

September 2023

# navigate

Westport Program Update



Taking a closer look at some of the science, thinking and technical processes behind one of Western Australia's largest ever infrastructure projects.

## Managing Director's Message

**Recognising the importance of WA's only container gateway, the scale of this project, and the importance of Cockburn Sound, we're undertaking an extraordinary amount of work pre-business case and it's having a material impact on the project.**

There's been a deliberate effort to drag key pieces of work forward in the planning cycle. In this edition, you'll read about how we're optimising shipping channels for the ships of the future and the environment, capturing cutting-edge research and ancient knowledge to shape design of the port and supply chain, and engaging extensively with the right people to ensure the best design outcome.

Our team is excited to continue to share the process and findings of our various technical projects. If you have questions or would like to discuss any articles in this issue further, please reach out via [enquiries@westport.wa.gov.au](mailto:enquiries@westport.wa.gov.au)

**Patrick Seares**  
Managing Director, Westport

## Mapping of cultural and spiritual values

**Cockburn Sound, or Derbal Nara (its Noongar name), and surrounds is an area rich with cultural knowledge, stories and songlines of the Whadjuk and Gnaala Karla Booja Noongar Peoples.**

In April 2023, Westport partnered with Winyama, an Indigenous-owned and operated business specialising in location intelligence, to capture and map these cultural and spiritual values.

As part of the mapping process, Winyama interviewed knowledge holders identified by Westport's Noongar Advisory Group to document sites of significance and the stories connected to them. Findings were then handed back to the Noongar Advisory Group.

Westport's team was given permission to use this data to inform Westport Stage 3 so that locations of cultural significance can be considered through the design process.

Westport is using this information to consider design, particularly of roads, and to identify opportunities for enhancing places of value through projects that deliver dual benefits for environment and culture.

This information will not be made publicly available and will remain the intellectual property of the knowledge owners until it can be passed to the Whadjuk and Gnaala Karla Booja Corporations, once they have secure data storages.





# Optimising channels for the vessels of the future

**Using a real time simulation, Westport tested how ships would navigate the proposed new deep-water channel through the Success and Parmelia banks under a range of weather and emergency conditions.**

It may not be the next big trend in gaming, but this vessel simulation certainly had a captive audience amongst the likes of Westport, HR Wallingford, Fremantle Port Authority, Fremantle Pilots, WSP Australia, and Svitzer Australia.

Using HR Wallingford's state-of-the-art virtual simulation software, the team watched as 366m- and 399m-long ships entered Cockburn Sound, steered by Captain Ian Simpson, a master mariner who has captained some of the world's largest ships, including the Ever Given. The simulations were run to:

- understand the channel width required for standard inbound and outbound manoeuvres for container ships along Westport's current proposed channel layout,
- examine how vessels respond in a range of local weather conditions and emergency conditions, and
- inform the baseline channel widths, which have been based on PIANC (World Association for Waterborne Transport Infrastructure) concept design calculations.

The ships used in the simulation were 14,000 TEU (366m long) and 18,000 TEU (399m long). 14,000 TEU vessels are currently the largest visiting container ports across Australia. The simulation vessels were modelled with full deck cargo providing maximum windage area (or exposed area) and a maximum draught (the distance between the very bottom of the ship and waterline) for each of the ships.

The virtual channels were navigated across a range of real-life conditions, including good weather, low and high-speed winds, and 55 knot-per hour storms. Pilots were kept on their toes with a range of scenarios including rudder failures, power losses and hazardous weather conditions.

The simulation demonstrated that channels narrower than PIANC standards can accommodate vessels up to 18,000 TEU under a variety of extreme and unusual conditions.

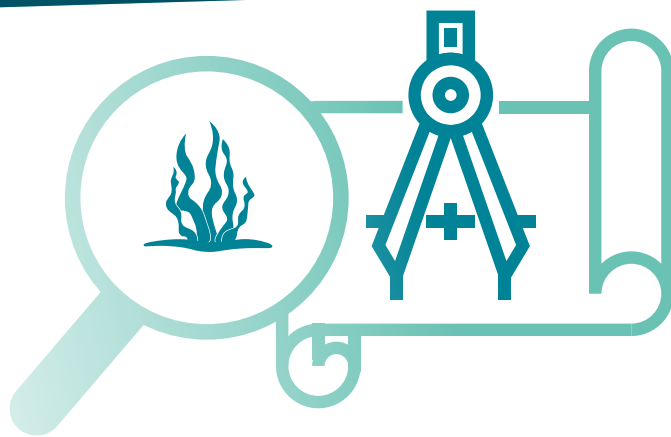
We have also undertaken Dynamic Under Keel Clearance (DUKC) modelling using new wave tide information, in areas including the approach channels, turning basins and Owen Anchorage. This modelling has identified the opportunity to reduce the channel depth in some areas by up to 2.5 metres.

The simulation and DUKC exercises give confidence that we can review final channel and turning basin designs to minimise dredging needs, and therefore environmental impact, while ensuring safe and highly efficient navigation for ships.





# Research to help shape design



**Westport is delivering a level of research and analysis uncommon for a project that's pre-business case. However, this is critical infrastructure in an area that is important to our community both environmentally and recreationally, and requires long-term planning, a considered approach, and significant spend.**

We're building a comprehensive understanding of the project's environment – the physical, social, and economic conditions – and we're doing this early. That way, this information can influence designs and planning to help identify avoidable delays and excess expenses in later project stages, as well as realise wider benefits and opportunities.

## Mapping the seafloor

The Westport team is reviewing the geophysical data collected from across a nearly 40km<sup>2</sup> area of Cockburn Sound and Owen Anchorage. It is uncommon for geophysical surveys to be conducted at this stage in a project, before a complete business case or progressed design. However, geophysical surveys will help us develop a detailed picture of the seafloor, identifying:

- depth measurements and subsurface characteristics,
- topography showing reefs, banks, scarp slopes and channels,
- any existing installed subsea infrastructure including cables, pipelines, or small wrecks,
- any smaller ferrous or non-ferrous items dropped on the ocean floor,
- the level of subsurface cemented material layers or bedrock, and
- any possible structural complexities or geohazards within the shallow geological succession.

This information is influencing the evaluation of different design options for the navigational channel, access channel, turning basin, and the berthing pocket.

## Hydrodynamics and water quality

The location and scale of this infrastructure project has called for a progressive approach to planning, where functional and environmental outcomes are considered with equal measure and used to shape the design.

To understand the potential future impact of construction and operation of a new terminal on water quality, we first need to understand it's current state. This includes establishing a 'baseline' of the contaminants that currently reside in the water and sediments, as well as the flushing and circulations patterns within Cockburn Sound.

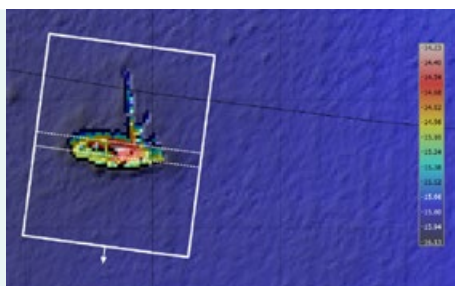
Monthly water quality monitoring, enclosed incubation experiments, and nutrient measurement surveys are amongst the methods being used to examine water and sediment quality in Cockburn Sound and Owen Anchorage.

Researching how environmental conditions influence sediment turbidity and contaminants in the water, and how nutrients are recycled within Cockburn Sound is important in understanding potential impacts from disruptions to these processes.

Hydrodynamic modelling, based on the collection of real-time data over 4 seasonal deployments, is also contributing to our understanding. The patterns of circulation and currents will help us identify the best time of year and conditions for any construction or dredging to occur, to minimise impacts on water quality. This research will also help inform the evaluation of terminal and potential breakwater designs. For example, some designs may be more disruptive to water circulation than others.

Overall, hydrodynamic modelling and water quality surveys will help refine and/or eliminate design options, as well as inform Westport's dredging planning based on predicted impacts on water quality and circulation.

These projects form part of Westport's partnership with the [Western Australian Marine Science Institution](#). Findings will not only help Westport plan responsibly for a new terminal, but public data will contribute to the wider community's understanding of Cockburn Sound.

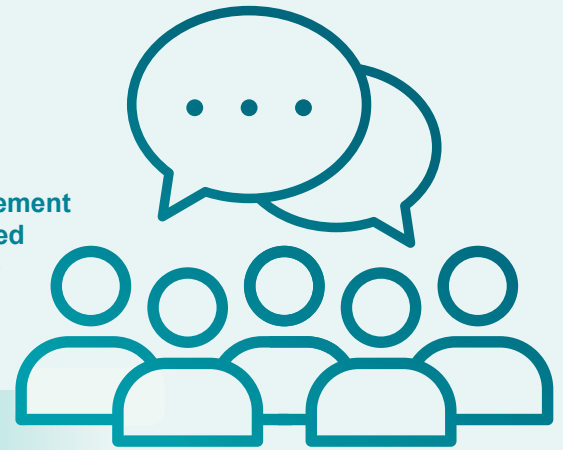


## A sunken sailboat identified in geophysical surveys.

*Image credited to Fremantle Ports Authority.*

# Extensive engagement

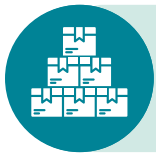
As part of planning for Perth's future container terminal and freight network, we've spent 500 hours since January 2022 in direct engagement with over 130 stakeholders. Inputs from stakeholders have influenced design, validated (or challenged) our assumptions, provided 'on the ground' expertise and knowledge to our team, and helped with the development of mitigations.



## Who we've talked to

- ✓ Academics and thought leaders
- ✓ Importers and exporters
- ✓ Industry groups and associations (including freight and logistics, energy, commerce and industry, shipping, and ports sectors)
- ✓ Investors
- ✓ Kwinana industry
- ✓ Local Governments
- ✓ Marine service providers
- ✓ Other ports (national and international)
- ✓ Quarantine services/Boarder Force
- ✓ Rail and IMT operators
- ✓ Road transport operators
- ✓ State Government agencies
- ✓ Shipping lines
- ✓ Stevedores and port operators
- ✓ Traditional Owners

## Recap on recent engagements with operators



### Discussion with importers and exporters

In our conversations with importers and exporters including Amazon, IKEA, Wesfarmers, and Super Retail Group, we discussed:

- their logistics networks and container staging requirements,
- insights into the potential use of rail for sustainable operations,
- locations of distribution centre locations in the context of Westport's IMT planning,
- the importance of having de-hire services near IMTs and distribution centres,
- current constraints and challenges of transporting containers by road, and
- current preference to move freight from east to west by rail, opposed to coastal shipping.



### Speaking with stevedores

In July and August, Westport continued engagement with stevedore companies to ensure our marine terminal design provides the necessary space and appropriate utilities for future operations. At these engagements Westport asked stevedores:

- their preference regarding the type/mode of operation and equipment built at the Westport terminal,
- recommendations for the terminal's integration with rail,
- the triggers for operators to invest in new capacity or more advanced technologies at a new terminal, and
- their views on the need for functional symmetry between stevedores within the new port.

The feedback received from engagement with importers, and exporters, and stevedores, is helping us develop the optimal configuration for the new terminal and supply chain. We will continue to speak with stakeholders as we refine our design options.