this immensely significant Victorian proposal and we encourage your participation in the process.
Build it – but will they come?

The pre-mortem technique involves imagining that the project has failed, and inventing a story to explain why, as a stimulus to considering changes in the project design, procedure or management. It is a simple technique that can indicate potential problems and prospects, as well as expose any weaknesses in the project.

The procedure offers three very clear advantages in project analysis:

• overcoming the ‘group think’ that can affect groups and individuals when the political decisions have apparently been made;

• removing the pressure from people who are worried about seeming disloyal if they voice their concerns over the project; and

• stimulating the imagination and harnessing the knowledge of participants, to encourage a broader involvement in assessing the potential challenges, difficulties and prospects that could face the project, before the costly implementation procedures are set in motion.

To illustrate the use of the pre-mortem technique in the context of the Port of Hastings Development Project we propose two distinct sets of conditions that could lead to the failure of the project.

The first condition assumes that mega ships will not replace the current workhorses of the maritime fleet, but instead will be used exclusively between the major global ports serving Europe, China, India, the Middle East and the Americas. The maritime transportation of containers for relatively small distant markets, such as Australia’s capital city container ports will, in the short to medium term, continue to be served by the current fleet of vessels, determined by the market, with a capacity of 3,000 to 7,000 containers (twenty-foot equivalent units, or TEU). In this scenario, the Port of Melbourne, through the Port Capacity Project at Webb Dock East and the proposed Swanson Dock capacity development programs, would continue to offer a fit for purpose cost-competitive alternative to the Port of Hastings. This condition is based on the understanding that shipping companies send their ships to markets not ports, and vessel size is determined by the economics of freight volumes, not by government policy.

The second condition is predicated on the likely responses from people who will be adversely affected, in one way or another, by the development of the Port of Hastings as a container port, and the necessary road and rail infrastructure that will link it with metropolitan Melbourne and Victoria’s regional hinterland. This scenario assumes that there will be very strong and united opposition, representing broad ranging economic, environmental, political and social interests.

The most significant environmental issue will be the internationally significant wetlands protected by the Ramsar Convention that include all of Western Port to the North and East of Phillip Island. The Convention was listed on the Register of the National Estate and the Australian Government has been a convention partner and signatory since 1982.
Build it – but will they come?

Constructing a nine million TEU container terminal in the Ramsar Convention-protected area will require intensive and guaranteed mitigation measures, to ensure the wetlands continue to be fully protected. The Government’s response will have to withstand very determined local, national and international scrutiny and demonstrate the safety of the wetlands against any foreseeable damage from the construction, dredging, maintenance and maritime operations of the Port of Hastings.

The economic and social issues will likely involve broad-ranging and detailed opposition to:

- Australia’s potential failure to fulfil its international obligations and responsibilities as a signatory to an environmental protection convention;
- the potential destruction of Western Port coastal scenery affecting landholders and residential and holiday home owners between Cape Schanck and Stony Point, on the Mornington Peninsula; on French Island; and between Ventnor and Cowes on Phillip Island;
- the impacts on the region’s tourist industry, including the internationally significant fairy penguin parade and seals at The Nobbies on Phillip Island, of the Port and its maritime operations;
- very strong concerns throughout Melbourne over the potential loss of properties and amenity resulting from the construction and operation of road works, and the South East Rail Link, for trains to cross the Yarra River and travel via Richmond, Flinders Street and Southern Cross Stations to the Tottenham freight rail yards, which may require excavation work in the affluent ‘leafy green’ suburbs of Malvern, Armadale, Toorak, Hawksburn and South Yarra.

These politically sensitive social and environmental issues could lead the government of the day to re-evaluate the political costs of the proposed port and associated infrastructure, and decide instead to concentrate on metropolitan and regional commuter transport priorities and other more pressing constituency issues.

As stakeholders in the supply chain industry, and interested members of the community your participation in the application of the pre-mortem technique would significantly enhance the work of the Institute for Supply Chain and Logistics at Victoria University and help to provide sound information as the basis on which the Victorian Government can make the best decisions for the future of the State. It will broaden the examination of the Port of Hastings Development Project in a timely manner; improve the monitoring and assessment of changes in global, national and regional logistics chains; support the concerns of industry and the community in relation to the current and potential port development; and support careful consideration of the economic, environmental and social implications of the Project.

Complex large-scale projects of this type can expect to meet with considerable opposition from affected individuals, organisations, associations and special interest groups. The Victorian Government and the Port of Hastings Development Authority will be judged, from the earliest stages of research and design, on the integrity, sensitivity and transparency of its communications
Build it – but will they come?

with the community, industry and individuals, and the effective and transparent resolution of issues and problems as they develop.

The Government’s responses framework should include the early establishment of a high quality, sensitive and sophisticated consultation and participation process, that encompasses frequent testing and reporting on the changing economic, environmental and social indicators as the work on the Port of Hastings Project gathers momentum.

The planning process would be further improved with the establishment of an independent agency for infrastructure planning to monitor the economic, political and social cost indices of major infrastructure, port development and maritime projects here and overseas.

International Sea Freight Supply Chain and Logistics

Supply chains are complex, multifaceted, interdependent systems that link producers, businesses and consumers through the decisions and interactions of the agencies, governments and people involved in their management. They involve precise time and cost management in logistics and multimodal transportation, and operate in environments heavily influenced by external variables, including the economic, legislative and social expectations that are managed through government policy and investment.

Supply chains face constant change in response to the global, national and regional business environment, with innovations in communications, equipment, operations, strategies and infrastructure. Air and sea ports are vital elements in supply chains and logistics, but they are single points within the overall integrated, complex system and therefore require a systems approach to assessing the costs and benefits of any single major project across the whole supply chain.

Australia’s import/export container freight supply chains are served by about seven million containers (TEU) annually, using a large number of shipping lines, with the following approximate distribution according to port:

- Port of Melbourne: 2.5 million containers (TEU), including Tasmania’s mainland domestic and international freight;
- Port Botany Sydney: 2.1 million containers (TEU);
- Port of Brisbane: 1.1 million containers (TEU);
- Port of Fremantle: 650,000 containers (TEU); and
- Port of Adelaide: 300,000 containers (TEU).

Container vessels routinely visit and serve the capital city ports of Australia, all of which have restrictions on vessel size. The proposed water depth at the Port of Hastings will be sufficient to allow vessels with a draft of 16 metres to berth at any time, compared with a draft of 14 metres at the Port of Melbourne (potentially 14.5 metres with tidal assistance), 15 metres at Port Botany, 14.7 metres at the Fremantle Inner Harbour, 14.2 metres at Adelaide’s Outer Harbour, and 14 metres at
the Port of Brisbane. The greater proposed water depth at the Port of Hastings, therefore, may have little or no influence on the size of vessels, given that the container ships normally also serve the other capital cities with ports that will not accommodate the larger vessels. Unless each major capital city port deepens their shipping channel and berths, the larger vessels will not come.

The capacity of container vessels has significantly increased over the past three decades (see table below) but presently the Post Panamax Plus class of vessels is the largest servicing Australian ports.

<table>
<thead>
<tr>
<th>Year of introduction</th>
<th>Generation (class) of container vessel</th>
<th>Capacity (TEU)</th>
<th>Design draft</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988</td>
<td>Post Panamax</td>
<td>4,000 – 5,000</td>
<td>13 metres</td>
</tr>
<tr>
<td>2000</td>
<td>Post Panamax Plus</td>
<td>6,000 – 8,000</td>
<td>14.5 metres</td>
</tr>
<tr>
<td>2013</td>
<td>New Panamax</td>
<td>12,500</td>
<td>15 metres</td>
</tr>
<tr>
<td>2014</td>
<td>Maersk Triple E Class</td>
<td>18,000</td>
<td>14.5 metres</td>
</tr>
</tbody>
</table>

*Source: Alphaliner 2014*
Build it – but will they come?

The newest Maersk Triple E vessels, with their 18,000 container (TEU) capacity and draft of 14.5 metres, could theoretically enter Port Phillip Heads with tidal assistance if only considering their draft, but this would require significant evaluation. But their length of 400 metres and width of 59 metres would potentially prohibit them from entering the Heads and berthing safely at the Port of Melbourne.

The capital city ports of Australia, except the Port of Fremantle, are all privately owned or being proposed for sale and each port owner will separately determine the costs and benefits of increasing water depth sufficiently to accommodate larger vessels.

The Port of Hastings Development Project’s anticipated service of container mega ships can be put into context by comparing with those trading on the major East-West shipping routes between Asia and Europe. The Port of Rotterdam handles mega ships to service a market hinterland of 350 million people, compared with Australia’s total market population of 23 million people and Victoria’s current population of 6 million that is anticipated to grow to 10 million people by 2050.

The stark differences in market sizes emphasise that in order to maintain a container shipping service that satisfies Australia’s need for reliable, regular (weekly) movement of imports and exports, particularly the substantial agricultural and perishable food-related exports, the smaller container vessels are likely to be more suitable than the larger mega ships; the transit times of Australia’s agricultural and food exports are kept to a minimum through regular and frequent direct vessel calls across all Australian ports.

Landside Logistics: Trucks and Trains

The Port of Hastings Development Project is designed to cater for nine million containers (TEU) per annum by 2050. Changes can be anticipated across the hinterland if businesses relocate and adjust their operations to optimise their use of the new container port. While freight logistics and transport service providers may relocate they must pass on to customers the higher operating costs resulting from moving approximately an extra 100 kilometres away from the current industrial ‘heartland’ in the West of the metropolitan region, with the same long distances on the return trip.

Business locations, including that of national distribution centres, are determined by many criteria and compelling commercial considerations, including the location of the core business; the asset investment strategies; customer locations; land availability and suitability; costs; access to labour; and proximity to international airports and national transport networks (road and rail). Personal, family and community reasons also influence business location decisions.

The 2009 Port of Melbourne Container Chain Logistics Study showed that approximately half of all import and export containers passing through the Port of Melbourne originated in or were destined for the crescent of industrial land located on both sides of the Western Ring Road between Altona and Laverton in the West and Hume in the North, with 65% of total containers transported less than 22 kilometres in the first and last transport legs via the Port of Melbourne. Based on 2011/2012 container volumes, mathematical modelling by the Institute for Supply Chain
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and Logistics at Victoria University shows a shift to the Port of Hastings would cause a doubling of truck operating costs, increased travel time and emission as well as air quality degradation.

If a significant proportion of the businesses currently established to the west of Melbourne’s central business district remain in their current locations, the potential freight transportation impact could be significant. When the Port of Hastings reaches its capacity of nine million containers (TEU) as planned in 2050, the land-side task could potentially involve the movement of 4.5 million containers annually to and from Melbourne’s main western industrial district.

Nevertheless, when the Port of Hastings reaches its capacity of nine million container (TEU) this would require:

- 1.5 million B-double trucks, or 50,000 freight trains carrying 90 containers per train, annually;
- over 4,000 trucks or 140 trains moving across Melbourne’s road and rail network between Melbourne’s industrial West and North, and Hastings, daily.

The freight logistics industry and the Victorian Government recognise that the current freight rail network cannot cope with this substantial increase in traffic. The proposed South East Rail Link will provide the essential land transport link between Hastings and Melbourne’s industrial West and North to prevent Melbourne’s shared road network from carrying millions of containers, with the associated major cost and efficiency implications for Victoria’s supply chains and Melbourne’s commuters. The landside logistics task involved in the development of the Port of Hastings is complex, expensive and requires the cooperation of many stakeholders; however, the likely costs of the land transport networks have so far not been made available by the Government.

Given the current road and rail infrastructure and distribution of import/export containers, over 70% of all containers would have to work their way through the Melbourne Metropolitan area to reach Hastings. The current road network will require substantial improvement and development to cope with the increased traffic and truck trip distances. The Victorian Freight and Logistics Plan nominates ring roads, as opposed to direct cross-city transport links, that will require container and construction industry trucks, taut liners, and over-dimensional and light commercial vehicles to circumvent the City to reach their destination, thereby increasing truck trip times and costs, and reducing the daily utilisation of port-related vehicles.

Managing Supply Chain Risk

The resolution of the complex issues that will determine the success of the proposed Port of Hastings should involve the implementation of contingency planning and fail-safe options, including:

- developing a plan for an alternative port location to the west of the Port of Melbourne in Port Phillip Bay to optimise the use of the $717 million channel deepening investment and the anticipated $1.6 billion Port Capacity Project investment;
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- monitoring container trade growth and megaship utilisation rates against what could be over-optimistic forecasts;
- determining expected container vessel dimensions for the Port of Melbourne for the next 50 years in view of forecast changes in global market conditions.

The economic significance of maximising and optimising Victoria’s current container port capacity and, if necessary, building a new container port to serve the businesses that compete daily in increasingly competitive global markets, requires early contingency planning should the current Port of Hastings Development Project fail for economic, environmental, political or technical reasons.

In 2013, the Victorian Government determined that the process of developing independent investigations into an alternative container port to the west of the Port of Melbourne in Port Phillip Bay was no longer required. The case for the Port of Hastings Development Project was considered sufficiently strong on the assumption that landside logistics efficiency was assured through the development of the South East Rail Link.

The Victorian Freight and Logistics Plan contends that for Victoria to maintain its status as the “Freight State” a new deep-water port at Hastings is required to attract the largest vessels and ensure that Victoria maintains its dominance over the other capital city ports. This simplistic view is not reflected in the commercial operations of shipping companies or the supply chain industries in international or capital city markets.

The potential implications of conceptualising competition in this way can be gleaned by looking at similar projects overseas. For example, in an effort to compete with the Port of Rotterdam, in the late 1990s the Port of Amsterdam decided to grant and subsidise a concession to a private operator to build a 54 hectare container terminal on the shores of the North Sea Canal, using an “indented dock”, where container cranes could work both sides of vessels simultaneously. The container terminal was completed in 2001 but only a small number of containers were handled until it was decided to close the facility in 2012. The City of Amsterdam and the private operator incurred losses of millions of euros.

This, and other examples, suggest that building a successful container terminal in a new location, specifically the Port of Hastings, involves:

- providing sufficient and well-connected infrastructure on the landside, as well as the waterside, ahead of time;
- achieving an early commitment from shipping lines that they will use the new facility, based on firm estimates of global commercial imperatives;
- guaranteeing efficiencies and the costs will be comparable with the available alternatives;
- ensuring that the supply chains and logistics industry enterprises formally agree to support the new facilities;
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- developing an effective, sensitive and knowledgeable agency to respond to complaints and requests for information, and to assist affected people in resolving their problems with the Project;

- providing an alternative to the Port of Hastings, prepared from a risk management perspective, to ensure that the experience of years of project planning and design processes are not lost if the proposal is discontinued.
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Conclusion

Over the last 30 years the world has changed in ways that were once unimaginable. To compete in global markets and succeed, Victoria’s supply chain and freight logistics businesses must be able to keep pace with changes through their agility, reliability, resilience and cost competitiveness.

Governments have stated the crucial reason for the development of the Port of Hastings is that a deep water port is needed to cater for much larger ships with a draft of 16 metres. In 2014 however, many industry experts suggest these mega ships may not come to Australia and Victoria, since the economic demand driven by population will probably not provide the commercial justification for international shipping companies to bear the cost of sending larger vessels to our ports. Our relatively small and diverse import/export markets and the dominance of food and perishable agricultural commodities are more likely to be best served by smaller vessels of 8,000 to 10,000 containers (TEU).

The Port of Hastings Development Project will affect every business, industry and individual in Victoria over the next 40 years, whether or not it is completed. This clearly needs to be considered in relation to the proposed lease of the Port of Melbourne to a private operator for a 40 year period.

There are many in the broader community who are willing and able to contribute to the examination of major infrastructure project issues when their interest and involvement is stimulated. The participation of all interested parties will add immeasurably to the quality of the decisions and the Institute for Supply Chain and Logistics hopes many firms, associations and individuals will offer their time and energy to refine and extend the ongoing debates.

We also hope the Government will establish excellent and well supported public and industry communications programs, to encourage the fullest possible participation in this most important investment concept. Issues will arise that will demand our contribution and support to make sure Victoria benefits to the maximum from the results and the lessons learned throughout the course of the Port of Hastings project and the implementation of the Victorian Freight and Logistics Plan.

The significance of planning and developing the critical freight infrastructure and port system to support Victorian business will have a multi-generational impact and is sufficiently critical to our society and future generations of Victorians to demand our fullest possible attention and contribution to the Port of Hastings planning and development processes.
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This pre-mortem analysis was prepared by the Institute for Supply Chain and Logistics at Victoria University with the support of the Supply Chain Advisory Network. It responds to the need for clarity and is based on the synthesis of many detailed reports and the expert opinion of stakeholders across the supply chain.

The Institute for Supply Chain and Logistics (ISCL) at Victoria University is a specialist research and knowledge centre that focuses specifically on freight logistics and value added supply chain, and provides independent, industry-focused study to support relevant and sustainable public and private sector decision making.

The Supply Chain Advisory Network is an informal network of supply chain practitioners, with companies representing each point of Victoria’s international import export supply chains. The network has a long term involvement in improving supply chain efficiency and productivity through ‘whole of chain’ understanding and its contribution to the people of Victoria.

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Technical report on biodiversity impacts, prepared by Professor Marcel Klaassen and Drs Craig Sherman and Michael Weston, of Deakin University’s Centre for Integrative Ecology.


This short report has been prepared by Professor Marcel Klaassen and Drs Craig Sherman and Michael Weston of Deakin University’s Centre for Integrative Ecology. The report has been prepared upon request for Deakin University’s Centre for Supply Chain and Logistics (CSCL). The purpose of this report is to:

- Provide a preliminary view on the proposed location of a second port for Melbourne based on information outlined in the Infrastructure Victoria’s Discussion Paper from the perspective of biodiversity and ecosystem impacts;
- Identify omissions and gaps in the Discussion Paper with respect to biodiversity and ecosystem impacts, their assessment and monitoring;

Our brief is to examine only those options currently highlighted by Infrastructure Victoria’s Discussion Paper. We do not assess likely impacts but provide advice to enable a fuller assessment of those impacts.

The authors

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**Dr Michael Weston** is a conservation ecologist with a special interest in the conservation of shore- and water-birds, and has published over 150 papers, including many on the birds of the western shoreline of Port Phillip Bay. He has a strong interest in the scientific management of bird disturbance (see [www.avianbuffer.com](http://www.avianbuffer.com)). [https://www.linkedin.com/in/michael-weston-9977788b?trk=nav_responsive_tab_profile](https://www.linkedin.com/in/michael-weston-9977788b?trk=nav_responsive_tab_profile).
Disclaimer

This report has been prepared in a short time-frame, and while all care has been taken to integrate current scientific knowledge in our views, we cannot guarantee the absence of omissions. The authors provide this report in the hope it will assist in attaining an outcome which has no net impact on biodiversity and ecological value.
Key Biodiversity Assets

The authors note that all locations proposed for the Cargo Port are of immense biodiversity and ecological value, and part or all of these areas are recognised under the Ramsar Convention on Wetlands of International Significance, which represents a matter of National Environmental Significance under the EPBC Act\(^1\). Beyond the protection conferred to biodiversity by protection of species and habitats under law, biodiversity underpins ecosystem function, and provides ecosystem services. Indeed, the locations proposed have considerable ecosystem value, including direct socio-economic benefits in terms of fisheries and carbon sequestration (i.e. blue carbon).

We note that previous proposals to develop some of the areas proposed for the Port (e.g., Imperial Chemical Industries of Australia and Coode Island relocation proposals) have elicited intense opposition from groups interested in biodiversity conservation.

We strongly support the inclusion of the seven key biodiversity and ecosystem attributes or “major differentiators”, as listed in the Discussion Paper, in future environmental impact assessments (i.e. seagrass, saltmarsh, mangroves, shorebirds, orange bellied parrot, fish, blue carbon). Of these we would like to highlight critical attributes that are present at or in the vicinity of all alternative locations:

- The Critically Endangered Orange-bellied Parrot, which is extant and should be considered. Even if locally extinct, reintroductions are planned by the Orange-bellied Parrot Recovery Team and Zoos Victoria;
- Internationally significant populations of shorebirds, including migratory species; many of which are currently experiencing severe population declines;
- Significant seagrass and benthic communities and their increasingly acknowledged ecosystem services (including sediment stabilisation and attenuating currents, which reduce erosion, providing habitat to a range of species (especially fisheries), recycling of nutrients, significant carbon storage, helping reduce harmful pathogens in the water); restoration of which appears to be highly problematic, if not impossible.

Moreover, additional aspects of biodiversity and ecosystem attributes that warrant consideration include:

- Coastal wetlands and mudflats that form foraging and roosting habitat for shorebirds and, also internationally significant populations, of waterbirds. Notably for the western side of Port Phillip Bay, recognition of its biodiversity and ecological importance extends beyond government; the areas of Port Phillip Bay subject to the proposed development are part of an Important Bird Area (IBA), declared by BirdLife Australia and ratified by BirdLife International.
- Rocky reefs in Port Phillip Bay typically support macroalgae communities, which are recognised as important ecosystem engineers supporting diverse communities (including recreationally important fish species). Impacted reefs can result in the formation of urchin barrens, which cause significant loss of macroalgae at these sites and the associated communities they support.

Moreover, there may be a number of Additional Matters of National Environmental Significance (MNES) that warrant impact assessment, which we will address in more detail below.

\(^1\) Environment Protection and Biodiversity Conservation Act
However, while awaiting such assessment, we may preliminarily conclude that all options proposed are adjacent to areas of extraordinary biodiversity and ecological value, though we consider that impacts vary greatly between options.

Hastings and Bay West options from a biodiversity and ecosystem impacts viewpoint

We have formed the preliminary view that:

- The Hastings option appears to represent an option likely to be particularly damaging to seagrass habitat, Westernport Bay and associated marine and terrestrial fauna. Thus, we consider this option is likely to cause unacceptable impacts to flora and fauna.

- The western Port Phillip Bay options vary greatly in their likely impact on biodiversity and ecosystem value. Seagrass, avian and other biodiversity values (listed in the Infrastructure Victoria Discussion Paper and elsewhere in this document) increase toward the southwest from Werribee River, and are generally extremely high on the western side of Port Phillip Bay. In particular, extremely high biodiversity and ecosystem values exist in the subtidal marine, coastal, and in the coastal wetlands, south-west from Werribee River.

- Given this, from a biodiversity and ecosystem impact perspective, assuming that a new Port is required and other options are not viable, the Werribee River option would appear to be likely to cause fewer biodiversity and ecosystem impacts than the other Port Phillip Bay options, because:
  - The Port facility is situated offshore in an area that offers the potential for minimising impacts on a number of key habitats with significant biodiversity and ecological value (coastal wetlands, mudflats, seagrass beds and rocky reefs).
  - The access route is mostly through agricultural land, which is likely to have comparatively low biodiversity values compared with routes further south. We note the two more south-westerly options include access options which are likely to be especially damaging (particularly the route across The Spit Nature Conservation Reserve).

- However, we note a series of concerns regarding biodiversity impacts that we consider should be addressed (see below).

Additional Matters of National Environmental Significance (MNES) that warrant impact assessment

The Orange-bellied Parrot, shorebirds and seagrass habitats are rightly mentioned in the Infrastructure Victoria report. Some waterbirds and shorebirds are also listed separately under the EPBC Act as MNES, and many species are listed as Marine and/or Migratory under the Act and so are also protected by the Act. We note in particular that with respect to threatened migratory species, that Australia is signatory to a range of International Agreements which mandate protection of these species, and that the Australian Government has advocated for habitat protection elsewhere in their Flyway. We note that the recent science suggests many populations of these migratory species are in decline, and that habitat loss and conversion seems to be one of the key threats underpinning these declines.

We suggest that other MNES warrant investigation, including marine and terrestrial species that may be affected by road, rail and marine infrastructure. These are not exclusive to the marine, coastal
and wetland habitats highlighted here, but also to likely impacted terrestrial habitats such as the Western Grassy Plains, where a rail terminal is tentatively foreseen. These include:

- Seabirds. A number of species (e.g., Australasian Gannet, Crested Tern, Little Penguin and White-faced Storm Petrel) breed in Port Phillip Bay and may use the marine waters within the proposed Port areas.
- Other EPBC-listed birds, apart from waterbirds or shorebirds.
- EPBC-listed amphibians such as Growling Grass Frog
- EPBC-listed reptiles such as Striped Legless Lizard
- Rocky reef associated macro algae and associated communities.
- Marine mammals also inhabit the areas proposed for development. The Burrunyan Dolphin, a narrow range endemic dolphin with a Port Phillip Bay having its own distinct population (approx. 80-100 individuals).

**Biodiversity risks and opportunities**

The development of a cargo port at the Werribee River option site should not only consider the immediate impacts of port development, but also ongoing threats and impacts to the surrounding areas once a port has been established. We note that some risks will be acute during the construction phase, but may be less acute post-construction (e.g. turbidity), and vice versa (e.g. road/rail/marine traffic). Smart engineering may mitigate these effects and possibly even promote desired biodiversity outcomes. Here, we highlight some considerations that warrant inclusion in impact assessment and port design:

- The development of any new marine infrastructure should be designed in a way that delivers both functional/economic objectives but also environmental and socio-cultural benefits – i.e. engineered habitats that are not only designed to achieve clearly defined economic benefits, but also ecological objectives (and potentially also socio-cultural benefits). Ecological objectives could for instance be achieved by considering options that encourage recruitment and establishment of native species. Biosecurity and monitoring measures should be put in place to prevent the introduction or proliferation of invasive pest species.
- Ports are often sinks for the accumulation of pollutants and high-risk areas for accidental hydrocarbon and other chemical spills. There are often also significant sources of human created marine debris that can pollute adjacent shorelines and lead to entanglements of wildlife. Port design and safeguards to be able to respond to an emergency and prevent the spread of a hydrocarbon/chemical spill should be made a high priority in port design. Thus, there is the need to develop environmentally-friendly infrastructure that protects surrounding natural areas.
- Disturbance, the physiological or behavioural disruption of normal activities, represents a threat above that of direct habitat loss. Disturbance effectively decreases habitat quality beyond the direct “footprint” of infrastructure and its operation. These disturbances include light pollution and collisions by birds with infrastructure, especially any powerlines, bridges or causeways. Lit areas may be especially problematic for seabirds, a problem that may be mitigated by use of seabird-friendly lighting. Underwater noise pollution is another
disturbance factor that is likely to increase, which may affect, in particular, marine species such as dolphins.

- Hydrological alterations and changes in longshore drift and other processes resulting in erosion or alteration of existing shore and subtidal habitats. Some of these impacts may extend beyond the local areas such as up to Pt Cooke Coastal Park or even beyond. Immediate and long-term effects of port works (through changed hydrodynamics) on turbidity and nutrient (originating from Western Treatment Plant) distributions and their effect on key habitats, notably seagrass, require evaluation.

Additional sources of data that could be used in impact assessment

We suggest the inclusion of the following data in impact assessments, in addition to other data sources that will presumably be used:

State of the Bays summarises key data sources for many aspects of biodiversity and ecosystem values for both Westernport and Port Phillip bays.

The Seagrass and Reefs Program for Port Phillip Bay (DELWP) provides key data on the distribution and reproductive health of seagrass and reef habitats for key sites within the potentially affected area.

BirdLife Australia has generated a habitat model for the Orange-bellied Parrot on mainland Australia. This is likely to be a critical tool with respect to examining impacts on this species.

A very large amount of data on birds is available from disparate sources for Western Port Bay and Port Philip Bay and notably the Western Treatment Complex, in which vicinity the Port Philip Bay options are currently proposed. This includes count data from Melbourne Water, Arthur Rhylah Institute, and BirdLife Australia, including Shorebird2020 counts and the Atlas of Australian Birds. Thirty years of shorebird banding data have been collected in these areas by the Victorian Wader Study Group. These data, notably the banding data, have only been partially analysed to highlight the key bird areas and their trajectory in bird numbers in recent times. A preliminary analysis of banding data has highlighted very high site fidelity in shorebirds and an apparently limited flexibility in birds to move sites. Through survival analyses of the banding data, the differential quality of sites within Western Port Bay and Port Philip Bay could be further assessed.

Data on seabirds at sea is sparse, but includes Little Penguin distribution (as part of the Channel deepening EIS work), and Australasian Gannet distribution derived from tracking (Deakin University data).

The Oil Spill Response Planning Atlas (DELWP).

Critically, the monitoring data implemented as part of the Channel Deepening should be exploited as a way of predicting impacts of dredging (including the effects of increased turbidity) and inferring likely impacts.

Cautionary note with the potential consideration of offsets

Albeit to varying degree (see above), damage to biodiversity and ecological value of the various alternative Port locations is to be expected and offset calculations need to be made. In anticipation of these offset calculations, we wish to make the following observations:
There is an ongoing scientific discussion about the suitable baselines for setting appropriate offsets for biodiversity loss. Some have suggested that some Australian laws do not adequately specify the baseline against which to offset.

We note that the process of selecting one option over others for the proposed Port does not confer long-term protection to the non-preferred sites. In other words, the selection of one option does not protect those sites that are not selected from other developments. While planning processes are site-specific, biodiversity impacts are cumulative across planning scales.

Impacts to seagrass cannot be easily offset, thus compromising the principle of ‘equivalency’ of offsets.

Saltmarsh is especially difficult to establish (being highly reliant on hydrology), making it very difficult to offset.

Off-site impacts are difficult to predict and therefore offset.

**The need for effective monitoring**

Notably in the light of the proposed staged development of the Port, monitoring permitting adaptive management of impacts to biodiversity and ecosystem function is required. There is also the opportunity for further research on impacts in general, and the response of biodiversity to changes associated with major developments. Such research could inform future developments in order to minimise impacts on biodiversity and ecosystem value. There have been cases where predicted impacts as assessed by Environmental Impact Assessments have failed to identify major issues. Ongoing monitoring and a commitment to solving unexpected problems affecting biodiversity and ecosystems would help alleviate these issues.

**Additional socio-economic impacts related to biodiversity**

In addition to the socio-economic considerations already mentioned (i.e. fishing and carbon sequestration), we note that the Western Treatment Complex and other parts of the western shoreline of Port Phillip Bay attract birdwatchers and eco-tourists from around Australia and the world. In the last year, Melbourne Water Corporation have commenced planning to increased public use of the natural values of the Western Treatment Complex. We note that an ARC funded project is currently examining the benefit of birdwatchers to the WTP and surrounds, and that Melbourne Water Corporation have established birdwatching infrastructure within the Western Treatment Complex (e.g. birdwatching routes and hides).

Moreover, there are increased considerations for the role of green space for human health and well-being. Thus, it seems prudent for the proponents to start planning for green space in the light of urban and industrial developments around Port Phillip Bay, notably between Geelong and Melbourne.