MID WEST PORTS

Draft Port Master Plan

FOR PUBLIC COMMENT

OCTOBER 2019

Contents

Minister's Foreword

HON ALANNAH MACTIERNAN MLC

The Mid West is a region with significant potential for economic growth. Its location in central Western Australia, its proximity to key international markets, and its diverse natural resources and thriving primary industries sector present a diversity of prospects, many of which have yet to be fully developed.

Mid West Ports Authority (MWPA) plays a key role in the Mid West economy by providing critical supply chain infrastructure for the mining, agriculture, and fishing sectors, with potential for future diversification, including further support of the region's growing tourism industry. We also see MWPA could play a crucial role in the development of the emerging renewable hydrogen in the region leveraging off the exceptional wind and solar resource.

This optimisation plan encourages more direct shipping into the region, reducing costs for local business and relieving heavy haulage pressure on our roads.

MWPA in itself is a large direct employer, and indirectly supports job creation through engaging local contractors and supporting local businesses and industries.

This draft Port Master Plan considers how the Port of Geraldton, its transport and infrastructure corridors and Fishing Boat Harbour could develop in the short to medium term, in response to increasing trade. It provides strategic guidance for investment decisions that will provide significant economic value to the Port, Mid West Community, and Financial Partners.

We are committed to ensuring our publically owned port continues to drive jobs and opportunities for the people of the Mid West.

HON Alannah MacTiernan MLC
Minister for Regional Development, Agriculture and Food, Ports, Minister assisting the Minister for State Development, Jobs and Trade.

From the Chair

JOHN ELKINGTON

MWPA celebrated its 50-year anniversary in 2019, and the Port of Geraldton has evolved considerably since the creation of the Geraldton Port Authority in 1969. In 2018, the Board and management took the opportunity to complete a strategy reset, with a vision to be bold supply chain enablers for the sustainable long-term future of regional Australia.

To support this vision, the new Executive and leadership team, under the leadership of the Board and Chief Executive Officer Dr Rochelle Macdonald have developed a 15-year corporate Strategic Plan, which is in alignment with the United Nations Global Goals for Sustainable Development. The Goals aim to address the global challenges that face the planet, including poverty, inequality, climate, environmental degradation, prosperity, peace and justice. This is one step in developing an outward looking approach and building a resilient Port which is connected with the community, customers and government.

The development of the draft Port Master Plan is another important milestone which will provide investment confidence and ensure that trade growth in the Mid West can be accommodated in a sustainable fashion, which is in line with the Port's vision and values and community expectations.

On behalf of the Board, I appreciate your interest in the future of the Port of Geraldton and look forward to your feedback on the draft Port Master Plan.

John Elkington
Chair

From the CEO

DR ROCHELLE MACDONALD

The Port of Geraldton is one of the most diverse commodity ports in Australia. To build on our base of diversified trades, our purpose is to be the sustainable Gateway to Trade and Tourism, providing our customers with efficient supply chain from the Mid West region to the world.

In 2018/19, the Port had a slight increase in throughput, recording 15.905 million tonnes. The estimated value of trade was $4.4 billion, up from $3.6 billion the previous year. With a number of potential projects in development across the Mid West region, the future is bright for Mid West Ports Authority to significantly increase both the volume and variety of exports through the Geraldton Port in the years to come.

It is important that future development to facilitate trade growth is undertaken in a coordinated and sustainable manner, which enables us to operate in BALANCE with the environment whilst providing economic benefits for our community and shareholders. The draft Port Master Plan offers a strategic direction for how sustainable growth can be accommodated over the next 30 years, with a focus on MAXIMISING capacity at the Port of Geraldton over the next 15 years.

The draft Port Master Plan is the culmination of over two years of stakeholder and community engagement, research, forecasting and analysis and offers several potential avenues for government and private investment. Ultimately, it is envisaged that the implementation of the Port Maximisation Plan would support throughput up to 50 million tonnes annually and lead to a substantial increase in revenue. The Port Maximisation Plan will also contribute directly to the Mid West economy through additional jobs and business opportunities.

I am pleased to present this draft Port Master Plan for public review and feedback.

Dr Rochelle Macdonald
Chief Executive Officer

Executive Summary

Mid West Ports Authority (MWPA) has undertaken the development of a Port Master Plan (PMP) for the Port of Geraldton. The PMP provides a high-level analysis of potential trade growth and required infrastructure to accommodate this growth over a 30-year planning timeframe.

It further considers how development can be staged in the short to medium term (i.e. over the next 15 years) to maximise the throughput and efficiency of the existing Port, prior to considering longer term expansion options, at either Geraldton or the Oakajee Port. Whilst the expansion options are considered, additional investigations, consultation and design work would be required to enable a preferred option to be recommended.

This document summarises the key components of the PMP, which are discussed in the sections below. It is underpinned by detailed technical reports undertaken throughout the life of the project, which were prepared by GHD Advisory and MWPA.

Section 1: Introduces the PMP objectives and how the document will be used.

Section 2: Provides a brief history of how the Port of Geraldton has evolved over time.

Section 3: Provides a high-level overview of opportunities and constraints that may affect future growth of the Port of Geraldton.

Section 4: Summarises the process undertaken.

Section 5: Provides a summary of the trade forecast scenarios considered in the development of the PMP and associated infrastructure capacity requirements.

Section 6: Outlines the broad PMP strategy, which focuses on maximisation of the existing Port footprint and integration of surrounding land and infrastructure corridors into port operations prior to considering opportunities for expansion.

Section 7: Looks at specific projects which may help realise the short to medium term goals of maximisation and integration, over 0-5, 5-10, and 10-15 year timeframes.

Section 8: Considers options for long-term Port expansion

Section 9: Explains how the PMP will be implemented and reviewed over time.

It is important to note that the PMP is not a statutory planning document, rather it is a strategic document that outlines one way of providing facilities and infrastructure to accommodate the trade demand predicted in a high-growth scenario. Put simply, it provides a vision for what the Port *could* look like as it evolves over the next 15 years, not necessarily what it *will* look like.

Whilst the PMP will be used to guide planning and investment decisions it will not replace the need to undertake detailed feasibility, environmental and design studies for individual projects. Investment decisions will be made further to Expressions of Interest for private investment or Business Cases for capital expenditure proposed to be undertaken by MWPA. Some projects will also require a substantial amount of stakeholder and community engagement.

The PMP is a live document that will continually be revisited to consider updated trade forecasts, stakeholder feedback, emerging proponents and developments completed.

FIGURE 1

MWPA Values

OUR VISION

To be BOLD supply chain enablers for the sustainable long-term future of regional Australia.

OUR PURPOSE

To provide a sustainable gateway for trade and tourism.

OUR VALUES

Accountability

Caring

Courage

Collaboration

Integrity

SECTION 1

Introduction

During 2017, the MWPA Board and Executives focused on planning initiatives to create and sustain a high performing organisation. As part of this strategic outlook, MWPA identified the need to undertake a detailed Port Master Planning process for the Port of Geraldton, including the Fishing Boat Harbour (FBH). This work commenced in early 2018, and has involved considerable stakeholder and community input, which is further detailed in Section 4.

Whilst MWPA jurisdiction also includes the site of the proposed Oakajee Port, the main focus of the PMP is the existing Port of Geraldton and surrounds. A subsequent Port Development Strategy is in progress which will further examine the relationship between Geraldton and Oakajee, both of which are included in one gazetted port under the Port Authorities Act 1999, in addition to other Ports including Cape Cuvier and Useless Loop which are scheduled to come under the management of MWPA in the future.

At a fundamental level, the PMP is guided by the MPWA vision and values and is designed to help achieve MWPA's organisational purpose.

The PMP aligns with the MWPA Corporate Strategy and Western Australia's *State Planning Strategy 2050*. The PMP has been informed by a suite of guiding documents, including but not limited to the *National Ports Strategy*, the *Inquiry into National Freight and Supply Chain Priorities 2018*, the *Mid West Regional Blueprint 2015*, the *Western Australian Regional Freight Transport Network Plan*, the *Mid West Regional Planning and Infrastructure Framework* and *Growing Greater Geraldton – A Growth Plan*.

The objectives of the PMP are to:

- Clarify and further define MWPA's strategic development planning for the Port of Geraldton over a 15-year horizon, informed by trade projections over the next 30 years;
- Guide and facilitate future developments by MWPA or private investors;
- Identify and preserve land for future developments within the existing Port boundary and surrounding areas;
- Identify and preserve land for key logistics routes which form part of the supply chain to the Port;
- Identify marine and land side infrastructure requirements for common and/or dedicated utilisation by MWPA and its customers;
- Align with the overarching development plans prepared for Geraldton, the Mid West and the wider Western Australia;
- Effectively consider opportunities, constraints and risks from various perspectives such as trade, asset maintenance, environmental and social aspects; and
- Be structured to enable revision as circumstances change.

> "A Port Master Plan describes what a port **could** look like, not what it **will** look like."

SECTION 1

Introduction

Once finalised, it is envisaged that the PMP will:

- Create additional economic value through increased industry and investment confidence;
- Unlock latent capacity in the existing Port footprint through operational improvements and provision and management of critical infrastructure;
- Assist in overall supply chain management by integrating the Port into broader network considerations and ensuring that vital seaport and logistics chain infrastructure is delivered when and where it is needed;
- Provide increased environmental protection by identification of -key environmental considerations early in the design process;
- Assist in realising the environmental and social interface opportunities in and around the Port; and
- Inform port users, employees and the broader community how they can expect to see the port develop over the coming years.

SUSTAINABILITY FOCUS

MWPA has started its journey towards a sustainable future by shaping its Corporate Strategy in alignment with the United Nations Sustainable Development Goals. One of MWPA's five 'Enterprise Objectives' is to 'Operate in BALANCE with the Environment.' This means that MWPA seeks to achieve sustainable yet profitable use of its assets by focusing on eco-friendly design, waste management, resource use efficiencies, engineering and technological solutions as the world moves towards a carbon free future.

Additionally, MWPA recognises the forecasted impacts of climate change and projected sea level rise will require careful management and planning. Projected effects include an increased risk of coastal erosion and inundation along the Mid West coastline. MWPA has identified these risks as part of the PMP and will seek opportunities make port design and expansion decisions that will enhance and complement existing coastal protection structures within and adjacent to the port precinct.

Out of the 18 Sustainable Development Goals adopted by the United Nations, it is considered that the PMP will align with the following 13 goals:

FIGURE 2

United Nations Sustainable Development Goals (United Nations, 2015) relevant to the Port Master Plan

SECTION 2

History

Maritime infrastructure has been part of the Geraldton urban fabric since European settlement began, with the first jetty built into Chapman Bay from Gregory Street in 1857.

The Port of Geraldton has existed in its current location for nearly 100 years, with Berths 1 and 2 in the location where the first reinforced concrete wharves in Western Australia were constructed between 1928 and 1931. The Berth 1 workshop is also a remnant of the original Berth No. 1 Goods Shed from the 1930s. As Geraldton has grown and its economy diversified, the Port has responded to these changes and has expanded as needed to accommodate the region's trade. In the coming years, the Port will continue to be a visible landmark in Geraldton, and will build upon its existing history to facilitate economic growth and employment opportunities for the Mid West community.

FIGURE 3

Timeline of Development at the Port of Geraldton

BEGINNING-1860'S

Maritime industry begins (1840)
Geraldton Town site begins (1849)

1900-1910'S

Fishing industry begins (1900-1939)

1940-1950

Crayfishing Boom begins (1940)

1960-1970

Became Geraldton Port Authority (1969)
Berth 3 built and extended
Fishing Boat harbour built
Berth 4 built (first iron ore shipment)

1990-2000

Various land reclamation
& maintenance projects (1994 - 96)
Berth 6 developed. Berth 3 expanded.
Berth 1 & 2 - increased shipping access.
Berth 4 - extended.

2010-CURRENT

Karara Mining Ltd commence
exports at Berth 7 (2012)
Third Tug Boat
Geraldton Port renamed
as Mid West Ports (2014)

1890-1900

Railway Jetty built (1893)

1920-1930'S

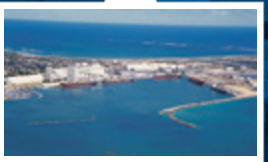
Main breakwater built (1924 - 1926)
Berth 1 & 2 built (1928 - 1931)
Export of 2 million bags of wheat

1950-1960

Formation of Fisherman Corporation
highlighting needs for the Rock
Lobster industry

1970-1980

Berth 5 built
(Iron Ore Ship-loading Facility)



2000-2010

Port Enhancement
Project $103 million (2003)
Two Tug Boats (2005)

SECTION 3

Opportunities and Constraints

The Port plays a vital role in supporting the economies of Geraldton and the wider Mid West region and facilitates trade in a diverse range of industry sectors including iron ore; metal concentrates and mineral sands; grain and agricultural products; rock lobster, molluscs and finfish; fuel; live cattle and the growing tourism sector, including cruise ship visitation. Port throughput has averaged around 16 Million tonnes per annum ('Mtpa') since 2013, with a peak of 18 Mtpa in 2014 and an average berth occupancy of 50%, as shown in Figure 4.

It is noted that the average berth occupancy does not reflect peak months, as Berth 6 can experience an occupancy of 70% during high periods. In context, an occupancy rate of 70% or greater is considered to provide a low level of service and is the point at which substantial queuing occurs. Additionally, Berths 1 and 2 are largely unutilised due to aging infrastructure and surge impacts which increases the demand for the remaining berths. Strategic investment in infrastructure can help ensure that berth occupancy is optimised.

An efficient and sustainable port is critical to support growth in existing trade sectors, as well as to enable the introduction of new and potential emerging sectors such as aquaculture, oil and gas industry support, breakbulk and container handling. Opportunities also exist to move trade from congested metropolitan areas to regional ports, which will help to maintain strong and sustainable regional communities.

Growth in trade leads to increased employment and training opportunities for local residents, which in turn encourages increased spending in local businesses. However, any new development must be cognisant of existing contraints as well as opportunities. The graphic in Figure 5 sets out some key opportunities and constraints which were identified and considered through the PMP process. These have informed the outcomes of the PMP.

It is noted that some constraints also lead to opportunities, if properly managed. For instance, the need to increase capacity in the power and water supplies presents an opportunity to explore renewable energy generation.

The PMP also considered regional constraints to supply chain infrastructure, including:

- All truck routes from the north and some from the south travel via built up areas;
- RAV10 vehicle access (vehicles between 36.5m and 53.5m in length) to the Port is constrained south of Carnarvon;
- The existing narrow gauge rail infrastructure with maximum 21 tonne axle load capacity will restrict longer term growth prospects; and
- The Oakajee Narngulu Infrastructure Corridor (ONIC), which would enable heavy road haulage to bypass the Geraldton urban area and access the Port, is not committed.

> "Problems are hidden opportunities, and constraints can boost creativity."
>
> MARTIN VILLENEUVE

FIGURE 4

Throughput and Berth Occupancy, 2013 – 2018

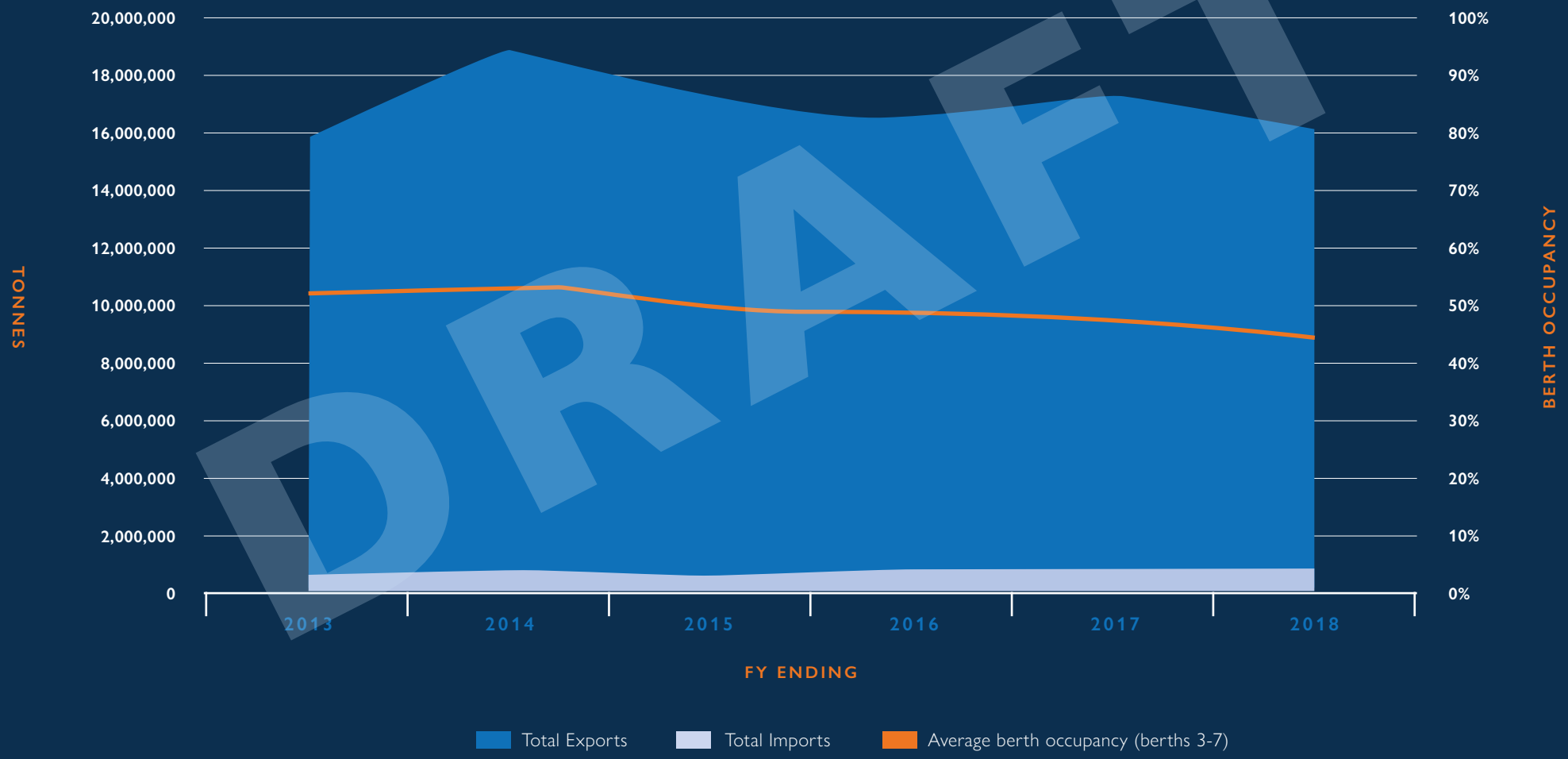


FIGURE 5

Opportunities and Constraints

SECTION 4

Process and Methodology

Stage 1 of the PMP project commenced early in 2018 and completion of the PMP review and public consultation tasks will conclude Stage 3. The three project stages are shown in Figure 6.

STAGE 1

Stage 1 involved a series of background investigations which helped define the baseline state of the Port of Geraldton. Investigations included:

- Collation and review of recent available data and reports, including environmental, metocean and heritage data and any existing strategic plans and studies relevant to the Port;
- Trade forecasts and capacity analysis to establish marine and landside infrastructure profiles required to service future demand (detailed in Section 5 of this Report);
- The establishment of a strategic framework and vision to guide the PMP process and outline the 'guiding principles'; and
- Development of a stakeholder and community engagement strategy.
- Stakeholder and community engagement were key components of Stage 1, and included:
- An online community survey which attracted 230 responses;
- Stakeholder input through formal briefing sessions, face-to-face meetings and teleconference interviews; and
- Liaison by the consultants with MWPA employees.

The outcomes of the engagement phase are plotted in Figure 7. Matters that were considered 'very important' to both stakeholders and MWPA included 'activating and supporting the Mid-West economy' and 'facilitating trade growth'. The PMP has been designed to achieve these objectives, whilst balancing the desire for growth with other important objectives such as 'ensuring environmental protection and management of impacts' and 'ensuring successful Port-Township interface', which were also of high importance to stakeholders.

FIGURE 6

Project Methodology

BASELINE
Stage 1

- Literature Review
- Stakeholder and community engagement
- Establish baseline capacity
- Identify opportunities and constraints
- Market Demand Analysis
- Trade Forecast
- Capacity Modelling
- Infrastructure Needs Analysis

DRAFT OPTIONS
Stage 2

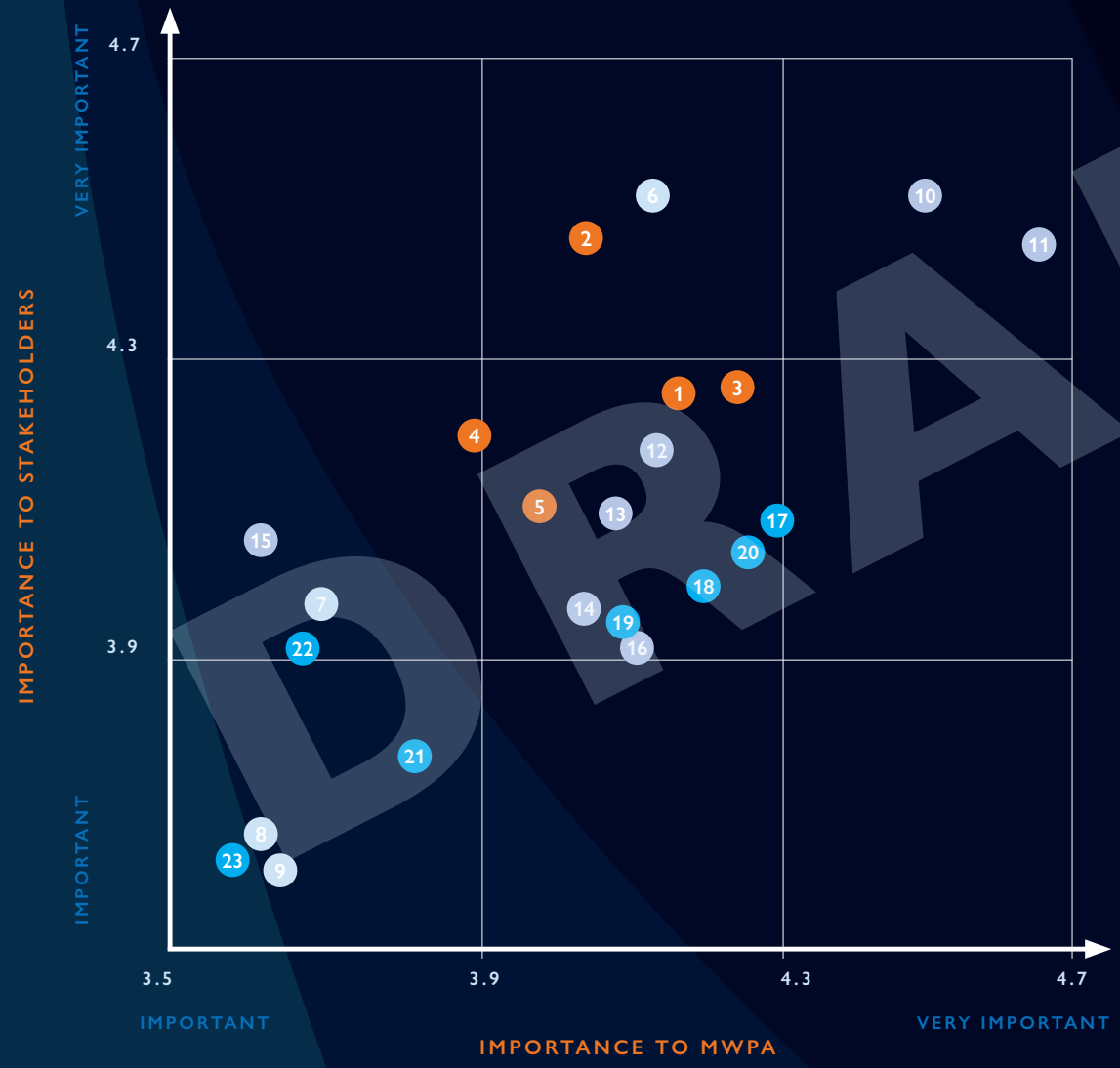
- Capacity Options
- Concept Plans
- Cost Estimation
- Multi Criteria Analysis

PREFERRED PLAN
Stage 3

- Draft PMP
- Community and Stakeholder Engagement
- Review Process
- Release PMP

FIGURE 7

Engagement Outcomes



SOCIAL/COMMUNITY

1. Outlining the 'port vision'
2. Ensuring successful port-township 'interface' management
3. Ensuring port safety and security
4. Showing 'anticipated' staged layout and/or expansion plans ie. 10 Year, 20 year, 30 year etc.
5. Facilitating cruise shipping within port

ENVIRONMENTAL

6. Ensuring environmental protection & management of impacts (dust, noise)
7. Clarifying future dredging programs & materiality placement options
8. Management of port buffers
9. Ensuring climate change resilience

ECONOMIC

10. Activating & supporting the mid-west economy
11. Facilitating trade growth
12. Providing confidence for investment
13. Ensuring infrastructure investment is economically viable
14. Facilitating anticipated commercial shipping fleet growth
15. Sustaining & activating investment in fishing boat harbour
16. Promoting cargo diversity

PORT DEVELOPMENT

17. Protecting of port access/ supply chains (sea channels)
18. Protecting of port access/ supply chains (rail)
19. Protecting of port access/ supply chains (road)
20. Ensuring well planned utilities (water, power, telecommunications, sewerage)
21. Consistency with State & Commonwealth regulations (policy alignment)
22. Clarifying relationship between Geraldton & Oakajee
23. Facilitating navy vessels within port

SECTION 4

Process and Methodology

STAGE 2

Stage 2 involved the preparation of various development concepts which were subjected to a multi-criteria analysis (MCA) to assess their strengths and weaknesses. The ten criteria used in the MCA included:

- Operability – berth;
- Operability – landside;
- Minimising navigational complexity and increasing safety;
- Environmental impacts;
- Social impacts;
- Opportunities to support enabling infrastructure and regional development;
- Timeframe and ease of obtaining relevant approvals;
- Scaleability;
- Financial aspects; and
- Construction fronts/schedules.

STAGE 3

Stage 3 is currently in progress and includes the development of a draft PMP and a review process, including a period of public consultation about key components of the draft document, prior to finalisation and endorsement by the MWPA Board of Directors and the WA Minister for Ports.

SECTION 5

Trade Forecast Scenarios and Infrastructure Needs

TRADE FORECAST SCENARIOS

The PMP considers four trade forecast scenarios for a range of commodities and how these scenarios would affect total Port throughput volumes, which are described in Mtpa. The scenarios and corresponding trade volumes are depicted in Figure 8 below and summarised in Table 1.

These include:

- **Low Growth:** Considers existing trade and possible cessations that would lead to a reduction in throughput;
- **Moderate Growth:** Considers existing trade and likely known prospects;
- **High Growth:** Considers moderate growth plus contestable projects; and
- **Super-High Growth:** Considers high growth and all known prospects in the Mid West catchment area, including those that are highly speculative and longer term.

The trade forecasts looked at throughput that could be achieved over a 30-year timeframe, however project timings are uncertain and largely dependent on commodity price fluctuations. For example, a sustained increase in the iron ore price may bring forward the timeframe for one or more high volume (i.e. 10 Mtpa) projects.

The principle observations drawn from the analysis of the forecast scenarios are:

- The design scenario used for the PMP is the 'high growth' scenario, which was forecast out to a 30-year horizon. This was determined to be an appropriate design scenario, as it will enable MWPA to 'future-proof' its development by accommodating realistic potential growth in the Mid West economy and avoid a situation where economic opportunities are lost due to a lack of foresight.
- The capacity of the existing Port infrastructure has been estimated at between 23 and 28 Mtpa depending on the commodities mix, as certain cargo cannot coexist on the same berth or within the same storage facilities. This means that the existing infrastructure could cater for the majority of the 'moderate' growth scenario. It is noted that the maximum throughput achieved to date has been 18Mtpa.

Port Maximisation (described in Sections 6 and 7) will cater for throughput of up to 50 Mtpa, depending on the commodities mix. This will accommodate some, but not all, of the growth associated with the high growth scenario. On this basis, the projects proposed over the next 15 years have been designed so not to preclude further Port expansion should economic growth necessitate this.

> "A Port Master Plan seeks that you do not do today what you must undo tomorrow."

FIGURE 8

Trade Forecast Scenarios to 2050

TABLE 1

Trade Forecast Scenarios to 2050

TOTAL	11.8 MTPA (LOW)	26.5 MTPA (MEDIUM)	85.9 MTPA (HIGH)	130.3 MTPA (SUPER HIGH)
IRON ORE	8 Mtpa	Up to 20 Mtpa	31 to 78 Mtpa	Up to 105 Mtpa
AGRIBULK	1.86 Mtpa	3.83 Mtpa	5.68 Mtpa	5.68 Mtpa
MINERAL SANDS & CONCENTRATES	1.7 Mtpa	Up to 2.28 Mtpa	Up to 7.11 Mtpa	Up to 17.68 Mtpa
CRUISE SHIPS & TOURISM	10-12 Vessels pa Fishing Boat Harbour Tourism	11-17 Vessels pa Fishing Boat Harbour Tourism	11-28 Vessels pa Fishing Boat Harbour Tourism	28+ Vessels pa Fishing Boat Harbour Tourism
LIQUID BULK	0.25 Mtpa	0.4 Mtpa	0.6 Mtpa	0.9 Mtpa
CONTAINERS, BREAK BULK & CONSTRUCTION SUPPORT	Break Bulk: 27 ktpa	Break Bulk: 27 ktpa	Break Bulk: 56 ktpa Containers: Up to 2,000 TEU	Break Bulk: Up to 71 ktpa Containers: Up to 2,000+ TEU
LNG	Nil	Nil	Nil	Perhaps 0.5 to 1.0 Mtpa
AQUACULTURE	Aquaculture: 250 - 1,000 tpa	Aquaculture: 10,000 - 20,000 tpa	Aquaculture: 20,000 - 48,000 tpa	Lobster: Total growth of 5-10% Aquaculture: 48,000+ tpa

SECTION 5

Trade Forecast Scenarios and Infrastructure Needs

INFRASTRUCTURE NEEDS

Through analysis, the infrastructure requirements to cater for the high growth scenario were determined. Berth capacity, rail capacity, road capacity and land capacity were all considered, with the outcomes summarised in Tables 2-4.

Main Harbour Berth Infrastructure

Berth infrastructure requirements in the main harbour were determined considering current commodity throughput achievable per berth, using vessel data from 2012-2018 and including existing materials handling infrastructure.

Fishing Boat Harbour Marine Infrastructure

Jetty capacity in the FBH was calculated based on vessel days occupied per metre of space, due to the length of vessels calling allowing multiple vessels to berth simultaneously. This was undertaken modelling the low, moderate and high number of forecasted vessel calls and assumes:

- Historical vessel split between FBH jetties is maintained;
- Historical average vessel length is maintained;
- Historical average time alongside is maintained; and
- Maximum berth occupancy of 70% of total berth length to account for spacing and different vessel sizing.

The results of the FBH capacity modelling suggests that it unlikely that there will be capacity issues over the forecast period at any of the jetties, with berth metre occupancy levels remaining below 45% for the high growth scenario.

Rail Infrastructure

Additional rail and rail dumper infrastructure will be required to meet the high-growth scenario requirements of bulk-centric commodity throughput. As is evident in Table 3, the existing capacity of the main rail line will be sufficient to cater for forecast growth under the moderate scenario, however there will be an excess of over 6,000 trains per annum that cannot be accommodated by the existing rail line under the 30-year high growth scenario. The impacts of increased rail traffic, including noise and dust will also require careful consideration and management. With respect to the rail dumpers, whilst Car Dumpers 2 and 3 (owned by private proponents) are considered generally sufficient to cater for projected growth, the MWPA common user car dumper will not be equipped to accommodate the moderate scenario under a 30-year timeframe. As a result, additional rail dumpers, and/or alternative transport infrastructure such as a slurry pipeline or pipelines, will be necessary.

Renewable Energy Infrastructure

To support the world's transition to a decarbonised future, Western Australia's resources sector has the opportunity to further diversify into renewable energy production and export, including renewable hydrogen. In alignment with the Western Australian Renewable Hydrogen Strategy, the PMP supports the development of a pilot hydrogen plant within the existing Port footprint. Additional landside or offshore areas may also be required for the renewable electricity production infrastructure to power the plant, such as solar and wind. 'Providing affordable and clean energy' is one of the United Nations Sustainable Development Goals to which the PMP is aligned.

TABLE 2

Berth infrastructure capacity

COMMODITY	EXISTING BERTHS (# AND IDENTITY)	POTENTIAL BERTHS (# AND IDENTITY)	EXISTING OPERATING CAPACITY (MTPA)	MAXIMISATION OF EXISTING OPERATING CAPACITY (MTPA)
Iron Ore	2 (B5 + B7)	1 (B6)	16.6	42 [1]
Mineral sands & mineral concentrates	1 (B4 + B6)	3 (B1/2 + B4 + B9) [2]	3.2	4-5
Fuel	1 (B6)	1 (B8) [3]	Sufficient	Sufficient
Agricultural bulk	1 (B3)	1 (B3)	3.3	5-6
Project cargo / Cattle / Container / Unknown	1 (part use of B6)	1 (part use of B6)	Part of B6	Part of B6
LNG / Renewable Hydrogen	0	0	0	50-100 tonnes per annum (0-5 years) 100+ tonnes per annum (5+ years)
Cruise	No dedicated berth	1 (B8)	Uses B3 on ad hoc basis, however impacts on Berths 2/4	New dedicated berth
Oil and Gas Service Facility	Limited ad hoc capacity at FBH and existing commercial harbour	1 (B1/2)	Limited ad hoc capacity at FBH and existing commercial harbour	Limited ad hoc capacity at FBH and existing commercial harbour
Aquaculture	Limited ad hoc capacity at FBH	Limited ad hoc capacity at FBH	Limited ad hoc capacity at FBH	Limited ad hoc capacity at FBH

[1] Upgraded B5 and B6 allow for 13 mtpa/annum each, and B7 allow for 16 mtpa

[2] Assumes upgraded B1/2 to accommodate increased vessel size and loading equipment, and loss of B6 to iron ore

[3] Assumes all fuel will use B8

TABLE 3

Rail Infrastructure capacity

RAIL COMPONENT	EXISTING CAPACITY	EXISTING THROUGHPUT	FORECAST – MODERATE	FORECAST – HIGH
Main Line	3,936 trains / annum	2,436 trains / annum	16.6 mtpa (2,715 trains)	47.1 mtpa (10,089 trains)

RAIL COMPONENT	EXISTING CAPACITY	EXISTING THROUGHPUT	FORECAST – MODERATE	FORECAST – HIGH
Car Dumper 1 (MWPA)	9 mtpa	3.6 mtpa	29.9 mtpa	46.9 mtpa
Car Dumper 2 (KML)	12 mtpa* (16 mtpa possible)	8.4mtpa	16 mtpa	16 mtpa
Car Dumper 3 (CBH)	1.8 mtpa	0.654 mtpa	1.3 mtpa	2 mtpa

TABLE 4

Land Requirements and Availability

COMMODITY / INDUSTRY / OPERATION	INFRASTRUCTURE REQUIRED FOR HIGH SCENARIO		EXISTING INFRASTRUCTURE		GAP (EXISTING TO HIGH SCENARIO- 30-YEAR TIMEFRAME)
Iron Ore	Storage area Process area Rail line Rail Dumpers	24 ha 4.3 ha Min 2 lines (with slurry) 3 (with slurry pipeline)	Storage area Process area Rail line Rail Dumpers	7.5 ha - 1 2	16.5 ha 4.3 ha 1 2
Mineral Concentrates	Storage area Road dumper	29 ha 2	Storage area Road dumper	3.2 ha 1	25.8 ha 1
Mineral Sands	Storage area Road dumper	5.8 ha 1	Storage area Road dumper	4.3 ha 1	1.5 ha Sufficient
Mineral Oils (Fuel)	Storage area	Adjacent to MWPA land	Storage area	Adjacent to MWPA land	Sufficient
Aquaculture	Storage / process area	2-11 ha	Storage / process area	0.3 – 1 ha	Assume 6 ha
Agribulk	Storage	Yes, growth in Narngulu	Storage and staging area	12.1 ha	None
Cruise	Passenger transfer area	Passenger transfer area	Berth 3	-	Passenger transfer area
Tourism	Tourist facilities e.g. eateries, port tours, viewing areas	Port leases	Eatery at FBH; GFC tours, Abrolhos Island cruise	n/a	Subject to further analysis
Access corridors	Road Rail Material Handling Concentrate Pipeline Utilities	Existing Existing + new Existing + new New Existing + new	Road Rail Material Handling Conc. Pipeline Utilities	John Wilcock Single rail Various MH None Power, Water, sewerage, Telcom	Subject to further analysis

SECTION 5

Trade Forecast Scenarios and Infrastructure Needs

Road Infrastructure

Capacity modelling for truck movements under the high growth scenario indicated the following:

- Along the John Willcock Link, the in/out bound peak will be approximately 170 vehicles per hour;
- Average traffic volumes are predicted to increase to 39 vehicles per hour, compared to the current average of 8 vehicles per hour; and
- Iron ore and dry bulk are projected as the commodities to incur the most truck movements per day.

Intersection modelling indicated that the existing road network has sufficient capacity to accommodate these increases and maintain an acceptable Level of Service, however it is noted that at present heavy vehicle traffic from the north passes through a developed urban area, which already causes a degree of community concern from an amenity and road safety perspective. It is anticipated that this concern would grow with a substantial increase in traffic volumes and the development of an alternative heavy haulage route is preferred.

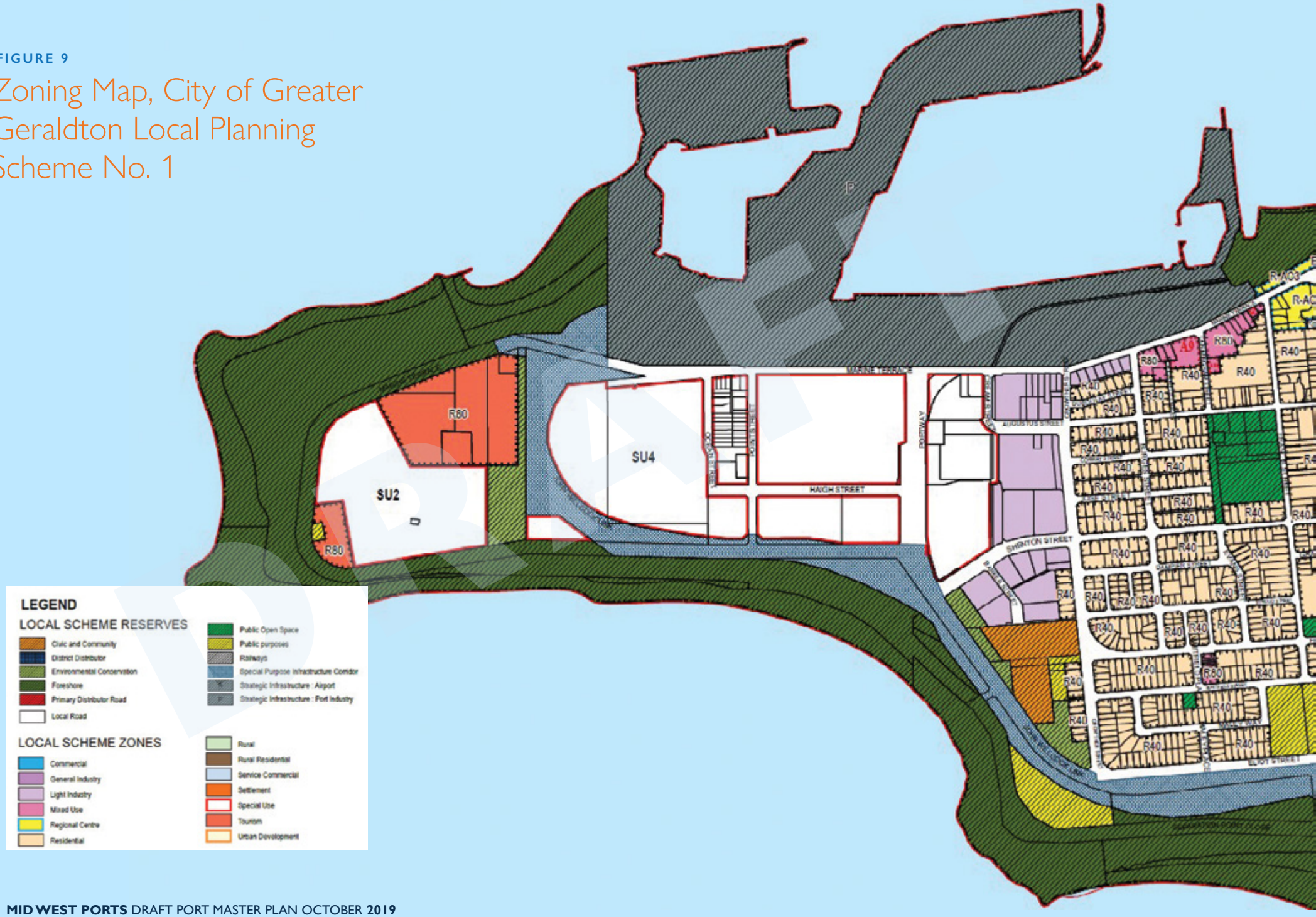
Land Availability

Sufficient land availability will be critical to enable the Port to respond to and cater for economic growth. The location of the Port is somewhat constrained given the proximity of other land uses. To meet the demand anticipated in Table 4, additional land will be required within the current Port boundary (by change of land use or creating of new land), in the adjacent precincts zoned 'Special Use 4' and 'Light Industry' under the City of Greater Geraldton Local Planning Scheme No. 1 (LPS1), in the Southern Transport Corridor and within the Narngulu Industrial Area. Long-term growth can be achieved by further outward expansion at the Port of Geraldton or alternatively the development of the Port of Oakajee, as discussed in Section 8

The current LPS1 zoning of the Port and surrounding areas is included as Figure 9, and the anticipated land needs associated with a high growth scenario over a 30-year timeframe are shown in Table 4. It is noted the total 'gap' of 54.1 hectares would enable throughput of approximately 85.9 Mtpa per annum, which would also require some form of Port expansion in terms of berth capacity beyond maximisation of the current footprint. Therefore this gap could partially be met through land reclaim associated with a future port expansion or the development of an alternative Port location.

FIGURE 9

Zoning Map, City of Greater Geraldton Local Planning Scheme No. 1



SECTION 6

PMP Strategy

The overarching PMP Strategy is intended to provide high-level guidance as to how the Port of Geraldton can develop over time to accommodate increased trade and support economic growth in the Mid West. It ensures that short-term developments do not jeopardise land and infrastructure required for long-term growth.

KEY FOCUS AREAS

The PMP strategy comprises five principle focus areas, namely:

1. Maximisation of the existing main harbour and Fishing Boat Harbour;
2. Development and integration of land south of Marine Terrace;
3. Protection and growth of transport and infrastructure corridors;
4. Creation of an inland Port at Narngulu, including storage and inter-modal transfer; and
5. Long term Port Expansion (Refer Section 8).

Focus areas 1 – 4 are conceptualised spatially in Figure 10 and outlined in brief below.

1. Port Maximisation - This focus includes projects to maximise the efficiency and development opportunity that exists within the existing Port area, to increase the Port throughput to a maximum level without significant changes to the surrounding Port environment. At a high level, the Port Master Plan considers maximisation of the existing Port layout via the following items:

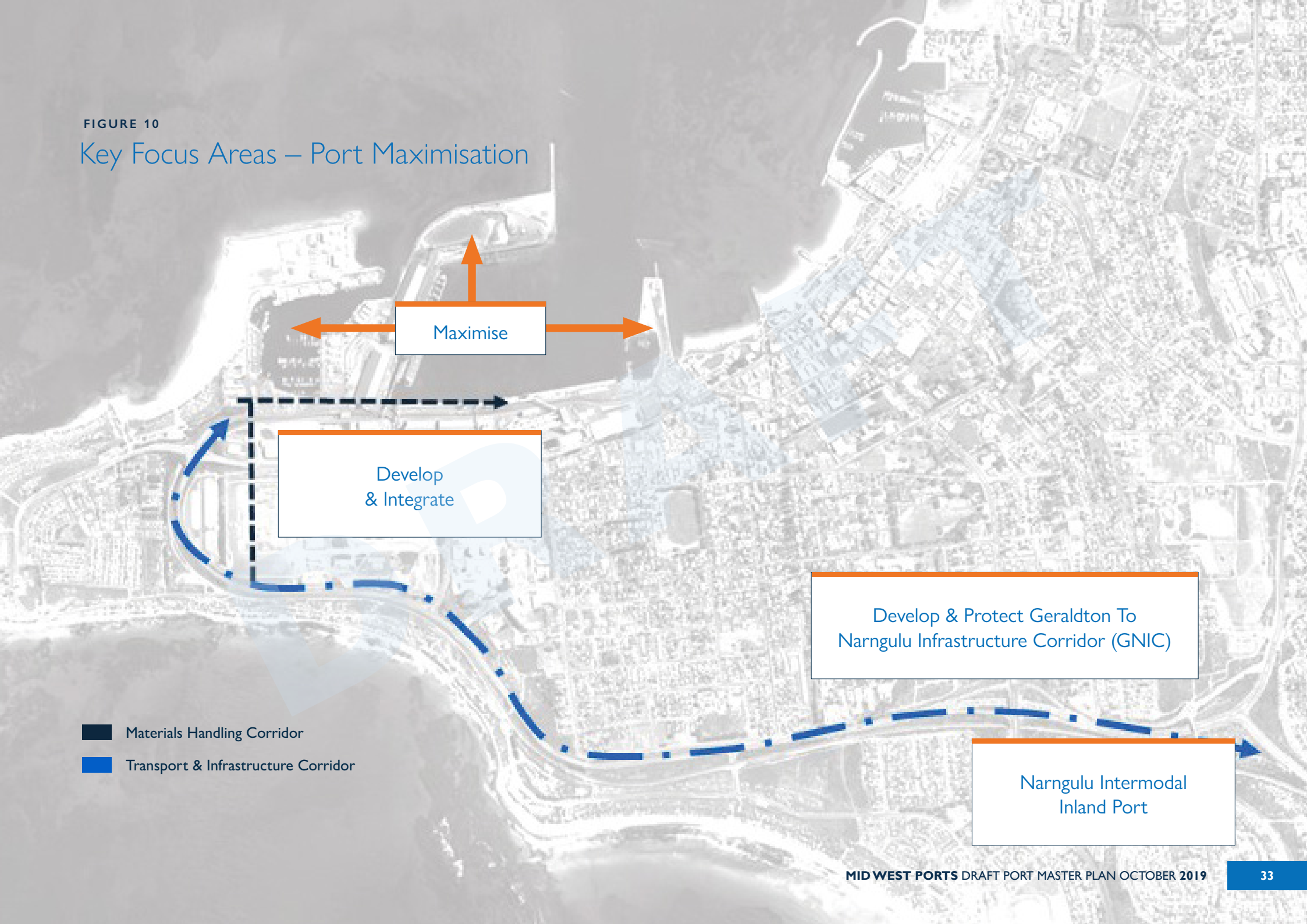
- Deepening / widening of existing berth pockets;
- Improving cargo load rates;
- Developing a new materials handling corridor;
- Managing surge through the procurement of additional Shore Tension Units and implementing mooring optimisation strategies;
- Upgrading Berths 1 and 2 as these are currently underutilised due to aging infrastructure and surge exposure;
- Developing two new berths (8 and 9) within the existing basin;
- Reconfiguring commodity and berth allocation;
- Increasing train lengths;
- Improving infrastructure and supporting the development of new industries within the FBH; and
- Improving both marine and landside operations.

These projects and other key actions are spatially depicted and described in Section 7.

2. Development and Integration - This focus area includes the identification, procurement, rezoning (where necessary) and development of surrounding areas adjacent to the Port boundary, to preserve and protect land critical to sustainable Port operations. It also involves integrating new and existing bulk handling materials facilities and corridors to cater for multiple users and commodities.

FIGURE 10

Key Focus Areas – Port Maximisation



SECTION 6

PMP Strategy

3. Protection and Growth of Transport and Infrastructure Corridors - This focus area recognises the importance of the Southern Transport Corridor, inclusive of road and rail infrastructure, in the continued growth of the Port of Geraldton. It identifies that minor expansion of the rail corridor to the south is likely to be required to cater for future enabling infrastructure such as potential additional rail lines, pipelines, and utilities . The development of the Geraldton-Narngulu Infrastructure Corridor (GNIC) may require land acquisition, reconsideration of existing Reserve management arrangements, and, where necessary, rezoning. In the longer term, a solution will need to be determined to protect the corridor from coastal erosion.

4. Creation of an Intermodal Inland Port at Narngulu - This focus area includes the identification, procurement, rezoning (where necessary) and development of land in the Narngulu Industrial Area for port related uses, with access to the Port provided via the Southern Transport Corridor and GNIC It is envisaged that the inland port will be attractive to low volume / high value cargos that can withstand an additional transportation cost.

TIMING

The focus areas each lend themselves to a natural development horizon. The initial four focus areas are anticipated to be achieved within the short to medium term (0 -15 years). This will enable throughput of approximately 50Mtpa through the Port of Geraldton. Once all the projects associated with these focus areas have been realised, any additional trade volumes will require a decision on Port expansion.

SECTION 7

Port Maximisation Plan Short to Medium Term Projects

In addition to articulating a strategic development vision, it is important that the PMP identifies projects that will help achieve the short to medium term focus areas to support both existing and emerging industries.

Figures 12-14 and Tables 6-8 spatially depict key projects that are proposed to be commenced within three timeframes – Stage 1 (0-5 years); Stage 2 (6-10 years) and Stage 3 (11-15 years). The priority development sequence for each project was determined by MWPA through a facilitated workshop.

It is noted that whilst the Stages set out the priority for the relevant project, they do not necessarily reflect the time it will take to complete each project. For instance, some 'Stage 1' projects may be completed in a manner of months, whilst other more complex projects may take five years or more. Some projects are also dependent on other actions being realised, such as purchase or reservation of land and investment decisions by government agencies and proponents. Additionally, market conditions may mean that some of the Stage 2 and 3 projects are brought forward or deferred.

Order of magnitude costs have been prepared for the items set out in Figures 12-14, with a total cost estimate of $958 million. It is envisaged that approximately $267 million of this investment will be made from public sources, with the majority ($691 million) coming from private sources. It is noted that public sector investment would be subject to preparation and acceptance of Business Cases. The following graph approximates the investment breakdown across the three Stages.

FIGURE 11

Project Investment

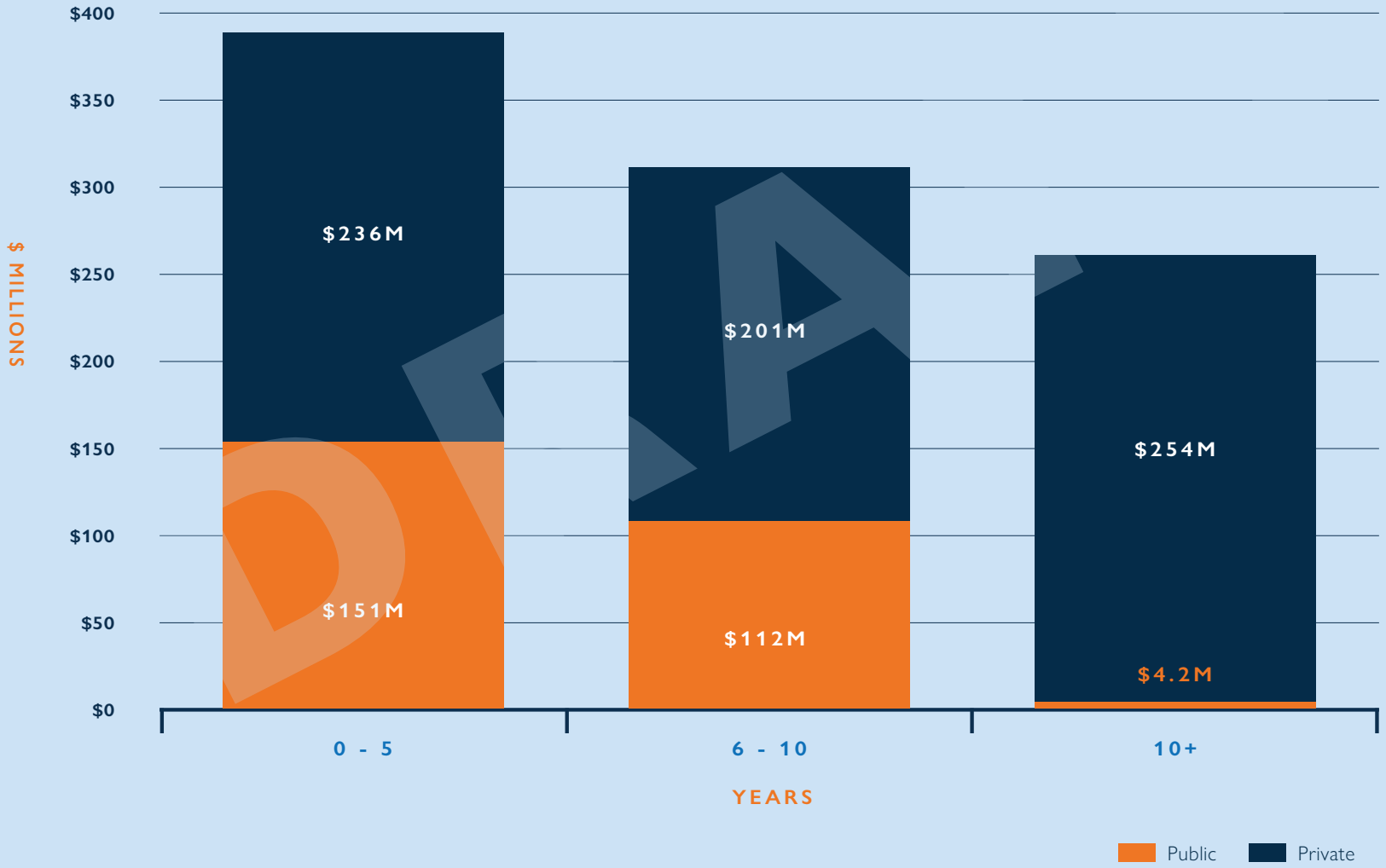
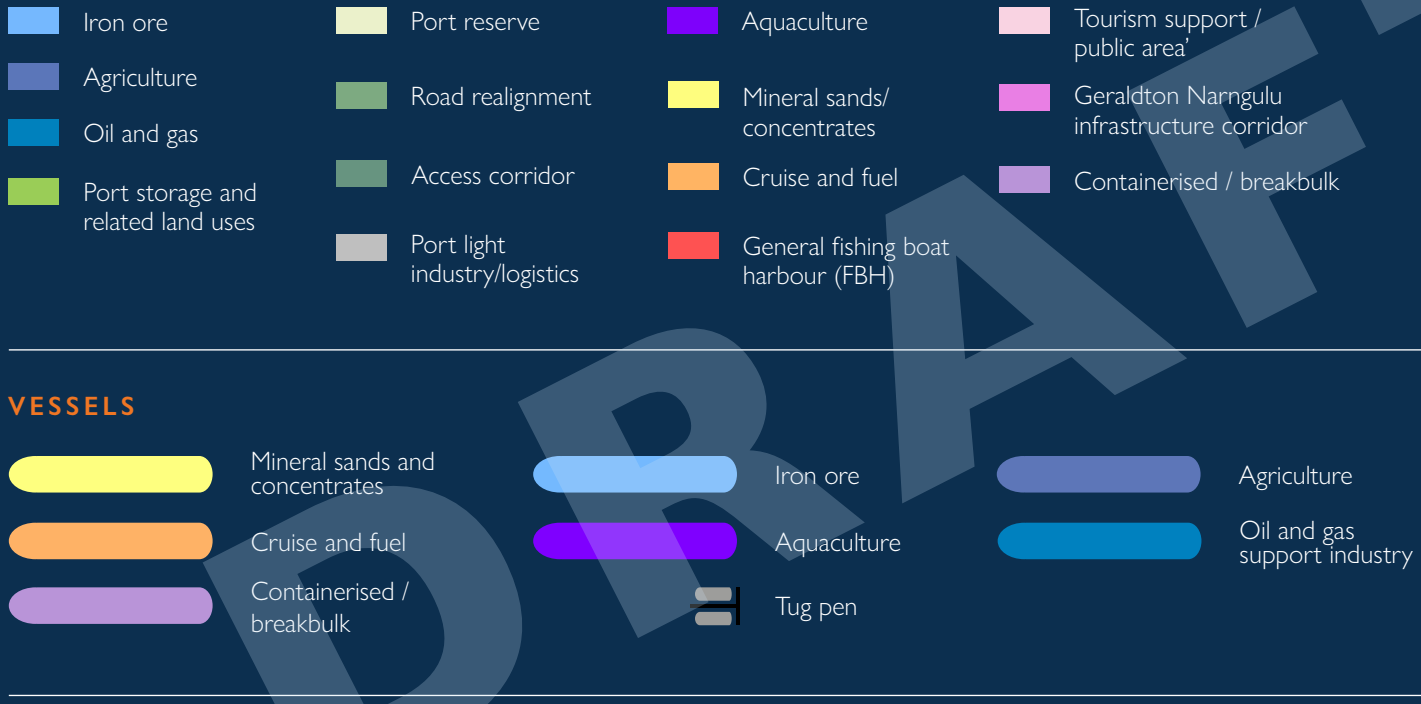


FIGURE 12

Port Maximisation Projects 0-5 Years



PROJECT IDENTIFICATION
0 TO 5 YEARS

1. Develop and integrate land for Port storage and related useage

2. Protect and where relevant, expand the southern transport corridor

3. Develop common user access and materials handling corridor

4. Realignment of Ian Bogel Rd

5. Repurpose Berth 1/2 for breakbulk and oil and gas support industry

6. Upgrade gate 1 security infrastructure

7. Realignment of Reg Clarke Rd

8. Realign boundary to improve Port operations

9. Options for aquaculture industry infrastructure development and protection of FBH entrance

10. Tug pen relocation and development

11. Reclaim and camp "duck pond"area

12. Upgrade Berth 5 materials and handling systems

13. Upgrade Berth 4 materials and handling systems

14. Mooring optimiation, including shore tension units and bollard upgrades

15. Develop fuel import manifold connection, Berth 5

16. Berth deck upgrade program

17. Upgrade truck uniloader (Gillam Rd)

18. Upgrade Port firefighting system

19. Develop bio security laydown zone

20. Upgrade security protocols for Port entrance

21. Options to develop breakbulkcontainer laydown area

22. Improve ablutions in FBH

23. Develop marine terrace traffic controls

24. Develop MWPA Integrated Operations Centre

25. Services / utilities upgrades

26. Develop inland Port at Narngulu (not shown)

27. Berth 8 development

28. Tourism support / public area

29. Fuel pipeline connection, Berth 8 to liquid bulk storage

30. Consideration of sea lion habitat

31. Tourism in FBH and Heritage Centre Development

32. New Ship repair facility and vessel storage

33. Relocate existing ship repair facility

34. Pilot renewable hydrogen plant

TABLE 6

Port Maximisation Projects 0-5 Years

Marine Structures | Rail | Road | Land

ITEM		PROJECT NAME	DESCRIPTION
1		Develop and integrate land for port storage and related uses	This land is located in a 'Special Use' zone ('SU4') under LPS1 which is designated for 'Port Industry.' Land uses within SU4 not supporting port operations or requiring physical proximity to the Port should be encouraged to progressively relocate.
2		Protect and where relevant, expand, the Southern Transport Corridor	Opportunities will be investigated to increase the capacity of the Southern Transport corridor through the addition of additional rail line(s), slurry pipeline(s) and utilities infrastructure to create the GNIC. This may entail widening the extents of the current 'Special Purpose – Infrastructure Corridor' Local Scheme Reserve.
3		Develop common user access and materials handling corridor	New infrastructure could connect the SU4 area to the existing Berth 4, 5, and 6 to enable efficient bulk materials transfer. Design options may include a conveyor trestle structure, which could be elevated across Marine Terrace to avoid traffic disruption.
4		Realignment of Ian Bogel Road	Realignment of Ian Bogel Road adjacent to the rail corridor will integrate the existing laydown area on the southern side of the road with Berths 1 and 2. This could improve functionality and commercial attractiveness and help minimise safety concerns.
5		Repurpose Berths 1 and 2 for breakbulk cargo and oil and gas support industry	MWPA's oldest Berths are largely unutilised due to aging infrastructure and surge impact. These Berths could be revitalised to support smaller vessels associated with the oil and gas support and breakbulk cargo industries.
6		Upgrade Gate 1 security infrastructure	This gate functions sub-optimally and could be upgraded to increase the speed of access and egress.
7		Realignment of Reg Clarke Road	This road could be realigned in the south-eastern corner of the Fishing Boat Harbour (FBH) to achieve acceptable swept path clearances for heavy vehicles and reduce the risk of accidents.
8		Realign boundary to improve Port operations	The boundary of Lease 26 adjacent to Berth 5 could be realigned to provide more common user area, increased operational areas for buildings on the western side of Reg Clarke Road, and future materials handling infrastructure connections from the SU4 zone.
9		Options for aquaculture industry development and protection of the FBH entrance	Options developed through aquaculture stakeholder engagement could include a breakwater structure, wharf space to accommodate vessels up to 30m in length, and area for land-based storage and operations. The optimal breakwater location will be informed by hydrodynamic modelling and refinement of proponent requirements.
10		Tug pen relocation and development	A new protective structure could be developed to relocate the tug boats to the north of the northern reclaim area. This would improve emergency response capability and could facilitate land reclamation for future berth development in the harbour.

TABLE 6

Port Maximisation Projects 0-5 Years

Marine Structures | Rail | Road | Land

ITEM		PROJECT NAME	DESCRIPTION
11		Reclaim and cap 'Duck Pond' area	This area has been set aside for the capture of dredge material from maintenance dredging campaigns. Once filled, engineered pavement preparation works could be undertaken to make the area suitable for Port development.
12		Upgrade Berth 5 materials handling system	In order to increase the Berth 5 throughput an opportunity exists to upgrade components of the materials handling circuit. This includes the car dumper, hoppers, transfer stations, conveyor circuit and shed equipment. The existing shiploader boom length could also be increased to accommodate wider beam vessels.
13		Upgrade Berth 4 materials handling system	Similar to Item 12, throughput, efficiency and safety at Berth 4 could be increased by upgrading the existing truck unloader and the installation of a new truck unloader, combined with materials handling infrastructure upgrades including lighting and wash down facilities.
14		Mooring optimisation, including shore tension units and bollard upgrades	This item involves ongoing actions to improve the management of surge within the harbour, including the purchase of additional Shore Tension Units (STUs) and upgrades to the load capacity of mooring bollards to enable the STUs to be deployed at increased capacity.
15		Develop fuel import manifold connection at Berth 5	The future use of Berth 6 as a bulk iron ore export facility will limit its availability as the sole berth for fuel imports. Connecting an additional manifold at Berth 5 to the existing import pipeline would provide an alternative connection to the bulk storage facility between Cream Street and Port Way.
16		Berth deck upgrade program	Progressive renewal of the Berth decks could be undertaken, including infill of existing deck areas to enable more efficient utilisation of ship gangways and mobile crane placement. Upgrades would also facilitate the mooring optimisation projects described in Item 14.
17		Upgrade truck unloader (Gillam Road)	The existing truck unloader is a bottom discharge facility. Most modern trucks are side tipping units and the upgrade of the truck unloader to accommodate side tipping trucks could increase the efficiency of this operation.
18		Upgrade Port firefighting system	A Port-wide firefighting system is to be installed, which is aimed at improving fire detection, prevention and response. The project is likely to be staged over several years and would see the installation of alarm systems, a pump station, a control room and a network of pipelines.
19		Develop bio-security laydown zone	The Port is a nominated First Point of Entry under the Biosecurity Act 2015, however there are no specified biosecurity entry points for general goods or animals. To enable the ongoing import of break bulk or containerised goods, treatment and inspection facilities and a storage area need to be provided. This could be accommodated in the reclaim area to the north of Berth 7, once the 'Duck Pond' has been filled and capped.
20		Upgrade security protocols for Port entrance	Currently, access into the Port from Marine Terrace is uncontrolled and public traffic can access the southern area of the Port housing various mine sites. Improved delineation within the Port's land-side security zone and installation of appropriate security infrastructure would help to secure this area.

TABLE 6

Port Maximisation Projects 0-5 Years

Marine Structures | Rail | Road | Land

ITEM		PROJECT NAME	DESCRIPTION
21		Options to develop breakbulk / container laydown area	Currently Berth 6 is utilised for the import and export of break bulk and Rotainer cargo. As Berth 6 transitions to a dedicated iron ore berth, alternative facilities will be required. Opportunities are also being investigated for a container service of up to 200 Twenty-foot Equivalent Units (TEUs) a month, which could be stored in the reclaimed 'Duck Pond' area.
22		Improve ablutions in the FBH	The current ablutions have recently been refurbished, however they could be further improved and additional facilities could be provided in the South Pens area.
23		Develop Marine Terrace traffic controls	As trade and traffic to and from the Port increases, the safety and utility of the Port to Marine Terrace interface may be compromised. Options for improved traffic controls include, but are not limited to, signage, electronic boards, speed humps and traffic roundabout installation.
24		Develop MWPA Integrated Operations Centre (IOC)	Currently MWPA staff are housed at several separate buildings within and Port and in town. The Port's main Administration Building is at the end of its useful life and opportunities exist to develop a new IOC to accommodate all staff, incorporating community spaces.
25		Services / utilities upgrades	The projected increase in demand for power and water under the medium growth scenario may exceed the current supply capacity. Increased Port development will also affect provision of other service infrastructure related to stormwater disposal and effluent and solid waste management. Several infrastructure development projects will be required to support Port Maximisation.
26		Develop inland Port at Narngulu (not shown on map)	To support the long-term growth strategy, strategic acquisition of land at Narngulu would assist in increasing the capacity of the Port by providing additional storage and processing area. Land at Narngulu is suitable for a wide range of industrial uses, particularly those which require a large operational area. This land would be particularly attractive to exporters of high value, low volume commodities that make up the mineral sands and concentrates portfolio.
27		Berth 8 development	As the number of cruise ship visits is anticipated to more than double, this item involves development of a new Berth to provide dedicated cruise ship facilities, which will alleviate the strain on other berths. A key feature of Berth 8 would be the ability to alternate between secure zone and public access areas for cruise ship passengers. Berth 8 could also be utilised for fuel imports, as a layby Berth and for other passive operations.

TABLE 6

Port Maximisation Projects 0-5 Years

Marine Structures | Rail | Road | Land

ITEM		PROJECT NAME	DESCRIPTION
28		Tourism support / public area	Flowing from the development of Berth 8 and the MWPA IOC, this area could be further enhanced as public space to provide an interface between the operational Port area and the Foreshore. Areas could be allocated for cruise passenger transfer services (i.e. taxis, bus tours) visitor information, and pop-up markets amongst other activities and community partnerships.
29		Fuel pipeline connection, Berth 8 to liquid bulk storage	The potential use of Berth 8 to facilitate fuel imports and increase its economic viability would require the development of new pipeline infrastructure between the Berth and the Liquid Bulk Storage facility.
30		Consideration of sea lion habitat	The rock breakwater approximately 150m north of the Esplanade is known locally as 'Seal Rocks' as it provides a habitat for the Australian sea lion. Should the Berth 8 footprint encroach on 'Seal Rocks,' this habitat would be re-established at a suitable nearby location prior to construction.
31		Tourism in FBH and Heritage Centre development	The existing tourism options in the FBH, such as the crayfish factory tours and café, can be further enhanced, including by developing a Fishermen's Heritage Centre in recognition of the long history of the fishing industry along the Batavia Coast.
32		New ship repair facility and vessel storage	In consideration of the trend towards larger vessels within the rock lobster, aquaculture, oil and gas and boat building industries, there is the potential to establish a multi-user ship repair precinct on the FBH Northern Reclaim. This would allow for relocation of the existing ship repair facility and Tami boat lifter to the upgraded precinct. Consideration will be given to accommodating an additional, larger heavy boat lifter to future proof this facility.
33		Relocate existing ship repair facility	Development of new ship repair area and large capacity boat lift as per Item 32 allows for the transfer and integration of the existing ship facility into the new area.
34		Pilot renewable hydrogen plant	This area could be used to locate a renewable hydrogen or green ammonia pilot plant.

FIGURE 13

Port Maximisation Projects 5-10 Years

ZONES

- Iron ore
- Agriculture
- Oil and gas
- Port storage and related land uses
- Port reserve
- Road realignment
- Access corridor
- Port light industry/logistics
- Aquaculture
- Mineral sands/ concentrates
- Cruise and fuel
- General fishing boat harbour (FBH)
- Tourism support / public area'
- Geraldton Narngulu infrastructure corridor
- Containerised / breakbulk

VESSELS

- Mineral sands and concentrates
- Cruise and fuel
- Containerised / breakbulk
- Iron ore
- Aquaculture
- Tug pen
- Agriculture
- Oil and gas support industry

OTHER

- Materials handling
- Rail unloader

PROJECT IDENTIFICATION 5 TO 10 YEARS

1. Develop and integrate land for Port storage and related useage

2. Potential road, rail, pipeline infrastructure development

3. Develop mooring dolphin infrastructure, Berth 2

4. Upgrade Berths 1/2 for Kamsarmax vessels

5. Reclaim land adjacent to north Reg Clarke Road

6. Realign and upgrade north Reg Clarke Road for two way traffic

7. Berth pocket deepening and widening

8. Infill and reclaim existing tug basin

9. Mineral sands/concentrates conveyor connectivity upgrade

10. Reclaim land for FBH development and coastal protection

11. Closure of Marine Terrace level crossing

12. New coastal road Separation Point Close to Marine Terrace

13. Upgrade pen infrastructure in FBH

14. Reclaim in north west FBH

15. Berth 9 development

16. Shallow draft wharf infrastructure

17. Develop agricultural materials handling corridor

TABLE 7

Port Maximisation Projects 5-10 Years

Marine Structures | Rail | Road | Land

ITEM		PROJECT NAME	DESCRIPTION
1		Develop and integrate land for port storage and related uses	This land is located in a 'Special Use' zone ('SU4') under LPS1, which is designated for 'Port Industry.' Land uses within SU4 not supporting port operations or requiring physical proximity to the Port should be encouraged to progressively relocate.
2		Potential road, rail, pipeline infrastructure development	Opportunities will be investigated to increase the capacity of the Southern Transport corridor through the addition of additional rail line(s), slurry pipeline(s) and utilities infrastructure to create the GNIC. This may entail widening the extents of the current 'Special Purpose – Infrastructure Corridor' Local Scheme Reserve.
3		Develop mooring dolphin infrastructure on Berth 2	This could increase the functionality of the Berth by straightening the berthing line. This will allow vessels to be shifted to accommodate larger vessels on adjacent Berths.
4		Upgrade Berths 1 and 2 for Kamsarmax (< 229m long) vessels	This upgrade could include new mooring and berthing infrastructure, a new wharf apron and a deeper and wider berth pocket to enable berthing of larger vessels. Detailed design to incorporate surge management strategies.
5		Reclaim land adjacent to Reg Clarke Road (North)	This area currently forms a traffic bottleneck for vehicles accessing Berth 6 via the Berth 7 Northern Reclaim. Minor reclamation could enable construction of a two-way road. Detailed design may incorporate continuous sheet piling to limit the impact on the FBH access channel width.
6		Realign and upgrade Reg Clarke Road (North)	Reg Clarke Road could be improved by widening the road to accommodate High Wide Load vehicles' swept paths to improve efficiency, safety and operability.
7		Berth pocket deepening and widening	This project aims to accommodate the trend towards larger vessels as trade volumes increase by deepening, widening, and in some cases lengthening, the berth pockets for Berth 5, 6 and 7.
8		Infill and reclaim existing tug basin	Relocation of the tugs frees up the existing tug basin for reclamation. Fill material may be sourced from dredge spoil. Once filled and engineered, this would provide land suitable for the development of Berth 9.
9		Mineral sands / concentrates conveyor connectivity and upgrade	Presently not all of the existing mineral sands / concentrates storage facilities are connected to the Berth 4 out loading circuit. This often leads to double handling and sub-optimal load efficiency. Development of a materials handling corridor with a multi user conveyor connecting current and future facilities to Berth 4 would be beneficial.

TABLE 7

Port Maximisation Projects 5-10 Years

Marine Structures | Rail | Road | Land

ITEM		PROJECT NAME	DESCRIPTION
10		Reclaim land for FBH development and coastal protection	Opportunity exists to reclaim land to the west of the FBH. This could facilitate construction of a seawall to protect landside infrastructure on the northern reclaim area and maximise the FBH operational area.
11		Closure of Marine Terrace (Point Moore) level crossing	The existing level crossing limits the maximum train lengths which can be accommodated within the Port. Closure of the Point Moore level crossing will allow longer trains to access the Port and increase throughput and efficiency and reduce risk exposure to pedestrians and vehicles. Also see Item 12.
12		Coastal road link – Separation Point Close to Marine Terrace	Should the Marine Terrace level crossing be closed as per Item 11, a new road could be created to connect Separation Point Close to Marine Terrace to provide alternative access to Point Moore. This road could be designed to contribute to coastal erosion protection to the GNIC. Also see Stage 3, Item 5.
13		Upgrade FBH pen infrastructure	The existing 150 pens currently service vessels up to 25m length. Pen users primarily comprise of commercial vessels supporting the fishing and rock lobster industry and some recreational vessels. Potential exists in the FBH to rationalize the existing pen facilities and to provide new larger pens, accommodating 40 – 50m long vessels, to support the growing aquaculture industry.
14		Reclaim land in north-west FBH	A 'pinch point' currently exists between Pages Beach and the North Pens which restricts the road and the services corridor width to the FBH Northern Reclaim. Reclamation of this area (approx. 0.5-1ha) in conjunction with Item 13, would also provide approximately 100-150m of berth frontage to support longer vessels.
15		Berth 9 development	Reclamation of the Tug Harbour basin allows for development of a new Berth. It is envisaged that Berth 9 together with associated landside infrastructure to support trucking movements, would cater for vessels up to 229m in length, 43m beam and maximum draft of 12.7m. Berth 9 could support containerised mineral sands and concentrates as well as break bulk and other project related cargo.
16		Shallow draft wharf infrastructure	In conjunction with the Batavia Coast Marina, infrastructure could be developed to cater for the small cruise / tourism craft providing services to the Abrolhos Islands. This infrastructure could be linked to development of adjacent cruise passenger and tourism support facilities.
17		Develop grain materials handling corridor	Grain products are currently received via truck at the storage facilities located between Point Street and Port Way. Product is then double handled from this facility into the port via truck when export load cycle commences generating significant additional traffic on Marine Terrace. Connecting these storage facilities via an overhead conveyor system would improve efficiency and decrease risk.

FIGURE 14

Port Maximisation Projects 10-15 Years

ZONES

- Iron ore
- Agriculture
- Oil and gas
- Port storage and related land uses
- Ship repair
- Ship building
- Coastal protection zone
- Port reserve
- Road realignment
- Access corridor
- Port light industry/logistics
- Aquaculture
- Mineral sands/ concentrates
- Cruise and fuel
- General fishing boat harbour (FBH)
- Tourism support / public area'
- Geraldton Narngulu infrastructure corridor
- Containerised / breakbulk

VESSELS

- Mineral sands and concentrates
- Cruise and fuel
- Containerised / breakbulk
- Iron ore
- Aquaculture
- Tug pen
- Agriculture
- Oil and gas support industry

OTHER

- Materials handling
- Rail unloader

PROJECT IDENTIFICATION 10 TO 15 YEARS

1. Berth 6 upgrade
2. Reclaim in southern area of the FBH
3. Develop Fitzgerald Street flyover
4. Investigate options for coastal protection and preservation of recreation areas

TABLE 8

Port Maximisation Projects 10-15 Years

Marine Structures | Rail | Road | Land

ITEM	PROJECT NAME	DESCRIPTION
1	Berth 6 Upgrade	As Berth 6 transitions to an exclusively iron ore berth, the supporting bulk materials handling infrastructure linked to storage facilities in the SU4 area, shiploading facilities and upgraded berthing and mooring infrastructure would need to be developed. Aligning the Berth 6 quayline with Berth 5 would improve flexibility to accommodate longer vessels on Berth 6 or Berth 5. This project would rely on Berth 1 and 2 works (Stage 1, Item 5) being complete.
2	Reclaim in south area of FBH	The develop a bulk materials corridor connecting Berth 6 to the storage facilities in the SU4 area will place additional strain on the area south of the FBH. Removal of the aging South Pens 1 and Part of South Pens 2 in conjunction with Stage 1, Item 32 and 33 (relocating ship repair facilities) and Stage 2, Item 13 (pen upgrades), would allow for the reclamation of this area.
3	Development of Fitzgerald Street flyover	The potential increase in rail track infrastructure may place additional strain on the Willcock Drive level crossing. In combination with the potential closure of the Marine Terrace level crossing and the establishment of Marine Terrace to Separation Point Close coastal road link (Item 12 in Stage 2), the construction of an overpass at Fitzgerald Street could provide safer and more convenient access.
4	Investigate options for coastal protection and preservation of recreation areas	Point Moore is currently subject to coastal erosion pressures and was recently included in the State Government's 'Coastal Erosion Hotspots in WA' publication. Coastal protection works will be required to preserve the GNIC. These works could aid the preservation of adjacent existing recreation areas.

SECTION 8

Long Term Port Expansion

The final focus area will include planning for and development of new Port infrastructure in the form of new basins and wharves, including supporting land and infrastructure, to support long term growth forecasts over a 30-year planning horizon.

Two options have been considered for this focus area:

- **Option 1:** Expand the Port at Geraldton north of its existing footprint, with a new outer basin extending from the northwest reclaim area. This would be possible through dredging and additional land reclaim. It is likely that this option would entail extension of the rail line and future materials handling corridor along the western edge of the FBH.
- **Option 2:** Develop a new Port at Oakajee, 23 kilometres north of Geraldton. 176 hectares of coastal land has been vested in MWPA to facilitate Port development, in addition to the surrounding waters and seabed.

The PMP does not recommend a preferred location for Port expansion, but has been developed to ensure that the focus areas associated with Port Maximisation are designed not to 'build out' the option for expansion at Geraldton in the future.

The expansion options are visually depicted in Figure 15.

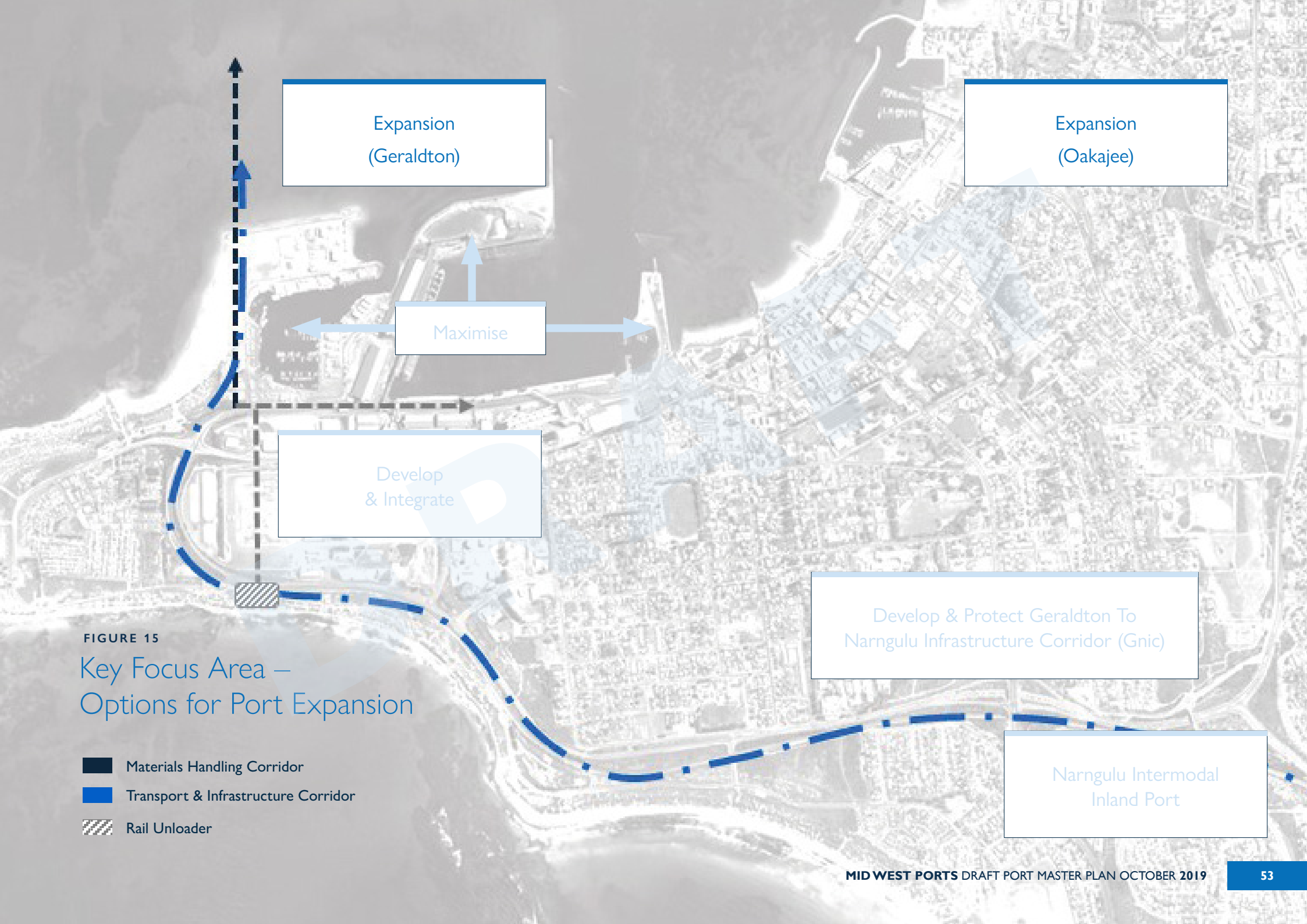


FIGURE 15

Key Focus Area – Options for Port Expansion

TABLE 9

Expansion Considerations

EXPANSION Geraldton	EXPANSION Oakajee
BERTH OPERABILITY	
■ New outer harbour could be designed to reduce surge impact in both new and existing basins, leading to high operability	■ High Operability for new basin option (highest cost option) ■ Operability of lower cost options such as a trestle wharf are untested and require technical assessment.
SUPPORTING REGIONAL DEVELOPMENT	
■ Increased operational workforce ■ Opportunities for industry development at Narngulu	■ Increased operational workforce ■ Construction workforce jobs (greater than for Geraldton expansion) ■ Opportunities for industry development at adjoining industrial estate
SOCIAL IMPACTS	
■ Potential amenity impacts on adjacent urban/residential areas ■ Impacts on water-based recreation in Champion Bay	■ Ability to create buffer zones to enforce separation distances between industrial and sensitive land uses. ■ Impact on water-based recreation at Coronation Beach
ENVIRONMENTAL IMPACTS	
■ Utilises existing enabling infrastructure (i.e. road, rail) ■ Would require dredging, but dredge spoil could be used for land reclaim.	■ Limited dredging (deep water) ■ Greenfield site – will require substantial land clearing and development to construct port and enabling infrastructure. ■ Environmental Protection Authority approval was previously received subject to conditions.
ESTIMATED INVESTMENT	
■ Approx. $4.4 billion (including $0.9 billion for Port Maximisation)	■ Approx. $6-10 billion (excluding enabling infrastructure corridor)

SECTION 8

Long Term Port Expansion

The expansion decision will need to consider a range of factors, some of which are summarised in Table 9.

TIMING

The development opportunities contained within the Expansion focus area are linked to a longer term development horizon (i.e. a 15-30 year period).

It is recognised that certain triggers could bring the decision-making timeframe forward. These include:

- Iron ore to be exported at a volume greater than 20Mtpa from a single new project. The likelihood, size and timing of this trigger is based on the economics of mining operations and buyer needs going forward, which includes considerations like the iron ore price range ($50 - $100+) and the Chinese demand for higher grade ores to reduce energy use and pollution.
- Success of the proposed pilot hydrogen facility and increasing demand for renewable energy may lead to scaling the hydrogen production to a level that cannot be accommodated within the existing Port footprint. Design and location of an expanded facility would require consideration of adequate separation distances to meet environmental requirements.
- Substantial development of the Oakajee Strategic Industrial Estate, which could be enabled prior to the construction of a Port by the provision of enabling infrastructure such as road access, power, and water.

The transition from a maximised Port to an expanded Port requires a considerable planning and consultative process. It follows that initial planning for the selected expansion option would need to commence within the next five years, in order to meet expansion requirements by the end of the 15 year horizon.

The PMP seeks to align at all times with the MWPA enterprise objectives. These include:

1. Facilitate, Protect and Grow Efficient Trade and Tourism;

2. Supply Chain Enabled;

3. Development Strategies Realised;

4. Engaged Customers, Stakeholders and Community; and

5. Operate in BALANCE with the Environment.

SECTION 9

Implementation and Review Process

This PMP will evolve over time and continue to form the basis for the articulation of the MWPA development vision to a wide range of stakeholders. Through promoting greater understanding of Port needs, the PMP allows the integration of the Port into broader network considerations with local, regional and state planning agencies and port related businesses.

Once publicly advertised, internally reviewed and accepted by the MWPA management, Board and Minister for Ports the PMP will be used to inform investment decisions and consideration of proponent proposals. It will also enable the Geraldton community to keep abreast of the Port's development intentions in the coming years.

Whilst some of the projects outlined in Section 7 are already in progress, many have not been initiated, or are in the early stages of Concept Design. Progression of any projects will require appropriate feasibility and technical studies, business cases (for MWPA sponsored projects), and detailed design. External projects within the gazetted MWPA Port area will require approval from MWPA prior to proceeding, and development in areas outside the gazetted Port area will require local government approval. Additionally, all projects may require statutory approval from a range of State and Federal government agencies, depending on potential significance and impacts. As a result, whilst the PMP provides direction on future Port development, it is open to change over time in response to new technical information, constraints or opportunities which may arise.

In conjunction with the outcomes of the PMP, MWPA will soon be embarking upon a number of other projects including:

- Land Assembly Strategy;
- Fishing Boat Harbour Development Plan;
- Breakbulk Cargo Strategy;
- Marine Terrace and West End Traffic Study; and
- Port Development Strategy (encompassing all current and proposed MWPA ports).

These projects will help refine the high-level directions contained in this report.

The PMP is built on the foundation of the market demand assessment. Ongoing review of the actual trade volumes compared to the market demand forecast volumes and continuous testing of the assumptions that drive the market demand forecast is necessary. This could lead to adjustment of the PMP to reflect market conditions.

The outputs of these reviews combined with the key messages from the Port's ongoing stakeholder engagement program can then be used to test the potential impact on the PMP. Should a major change in assumptions or significant new information become apparent then the PMP can be updated to accommodate such change. Furthermore, continued discussions with a broad range of interested and affected stakeholders will enable MWPA to capture feedback on the effectiveness and suitability of the PMP which may necessitate additional revision and updating.

CONTACT US

For trade enquiries, please contact the MWPA Trade Team on **9938 0412.**

For enquiries about the Master Plan, please contact the MWPA Planning team on masterplan@midwestports.com.au or 9964 0539.

MID WEST PORTS