GOVERNMENT OF
WESTERN AUSTRALIA

WESTPORT
Port and Environs Strategy

WESTPORT

Future Port Recommendations

Stage 2 Report

May 2020

Westport would like to extend our sincere thanks to our stakeholders and the community for their contributions. We also thank the members of the Westport Taskforce for their work.

Nicole Lockwood, Independent Chair, Westport Taskforce

Message from the Independent Chair

Technological disruption, innovation and globalisation of community and industry is evolving at an increasing rate. In this context, the Westport Taskforce's mandate to look afresh at Western Australia's entire freight system and plan for future needs over a 50-year horizon, delivered both a unique opportunity and an enormous challenge. This was highlighted further by the recent impacts of COVID-19, which has reinforced the criticality of our supply chains and complex trade links. Never before have seamless, efficient and scalable port and supply chain operations been so important.

It was a challenge not only for Westport, but for industry, interest groups, government and the broader community. Supply chain infrastructure like ports, roads and rail is often owned by government, but operated by industry and interfaces with community, so it was essential to have everyone around the table to grapple with the complex issues and define potential solutions.

The responsibility delivered to Westport was to develop port and supply chain options that would facilitate growth and prosperity for generations to come. The opportunity was to examine every part of the supply chain; to identify 'weak links'; to assess, and sometimes challenge, existing constraints; and take a 'whole-of-system' perspective in defining solutions for the future.

As the Independent Chair, I have drawn on the insights I have gained from sitting on the Board of Infrastructure Australia and leading the Freight and Logistics Council of WA, along with my experience developing long-term infrastructure plans with government and industry, to ensure the robustness of Westport's process and focus on collaboration. My independence has enabled me to broker effective cooperation across government, as well as engage openly with industry and the community, in order to provide clear advice to Government. As a local resident, I have been very conscious of securing the best long-term outcomes for Fremantle, as well as the broader freight and logistics sectors, to enable future growth for the State of Western Australia.

At the start of the Westport process, I was clear there were no guarantees that everyone would like the outcomes, but that it would be an open, transparent and robust process with clear assumptions. We have provided a regular flow of information about the process and outcomes, and the team has been available to share its work and findings with any individuals and groups who have expressed an interest. The future of this State's freight and trade infrastructure is a matter that impacts all Western Australians, so providing quality information about the current state of our operations and the different trade-offs that may be involved in various future options was a critical part of Westport's process.

Westport is pleased to be recommending two port options that could future-proof Perth's freight network over the next 50 years and beyond – Option D2, a shared model that sees the existing Fremantle port and a new Kwinana port split the container task, before transitioning all freight to Kwinana over time; and Option B, which involves moving all freight from Fremantle to Kwinana in one step. Both options involve constructing a new land-backed port in the Kwinana Industrial Area serviced by an upgraded Anketell Road freight route. The options are still at conceptual stage and need to be further investigated before the overall best option and a transition plan can be determined.

It is significant to note that the freight task is only one part of Perth's complex transport planning challenge. As Perth continues to grow, the biggest issue impacting the metropolitan area's road network – including the capacity of road links into Fremantle – is the growth in passenger vehicles.

Westport's preliminary recommendation to establish a new port in Kwinana may assist in alleviating road safety and capacity concerns by reducing truck movements in the medium-term once the new port is established. Eventually, after the full freight task has transitioned from Fremantle to Kwinana, port-bound trucks will mainly utilise the Tonkin Highway-Anketell Road freight route, bypassing suburban areas altogether.

However, the congestion conversation is far from over. Governments everywhere are tackling the same challenge – the need to develop integrated transport plans that encourage people to utilise alternative modes of transport to reduce the number of cars on our roads. Successfully reducing road congestion would require a major change in our behaviour – one for which we are all responsible.

In the meantime, I would like to thank everyone who has contributed to the Westport project to date for their time, expertise and insights. The input we have received from contributors to the Taskforce has challenged our thinking and shaped our findings. The list of organisations involved is extensive, along with many community members who continue to take an active interest in the progress of our work.

This report marks a major milestone in the journey to secure capacity to accommodate Western Australia's future growth in trade, but is still far from a conclusion. The findings provide Government with a starting point for the next phase of work, which includes more detailed port planning, land use planning and approval processes, environmental approval processes, a business case for new infrastructure, and further work to explore operational improvements to the current facilities at Fremantle. These tasks will also be enormously challenging and require continued collaboration across government and with industry, operators and the community to ensure that all impacts and opportunities have been understood and considered – and that we ultimately achieve the best possible outcome for Western Australia.

We look forward to the Government's decision and the next stage of this important work.

Sincerely,

Nicole Lockwood
Independent Chair, Westport Taskforce

Inner Harbour, Fremantle

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01 Executive Summary

Container stacks at the Inner Harbour, Fremantle

The Western Australian economy is powered by exports and reliant on our imports. The bulk mineral ports of northern WA, including the world's largest at Port Hedland, are major income generators for the State, exporting our abundant natural resources to the world. However, it is the Fremantle Inner Harbour that facilitates access to the products that allow Western Australians to enjoy some of the highest living standards in the world[1]. Imported containers are laden with the everyday consumer products upon which we rely. Groceries, building materials, electronics, medications, wearables and furniture, amongst many other things, are imported in containers. As the primary container import and export facility for Perth and the State, Fremantle is one of the most important pieces of economic infrastructure in WA.

1 http://www.oecdbetterlifeindex.org/countries/australia/

Container vessel at the Inner Harbour, Fremantle

While Fremantle has serviced WA's trade needs for more than 120 years, our population and industries continue to grow, and our freight demands are growing too. Proactive, long-term, holistic assessment and planning is essential to ensure we have the necessary freight infrastructure in place in time to meet forecast demand. This is especially important given the long lead times required to plan, fund and build major heavy infrastructure such as a port.

With these considerations in mind, the Westport Taskforce (Westport) was established by the State Government in September 2017. The purpose of the project was to develop a plan to manage the growing freight demands of Perth and surrounding regions for the next 50 years, and ideally, well beyond – essentially future-proofing Perth's freight network. With a particular focus on the existing port locations at Fremantle, Kwinana and Bunbury, Westport was tasked with undertaking a complete assessment of the ports, associated road and rail links, and intermodal terminals to determine the best long-term integrated freight transport plan to meet the State's needs.

This report marks a significant milestone, arriving at the preliminary recommendations for Perth's new port development; but Westport's work is not completed. It should be noted that:

- more detailed assessment and comparative work is required and the project's findings to date do not form the basis for an investment decision; and
- Westport has focused only on the freight component of the wider transport network.

Westport's future port recommendations

Westport's work to date has identified preferred options for the location and footprint design for Western Australia's future primary container port.

Based on the combined results of a second multi-criteria analysis (MCA-2) and the rapid cost-benefit analysis, the port options that best meet WA's future needs are a shared Fremantle/Kwinana operating model, eventually transitioning to Kwinana over time **(Option D2)** and moving all freight to Kwinana in one step **(Option B)**.

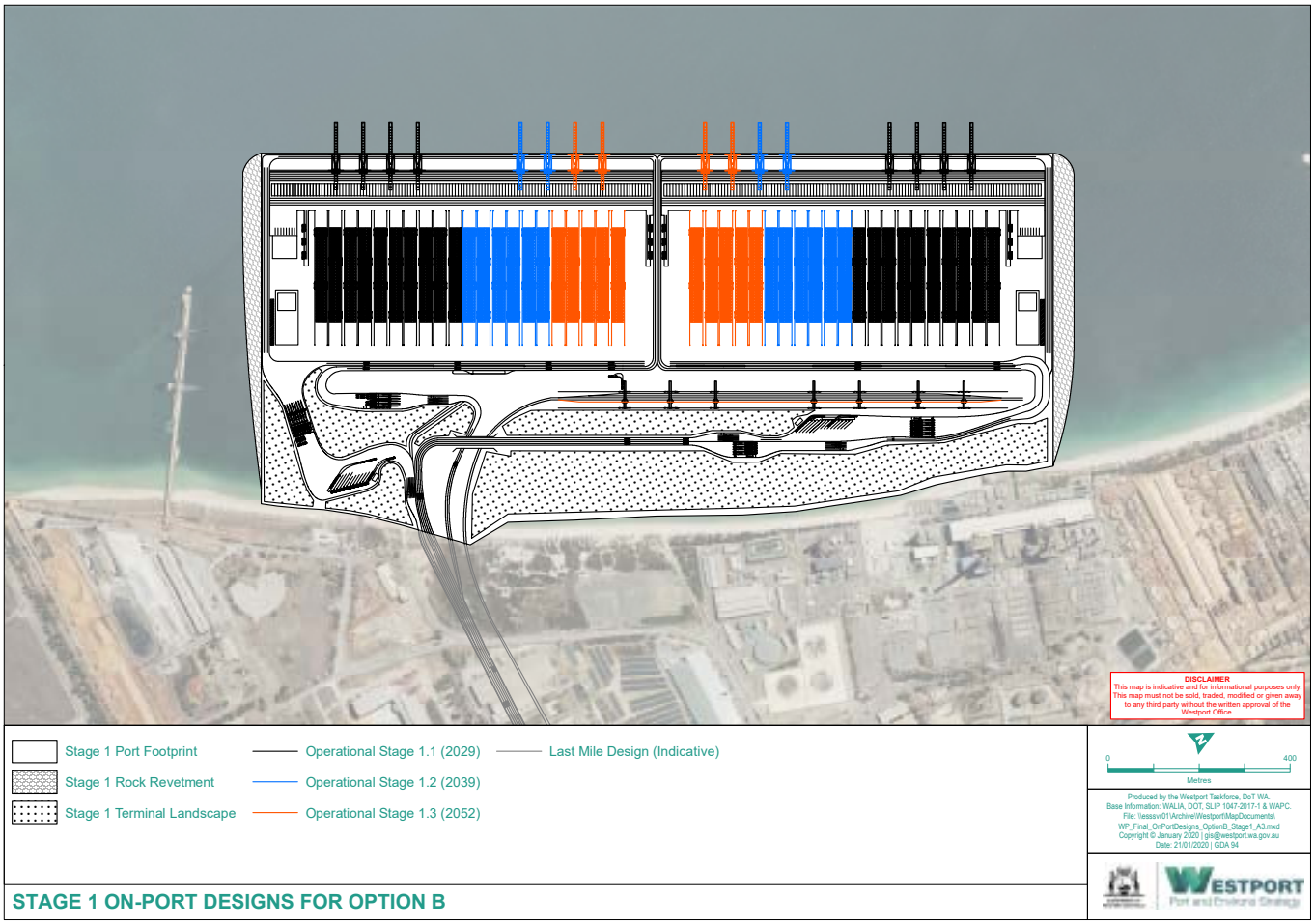
Both port options, should either eventually proceed into construction, can future-proof Perth's freight network, ensure WA's trade and logistics remain internationally competitive, and deliver economic benefits for the whole State.

Option B and the Kwinana component of Option D2 both share the same location, land-backed design and eventual end state (see Diagram 1). The key difference between the options is timing; specifically, either moving trade from Fremantle to Kwinana in one step (as soon as it becomes economically and commercially viable to do so) as per Option B, or transitioning all freight to Kwinana gradually while operating two ports in parallel for a period, as per Option D2. Further work needs to be done to definitively answer the remaining questions around the transition models, stages, timings and costs – this will be Westport's immediate focus in the next phase of work.

Diagram 1:
Artist's impression of the high-level design and location of Perth's future container port in Kwinana

Map 1:

Port footprint and infrastructure for Option B (Stage 1) and Option D2 (Kwinana component)



STAGE 1 ON-PORT DESIGNS FOR OPTION B

"The principal conclusion reached from the Stage 2 work is that port options B and D2 should be recommended for further assessment. The Peer Review Panel supports this recommendation."

Westport Peer Review Panel Stage 2 report, February 2020

Benefits of the recommended options, D2 and B

According to Westport's work to date, Options D2 and B could deliver the following benefits to the State of Western Australia:

- Strongly positive benefit to cost ratios of 1.76 for Option D2 and 1.64 for Option B.
- Potential cost savings for the State, through having a more efficient and cost-effective port and supply chain (based on high level comparative cost analysis).
- Likely cost savings on the transport costs per twenty-foot equivalent unit (TEU, the metric for containers).
- The end state port designs automatically accommodate a throughput capacity of approximately 4.5 million TEUs, which provides excess capacity to the forecast container demand of 3.8 million TEUs by 2068.
- More flexibility to increase the port capacity as required.
- Globally competitive trade infrastructure that may help facilitate the State's economic growth long-term.
- Redirecting a significant number of trucks out of suburban areas and onto the purpose-built Anketell/Tonkin freight route (see Section 8.1 and Map 19) that connects the Kwinana port with the chain of intermodal terminals surrounding the Perth metropolitan area.
- Community development benefits for Greater Perth through increased employment opportunities and attracting more residents that, in turn, generate better conditions for small businesses in particular.
- A possible opportunity to redevelop North Quay and surrounding land, as well as making Victoria Quay amenable to more uses by removing industrial trades from the Inner Harbour that require the current buffer zone.
- Port service industries, logistics companies, and businesses and industries that rely on imports and/or exports may be attracted to available land in and around Kwinana, injecting investment and jobs into the economy.
- Providing long-term certainty and security to businesses, residents, landowners, government, investors, trading partners and other stakeholders.

Context and forecasting

For Westport to reach its preliminary recommendations, it was firstly important to quantify the future freight demand that the port must be able to handle. Westport commissioned Deloitte Access Economics (DAE) to forecast WA's trade requirements out to 2068, Westport's (now 48-year; originally 50-year) end state.

To calculate the container forecasts, a baseline of 770,000 TEUs was used, which was the volume handled at the Fremantle Inner Harbour in 2017-18. Using a complex model of macro and micro economic inputs, along with the latest population forecasts provided by the WA Department of Treasury, DAE calculated a container compound annual growth rate (CAGR) of 3.2 per cent. DAE's model and forecasts were independently peer reviewed by the Western Australian Treasury Corporation, which recommended Westport use a CAGR of between 3.0 and 4.0 per cent. Westport opted to use a CAGR of 3.25 per cent based on advice from industry experts and professional consultants, which extrapolates to an end state container task of 3.8 million TEUs in 2068.

Westport also commissioned a study to investigate when the ultra large container vessels (ULCVs) currently servicing the major hub ports might begin servicing Australia. ULCVs exceed the capabilities of Fremantle's current facilities. It was estimated, based on current shipping fleet trends, that ULCVs might begin arriving at Australian ports around the mid-2040s.

As Fremantle's current infrastructure cannot handle 3.8 million containers or ULCVs, it is important that WA begins planning for alternative facilities in a timely manner. Whether planning begins now or in 20 years' time when the situation is more urgent, the fact is that major infrastructure changes will be required to handle WA's long-term freight task.

The need to commence planning

In line with Infrastructure Australia's (IA) Assessment Framework, Stage 1 of Westport's work set about identifying the problem – the freight network's constraints. The comprehensive findings of Stage 1 are captured in the *Westport: What we have found so far report*[2] (December 2018). One of the most important highlights of these findings was that Fremantle port itself is not the key issue; it is the road and rail links to the Inner Harbour that are the major constraints.

In numerical terms, the Inner Harbour footprint could handle up to 2.1 million TEUs. Westport's peer-reviewed modelling of Fremantle's road and rail linkages, undertaken in partnership with Main Roads WA, the Public Transport Authority and Arc Infrastructure, showed the road and rail networks to the port can only handle around 1.2 million TEUs under current operations. The modelling indicates they will begin to reach capacity around the mid-2030s.

Given Fremantle's capacity can only be as great as its ability to move freight in and out, this limits the Inner Harbour's capacity to around 1.2 million TEUs also – some 0.9 million TEUs below the level previously thought. This means that planning for additional facilities must take place much sooner than expected – especially as it takes an estimated average of five years to plan and five years to construct a port based on the advice from Westport's professional consultants.

2 *Westport: What we have found so far report*, December 2018, Westport Office, https://www.mysaytransport.wa.gov.au/westport-strategy-documents

Container vessel at the Inner Harbour, Fremantle

However, the capacity of Fremantle's supply chain is only one driver behind the need for a new port. There are six main drivers that will determine the need for facilities, and when:

1. increasing road congestion mainly caused by passenger vehicles;
2. bigger ships which exceed the Inner Harbour's capabilities begin arriving;
3. optimisation of port assets, taking into account that Fremantle's wharves are likely to reach their optimal asset life in the next 20 to 30 years;
4. the 'highest and best use' of the Inner Harbour's land shifts away from its current industrial purposes towards residential and commercial use;
5. the Inner Harbour loses its social licence to continue operating; and
6. the broader operating environment, in terms of technology, policy and regulation, and expectations regarding environmental impacts, shifts enough to influence decision-making.

For each of the drivers listed above, a tipping point will be reached, as determined by agreed indicators to be monitored by Westport, that will trigger the need for action. Once a tipping point is reached, the State Government will need to assess whether the better option is to continue investing funds into extending the life of Fremantle, or to commence construction of the new port.

While it may be possible to address some triggers in the near-term with incremental upgrades or operational changes, eventually, the cumulative concerns and costs of these drivers will make the imperative for new facilities indisputable. However, just when that time may occur is a question that must still be answered and will be addressed in Westport's next phase of work.

"The Peer Review Panel concluded that the overall methodology developed to undertake the Westport study was appropriate, comprehensive and well structured."

Westport Peer Review Panel progress report, May 2019

Eight Strategic Options

Westport Stage 1 ran throughout 2018. As outlined in *Westport: What we have found so far*[2], this stage of work closed out with the identification of the Eight Strategic Options. These were eight high-level scenarios outlining how the container trade could be allocated across the three port locations of Fremantle, Kwinana and Bunbury over various time horizons:

Option 1: Theoretical base case, as per IA guidelines

Option 2: Optimise Fremantle and transition to Kwinana over time

Option 3: Optimise Fremantle and transition to Bunbury over time

Option 4: De-industrialise Fremantle and move containers to Kwinana in one step

Option 5: De-industrialise Fremantle and move containers to Bunbury in one step

Option 6: Fremantle and Kwinana both have containers for the long-term

Option 7: Fremantle and Bunbury both have containers for the long-term

Option 8: Only Fremantle has containers for the long-term

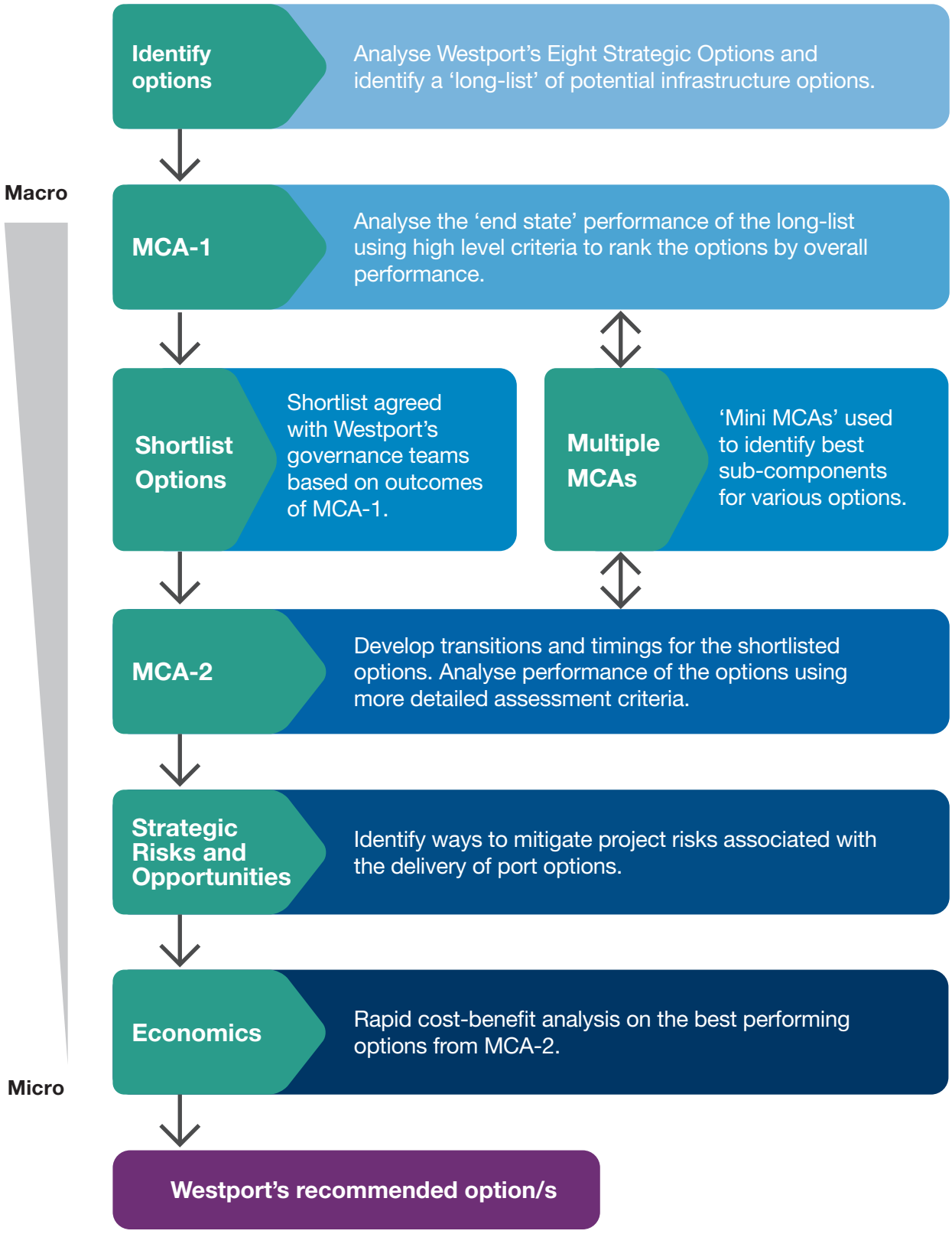
Early in Stage 1, Westport had planned to address all trade types – containers, bulk, general cargo, such as roll-on roll-off cargo, livestock and breakbulk, and even cruise passengers – in parallel throughout the process. However, given the complexity of investigating multiple trades, the specialised requirements for each trade and Westport's time and resource constraints, the project decided to focus only on containers in Stage 2. Other trades may be assessed as part of Westport's future work.

Westport Stage 2 commenced in late 2018 and ran throughout 2019 into 2020. The methodology adopted during this stage of work is depicted in Diagram 2. Westport has undertaken necessary due diligence throughout this stage, particularly around governance.

2 *Westport: What we have found so far report*, December 2018, Westport Office, https://www.mysaytransport.wa.gov.au/westport-strategy-documents

Diagram 2:

Westport's methodology for Stage 2



Identifying the long-list of options

The first step in Westport Stage 2 was to analyse the variable components of the Eight Strategic Options, such as the possible road and rail connections, freight transport modal splits, and port locations/layouts. From here, Westport was able to develop a long-list of diverse infrastructure scenarios, each with differing components, for assessment. The long-list included 25 options with different supply chain scenarios, varying port designs and locations in Kwinana, and several scenarios where the container task was shared between two ports. Of the 25 options, four involved Fremantle, four involved Bunbury and 17 were in Kwinana. The full long-list is detailed in Section 5.1, while *Westport Beacon 6: Westport's long-list of options*[3] displays the high-level designs of the 25 options.

Narrowing to a shortlist

Objectively measuring and assessing numerous, complex infrastructure options, each with pros, cons and trade-offs, is exceptionally challenging. Infrastructure Australia recommends using a multi-criteria analysis (MCA), which is a data-based, objective decision-making tool, to facilitate this process. This approach was followed by Westport.

Westport's first MCA (MCA-1) was undertaken on the 25 long-listed options to reach a shortlist. In consultation with government and industry representatives, Westport developed a broad catalogue of assessment criteria covering the categories of economics, environment, social, land use and governance and operations. The various criteria were then weighted, with the weightings shown in Diagram 9.

The MCA-1 methodology involved a series of facilitated assessment workshops conducted to compare and score the 25 options. These were attended by 78 subject matter experts from 23 different organisations. More than 16 hours of workshops took place, each focused on a different criterion, with proceedings recorded for peer review purposes. Each option was assessed and assigned a comparative score between one (worst) and five (best) against each criterion. The scores for the 25 options were then totalled and ranked. The five top-scoring options became Westport's shortlist.

The most notable outcomes from MCA-1 were:

- all five shortlisted options featured a new port in Kwinana;
- no Bunbury options (Strategic Options 3, 5 and 7) made the shortlist; and
- Fremantle as a stand-alone option (Strategic Option 8) did not make the shortlist.

"Being a resident of East Fremantle and a frequent user of Leach Highway, Fremantle and Port Beach, I found *Westport Beacon 8* to be most informative. In my opinion, *Beacon 8* is a very rigorous assessment of the constraints affecting the long-term use of Fremantle port, and I fully support Westport's conclusion and future investigative focus on this issue."

Ian Le Provost, Environmental Peer Reviewer, December 2019

3 *Westport Beacon 6: Westport's long-list of options*, August 2019, Westport Office, https://www.mysaytransport.wa.gov.au/westportbeacon

Bunbury Port

The four Bunbury options ranked the lowest in MCA-1 due to the high costs involved in duplicating the South West Main Rail Line; the high land transport costs associated with cartage between Bunbury and Perth; and the significant costs associated with removing the basalt that sits approximately 14 metres below sea level under the Bunbury Inner Harbour channel and Koombana Bay.

The stand-alone Fremantle options did not score well in MCA-1 due to the substantial costs and social impacts involved in upgrading the road connections and freight rail line; the major ongoing impacts of running freight through highly urbanised areas on the community; and the high capital costs of extending the port footprint once its current limit is reached. Far from being no-cost or low-cost options, the 'Fremantle forever' options were costlier than most of the Kwinana options, while delivering a sub-optimal result for the State – especially for communities surrounding Fremantle and the freight and logistics industries. In the comparative analysis, it was clear that Kwinana offered superior outcomes to Fremantle across nearly all criteria. The reasons the stand-alone Fremantle options did not make the shortlist are further explained in *Westport Beacon 8: Why Fremantle can't handle the long-term freight task alone*[4].

While initially the shortlist only had five options, Westport's subsequent work made it clear that the transition periods for the two shared Fremantle/Kwinana options had their own complexities and needed to be assessed separately. The shortlist was therefore expanded to seven options to include two new transition options. The seven options are listed in Table 1, while their key features are summarised in Table 2.

4 *Westport Beacon 8: Why Fremantle can't handle the long-term freight task alone*, August 2019, Westport Office, https://www.mysaytransport.wa.gov.au/westportbeacon

Table 1:
Westport's revised shortlist for MCA-2

Option code	Description	Operation
Option A Kwinana	Cockburn Sound North (vicinity Rowley Road) narrow island port with intermodal operations at Latitude 32	End state
Option B Kwinana	Cockburn Sound South (vicinity Anketell Road) conventional land-backed port	End state
Option C Kwinana	Cockburn Sound South (vicinity Anketell Road) conventional island port	End state
Option D Fremantle and Kwinana	Fremantle port shared with Cockburn Sound South (vicinity Anketell Road) medium conventional land-backed port	End state
Option D2 Fremantle and Kwinana	Unmodified Fremantle port shared with Cockburn Sound South (vicinity Anketell Road) medium land-backed port transitioning to Cockburn Sound South (vicinity Anketell Road) land-backed port (Option B)	Transition to Option B
Option E Fremantle and Kwinana	Modified Fremantle port shared with Cockburn Sound South (vicinity Anketell Road) medium conventional land-backed port with Blue Highway	End state
Option E2 Fremantle and Kwinana	Slightly modified Fremantle Port shared with Cockburn Sound South (vicinity Anketell Road) medium land-backed port with Blue Highway, transitioning to Cockburn Sound South (vicinity Anketell Road) land-backed port (Option B)	Transition to Option B

Table 2:
Key features of the shortlisted options

Locale in Kwinana	Port design	Physical features	Option	Fremantle impact	Terminals
North – serviced by Rowley Road	Narrow island	Two berths on port; all landside operations at Latitude 32 linked by 3.2km automated transfer vehicles	**A**	Fremantle closes as an industrial port once it is viable to move all freight to Kwinana	Two 'terminals' at inland IMT at Latitude 32
South – serviced by Anketell Road	Land-backed	Four berths on port initially, and road/rail terminals; container parks on port footprint and nearby land; port capacity and size increased progressively up to 2.5km long and six berths	**B**	Fremantle closes as an industrial port once it is viable to move all freight to Kwinana	Two stevedores operate at each port at all times
			D	Fremantle is assumed to become automated but continues operating indefinitely, handling up to its supply chain capacity	One stevedore each at Fremantle and Kwinana
			D2	Fremantle is not automated; it continues operating until bigger ships or economic factors make it unviable, then all freight transitions to Kwinana	One stevedore each at Fremantle and Kwinana, then anticipated transition to two stevedores at Kwinana
			E	Fremantle rebuilt to accommodate the Blue Highway; continues indefinitely handling up to its supply chain capacity	Two stevedores, each with facilities at Fremantle and Kwinana
			E2	Maintained as is, handling up to its supply chain capacity; operates until moving all freight to Kwinana is viable	Two stevedores at each location
	Conventional Island	Four berths initially and road/rail terminals, onsite container parks on 2.5km long island	**C**	Fremantle closes as an industrial port once it is viable to move all freight to Kwinana	Two stevedores operate at each port at all times

Assessing the shortlist

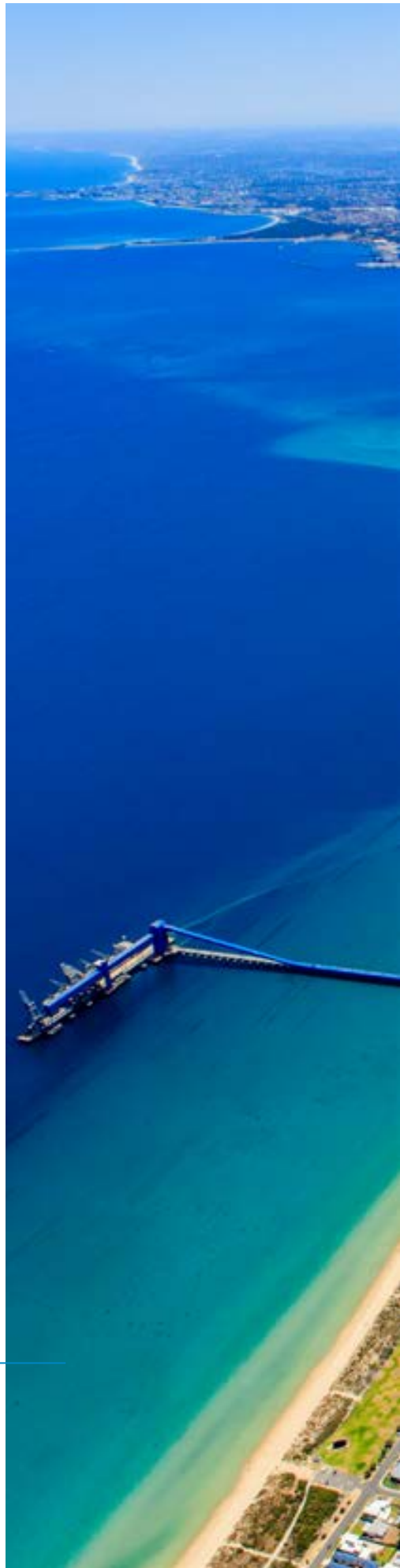
Once the shortlist was determined, Westport launched new investigations for the second, more rigorous MCA (MCA-2). Each option was reassessed for MCA-2 with a clean slate.

While Westport's work in 2019 expanded on the details of the shortlisted options, it is important to note that the project is still in the early planning stages; there are many more steps to be completed before any new infrastructure can be constructed. As the MCAs involve a comparative analysis between options, investigations have focused on the areas that highlight the differences. The options, which are still just concepts, may be subject to change in future stages of work when the more detailed technical design, planning and costings are underway.

The criteria, weightings and inputs were all refined for MCA-2 (see Section 5.5 for details); however, the weightings, scoring and ranking process was largely the same as for MCA-1. Options were again assessed on both the port and supply chain components. The most notable difference in MCA-2 was the significantly higher proportion of quantitative inputs, such as capital and operational costs (CAPEX and OPEX). This added a level of definitiveness to the scores and rankings, while noting they were at a high level for comparative purposes.

While MCA-2's outcomes provided the most guidance in determining the recommended port options, the preliminary recommendations are a combination of overlaid results from three separate assessments:

1. MCA-2;
2. a strategic risk assessment, which considered the risks, opportunities and qualitative criteria that could not be accurately captured through MCA-2; and
3. a rapid cost-benefit analysis on the top-performing options from MCA-2 and the strategic risk assessment.



CBH grain terminal and rail loop in the Rockingham Industry Zone - part of the Outer Harbour

Strengths and weaknesses of the options

The tables below list the comparative strengths and weaknesses of the seven options, as determined through the MCA-2 and risk analysis process.

Option A

Strengths

- Highest complementary land use score due to proximity to vacant land at Latitude 32 to support the operations of the supply chain and port ecosystem, including empty container parks
- Scored well on social criteria with relatively low impact on beach use
- Scored well on supply chain capacity

Weaknesses

- Lowest scoring option on terrestrial environmental criteria due to impacts on Mount Brown and associated Bush Forever sites, as well as the Rowley Road corridor having greater environmental impacts than Anketell Road
- Lowest scoring option on economic criteria – it was most expensive option in NPV terms due to the high upfront costs of constructing the highly automated port infrastructure in one stage, the automated guided vehicle (AGV) connection to the IMT, and building the IMT at Latitude 32
- Rowley Road not as strong as Anketell Road as a freight route (see Graph 7 for details)
- Considerable Aboriginal and non-Aboriginal heritage site impacts
- Port location impacts the Australian Marine Complex channel
- High dredging requirements, with associated costs and marine environmental impacts

Unknowns

- Untested port concept needs further investigation
- Fully automated container transport connection poses risks and possible complexities in organising cargo for export

See Map 3 for Option A's layout and location

Option B

Strengths

- Highest ranked option across most sensitivity assessments, except economic
- Highest performing economic option (i.e. the most efficient port from a cost perspective) on an undiscounted basis (i.e. without discounting all costs to the present day)
- Equal highest scoring option on supply chain capacity, along with Option C, due to leveraging Anketell Road
- Least heritage impacts, along with Options C, D2 and E2
- Scored second highest on social criteria
- Dredging cost and marine environmental impacts lower than most other options

Weaknesses

- Has a high upfront investment cost due to being a one-step transition option, so the Kwinana port must have a larger capacity and all supporting infrastructure in place during the first stage of transition

Unknowns

- Further modelling and assessment required to determine whether a breakwater is required
- Can bulk facilities be incorporated into the port design to negate the risk of displacing the Kwinana Bulk Terminal (KBT)?
- Impacts on a second Water Corporation desalination plant in Kwinana and other surrounding industries and properties needs to be further investigated
- Land availability in Kwinana to support the operations of the supply chain and port ecosystem, including customs, truck marshalling areas and empty container parks, must be assessed

See Map 6 for Option B's layout and location

Option C

Strengths

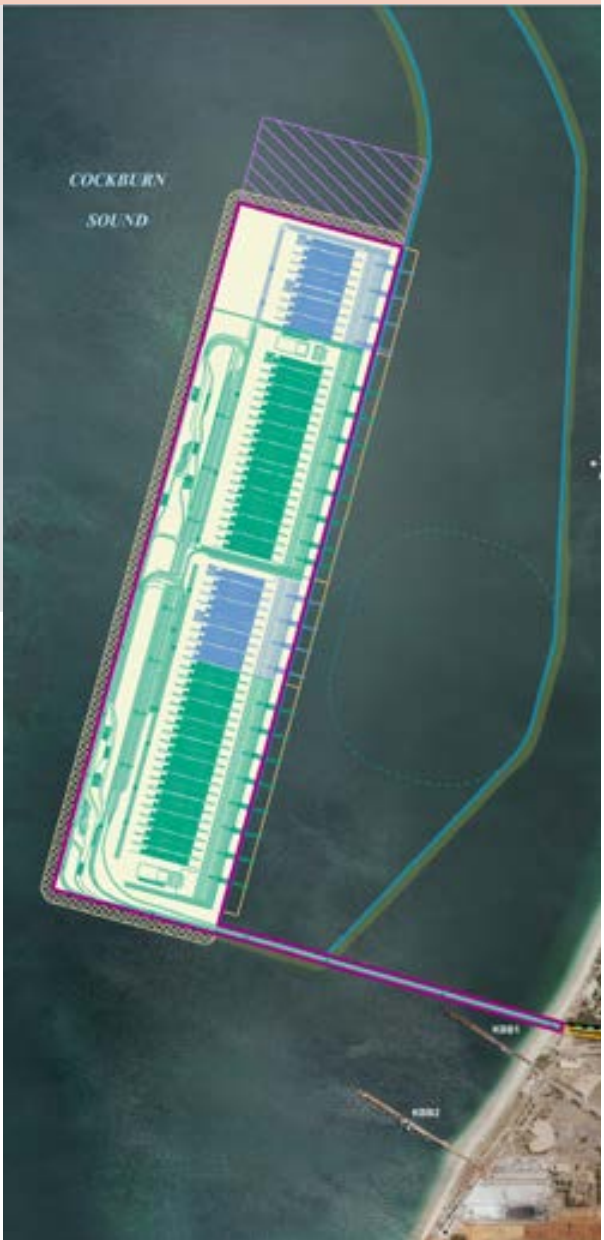
- Equal highest scoring option on supply chain capacity, along with Option B, due to leveraging Anketell Road
- Least heritage impacts, along with Options B, D2 and E2
- Scored better than Option B on beach access, as it does not impact the Barter Road beach
- Lower risk profile as the port design does not affect KBT
- Port design gives natural breakwater protection for vessels

Weaknesses

- Higher benthic habitat impacts due to the large area of infill for the port footprint and more significant habitat loss
- Highest dredging requirements, with associated costs and marine environmental impacts
- Reliance on a single causeway bridge is a risk
- Has a high upfront investment cost due to being a one-step transition option, so the Kwinana port must have a larger capacity and all supporting infrastructure in place during the first stage of transition

Unknowns

- Is there an opportunity to incorporate KBT landside within the protected waters provided by Option C's port design?
- Impacts on surrounding industries and properties needs to be further investigated
- Land availability in Kwinana to support the operations of the supply chain and port ecosystem, including customs, truck marshalling areas and empty container parks, must be assessed



See Map 8 for Option C's layout and location

Option D

Strengths

- Scored well on economic criteria as this option leverages Fremantle port over the long-term
- Scored well on environmental criteria as the Kwinana port component will have a smaller footprint than Option B

Weaknesses

- Weakest performing option overall
- Relying on the Fremantle supply chain long-term means this option scored lowest by a significant margin on supply chain capacity, along with Option E
- Significant dredge campaign required as both Fremantle and Kwinana would require dredging to 18 metres (with associated costs and environmental impacts)
- By far the lowest scoring option on social criteria due to significant ongoing supply chain impacts on the communities around Fremantle
- High Aboriginal and non-Aboriginal heritage impacts in the Fremantle area
- Operating cost inefficiencies due to duplicating port, stevedore and supply chain infrastructure and business operations across two ports

Unknowns

- Commercial viability and ongoing economic impacts to the State of simultaneously running two ports within close proximity needs to be further investigated
- Can Fremantle continue to operate at full capacity while undergoing major infrastructure changes?
- Impacts of the Kwinana port on surrounding industries and properties needs to be further investigated
- Land availability in Kwinana to support the operations of the supply chain and port ecosystem, including customs, truck marshalling areas and empty container parks, must be assessed

See Map 10 for Option D's layouts and locations

Option D2

Strengths

- Highest scoring option overall
- Maximises the life and value of the Fremantle asset without requiring any major investment in Fremantle
- Best scoring option on economic criteria due the phased investment and construction period, and because it eventually operates as Option B (the most efficient operation)
- The Kwinana port eventually transitions into Option B, which is the optimal end state. It has the highest supply chain capacity, comparatively low environmental impact and low heritage impacts
- Equal top scoring option on heritage, along with Options B, C and E2

Weaknesses

- Lower score on supply chain capacity due to the constraints facing Fremantle
- Lower score on social criteria due to a longer period of impact on the Fremantle community
- Operating cost inefficiencies due to duplicating port, stevedore and supply chain infrastructure and business operations across two ports

Unknowns

- Westport has assumed that Fremantle would not be automated during the shared operating period, but this would need to be further investigated
- Impacts of the Kwinana port on surrounding industries and properties needs to be further investigated
- Land availability in Kwinana to support the operations of the supply chain and port ecosystem, including customs, truck marshalling areas and empty container parks, must be assessed

See Map 13 for Option D2's layouts and locations

Option E

Strengths

- Highest scoring option on marine environmental criteria due to there being no requirement for dredging within Cockburn Sound
- Scored well on economic criteria as this option leverages Fremantle's existing assets for the long-term, has lower dredging costs, a smaller port footprint in Kwinana and no rail connections in Kwinana

Weaknesses

- Second weakest performing option overall
- Relying on the Fremantle supply chain long-term means this option scored equal lowest by some margin on supply chain capacity, along with Option D
- Second lowest scoring option on social criteria due to significant ongoing impacts on the community around Fremantle
- Weakest performing option on heritage due to the impacts on Aboriginal and non-Aboriginal heritage sites in the Fremantle area
- Equal second lowest scoring option on the availability of complementary land near Fremantle
- Higher operational costs due to double handling of containers
- Operating cost inefficiencies due to duplicating port, stevedore and supply chain infrastructure and business operations across two ports

Unknowns

- Untested port concept needs further investigation
- Could Fremantle continue to operate at full capacity while undergoing major infrastructure changes?
- Would the market be willing to accept a Blue Highway mode of transport?
- Would the Blue Highway be viable given the relatively short barging distance?
- Commercial viability and ongoing economic impacts to the State of simultaneously running two ports within close proximity needs to be further investigated
- Ability of the system to accommodate the high growth scenario forecast of 5.4 million TEUs

See Map 14 for Option E's layouts and locations

Victoria Quay at the Inner Harbour, Fremantle

Option E2

Strengths

- Third highest scoring option overall
- Maximises the life and value of the Fremantle asset without requiring any major investment
- Second highest scoring option on economic criteria due the phased investment and construction period
- The Kwinana component eventually transitions into Option B, which has the highest supply chain capacity, relatively low environmental impact, very low heritage impacts and plenty of complementary land available
- Equal top scoring option on heritage, along with Options B, C and D2

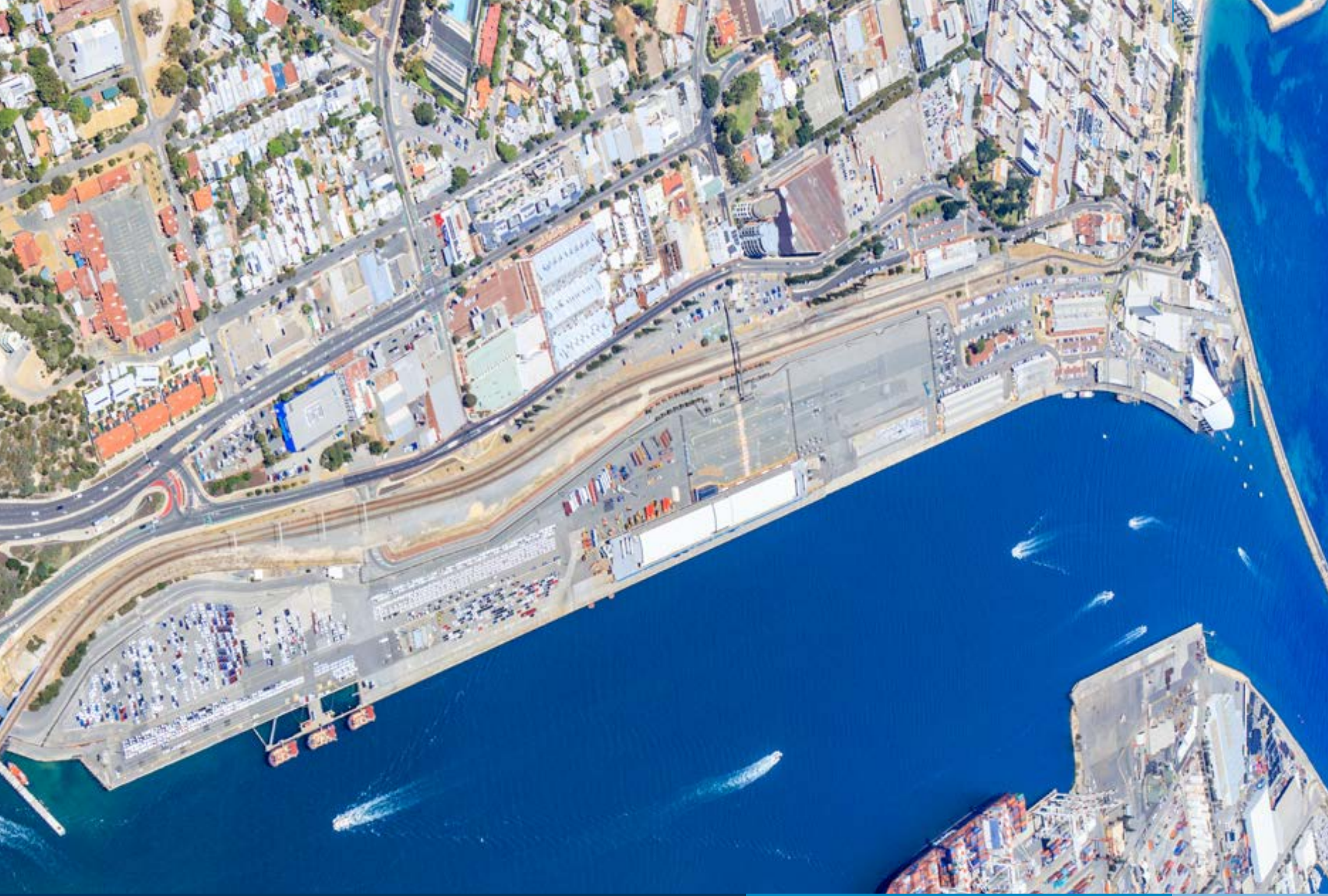
Weaknesses

- Relying on the Fremantle supply chain long-term means this option scored by far equal weakest on supply chain capacity, along with Option D
- Lower score on social criteria due to significant ongoing impacts on the community around Fremantle
- Higher operational costs due to double handling of containers
- Operating cost inefficiencies due to duplicating port, stevedore and supply chain infrastructure and business operations across two ports

Unknowns

- Westport has assumed that Fremantle would not be automated during the shared operating period, but this would need to be further investigated
- Can Fremantle continue to operate at full capacity while undergoing major infrastructure changes?
- Would the market be willing to accept a Blue Highway mode of transport, especially given the large investment required for a relatively short timeframe (approximately six years)?
- Would the Blue Highway be viable given the relatively short barging distance?
- Impacts of the Kwinana port on surrounding industries and properties needs to be further investigated
- Land availability in Kwinana to support the operations of the supply chain and port ecosystem, including customs, truck marshalling areas and empty container parks, must be assessed

See Map 18 for Option E2's layouts and locations



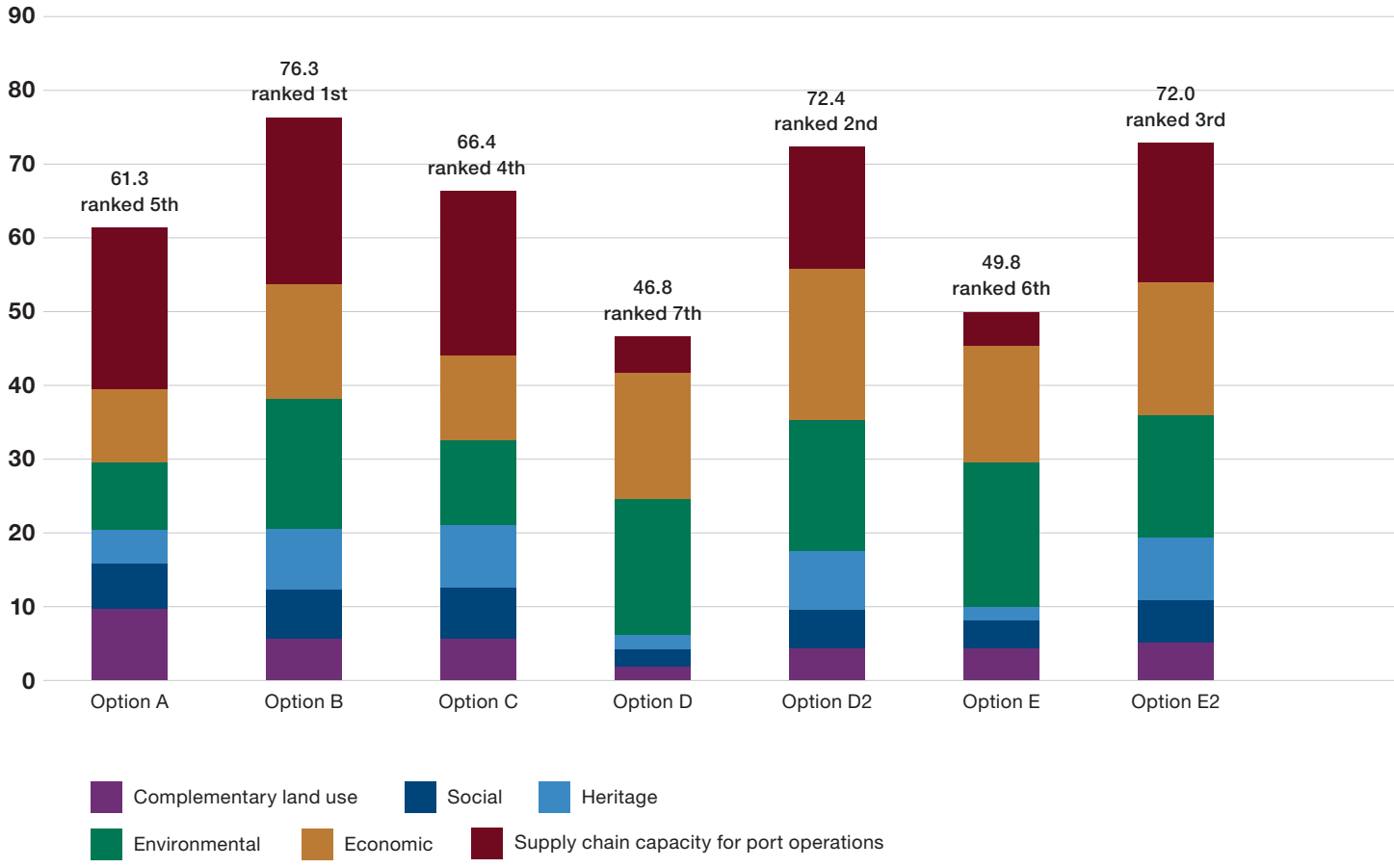
The scores assigned to each option against each criterion were normalised across a range for each criteria with the worst performing option receiving the lowest score and the best performing option receiving the highest score. The cumulative normalised MCA-2 scores across all criteria for the seven shortlisted options are shown in Graph 1. As mentioned, higher scores are better in this analysis, so the taller the bar, the better that option performed in the MCA-2 process.

Options D2, B and E2 performed the strongest overall in the MCA-2 assessments; however, it was determined that the commercial and operational risks posed by the short-term Blue Highway mode of transport in Option E2 were too significant to warrant that option being progressed any further in Westport's process.

From the MCA-2 rankings and risk analysis results, the Westport project team and governance committees endorsed taking Options B, C and D2 through to the rapid cost-benefit analysis. Though Option E2 scored well in MCA-2, its commercial and operational risks made it unfeasible to progress through to the RCBA.

Graph 1:

Total normalised scores for Westport's shortlisted options in MCA-2



Rapid cost-benefit analysis

Westport is still in the options comparison phase, so only the 'headline' (most prominent) costs and benefits have been developed for the seven shortlisted options. Based on this, Westport has used a rapid cost-benefit analysis (RCBA) to assess the benefits and costs for this stage. A thorough cost-benefit analysis of the recommended options will be conducted as part of Westport's business case development in the next stage of work.

Western Australian Treasury Corporation (WATC) conducted Westport's RCBA on Options B, C and D2, using the theoretical Fremantle base case of 'doing the minimum' as the baseline for comparison. WATC developed a complex model incorporating more than 23,000 unique formulas to calculate the RCBA results and the economic criteria assessed in the MCA-2 process.

The RCBA determined the benefit to cost ratios (BCR) for the three options. A BCR measures the economic benefits, capital (CAPEX) and operational (OPEX) costs in net present value (NPV) for the lifespan of the project, compared to the theoretical base case. If the resulting BCR is greater than 1.0, it indicates the project will produce a positive economic result.

The BCRs for Westport's three options were:

1. Option D2 – 1.76
2. Option B – 1.64
3. Option C – 1.55

The results

Option B was the strongest performing option overall in MCA-2. However, Option D2 was the strongest performing option in the RCBA. These two options both propose the same port design (land-backed), location and eventual end state in Kwinana; however, some questions remain over the economic and financial impacts of each option, and the optimal transition timings and stages. There is also the need to undertake much more thorough environmental assessments.

It is preferable for only two options to be taken forward to the next phase of investigation, as this allows research efforts and resources to be much more focused. To that end, Westport recommends taking both Options B and D2 through to the next stage of work. This recommendation has been reviewed and approved by Westport's governing committees.

Next steps and further work

Westport's next stage of work will involve addressing identified knowledge gaps and compiling a rigorous repository of data and information to enable the development of a business case.

In the next stage of work, Westport will:

- further investigate the supply chain capacity of Fremantle;
- develop a detailed transition plan, including costs, trigger points and stages;
- investigate how to minimise impacts on properties and industries in Kwinana;
- undertake detailed engineering assessments;
- implement rigorous environmental studies and assessments with a view to commencing the environmental approvals process;
- develop granular costing, financing and commercial strategies;
- assess the availability of land in Kwinana to support the operations of the supply chain and port ecosystem, including customs, truck marshalling areas and empty container parks;
- assess planning strategies and costs to secure the land required for the port ecosystem and supply chain corridors; and
- continue to engage with the community and stakeholders, including Aboriginal people.

Westport acknowledges the significance of Cockburn Sound as a vital habitat and recreational area, and the preservation of this environment is a key priority. Westport is recommending a comprehensive package of environmental and social initiatives is developed to offset the potential impacts of a new port, or achieve net benefits for Cockburn Sound and the community. These measures may include:

- funding for seagrass research and regeneration programs;
- dredge spoil to be deposited in areas suitable for seagrass regeneration to create offsets and net seagrass gains;
- investment in research on the potential impacts on a range of key species, including forage fish forming important trophic links, pink snapper, blue swimmer crabs, little penguins and bottlenose dolphins, and in protecting key habitats, sensitive ecological periods and foraging/spawning areas;
- new or alternative facilities and amenities for recreational boating and fishing;
- a new horse beach to offset the loss of Barter Road beach;
- operational planning to investigate the impacts and opportunities for recreational boating in Cockburn Sound;
- the investigation of Aboriginal economic, social, cultural and creative opportunities; and
- the engagement of community working groups to help identify opportunities and provide ongoing input.

Kwinana Bulk Jetty and BP jetty in the Outer Harbour

"The Panel has concluded that the principal conclusion from the MCA-2 analysis and Report is sound. It commends the detailed work that has been undertaken in assessing the shortlisted options and the rigour applied through sensitivity tests, consultations and merit assessments undertaken to verify their circumstances and relative rankings."

Westport Peer Review Panel Stage 2 report, February 2020

02

Artist's impression of on-site infrastructure at the future Kwinana port

Drivers for a New Port

While Westport has previously highlighted supply chain constraints as a major impediment to the long-term viability of Fremantle port, there are several other factors impacting its ability to operate as Perth's stand-alone port in the future. It is important to understand that there is actually a tapestry of six complex, interwoven drivers that will eventually combine to make the need for new port facilities indisputable.

The six drivers for a new port were identified through a series of facilitated stakeholder workshops conducted in partnership with Fremantle Ports. Once the main drivers were identified, participants then assessed how these drivers may impact Westport's project timing; how and when the trigger points for action may manifest for each driver; and indicators that can be monitored and measured as barometers on when required actions may be imminent.

The six drivers for a new port are:

1. Increasing road congestion

Congestion on the road networks servicing the Inner Harbour caused by increases in passenger vehicles is gradually inhibiting access to the port for freight vehicles. While this is a problem that impacts the port, it is not being caused by the port – rather, it is being caused by growing density levels without corresponding increases in road capacity or changes in behaviour, and is an issue that is impacting many parts of the Greater Perth road network. Increasing road capacity will impact social amenity, so the community would have to be willing to accept that trade-off.

2. Bigger ships

As outlined in Section 3.3, the container vessels servicing Perth will eventually exceed the Inner Harbour's capabilities. While longer and wider ships might be facilitated through some fairly minor upgrades or operational changes, vessels that require the Inner Harbour channel to be deepened at substantial cost and impact to port operations may be better accommodated by a new port.

3. Asset optimisation

The Inner Harbour has a considerable portfolio of infrastructure assets, including channels, seawalls, breakwaters, berths, jetties and other built infrastructure – representing many millions of dollars of both public and private investment. There is a need to consider optimising the lifespan of these assets; however, Fremantle's wharves are likely to reach their optimum asset life in the next 20 to 30 years. By this time, a clear plan for asset renewal or replacement must be established that balances related risks and costs while considering the need to maximise service delivery for port customers.

4. Land value

At some point in the future, the 'highest and best use' of the Inner Harbour's land will move away from its current industrial purposes towards being redeveloped for residential and commercial use. This was the case with Darling Harbour, Circular Quay and Barangaroo in Sydney, Docklands in Melbourne, Cape Town in South Africa, and Rotterdam in the Netherlands.

5. Social licence

The Inner Harbour relies on the goodwill of the communities surrounding both the port and its freight corridors to continue operating. However, changing social expectations are placing greater pressure on industrial land uses that interact with residential uses. The standards the community now expects may not be compatible with a working port. In Fremantle's case, growing impacts on nearby residents, such as more emissions, noise and vibration from increasing freight movements, may eventually erode the Inner Harbour's social licence to operate.

6. Environment

This driver is divided into three sub-areas that may influence decision-making:

a) **the natural environment:** the timing and conditions of Westport obtaining environmental approvals for the new port may impact the lifespan of Fremantle;

b) **legislative and regulatory environment:** the imposition of new legislative or regulatory controls – such as emissions caps, planning scheme changes, security exclusion zones, economic approvals and financing availability – may either accelerate or inhibit a shift from Fremantle to Kwinana; and

c) **technological environment:** advances in technology impacting freight and trade – such as an uptake in 3D printing, new logistics methods (i.e. a shift away from containers), autonomous vessels, or changes in consumer habits – may either accelerate or inhibit the need for a new port.

Fremantle traffic bridge and the rail bridge over the Swan River

Each of the six drivers will, at some stage, reach a tipping point that will trigger the need for a decision from Government. Once a tipping point is reached, the Government will need to decide whether to continue investing to extend the life of Fremantle, or whether it is a more effective use of money to commence construction of the new port.

Clearly explaining and tracking the six drivers, along with their trigger points and indicators, will ensure that future Government investment decisions are underpinned by clear, defensible rationale and transparent information. This will also help to reassure the community that new facilities are being delivered only when there is an economic and/or commercial imperative to do so.

Predicting the timings of when any of the six drivers will reach their trigger points is problematic, as they are highly dynamic and influenced by variables outside of Westport's and the Government's control. Therefore, ongoing monitoring is essential to ensure that the Government can make a decision as soon as it is required.

While it may be possible to solve some issues with incremental upgrades or operational changes at Fremantle in the near-term, eventually, the cumulative amount of work and costs to keep addressing all six drivers will make the transition to a new port a more fiscally sensible option.

The triggers for each driver will be measured and reported on transparently on a regular basis. These indicators will act as barometers to help the State Government determine likely timeframes for when new facilities may be required.

Diagram 3:

Six drivers that may trigger the need for a new port

04

Environment

Environmental issues must be addressed for any new development.

When and how might these trigger a new port commencement?

05

Social Licence

Freight and communities need to live together.

What's the right balance between our collective freight needs and social amenity for those living on the freight network and near the port?

06

Land Value

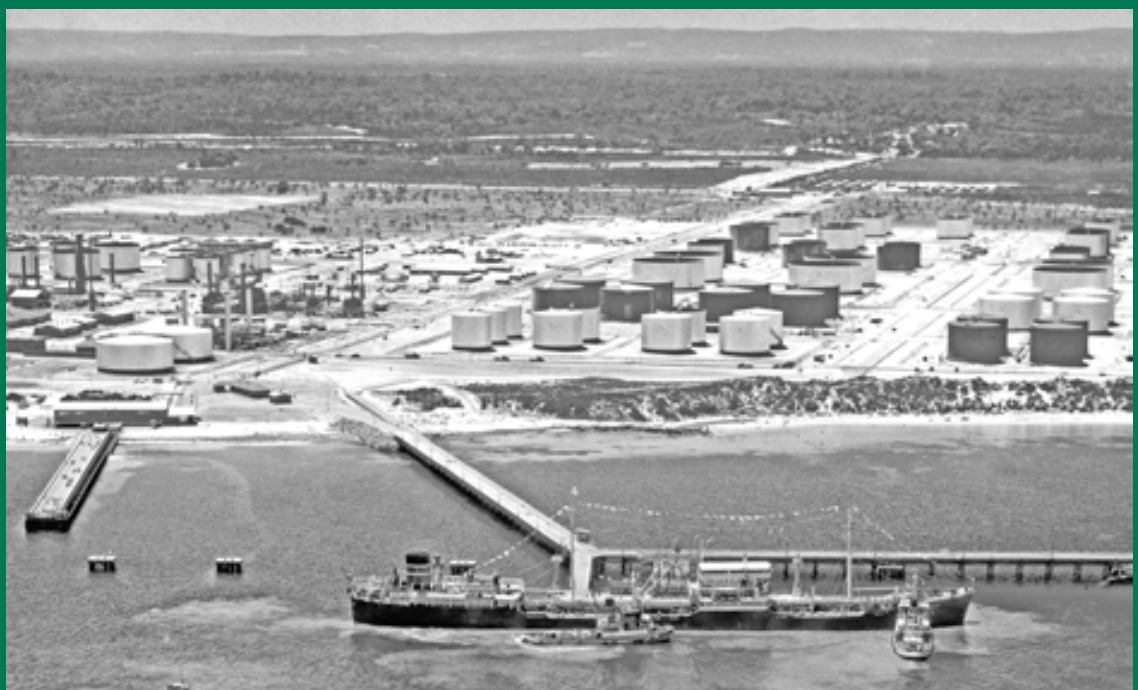
Valuable land around both Fremantle and Kwinana can be used for freight or residential and commercial purposes, depending on time and demand.

What decisions do we take?

The world's largest container ship in 2019, the OOCL Hong Kong, which can carry up to 21,413 TEUs. Photo credit: Malte Kopfer, www.maritime-fotos.de/

Bottom: Opening of the Oil Refinery Jetty Kwinana in 1955. Image courtesy of Fremantle Ports

03 Contextual Considerations



3.1
History of Outer Harbour port planning

Since it first opened more than 120 years ago in 1897, the Fremantle Inner Harbour has effectively serviced the freight needs of Perth and the surrounding regions. The port has adapted to numerous changes in freight and transport trends over the years, most notably the arrival of the international shipping container trade in 1969. Yet, the question has always been: what happens when the Inner Harbour reaches its capacity?

Battlecruiser HMS Renown at the Inner Harbour for a visit by the Duke and Duchess of York, 1927

Image courtesy of the State Library of Western Australia.

Since the 1950s, Perth's planning scheme has anticipated the development of the city's next major overflow port in the Outer Harbour – the ocean-side companion to the Inner Harbour, extending from the mouth of the Swan River out to Rottnest and encompassing Owen Anchorage and Cockburn Sound, one of the State's rare natural embayments, to the south. The Outer Harbour already includes five operational bulk jetties that service nearly as many ships each year as the Inner Harbour. Like the Inner Harbour, the Outer Harbour comes under the management of Fremantle Ports, a State Government trading enterprise that owns and operates two of the bulk jetties in the area. The remaining three bulk facilities are under private ownership or management. Planning provisions have been made for the proposed Outer Harbour port, with relevant road and rail corridors largely identified in strategic planning with some corridors already having protection in place.

It is recognised that Cockburn Sound is a significant marine habitat and one of the busiest recreational waterways in Western Australia. However, many alternative port locations, including Wilbinga, Bunbury, Breton Bay and North Fremantle, have been assessed over the years to determine if there is another site suitable for a major port in proximity to the Perth metropolitan area. The answer was no; only the Outer Harbour had the road and rail links, immediacy to the metro area and industry, and segregation from residential land uses required to be a viable alternative site to Fremantle.

No less than eight Outer Harbour and port planning exercises have been undertaken since the 1950s. One private port consortium, which had signed a formal operating agreement with the then-Court Government in 2000, put forward a port design that featured a container and general cargo port with dredged channels, turning basin and berthing pocket, and a cargo wharf on reclaimed land in Cockburn Sound. However, for many reasons, the proposal did not move forward.

Nonetheless, the need for a new port to handle future freight demand remained and was supported by both sides of Government. This led to the Kwinana Quay proposal for a container port in Cockburn Sound, which was developed by Fremantle Ports. This proposal underwent significant assessment and even undertook the precursor studies to environmental approvals. Although the proposal was subsequently withdrawn, the knowledge, information and work undertaken for the Kwinana Quay proposal was not lost, as Westport has leveraged Fremantle Ports' work and lessons learned into the project's process where possible.

3.2 Long-term container trade forecasts

The volume of shipping containers imported and exported to and from Greater Perth in 50 years' time is a key factor in Westport's process and outcomes. It was imperative that all Westport's port and supply chain options could comfortably handle the forecast volume of containers for the long-term. To that end, Westport commissioned Deloitte Access Economics (DAE) to forecast WA's trade requirements for 2068, which is Westport's end state.

Starting with a baseline of 770,000 TEUs, which was the volume handled at the Fremantle Inner Harbour in 2017-18, DAE used a complex model of macro and micro economic inputs to calculate the long-term forecast. When the model was first run in 2018, the result was a container compound annual growth rate (CAGR) of 2.8 per cent, which equated to an end state container volume of 3.1 million TEUs by 2068.

In early 2019, DAE adjusted its model in line with updated population forecasts from the WA Department of Treasury. The recalculated CAGR increased to 3.2 per cent, but was still conservative compared to the average 5.4 per cent annual container growth rate at Fremantle over the past 20 years.

DAE's model and forecasts were independently peer reviewed by the WATC, which carried out extensive analysis of container growth rates, industry trends and historic data in Western Australia, Australia and internationally. It sourced market research, stakeholder feedback, long-term forecasts from Fremantle Ports and other Australian ports, and economic and industry reports from WA and Australian government agencies, Drewry Maritime Consulting and Indec Consulting. Drewry was forecasting long-term growth rates of between 3.9 and 4.7 per cent, while Melbourne, New South Wales and Brisbane ports were forecasting growth rates of between 3.5 and 4.5 per cent.

Following its review, WATC recommended that Westport use an annual growth range of 3.0 to 4.0 per cent to calculate container forecasts. Westport settled on the conservative CAGR of 3.25 per cent, which results in a container trade volume of 3.8 million TEUs by 2068.

3.3 Future shipping trends

Container ship sizes and their carrying capacities have increased 1,200 per cent since 1969 when containers were first shipped to Fremantle. Technical advancements in the past two decades in particular have seen substantial capacity increases, as shown in Diagram 4.

Container vessels that call into Fremantle are nearly always assigned to the Australian/Asian shipping routes, meaning they are either passing through Fremantle en route to the eastern states of Australia from South East Asia, or vice versa. Vessels on the Australian/Asian routes tend to be small by global standards, ranging in size from 1,100 TEUs (147m in length) to 8,266 TEUs (318m in length).

Current data shows that:

- in 2019, around 35 per cent of the existing global fleet was 8,000 to 14,000 TEUs in capacity (300m to 366m in length); and
- nearly 80 per cent of ships on order in 2017 hold more than 10,000 TEUs (longer than 350m).

The largest container vessels currently in operation globally have capacities of more than 18,000 TEUs. While these vessels exceed the depth, channel width, and crane/yard capacities of Fremantle, it is highly unlikely that these giant vessels would visit Perth in coming decades due to economic reasons and similar constraints at other Australian ports.

Looking 50 years ahead to Westport's 2068 end state, the global shipping situation is likely to be very different. This has major implications for planning.

Arup, an independent firm of designers, planners, engineers, architects, consultants and technical specialists, undertook an analysis of trends in global shipping fleet distributions to determine the specifications of the container vessels likely to visit WA in coming decades. These ship specifications are a vital input for future planning, informing elements including the berth lengths, channel capacities and terminal equipment required in a future port.

Diagram 4:

Increase in container ship sizes in the global fleet between 1968 and 2018

50 years of container ship growth

Based on peer-reviewed rationale, Arup predicted that three types of vessels are likely to call at Perth over the next 50 years:

1. **Feeder Service Vessels** shuttling between Perth and hub ports in South East Asia (Singapore, Colombo etc.) with an average TEU capacity of 3,500. These ships may comprise around 40 per cent of visits to Perth;
2. **Regional Swing Vessels** calling at multiple ports in the Indian Ocean, Asia, Australia Pacific and on the United States western coast, with an average TEU capacity of 6,500. These ships may comprise around 20 per cent of visits to Perth; and
3. **Long-Range Swing Vessels** operated by shipping consortiums originating in North Asia and Europe, calling at all major Australian ports. Their average capacity will be 18,000 TEUs and they may make up around 40 per cent of ship visits to Perth.

It is important to determine if/when Long-Range Swing Vessels (LRSV) may begin servicing Australian ports, as this marks an important decision-making milestone – should the Government invest in expanding Fremantle's width and depth, or move to the Kwinana port?

Estimating the timing of larger container ships calling into Australian ports is an inexact science influenced by many variables, including globalisation of trade, technology, aggressiveness of shipping companies, new routes opening (such as those enabled by the new Panama Canal Locks which opened in 2016), advantages of scale, economic and political factors, and whether the size of ships continues to increase. The economic lifespan of a container ship is about 20-25 years, which also factors into fleet planning and running out the life of older vessels.

Taking these trends into account, Arup's view is that operators will seek to redeploy their larger ships on secondary routes (such as Australia) toward the end of their economic lives. If that holds true:

- operators of the current fleet of Neopanamax class of ships (15,000 TEUs capacity and 366m length) may redeploy their vessels to Australia towards the end of the 2020s; and
- recently or soon-to-be constructed ULCVs with a capacity of 18,000 TEUs and length of 400m may start to be redeployed to Australia from the early 2040s.

Fremantle has been capable – up to current times – of handling the largest container ships to visit Australia, which can carry up to 9,400 TEUs and measure 300 metres in length. However, the deployment of ULCVs to Australian ports, if/when that occurs, could signal the end of Fremantle's term as Perth's only container port.

"…the Panel believes the work undertaken to date is strategically focused, thorough and of a high standard."

Westport Peer Review Panel progress report, May 2019

04 Governance, Due Diligence and Frameworks

Westport Reference Group briefing, 29 August 2019

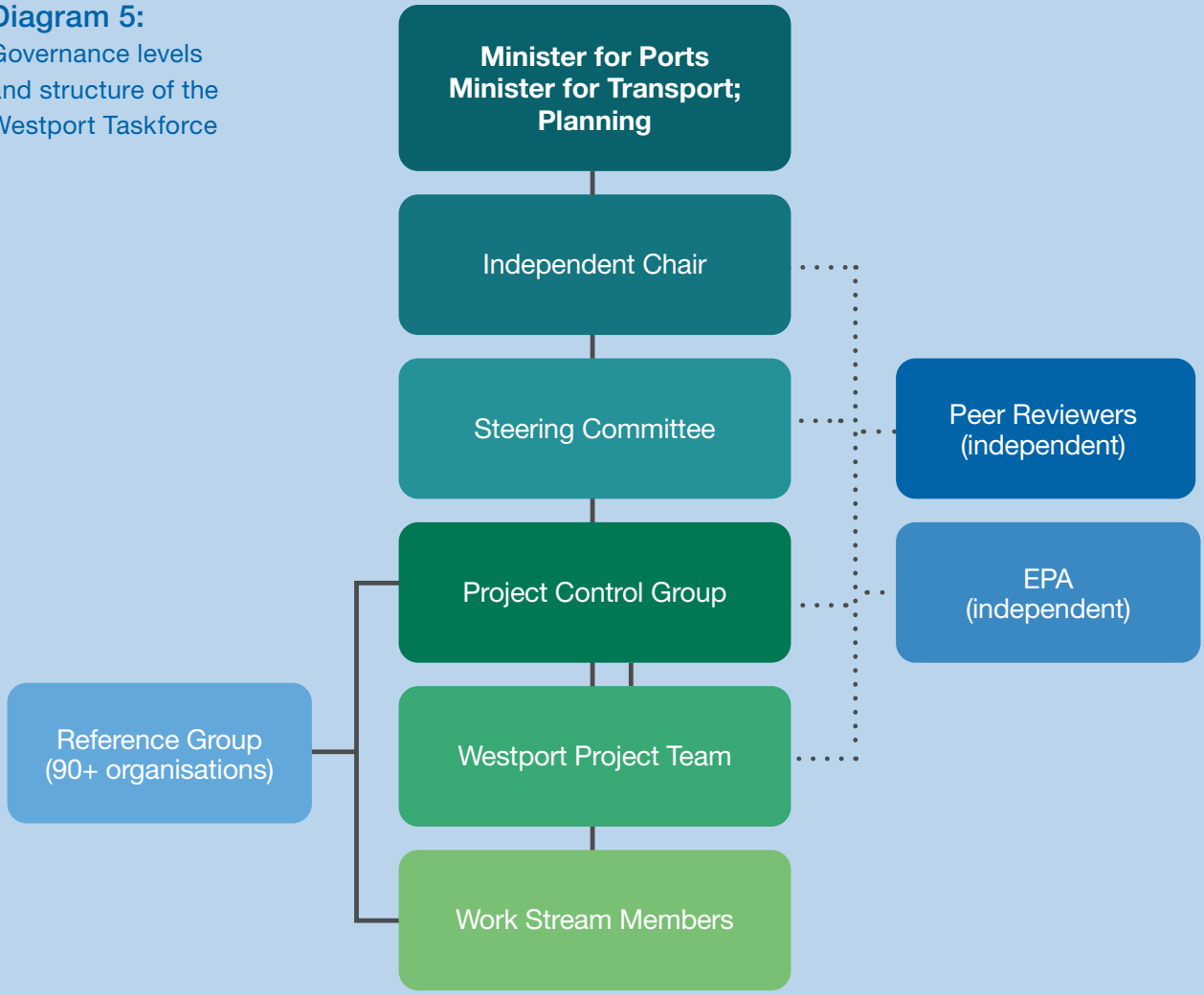
It is right that the work of the Westport project is tested and scrutinised – both while it is underway and for many years to come. As a project promising to deliver the best long-term freight infrastructure solutions for the State, at a significant cost, all interested parties including the wider community need to feel reassured that Westport's process and outcomes are robust and free from bias; the planning is effective; and the investment of public funds is well-made.

To provide comfort and confidence to all stakeholders, Westport adopted several frameworks considered best practice in the infrastructure sector, and committed to upholding high standards in terms of process, review and transparency.

4.1
Governance and due diligence

The Westport Taskforce was established by the State Government as a cross-agency project governed by relevant agencies and housed within the Department of Transport. Westport has several layers of governance – a Project Control Group, a Steering Committee, an Independent Chair, two Ministers, a Peer Review Panel and a Reference Group – as depicted in Diagram 5.

Diagram 5:
Governance levels and structure of the Westport Taskforce



"I could not promise that everyone would like the answer, but what I could promise is that Westport would follow the best possible process."

Nicole Lockwood, Independent Chair, Westport Taskforce

Peer Review Panel

As part of its commitment to best practice and in a bid to ensure Westport's work was tested and challenged throughout, the Westport Taskforce made the decision early in Stage 1 to appoint a panel of independent subject matter experts to review the process and findings. Westport's peer reviewers are listed in Table 3. Having governance and oversight from highly respected, independent experts in their fields provides comfort to the Taskforce, State Government, other industry experts and the wider community that Westport's process is rigorous, independent and robust. This is a critical factor in earning the trust of external stakeholders who may not have been directly involved in the process.

The Peer Review Panel convenes regularly to review Westport's process and deliverables. Technical work and reports are also sent to the reviewers out of session for thorough assessment and advice. The peer reviewers may also provide guidance to the project team as needed.

Minister for Ports and Minister for Transport; Planning

The Westport Taskforce reports to both the Minister for Ports and the Minister for Transport; Planning, who are the first tier of Westport's governance hierarchy. Both Ministers and their teams are briefed and kept updated by Westport, as they have the ultimate decision-making authority over Westport's outcomes and recommendations. Items approved by the Steering Committee are escalated to the Ministers for endorsement.

Independent Chair

As the Independent Chair of the Westport Taskforce, Nicole Lockwood is the second tier of Westport's governance hierarchy. Nicole is not a public servant; she is employed as an independent consultant to oversee the strategic leadership of the project, and reports directly through to Westport's two Ministers.

Steering Committee

The Steering Committee is the third tier of Westport's governance hierarchy and has a strategic focus. The Steering Committee consists of Directors General and Chairs from relevant government agencies. In 2020, the membership of the Steering Committee includes:

1. **Independent Chair, Westport Taskforce**
2. **Director General, Department of the Premier and Cabinet**
3. **Under Treasurer, Department of Treasury**
4. **Director General, Department of Transport**
5. **Director General, Department of Planning, Lands and Heritage**
6. **Director General, Department of Jobs, Tourism, Science and Innovation**
7. **Director General, Department of Water and Environmental Regulation**
8. **Chairman, Western Australian Planning Commission**
9. **Chairman, Fremantle Ports**
10. **Chairman, Southern Ports**

(L-R) Tim Collins, Westport Project Director; Hon. Alannah MacTiernan MLC, Minister for Ports; Nicole Lockwood, Independent Chair, Westport Taskforce

Project Control Group

The Project Control Group (PCG) is the fourth tier of Westport's governance hierarchy and has a technical and operational focus. It consists of senior Directors from a broad cross-section of government agencies that have input into, or are affected by, the outcomes of Westport. It also includesthe Chairs of the technical work streams.

In 2020, the membership of the PCG includes the following organisations n no particular order):

1. Westport Taskforce
2. Department of the Premier and Cabinet
3. Department of Treasury
4. Department of Transport
5. Department of Planning, Lands and Heritage
6. Department of Jobs, Tourism, Science and Innovation
7. Department of Water and Environmental Regulation
8. Department of Primary Industries and Regional Development
9. Western Australian Treasury Corporation
10. DevelopmentWA (formerly LandCorp and the Metropolitan Redevelopment Authority)
11. Fremantle Ports
12. Southern Ports
13. Department of Infrastructure, Regional Development and Cities (Federal)
14. Planning and Transport Research Centre (PATREC) (non-government)

Table 3:
Westport's peer reviewers

Name	Area of review	Expertise
John Langoulant AO	Chair of Peer Review Panel	Extensive experience leading private, public and not-for-profit entities as the WA Under Treasurer and Chief Executive roles with Mitsubishi, CCIWA and Australian Capital Equity. Awarded an Order of Australia (AO) in 2010 for distinguished service to business and commerce, particularly through leadership and management roles and to the community of Western Australia. Appointed by Premier Mark McGowan as Chairman of Infrastructure WA in July 2019.
Ian Le Provost	Environmental	More than 40 years' experience in environmental impact assessment and management of coastal environments, with expertise in port and dredging developments. Served as a member of the Western Australian Environmental Protection Authority and substantially contributed to the development of the Cockburn Sound Environmental Protection Policy.
Neil Matthews	Supply Chain	Has 40 years' experience in national and global supply chain logistics in public and private sectors, providing leadership in regional and intermodal freight systems, policy development, governance and value chain analysis, demand and capacity forecasting and analysis, infrastructure performance assessment, quantitative analysis and operations management.
Greg Watkinson	Commercial	Former CEO of the Economic Regulation Authority and current Governing Body Member, with more than 25 years' experience across economic regulation, competition policy, education policy, tax policy, welfare policy and macroeconomics.
Dennis Koegeboehn	Ports	Internationally renowned expert in port planning, design, development, implementation and improvement with a focus on strategic planning of integrated ports and terminals.
Warren Mundy	Economic Development	Former Commissioner of the Australian Government Productivity Commission and highly qualified economist specialising in energy and transport infrastructure development.
Alex Uloth	Geographical Information Systems	A spatial architect and consultant of significant repute. Alex was also commissioned to undertake a large-scale review of GIS for the Water Corporation, and has completed similar reviews and devised spatial architecture solutions for Landgate, ATCO, BHP, Western Power, Woodside, Western Airports and the Department of Mines, Industry Regulation and Safety.
Marie Mills	Communications	More than 30 years' journalism, communications and engagement experience working at the highest level of public relations practice across government, corporate and not-for-profit sectors, and recognised with several state and national awards.

Westport Reference Group

Perth's supply chains are managed by many different operators, with some sections controlled by private companies and others overseen by Government. The Westport Reference Group was established to ensure industry, peak bodies and private operators had a voice throughout the process – and would help inform Westport's methodology, act as a sounding board for ideas and feedback, and gather different input and suggestions from many different perspectives. The role and structure of the Westport Reference Group is explained further in Section 9.

Probity and risk management

Westport's operations are highly regimented by government protocols and overseen by due diligence providers that ensure the project adheres to strict probity, reporting, legal and risk management policies. Westport has been regularly audited to ensure the robustness of its contract management, procurement, human resources, financial reporting and other administrative requirements. Westport has also engaged legal advice and oversight from the State Solicitor's Office.

Westport Reference Group briefing, 10 April 2019

"Westport has been using a very transparent, communicative and open dialogue with industry, and the Property Council of Australia is thankful for this deep engagement."

Property Council of Australia, WA Division's official submission to Westport on the shortlisted options, December 2019

4.2
Best practice frameworks

Infrastructure Australia Assessment Framework

Upon its inception, the Westport Taskforce committed to aligning its process with Infrastructure Australia's (IA) Assessment Framework, as shown in Diagram 6.

Diagram 6:
Infrastructure Australia's Five Stage Assessment Framework

The framework is widely considered best practice in developing infrastructure business cases in Australia. IA will also eventually assess Westport for Federal funding if the project progresses to Stage 4: Business Case Assessment, based on meeting the benchmarks specified in the above framework.

Infrastructure Sustainability Council of Australia

Westport is committed to delivering a sustainable port and supply chain that is resilient, scalable and fit-for-purpose for the long-term to meet the State's future demand and maximise WA's return on investment. To deliver on this commitment, Westport became the first Australasian strategic planning project to register for an Infrastructure Sustainability (IS) Version 2.0 Planning rating with the Infrastructure Sustainability Council of Australia (ISCA).

ISCA is a member-based, not-for-profit organisation operating in Australia and New Zealand with the purpose of promoting sustainability outcomes in infrastructure. ISCA defines sustainable infrastructure as being planned, designed, constructed and operated to optimise environmental, social and economic outcomes over the long-term. The IS rating scheme provides an independent, assured industry standard to help scope whole-of-life sustainability risks for projects and assets. This enables smarter solutions that reduce risks and cost, foster efficiency and waste reduction, and foster innovation and continuous improvement in the sustainability outcomes from infrastructure.

Westport is working in close partnership with ISCA to demonstrate the potential benefits of the IS rating scheme in the strategic project planning phase (i.e. before the final solution has been identified). It is in these early stages of planning that the integration of sustainability goals and initiatives is best achieved, which then sets up the project to yield significant tangible benefits at the delivery stage.

PIANC Working with Nature

Westport adopted the Working with Nature approach championed by the World Association for Waterborne Transport Infrastructure (PIANC). The Working with Nature approach calls for an important shift in infrastructure development thinking to help deliver mutually beneficial, win-win solutions. It promotes a proactive, integrated philosophy which focuses on achieving project objectives in an ecosystem context, rather than applying impact mitigation measures associated with predetermined infrastructure design. It effectively requires the consideration of environmental issues all the way through the project from the outset. In line with this approach, Westport subsequently brought forward the Environmental work stream into Stage 1 to ensure that the environment was considered at all stages of the project.

United Nations Sustainable Development Goals

The United Nations Sustainable Development Goals (SDGs) are an internationally agreed set of targets making up the 2030 Agenda for Sustainable Development (see Diagram 7).

The 2030 Agenda was endorsed by the Australian Government on 25 September 2015 and provide a non-binding roadmap to guide Australian governments, business, universities and civil society groups in a cooperative and coordinated effort toward global sustainable development.

Diagram 7:
United Nations Sustainable Development Goals

Westport Sustainability Goals

The sustainability goals adopted and addressed as part of the Westport process were informed by a multi-stakeholder workshop. Following this, Westport developed its own sustainability goals aligned to the United Nations' SDGs that consider values which could be most impacted (either positively or negatively) by the development of a new port and supply chain (see Table 4).

The Westport sustainability goals will guide future stages of planning, design, construction and operation to achieve broad economic, social and environmental benefits that will support achievement of the SDGs by 2030. These have been reviewed and updated and will continue to be integrated into the planning and infrastructure roll-out process.

Table 4:

Westport's United Nations Sustainable Development Goals

UN SDG		Sustainability goals across the Westport asset lifecycle
	**Ensure access to affordable, reliable, sustainable and modern energy for all.**	Westport facilitates transition to a net zero emissions economy by 2050, consistent with the WA Government Greenhouse Gas Emissions Policy for Major Projects. Future port and supply chain infrastructure minimises carbon footprint across design, construction and operation, incorporating flexibility to account for future shifts in the transport sector towards alternative fuels and renewable energy. Improvements, retrofits or reforms to extend the life of the Fremantle Inner Harbour and its supply chain will assess opportunities to reduce energy use and carbon emissions.
	**Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.**	Coordinate the timing of Westport's plans with other major government infrastructure projects to provide long-term employment and minimise skills shortages consistent with Infrastructure WA State Infrastructure Strategy. Identify skills gaps and plan actions to meet skills requirements across the project lifecycle. Contracts awarded to Aboriginal businesses exceed State Government's Aboriginal Procurement Policy requirements. Go beyond the WA Government Industry Participation Strategy requirements to address issues of diversity, equity and modern slavery in procurement and delivery. Minimise impacts on the Kwinana strategic industrial area.
	**Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation.**	New port and supply chain infrastructure assets are resilient and adaptable to climate change and natural hazard impacts over their forecast useful life. Identify interdependencies between the port, supply chain, key assets and indirect impacts on the community to promote resilience, should asset functionality be lost. Incorporate innovative technologies, processes, products or ideas that reduce environmental impacts and promote beneficial social outcomes.

UN SDG		Sustainability goals across the Westport asset lifecycle
	**Ensure sustainable consumption and production patterns.**	Integrate principles to support resource efficiency and the circular economy that support the WA Government's *Waste Avoidance and Resource Recovery Strategy 2030*.
	**Conserve and sustainably use the oceans, seas and marine resources for sustainable development.**	Sustainably, where possible, manage and protect marine and coastal ecosystem integrity to avoid significant adverse impacts on the quality of seafood and recreational values of Cockburn Sound.
	**Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss.**	Seek to restore ecosystem quality and promote resilience to a changing climate, natural hazards and the impacts of human activities.
	**Strengthen the means of implementation and revitalize the global partnership for sustainable development.**	Seek partnerships to recognise the cultural and spiritual values of port- and supply chain-impacted ecosystems and develop criteria and indicators to protect those values. Targets for Aboriginal participation are developed including for design, construction and operation, and these are communicated to tenderers/ proponents. Seek partnerships with universities, industry and government to address technical, environmental and social knowledge gaps to support the achievement of the SDGs. Work collaboratively with stakeholders and the community to develop a sustainable port and supply chain and find innovative solutions to the challenges identified.

05

Stage 2 Process and Outcomes

Alcoa Australia's operations at the Outer Harbour

Westport has staged its work in line with Infrastructure Australia's (IA) five stage Assessment Framework, as depicted in Diagram 6 in Section 4.2.

Stage 1 of IA's framework is Problem Identification and Prioritisation, which was the focus of Stage 1 of Westport's work. This phase of investigation took place throughout 2018 and the findings are captured in the *Westport: What we have found so far* report[2].

This report follows on from that report, covering all the work undertaken for Westport Stage 2 to date. Westport commenced its Stage 2 work in late 2018, and while most of the scope has been completed, some tasks remain ongoing.

Whereas Westport Stage 1 was largely high-level and qualitative, the methodology changed noticeably in Stage 2. In realising the level of rigor and technicality required to undertake a thorough, robust MCA process, a new approach had to be taken.

Working with one of Australia's leading IA and MCA advisors, Ambrosia Consulting, Westport developed a step-by-step methodology for Stage 2, as shown in Diagram 2.

Container ships at the Inner Harbour, Fremantle

5.1
The long-list and MCA-1

Westport Stage 1 closed out with the identification of the Eight Strategic Options outlined in *Westport: What we have found so far*[2]. These eight high-level scenarios explained how the container trade could be allocated or transitioned across the three port locations (Fremantle, Kwinana and Bunbury) over the short, medium and long-term:

- **Option 1:** Theoretical base case, as per IA guidelines
- **Option 2:** Optimise Fremantle and transition to Kwinana over time
- **Option 3:** Optimise Fremantle and transition to Bunbury over time
- **Option 4:** De-industrialise Fremantle and move containers to Kwinana in one step
- **Option 5:** De-industrialise Fremantle and move containers to Bunbury in one step
- **Option 6:** Fremantle and Kwinana both have containers for the long-term
- **Option 7:** Fremantle and Bunbury both have containers for the long-term
- **Option 8:** Only Fremantle has containers for the long-term

Westport determined the forecast for WA's container trade by 2068 was around 3.8 million TEUs. This was based on a compound annual growth rate of 3.25 per cent, as chosen by Westport based on the advice of several industry experts and professional consultants, and endorsed by Westport's governance committees. *Westport Beacon 5: Long-term container trade forecast*[5] explains the process and importance of determining the long-range container forecasts in detail.

The next step was to identify a long-list of potential infrastructure options that could handle 3.8 million TEUs by 2068. This was done by splitting out the variable components of the Eight Strategic Options, such as port location, port operating design, supply chain design and differing modal splits, to develop a long-list of viable scenarios for assessment. Westport's long-list of 25 options included four options for Fremantle, four for Bunbury and 17 for Kwinana. The details of the 25 options are listed in Table 5 (Fremantle), Table 6 (Bunbury) and Table 7 (Kwinana).

5 *Westport Beacon 5: Long-term container trade forecast,* August 2019, Westport Office, https://www.mysaytransport.wa.gov.au/westportbeacon

Table 5: Fremantle's four options in Westport's long-list

Port Location: Fremantle			
No	Strategic Option	Port type	Shared Port
1	8	Large land port to handle 3.8M TEUs	None
2	6, 7	Small land port to handle 1.2M TEUs	Options 6, 8, 10, 12, 16, 18, 20, 24, & 25
3	8	Large land port to handle 3.8 M TEUs	None
4	6	Large land port to handle 3.8M TEUs and Blue Highway	Option 15

Table 6: Bunbury's four options in Westport's long-list

Port Location: Bunbury			
No	Strategic Option	Port type	Shared Port
5	3, 5	Large land port to handle 3.8M TEUs	None
6	3, 7	Medium land port to handle 2.65 M TEUs	Option 2
7	3, 5	Large land port to handle 3.8M TEUs	None
8	3, 7	Medium land port to handle 2.65M TEUs	Option 2

Table 7: Kwinana's 17 options in Westport's long-list

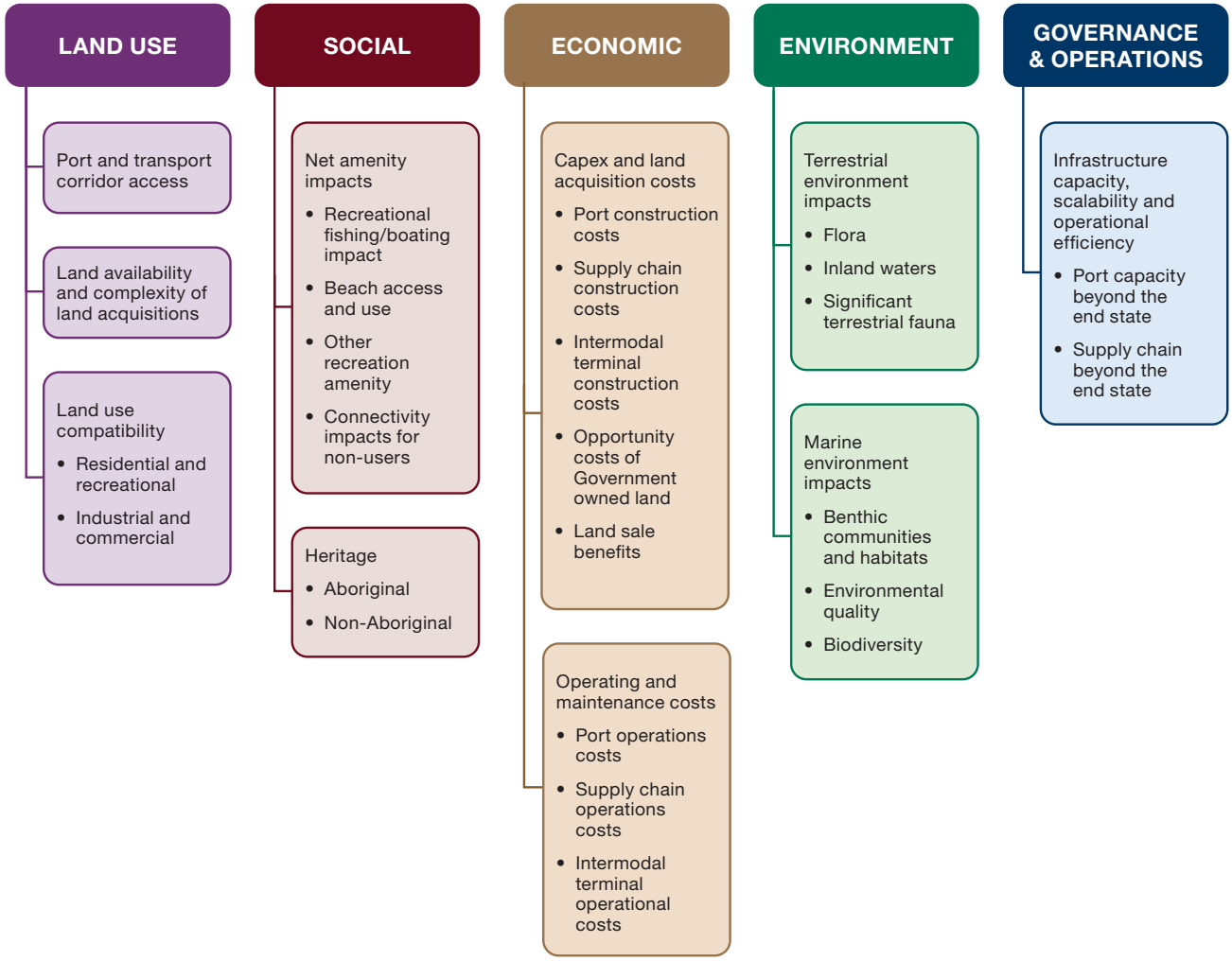
Port Location: Kwinana			
No	Strategic Option	Port type	Shared Port
9	2, 4	Large island port to handle 3.8M TEUs served by Rowley Road	None
10	2, 6	Medium island port to handle 2.65M TEUs served by Rowley Road	Option 2
11	2, 4	Large narrow island port to handle 3.8M TEUs served by Rowley Road	None
12	2, 6	Large narrow island port to handle 2.65M TEUs served by Rowley Road	Option 2
13	2, 4	Hybrid, land-backed and island port to handle 3.8M TEUs via Anketell Road	None
14	2, 4	Large island port to handle 3.8M TEUs served by Anketell Road	None
15	2, 6	Medium island port to handle 2.65M TEUs served by Anketell Road and Blue Highway from Fremantle port	Option 4
16	2, 6	Medium island port to handle 2.65M TEUs served by Anketell Road	Option 2
17	2, 4	Large narrow island port to handle 3.8M TEUs opposite AMC	None
18	2, 6	Medium narrow island port to handle 2.65M TEUs opposite AMC	Option 2
19	2, 4	Large narrow island port to handle 3.8M TEUs between AMC and Alcoa jetty and served by Rowley Road	None
20	2, 6	Medium narrow island port to handle 2.65M TEUs between AMC and Alcoa jetty and served by Rowley Road	Option 2
21	2, 4	Large narrow land-backed port to handle 3.8M TEUs between AMC and Alcoa jetty and served by Rowley Road	None
22	2, 4	Large land-backed port to handle 3.8M TEUs between AMC and Alcoa jetty and served by Rowley Road (Indian Ocean Gateway Stage 1)	None
23	2, 4	Large land-backed port to handle 3.85M TEUs between AMC and Alcoa jetty and served by Anketell Road (Indian Ocean Gateway Stage 2)	None
24	2, 6	Medium land-backed port to handle 2.65M TEUs between AMC and Alcoa jetty and served by Anketell Road	Option 2
25	2, 4	Land-backed port to handle 2.65M TEUs north of Naval Base Shacks to south of Alcoa Kwinana Refinery – Rowley Road connection	Option 2

Determining the best option to meet WA's long-term requirements from this extensive list in an objective, evidence-based manner is challenging. Each option has pros, cons and trade-offs across economic, environmental and social criteria. In complex decision-making scenarios such as this, Infrastructure Australia recommends using a multi-criteria analysis (MCA). This data-based, objective decision-making tool allows options to be measured and ranked on many, sometimes competing, criteria. It was the ideal methodology for Westport.

Once the MCA had been selected as the approach, the next step was to determine an extensive list of criteria that would assess not only how each option performs against key economic, social and environmental values, but would also highlight the strengths and weaknesses of each option in a comparative analysis. The final list of the criteria and sub-criteria used to score the options in MCA-1 is shown in Diagram 8.

Diagram 8:

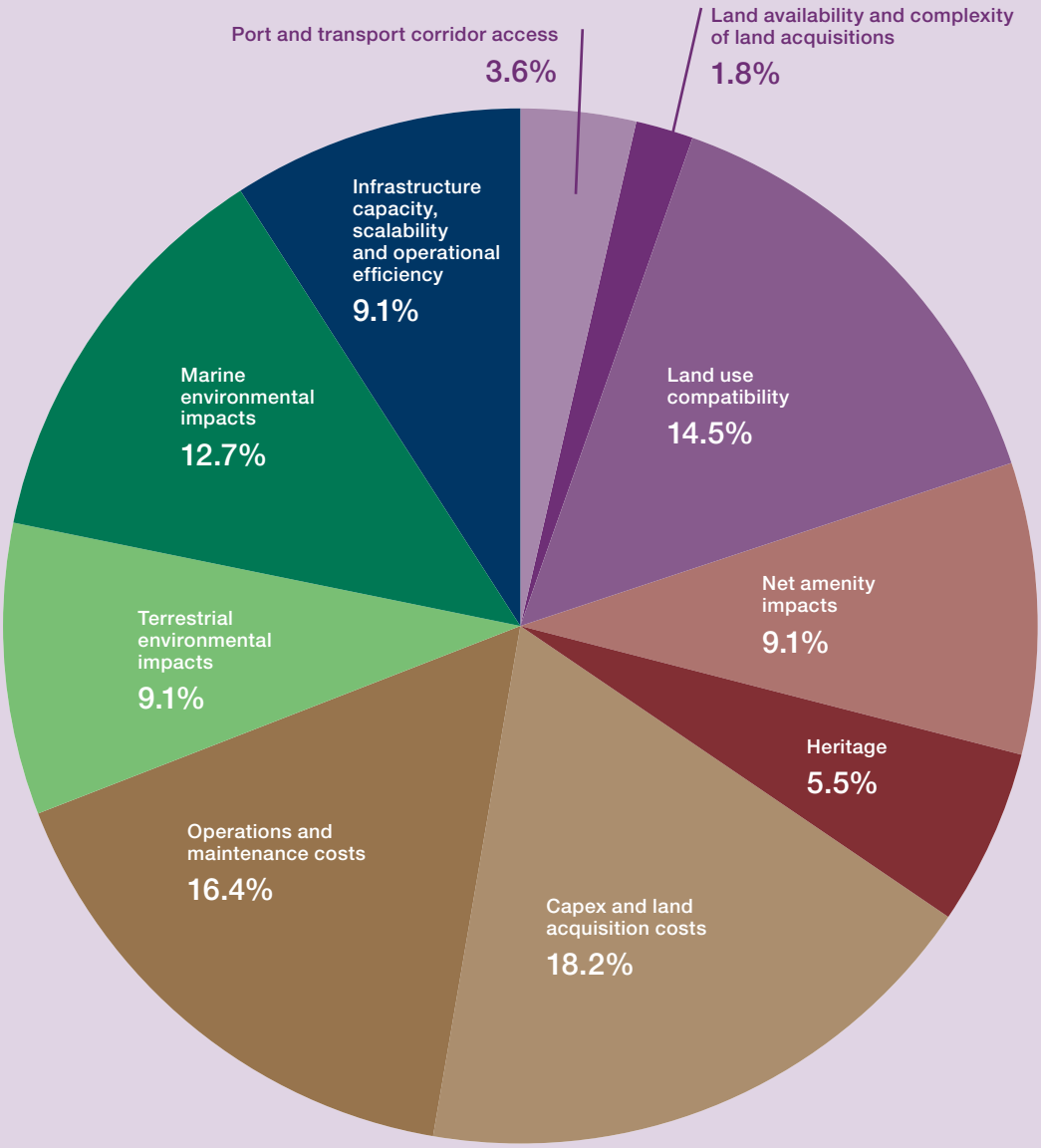
Criteria and sub-criteria used to assess the long-list in MCA-1



Once the criteria had been determined, the next step was to assign weightings to each category of criteria. While all the criteria are desirable in the outcome, some criteria are more critical than others. Weightings are assigned to each criterion to represent their comparable importance to the end outcome. The weightings for the high-level criteria for MCA-1 are shown in Diagram 9. These weightings were determined through a series of workshops with subject matter experts from a broad cross-section of government agencies and Westport consultancies. Feedback from stakeholders and the community, obtained through surveys and input tools, were also addressed in determining the weightings.

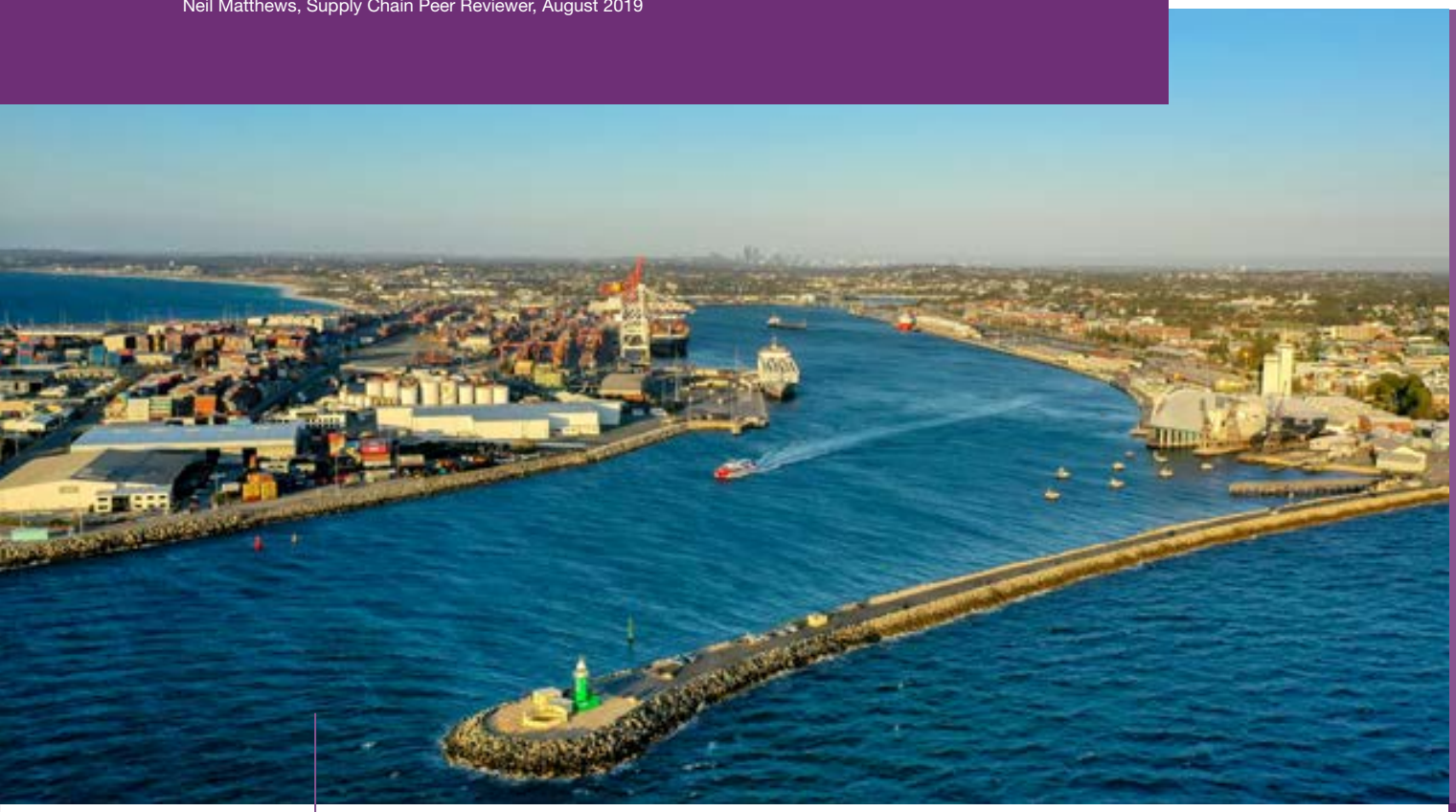
Economic criteria – relative capital expenditure (CAPEX) and land acquisition costs, and operations and maintenance costs – make up most of the weightings at 34.6 per cent. This is not surprising for a high investment and economically critical project such as Westport. It is notable that the marine and terrestrial environmental criteria were weighted second highest, with 21.8 per cent of the overall weightings.

Diagram 9:
Criteria weightings for MCA-1



"My overall impression… is that the MCA process is comprehensive, and engaged a multi-disciplined approach."

Neil Matthews, Supply Chain Peer Reviewer, August 2019



Fremantle Inner Harbour

To score and rank the 25 long-listed options, a series of facilitated assessment workshops were conducted by Westport. These workshops were attended by 78 subject matter experts from 23 different organisations, with the most participants being representatives from a broad cross-section of State Government agencies.

More than 16 hours of workshops took place, each focused on a different criterion. Proceedings were comprehensively recorded for subsequent peer review and any future audits. Each option was assessed by the expert participants and assigned a comparative score for each criterion between one (weakest) and five (strongest). The Fremantle shared options (Options 2 and 4) were intrinsically scored in either the Kwinana or Bunbury part of the pair, given Fremantle would essentially stay as is.

The summary outcomes of MCA-1 for each option, including their rankings, are presented in Table 8. The weighted scores in this table represent the total score for each criterion multiplied by the criteria weights in Diagram 9. The overall top-ranking options are highlighted in orange in the table.

As noted above, the Fremantle shared options (Options 2 and 4) are not listed in Table 8 as separate options, as they were intrinsically scored in the assessments for the Bunbury or Kwinana components of the shared pairs.

Table 8:

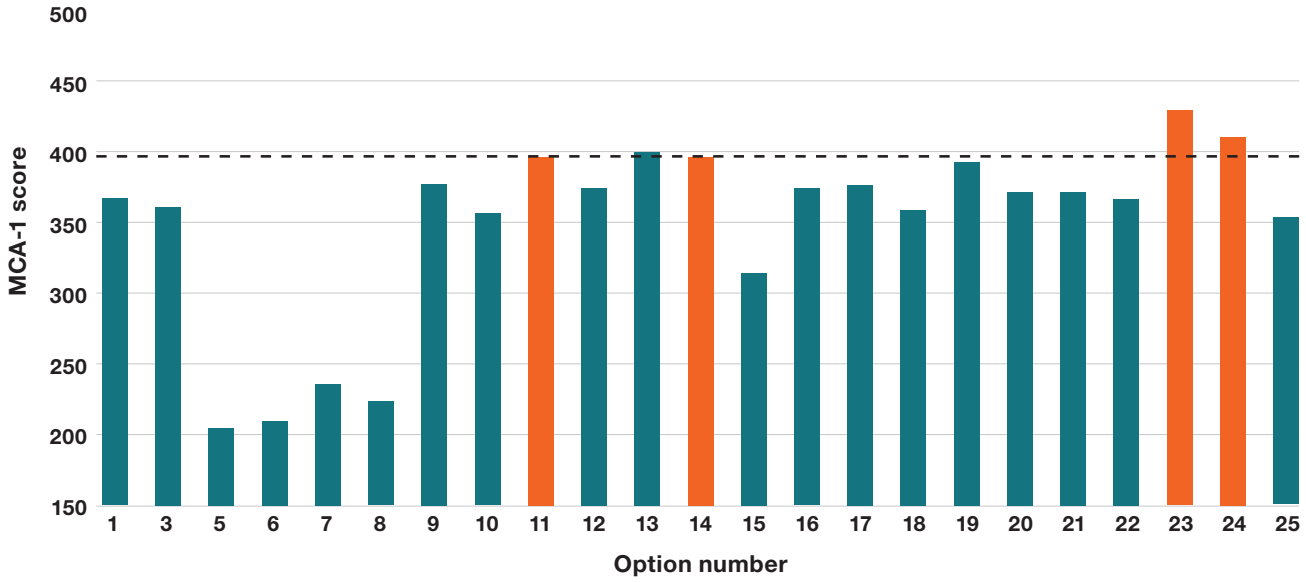
Scores and rankings of the long-list of options following MCA-1

Option	Location	Port Configuration	Score out of 500	Rank (1-23)
Fremantle stand-alone options				
1	Fremantle existing location	Conventional – Large	368	13
3	Fremantle existing location	Conventional – Large	361	14
Bunbury options				
5	Bunbury Port existing location	Conventional – Large	205	23
6	Bunbury Port existing location	Conventional – Medium (shared)	209	22
7	Bunbury Port existing location	Conventional – Large	235	20
8	Bunbury Port existing location	Conventional – Medium (shared)	223	21
Kwinana options				
9	Parallel offshore port south of Alcoa jetty linked to Rowley Road using a Mount Brown road/AGV alignment	Conventional – Large	369	12
10		Conventional – Medium (shared)	346	17
11		Narrow island – Large	398	4
12		Narrow island – Medium (shared)	376	8
13	Hybrid partial land-backed and partial offshore port linked to Anketell Road	Conventional – Large	400	3
14	Offshore port linked to Anketell Road	Conventional – Large	396	5
15		Blue Highway – Medium (shared)	313	19
16		Conventional – Medium (shared)	375	9
17	Offshore port south of AMC connecting to Latitude 32 IMT and Rowley Road using an AGV link	Narrow island – Large	376	7
18		Narrow island – Medium (shared)	359	15
19	Offshore port south of AMC and north of Alcoa Jetty, connected to Rowley Road using an AGV link	Narrow island – Large	393	6
20		Narrow island – Medium (shared)	372	10
21	Land-backed port linked to Rowley Road using a Mount Brown road/rail/AGV alignment	Narrow footprint – Large	371	11
22		Conventional – Large	353	16
23	Land-backed port linked to Anketell Road	Conventional – Large	430	1
24		Conventional – Medium (shared)	411	2
25	Land-backed port north of Alcoa jetty linked to Rowley Road using a Mount Brown road alignment	Conventional – Medium (shared)	344	18

Graph 2 shows visually how the options perform relative to one another. As can be seen from this graph, the top ranked options are nearly all Kwinana options (Options 9 to 25). The Bunbury options – Options 5 to 8 – score significantly lower than all other locations. The Fremantle stand-alone options (Options 1 and 3) also rank below the cut-off score to make the shortlist, which is depicted by the dashed black line in Graph 2.

Graph 2:

Total weighted scores for Westport's MCA-1 assessment, and shortlist cut-off score



BP's facilities at the Outer Harbour

5.2
Westport's shortlist

Based on the results of MCA-1 and subsequent ranking of the weighted scores, the following five options were shortlisted:

1. Kwinana Option 23 – ranked 1st

As the highest scoring option in MCA-1, it was an obvious choice for a stand-alone Kwinana option in the shortlist.

2. Kwinana Option 24 and Fremantle Option 2 (shared scenario) – ranked 2nd

As well as being ranked second overall, it was important for Westport to analyse the feasibility of a shared port scenario, which would enable optimisation of the existing Inner Harbour assets. It was also critical to further investigate the capacity of Fremantle to properly understand when this might be reached, and if and how it may be extended.

3. Kwinana Option 24 and Fremantle Option 2 (shared scenario featuring the Blue Highway) – unranked as a new option

While not being assessed as a separate option in MCA-1, Westport found merit in the Blue Highway barging method of transporting containers. This option leveraged the strengths of the above shared option but with an additional transport mode to investigate in more detail.

4. Kwinana Option 11 – ranked 4th

This was the highest ranked 'narrow island' port, a new concept that Westport was eager to investigate further given its potential to reduce marine environment impacts.

5. Kwinana Option 14 – ranked 5th

This was the highest scoring conventional island port, with many of the same strengths as top-scoring Option 23.

With the shortlist now determined, a new nomenclature of A to E was introduced and all options were given a clean slate for the MCA-2 assessments.

As Westport's work for MCA-2 commenced, it became clear that as well as the long-term shared port scenarios of Options D and E, there were also sub-options to D and E that involved a staged transition to Kwinana over time with a temporary shared arrangement. These 'transition options' had their own costs, timings and complexities that needed to be investigated as stand-alone options. The shortlist was therefore expanded to seven options to include two transition options, D2 and E2, as listed in Table 9.

With transition option D2 being one of Westport's recommended options, undertaking further analysis to determine the 'why, when, how and how much' for each phase of transitioning freight, infrastructure and support services from Fremantle to Kwinana will be a priority for Westport in the next phase of work.

Table 9:
Westport's revised shortlist for MCA-2

Option code	Description	Operation
Option A Kwinana	Cockburn Sound North (vicinity Rowley Road) narrow island port with intermodal operations at Latitude 32	End state
Option B Kwinana	Cockburn Sound South (vicinity Anketell Road) conventional land-backed port	End state
Option C Kwinana	Cockburn Sound South (vicinity Anketell Road) conventional island port	End state
Option D Fremantle and Kwinana	Fremantle port shared with Cockburn Sound South (vicinity Anketell Road) medium conventional land-backed port	End state
Option D2 Fremantle and Kwinana	Unmodified Fremantle port shared with Cockburn Sound South (vicinity Anketell Road) medium land-backed port transitioning to Cockburn Sound South (vicinity Anketell Road) land-backed port (Option B)	Transition to Option B
Option E Fremantle and Kwinana	Modified Fremantle port shared with Cockburn Sound South (vicinity Anketell Road) medium conventional land-backed port with Blue Highway	End state
Option E2 Fremantle and Kwinana	Slightly modified Fremantle port shared with Cockburn Sound South (vicinity Anketell Road) medium land-backed port with Blue Highway, transitioning to Cockburn Sound South (vicinity Anketell Road) land-backed port (Option B)	Transition to Option B

"It is interesting how Westport's process keeps changing. It's good to see, as it shows that Westport is listening and changing tack when required and not sticking to the process for the sake of it."

Paul Bodlovich, CEO, Perth Natural Resource Management, October 2019

5.3
Why Fremantle didn't make the shortlist as a stand-alone option

As Fremantle is adequately handling Perth's trade task at present, it was surprising to many that it did not make Westport's shortlist of options as a stand-alone port. However, Westport's investigations into Fremantle's constraints and its ability to handle the long-term freight task revealed a number of substantial issues that make Fremantle unviable as a stand-alone option. The major issues included:

- reliance on the existing road links to the Inner Harbour, with capacity limited by bottlenecks such as Stirling Bridge. While tunnels and other options were investigated, they were not preferred due to cost, inefficiency and engineering concerns;
- upgrading the road network servicing Fremantle would cost an estimated $2.3 billion[6], plus an additional $1 billion[6] to upgrade Leach Highway to freeway standard (or $2 billion[6] to build Roe 8/9);
- reliance on the existing freight rail corridor into the port, as no other viable alternatives could be identified. Expanding the capacity of the freight rail would involve duplicating the line, sinking the tracks and enclosing them – with the track having to be closed for several years so the work can be undertaken through Fremantle's main heritage and tourism precinct, at a cost of $1.4 billion[6]. The duplicated line would also make Victoria Quay largely inaccessible from central Fremantle, preventing full utilisation of that prime land;
- ongoing safety and congestion impacts on the Fremantle and Western Suburbs' road network due to the mixing of cars and trucks;
- increasing noise, vibration and emission impacts on surrounding communities from more trucks and train passings; and
- concerns about the capacity of Fremantle being upscaled enough to handle the long-term container task.

Meanwhile, by comparison, the Kwinana options offered major social and economic benefits, including:

- removing some freight vehicles from the Fremantle and Western Suburbs' road networks, which will improve safety and efficiency for all road users;
- potentially removing the need for the freight rail line running through Fremantle;
- the potential opportunity to redevelop some or all the port land at both Victoria and North Quays, unlocking new economic and social development opportunities for Fremantle and WA;
- reducing the interaction between residential land uses and port-related impacts;
- the port providing an incentive to attract new industries to Latitude 32 and potentially facilitating the expansion of existing industries;
- utilisation of the latest technology and advancements to improve supply chain times and costs; and
- the opportunity to build resilience, sustainability and scalability into the design – along with possible creative and artistic elements.

In Westport's comparative analysis, the Fremantle stand-alone options performed poorly due to their high costs, high social impacts and concerns over their long-term feasibility.

6 High-level working estimates only

"I am impressed with Westport's thorough, evidence-based process and that we had the chance to provide input. I understand there is still much investigation to be done and even though Bunbury Port is not currently part of the recommended options, we take comfort in knowing that the process has identified and is advocating for short and medium-term opportunities to support the Bunbury Geographe region and to ensure that Bunbury Port and the South West's current and future industries are given the support they need to flourish."

Councillor Mick Bennett, Dardanup Shire President, January 2020

5.4
Why Bunbury didn't make the shortlist

Bunbury's distance from the Perth metropolitan area, which is the origin and destination for most of the container trade, was a disadvantage from the start. The *Fremantle Ports Container Movement Study 2017*[7] found that only 3.5 per cent of containers handled at the Inner Harbour are transported more than 100km from the port for unpacking. With extra distance comes extra costs – both in terms of more infrastructure costs, as well as higher operational costs. However, given recent advances in transport and construction methods, it was timely to take a fresh look at Bunbury Port to see whether it could play a bigger role in Perth's freight network.

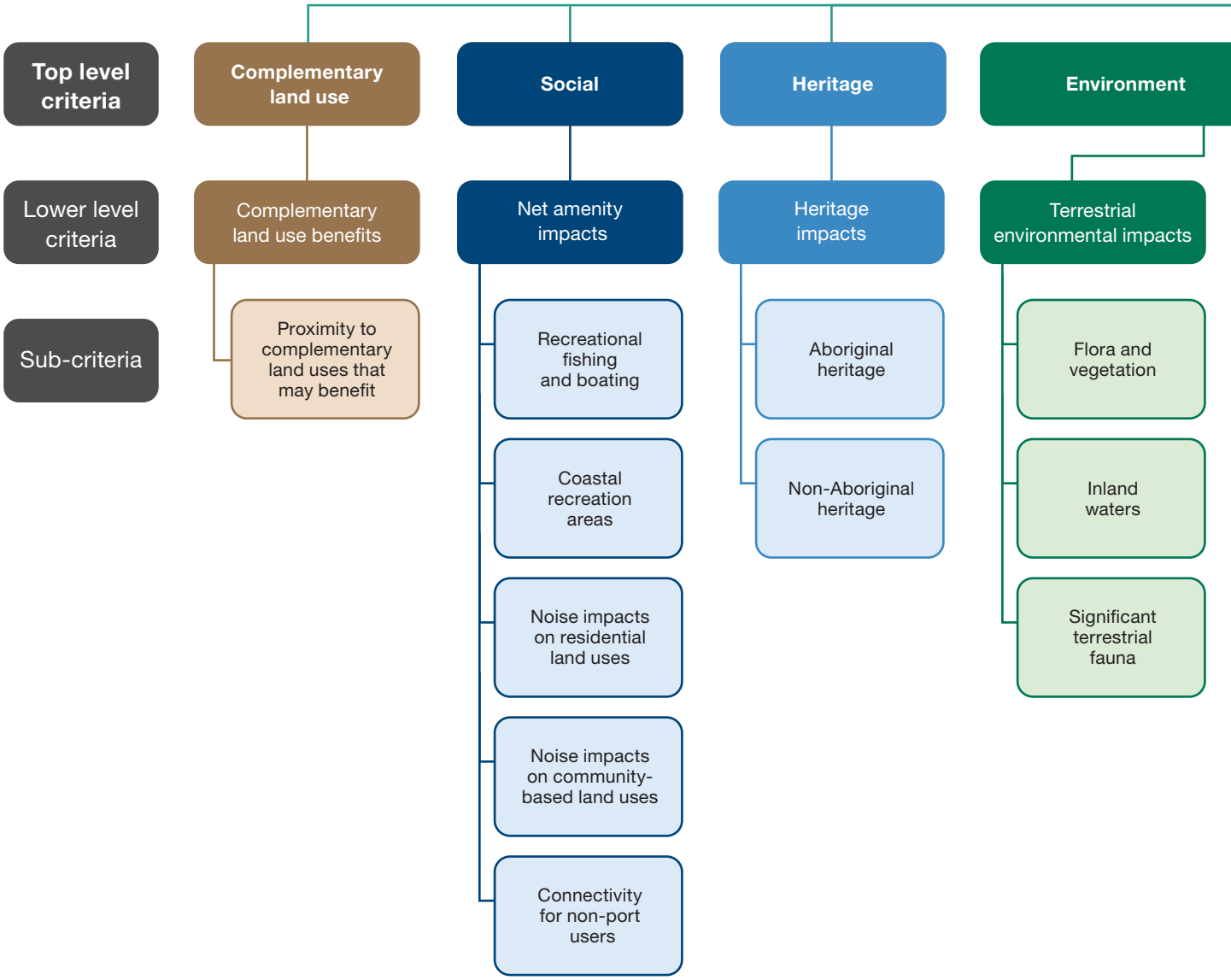
There were several major challenges that saw the Bunbury options score comparatively low in the MCA:

- The cost implications of duplicating the South West Main Rail Line were significant; not just in terms of the rail infrastructure, but also the necessary land acquisitions, grade separations at several key crossings, and managing the 100-plus level crossings. The large increase in daily rail traffic would also impact the amenity of people living in communities along the rail corridor.
- Necessary road enhancements, such as the duplication of Willinge Drive and grade separations on Forrest and South West Highways, also presented significant cost implications.
- The high land transport and operational costs associated with cartage between Bunbury and Perth.
- The basalt layer, which sits at a depth of around 14 metres below sea level under the Bunbury Inner Harbour channel and Koombana Bay, is problematic. To reach the required depth of 18 metres, blasting would be required at significant expense and pose environmental risks.
- There were concerns over whether the port could be expanded enough to handle the end state 3.8 million TEUs.

For these reasons, Bunbury did not make Westport's shortlist. However, other niche container trade opportunities for the South West are being explored by the Department of Transport and Southern Ports.

7 https://www.fremantleports.com.au/docs/default-source/landside/fremantle-ports-container-movement-study-2017.pdf

Diagram 10:
Criteria and sub-criteria hierarchy for MCA-2

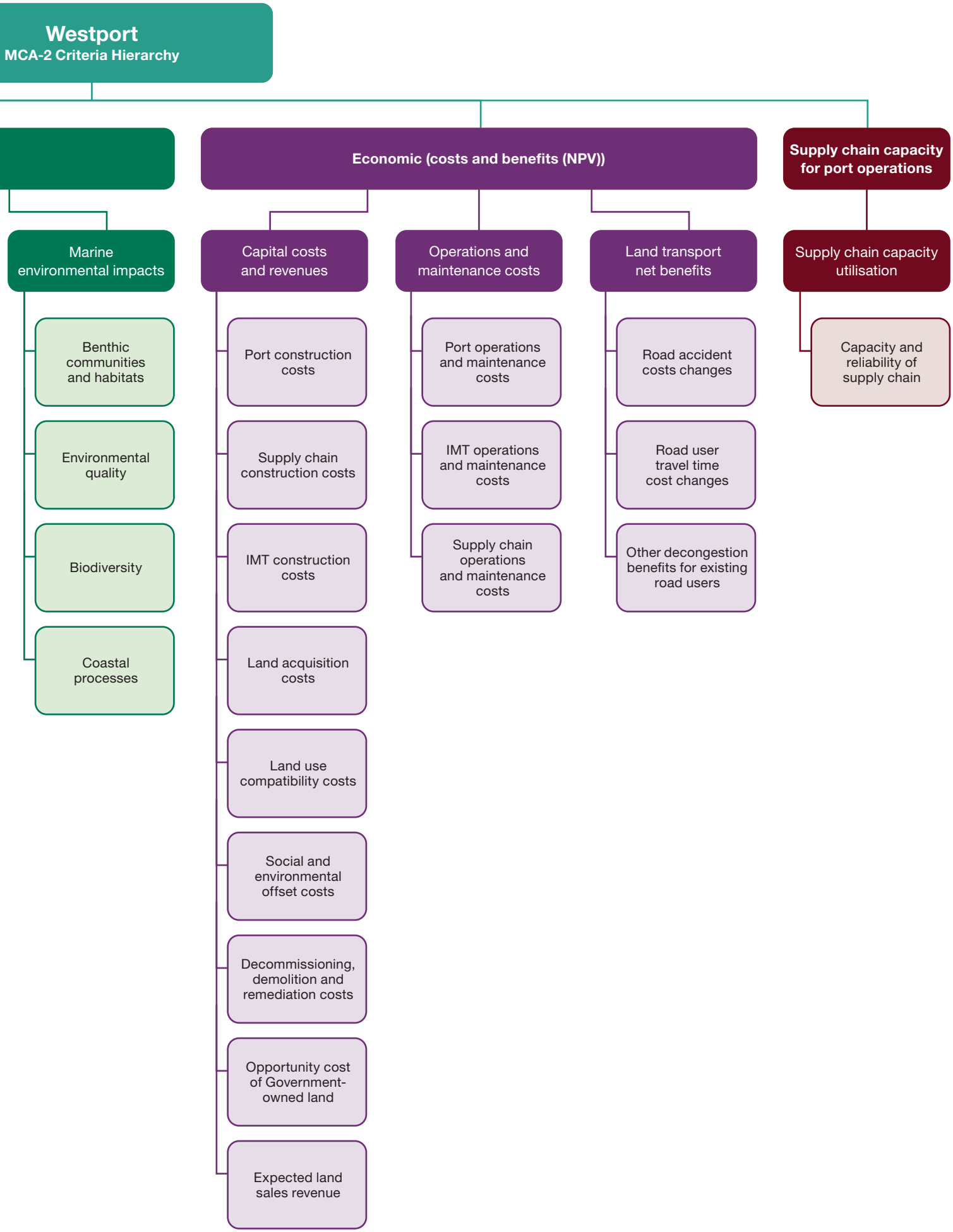


5.5
MCA-2 process and outcomes

While the purpose of MCA-1 was to act as a coarse filter on the long-list of options, the aim of MCA-2 was to provide a more detailed and rigorous assessment of the shortlisted options using quantitative assessment wherever possible. After a competitive tender process, PwC were appointed as the independent consultants to oversee and manage the MCA-2 process and outcomes.

The MCA-2 criteria and weightings were developed through a series of workshops facilitated by PwC in conjunction with Ambrosia Consulting, and attended by selected members of the Westport project team and expert representatives from a broad selection of government agencies.

In developing the criteria for MCA-2, Westport wanted to retain the overarching categories from MCA-1, but consolidate, where appropriate, and clarify and refine their focus. Diagram 10 shows the criteria and sub-criteria determined for MCA-2.


Westport
MCA-2 Criteria Hierarchy
Economic (costs and benefits (NPV))
Supply chain capacity for port operations
Marine environmental impacts
Capital costs and revenues
Operations and maintenance costs
Land transport net benefits
Supply chain capacity utilisation
Benthic communities and habitats
Environmental quality
Biodiversity
Coastal processes
Port construction costs
Supply chain construction costs
IMT construction costs
Land acquisition costs
Land use compatibility costs
Social and environmental offset costs
Decommissioning, demolition and remediation costs
Opportunity cost of Government-owned land
Expected land sales revenue
Port operations and maintenance costs
IMT operations and maintenance costs
Supply chain operations and maintenance costs
Road accident costs changes
Road user travel time cost changes
Other decongestion benefits for existing road users
Capacity and reliability of supply chain

Criteria weightings

Diagram 11 and Diagram 12 show the weightings that were allocated to the top-level criteria and sub-criteria in the MCA-2 assessment through Westport's weightings process.

Diagram 11:

Weightings for the top-level MCA-2 criteria

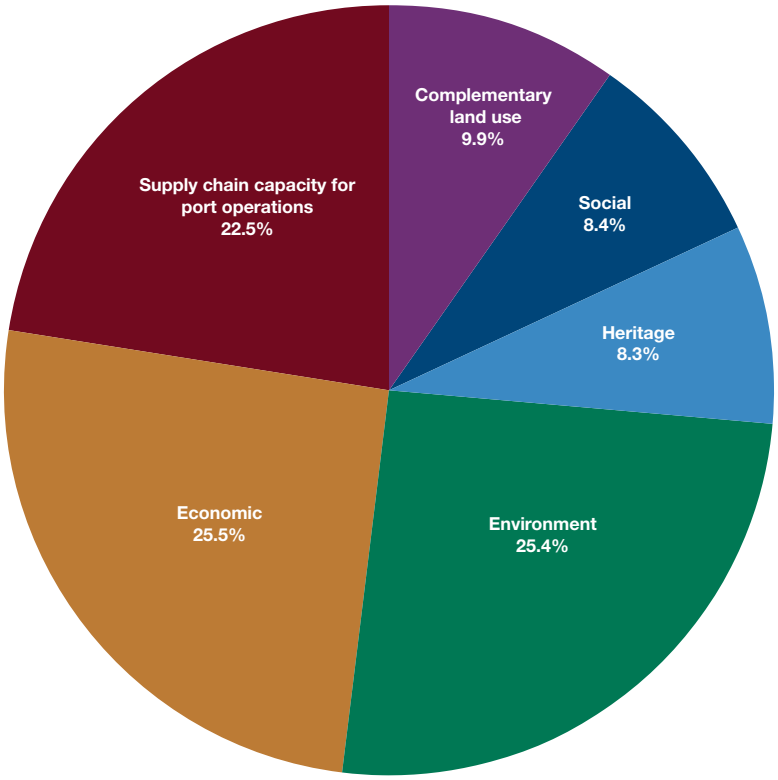
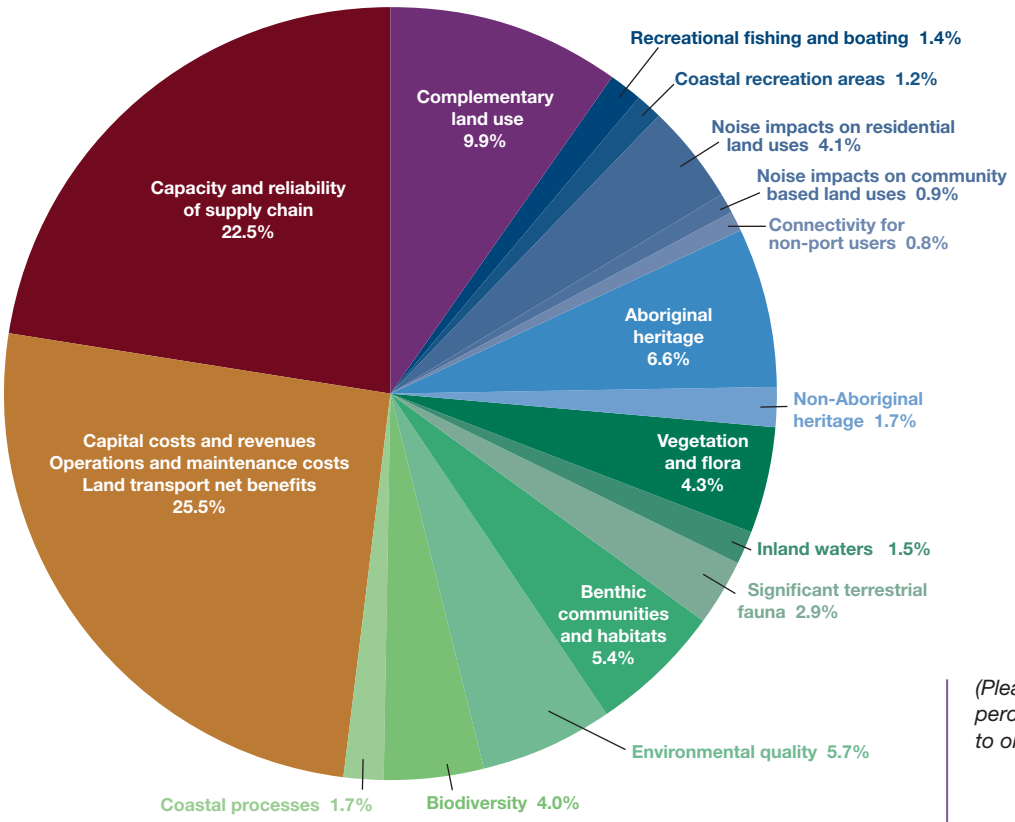


Diagram 12:

Weightings for the MCA-2 sub-criteria



(Please note that the percentages are rounded to one decimal place)

"Overall, it is encouraging to see a satisfying extent of consistency of aspects and measures between MCA-1 and MCA-2."

Dennis Koegeboehn, Port Operations Peer Reviewer, August 2019

It is particularly important to note the weighting assigned to the environmental criteria in MCA-2 – 25.4 per cent, or more than one quarter of the overall weighting, demonstrating that environment was considered adequately. This is even higher than the weighting assigned to marine and terrestrial environments in MCA-1 (21.8 per cent).

These environmental weightings are believed to be unprecedented in WA infrastructure development – members of the Westport Taskforce with years of experience in these types of assessments commented that they have never seen environmental values weighted so highly in an MCA process before. This demonstrates Westport's ongoing commitment to prioritising environmental considerations and achieving optimal outcomes, and reflects a response to stakeholder and community input, as well as the project's own priorities.

With the criteria weightings determined and endorsed by all tiers of Westport's governance hierarchy, the MCA-2 workshops commenced. Following a similar process to the MCA-1 workshops, each workshop focused on a different category of criteria and were attended by selected subject matter experts from the Westport project team, relevant government agencies and consultants involved in the project. Participation in the workshops had to be selective to ensure objectivity of views and commercial confidentiality, but it was also important to ensure a cross-section of viewpoints and expertise that could also accurately represent the priorities of different stakeholders and the community.

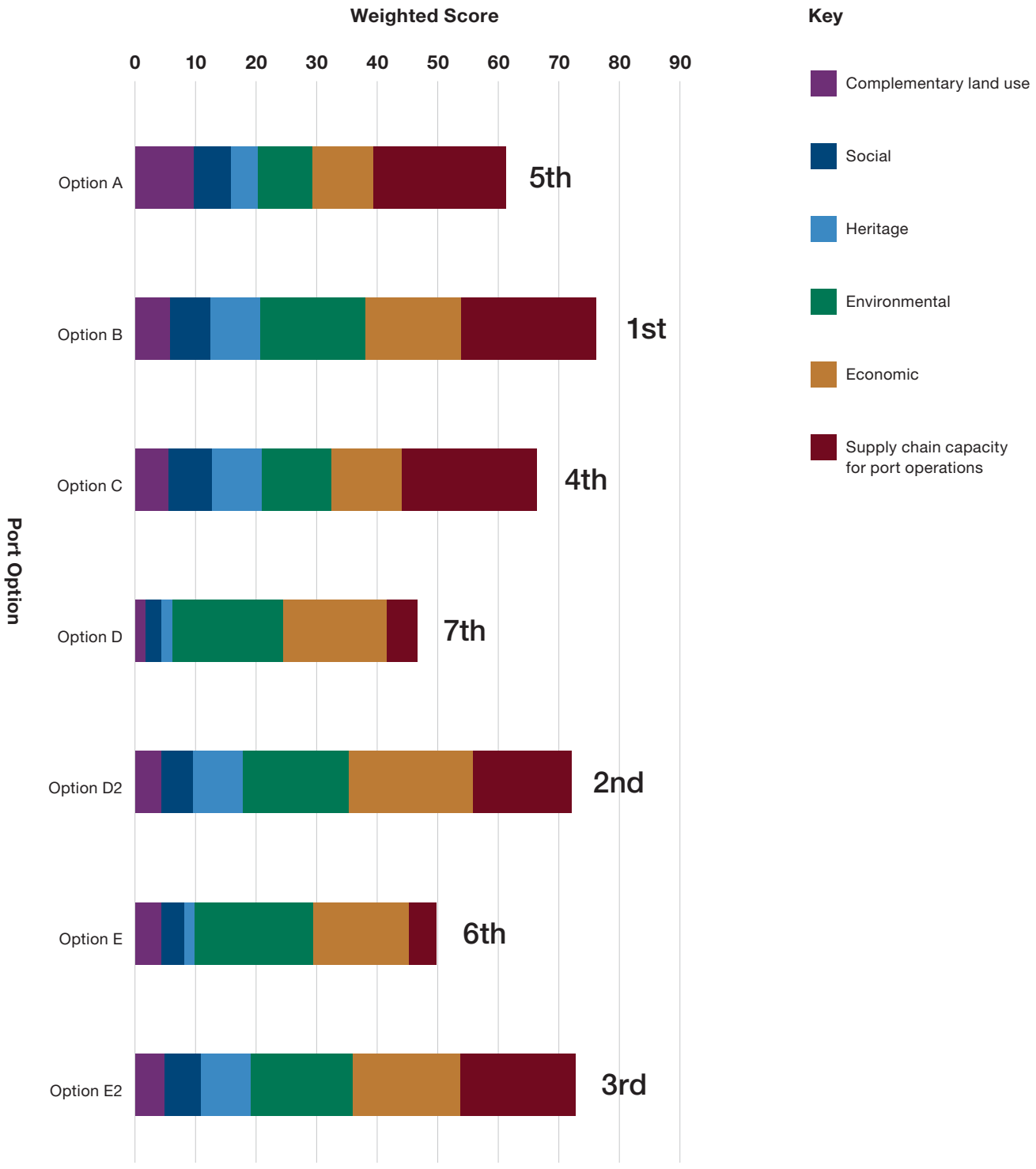
Alcoa's jetty in the Outer Harbour, Kwinana

Overall weighted scores for the options

The weighted score breakdown by top-level criteria for the seven options are shown in Graph 3, with the table showing the accurate scores and rankings.

Graph 3:

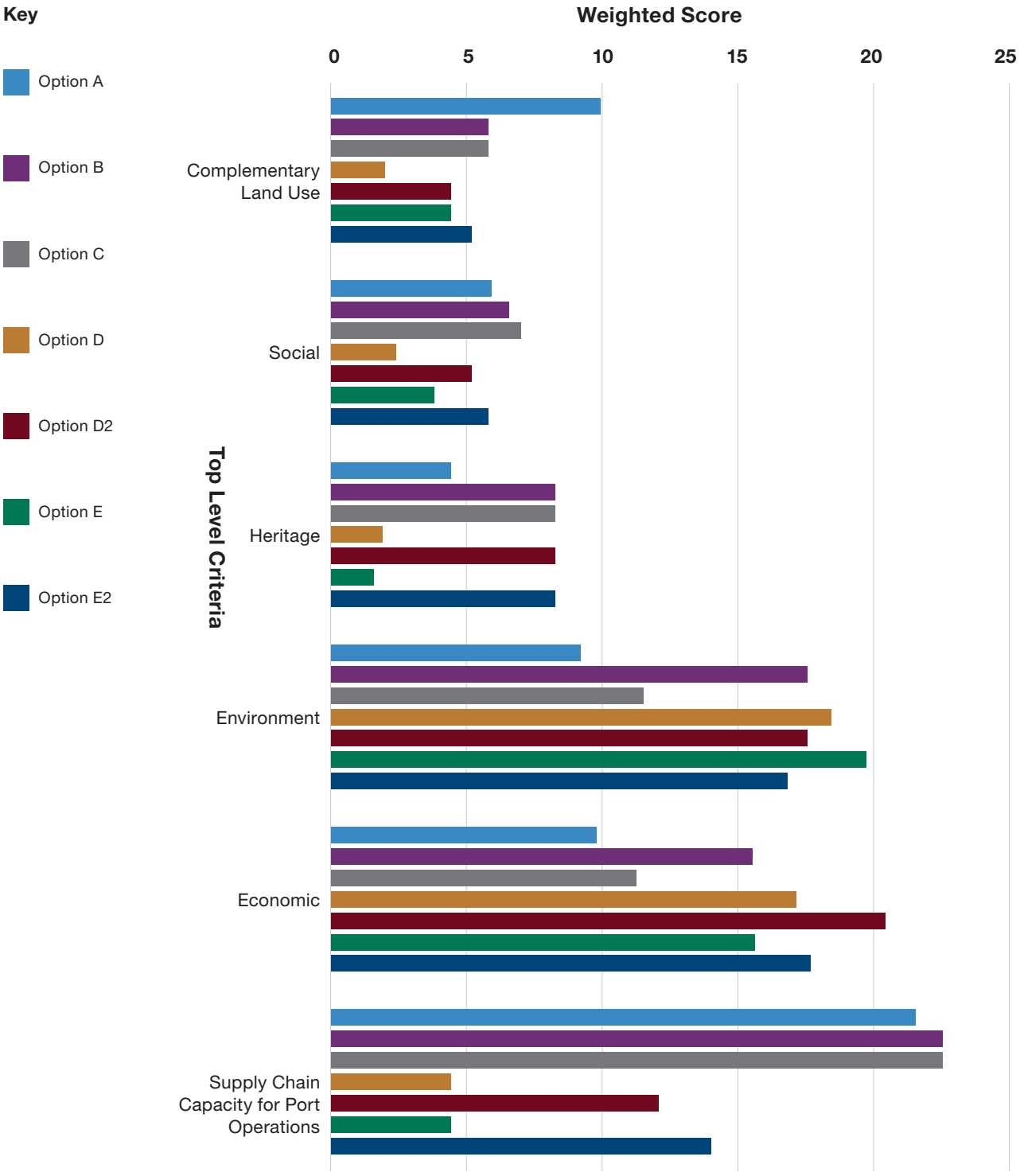
Weighted score breakdown for the seven options



Graph 4 shows how each option performed against the top-level criteria based on their weighted score.

Graph 4:

Comparative scores for the top-level criteria for the seven options

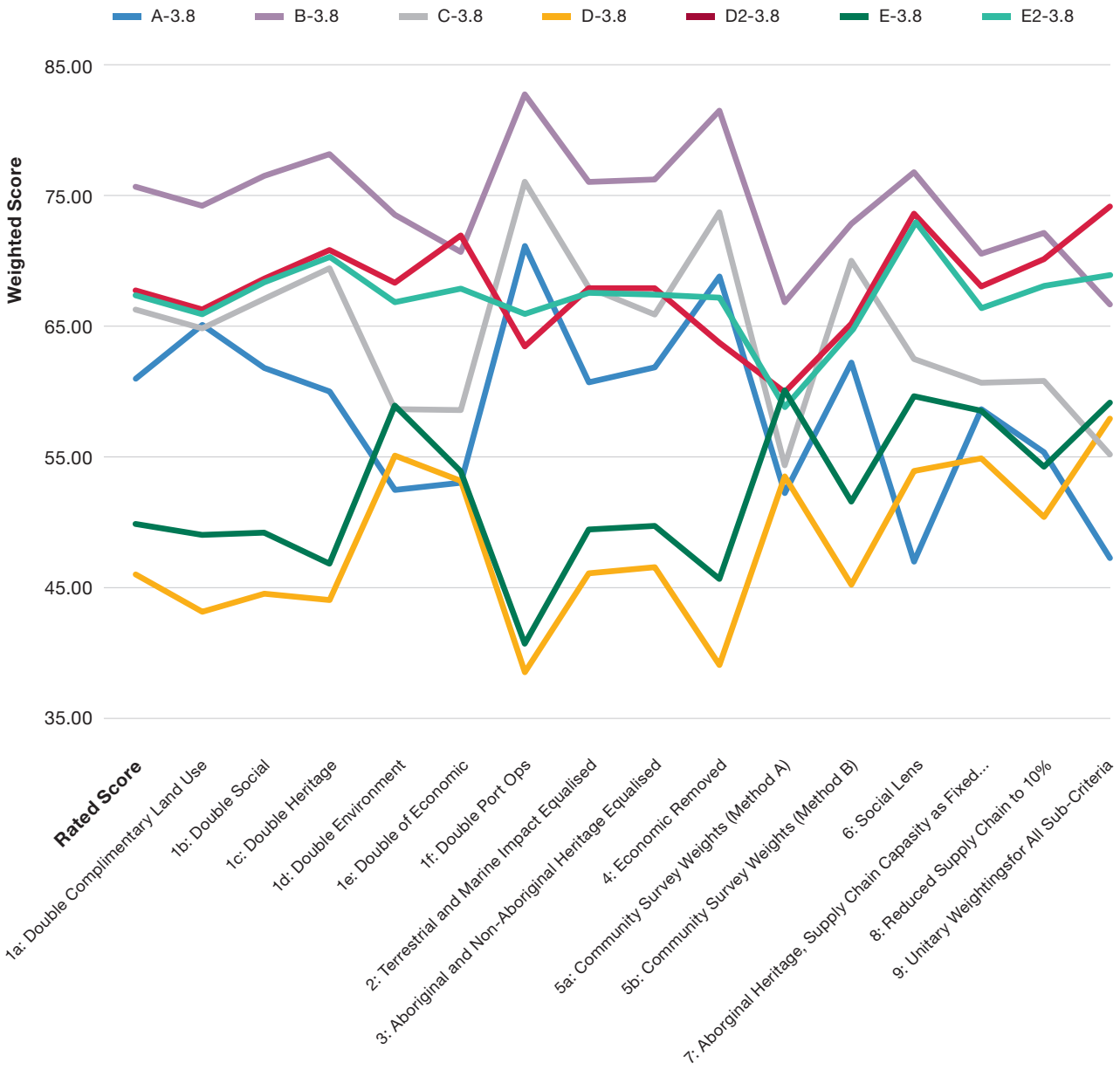


Sensitivity analysis

A sensitivity analysis was performed on the MCA-2 outcomes through the adjustment of the weightings applied to the scores associated with each relevant criteria and sub-criteria. The effects on the rankings of the seven options are shown in Graph 5. Option B, represented by the purple line, remains the top-ranked option almost across the board, with Option D2 (red) remaining the second-ranked option for most criteria. Options D (yellow) and E (dark green) are the poorest performing options across all sensitivities. These results show that Options B and D2 are the standout performers across all criteria.

Graph 5:

Changes in rankings when a sensitivity analysis is applied to the seven options

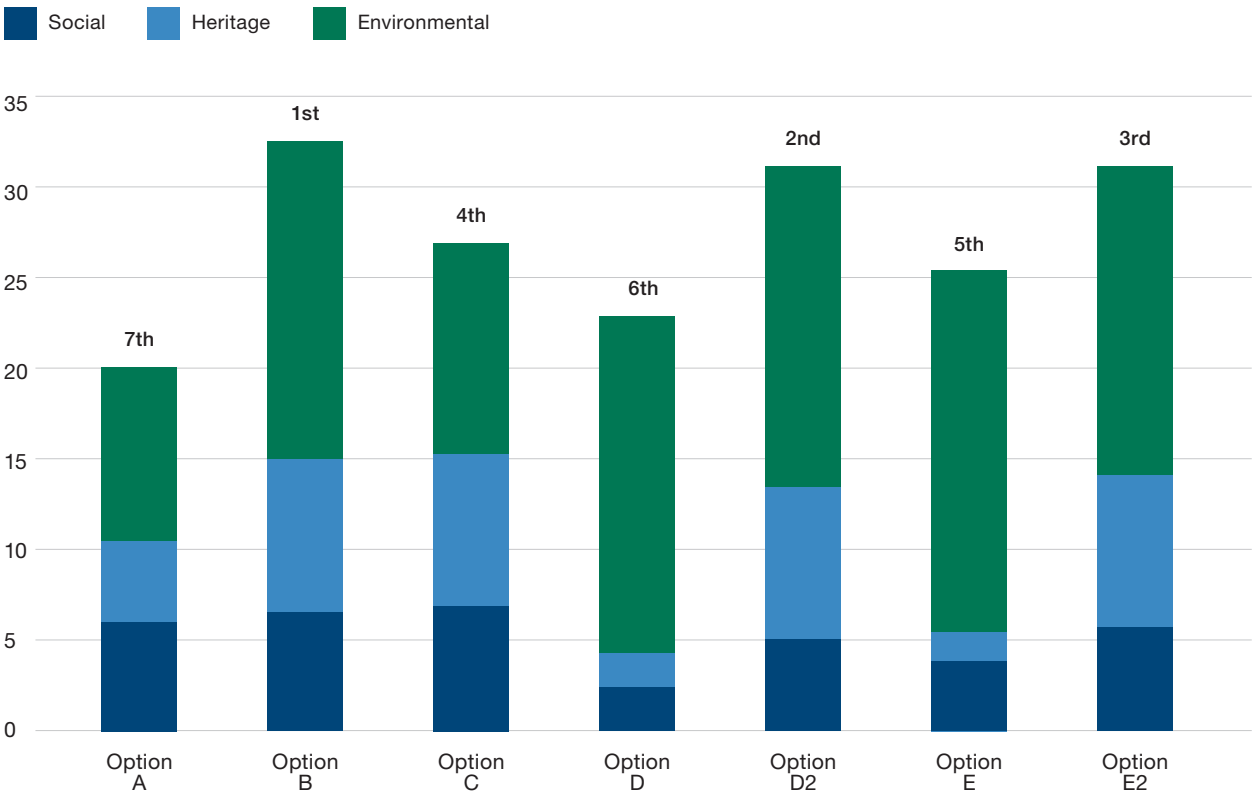


Kwinana Bulk Jetty at the Outer Harbour

Importantly, Westport wanted to know how the option rankings would perform based on community values. As such, the scores for the seven options were run through a 'social licence' lens comprising of the environmental, social and heritage criteria. Feedback provided to Westport by the community through various surveys and input channels has repeatedly shown these criteria to be the public's highest priorities. Graph 6 depicts the 'social licence' pro-rata scores for each of the seven options, which shows that recommended Options B and D2 perform the best on the criteria that are most important to the community.

Graph 6:

Social licence lens scores for the seven options



5.6
Strategic risk and opportunity analysis

As part of the technical appraisal of the options for MCA-2, an identification and evaluation of risks and opportunities was undertaken to better understand factors that may influence option selection but were not captured in the MCA-2 evaluation. This was an important step, as some identified risks had the potential to be 'deal breakers' for certain options.

The identification and evaluation of risks and opportunities involved broad consultation across the Westport Taskforce and key stakeholders during the development period for MCA-2. The risk and opportunity rating framework aligned with the framework used by the WA Department of Transport. The main risks flagged for each of the options are listed in Table 10.

It is important to understand that at this stage of the assessment (with the exception of Option E2) these risks are not deemed to be 'fatal flaws' for the options; rather, they indicate the additional investigations required in Westport's next stage of work to ensure the risks are addressed. In the instance of Option E2, it was deemed that the significance of the risks would be too difficult to overcome to make that option operationally, commercially and economically viable.

Inner Harbour, Fremantle

Table 10:
Strategic risks to investigate further for the seven options

Option	Strategic risks
A	• Unconventional and untested port design (narrow footprint) • Fully automated container transport connection is a point of vulnerability and adds complexity to the operating model • The location of this option may impact on the Australian Marine Complex
B	• The current design does not include a breakwater, based on expert advice made to Westport. However, it is worth noting that Westport has sensitivity tested the risk of requiring a breakwater, and even if one is needed, the additional costs and impacts do not change the comparative ranking of this option • The port may impact industries, both land and marine, in Kwinana • The port footprint may impact the Kwinana Bulk Terminal • The port and supply chain construction and operations may impact on the Water Corporation desalination plant, the second desalination plant currently proposed for the area, and other surrounding industries and properties • Land availability in Kwinana to support the operations of the supply chain and port ecosystem, including customs, truck marshalling areas and empty container parks, must be assessed
C	• The port may impact industries, both land and marine, in Kwinana • The port and supply chain construction and operations may impact on the Water Corporation desalination plant, the second desalination plant currently proposed for the area, and other surrounding industries and properties • Land availability in Kwinana to support the operations of the supply chain and port ecosystem, including customs, truck marshalling areas and empty container parks, must be assessed
D	• Commercial viability and ongoing economic impacts to the State of running two ports within close proximity, for the long-term, needs to be further investigated • Impacts to Fremantle's operations and capacity while modifications are made to the port • The port may impact industries, both land and marine, in Kwinana • The port and supply chain construction and operations may impact on the Water Corporation desalination plant, the second desalination plant currently proposed for the area, and other surrounding industries and properties • Land availability in Kwinana to support the operations of the supply chain and port ecosystem, including customs, truck marshalling areas and empty container parks, must be assessed
D2	• Commercial viability and ongoing economic impacts to the State of running two ports within close proximity, for the short-term, needs to be further investigated • Westport has assumed that Fremantle would not be automated during the shared operating period • The port may impact industries, both land and marine, in Kwinana • The port and supply chain construction and operations may impact on the Water Corporation desalination plant, the second desalination plant currently proposed for the area, and other surrounding industries and properties • Land availability in Kwinana to support the operations of the supply chain and port ecosystem, including customs, truck marshalling areas and empty container parks, must be assessed
E	• Impacts to Fremantle's operations and capacity while modifications are made to the port • Questions over whether the market would be willing to accept a Blue Highway mode of transport • Operational viability of the Blue Highway, given the relatively short barging distance and lack of protection along the coast • Commercial viability and ongoing economic impacts to the State of running two ports within close proximity, for the long-term, needs to be further investigated • Questions over the ability of this operating model to accommodate the high growth scenario forecast of 5.4 million TEUs by 2068 • The port and supply chain construction and operations may impact on the Water Corporation desalination plant, the second desalination plant currently proposed for the area, and other surrounding industries and properties
E2	• Impacts to Fremantle's operations and capacity while modifications are made to the port • Westport has assumed that Fremantle would not be automated during the shared operating period • Operational viability of the Blue Highway, given the relatively short barging distance and lack of protection along the coast • Questions over the willingness of the market to invest large sums in the infrastructure required to implement the Blue Highway for a relatively short timeframe (approximately six years) with this option? • Commercial viability and ongoing economic impacts to the State of running two ports within close proximity, for the short-term, needs to be further investigated • The port may impact industries, both land and marine, in Kwinana • The port and supply chain construction and operations may impact on the Water Corporation desalination plant, the second desalination plant currently proposed for the area, and other surrounding industries and properties • Land availability in Kwinana to support the operations of the supply chain and port ecosystem, including customs, truck marshalling areas and empty container parks, must be assessed

5.7
Rapid cost-benefit analysis

Westport is still in the options comparison phase, so only the 'headline' (most prominent) costs and benefits have been developed for the seven shortlisted options. The headline costs and benefits, developed over six months by Westport and its consultants, are sufficient to compare options and determine which one/s should progress through to the next stage for more detailed evaluation.

An RCBA is used to determine whether the three options tested (Options B, C and D2) are likely to generate a positive economic benefit for the State if they are constructed.

In the next stage of work, Westport will develop a detailed business case for the final option and undertake a standard cost-benefit analysis (CBA) of this business case, which will form the basis of any future investment decision.

Westport's RCBA was undertaken by the WATC, which developed a detailed model over numerous months incorporating more than 23,000 unique formulas to determine the results. The model was underpinned by some 6,000 assumptions, which were established by Westport and its consultants. WATC's RCBA for Westport aligns with Infrastructure Australia's (IA) standards and guidelines, and has been peer reviewed.

While the RCBA results are positive and compelling, it must again be stated that this analysis is to determine whether the selected options would provide a positive economic benefit to the State when compared against a theoretical base case where no expansion capital expenditure is undertaken, and only capital expenditure to maintain existing assets is accepted (i.e. a 'do minimum' case used for comparative purposes). This approach is required by IA for the comparison of any new capital developments.

High-level cost estimates

At each stage of Westport's process, the level of detail, scope and analysis continues to be refined and expanded; this is also true of the cost estimates.

For the purposes of MCA 1, cost estimates were developed to allow comparability between the 25 options on the long-list, and give a first indication of the minimum cost involved based on broad assumptions and industry benchmarks. For the MCA-2 process, preliminary port designs were developed, operational analyses undertaken, and high-level construction stages identified, which allowed WATC to develop more thorough cost estimates (while noting that Westport is still some way away from having comprehensive costings). The MCA-2 process also included a broader scope of operational (OPEX) and capital (CAPEX) costs, including port, stevedore, road, rail, intermodal terminals and land acquisition costs.

Based on undiscounted costs, WATC estimated the total costs to construct the first stage (as noted in Sections 7.2, 7.3 and 7.5 respectively) of each port option and its stevedore facilities, along with the associated land and supply chain costs, were:

1. Option D2 – $4.0 billion
2. Option B – $4.7 billion
3. Option C – $5.6 billion

Option D2 benefits in this analysis from having some delayed costs due to the shared operating model with Fremantle. A more rigorous analysis on the costs of all the options will be done in Westport's next phase of work.

BCR calculation and results

The RCBA determined the benefit to cost ratio (BCR) for the three options agreed to be assessed from the MCA-2 process: Options B, C and D2.

A BCR measures the estimated economic benefits against the combined estimated CAPEX and OPEX (all in net present value) of the three options over Westport's 49-year forecast period (at the time of the assessment) to 2068. If the resulting BCR is greater than 1.0, it indicates that the project will produce a positive economic result for Western Australia, with higher BCRs indicating more benefits.

Based on WATC's benefit and cost estimates for the three options to date, the BCRs for the three options are:

1. Option D2 – 1.76
2. Option B – 1.64
3. Option C – 1.55

While Option D2 produces the highest BCR, some questions remain regarding this option's total costs, as a more detailed analysis of the costs of the shared port model will be done in the next phase of work.

Costs per TEU

The financial modelling undertaken by WATC to date indicates that the cost savings and avoided costs facilitated by more efficient port and supply chain operations will result in cost savings on a 'per TEU' basis of up to one third on current transport costs.

WATC determined that the average cost to transport one TEU in 2020 is around $332; it is estimated that a new port could reduce this figure by around $100 per TEU over the forecast period, thanks to lower port and stevedore costs, reduced supply chain congestion and lower road-related supply chain costs.

North Quay Rail Terminal, Fremantle

06

Planning for the Environment

Cockburn Sound is one of very few major natural embayments along the coast of WA, and its sheltered waters provide refuge for a diverse range of marine species. The Sound is highly valued both as an important marine habitat and for the recreational activities it facilitates, such as fishing, diving and boating. Community feedback to Westport has very clearly emphasised the need for the environment, and especially the marine environment of Cockburn Sound, to be prioritised.

In recognition of the scale and longevity of Westport's proposed developments, and the potential environmental and social consequences if not adequately managed, the Westport Taskforce has prioritised environmental, sustainability, social impact and social licence considerations from its inception. This focus is evident in Westport's adoption of the PIANC Working with Nature, ISCA and UN SDG frameworks.

This approach is also demonstrated in the detail of the shortlisted options themselves. Including a narrow island port (Option A) and a Blue Highway option that did not require dredging in Cockburn Sound (Option E) demonstrates broader thinking. Adopting a Working with Nature approach always leads to better environmental and social outcomes, but more importantly, it will enable Westport to prioritise some values and achieve net environmental benefits where they count the most.

A baby whale near Kwinana Bulk Terminal in the Outer Harbour

Despite the adoption of best practice, smart design and resilience-building initiatives, the reality is that there will be residual environmental and social impacts from constructing and operating a major container port. However, the design and location of the port and supply chain influence the extent and nature of the impacts, which means there is a degree of control over the nature and extent of the impacts. Additionally, there will be opportunities to improve particular social and ecological values and to build resilience into the ecosystem as a whole. Westport's priority is to ensure that unacceptable impacts do not occur, and that Cockburn Sound can continue to thrive for generations to come.

Westport aims to achieve this by:

- being well-informed and understanding which values are paramount, both from an ecosystem health and a community perspective;
- using the best available science, information and data to investigate potential impacts and opportunities;
- undertaking additional research into key issues such as seagrass, pink snapper, blue swimmer crabs, little penguins and bottlenose dolphins;
- continuing to collaborate with stakeholders and the community in future stages of work;
- making decisions with the protection of key ecological and social values in mind at all times; and
- identifying and delivering on net gains wherever possible.

It is also worth noting that existing and new pressures on Cockburn Sound are regulated through a robust Environmental Quality Management Framework (EQMF) established by the State Environmental Policy for Cockburn Sound. This framework helped the marine ecosystem to recover from historic pollution from the 1960s to 1980s, and was reviewed and re-endorsed by the Office of the Auditor General in 2010. Westport is confident that, with the appropriate commitment to avoiding and mitigating impacts, a new port can meet EQMF environmental quality criteria and ensure environmental and social values are protected for future generations.

"The Westport process has been excellent in terms of its widely consultative approach and its rigour. We look forward to Westport's continuing consultation with the Cockburn Sound Management Council during the next stage of the project."

Cockburn Sound Management Council's official submission to Westport on the shortlisted options, December 2019

6.1
Environmental opportunities investigated

The PIANC Working with Nature approach (see Section 4.2) saw environmental considerations embedded into Westport's process. Westport benefited from collaboration with Fremantle Ports, Cockburn Sound Management Council, the Environmental Protection Authority (EPA) and other government agencies and stakeholders, and received an enormous amount of environmental data and technical studies. The Western Australian Marine Science Institution (WAMSI), Spectrum Ecology and Bamford Consulting were commissioned to review these and other relevant studies to ensure environmental trends in Cockburn Sound were thoroughly understood and considered. This work informed Westport's options design and assessment processes.

Westport initially identified 15 opportunities to avoid, mitigate or offset impacts, and/or improve environmental and social values in Cockburn Sound. Westport investigated most of these opportunities in Stage 2, with several programs now already underway and others flagged for progression in Westport's next stage of work. Table 11 outlines the environmental opportunities identified, the action taken to date and the planned next steps. Where the opportunities were found to be unsuitable, it has been noted that they will not be progressed any further.

Bottlenose dolphins in Cockburn Sound

Table 11:
Environmental opportunities identified and progressed by Westport

Environmental opportunity identified	Work done so far	Next steps
1. Environmental research funding Establishing ongoing funding arrangements for relevant environmental research, with a focus on improving understanding of key values and relevant pressure-response pathways.	Westport worked closely with DWER, CSMC, DPIRD, WAMSI and other stakeholders to iteratively implement a series of priority monitoring and research programs in Cockburn Sound to develop a comprehensive environmental 'baseline', starting with a real-time water quality monitoring program over the 2019-20 summer.	Westport will be responsible for providing funding and implementing several programs from 2020 onwards, into important areas such as pink snapper, seagrass, blue swimmer crabs and bottlenose dolphins.
2. Water monitoring in Cockburn Sound Implementing fit-for-purpose environmental monitoring and responsive management in Cockburn Sound.		Westport is collaborating with WAMSI to support a WAMSI-led science node to develop and address a series of priority gaps in a major multi-year scientific research program.
3. Improve seagrass coverage in Cockburn Sound Establishing long-term trials and programs aimed at offsetting seagrass loss and re-establishing seagrass beds in Cockburn Sound.	The feasibility of using dredge spoil to fill in existing holes in Success and Parmelia Banks to offset the loss of shallow sand and seagrass habitat on these banks when the channel into the Sound is dredged was investigated. Preliminary dredging schedules and volumes indicate that spoil will be available.	Westport will be furthering work on this opportunity in the next stage as a priority.
	Investigating the feasibility of seagrass rehabilitation on spoil-filled habitats in this area has been included as a priority research project in the draft monitoring and research program discussed above.	Westport will be responsible for funding, scoping and managing this research project that is intended to commence in 2020.
4. Minimise fishing impacts Options for avoiding, mitigating and offsetting potential impacts on commercial fishers and operations (e.g. avoidance of 'ecological windows of sensitivity') and recreational fishers (e.g. improvement of land-based recreational fishing opportunities and access points such as boat ramps, implementation of artificial reefs/fish aggregating devices and finfish stocking programs).	Westport has done some preliminary work on this matter. A conversation has been started with recreational fishers commencing with a mid-2019 workshop.	Westport to follow up on recreational fisher concerns voiced during the first workshop and opportunities for improving recreational fishing values.
	The potential impact from each of the shortlist port options on the flushing and circulation regimes in Cockburn Sound were investigated through a hydrodynamic modelling study, which underpin important biological/ecological processes.	Westport will further investigate potential impacts and opportunities through a very comprehensive hydrodynamic modelling study in the next stage of work.
	Westport is collaborating with DPIRD to refine impact estimates relevant to commercial fishing interests.	Westport will collaborate with DPIRD to investigate impacts and opportunities, and provide financial support to DPIRD for work in this area if required.
	A preliminary desktop assessment on the use of Cockburn Sound by commercial fishers capturing small pelagics and coastal species was completed, and an order-of-magnitude valuation of the product sourced from the Sound.	Westport will be working with DPIRD to refine these numbers and investigate opportunities for resilience-building initiatives.

Table 11:
Environmental opportunities identified and progressed by Westport

Environmental opportunity identified	Work done so far	Next steps
5. Investigate Garden Island Causeway impacts Investigating the cost and benefits of modifying the Garden Island Causeway to improve water circulation and quality in the southern section of the Sound.	Westport and WAMSI facilitated a workshop to gauge the views of prominent scientists and managers on this topic.	Westport will continue to discuss the outcomes of the preliminary modelling and the topics raised at the workshop with other departments.
	A preliminary modelling exercise was subsequently commissioned to test the potential benefits of modifying the Causeway to water quality in the southern section of the Sound (in terms of flushing and circulation).	
6. Minimise desalination brine formation Developing options for minimising the formation of a high-density brine plume related to desalination activities in the Cockburn Sound basin.	Westport has met with Water Corporation but has not furthered this discussion because different port options require a different response.	Westport will collaborate with Water Corporation on this issue if required.
7. Improve oil spill response Increasing emergency response capabilities and coordination in Cockburn Sound to improve the capacity to effectively deal with HAZMAT and oil spill incidents.	Not followed up during Stage 2.	To be further investigated in the next stage of work.
8. Maximising use of dredge spoil Investigate using dredge spoil for beneficial environmental and social outcomes.	There has been progress on investigations into using dredge spoil as a way to offset shallow (potential seagrass) habitat on Success and Parmelia banks.	Westport will investigate other opportunities for using dredge spoil for environmental/ social benefit in collaboration with WAMSI and other experts.
	There have been preliminary discussions with a prominent international expert in harbour design to use dredge spoil for a 'natural' breakwater.	Westport will further investigate the merit and feasibility of this opportunity once the preferred option has been defined.
9. Avoid heritage impacts Avoiding/mitigating impacts on heritage values.	Heritage issues are considered by Westport under a different work stream (social criteria).	Heritage issues are considered by Westport under a different work stream.
10. Improving recreational beach access	Not followed up during Stage 2.	To be further investigated in the next stage of work once the preferred option has been defined.
11. Aquatic species research Funding research into (and ongoing monitoring of) potential factors influencing recruitment of commercially and recreationally important aquatic species.	This issue was discussed during the collaborative inter-departmental Cockburn Sound monitoring and research program workshops initiated by Westport and led by DWER. Included as a priority research project is a study investigating the impact on increased turbidity (Total Suspended Solids - TSS) on early life-stages of key species in Cockburn Sound.	DPIRD is currently looking into a potential scope for this work and Westport will collaborate with DPIRD to commence this research project in 2020.
12. Preserving vegetation Purchasing and reserving areas of remnant vegetation.	Westport has commissioned work to start looking into relevant opportunities.	Westport will be further investigating offsets and opportunities in the next stage of work once the preferred option has been defined.

Table 11:
Environmental opportunities identified and progressed by Westport

Environmental opportunity identified	Work done so far	Next steps
13. Groundwater treatment Options for treating contaminated groundwater resources.	DWER has done some preliminary work to get an understanding of the number and location of sites with suspected contamination issues.	To be further investigated in the next stage of work once the preferred option has been defined.
14. Implement dredging best practice Investigating and developing new world-leading control measures for mitigating dredging-related impacts informed by WAMSI-led Dredging Science Node outcomes.	A review of the DSN outcomes has commenced.	Westport will collaborate with WAMSI and DWER to use the outcomes of DSN program to plan a best-practice dredging campaign.
15. Innovative port design Investigating opportunities for avoiding/ mitigating marine impacts and creating benefits through innovative port design, including:	DWER has done some preliminary work to get an understanding of the number and location of sites with suspected contamination issues.	Opportunities with merit for avoiding/mitigating impacts associated with the recommended options will be further investigated during the next stage of work.
a) Pile driving-related underwater noise mitigation.	a) Opportunities have been identified.	a) Opportunities will be further investigated in the next stage.
b) Best practice port construction techniques (e.g. caisson structure).	b) Best practice port construction options have been identified, but not incorporated into designs thus far.	b) These opportunities will be further investigated during in the next stage.
c) Narrow footprint container ports (with on-land storage container facility).	c) This opportunity was sense-checked for merit and feasibility, and informed design of shortlisted Option A.	c) With Option A not proceeding, narrow footprint ports will not be further investigated.
d) Floating ports.	d) Floating ports were sense-checked for merit and feasibility, but not incorporated into design.	d) This will not be further investigated.
e) Automated container transport systems and guided vehicles to facilitate small footprint port design and mitigate terrestrial impacts.	e) This opportunity was sense-checked for merit and feasibility, and informed design of shortlist Option A.	e) With Option A not proceeding, this will not be further investigated.
f) Mooring systems to negate the need for a breakwater and ensure a high degree of flushing within the harbour.	f) This opportunity was sense-checked for merit and feasibility, and informed design of shortlist Option B.	f) This will be further investigated during the next stage, as the need for a breakwater has been flagged as a risk for recommended Option B.
g) Port tunnel model to Fremantle.	g) This was sense-checked for merit and feasibility and informed design of some long-list options, but none of those options progressed to the shortlist.	g) This will not be further investigated.
h) Coastal shipping (Blue Highway).	h) This was sense-checked for merit and feasibility, and informed design of shortlisted Options E and E2.	h) With Options E and E2 not proceeding, the Blue Highway will not be further investigated.

More opportunities were identified throughout Stage 2; by November 2019, Westport's opportunities register for further investigation in the next stage of work included more than 50 environmental and social opportunities. Westport intends to establish an expert panel to review these for feasibility and prioritisation over the next year.

"I support the potential control measures and opportunities described… particularly that significant impacts from port-related development… should be either avoidable, appropriately mitigated and/or offset."

Ian Le Provost, Environmental Peer Reviewer, January 2019

6.2 Investigating the impacts of a new access channel

One of the biggest environmental points of concern associated with the new port is the potential impact of a dredging campaign to construct a new access channel for the Kwinana port. There are already several channels in Cockburn Sound, both natural and man-made, as depicted in Map 2.

The Success and Parmelia Channels are dredged to 14.7 metres' depth. The Woodman, Jervoise, Medina, Calista and Stirling Channels are all partially dredged to provide access to the Australian Marine Complex, Alcoa, BP and Kwinana Bulk Terminal jetties.

A crucial component of the new port is a second access channel that allows container vessels to enter Cockburn Sound. This will need to be dredged through the sand banks situated between Fremantle and Cockburn Sound in Owen Anchorage. The new channel will provide access for deeper, more efficient vessels, and reduce operational risks by providing a second, back-up point of access to Cockburn Sound. The new port will also require some sections of Kwinana Shelf to be dredged to create the new harbour; however, the amount of dredging will be minimised through smart design.

The two primary sources for environmental concerns associated with dredging a second access channel are: the impact on seagrass meadows and marine fauna from excavation and dredging-related turbidity; and the effect on broadscale flushing and water circulation regimes in Cockburn Sound. To that end, it was critical that Westport fully comprehend any probable impacts on these values from creating a new channel.

Map 2:

Benthic habitat in relation to shipping channels in Cockburn Sound

COCKBURN SOUND - BENTHIC HABITAT AND SHIPPING CHANNELS

Dredging best practice

WA's northern bulk ports have undertaken capital dredging campaigns that are large even by international standards. In recognising the need to improve the predictability and management of dredging impacts both in WA and globally, a $19 million collaborative research program known as the Dredging Science Node (DSN) was established within WAMSI.

Some 114 scientists from a variety of disciplines contributed to the DSN. The research was informed by data volunteered from real-world dredging campaigns, which led to outcomes that directly benefit the prediction, monitoring and management of dredging impacts. This has led to a more comprehensive understanding of how key organisms respond to and recover from pressures associated with dredging. There is now also an improved knowledge of the process of sediment particle generation, dredge-related physical pressures and the ability to quantify and predict, manage and measure those pressures. These new insights from the DSN have led to increased confidence, timeliness and efficiency of environmental approval and regulatory processes associated with dredging projects.

This knowledge will benefit Westport's environmental impact assessments, the setting of appropriate approval conditions, and the auditing and compliance with those conditions. This will all occur in the next stage of Westport's work and would form a key component of the project being granted EPA approval.

Garden Island Causeway

Impacts on seagrass

Map 2 depicts the benthic habitats of Cockburn Sound and Owen Anchorage. Substantive seagrass meadows are predominantly found on the Success and Parmelia Banks in Owen Anchorage, and in the shallow, protected waters around Garden Island, the Garden Island Causeway and in Mangles Bay to the south. Most of the seagrass that once occurred on Kwinana Shelf was lost decades ago, although some ephemeral seagrass occurs on and around an old spoil ground on Kwinana Shelf every spring/summer. The main impact on meadow-forming seagrass from the construction of a new port is therefore associated with dredging a new access channel through the sand banks in Owen Anchorage.

Westport will implement recommendations from the DSN to limit the direct and indirect impacts of the port's construction and operations on seagrass. Westport also aims to offset seagrass loss, potentially by infilling selected areas with dredge spoil to create additional seagrass habitat, and to undertake research and rehabilitation programs to increase seagrass meadow cover on the banks over time.

Impacts on marine fauna

Marine fauna in Cockburn Sound may be affected through impacts such as habitat loss associated with excavation and reclamation, dredging-related turbidity, and increased vessel movements. Certain fauna may be more vulnerable to different pressures at different stages of their life cycles, such as the larval stage. Further, impacts on fauna that form integral parts of the wider ecosystem and food web (such as forage fish eaten by numerous predators) can result in larger ecological consequences. Westport is committed to avoiding impacts with significant ecological consequences, and that opportunities benefiting marine fauna are identified and incorporated into a future proposal where possible.

This commitment requires considerable focus in the next phase of work. Westport, in collaboration with the Department of Water and Environmental Regulation, the Department of Primary Industries and Regional Development, and other stakeholders, has identified a series of dedicated research programs to inform impact estimation, mitigation and resilience-building initiatives that may benefit marine fauna. Further development of these additional studies will be progressed in the next stage of Westport.

Hydrodynamic impacts

The second source of impact associated with a new access channel was its effect on broadscale flushing and water circulation regimes in Cockburn Sound. Flushing is an important process as it dilutes and removes sediment and other pollutants that may become trapped in the Sound. Improving flushing times over wider areas generally improves the water quality.

If the second access channel reduces water circulation in Cockburn Sound, this may pose a risk to key biological and ecological processes, such as pink snapper spawning. An increase in flushing times may also exacerbate stratification and water quality issues in the southern section of the Sound.

Westport commissioned marine consultancy, BMT – who developed a contemporary, validated and extensively peer-reviewed hydrodynamic model of Cockburn Sound for the Water Corporation – to undertake a series of simulations to:

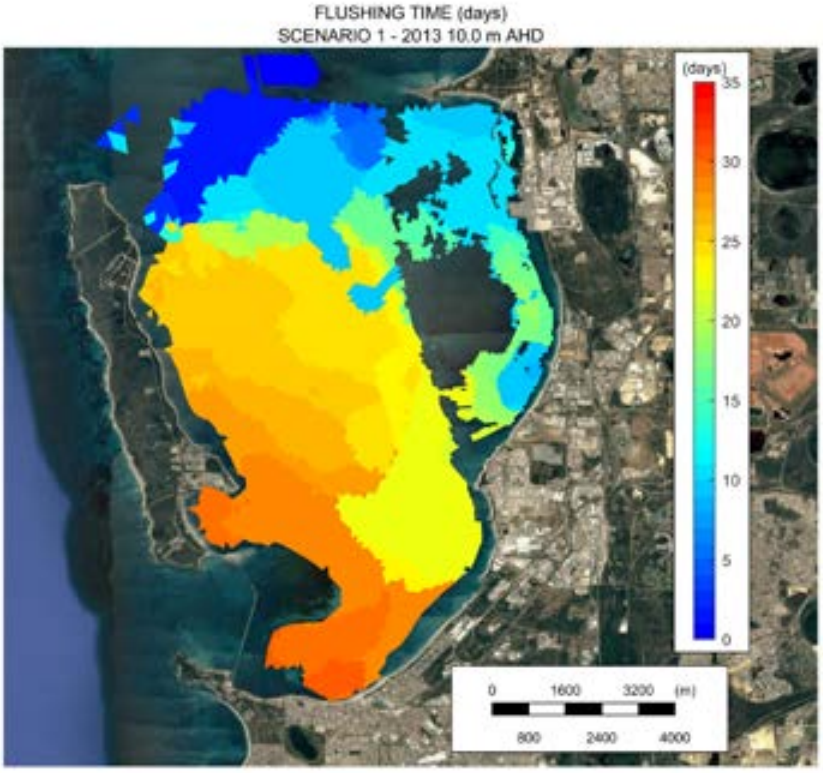
1. **Quantify the effects of the proposed options for access channels through Parmelia and Success Banks on Cockburn Sound's overall water circulation; and**
2. **Quantity the effects of the proposed end state port options on Cockburn Sound's overall circulation and flushing regimes.**

The study included a 'tracer' component – where a virtual dye (tracer) is released on day zero and the number of days is counted for the concentration of the dye to reduce to a pre-defined level – and a 'current' component – where the strength and direction of currents at a predefined depth is investigated.

The flushing diagrams for Scenarios 1-4 depict water residence times during April 2013 (which is the most recent and reliable data) at 10 metres' depth. April has been chosen for the modelling as autumn is the period of highest water stratification. The colours in the diagrams show the flushing time in days, with the faster flushing times (represented by the blue and green) being the desired result, as opposed to the slower flushing times (represented by the red, orange and yellow).

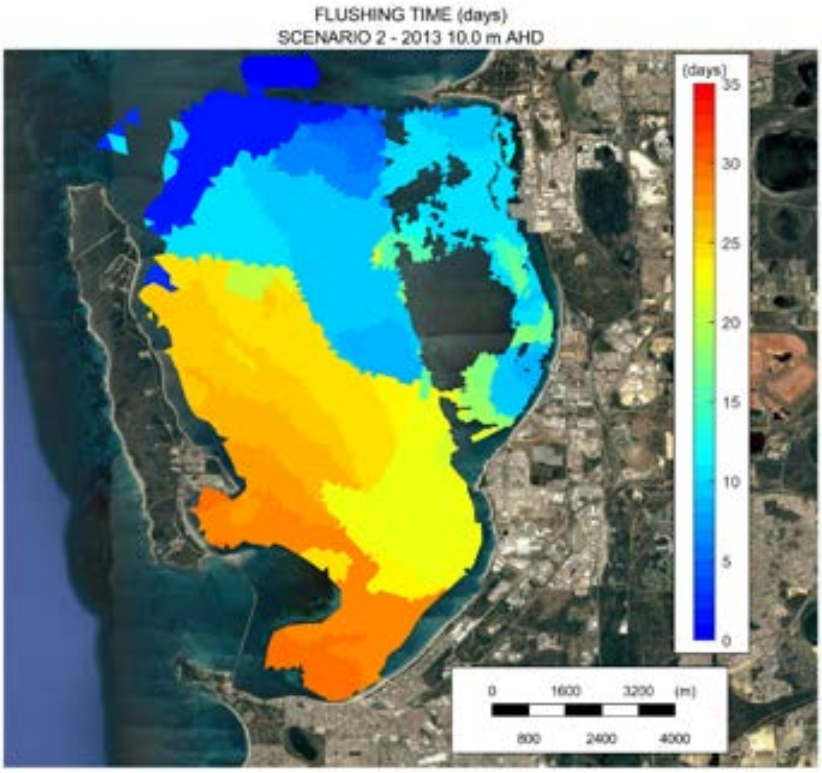
• Scenario 1:

Baseline: the base case is the standard flushing scenario as it was in April 2013. It has no changes to the existing layout of the channels and excluded the proposed port footprints.



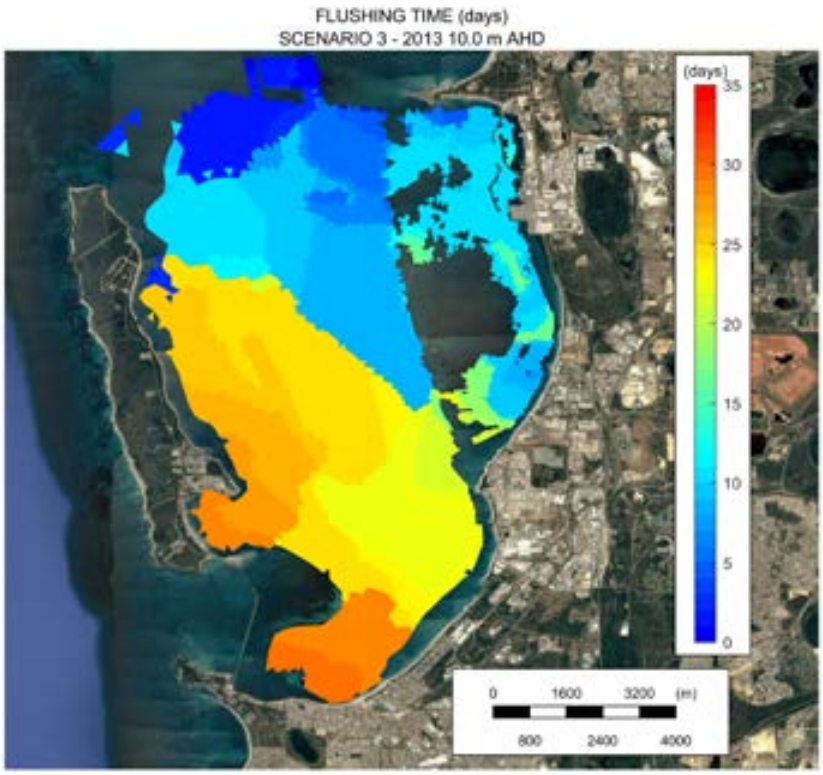
• Scenario 2:

Based on the deepening and widening of the existing channel to 18.76 metres' depth and 220 metres' width.



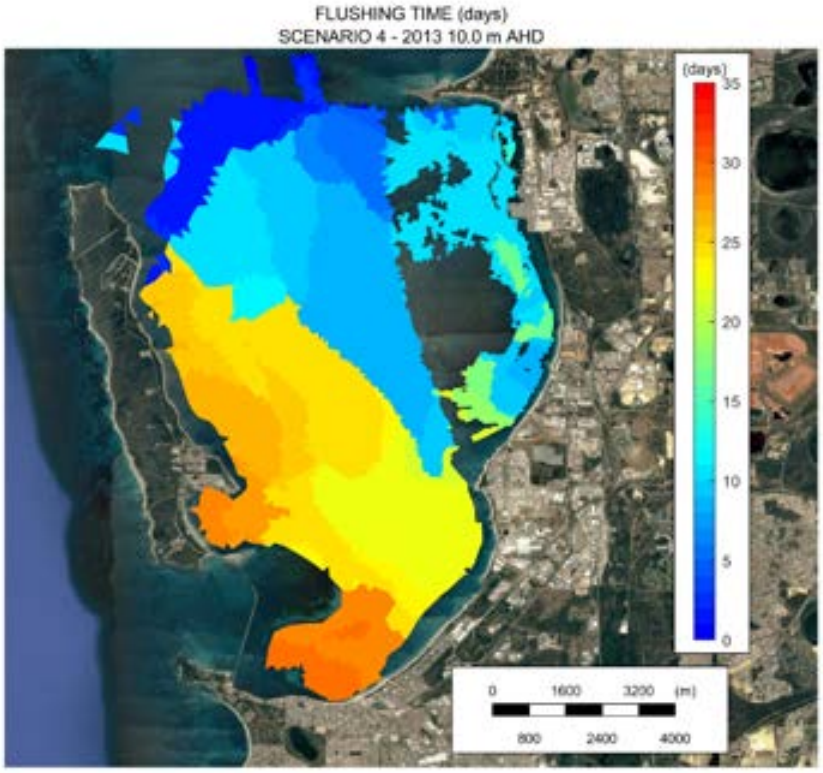
• Scenario 3:

Based on the existing navigational access channel (with no changes to depth or width) but with an additional access channel in parallel to the existing one. This channel was dredged to 18.76 metres' depth and 220 metres' width through Parmelia and Success banks.



• Scenario 4:

Based on Scenario 3 with both the existing and additional channels, but with filling to occur in the designated disposal area to a level of 7.76 metres' depth to simulate the effect of a potential seagrass offset measure.



The following conclusions were drawn from these hydrodynamic simulations:

1. A wider, deeper channel improves the flushing of Cockburn Sound and is felt over most parts of the year and across most of the deep basin.
2. Dredging a second channel in addition to the existing channel is the best option for improving flushing rates.
3. Filling in holes on the sand banks to offset seagrass habitat loss does not negate flushing improvements created by the new channel.
4. Seasonal medium-scale and broadscale water circulation regimes in Cockburn Sound were not affected.

The anticipated result was that a new, deep channel into Cockburn Sound would help flush the basin faster, with marginal improvements in the southern section.

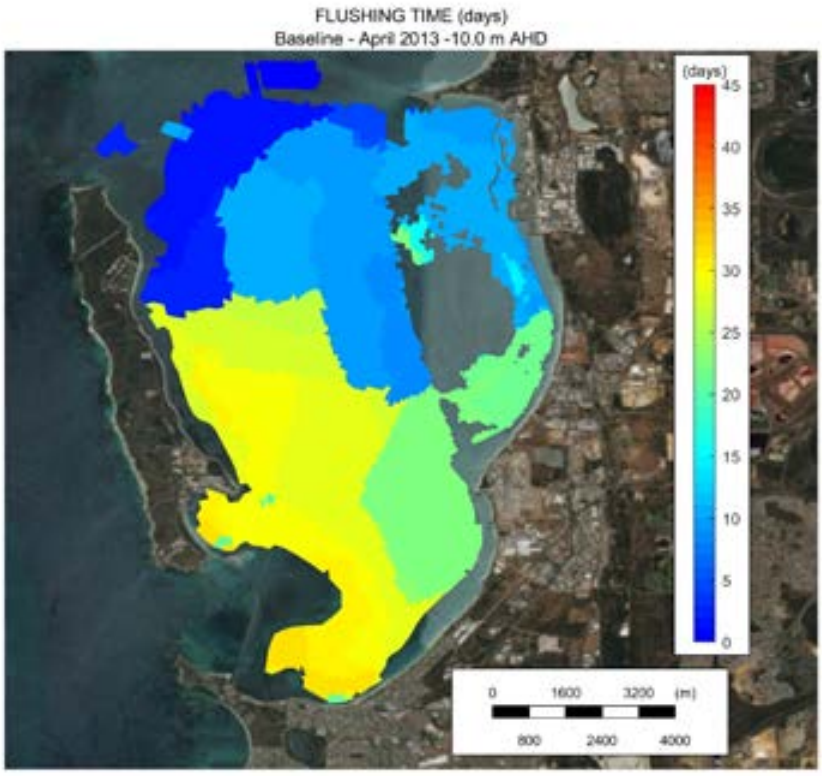
6.3
Flushing impacts of the Kwinana ports

The second component of the modelling study investigated the potential for the various channel and port configurations to affect circulation regimes. BMT ran a series of simulations on the three end state Kwinana ports – Options A, B and C – to determine the impacts of the port footprints on flushing in Cockburn Sound.

The results of the three simulations are depicted in the diagrams for Scenarios 6-8, along with the baseline (Scenario 5):

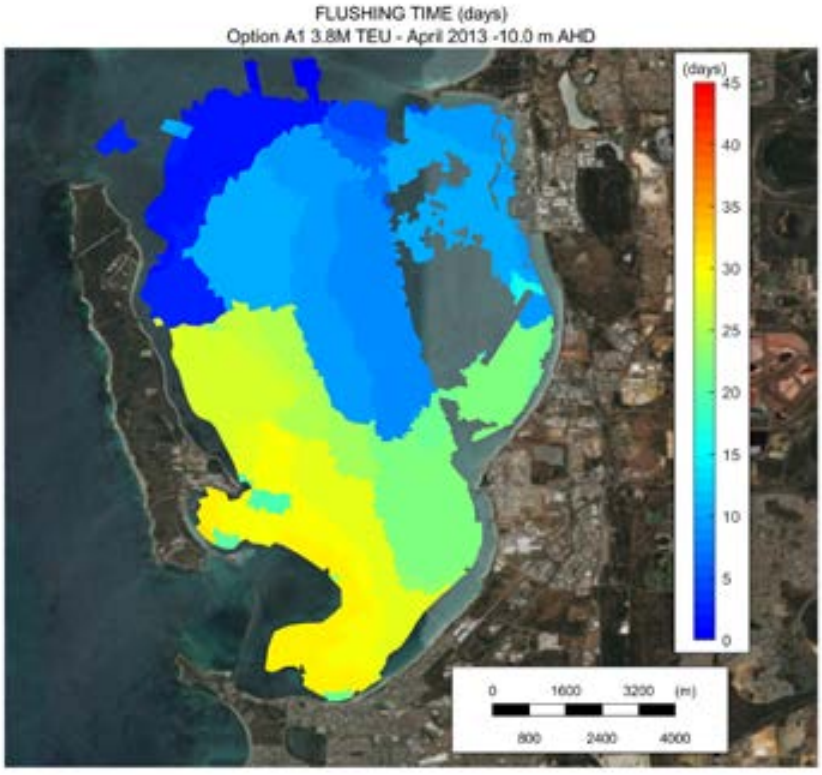
- **Scenario 5:**

  Depicts the baseline, which is the current situation of having one access channel, but without the industrial intakes and discharges. This is the hydrodynamic model against which the Option A, B and C impacts are measured to determine whether they improve flushing in Cockburn Sound or not.



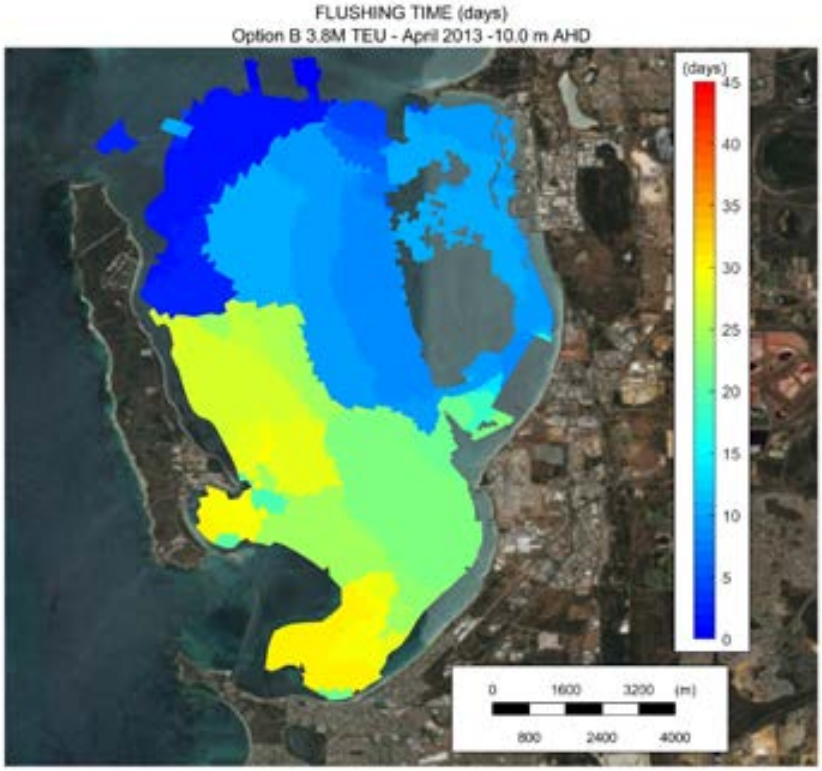
- **Scenario 6:**

  Depicts the hydrodynamics for Option A at its end state (handling 3.8 million TEUs) with a second access channel, excluding industrial discharges. The larger areas of blue and green in Scenario 6 show an improvement in flushing throughout Cockburn Sound for Option A.



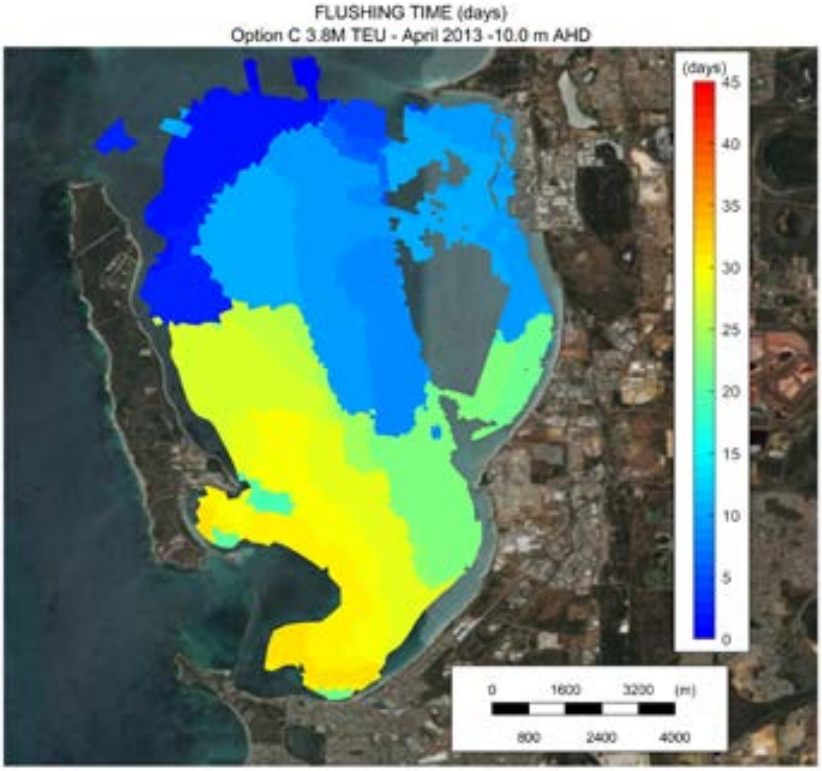
- **Scenario 7:**

  Depicts the hydrodynamics for Option B at its end state with a second access channel, excluding industrial discharges. The larger areas of blue and especially green in this model shows an observable and consistent improvement in flushing throughout Cockburn Sound for Option B.



- **Scenario 8:**

  Depicts the hydrodynamics for Option C at its end state with a second access channel. The slightly increased areas of blue and green in this model show a small improvement in flushing with Option C.



The results of this modelling show that flushing times in Cockburn Sound improve with all three of the end state options, however Option B has the most marked improvement with a substantial reduction in flushing times particularly towards the southern area of Cockburn Sound.

Aerial view of existing infrastructure at the Outer Harbour, Kwinana

07

The Seven Options

Inner Harbour, Fremantle

DP World cranes at the Inner Harbour, Fremantle

The original shortlist of five future port options was announced in August 2019. More work was then undertaken to expand on the core details of these options so that they could be compared and ranked in MCA-2.

While Westport is gradually defining the more granular aspects of each port option, on the spectrum of infrastructure planning through to delivery, the project is still in its early stages. Information and port concepts may be subject to change when more detailed technical work and costings are undertaken on the recommended options.

Investigations to date have focused on criteria that highlighted the differences between the seven options. This enabled them to be more easily scored and ranked against each other in the comparative analysis. Areas of assessment where impacts were deemed to be largely consistent across the options – such as land availability in Kwinana, fishing and boating impacts in Cockburn Sound, and port ecosystem operations in Kwinana – were only assessed at a superficial level in Stage 2, but will be rigorously assessed in the next stage of work.

A consortium of leading consultants further developed the concepts for the shortlisted options based on the following parameters and considerations:

- future (end state) vessel capacity is assumed to be 18,000 TEUs with a draught of 16 metres, consistent with current ULCVs;
- the future port shall seek to maximise trade efficiency;
- the future port shall seek to minimise its carbon footprint; and
- the future transport network may be characterised by an increase in rail mode-share and efficient intermodal terminals.

This phase of work has focused on the design and integration of the first and last miles of the supply chain with the ports. These preliminary port and intermodal designs allow for the operation of two independent stevedores at each stage of construction and transition to preserve the existing competitive arrangements; however, this does result in the duplication of some infrastructure.

Westport has not yet identified land outside of the port footprints for customs, truck marshalling areas or empty container parks. This applies to all options apart from Option A, which utilised Latitude 32 for these purposes.

7.1 Option A

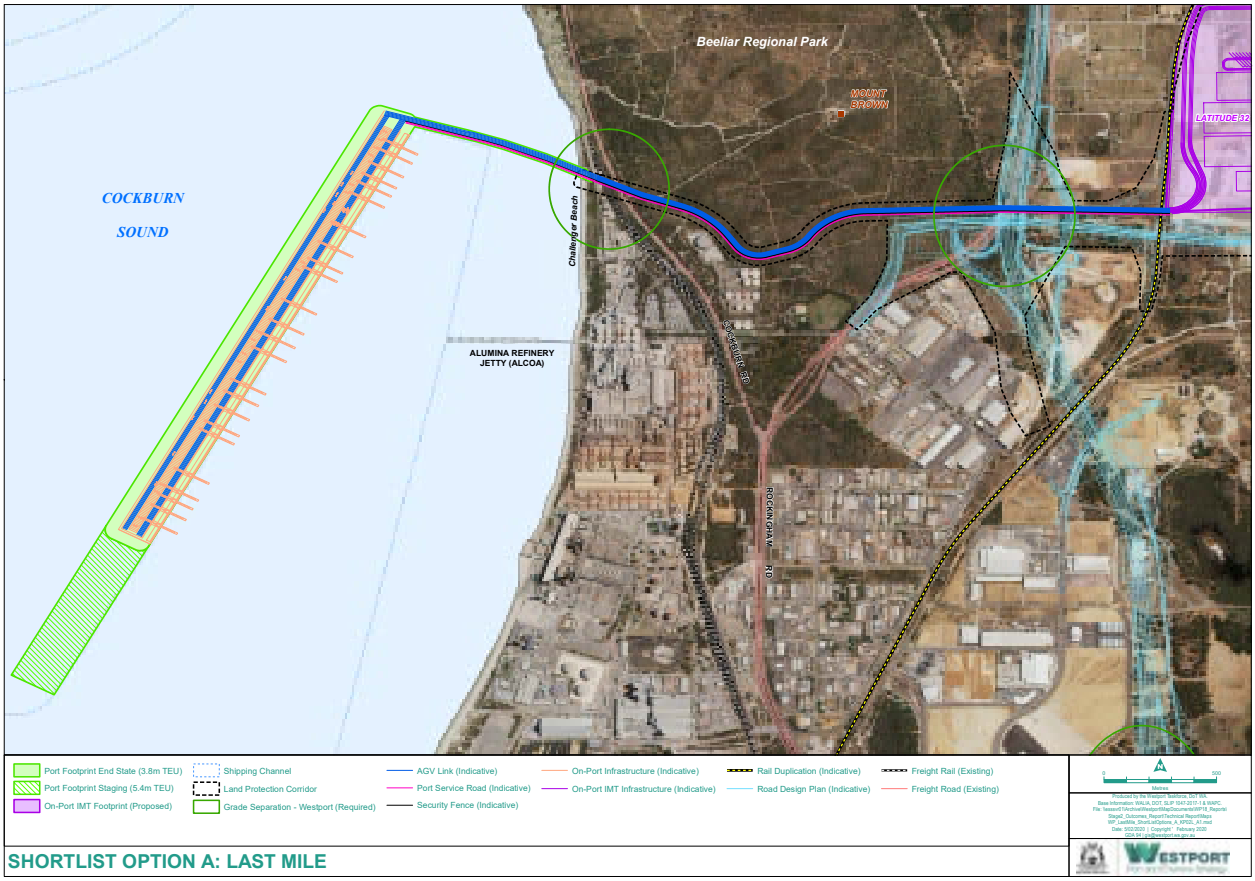
Kwinana stand-alone option: Cockburn Sound north (vicinity Rowley Road), narrow island port with intermodal operations at Latitude 32. Transition from Fremantle in one step when it is viable to do so.

Map 3:

Port location and layout for Option A

Map 4:

Option A last mile design and on-port infrastructure



SHORTLIST OPTION A: LAST MILE

Option A features an innovative concept for a container port, in that it features a narrow wharf footprint separated from the container stacking area by a considerable distance (3.2 kilometres). This option is designed to replace the Fremantle Inner Harbour in a single transition stage, once it is economically and commercially viable to do so.

Option A could accommodate an end state annual throughput of 3.8 million TEUs by 2068. It is Westport's only shortlisted option located in the northern precinct of Cockburn Sound, and is the only option serviced primarily by the Rowley Road corridor.

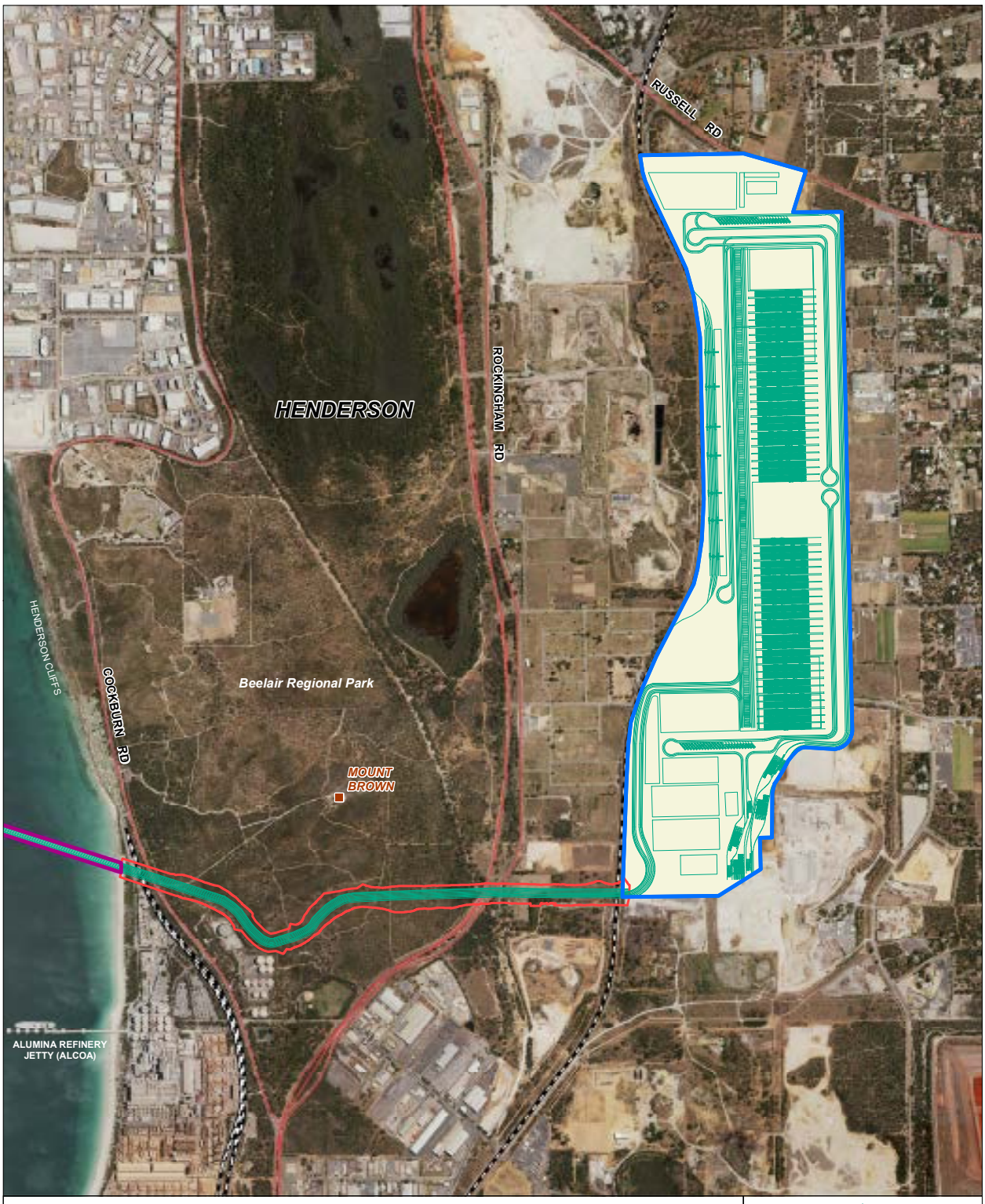
The port design consists of a narrow, reclaimed island that supports the wharf, quayside cranes and the exchange area for the automated guided vehicles (AGVs) that transport the containers from the port to the intermodal facilities at Latitude 32, 3.2 kilometres inland, and vice versa. An access jetty and dedicated six-lane road (referred to as the AGV link) connect the port to Latitude 32. The port design allows clearance for vessels to access the Alcoa jetty to the north. A turning basin is located at the southern end of the island to allow for ship turning and manoeuvrability – see Map 3.

Option A sees roughly two thirds of containers distributed from Latitude 32 to the wider freight network by road, with Rowley Road being the main freight route. The other third of containers could be transported on rail via an extended South West Main Rail Line. The last mile supply chain design is depicted in Map 4.

All yard storage and intermodal transfers for Option A would take place at Latitude 32. The intermodal terminal (IMT) area would have two terminals for two independent stevedores, which allows the current competitive arrangement with Patrick and DP World to be maintained. A high-level design of the IMT at Latitude 32 is shown in Map 5.

Map 5:

Intermodal and container stacking layout at Latitude 32 for Option A



Port Footprint (Option A)
Latitude 32
AGV Corridor
AGV Corridor and Latitude 32 Infrastructure
Freight Road
Freight Rail

0 800
Meters

Produced by the Westport Taskforce, DoT WA.
Base Information: WALIA, DOT, SLIP 1047-2017-1 & WAPC.
File: \\esssvr01\Archive\Westport\MapDocuments\WP18_Reports\Stage2_Outcomes_Report\Technical_Report\Maps\WP_AGVCorridor_Latitude32_A3.mxd
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Date: 5/02/2020 | GDA 94

WESTPORT Port and Environs Strategy

AGV CORRIDOR AND LATITUDE 32

Northern precinct of Cockburn Sound in Kwinana, where Option A would be situated

The proposed construction stages for Option A are outlined at a high level below:

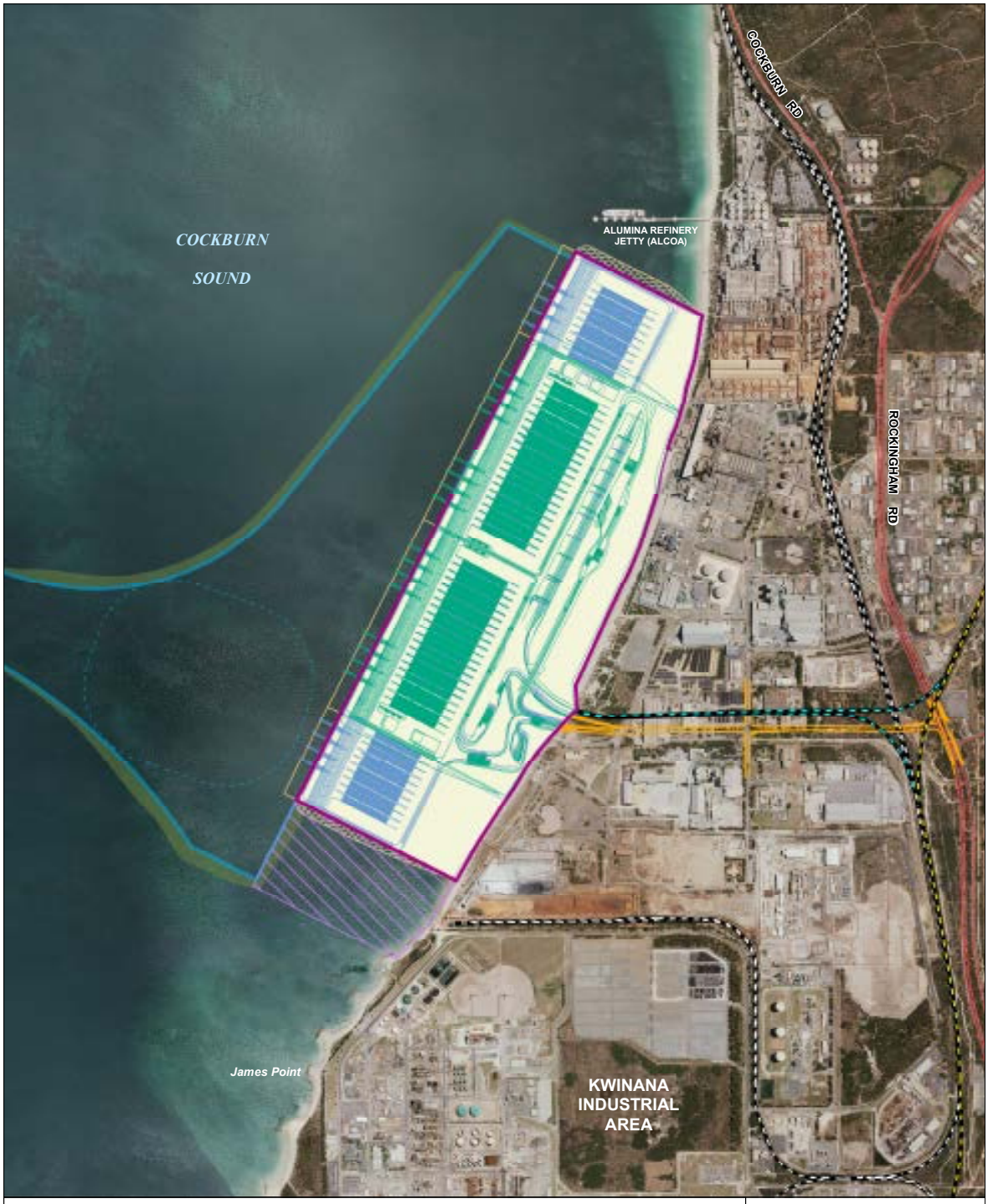
1. **Stage 0:** Upgrade Fremantle's supply chain to accommodate near-term freight growth, but with minimal capital spend.
2. **Stage 1:** Construction of the Kwinana port commences, once it is deemed economically and commercially viable to do so. Stage 1 of the Kwinana port could be built to handle up to 1.52 million TEUs with two container berths and two operators at the Latitude 32 IMT. The Cockburn Sound access channels would be dredged to a depth of 16 metres. Once completed, all freight, infrastructure and support services would be transitioned to Kwinana, and Fremantle would be closed as an industrial port.
3. **Stage 2:** If/when capacity warrants, a third berth could be constructed, the yards at Latitude 32 expanded and additional equipment procured to handle a capacity of up to 2.3 million TEUs.
4. **Stage 3:** If/when ultra large container vessels begin servicing Australian ports, the Cockburn Sound access channels could be deepened and widened if necessary.
5. **Stages 4 and 5:** If/when capacity warrants, fourth and fifth berths could be constructed, the yards at Latitude 32 further expanded and additional equipment procured to handle capacities of up to 3.0 million TEUs and 3.8 million TEUs respectively.

7.2 Option B

Kwinana stand-alone option: Cockburn Sound south (vicinity Anketell Road), conventional land-backed port. Transition from Fremantle in one step when it is viable to do so.

Map 6:

Port location and layout for Option B



SHORTLIST OPTION B

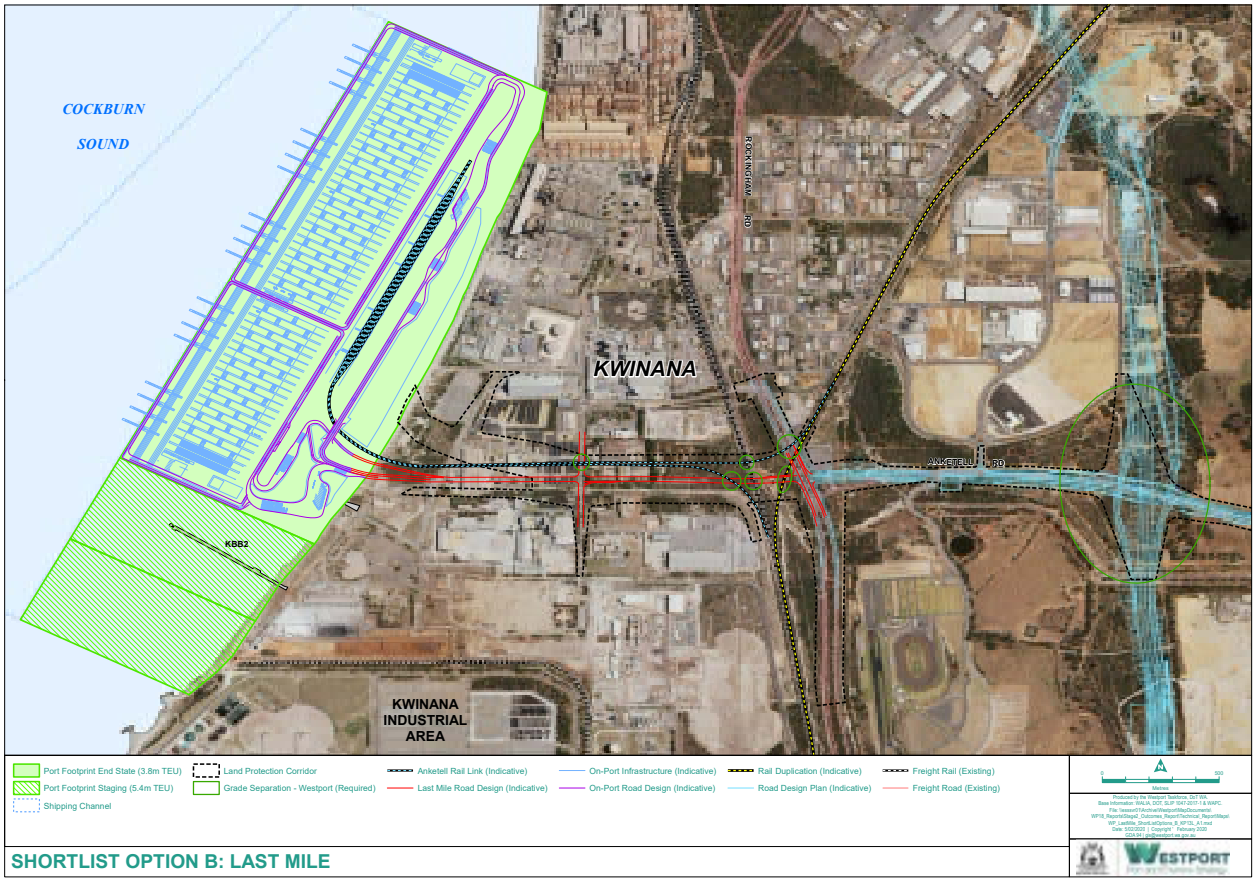
Option B features a conventional land-backed container port. This option is designed to replace the Fremantle Inner Harbour, once it is economically and commercially viable to do so, in a single transition stage. The port design may accommodate an end state annual container throughput of 4.5 million TEUs by 2068.

In a more traditional operating model than Option A, Option B's port footprint contains all the operational functions, including wharf, cranes, container stacks, trucking facilities and a rail terminal. The container terminal would be constructed on land reclaimed with dredge spoil and will be approximately 2.5 kilometres in length. The northern end of the port allows access to the Alcoa jetty, while the southern end extends beyond the Kwinana Bulk Terminal (KBT). A turning basin would be located at the southern end of the port – see Map 6 for the layout.

Option B is in the southern precinct of Cockburn Sound in the Kwinana Industrial Area (KIA). The modal share for this option sees roughly two thirds of containers distributed to the wider freight network by road, with Anketell Road being the main freight route. The other third of containers could be transported on rail via an extended South West Main Line. A high-level last mile supply chain design is shown in Map 7, although it should be noted that at this stage in the process, Westport has not identified land outside of the port footprints for customs, truck marshalling areas or empty container parks (this applies to all options aside from Option A, which utilised Latitude 32 for those purposes).

Map 7:

Option B last mile design and on-port infrastructure



Proposed location of Option B in Kwinana

Option B would have two terminals at every stage of development, operated by competing stevedores to maintain the current arrangement at Fremantle. Each terminal would operate an automated container handling system with independent gates leading to the main road connection and shared access to the single rail terminal. By year 2068, the port would have six berths that will offer capacity in excess of the forecast requirement of 3.8 million TEUs.

The proposed construction stages for Option B are outlined at a high level below:

1. **Stage 0:** Upgrade Fremantle's supply chain to meet near-term freight growth, but with minimal capital spend.
2. **Stage 1:** Construction of the Kwinana port commences, once it is deemed economically and commercially viable to do so. Stage 1 of the Kwinana port could be built to handle up to 1.52 million TEUs. The Cockburn Sound access channels would be dredged to a depth of 16 metres. Once completed, all freight, infrastructure and support services would be transitioned to Kwinana, and Fremantle would be closed as an industrial port.
3. **Stage 2:** If/when ultra large container vessels begin servicing Australian ports, the Cockburn Sound access channels could be deepened and widened if necessary.
4. **Stage 3:** If/when capacity warrants, the Kwinana terminals, yards and equipment could be developed to meet a throughput of up to 4.5 million TEUs. Even though this is more capacity than required, according to Westport's long-term container forecasts, the port design automatically accommodates the larger capacity.

7.3 Option C

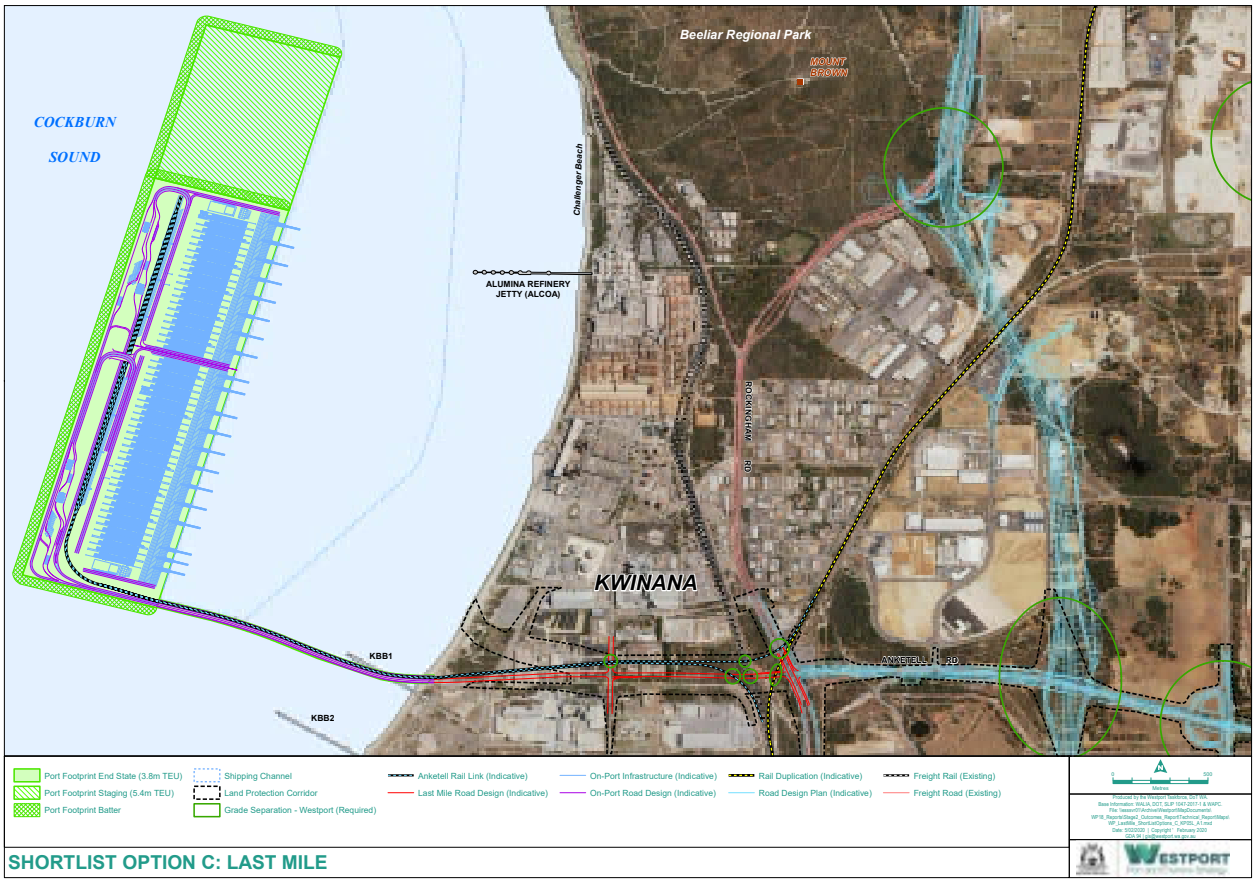
Kwinana stand-alone option: Cockburn Sound south (vicinity Anketell Road), conventional island port. Transition from Fremantle in one step when it is viable to do so.

Map 8:

Port location and layout for Option C

Map 9:

Option C last mile design and on-port infrastructure



SHORTLIST OPTION C: LAST MILE

Option C features a conventionally laid-out container terminal located on a large island port. This option is designed to replace the Fremantle Inner Harbour in a single transition stage, once it is economically and commercially viable to do so. The port design may accommodate an end state annual throughput of more than 4.5 million TEUs by 2068.

The port footprint would be constructed on reclaimed land that supports all the operational functions, including wharf, cranes, container stacks, trucking facilities and a rail terminal. The port island would be approximately 630 metres wide including revetment extents, and the berth length approximately 2.5 kilometres. The port would be roughly aligned with the coast, though slightly rotated to best connect the land bridge to Anketell Road. The port layout and location are shown in Map 8.

The existing Deepwater, Success, Parmelia and Stirling Channels in Cockburn Sound would be widened and deepened to 16 metres to provide access for large container ships. A new channel would be cut north of the island to facilitate access for large vessels while providing access to Alcoa jetty and the Australian Marine Complex. Access to KBT would be via the existing Success Channel. Dredging east of the port would provide a turning basin that can also be used by Panamax vessels accessing the Alcoa berths.

Option C is in the same area as Option B, near Anketell Road within the KIA. The modal share for this option is also the same as Option B, with two thirds of containers distributed to the wider freight network by road (via Anketell Road), with the other third of containers being transported on rail via an extended South West Main Line. A high-level last mile supply chain design is depicted in Map 9.

Kwinana Bulk Terminal — featuring operational Jetty No. 1 and derelict Jetty No. 2 — adjacent to the location of Option C

At every stage of development, Option C would have two terminals operated by competing stevedores in line with the current arrangement at Fremantle. Each terminal would operate an automated container handling system with independent gates leading to the main road connection via the land bridge, and shared access to a single rail terminal.

The proposed construction stages for Option C are outlined at a high level below:

1. **Stage 0:** Upgrade Fremantle's supply chain to meet near-term freight growth, but with minimal capital spend.
2. **Stage 1:** Construction of the Kwinana port commences, once it is deemed economically and commercially viable to do so. Stage 1 of the Kwinana port could be built to handle up to 1.52 million TEUs. The Cockburn Sound access channels would be dredged to a depth of 16 metres. Once completed, all freight, infrastructure and support services would be transitioned to Kwinana, and Fremantle would be closed as an industrial port.
3. **Stage 2:** If/when ultra large container vessels begin servicing Australian ports, the Cockburn Sound access channels could be deepened and widened if necessary.
4. **Stage 3:** If/when capacity warrants, the Kwinana terminals, yards and equipment could be expanded to handle a throughput of up to 4.5 million TEUs.

7.4 Option D

Fremantle and Kwinana shared option: Fremantle port shared with Cockburn Sound south (vicinity Anketell Road), medium conventional land-backed Kwinana port for the long-term.

Map 10:

Port layouts at Fremantle and Kwinana for Option D

Option D features ports at both Fremantle and Kwinana that work in partnership for the long-term (beyond 50 years). This option could deliver a total end state annual throughput of 4.2 million TEUs.

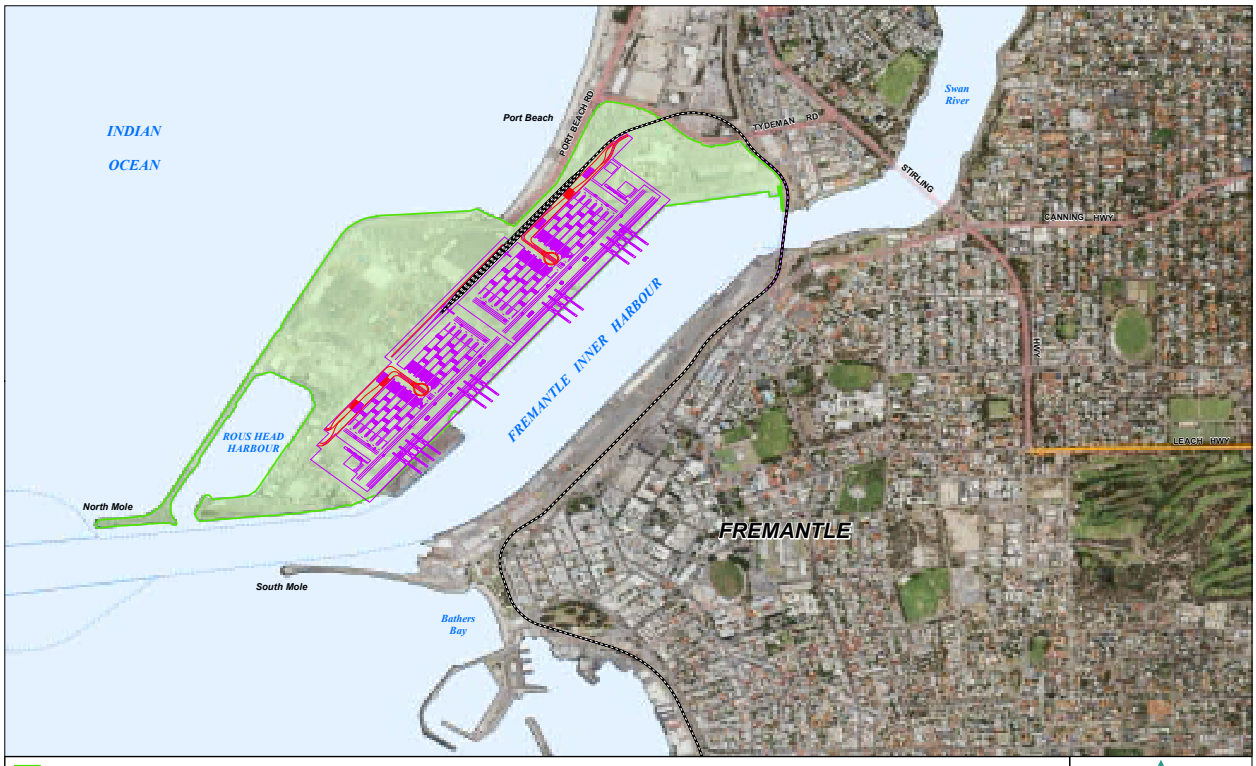
The shared port arrangement would consist of an upgraded, fully automated Fremantle handling a capacity of approximately 1.2 million TEUs, and a conventional land-backed Kwinana port similar to Option B, but with a slightly smaller berth length of 1.7 kilometres. The Kwinana port would sit on reclaimed land on the KIA coast, with the footprint supporting all the port's operational functions, including wharf, cranes, container stacks, trucking facilities and rail terminal. It would have a container capacity of 3.0 million TEUs.

The existing Deepwater, Fremantle Access and Fremantle Inner Harbour channels, along with the Success, Parmelia and Stirling Channels in Cockburn Sound, would be widened and deepened to 16 metres to provide access for large container ships. An 800-metre-diameter swing basin would be located at the southern end of the Kwinana port as shown in the bottom part of Map 10.

Containers would be distributed from Fremantle to the wider freight network via a 0.35 million TEU near-dock rail task and a 0.85 million TEU direct road task, which are essentially Fremantle's current road and rail capacities. The Kwinana port would distribute to the freight network via a 30 per cent rail (via the South West Main Line) and 70 per cent road (via Anketell Road) modal split.

Map 11:

Option D Fremantle last mile design and on-port infrastructure



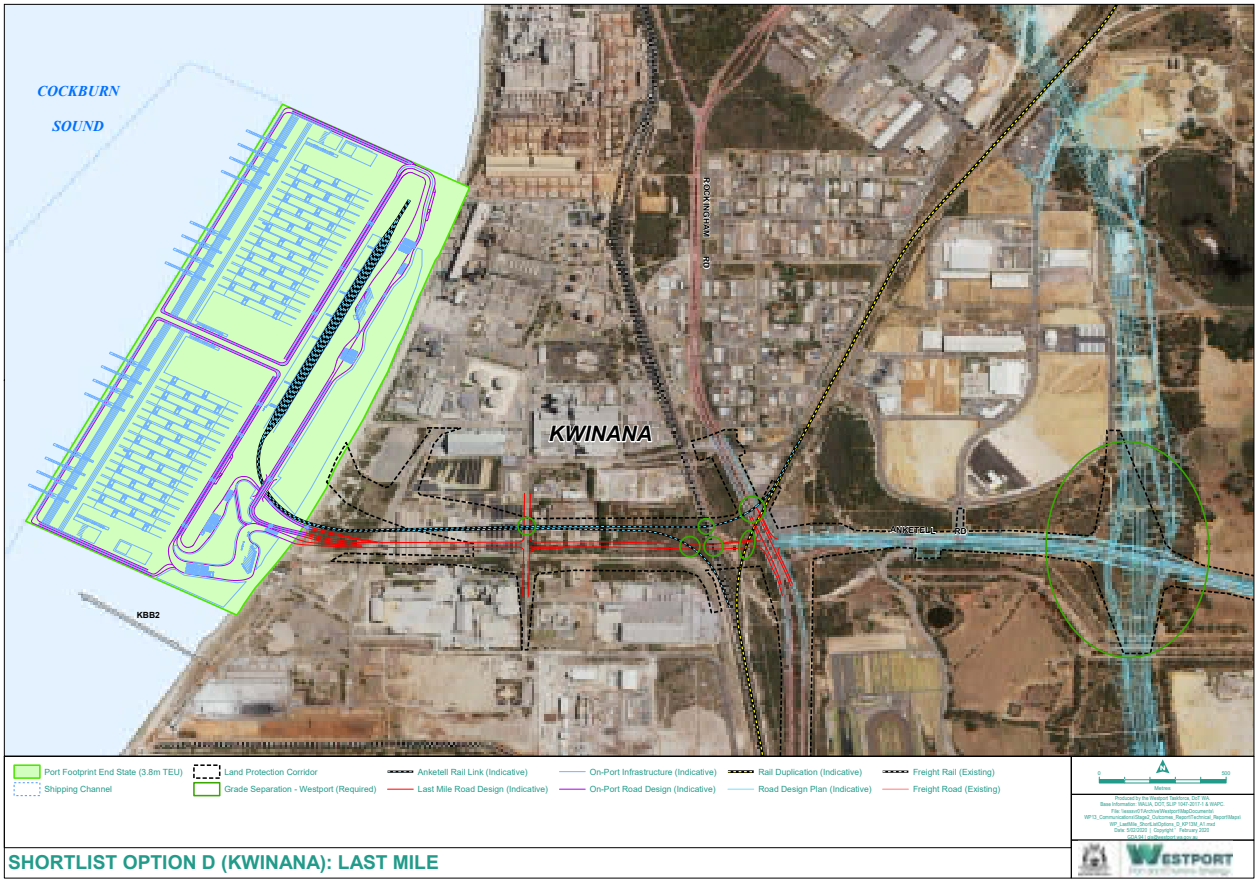
SHORTLIST OPTION D (FREMANTLE): LAST MILE

The construction of Option D is proposed to occur in stages as outlined at a high level below:

1. **Stage 0:** Fremantle's supply chain and terminals will be upgraded to meet near-term freight growth.
2. **Stage 1:** Construction of the Kwinana port commences, once it is deemed economically and commercially viable to do so. Stage 1 of the Kwinana port could be built to handle up to 1.52 million TEUs and, once completed, it is anticipated that one stevedore would shift their operations to Kwinana. The Fremantle and Cockburn Sound access channels would be dredged to a depth of 16 metres.
3. **Stage 2:** If/when ultra large container vessels begin servicing Australian ports, the Cockburn Sound access channels could be deepened and widened if necessary. The Kwinana port would handle ULCVS, as the berths can be deeper.
4. **Stage 3:** If/when capacity warrants, both terminals could be expanded, providing the system with a combined end state capacity of 4.2 million TEUs – 1.2 million TEUs at Fremantle and 3.0 million TEUs at Kwinana.

Map 12:

Option D Kwinana last mile design and on-port infrastructure

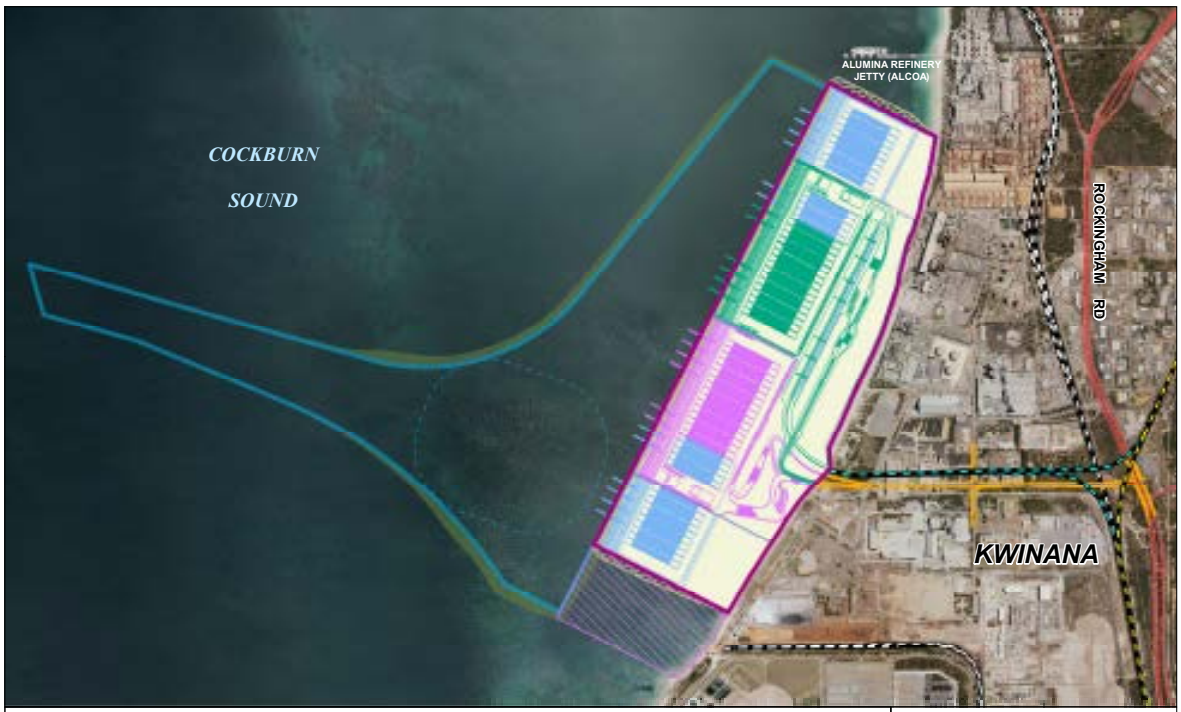


7.5 Option D2

Fremantle and Kwinana shared/transitioning to Kwinana option: Fremantle shared with Cockburn Sound south (vicinity Anketell Road) medium land-backed Kwinana port, transitioning to Cockburn Sound south (vicinity Anketell Road) land-backed Kwinana port (Option B) over time.

Map 13:

Port layouts at Fremantle and Kwinana for Option D2



Port Footprints (Option D2)
Port Future Expansion
Rock Revetment
Shipping Channel
Batter
Turning Basin
Berth
Freight Road
Freight Rail
Last Mile Road Design
Anketell Rail Link
Rail Duplication
On-Port Infrastructure (Stage 0)
On-Port Infrastructure (Stage 1)
On-Port Infrastructure (Stage 2)
On-Port Infrastructure (Stage 4)

0 800
Meters

Produced by the Westport Taskforce, DoT WA.
Base Information: WALIA, DOT, SLIP 1047-2017-1 & WAPC.
File: \\esssvr01\Archive\Westport\MapDocuments\WP18_Reports\Stage2_Outcomes_Report\Technical_Report\Maps\WP_ShortListOption_D2_A3.mxd
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WESTPORT Port and Environs Strategy

SHORTLIST OPTION D2

Option D2 is a variation of Option D, but instead of the Fremantle and Kwinana ports sharing the container task for the long-term, the task is shared for a temporary period, before all container operations are gradually transitioned to Kwinana. The end state of Option D2 is essentially the same as Option B.

The intent of this option is to extend the life of Fremantle as a manual operation while minimising capital spend. The port in Kwinana would be built at a smaller scale to accommodate one stevedore, who would transition to the new port once it is economically and commercially viable to do so. The other stevedore would remain at Fremantle.

It is estimated that Fremantle and Kwinana could operate in partnership for several decades, until it becomes economically unviable to continue operating Fremantle for one or more of the following assumptions:

- Fremantle's assets and/or supply chain near capacity and require a substantial capital investment;
- the manual terminal at Fremantle may become costlier to operate than the automated operations at Kwinana; and
- Fremantle's limitations on vessel size and depth may see a decrease in the number of vessels that can use Fremantle if/when ULCVs become more common on Australian routes.

Following decommissioning of Fremantle, the Kwinana port transitions in to the Option B design and layout for end state (see bottom half of Map 13).

The proposed construction stages for Option D2 are outlined at a high level below:

1. **Stage 1:** Construction of the Kwinana port commences, once it is deemed economically and commercially viable to do so. Once Stage 1 is completed, it is anticipated that one of the two stevedores at Fremantle would transition to the new port. The Cockburn Sound access channels would be dredged to a depth of 16 metres.
2. **Stage 2:** Construction of Stage 2 of the Kwinana port occurs, with timing driven by the economic and commercial viability of Fremantle. Once completed, the second stevedore would transition to Kwinana and Fremantle would be closed as an industrial port.
3. **Stage 3:** If/when ultra large container vessels begin servicing Australian ports, the Cockburn Sound access channels could be deepened and widened if necessary.
4. **Stage 4:** If/when demand warrants, the Kwinana port could be expanded to provide an end state throughput capacity of 4.5 million TEUs.

7.6 Option E

Fremantle and Kwinana shared option: modified Fremantle port shared with Cockburn Sound south (vicinity Anketell Road), medium conventional land-backed Kwinana port, with Blue Highway operating long-term.

Map 14:

Port layouts at Fremantle and Kwinana for Option E

Like Option D, Option E features ports at both Fremantle and Kwinana operating in partnership for the long-term. However, this option proposes transporting containers between the terminals using a transhipment barge operation along the coast between Fremantle and Kwinana – known as a 'Blue Highway' shipping route (see Map 15). This option seeks to overcome the constraints of Fremantle's road and rail connections by introducing a third mode of container transport.

Map 15:

Blue Highway coastal shipping route

BLUE HIGHWAY

Option E could accommodate a total end state annual throughput of 3.8 million TEUs. Under this option, Fremantle must be modified so that all import and export containers can be landed. Of the total end state task, 1.2 million TEUs may be distributed directly from Fremantle using the existing road and rail network. The balance of the containers (2.6 million TEUs) could be transshipped from Fremantle to a medium land-backed port in Kwinana via the Blue Highway for distribution.

The Blue Highway could have a continuous, dynamic cycle of transshipment feeder vessels. The barges would be sized to maintain a regular service between the ports but would be small enough not to require dredging of the Parmelia or Kwinana channels in Cockburn Sound. It is envisaged that each stevedore would need to run their own transshipment operations on the Blue Highway, as this reduces the amount of container handling (and therefore operational costs) by streamlining end-to-end integration, while maintaining healthy competition.

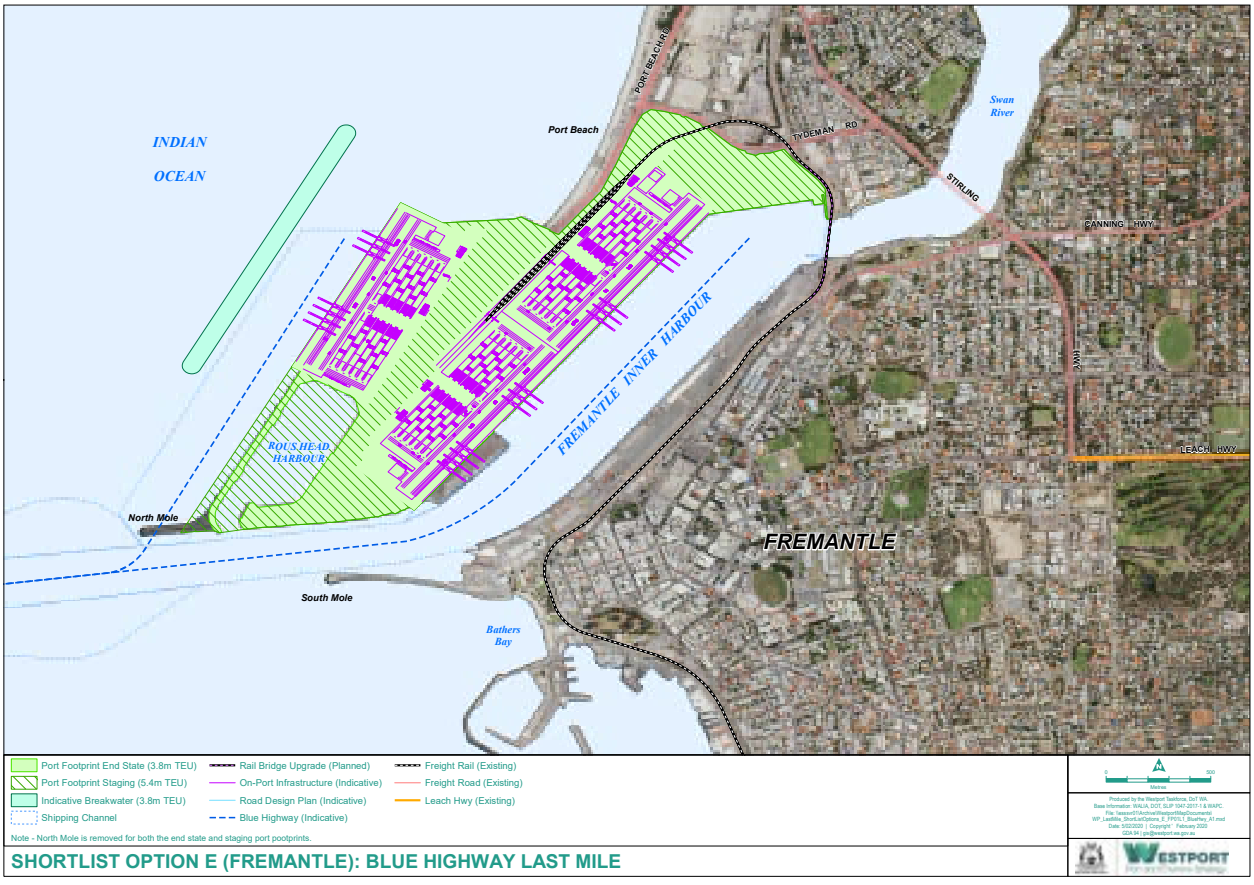
Fremantle would require some modifications under this option, as the existing terminals and wharves at Fremantle were found to be unable to support the Blue Highway concept due to insufficient depth and crane gauge. The existing Berths 1 and 2 and the Stevedore 1 and 2 terminals would need to be completely rebuilt, providing 1,800 metres of suitable wharf space. A third terminal would be constructed on the north side of the Rous Head peninsula, which would be protected by a new breakwater. It would also require some additional dredging and infill of the Rous Head inlet.

Fremantle would continue operating with two terminals managed by competing stevedores. Each terminal would operate an automated container handling system with independent gates leading to the main road connection. The terminals would share access to a single rail terminal. The third terminal would be developed over time as the TEU capacity exceeds the two-operator model.

Containers would be distributed from Fremantle via a 0.35 million TEU near-dock rail task and a 0.85 million TEU direct road task, which are essentially Fremantle's current maximum road and rail capacities. The Fremantle port, breakwater and last mile designs are depicted in Map 16.

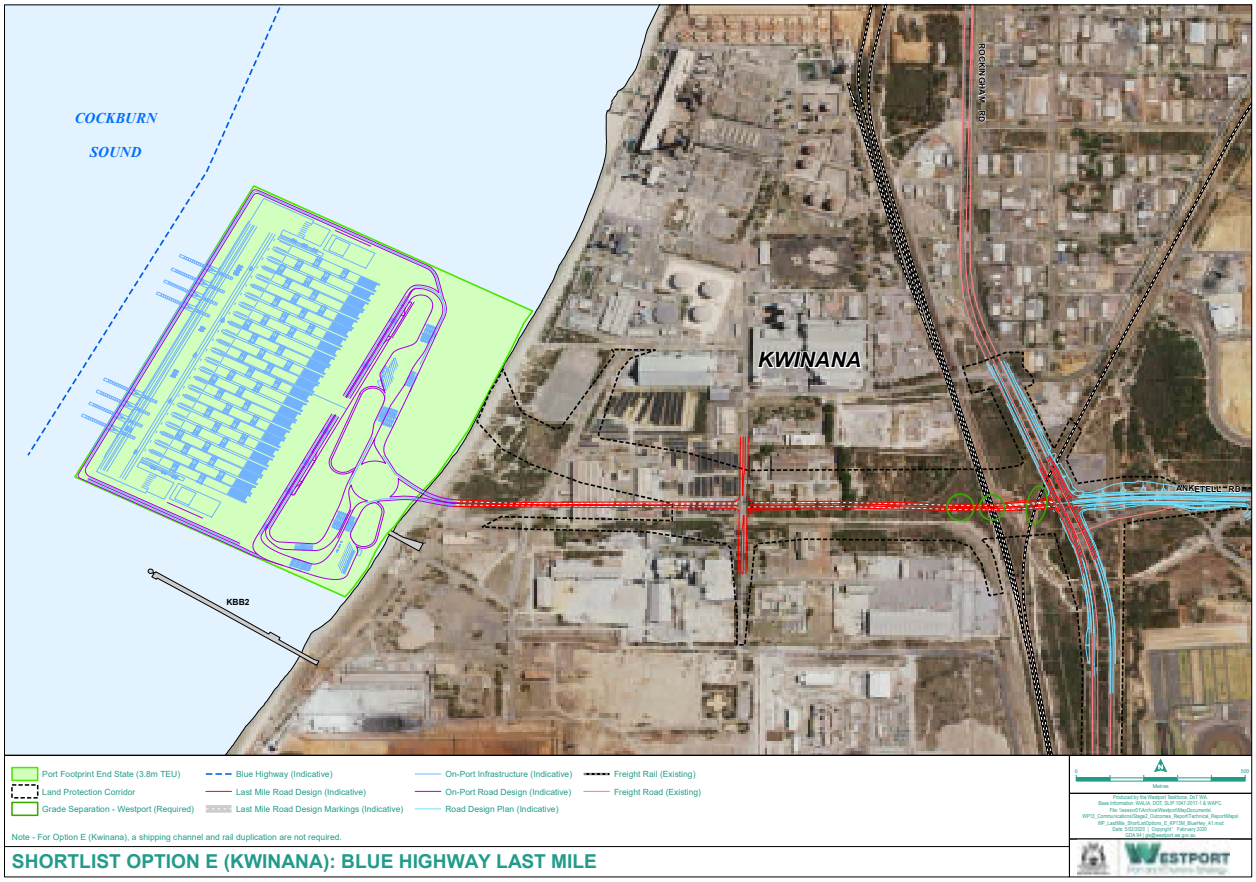
Map 16:

Option E Fremantle last mile design and on-port infrastructure



Map 17:

Option E Kwinana last mile design and on-port infrastructure



Each stevedore would operate their own terminal at Kwinana. Each terminal would operate an automated container handling system with independent gates leading to the main road connection. No dredging of the Success channel in Cockburn Sound would be required in the medium-term due to the shallow draughts of the transshipment barges.

The Kwinana port footprint would be created by reclaiming land approximately 800 metres in width with a total wharf extending approximately 970 metres with additional length for revetments. The port layout is shown in Map 17.

The Kwinana terminal would be connected to the road network only, via an extended Anketell Road. With no rail connection, the end state 2.6 million TEUs container task would all be distributed via road.

The proposed construction stages for Option E are outlined at a high level below:

1. **Stage 0:** Fremantle would undergo minimal capital works to increase productivity, enabling the existing stevedores to handle the near-term forecast container throughput.
2. **Stage 1:** One of the stevedore terminals at Fremantle is redeveloped and transitioned to automated operations. While this is occurring, construction of Stage 1 of the Kwinana port takes place. All access channels are dredged to 16 metres' depth.
3. **Stage 2:** The remaining stevedore terminal at Fremantle is upgraded. Meanwhile, the Kwinana port would be upgraded to accommodate another terminal, stevedore and berth, providing it with a total throughput capacity of 1.5 million TEUs. The total system capacity of Kwinana in combination with Fremantle is up to 2.53 million TEUs.
4. **Stage 3:** If/when ultra large container vessels begin servicing Australian ports, all access channels could be deepened and widened if necessary.
5. **Stage 4:** If/when capacity warrants, the final stage of development involves constructing a third terminal at Rous Head, to be operated by a third stevedore. Operations would be protected by a new breakwater to the west. To support the Blue Highway operations of this third stevedore at Fremantle, an additional terminal would be constructed at Kwinana, giving the system a total capacity of 3.8 million TEUs.

7.7 Option E2

Fremantle and Kwinana shared/transitioning to Kwinana option: Fremantle port shared with Cockburn Sound south (vicinity Anketell Road) medium land-backed Kwinana port, transitioning to Cockburn Sound south (vicinity Anketell Road) land-backed Kwinana port (Option B) over time, with the Blue Highway.

Map 18:

Port layouts at Fremantle and Kwinana for Option E2

Option E2 is a variation of Option E, but transitions to an end state similar to Option B using a temporary Blue Highway solution. It differs from Option E in that, instead of Fremantle and Kwinana sharing the container task long-term, the operations are shared for a period while all container operations are gradually transitioned to Kwinana. The port layouts at Fremantle and Kwinana for Option E2 are shown in Map 18.

The intent of this option is to extend the life of Fremantle as a manual operation while minimising capital spend. This is done by transshipping the TEUs exceeding Fremantle's supply chain capacity (estimated to be 1.2 million TEUs) to Kwinana for distribution while the Kwinana port is gradually established and operations at Fremantle are slowly phased out.

This option proposes no dredging at Fremantle and minimal dredging in Cockburn Sound. Therefore, ships outsizing Fremantle's capabilities may not be able to call into Perth until the transition to Kwinana is completed.

It is estimated that the Blue Highway could extend Fremantle's asset life for up to two decades. Beyond this time, the Blue Highway operations would require additional cranes and barges, which counters the intent to minimise capital spend at Fremantle.

Following the decommissioning of Fremantle, the Kwinana port would transition into the Option B design and layout for end state (see Map 6).

The proposed construction stages for Option E2 are outlined at a high level below:

1. **Stage 0:** Fremantle's supply chain and terminals are upgraded to meet the near-term container task.
2. **Stage 1:** The terminals at Fremantle are upgraded to enable Blue Highway operations. At the same time, Stage 1 of the Kwinana port is constructed to begin receiving containers from Fremantle via the Blue Highway. This will see the supply chain load split between the two locations.
3. **Stage 2:** Once it is economically and commercially viable, the Kwinana port will be expanded to a throughput capacity of more than 3.0 million TEUs, while the Cockburn Sound access channels are dredged to 16 metres' depth. All container operations are then moved to Kwinana and Fremantle port is decommissioned as a working port.
4. **Stage 3:** If/when ultra large container vessels begin servicing Australian ports, all access channels could be deepened and widened if necessary.
5. **Stage 4:** If/when demand warrants, the Kwinana port can be further expanded, providing the port with an end state capacity of 4.5 million TEUs.

08 Supply Chain Considerations

A Tonkin Highway interchange

Westport was tasked with undertaking a holistic assessment of the freight supply chains servicing the ports, so consideration of the road and rail networks that deliver the freight, along with the intermodal terminals, are essential components of the project. These supply chain assessments were critical in determining which options made the shortlist, as well as the preliminary recommended options.

Westport considered the following components of the freight supply chain:

- port (or ports in the case of Options D, D2, E, E2);
- road connections;
- rail connections; and
- intermodal terminals (IMTs), where containers transfer from trucks onto rail or vice versa.

It should be noted that Westport has not yet identified land outside of the port footprints for port-related uses, such as customs, truck marshalling areas and empty container parks, apart from Option A, which utilised Latitude 32 for these purposes.

In the same way that Westport considered the capacity of the seven port options to handle the long-term container forecast of 3.8 million TEUs, the roads, rail and IMTs were also assessed on their capacity to manage 3.8 million containers. The high-level supply chain costs and impacts for each option were factored into their respective MCA-2 assessments.

In 2018-19, 20 per cent of freight was transported on rail. The State Government has a long-term rail mode share target of 30 per cent, or 1.14 million TEUs, which Westport adopted as a target rail mode share for all options except Option E, which did not have a rail component at Kwinana. The remaining 70 per cent of containers, or 2.66 million TEUs at end state, would be transported to the wider freight network via roads.

Freight vehicle departing the Inner Harbour, Fremantle

8.1
Kwinana's freight route opportunity

Good connectivity of the Restricted Access Vehicle (RAV) network between the port and industrial areas is critical to ensuring efficient containerised road freight supply chains. Kwinana is serviced by several east-west links which connect the Western Trade Coast through to the areas around Armadale and Byford, as well as Tonkin Highway and the South Western Highway. The primary links servicing this area are Anketell Road, Rowley Road and Thomas Road. As the Outer Harbour and Western Trade Coast develop and expand over the coming years, these east-west connections will become increasingly critical to the long-term operations of the State's freight and logistics sectors.

These east-west links have been preserved enough to present a unique opportunity to construct a major freight route that extends from the port gate in Kwinana through to Muchea in the north or Bunbury in the south. This freight route could be constructed along the Anketell Road corridor – or the Rowley Road corridor as an alternative or additional route if necessary – linking port Options B or D2 from the Kwinana coast directly through to Tonkin Highway in the east. The possible freight route corridors are shown in Map 19.

Tonkin Highway would then efficiently connect through to a network of current and proposed intermodal sites ringing the metropolitan area, as explained further in Section 8.4.

Map 19:

Anketell Road freight route to Tonkin Highway

PRIMARY FREIGHT ROUTE FROM THE KWINANA PORT TO MUCHEA

The Kwinana freight route would deliver significant benefits to both the transport and logistics industries and general road users in the following ways:

1. This unencumbered road corridor would allow trucks to travel at consistent speeds without the need for braking, saving on fuel and improving efficiency, while alleviating some noise concerns for residents along the Fremantle freight roads. Better efficiency ultimately would mean improved reliability, reduced transport times and decreased supply chain costs – delivering savings to businesses and consumers.
2. The Anketell/Tonkin freight route skirts around the metropolitan area, shifting trucks out of congested urban areas. This would result in much less interaction between trucks and cars, with improved safety and efficiency outcomes for all road users.

3. Trucks could exit the road at numerous points along the way, so they were not locked into one end destination as they would be with a tunnel. Both Rowley and Anketell Roads connect to other primary freight routes, including the Fremantle Rockingham Controlled Access Highway, Kwinana Freeway and Tonkin Highway.
4. The freight route design would prevent some of the current issues experienced on Leach Highway, such as residential driveways, turning vehicles and intersections.
5. This corridor could enable future trucking trends, such as automated platooning, to be considered.

While both Anketell and Rowley Roads are suitable to be expanded into a major freight route, Anketell Road is Westport's preferred option as it could allow vehicles to travel at up to 100 km/h, and impacts fewer existing residences than Rowley Road.

By comparison, Rowley Road would be limited to travel speeds of between 70 km/h and 90 km/h, and has more property and environmental impacts.

A comparison of the two road corridors in MCA-2 also found that Anketell Road scored higher than Rowley Road. This was due to having less impacts on Aboriginal and non-Aboriginal heritage sites, inland waters, vegetation and flora and residential land use. Graph 7 shows the comparison.

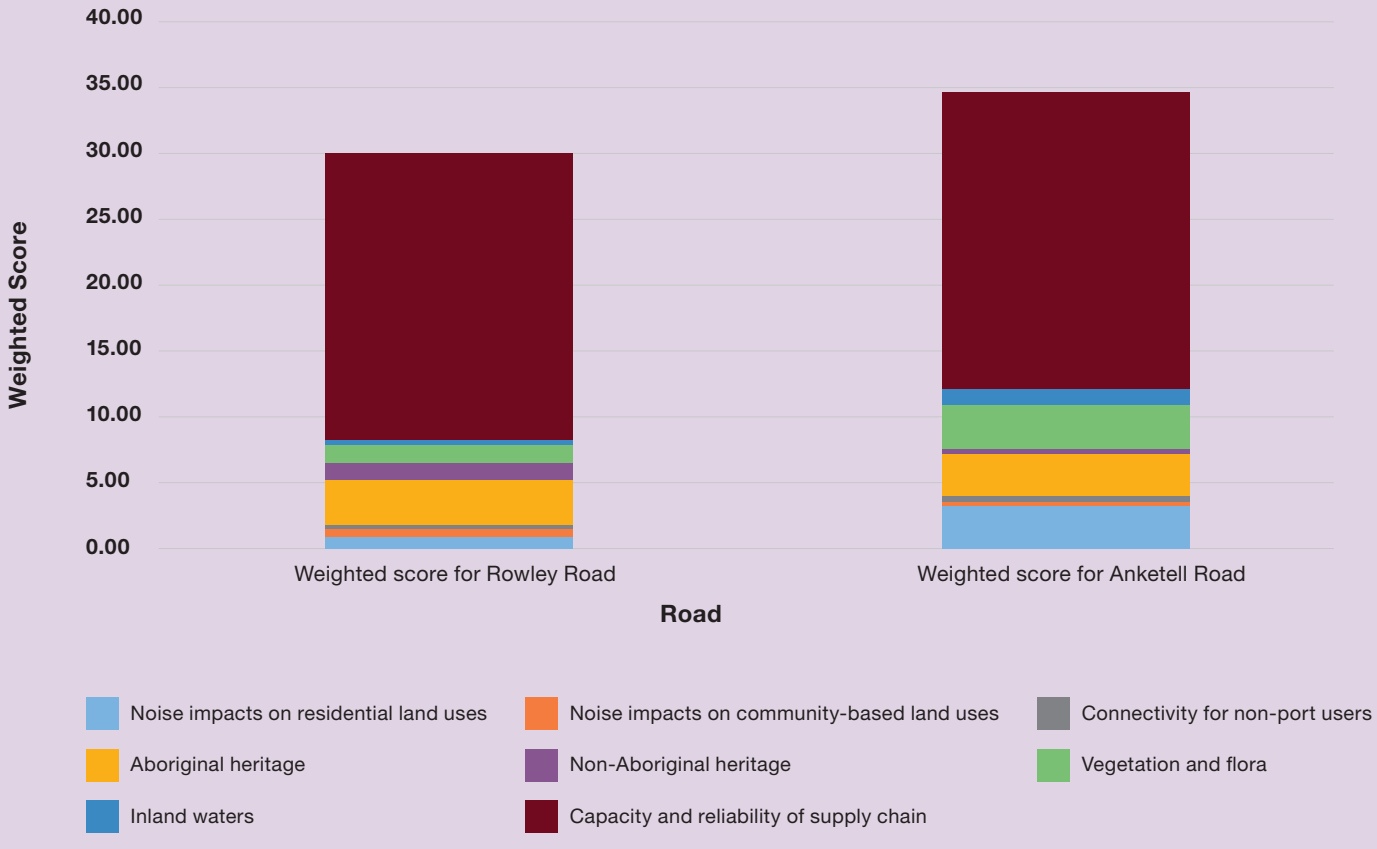
Some key factors to note about this comparison are:

- economic costs and benefits are excluded as the roads cannot be constructed to the same design standard;
- analysis for Rowley Road excludes Mount Brown to compare the road supply chain only (not the AGV link); and
- both roads provide a good level of future spare capacity.

Graph 7:

Comparison of Anketell and Rowley Roads' weighted component scores in MCA-2

Note: Impacts specific to the road alignments have been isolated from port-related impacts where possible from raw data.



8.2
Road supply chain considerations

For MCA-1, Westport investigated and assessed the following road supply chain enhancements for the Fremantle and Bunbury options. For the reasons outlined below, these road upgrades were not investigated any further.

- Leach Highway upgrade comprising four lanes between Kwinana Freeway and Canning Highway with grade separations to remove all traffic lights. This did not progress due to:
  - high capital cost;
  - impacts on residential and commercial properties;
  - significant reductions in access to Leach Highway for residents;
  - significant reductions in access to the Melville commercial precinct; and
  - the modelling demonstrated that while the Leach Highway upgrade would improve port access in the short-term, its efficiency declines over time. The Leach Highway upgrade would not be a long-term solution for improving heavy vehicle access to the port.
- Many other alternative ways to access the port by road were considered, including tunnels under Leach Highway. These were found to be unviable due to the significant engineering challenges and very high costs.
- Willinge Drive upgrades to improve access to Bunbury Port were considered, but did not progress further as Bunbury was not shortlisted.

The road upgrades that progressed from MCA-1 and were explored in more detail for MCA-2 were:

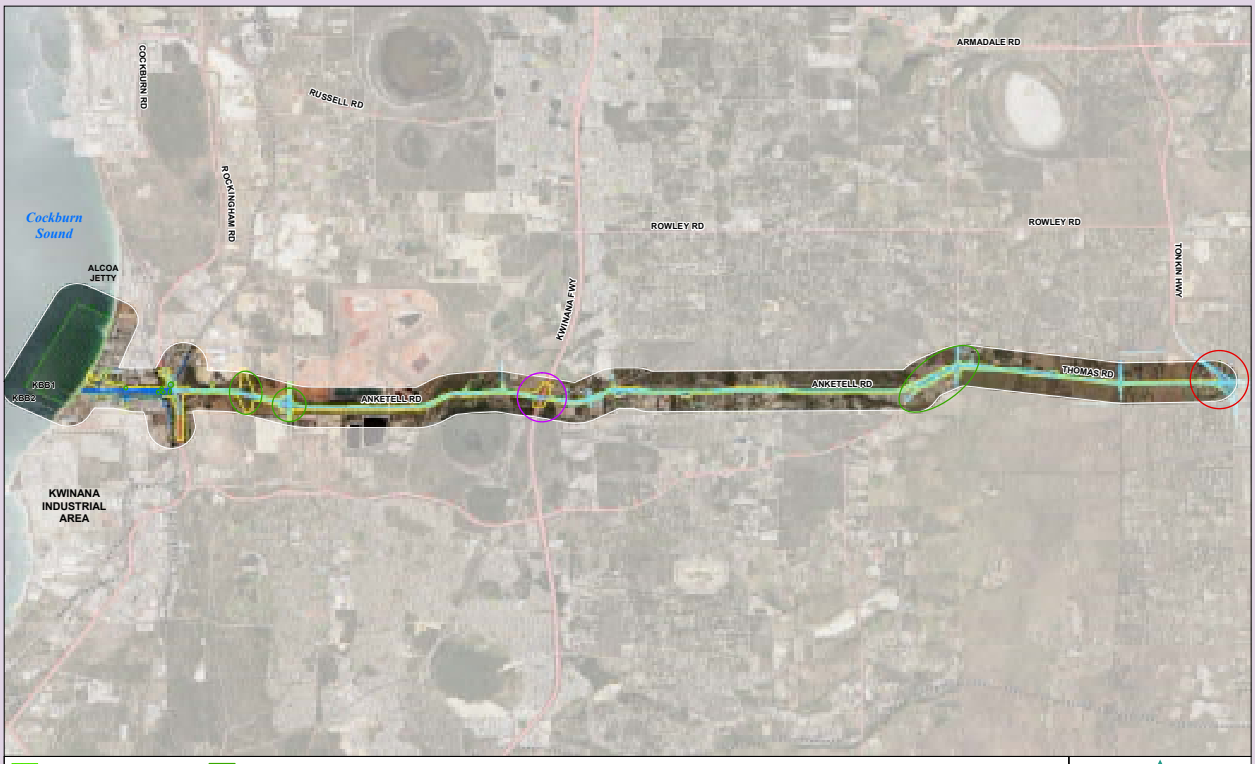
- Anketell Road as a four-lane divided high standard controlled access highway between Tonkin Highway and the coast – see Map 20 for the corridor alignment.
- Rowley Road as a four-lane divided high standard controlled access highway between Tonkin Highway and Rockingham Road – see Map 21 for the corridor alignment.

For MCA-2, Westport obtained dual carriageway designs for both Rowley and Anketell Roads from Main Roads WA. The road designs include grade-separations, traffic lights, roundabouts and other intersections suitable for the projected traffic and container freight task. These upgrades have been designed to accommodate 36.5 metre RAV 7 (four TEU) vehicles.

Map 20:

Anketell Road corridor from Option B to Tonkin Highway

Disclaimer: The highlighted section of Map 20 is for viewing clarity of the corridor alignment only; it does not represent the land area required for the road upgrades.

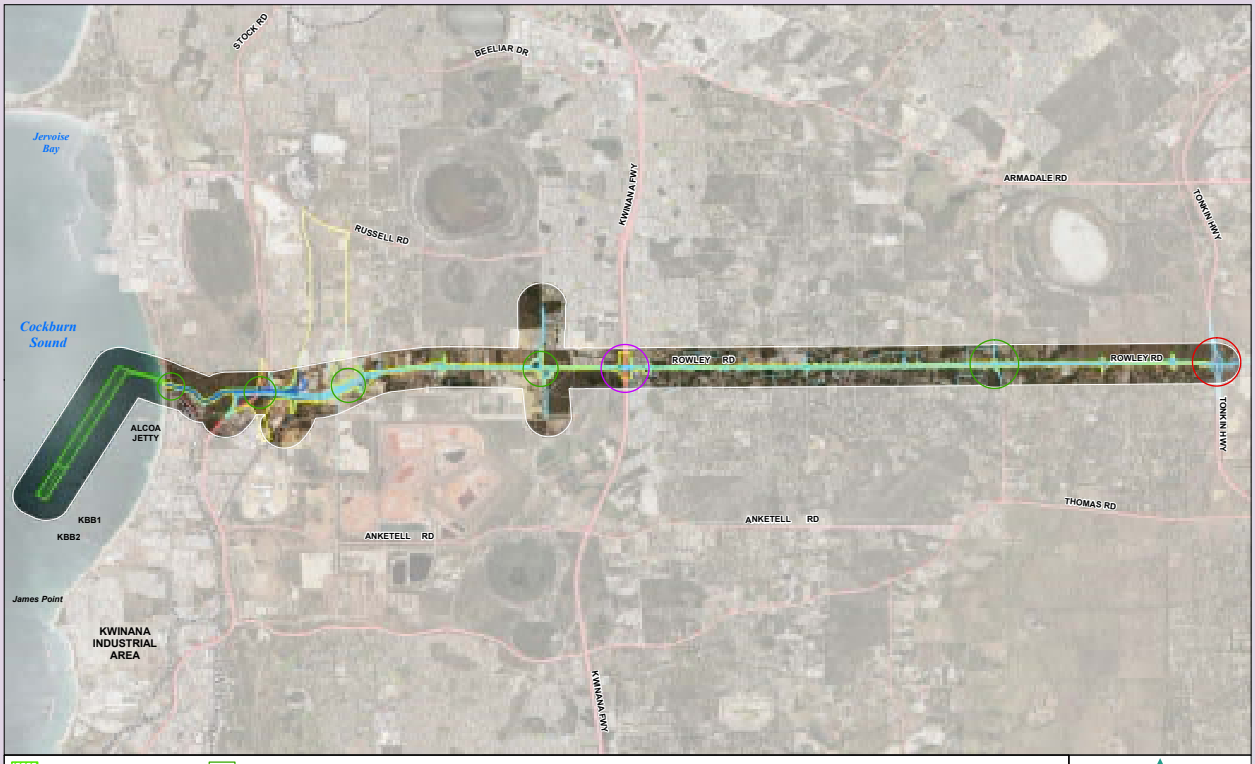


ANKETELL ROAD DESIGN PLAN WITH THE LAST MILE

Map 21:

Rowley Road corridor from Option A to Tonkin Highway

Disclaimer: The highlighted section of Map 21 is for viewing clarity of the corridor alignment only; it does not represent the land area required for the road upgrades.



ROWLEY ROAD DESIGN PLAN WITH THE LAST MILE

Fremantle has existing RAV level 4 access (RAV 4)[8]. For MCA-2, 30 metre Performance Based Standards[9] (PBS) access (4 TEU) was used, without road infrastructure upgrades, as advised by Main Roads[10], however a Government policy change would be required to allow 30 metre PBS access to Fremantle port.

With the road upgrades in place, container trucks up to 36.5 metres in length would be able to travel to the Kwinana port. Westport has assumed road freight operators would invest in and operate heavy vehicle combinations that optimise their commercial competitiveness. A non-exhaustive list of the heavy vehicle combinations that Westport expects to service Perth's container ports is detailed in Table 12.

Due to the RAV access for the Rowley Road and Anketell Road upgrades being better than Fremantle port, a container port in Kwinana would have a road freight capacity to transport containers more efficiently than the freight routes into Fremantle.

Table 12:

Container truck sizes able to service the Fremantle and Kwinana ports

Heavy Vehicle Combination	Maximum TEU Capacity	Fremantle Port	Kwinana Port
<= 12.5m Rigid Truck	1	✓	✓
<=19m Semi Trailer (RAV 1)	2	✓	✓
<= 27.5m B-Double (RAV 2)	3	✓	✓
<= 27.5m A-Double (RAV 3 or 4)	3	✓	✓
<= 30m PBS B-Double	4	✓	✓
<= 30m PBS A-Double	4	✓	✓
<= 36.5m A-Double (RAV 5 or 6)	4	✗	✓
<= 36.5m AB-Triple (RAV 7)	4	✗	✓
<= 36.5m BA-Triple (RAV 7)	4	✗	✓

8 https://mrwebapps.mainroads.wa.gov.au/hvsnetworkmap
https://www.mainroads.wa.gov.au/UsingRoads/HVS/roadaccess/Pages/default.aspx
9 https://www.mainroads.wa.gov.au/UsingRoads/HVS/Pages/performancebasedstandards.aspx
10 Approved Performance Based Standards (PBS) Routes – Department of Transport, 2019

8.3
Rail supply chain considerations

For MCA-1, the following rail supply chain enhancements for the long-list of options were investigated, and for the reasons outlined below, these rail upgrades did not progress any further:

- At-grade (ground surface level) dual-gauge double-tracking between Fremantle and the Cockburn Triangle. This was not progressed due to amenity impacts on properties near the rail corridor which, even with noise mitigation measures in place, would be significant.
- Duplicating and sinking the rail line to the Inner Harbour in an 8-metre-deep, covered trench along the existing rail corridor through Fremantle to mitigate the noise impacts on surrounding residents and businesses. This was not progressed due to the following issues:
    - high capital investment;
    - the need to close the freight rail route to the Inner Harbour for several years while the construction takes place;
    - the inability to redevelop Victoria Quay for tourism, community or commercial purposes, as the duplicated rail corridor would cut it off from the city centre;
    - possible impacts on the Roundhouse and other heritage buildings during construction of the tunnel, as well as from the ongoing vibrations of the passing trains; and
    - the inability to stage the roll-out of this infrastructure – it would all need to be done at one time.
- Alternative rail corridors between a Kwinana port and Latitude 32 to avoid the Beeliar Regional Park were not progressed due to difficulties in achieving grade separation at the point where the options cross Rockingham Road.
- Double-stacking of containers was not progressed due to the significant cost of raising or lowering power lines and other structures to achieve the required clearance.
- Many alternatives to access the port by rail, including tunnels connecting the Inner Harbour to either Cockburn or Forrestfield, a tunnel under Leach Highway and/or at-grade rail track via the Leach Highway median to Forrestfield were considered. These were all found to be unviable due to significant engineering challenges that would hamper access, and prohibitive costs.
- Duplication of the South West Main Rail Line between Bunbury and Perth was investigated for the Bunbury options. This was not progressed due to:
    - significant capital cost of duplicating the heavy rail tracks;
    - further significant costs for land acquisitions, grade separations at several key crossings, and management of more than 100 other level crossings; and
    - significant disruption and amenity impacts on communities near the rail corridor due to the large increase in daily rail movements.

The rail upgrades that progressed from MCA-1 and were expanded in more detail for MCA-2 were:

- dual-gauge, double-track near the Forrestfield intermodal terminal;
- dual-gauge, double-track between the Cockburn Triangle and Kwinana Triangle;
- dual-gauge, double-track between the Kwinana Triangle and southern end of Kwinana marshalling yard; and
- new dual-gauge, double-track from the Option B location to the main line, including a new triangle to access the existing rail corridor.

The rail upgrades required for the seven options are outlined in Table 13 and shown in Map 22. The rail capacity of options that continue to use Fremantle (Options D, D2, E and E2) was assessed using the existing single-track rail between the North Quay Rail Terminal (NQRT) and the Cockburn Triangle.

Westport proposes to investigate opportunities to increase train path availability and rail TEU capacity in the next stage of the project, including:

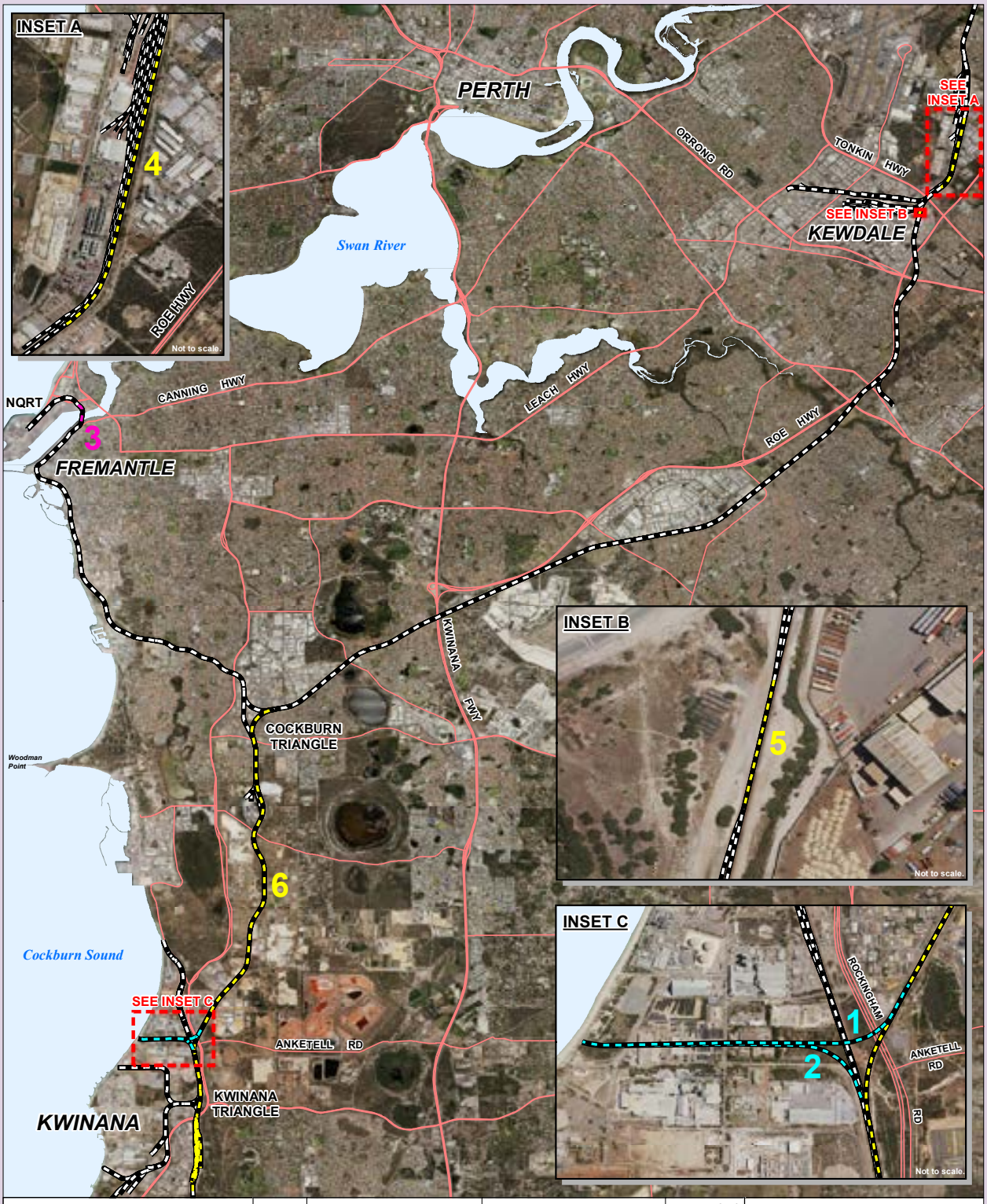
- a new freight rail passing loop between NQRT and Cockburn Triangle, which will benefit Fremantle;
- additional rail roads at NQRT, to allow multiple trains to be loaded and unloaded at the same time;
- optimising the designs of the proposed rail track duplications and triangles;
- the potential for a new rail connection from the existing rail line serving Kwinana Bulk Terminal to the location of Option B;
- the potential for a new rail connection between the CBH Kwinana grain terminal balloon loop and the South West Main Rail Line; and
- further work to understand the commercial viability of double-stacking container trains.

Table 13:
Rail upgrades required for the seven options

MCA-2 Option:	A	B	C	D	E	D2	E2
Rail track upgrades (dual-gauge, double-track) at the following locations:							
Existing single-track (2km and 110m sections) close to Forrestfield IMT	✓	✓	✓	✓	✗	✓	✓
Existing single-track Cockburn Triangle to Kwinana Triangle	✓	✓	✓	✓	✗	✓	✓
Existing single-track Kwinana Triangle to southern end of Kwinana marshalling yard	✓	✓	✓	✓	✗	✓	✓
New railway (dual-gauge, double-track)							
New 'Anketell Triangle' and railway to port intermodal	✗	✓	✓	✓	✗	✓	✓

Map 22:

Rail upgrades required for the seven options



Anketell Rail Link
Single Track Duplication
Rail Track Upgrade
Freight Rail (Existing)
Freight Road (Existing)

Map ID	Name	Location	Length (m)
1	Anketell Rail Link (North)	Anketell Last Mile	1796.3
2	Anketell Rail Link (South)	Anketell Last Mile	1549.9
3	Rail Track Upgrade	Fremantle Bridge	686.5
4	Single Track Duplication	Forrestfield / Kewdale	2589.9
5	Single Track Duplication	Forrestfield / Kewdale	101.9
6	Single Track Duplication	Cockburn Triangle to Kwinana Marshalling Yards	30,400.9

0 5 Kilometres

Produced by the Westport Taskforce, DoT WA.
Base Information: WALIA, DOT, SLIP 1047-2017-1 & WAPC.
File: \\esssvr01\Archive\Westport\MapDocuments\WP_SupplyChain_FreightRailUpgrades_A3.mxd

Date: 7/02/2020 | GDA 94

FREIGHT RAIL UPGRADES WITHIN THE SUPPLY CHAIN NETWORK

8.4
Intermodal terminal considerations

It is almost certain that Perth's intermodal network will look and operate very differently to how it does now by the time a future Kwinana port is operating. The proposed Anketell/Tonkin freight route explained in Section 8.1 essentially links the port directly to the ring of current and future IMTs that sit around the perimeter of the Perth metropolitan area.

There are currently only three existing IMTs servicing Greater Perth, shown in green on Map 23:

1. Forrestfield – this is the major IMT servicing Fremantle currently, located near Perth Airport
2. North Quay Rail Terminal, located on-site at Fremantle
3. Kwinana marshalling yard

Except for Bunbury, Avon and Latitude 32 in Kwinana, all other sites earmarked for possible future IMT facilities and distribution hubs either sit on or near the Anketell/Tonkin freight route. This gives these IMTs a direct route straight to the Kwinana port gate. These sites are shown in Map 23 in orange (under construction) and purple (proposed location):

- Mundijong
- Canning Vale
- Kenwick
- Kewdale
- Airport North
- Bullsbrook East and West
- Muchea

Industry stakeholders have identified the need for more intermodal facilities as soon as possible. Some of the opportunities to enhance the capacity of the Inner Harbour involve more intermodal hubs.

Freight train at NQRT

Map 23:

Perth's current freight network and proposed future IMT locations

INTERMODAL TERMINAL SITES

09 Stakeholder Engagement

"I've never seen a multi-faceted project of this scale and complexity run this smoothly with so much engagement. Certainly a credit to the Westport team and process."

Greg Williams, Technical Director, RPS Group, November 2019

The term 'stakeholder' refers to a person or organisation with an interest or concern in something. In this context, Westport's stakeholders are numerous and varied. Diagram 13 depicts the stakeholder groups with whom Westport has engaged throughout our process.

Given the diversity of Westport's stakeholder groups and the different topics of interest and ways in which they could participate and provide value to the project, they were separated into different groups and tailored engagement strategies were implemented.

- Westport developed a comprehensive informative and engagement plan for the community, outlined in Section 9.1
- A separate engagement plan was developed for Aboriginal groups in conjunction with Dr Richard Walley OAM, outlined in Section 9.2.
- Research organisations were engaged in the work stream groups or commissioned to provide inputs into, or peer review, the investigations.
- The Governance Committees were engaged through regular, highly structured, formal meetings.
- Industry, peak bodies, economic development organisations, environmental groups, government agencies and unions were engaged primarily through the Westport Reference Group – though the broader opportunities to engage were also available to these organisations.

First convened in December 2017, the role of the Westport Reference Group is to:

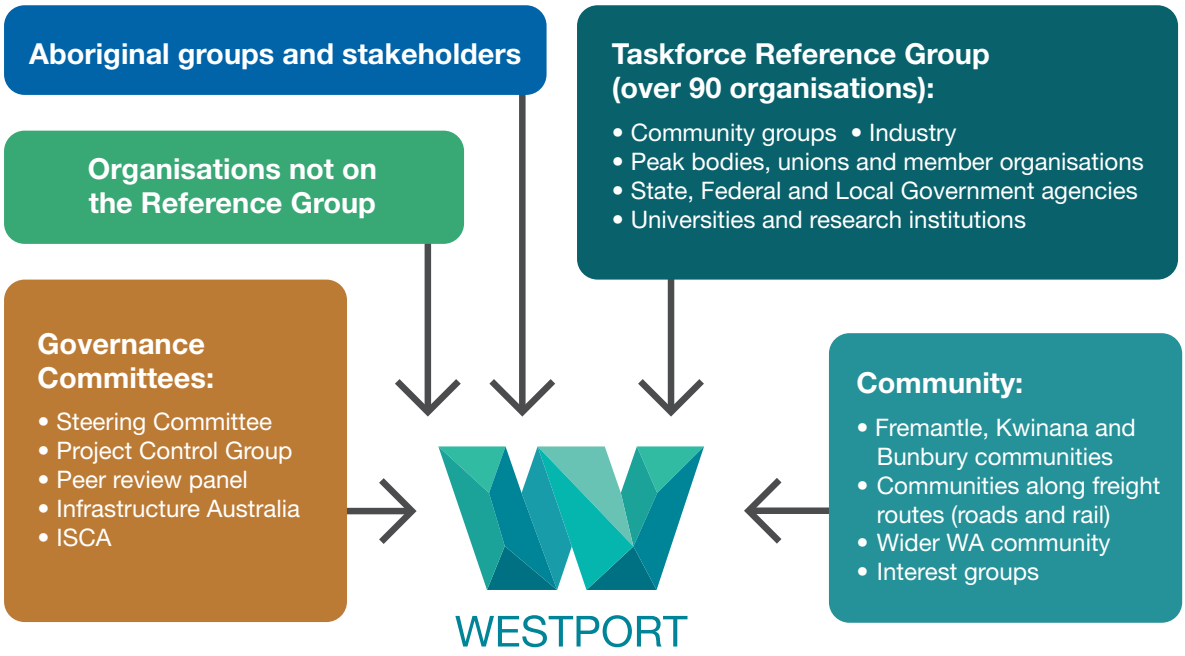
- facilitate issues and opportunities pertaining to Westport being raised;
- provide different perspectives and viewpoints;
- contribute information;
- guide and have input into Westport's process;
- provide feedback on outcomes; and
- share the process and findings with their wider networks.

"(Westport) is the most comprehensive study I have seen. My input has been considered. The Westport team listen… I have confidence in the team."

Jonathan Smith, CEO, Australian Marine Complex, June 2019

Diagram 13:

Stakeholders who provided input into Westport's process



The Reference Group played an active role in shaping and contributing to Westport's process and methodology in the formative phase. As the project progressed into more technical and sensitive investigations in Stage 2, the Reference Group were engaged to provide different perspectives, views and feedback, and communicate information about the project to their networks and members.

The Westport Reference Group grew both organically and by design. Organisations were invited to join by Westport if their perspectives and expertise could add value, and other organisations asked to join proactively.

By August 2019, the Westport Taskforce – which includes the Reference Group members, partner agencies and research consultants – comprised 93 organisations, which are listed on Westport's website[11].

Westport is committed to ongoing engagement with stakeholders, the community and Aboriginal groups throughout the future planning and delivery phases of the project. Westport aims to identify meaningful opportunities for consultation with these stakeholder groups so that their feedback and mutually beneficial opportunities can continue to be integrated into the project.

11 https://www.mysaytransport.wa.gov.au/westport-organisations

9.1
Community engagement

Community expectations around the level of engagement and input they should have into infrastructure projects has markedly increased in recent decades. Particularly in an era of well-organised interest groups, heightened communications options including social media, and high accountability, no authority or, indeed, corporate entity, can or should ignore the importance of a social licence to operate.

This argument is supported by Infrastructure Australia's (IA) 2019 Australian Infrastructure Audit[12]. A found that engaging with the community is essential to ensuring vital infrastructure projects can proceed. IA Chair, Julieanne Alroe, explains: "The 2019 Audit finds that engagement with customers and the broader community on project planning needs to increase across most sectors and jurisdictions. A failure to engage can carry substantial costs to projects, and it is estimated that around $20 billion worth of infrastructure projects have been delayed, cancelled or mothballed due to community opposition over the past decade."

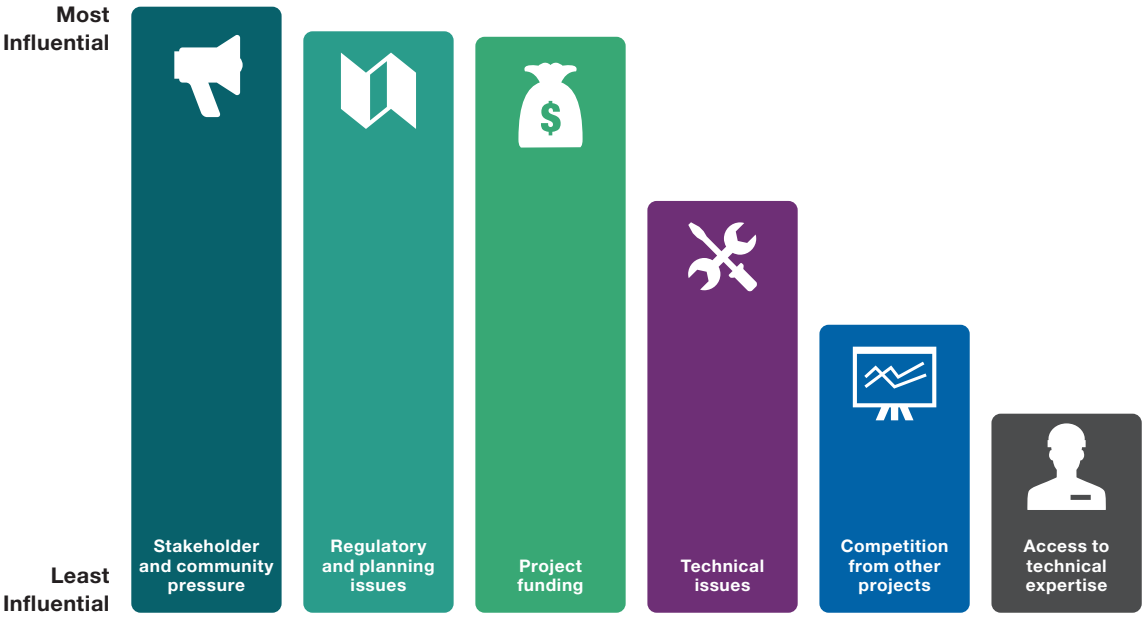
This paradigm shift is further supported by the Next Generation National Infrastructure Survey 2017 (Diagram 14), which shows that stakeholder and community pressure are the most influential factors impacting project delivery.

Fremantle community information session, 18 September 2019

12 https://www.infrastructureaustralia.gov.au/publications/australian-infrastructure-audit-2019

Diagram 14:

Next Generation National Infrastructure Survey 2017 showing the most influential factors impacting project delivery



N=(project funding, pressure=117, competition=118, technical=120, regulatory=122)

Source: Next Generation National Infrastructure Survey 2017

"Better engagement with communities and businesses can help to establish a social licence for projects, as it provides an opportunity to incorporate their feedback through project planning and delivery. Establishing genuine community buy-in on the need to reform must be a priority for government and industry alike as we embark on a new era of investment and reform to meet Australia's changing and growing infrastructure needs." [13]

Westport is a polarising project set against a history of stalled Outer Harbour port planning exercises (see Section 3.1) that have already helped to shape many people's opinions. It was clear that community engagement needed to be a top priority and approached authentically.

How did Westport engage with the community?

Westport categorised the wider community into two sections: 'directly impacted community and residents', which encompassed Fremantle, Kwinana and Bunbury as well as surrounding suburbs and communities living along major freight routes; and 'wider WA community', which encompassed Greater Perth and the rest of the State.

A great deal of consideration was put into how to reach different demographic, socio-economic and cultural groups to ensure there were no barriers to engaging with Westport. The following methods of communication were employed to maximise engagement with Westport through feedback opportunities including events:

- **Digital platforms** – Westport's website and social media channels were utilised to gather input and target active stakeholders, younger demographics, people in specific geographic areas and low socio-economic groups. Opportunities to provide feedback online for the project included:
  - Social PinPoint interactive map on MySayTransport;
  - feedback survey on the *Westport: What we have found so far report*[2];
  - community survey on freight, future planning; and
  - opportunity to comment on Facebook event advertisements (geo-targeted), as well as general Facebook, Twitter and LinkedIn posts.
- **Traditional media** – traditional print (*The West, Business News* and *Community* newspapers), broadcast (radio, television) and digital (WAtoday, The West, Business News) media ran event advertising, opinion pieces and media releases. Coverage included 230 articles/segments with 81.7 per cent positive or neutral sentiment.
- **Events** – a mix of free events and presentations at paid events to access people from a wide range of demographics, socio-economic groups and geographic locations were conducted. There were 19 free community information sessions across seven areas of Perth and Bunbury in 2018 and 2019, including shopping centre displays. Paper feedback surveys were conducted at these events, with 429 responses collected. Presentations at 102 external events (a combination of paid and free events) were delivered, reaching a combined audience of more than 16,000 people throughout 2018 and 2019.

13 Infrastructure Australia Chair, Julieanne Alroe, 2019 Australian Infrastructure Audit

- **Direct mail** – frequent electronic direct mails (eDMs) were sent to Westport's subscriber list of more than 2,200 recipients, with a 98.3 per cent hit rate and average open rate of over 40 per cent. Letterbox drops were implemented to promote Westport's events, with flyers delivered to around 8,000 residences and businesses in the Fremantle, Kwinana and Bunbury areas.
- **Utilising members** of the Westport Reference Group, which have a combined reach to a network of more than 1.5 million people across WA, for word of mouth promotion and information sharing.
- **Focus groups** – targeted focus groups were conducted on a number of selected topics, with participants being both self-selected and selected by Westport:

1. Recreational fishers (27 June 2019)
2. Residents living along the freight rail line (8 July 2019)
3. Latitude 32 landowners (13 August 2019)
4. Fremantle Inner Harbour industries (16 September 2019)
5. Kwinana industries (23 September 2019)
6. Local Government authorities (25 September 2019)

- **Telephone interviews** – two rounds of detailed interviews with community members who had responded to Westport's surveys were conducted in March/April and July 2019 to gather detailed qualitative feedback. The first round had 29 participants while the second round had 49 participants.
- **The University of Western Australia social values research** – a survey of 769 randomly selected community members in Fremantle, Kwinana, Bunbury and Greater Perth was conducted to test their social and environmental preferences. The results of their preferred values, in order, were:
  - **Marine environment:**
    (1) key marine species – 8.3 (2) marine diversity – 7.5
    (3) water quality – 7.3 (4) seabed habitats – 7.1
    (5) charismatic megafauna, such as penguins and dolphins – 4.3
  - **Terrestrial environment:**
    (1) protected ecological communities – 7.9 (2) protected flora and fauna – 7.7
    (3) protected wetlands – 6.6 (4) remnant vegetation – 4.9
    (5) landforms, such as the Henderson Cliffs – 3.4
  - **Recreational amenity:**
    (1) recreational beaches – 5.7 (2) green open space – 5.2
    (3) visual amenity – 4.1 (4) recreational fishing – 2.4
    (5) recreational accommodation – 2.0
  - **Urban values:**
    (1) public health – 7.6 (2) driving experience – 5.4
    (3) connectivity – 2.5

The close alignment between the MCA-2 participant scores and the community values scores demonstrates that the views and priorities of participants in the MCA-2 process were well-aligned with and responsive to community values, priorities and concerns.

Diagram 15:
Infographic depicting Westport's engagement statistics for 2019

Acting on the feedback

Westport has heard that the environment is the community's number one priority. That priority has been actively incorporated into the Westport process to ensure it is reflected in the outcomes.

Adopting the PIANC Working with Nature philosophy was one part of this process. The Working with Nature approach has seen environmental considerations embedded into the Westport process at every stage, with all outcomes reviewed through an environmental lens.

Additionally, the environmental criteria used in the multi-criteria analyses (MCAs) have been given much higher weightings – and therefore, more importance – by Westport than traditional infrastructure MCA processes. It has been noted that these weightings are the highest many participants have seen for an infrastructure project. By giving these criteria high weightings, any options with poor environmental outcomes scored lower in the ranking process and did not feature on Westport's shortlist.

Finally, there were the UWA social values community survey results, which were fed directly into the MCA-2 assessment process.

"There was surprisingly little disagreement among the participants that an alternative to the North Fremantle container terminal is inevitable – the question is where and when. So far as the overwhelming majority of the meeting's attendees were concerned, the alternative (port) should be investigated, decided upon and proceeded with ASAP."

Gerard MacGill on behalf of the North Fremantle Community Association, September 2019

Bunbury community information session, 6 June 2019

9.2
Aboriginal engagement

The Traditional Owners of the land and water in Westport's study areas are some of the project's most significant stakeholders. Westport is conscious that the Aboriginal groups in south west WA have experienced traumatic displacement and disempowerment at the hands of European settlers, the ramifications of which can still be felt today. The Westport Taskforce is eager to embrace the Traditional Owners and weave their people, culture, stories and heritage into its process, with a view to maximising economic and social outcomes for Aboriginal people during the project delivery and operational phases.

Working to benefit Aboriginal communities also supports Westport's commitment to the UN Sustainable Development Goals #1: No Poverty; #8: Decent Work and Economic Growth; and #10: Reduced Inequalities.

Fremantle is Whadjuk Country, while Kwinana is both Whadjuk and Gnaala Karla Booja Country. Map 24 shows the borders of the two groups.

Westport has worked with senior Nyoongar statesman, Dr Richard Walley AO, and his consultancy, Aboriginal Productions and Promotions (APP), to engage with the relevant Aboriginal stakeholder groups on Westport's behalf. Through Dr Walley's assistance, Westport has secured engagement from the South West Aboriginal Land and Sea Council (SWALSC) and other key Aboriginal stakeholder groups in the Fremantle and Kwinana areas. Dr Walley also participated in the heritage criteria workshops conducted for MCAs 1 and 2 to ensure Aboriginal cultural and sacred sites were considered during the assessments.

APP has produced an Aboriginal economic and cultural development plan for future stages of the Westport project, *Kapi Biddi: The Westport Aboriginal Engagement Strategy*[14]. This document will steer Westport's Aboriginal engagement through any future planning, delivery and operational phases. It sets clear guidelines and targets for maximising economic, social and cultural development opportunities for Aboriginal people, particularly the traditional custodians of the Fremantle and Kwinana areas, throughout the project lifecycle.

Westport is now collaborating with SWALSC to establish an Aboriginal advisory group. The advisory group will be formed with the assistance of Dr Walley, to help advise and guide Westport on risks and opportunities relating to Aboriginal heritage and culture, as well as broader environmental and social outcomes.

Westport will continue to work closely with Aboriginal groups and individuals as the project progresses to ensure different viewpoints are considered and opportunities are optimised.

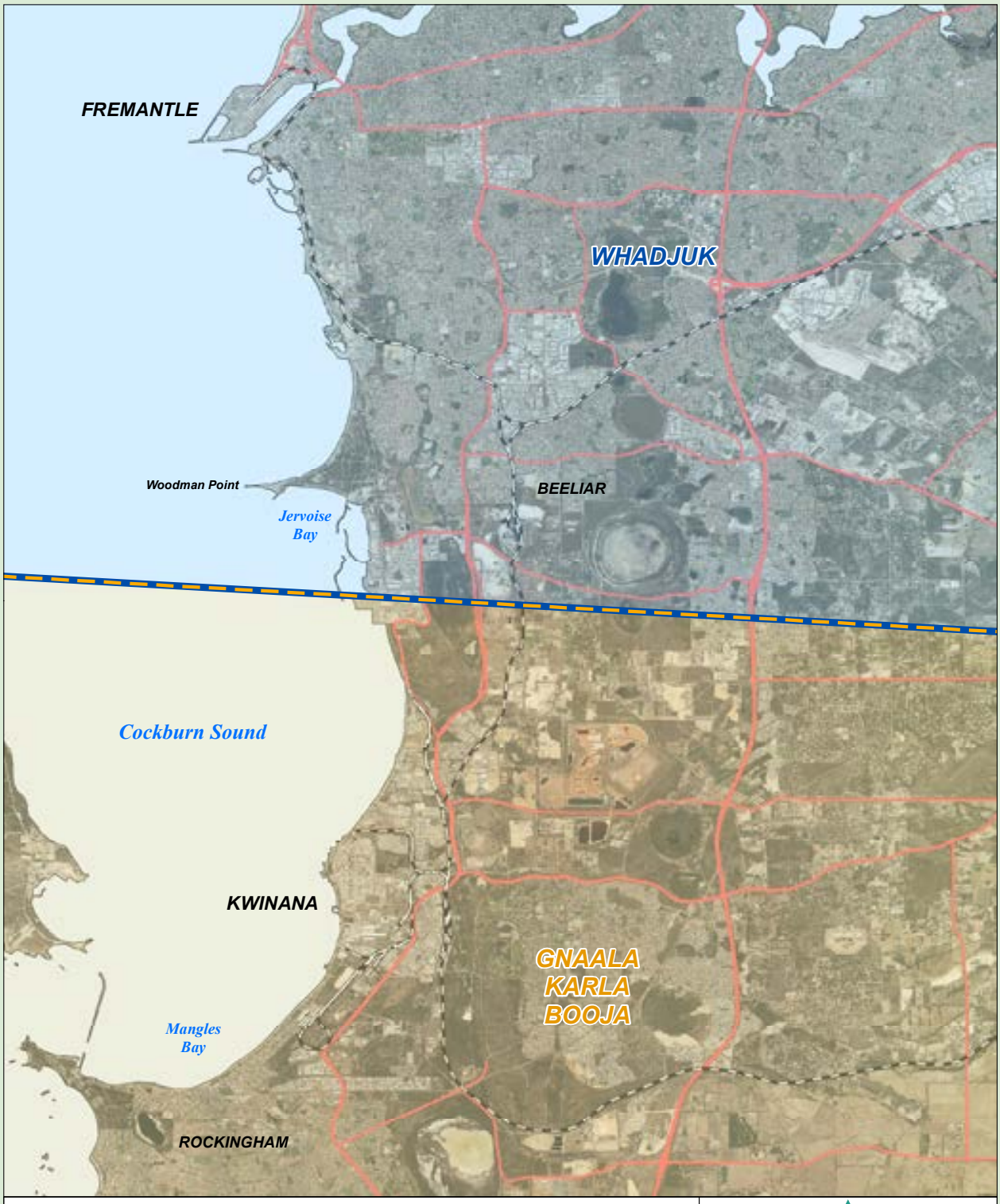
14 *Kapi Biddi (Water Pathways), The Westport Aboriginal Engagement Strategy*, 2019, Aboriginal Productions and Promotions

"Effective Aboriginal engagement will produce a culturally competent organisation which has respect for the cultural protocols involved in Aboriginal culture. The organisation will have the capacity to empower Aboriginal people and incorporate them into the decision-making process."

Kapi Biddi: The Westport Aboriginal Engagement Strategy

Map 24:

Boundaries of the Whadjuk and Gnaala Karla Booja Indigenous Land Use Agreement



Produced by the Westport Taskforce, DoT WA.
Base Information: WALIA, DOT, SLIP 1047-2017-1 & WAPC.
File: \\esssvr01\Archive\Westport\MapDocuments\WP18_Reports\Stage2_Outcomes_Report\Technical_Report\Maps\18251336_COMS_AboriginalRegions_ILUA_A4.mxd
Date: 4/02/2020 | GDA 94 | Copyright ' February 2020

NOONGAR INDIGENOUS LAND USE AGREEMENT REGIONS WITHIN WESTPORT'S STUDY AREA

WESTPORT Port and Environs Strategy

10 Where to From Here?

View from Fremantle along the Swan River to Perth

Determining the preliminary recommended port options is just an initial step in Westport's lengthy journey of delivering Perth's new port. The recommended options are still high-level concepts; there is a great deal of technical work still to be undertaken before the point of making an investment decision is reached.

Westport's next phase of work will focus on obtaining all necessary information for the Government to make an investment decision. The scope of work for Westport's next phase includes:

- delivery strategy and procurement model development;
- more detailed environmental work, including:
  - technical assessments, including observational studies, refinement of channel design, thorough hydrodynamic and dredging analysis, geotechnical studies and more detailed ecosystem research focused specifically on Options D2 and B;
  - beginning implementation of the environmental mitigations, such as researching seagrass regeneration and protecting pink snapper spawning conditions;
  - the Environmental Impact Assessment (EIA), with Westport aiming to be the first project to undertake a digital EIA given the wealth of data and maps the project has collated to date;
  - the Environmental Protection Authority (EPA) assessment and recommendations; and
  - determining the detailed environmental/social mitigation costs, as well as any commercial fisheries or industries that require licences bought out or compensation;
- consideration of strategies to protect road and rail corridors;
- supply chain development, including port strategy and design, road design, rail design, IMTs, land use modelling and 3D simulation for Options D2 and B;
- technical work on the port and supply chain links, and associated impacts on existing land and infrastructure, including:
  - surveys and engineering investigations;
  - definition design for Options D2 and B;
  - land acquisition strategy, potential legal ramifications and detailed cost estimates;
  - value management;
  - constructability assessment, including staging and scheduling;
  - risk management, legal considerations and updated risk register;
  - whole-of-life cost estimate;
  - correlation and schedule assessment, renewals and port operating costs, including road and rail links;
  - asset management strategy for port and supply chain;
  - location intelligence, including simulation and modelling, visualisation and digital EIA; and
  - systems assurance plan, including systems engineering and safety assurance approach;

- commercial investigations, including:
  - whole-of-Government cost assessment;
  - port transition strategy;
  - transaction costs;
  - commercial strategy and plan;
  - competitiveness model assessment; and
  - funding strategies;
- continued community, stakeholder and Aboriginal engagement, including:
  - working closely with industries in Kwinana, particularly those adjacent to and/or impacted by the new port location;
  - working closely with Fremantle operators and stakeholders to prepare for an eventual transition;
  - working with the community around Fremantle to alleviate, as much as possible, the ongoing impacts from port-related traffic and trains;
  - continuing to work with community and peak bodies such as Recfishwest and the Cockburn Sound Power Boats Association to identify opportunities to improve facilities and amenity for recreational users of Cockburn Sound; and
  - maximising outcomes for Aboriginal people;
- continuing to develop Westport's digital, interactive, data-based spatial model;
- assessing opportunities to integrate Aboriginal art, culture and stories into both the port design as well as the wider port precinct; and
- evaluation and 'measuring success' frameworks.

10.1
Complementary work considerations

Through its investigations to date, the Westport Taskforce has identified the need for further work or strategies outside of Westport's scope that both complement and support the project's work. Conversations are being held with relevant agencies to determine the best pathway forward on undertaking the following investigations:

- determining the maximum supply chain capacity of the Inner Harbour;
- additional road network upgrades required to support the Inner Harbour while it remains operational;
- addressing growing passenger vehicle congestion across the broader road network;
- considering the highest and best use of North Quay long-term;
- investigating new or alternative facilities and arrangements to accommodate bulk and general cargo; and
- deciding on the future use of Latitude 32 in Kwinana, in the instance that it is not used as an intermodal terminal for the future port.

11

Acknowledgements

CBH grain terminal (foreground), Garden Island (background) and bulk vessels in the Outer Harbour

Thanks and acknowledgement are due to the individuals, groups and organisations who have been a part of the Westport Taskforce and contributed to the outcomes to date.

All current and past members of the Westport project team, including Westport Independent Chair, Nicole Lockwood, and Westport Director, Tim Collins, and current and former members of the Westport Taskforce are also acknowledged and thanked for their significant body of work.

And finally, thanks to those members of the general community who have taken an interest and contributed to this work that is so significant for the future of Western Australia.

1 360Environmental

2 Aboriginal Productions and Promotions

3 Alcoa of Australia

4 Ambrosia Consulting

5 Arc Infrastructure

6 Arup

7 Aurecon

8 Aurizon

9 Australian Industry and Defence Network of WA

10 Australian Marine Complex

11 Bamford Consulting

12 Beeliar Regional Park Community Advisory Committee

13 Black Quay Consulting

14 Blue Arcadia

15 BMT

16 Boating WA

17 Bunbury Geographe Economic Alliance

18 CBH Group

19 Chamber of Commerce and Industry of WA

20 Chamber of Minerals and Energy of WA

21 City of Armadale

22 City of Bayswater

23 City of Belmont

24 City of Bunbury

25 City of Canning

26 City of Cockburn

27 City of Fremantle

28 City of Gosnells

29 City of Joondalup

30 City of Kalamunda

31 City of Kwinana

32 City of Mandurah

33 City of Melville

34 City of Perth

35 City of Rockingham

36 City of Swan

37 CGM Communications

38 Cockburn Boating Association

39 Cockburn Sound Management Council

40 Committee for Perth

41 Conservation Council of WA

42 Defence West

43 Deloitte Access Economics

44 Department of Biodiversity, Conservation and Attractions (WA)

45 Department of Infrastructure, Regional Development and Cities (Federal)

46 Department of Jobs, Tourism, Science and Innovation (WA)

47 Department of Planning, Lands and Heritage (WA)

48 Department of Primary Industries and Regional Development (WA)

49 Department of Transport (WA)

50 Department of Treasury (WA)

51 Department of Water and Environmental Regulation (WA)

52 DevelopmentWA

53 DP World

54 East Metropolitan Regional Council

55 Freight and Logistics Council of Western Australia

56 Fremantle Chamber of Commerce and Industry

57 Fremantle Ports

58 GHD

59 Jacobs

60 Kwinana Industries Council

61 Latitude 32 Community Group

62 Livestock and Rural Transport Association

63 Main Roads WA

64 Maritime Union of Australia

65 Mediterranean Shipping Company

66 Mills Wilson

67 Naval Base Holiday Association

68 Pastoralists and Graziers Association of WA

69 Patrick Terminals

70 Peel Development Commission

71 Perth Airport

72 Perth Natural Resource Management

73 Planning and Transport Research Centre (PATREC)

74 Property Council of Australia, WA Division

75 Public Transport Authority

76 PwC Perth

77 Rail, Tram and Bus Union of WA

78 Recfishwest

79 Regional Development Australia

80 Riskwest Management Consultants

81 Shire of Dardanup

82 Shire of Mundaring

83 Shire of Murray

84 Shire of Serpentine Jarrahdale

85 South West Development Commission

86 South West Group

87 Southern Ports

88 Spectrum Ecology

89 TBA Consultants

90 Town of East Fremantle

91 Transport Workers Union WA

92 Urban Development Institute of Australia (WA)

93 University of Western Australia

94 Urbis

95 WA Biodiversity Science Institute

96 WA Fishing Industries Council

97 WA Livestock Exporters Association

98 WA Marine Science Institute

99 WA Planning Commission

100 Western Australian Treasury Corporation

101 Watco Australia

102 Water Corporation

103 WA Local Government Association

104 Western Harbours Alliance

105 Western Roads Federation

GOVERNMENT OF
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