

INDUSTRY PROFILE

Ports & Stevedoring



ANZSIC 4810 Water Freight Transport

ANZSIC 5211 Stevedoring Services

**ANZSIC 5212 Port and Water Transport
Terminal Operations**

Seagoing and landside crossover. There is natural crossover between seagoing and landside jobs. Therefore this LDSC Ports & Stevedoring industry profile should be read in conjunction with the LDSC Maritime industry profile.

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Overview

- **Ports.** Ports are the gateway for imports and exports to enter and leave Australia.
- **Stevedoring.** Stevedoring is the loading and unloading of bulk, general and containerised cargo at the connection of road, rail and sea transport.
- **Sea freight.** The maritime industry carries 80% of Australia’s imports and exports by value.¹ The industry annual revenue of \$5.48 billion in 2021-22 added \$1.95 billion to the Gross Domestic Product. Australia is the fifth largest user of commercial shipping services globally. However the Australian flagged merchant fleet is approximately eleven ships.²
- **Landside maritime occupations.** The ports & stevedoring sector is naturally related to the maritime industry. Landside occupations such as Ship’s Pilot, Harbour Master, Deputy Harbour Master and Ship’s Surveyor are frequently classified as maritime. Senior landside positions require sea time and an Australian Maritime Safety Authority (AMSA) Master Unlimited ticket. The Master Unlimited or Master 1 is the highest AMSA ticket that can be achieved.³
- **Sovereign capability.** Developments in the Indo-Pacific have brought focus on Australian sovereign control of the supply chain. Australian foreign and defence policies will dictate Australian projection into the Indo-Pacific. Policy on sovereign control of ports and shipping will follow. See LDSC Maritime industry profile for:
 - Maritime skills crisis
 - Sovereign capability
 - WA Shipping and Supply Chain Taskforce
 - Australian Government Strategic Fleet Taskforce

1. Industry background

- **WA ports.** Demand for the maritime occupations that work with ships is geographically related to the five WA port authorities responsible for the 13 WA ports. An additional eight ports are overseen by the five WA port authorities under the Shipping and Pilotage Act 1967 and six ports are proposed as follows:
 - Fremantle Port Authority responsible for:
 - Inner harbour Port of Fremantle
 - Outer Harbour in Kwinana.
 - Westport will open circa 2030
 - Southern Ports Authority responsible for:
 - Albany
 - Bunbury
 - Esperance
 - Mid West Ports Authority responsible for:
 - Port of Geraldton
 - oversees Carnarvon that comprises of port facilities at Cape Cuvier and Useless Loop.
 - proposed port at Oakajee
 - Kimberley Ports Authority is responsible for:
 - Broome
 - Derby (leased and managed by the Shire of Derby West Kimberley)
 - Wyndham (leased and managed by Cambridge Gulf Ltd)
 - Yampi Sound (comprises port facilities at Cockatoo Island and Koolan Island)
 - proposed port at James Price Point
 - Pilbara Ports Authority is responsible for:
 - Ashburton
 - Dampier
 - Port Hedland

- Varanus Island (operated by Santos)
 - oversees Cape Preston
 - oversees Barrow Island
 - oversees Walcott
 - oversees Onslow that comprises port facilities at Onslow, Airlie and Thevenard Islands
 - proposed port at Anketell
 - proposed port at Balla Balla
 - proposed port at Cape Preston East
 - proposed port at Cape Preston West
 - proposed port at Urala.⁴
- **Landside occupations.** The landside occupation Harbour Master is a qualified Master Mariner with extensive seagoing experience. Fremantle and Pilbara Ports have a team of Vessel Tracking Service Operators (VTSO) to support shipping traffic approaching port and when under pilotage to dock. The Waterside Worker or stevedore loads and unload cargos. Tasks of Ship's Surveyor include certification of loads and ship worthiness to Australian Law. Relevant ANZSCO codes are:
 - 139999 Specialist Managers, nec for specialisation Harbour Master and Deputy Harbour Master - landside maritime occupation in ports
 - 231299 Marine Transport Professionals, nec - for landside maritime specialisation Vessel Traffic Service Operator (VTSO)
 - 231215 Ship's Surveyor - landside maritime occupation in ports
 - 891113 Waterside Worker - landside maritime occupation in ports. The WA term is stevedore.
 - **Harbour Master.** The safe operation, navigation and security of the port is the responsibility of the Harbour Master and Deputy Harbour Master (ANZSCO code 139999 Specialist Managers, not elsewhere classified). The governance demands of large harbours have seen this job develop into two: The hands-on, operational shipping role who controls the Vessel Traffic Service team and the administrative-legal-security role who has a focus on governance.
 - **Vessel Traffic Service Operator.** The ANZSCO code 231299 Marine Transport Professionals, not elsewhere classified is used for the Maritime specialisation Vessel Traffic Service Operator (VTSO). The VTSO is required in the control tower at larger WA ports to manage channel congestion. The VTSO works under the supervision of a Harbour Master who is a qualified 231213 Ship's Master. The term Vessel Tracking Officer (VTO) is sometimes used.⁵

- **Recruitment of Vessel Traffic Service Operator in WA.** There are approximately 40 VTSO in WA around the high traffic channels of Fremantle, Dampier and Port Hedland. The role requires calm, multi-tasking under pressure. VTSO are not generally FIFO. Although the workforce numbers are small the workforce shortage is acute and persistent. The workforce shortage in the Pilbara and the shortage of Maritime trained professionals in WA has seen recruitment from landside professions. Port authorities recruit former schoolteachers, emergency services and Defence Force to work under a Harbour Master who is qualified 231213 Ship's Master.⁶
- **Stevedoring companies.** Stevedoring operations are generally carried out by private companies under contract to the ports, shipping lines or manufacturers. A stevedoring company typically owns the loading equipment and employs labour directly or via labour hire. A stevedoring company may contract with a terminal owner to manage all terminal operations. There are two stevedoring companies that handle containers in Fremantle: DP World and Patrick. Each operate a terminal on North Quay. Smaller operators provide the service in the regional ports. Some WA regional ports such as Esperance directly employ stevedores.



Stevedoring companies DP World and Patrick operate two berths on North Quay, Inner Harbour, Fremantle. Photo credit Fremantle Ports.^{7 8}

- **Cargo categories.** The five main categories of cargo transported by sea are:
 - roll-on/roll-off eg vehicle
 - dry bulk eg iron ore loaded loose
 - liquid bulk eg liquified gas
 - break bulk eg metal drums or machinery loaded individually
 - container.

- **Planning considerations for sea freight.** The national freight task is split across rail, road and sea. Planning considerations for sea freight include: ⁹
 - lower cost than land transport for bulk cargo eg dry bulk such as iron ore
 - lower cost than land transport for certain routes
 - longer transit times than road or rail
 - port – rail - road infrastructure connectivity
 - regulatory constraints eg impediments to coastal shipping
 - coastal vessel types
 - generally lower carbon dioxide emission per tonne of freight
 - global supply chain factors eg short notice port closures in Ukraine or China

2. Workforce opportunities and challenges

2.1 Workforce opportunities

- **Global demand for WA iron ore.** WA Seafaring and Landside maritime workforce make a strategic contribution to Australia through the value of iron ore exports to the Australian economy. Iron ore accounted for 89% of WA royalty revenue and 28% of general revenue in 2020-21. Over 60% of WA iron ore sales volume was exported from Port Hedland in 2020-21 followed by Cape Lambert (20%), Dampier (15%) and all other ports (5%). WA accounted for 39% of global iron ore supply in 2020.
- **Mining, oil and gas projects.** Projects developing in the WA oil and gas sector will maintain demand for ports & stevedoring workers. Modelling by the Australian Resources and Energy Employers Association (AREEA) for mining activities 2022 to 2027 estimates the WA direct resources workforce as 150,700. AREEA identified 57 projects in the WA investment pipeline to 2027 for the Kimberly, Pilbara, Goldfield-Esperance and offshore regions of WA. Workforce shortages may impact the awarding of WA tenders particularly for projects in the Northwest.¹⁰
- **Global demand for WA wheat.** WA generates about 50% of Australia's total wheat production with more than 95% of this exported from ports to Asia and the Middle East. Wheat is the major grain crop produced in WA making up 65% of annual grain production and generating \$2-3 billion for the State economy each year. Wheat is moved by Heavy Hail rail to port and loaded on ship. The war in Ukraine has boosted demand for WA wheat. The 2022-2023 WA harvest set a new record. This is the second successive record harvest beating 2021-2022. The 2021-2022 harvest was still being moved by rail from storage to port in 2023.
- **Port Hedland Channel Risk and Optimisation Project.** The Channel Risk and Optimisation Project (CROP) at the Port Hedland commenced in 2017. The CROP investment has increased the channel depth to extend berthing windows for larger ships. This permits the multi-user port to operate a complex schedule to maximise access in a congested channel. An example is scheduling the WA iron ore and lithium concentrate exports. In 2019 the Port of Port Hedland earned biosecurity certification to allow direct maritime freight services into the Pilbara. CROP will increase the number of cruise ship berths. Naturally cruise activity has been interrupted by COVID-19. Long term the cruise ship outlook is dynamic. See Cruise Shipping below.¹¹

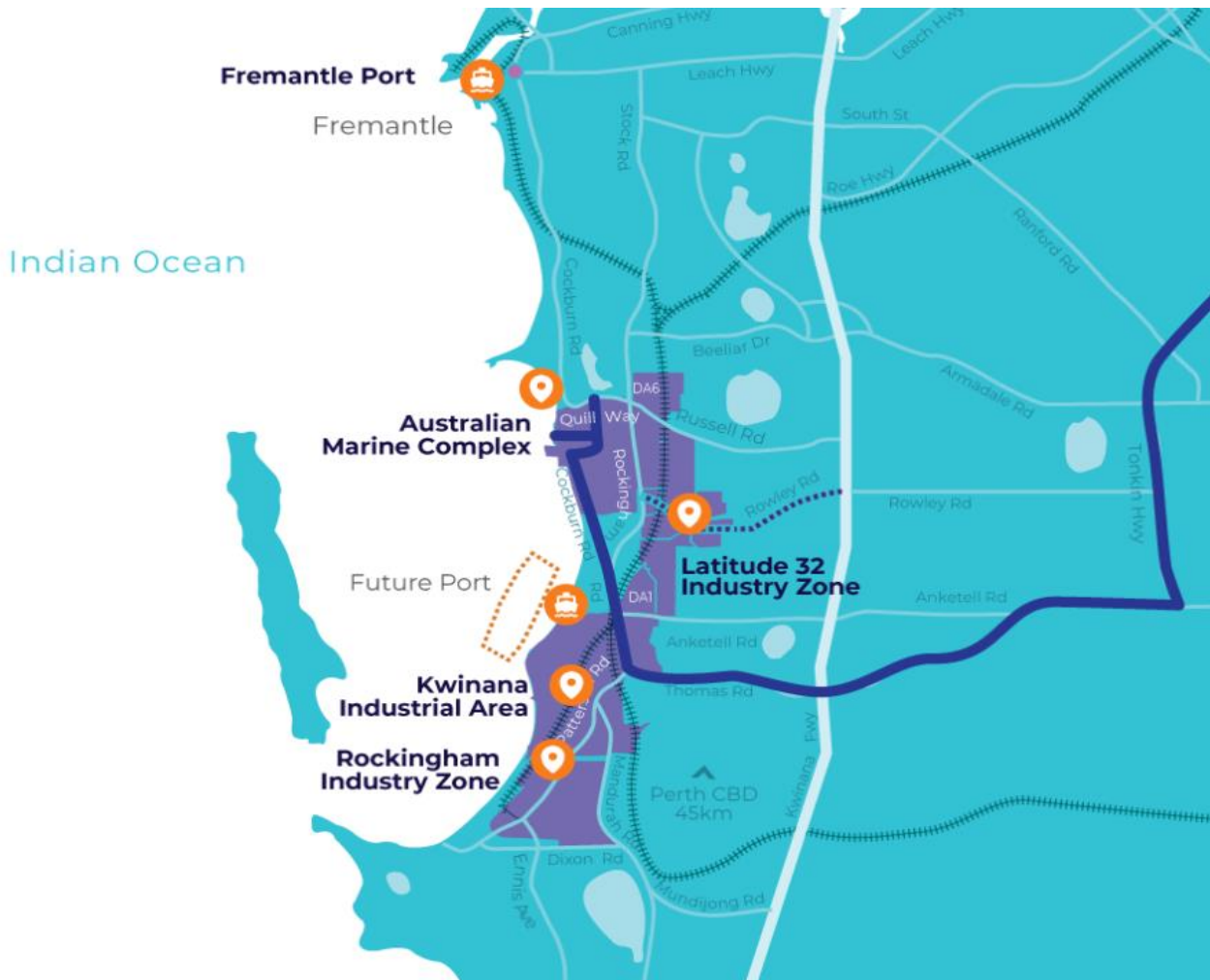
- **Rio Tinto Commercial Freight Shipping Service for Dampier.** Rio Tinto has secured the first Commercial Freight Shipping Service for Dampier. The Shipping service from Singapore to the Pilbara will deliver maintenance supplies for Rio Tinto iron ore operations. The container vessel is expected to allow local businesses to partner with Rio Tinto following biosecurity upgrades.¹²



Over 60% of WA iron ore sales volume was exported from Port Hedland in 2020-21

Photo Credit Pilbara Ports Authority.¹³

- **The Western Trade Coast.** The Western Trade Coast Global Advanced Industries Hub is a 3,900 hectare heavy industrial area between Munster and Rockingham.¹⁴ The concept is to connect the infrastructure to support mineral processing, chemical manufacture, energy generation, renewable hydrogen processing, advanced fabrication, manufacturing, defence and shipbuilding capabilities across the developing investments at:
 - the Kwinana Industrial Area services
 - the Rockingham Industry Zone services
 - the Latitude 32 Industry Zone
 - the Australian Marine Complex services.
- **Australian Marine Complex services and dry dock development.** Port - rail - road integration will need consideration in the Defence supply chain for the dry dock development at the Australian Marine Complex, Henderson and related growth of HMAS Stirling as a Royal Australian Navy regional maintenance hub.¹⁵



The Western Trade Coast Global Advanced Industries Hub is a 3,900 hectare heavy industrial area between Munster and Rockingham.¹⁶

- **Defence West support to the Naval Shipbuilding Plan and SSN-AUKUS.** Defence West planning will need to include port - rail - road integration in the Defence supply chain for construction, operation and maintenance in the Naval Shipbuilding Plan including SSN-AUKUS submarine developments.¹⁷
- **Westport.** Westport is the proposed container port in Kwinana with integrated road and rail networks. See 'Future Port' location on diagram above. The Westport Taskforce was established by the State Government in 2017 to determine a long-term integrated freight transport plan for WA. The State Government has endorsed the Westport Taskforce proposal for a conventional land-backed container port called Westport in Cockburn Sound South, vicinity Anketell Road. The Westport Taskforce recommends two port options with the same design at Kwinana called D2 and B. Both options construct a new land-backed port in the Kwinana Industrial Area serviced by an upgraded Anketell Road freight route. Option D2 sees the existing port and a new Kwinana port split container traffic before transitioning all freight to Kwinana over 15 years. Option B moves all freight from Fremantle to Kwinana in one step by 2032.¹⁸

- **North Fremantle Development Precinct.** The Western Australian Planning Commission has established a Future of Fremantle Planning Committee for two years to examine the redevelopment of Fremantle's North Quay and the Victoria Quay Waterfront Precinct. This Committee will develop an employment strategy to maintain local jobs when the container terminals are relocated to Westport and finalise work undertaken by the North Fremantle Development Precinct Technical Advisory Group.¹⁹ The 2022-23 State Budget allocates budget towards transforming the historic precinct. For example \$7.5 million to enhance public space: providing shade, seating, landscaping and pedestrian and cycle pathways.²⁰

2.2 Workforce challenges

- **China trade.** China is the major trading partner for Australia and WA. In 2019 China purchased a third of Australian exports of goods and services. China is the largest trading partner for WA trading \$146 billion of goods in 2021-2022. WA exported \$136 billion of goods to China in 2022 above the annual average of \$82 billion over the past 10 years. WA accounted for 53% of total trade Australian in goods with China in 2021-2022. China is the largest supplier of goods into WA accounting for 19% of WA goods imported in 2021-2022. The effects of COVID-19 have stabilised in Chinese trade figures. The long-term impact of the China-Australia trade tensions on WA ports and stevedoring industries are to be determined. However Australian exports of goods worldwide rose by 11% year-on-year in May 2021 with exports to China up 16%.^{21 22}
- **COVID-19 initial impact.** In 2020 COVID-19 caused an initial reduction in imports and exports at WA ports. Port productivity fell due to COVID-19 lockdowns, shipping delays caused by quarantine restrictions, decreased demand for goods, higher financial and regulatory costs. However demand remained for ports and stevedoring services. Australia's health response to the COVID-19 pandemic was successful relative to comparable countries. This health success had an economic cost. The restrictions to control the virus disrupted trade. Globally COVID-19 closed ports, affected shipping routes, changed supply and demand of imports and exports, affected the use of national and international FIFO workers, seasonal workers, overseas workers and skilled migration. For stevedoring the impact was generally 'business as usual' under operating restrictions. Ports & stevedoring was not affected by job losses like sectors such as retail. WA cargo ship movements continued partly due to the proximity to Singapore.^{23 24}
- **COVID-19 legacy.** The maritime sector trades internationally. WA stakeholders remain responsive to global changes since seafarers move between ports of countries with COVID-19. The effects of COVID-19 continue to interrupt global maritime supply chains. By mid 2022 many pandemic conditions and capacity constraints were easing. Spot freight-rates were moderating although still above pre-pandemic levels. The global situation is dynamic and world economic circumstances will change. The WA supply chain remains vulnerable to short notice lockdowns as occurred in 2022 at the Chinese ports Shenzhen and Shanghai requiring carriers to reroute to ports such as Ningbo-Zhoushan. In 2022, the pandemic continued to disrupt supply chains with many ships stuck in port. Over 2016–2019 port congestion had caused around 32% of world containership fleet capacity to be held up at ports. By July 2022 the proportion was 37%.^{25 26}
- **Global maritime supply chains disruption.** Australia remains subject to volatile world commodity markets and global supply chain disruption. COVID-19 and the war in Ukraine have impacted global maritime supply chains. Factors include historically high and volatile freight rates, port congestion and port closure. The operating landscape remains complex. Globally inflation and living costs are rising. China, the world's largest exporter, triggered shutdowns and disrupted manufacturing, logistics and supply chains with a zero COVID-19 policy. Ukraine, a major food exporter, has ports in the Black Sea closed by war. Developments in the Indo-Pacific have brought focus on Australian sovereign control of maritime supply chain.^{27 28}

- Container costs.** Worldwide container shipping costs surged in 2021 affecting retail prices. COVID-19 disruption to shipping routes caused containers to be stockpiled in North America and Europe. In contrast it could take weeks to get containers for shipping from China to Europe.²⁹ The global logistics logjam started in late 2020. Congested ports struggled to cope with demand. Port hinterland connections were often short of equipment, labour and storage. In 2021 global average container schedule delays doubled. From the first quarter of 2020 to the last quarter of 2021 delays on the Far East and North America routes rose from two days to 12. Congestion in some Australian ports caused shipping companies to cancel sailings or skip Australian ports for scheduling. In 2021 the shortage of shipping capacity combined with a rebound in trade volumes sent container freight rates to record levels. By mid 2021 container rates had peaked at four times pre-pandemic levels. Container carriers faced extra costs but posted record profits.³⁰
- Cruise shipping resumption.** The Australian Government lifted COVID-19 restrictions on cruise ships entering Australian waters and ports under the Biosecurity Act 2015 from 17 April 2022. WA commenced phased resumption of cruise ships with small ships carrying up to 350 passengers. Following a successful Kimberley cruising season in 2022 the Coral Princess of Carnival Cruise Line was the first large cruise vessel to visit WA for two and a half years docking in Fremantle on 28 October 2022. In April 2023 Caledonian Sky of Australian Pacific Touring was the first cruise vessel to dock at the Port of Dampier in the Pilbara. Approximately 80 passengers visited Murujuga country and the Red Dog Memorial. The proposed multi-user Dampier Bulk Handling Facility will have capacity for cruise vessels.³¹
- WA cruise tourism value.** Cruise shipping is valuable to WA tourism. Pre-pandemic 2019-20 a total of 106 cruise ships visited WA generating an estimated \$261.9 million for the WA economy. This rose from \$228.9 million in 2018-19 and is estimated to support about 935 jobs. Tourism WA hopes for 10,000 cruise passengers by Christmas 2023. The WA Cruise Tourism Strategy 2023 to 2033 was issued July 2023.^{32 33} Key WA cruise destination ports are:

 - Fremantle
 - Esperance
 - Albany
 - Bunbury
 - Broome
 - Geraldton
 - Exmouth
 - Port Hedland
 - Port of Dampier
 - Busselton
 - Augusta
 - Wyndham
- Australian sea time training placements.** Traditionally land-based roles such as Harbour Master, Deputy Harbour Master, Ship's Pilot, Marine Surveyor, Marine Assurance, Marine Superintendent, Cargo Planners, Regulators and Trainers were filled by AMSA Master Unlimited skippers transitioning from seagoing occupations. The lack of bluewater Australian flagged merchant vessels means there is no flow of qualified mariners to the shore based jobs in ports & stevedoring. Not enough young people are able to enter the maritime sector to meet the industry demand for the higher level occupations ANZSCO 231213 Ship's Master nor 231212 Ship's Engineer. Employers must employ migrants. Australian mariners must seek expensive overseas training to gain the mandated sea time. Many do not return to Australia.³⁴

- **Migration.** Shipping is a global marketplace with international job opportunities. As the availability of Australian qualified seafarers decreases so the demand for overseas qualified migrants increases. Stakeholders reported that most qualified applicants are from India, China, United Kingdom and the Philippines.³⁵ The 2023 WA Skilled Migration Occupation List (WASMOL) includes the ANZSCO codes for the following maritime - port occupations:³⁶

Occupations by ANZSCO code	190 Visa	491 Visa	WASMOL	Graduate Stream
139999 Specialist Managers, nec - for specialisation Harbour Master	190 Visa	491 Visa	WASMOL	Graduate Stream
231213 Ship's Master		491 Visa	WASMOL	Graduate Stream
233916 Naval Architect / Marine Designer	190 Visa	491 Visa		Graduate Stream

- **Fly In/Fly Out.** Some ports use Fly In/Fly Out (FIFO) staff for workforce. Examples include Marine Pilots who live in metropolitan WA, interstate or overseas in Indonesia or New Zealand. The difference in standard of living conditions between remote and metropolitan areas affects the attraction of skilled workers. The remoteness of the Northwest region can be an obstacle to employment. Employers must decide on the cost of training local entrants or the characteristics of rostering non-residential, qualified, FIFO shift workers. COVID-19 may have long term effects on FIFO and living in the regions.³⁷
- **Defence veterans.** Mapping the transferability of skills of Defence veterans to maritime roles would be well regarded by industry. The largest concentration of Defence veterans in WA is in Rockingham vicinity Fleet Base West. This workforce has maritime skills founded on RAN veterans. Working Spirit and RSLWA have established a Veterans Employment Program to connect companies and Defence veterans funded through the State Government Anzac Day Trust Grants. The WA Government has established a Defence Industry Veterans Employment Scheme (DIVES) scholarship program. Competition in WA for qualified seagoing veterans is strong given the global mobility of the maritime workforce.³⁸

2.3 Supply and demand for workforce

- **Supply and demand for skills.** The key issue to the WA skills shortage is a lack of a training pathway to Ship's Master ANZSCO 231213. Traditionally the seafaring jobs feed the landside occupations. Cost makes seafaring training prohibitive. The cost for seafarers is not the cost of the TAFE qualifications but the opportunity cost of lost earnings for seafarers during upskilling. Acute shortages in downstream land-side occupations are:
 - Ship's Pilot - classified ANZSCO 231213 Ship's Master
 - Harbour Master and Deputy Harbour Master - classified ANZSCO 139999 Specialist Managers, nec
 - 231215 Marine Surveyor
 - Vessel Traffic Service Operator - classified ANZSCO 231299 Marine Transport Professionals, nec³⁹

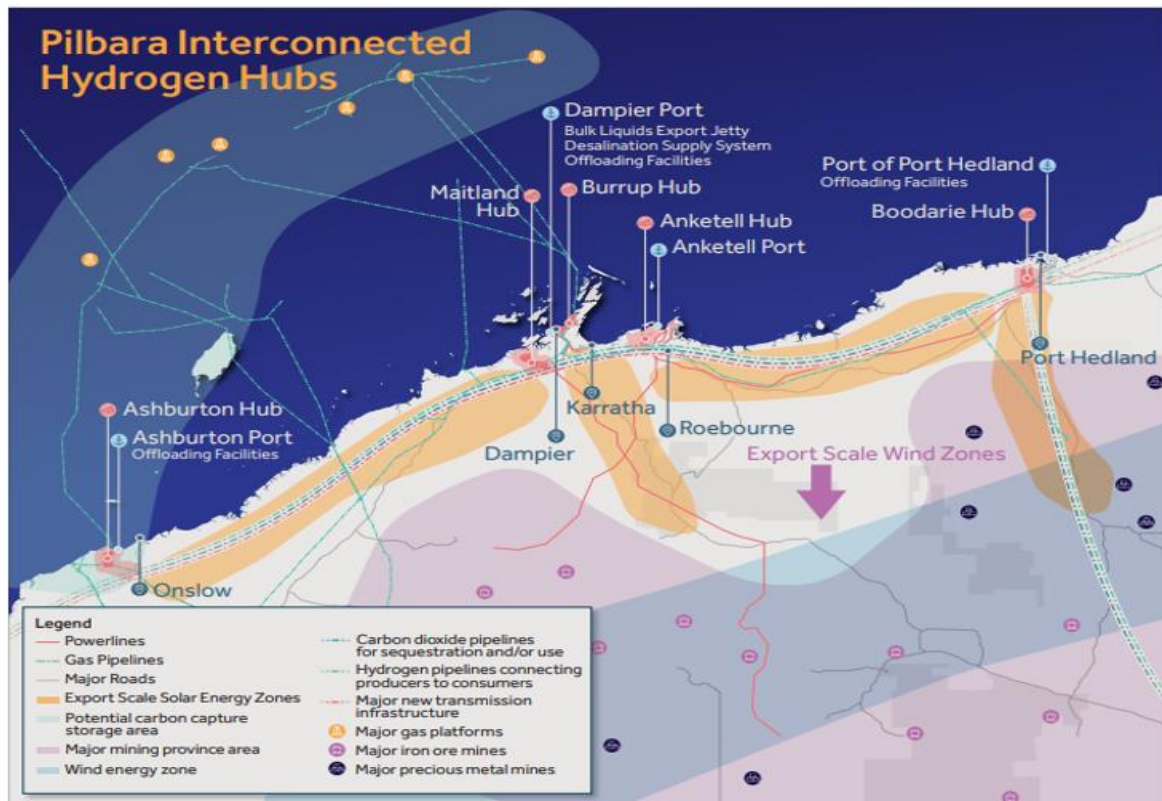
- **891113 Waterside Worker.** Ports & stevedoring organisations are generally positioned as an employer of choice. They offer good employment conditions with low workforce turnover and stable stevedoring numbers. The IBIS World five-year forecast 2021-2026 for stevedoring services predicts demand to improve significantly. Naturally industry demand in WA is directly related to international freight with Australia's principal trade partner China. For stevedore workforce numbers the anticipated increase in demand may be balanced by an increase in automation as international companies work towards automated container ports.⁴⁰

2.4 Technology and innovation

- **Technology.** Market pressure drives international shipping companies to automation. Technological changes impact port operations. For example an automated container terminal or smart port will have sensors, cameras and devices for remote control of heavy machinery and automated port vehicles. Automated container weighing systems will reduce weighing times. Remote controlled quay cranes will lower vessel completion times. Technological developments in cybersecurity, autonomous vessels, dynamic positioning, digitisation and e-navigation will affect the workforce size and skillsets. For example there will be a need for information control and data handling plus specialist operators and maintainers.⁴¹ Fremantle is a 'manual' terminal. 'Manual' refers to the systems not to the equipment. Automation technology is an important planning consideration for Westport.⁴²
- **Transition of occupations with technology.** There are emerging occupation changes related to technology. Streams include drone inspections, electronic security and port integrated logistics. Development continues in automated vessels and automated loading/unloading. These technologies will have transition stages before full automation. Naturally legal changes will lag behind technology changes. For example legislation regarding chain of responsibility. Development of technology leads to role changes for engineers and supporting technicians who need to analyse and react to data.
- **Automation technology.** Automation technology employs 'systems thinking' at macro level across an integrated logistics system. For example Scandinavian and Japanese companies are trialling unmanned shipping with automated load and unload. Functioning examples of automation technology are Port Botany, NSW⁴³ and Victoria International Container Terminal, VIC.⁴⁴ At Port Botany the port Stacking Yard and Ship Load-Unload cranes are automatic but the trucks and trailers have a driver. The concept is that a Cargo Movement Coordinating Centre controls the loading and unloading on the ship, road and rail network in an integrated logistics system. Sensors control vehicle and container movement. Long term data analytics give predictive information to plan vessel, train and vehicle marshalling, scheduling and routing. Cranes operated from an office-desk monitor instead of a crane cabin are probably safer and cheaper in the long run. The downfall of current automation technology is the lack of agile response to interference like the weather.
- **Cyber security.** Engineers will be required to defend automated systems from cyber-attack. For example the strategic value of iron ore exports from the Pilbara Ports to Australian GDP is a cyber target. Iron ore accounted for 85% of State government royalty revenue and 25% of general revenue in 2021-22. Port Hedland exported 61% of WA iron ore sales by volume in 2021-22. WA accounted for 38% of global iron ore supply in 2022. The cyber risks are criminal manipulation of the share price or state actor grey zone warfare. These systems are of strategic value and require cyber defence coordinated at Commonwealth level.

3. Environmental, social and governance

- **Climate change.** The Commonwealth is committed to reduce greenhouse gas emissions by 43% by 2030 under the Paris Agreement. The WA State Government target is net zero greenhouse gas emissions by 2050. Governments and corporations follow environmental policies to comply with environmental law and promote an image of social responsibility. Private corporations act to protect shareholder value and support investors. Shipping is typically more carbon efficient than rail or road for moving large quantities of goods although the world shipping fleet is a focus for legally binding measures Net Zero Emissions by 2050.^{45 46}
- **Sustainability strategy information pack.** The WA government has published the Western Australia's Environmental, Social and Governance (ESG) Industry Information Pack.⁴⁷ An example of a maritime sustainability strategy is the Westport Environmental, Social and Governance Strategy.⁴⁸ A Sustainability Strategy or ESG proposition' may include:
 - Environmental (E) criteria such as climate change, carbon emissions, energy use, renewables, green technology, waste, recycling, decommissioning and resource use
 - Social (S) factors like community relationships, reputation, labour relations, indigenous policies, diversity and inclusion
 - Governance (G) covers the procedures to make effective decisions to comply with the law and relate to stakeholders.
- In July 2023 the WA government has published a Climate Adaptation Strategy called *Building WA's climate resilient future*.⁴⁹
- **Pilbara Ports Authority and the Green Iron Corridor.** Pilbara Ports Authority (PPA) is in a unique position to coordinate action between the maritime, ports, energy, rail, road and resource sectors to develop a green corridor for transportation of iron ore between Australia and the Indo-Pacific. The Pilbara is a centre for renewable energy projects including hydrogen, ammonia and renewables solar and wind.⁵⁰ This postures PPA to become a global centre for green fuel production, use and export.⁵¹ The PPA vision parallels developments in the WA Government Green Steel Value Chain Model.^{52 53} PPA action to support decarbonisation includes:
 - work with Yara Clean Ammonia to assess ammonia as a shipping fuel
 - net zero emission initiatives with the Japanese Port of Himeji on the green iron corridor
 - infrastructure planning across the Pilbara ports of Ashburton, Dampier, Port Hedland and Varanus Island for inter-connecting hubs to service a hydrogen fuel export industry. For example the development of a new multi-user facility at Lumsden Point.⁵⁴



Pilbara Interconnected Hydrogen Hubs

Diagram credit to Department of Jobs, Tourism, Science and Innovation.⁵⁵

4. Training and education needs

4.1 Training needs

- Licences for Stevedores.** The skills and training requirements of 891113 Waterside Worker are closely related to the occupations 712111 Crane, Hoist or Lift Operator and 721311 Forklift in the Warehousing and Logistics sector. All port workers require a Maritime Security Identification Card (MISC).⁵⁶ Stevedoring companies generally train in-house on a range of licences starting with LF - Light forklift and developing to:
 - CB - Bridge and gantry
 - CN - Non slewing crane
 - DG - Dogman
 - CD - Derrick crane
 - CP - Portal Boom Crane
 - RB - Basic rigger
 - WP - Elevated work platform.
- Ship's Pilot, Harbour Master and Deputy Harbour Master.** The training pathway for a Ship's Pilot, Harbour Master and Deputy Harbour Master is the same as a Ship's Master: an AMSA Master Unlimited and experience as a Captain on a commercial vessel. See Maritime profile⁵⁷

- **231215 Marine Surveyor.** The Marine or Ship's Surveyor generally transfers from the experienced seagoing workforce qualified as AMSA Master Unlimited or Engineer Class 1. Surveyors generally require relevant seagoing experience to conduct audits and certification. Marine Surveyors must be accredited by AMSA in accordance with section 22 of the National Law Regulation. There is currently no preferred qualification. The Australasian Institute of Marine Surveyors has developed an unaccredited International Diploma of Marine Surveying (Working Boats) but work as a Domestic Commercial Marine Surveyor still requires AMSA accreditation.⁵⁸
- **Vessel Traffic Service Operator qualifications.** AMSA (Australian Maritime Safety Authority) has accredited only the Australian Maritime College in Tasmania to deliver VTS (Vessel Tracking Services) training based to IALA (International Association of Marine Aids to Navigation and Lighthouse Authorities) Standards. An Australian Training Package qualification was developed at AIS late in 2022 to follow the IALA requirements.

4.2 Training challenges and opportunities

- **Pilbara Ports Authority cadetship program.** Pilbara Ports Authority started a cadetship program in 2018 for school graduates to train as seagoing officers. Eight cadets have been engaged including the three females. Two cadets have graduated with six in training. This model uses foreign vessels for sea time. The trainees are not employed on training wages but on a training scholarship. A similar model is running in Sydney Ports and has run at Fremantle Port Authority. Trinity House UK has a similar 'bursary'. This may be a template for national use.^{59 60}
- **Pilbara Ports Authority training proposal.** Pilbara Ports Authority (PPA) has proposed a maritime training college and a new shipping channel simulator for Ship's Pilot training at the west end of the Port of Port Hedland. This parallels interest from PPA in the Alternative Pilot Training Program being developed by Rory Main, Managing Director, Fremantle Maritime Simulation Centre, supported by Australian Marine Pilots Institute. PPA have scoped the establishment of a helicopter underwater escape training facility. The economic driver for PPA is the cost and time of sending trainees to Perth.⁶¹

4.3 Training pathways

- **Apprenticeships and Traineeships.** Apprenticeships and Traineeships are utilised by the WA port authorities but not generally in the private stevedoring companies. For example in Fremantle the two stevedoring companies Patrick Terminals and DP World tend to train in-house. The five WA port authorities acknowledge traineeship, work placement, indigenous and gender training pathways in accordance with Government guidelines. For example Pilbara Ports Authority (PPA) has a Youth Training Strategy that includes:⁶²
 - an apprentice Program for heavy fabrication, welding, electricians and mechanical fitters
 - a traineeship program for Finance and Information Communication Technology
 - a graduate program Engineering, Development & Trade, Mapping & Data
 - School Based Traineeships Certificate II in Engineering and Certificate II in Government
 - a Public Sector Aboriginal Traineeship Program
 - short term experience for school students and casual vacation positions.

- **Jobs and Skills WA.** Relevant training available under Jobs and Skills WA includes:

Fee free:

- Warehousing Operations (Level 5) TLI50221 Diploma of Logistics

New entrant traineeships:

- Warehousing Operations (Level 2) TLI20421 Certificate II in Supply Chain Operations
- Warehousing Operations (Level 3) TLI30321 Certificate III in Supply Chain Operations
- Warehousing Operations (Level 4) TLI40321 Certificate IV in Supply Chain Operations

Priority Industry Qualifications:

- Warehousing Operations (Level 2) TLI20421 Certificate II in Supply Chain Operations
- Warehousing Operations (Level 3) TLI30321 Certificate III in Supply Chain Operations
- Warehousing Operations (Level 4) TLI40722 Certificate IV in Mobile Crane Operations

Targeted fee relief:

- Warehousing Operations (Level 3) TLI30121 Certificate III in Mobile Crane Operations

Stevedoring qualifications:

- Stevedoring (Level 2) TLI20321 Certificate II in Stevedoring
- Stevedoring (Level 3) TLI30219 Certificate III in Stevedoring

5. Your input

- **Why this report?** The WA Government has 8 skills councils to engage stakeholders to advise the State Training Board and the Department of Training and Workforce Development on the training and priorities of industry with particular reference to skills development.
- **Input.** LDSC welcomes input on 08 9388 8781 or <https://www.ldsc.asn.au/contact.html>
- **Industry Advisory Group.** LDSC invites stakeholders to join our Maritime Industry Advisory Group 08 9388 8781 or <https://www.ldsc.asn.au/contact.html>

6. References

- 1 Australian Industry Standard Supply Chain Industry outlook 2022.
https://www.australianindustrystandards.org.au/wp-content/uploads/2022/05/20220504_Supply_Chain_Industry_Outlook_2022.pdf
- 2 Australian Industry Standard Supply Chain Industry outlook 2022.
https://www.australianindustrystandards.org.au/wp-content/uploads/2022/05/20220504_Supply_Chain_Industry_Outlook_2022.pdf
- 3 The Australian Maritime Safety Authority (AMSA) Master Unlimited or Master 1 ticket is henceforth referred to in this document as the Master Unlimited <https://www.amsa.gov.au/qualifications-training>
- 4 https://www.transport.wa.gov.au/mediaFiles/Freight-Ports/FRE_P_WAPortsPortAuthoritiesMap.pdf
- 5 AMSA guidance on VTSSO qualifications: <https://www.amsa.gov.au/safety-navigation/navigating-coastal-waters/qualifications-and-training-vts-personnel>
- 6 AMSA guidance on VTSSO qualifications: <https://www.amsa.gov.au/safety-navigation/navigating-coastal-waters/qualifications-and-training-vts-personnel>
- 7 Fremantle Ports <https://www.fremantleports.com.au/the-port>
- 8 Bureau of Infrastructure and Transport Research Economics 2023, [Waterline 69, Statistical Report](#), Canberra, ACT
- 9 Ports Australia Coastal Shipping Factsheet. Posted 6 May 2021. <https://www.portsaustralia.com.au/blog/ports-australia-releases-coastal-shipping-factsheet>
- 10 Resources and Energy Workforce Forecast Volume 3 – Jul 2022, Australian Resources and Energy Employers Association (AREEA) https://issuu.com/resourcepeople/docs/areea_workforce_forecasting_hr_final
- 11 <https://www.pilbaraports.com.au/ports/port-of-port-hedland/environment-and-community/statutory-environmental-approvals-and-permits>
- 12 The Australian, Taylor, P, Rio Tinto freight shipping service opens Pilbara businesses to world of opportunity, 18 February 2021 <https://www.riotinto.com/en/news/releases/2021/Rio-Tinto-connects-the-Pilbara-to-Asia-with-new-direct-freight-shipping-service>
- 13 Port of Port Hedland <https://www.pilbaraports.com.au/ports/port-of-port-hedland>
- 14 [The Western Trade Coast: A Western Australian Global Advanced Industries Hub by djtsi - Issuu](#)
- 15 <https://developmentwa.com.au/projects/industrial-and-commercial/australian-marine-complex/about-the-amc>
- 16 <https://www.investandtrade.wa.gov.au/opportunities/western-trade-coast>
- 17 <https://commonslibrary.parliament.uk/research-briefings/cbp-9843/>
- 18 Fremantle Ports Annual Report 2020 p55 https://www.fremantleports.com.au/docs/default-source/default-document-library/2020-annual-report-interactive-pdf.pdf?sfvrsn=5cd1ab0e_0 WESTPORT Future Port Recommendations Stage 2 Report May 2020 p5
- 19 https://www.transport.wa.gov.au/mediaFiles/marine/PROJ_P_Westport_Future_Port_Recommendations_Stage_2_Report_May_2020.pdf
- 20 <https://www.mediastatements.wa.gov.au/Pages/McGowan/2021/06/Future-planning-of-Fremantle-underway-with-Westport.aspx>
- 21 [Media Statements - Victoria Quay vision ramping up as Westport powers ahead](#) 11 May 2022
- 22 Department of Jobs, Tourism, Science and Innovation Western Australia Trade Profile – Feb 2023 <https://www.watc.wa.gov.au/media/unphvtxh/wa-trade-profiles-february-2023.pdf>
- 23 Australia-China Trade Tensions: The Great Escape? Rajiv Biswas, Asia Pacific Chief Economist, IHS Markit 9 Jul 2021 <https://ihsmarkit.com/research-analysis/australiachina-trade-tensions-the-great-escape-july21.html> ABC News Shipping cost surge raises retail price pressures and inflation risks, Sue Lannin, 10 Jun 2021 <https://www.abc.net.au/news/2021-06-10/prices-consumers-shipping-ports-trade/100203086>
- 24 White, I 2021, VET student outcomes 2020: impact of COVID-19 on domestic students, NCVER, Adelaide, p9 <https://www.ncver.edu.au/research-and-statistics/publications/all-publications/vet-student-outcomes-2020-impact-of-covid-19-on-domestic-students>
- 25 Maritime, Ports & Stevedoring Industry Working Group Minutes 13 Apr 2021
- 26 Maritime, Ports & Stevedoring Industry Working Group Minutes 22 Mar 2023.
- 27 Maritime, Ports & Stevedoring Industry Working Group Minutes 26 Oct 2022.
- 28 Maritime, Ports & Stevedoring Industry Working Group Minutes 22 Jul 2020. Stay at Home and Closure (Perth, Peel and the South West Regions) Directions issued 31 January 21 under the Emergency Management Act 2005 (WA) <https://www.wa.gov.au/sites/default/files/2021-01/310121-Stay-and-Home-and-Closure-Perth-Peel-and-South-West-Regions-Directions.pdf>
- 29 White, I 2021, VET student outcomes 2020: impact of COVID-19 on domestic students, NCVER, Adelaide, p9 <https://www.ncver.edu.au/research-and-statistics/publications/all-publications/vet-student-outcomes-2020-impact-of-covid-19-on-domestic-students>
- 30 United Nations Conference On Trade And Development 2022 Review of Maritime Transport, Navigating Stormy Waters, Page 14 https://unctad.org/system/files/official-document/rmt2022_en.pdf
- 31 Maritime, Ports & Stevedoring Industry Working Group Minutes 13 Apr 2021 [Port of Dampier receives its first cruise ship visit - Pilbara Ports Authority](#)

32 Tourism WA [https://www.tourism.wa.gov.au/industry-support-and-events/tourism-development/Cruise_shipping/Pages/Cruise-shipping.aspx#/WA CRUISE TOURISM STRATEGY 2023 to 2033.pdf](https://www.tourism.wa.gov.au/industry-support-and-events/tourism-development/Cruise_shipping/Pages/Cruise-shipping.aspx#/WA%20CRUISE%20TOURISM%20STRATEGY%202023%20to%202033.pdf)

33

34 Maritime, Ports & Stevedoring Industry Working Group Minutes 13 Apr 2021

35 Maritime, Ports & Stevedoring Industry Working Group Minutes 22 Jul 2020

36 [State Nominated Migration Program | Migration WA \(amazee.io\)](#)

37 Maritime, Ports & Stevedoring Industry Working Group Minutes 22 Mar 2023

38 Maritime, Ports & Stevedoring Industry Working Group Minutes 26 Oct 2022

39 Maritime, Ports & Stevedoring Industry Working Group Minutes 13 Apr 2021

40 IBIS World Industry Research Reports 26 Mar 2021, Stevedoring Services in Australia
<https://www.ibisworld.com/au/industry/stevedoring-services/483/> Industry Consultation 22 June 2021

41 AIS, Maritime: Emerging Trends and Skills Needs to Support the Industry Forum, 12 Mar 2021

42 Maritime 4.0 – Opportunities in Digitalization and Advanced Manufacturing for Vessel Development
[Authors Brendan P.Sullivan, Shantanoo Desai, Jordi Solec, Monica Rossia, Lucia Ramundoa, SergioTerzia, 2020 International Conference on Industry 4.0 and Smart Manufacturing \(ISM 2019\)](#)

43 [Automation Technology at Port Botany case study | Transport for NSW](#)

44 [Our Story » Victoria International Container Terminal](#)

45 Ports Australia Coastal Shipping Factsheet. Posted 6 May 2021. <https://www.portsaustralia.com.au/blog/ports-australia-releases-coastal-shipping-factsheet>

46 International Energy Agency <https://www.iea.org/energy-system/transport/international-shipping>

47 [Western Australia's Environmental, Social and Governance \(ESG\) Industry Information Pack \(www.wa.gov.au\)](#)

48 Westport Environmental, Social and Governance Strategy <https://westport.wa.gov.au/media/ih1nvx4x/westport-esg-strategy.pdf>

49 WA government July 2023 Building WA's climate resilient future [climate adaption strategy 220623.pdf \(www.wa.gov.au\)](#)

50 Department of Jobs, Tourism, Science and Innovation. Western Australia's Hydrogen Projects Developing the renewable hydrogen industry January 2023. https://www.wa.gov.au/system/files/2023-02/WA_Hydrogen_Projects_-_Developing_the_renewable_hydrogen_industry_web.pdf

51 Developing port infrastructure to support decarbonisation. Lyle banks. Pilbara Ports Authority presentation to MIAL Decarbonisation Summit, Perth WA 16 May 23

52 [Green Steel Resources - Minerals Research Institute of WA Minerals Research Institute of WA \(mriwa.wa.gov.au\)](#)

53 Minerals Research Institute of Western Australia, 2023, Western Australia's Green Steel Opportunity, MRIWA [MRIWA Final Reports - Final-Report_10471 MRIWA M10471 - Full Report.pdf - All Documents \(sharepoint.com\)](#)

54 [Lumsden Point - Pilbara Ports Authority](#)

55 Department of Jobs, Tourism, Science and Innovation. Western Australia An outstanding place for renewable hydrogen investment January 2023. https://www.wa.gov.au/system/files/2023-02/Hydrogen_Prospectus_JAN_2023.pdf

56 Maritime, Ports & Stevedoring Industry Working Group Minutes 22 Mar 2023

57 Maritime, Ports & Stevedoring Industry Working Group Minutes 22 Jul 2021

58 Australian Institute of Marine Surveyors, <https://www.aimsurveyors.com.au/Diploma-Courses>.

59 Maritime, Ports & Stevedoring Industry Working Group Minutes 22 Jul 2020

60 ABC News, Standon, S., Ambitious Maritime vision for Port Hedlands' Future, 24 Sep 2020
<https://www.abc.net.au/news/2020-09-24/big-plans-for-maritime-precinct-in-port-hedland/12695480>

61 ABC News, Standon, S., Ambitious Maritime vision for Port Hedlands' Future, 24 Sep 2020
<https://www.abc.net.au/news/2020-09-24/big-plans-for-maritime-precinct-in-port-hedland/12695480>

62 <https://www.pilbaraports.com.au/about-ppa/working-with-us/youth-training-strategy>