APPENDIX 12

ISSUES AND OPTIONS REPORT

Sensitivity: General

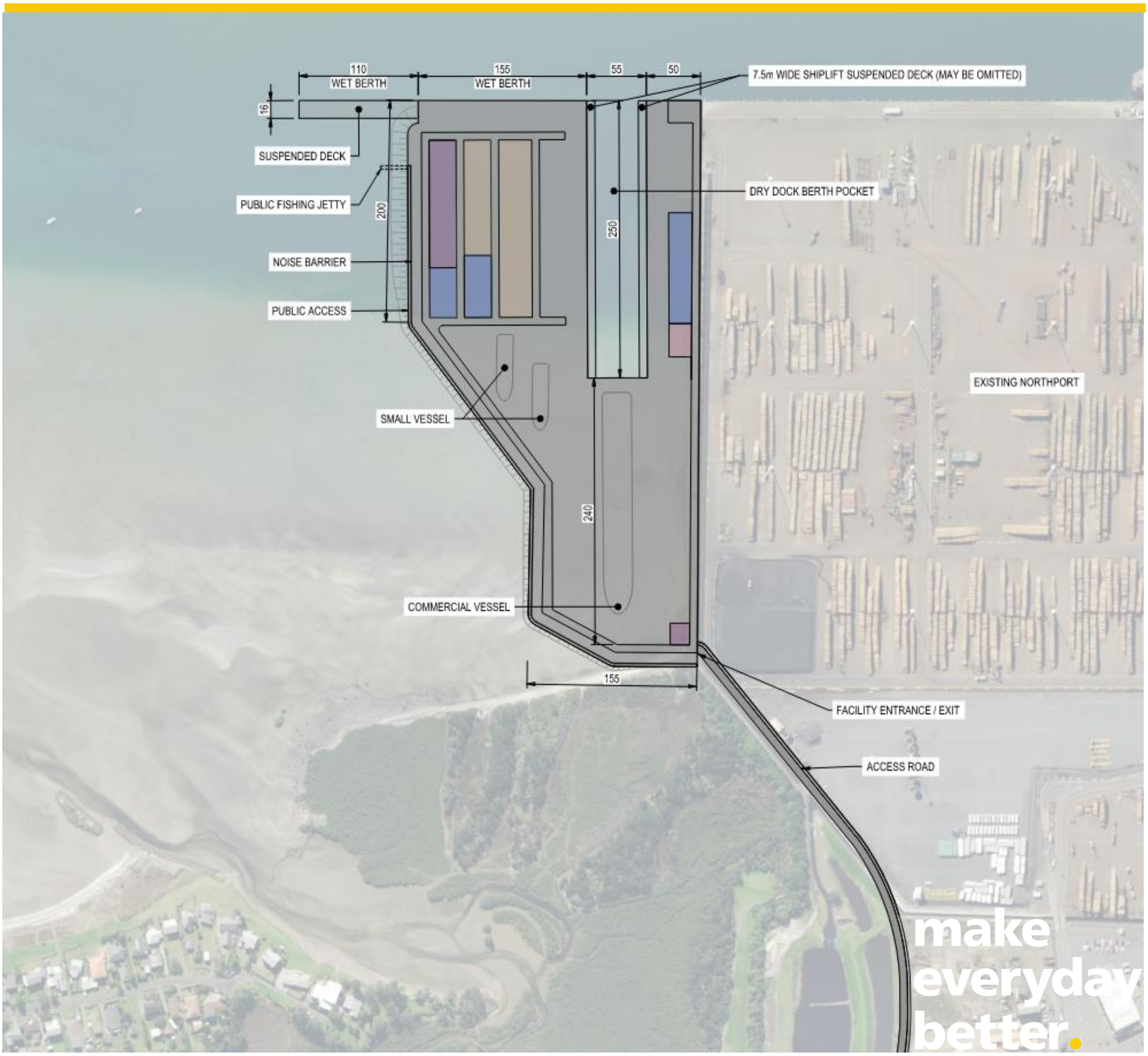
Beca

Issues and Options Report

Northland Shipyard and Drydock

Prepared for Ministry of Business, Innovation & Employment
Prepared by Beca Limited

18 August 2026



Contents

Revision History

Revision Nº	Prepared By	Description	Date
A	Blair Masefield	draft Structure for Review	15 May 2026
B	Blair Masefield Robbie Howe	DRAFT for review	12 June 2026
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Document Acceptance

Action	Name	Signed	Date
Prepared by	Blair Masefield Robbie Howe		18 August 2026
Reviewed by	John Tucker	pp.	18 August 2026
Approved by	Andy Harvey		18 August 2026
on behalf of	Beca Limited		

Executive Summary

This Issues and Options Report has been prepared to support the Ministry of Business, Innovation and Employment's application under the Fast-track Approvals Act 2024 for the Shipyard and Drydock Facility listed in Schedule 2 of the Act (the Project). The Project comprises a proposed shipyard and marine maintenance facility at Marsden Point, immediately adjacent to Northport. The report examines the issue and rationale for the project, the assessment of alternative locations, and the design development and optioneering processes undertaken to establish the preferred concept.

The Issue

New Zealand currently has limited dry docking capability for medium and large vessels. Existing dry docks at Devonport and Lyttelton are constrained by vessel size, resulting in many commercial, transport and defence vessels being required to undertake routine maintenance and statutory dry docking overseas. This reliance on offshore facilities increases operating costs, vessel downtime, scheduling risk, and exposure to international capacity constraints.

The Ministry of Transport's *Northport Dry Dock Supporting the Blue Economy Business Case* (July 2023) (the 2023 Business Case) identified a sustained market for a domestic facility capable of servicing vessels larger than those accommodated by existing New Zealand dry docks. The assessment confirmed demand from a range of vessel classes, including inter-island ferries, naval vessels, commercial shipping, offshore support vessels and other specialist craft. Forecast utilisation indicates a facility of the scale proposed would support regular scheduled dry dock activity, with additional demand arising from unscheduled maintenance, emergency repairs and biosecurity-related work.

The project is intended to address this infrastructure gap by providing modern marine maintenance capability within New Zealand, improving resilience within the maritime sector and supporting the long-term operation of vessels critical to freight movement, passenger transport, regional connectivity and national service delivery.

Site Selection

A range of alternatives were considered both within New Zealand and across the wider South-West Pacific. Existing facilities in Australia and Asia were identified as capable of servicing larger vessels but were located considerable distances from New Zealand and subject to competing demand. Existing New Zealand facilities were found to be physically constrained and unable to accommodate future vessel requirements.

Site selection criteria focused on navigable deep-water access, harbour shelter, sufficient operational sea-room, industrial land availability, and proximity to an established marine engineering sector. Marsden Point was identified as the ideal location in New Zealand that satisfied these key requirements while also benefiting from existing port infrastructure and planned transport network improvements.

Within Marsden Point, eastern and western location options were assessed. While both locations were technically feasible, the eastern option would conflict with Northport's consented expansion plans and existing industrial operations. The western location was therefore identified as the preferred site due to its compatibility with future port development, operational separation from existing shipping movements, and ability to accommodate the required facility footprint.

Design Development and Proposed Concept

The proposed concept has been developed through a structured and iterative design process spanning several years, progressing from strategic investigations and demand assessments through to concept refinement, engagement with a potential operator, value engineering, and consenting design. Each stage informed subsequent design decisions, so that the proposed facility responds to operational requirements, technical constraints, commercial considerations, and environmental factors.

Subsequent design refinement incorporated additional engineering investigations, navigation assessments, geotechnical information, three-dimensional modelling, and constructability reviews. Engagement with a potential operator and value engineering undertaken between 2025 and 2026 played a role in refining the proposed concept. Input from a potential operator resulted in a reassessment of vessel handling arrangements, hardstand requirements, and lifting technologies.

This review highlighted the operational benefits of providing landside transfer capability and the ability to service multiple vessels concurrently. As a result, the project evolved from a concept centred exclusively on a floating dry dock to one that also accommodates a ship lift solution capable of lifting vessels from the water and transferring them onto landside maintenance areas. While the final lifting technology remains subject to further assessment, the concept design has been developed to allow either option to be implemented without materially altering the overall project footprint. Both options are capable of servicing and lifting the hypothetical design vessel, being up to 230m long, with a draft of 9m and 28000 tonnes weight.

The reclamation and dredging strategy was tested and evolved through successive design stages. Combinations of reclamation and piled structures were assessed to provide the above sea level footprint for the dry dock and marine maintenance facility. Ultimately a reclamation configuration was selected with small areas of piles structures for the wet berth and ship lift platforms. Reclamation provides greater structural integrity for the large vessel dry berth, lower whole of life costs and greater resilience in a harsh marine environment. The dredging area required for the lifting pocket, wet berth and turning basis provides a cut fill balance for the reclamation area required and is the most efficient option compared to offshore disposal or stockpiling for an alternative use.

The structural form of the marine infrastructure was also subject to optioneering. A range of suspended deck, revetment, retaining wall, and combi-wall solutions were examined. Following consideration of constructability, operational performance, durability, and cost, a combi-wall system was selected as the preferred structural form for the lifting pocket and wet berth areas. This solution provides the required structural performance while facilitating reclamation construction and operational flexibility.

Building layouts, workshops, storage areas, utilities, administration facilities, environmental infrastructure, access arrangements, and parking requirements have likewise been progressively refined throughout the design process. The proposed concept reflects close collaboration between MBIE, Northport, technical specialists, and a potential operator to provide facility layouts that support anticipated operational practices while allowing flexibility for future optimisation during detailed design and implementation. Transport assessments have informed access and parking requirements, while environmental considerations have led to inclusion of stormwater treatment, wastewater containment and treatment systems, contained hardstand areas, and public access arrangements within the overall facility design.

The resulting proposed concept represents the culmination of a staged and evidence-based design process. It provides a flexible marine maintenance facility capable of accommodating vessels up to approximately 230 metres in length and more than 28,000 tonnes displacement, while allowing for future refinement as operational requirements, commercial arrangements, and detailed engineering design continue to develop.

Findings

The assessment undertaken demonstrates the issue and rationale for establishing a large dry dock in New Zealand and identifies Marsden Point as the most suitable location for the proposed facility based on operational, technical, environmental and planning considerations. The preferred concept has evolved through a structured and iterative assessment process involving technical investigations, demand analysis, engineering design, and input from a potential operator. The concept balances operational functionality, constructability, environmental management, and long-term adaptability, providing a robust basis for consideration through the Fast-track Approvals Act approvals process.

1 Introduction

1.1 Purpose

This Issues and Options Report has been prepared to inform the Ministry of Business, Innovation and Employment (MBIE) application under the Fast-track Approvals Act (FTAA) for the Project at Marsden Point, immediately adjacent to Northport in Northland. The purpose of this report is to:

- set out existing dry dock limitations and the rationale for establishing a large dry dock facility in New Zealand,
- outline the considerations relevant to the selection of Marsden Point as the project location, and
- evaluate the options considered in the proposed facility design and construction approach.

1.2 Report Structure

This report has been prepared to support MBIE's application under the FTAA and contains the following information:

- The issue and rationale for a dry dock at Marsden Point.
- Selection of the Marsden Point location.
- The design development and optioneering process
- The preferred option

1.3 Statement of Qualifications and Experience

1.3.1 John Tucker

John Tucker holds a Bachelor of Engineering (Mechanical) and is a Chartered Engineer and Chartered Marine Engineer. He has 36 years' experience in the Naval and Offshore Marine sectors, working across the Asia Pacific region.

Through his NZ Defence Force roles as Fleet Marine Engineering Officer, Assistant Chief of Navy (Capability) and Logistics Commander, John developed in-depth knowledge of Naval vessel build, commissioning, maintenance and operations, including logistics and planning for vessel docking.

He consolidated his systems engineering and vessel maintenance and operations project management experience within the marine sector as Managing Director of a Singapore-based company that owned, chartered, and operated a fleet of specialised offshore support vessels. He subsequently operated his own offshore marine consultancy based in Singapore.

At Beca, John has continued his focus on Maritime developments including on the i-ReX replacement Inter-Islander Ferry programme, various NZ Defence Force systems engineering projects, and business cases for the NZ Naval Base location and the Marsden Point Dry Dock.

John's experience across the Asia Pacific region provides him with real-world knowledge and understanding of how to design for the layout and operation of dry docks and marine maintenance facilities.

John confirms he has read the Environment Court Practice Note 2023 – Code of Conduct for Expert Witnesses and agrees to comply with it in the preparation of this report and participation in any subsequent expert or hearing processes. He confirms that the opinions expressed are within his respective areas of expertise and are his own, except where they have expressly relied on the work of others.

1.3.2 Blair Masefield

Blair Masefield holds a Bachelor of Resource and Environmental Planning (Honours). He is a Technical Director – Planning at Beca with 21 years' experience consenting and designating infrastructure and coastal projects.

His relevant experience with assessment of alternatives processes has developed through involvement in the consenting / designation phases of the Waterview Tunnels and SH16 Causeway Board of Inquiry, Auckland Manukau Eastern Transport Initiative Stage 2B, PenLink, Auckland Harbour Bridge Maintenance Discharges, Warkworth to Te Hana RoNS, Kerikeri Bypass Road, and the Alternative to Brynderwyns RoNS.

His experience with the coastal policy framework is derived from time as a coastal consent officer at the Auckland Regional Council, coastal aspects of the aforementioned projects, numerous other coastal consenting projects and most recently as the processing planner for the Northport Expansion (Vision for Growth) consents.

His knowledge of the Marsden Point area comes from 9 years based in Whangārei, involvement in District and Regional plan making processes, consenting work for Channel Infrastructure and Northport.

Blair confirms he has read the Environment Court Practice Note 2023 – Code of Conduct for Expert Witnesses and agrees to comply with it in the preparation of this report and participation in any subsequent expert or hearing processes. He confirms that the opinions expressed are within his area of expertise and are his own, except where he has expressly relied on the work of others.

1.3.3 Robbie Howe

Robbie Howe holds a Master of Civil Engineering with International Studies (first-class honours). He is a Senior Ports and Coastal Engineer at Beca with experience delivering port, shipyard and dry dock projects across New Zealand and internationally.

Robbie has experience in port master planning, maritime engineering and marine infrastructure development. He has acted as Project Manager, and maritime engineer on a range of port and marine infrastructure projects, working directly with government agencies, port authorities and private sector clients.

At Beca, Robbie has undertaken project management and engineering roles on projects involving marine maintenance facilities, shipyards and dry dock infrastructure. This includes serving as Project Manager and Marine Engineer for the Northland Dry Dock Concept Refinement project and contributing to the Northland Shipyard Business Case and shipyard studies in New Caledonia and Tonga.

Robbie's experience in shipyard planning, dry dock development, marine maintenance facilities, port master planning and maritime infrastructure design provides him with practical knowledge and understanding of the planning and design of shipyards, dry docks and marine maintenance facilities.

Robbie confirms he has read the Environment Court Practice Note 2023 – Code of Conduct for Expert Witnesses and agrees to comply with it in the preparation of this report and participation in any subsequent expert or hearing processes. He confirms that the opinions expressed are within his area of expertise and are his own, except where he has expressly relied on the work of others.

2 The Issue

This section provides context for the proposed dry dock and marine maintenance facility at Marsden Point. It outlines the current gap in dry dock capacity within New Zealand, role of the maritime sector in New Zealand, relevant industry trends, the function of dry dock infrastructure, the likely utilisation rates and the types of vessels expected to use the facility, which informs the Concept Design.

2.1 The Gap in Available Facilities

2.1.1 New Zealand facilities

New Zealand currently has two graving dry docks: the Calliope Dock at Devonport and the Lyttelton dry dock. Both were constructed in the nineteenth century and are limited to vessels of approximately 180 metres, and 120 metres length overall (LOA) respectively. Both are relatively narrow at the entrance, with Calliope dock being a maximum of 21.8 meters wide at the dock entrance. These physical constraints mean that some existing and planned NZ flagged vessels, including the new inter-island ferries and larger naval vessels, cannot be dry docked locally (in NZ).

As a result, large (beam exceeding Calliope gate width) vessels domiciled in New Zealand are forced to travel offshore for dry dockings, often to Australia or Singapore for servicing and routine dockings.

2.1.2 Alternatives to a local dry-docking capability

Overseas dry dock facilities provide an alternative option for servicing vessels. Access to these is constrained by distance, availability, and competing demand. The dry dock facilities that NZ operators of large vessels are forced to rely on are exclusively offshore. The closest is the Captain Cook Graving Dock (CCGD) in Sydney, while the most reliably available are typically shipyards in Singapore.

The Sydney facility is primarily a military dry dock, being highly utilised by a growing Royal Australian Navy (RAN) as a priority user. As evidenced by the recent award of new-build contacts, the RAN fleet continues to grow and as these new ships are delivered, the priority demand for CCGD will increase.

2.1.3 Impact of relying on offshore facilities

Relying on offshore facilities involves lengthy transit times and fuel consumption, extended vessel operational downtime, and exposure to scheduling and availability constraints at the overseas facilities.

The increasing unreliability of the CCGD will force NZ commercial vessel operators further afield (to Singapore), with all the associated costs, reduced productivity and carbon footprint.

By way of example, travel to Singapore will typically amount to approximately 28 days of transit time with large operational opportunity costs / loss of revenue and significant fuel costs.

2.2 The Maritime Sector

2.2.1 Global and Domestic Maritime Trends

Global and domestic maritime trends indicate that demand for ship maintenance and repair infrastructure will continue to increase over coming decades. Internationally, there is a clear trend toward larger vessels, higher performance ships, and improved fuel efficiency, driven by economies of scale, emissions regulations and evolving freight patterns.

Similar trends are seen in New Zealand. KiwiRail has ordered new InterIslander ferries of approximately 200 metres, which are larger than existing vessels. Changes in vessel scale are also occurring within the Royal New Zealand Navy's current and planned fleet. Presently, two strategic vessels of the current fleet (HMNZ

Ships Canterbury and Aotearoa) cannot be docked in New Zealand. Increased vessel size and technical complexity combine to heighten the advantages of having access to specialised infrastructure to manage scheduled and unscheduled maintenance demands; including out of water maintenance. Moreover, access to a sovereign large dry dock will provide flexibility with the Navy's future vessel selection options.

Decarbonisation is also likely to influence future ship design. The wider maritime sector transition to low- and zero-emissions fuels such as, for example, hydrogen or ammonia will likely drive an increase in future vessel size. This is a design response to the fact that low-emission fuels, with lower calorific value, require greater onboard bunker tank volumes to achieve the same range when compared to a vessel powered by marine diesel fuel, further reinforcing the need for modern, suitably sized dry dock infrastructure.

Improved ship hull cleanliness will continue to warrant attention not only from a biosecurity point of view but because of the marked impact a clean hull has on reducing fuel (of all types) consumption. Collectively, these trends will drive ongoing demand for dry dock facilities capable of accommodating larger and more technically complex vessels.

2.2.2 Function of a Dry Dock and Marine Maintenance Facilities

Dry docks are used for the construction, inspection, repair, and maintenance of vessels, particularly for work below the waterline that cannot be undertaken while vessels are afloat. These facilities form an essential part of the maintenance and operation for the Maritime sector.

Activities typically carried out in dry docks include hull cleaning and painting, propeller and thruster maintenance, steel repairs, machinery work, and structural modifications and close-up inspections of the integrity of the hull. A full description of typical facilities is contained in the Beca Concept Design Report, 2026.

International Maritime Organization (IMO) conventions, including Safety of Life at Sea Convention (SOLAS) requirements, and Flag-State/Classification requirements generally require all vessels over 500 gross tonnes to dry dock at intervals not exceeding five years. Over and above these general requirements, tankers and passenger vessels are generally subject to two dry docking inspections over a five-year cycle. Dry docks are also crucial facilities with which to deal with unplanned or emergency repairs and for (biosecurity) directed hull cleaning.

2.3 Utilisation and Vessel Type

2.3.1 Industry Demand

Demand for dry dock and marine maintenance facilities in New Zealand is driven, in the first instance, by the combination of core regulatory requirements, fleet characteristics, and existing infrastructure constraints. . The 2023 Business Case identifies a shortfall in domestic dry dock capacity for medium to large vessels and a gross regional vessel pool of approximately 185 vessels. Of those 113 vessels were considered viable candidate vessels that would seek to utilise a New Zealand based large dry dock facility.

Key demand drivers include:

- Regulatory requirements: International maritime rules (IMO and classification society requirements) require vessels (over 500GT) to undergo dry docking at intervals of up to five years, with more frequent inspections for certain vessel types.
- Vessel size and dry dock capacity: An increasing proportion of the New Zealand-flagged fleet, including inter-island ferries, naval vessels, and larger commercial vessels, exceeds the capacity of existing domestic dry dock facilities. Combined with constrained regional dry dock availability, this often requires vessels to travel offshore for major maintenance and refit works, resulting in significant cost, downtime, and emissions impacts.

- Fleet composition: Future growth in coastal and regional shipping, both in terms of vessel numbers and in vessel size (tonnage) will drive a proportional demand for maintenance facility capacity.
- Operational requirements: Defence and commercial fleets require access to appropriate maintenance facilities for scheduled and unscheduled out of water servicing as explained above. The closer to home waters these facilities are, the lower the vulnerability, and the higher the availability and resilience of the services provided by these fleets.
- An increase in biosecurity vigilance and hull inspections of ships arriving in New Zealand waters over recent years is increasing the number of vessels being required to clean their hulls on arrival. A dry dock capable of accepting larger vessels offers an opportunity to deal with this hull cleaning requirement in a more controlled and efficient manner when compared to cleaning ships hulls in the water.

2.3.2 Utilisation

An assessment of the potential facility utilisation has been undertaken based on forecast demand and regulatory docking requirements as set out in the 2023 Business Case. Modelling indicates that a dry dock facility of approximately 230-250 metres in length would achieve high utilisation based on scheduled dry dockings alone. When unscheduled, emergency, and biofouling-related dockings are included, utilisation is expected to increase further, approaching practical capacity.

While the utilisation assessment includes a practical provision for unplanned events it excludes markets such as cruise ships, routine (as opposed to contingency dockings) maintenance of Royal Australian Navy (RAN) ships and large vessels managed out of Europe or Asia (on the basis that the vessel management companies will have longstanding arrangements with shipyards closer to the vessels' home ports). While not eliminating the possibility of these markets, the application of this pragmatic assessment strengthens confidence in the utilisation model without overstating the case.

The potential facility Operator conducted their own due diligence by way of a market demand analysis that corroborated the previously assessed utilization rate and why the Northland facility could become an essential, nationally significant infrastructure asset.

2.3.3 Type/Number of Vessels

The facility is expected to service vessels across a range of types, displacements and LOA but is optimised to accommodate larger vessels. A substantial proportion of identified demand relates to vessels approximately 150 to 230 metres in length, including inter-island ferries, naval vessels, and larger commercial vessels, most of which cannot currently be serviced within existing domestic dry docks.

Additional demand will be generated by the medium-sized tonnage fleets such as regional cargo ships, fishing vessels, and offshore support vessels, as well as smaller commercial and specialist vessels. There is also a luxury yacht (white boat) market that is currently unable to be dry docked in New Zealand because of an inability to move such vessels ashore. While Whangārei has a strong reputation for this white-boat work, existing facilities lack the ability to lift boats larger than 500 tonnes. Addressing this shortfall will create new opportunities for this specialist sector in Northland.

3 Location

Identifying an optimal location for this facility drew, initially, from earlier sector or regional studies to establish dry dock capability. The review of existing facilities across New Zealand and the wider Trans-Tasman region, and their capacities, was considered in the 2023 Business Case and used to inform the likely demand for such a facility in New Zealand.

3.1 Consideration of Alternative Locations

3.1.1 SW Pacific and SE Asia

Across the wider South-West Pacific and Southeast Asia, existing dry dock infrastructure is limited and geographically dispersed, with key facilities located in:

- Sydney (Captain Cook dry dock) – the closest large-scale facility, but heavily constrained by Royal Australian Navy demand and limited commercial availability
- Singapore and Southeast Asia – capable of servicing large vessels but requiring extended international voyages (weeks of travel time and high cost)
- Smaller facilities in Australia (e.g. Queensland, Darwin), which lack the scale or capability to service large New Zealand based vessels.

3.1.2 New Zealand

Within New Zealand, existing facilities / locations have the following limitations:

- Devonport (Calliope Dock, Auckland) – limited to ~180m vessels and constrained by narrow (21.8m) entrance portal
- Lyttelton (Stark Brothers) – significantly smaller (~120m LOA capacity)
- Port of Taranaki – previously considered for a floating dock but lacks sufficiently sheltered area and inability to economically design out exposure to prevailing south-westerly swells
- Picton/Shakespeare Bay – previously considered for floating dock but lacks supporting landside development potential and not well supported by an established marine-related industrial base.
- Other slipways and facilities across NZ – only able to service smaller vessels.

3.1.3 Conclusion

Existing facilities are:

- In the case of regional facilities (SW Pacific / SE Asia), have constrained availability, and those that can be booked are a significant distant away. This causes high costs from lost operating time and fuel for long transit voyages to/from these facilities and the associated emissions.
- In the case of National facilities, these are all undersized and unfeasible to be adapted for larger vessels
- There is no readily available, local large dry dock capacity to service New Zealand based vessels
- Overseas options impose significant cost, downtime, and emissions impacts
- Capacity constraints and competing naval demand limit reliability of access

Reliance on trans-Tasman or international facilities is therefore a sub-optimal long-term solution.

3.2 Marsden Point

From a functional and logistical perspective, Marsden Point is a suitable location in New Zealand for a large dry dock, due to deep-water access, available industrial land, an existing marine manufacturing and servicing industry, scheduled/consented upgrades to road and rail connections, and proximity to both domestic and regional maritime markets. Locating a dry dock at Marsden Point would allow integration with existing port infrastructure and would support further development of marine-related activity in the region.

Marsden Point is New Zealand's northernmost deep water commercial port and plays a role within the wider national port network. The port has established maritime access and existing consented upgrades to road and rail connections, existing port operations and, crucially, is proximate to a well-established marine engineering and industrial capability. This critical combination of sufficiently deep water, reasonably-well sheltered harbour and proximity to a burgeoning marine industry are critical key factors that, in the New Zealand context, make the Marsden Point location unique.

The closure of the Marsden Point oil refinery reduced industrial employment in the region while marine, engineering, and fabrication enterprises continues to thrive in Northland, with experience in vessel construction, maintenance, and refit work. The operational model to be established at the facility is expected to leverage this local capability.

3.2.1 Site Selection criteria

The core requirements to be satisfied by the location included:

- An area that is coastal in character that offered a deep-water navigable interface to the sea,
- A location that had sufficient deep water for manoeuvring to enter or exit the facility or when a vessel in maintenance is being turned around by tugs,
- A sheltered harbour that is not subject to long-set wave action,
- Sufficient space to create a facility capable of handling large (up to 230m) vessels, and
- A location that is proximate to an established precinct of varied engineering (preferably marine) related industries.

Using these criteria and the limitation in Section 3.1.2 above, Marsden Point is an ideally suitable domestic location.

3.2.2 Marsden Point Location Options

Against that backdrop, the 2023 Business Case sought to understand the optimal site, layout and cost of a marine maintenance facility at Marsden Point; one that included a large dry dock facility. Two possible locations for a dry dock and adjoining marine maintenance facility at Marsden Point were originally considered; to the west of existing Northport wharf and to the east of the Northport facility, as shown in Figure 1 below.

Because Northport has, in late 2025, secured resource consents to extend the existing port facility eastward, via reclamation to construct and operate a purpose-built container terminal, the only viable location at Marsden Point is to the immediate west of the existing Northport facility.

Figure 1: Location options considered: Western (yellow circle) and Eastern (purple circle) (Source: GRIP)

4 Design Development

As set out above, the options assessment for the project has been informed by a series of earlier third-party investigations and reports spanning from at least 2017 to 2026. Those earlier assessments have progressively refined demand assumptions, facility configuration (design), delivery approach, and operational considerations to inform the preferred option, being the subject of the current substantive FTAA application.

Earlier work, including Northport on its Vision for Growth, and the Ministry of Transport (MoT) to develop its Business Case, have informed (but are distinct from) the current Project.

4.1 Vision for Growth

Since 2012, Northport has been reviewing its strategic positioning with a focus on likely capital expenditure required to support potential Northland and North Auckland freight growth. Various iterative options[1] were explored for potential expansion. While the primary focus was on delivering capacity for a dedicated container terminal facility Northport's published Vision for Growth contemplated the establishment of a marine maintenance facility adjacent to the port facility.

The Vision for Growth study concluded that the preferred option for the location of the shipyard and drydock was to the west of the existing port operations.

In early 2022, Northport decided to 'de-couple' the proposed Eastern and Western developments to enable a greater level of focus and consultation on its proposed container terminal. While the shipyard project was not progressed at that time by Northport, Northport's view remains "that the shipyard and floating drydock project is a nationally significant and regionally strategic project which presents a great opportunity for regional growth while dealing with ship maintenance shortfalls within New Zealand and Australia"[2].

4.2 Business Case

The Ministry of Transport-led 2023 Business Case brought together demand analysis, preliminary engineering, economic assessment and stakeholder input to inform Crown investment decision-making regarding a possible dry dock and marine maintenance facility at Marsden Point. It assessed the strategic case, demand, options, commercial viability, costs, benefits and risks, and identified a concept for further consideration.

The 2023 Business Case pre-dated the current Shipyard and Drydock Facility Project. It informed, but did not constitute, the Project subsequently listed in Schedule 2 or MBIE's present substantive application. Responsibility for subsequent Project development transferred to MBIE.

4.3 Concept Refinement

Following the Business Case, the project moved from a policy and investment decision phase into a technical design and development phase. Concept refinement was undertaken by the project team and design consultants to:

- Translate the preferred option into a more detailed and coordinated design

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[1] Refer Issues and Options report for Northport's Vision for Growth found https://visionforgrowth.co.nz/resources/documents/A2%20-%20Appendix%202%20Issues%20and%20Options%20Report%20.pdf

[2] Ibid, page 54

- Test key functional requirements, including operational layout and interfaces
- Assess constructability and staging, identifying practical constraints and risks
- Provide a more robust basis for costing, consenting, and delivery planning.

This phase involved primarily technical and delivery-focused parties, including the Project team and local consultants, engineers and technical specialists, and delivery and constructability advisors.

The concept refinement phase did not revisit the strategic need for the project established via the business case and instead, focused on how the project could be delivered in practice, resolving design complexities and preparing the concept for further optimisation and input from potential operators and contractors in subsequent stages.

4.4 Potential Operator Involvement and Value Engineering

Following concept refinement, the project moved into a combined optimisation and delivery readiness phase, focused on refining the design to improve financial viability and deliverability.

This phase brought together project stakeholders, designers, cost advisors, a potential operator, and potential construction contractors to:

- Improve value and financial viability through identifying cost efficiencies and refining scope
- Optimise design, materials, and construction approaches while maintaining core functionality
- Validate the concept against real-world constructability requirements
- Incorporate potential operator input, including operational workflows and maintenance needs
- Identify and address delivery risks, sequencing, and interface challenges.

This phase built on the previous design-led work to bring an implementation-focused refinement to the scheme. Involvement from a potential operator was a critical stage in the design refinement to refine the emerging preferred option to improve constructability and functionality of the facility, and financial viability of the project.

This phase focused on making the approved design efficient, buildable, and operationally robust, preparing it for future consenting, procurement, and delivery.

4.5 Consenting Design Phase

This phase of the design process involved collaboration between MBIE, Northport and the potential operator to test and respond to:

- The configurations and split between wet and dry berths
- A flexible design capable of providing for either a floating dry dock or a shiplift
- Northport operational and safety requirements
- Navigational safety requirements
- The location of buildings for administration, workshops, warehousing and storage
- The management of stormwater / wastewater, parking and site access
- Pile sizes and construction techniques
- A likely construction sequence and programme
- The competing application of the Northport Expansion and how this influences the extent of dredging.

Table 1 Design Development Summary

Stage	Date	Design Focus	Key Activities	Outcome
Vision for Growth Concepts	2019	Early strategic positioning	• High-level development concepts and layout options • Initial consideration of demand drivers and constraints • Early stakeholder alignment	Established initial development opportunities and strategic direction
Business Case	2023	Strategic feasibility and option selection	• Market demand and utilisation analysis • Long-list to preferred option assessment (location, dry dock type, dredging, construction) • Production of initial concept layout and cost basis	Defined preferred development concept and baseline scope for investment decision-making
Concept Refinement	2025	Concept-level engineering design	• Expanded design to full site (access, services, infrastructure) • Integrated geotechnical data, navigation studies and Civil 3D modelling • Refined dredging, reclamation and material volumes • Refined cost estimate	Improved design definition and cost certainty, identifying and reducing key technical risks
Potential operator Involvement and Value Engineering	2025	Delivery and option comparability	• Competitive tender review • Evaluation of consortium submissions and selected a potential operator for the development • Various options were developed with this potential operator to test costs and increase potential revenue • Further review of shiplift technologies for revenue optimization • Further development of the market study and revenue assessment	Involvement with a potential operator informed lifting technology and shipyard layouts for consideration
Consenting (Current)	2026	Consenting readiness	• Defined project footprint, dredging and reclamation extents • Developed construction methodologies and staging	Design for consenting application with flexibility to adapt to future requirements and design refinements in response to RMA effect and policy tests.

5 Optioneering of Design Elements

5.1 Overview

This section outlines the key design elements that have been tested through optioneering to inform the proposed development for consenting, comprising:

- The type of dry dock facility
- The number and locations of wet and dry berths
- Building and facility layouts,
- The extent of reclamation
- The extent of dredging
- Structural form of retaining structures
- Ancillary infrastructure.

5.2 Types of Dry Dock Facilities

Four principal dry dock types were considered, as described below.

- **Graving dock** (excavated basin) – fixed, excavated structure with gated (caisson) entrance. A vessel is positioned, afloat, within the graving dock and above preposition dock blocks. The caisson is closed and the dock pumped out lowering the vessel onto the dock blocks until the dock Is empty. Repair work occurs in the dock.
- **Slipway** – inclined ramp for hauling vessels out of the water. A slipway consists of a cradle, an inclined track on a foundation, a hauling chain, and hauling machine.
- **Floating dry dock** – a buoyant, walled structure that is submerged allowing a vessel to be positioned within it and then refloated by the controlled dewatering of large buoyancy tanks. The floating dock raises the vessel as it is dewatered. Repair work happens in the dock, or for small and medium vessels via longitudinal transfer to a hard stand.
- **Ship lift** – vertical lift device that consists of a platform that is initially submerged and over which the vessel is positioned. The platform is then lifted by several (synchronised) hoisting winches or hydraulic jacks. Once lifted a wheeled transfer trolley system transports vessels from the lifting platform either longitudinally or, for small and medium vessels, transversely, to a hardstand area ashore where they are worked on. Alternatively, a vessel could be retained on the platform for the maintenance period.

At the Business Case stage, the graving dock and slipway options were discarded because:

- The graving dock has a high initial construction cost and is operationally limited as it does not allow for vessel transfer for landside repairs
- Slipways for the purpose of maintenance are designed for vessels with a smaller length and are not a suitable option for a large vessel dry dock facility.

5.2.1 Floating Dry Dock

If a floating dry dock is preferred, it will be secured within a specially sized and dredged pocket and retained by seismic rated couplings to the quay walls on each side.

In preparation for the docking, dock blocks will be arranged on the dock floor in accordance with the ship docking plan. The floating dock buoyancy pontoon tanks are progressively flooded and the floating dock sunk until such time as the dock blocks are at least 0.5 m deeper that the maximum draft of the vessel.

The vessel is hauled into position within the dock with the coordinated assistance of mules, the in-haul winch and tugs. Once positioned over the dock blocks the floating dry dock's in-built ballast pumps are used to pump out the buoyancy tanks in sequence to cause the dock to refloat lifting the vessel up at the same time.

The de-ballasting completes once the dock freeboard (small) is deemed sufficient. Refloating the vessel on completion of work is achieved by again sinking the dock.

Where vessels are to be transferred ashore the de-ballasting operation continues until the deck of the floating dock is level with yard pavement. A bogey and rail transfer system is then utilised to pick up the vessel and slowly transfer the vessel off the floating dock to hardstand area ashore.

During this operation, the auto ballast system will be compensating for the gradual change in buoyancy as the load transfers off the floating dock and small tidal changes that may occur throughout the transfer period.

Figure 2 Example of a floating dry dock in San Diego, United States of America (photo courtesy of Hedger Dry Dock

5.2.2 Ship lift

In the case of a ship lift the lifting platform is prepared in much the same way as a floating dry dock albeit that the dock blocks are substantial cradle structures that used to facilitate the subsequent lifting and shifting of the vessel to a hardstand.

The platform is lowered sub surface until the dock blocks are deeper (0.5m) than the deepest draft of the client vessel.

The vessel is guided into the ship lift pocket, again using mules, in-haul winch and tugs. Once positioned a series of winches or jacks raise the platform and the vessel in unison.

The lifting operation is complete when the platform is level with the pavement of the yard at which point the platform is locked in position and the weight taken off the wires/chains. At this point, (unlike a floating dock) the platform height is independent of further tidal movement.

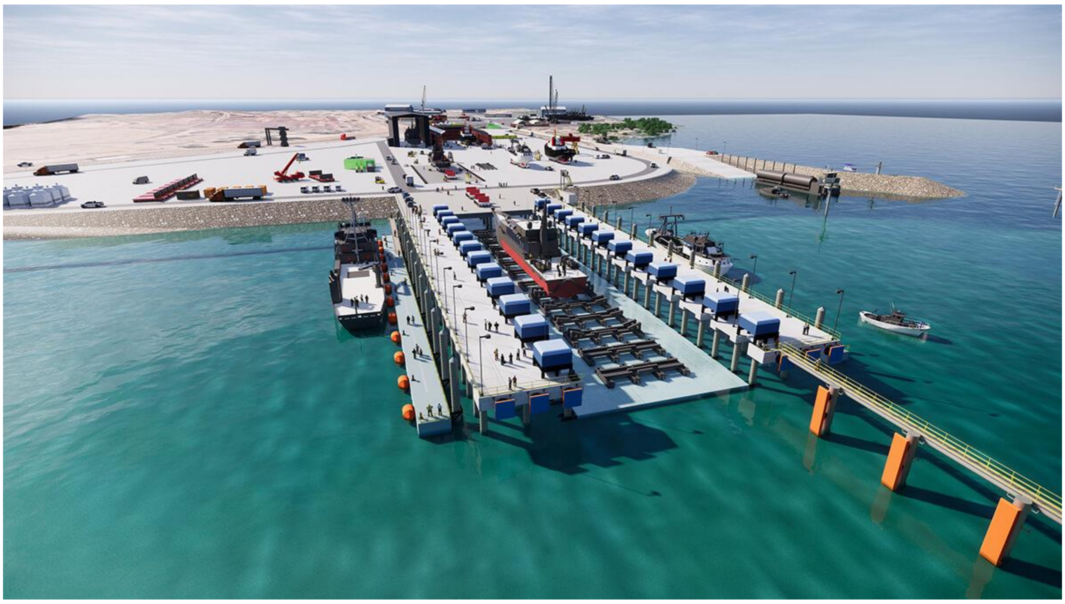

Figure 3 Example of a ship lift docking system in Darwin, Australia (photo courtesy of NAIF)

Once the ship lift platform is locked at pavement level as described above, the yard operator has a choice to make; either undertake work on the vessel while it remains on the platform or, using a rails and bogey transfer system, lift and shift vessels ashore to a hardstand area behind the ship lift.

Once the vessel has been transferred to a hardstand 'dry berth' ashore the transfer trolley system is removed and returned to its allocated parking space.

The dry berth hardstand area is a purpose designed, drained and bunded area that will capture wash down water and arisings. A vessel parked either on the platform or hardstand improves ease of access to the vessel and, as a result, productivity compared when to working within the confines of the wing walls of a floating dock.

On completion of maintenance the transfer trolley system is used to pick the vessel up and transfer it back to the ship lift platform where upon the platform is lowered under the control of the synchronised winches or chain jacks until the vessel is afloat. Then it is navigated from the ship lift pocket under the control of the mules and tugs.

5.2.3 Selected Dry Dock Facility

The proposed concept design enables either a floating dry dock or ship lift solution to be constructed.

In that regard, the concept allows for either:

- A 250m long x 55m wide floating dry dock; or
- A 230m long x 40m ship lift with 7.5m wide sections of suspended deck on each side.

Both lifting devices will have a lifting capacity of approximately 28,000 tonnes and will provide for the lifting of a vessel with a length overall (LOA) of 230m with a docking draught of 9m.

5.3 Wet and Dry Berths

5.3.1 Dry Berths

Dry berths and landside vessel storage areas provide essential space for vessels to be transferred out of the water for maintenance, repair, refit, and storage. They enable unrestricted access to hull and underwater components, support simultaneous servicing of multiple vessels, and increase overall shipyard capacity and operational efficiency. Landside storage areas also provide flexibility for vessel lay-up, reducing reliance on wet berths and other marine infrastructure.

5.3.2 Wet Berths

Wet berths provide essential operational space for vessels to remain afloat before, during, and after maintenance activities. They facilitate vessel staging, inspections, commissioning, mobilisation, and minor repair works, while providing flexibility when dry dock or ship lift facilities are occupied. The inclusion of wet berths increases shipyard operational efficiency, enables simultaneous servicing of multiple vessels, and supports higher overall facility utilisation.

5.3.3 Selected Berth Arrangement

The principal capability outcome provided by the facility is the ability to lift vessels out of the water to facilitate inspections and maintenance of the underwater sections of large vessels that cannot be completed when a vessel is afloat.

While the lifting device itself can be regarded as dry berth in which underwater hull maintenance can be completed, having the ability to move the vessels onto a hardstand area allows more than one large vessel to be attended to at once, providing additional capacity, flexibility, productivity and revenue potential; all of which underpin viability of the facility.

Early design iterations for the facility included multiple wet berths. As the design evolved, in conjunction with the potential operator, it was identified that a single wet berth capable of mooring the largest design vessel (230m LOA) was sufficient. Multiple dry berths provide maximum operational flexibility and enable simultaneous maintenance activities of multiple vessels, and this enables higher facility utilisation.

The concept design maximises landside maintenance capacity, including provision for one large vessel dry berth and areas for dry berthing multiple smaller vessels. This arrangement enables simultaneous maintenance activities and provides for higher facility utilisation. The area for smaller vessels enables the private high value ‘white boat’ market to be catered for and this supports overall revenue generation and regional trade skill base development.

Accordingly, the selected consenting design comprises the following:

- One 230m LOA vessel Wet Berth
- One 200m LOA vessel Dry Berth
- Multiple small vessel Dry Berths

The wet berth is 265m length, with a depth of -14.5mCD. The total length of 265m allows for an overhang at each end of the vessel to enable safe mooring. The approximately 155m section of wet berth alongside the reclamation is a narrow deck structure placed on top of a combi-pile wall (refer Section 5.8). The western section of the wet berth will be formed by a suspended deck structure which is 110m long and 16m wide. This is the optimal design solution compared to extending the combi-pile wall for the full length with a finger of reclamation for the western section.

Dry berth details are as follows:

- One large vessel dry berth immediately to the south of the Lifting Pocket for a maximum vessel tonnage of 25,000 and maximum length of 200m. The hardstand area has a total length of 240m to allow for 20m working area offsets at the bow and stern. This vessel would be ‘end slipped’ or longitudinally transferred from the ship lifting device.
- An area of dry berth space to provide for small vessels (less than 100m). These vessels could be end slipped or side slipped from the lifting device.

5.4 Building and Facility Requirements

To enable an efficient operational marine maintenance facility, an optimised shipyard must balance the space allocated to the following key facilities, plant and services:

Dry Dock Core Services (examples):

- Reticulated services (fresh and cooling water supplies, shore power and waste and wash-water collection and treatment)
- Ship handling systems (winches and mules)
- Wet and Dry Berths
- Admin, project offices for docking staff
- Stores and hardstand areas for dry dock equipment, including the cranes, dock block marshalling and access ramps, brows.

Marine Maintenance Core Facilities:

- Admin, project office and welfare facilities for MMF staff and clients oversight teams
- Materials storage and warehousing for equipment used by the MMF and clients/customers
- Combined and segregated workshops with appropriate plant and lifting equipment for long term and specialist contractors
- Space allocated for the transportation and storage (on hardstand areas) of white boats and client containers, and safe movement of cranes and equipment.

The main facilities requiring a location directly proximate to the lifting device and berth areas are summarised in Table 2:

Table 2 Proposed Landside Facilities

Facility	Area Allocation (m^2)	Typical Activities	
Administration Spaces	3,250	- Gate house and security - Central Office - Training Facilities - Canteen and galley - Medical centre	- Firefighting store - PPE - Ablutions - Locker and change room - Client offices
Warehouse and Storage Spaces	4,650	- Washdown areas - Keel, timber and scaffold area - Container laydown area	- Waste - Grit storage and recycling - Main warehouse - Carpentry
Workshops	7,500	- Yard maintenance - Riggers - Wharf store - Lay-apart store - Utilities - Contractor workshops	- Fabrication shops - Mechanical fitters - Paint shop - Steel and plate store - Goods receipt store - Plant and machinery workshop
Utilities	600	- Shore power - Substation / power	- Compressor room
Roads	13,500	- Internal roadways for safe access and freighting	

Facility	Area Allocation (m^2)	Typical Activities
Lift Pocket Crane Corridors	19,250	- 20m wide corridors allow for: - 6m crane corridor - 8m working corridor - 6m access corridor
Transfer Bogie Storage	3,150	- Bogie storage for unused trolleys
Dock Block and Cradle Storage	1,800	- Equipment and materials storage
Vessel Transfer and Working Areas and Laydown Hardstand	27,850	Hardstand storage for: - One large vessel (up to 200m) - Multiple small vessels (>100m) - Working Areas - Temporary storage of equipment and materials
Wastewater and Environmental Controls	7,950	- Conveyance Canals - Wastewater treatment system - Pump house
Wet Berth Working and Laydown Areas	5,600	- Working Areas - Crane and equipment access - Storage of equipment and materials - Wet berth suspended deck
Public Access	1,700	- Public access pathway to the fishing jetty.
Revetment	2,050	- Revetment above MHWS
Total Area	98,850	- All of the Above

Note: The ship lift suspended deck has been omitted.

The layout of these facilities has been refined through the design phases including in collaboration with a potential operator, partners and stakeholders.

It is expected that the final built form areas and configurations will be optimised in conjunction with future operators. In this way the facility layout and capabilities can be aligned to the commercial and business models adopted.

5.5 Design Vessel, Dry Dock pocket depth and Turning Basin

5.5.1 Design Vessel and Pocket Depth

Demand studies informed vessel types and credible LOA, beam and draft criteria. It further confirmed that the dimensional limits are not set by a single vessel type. The deepest draft vessels for instance may not be the longest or widest. Research vessels with hull mounted appendages, for instance, can draw deeper drafts than expected for vessel associated with their displacement; Polar Star, which operates in the region, is an example of this.

Through collaboration with a potential operator the maximum vessel lightweight (docking) draft has been set at 9m. This draft is then used to derive the necessary depths of both the turning basin and the dry dock pocket. The latter is -16m CD and is derived from the height of the dock blocks, the depth of the dry dock platform /buoyancy chamber, and the necessary under keel clearances that will allow a vessel having a 9m draft to be safely positioned over the submerged dock platform.

The dry dock pocket has been designed to accommodate either a floating dock or a ship lift of the dimensions set out in Section 6.1 above. The pocket has the following dimensions:

- Length 250m

- Width 55m
- Depth -16mCD

The pocket has been offset (to the west) by 50m from the western edge of the Northport logging wharf. This is a safety requirement to ensure sufficient navigational margin for vessels manoeuvring at the logging wharf while berthing and unberthing.

5.5.2 Western Turning Basin dredging

The extent and depth of the Turning Basin has been derived through a combination of design vessel length and depth and navigational influences of wind and tide on turning vessels as they enter or exit the dry dock under the control of tugs.

Different turning basin dimensions were tested during the design phases and through navigational simulations undertaken by Northport and reported in a Navigational Safety Assessment report. The western turning basin extends northwards and has a variable depth of -14.5m CD at the ship repair facility berth face, and -11.5m CD at the northern edge of the basin. The dredged turning basin (aside from dock berth pocket) remains within the consented dredge area indicated in Northport's Vision for Growth dredge plan.

The extent and depth of the western turning basin can be seen in Drawing Package B.02

5.5.3 Secondary dredge area

To satisfy the requirement for a cut to fill volume balance for the facility reclamation and provide for the future Northport expansion cut to fill balance, a secondary dredge area is identified to provide additional dredge depth necessary to offset the material removed from the Northport Expansion dredging area.

Once the western turning basin was determined, how the dredging necessary to create that turning basin interacts with the existing Northport consented dredge and reclamation volumes was considered.

It was identified that, if the Dry Dock was to dredge first, and used the material from the updated turning basin for its reclamation (volumes approximately achieve a cut to fill balance) there would be a potential shortfall in dredge material once Northport came to implement its consents.

Conversely, if Northport dredged first, the Dry Dock turning basin would be dredged and there would be no (or insufficient) material for MBIE to construct its consented reclamation. Following consideration of potential sources of dredged material elsewhere in the harbour and surrounds, it was determined that the best practicable option was to contain dredging within the spatial area already consented for Northport dredging.

The extent and depth of the secondary dredge area can be seen in Drawing Package B.02.

5.6 Reclamation

5.6.1 Extent

The extent of ship repair facility reclamation is driven by the landside operational requirements of the facility, including but not limited to the provision of hardstand dry berth areas to facilitate work on vessel hulls, workshops, material/equipment storage and the various facilities identified in Section 5.4.

Iterative refinements of the layout have and continue to be undertaken as part of the design development phases to optimise the reclamation footprint, balance cut and fill volumes (between dredging and reclamation) and provide sufficient landside area to support key operational requirements essential to the marine maintenance facility's feasibility.

The southern half of the facility is approximately 155m wide and 260m long and extends from the dry dock pocket to the existing beach. This width is necessary to provide sufficient cross section width to end slip a large vessel from the dry dock and have adequate crane corridors, working areas and lay down hardstand space to efficiently undertake vessel maintenance activities. The length has been optimised to enable a dry berth for a 200m LOA vessel, working areas, and the access corridor, stormwater canal, noise wall and public walkway. An option to retain a straight southwestern edge of the reclamation was tested, however this would not provide enough length for the 200m vessel to be dry berthed. As discussed in the Beca Concept Design Report, this area requires piling to support the weight of these large vessels.

The Northern half of the facility is approximately 210m wide and 250m in length. The length is driven by the dry dock pocket length of 250m, refer section 5.5.1. The width is driven by needing 110m from the edge of Northport to provide a 50m navigational safety offset, refer section 5.5.1, and 55m for the dry dock pocket width. The remaining 155m of width enables the efficient configuration of the main blocks of built form on the facility to provide for the marine maintenance operations, plus enable the transfer of side slipped vessels, access in and around the facility, stormwater canals, noise wall and the public walkway.

5.6.2 Options

Options considered for creating the above sea structures to provide for the facility include full reclamation, partial reclamation with piled structures and all piled structures:

- Full reclamation – creation of new land, generally using dredged material. Full reclamations are typically functionally efficient and cost-effective but results in permanent modification to the coastal environment.
- Partial reclamation with piled wharves – the facility is constructed from reclamation close to land, with piled wharf structures surrounding the dry dock to provide working areas. Partial reclamations have a continuum for reclamation required and may result in a reduced environmental footprint compared with full reclamation.
- Predominantly piled solution – in this case wharves are constructed from piles driven into the seabed, with a deck constructed on top. This deck over piles technique is an efficient method for creating wharf structures where retaining (of reclamation) is not a primary requirement. The technique is recognised as minimising the impact on the seabed and local benthic environment.

The facility concept design is for a total area of approximately 9.7 hectares. The selected option is predominately reclamation with piled wharves for part of the wet berth and decking in the lift pocket if a ship lift is the selected lifting device.

The reason reclamation has been selected over a partial / piled arrangement is that it:

- Is necessary in the southern portion of the facility to enable the required structural support for the load and weight of large vessels when dry berthed
- Is preferred for the northern portion as it provides the most resilient structural solution through its lifecycle and has a lower maintenance cost than a piled steel structure and a longer design life in harsh marine conditions.
- Best enables the creation of the stormwater / wastewater canals required around the perimeter of the facility
- It provides a complete dredge disposal option for the dredged material (see Section 5.7 below);

The minimum finished level of the reclamation is proposed at + 5.0m CD, with the crest height at approx. 5.7mCD. Higher levels were tested to provide maximum resilience from seal level rise through time. This level was selected as it will tie into the existing port, allowing for operational efficiencies. If raising needs to occur in the future to address sea level, this can occur in a staged manner.

5.7 Dredging

Establishing the facility requires dredging to provide sufficient depth of water for vessels to secure alongside and/or enter/exit the dry dock facility at all heights of tide. The shipyard facility will require a dredging programme to create the following key enabling features for the facility:

- Lifting device pocket
- Wet berth
- Turning basin

Disposal of dredged material options considered included:

- Re-use for reclamation – the dredged material can be used for reclamation, either around the dry dock or for other areas of the port. This assumes there is reclamation required, but it is typically the most cost effective and functionally preferred option, and the most efficient way of managing dredgings. Utilisation of dredged material within reclamation avoids the need for offshore disposal, which materially reduces overall environmental effects.
- Offshore Disposal – offshore disposal of dredged material. The need to transport dredge material considerable distances offshore typically increases costs for the project and can result in significant impacts on marine ecosystems and fauna from sedimentation (smothering) and turbidity impacts.
- Stockpiling on land for reuse – dredged material can be stockpiled on land and potentially used for a variety of land-side construction projects. This option requires sufficient land available for a considerable amount of stored material (and a need for that material), and typically increases costs from land-side transport, storage and drainage requirements. It is not feasible for large volumes or longer durations.

It is understood there is a strong policy directive against offshore disposal, and this method incurs additional cost. Similarly, stockpiling material would require sluicing it to a landside location and then double handling it to another use. This option also adds cost and for both options is unnecessary when it can be used to create the facility. For these reasons the option to re-use the dredged material for the site reclamation requirements is preferred.

5.8 Structural Form

A few concept structural forms have been assessed for the creation of a vertical edge for the dry dock pocket and wet berth, as described below. Further details on the preferred structural form are provided in the Concept Design and Construction Report, Beca 2026.

5.8.1 33m Suspended Deck Quay with Rock Armoured Revetment

This option considers a 33.0m wide concrete suspended deck slab constructed from reinforced concrete supported on steel tubular piles. Split into 3m of capping beam from the quay edge and 30m of deck slab. The wharf deck is supported by 6 rows of piles transversely spaced at 6m centres and rows of piles longitudinally spaced at 6m centres.

Piles are open ended driven steel piles driven into the underlying weakly cemented sands and are filled with reinforced concrete over their upper extents to provide a rigid connection to the wharf deck. Conceptually all piles are 764mm diameter steel tubes manufactured as API Linepipe, to be protected by either HDPE sleeve or suitable paint coating.

The wharf deck is a grillage of precast beams, 900mm wide x 1100mm deep, with precast decking planks and in-situ topping slab, 500mm combined thickness, and slopes from the landward most gridline at a 1:100 fall to the berth face to provide for stormwater runoff.

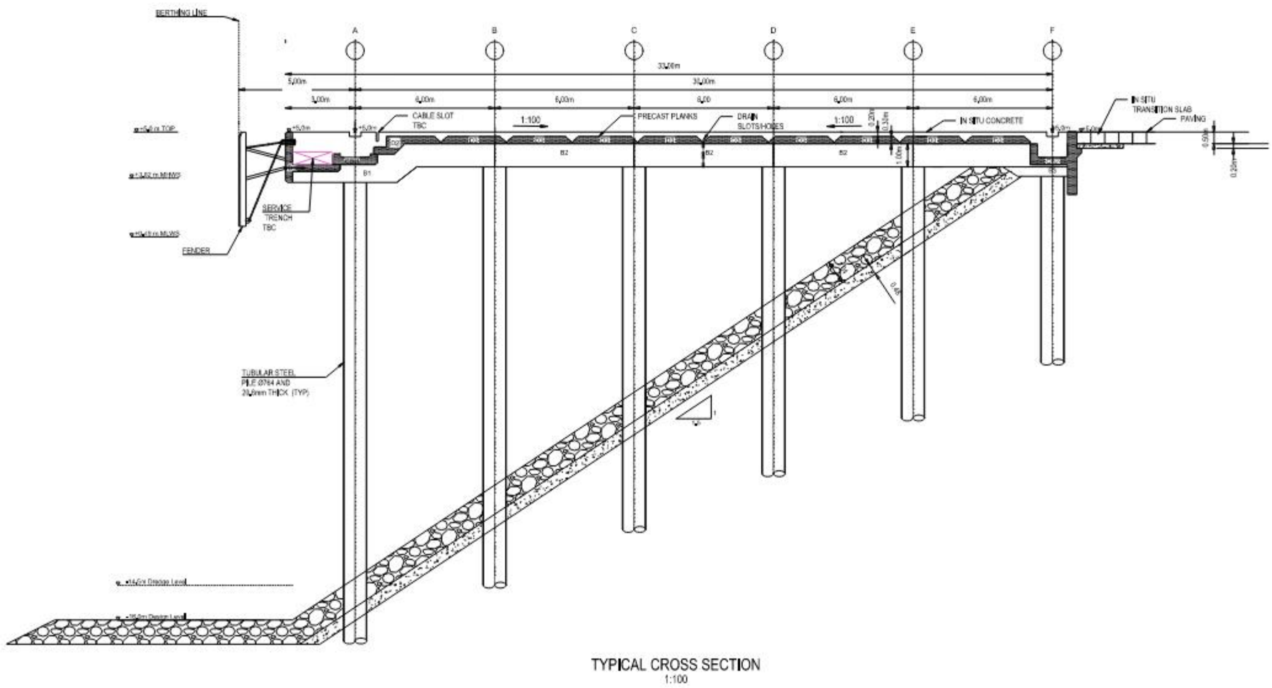

Figure 4 Standard Suspended Deck with Revetment

Mooring bollards are located along the berth face of the wharf at 12m centres, coinciding with the transverse beams, to allow for the mooring of a range of vessels.

Fenders with steel facing panels mounted on down stand panels are located along the berth face at 12m centres to allow for the berthing and mooring of a range of vessels and the tidal range at the port.

The revetment and eastern bund slopes have a 1v:1.5h profile and are armoured with conventional rock armour to protect the quarried and dredged core material from wave/current action and slip stream from vessel's thrusters. The revetment under the wharf is to include primary and secondary layers to dissipate wave energies.

5.8.2 21m Suspended Deck Quay with Rear Retaining Wall and Rock Armoured Revetment

The wharf structure comprises a 21m wide concrete suspended deck slab constructed from reinforced concrete supported on steel tubular piles, split into 3m of capping beam from the quay edge and 18m of deck slab extending back to the first line of sheet piles retaining wall. The wharf deck is supported by 3 rows of tubular piles transversely spaced at 6m centres and rows of piles longitudinally spaced at 6m centres. The landside edge of the deck is to be supported on driven sheet piles that are tied back to a sheet pile anchor wall in the reclamation.

Tubular piles are open ended driven steel piles driven into the underlying weakly cemented sands and are filled with reinforced concrete in their upper extents to provide a rigid connection to the wharf deck. All piles are 764mm diameter steel tubes manufactured as API Linepipe. The tubular piles will rely on skin friction rather than end bearing and are estimated to be 40m long. The sheet pile rear retaining wall will need to be approximately 30m long while the piles for the anchor wall will be approximately 15m in length. All sheet piles are assumed to be AZ25-800.

The wharf deck is a grillage of precast beams, 900mm wide x 1100mm deep, with precast decking planks and in-situ topping slab, 500mm combined thickness, and slopes from the landward most gridline at a 1:100 fall to the berth face to provide for stormwater runoff.

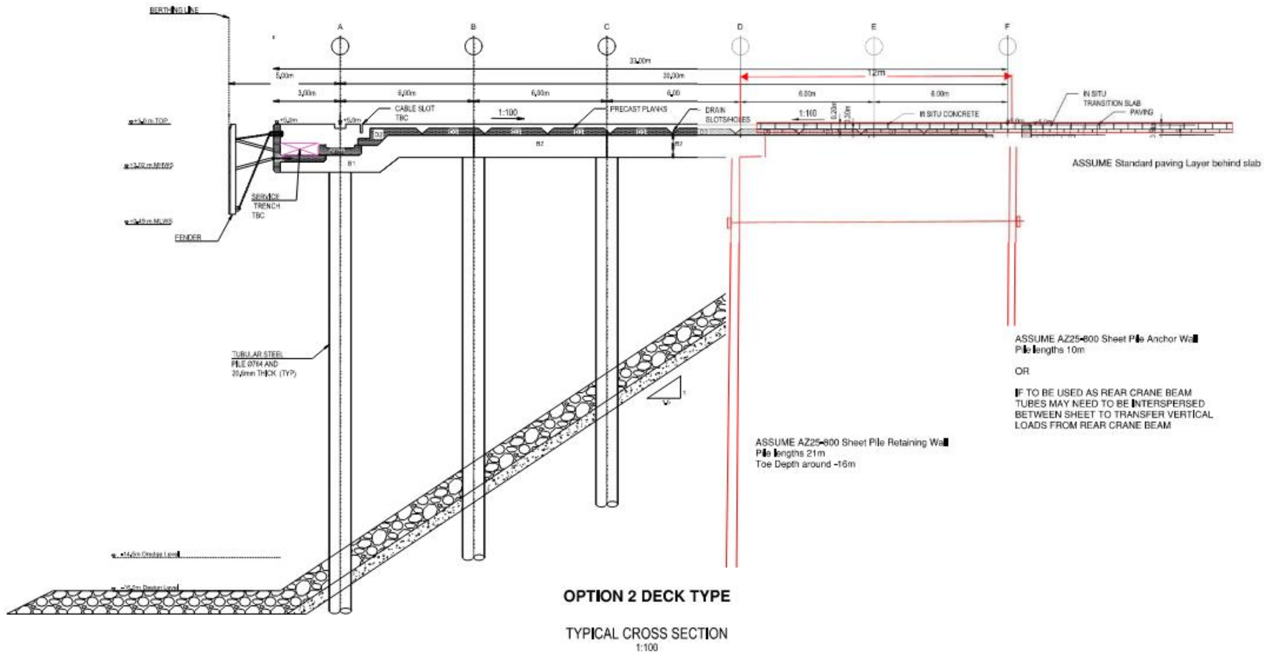

Figure 5 Partial Suspended deck with retaining wall

Mooring bollards are located along the berth face of the wharf at 12m centres, coinciding with the transverse beams, to allow for the mooring of a range of vessels.

Fenders with steel facing panels mounted on down stand panels are located along the berth face at 12m centres to allow for the berthing and mooring of a range of vessels and the tidal range at the port.

The revetment and eastern bund slopes have a 1v:1.5h profile and are armoured with conventional rock armour to protect the quarried and dredged core material from wave/current action and slip stream from vessel's thrusters. The revetment under the wharf is to include primary and secondary layers to dissipate wave energies.

5.8.3 Combined Tubular Pile Wall (Combi-wall) System

The combined pile wall structure combines tubular steel and sheet pile wall anchored back to a sheet pile wall embedded in the reclamation. Tubular piles are open ended driven steel piles driven into the underlying weakly cemented sands and are filled with sand or gravels up to a reinforced concrete pile plug in the upper extents to provide a rigid connection to a capping beam. All tubular piles are anticipated to be 1600mm diameter steel tubes manufactured as API Linepipe with sheet pile clutches welded to exterior of the pile, prior to driving, to connect to the AZ 25-800 sheet piles. The sheet pile anchor wall, depth to be confirmed, will be located approximately 35m from the centreline of the piled wall connected with a pair of M85 tie rods per tubular pile.

The in-situ concrete capping beam to the wharf is anticipated to be 3m wide x 1.5m deep, will run the full length of the piled wall.

The paving behind the capping beam will be standard Port Paving designed to take the operational loads. Drainage will be via slot drains or positive fall at a 1:100 fall to provide for stormwater runoff.

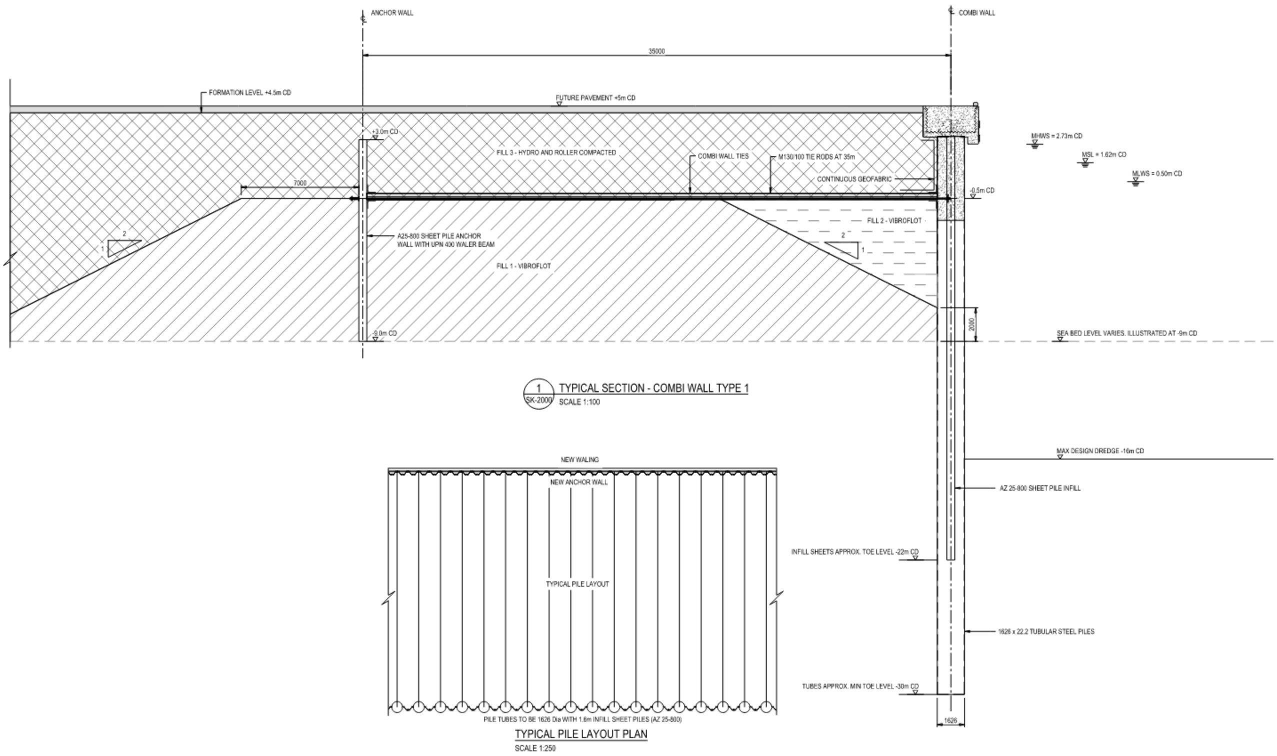

Figure 6 Tubular Combi wall with anchor wall

Mooring bollards are located along the berth face of the wharf at 12m centres, coinciding with the transverse beams, to allow for the mooring of a range of vessels.

Fenders with steel facing panels mounted on down stand panels are located along the berth face at 12m centres to allow for the berthing and mooring of a range of vessels and the tidal range at the port.

5.8.4 Preferred Structural Form

Based on site-specific considerations, previous project experience, and previous early contractor engagement, the combined tubular pile (combi-wall) system has been identified as the preferred option to provide a vertical edge for the lifting pocket and the wet berth.

5.9 Ancillary Landside Infrastructure (Access and Parking)

Transport and access to the facility will need to allow for staff and operators as well as customers and specialist labour. Supply of materials to the facility will generally come in one of two ways, marine or road with the supply of bulk materials being on long order whilst the supply of specialist parts being short fast supply periods and requiring air freight connectivity. The wider road networks are good and rail to the Port is planned.

Direct access to the site will utilise Northport land and specific details still need to be formalised. Provision of parking on the reclamation or within the existing Port area has been assessed and determined to be impracticable; accordingly, offsite parking solutions are required and have been considered, as discussed in the Application Documents.

5.10 Summary

The design and optioning process undertaken for the key design elements of the project is set out in Table 3.

Table 3 Design Optioneering Approach

Key Design Features	Business Case	Concept Refinement	Operator involvement and Value Engineering	Consenting Phase
Lifting Device	Selected the primary facility type as a floating dry dock.	Refined key operational interfaces and functional requirements. Option to include a shiplift facility introduced.	The design team in collaboration with a potential operator confirmed the suitability of a multi shipyard and shiplift for the NZ context.	Floating drydock or a shiplift provided for in the concept desig
Reclamation and Dredging	Partial reclamation and piled (suspended deck) options were initially considered; however, to achieve cut–fill balance and minimise offsite disposal, full reclamation using the dredged material from the berth pockets and turning basin was preferred. The footprint of the reclamation was established based on the spatial requirements of the wet berths and dry dock.	The Business Case cut–fill balance approach was retained, with Civil 3D modelling and integrated geotechnical data used to quantify dredged volumes and material types. The reclamation footprint remained broadly consistent with that established in the Business Case.	Engagement with a potential operator confirmed a requirement for a single wet berth, enabling a reduction in the dry dock pocket and associated wet berth dredging extents. This reduced overall dredge volumes and allowed partial reclamation to be reconsidered.	The facility footprint for consenting is confirmed by Northport and MBIE. The development is primarily formed on reclaimed land to maximise dry berthage, with wet berth provision accommodated via a suspended deck jetty structure. Secondary dredging area defined.
Design Vessel Working Areas / Berths	Established design vessel size (230m LOA and 28,0000 t) and acknowledged the potential revenue from being able to cater for large 'white' boats	Design vessel size of 230m LOA and 28,000t. Cruise industry vessels discarded as a viable target market. Design provides for a mix of wet and dry berths.	Layout optimisation workshop establishes that a potential operator requires a single wet berth capable of taking the largest vessel. The potential operator also identified a need to store and undertake maintenance on multiple vessels on the hardstand concurrently. This operational requirement underpins allowance for a shiplift system.	The design provides for the transfer of large commercial vessels, with lengths overall (LOA) of up to 200m, onto the hardstand for maintenance and repair activities. Multiple Dry Berths and hardstand working areas incorporated and wet berths rationalised to a single large berth.

Key Design Features	Business Case	Concept Refinement	Operator involvement and Value Engineering	Consenting Phase
Construction Approach	Determined the construction approach, including reclamation and dredging	Further refinement of the constructability and staging assumptions to support the future selection of a potential Operator and partner.	The construction approach for the shiplift option was defined.	A potential construction approach has been further developed based on the selected concept design; with this approach subject to detailed design.
Buildings and Facilities Layouts	Made an allocation for the purposes of cost estimation	Refined the facility layout and configuration. Tested location adjacent to the dry dock facility or more remote landside.	Buildings and workshop space tested with a potential Operator based on expected operating model.	Indicative spatial allocations shown on plans with refinement subject to detailed design.
Ancillary infrastructure	Need for admin centre and car park outside the dock yard precinct was identified	The need for a parcel of land outside the dock yard precinct retained and noted as needing t be within 500m of entrance	Landside facilities (access and parking) developed following confirmation of potential operator requirements. Location will need refinement in cooperation with Northport.	A notional location for the car park has been indicated. This to be refined. The size of the car park has been established based on the traffic modelling
Stormwater and Wastewater Treatment	Stormwater is captured and treated prior to controlled discharge via Northport's network, while all vessel and dock wastewater is contained, pre-treated, and discharged to onshore trade waste systems.	Followed the same principles as the Business Case.	Followed the same principles as the Business Case.	The key principles from the Business Case remain applicable, with the inclusion of a fully contained hardstand area. Space allocated for this.

6 Proposed Concept

Given all the above, the general arrangement and layout of the facility is shown below and discussed fully in the Concept Design Report:

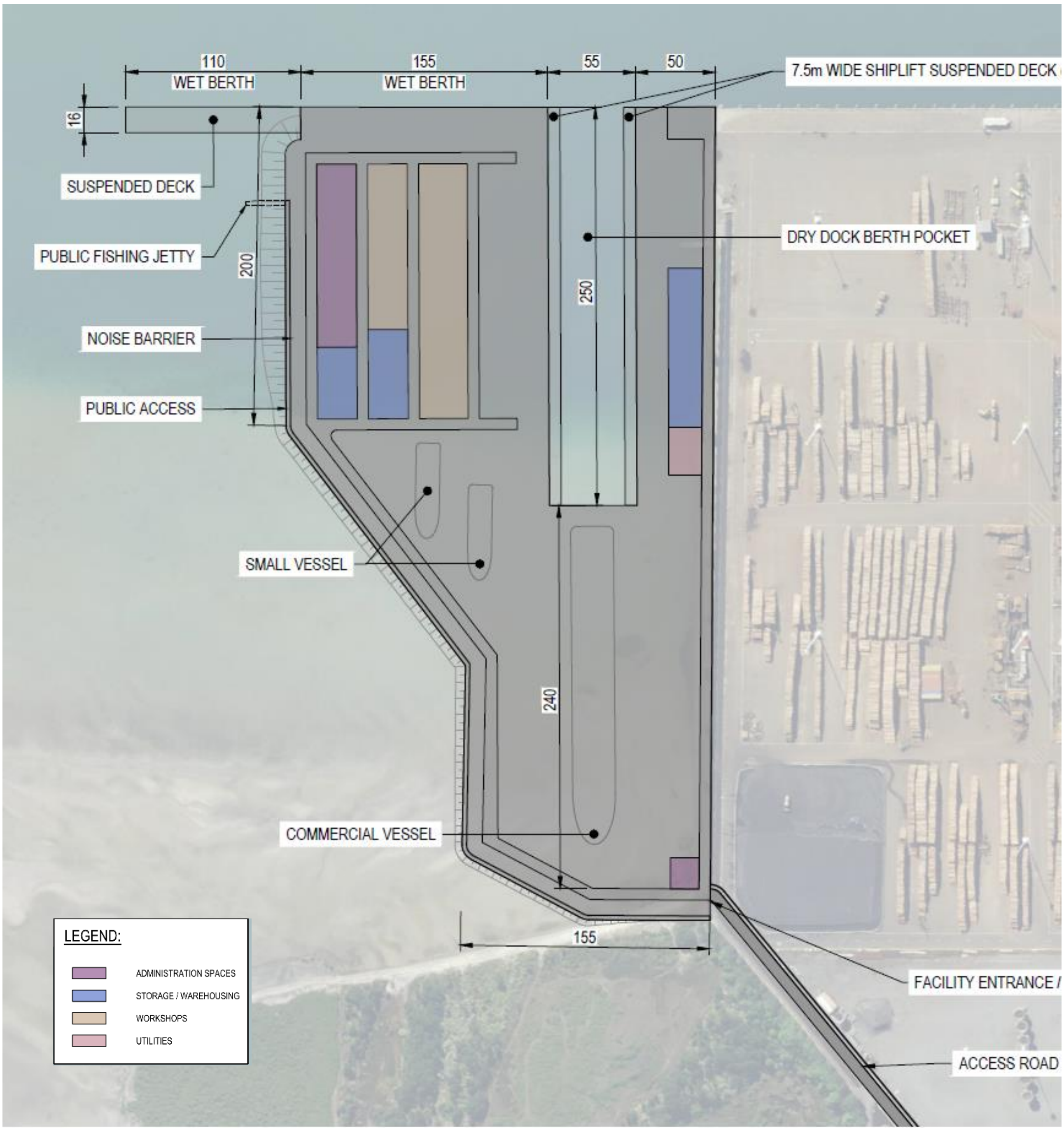

Figure 7 Concept Layout

7 Conclusion

This Report provides a focus on the location, design, and refinements to explain the process leading to the current proposal for additional dry dock capacity in New Zealand to service medium and large vessels that exceed the capability of existing domestic facilities. Current reliance on overseas dry docks for larger vessels results in increased costs, vessel downtime, operational inefficiencies, and reduced resilience for commercial, transport, and defence vessel operators.

A range of location options were considered across New Zealand and the wider South-West Pacific. Existing domestic facilities were found to be physically constrained, while offshore facilities are subject to distance, availability, and capacity limitations. Marsden Point was identified as the ideal location that combines deep-water access, sheltered harbour conditions, available industrial land, existing port infrastructure, marine industry capability, and strategic transport connections. Within Marsden Point, the western site was selected following assessment of alternative eastern and western options and consideration of operational, planning, environmental, and land-use constraints.

The concept design has been developed through a staged process involving business case development, technical design refinement, a potential operator and stakeholder/partner engagement, and value engineering. Throughout this process, multiple options for facility type, layout, reclamation extent, dredging requirements, structural form, vessel transfer arrangements, and supporting infrastructure were assessed. The resulting concept provides a flexible design capable of accommodating either a floating dry dock or ship lift system, together with wet berths, dry berths, vessel maintenance areas, workshops, and supporting operational infrastructure.

Overall, the assessment process has identified the western Marsden Point site and the proposed facility concept as an option that satisfies project needs and demands while responding to technical, operational, environmental, economic, and planning considerations. The concept design is supported by site investigations, engineering assessments, and stakeholder engagement undertaken through the development of the proposal and provides a basis for progressing the project through the Fast-track Approvals Act 2024 approvals process.