Deloitte.

Infrastructure Victoria Second Container Port Advice

Multi Criteria Assessment

24 April 2017

Contents

Glossary

Item	Description
IV	Infrastructure Victoria
MCA	Multi Criteria Assessment

1 Overview

This report summarises the MCA process undertaken to identify the preferred location of Victoria's second container port. A Multi Criteria Assessment (MCA) is a tool that can compare quantitative and qualitative impacts across developed options or scenarios by assigning weights and scores to various criteria that are linked to objectives, policy or a mandate.

When are MCA's used?

An MCA can be used in a variety of circumstances, particularly where there is more than one reason for proceeding with an investment decision or taking a particular path in relation to the investment decision. The key reasons for adopting an MCA process for the IV Port Strategy are outlined below:

- There is a very clear basis for scoring project options against criteria, where the evaluation framework is agreed and documented before the analysis has commenced
- There are non–quantifiable consequences or benefits which cannot be assessed or compared (e.g. environmental consequences) by other assessment methodologies
- Criteria can be linked to government policy and objectives.

What are its limitations?

While the MCA process is useful to consider a number of criteria when making key decisions, it does have its limitations. These are:

- If objectives aren't clearly defined, there may be an overlap causing benefits to be double counted
- The evidence base supporting the MCA process may be 'thin' which may affect its robustness
- Weightings may be difficult for some criteria, particularly where developed options or scenarios aren't clear or require staging.

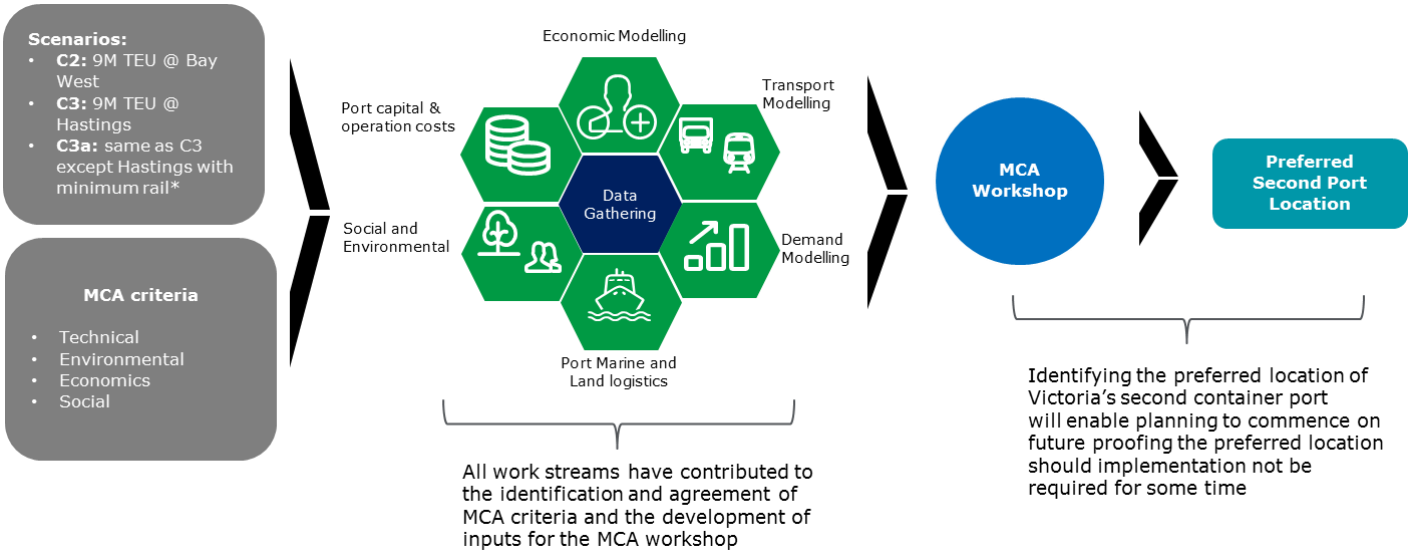
2 Port Strategy MCA Process

Determining where Victoria's second port will be located is a decision which involves the assessment and consideration of many factors such as financial and economic costs, benefits to the State of Victoria, social and environmental impacts and technical feasibility.

To ensure these factors were addressed and considered for both port locations, four criterion were developed. The criterion were developed by the IV Port Strategy project team and tested and reviewed through a Peer Review process. With criteria agreed and approved, the Port Strategy project team developed an evidence base for each criteria which was used to inform the MCA workshop. The MCA workshop was a pivotal step in the MCA Process, as it was where the project team gathered to discuss the relevant outputs developed, test their impact and rank the impact of second port location against each criteria.

Figure 1 below provides an overview of the Port Strategy MCA process undertaken to determine which of the two proposed locations for Victoria's second port is preferred.

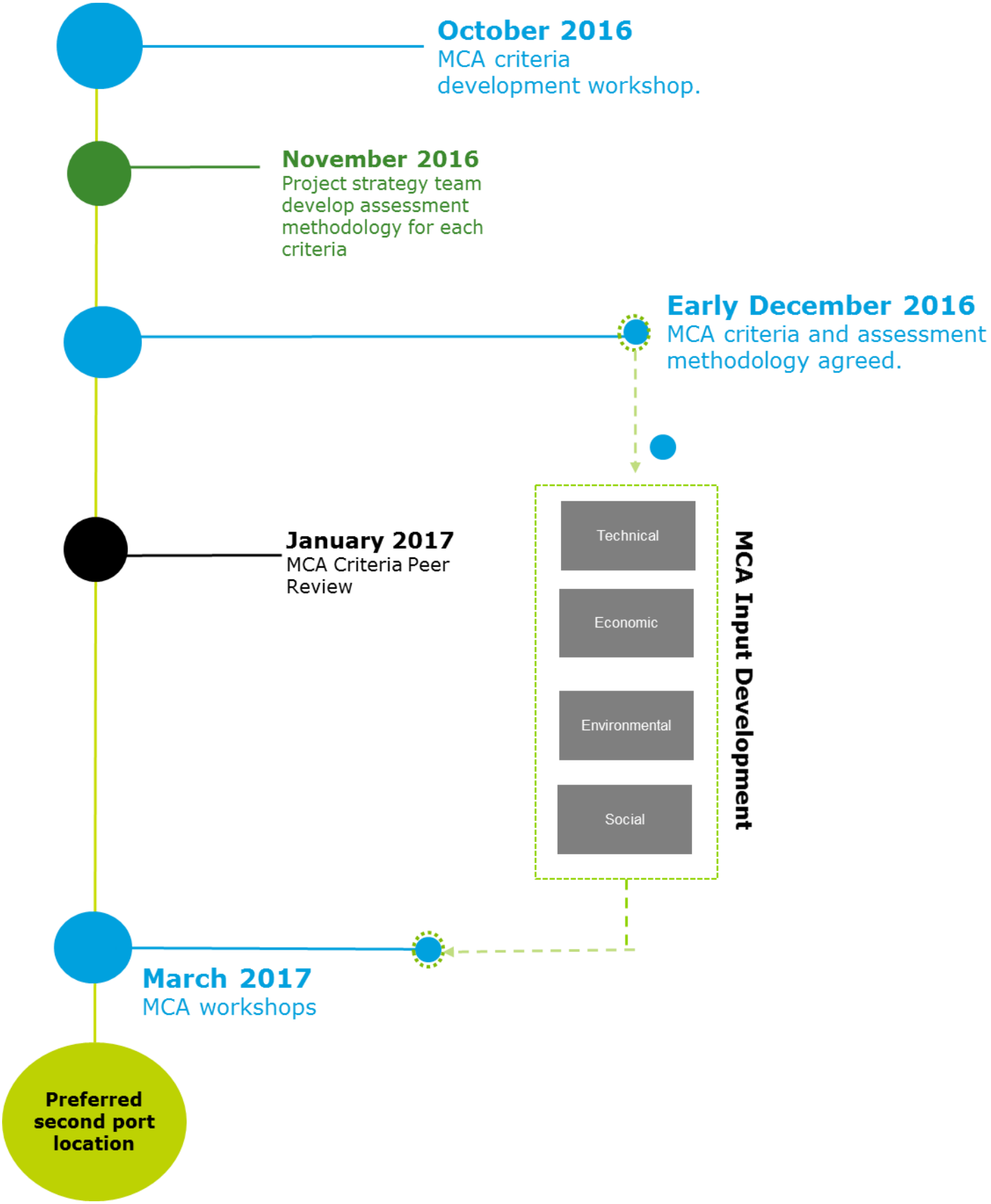
Figure 1 Determining Victoria's second port location



*C3A: The minimum rail scenario assumes no new rail investment to Hastings over and above what is currently available. As C3 included a new rail link to Hastings (which would require significant cost to construct and results in considerable disadvantage to Hastings), C3a was included to understand whether the MCA results would change for Hastings. This was particularly relevant for the economic and technical criteria.

Outlined in Figure 2 below is the Port Strategy MCA process timeline.

Figure 2 IV MCA Process Timeline



3 Critical development & building the evidence base

Criteria Development

As mentioned in Section 2, identifying where Victoria's second container port will be located, requires a number of factors to be considered. In selecting the criteria, consideration was given to ensuring that they are:

- Linked directly to the objectives of the Infrastructure Victoria's mandate
- Complete and relevant – all important criteria are included and redundant criteria are excluded
- Appropriate in size and scope – criteria are appropriate to the relative size, impacts and risk of the identified options
- Practical and address the objectives – criteria can be easily assessed and are able to estimate or measure the outcomes/objectives
- Mutually independent of preference – so that each criterion can be independently assessed without knowing the result of other criteria. This helps prevent double counting and overestimating benefits.

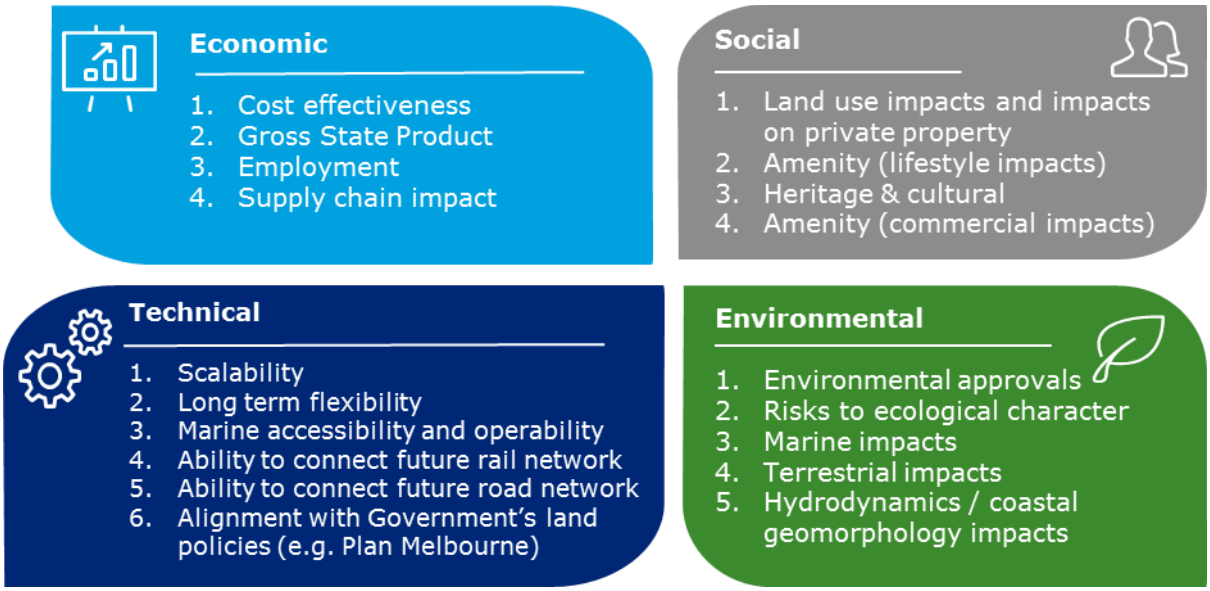
Criteria and the assessment methodology for the MCA were confirmed at an initial workshop held on 12 October 2016 and attended by all work stream leads from both Infrastructure Victoria and the key advisers. The criteria were subsequently reviewed in a second workshop on 7 December 2016 to confirm the most appropriate criteria had been selected and that each criterion was assessed as part of the information gathering phase of the port strategy.

The key advisers informing each of the four criteria were:

Key Advisors	Criteria informed
Deloitte	Economics
Cardno/AECOM	Environmental (Hydrodynamics)
GHD	Environment and Social Engineering
Jacobs	Economic (transport modelling)

The criteria were arranged into four categories (economic, technical, environmental and social) to reflect the areas where port development will impact on Victoria. Each criterion was given equal weight as to its importance in selecting a preferred option.

Figure 3 MCA Criteria



Building the evidence base

Following the development of the MCA criteria, all work streams developed key inputs to inform the assessment methodology for each criteria. These inputs and findings were presented at the MCA workshop by the relevant subject matter expert.

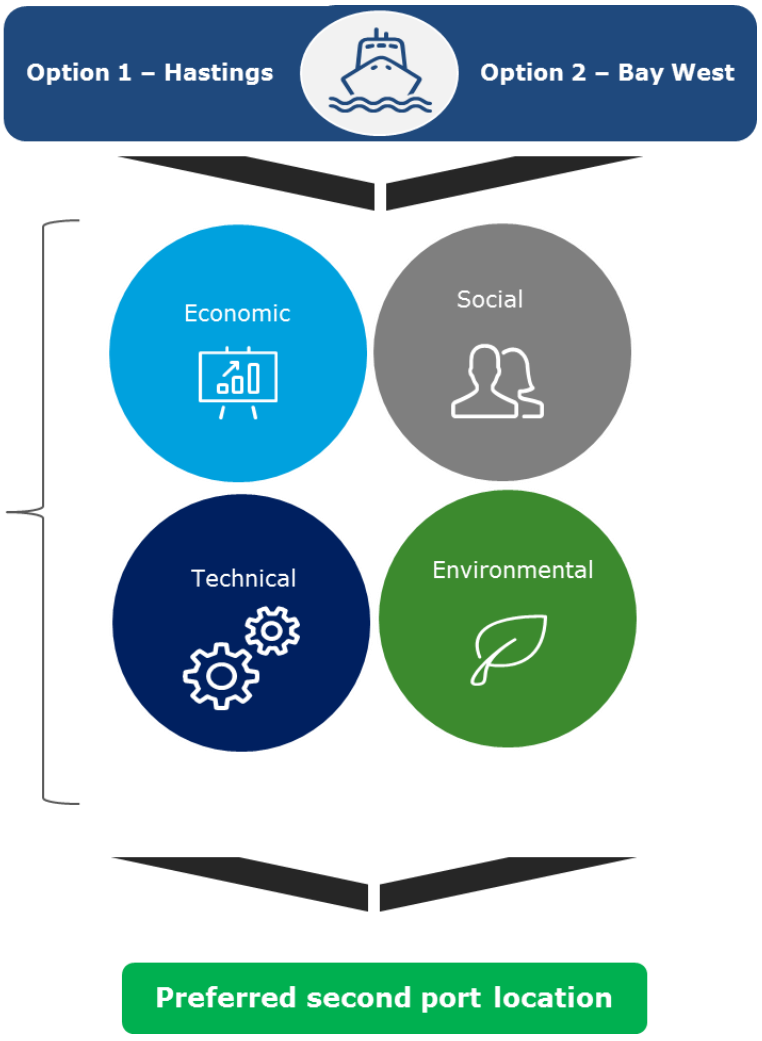
Further detail regarding the assessment methodology for each criteria can be found in Appendix A.

4 MCA Workshop

The MCA workshop is the pivotal step in identifying where Victoria's second container port will be located. It is where all the key findings were presented to the broader project team by the relevant expert to enable a robust assessment of each criterion in selecting the preferred second port location at either Hastings or Bay West. Following the presentation of each criteria, attendees were asked to score each port location against the relevant criteria presented.

The workshops were attended by the Infrastructure Victoria Ports Project team and its key advisors.

Figure 4 MCA Workshop



Ranking	Description
1	Highly Negative
2	Slightly Negative
3	Neutral
4	Slightly Positive
5	Highly Positive

Criteria scores were received 'live' via an online application which enabled workshop attendees to vote independently and not be biased by other views at the workshop

5 Port strategy MCA Results

Table 1 and Table 2 below, outline the MCA workshop results. Table 1 details the results where there is an even weighting applied to each criteria. Table 2 weights each criteria, based on information gathered during public and stakeholder consultations held by the IV throughout the development of the port strategy.

In both the variable weighted and equally weighted alternatives, Bay West scores higher than Hastings as the preferred location for a second port.

Appendix A details the MCA criteria, criteria assessment methodology and non-weighted results for each criteria.

Table 1 MCA Results (equal weighting)

	MCA Total Average Score		
Criteria	**Hastings**	**Bay West**	**Weighting %**
Economic	0.4	0.9	25%
Technical	0.6	0.9	25%
Environmental	0.4	0.8	25%
Social	0.6	0.8	25%
TOTAL	**2.1**	**3.5**	**100%**

Table 2 MCA Workshop results (Varied weighting)

	MCA Total Average Score		
Criteria	**Hastings**	**Bay West**	**Weighting %**
Economic	0.2	0.4	10%
Technical	0.7	1.1	30%
Environmental	0.5	1	30%
Social	0.8	0.9	30%
TOTAL	**2.2**	**3.4**	**100%**

The only circumstances in which Hastings scores higher than Bay West is in an extreme scenario that weights the technical criteria at 97% and the remaining criteria at 1% each. This also requires the sub-criteria of "marine accessibility and operability" to have a weighting of 95%, and all other technical sub-criteria weighted at 1% each.

Appendix A – MCA Results by Criteria

All scores in Appendix A are the raw scores prior to any weighting being applied.

Economic Criteria

			MCA Score	
Criteria	**Description**	**Assessment Methodology**	**Hastings**	**Bay West**
Cost Effectiveness	The total present discounted value of expanding capacity at each of the alternative port sites (Hastings and Bay West).	Takes into consideration not only upfront development and ongoing operational costs, but also supply chain and environmental externality costs	**2.0**	**3.9**
Gross State Product (GSP)	Gross State Product (GSP) is the measure of Victoria's overall economic output. It is the sum of the market value of all final goods produced by industries within Victoria (e.g. manufacturing, construction)	The impact on Victorian GSP from having a port at Bay West or Hasting, relative to the investment required to build the port at these locations. This methodology accounts for crowding out impacts (price of resources adjusts to demand) and funding source (government versus private sector funding). CGE modelling is used to estimate these impacts.	**1.7**	**3.8**
Supply Chain Impact	Supply chain costs are the costs associated with the movement of freight. For the purpose of this analysis, supply chain costs include landside freight transport costs (road and rail) for each of the port options (Hastings and Bay West) at 2046. The landside transport costs will be influenced by the location of the port and where the freight originates or is consumed	Estimate of the impact on the cost of generic supply chains of each port location. The key driver for differentiation between the port options is the distance freight moves from port to final point of consumption (imports) or where freight originates (exports)	**1.8**	**4.0**

Employment	A decision to build a second port will have an effect on the state's employment. This will occur during the planning and construction phases of the new port and there will also be a sustained change in employment as a result of improved efficiency at the new port location and impacts of traffic flows impacting on productivity	The impact of capital and operational development costs of both options, as well as supply chain impacts (relative to continuing with PoM) on Victorian FTE levels. This methodology accounts for crowding out impacts (price of resources adjusts to demand) and funding source (government versus private sector funding). CGE modelling is used to estimate these impacts.	**1.5**	**2.9**

Technical Criteria

			MCA Score	
Criteria	**Description**	**Assessment Methodology**	**Hastings**	**Bay West**
Scalability	The demand modelling and capacity assessment of Port of Melbourne will inform when a new port is required. The timing of when additional capacity is required is critical to ensure the State does not over or under invest. The ability to develop tranches of capacity in stages will help to mitigate this risk.	Estimate the complexity of design, approvals and construction of each capacity tranche for both port options. Assessed at 3m, 6m & 9m TEU capacity. Consider the ability to bring forward or defer stages to mirror demand. Is each capacity tranche "stand alone", both efficient and able to be operated if no further stages were delivered?	**2.4**	**4.1**
Long term flexibility	The criteria will assess whether the second port has the ability to become the State's primary port in the future and whether each option has the capacity to expand to meet long term demand and accommodate alternative trades.	For the port option locations, what is the: - maximum capacity i.e. flexibility for expansion beyond 9m TEU (12m/15m)? Do the port option locations enable: • changes to the port location and layout in design development phase (to mitigate impacts)? • sufficient flexibility to adapt to unforeseen changes /new technologies? • readily accommodate a world class intermodal (rail) facility? • readily accommodate large areas of land for logistics and other port-related uses?	**2.2**	**4.1**

Marine accessibility and operability	The criteria will assess both port options' ability to accommodate foreseeable ship fleet size. It will look at the marine side restrictions of each, and consider required enabling works or potential long term risks to performance.	Foreseeable and maximum ship sizes that can be accommodated? Ie. really large ships in the future up to 26,000 TEU, 460x63m Complexity factor for enabling access for design vessels: - wind, wave and current climate suitability for marine operations - access restrictions that could impact on terminal efficiency (e.g. waiting for right state of the tide)	**4.0**	**2.7**
Ability to connect the future rail network	This criteria will identify current restrictions and enabling works required to connect both port options to the future rail network (sources include the VITM project reference case)	Complexity factor for enabling rail capacity to each port option. Consider: - capex for connections and upgrades to network - impact and disruption to the existing network - capacity on network	**1.4**	**4.2**
Ability to connect the future road network	This criteria will identify current restrictions and enabling works required to connect both port options to the future road network (sources include the VITM project reference case)	Complexity factor for enabling road capacity to each port option. Consider: • Capex for connections and upgrades to network • Impact and disruption to the existing network • capacity on the network	**1.9**	**4.2**

Alignment with Government's land policies (e.g. Plan Melbourne)	This criteria will identify the aligned with current land use policies both now and in the future.	Qualitative assessment of availability of industrial land (for manufacturing and logistics) based on forecast population growth patterns and planned land use, for both port options' locations.	**2.8**	**3.2**

Environmental Criteria

			MCA Score	
Criteria	**Description**	**Assessment Methodology**	**Hastings**	**Bay West**
Environmental Approvals	Environmental approvals are key to site approval for the port development. The key environmental approvals would be identified including the time expected for the approval process. The approval process criteria will consider The assessment process, key assets values and environmental offsets.	Assessment process for key approvals will be informed by the assessment of the other environmental and social criteria Consider time, cost and risk of required approvals.	**1.6**	**3.3**
Risks to ecological character	Assessment of each component of the ecological character for both Ramsar sites based on port footprint and construction / operation impacts. Impacts outside of the Ramsar site will be included in the Marine or Terrestrial assessment. This will tie to the environmental approvals aspect.	Assessment of impacts/risk to essential elements of the ecological character. Consider loss of habitat and species impacted.	**1.3**	**3.7**
Marine Impacts	Potential impacts to inshore waters and surrounding port areas will be assessed in components • Footprint as constructed to assess habitat loss, species impacts and ecological processes • Construction – dredging, contamination etc. • Operation not likely to be included as not expected to be a discriminator.	Assessment of proportion of habitat loss in Port Phillip bay and Western Port bay from footprint Construction impact (temporary or permanent loss) on breeding/roosting sites etc. Consider risk of indirect impact from construction activities, e.g. noise, turbidity.	**1.2**	**3.6**

Marine Impacts	Potential impacts to inshore waters and surrounding port areas will be assessed in components • Footprint as constructed to assess habitat loss, species impacts and ecological processes • Construction – dredging, contamination etc. • Operation not likely to be included as not expected to be a discriminator.	Assessment of proportion of habitat loss in Port Phillip bay and Western Port bay from footprint Construction impact (temporary or permanent loss) on breeding/roosting sites etc. Consider risk of indirect impact from construction activities, e.g. noise turbidity.	**1.2**	**3.6**
Terrestrial Impacts	Potential impacts to terrestrial communities will be assessed in components • Footprint as constructed to assess habitat loss, species impacts and ecological processes • Construction – disturbance of terrestrial communities • Operation not likely to be included as not expected to be a discriminator	Assessment of proportion of habitat loss for associated species in land areas adjacent to footprint. Construction impact (temporary or permanent loss) on breeding/roosting sites etc.	**1.6**	**3.5**
Hydrodynamic/ Coastal Geomorphology	Changes to coastal geomorphological processes from footprint that impact asset values and uses	Assessment of areas of likely change. Magnitude of change will be not assessed Consider: • hydrodynamic factors: changes to currents, waves and water levels and water circulation • Geomorphology factors: changes to shorelines, bathymetry	**2.8**	**2.6**

Social Criteria

			MCA Score	
Criteria	**Description**	**Assessment Methodology**	**Hastings**	**Bay West**
Land use impacts and impacts on private property	These are the impacts of changes in land zoning and planning controls. This may also include other industry consequences. For example local agricultural producers who are required to move due to a new road required for the second port.	Assessment of scale of land acquisition required as direct and indirect (where significant loss of amenity requires acquisition). Targeted to amount of acquisition and the type with capital cost to be included as part of economic analysis [do we have land acquisition costs?]	**1.8**	**3.7**
Amenity (lifestyle impacts)	Proximity to the port option locations, and port triggered infrastructure and its impact on amenity and lifestyle of the area	Assessment of impacts to sensitive receivers for parks, fishing and boating. Consider noise, traffic, visual impact, access and connectivity (residents/recreationists).	**2.4**	**2.6**
Heritage & Cultural	This criteria relates to the level of Aboriginal, cultural and historical heritage impacts.	Potential sites will be identified	**3.1**	**3.1**
Amenity (commercial)	Proximity to the port option locations, and port triggered infrastructure and its impact on tourism/commercial activities in the surrounding areas, eg aquaculture.	Assessment of impacts to tourism/commercial industry. Assessment of impacts of the construction on business operations unable to continue operating/conducting business as usual. Consider noise, traffic, visual impact, access and connectivity (commercial/industry).	**2.8**	**3.0**

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