

Flinders Port Holdings

Masterplan

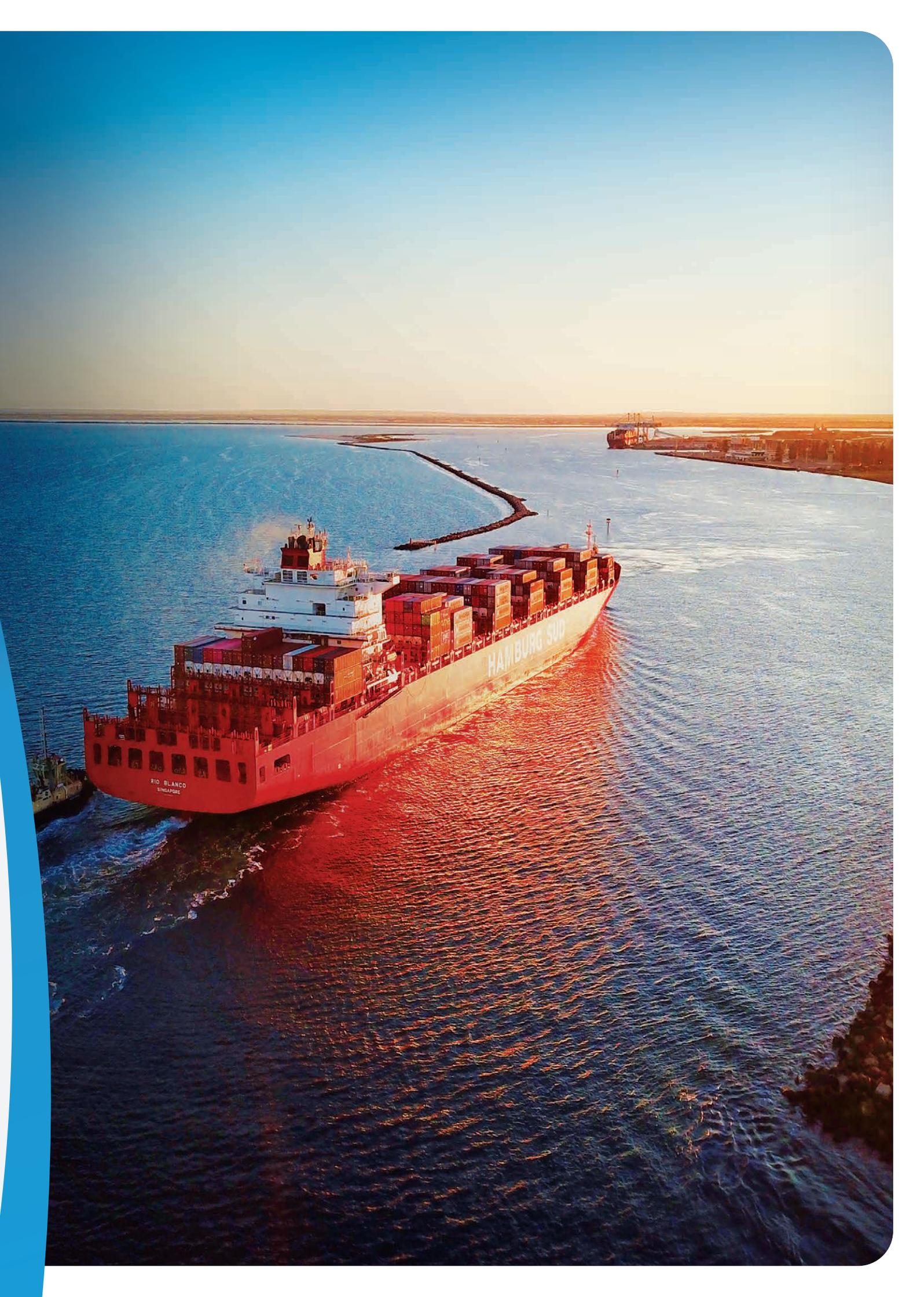
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This Masterplan has been prepared for Flinders Port Holdings Pty Limited (FPH) ACN 117 687 313 by Black Quay Maritime Consulting Pty Limited ACN 613 148 164 (Black Quay). Information on environmental factors and sustainability was contributed Suzanne Ridding, Proprietor, Sustainable Business Consultants as a contractor to Black Quay. The Masterplan process was conducted over 2 financial year periods 2019-2021. Please note that some data contained in this report will be reflective of those points in time. Whilst all due care has been taken in preparing this Masterplan, neither FPH nor Black Quay nor any of their contractors or agents make any representation or warranty as to the accuracy or completeness of the information provided. No person should act in reliance on any information provided in, or omitted from, this Masterplan or any other written or oral information or opinions provided in connection with it. Neither FPH nor Black Quay nor any of their contractors or agents accept any liability whatsoever to any person who relies in any way on information in this Masterplan.





1 | Introduction

To ensure that Flinders Port Holdings Pty Ltd (FPH) continues to provide the capacity and services that South Australia require into the long-term, FPH has embarked on a complex and detailed strategic planning process in the delivery of a long-term Masterplan covering all ports under FPH control. To assist in the process, FPH engaged the services of specialist port planners Black Quay Consulting.

FPH, through its subsidiary Flinders Ports Pty Ltd (FP), is the largest port operator and the primary port authority in South Australia, operating and maintaining seven (7) ports across the State, those being Port Adelaide, Thevenard, Port Pirie, Port Lincoln, Klein Point, Port Giles, and Wallaroo (Ports).

These ports are critical supply chain service points for localised regions across South Australia, and Port Adelaide is home to the State's only international container terminal (Flinders Adelaide Container Terminal - FACT) as well as other primary trade terminals.

Flinders Ports leases the port infrastructure and operate the Ports under a 99-year land lease, which commenced in 2001. As South Australia's international gateway, the Ports under Flinders Ports control are critical infrastructure of State-wide importance and directly linked to the trade logistical capabilities of South Australia, and subsequently to the economic health of the region.

This study provides strategic context and direction for FPH in the management and development of the Ports into the long-term, considering a 50-year horizon.

The Masterplan is a culmination of the outcomes of multiple reports prepared by Black Quay and FPH throughout the project's 12-month timeline.

This has included:

- Future State Visioning – An in-depth study into future geopolitical environments, consumerism trends, technologies and market characteristics (to inform future port operating environments, trade and fleet forecasts)
- Trade Forecasts – Detailed trade forecasting across all current FPH trade types and review of emerging trade trends and types that might apply to South Australia in the future
- Fleet Forecasts – Complex first principle fleet forecasting across all fleet types expected internationally, and to call at South Australia into the long-term
- Capacity Analysis – Capacity modelling and analysis of all Ports, including determination of the potential FACT capacity over time under various trade scenarios
- Option Determination & Analysis – Determination of development options at all Flinders Ports assets to meet future trade and fleet demands
- Automation Role Review – Analysis of potential capital and operational cost implications over time should FPH elect to automate the container terminal
- Preferred Masterplan – Strategic & commercial review of options to determine a preferred Masterplan that meets FPH's port planning requirements and objectives out to 2070 and development of a delivery map.

This report is not the full masterplan study report, but rather a summary report highlighting the primary outcomes of the work.



1.1

Project Planning Timeframes

References are made throughout the report to timeframes, and these correspond to the timeframes of the overall study. They are as follows:





2 | The Need for a Strategic Plan

Strategic port planning and port masterplanning are in fact, not the same thing. Whilst a Masterplan for a port may be the end goal, a great deal of strategic planning is required to inform and sit behind the Masterplan in order for it to remain valid over time.

In essence, this is the complex work that justifies any properly developed and genuine port Masterplan. Without it, the Masterplan itself will struggle to remain useful, and this tends to become more acute over time, as relative unknowns start to surface.

A good port Masterplan does several things. Firstly, it studies and determines the future environment that the port might face. Then, it identifies limitations and negative legacies at the port, and outlines informed and justifiable solutions to this over time.

Particularly complex port Masterplans look out into the long-term. Whilst shorter term plans are perhaps more straightforward, as the challenges the port faces are more clear. Long-term plans must gaze into the future and apply innovative and first principle techniques to ensure that the plan guides the development of the port to both mitigate the impacts of historic negative legacies, and to simultaneously ensure that new ones don't emerge over time.

It is timely that the seven ports under Flinders Ports control are proactively planned, and their future operating requirements are considered and fully understood. This will assist in ensuring that the ports do not become critically constrained or ineffective

to accommodate their primary purpose; that being to facilitate trade for the regions that they serve.

This Masterplan has identified that some of the ports under Flinders Ports control face challenges in the future.

The Masterplan is designed to meet these challenges, and to guide the strategic development of FPH into the long-term in a sustainable manner.

Further, the plan identifies new opportunities for FPH in its service to the State and its customers.

4 | The SA Port Environment

Aside from the seven FPH ports across South Australia, another four (4) commercial ports exist in the State (owned and operated by others). They are Port Bonython, Whyalla, Ardrossan and Lucky Bay. FP provides services to Port Bonython, Whyalla and Ardrossan but not to Lucky Bay (grain transshipment port). The State is relatively saturated with active and proposed ports which has the effect the increasing overall capital, operational and maintenance infrastructure costs for the State.

At the time of the study, five (5) potential new ports are proposed in South Australia at Kangaroo Island (Timber), Port Augusta (Iron Ore), Wallaroo (a proposed grain port), Cape Hardy (a proposed bulk export port) and Port Spencer (a proposed grain port at Sheep Hill).

FPH assets play a critical role in facilitating trade across global markets, from both import and export perspectives. Associated commodities are transported both in bulk and containers, and include:

- Limestone and cement exports to the international construction industry and import of cement for local industry
- International export of grain and other primary industry raw materials
- Containerised exports of wine, hay and fodder and cereal preparations alongside containerised imports
- Petroleum product imports
- Fertiliser imports for primary industries

- Mining related product including mineral sands, salt, copper, gypsum, concentrates and supporting inputs that contributed approximately AUD \$3.2billion (or 3.2%) to South Australian GSP in FY19.

Figure 1 – South Australian Port Environment





5 | Emerging FPH Challenges

5.1

Terminal Capacity Pressures

1. Whilst the majority of FPH assets across the State have adequate terminal capacity and berth length for our customers, there are waterside constraints at Port Adelaide's Inner Harbour, Port Pirie, Wallaroo and Thevenard. These are likely to present significant limitations to trade handling before 2070.
2. Some berth pockets at Port Adelaide's Outer Harbor, Port Lincoln and Port Giles may require works to allow them to cater for trade to 2070. However, this is expected to be minor.
3. Forecast fleets and trade indicate that significant upgrade and expansion works will be required at the FACT container terminal during the planning horizon. These works relate to multiple constraints including landside capacity, berth length, channel and berth depths.
4. To avoid the need for container operations to encroach into other areas of the port, the FACT yard will need to convert to a higher density system before the end of the 99-year lease. This would need to occur prior to 2070 and possibly much sooner.
5. Expansion of the current manual regime within the ultimate FACT footprint would not be able to cope with any upside trade into the long term. Nor would it be sufficient to handle further forecast trade to the end of FPH's lease, including the capture of any contestable trade.

5.2

Port Adelaide Channel Capacity

For the most part, the existing one-way channel was deemed adequate for the forecast task. However, it was identified that the Port Adelaide Channel would come under increased pressure based on one-way operations within the study timeframe.

The analysis showed that by FY70, the channel would come under strain based on expected vessel visitation and would cause delays. However, it was determined that Port Adelaide could likely cope with a one-way channel providing that widened areas for ships to pass in opposite directions are constructed.

The concept analysis indicated that under mild conditions, a width of approximately 345m would be required, and various areas suitable for passing zones were identified.

5.3

Competing Interests

Masterplan studies highlighted the potential future risks associated with emerging competing interests for land in or around two of the ports in FPH's portfolio, namely Port Adelaide and Port Lincoln.

At Port Adelaide, the Masterplan has highlighted that FPH are potentially heavily exposed to possible land & berth pressures. It is assumed that the Port will become highly constrained, and this has informed aspects of various strategies/works proposed in this Masterplan.

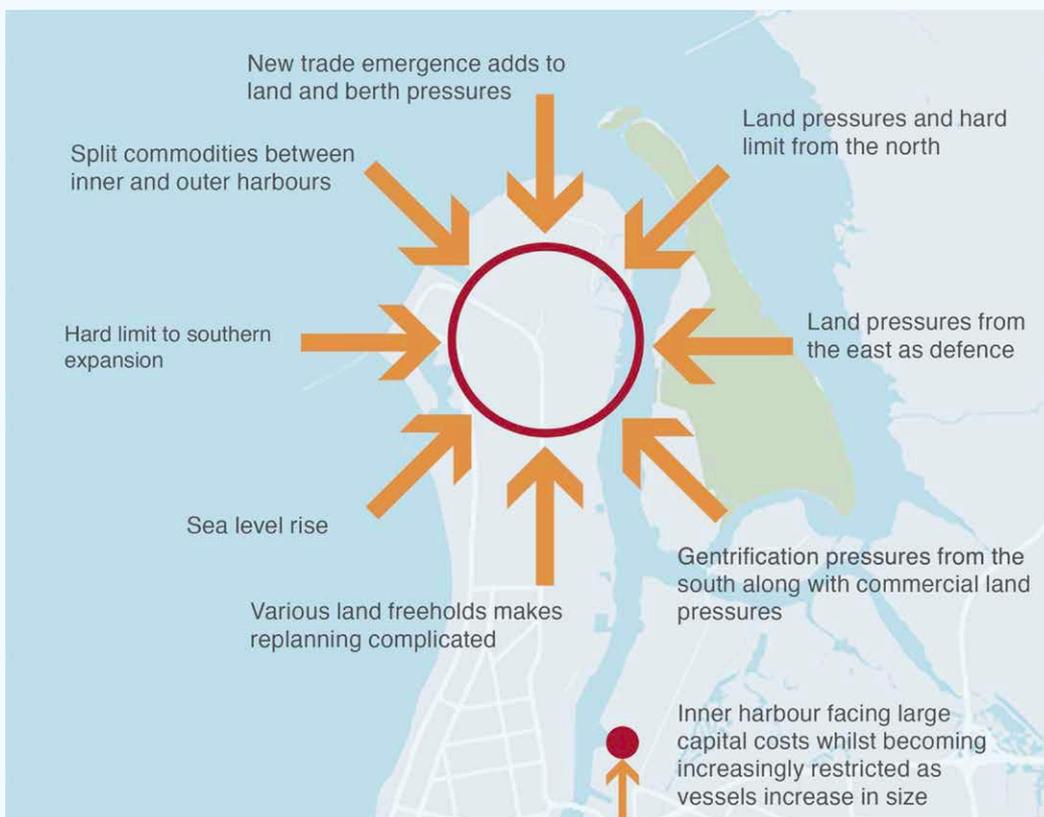
5 Emerging FPH Challenges Cont.

As was envisaged with the development of the Outer Harbor, the Inner Harbour at Port Adelaide over the long term is becoming increasingly less viable as a commercial port precinct, given its physical limitations on shipping access.

In addition, as ships continue to get bigger, adequate berth length will increasingly become critical at the port.

These land and berth pressures represent significant threats to the long-term viability for customers of the port. The issue surrounding the Outer Harbor is illustrated in the following figure.

Figure 2 – Outer Harbor Emerging Pressure Culmination (Black Quay, 2020)





At Port Lincoln, interaction between recreational use and port-related use presents additional complication, however the

infrastructure remains in a strong position to support further growth. This is displayed in the figure below.

Figure 3 – Showing Existing Landside Conflicts at Port Lincoln



Legend

- Viterrra Truck Movement to Vertical Storage
- Viterrra Truck Movement to Sheds
- Viterrra Truck Movement – Common Route
- Parkalla Trail Pedestrian Movement
- Approx. Public Access Area (pedestrian and vehicular)
- Port-related truck movements to/from fertiliser
- Cruise terminal passenger movements
- Commercial fishing related movements

Port Lincoln is also surrounded by development on all sides, and limited space for expansion means that the Masterplan has had to identify and consider mechanisms to mitigate this risk.

5.4 Limited Waterfront

It has been calculated that, without changes such as those outlined in the Masterplan, berth capacity at Port Adelaide for the customers will potentially run out by 2070 if not before, leaving the port with a finite life.

Complex undertakings are required to ensure that the port remains operationally viable into the long-term future for the State.



5 Emerging FPH Challenges Cont.

5.5 Ageing Assets

FPH is faced with a number of ageing assets located across South Australia that are in varying conditions.

At FPH's regional ports, trade growth profiles are somewhat limited. This presents a difficult situation for FPH where some assets require spending that is not fully justified given expected throughputs and revenues.

Accordingly, the Masterplan has been developed to provide a strategy that maintains regional port obligations under the lease, and ensure they remain adequate to handle forecast trade, whilst managing both maintenance expenditure and any proposed improvements in a cost-effective manner.

The following figure provides a summary of the active and potential risks and constraints faced by FPH.

5.6 Evolving Environmental and Sustainability Landscape

The increasing focus on sustainability and changes in environment, such as those caused by climate change are over-arching trends that are likely to have a critical impact on FPH operations over the coming 50 years.

Amongst the items that will require focus by FPH (and are considered within the Masterplan) are the depletion of environmental resources and production inputs, an increasing focus on sustainable development, adaptation to advancing climate change, sea level rise and decarbonisation, the growing importance of social license to operate and the rising awareness of the role of natural ecosystems and biodiversity (and our need to value and protect them).

The port infrastructure of the future will need to be resilient to the future environmental challenges and the need to achieve net-zero emissions.





6 | Flinders Port Holdings Opportunities

The Masterplans have been developed to capitalise on the following opportunities, whilst mitigating or eliminating the issues and constraints identified previously.





6 Flinders Port Holdings Opportunities Cont.

6.1 Fixable Issues

The challenges discussed in the previous section, whilst serious, are relatively immature when compared to those at many ports around the world, and indeed the rest of Australia.

It is timely that FPH consider current issues and avoid creating new negative legacies in the future. Whilst there will undoubtedly be a cost in doing this, it is expected to outweigh the longer-term impacts of not doing so.

6.2 Strategic Advantages

By virtue of its presence along the South Australian coastline, the Ports have a strategic advantage to service a varied array of trade and industries. At the regional ports, this enables largely unhindered access to and from the facilities.

The regional ports provide proximity to the major grain producing regions of South Australia which is evidenced by the presence of grain exports from five of six regional ports.

Additionally, ports such as Thevenard and Klein Point provide direct access for mining related exports. For some of these low-value commodities, significant landside transport legs would not be economically feasible and thus Flinders Ports positioning allows unprecedented access.

Arguably, the largest regional strategic advantage is deep-water access at both Port Lincoln and Port Giles which, alongside the locality of these ports near renewable energy generation regions, positions Flinders Ports well to handle future hydrogen exports and/or other potential new trades.

Port Adelaide's position to serve the State and the wider hinterland is already proven. Whilst some landside transport issues are expected to become more acute in time, the reality is that these challenges are common across nearly all major ports. In Port Adelaide's case, these are also potentially fixable, which is not always the case for mature city located ports.



7 | Future South Australian Population

The publicised population forecasts for Adelaide fall well short of the growth expected in major eastern cities. This effectively assumes a business as usual approach for the city and for the wider State; that being low growth in industry, population and consumerism.

Current population forecasts for the State propose no substantial changes in how it will look and work in the future. However, this fails to embrace the positives that are already present and that point to a highly liveable and prosperous State.

As Melbourne's and Sydney's populations are set to expand dramatically, the sustainability and liveability of the cities can at very least be questioned.

Adelaide will offer an increasingly attractive alternative for these people, providing that industry develops to ensure jobs are there and that social infrastructure matches or betters that of the mega cities.

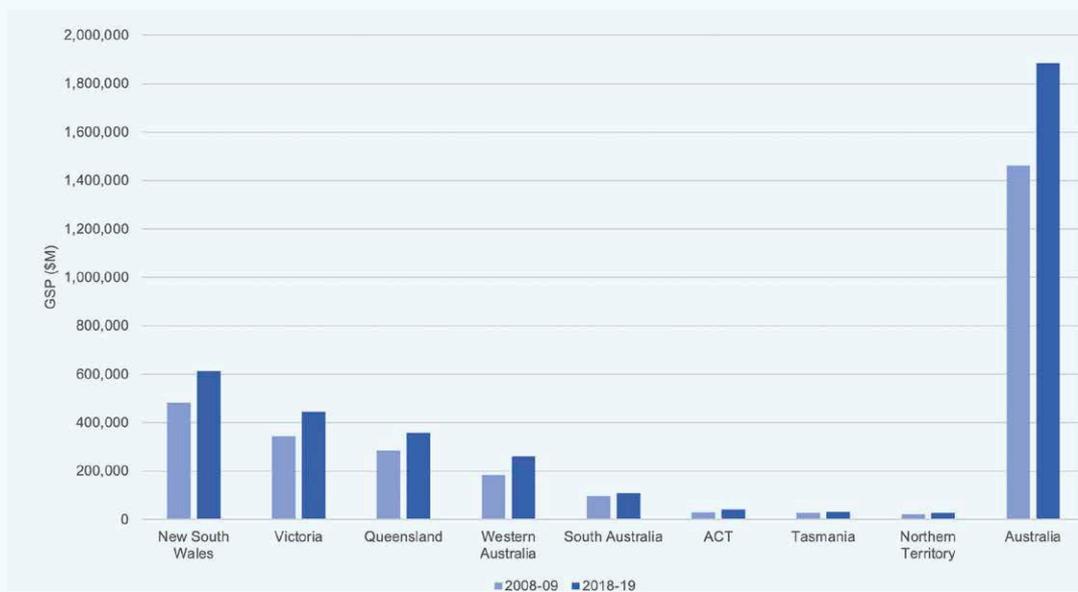
The Australian Bureau of Statistics (ABS) have forecast South Australia's population of 1.7 million people will increase to between 2.43 million to 2.7 million people by 2066. Adelaide's share of South Australia's population is predicted to rise to around 80% by 2042.

When one considers the many advantages that Adelaide offers, by 2070, Adelaide's population could potentially almost triple to 3.5 million people, whilst State wide population growth will be limited to around 400,000 people, resulting in a State population of around 3.9 million people by 2070 (1 million more people than predicted by ABS).

8 | Economy & Trade

South Australia is currently the 5th largest economy in Australia by GSP. Its growth in 2018-19 matched this, ranking 5th at 1.4%. Adelaide is gradually transforming to be a hub for innovation and forward thinking.

Figure 4 - Australian GSP by State 2009 and 2019 (Black Quay, 2020)



Whilst Adelaide's days as a blue-collar manufacturing hub continues to reduce (recognising some success areas such as some applicable defence activities), the city has already morphed into a high-tech manufacturing and design, healthcare, education, and retail hub.

Although South Australia continues to hold market share in the manufacture of some hard products, even current regional growth in high-tech manufacturing outweighs this. Disruptive industries such as 3D printing and

renewable energy enablement are where large-scale change in the longer term could eventuate from.

A new era of localised manufacturing could potentially derive from Adelaide's population increases, a retention of brainpower in the region as companies take advantage of cost reductions versus the eastern mega cities, and development of its existing prowess as a technological hub. In many ways, Adelaide is ideally suited to embracing disruptive change in manufacturing including a highly trained



population and the ability to retrain blue-collar workers, good education access, and large areas of available commercial space for manufacturing.

In planning for the long-term, we can already see the emergence of high-tech manufacturing in Adelaide just as clearly as we can see the decline in traditional manufacturing.

Despite the automotive industry having left South Australia, the high-tech manufacturing skills and experience gained means that these skills help position the State as a future leader in advanced manufacturing. This is bolstered significantly by the growing presence of the South Australian defence industry with the \$50billion Future Submarine Program. The State is also already a leading player in the development of autonomous vehicles.

A strengthening of high-tech agricultural equipment and medical equipment is also expected in the future, and in addition, the State's premium wine industry will likely grow (possibly at the expense of cheaper wines), as will cyber-security services.

The potential for increased export of high value, high-tech South Australian manufactured product appears high.

Localised manufacturing, enabled through advancements in additive manufacturing, could result in large areas of rural decline being reversed in South Australia, transforming them into high-tech industrial zones close to Adelaide, supplying Australians with all manner of products, as well as overseas customers.

The moral of the story is that Adelaide sits on the cusp of transformational change in manufacturing and trade. There is no better place in Australia to establish a shift towards

local high-tech manufacturing and resurgence in manufacturing skill sets and jobs. With its access to capital and skilled work forces, and access to shipping routes, the city may be set to change into the long-term.

Trade through South Australia's ports could increase if the Adelaide population suggestions proposed herein emerge, and Port Adelaide can be transformed into a regional hub.

9 | How Trade & People will Move

Without transformational change in South Australia's transport sector, rising populations would lead to untenable congestion on the roads, and would drive demand for residential land through booms in the housing sector, as people struggle to find homes. Increased population would also inevitably result in increased trade demand, putting further pressure on the transport system and the ports.

Whilst in some ways these pressures start to mirror those of the bigger eastern cities, it is important to remember that even if the higher projections emerged, Adelaide would still be smaller than Melbourne is today in some 50 years. This gives some colour around the notion that Adelaide will be a more attractive place to live for many people.

Even if the low population long-term projections for Adelaide prove true, the city will face significant increased congestion on roads and to a lesser extent, on rail. Currently, Adelaide has relatively little congestion issues compared to the likes of Melbourne and Sydney.

However, the infrastructure is poor at many points across the transport network, and whilst working currently, as the population increases, it is possible that the transport network would buckle under the pressure by 2070 without introduction of major transformational projects. The future requires a rethink on how the entire network will work.

The transport of freight will need to be carried out more by rail than it currently is, which will require a significant improvement in distribution centres and the rail lines to

and from the ports. This is in contrast to the current governmental stance which seems to be to allow rail to decline whilst investing in road freight transport.

There will also need to be a radical change in how road trucking operates. This is likely to come in the shape of automated trucking and rail systems to reduce inefficiencies and introduce a greater spread of operating hours throughout the day.

In terms of road congestion, self-driven cars could be banned from Adelaide's city centre streets in the future. Instead, autonomous cars and a much-improved public transport system could replace these. Automated ride-share cars and buses could roam the streets and will be hailed by a sensor.

Goods vehicles in the city might also be automated, eliminating sporadic stopping and parking. South Australian passenger rail might be retrofitted entirely for autonomous trains.

Shipping servicing the ports are also likely to be automated in the long term, whilst the ports themselves are transformed into tighter operational arenas and be highly technologically advanced.

For auto terminals, these could be fed by automated ships handling automated cars, buses and other transport related plant that will have almost zero dwell time and drive themselves to their dealers, or possibly even directly to their new owners.

Adelaide Airport will continue to expand under increasing visitation and supporting the larger local population and investment. This will likely drive a need for more land close to the city and put more pressure on industries located close to them to relocate and free up land, including the ports potentially.





10 | Environment & Energy

It is likely that by 2030, the majority of South Australia's energy needs will be met by renewable energies, solar and wind power in particular.

This will almost certainly not be enough to halt localised effects of climate change, and the city could be forced to create a new defence line against flooding, including flood barriers and sacrificial zones around the waterfronts.

The effects of climate change could be a major driver in how the ports work as they potentially lose land and/or be required to elevate or relocate elsewhere. Customers and stakeholders identified this as a key concern for the future of the ports across all areas of the state.

Ongoing consideration of asset exposure to climate variables such as sea level rise, increased and prolonged heat and ocean acidification, for instance, must be made to ensure that the growing maintenance and repair costs to existing infrastructure as a result of natural occurrences can be met. In some instances, it may be more appropriate to build new infrastructure to suit the changed environment.



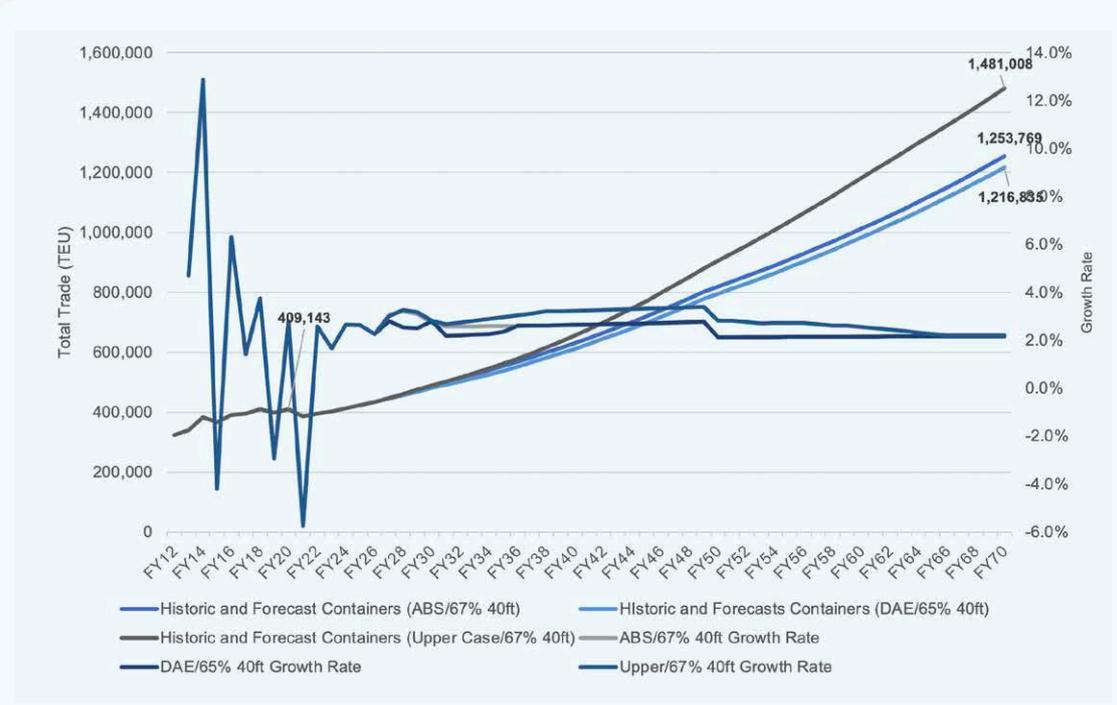
11 | South Australian Container Trade Forecasts

The vast majority of containerised trade passes through Port Adelaide, with only negligible volumes of containers through Port Pirie / Port Lincoln.

Predominant containerised exports include the export of fortified and unfortified wine, hay & fodder and cereal grain and pulses, whilst imports mainly include consumer products, along with manufacturing goods and some

construction-based goods. Recent strong import volumes can be attributed to solar farm projects, which are expected to continue for the next few years.

Figure 5 – Base Containerised Trade Forecast to 2070 (Black Quay & FPH 2020)



11 South Australian Container Trade Forecasts Cont.

Whilst some sectors may experience further containerisation, it is expected that the majority of the shift towards containerisation has already occurred and therefore growth will be more closely linked to GSP and population related factors.

Containerised trade through Flinders Ports is expected to rise from 410,000 TEUs in FY20 to approximately 1,254,000 TEUs in FY70. This could increase marginally to 1,481,000 TEU's where upper case population forecasts are realised (influencing imports predominately).

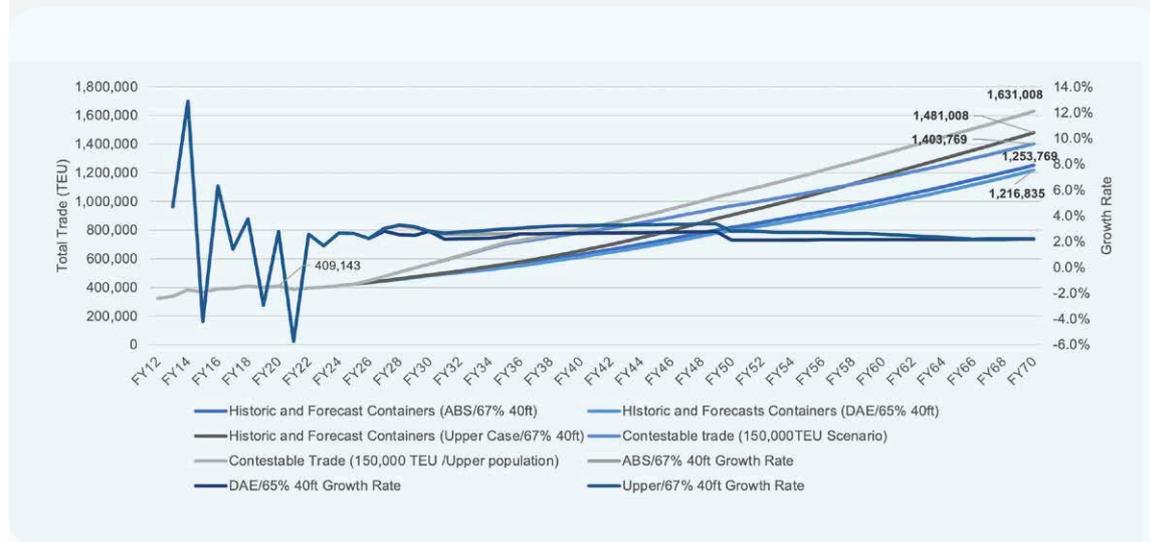
The baseline containerised trade has been forecast to 2070 and is illustrated below.

At the lower end, a shift in contestable trade could raise Port Adelaide trade by a minimum of 150,000 TEU per year. However, in theory, this could increase to as much as 2 million TEU, depending on the amount of services captured.

Alongside investment from FPH, a change will also require South Australian and Federal Government investment in rail improvements in the Adelaide Hills. This could require between \$0.5billion and \$3billion.

The figure below provides the lower end only, but also combines this with the proposed alternative SA population forecast for a true upper limit container trade scenario. This results in a 2070 container trade of approximately 1.63 million TEU.

Figure 6 Flinders Ports Ultimate Container Trade Scenario (Black Quay, 2020)



Additionally, multi governmental and third-party investments and buy ins will be required, including but not necessarily limited to:

- Renewal SA and DIT (Influence in terms of landside access to the port and associated logistics land planning)

- Adjacent land holder buy-ins (several key parties)
- Wider Government transport planning and support



12 | Non-Containerised Trade

Combined bulk trade in Australia is predominantly export based. This is due to the fact that Australia is the world's leading exporter of iron ore (approximately 57% of the global market) and the world's second largest exporter of coal (approximately 30% of the global market). This trade is almost entirely focused on the east and west coasts (east for coal and west for iron ore). From a liquid bulk perspective, with now only limited oil refinery capability, Australia relies heavily on oil imports.

12.1 Dry Bulk

At a state level, grain and seed exports dominate the South Australian dry bulk market; however, imports and exports of other non-grain dry bulk is generally balanced (overall).

Other prominent dry bulk exports include limestone (Klein Point), mineral sands (Port Adelaide and Thevenard), gypsum (Thevenard), cement/clinker (Adelaide), and copper (Adelaide).

In terms of dry bulk imports, these generally include cement/clinker (Port Adelaide) which tends to be similar to export volumes, fertilizers (Port Adelaide and Port Lincoln), limestone (receipt of Klein Point exports in Adelaide), soda ash (Adelaide), sulphur (Adelaide), and concentrates and paragoethite (Port Pirie).

With the predominance of grain exports, the South Australian dry bulk market will continue to rely heavily on the health and demand of the grain sector.

The South Australian grain sector is in fact facing a challenging future. It is anticipated that climate change will present increasing risks to crop yields. Whilst technologies such as genetic modification and drought resistant crops may well assist in balancing this risk, the magnitude of the risk itself along with the lack of new farm areas may well lead to plateauing of South Australian grain and seed trade, and possibly even see it reducing into the longer term.

However, the continual growth of global food demand, will likely drive towards continual market growth and a likely increasing reliance on technology to help meet the challenges.

Export growths of limestone, gypsum and cement is likely to remain modest.



12 Non-Containerised Trade Cont.

Mineral sand exports may see longer term growth as global demand is expected to increase over time. Copper exports are also expected to grow by the medium term due to increased demand associated with renewable energy technologies.

The minerals sector is understood to currently account for more than 50% of South Australian commodity exports and it is envisaged that this will increase. Uranium exports are also expected to increase considerably in the short to medium term, given that South Australia accounts for 80% of Australia's identified resources.

Bulk imports to South Australia tend to be construction market or process related, with the exception of fertilizers, which relate to servicing the agriculture market. Therefore, imports rely heavily on the state of the economy (as its tied to construction demand) as well as also relying on the health of the grain and wider agriculture industry.

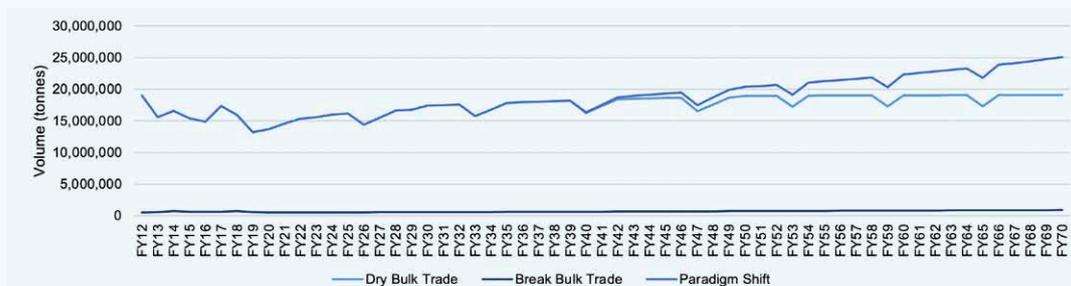
Perhaps the largest potential disruptor to South Australian dry bulk trade is iron ore.

With 14 billion tonnes of identified iron ore resources, South Australia could become one of the largest iron ore export districts in Australia. The main drivers to this not having eventuated as yet is a mix of relatively poor iron ore commodity prices on the world market and the relatively high cost of extraction in South Australia. It is not so much the cost of accessing the ore, but more the cost of transport and developing suitable transport related infrastructure.

Should the market reach a level of appropriate stabilisation and a workable supply chain put in place, there is potential for a sizeable export industry to develop in South Australia. The timing of this is difficult to determine given the reliance on the market itself.

Total baseline dry and break-bulk trade has been forecast to 2070 and has been illustrated below. It should be noted that this forecast includes FPH's expectation of Covid-19 pandemic impacts in the shorter term (to 2025).

Figure 7 Total Dry Bulk Trade Forecast to 2070 (Black Quay & FPH, 2020)





12.2

Liquid Bulk

The majority of liquid bulk through South Australia consists of imported fuel, oil and gas products. For this reason, it is expected that these will drive the future vessel fleet and thus is the focus of liquid bulk trade, rather than non-fuel products.

Port Adelaide is a key hub for South Australian fuel imports, and therefore the capability of Port Adelaide to accommodate fuel ships is of paramount importance to the security of the State.

It is believed that the remaining Australian oil refineries will close down within the next decade as their cost effectiveness continues to reduce against competition from Asian refined product imports.

Whilst current refined product imports to South Australia are relatively stable, it is likely that future trade trends will match those of the global industry, although likely later in time.

As the world is forced towards reduction and potential elimination of fossil fuel use, this would

include a reduction in oil related imports to South Australia at some stage, or at least a stabilisation of trade volumes.

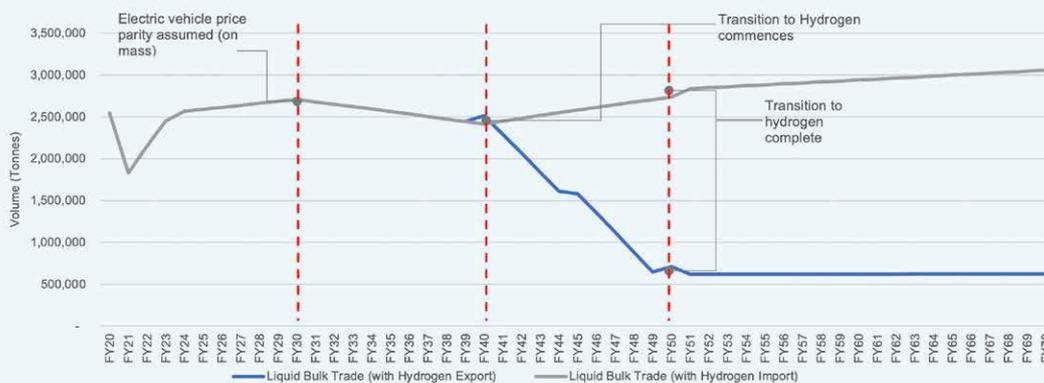
Petroleum and gas trade forecasting has been informed by discussions with industry, as well as future state analysis of global fuels and an expectation of a move towards sustainable fuels.

Assumptions in the model assume that Australia takes a similar path as other countries, such as the United Kingdom, in ultimately phasing out the use of diesel fuel and motor spirit in favour of more sustainable alternatives.

It is also recognised that the South Australian Government appears committed to becoming a producer and net exporter of hydrogen in the short to medium-term, as outlined in South Australia's Hydrogen Action Plan (September 2019). It is understood that South Australia has already undertaken early projects in this regard, with the aim to become a net exporter in the late 2020's to 2030's, however there is significant study yet to occur to quantify this volume.

The resulting forecasts to 2070 are depicted in the following figure.

Figure 8 Total Liquid Bulk Trade Forecast to 2070 (Black Quay & FPH, 2020)





12 Non-Containerised Trade Cont.

12.3

Renewable Energy Disruption

As the world is pushed towards a reduced reliance on fossil fuels, it is believed that the liquid bulk sector, the crude oil and refined product markets in particular, will see significant reduction in demand, starting by the medium-term and continuing into the long-term at increasing rates.

Renewables will likely create entirely new localised trading networks and do this at the expense of global oil trading. This will see a shift away from large scale crude exports and refined oil product imports to more regional power production based on renewables. Countries will focus on producing their own electrical power whilst their demand for shipped liquid bulk imports will decrease ever more substantially over time.

Australia is potentially well placed naturally to make use of renewable energy sources such as the sun for solar power generation, however, current political direction will need to change, and major investment will be required if this is to materialise in good time.



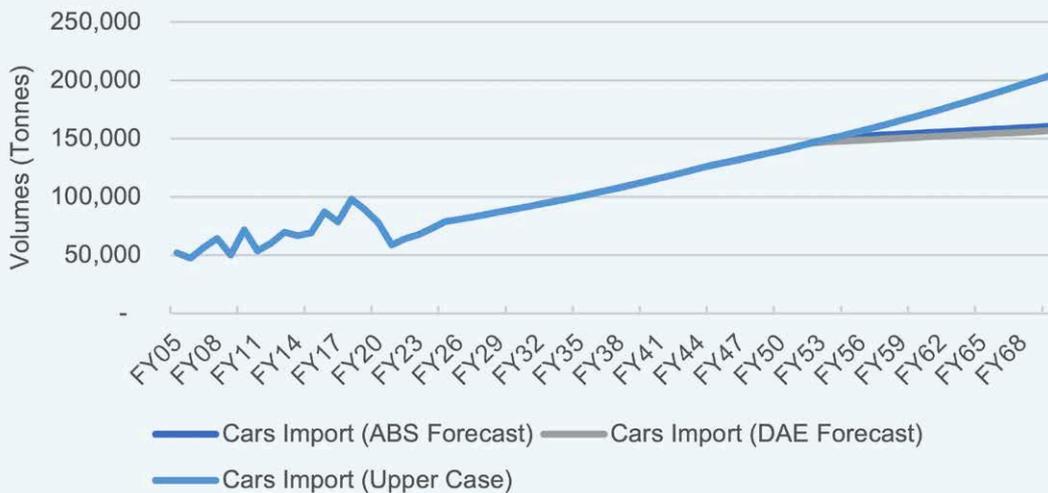
13 | Auto Trade Forecasts

Since the end of the last decade, all domestic car manufacturing in Australia has ceased, turning the country into a sole importer of automotive vehicles.

With the recent elimination of car manufacturing in South Australia, car imports increased considerably in recent years to reflect the State's new import-only status.

Going forward it is expected that car imports will closely match new car sales in South Australia.

Figure 9 Automotive Import Forecast (Black Quay & FPH, 2020)



14 | South Australian Cruise Demand

14.1 South Australian Cruise Ship Visits

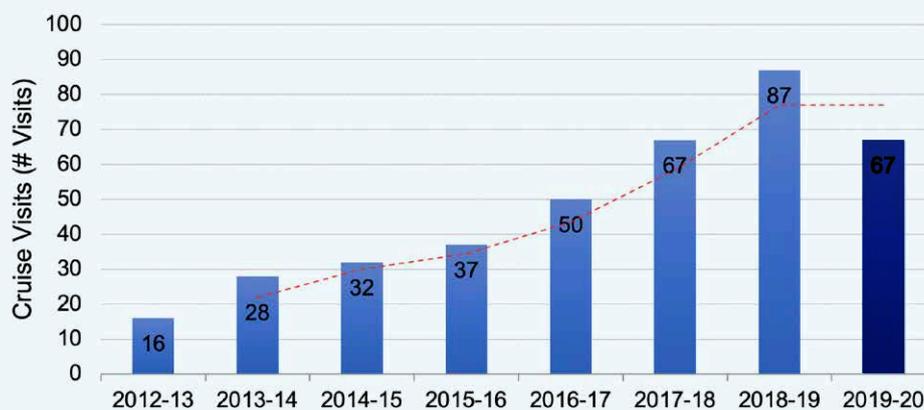
The Australian Cruise Industry included a total of 87 cruise ship visits to South Australian ports during the 2018/19 season, bringing over 185,000 passengers and crew to the State. This represented a 34% increase in ship numbers and a 19% increase in passenger and crew visitation from the previous year.

The economic contribution to the State in the same year was estimated at \$145 million.

The figure below illustrates that since the 2012/13 cruise season, the growth in the number of ships visiting South Australia has been reasonably consistent, rising from 16 to 87 cruise ship visits per season. This means that there has been a near 450% increase in cruise ship visits to South Australia in only 7 years, with growth accelerating up to 2019 in particular, before a near decimation in Q1 2020.

This is graphed in order to illustrate growth and the growing importance of this customer segment.

Figure 10 South Australian Cruise Ship Visits, 2012 to 2019 (Black Quay, 2020)



Note: The FY20 bookings were at 79, prior to Covid19 impacts which eliminated cruise operations in March 2020 and likely beyond, at which point 67 cruise vessels had already visited in FY20.



14.2 Future Visitation Forecasts

A preliminary visitation forecast was developed for South Australian cruises, which is provided in Figure 11.

This is based on a continuing decline next year as a result of global geo-political uncertainty and related economic conditions, as well as falls in demand as a result of the recent fires (particularly on Kangaroo Island) and the Covid19 pandemic, which mean that the market will take time to fully recover.

Figure 11 Proposed SA Cruise Visits to 2070 (Black Quay, 2020)





14 South Australian Cruise Demand Cont.

This would represent a 52% increase between 2020 and 2030 (excluding the effects of Covid19). The Australian industry has been growing at approximately 20% per annum, and it is expected that this will continue for some time, dependent upon Covid-19.

If we then consider an approximate split of vessels between Adelaide, Port Lincoln and Wallaroo and assuming a marginal share increase at Adelaide, we can see the forecast in the following table.

If a full year is assumed for cruise visitation in 2030, this equates to 2 or 3 vessels per week, with this doubling by 2070.

Figure 12 Proposed Port Split to 2070 (Black Quay, 2020)

	Adel. Visits	% of SA Visits	Port Lincoln Visits	% of SA Visits	W'aroo Visits	% of SA Visits	Kangaroo Island Visits	% of SA Visits
2020	51	46%	20	18%	1	1%	38	35%
2030	57	43%	27	20%	3	2%	47	35%
2040	66	41%	36	22%	3	2%	57	35%
2050	72	39%	44	24%	4	2%	65	35%
2060	78	37%	55	26%	4	2%	74	35%
2070	81	35%	64	28%	5	2%	81	35%



15 | Long-Term Adelaide Container Fleet

15.1

South Australian Maximum Vessel Expectation

At the time of the study, the average container vessel to visit Port Adelaide is approximately 5,240 TEU, with the maximum sized vessel being the 'CMA CGM Ural' at a nominal 10,600 TEU capacity in 2020.

Cascading and other effects anticipated globally are likely to increase the upper end of the South Australian fleet, and certainly across the wider Australian fleet (given both will likely continue to be intrinsically linked). The average vessel size is also expected to increase accordingly.

Given global and regional trends, it is difficult to predict that South Australia will not see increases in current fleet sizes (as a result of cascading to all other routes and eventually to the North Asian and South east Asian – Australian services).

Adelaide's future container fleet will be a result of one of two scenarios, with a third alternative option:

- Port Adelaide fleet continues to mirror the Australian fleet as governed by Port of Melbourne

- Port Adelaide becomes a central hub for southern containers, bypassing Port of Melbourne, and in turn, ship size will increase beyond that predicted for Port of Melbourne (or Melbourne manages to increase ship size)
- Or alternatively, container ship sizes will stabilise as localised instant manufacturing takes hold, and bulk vessel sizes increase.

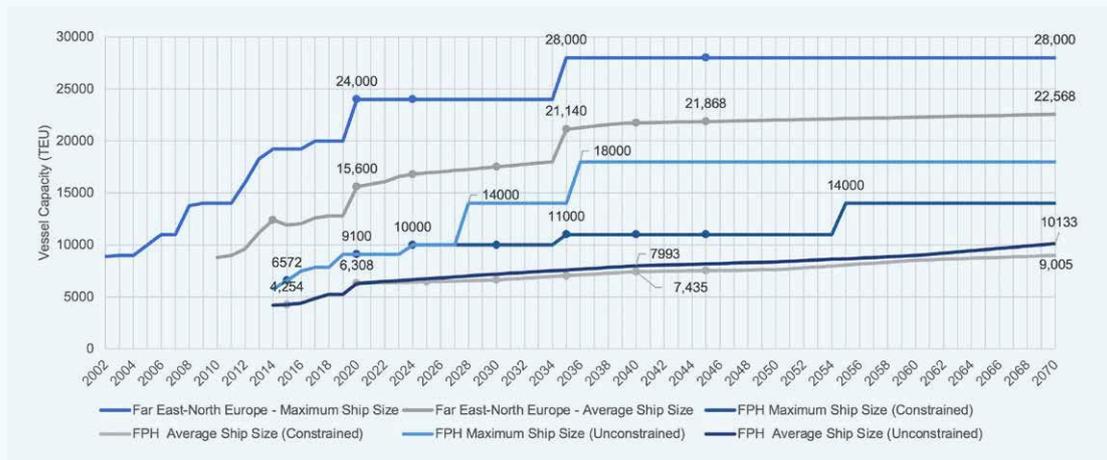
By 2050 there could be three calls per week by vessels beyond the current Port Adelaide maximum size. Between 2050 and 2070, the ability to upsize services will be limited as most routes will be operating close to their largest possible vessels.

It is expected that this will include a small number of size specific 14,000 TEU vessels operating on the primary Australian services which will be limited by the Port of Melbourne. These are likely to represent only 3% of the fleet, but a significant component of overall service capacity.



15 Long-Term Adelaide Container Fleet Cont.

Figure 13 Potential Future Adelaide Maximum Container Vessel Sizes (Black Quay, 2020)



Should Port Adelaide become a central hub for southern containers, with services bypassing the limited Port of Melbourne, there is potential for larger vessels to be deployed to Australia, a higher exchange in Port Adelaide and transshipment to East Coast ports on smaller vessels. In this instance, it is proposed that the maximum vessel to visit Port Adelaide could increase to 18,000 TEU in the longer term, if not before.

These maximum vessel size assumptions and estimated timing of their introduction are illustrated in Figure 13.



16 | Dry Bulk Fleet

It is estimated that there will be no substantial increase in the largest bulk carrier size in the short to medium term as the industry focuses on restoring profitable utilisation levels through increased scrapping activities.

In the longer term, even where dry bulk utilisation is restored, it is believed that it is unlikely that a significant increase in the global maximum bulk carrier will be experienced. This is predominately because of the limited number of global ports that can accept the current global maximum, let alone any future increases in maximum size.

At a local level, the average dry bulk carrier at Flinders Ports has declined across the last 6 years from 14,899GRT in FY14 to 12,038GRT in FY19.

In terms of maximum size vessel, this has been driven by grain vessels and has similarly experienced a slight decline between FY14 and FY19 from 45,999GRT to 44,425GRT. This represents a slight decline in Panamax class size.

As a relatively minor and diversified trade type at Flinders Ports, it is reasonable to expect that under a future scenario, a modest growth in the average and maximum vessel size would be experienced back to, or slightly above, FY14 levels, however it is expected that vessels would remain in the Panamax class size.

This would largely be due to the diversified nature of the cargo and its origin/destination requiring Panamax size vessels for economies of scale.

Given this, it is expected that the average vessel in the medium term will be around 25,000DWT (approximately 16,000 GRT) and in the longer term around 30,000DWT (approximately 18,000 GRT). The maximum vessel is expected to be up to 88,000 DWT.

On a port-specific basis, the projected vessel size for each trade type is provided in Figure 14. It should be noted that for all ports, this forecast is based on an 'unconstrained' environment. That is, no barriers to accessibility by these vessels at each port exist in theory.

For all ports handling grain, the general unconstrained expectation is that grain vessels will remain at approximately 229m LOA in the short to medium term, with a push to larger Panamax sizes in the longer term of 240m. Whilst potential may exist for Capesize vessels to be introduced by 2070, this is considered unlikely for grain (as explained in the section above).

Comments on other dry bulk vessels are as follows:

- Cement – Cement vessels to Inner Harbour largely relate to Adabri export activities, although also call at Osborne and Berth 25. Vessel size is likely to remain constant for some time but could ultimately grow to a larger Panamax of 240m LOA in an unconstrained scenario.
- Fertiliser – The forecast fertiliser vessel is likely to remain constant for some time but could eventually grow in line with grain. Hazardous cargo could drive new builds if demand is sufficient. Should this emerge, it could match grain vessel sizes of 240m.
- Limestone – Limestone is carried by one vessel (Accolade II) only, which is approximately 109m LOA and 23m beam. It is understood that the Accolade has recently undergone refurbishment to allow

16 Dry Bulk Fleet Cont.

it to continue operations into the future. Based on this and the understanding that Adbri have no existing intentions to change operations and/or production levels, there is not anticipated to be any change in the vessel size accessing either Klein Point or Port Adelaide Inner Harbour.

- Other Dry Bulk – As with cement vessels, other forecast dry bulk vessels will likely remain constant for some time but could eventually grow in line with grain. Hazardous cargo could drive new builds if demand is sufficient. Should this emerge, it

could eventuate in vessel sizes of 240m in an unconstrained scenario.

- General Cargo – Vessel size is expected to remain similar to current vessels as trade is expected to be steady into the longer term. These could eventually upgrade to 225m as the existing fleet is scrapped.

This unconstrained forecast of dry bulk vessels is summarised below.

Figure 14 Flinders Ports Projected Dry Bulk & General Cargo Vessels (by Port - Unconstrained) (LOA)

	Type	Short Term	Medium Term	Long Term
Outer Harbor	Grain	229m	229m to 240m	240m to 289m
Inner Harbour	General Cargo	200m	200m	200-225m
	Cement	200 to 225m	225m to 240m	240m
	Grain	229m	229m to 240m	240m to 289m
	Other	200 to 225m	225m to 240m	240m
Port Lincoln	Grain	225 to 229m	229m to 240m	240m to 289m
	Fertiliser	200 to 225m	225m to 240m	240m
Port Pirie	Concentrates	200 to 225m	225m to 240m	240m
	Other	200 to 225m	225m to 240m	240m
	General Cargo	200m	200m	200-225m
Wallaroo	Grain	229m	229m to 240m	240m to 289m
Klein Point	Limestone	109m	109m	109m
Thevenard	Grain	229m	229m to 240m	240m to 289m
	Other	200 to 225m	225m to 240m	240m
Port Giles	Grain	229m	229m to 240m	240m to 289m

17 | Liquid Bulk Fleet

The maximum global tanker sizes were actually achieved in the 1970's, and current vessel sizes are below those previously experienced.

It is expected that this trend will remain. The industry has set a precedent over 30 years ago for the largest crude carriers and whilst these vessels were utilised, they were not replaced with vessels of that scale.

This is largely representative of the pressures on the industry to achieve economies of scale whilst maintaining accessibility to global ports, and it is unlikely that global maximum vessels will surpass those milestones previously achieved.

That said, and whilst there may not be a foreseeable upward change in the maximum global tanker size, there is expected to be a modest upward shift in the average liquid bulk vessel sizes in crude, product and chemical vessel segments over the short to medium term.

At Flinders Ports, for petroleum vessels, both maximum and average vessel have remained unchanged over the period FY14-FY19. For

general tankers, the maximum vessel size has remained unchanged, however average vessel size has decreased by 26% over the period FY14-FY19. Going forward, there is unlikely to be any change in the short term from the current MR1 vessels.

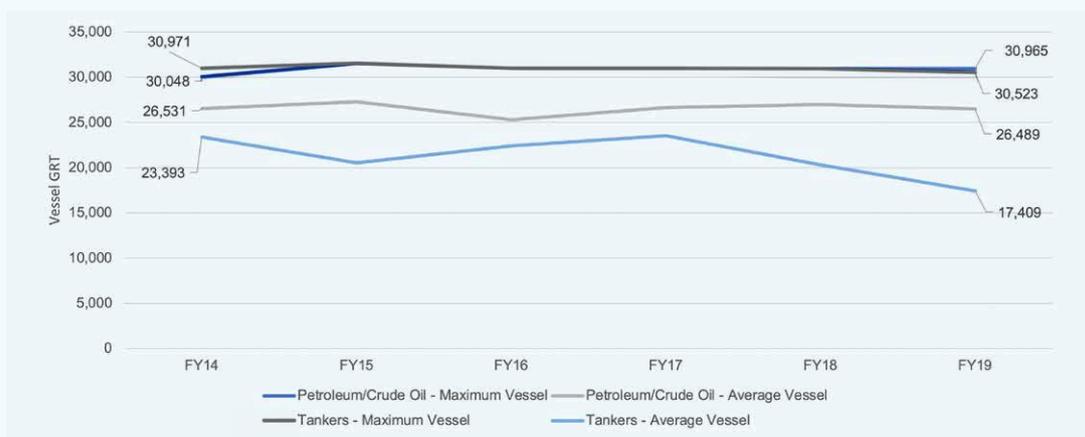
In part, this is expected to be due to the nature of trade constituting shorter sea hauls as well as a need to maintain frequent smaller shipments, rather than larger less frequent ones. For petroleum vessels, this is also due to expected decreasing task over time.

There is always potential for this to increase to MR2 but the size will be similar if not the same, albeit with greater draft.

There is some potential for length increase to 225m in the longer term, but the uncertain market in relation to hydrogen makes this impossible to predict with any certainty.

There may, however, be a slight increase in the average vessel size to levels previously seen (for general tankers).

Figure 15 Average & Maximum Liquid Bulk Carrier GRT at Flinders Ports FY14-FY19 (Black Quay, 2020)





17 Liquid Bulk Fleet Cont.

On a port-specific basis, the projected vessel size for each liquid bulk trade type is provided below. It should be noted that as for the dry bulk fleet, for all ports, this forecast is based on an 'unconstrained' environment. That is, no barriers to accessibility by these vessels at each port exist.

Figure 16 Flinders Ports Projected Liquid Bulk Vessels (by Port - Unconstrained)

	Type	Short Term (LOA)	Medium Term (LOA)	Long Term (LOA)
Outer Harbor	Petroleum	189m	189m to 225m	189m to 225m
Inner Harbour	Petroleum	189m	189m to 225m	189m to 225m
	Acids and Other	170m	185m	185m
Port Pirie	Acids and Other	180m	185m	185m
Kirton Point	Petroleum	189m	189m to 225m	189m to 225m

For all petroleum vessels, there is forecast growth in vessels from an MR1 to an MR2 and potential increase to LR1 in the longer term, depending on how the hydrogen market eventuates (and whether South Australia becomes a net importer, generator and/or exporter of hydrogen).

For acids and other liquid bulk, as is typical across most ports, this is carried on slightly smaller tankers (than petroleum). The current maximum is 170m LOA at Inner Harbour and 180m at Port Pirie in recent years.

Given the relatively small nature of this trade both now and forecast into the future, it is anticipated that there will be no significant increase in vessel size in the short term. In the medium to long term, the largest vessel in this category may increase to approximately 185m LOA (MR1), however it is expected that a good proportion of the fleet will remain smaller.



18 | Cruise Fleet

Whilst Flinders Ports are currently required to accommodate Oasis Class vessels (to varying extents), the likely limitation on the global fleet vessel length will go some way to ensuring that this doesn't change again, at least until the longer term.

Accordingly, it is likely that the current upper end Port Adelaide vessel could be amongst the world's largest, and this could occur within the next 5 to 10 years.

It would stand to reason then that it is not so much the berth size at Flinders Ports that will be the limiting factor, but ever increasingly it is berth availability that will drive capacity and perhaps trade limitations (taking current facility upgrades into account).

Should ports not keep up with cruise demand, the lines have a tendency to simply drop that call from their itinerary and this can happen quickly. Indeed, the same goes for home port scenarios, where vessels are relocated elsewhere if capacity

does not exist to accommodate them, or even if facilities are not up to standard (lack of efficiency etc).

What are also changing however are the smaller cruise vessels, used for expedition and adventure cruising. As the demand for this increases, some increase in the size of those vessels is expected, however there will likely be some limitation to this given that those vessels often need to be smaller to visit remote sites of interest.

Based upon the above, the projected maximum South Australian cruise vessels over the short, medium and longer terms are provided in the figure below.

Figure 17 Proposed SA Design Cruise Vessel (Black Quay, 2020)

	Vessel Size	LOA	Beam	Draft	Notes
Current	4,905 PAX	348m	41.2m	8.5m	Based upon the <i>Ovation of the Seas</i>
Short Term	4,905 PAX	348m	41.2m	8.5m	Based upon the <i>Ovation of the Seas</i>
Medium Term	5,400 PAX	362m	47m	9.1m	Based upon <i>Allure of the Seas</i>
Long Term	5,400 PAX	362m	47m	9.1m	Based upon <i>Symphony of the Seas</i>

19 | South Australian Car Carrier Fleet

It is expected that the future auto fleet calling at Flinders Ports will directly correspond with that of the world fleet in the short to medium-term.

However, in the longer term, it is expected that the transition to a more hub and spoke type arrangement for auto shipping, will see the maximum vessel remain around 265m (as opposed to a 300m longer term vessel for the global fleet).

As such, the maximum vessel expectations over time for South Australia are detailed in the figure below.

Figure 18 Proposed Flinders Ports Maximum Auto Design Vessel (Black Quay, 2020)

	Vessel Capacity	LOA	Beam	Draft	Notes
Current	8,500 CEU	265m	36.5m	11m	Based on the maximum dimensions across the fleet (not representative of one vessel)
Short Term	8,500 CEU	265m	36.5m	11m	Expect fleet to address short sea shipping and underutilisation and top end not to increase
Medium Term	9,000-10,000 CEU	265m	42m	13m	Expect any capacity gains to be achieved through increase in beam and increases in length within current industry maximums
Long Term	9,000-10,000 CEU	265m	42m	13m	No change



20 | Goals & Targets

FPH's approach to sustainability is one of a responsible and sustainable business through the themes of Environment, Social and Governance (ESG).

Weaving sustainability into all aspects of port development presents the opportunity to accelerate FPH's position as a sustainable port.

Over-arching trends that will influence the successful delivery of the Masterplan and which are discussed within this chapter are:

- Increasing focus, relevance and value of the United Nations Sustainable Development Goals (SDGs) and linking them to planning, reporting and future funding
- Advancing climate change solutions and the need to adapt, to decarbonise and to report progress
- The rising global financial market appetite for sustainable or 'impact' investments and the reducing tolerance of high-risk high carbon intensity assets, especially those reliant on fossil fuels
- Reduction in resources and production inputs, and advancements in energy technologies and the rapid conversion to renewable power
- Growing importance of social license to operate – by customers, by financiers and by the general public
- Depletion of environmental resources and the importance of preserving biodiversity
- The rising awareness of the role of natural ecosystems and biodiversity and our need to value and protect them.

One of the greatest opportunities is the transition to a lower carbon economy in which there is cheaper renewable power and more efficient supply chain logistics. The shipping industry must decarbonise to meet the International Maritime Organisation, and other global carbon targets, and ports have a key role to play.

Port infrastructure of tomorrow will need to be built to higher specifications of resilience and to achieve net-zero emissions. This is a sizeable challenge and need. The development of the Masterplan means that FPH is well placed to demonstrate how this can be done and to reap the benefits. It can also play an integral role in achieving good outcomes for coastal ecosystems and local communities by taking a holistic approach to its development planning.

Such an approach will place FPH in an advantageous position to attract funding from institutions seeking to decarbonise their portfolios, support action on climate change and to help achieve outcomes for sustainable development.

Multiple initiatives were identified as part of the masterplan relating to the environment and sustainability. These are outlined below.



20 Goals & Targets Cont.

20.1 Environmental & Sustainability Considerations

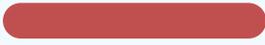
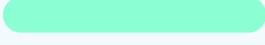
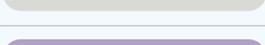
- Develop a sustainable development guide to be used as an overarching handbook during development planning, design, construction and procurement (Short Term)
- Position FPH's investment business cases to align with outcomes sought by funders seeking sustainable or social impact investments (Short Term)
- Monitor best practice in sustainable development and operations and aim to incorporate such practices into future planning (Short – Medium Term)
- Undertake port specific data gathering and assessments for critical assets estimated to be below sea allowance height (Short Term)
- Consider climate change impacts in relevant AMP reviews (Short - Medium Term)
- Develop an emissions reduction pathway and decarbonisation targets (Short Term)
- Develop a business case and feasibility study into electrification of the FACT terminal and other assets where applicable. (Short Term)
- Maintain dialogue with SA Government on export and hydrogen and involvement in supply chain (Short - Medium Term)
- At Asset Management Plan reviews and at end of life, consider the market availability of more fuel-efficient options. Using current AMPs and asset useful life, develop a pathway to an operating fleet run on renewable power. (Short Term)
- Conduct a feasibility study into the timing and viability of installing battery recharging stations on-site and converting light vehicle fleet to electric (Short Term)
- Develop a tiered charging system for vessels based on environmental impact (Short – Medium Term)
- Proactively prepare for larger vehicles to enter ports, before Government provides road access for them, for example improve road infrastructure, plan how to deal with the containers on a triple road train, and consider providing adequate space for large turning circles/swept paths (without the need for reversing). (Short – Medium Term)
- Ensure sustainable development principles relating to community are applied during port development planning and design (Short Term)
- Monitor developments in marine-based carbon projects and their potential to qualify as Australian Carbon Credit Units, thereby attracting a monetary and carbon value (Short – Medium Term)



21 | Masterplan Precinct Coding

The Masterplans are discussed and illustrated in the following sections of the report. All trade and associated precincts have been colour-coded to ensure consistency across the plans for the various ports and to assist the reader in understanding their direction.

The coding is as below:

Trade / Precinct	Colour Code
Containers	
Central Cargo (inc Auto & Combined)	
Bulk	
Project Specific Cargo	
Port Related/Logistics (FPH)	
Port Related/Logistics (Others)	
Green Buffer/Biodiversity/Offset	
Cruise (red for Adelaide)	
Future Precinct/Reserved	
Primary Port Access Road	
Port Rail	



22 | Port Adelaide Masterplan

The preferred option has been designed to flex and change in the future should it be required. While the plans in this document form the basis of a Masterplan, the plan will be reviewed and updated at 5 year intervals to ensure the changing port landscape continues to be considered.

The various analyses undertaken as part of the Masterplan process concluded that the FACT terminal will require an additional berth to handle the base case trade forecast by 2054. This is brought forward significantly where additional trade is captured across the berth.

Whilst this is some time away, it presents significant challenges for the FACT terminal. This is primarily due to the FACT terminal being effectively hemmed in. The terminal is limited by the RSAYS Marina to its south, and the Viterra terminal to the North (Berth 8).

This makes future planning of the terminal complex. Accordingly, options were developed that took this into account.

22.1 Potential Outer Harbor Option

A series of options to allow Adelaide to meet its long-term requirements were developed and considered.

The Outer Harbor masterplan incorporates an additional container berth in order to support FACT from a berth length perspective. Options remain viable for additional berths either as a southern extension or a 3rd container berth north of the grain terminal.

Consideration is required for the short-term potential for other berths to handle LNG (currently being explored by Flinders Ports), and it is essential that a sizable area of the port is reserved for future trade disruption (identified emerging trades that could impact this include LNG, hydrogen exports, offshore services or increased bulk as a result of localised manufacturing). Without this, there is a risk that the port could become critically restricted.

This includes accommodation of increased localised high-tech manufacturing if paradigm shifts in trading types were to occur for instance.

The Port Adelaide Masterplan and its phasing is illustrated right.

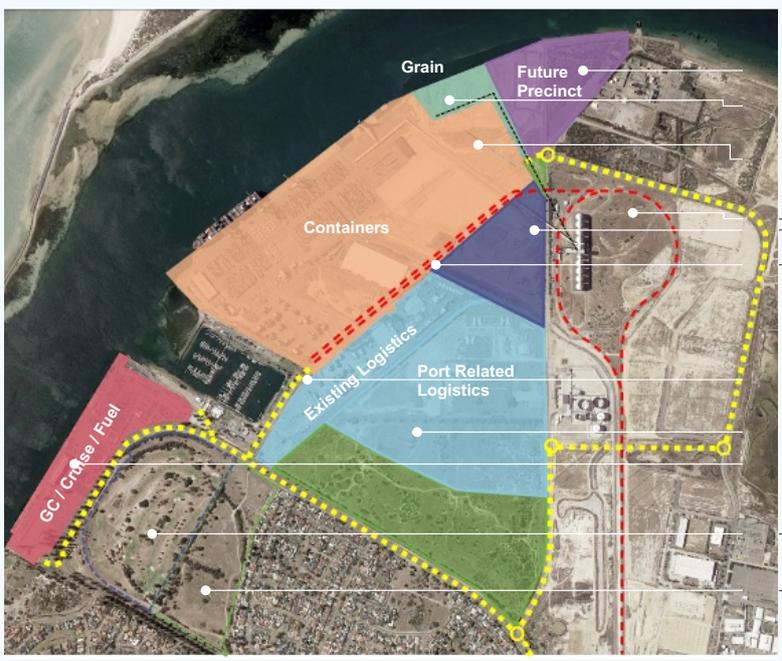


Figure 19 The Outer Harbor Masterplan - Potential Phase I



- Strategic purchase as part of Berth 9 & 10 precinct. Future Terminal to absorb new trades (including potential shift in manufacturing materials or new fuels)
- New primary port access road & intersection developed in conjunction with proposed Govt. road initiatives (see below)
- Grain conveyor raised (7.5m min) to allow underflow of landside transport to container terminal
- Reserved for future FPH Port Logistics Precinct & Offices
- New Berth 5 extension to cater for near term fleet needs (length and structure currently being determined through follow on study)
- Future external port logistics precinct and buffer (by others)
- New roadworks (by Govt) redirecting some port traffic to Mersey Rd North via rail grade separation
- Future green buffer developed as part of external port logistics precinct (by others)

Figure 20 The Outer Harbor Masterplan - Potential Phase II



- Remaining 9&10 precinct used to accommodate new trades where feasible and/or as back up land for sea level rise loss
- Option to relocate new grain terminal, relocated from Berth 8 and new conveyor aligned to Viterra Silos.
- New container terminal land backing to support Berth 8 container operations or used for additional logistics operations
- Rail loop agreement with Viterra to Berth 9
- FPH logistics precinct constructed over old rail alignment
- New Rail Spur/s (to accommodate full length trains)
- Coghlan Rd entrance closed or reorientated to avoid conflict with new rail alignment. Further options relating to improved connectivity of precincts are also to be considered.
- External port logistics precinct and green buffer developed by RSA and others (customers to be port related only). May include secondary port access point
- Cruise terminal developed, auto trade consolidated to east and west of precinct 1 to 4, parking addressed (would occur sooner than Phase II should need arise)
- Potential purchase of North Haven Golf Course, developed as port logistics precinct and green buffer.



22 Port Adelaide Masterplan Cont.

22.2 Inner Harbour Plans

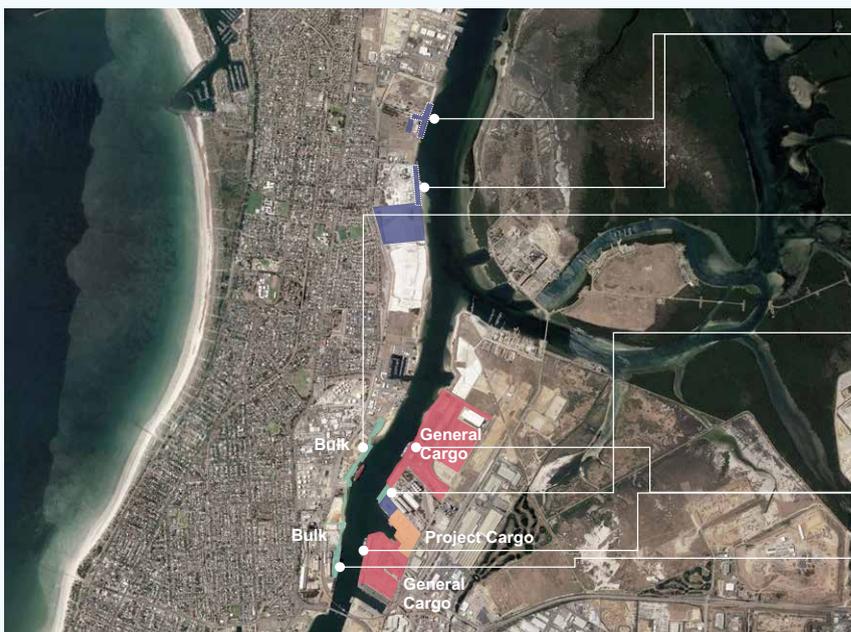
Planning of the Adelaide Inner Harbour into the long-term included development of multiple options in their own right, over and above the options relating to the Outer Harbor.

In essence, it was recognised that the long-term options for the Inner Harbour are limited due to its spatial and physical constraints. It was also recognised that the various competitive encroachments in the area are likely to result in increased demand for the land for non-port related uses out to 2070.

Additionally, the ability to dredge within the Inner Harbour to provide full unconstrained access for future vessels would be problematic and the existing trades, for various reasons were anticipated to manage operations within the current restrictions.

This resulted in a preferred option to consolidate the majority of Inner Harbour trade along the eastern side of the Port Adelaide river, including relocation of Osborne precinct trade, and Berths' M, N, H and K remaining in place, dependant on the continued viability of the terminals for the various tenants. The Inner Harbour plan is illustrated below.

Figure 21 Preferred Option – Port Adelaide Inner Harbour



General cargo trade at Osborne redirected to Inner Harbour East precinct subject to Business Case. Alternative use for land and asset sought around potential high-tech trade.

IH petroleum operations where parcel sizes remain small and IH operations remain feasible (dependent on future hydrogen scenario). Petroleum trade consolidated at OH4 when IH operations become unfeasible from accessibility perspective.

Grain operations remain in Inner Harbour whilst partial loading is still a feasible option, with top up at Outer Harbor. Grain operations consolidated at Outer Harbor when accessibility constraints become unfeasible.

Berths 18-20 and Berth 29 to remain common user facilities

IH cement and limestone operations continue as is (subject to local manufacturing continuing)

22.3

What Happens Beyond 2070?

In the interests of entirely future proofing Port Adelaide, there will be a need to establish a new port, however this need sits beyond the study timeframe (2070), and likely beyond the existing lease timeframe (2100).

The strategic planning process uncovered high level options for a potential new port. Whilst these were discounted as 2070 Masterplan options, it is possible that the highest scoring new port options could present a possible option for a new port in the much longer term.

This included the established of a new port with a large footprint in order to generate suitable return on investment. Indicatively, this option consisted of an offshore port with a 30-50ha general cargo and energy terminal with a berth line of approximately 1,700m, and a 50ha container terminal(s) with 1,740m of berth line.

Various locations in the Adelaide region were considered at a high-level, however determination of an optimal location would require more detailed study, unnecessary as part of this Masterplan.





23 | Port Lincoln Masterplan

As a strategic deep port, Port Lincoln has potential to handle future trade types (such as Hydrogen export) as well as increases in cruise services. Whilst it does not require any substantial investments, it is challenged by limited landside capacity and poor traffic arrangements. Its largest challenge is to monitor and, as appropriate, further mitigate the safety risks associated with interactions of both recreational and commercial traffic.

Therefore, identified Port Lincoln options focussed on various arrangements to improve these aspects as follows:

- improving the cruise experience
- reducing disruptions to bulk loading during cruise visitation
- maintaining safety of landside movements, including interactions with public use.

The preferred option involves the relocation of cruise to inner berths on the western (township) face to provide for an improved cruise transfer experience and reduce disruption to grain operations. Subject to co-funding from Tourism SA and/or Council this may involve the acquisition, upgrade and use of the existing DIT berth.

On the landside, the preferred option included maintaining the existing mixed-use access from London Street. However, the option supports better definition and separation of Parnkalla Trail pedestrian traffic.

Ideally this would be relocated outside of the port zone and thus it has been recommended to explore the potential of this with local council. However, where this cannot be achieved, it is recommended that this is confined to a corridor along the north of the site leading to a designated crossing point.

The Port Lincoln Masterplan and Phases are illustrated right.



Figure 22 Port Lincoln Masterplan – Phase I



Recreational access zone. Signage measures to enforce recreational parking in this zone only

Formalised trail crossing of port access road. Accessible elevated crossing to be investigated. Where not feasible, at grade crossing to be managed

Establishment of Parnkalla walking trail buffer with physical delineation from port trafficable area. Establishment of green buffer zone where possible to increase trail experience, increase visual amenity and safety.

Figure 23 Port Lincoln Masterplan – Phase II



Minor berth pocket dredging to facilitate cruise berthing at Berths 2/3

Potential double-up berth for cruise. Subject to Business Case and co-funding by third parties

Cruise operations (cruise days only)
Landside zone restricted for cruise-related traffic at transfer times. Fishing-related traffic to utilise wharf apron.

Recreation vehicles restricted to eastern carpark on cruise days.



24 | Klein Point Masterplan

Future trade at Klein Point has been projected to be stable at 1.85 million tonnes per annum, with no forecast growth over the Masterplan period. This trade is directly linked to the longevity of the quarry, which is not anticipated to be exhausted before 2070.

The port faces severe limitations in terms of accessibility, lack of backing land and lack of rail.

However, despite this, Klein Point operates satisfactorily for the existing user who has recently invested in continuing the current vessel operation, and has not expressed any requirement to modify the existing arrangement.

Given the severe limitations and high utilisation, there is little opportunity to relocate trade to

Klein Point. However, with the heavy utilisation of the berth by the current user and proximity to the limestone quarry, it was also determined that there is little opportunity to relocate existing trade away from Klein Point.

Therefore, the preferred option for Klein Point is to continue as normal, on the basis that the operations of the quarry continue as planned.

The preferred option is presented right.

Figure 24 Preferred Option – Klein Point



Where limestone quarry and shipping operations cease, asset closure to be explored.

Recreational access across structure to be maintained in accordance with Recreational Access Agreement



25 | Wallaroo Masterplan

Wallaroo is solely used to export grain from Viterra’s neighbouring storage facilities. Given its depth limitations, vessels are subject to part-loading in Wallaroo and then undertaking vessel ‘top-up’ at other Flinders Ports locations.

Forecast maintenance costs over the next 20 years is significantly higher than Flinders Ports’ other regional ports. Future trade projections for Wallaroo indicate an increase in grain trade from approximately 600,000 tonnes per annum to 920,000 tonnes per annum in 2070. This may be also accompanied by an increase in cruise visitation to 5 vessels per annum by 2070.

Given existing limitations to draft and high cost of maintenance, there is little opportunity

to entice new trade to Wallaroo. Even where dredging was undertaken this would be unlikely to attract additional trade. Options identified for Wallaroo involved the retention of existing trade with current restrictions, or retention of trade with deepening to allow for full accessibility. Given the lack of ability to attract additional trade through dredging and the existing expenditure profile, the preferred option was to maintain the current facility without any capital dredging.

Figure 25 Wallaroo Masterplan



Berth structure to be maintained in accordance with requirements of Port Operating Agreement.

Waterside accessibility to be maintained at current levels.

Restricted recreational access across structure to be maintained in accordance with Recreational Access Agreement

26 | Thevenard Masterplan

Thevenard is restricted by water depth and limited ship loader capacity. Thevenard tenants have proposed a required daily draft of 11.3m to facilitate increased parcel size and competitiveness. This would require dredging by 1.7m.

Trade for Thevenard is forecast from a total of 2.8 million tonnes per annum to 3.2 million tonnes per annum in 2070, where the loader allows this. A review of the current loader (owned by Viteria) suggested that it would likely require replacement or significant rehabilitation in order to consistently meet these throughput levels.

Geographically, Thevenard is isolated from other ports and adjacent to Gypsum, Salt and Mineral Sands operations. Given its geographic isolation, it would be challenging to relocate low cost commodities there without losing trade. Conversely, there is unlikely to be ability or logic to consolidate other trades at Thevenard given its location.

Options identified for Thevenard were to continue operations without improving accessibility, or improve accessibility through capital dredging works.

It was identified that where improved accessibility occurred, this provided potential for a trade upside, particularly in relation to Gypsum volumes and potential kaolin trade. However, any increase to trade would also need to be accompanied with upgrades to the loader (or replacement) as mentioned. The preferred option for Thevenard was to provide improved accessibility through capital dredging works of both channel and berth pocket. It was expected that this would be subject to a Business Case and potentially be co-funded by port user(s).

Figure 26 Thevenard Masterplan



Increased accessibility to be facilitated through dredging campaign for berths and approach channel in conjunction with upgrades to or replacement of shiploader and conveyor (by others).

Restricted recreational access across structure to be maintained in accordance with Recreational Access Agreement

27 | Port Giles Masterplan

Future trade projections for Port Giles indicates an increase in grain trade from approximately 650,000 tonnes per annum to 985,000 tonnes per annum in 2070. Additionally, it was identified that Port Giles has potential to cater for hydrogen exports should this eventuate in South Australia (trade volumes unknown).

Port Giles, as a naturally deep-water port, faces only minor trade increases over time and currently only services one trade type.

Despite the constraints identified at Port Giles, its deep-water access was recognised as being strategically important.

Given the link with Viterria facilities, there was no identified logic in relocating trade away from Port Giles. Conversely, there is no immediate potential for relocating trade to Port Giles. However, it was recognised that where hydrogen export does eventuate, potential exists to use Port Giles.

The Preferred Option proposed no change in the current regime, however recognises the potential of the facilities should either hydrogen exports and/or consolidation of grain eventuate.

In this instance there may be some minor works required to reduce exposure on the berth (i.e. sheet pile protection to wharf) and some works required of others (external road network upgrades, potential pipelines to storage/liquification facilities).

Figure 27 Port Giles Masterplan



Where berth exposure becomes intolerable, berth protection measures to be provided

Restricted recreational access across structure to be maintained in accordance with Recreational Access Agreement

Supporting land to be safeguarded for future trade potential arising from renewables.

28 | Port Pirie Masterplan

Trade at Port Pirie is forecast to increase from a total of 855,000 tonnes per annum to 1.5 million tonnes per annum in 2070. This is largely driven by an anticipated increase in Nyrstar volumes and the introduction of grain handling using mobile equipment.

The port is heavily restricted by channel depth and width and the feasibility of dredging is questionable given environmental considerations. It does however service local industry.

It was identified that Port Pirie was unlikely to attract other trades due to its restrictions. This includes any possibly of using it for coastal trade given its geographical limitation.

It was also identified that whilst it might be possible to relocate scrapping and general cargo activities elsewhere, it would be difficult to relocate Nyrstar-related trades and therefore Port Pirie still serves a purpose, albeit with restrictions.

Two (2) options were identified for Port Pirie, both of which supported the retention of existing trade with current restrictions across Berths 5-10.

The options differed in the use of Berth 2; one opening it up for recreational access (making Berth 1 – 3 contiguous access), whilst the other outlined the rehabilitation of Berth 2 to be utilised for the layup or scrapping vessels and/or working vessels (in conjunction with the removal of the Viterra loader).

The preferred option retained Berth 2 for port use, and recognised its ability to cater for berthing of scrapping vessels, and to provide an alternate entrance/egress to the port, which directs traffic away from Ellen Street.

Figure 28 Port Pirie Masterplan



Secondary port access/egress established to remove congestion on Ellen Street.

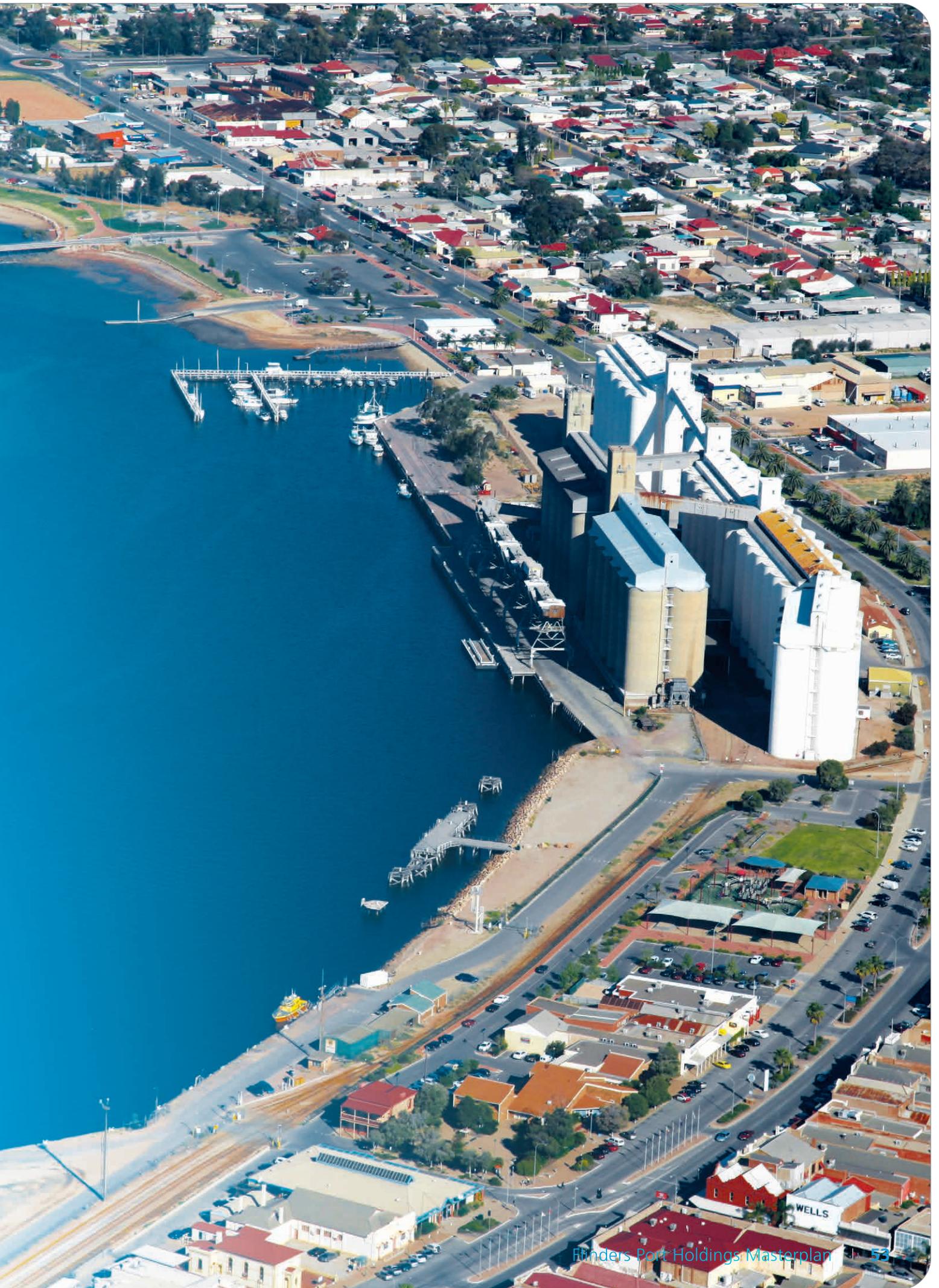
Existing timber wharf removed and replaced where required for berth redundancy

Existing shiploaders to be removed (by others)

Restricted recreational access across port to be maintained in accordance with Recreational Access Agreement

Berthline across Berths 5-7 to be used flexibly as a 2-berth operation as vessel size necessitates

Waterside accessibility to be maintained at current existing limited depths





Conclusion

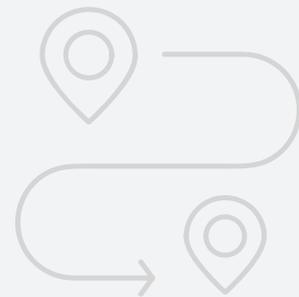
Progressing the Masterplan

As outlined in this study, it is a potentially exciting time for the South Australian economy with significant opportunity to further diversify the state's industrial base and grow interstate and international trade. As the largest port operator and the primary port authority in South Australia, Flinders Port Holdings will play a central enabling role in realising these opportunities, ensuring that port and supply chain logistics keep pace with the changes the state will witness over the next fifty years.

Yet while the masterplan is a significant piece of research, which will play a major role in company planning and decision making, the scenarios outlined and assessed in this study do not represent agreed company action. Rather, the information and analysis will be used to aid strategic decision making about the management and development of the Ports into the long-term. Decisions on individual projects will be announced independently of the masterplan process and communicated to stakeholders accordingly.

With regards to the overall masterplan, this document will be published and available on the Flinders Port Holdings website, the plan will be reviewed and updated at 5 year intervals to ensure the changing port landscape continues to be considered. The company will also continue to engage with stakeholders about the masterplan when relevant.

To discuss this study further, or to learn more about the company's assets and operations, please visit flindersportholdings.com.au.







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