

LORD HOWE ISLAND CRITICAL INFRASTRUCTURE PROJECT

FINAL
Urban Design Report

September 2025

Prepared for:





LORD HOWE ISLAND MASTER PLAN AND CONCEPT PLAN

Prepared for NSW Department of Climate Change, Energy, the Environment and Water through NSW National Parks and Wildlife Service and Lord Howe Island Board, by Spackman Mossop Michaels in association with lahznimmo Architects.

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GLOSSARY

- » CIP - Critical Infrastructure Project
- » DPIE - Department of Planning and Environment
- » LHI - Lord Howe Island
- » LHIG - Lord Howe Island Group
- » LHIB - Lord Howe Island Board
- » LNA - Lahznimmo Architects
- » MRF - Material Recovery Facility
- » NPWS - National Parks and Wildlife Services
- » NZ - North Zone
- » SMM - Spackman Mossop Michaels
- » SZ - South Zone
- » WMF - Waste Management Facility



1. INTRODUCTION

“Without well-functioning enabling infrastructures like waste management, aviation refueling, marine freight service and biosecurity controls, the local residents and visitor economy will suffer in the long term”

NPWS Project Brief, March 2024

1.1 PROJECT BACKGROUND

Lord Howe Island is an internationally renowned tourist destination, notably for its World Heritage status and pristine environment and ecology. It's businesses and residents rely largely on the visitor economy to sustain the quality of life on the remote island. Without well-functioning enabling infrastructures like waste management, aviation refueling, marine freight service and biosecurity controls, the local residents and visitor economy will suffer in the long term. In addition, these infrastructures enable businesses, hospitality operators and the Government to secure and provide quality levels of service to tourists and uphold the NSW Government's reputation.

Lord Howe Island is recognised on the World Heritage List as a place of exceptional beauty with a pristine environment and ecology. Given the importance and sensitivity of the Project's location, an integrated design process that balances the built form, engineering, ecological and operational outcomes with landscaping design, community involvement and visual and environmental impacts was essential for the Project.

This program will enable continuation of the Lord Howe Island's habitation, tourism industry and all other activities that depend on the marine freight service. The benefits anticipated from the infrastructure upgrades will flow to businesses on the Island, suppliers to these businesses, the NSW Government, and tourists.

1.2 CRITICAL INFRASTRUCTURE PROJECT

The Critical Infrastructure Project (CIP) will provide Lord Howe Island Board with resources to implement improvements and upgrades to essential infrastructure to ensure Lord Howe Island's future. The CIP includes infrastructure projects that are crucial to Lord Howe Island's everyday life and to support its long-term future as a sustainable tourism destination.

The CIP involves the preparation of a master plan that builds on key strategies, including a Marine Strategy, Waste Management Strategy and Biosecurity Strategy, and incorporates further enabling infrastructure. It will also involve:

- » Establishing a suitable marine freight service to Lord Howe Island and replacing the existing freight transport vessel which is nearing the end of its service life;
- » Design and delivery of biosecurity measures to support the long-term security of the Marine Strategy, plus related capital works on Lord Howe Island and from the primary port that services Lord Howe Island; and
- » Delivery of a fully functioning Waste Management Facility on Lord Howe Island to support both day-to-day operations and Lord Howe Island's tourism-led economy.

In summary, the CIP includes the five major, interdependent infrastructure projects set out below. This report relates to Project B, C and E only.

- Project A – Precinct Planning Services and Approvals
- Project B – New Waste Management Facility
- Project C – New Vessel Access Infrastructure
- Project D – New Marine Vessel and Operations
- Project E – New Biosecurity Infrastructure

1.3 PROJECT OBJECTIVES

The objectives of the LHI CIP are to:

- » Maintain the tourism economy of Lord Howe Island and NSW
- » Facilitate access to the World Heritage property and associated marine park
- » Replace the Lord Howe Island marine freight service, which is essential to the functioning of the Island, including long-term procurement of this service
- » Upgrade the freight handling facilities on the Island and manage biosecurity risks
- » Minimise impacts on the marine environment and provide marine infrastructure that facilitate safe access for the loading and unloading of marine freight
- » Deliver a fully functioning WMF that complies with the requirements of the associated Environmental Protection Licence (EPL)
- » Protect the unique ecological and cultural values of the Island during construction and operation
- » Ensure the quality of life for residents and visitors to the Island is maintained.

1.4 PROJECT METHODOLOGY

Lord Howe Island is recognised on the World Heritage List as a remarkable example of isolated oceanic islands, born of volcanic activity more than 2,000 m under the sea, these islands boast a spectacular topography and are home to numerous endemic species, especially birds. The building of any new work and its physical and visual impact will be highly scrutinised.

The approach to Urban Design and Landscape Architecture will focus on collaboration between lahznimmo architects (LNA) and SMM landscape architects (SMM). It will follow an integrated design process that resolves built form, engineering, ecological and operational issues hand in hand with landscape design considerations - addressing, mitigating and minimising stakeholder concerns such as visual and environmental impacts.

The methodology for the project included the following stages and activities:

- » **STAGE 1 Project Initiation and Site Analysis:** This stage included activities such as project inception, review of background documents and indepth site analysis through desktop studies. A preliminary viewshed analysis was prepared and a site visit conducted to determine the visual and landscape impacts introduced by the Project. From the analysis, opportunities and constraints were identified and draft design principles were developed. These findings were summarised in a draft Return Brief report.
- » **STAGE 2 Preliminary Concept Master Plan Options:** following feedback on Stage 1, several preliminary Master Plan options were prepared. These options were developed through a collaborative and iterative approach between SMM and LNA across a number of workshops, and with other disciplines as required. The Options were supported by precedent examples, drawings (plans, sections/ elevations, design diagrams, text, images, initial artist impressions, proposed materials and sketches as appropriate) to illustrate the design intent and outcomes to effectively compare the options. Assistance was provided to the Quantity Surveyor to prepare a cost plan. The work within this stage was summarised within an updated Return Brief report.

- » **STAGE 3 Final Master Plan and Concept Design:** Following client feedback and community feedback on the options prepared in Stage 2, the preferred option was developed into a final Master Plan and Concept Plans.
- » **Environmental Impact Statement (EIS) and Request for Tender (RFT):** Given the UNESCO World Heritage status of the site and the significance of the program to the island, an Environmental Impact Assessment is being lodged to support project approvals. A Landscape Character and Visual Impact Assessment (LCVIA) has been prepared within this report as a technical input into the EIS. 20% DA drawings have also been prepared to support an RFT process, that will see the nominated tenderer becoming the lead consultant on the remaining design and construction stages of the program.

1.5 PROJECT TEAM

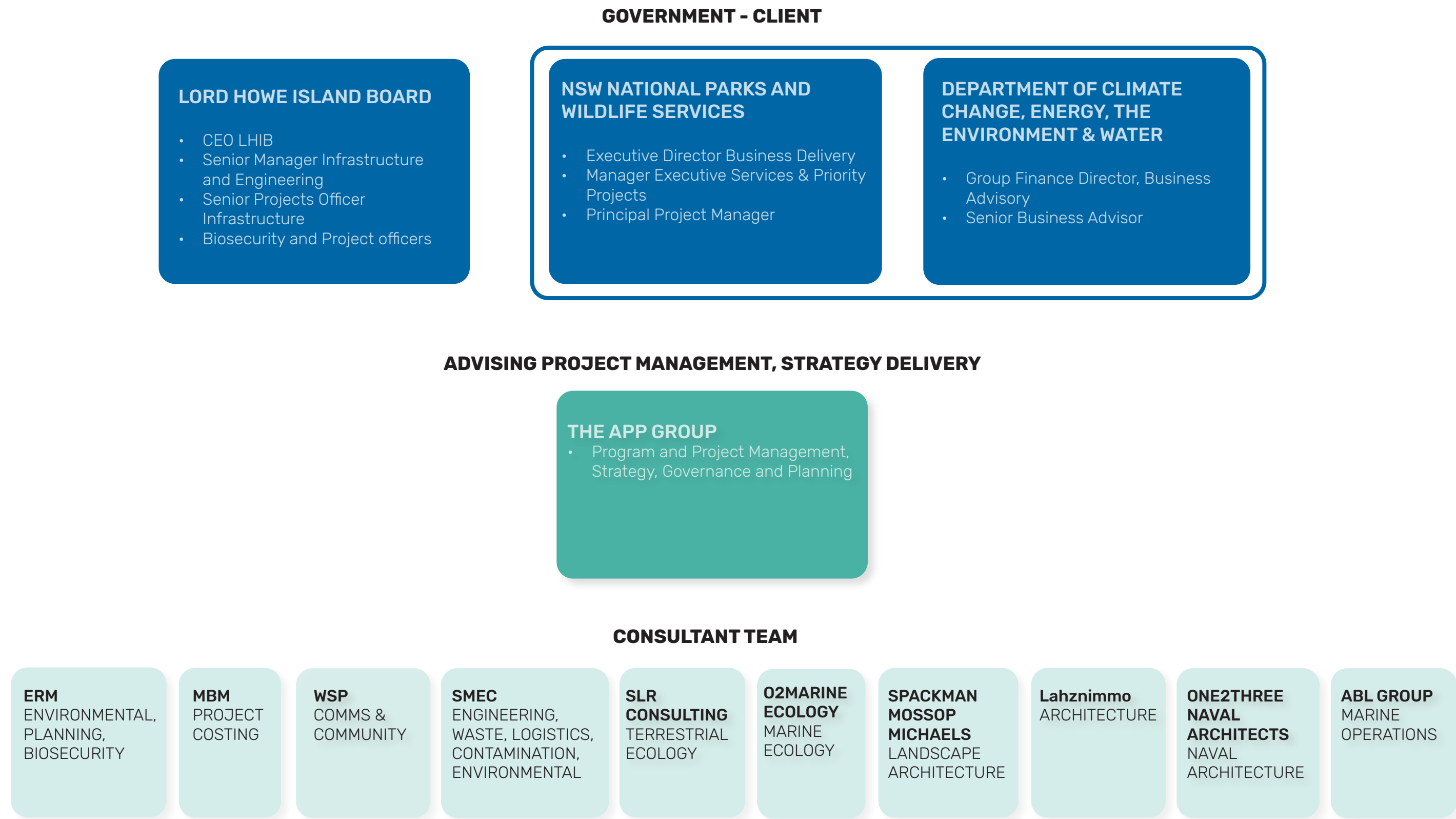


Figure 1: Project Team Structure

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2. CONTEXTUAL ANALYSIS

2.1 PLANNING CONTEXT

This Master Plan has been guided by the following planning and policy documents in relation to the Lord Howe Island Group (LHIG). A summary of selected documents is also provided within this section.

LHI Infrastructure

- » LHI Marine Infrastructure Business Case (The APP Group et al, March 2023)
- » LHI Waste Management Facility Business Case (The APP Group et al, March 2023)
- » LHI Biosecurity Business Case, Final Draft (NSW Government, March 2020)
- » EPA Design Waste Management Facility (MRA Consulting Group, February 2023)
- » Marine Freight Service Strategy (The APP Group, January 2023)
- » Landscape Visual Impact Assessment for LHI Wind Turbines (MOIR Landscape Architecture, September 2016) – only referenced for background information on viewpoint analysis.

LHI Biodiversity

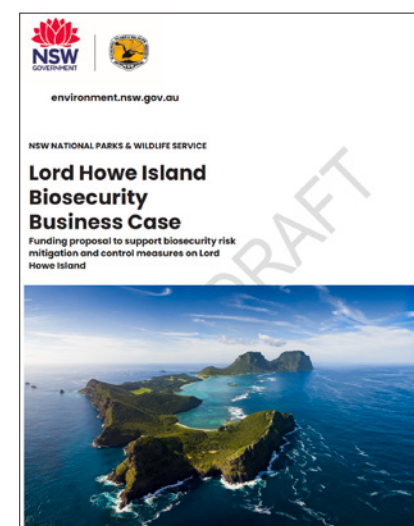
- » LHI Biodiversity Management Plan (LHIB, 2007)
- » A Systematic Flora Survey, Floristic Classification and High-Resolution Vegetation Map of Lord Howe Island (Paul Sheringham et al, 2016)

LHI Planning

- » Strategic Plan for the LHI Group (LHIB, n.d)
- » LHI PPP Plan of Management (LHIB, 2010)
- » LHI Regional Development Plan (NSW Government, 2005)
- » Lord Howe LEP (NSW Government, 2010)
- » Lord Howe DCP (NSW Government, 2005)

DPIE

- » NSW Coastal Design Guidelines (DPIE, 2023)



Marine Infrastructure Business Case

Options were analysed and recommended for 3 key aspects of the freight service preferencing option 2Dii, as follows:

- » Freight Transport Vessel – of which option 2 (a stern landing craft) is preferred
- » Island Based Infrastructure – of which option D (location near the airport and WMF) is preferred
- » Freight Service Operating Model – of which option ii (government owns and outsources its supply/operation/maintenance) is preferred.

Waste Management Facility Business Case

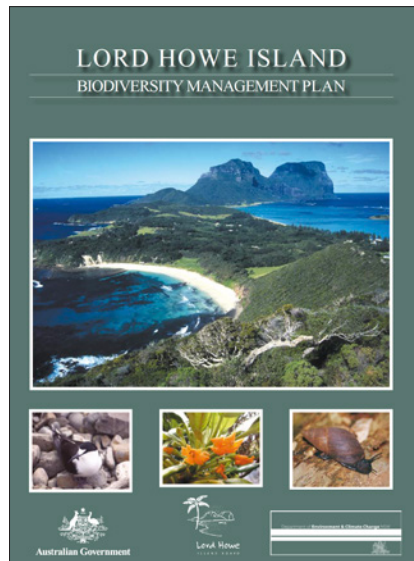
Several options were considered, ranging from minor improvements to the current facility through to a full redevelopment of the site (Option 3), which was the final preferred option. Option 3 includes:

- » Relocation and reconfiguration of the organics processing infrastructure to the northern boundary and housing within a shed
- » Construction of a receival shed to house the drop-off functions and restrict public access
- » Installation of a weighbridge
- » Construction of new chemical shed to adequately store liquid and hazardous wastes
- » Construction of a dedicated waste storage shed
- » Construction of a new Materials Recycling Facility (MRF) shed to house the new MRF infrastructure with a new working platform to provide secure, safe operating conditions.
- » Perimeter fencing, locked gate and restricted access

Biosecurity Business Case

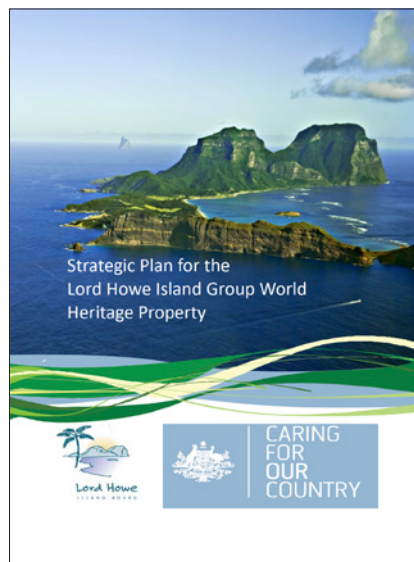
Five options were analysed for cost-benefit outcomes and Option 5 was preferred, which includes funding for the following items:

- » Ongoing biosecurity commitments;
- » Long term security of maritime strategy;
- » Minor capital works; and
- » Capital improvements at ports servicing Lord Howe Island.



Lord Howe Island Biodiversity Management Plan (BMP)

The Lord Howe Island Group (LHIG) BMP provides a detailed overview of the flora and fauna communities on LHI, including those that are endemic and their ecological status based on the Threatened Species Conservation Act 1995 (TSC Act) and the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The BMP also outlines the key threatening processes that are impacting or likely to impact these communities in the future and defines action/management plans or recovery plans to assist in mitigating these threats. Importantly, the LHI group supports incredibly diverse terrestrial flora and fauna with a high degree of endemic species and communities that must be preserved.



Strategic Plan for the Lord Howe Island Group World Heritage Property

This Strategic Plan provides an overarching framework for the next decade, aimed at ensuring management decisions regarding the island group are made in a consistent and coordinated manner across key government agencies such as the LHI Board and NSW and Commonwealth government bodies. Ultimately, it aims to ensure that the LHIG continues to comply with its obligations under the World Heritage Convention and remains a UNESCO World Heritage area. It summarises the World Heritage Values that must be upheld, along with defining a vision and strategic approaches to managing island matters such as biodiversity, tourism, resource management, sustainability and the island community.



Landscape and Visual Impact Assessment - Proposed Lord Howe Island Wind Turbines (MOIR Landscape Architecture)

In 2016, a Visual Impact Assessment was conducted by Moir Landscape Architecture to review the visual impacts of new wind turbines on the island. The initiative was part of the Lord Howe Island Renewable Operations - Energy Supply Road Map and was not approved to progress.

The document provides viewpoint analysis and photography of the island, showcasing views from several locations, both on land and from sea. This study has been used to provide background information prior to visiting the island and conducting a viewshed analysis and visual impact assessment.

2.2 REGIONAL CONTEXT

2.2.1 LORD HOWE ISLAND LOCATION

Lord Howe Island sits off the east coast of New South Wales, approximately 780km from Sydney. The island is accessed via flights from Sydney (SmartLynx codeshare with Qantas) or via Port Macquarie, Gold Coast or Newcastle (Eastern Air Services) – refer Figure 2.

The MV Island Trader ship currently visits the island each fortnight, leaving from Port Macquarie. The ship carries goods and fuel to the island and carries particular types of waste from the island back to the mainland. The MV Island Trader is at the end of its servicing life and a new marine freight vessel is being procured as part of the CIP by the NSW Government.

2.2.2 THE LORD HOWE ISLAND GROUP (LHIG)

Lord Howe Island is one of several islands and islets within the Lord Howe Island Group, a UNESCO World Heritage-listed site. In addition to Lord Howe Island, the Group also includes the Admiralty Islands, Mutton Bird Island, Blackburn Island, Gower Island, Balls Pyramid and offshore islets). There are approximately 145,000 hectares of marine environment surrounding these landforms.



Figure 2: Regional Context Map



2.3 ISLAND CONTEXT

2.3.1 ISLAND LAYOUT

Lord Howe Island is the largest land mass within the LHIG and is around 11km long and 2.8km wide at its widest point. A lagoon straddles the western coastline, providing protection from ocean currents and winds, whilst the eastern side of the island has deeper waters and is more exposed to oceanic forces. Areas of the island fall within the Permanent Park Preserve (PPP), as shown in Figure 3. The preserve acts similarly to a national park in that the primary management emphasis is conservation and preservation of natural values, however allows some harvesting of natural resources such as palm seeds and allows visitor access.

The main settlement area lies within the northern part of the island, offering convenient access to the lagoon and various beaches including Old Settlement Beach, Lagoon Beach, Ned’s Beach and several others. Walking trails provide access to Mount Eliza, Kims Lookout and Malabar Hill. The North Zone (NZ) project site is located within this area, which includes the exiting jetty, public boat ramp and surrounding hardstand area. The public boat ramp is used extensively by local residents, and many boat trailers and vehicles are often parked around the grassy edges of the hardstand area.

The central part of the island houses the South Zone (SZ) project site, which sits in a low-lying isthmus between the northern and southern parts of the island. The SZ contains the existing Waste Management Facility and some additional lots of land. The island’s airport sits on the northern side of the SZ along with some residential dwellings, and the Golf Course is on the southeastern side.

The southernmost part of the island is dominated by Mount Lidgbird and Mount Gower. The steep slopes and high biodiversity values in this zone offer spectacular views and nature trails.

LEGEND

Project Sites

Permanent Park Preserve

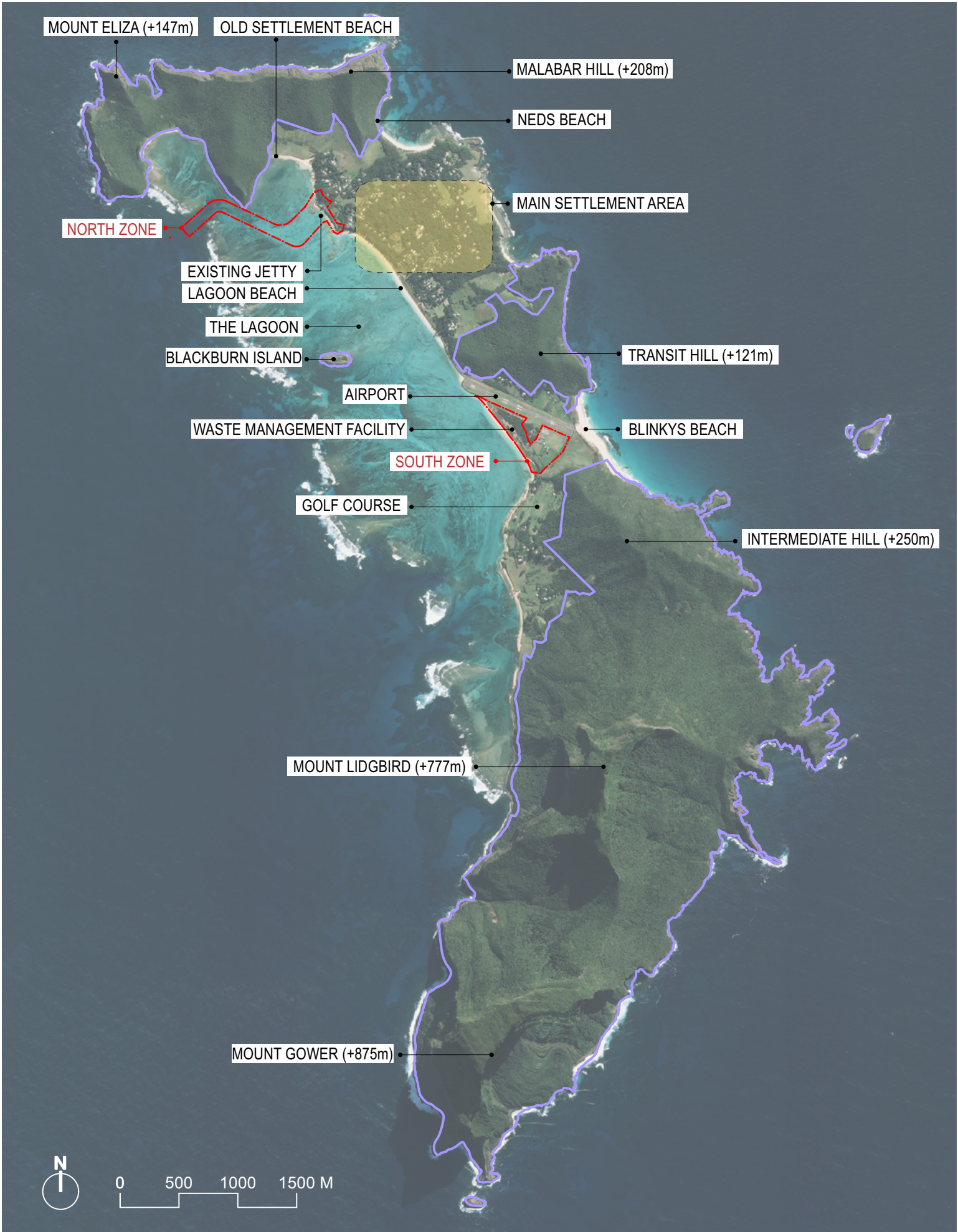


Figure 3: Regional Context Map



Figure 4: Views from Mount Eliza to Mount Lidgbird and Mount Gower



Figure 5: Ned's Beach Road within the main settlement area

Source: *Exploreshaw.com*



Figure 6: Existing jetty

2.3.2 ISLAND TOPOGRAPHY

The topography of the island is shown in Figure 7.

Elevations around the main settlement area and South Zone are generally relatively flat (Figure 9). The airport runway sits at around 4m AHD, framed by Transit Hill to the north at 121m and Intermediate Hill to the south at 250m. Mount Eliza and Malabar Hill form the highest points in the northern zone of the island, whilst Mount Lidgbird (777m) and Mount Gower (875m) are key landforms towering over the island in the south (Figure 8). The topography of the island and these volcanic basalt ridge tops offer a dramatic backdrop to photographs and images of the island.

DESIGN CONSIDERATIONS

- » The NZ and SZ reside in low-lying areas, which are likely to have visual impacts from walks and viewing points from the surrounding elevated hills, as well as the lagoon.
- » The SZ is nestled between narrow sand dunes on its eastern and western edges. This could make it highly prone to strong easterly and westerly winds and more likely to be impacted by rising sea levels in the coming decades.

LEGEND

- Project Sites
- *Contour 0 - 99m
- *Contour 100 - 299m
- *Contour 300 - 599m
- *Contour 600 - 875m
- *Contours at 10m interval

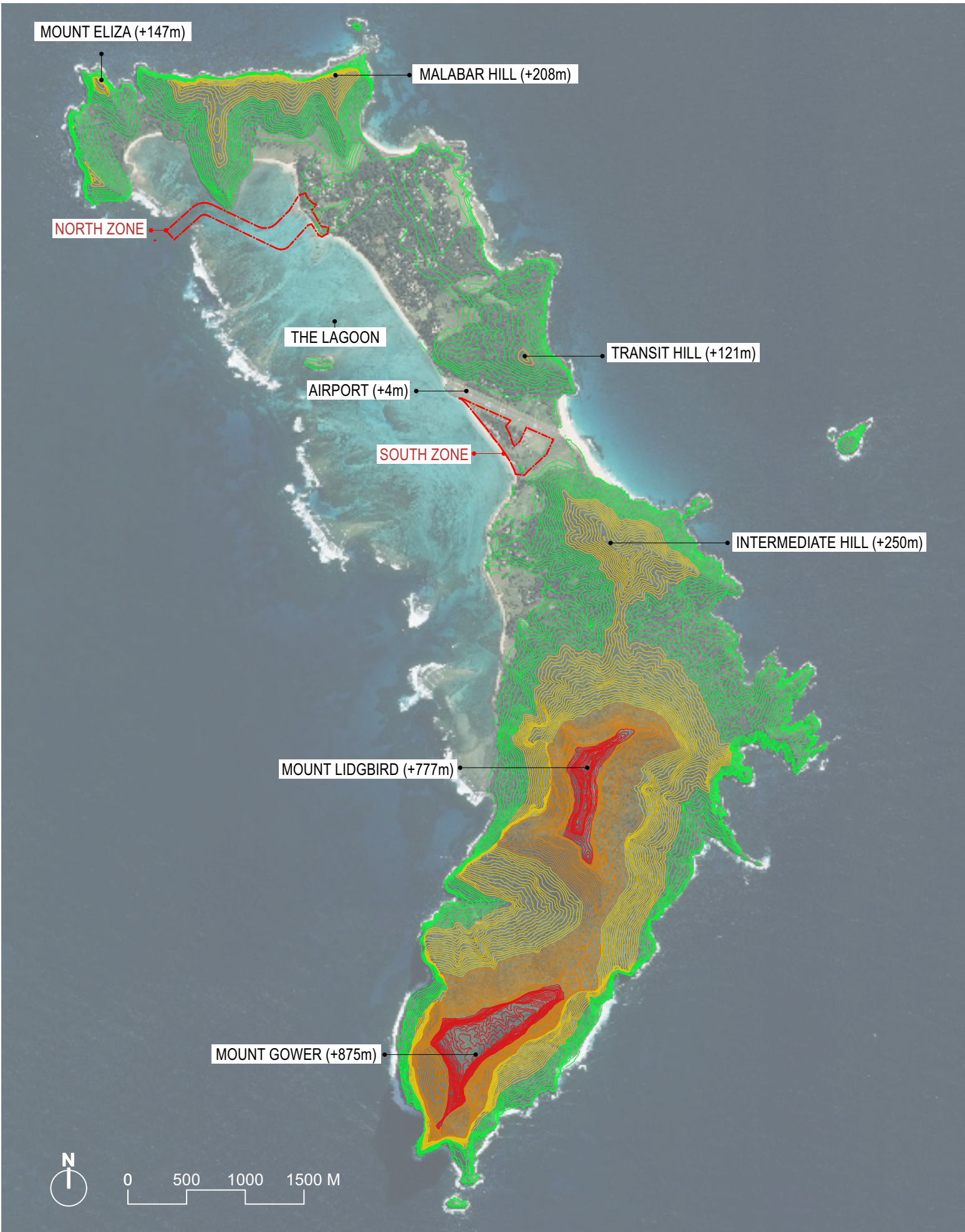


Figure 7: Topography Map



Figure 8: View from Malabar Hill looking North



Figure 9: Low lying and flat central zone

2.3.3 ISLAND HYDROLOGY

The island is surrounded by the Tasman Sea, featuring numerous beaches, bays, and coves along its coastline (Figure 10).

On the western side of the island, there are several marine passages, with one located on the northern side. The existing marine service to the Island is operated on the MV Island Trader, which navigates through the North Passage to dock at the existing Jetty.

Throughout the island, various watercourses, including some named creeks, flow down the steeper slopes, passing through gullies and draining into the sea. Several small swamps and dams are scattered around the island, particularly near the airport and to the north.

DESIGN CONSIDERATIONS

- » If the jetty and marine infrastructure were to shift to the SZ (as originally proposed within the Marine Infrastructure Business Case), the newly procured marine vessel would need to travel through the South Passage and/or Erscotts Passage to reach the new marine facility.
- » Retaining marine infrastructure and operations in the NZ would have a lower environmental impact for the program.

LEGEND

- Project Sites
- Watercourses
- Waterbodies
- Marine Passage

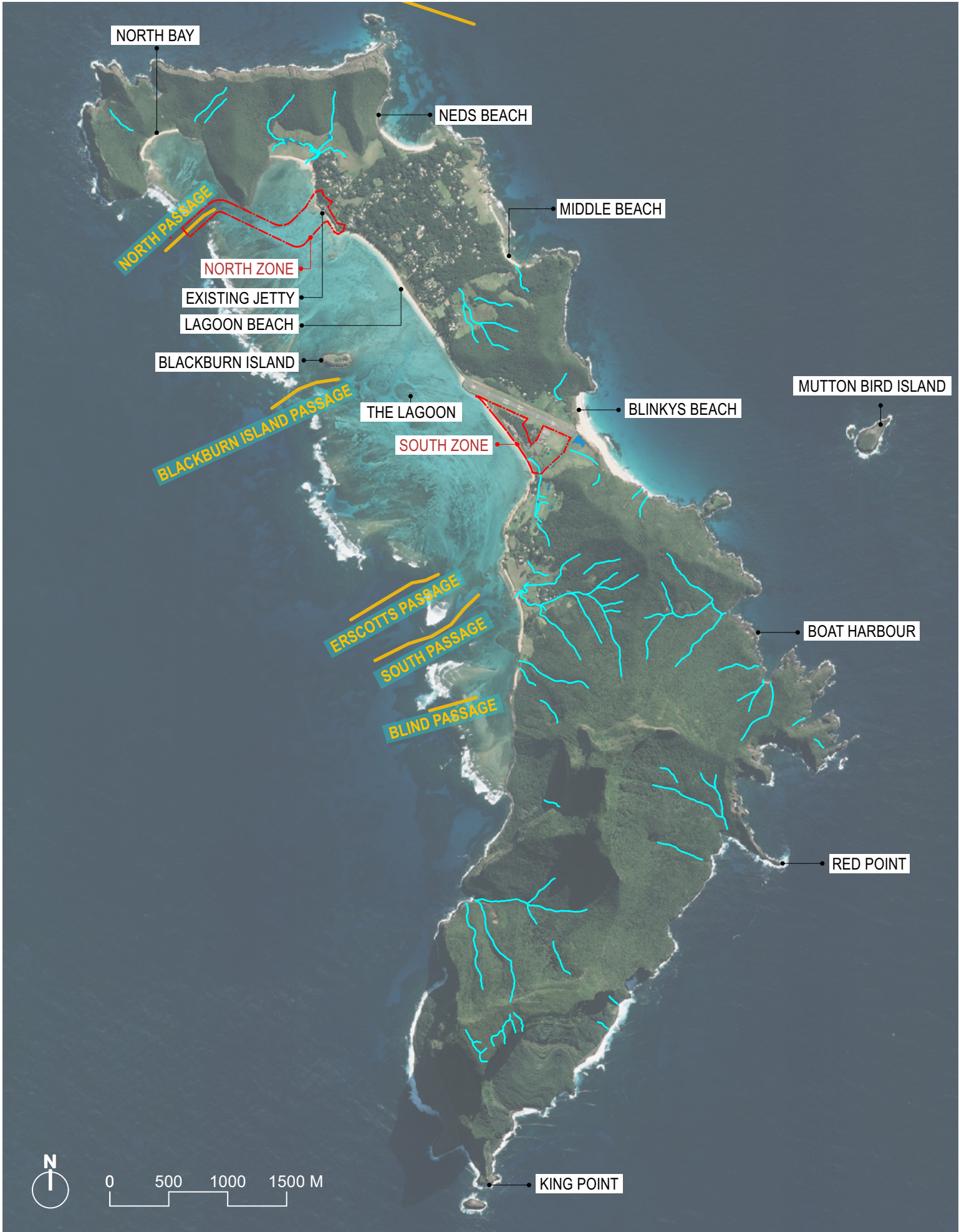


Figure 10: Hydrology Map



Figure 11: Segment of Soldier Creek along the Goat House Track



Figure 12: Blinky Beach



Figure 13: The Lagoon

2.3.4 ISLAND ECOLOGY

Lord Howe Island (along with the other islets in the LHIG) are unique examples of oceanic islands with volcanic origins. They have an incredibly rich biota of plants and animals, 47% of which are endemic to the islands and occur nowhere else (refer to key statistics in Figure 17). The island hosts a diversity of indigenous vascular plants, provides habitat and breeding grounds for a wide range of birds and seabirds and includes a high proportion of endemism in terrestrial invertebrates.

Early floristic studies were conducted in Lord Howe Island in 1983. However, a more recent survey and mapping of vegetation on Lord Howe Island was conducted in 2016 and is summarised in the report '*A Systematic Flora Survey, Floristic Classification and High-Resolution Vegetation Map of Lord Howe Island*' (P. Sherringham, P.Richards, P.Gilmour, E.Kemmerer; 2016). Within this study, 33 vegetation communities were classified across the island and these are shown in Figure 14. Figure 15 and Figure 16 shows examples of local vegetation communities on the island.

The island is surrounded by marine waters that also offer pristine and unique marine ecologies such as coral reefs and aquatic habitats. The LHIG has the most southern coral reef system in the world, offering a rich diversity of fish species, marine invertebrates and marine benthic algae communities.

DESIGN CONSIDERATIONS

- » With such unique and incredibly diverse ecosystems, it will be paramount to minimise adverse impacts on both marine and terrestrial ecologies during the design, construction and ongoing maintenance of any new infrastructure services on the island.

LEGEND

- Project Sites
- Coral Reef/Marine Habitat
- Vegetation Communities

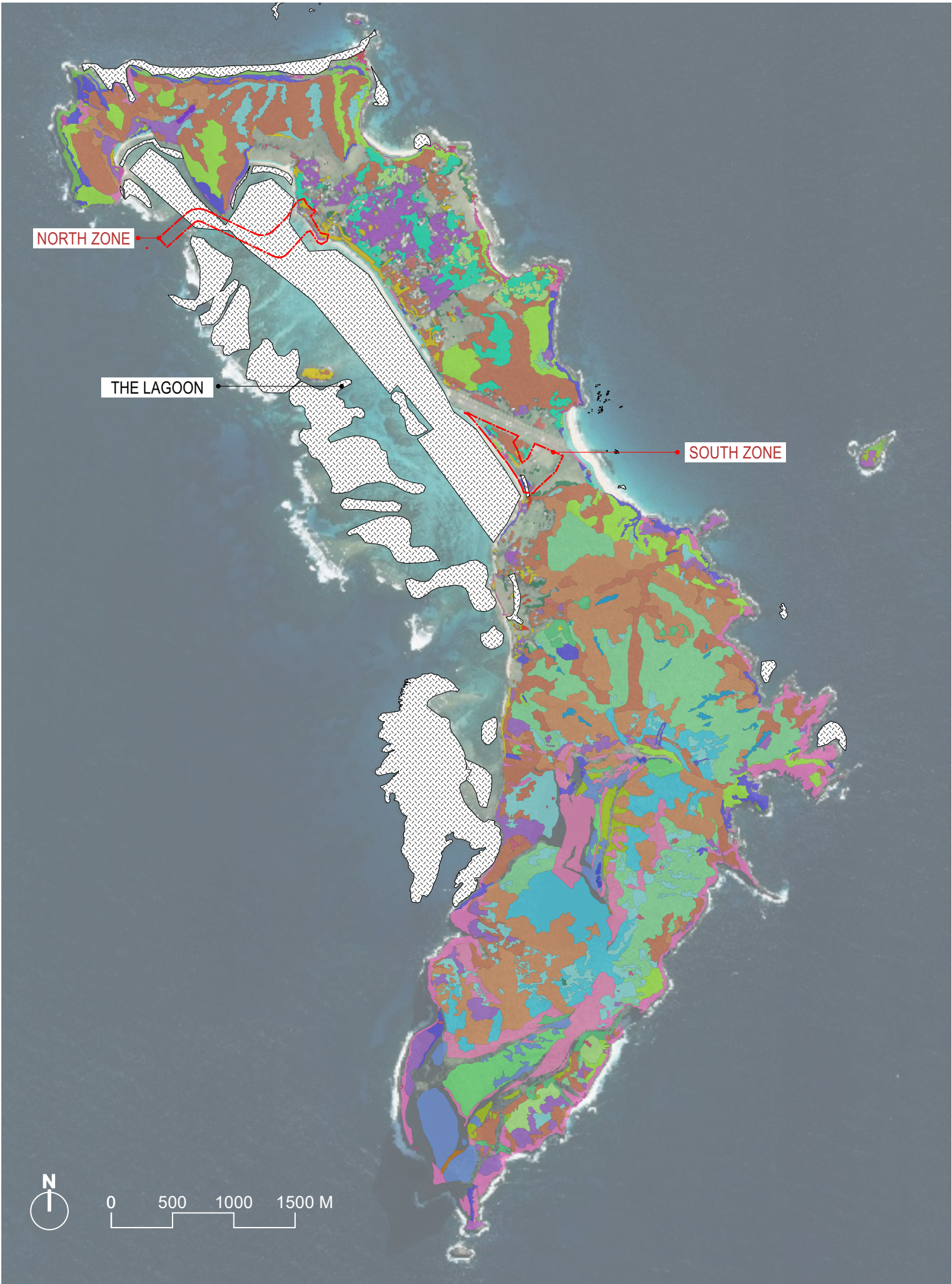


Figure 14: Ecology Map



Figure 15: Community 12b: Banyan Kentia Palm Forest

Source: A Systematic Flora Survey, Floristic Classification and High-Resolution Vegetation Map of Lord Howe Island (2016)



Figure 16: Community 17: Greybark Blackbutt Rainforest

Source: A Systematic Flora Survey, Floristic Classification and High-Resolution Vegetation Map of Lord Howe Island (2016)



Figure 17: Lord Howe Island Biodiversity Statistics

Source: LHI Destination Management Plan 2024 - 2034 (LHIB, 2024)



2.4 NORTH ZONE - DETAILED ANALYSIS

2.4.1 NORTH ZONE ACCESS AND CIRCULATION

The North Zone (NZ) is located north-west of the main settlement area and south of Settlement Beach. As shown in Figure 18, the primary road that links the NZ to the northern and southern parts of the island is Lagoon Road. Ned's Beach Road contains a variety of local stores and cafes and leads further into the main settlement area. There is a walking track from Ocean View Apartments that connects with the Malabar Hill walk, and many walkers and cyclists move along Lagoon Road between Settlement Beach and the main settlement area.

The NZ area currently contains the existing jetty where the Island Trader and other boats dock, along with a public boat ramp, marine rescue building, Ocean View Shed, amenities building and biosecurity shed (refer Figure 20). A hardstand area is located between these buildings and Lagoon Road, and is utilised to store fuel and freight in preparation for transfer across the island. Forklifts and small trucks traverse back and forth along the jetty and hardstand areas during vessel operations, loading and unloading freight.

DESIGN CONSIDERATIONS

- » The North Zone will need to function in two distinct modes:
 - Operational Mode: when the area becomes a work zone controlled by the Stevedores loading and unloading goods from the vessel. During this time, the hardstand area will require limited access to improve the safety of workers and visitors to the area.
 - Recreation Mode: the time period between vessel arrivals when the area is available for general public use, including accessing the boat ramp, the jetty and surrounding areas by cars, cyclists and pedestrians.
- » Appropriate turning circles for cars with boat trailers will need to be provisioned near the boat ramp when designing the cargo laydown area.

LEGEND

- North Zone
- Buildings
- Local Road
- Easement
- Private Driveway
- Walking Trails

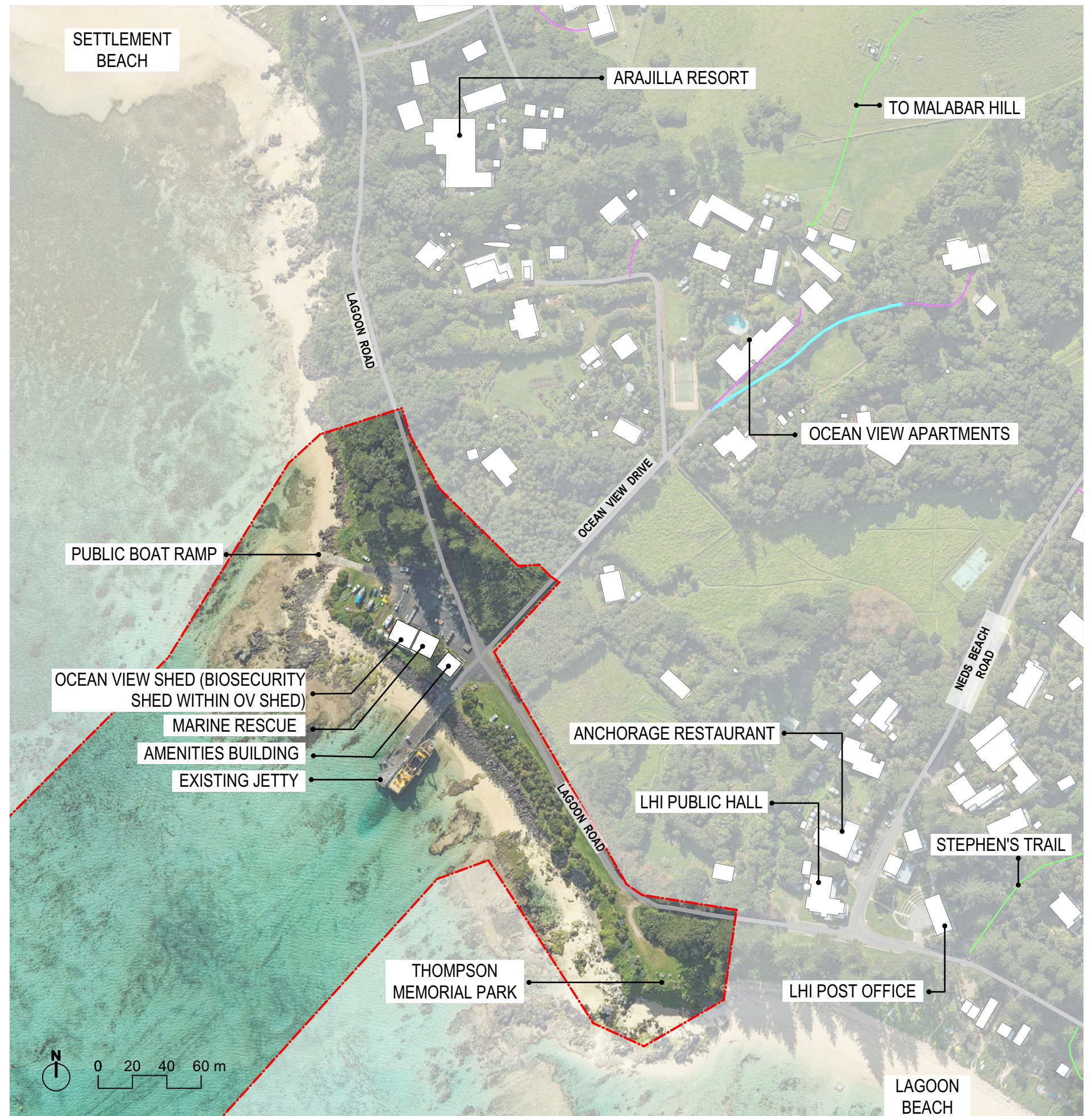


Figure 18: NZ Access and Circulation



Figure 19: NZ Drone Imagery of the jetty and adjoining buildings



Figure 21: Forklifts travel along jetty during vessel loading/unloading



Figure 20: NZ Marine Rescue and Marine Parks/Biosecurity Shed



Figure 22: Views of jetty from Thompson Memorial Park, looking north

2.4.2 NORTH ZONE LAND ZONING

The majority of the NZ area is zoned “Environment Protection”, with the exception of a small strip of palm plantation adjacent to the corner of Lagoon Road and Ocean View Drive.

The NZ area runs along an embankment which is several metres above sea level and prone to erosion. As such, the Environment Protection zoning seeks to protect these types of sensitive areas. It also seeks to preserve the scenic amenity of the land and allows for the integration of utility services in harmony with the World Heritage values of the island’s natural environment.

DESIGN CONSIDERATIONS

- » Given the criticality of the program and the environmental significance of the island and its marine environments, the program will follow the Critical State significant infrastructure (CSSI) pathway to obtain planning approval. This includes the preparation of an Environmental Impact Statement (EIS) to obtain approvals under the Environmental Protection and Biodiversity Conservation (EPBC) Act.
- » In addition to complying with all CSSI requirements, the project should aim to minimise development impacts to any natural environments such as existing native vegetation areas and the marine environment.
- » The design of the marine infrastructure will also need to be sensitive to the landscape and marine environment, minimising environmental and visual impacts in the lagoon and surrounding areas.

LEGEND

	North Zone
	Zone - Settlement
	Zone - Rural
	Zone - Special uses
	Zone - Environment Protection
	Zone - Recreation

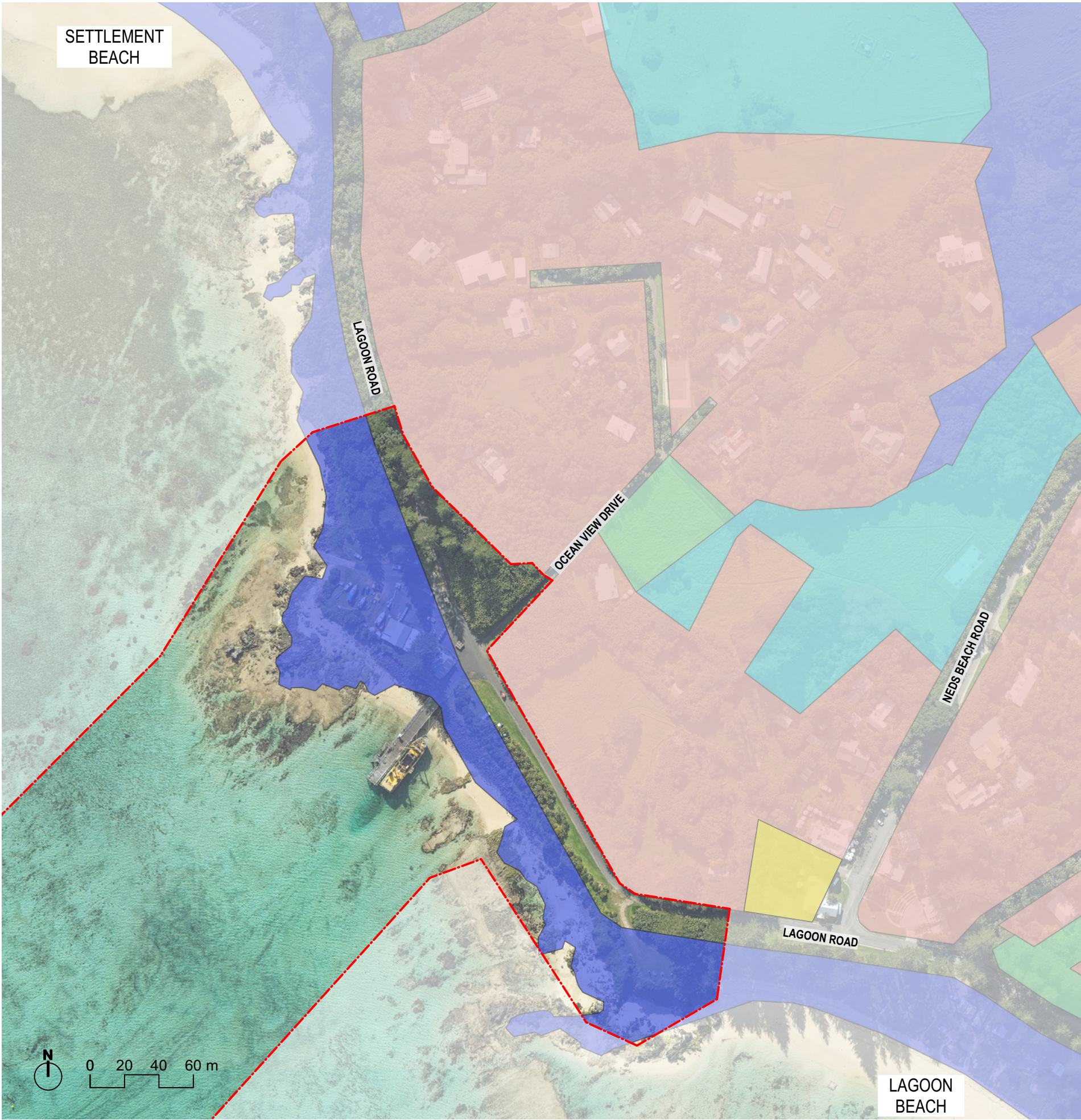


Figure 23: NZ Land Zoning

2.4.3 NORTH ZONE FLORA

A number of vegetation communities occur within the NZ, including areas of exotic plantings and palm plantations. Under the LEP, there is a small portion of Significant Native Vegetation (SNV) on the northern end of the NZ, however it is unlikely to be impacted given its distance from the hardstand area.

DESIGN CONSIDERATIONS

- » The NZ has very little LEP listed SNV within its boundary, however the native vegetation communities within this area are endemic to the island. They also provide nesting areas for migratory shorebirds and are highly valuable from an ecological perspective.
- » Given the presence of rare and endemic flora within the NZ, the project ecologist is preparing a Flora and Fauna Assessment as part of the Environmental Impact Statement (EIS) that will seek the relevant approvals under the Environmental Protection and Biodiversity Conservation (EPBC) Act.
- » There are some exotic Norfolk Island Pine trees surrounding the hardstand area that are landmark feature trees, including two adjacent to the Old Cargo Shed that are listed in the NSW State Heritage Register as part of the 'Cargo Shed Group'. These existing trees should be retained where ever feasible.
- » The palm plantations surrounding the site enhance the landscape character of the area and should also be retained where ever feasible.

LEGEND

- North Zone
- Greybark - Blackbutt Rainforest
- *Environmental Plantings
- *Exotic
- *Plantation
- Kentia Palm Forest on coral sand and calcarenite
- *Bully Bush - Hopwood shrubland on shallow rocky soils
- Kentia Palm - Greybark rainforest of low to mid altitude slopes
- Melanthera biflora - Saltwater Couch herbland/grassland on coral boulder beaches and rocky headlands
- SNV - Significant Native Vegetation

* Most likely to be impacted

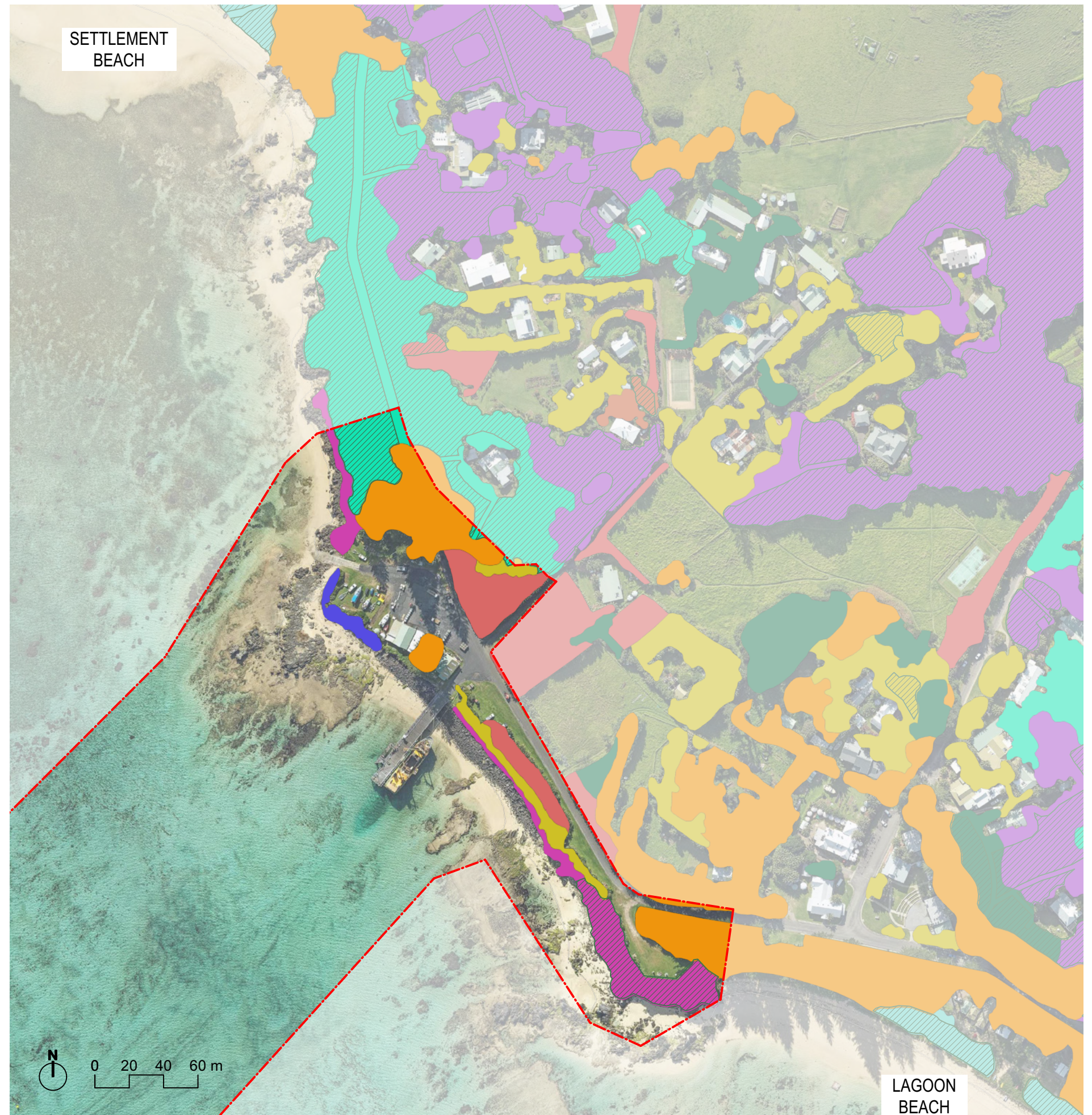


Figure 24: NZ Vegetation Communities

2.4.4 NORTH ZONE THREATENED FAUNA

There have been threatened fauna sightings within the NZ. The Lord Howe Island Wood Hen is the most prevalent sighting, however one or two sightings of Wedge-tailed Shearwaters, White Terns and other bird species are also present. The LHI Placostylus (a land snail endemic to the island) has also been sighted within the zone.

DESIGN CONSIDERATIONS

» Given the presence of threatened fauna within the NZ, the project ecologist is preparing a Flora and Fauna Assessment as part of the Environmental Impact Statement (EIS) that will seek the relevant approvals under the Environmental Protection and Biodiversity Conservation (EPBC) Act.

LEGEND

North Zone

Lord Howe Wood Hen

Ruddy Turnstone

Wedge-tailed Shearwater

White Tern

Silver Eye (LHI subspecies)

Lord Howe Placostylus

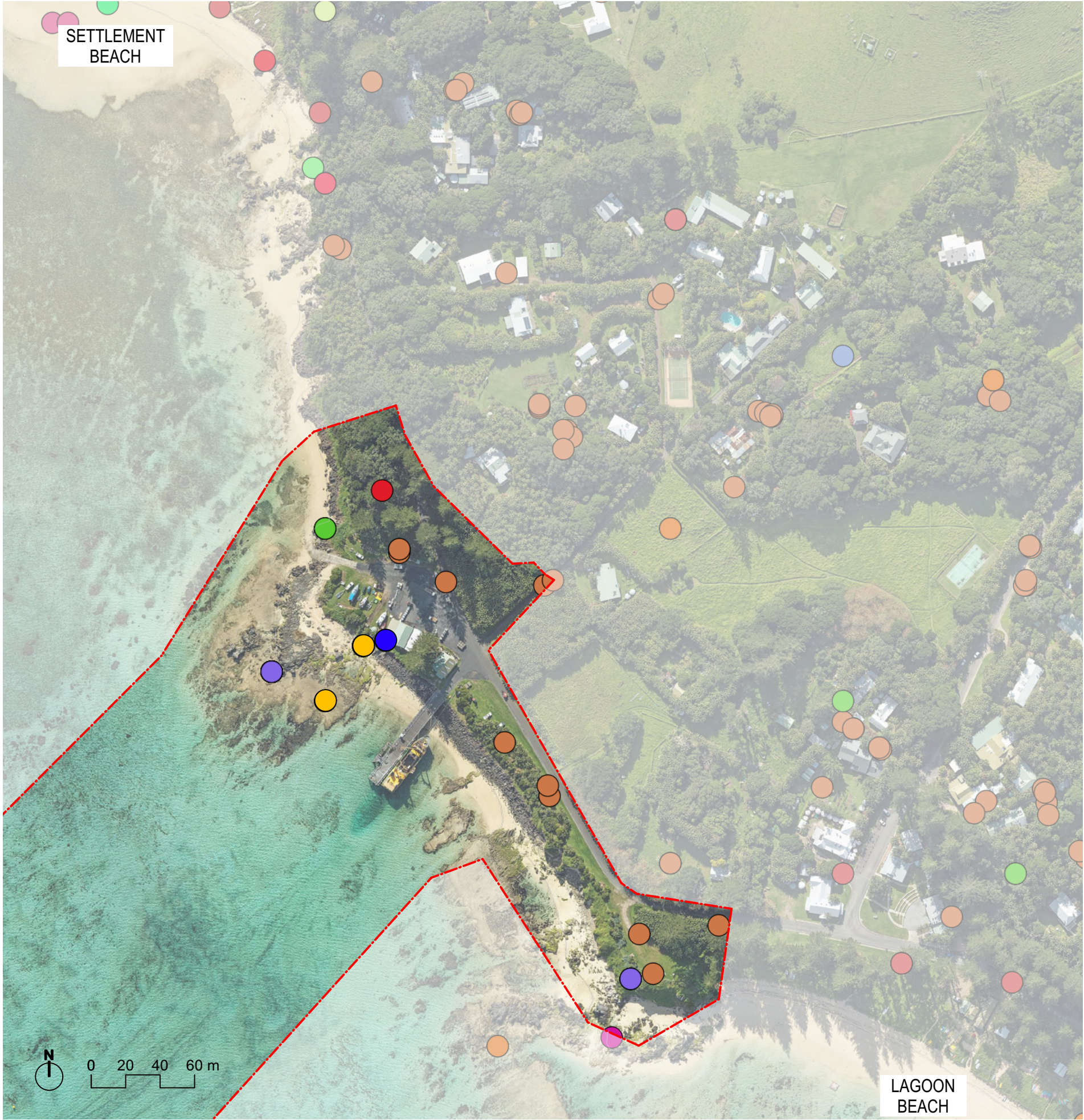


Figure 25: NZ Threatened Fauna

2.4.5 NORTH ZONE SETTLEMENT PATTERN

The NZ does not contain any residential development. It does contain the Ocean View Shed, Marine Rescue and the Old Cargo Shed. The Ocean View Shed and the Old Cargo Shed, along with two Norfolk Pines, are listed in the NSW State Heritage Register as part of the 'Cargo Shed Group'.

In the areas surrounding the NZ, there are predominantly residential buildings and resorts offering accommodation such as Arajilla resort and the Ocean View Apartments. Ned's Beach Road has a series of shops, cafes and small grocery stores at its southern end, as well as a community hall and post office.

DESIGN CONSIDERATIONS

- » The Ocean View Shed and the Old Cargo Shed should be retained and reused as part of any site development. Consider removal of the later unsympathetic additions to both buildings
- » Residences surrounding the NZ are likely to be the most affected by development within this area. Impacts could include construction noise along with visual impacts of construction activities and material stockpile areas. It is also likely that there could be disruptions to traffic movement along Lagoon Road between Settlement Beach and Ned's Beach Road.
 - Develop Change Management and Communication strategies that are tailored to the unique needs of particular groups using Lagoon Road and living within the surrounding area.
 - The Concept Master Plan and Masterplan should aim to minimise impacts on these residents/businesses/tourists through the design and construction phases of the project, as well as ongoing operational activities. The Final Draft Concept Plan and Masterplan are now on public display on the LHIB Website.

LEGEND

- North Zone
- Building - Dwelling
- Building - Shed
- Building - Commercial Use
- Building - Heritage

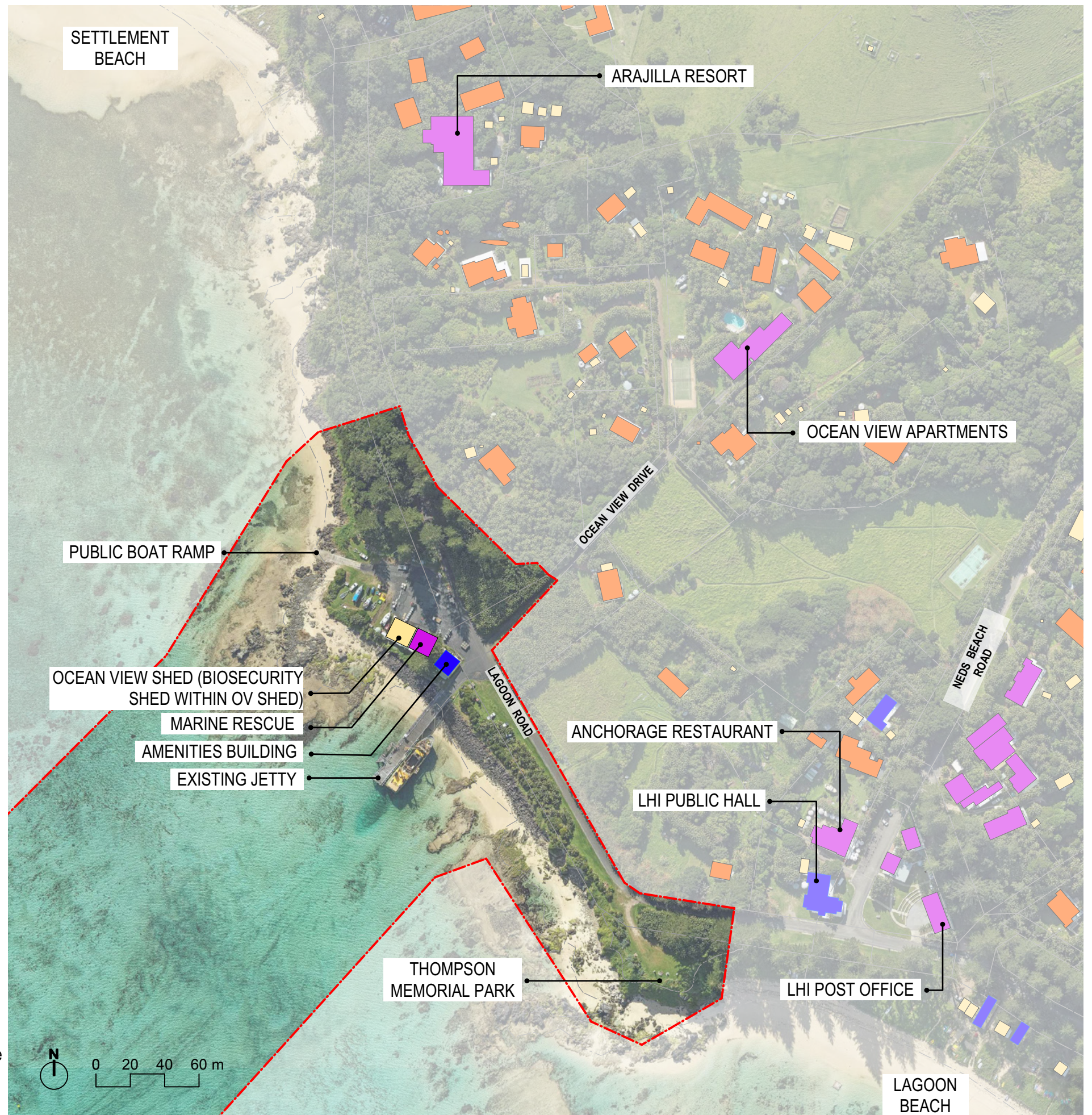


Figure 26: NZ Settlement Pattern

2.4.6 NORTH ZONE UTILITIES

Prior to 2021, most of the island's electricity was generated using diesel-fuelled generators. In 2021, the island's power infrastructure was upgraded with the addition of a solar array and batteries, reducing reliance on diesel fuel. Electricity is distributed through an underground electrical reticulation system that serves 296 customers.

For telecommunications, Lord Howe Island uses a copper network and landline telephony, currently serviced by Telstra. There is no cellular connectivity on the island.

Electricity and telecommunications cables are shown in Figure 27. These cables run underground, minimizing visual impacts.

There is a stormwater culvert that runs underneath Lagoon Road, just north of the hardstand area. The Amenities building has a septic system that is pumped into an absorption area in the palm plantation on the corner of Lagoon Road and Ocean View Drive.

DESIGN CONSIDERATIONS

- » The newly designed marine infrastructure will need to capture and manage stormwater run-off that comes from the north side of Lagoon Road. Similarly, it will also need to manage any potential septic run-off from the palm plantation on the northern side of the road.
- » Electricity and Telecom cables already connect with the existing Amenities Building, however the current substation is close to maximum capacity. As such, a new substation will be required to support the new facilities.

LEGEND

- North Zone
- Culvert
- Septic Drainage Area
- Telecom cable
- Low Voltage Electricity Cable
- High Voltage Electricity Cable

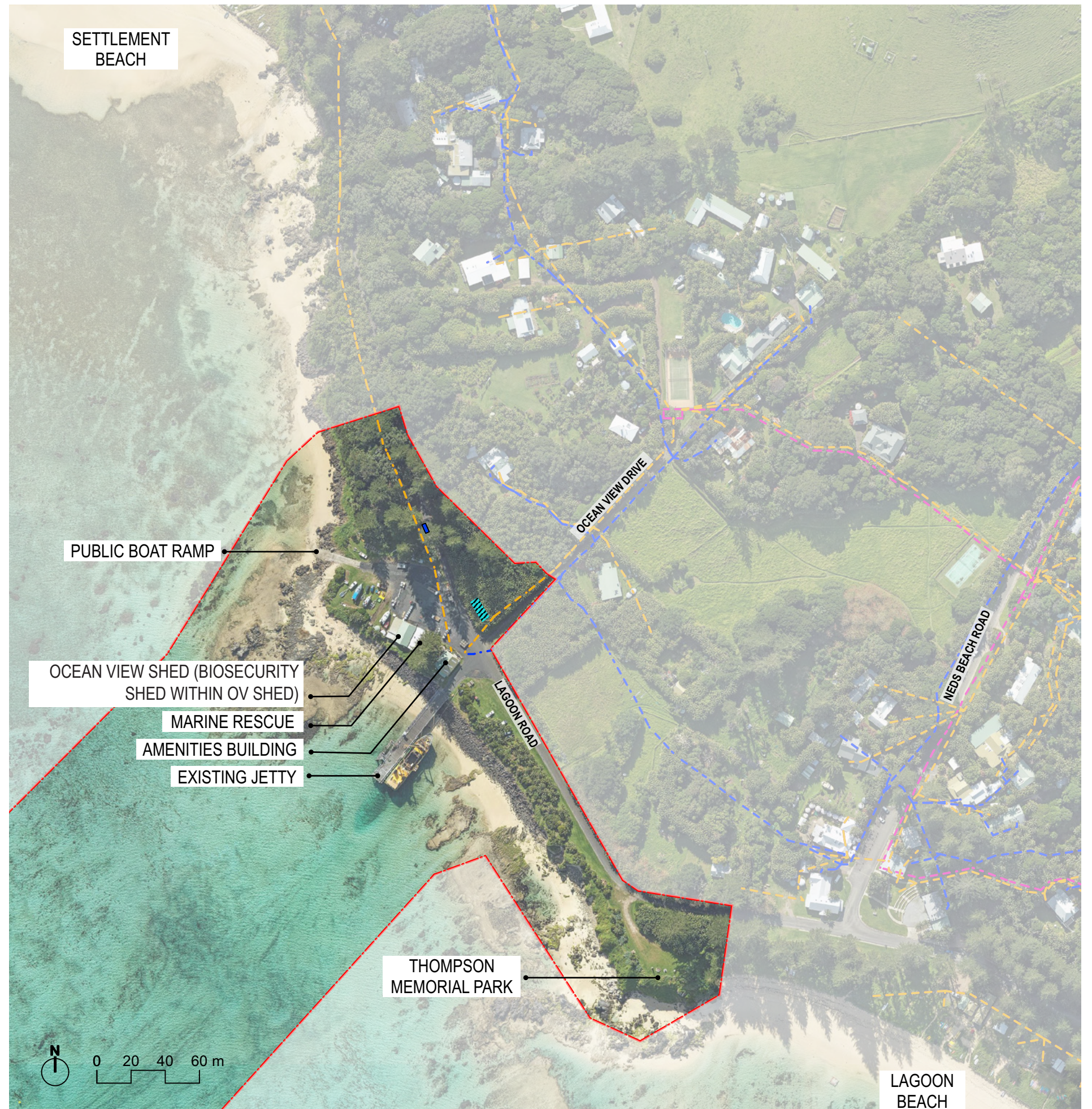


Figure 27: NZ Utilities

2.4.7 NORTH ZONE LANDFORM

The NZ site is located adjacent to the shoreline and sits above an embankment that is formed by a rock revetment wall. The marine infrastructure area is fairly exposed on its western and southern sides, with only a handful of mature Norfolk Island Pine trees and some shrubby vegetation along the top of embankment.

The existing hardstand area has a substantial cross fall of around 2m between the northern side near Lagoon Road and the southern side near the foreshore. There is also a steep drop of around 2.5m from the top of the embankment to the sand below.

DESIGN CONSIDERATIONS

- » The level changes across the site will likely require a retaining wall between Lagoon Road and the hardstand. Section 01 shown in Figure 29 indicates that a wall of around 1.5m high may be required to achieve a 2% fall.
- » Given the site's exposure to coastal processes such as wind, storm surges and future sea level changes, consider opportunities to reinforce the existing embankment wall that separates the built elements from the beach.
- » New buildings within the hardstand area will be visible from the lagoon and from Lagoon Road. As such, screening vegetation should be utilised around the site to soften and conceal built elements whilst also providing protection from strong winds.
- » The hardstand area will need to be bunded and require drainage control to ensure that chemical spills are contained and not allowed to flow into the lagoon. A specific sealed bunded area will need to be included in the broader bunded hardstand to serve as an area for boat wash down and maintenance, which is currently not provided. Stormwater flows from the northern side of Lagoon Road will need to be transferred to the lagoon, either under or around the hardstand area.
- » Maintaining suitable setbacks from the top of the embankment for all structures and activities will be a requirement to protect the embankment stability and safeguard the functions of the area.

LEGEND

- North Zone
- Contours (0.2m)

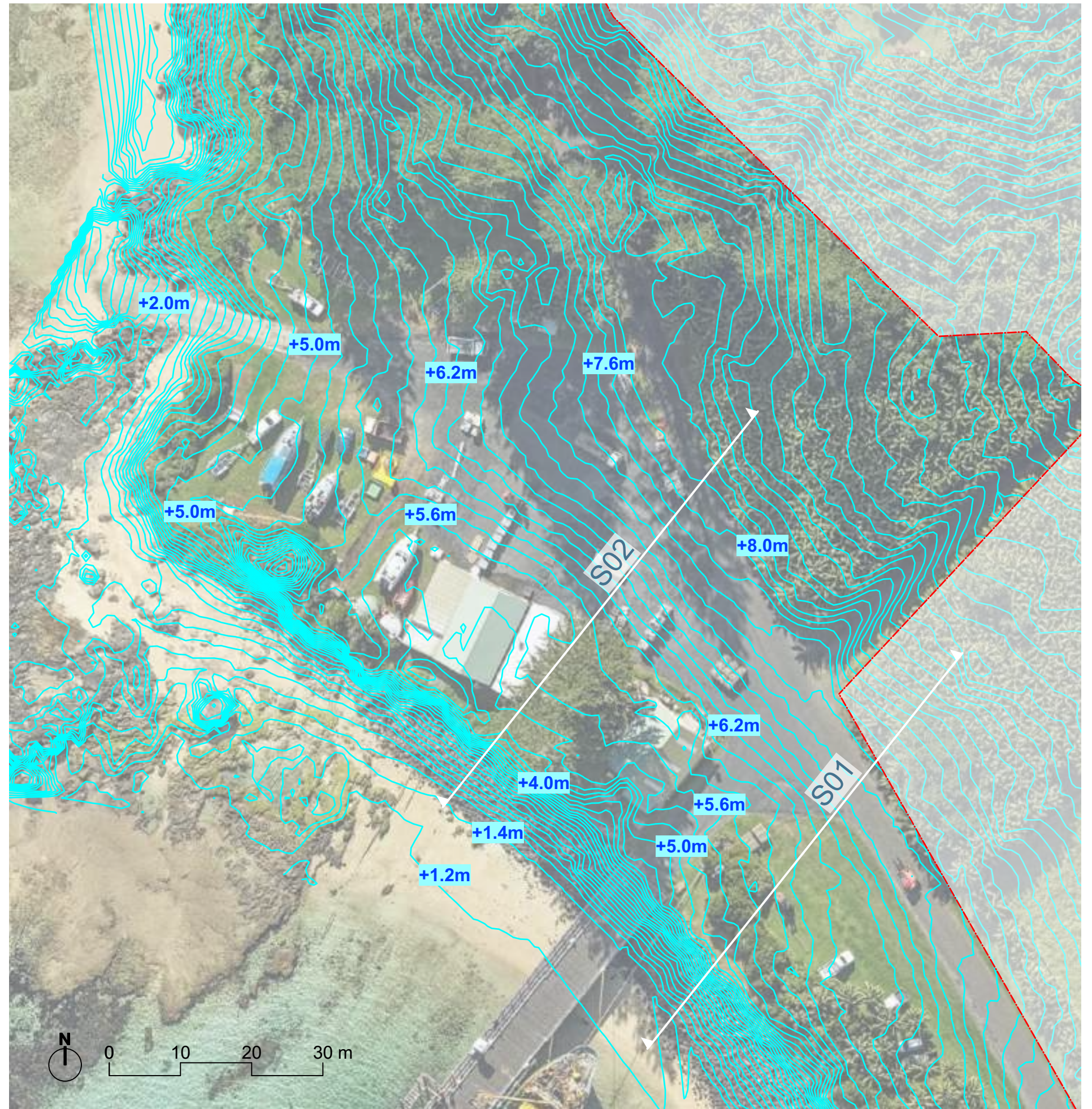


Figure 28: NZ Landform

LEGEND

- SEALED SURFACE
- NATIVE VEGETATION COMMUNITY
- PALM PLANTATION
- TURF
- ROCK EMBANKMENT WALL
- BEACH SAND

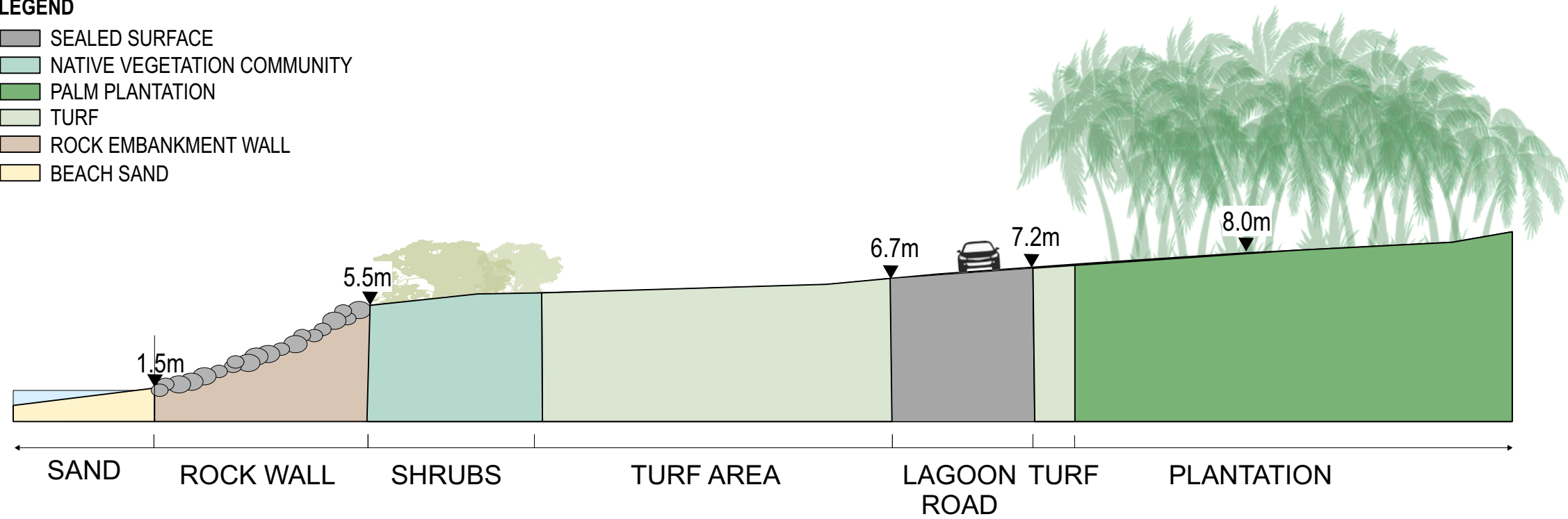


Figure 29: NZ Section S01

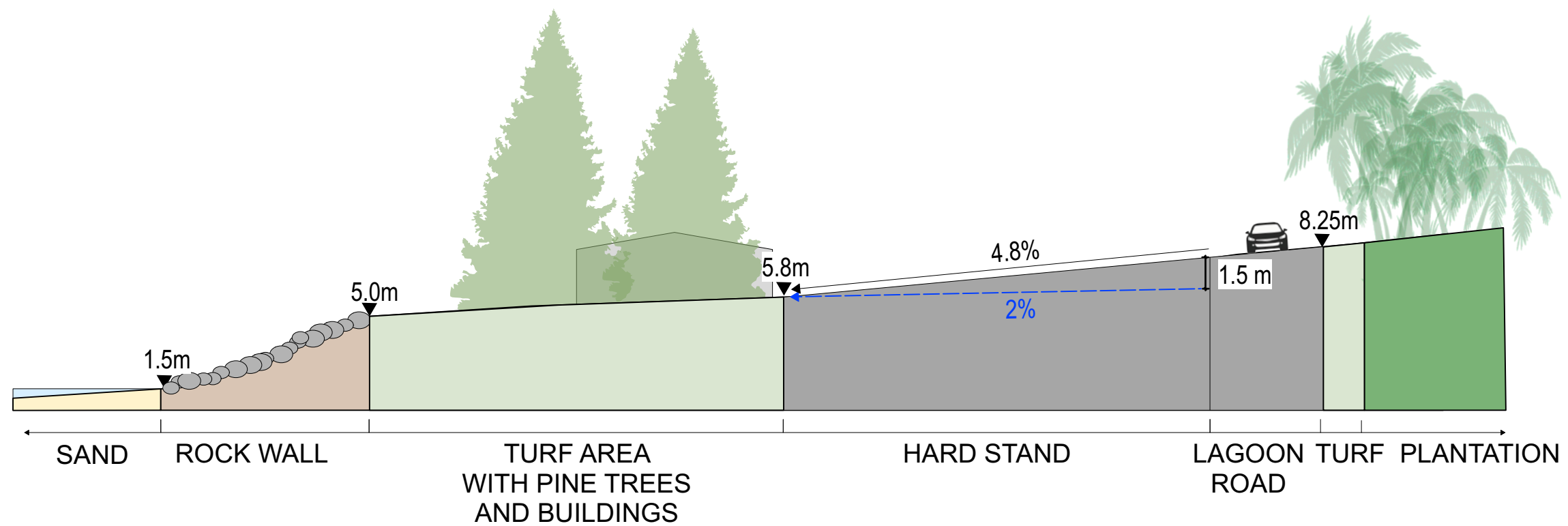


Figure 30: NZ Section S02

2.5 SOUTH ZONE - DETAILED ANALYSIS

2.5.1 SOUTH ZONE ACCESS AND CIRCULATION

The island's airport is located directly adjacent to the South Zone (SZ), with flights operated by SmartLynx (codeshare with Qantas) and Eastern Air Services.

Lagoon Road, the main sealed road running through the SZ, connects the northern and southern parts of the island (Figure 31). Due to the limited use of cars on the island, Lagoon Road accommodates motor vehicles, cyclists, and walkers. There are generally no formal footpaths for pedestrians along Lagoon Road, except for a short stretch northwest of the airport. Old Lagoon Road leads into the airport and connects with a public sealed driveway providing access to the Waste Management Facility (Figure 34). An unsealed road (Figure 33) continues from here, leading to an LHIB storage shed and Aerorefuellers storage and shed.

Several walking trails end near the development precinct, including those leading to Transit Hill and Intermediate Hill. Another walking track connects with Lagoon Road, taking walkers to Blinkys Beach.

DESIGN CONSIDERATIONS

- » Old Lagoon Road is the key access route to the Waste Management Facility (WMF) and also serves the airport. It is essential to assess whether the new WMF will increase traffic volumes or create peak times for rubbish drop-off that could impact traffic flow. If such impacts are identified, modifications to the surrounding road network may be necessary.
- » The majority of visitors to the WMF arrive in motor vehicles. Given there are very few formal footpaths and no cycle paths on the island, there is no need to provide special provisions for these modes of transport in the SZ.
- » Maintaining existing public access to the lagoon and existing private residence should be considered.

LEGEND

- South Zone
- Buildings
- Local Road
- Public Driveway
- Private Driveway
- Walking Trails



Figure 31: SZ Access and Circulation



Figure 32: Lagoon Road north of the airport runway



Figure 34: Public driveway into Waste Management Facility



Figure 33: Unsealed road within Waste Management Facility area

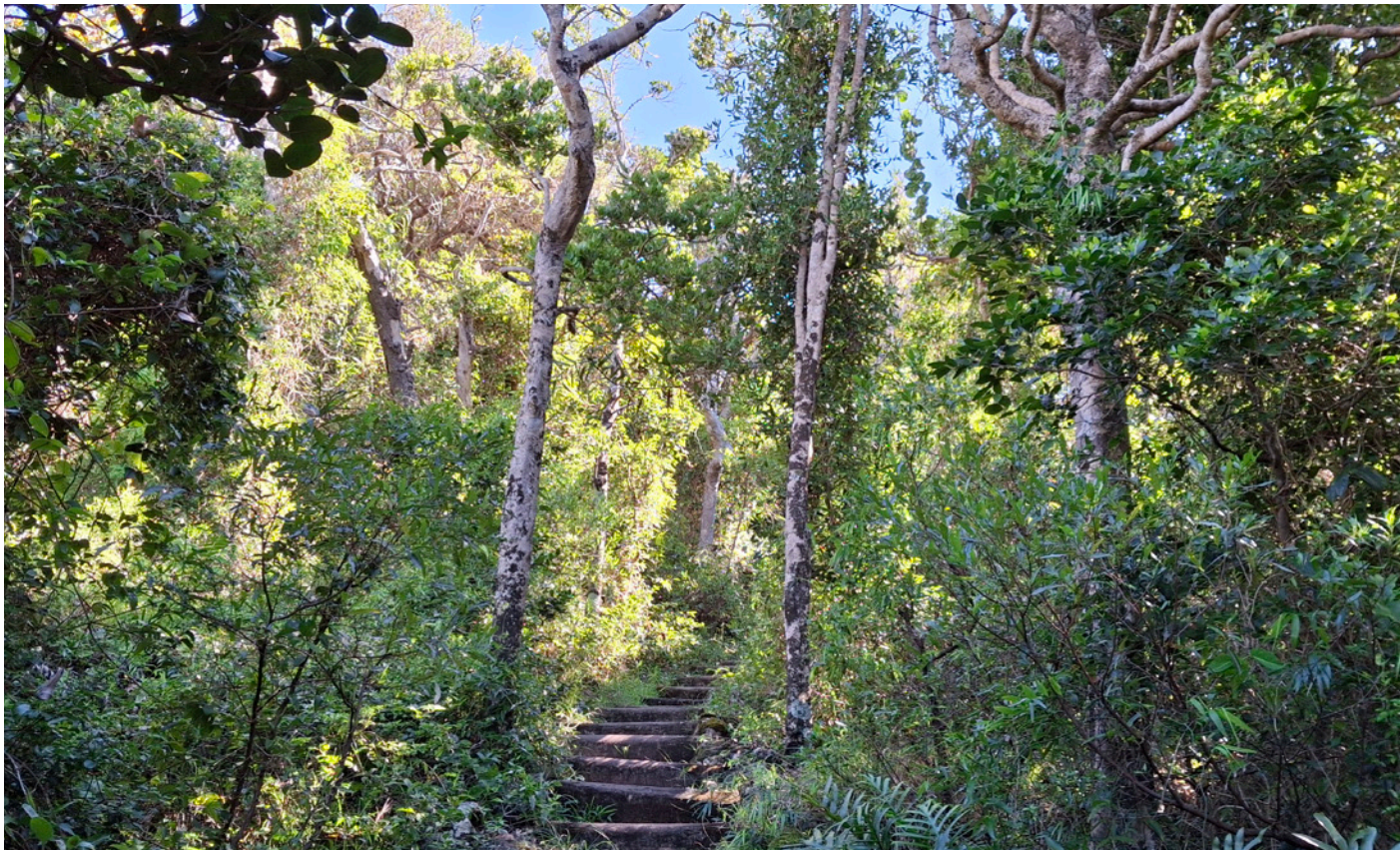


Figure 35: Typical island walking trail with timber edged stairs

2.5.2 SOUTH ZONE LAND ZONING

The majority of the areas likely to be developed for the newly designed Waste Management Facility are within a 'special uses' zone. According to the LHI Local Environment Plan (LEP), any demolition or construction in this zone must receive approval from the consent authority. Complying developments include depots, schools, public utilities, island infrastructure, and others. An Environment Protection Zone runs along the western shoreline. This zoning aims to protect areas that may be vulnerable to erosion, serve as habitats or corridors for native animals, or contain significant native vegetation. It also seeks to preserve the scenic amenity of the land and allows for the integration of utility services in harmony with the World Heritage values of the island's natural environment. There is a private residence in the centre of the development precinct, which is likely to be most affected by visual impacts, noise, and air quality issues from construction works.

DESIGN CONSIDERATIONS

- » Given the criticality of the program and the environmental significance of the island and its marine environments, the program will follow the Critical State Significant Infrastructure (CSSI) pathway to obtain planning approval. This includes the preparation of an Environmental Impact Statement (EIS) to obtain approvals under the Environmental Protection and Biodiversity Conservation (EPBC) Act.
- » In addition to complying with all CSSI requirements, the project should aim to minimise development impacts to any natural environments such as existing native vegetation areas and the marine environment.
- » Areas of the existing WMF site are contaminated and this will need to be remediated to the satisfaction of the EPA.

LEGEND

- South Zone
- Zone - Settlement
- Zone - Rural
- Zone - Special uses
- Zone - Environment Protection
- Zone - Permanent Park Preserve
- Zone - Recreation



Figure 36: SZ Land Zoning

2.5.3 SOUTH ZONE FLORA

A number of vegetation communities occur within the South Zone. Of these, 6 communities are most likely to be directly impacted by an expanded building footprint for the new Waste Management Facility buildings.

Much of the vegetation immediately surrounding the WMF buildings is classed as Significant Native Vegetation (SNV), which under the LEP rulings cannot be cleared or removed. This restriction is not present within the CSSI planning pathway, however the program seeks to minimise clearing of any native vegetation wherever possible.

DESIGN CONSIDERATIONS

- » Given the presence of rare and endemic flora within the SZ, the project ecologist is preparing a Flora and Fauna Assessment as part of the Environmental Impact Statement (EIS) that will seek the relevant approvals under the Environmental Protection and Biodiversity Conservation (EPBC) Act.
- » The area available for construction without impacting surrounding native vegetation communities is very constrained. The construction footprint for the WMF will need to be long and narrow to minimise vegetation removal.

LEGEND

 South Zone	 *Coastal Spinifex - Dune Bean - Club Rush - Melanthera biflora - Saltwater Couch beach strandline grassland
 *Greybark - Blackbutt Rainforest	 *Greybark - Blackbutt low closed forest on exposed basalt slopes
 *Kentia Palm Forest on coral sand and calcarenite	 *Melanthera biflora - Saltwater Couch herbland/grassland on coral boulder beaches and rocky headlands
 *Bully Bush - Hopwood shrubland on shallow rocky soils	 Tea Tree shrubland on exposed rocky slopes
 River Mangrove tall shrubland of brackish creeks	 Sallywood swamp forest of poorly drained; low-lying areas
 Remnant native	 SNV - Significant Native Vegetation
 *Environmental Plantings	
 *Exotic	
 Kentia Palm - Greybark rainforest of low to mid altitude slopes	

* Most likely to be impacted

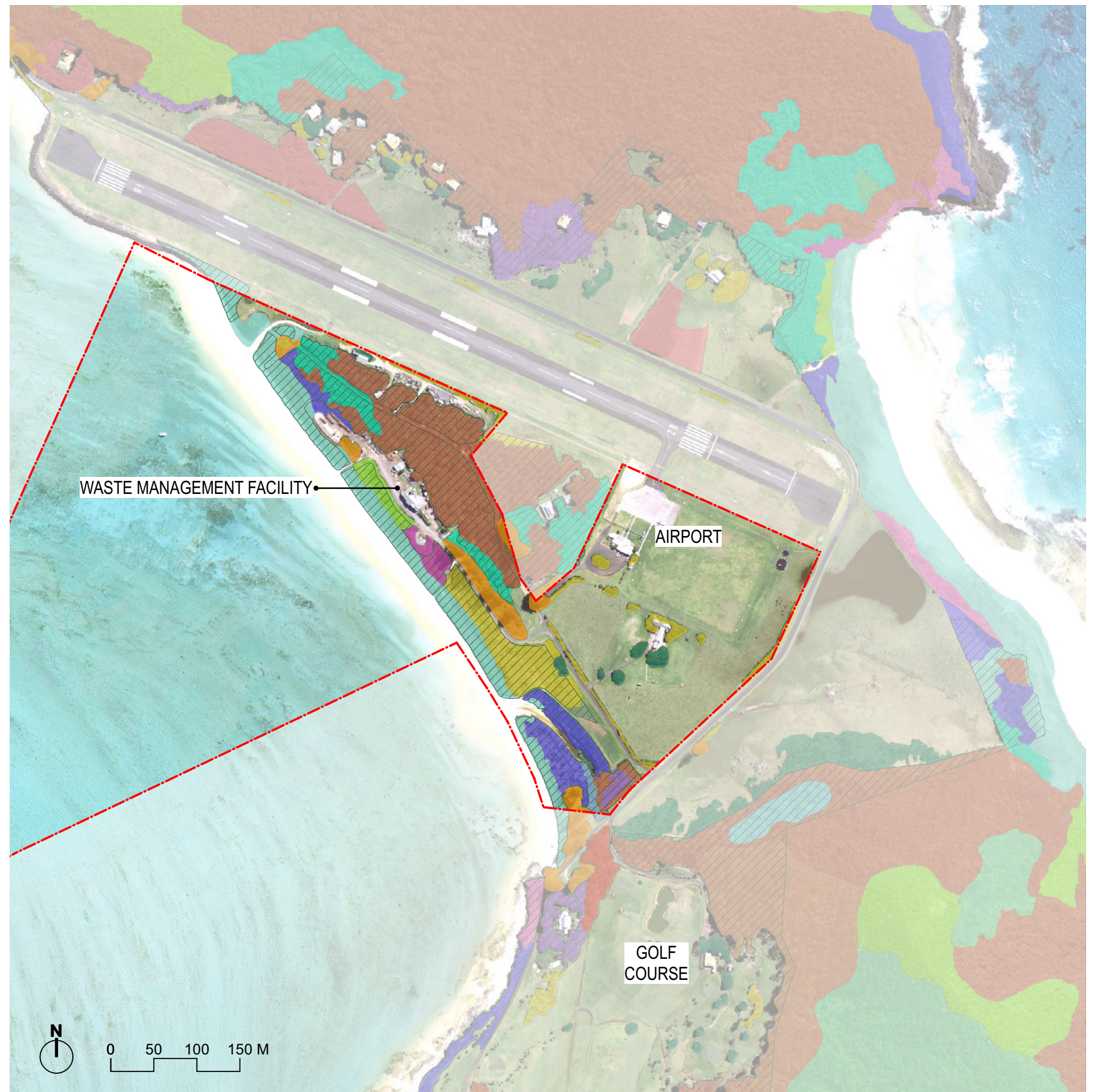


Figure 37: SZ Vegetation

2.5.4 SOUTH ZONE THREATENED FAUNA

Within the South Zone, sightings of threatened fauna have been recorded. These sightings mainly involve various bird species, but also include the LHI Southern Gecko and the LHI Placostylus, a land snail endemic to the island. The locations of these sightings are illustrated in Figure 38.

DESIGN CONSIDERATIONS

» Given the presence of threatened fauna within the SZ, the project ecologist is preparing a Flora and Fauna Assessment as part of the Environmental Impact Statement (EIS) that will seek the relevant approvals under the Environmental Protection and Biodiversity Conservation (EPBC) Act.

LEGEND

- South Zone
- Lord Howe Wood Hen
- Lord Howe Island Southern Gecko
- Pacific Golden Plover
- Red-Tailed Tropic Bird
- Pied Currawong (LHI subspecies)
- Lord Howe Placostylus



Figure 38: SZ Threatened Fauna

2.5.5 SOUTH ZONE SETTLEMENT PATTERN

The area surrounding the South Zone (SZ) has a handful of residential dwellings and sheds.

Commercial buildings include the Waimarie Apartments accommodation on the northern side of the airport, the Waste Management Facility, and the Airport and Golf Club to the south.

One heritage building also resides in the SZ area called Kentia House. Kentia House is considered to be a good example of an early prefabricated building on the island and is privately owned.

DESIGN CONSIDERATIONS

- » The residents and businesses within this area will be the most directly affected by the Project, given their proximity to the site.
 - Reduce the impact of noise and/or odour nuisance
 - Develop Change Management and Communication strategies that are tailored to the unique needs of this particular group.
 - Develop a Concept Master Plan that seeks to minimise any impacts on these residents/businesses through the design and construction phases of the project, as well as ongoing operational activities.

LEGEND

- South Zone
- Building - Dwelling
- Building - Shed
- Building - Comercial Use
- Building - Heritage
- Cadastre

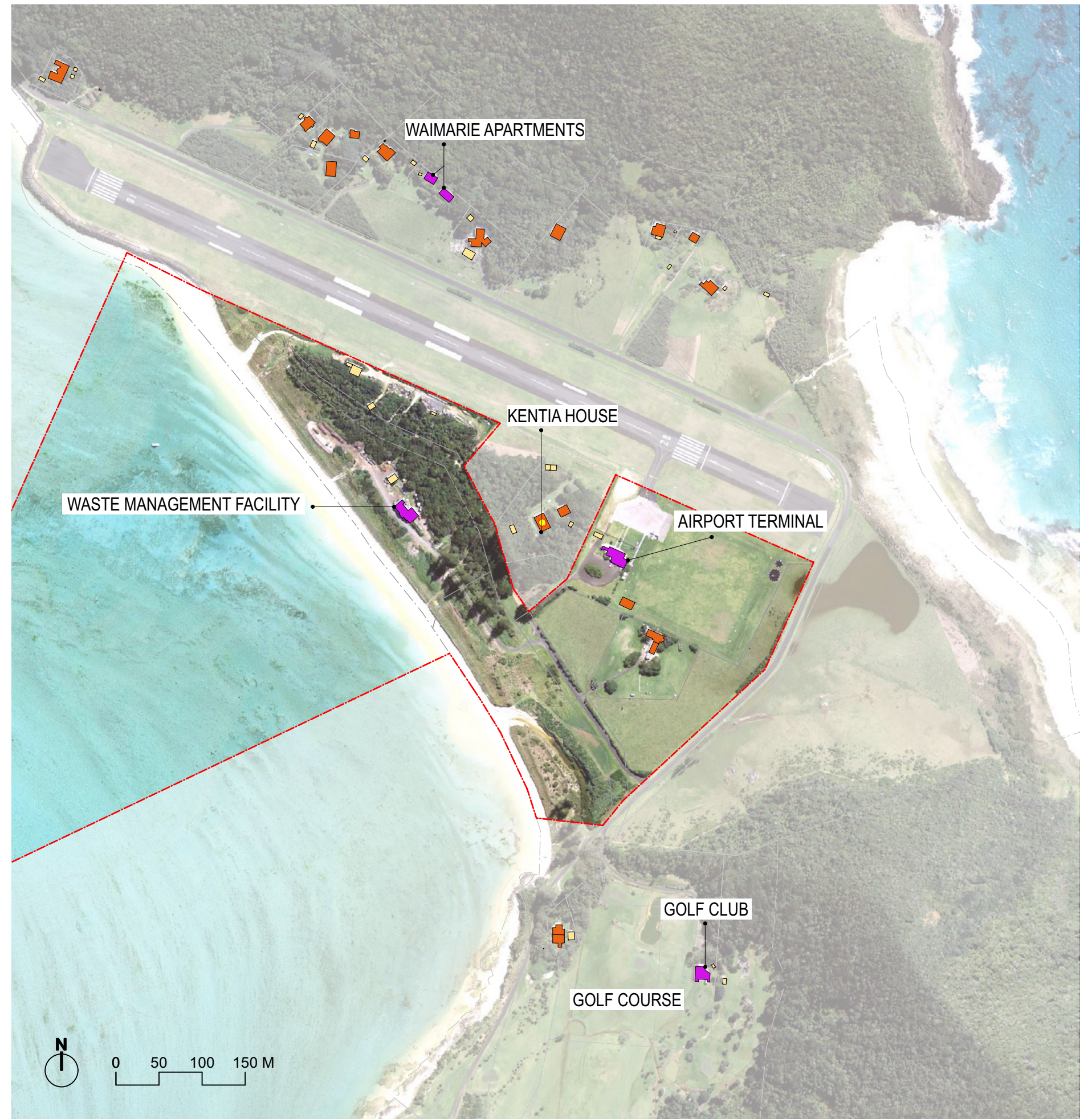


Figure 39: SZ Settlement Pattern

2.5.6 SOUTH ZONE UTILITIES

Electricity and telecommunications cables for the SZ are shown in Figure 40. These cables run underground, minimizing visual impacts.

There is no public infrastructure for potable water distribution on the island. Residents and businesses capture and store rainwater or utilise groundwater wells/bores. Public stormwater infrastructure is minimal, with several drains installed along Lagoon Road near the airport runway to address flooding issues in the area.

DESIGN CONSIDERATIONS

- » The newly designed WMF will need to capture and manage stormwater for use within its operations. Water-sensitive urban design (WSUD) strategies should be explored within the landscape design to maximise the re-use of rainwater.
- » The current substation is nearing maximum capacity, therefore a new electrical substation will be required to support the WMF facility.

LEGEND

- South Zone
- Telecom cable
- Low Voltage Electricity Cable
- High Voltage Electricity Cable
- ▲ Groundwater well



Figure 40: SZ Utilities

2.5.7 SOUTH ZONE LANDFORM

The current WMF buildings sit on a levelled area at about 5m in elevation. This is directly behind a low foredune that is approximately 4m high.

The majority of the South Zone is relatively flat, with elevations predominantly ranging from 4-6m. The precinct is buffered by hills on both the northern and southern sides, however remains open and exposed in the east-west direction where the low-lying sand dunes and their vegetation provide the only form of protection between the ocean and the land.

DESIGN CONSIDERATIONS

- » Given the site's exposure to wind, wave surges and future sea level changes, consider opportunities to bolster the foredune near the lagoon to provide increased protection from these elements.
- » New buildings may be visible from a variety of higher points around the island and also clearly visible from the lagoon. As such, methods of camouflage will be important within the design to minimise visual impacts. This primarily includes screening plants and vines in conjunction with topographic modifications such as the creation of batters and augmentation of existing dunes.

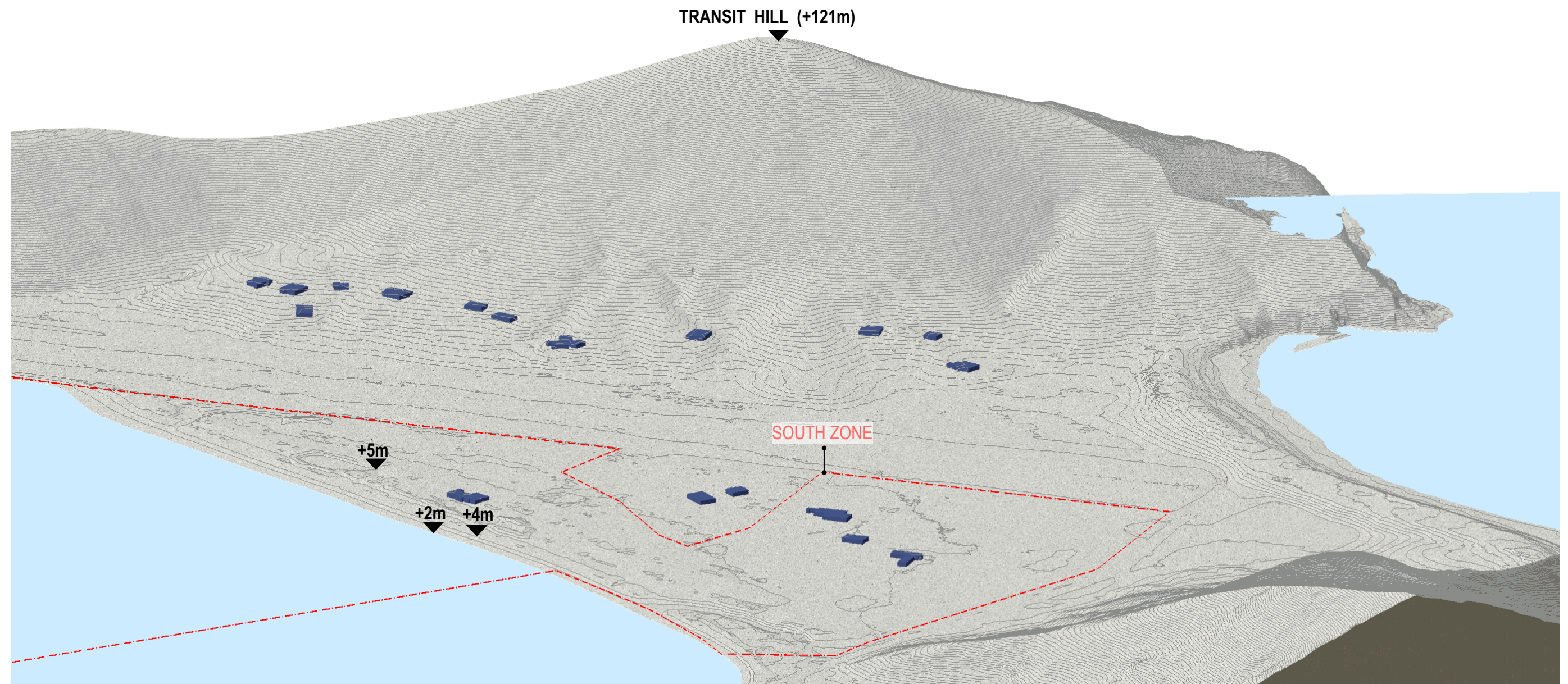


Figure 41: SZ Landform

2.5.8 SOUTH ZONE SPATIAL CONSTRAINTS AND LANDSCAPE OPPORTUNITIES

The following site cross-sections show the spatial constraints for the new WMF site. Existing native vegetation poses a major constraint for building locations and clearing extents.

There is a foredune in some parts of the site (Section 01 and Section 01.1) that helps protect the WMF site from wind, and waves and also provides good screening from the lagoon. In other areas, the dune is less prominent (Section 02) and provides less screening and buffering.

As outlined above, it is recommended that development does not extend into or onto the foredune system given the important functions it provides to the WMF and ecologically. Rather, the dune system should be kept intact, and where lacking, should be bolstered with additional height and planting to create a continuous mound between the site and the water to provide optimal screening and buffering from oceanic forces.



Section Locations

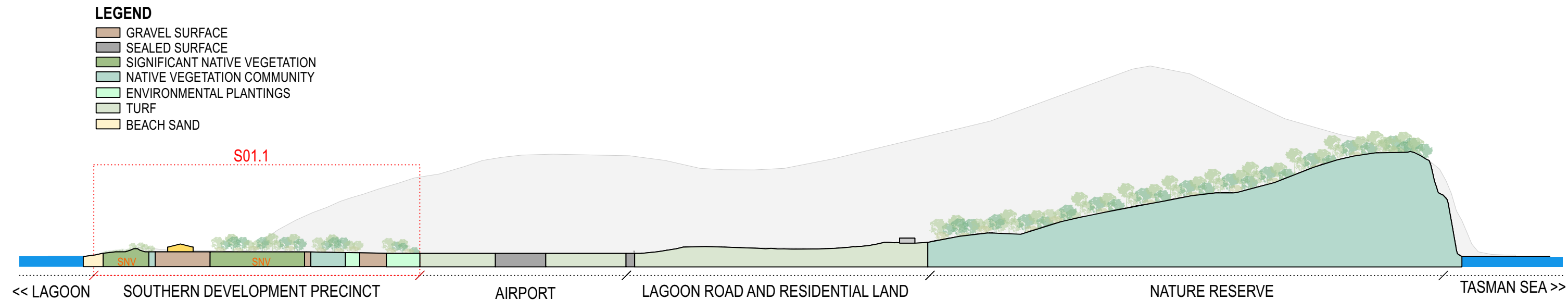


Figure 42: S01 - Section 01 (Scale 1:2500 @ A3)

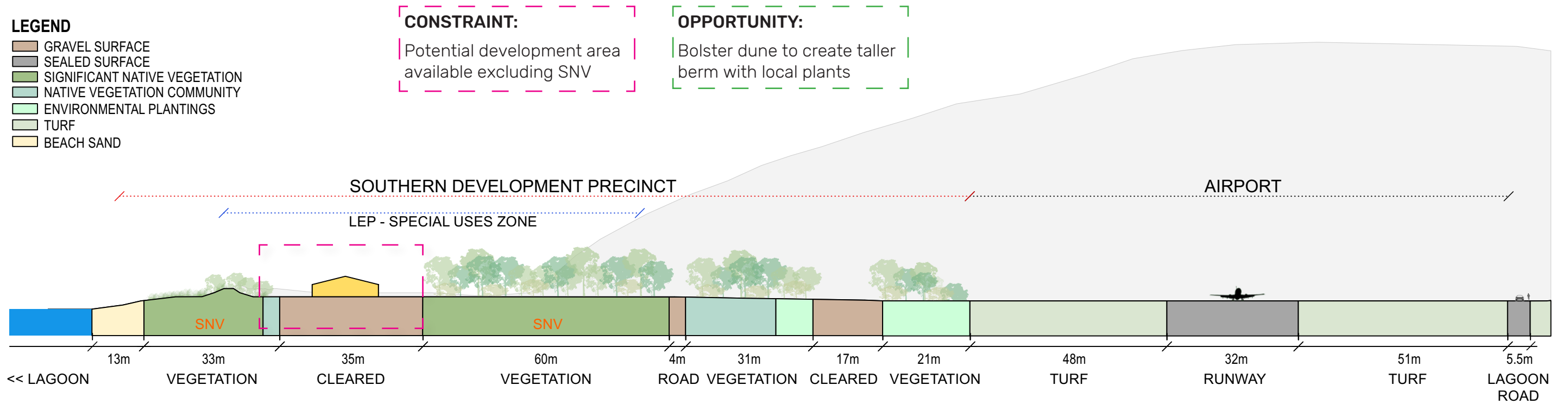


Figure 43: S01.1 - Detail Section 01 (Scale 1:1000 @ A3)

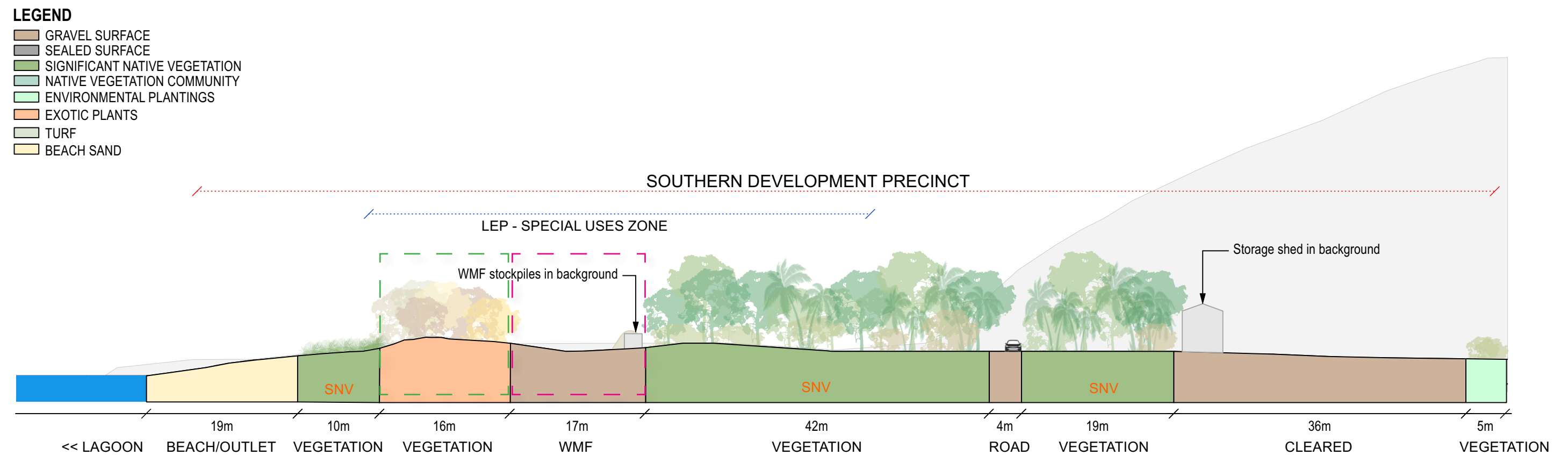


Figure 44: S02 - Section 02 (Scale 1:500 @ A3)

2.6 CONSTRAINTS/OPPORTUNITIES SUMMARY

The following list of constraints and opportunities have been identified during the site analysis activities for the project.

Table 1: High Level Summary of Project Challenges and Opportunities

THEME	ISSUES/CONSTRAINTS	ADVANTAGES/OPPORTUNITIES
Regional location	- The remote location of the site means that much of the construction material and waste will need to be shipped from and back to the mainland - There are numerous plant importation restrictions for LHI, as outlined in the LHI Plant Importation Strategy (LHI Board).	- Utilise innovative methods to recycle/reuse and grow landscaping materials on the island, rather than sourcing from the mainland - Leverage the on-island nursery to propagate local/endemic plants for the project and island revegetation projects.
Waste Management Facility	- WMF machinery and operations is out-dated and needs to adopt EPA NSW best practice standards for waste management - The compost recipe and preparation are currently sub-optimal and the compost is not fit for use across the island - Effluent is irrigated in the vegetation community adjacent to the main WMF building. However, currently the effluent requires additional treatments - A pedestrian access track, which runs outside the entrance to the WMF and leads to the lagoon, is highly valued by locals and should be retained.	- Re-design the WMF to achieve compliant waste management standards whilst also supporting improved operational outcomes for the island’s residents and workers - The newly designed WMF will produce highly treated effluent that will be safer to use on the neighbouring vegetation zones - Ensure the updated WMF footprint does not extend past the current pedestrian track in order to maintain public access to the beach.
Marine Infrastructure	- The Island Trader vessel is aging and needs to be replaced urgently - Existing operational processes around the jetty create safety issues for workers and locals/tourists with fork lifts and vehicles intersecting with pedestrian/cyclist routes - The North Zone is heavily used by locals and tourists to join boat trips and tours and access the boat ramp to launch vessels, therefore parking of boats, trailers and cars is also important to the community - A fully bunded boat maintenance area is required as part of an EPA order.	- Re-design the North Zone to ensure that a new vessel can dock near the existing jetty, whilst allowing Island Trader activities to continue for a period of time - Ensure that the hardstand area is designed to optimise the safety of workers as well as pedestrians and cyclists accessing the area - Ensure that the hardstand area offers alternative uses for residents and tourists when marine operations are not occurring - A fully bunded area suitable for boat maintenance has been included in the design.
Site Locations	Whilst the North Zone and South Zone locations have good separation from the main settlement area, they do have some nearby residences and resorts who will be most affected by construction activities.	- For the community members in closer proximity to the NZ and SZ sites, consider a more tailored change management plan to support their needs throughout the project - Consideration should also be given to tourists travelling to and from the airport or those sightseeing around the central area of the island.
Landform - North Zone	- The level changes across the site will likely require a retaining wall between Lagoon Road and the proposed laydown area - The site is exposed to coastal processes such as wind, storm surges and future sea level changes - Any new buildings within the laydown area will be highly visible from the lagoon and from Lagoon Road.	- Provide screening and camouflage around the new marine infrastructure to minimise its visual impacts across the island - Consider opportunities to reinforce the existing embankment wall that separates the built elements from the beach - Provide screening vegetation around the site to soften and conceal built elements whilst also providing protection from strong winds.

THEME	ISSUES/CONSTRAINTS	ADVANTAGES/OPPORTUNITIES
Landform - South Zone	- The site is in a low-lying area that is visible from many locations around the island - The site could be impacted by storm surges and sea level rises in the coming decades - The site may have a high water table, making it difficult to build below ground to help reduce the visibility of buildings. There could also be issues with saline soils and salinity affecting planting. - The site is very exposed in the east-west direction and may be subject to strong winds and gusts.	- Provide screening and camouflage for the new WMF to minimise its visual impacts across the island - Stabilise or expand the dune system in front of the site to increase protection from wind and waves and improve biodiversity - For new planting areas, utilise salt-tolerant local plants based on those already thriving in the area - Consider the opportunity to rationalise the WMF site and layout to minimise the construction footprint and increase the setback from the foredune
Hydrology and water management	- Stormwater flows from the North Zone and South Zone will need to be appropriately managed - There is no public potable water source on the island.	- Incorporate design elements that improve the water quality of any run-off that flows from each site into the lagoon - Incorporate WSUD strategies within the design of buildings and landscaping to capture and harness stormwater for both site operations and landscape use.
Access and Circulation	- Both the North Zone and South Zone have one main access route via Lagoon Road - There are no formal footpaths or cycle paths around the site, with all commuters sharing Lagoon Road to traverse the island. There is also a grassed walking track along the foreshore side of Lagoon Road for pedestrians.	Determine traffic volumes for each mode of transport for the WMF/marine service/airport and design an appropriate access network into and out of the North Zone and South Zone sites for cars, cyclists and walkers
Biosecurity	- Biosecurity controls are strict on the island to avoid the risk of pests and diseases entering the island and spreading across the island. - All imported materials will need to follow the relevant biosecurity controls - No soil can be imported to the island - Only specific plant species can be imported to the island. All indigenous and native species must be sourced on the island from the LHI Nursery.	- The project team is working closely with the LHI Nursery to select local plant species that can be propagated and grown on site. - Discussions with the LHIB Revegetation Team have assisted the project team to determine what types of soil ameliorants can be imported to the island to improve existing site soils.

THEME	ISSUES/CONSTRAINTS	ADVANTAGES/OPPORTUNITIES
Biodiversity	• There are native vegetation communities in both the NZ and SZ areas which should be retained where feasible. • Threatened fauna sightings have occurred within the NZ and SZ. • Given the world heritage status of the site and the island’s unique flora and fauna, the project ecologist is preparing a Flora and Fauna Assessment as part of the Environmental Impact Statement which will require approval under the EPBC Act. • There is a risk that the NZ and SZ have areas of contamination. In addition, it will be important that contaminated run-off from the North Zone and South Zone sites is contained and not allowed to leach into the surrounding landscape or into the lagoon	• Design innovatively within the cleared spaces already available • Rehabilitate landscape areas that are degraded and need rejuvenation, including controlling invasive species • Consider reducing the extent of access roads in and around the site to reduce the construction footprint and disturbance of flora and fauna communities. Healthy and stable vegetation communities across the site are essential for minimising erosion and maximising the screening potential around the site. • Conduct an ecological assessment to determine other mitigating actions that can be taken to protect flora and fauna. • Ensure that contaminated run-off is managed appropriately in both the North Zone and South Zone
Community Engagement	• Community engagement and support is required throughout the design process to achieve the best outcomes for the island and its residents, along with tourists.	• Two rounds of community engagement have now occurred with positive feedback from the community on the direction the project is taking • Within the WMF, design simple/convenient processes for garbage drop off and collection • With the North Zone, consider opportunities to revitalise the area surrounding the existing jetty, offering new social and cultural opportunities that provide greater amenity and social interaction.
Operational Continuity	• Both the Waste Management Facility and Marine Infrastructure operations must continue effectively whilst the North Zone and South Zone constructions activities occur.	• In the North Zone, program sequencing should aim to construct the new piled vessel ramp with minimal disruption to existing jetty activities • Sequencing of WMF construction will need to be carefully carried out to allow waste processing to continue during the construction phase.



3. COMMUNITY ENGAGEMENT

3.1 CONSULTATION OVERVIEW

Community consultation has occurred throughout 2024, and included a variety of consultation methods, including information flyers, surveys, interviews and two consultation workshops (one in May and a subsequent follow up session in December). The consultation work has continued throughout 2025 with Community Consultation Group bi-monthly meetings and monthly householder notifications. These activities are summarised below.

The Final Draft Masterplan and Concept Plans along with artist impressions and video fly-throughs were posted on the LHIB website in June 2025 for public review. They can be found at:

<https://www.lhib.nsw.gov.au/infrastructure/critical-infrastructure-program/north-zone-and-south-zone-master-plan-designs>

PHASE A ENGAGEMENT - REACH AND PARTICIPATION

As many as one in four members of the Lord Howe Island community participated in the Phase A engagement*



All households and businesses received the project flyer



53 people responded to the community survey



4 submissions were received



12 people participated in the stakeholder interviews and workshop including business owners/ operators and those with an interest in shipping, weather conditions, the environment and tourism/ local business impacts



38 people participated in the two community information sessions including residents., business owners/ operators and those with an interest in community and the environment

** Based on participation by 107 members. of the community from a total population of 445*

PHASE B ENGAGEMENT - REACH AND PARTICIPATION

Approximately 100 members of the Lord Howe Island community participated in the Phase B engagement*



All households and businesses received the project flyer (including 359 people receiving the flyer via EDM and 20 households receiving hard copies)



9 submissions were received



19 people participated in the 15 stakeholder interviews including business owners/ operators and those with specific knowledge and interest in marine infrastructure, biosecurity, tourism and waste management



40 people participated in the five community drop-in sessions including residents, business owners/ operators and those with an interest in community and the environment



114 views of the Lord Howe Island Board Critical Infrastructure Project web page



16 community members participated in the Community Consultation Group /12 government stakeholders participated in the Government Stakeholder Consultation Group

** Based on participation by 107 members. of the community from a total population of 445*

3.2 CONSULTATION MAY 2024

Understanding Issues and Opportunities

The purpose of the community engagement sessions was to provide information about the Critical Infrastructure Project and the proposed ways to address the critical infrastructure challenges on the Island.

It was also important to hear feedback from the community about the early work and potential approaches. In May the program was at the 'Understanding Issues and Opportunities' stage of the planning process with preliminary site investigations still to be completed.

The outcome of the sessions was to provide an update to the island residents and seek community feedback on the planning process regarding the ideas for the South Zone and the north alternate approach. The sessions assisted the project team to develop concepts and the master plans in the next stages. The consultation was presented in the form of a formal presentation and project overview followed by Q&A table discussion.

The content presented in the presentation was a combination of display boards, online material, and information pamphlets. The sessions were facilitated by selected project team members and was designed to promote open discussions and encourage questions and feedback.

The following areas were covered during the Initial consultation:

- » Clarify where the project is in the process, what input is being sought from stakeholders at this stage, and how feedback will be used
- » Biosecurity - North and South Zone
- » Waste infrastructure - South Zone
- » Alternate/Contingency approach and options: Critical Infrastructure challenges. Taking an alternative approach to the original business case that located the new wharf in the south zone.
- » Alternative Marine Infrastructure - North Zone

Outcomes

- » It was noted that relevant studies were yet to be undertaken - Geotechnical, Hydrographic Survey, Marine and Terrestrial Ecology, Bathymetry and Lagoon Hydrology, visual amenity - to inform decision making
- » A Community Consultation Group has since been established to provide further opportunities for community input to the Program. The group meets on a bi-monthly basis
- » The project team responded to the feedback received and incorporated this into the subsequent design activities for the program.



3.3 CONSULTATION DECEMBER 2024

3.3.1 ON ISLAND CONSULTATION: PRESENTING DESIGN CONCEPTS

On island consultation was designed to provide an update to the community on the progress and work undertaken since the previous information and workshop sessions.

The on-island visit was run over 3 days and included public display and consultation with the residents as well as meetings with individual stakeholders to gain more targeted feedback and information responding to the proposed master plans and design concepts.

Drop-in Sessions at the hall were set with the display of the concept designs. Representatives from the project team were available to answer questions and hear feedback from the locals. The island visit concluded with a project team debrief and the key takeaways were later presented back to the wider consultant team for consideration in the next design and planning phase.

The information presented covered the following:

- » North Zone: Maritime infrastructure and biosecurity infrastructure
- » Marine Freight Vessel
- » South Zone: Waste Management Facility and related infrastructure. Including the proposed location for the Biosecurity dog kennels the proposed location of the fuel bowser.

3.3.2 OVERALL COMMUNITY FEEDBACK

North Zone: Marine and Biosecurity Infrastructure

- » General support for marine and biosecurity infrastructure in the North Zone location
- » Widespread understanding of rationale for not continuing to pursue South Zone for this infrastructure
- » Desire for concept design to be refined – to further improve safety and efficiency, while reducing congestion and potential conflicts

Marine Vessel

- Widespread support for new freight vessel and contemporary approach, albeit with resistance to proposed approach from select stakeholders
- Strong interest in vessel sea worthiness, interface with marine infrastructure, containerisation, environmental impacts / lagoon access
- Support focus on mainland biosecurity arrangements
- Strong interest in time horizon for procurement / commencing operations, ongoing management and maintenance, customer experience and freight costs

South Zone: Waste Management Facility and Related Infrastructure

- General support for upgraded WMF and related infrastructure in this location
- Desire for site contamination to be managed effectively
- Desire for reuse of materials on island / off island wherever possible
- Interest in continuous improvement in terms of waste management and communications to support community/visitor education and behaviour
- Strong desire for concept design to be refined to further enhance user experience / neighbourhood amenity where possible

OUTCOMES

- » Action was required to progress and finalise state planning approvals.
- » A Remediation Action Plan approved by the EPA for the Waste Management Facility
- » Agreed understanding of rationale for not continuing to pursue South Zone for the wharf and cargo infrastructure continue to develop the North Zone master plan.
- » Progress and finalise for state planning approval the North Zone: Marine Infrastructure and Cargo Laydown facility.
- » The “What we Heard” Report from the December/January consultation period is now available online.



NEXT STEPS - AT A GLANCE

Understanding needs and opportunities
Preliminary site investigations
Master Plan (concept options)
Community consultation on concept options → WE ARE HERE
Environmental Assessment
Public consultation (IES)
Conceptual design (IES)
Submission report
Regional Watercourse
Detailed design
Construction approval

START OF CONSTRUCTION

WE'RE KEEN TO HEAR FROM YOU.
Find out more and share your feedback by scanning the QR code or visiting www.hib.nsw.gov.au/infrastructure/critical-infrastructure-program

CRITICAL INFRASTRUCTURE PROGRAM

LORD HOWE ISLAND

NOVEMBER 2024

The Lord Howe Island Critical Infrastructure Program is underway to deliver improvements and upgrades that are critical to everyday life for Islanders, and to support the Island's long-term future as a sustainable tourism destination. The Program includes precinct planning services, an upgraded waste management facility, new marine infrastructure and cargo bydown area, a new marine vessel, and related biosecurity measures and infrastructure. Ongoing consultation with the community is helping inform the Program.

The Program is currently at the 'Community consultation on concept options' stage of the planning process. Preliminary site investigations commenced earlier this year and have been used to develop a number of concept design plans. Join us to find out more in early December.

SHARE YOUR FEEDBACK ABOUT THE CONCEPT DESIGN PLANS FOR THE LORD HOWE ISLAND CRITICAL INFRASTRUCTURE PROGRAM



Engaging the community and stakeholders on the Lord Howe Island Critical Infrastructure Program

Phase B Community and Stakeholder Engagement: "What we heard"

Key Highlights
December 2024

LORD HOWE ISLAND

CRITICAL INFRASTRUCTURE PROGRAM

Thank you for joining us today to find out more about the next phase of community consultation on the Lord Howe Island Critical Infrastructure Program (the Program).

The Program is underway in discussion with the community, to deliver improvements and upgrades that are critical to everyday life for Islanders, and to support the Island's long-term future as a sustainable tourism destination. It includes precinct planning services, an upgraded waste management facility, new marine infrastructure and cargo bydown area, a new marine vessel, and related biosecurity arrangements.

WE'RE KEEN TO HEAR FROM YOU.
Find out more and share your feedback by scanning the QR code or visiting www.hib.nsw.gov.au/infrastructure/critical-infrastructure-program

YOUR EARLY INPUT

We thank all members of the community who participated in the first phase of consultation earlier this year. Feedback indicated general support for an upgrade of the existing waste management facility and procurement of a new vessel, with various ideas about the specific design of these elements of the Program.

A key issue raised by members of the community was the viability of the South Zone for locating the marine infrastructure, dependent on the outcomes of relevant technical studies. These studies have now been conducted and further details are presented here today.

PROGRESS SINCE THE CONSULTATION EARLIER THIS YEAR

The Program is currently at the community comments on concept options' of the planning process. Preliminary site investigations and analysis commenced earlier this year and have been used to develop the design concepts, which will inform preparation of a master plan.

We're now seeking your feedback on the concept options. Your insights and feedback will be considered by the project team as development of the master plan progresses, with community and stakeholder feedback one of several important inputs.

Understanding needs and opportunities
Preliminary site investigations
Master Plan (concept options)
Community consultation on concept options → WE ARE HERE
Environmental Assessment
Public consultation (IES)
Submission report
Regional Watercourse
Detailed design
Construction approval

START OF CONSTRUCTION

WE'RE KEEN TO HEAR FROM YOU

We look forward to hearing from you. Please share your feedback by:

- Speaking with a member of the project team here today
- Sending us a submission before **Friday 31 January 2025** including your feedback via email or hard copy: CIP@hib.nsw.gov.au.

We'll also be conducting a number of interviews with community leaders to obtain their feedback as part of the consultation process. Beyond this current phase of engagement, members of the community and stakeholders will have a further opportunity to provide feedback on the draft master plan as part of the public exhibition process for the Environmental Impact Statement (EIS).

You can stay up to date and get in touch with the project team via the Lord Howe Island Board webpage at hib.nsw.gov.au/infrastructure/critical-infrastructure-program.



DRAFT FOR CONSULTATION PURPOSES

NEW VESSEL OPERATIONS AND MAINTENANCE

NEXT STEPS FOR NEW VESSEL - AT A GLANCE

Design Vessel (Procurement Strategy)
Procure Vessel
Construction design and construction
Vessel construction
VESSEL COMMENCES OPERATIONS

A FIT FOR PURPOSE MARINE VESSEL

Discussions with Stakeholders and the market. Over the last few months, we have met with key stakeholders to develop a clear understanding of the community consultation regarding the new marine vessel and the unique operating environments of the Lord Howe Island region. We have spoken to representatives of the Department of Primary Industries and Regional Development, Island residents with an in-depth understanding of marine vessel operations, the lagoon and sea conditions, as well as island dwellers and other community members.

We have also undertaken a number of important report engagements and procurements to assist in the Request for Tender stage for the new marine vessel, and freight service.

Market sounding process
A market sounding has been undertaken with shipbuilders and marine freight operators who expressed an interest in participating in the procurement process. This market sounding involved an online questionnaire and meetings with the builders and vessel operators from around the world. The findings from the market sounding exercise have been used to inform the design and construction of the new vessel and operator.

Expression of Interest
An open market Expression of Interest (EOI) process was also undertaken, where suitable experienced and capable entities from Australia and around the world were invited to submit an expression of interest to participate in the Request for Tender (RFT) Stage, to design and build the new marine vessel (Package 1) or to operate and maintain the marine freight service (Package 2) for both.

The EOI provides two new vessels and successful participants have been selected that they are able to participate in the upcoming RFT packages - for either the new marine vessel or marine freight service or both.

Request for Tender (RFT) for New Marine Vessel
The Request for Tender documents for design and build of the new marine vessel package are now being prepared and will be released to market in early 2025. One of the key documents for the RFT stage is the Technical Specification for the new vessel. The Technical Specification is being developed by a specialist naval architect from Sharnwood Marine Design.

The vessel specification is now well developed and is being refined. The proposed vessel will have the following features:

Key considerations for the new vessel

The vessel design must respond to a range of factors, such as:

- Reliability of the lagoon in the North zone on approach to the existing jetty
- Tide waves and anomalies affecting access into the lagoon
- Wave height and surge as impacted by weather, wind and other variables
- Current and future level of sea in the existing pocket in the existing jetty
- Interface with the Island wharf infrastructure
- Mooring and berthing arrangements to suit different jetty/ramp structures and/or scenarios
- Loading/unloading methods for vessel cargo
- Cargo storage (communication vs. pallets)
- Cargo safety and compliance
- Biosecurity controls as a range of mainland departure ports
- Biosecurity controls required for the vessel itself
- Cargo loading/unloading equipment (shoreward and on-vessel)

CONCEPT DESIGN FOR NEW MARINE VESSEL

The Benefits of Containerisation
Containerisation offers an effective, modern solution to organise, store and distribute goods to Lord Howe Island. Consolidating goods into shipping containers offers a more streamlined and secure freight shipping process. Goods can be transported and packed up the mountain using efficient slip trail systems, then transported and loaded within the containers to prevent exposure to pests or contaminants. The function of containers would be done to international standards to ensure food safety.

Once they arrive on Lord Howe Island, pre-packed containers also simplify the distribution process, as items are already pre-packed and ready to be distributed.

Additionally, use of containers reduces the manual handling required for freight operations. Each container acts as a single manageable unit, for transporting a variety of goods while minimising risk of damage. Containerisation not only protects Lord Howe Island's unique environment but also ensures that residents receive their goods in an organised, efficient and reliable manner - bringing significant benefits to both the Lord Howe community and ecosystem.

But what about odd-shaped cargo items?
While most goods will be able to be neatly packed into a standard size container, the larger freight items needs to meet the needs of all goods, larger odd-shaped items, such as cars, boats, tramster tanks and construction materials will be organised and managed alongside containerised cargo on the island dock. Some new freight origin biosecurity procedures would apply to overseas and odd-shaped items to ensure the island's fragile ecosystem is protected. See above for an example of how a mix of containerised cargo and odd-shaped items can be managed.

Example 10ft shipping container

Vessel transporting containers and odd-shaped cargo items such as vehicles, a 7m boat on trailer, picks of timber and roofing materials, motorbikes, kayaks, water tank, slip bins, IBCs, gas bottles, large excavator etc.

NEXT STEPS

- Finalise Technical Specification and RFT documents - December 2024
- Release of RFT for new marine vessel - early 2025
- Contract award for New Marine Vessel - October 2025
- Vessel design and build commences - October 2025
- Release of RFT for new marine freight operator - April 2025
- Contract award for new marine freight operator - June 2025
- Delivery of new marine vessel - February 2027
- First marine service of new marine vessel - March 2027

Figure 45: Consultation examples



4. DESIGN PRINCIPLES & OBJECTIVES

4.1 EXISTING GUIDING PRINCIPLES

In shaping the draft design objectives and design principles for the project, the following existing values and guiding principles have been considered.

Strategic Plan for Lord Howe Island Group World Heritage Property	VISION <i>The Lord Howe Island Group World Heritage Property will retain its outstanding universal natural values in perpetuity. Its ecosystems, biota and exceptional natural beauty will be respected, protected and conserved by government agencies, the Island's residents, visitors to the area, and the industries which use the resources of the area.</i>	WORLD HERITAGE VALUES The LHIG was inscribed on the World Heritage List under two of the criteria for natural values of outstanding universal significance: (vii) containing superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance; (x) containing the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.	GUIDING PRINCIPLES 1. The Property will be transmitted to future generations unimpaired, with its values restored where there has been damage or deterioration caused by human activity. 2. The best available scientific evidence will contribute to sustainable ecosystem management. 3. Residents and visitors alike will appreciate and enjoy its landscapes and ecosystems. 4. Commonwealth and State government institutions and laws will protect the area, and these governments will provide the most secure future possible for this World Heritage Property through funding and other resources to support management. 5. The unique living community of people who live on Lord Howe Island and manage its resources will incorporate the ethos of an ecologically sustainable lifestyle within the World Heritage Property as an example to other communities.
Lord Howe Island Destination Management Plan	VISION <i>Lord Howe Island is globally recognised as a place of natural significance and beauty, preserved for future generations through leading sustainable and regenerative tourism practices.</i>	GOALS » Sustainable Visitor Economy » World leading sustainable tourism » Socially sustainable tourism	STRATEGIC PRIORITIES 1. World leading sustainable destination 2. Year-round visitor economy 3. Regenerative visitor experiences 4. Responsible marketing and media PR 5. Strategic collective approach

4.2 LHI DESIGN OBJECTIVES AND DESIGN PRINCIPLES

The following Design Objectives and Design Principles have been drafted for the project.

OBJECTIVE 1: Protect and celebrate the unique natural landscapes, scenery and biodiversity of Lord Howe Island, ensuring that World Heritage Status is not compromised by the project.	DESIGN PRINCIPLES • Protect and preserve local indigenous vegetation communities, minimising impacts where possible. • Utilise local indigenous species to revegetate landscaped areas • Source all plant and organic material locally from the island, as outlined within the LHI Plant Procurement Strategy • Ensure that areas classified as Significant Native Vegetation are not encroached upon • Minimise impacts to the existing marine environment surrounding the island • Limit building works to areas already cleared • Clean up and/or contain existing site contamination	NORTH ZONE SPECIFIC PRINCIPLES • Improve Biosecurity practices to prevent the transfer of exotic and invasive species, (including flora, fauna and fungal pathogens) to Lord Howe Island via marine operations.	SOUTH ZONE SPECIFIC PRINCIPLES • Stabilise and revegetate the existing sand dunes and vegetation between the WMF and beach, to maintain screening and to provide a buffer against wind and wave activity.
OBJECTIVE 2: Ensure that all of the proposed infrastructure facilities are sustainably designed and meet the functional needs of the LHI Board and LHI community, whilst being safe and simple to operate and maintain.	DESIGN PRINCIPLES • Design should be functional and suited to the specific needs of the Lord Howe Island Board and Lord Howe Island Community • Design for safe and efficient working environments • Ensure that newly designed operational processes can be fully staffed and managed on the island • Ensure that newly proposed vehicles/machinery can be housed adequately on the island and maintained as required. • Design for low and simple maintenance and longevity. • Adaptive reuse and repair of existing structures where possible	NORTH ZONE SPECIFIC PRINCIPLES • Accommodate existing operations for Marine Rescue, TfNSW, Marine Parks and the LHIB.	SOUTH ZONE SPECIFIC PRINCIPLES • Development should support compliant waste management, reuse and recycling of materials.

OBJECTIVE 3: Ensure that project elements are well designed and seamlessly integrated into the existing landscape, enhancing the public domain for the local LHI community and visiting tourists.	DESIGN PRINCIPLES • All new development should be visually recessive to minimise visual impacts across the island. • All new development should be visually cohesive with surroundings. • Infrastructure facilities and hardstand areas will be screened with local indigenous vegetation to conceal and soften the visual appearance of these areas. • Ensure that development within the North Zone and South Zone does not negatively impact views and vistas around the coastline and lagoon.	NORTH ZONE SPECIFIC PRINCIPLES • Retain and enhance recreational opportunities within and around the North Zone Precinct, including improving access to the public boat ramp and jetty, and creating viewing areas for the public around the jetty.	SOUTH ZONE SPECIFIC PRINCIPLES • Retain existing community access to the beach and lagoon adjacent to the WMF site.
OBJECTIVE 4: Ensure that all project elements are designed and built to be climate resilient and to withstand the dynamic coastal processes on the island	DESIGN PRINCIPLES • All project elements must be built to withstand coastal processes that are likely to occur. This includes wind, storm surges, probably flood events and future predicted sea level rises. • All new buildings and roofs must be designed to capture rainwater. • Sufficient rainwater tanks and retention systems should be provisioned to maximise rainwater harvesting and re-use at each site. • Utilise Water-Sensitive-Urban-Design (WSUD) design strategies where appropriate to capture stormwater runoff and improve the quality of water flowing into the lagoon. • Minimise the risk of cross-contaminating surface and ground water. • Incorporate solar power within the North Zone and South Zone sites where feasible		



5. DESIGN OPTIONS

5.1 DESIGN OPTIONS PROCESS

5.1.1 DESIGN OPTIONS DEVELOPMENT

The Critical Infrastructure Project is a significant investment into Lord Howe Island which aims to achieve high quality social, environmental (i.e. biosecurity and waste management improvements), economic and community outcomes for the island and its community. The Marine Freight Service is critical to the ongoing operations of the island.

Community consultation and co-design is a key consideration to achieving positive project outcomes and authority approvals. The unique location and needs of LHI should be considered in the design and delivery of each project. Community consultation and stakeholder management is a key consideration in all aspects of the Program.

The visual impact of any built infrastructure and landscape design solution needs to be a considered and all concept designs will need to be co-designed with the community.

During the design options phase the project team has been required to undertake genuine and transparent communication with the community and Government. The team has been required to show innovative thinking in all aspects of the design options conceptual master planning.

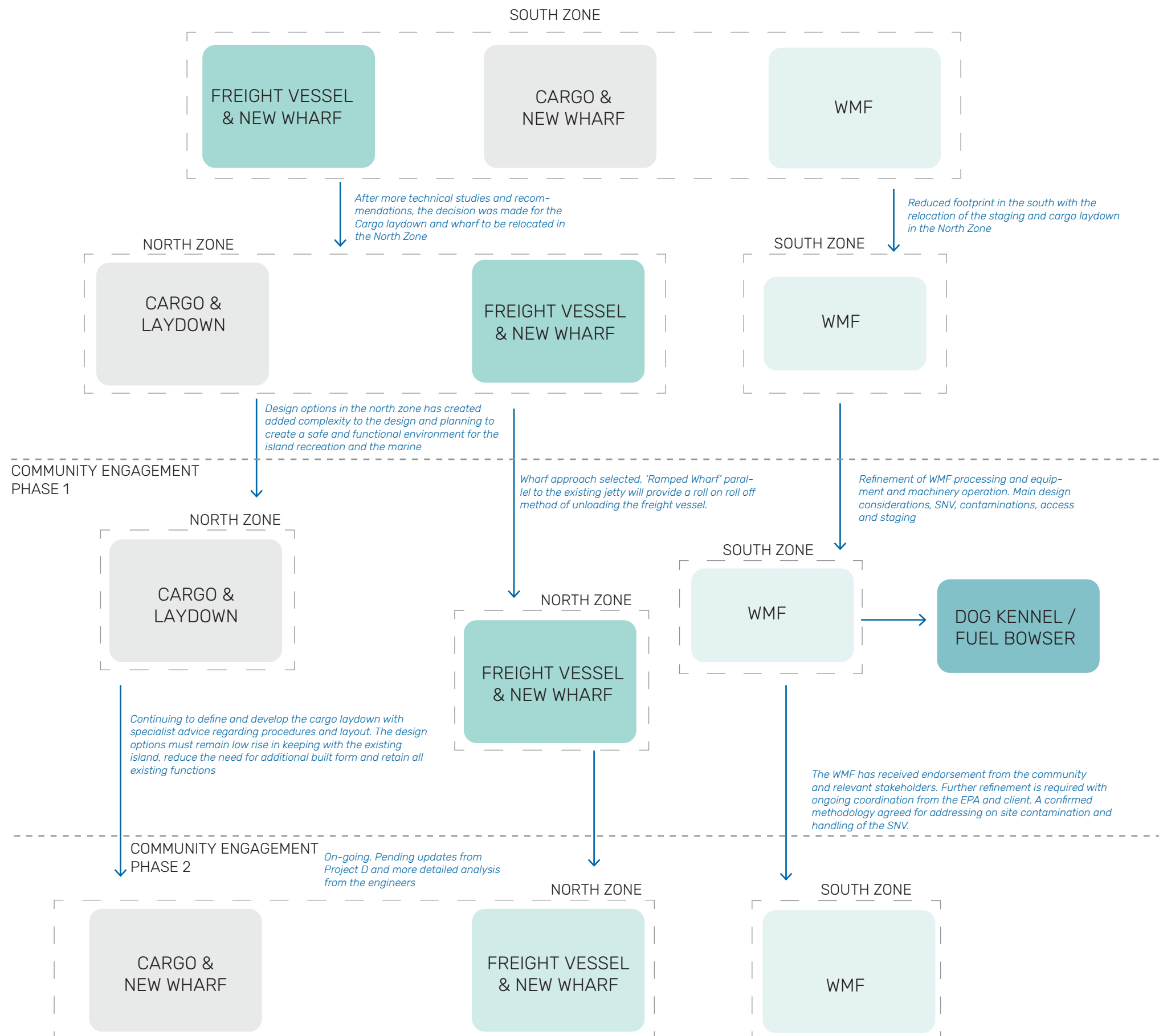
During the design options process considerations for the staging and requirements that the current Waste Management facility and vessel will need to continue operating until the new services are operational.

Design options have been developed through regular team meetings, island site visits, understanding and interpreting data, surveys and technical reports along with stakeholder consultation and community engagement.

Our starting point for the design options process was reviewing the business cases and preliminary work conducted prior to project commencement. The Marine Infrastructure Detailed Business Case assesses options pertaining to 3 key aspects of marine infrastructure and nominated Option D as the preferred option to carry forward.

DESIGN OPTIONS

BUSINESS CASE / WORK TO DATE



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5.2 NORTH ZONE MARINE INFRASTRUCTURE

5.2.1 RAMP TYPE OPTIONS

In determining the most appropriate ramp type for the new Marine Infrastructure, three main options were considered. These options also considered two main types of vessel operation – Lift On Lift Off (LoLo) and Roll On Roll Off (RoRo). The MV Island Trader and existing jetty currently utilise a LoLo approach.

OPTION 1

Pedestal Crane and Partial Jetty Upgrade

- » This approach would continue to utilise the LoLo approach and require a partial upgrade of the existing jetty.

OPTION 2

Fixed Ramp (Preferred Option)

- » This approach would utilise a RoRo approach and require a new fixed piled ramp with berthing dolphins to be built.
- » The existing jetty would remain and continue to service public vessels and marine tour operators.
- » A multi-criteria assessment was performed and this option was deemed the most suitable and cost effective.

OPTION 3

Linkspan

- » This approach would also utilise a RoRo approach and require a new linkspan ramp with berthing dolphins to be built.
- » The existing jetty would remain and continue to service public vessels and marine tour operators.

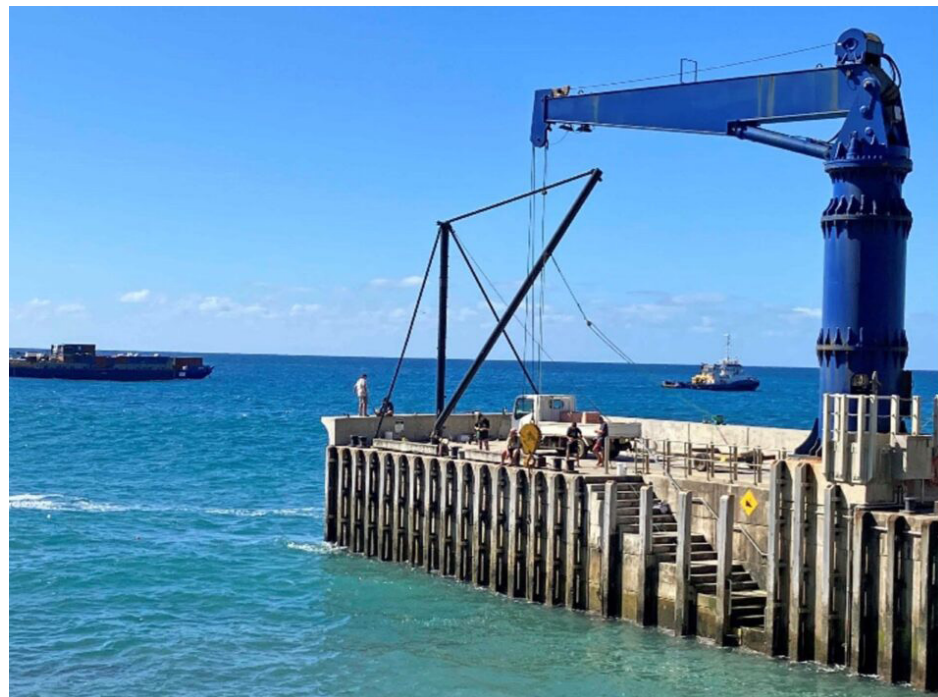


Figure 46: Example of a Pedestal Crane and Jetty (LoLo)



Figure 47: Example of a Fixed Piled Ramp (RoRo)



Figure 48: Example of a Linkspan (RoRo)

5.2.2 PILED RAMP AND BUILDING LOCATIONS

Following a program decision to retain marine infrastructure and operations in the north of the Island, design options were prepared that explored how a new piled ramp could be incorporated within the existing North Zone site around the existing jetty.

The following sketches show this development. Option 3 was chosen as the preferred design option which consists of a new ramped wharf immediately to south side of the existing jetty. The new piled ramped will need to be long enough to reach the required level of RL -0.9.

OPTION 1

New Piled Ramped North of Existing Jetty

- » Spaced 15m away from existing Jetty to retain access to recreational mooring.

OPTION 2

New Angled Piled Ramp North of Existing Jetty and Existing Jetty Partially Removed

- » Minimum gap between wharf and jetty 5m

OPTION 3

New Piled Ramp Immediately to South Side of the Existing Jetty

- » New ramped wharf will need to be 57m long to reach required level of RL -0.9.

OPTION 4

Build a New Piled Ramped on the end of the existing jetty and replace the deck of the existing jetty and strengthen as required

- » New piled ramp will need to extend approx. 40m beyond existing jetty to reach the required level of RL -0.9. Deck of existing jetty needs to be partially replaced and structural upgrade completed – some existing piles may need to be cut down to suit new arrangement.



Figure 49: North Zone Options Development

5.2.3 NORTH ZONE DESIGN OPTION DEVELOPMENT

The ongoing iterative design process has considered a number of design options that have incorporated and responded to the following general assumptions for the North Zone.

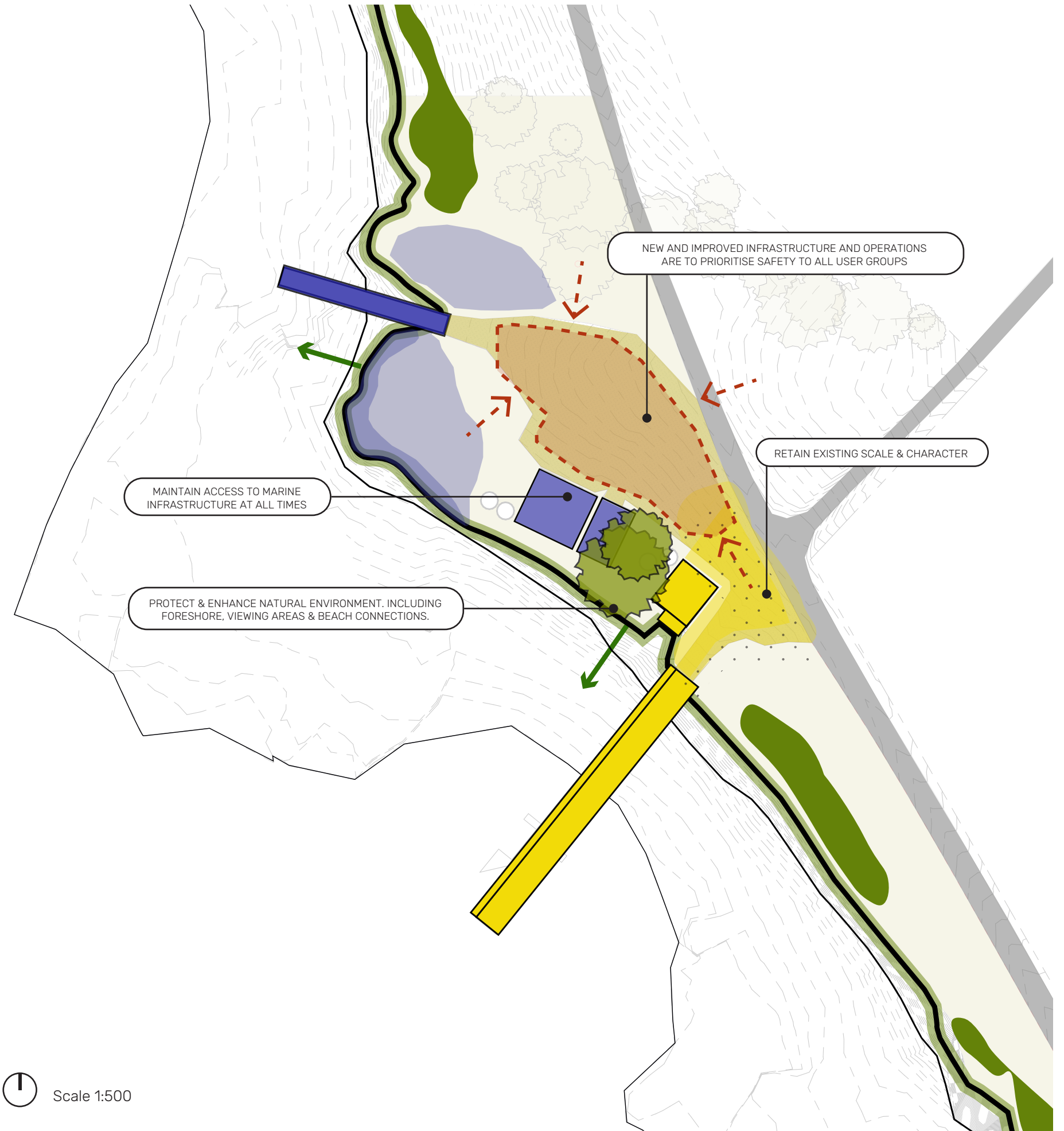
The challenge is to ensure the competing demands of the site including marine operations, recreation, tourism and freight delivery are accommodated for in the planning and final layout of the Master Plan.

Safety: All design options are to ensure that the final design prioritises the overall safety of residents, tourists and workers, with new and improved operational procedures as well as the upgrade to the existing staging area and cargo laydown. The proposed unloading area must be secured, so as not to allow public access, including tourists, to mix with operational activities when the freight vessel is docked. (2-3 days per fortnight).

Essential Marine Operations & Recreational Uses: Existing marine operations are to remain as they are currently in the North Zone. In particular the Marine Rescue shed is to remain in operation at all times, as well as access to the public boat ramp, and access to the foreshore and beach.

Protecting & Enhancing the Surrounding Environment: Biosecurity practices are also currently below best standards, and the existing jetty is incompatible to potential new methods of unloading. The new wharf will support the most efficient method for unloading. All design options will need to improve on a lack of containment for spills on the future hardstand, avoiding environmental damage and contamination. The area also has the potential for recreational mooring on the north side, benefiting both public and commercial users and improving the recreation experience along the foreshore and beach.

Retain Existing Scale & Character: Retain the existing scale and character of the North Zone. The heritage-listed office building is an asset, and its original features should be preserved. The Norfolk Pines and jetty are a valuable landscape feature that should be incorporated into the final design option.



Scale 1:500

Figure 50: North Zone Sketch

5.3 WMF DESIGN OPTION DEVELOPMENT

Design options for the Waste Management Facility (WMF) have been developed together with the consultant project team including SMEC engineers and the waste management team on the LHI Board. The design process has also entailed comprehensive community feedback through on island community engagement sessions and workshops.

The iterative design process has considered a number of design options that have incorporated and responded to the following general assumptions for the facility.

- » Construction of the building needs to be very simple and repetitive, ideally to allow for off site fabrication and then quick install
- » Visually it needs to be simple and recessive taking into consideration the view from the air
- » The activities within the WMF are progressive and should be in a single linear arrangement
- » The facility needs to fit within the available long and narrow cleared space and minimise any impact to Significant Native Vegetation
- » It should be column free, if possible, to maximize flexibility and avoid damage from forklifts/merlo etc. moving around.
- » On site the existing clear head height is 4.176m, however has been increased to 5m to improve safety
- » There is only room for a single road in and out
- » The public are restricted to just the drop-off area except through prior arrangement.

5.3.1 WMF DESIGN OPTIONS - ON-GOING

As of January 2025

On going refinement and development will be required in confirming the final site boundary where the EPA has approved waste management activities and the defined boundary of the Significant Native Vegetation in accordance with the Lord Howe Island LEP and Cumberland Ecology.

The final footprint and scale of the facility will depend on the project sponsor's final decision regarding the following:

- » Organics processing - Dehydrator/ HotRot
- » Material storage - containerized (Roll on Roll off) or another method is preferred.
- » The island's storage requirements
- » Final material selection will affect the final design option. Material selection will need to consider the cost, method of transport and level of labor skill on the island during construction.
- » The amount and type of hardstand required
- » Confirmation of glass processing
- » Confirmation of the walls and enclosed areas required to prevent any odor or acoustic disturbance on the surrounding environment and residents.
- » Final dimensions of the equipment, machinery, truck and forklifts operating in the facility and around the island.



Figure 51: South Zone Options Development



6. CONCEPT DESIGN - PREFERRED OPTION

6.1 MASTER PLANS AND CONCEPT PLANS

The Master Plans and Concept Plans for the NZ and SZ were developed iteratively, with refinements being made to address client, LHIB and community feedback. This section includes the Final Draft Master Plan and Concept Plans that were published in May 2025. These are also publicly available on the Lord Howe Island Board's website at the following URL:

<https://www.lhib.nsw.gov.au/infrastructure/critical-infrastructure-program/north-zone-and-south-zone-master-plan-designs>

6.2 NORTH ZONE - MASTER PLAN

6.2.1 NORTH ZONE MASTER PLAN

The North Zone Master Plan has been prepared based on a program decision to continue providing marine infrastructure and operations in the north of the island.

The Master Plan and Concept design includes:

- » A new fixed piled vessel ramp adjacent to the existing jetty to support a new vessel with roll-on/roll-off (RoRo) operations.
- » There will be an expansion of the existing hardstand area with unit pavers and modification of existing levels and grades to create a safe working environment during unloading and loading of the cargo vessel, including a fully sealed bunded area for boat maintenance
- » There will be a new Unstuffing Shed (incorporating Biosecurity, Australia Post sorting and storage for the Lord Howe Island Board) that will be built on the Lagoon Road side of the hardstand. This building will support vessel unstuffing/ stuffing during marine operations and provide parking for forklifts outside of operational hours. The building will also support marine biosecurity operations. The building will utilise a similar material and colour palette to existing buildings to tie in with the existing built forms and roof forms. A large retaining wall will be required between the Unstuffing Shed and Lagoon Road to moderate the change in grades of the site.
- » The Old Cargo Shed will require a new retaining wall structure around the building with safety barriers sitting above, to achieve a minimum 1:10 fall leading to the ramp and jetty. It will also be repainted and the Lagoon side porch modified for improved amenity.
- » Some new copses of trees will be planted in strategic locations to screen new buildings from the Lagoon and from Lagoon Road.
- » All but one of the existing mature Norfolk Island Pines within the area will be retained to retain the existing foreshore character of the site whilst maintaining existing screening of buildings
- » Existing dense native vegetation along the foreshore will be mostly retained, preserving the natural vegetation character along the foreshore edge. A small segment will need to be removed to cater for the expanded hardstand and new fixed piled vessel ramp.
- » Trees and vines will be incorporated to screen new retaining walls and safety barriers.
- » Existing above ground rain water tanks will be removed and a new below ground water storage tank will be built to collect rain water from all the new and existing built structures.
- » Subject to additional funding, the later annex addition to the OV Shed will be removed and the building re-purposed and renovated for use by Marine Parks NSW and TfNSW.
- » Subject to additional funding, the existing public boat ramp will be upgraded to improve functionality and usability.

6.3 NORTH ZONE - MASTER PLAN

6.3.1 MARINE OPERATIONS IN PROGRESS

LEGEND

- Proposed Unit Paving
- Proposed Coloured Unit Paving
- Existing Sealed Surface
- Proposed Timber Deck
- Proposed Turf Area
- Proposed Bioswale Area
- Proposed Planting Bed
- Significant Native Vegetation (Cumberland Ecology)
- Existing Turf Area
- Existing Native Shrubs
- P1 Existing Car/Trailer Parking [10 spaces]
- P2 Existing Boat/Trailer Parking [5-6 spaces]
- P3 Existing Boat/Trailer Parking [8-10 spaces]
- Existing Tree
- Existing Palm Tree
- Proposed Tree
- Proposed Feature Tree
- Item to be removed
- Proposed Underground Water Tank

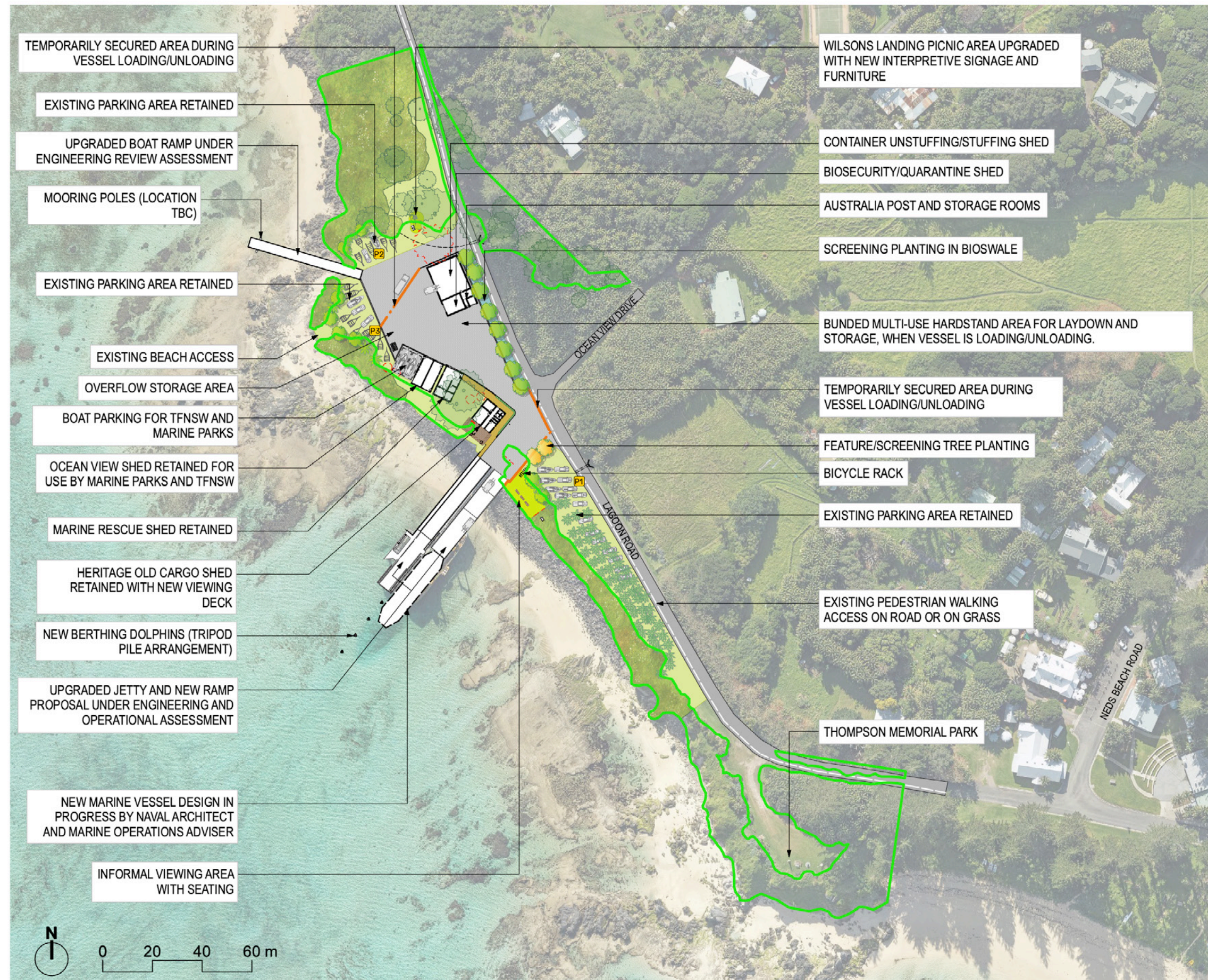


Figure 52: North Zone Master Plan

6.4 NORTH ZONE - CONCEPT PLANS

6.4.1 MARINE OPERATIONS IN PROGRESS

LEGEND

-  Proposed Unit Paving
-  Proposed Coloured Unit Paving
-  Existing Sealed Surface
-  Proposed Timber Deck
-  Proposed Turf Area
-  Proposed Bioswale Area
-  Proposed Planting Bed
-  Significant Native Vegetation (Cumberland Ecology)
-  Existing Turf Area
-  Existing Native Shrubs
-  Existing Car/Trailer Parking [10 spaces]
-  Existing Boat/Trailer Parking [5-6 spaces]
-  Existing Boat/Trailer Parking [8-10 spaces]
-  Existing Tree
-  Existing Palm Tree
-  Proposed Tree
-  Proposed Feature Tree
-  Item to be removed
-  Proposed Underground Water Tank



Figure 53: North Zone Concept Plan - With Marine Operations

PERSPECTIVE VIEW



Figure 54: Perspective View – Marine Operations in Progress

LEGEND	
	Proposed Unit Paving
	Proposed Coloured Unit Paving
	Existing Sealed Surface
	Proposed Timber Deck
	Proposed Turf Area
	Proposed Bioswale Area
	Proposed Planting Bed
	Significant Native Vegetation (Cumberland Ecology)
	Existing Turf Area
	Existing Native Shrubs
	Existing Car/Trailer Parking [10 spaces]
	Existing Boat/Trailer Parking [5-6 spaces]
	Existing Boat/Trailer Parking [8-10 spaces]
	Existing Tree
	Existing Palm Tree
	Proposed Tree
	Proposed Feature Tree
	Item to be removed
	Proposed Underground Water Tank

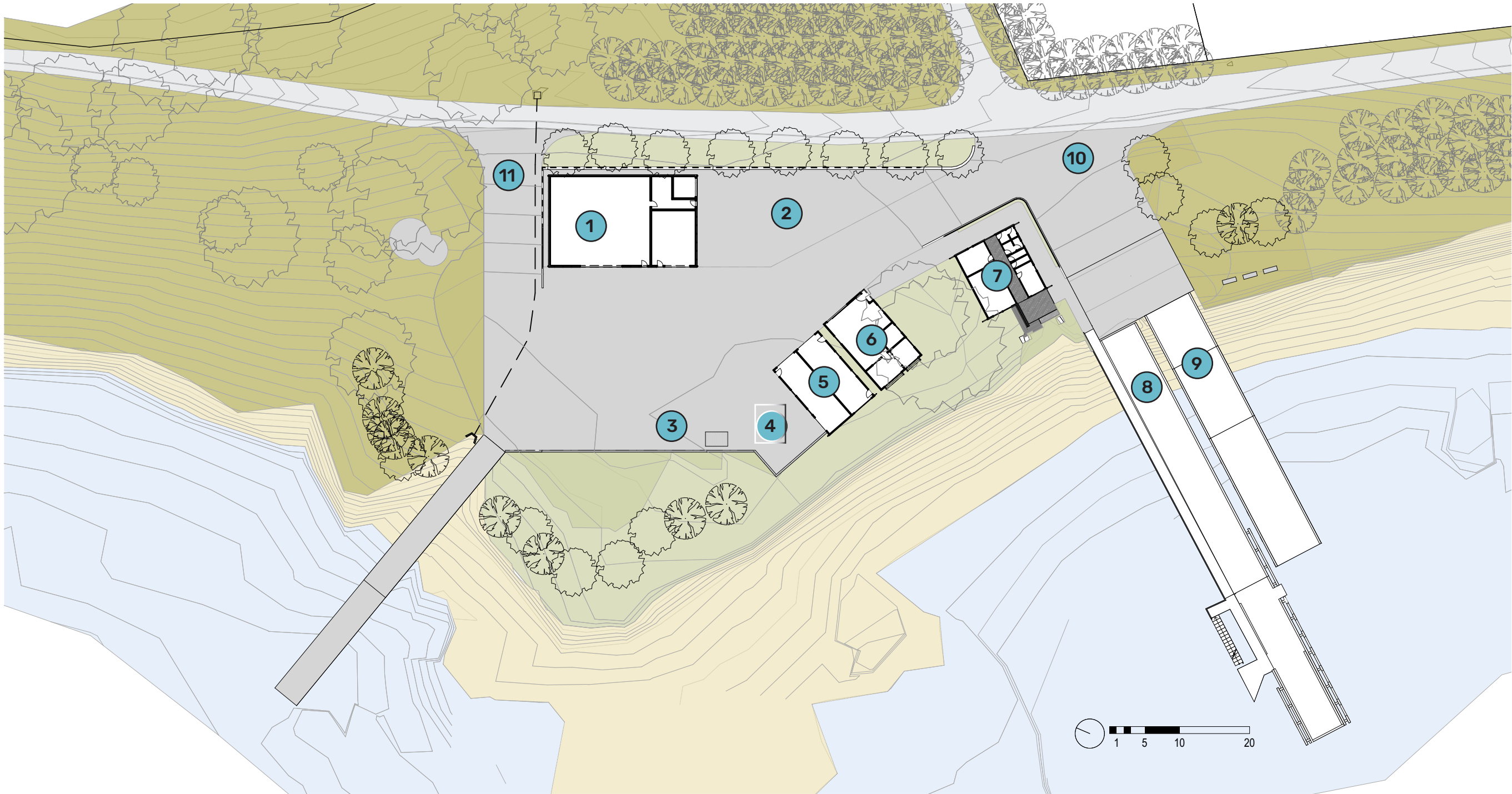


PERSPECTIVE VIEW



Figure 56: Perspective View – Marine Operations Not in Progress

6.5 NORTH ZONE - ARCHITECTURAL PLANS



- 01 UNSTUFFING SHED; BIOSECURITY, LHI BOARD STORE + AUSTRALIA POST PROCESSING
- 02 HARDSTAND AREA FOR CONTAINERS, IBC TANKS, SKIP BINS AND THE LIKE
- 03 OVERFLOW HARDSTAND AREA

- 04 BOAT STORAGE AREA AND UNDERGROUND WATER TANK
- 05 OCEAN VIEW SHED USED BY MARINE PARKS + TFNSW
- 06 EXISTING MARINE RESCUE SHED (UNTOUCHED)
- 07 OLD CARGO SHED
- 08 EXISTING JETTY

- 09 NEW BOAT RAMP
- 10 WIDENED SOUTH ENTRY
- 11 NEW NORTH ENTRY

Figure 57: North Zone Components

8.7.1 UNSTUFFING SHED

Undercover shed where containers can be unstuffed (unpacked) and sorted for loading onto vehicles for delivery around the island. The shed is large enough for two containers to be unstuffed at the same time, for access by tele-handlers and forklifts. When not in use for unstuffing, the shed can be used for the storage of vehicles associated with the loading and unloading of the vessel.

8.7.2 BIOSECURITY

This is a sealed space for the safe inspection of containers or other items that are considered to be at risk of contamination. It is sized to allow one container to be stored, unpacked and inspected.

8.7.3 AUSTRALIA POST PROCESSING

As postal items are unpacked from containers within the unstuffing shed, they will be sorted within the space ready for pickup.

8.7.4 LHI STORE

A storage space for equipment used by the Lord Howe Island Board that has direct relevance to the jetty area.

8.7.5 STAGING AREA

Hardstand area set aside for the temporary storage of items unloaded from the vessel, or to be loaded onto the vessel.

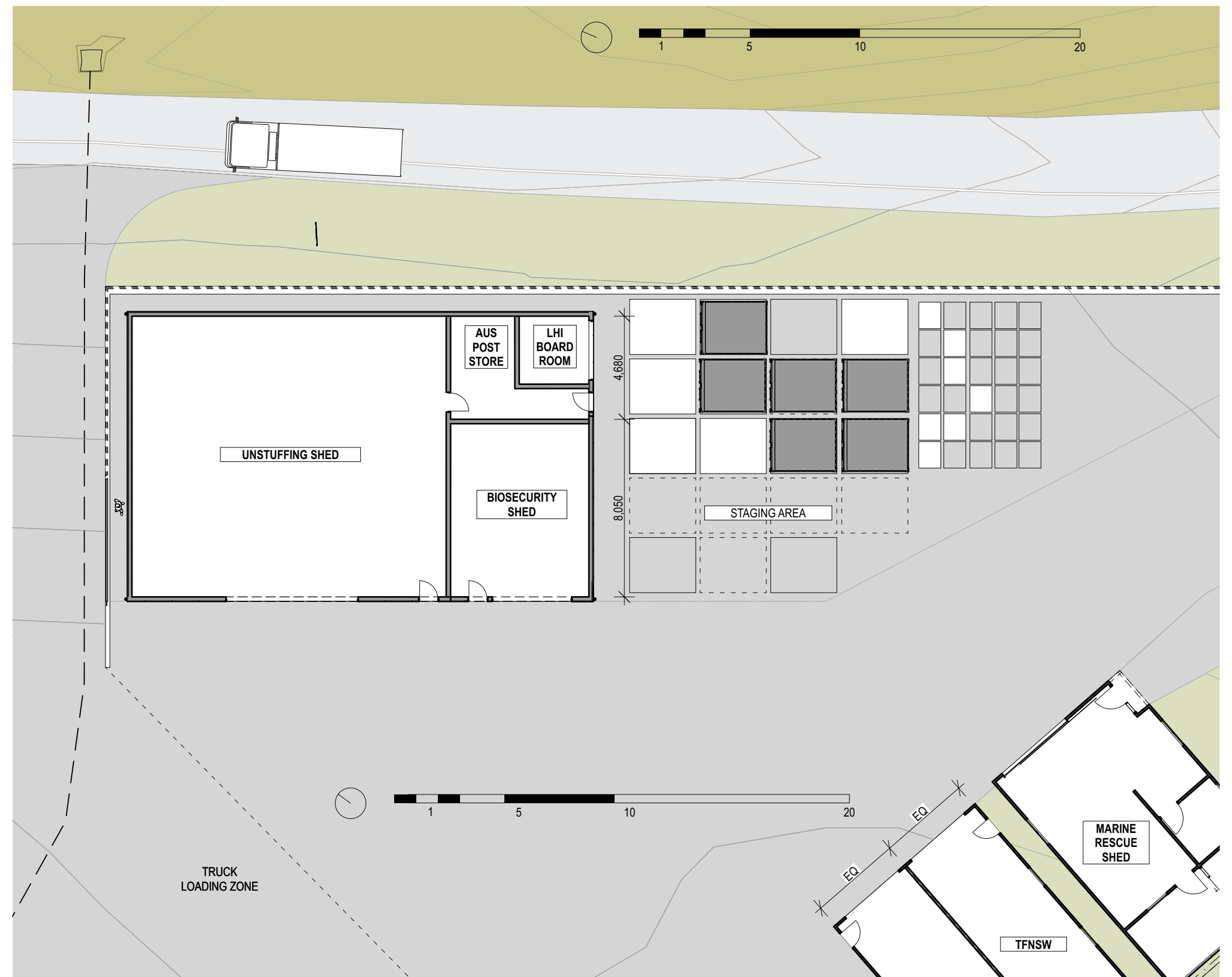


Figure 58: Bio Security Shed

8.7.6 OCEAN VIEW SHED

The existing Ocean View Shed will be refurbished (subject to additional funding) to provide space for the activities of Marine Parks and TfNSW, which currently occupy a smaller space within the annex. The annex will be demolished.

Boats used by Marine Parks and TfNSW are proposed to be parked adjacent, above a new underground water tank that will collect rainwater from the surrounding building roofs.

8.7.1 STAGING AREA OVERFLOW

When required, this area can be used as an overflow staging area for items unloaded from the vessel, or to be loaded onto the vessel.

8.7.7 MARINE RESCUE

Existing building - no work is proposed.



Figure 59: Ocean View Shed

6.6 NORTH ZONE - NEW/UPGRADED RAMPS

6.6.1 FIXED PILED VESSEL RAMP

The fixed piled vessel ramp (Ramp) as proposed, is required to support the new marine vessel which is being procured concurrently. The new marine vessel is vital to deliver the Lord Howe Island community's ongoing marine freight services. The new marine vessel allows for a Roll-on Roll-off (RoRo) cargo handling methodology which is unable to be achieved through the existing jetty infrastructure alone. Whilst the existing jetty will continue to support any Lift-on Lift-off cargo handling operations as currently occurs, a new ramp is required to allow forklifts and vehicles to access the vessel's deck via its stern door for unloading and loading containers and cargo.

The new ramp design (shown in Figure 60) must be safe, efficient, operable and compliant to current standards that supports the vital marine freight service from the mainland to Lord Howe Island.

Key design and functional constraints include but are not limited to the following:

- » Bathymetry and no-dredging approach due to World Heritage status of the site
- » Metocean conditions such as wind, wave, tide, current and sea level rise
- » Geotechnical conditions
- » New marine vessel parameters, vessel position and cargo handling method i.e. RoRo
- » Design life i.e. 50 years in accordance with AS 4997 and its exposure classification
- » Design loads for ultimate strength, serviceability and stability
- » Berthing through adequate fendering and mooring requirements
- » Low-impact construction due to sensitive environmental receptors
- » Precast / prefabricated construction methods due to remote location of the project site
- » Allow for forklift movements to support RoRo cargo handling (maximum ramp grade of 1 in 10)
- » Minimising the ramp width whilst allowing sufficient clearance for 10ft cargo containers to be safely unloaded
- » Minimising the ramp length whilst responding to bathymetry and vessel parameters to maximise overall operability in

varying tidal conditions

- » Allowing for a flat area adjacent to the landside interface for operational safety
- » Maximising the ramp structure and extent which remains above the water line to minimise maintenance issues such as algae growth.
- » Maintaining the landside tie-in level at the same elevation as the existing jetty.

6.6.2 PUBLIC BOAT RAMP

The project involves upgrading the existing public boat ramp to enhance access for recreational vessels on trailers. The upgrade aims to improve usability for local residents, and to align, where practical, with the NSW Boat Ramp Facility Guidelines.

Due to limited water depths in the Lagoon and the Island's World Heritage status, the ramp will mainly support powerboats and possibly small keelboats, with usage constrained by tidal conditions.

The upgraded ramp will be designed to meet both functional requirements and environmental constraints, including:

- » Extending the ramp seaward to achieve the required Design Low Water Level.
- » Integrating with the adjacent cargo laydown area.
- » Minimising visual and environmental impacts consistent with the Island's World Heritage values.
- » Enabling use by both small craft and larger vessels on trailers.

It is considered that detailed design development post approval will allow opportunity for further design refinement.

Key design constraints, include but are not limited to the following:

- » Compliance with the NSW Boat Launching Ramp Facility Guidelines.
- » Matching the ramp landside tie-in level with the adjacent cargo laydown area.
- » Avoiding dredging due to World Heritage constraints.
- » Addressing site-specific metocean and geotechnical conditions.
- » Ensuring low-impact construction and adopting prefabricated

elements due to the Island's remote location.

- » Design life in accordance with AS 4997 and its exposure classification.

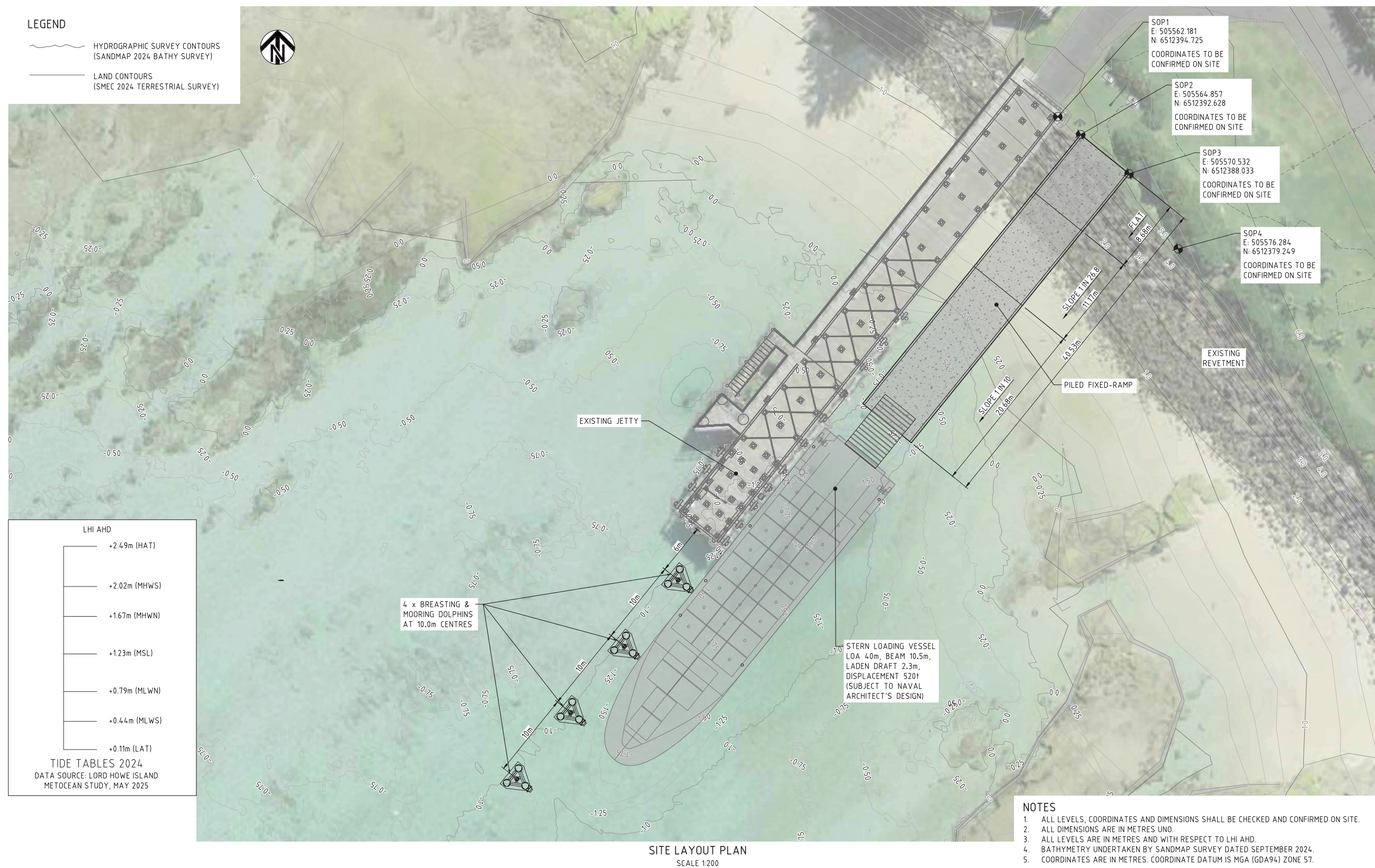
Key functional constraints, include but are not limited to the following:

- » Accommodating turning movements for cars and trailers as per AS 3962.
- » Supporting load requirements for vessels and trailers using the ramp.
- » Ensuring operational compatibility with the cargo laydown area.

The concept design for the public boat ramp results in a ramp that is approximately 36.5m in length (around 8.5m longer than existing ramp) and 1m wide (including kerbs). The ramp crest sits at 4.9m LHI AHD and the toe is at +0.30m LHI AHD (0.84m below the existing toe).

Other design criteria include:

- » Vessel load
 - Length Overall: 12m
 - Draft: 1.2m
 - Displacement: 12t.



6.7 SOUTH ZONE - MASTER PLAN

The preferred design option for the South Zone does not include any marine infrastructure elements such as a new wharf/ramp and new biosecurity facility.

6.7.1 SOUTH ZONE MASTER PLAN

Figure 61 shows the Draft South Zone Master Plan. The Master Plan includes:

- » Replacement of the existing Waste Management Facility with new buildings such as a Residential and Commercial Waste Receiving Area, Materials Recovery Facility (MRF), Organics Processing Workshop, Waste Water Treatment Plant, Office Building and Storage Shed. Outdoor staging areas, storage areas and bunkers will also be provisioned on a paved hardstand area with some patches of turf. A small segment of Old Lagoon Road will also be widened near the entry gates of the WMF to enhance safety. Whilst there will be more buildings than currently, the site should appear more organised and tidy overall with less waste material strewn around the site.
- » A new dog kennel facility will be introduced adjacent to the existing Bureau of Meteorology site, housing biosecurity dogs and providing several kennels and outdoor training and exercise areas for the dogs.
- » A new fuel bowser will also be introduced along Old Lagoon Road to provide fuel to local residents and businesses.
- » The foreshore dune and its vegetation will be retained and selectively revegetated, preserving the local character along the foreshore, whilst helping to screen the facility from the beach and lagoon.
- » The existing native vegetation on the eastern side of the WMF site will also be retained, maintaining the character around the site and helping to provide some screening from lookouts such as Transit Hill.
- » Dense screening vegetation will also be planted around the Fuel Bowser and Dog Kennels to minimise their visual impact from surrounding areas.



Figure 61: South Zone Master Plan

6.8 SOUTH ZONE - CONCEPT PLANS

6.8.1 WASTE MANAGEMENT FACILITY

LEGEND

- Proposed Fencing
- Proposed Turf Area
- Proposed Shrub/Groundcover Planting
- Proposed Unit Paving
- Proposed New/Upgraded Road
- Existing Native Vegetation
- Existing Turf
- Significant Native Vegetation (Cumberland Ecology)
- Existing Sealed Surface
- Existing Unsealed Surface
- Selective Dune Rehabilitation
- Item to be removed
- Water Tank - Existing
- Water Tank - New
- 🌳 Proposed Tree
- 🌳 Proposed Feature Tree



Figure 62: South Zone Concept Plan - Waste Management Facility

6.8.2 DOG KENNELS AND FUEL BOWSER

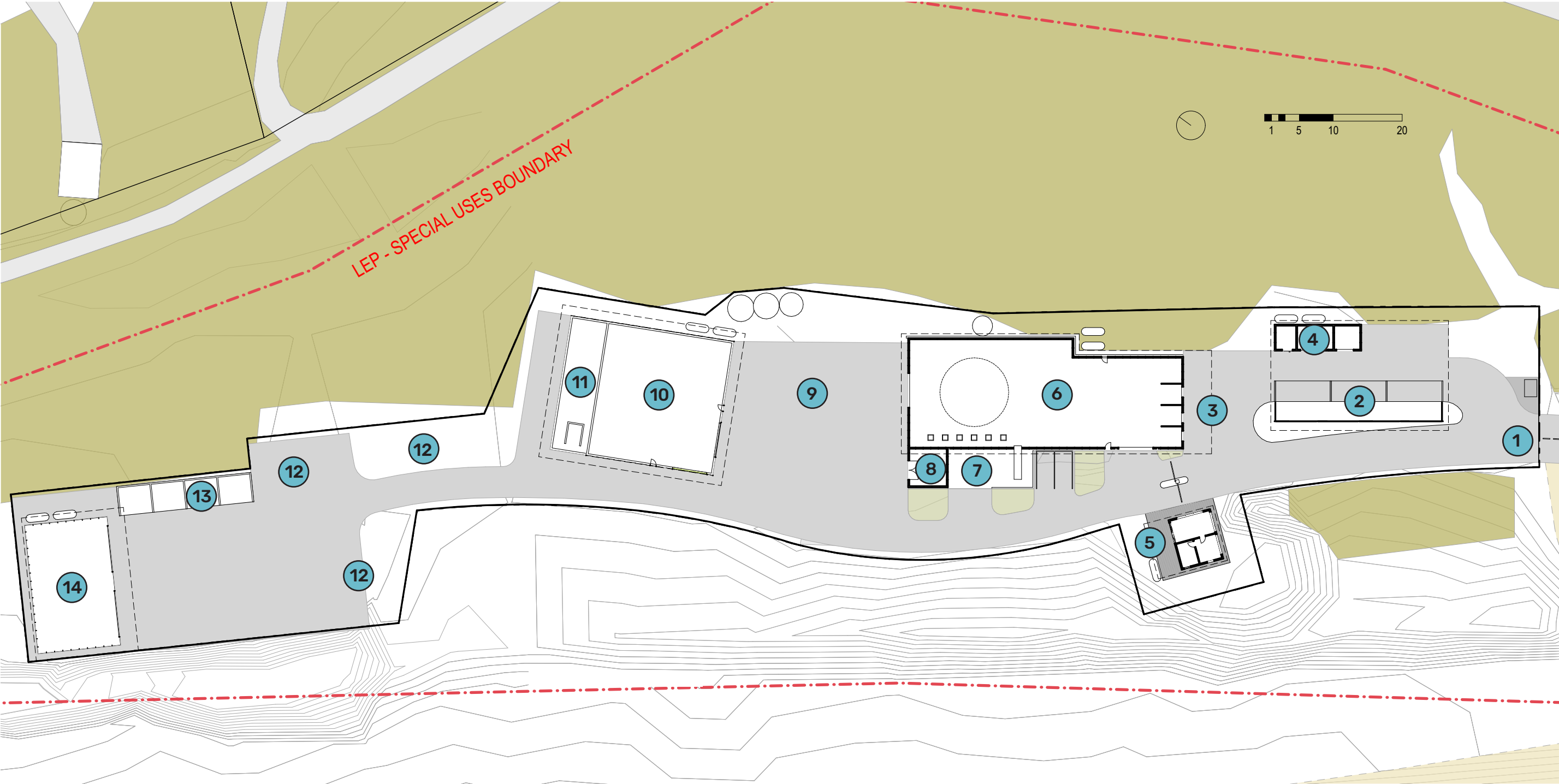
LEGEND

- Proposed Fencing
- Proposed Turf Area
- Proposed Shrub/Groundcover Planting
- Proposed New/Upgraded Road
- Existing Native Vegetation
- Existing Turf
- Significant Native Vegetation (Cumberland Ecology)
- Existing Sealed Surface
- Existing Unsealed Surface
- Selective Dune Rehabilitation
- Water Tank - Existing
- Water Tank - New
- 🌳 Proposed Tree
- 🌳 Proposed Feature Tree



Figure 63: South Zone Concept Plan - Dog Kennels and Fuel Bowser

6.9 SOUTH ZONE - ARCHITECTURAL PLANS



- | | | | | | |
|----|--|----|------------------------------|----|-----------------------------|
| 01 | ENTRY GATES | 06 | MATERIAL RECOVERY FACILITY | 11 | WASTE WATER TREATMENT PLANT |
| 02 | RESIDENTIAL WASTE RECEIVING AREA (INC SKIP BINS) | 07 | GLASS PROCESSING | 12 | WASTE STORAGE PILES |
| 03 | COMMERCIAL WASTE RECEIVING AREA | 08 | WORKSHOP | 13 | EXISTING OPEN BUNKERS |
| 04 | CHEMICAL & HAZARDOUS MATERIALS SHED | 09 | STAGING AREA | 14 | STORAGE SHED AND HARDSTAND |
| 05 | WMF OFFICE | 10 | ORGANICS PROCESSING WORKSHOP | | |

Figure 64: WMF Components

6.9.1 RECEPTION - COMMERCIAL AND RESIDENTIAL DROP OFF

The new facility will consist of drive-through drop-off areas, split into commercial drop off zone and residential drop off zone. The drop off areas will feature labelled, secure containers designated for specific types of waste.

The area is to be separated from the processing area to prevent the public coming in contact with equipment or stored material, and prevent unauthorised waste dumping inside the processing site. Direct access will be allowed only to the septic truck contractor and for special delivery/collections which is to be coordinated with the facility's personnel and boom gates.

The design will consider various types of vehicles and their required turning circle and to facilitate traffic flow.

8.3.2 CHEMICAL AND HAZARDOUS MATERIALS SHED + REUSE SHED

Reception and storage of chemicals will take place in the reception area where containers will collect used cooking oil, paint or motor oil. A special section will also receive solid chemicals in drums, cans, or other. This area will be equipped with bunding and designed securely to handle various hazardous materials.

The building also includes a reuse shed where locals can drop off/pick up unwanted items that are suitable for reuse.



Figure 65: WMF Drop Off Area and Chemical Shed

8.3.3 MATERIAL RECOVERY FACILITY (MRF) - GROUND

A new Materials Recovery Facility (MRF) will be established, featuring a redesigned working platform to ensure secure and safe operating conditions. Equipment will include a feeding hopper, conveyors, glass screen, magnet, a picking station, six capture bunkers, two balers, polystyrene processing and wrapper.

To reduce double handling of incoming waste, the MRF building will be positioned at the reception area allocated for commercial customers. Connecting chutes will be placed in the MRF walls for waste to be processed inside the MRF and will be deposited directly into receival bunkers.

This will reduce double handling and will place processing material ready to be sorted (recyclables and paper/cardboard) or baled for transportation to the mainland.

Attached to the MRF is a Workshop and Glass Processing area for crushing and bagging of glass.

8.3.4 FACILITY OFFICE AND SHARED AMENITY

The staff office with amenities will be located apart and detached from the processing area - away from the noise and dust of the MRF. It is located close to the receival hall to facilitate inspection and direct line of sight of incoming materials and assist visitors if required. Additional workstations are provided for the Biosecurity staff.

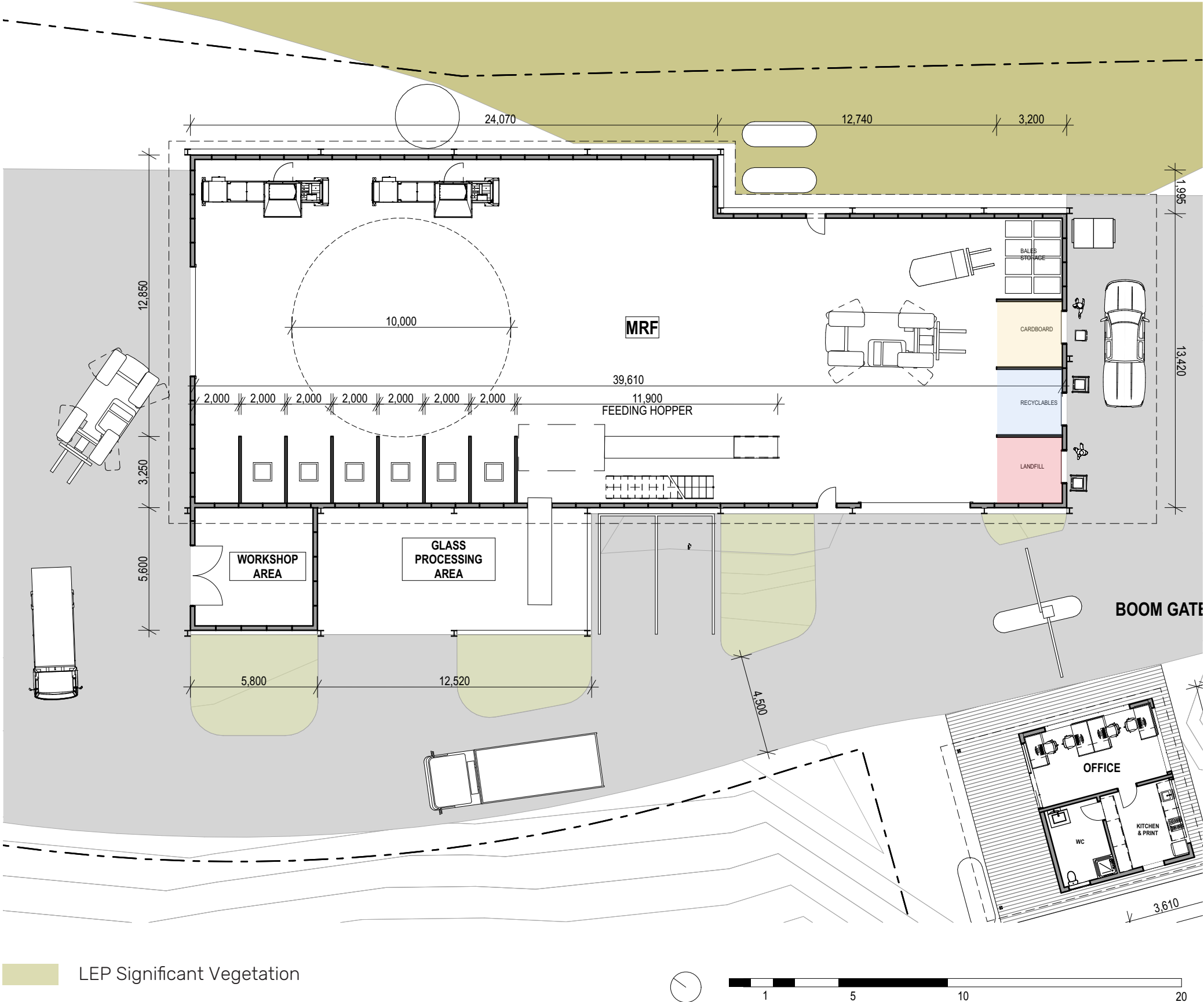


Figure 66: WMF Material Recover Facility and Facility Office

8.3.5 MATERIAL RECOVERY FACILITY -
MEZZANINE

The MRF will include a mezzanine level for the Picking Station. The new and improved working platform will ensure secure and safe operating conditions. Equipment will include a conveyor, magnet and series of six feeding hoppers to allow for easy waste separation into bunkers underneath. The conveyor will also include a glass screen to direct glass outside to the glass crusher and processing area.

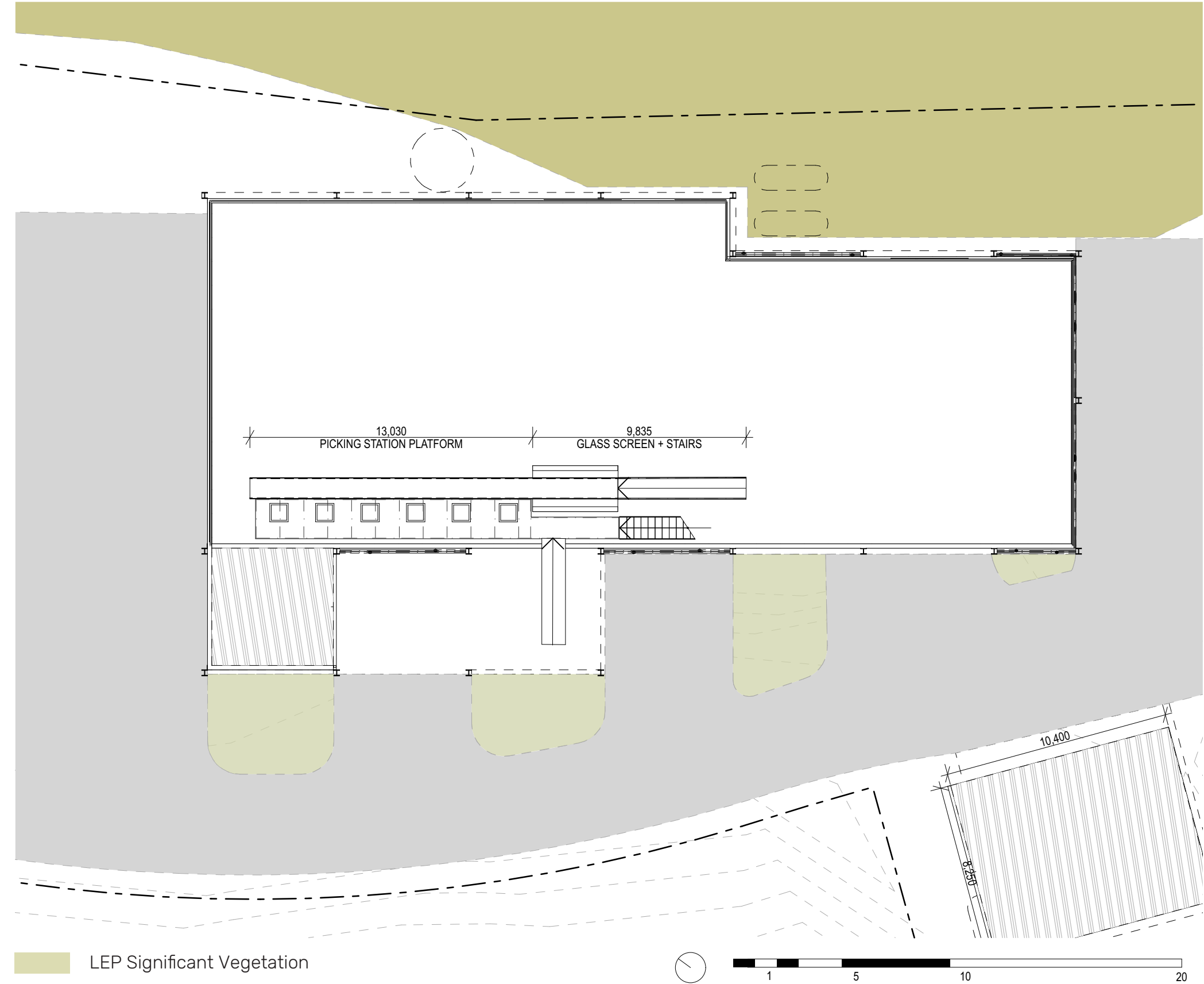


Figure 67: WMF MRF Mezzanine

8.3.6 STAGING AREA

An open hardstand is located between the Materials Recovery Facility and the Organics Workshop. This area allows for skips and containers to be filled and stored before being relocated to the North Zone hardstand when the ship arrives each fortnight. It is also an overflow space for vehicle parking.

8.3.7 WASTE WATER TREATMENT & ORGANICS SHED

The existing wastewater treatment system will be replaced by a new automated treatment facility to reduce the need of operators to manually operate the different stages of wastewater treatment.

The new wastewater treatment facility will consider a new reception mechanism (septic truck discharge) and a fully automated feeding system. It will also incorporate a filtration unit for bio-solids and a direct discharge system into a designated bio-solids bunker. Treated water will be used to irrigate the adjacent vegetation.

The Organics Shed will contain two Dehydrators to process the island's organic waste. Once processed by the Dehydrator, the organic product will be put in containers and shipped to the main land. It also includes the existing HotRot as a backup for organics processing. Waste water will be processed by the adjacent waste water treatment system

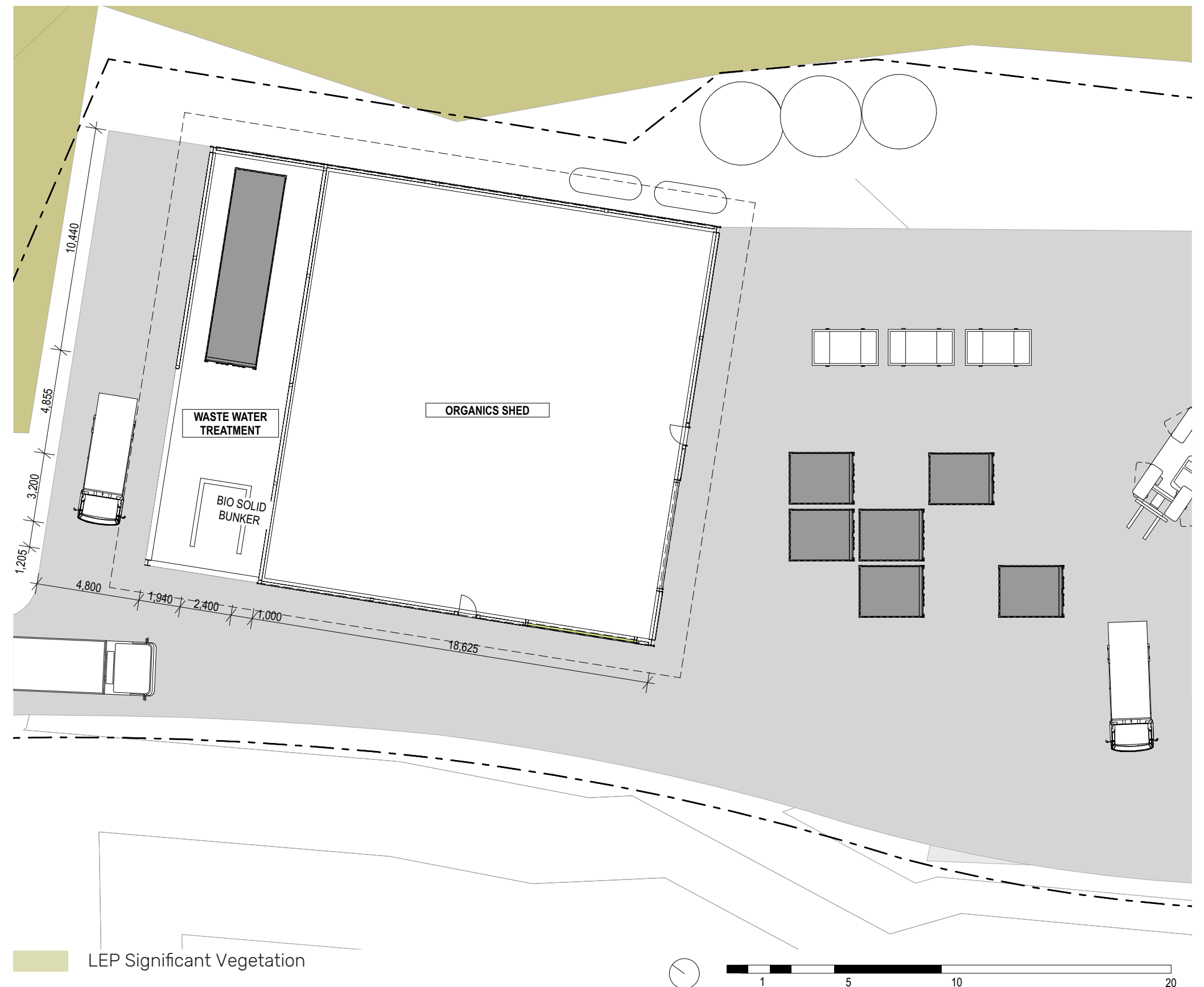


Figure 68: WMF Waste Water Treatment and Organics

8.3.8 EXISTING BUNKERS, STORAGE SHED AND HARDSTAND

The existing Bunkers will receive material that has been separated and is ready for processing, or processed material that is ready for re-use or disposal. This might include material like separated construction material such as steel, wood and crush concrete; shredded green/wood waste and others to be directly disposed of on the mainland.

Within the hardstand area is set aside for storage of bulky items before processing, and space for the processing of materials - such as concrete crushing or green material shredding.

The area also provide ample space for manoeuvring larger vehicles.

A new equipment storage shed will protect new mobile equipment from weather, such as the wood shredder and concrete crusher.

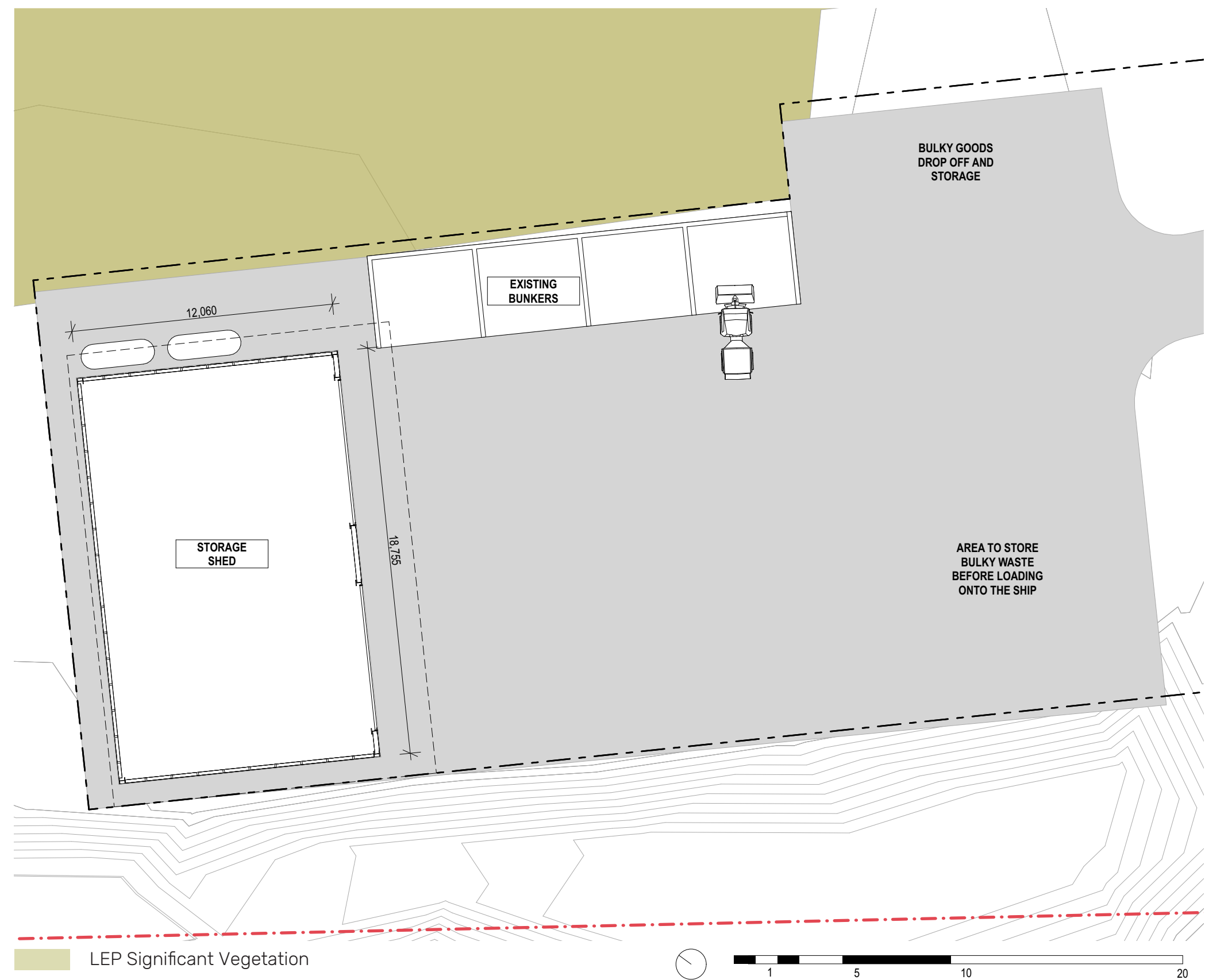


Figure 69: WMF Bunkers, Storage Shed and Hardstand

6.9.2 SOUTH ZONE PERSPECTIVE VIEWS



Figure 70: Perspective View – WMF Entry Gates



Figure 71: Perspective View – WMF Entry Area and Reception Drop Off



7. LANDSCAPE CHARACTER AND VISUAL IMPACT ASSESSMENT

7.1 LCVIA OVERVIEW

7.1.1 LCVIA PURPOSE

A Landscape Character and Visual Impact Assessment (LCVIA) has been prepared for the project and seeks to:

- » Inform the design of the project so as to minimise the direct and indirect impacts that the project may have on the island’s landscape character and visual appeal.
- » Inform DCCEEW (NPWS) and other agencies and the community about the landscape character impact and visual impact of the proposal, whilst providing recommendations on the mitigation strategies that should be implemented to avoid or reduce the impacts identified.

7.1.2 LCVIA APPROACH

The LCVIA has investigated landscape character impacts and visual impacts of the proposed works in the North Zone and South Zones. The LCVIA methodology has been based on the Guideline for Landscape Character and Visual Impact Assessment (TfNSW, 2023), however the method has been adapted and tailored to suite the context of Lord Howe Island and it’s UNESCO World Heritage status. This particularly relates to the landscape character assessment which typically concentrates the study on direct development impacts to a character zone. However, this LCVIA has considered indirect impacts to each character zone, given that views and vistas form a major part of the island’s character and spectacular scenic beauty.

Components of the LCVIA are summarised below:

- » A landscape character assessment evaluates how a project might affect the character and identity of an area, including its emotional significance to people. This assessment has identified a series of landscape character zones across the island and determined the impacts caused by the program of works.
- » A visual impact assessment identifies how a project may affect everyday views experienced by people when they are present at a particular location. This assessment has identified a series of viewpoints across the island that have views to the proposed project development. Each viewpoint has been assessed in terms of the impacts caused by the program of works.

7.2 LANDSCAPE CHARACTER ASSESSMENT

7.2.1 LANDSCAPE CHARACTER ASSESSMENT METHODOLOGY

The assessment of landscape character involves the identification of the diverse landscape character zones surrounding the project sites (defined by distinctive landscape characteristics), and an assessment of the sensitivity and magnitude of the proposal for each zone.

Sensitivity refers to how susceptible the environment is to the proposed change. The assessment is informed by background research, including, the quality of the landscape, it’s cultural and historical importance to the community, scenic quality, and the overall composition of the place and its users. Additionally, sensitivity considers the landscape’s inherent capacity to absorb change. For example, an area with a pristine natural character would be more sensitive to change than an area that has existing built infrastructure such as a road or building.

Magnitude refers to the type of proposal and its compatibility with existing landscape character, including; scale, form and material composition of elements, as well as their location or setting. Moreover, magnitude considers the influence of the physical presence of the proposal. The magnitude impact rating also considers whether the proposal has a positive or negative impact on the landscape character of the zone. For example, a proposal may be of a large scale but may provide beneficial outcomes such as increased open space, enhancement of the areas ‘sense of place’, better connectivity and a safer road environment.

Landscape Character Impact is the combined evaluation of the sensitivity and magnitude of change caused by the proposal, in accordance with the Landscape Character Impact Assessment Grading Matrix shown in Figure 72.

		MAGNITUDE			
		HIGH	MODERATE	LOW	NEGLIGIBLE
SENSITIVITY	HIGH	HIGH	HIGH-MODERATE	MODERATE	NEGLIGIBLE
	MODERATE	HIGH-MODERATE	MODERATE	MODERATE-LOW	NEGLIGIBLE
	LOW	MODERATE	MODERATE-LOW	LOW	NEGLIGIBLE
	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE

Figure 72: Landscape Character and Visual Impact Assessment Rating Matrix
Source: Guideline for Landscape Character and Visual Impact Assessment (TfNSW, 2023)

7.2.2 ISLAND CHARACTER ZONES

To support the LCVIA, a series of Landscape Character Zones have been identified across the island. These zones have been identified based on the following distinguishing landscape characteristics:

- » Landform
- » Ecological Value
- » Urban/landscape setting
- » Access and movement
- » Island Infrastructure

The Landscape Character Zones are shown in Figure 73 and corresponding images are shown in Figure 74. The character zones are:

- » LC1 PPP North - the Permanent Park Preserve area in the north of the island including the North Bay area, Mount Eliza, Kim's Lookout and Malabar Hill.
- » LC2 Marine Infrastructure - the Marine Infrastructure area surrounding the existing jetty. The proposed works in the North Zone are contained to this character zone.
- » LC3 Settlement North - the main township and settlement area in the north
- » LC4 The Lagoon - the lagoon area along the western foreshore of the island
- » LC5 PPP Central - the Permanent Park Preserve area in the centre of the island surrounding Transit Hill
- » LC6 Infrastructure South - the island infrastructure area in the centre of the island includes the airport, the existing Waste Management Facility and some private residences and accommodation facilities. The proposed works in the South Zone are contained to this character zone.
- » LC7 Settlement South - the settlement area in the south including the LHI Golf Course
- » LC8 PPP South - the Permanent Park Preserve area in the south of the island including Mount Lidgbird and Mount Gower.

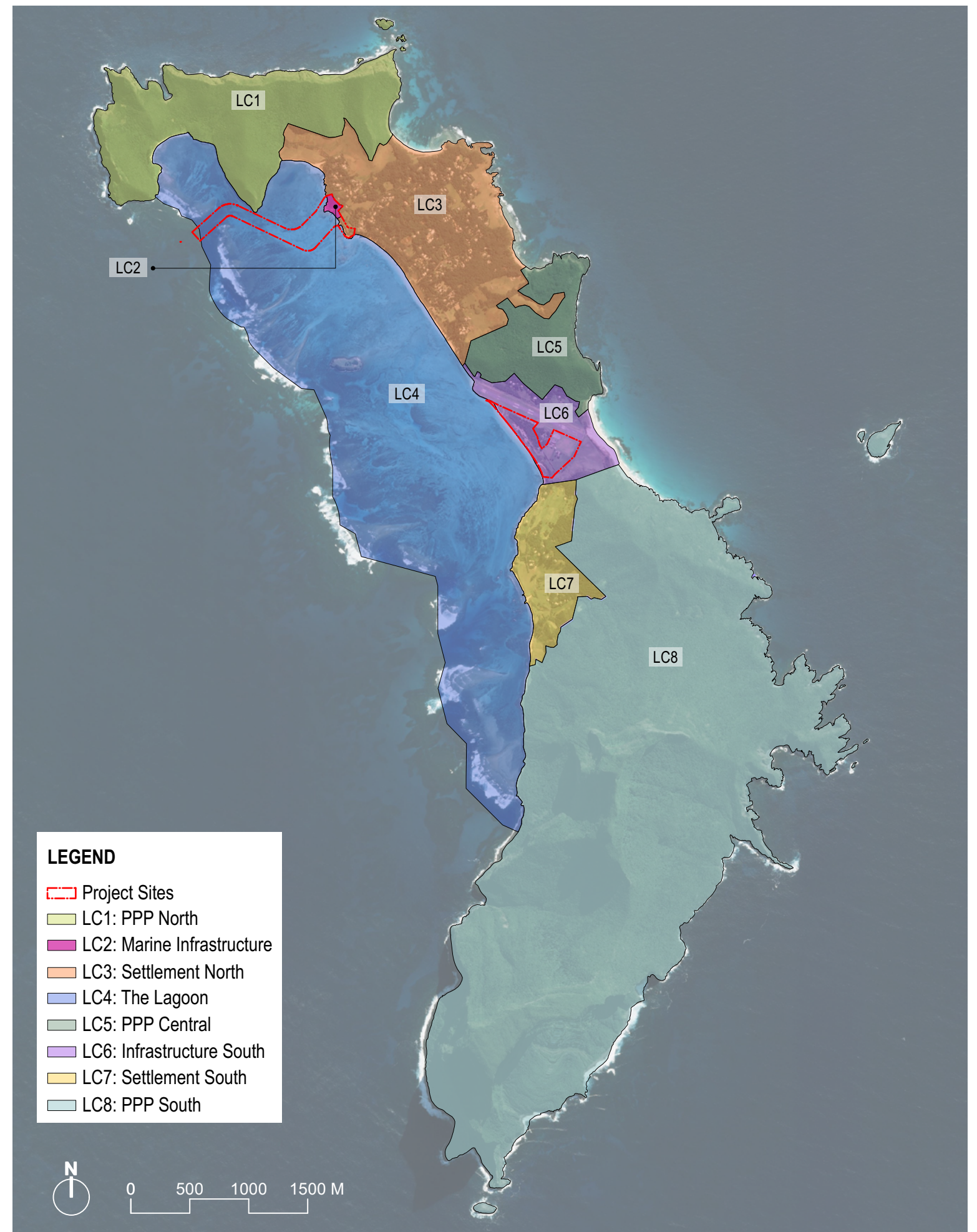


Figure 73: Character Zone Map



LC1 - PPP North



LC2 - Marine Infrastructure



LC3 - Settlement North - Town Centre



LC3 - Settlement North - Residential Streets



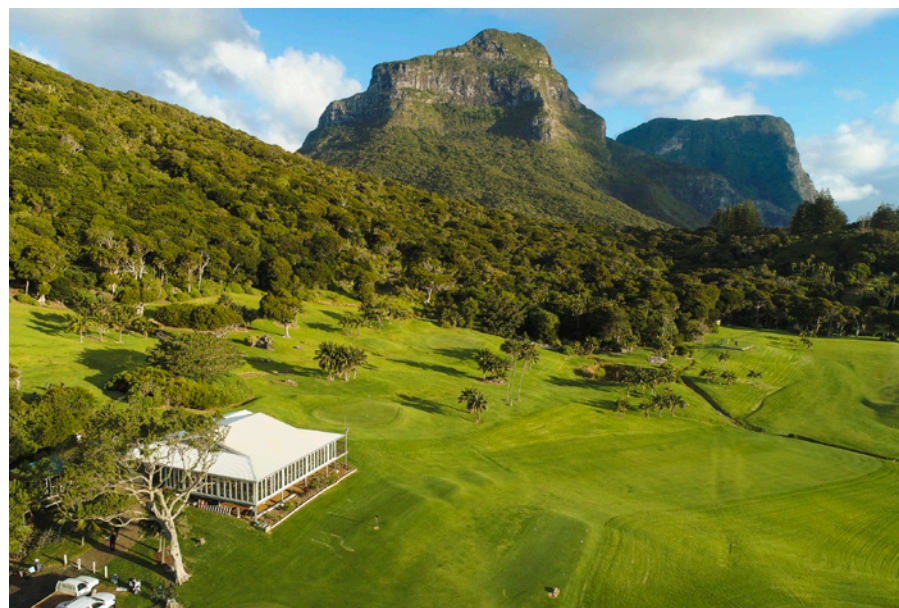
LC4 - The Lagoon



LC5 - PPP Central



LC6 - Infrastructure South



LC7 - Settlement South

Source: LHI Golf Club



LC8 - PPP South

Figure 74: Landscape Character Zones Photos

7.2.3 LANDSCAPE CHARACTER IMPACTS

Table 2: Landscape Character Zones and Site Characteristics

CHARACTER ZONE	SENSITIVITY	MAGNITUDE	LANDSCAPE CHARACTER IMPACT
LC1 PPP - North	HIGH - This is a pristine and natural area of Permanent Park Preserve. It is dominated by volcanic hills, lush endemic vegetation and offers breathtaking scenery and vistas. - It has high ecological value and is largely undisturbed with only a few walking trails to popular lookout points such as Malabar Hill, Mount Eliza and Kim's Lookout. - This area has a HIGH sensitivity to change.	LOW Whilst the proposed works in the North Zone and South Zone do not directly affect this area, the area is renowned for its exceptional and iconic views and vistas across the island. The views from iconic lookouts such as Mount Eliza and Kim's Lookout, as well as from Old Settlement Beach and North Bay will be impacted to varying degrees by the proposed changes in the North Zone and South Zone. Views from Malabar Hill will not be affected. As such, a LOW magnitude rating has been nominated for the character zone given these impacts occur in partially screened locations, which are relatively distant from this LCZ.	MODERATE The combined sensitivity and magnitude of change occurring in this character zone result in a MODERATE impact rating.
LC2 Marine Infrastructure	MODERATE - This is a relatively flat and low lying area with several existing small-scale sheds and buildings, as well as the existing jetty, existing boat ramp and a large hardstand area supporting existing marine operations. The grassed areas around the hardstand are often used to park cars and boat trailers - The existing "Old Cargo Shed" building and adjacent Norfolk Island Pine trees have heritage value. Recorded on the State Heritage Register as Cargo Shed Group (SHR/LEP/S170), the listing primarily refers to the Old Cargo Shed, but also includes reference to the Ocean View (OV) Shed and the Norfolk Island Pines. - The area has high visitation from tourists for boat tour departures and is also used regularly by locals for recreational and commercial boating and picnics. - There are native vegetation communities along the foreshore edge that provide important habitat for shorebirds - Despite the existing hardstand and buildings, it is still relatively undeveloped and is situated in an idyllic location adjacent to the Lagoon foreshore, acting as an important transport node for islanders and tourists and important habitat for birds. As such, this site is considered to have a MODERATE level of sensitivity to change.	HIGH - The proposed North Zone work will directly impact this character zone and the magnitude rating is considered to be HIGH. Proposed development works are shown in Figure 75 and include: - A new fixed piled vessel ramp adjacent to the existing jetty to support a new vessel with roll-on/roll-off (RoRo) operations. This will have a different form and grading to the existing jetty (refer 7.4 Mitigation Strategies). - The existing public boat ramp will be upgraded and lengthened to improve its functionality and usage. - There will be an expansion of the existing hardstand area with unit pavers and modification of existing levels and grades to create a safe working environment during unloading and loading of the cargo vessel - There will be a new Unstuffing Shed (incorporating Biosecurity, Australia Post sorting and Store for the Lord Howe Island Board) that will be built on the Lagoon Road side of the hardstand, where no buildings exist at present. This building will support unstuffing/stuffing of containers during marine operations and provide parking for operational equipment outside of operational hours. The building will also support vessel-related biosecurity operations. The building will utilise a similar material and colour palette to existing buildings to tie in with the existing built forms and roof forms. A large retaining wall will be required between the Unstuffing Shed and Lagoon Road to accommodate the change in levels across the site. - The Old Cargo Shed will require a new retaining wall structure around the building with safety barriers sitting above, to achieve a minimum 1:10 fall leading to the ramp and jetty. It will also be repainted and the Lagoon side porch/deck modified for improved amenity. - Subject to additional funding, the later annex addition to the OV Shed will be removed and the building re-purposed and renovated for use by Marine Parks NSW and TfNSW. - Some new copses of trees will be planted in strategic locations to screen new buildings from the Lagoon and from Lagoon Road. All (except for one) of the existing mature Norfolk Island Pines within the area will be retained to retain the existing foreshore character of the site whilst maintaining existing screening of buildings. - Existing dense native vegetation along the foreshore will be mostly retained, preserving the natural vegetation character along the foreshore edge. A small segment will need to be removed to cater for the expanded hardstand and new fixed piled vessel ramp. - Trees and vines will be incorporated to screen new retaining walls and safety barriers. This will improve and soften the visual aesthetic of the walls and barriers. - Existing above ground rain water tanks will be removed and a new below ground water storage tank will be built to collect rainwater from all the new and existing built structures.	HIGH-MODERATE The combined sensitivity and magnitude of change occurring in this character zone result in a HIGH-MODERATE impact rating.

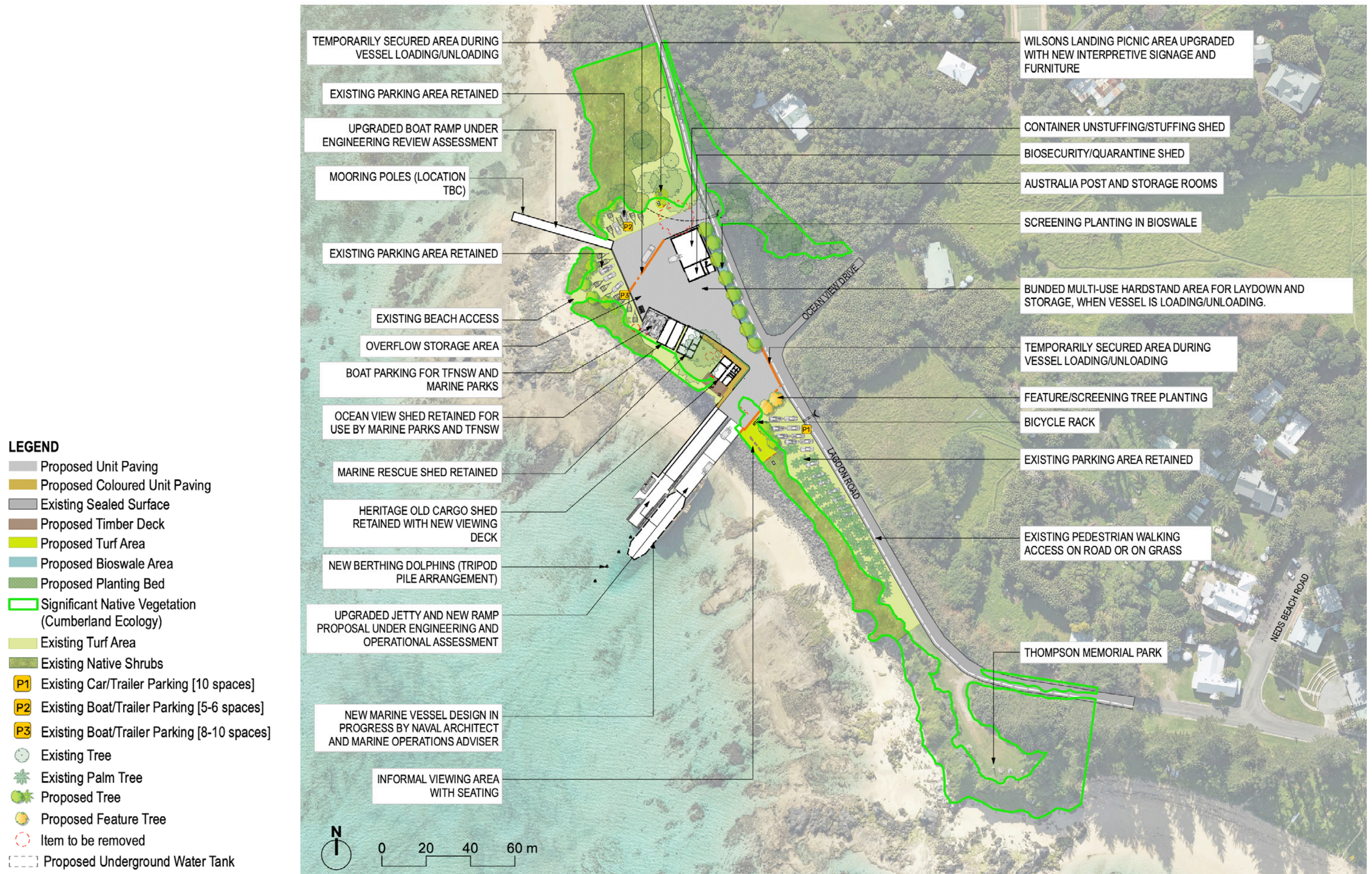


Figure 75: North Zone Master Plan

CHARACTER ZONE	SENSITIVITY	MAGNITUDE	LANDSCAPE CHARACTER IMPACT
LC3 Settlement - North	MODERATE - This is the main settlement area on the island, comprising a local road network and numerous residential houses, some agricultural land and accommodation facilities. - A small town centre is also located at the junction of Lagoon Road and Ned's Beach Road with a post office, community hall, cafe, bar and grocery stores. - This area has the greatest residential population on the island, although still preserves the island's special character through dense vegetative screening of most properties. - As such, it is considered to have a MODERATE sensitivity to change.	LOW This character zone surrounds LC2 where the proposed North Zone works are occurring. As such, character changes to LC2 will impact areas around the periphery of LC3, particularly the character around Ocean View Drive and along Lagoon Road which provides a critical link between northern parts of the island and the town centre. Given these character changes will be limited to the areas closest to LC2, a LOW magnitude rating has been nominated overall for the character zone.	MODERATE-LOW The combined sensitivity and magnitude of change occurring in this character zone result in a MODERATE-LOW impact rating.
LC4 The Lagoon	HIGH - The Lagoon sits within the Lord Howe Island Marine Park. It is the world's most southern coral reef system. - The Lagoon is protected under the Marine Parks Act, however sustainable uses such as recreational fishing, diving, sailing and others are permitted - The Lagoon is a popular location, utilised by tour operators, tourists and locals for many recreational activities as well as marine transport to and from the island. - This area has a HIGH sensitivity to change.	MODERATE - As shown in Figure 75, the proposed new fixed piled vessel ramp structure will be built adjacent to the existing jetty. The new ramp will extend approximately 40m out into the lagoon, and is shorter than the existing jetty which is approximately 64m long. Several ramp options were investigated by SMEC/ABL in November 2024 and the fixed pile ramp solution was chosen as the best possible solution to meet numerous criteria (refer Section 7.4 Mitigation Strategies for further details) - An additional 4 berthing dolphin (monopiles) will also be constructed that will extend approximately 102m out into the lagoon from the shoreline, or 38m further out than the end of the existing jetty. To minimise the visual impact of having 4 individual 2m wide diameter berthing dolphins, 3 smaller diameter piles will be arranged in a tripod formation for each dolphin. - The public boat ramp will be upgraded and will be lengthened to approximately 36.5m (currently 25m long) with the toe level reaching +0.30m LHI AHD which is 0.84m below the existing toe level - Given these elements are contained to a small area within the northern part of the Lagoon, the magnitude of impact is considered to be MODERATE.	HIGH-MODERATE The combined sensitivity and magnitude of change occurring in this character zone result in a HIGH-MODERATE impact rating.
LC5 PPP - Central	HIGH - This is a pristine and densely vegetated area of Permanent Park Preserve. It is dominated by volcanic hills, lush endemic vegetation and offers breathtaking scenery and vistas. - It has high ecological value and is largely undisturbed with one main walking trail to the popular Transit Hill lookout. - As such, this area has a HIGH sensitivity to change.	LOW Whilst the proposed works in the North Zone and South Zone do not directly affect this area, the area is renowned for its exceptional and iconic views and vistas across the island. The views from iconic lookouts such as Transit Hill will be marginally impacted by the proposed changes in the South Zone. As such, a LOW magnitude rating has been nominated for the character zone given the impacted views are contained to limited locations.	MODERATE The combined sensitivity and magnitude of change occurring in this character zone result in a MODERATE impact rating.

CHARACTER ZONE	SENSITIVITY	MAGNITUDE	LANDSCAPE CHARACTER IMPACT
LC6 Infrastructure - South	MODERATE - This is a relatively flat and low lying area encompassing existing island infrastructure such as the LHI Airport, the Bureau of Meteorology (BOM) site and the Waste Management Facility (WMF). There are a few local residences and one accommodation facility located within this zone. - The area has high visitation from tourists arriving and departing the island via the airport. - The Waste Management Facility is also frequently visited by island locals and business operators dropping off their waste and recycling. The majority of visitors to the airport and WMF would arrive by car or van, accessing the site from Lagoon Road and Old Lagoon Road. - The Waste Management Facility is surrounded and screened by local endemic vegetation and exotic plantings. - Whilst the area houses several infrastructure services and is relatively developed compared to other parts of the island, it is nestled amongst volcanic hills and adjacent to pristine beaches along the lagoon, therefore it has a MODERATE level of sensitivity to change.	MODERATE - The proposed South Zone work will directly impact this character zone and is also contained within this character zone. Proposed development works are shown in Figure 76 and include: - Replacement of the existing Waste Management Facility with new buildings such as a Residential and Commercial Waste Receival Area, Materials Recovery Facility (MRF), Organics Processing Workshop, Waste Water Treatment Plant, Office Building and Storage Shed. Outdoor staging areas, storage areas and bunkers will also be provisioned on a paved hardstand area with some patches of turf. A small segment of existing road will also be widened near the entry gates of the WMF to enhance safety. Whilst there will be more buildings than currently, the site should appear more organised and tidy overall with less waste material strewn around the site. - A new dog kennel facility will be introduced adjacent to the existing Bureau of Meteorology site, housing biosecurity dogs and providing several kennels and outdoor training and exercise areas for the dogs - A new fuel bowser will also be introduced along Old Lagoon Road to provide fuel to local residents and businesses - The foreshore dune and its vegetation will be retained and selectively revegetated, preserving the local character along the foreshore, whilst helping to screen the facility from the beach and lagoon - The existing SNV on the eastern side of the WMF site will also be retained, maintaining the character around the site and helping to provide some screening from lookouts such as Transit Hill. - Screening vegetation will be planted around the Dog Kennel and Fuel Bowser facilities to screen and hide them from the surrounding areas, limiting their impact on the local character - New buildings will be designed with similar forms, materials and colours to the existing built form within the area, taking strong clues from the airport terminal building. - Although the general footprint of the WMF and approach roads remain the same, additional WMF buildings plus the introduction of the dog kennels and fuel bowser, results in a MODERATE magnitude.	MODERATE The combined sensitivity and magnitude of change occurring in this character zone result in a MODERATE impact rating.
LC7 Settlement - South	HIGH - This area includes the Lord Howe Island Golf Course, plus some residential houses that are situated higher above Lagoon road. The zone has exceptional views across the Lagoon to the north of the island. It also encompasses several iconic and popular picnic areas along the Lagoon such as Cobby's Corner and Lovers Bay. - The area has a highly scenic character with residences tucked away in small side streets and screened behind dense vegetation. - In addition to the characteristics listed above, the powerful presence of Mount Lidgbird and Mount Gower also contribute to the HIGH sensitivity of this LCZ.	LOW Whilst the proposed works in the North Zone and South Zone do not directly affect this area, the area is renowned for its exceptional and iconic views and vistas across the island and lagoon and up to the mountains Lidgbird and Gower. The views from iconic lookouts such as Cobby's Corner and Lovers Bay will be impacted to varying degrees by the proposed changes in the North Zone and South Zone. As such, a LOW magnitude rating has been nominated for the character zone given these impacts occur in limited locations.	MODERATE The combined sensitivity and magnitude of change occurring in this character zone result in a MODERATE impact rating.



Figure 76: South Zone Master Plan

CHARACTER ZONE	SENSITIVITY	MAGNITUDE	LANDSCAPE CHARACTER IMPACT
LC8 PPP - South	HIGH • This is a pristine and densely vegetated area of Permanent Park Preserve. It is dominated by the volcanic peaks of Mount Lidgbird and Mount Gower, covered with lush endemic vegetation. This zone offers breathtaking scenery and vistas. • It has high ecological value and is largely undisturbed with several popular walking trails to Intermediate Hill, Goat House Cave and Mount Gower (for experienced walkers), as well as a coastal walk to Little Island. • This area has a HIGH sensitivity to change.	LOW • Whilst the proposed works in the North Zone and South Zone do not directly affect this area, the area is renowned for its exceptional and iconic views and vistas across the island. The views from iconic lookouts such as Goat House Cave on Mount Lidgbird and Mount Gower will be impacted by the proposed changes in the North Zone and South Zone, although these are relatively distant views. As such, a LOW magnitude rating has been nominated for the character zone given these impacts occur in limited and partially screened locations.	MODERATE • The combined sensitivity and magnitude of change occurring in this character zone result in a MODERATE impact rating.



Figure 77: Views from Goat House Cave Track

Source: LordHowelsland.Info

7.2.4 LANDSCAPE CHARACTER ASSESSMENT SUMMARY

The landscape character impact assessment of the Lord Howe Island Critical Infrastructure Project is summarised in Table 3.

Given the island’s UNESCO World Heritage status and its exceptional natural and scenic character, the sensitivity of the landscape to change is considered to be high across most of the undeveloped areas of the island.

Out of the eight character zones, the range of landscape character impact ratings were determined as follows:

- » Two zones will have a HIGH-MODERATE impact on landscape character. This includes:
 - LC2 – Marine Infrastructure Zone where the North Zone works will occur.
 - LC4 – Northern part of the lagoon where the North Zone works will occur
- » Six zones will have a MODERATE impact to their landscape character. This includes LC6 which will be directly impacted by the South Zone works. The remaining five zones with a

MODERATE impact are not directly impacted by the proposed development, however they will be indirectly affected in terms of views and vistas being modified or due to their proximity to the proposed changes.

Table 3: Landscape Character Assessment Summary

LANDSCAPE CHARACTER ZONES		SENSITIVITY	MAGNITUDE	IMPACT
LC1	PPP - North	HIGH	LOW	MODERATE
LC2	Marine Infrastructure	MODERATE	HIGH	HIGH-MODERATE
LC3	Settlement - North	MODERATE	LOW	MODERATE
LC4	The Lagoon	HIGH	MODERATE	HIGH-MODERATE
LC5	PPP - Central	HIGH	LOW	MODERATE
LC6	Infrastructure - South	MODERATE	MODERATE	MODERATE
LC7	Settlement - South	HIGH	LOW	MODERATE
LC8	PPP - South	HIGH	LOW	MODERATE

7.3 VISUAL IMPACT ASSESSMENT (VIA)

7.3.1 VIA METHODOLOGY

The assessment of visual impact requires the selection of viewpoints, overlooking the North Zone and South Zone study areas. A collection of viewpoints have been selected from different locations, distances and directions within the visual catchments of each study area.

Visual Catchments/Viewshed Analysis

The extent from which the two development proposals would be visible from adjoining areas varies across the island. Views can be influenced by topography, vegetation, and built elements.

A detailed field and desktop assessment has been undertaken to determine the area from where each proposal would be visible, as shown in the North Zone Viewshed Map (Figure 79) and the South Zone Viewshed Map (Figure 86). These maps have been generated using a 1-second Digital Surface Model (DSM) of the island (Source: Elvis – Elevation, 2020). Each map shows a Theoretical Zone of Visibility (TZV), which is an area that theoretically has a line of sight to a specific viewed location, based on surface-level changes.

NOTE: The TZV is based on the age and accuracy of the information in the digital surface model. As such, it must ideally be validated on site. For example, Waimarie Apartments on Lagoon Road is within the TZV for the South Zone, yet Figure 78 shows that the main WMF building is hidden by vegetation cover.

Selection of viewpoints

From within the TZV, a series of viewpoints were carefully selected to offer a range of vantage points with varying distances and elevations from the proposed development sites, whilst also ensuring a good distribution across character zones. The majority of viewpoints were visited and documented by staff, with high definition photographs taken. GPS coordinates and elevation heights were recorded using an accurate Geographical Positioning System (GPS) to verify each of the selected viewpoints. The GPS is accurate to within 10m.

A total of 12 viewpoints were identified for the North Zone, with 6 nominated for the VIA based on actual site views. A total of 10 viewpoints were identified for the South Zone with 7 nominated for the VIA based on actual site views.

Visual Impact Assessment

The visual impact of the proposal from each viewpoint has been assessed using the sensitivity of the setting and the magnitude of change.

Sensitivity is the measure of visual quality and importance of the view and is dependent on the distance between the observer and the proposal, the activity category of observer and the visible elements of the proposal. Visual sensitivity includes the consideration of the perceived cultural and historical values of the visual environment and the elements within it. Generally, viewers with the highest sensitivity on the island include:

- » Users of public open space where their attention is focused on the visual landscape, for example, lookouts or other scenic natural areas
- » Residents who have existing attractive views that will be affected by the proposal
- » Island local's visiting recreational locations such as picnic areas, beaches or the public jetty and boat ramp

Magnitude of change on existing views refers to the nature and scale of the proposal, and also the extent and proximity of the view to it. Magnitude represents the contrast in scale, form and type of proposal to the location and context to which it is proposed.

Visual impact is the combination of the sensitivity and magnitude rating in accordance with the Visual Impact Assessment Grading Matrix shown in Figure 72.



Figure 78: View from Waimarie Apartments, Lagoon Road

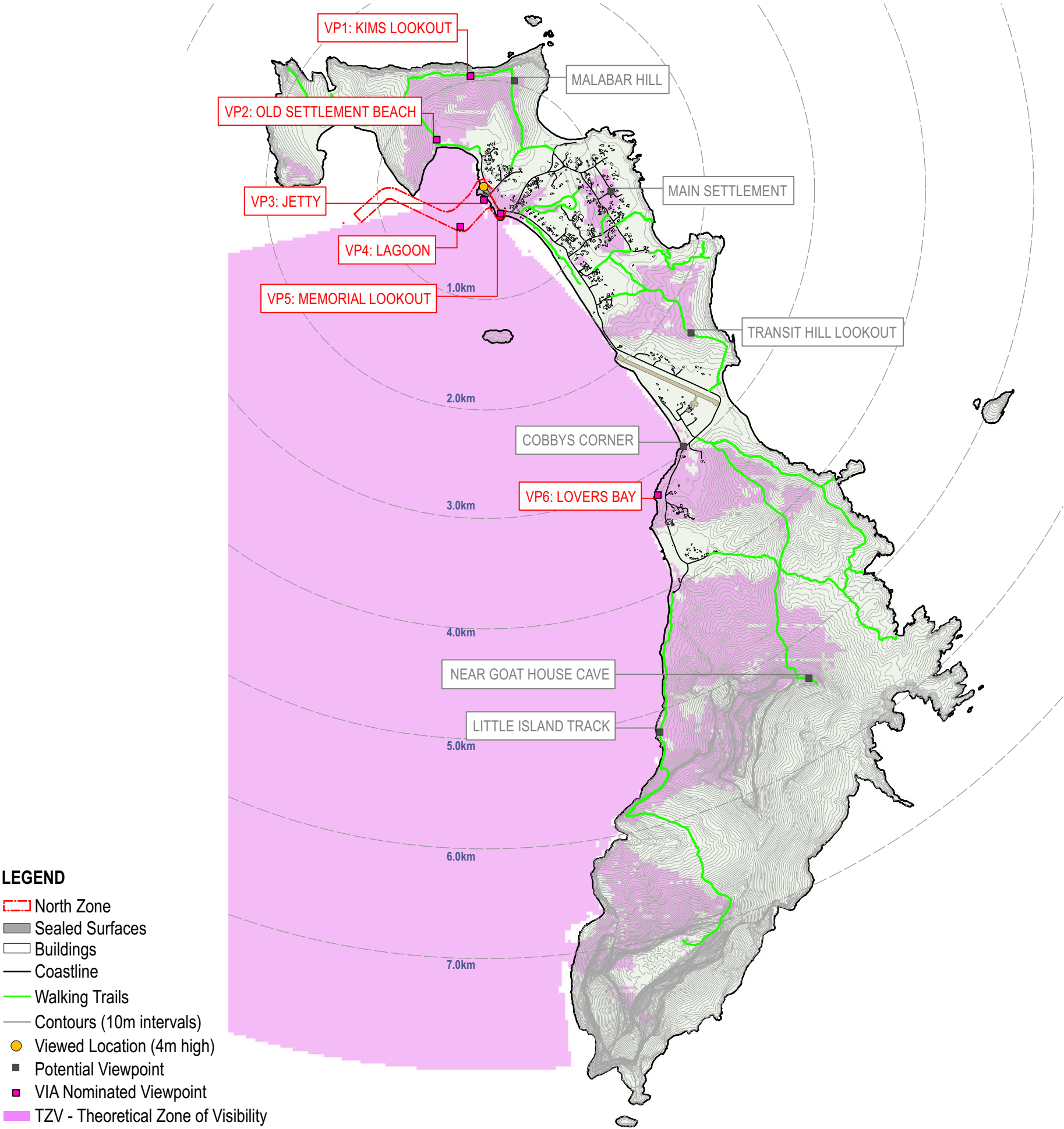
7.3.2 NORTH ZONE VISUAL CATCHMENT

The North Zone Visual Catchment has been prepared based on a 4m high building (the Viewed Location) located within the hardstand area in the proposed location of the new Unstuffing Shed. Figure 79 shows the TZV for this viewed location, which spans across the lagoon and up the western facing slopes of Transit Hill, Intermediate Hill, Mount Lidgbird and Mount Gower.

The following table provides a summary of potential viewpoints identified within the TZV for the North Zone, with 6 viewpoints short-listed for inclusion in the VIA based on actual on-site views from those locations.

Table 4: North Zone Identified and Nominated Viewpoints

VIEWPOINT	SITE VISIBLE?	NOMINATED FOR VIA
Kim’s Lookout	YES	YES (VP1)
Old Settlement Beach	YES	YES (VP2)
Jetty	YES	YES (VP3)
Lagoon	YES	YES (VP4)
Memorial Lookout	YES	YES (VP5)
Lovers Bay	YES	YES (VP6)
Malabar Hill	NO	NO
Main Settlement Area	NO	NO
Transit Hill Lookout	NO	NO
Cobby’s Corner	NO	NO
Little Island Track	NO	NO
Goat House Cave	YES (DISTANT)	NO



7.3.3 VIEWPOINT 1 - KIM'S LOOKOUT

VIEWPOINT	SENSITIVITY	MAGNITUDE OF VISUAL EFFECT	VISUAL IMPACT
VP1 Kim's Lookout Elevation: 192m AHD Distance: 1.1km	HIGH - Kim's lookout is located in LC1 (PPP North). This is a pristine and densely vegetated area of Permanent Park Preserve - The lookout sits at around 192m AHD and offers sweeping views across the entire lagoon and island, as well as provides view out to sea to the north. - This area has high ecological value and is largely undisturbed. - Potential Viewers: Kim's lookout can only be accessed on foot via a walking trail from Old Settlement Beach or from Malabar Hill. Viewers are likely to be tourists and locals visiting the lookout for recreation or exercise. - Due to the high scenic qualities and popularity of this lookout, it has a HIGH sensitivity to change.	MODERATE - The current view takes in the western side of the North Zone hardstand, plus existing buildings along the foreshore, as well as the public boat ramp and jetty. - The proposed development will introduce the new fixed piled vessel ramp which will be located on the southern side of the existing jetty. The new ramp would be partially visible from this angle. 4 new berthing dolphins would be clearly visible and would extend 102m out into the lagoon from the foreshore edge, or around 38m beyond the end of the existing jetty. - The view may also be affected by the new Unstuffing Shed and Biosecurity Shed that will be located along the edge of Lagoon Road, however, existing vegetation including a mature Norfolk Island Pine Tree (being retained), currently screens this location and will help to hide the new building. - The removal of the annex on the western side of the OV Shed will reduce the amount of built form along the foreshore, marginally improving the scenic view from this location - The public boat ramp will be upgraded and lengthened to approximately 36.5m. It will extend out into the lagoon around 12m beyond its current extent. - Other Norfolk Island Pines around the hardstand will also be retained (with the exception of one tree that needs to be removed) to provide ongoing screening of buildings - Some corses of trees will be planted around the north-western edge of the hardstand area that will provide some additional screening of the new ramp and existing jetty from this viewing angle. - The magnitude of visual effect will be MODERATE due to the extent of screening of the new buildings and ramp south of the jetty.	HIGH-MODERATE The combined sensitivity and magnitude of visual effect for this viewpoint result in a HIGH-MODERATE impact rating.



Figure 80: Viewpoint 1 - Kim's Lookout

7.3.4 VIEWPOINT 2 - OLD SETTLEMENT BEACH

VIEWPOINT	SENSITIVITY	MAGNITUDE OF VISUAL EFFECT	VISUAL IMPACT
VP2 Old Settlement Beach Elevation: 9m AHD Distance: 0.66km	HIGH - Old Settlement Beach is located in LC3 (Settlement-North). LC3 has a moderate sensitivity to change. - This is a pristine beach with weather-sculpted sandstone rocks dotted across the southern end of the beach. It is a popular spot for swimming and snorkelling with visiting turtles. Areas behind the beach have been cleared and were used for agricultural land by the early settlers on the island. The beach offers scenic views to the northern and southern volcanic hills on the island and is considered to have a high sensitivity to change. - Potential Viewers: Viewers are likely to be tourists and locals visiting the beach for recreational activities and to connect with northern walking trails. - As a result, sensitivity is considered to be HIGH.	MODERATE - The current view takes in the western side of the North Zone hardstand, including existing buildings along the foreshore. The existing jetty is also visible. - The proposed development will introduce the new fixed piled vessel ramp which will be located on the eastern side of the existing jetty. The new ramp would be hidden from this angle. 4 new berthing dolphins would be clearly visible and would extend 102m out into the lagoon from the foreshore edge, or around 38m beyond the end of the existing jetty. - The view may also be affected by the new Unstuffing Shed and Biosecurity Shed that will be located along the edge of Lagoon Road, however, existing vegetation include a mature Norfolk Island Pine Tree (being retained), currently screens this location and will help to partially hide the new building. - The removal of the annex on the western side of the OV Shed will reduce the amount of built form along the foreshore, marginally improving the scenic view from this location - The public boat ramp will be upgraded and lengthened to approximately 36.5m. It will extend out into the lagoon around 12m beyond its current extent. - Other Norfolk Island Pines around the hardstand will also be retained (with the exception of one tree that needs to be removed) to provide ongoing screening of buildings - Some corses of trees will be planted around the north-western edge of the hardstand area that will provide some additional screening of the new ramp and existing jetty from this viewing angle. - The magnitude of visual effect will be MODERATE due to the extent of screening of the new buildings and ramp south of the jetty.	HIGH-MODERATE The combined sensitivity and magnitude of visual effect for this viewpoint result in a HIGH-MODERATE impact rating.



Figure 81: Viewpoint 2 - Old Settlement Beach

7.3.5 VIEWPOINT 3 - EXISTING JETTY

VIEWPOINT	SENSITIVITY	MAGNITUDE OF VISUAL EFFECT	VISUAL IMPACT
VP3 Existing Jetty Elevation: 4m AHD Distance: 0.08km	MODERATE - The existing jetty is located in LC2 (Marine Infrastructure). This is a relatively flat and low lying area with several existing small-scale sheds and buildings, as well as the existing jetty, existing boat ramp and a large hardstand area supporting existing marine operations. The area has high visitation from tourists for boat tour departures and is also used regularly by locals for recreational and commercial boating. Grassed areas near the jetty are used for picnics and to buy fish and chips from Benny's Fish Truck. - Potential Viewers: Tourists, tour operators and locals would visit this area. In addition, all marine operations staff such as stevedores and forklift/truck operators would also frequent this area. - The viewpoint has a MODERATE sensitivity as the foreground is dominated by marine infrastructure including buildings, the jetty, roads and the rock armoured embankment.	HIGH - The view from the end of the existing jetty is within 100m of the hardstand area. This view takes in the entire foreshore area of the North Zone, including all existing buildings. - The view would be affected by the new fixed piled vessel ramp which will be located directly adjacent to the existing jetty on the eastern side. This would be clearly visible as one looks back towards the rock armoured embankment wall. - The view would also be affected by the new Unstuffing Shed and Biosecurity Shed that will be located along the edge of Lagoon Road, which will be partially screened by the existing buildings along the foreshore edge. - The new retaining wall and safety barriers around the Old Cargo Shed will be partially visible, as well as the Lagoon side porch. - Parts of the eastern side of the retaining wall along Lagoon Road will also be visible. - The removal of the annex on the western side of the OV Shed will reduce the amount of built form along the foreshore, marginally improving the view to the foreshore from this location - All above ground water tanks will be relocated underground to reduce visual clutter and improve the visual appearance of the area and accessibility around the buildings. - The two large Norfolk Island Pines near the Old Cargo Shed will be retained, helping to retain the character of the existing view. Some new copses of trees will be planted around the north-western edge of the hardstand area, which should also help to provide some additional screening of the new Unstuffing Shed. - The close proximity of these new facilities to the viewpoint will create a HIGH magnitude of visual effect.	HIGH-MODERATE The combined sensitivity and magnitude of visual effect for this viewpoint result in a HIGH-MODERATE impact rating.



Figure 82: Viewpoint 3 - Existing Jetty

7.3.6 VIEWPOINT 4 - THE LAGOON NEAR THE EXISTING JETTY

VIEWPOINT	SENSITIVITY	MAGNITUDE OF VISUAL EFFECT	VISUAL IMPACT
VP4 The Lagoon Elevation: 2m AHD Distance: 0.16km	HIGH • This viewpoint resides in LC4 (The Lagoon). This is a pristine, protected marine environment with high biodiversity value. • The Lagoon has high usage from tour operators, tourists and locals who use the lagoon for recreational activities and boating across the lagoon and out to sea. • Potential Viewers: Tourists, tour operators and locals out on the lagoon. In addition, the MV Island Trader staff and crew and the new marine vessel crew would also be viewers from this location. • Views from the lagoon to the foreshore areas of the island have a HIGH sensitivity to change.	MODERATE • This view takes in the entire foreshore area of the North Zone, including the existing jetty and buildings. • The view would be affected by the new fixed piled vessel ramp which will be located directly adjacent to the existing jetty on the eastern side. This would be clearly visible as one looks back towards the foreshore. Similarly, the 4 new berthing dolphins that extend out into the lagoon would also be highly visible from this location. • The view would also be affected by the new Unstuffing Shed that will be located along the edge of Lagoon Road, which will be partially screened by the existing buildings and foreshore vegetation. The use of darker materials will also help to make this building visually recessive. • The new retaining wall and safety barriers around the Old Cargo Shed will be partially visible, as well as the new Lagoon side porch. • The removal of the annex on the western side of the OV Shed will reduce the amount of built form along the foreshore, and may potentially expose part of the new unstuffing shed • All above ground water tanks will be relocated underground to reduce visual clutter and improve the visual appearance of the area and accessibility around the buildings. • The two large Norfolk Island Pines near the Old Cargo Shed will be retained, helping to retain the character of the existing view. Some new copses of trees will be planted around the north-western edge of the hardstand area, which should also help to provide some additional screening of the new Unstuffing Shed. • The magnitude of visual effect of these changes is considered to be MODERATE due to the existing buildings and vegetation partially screening the new facilities.	HIGH-MODERATE • The combined sensitivity and magnitude of visual effect for this viewpoint result in a HIGH-MODERATE impact rating.



Figure 83: Viewpoint 4 - The Lagoon

7.3.7 VIEWPOINT 5 - MEMORIAL LOOKOUT

VIEWPOINT	SENSITIVITY	MAGNITUDE OF VISUAL EFFECT	VISUAL IMPACT
VP5 MEMORIAL LOOKOUT Elevation: 6m AHD Distance: 0.25km	HIGH - Thompsons Memorial Park resides in LC3 (Settlement-North). The park is perched on the edge of the lagoon, with 180 degree views across the lagoon. - The site commemorates an early administrator of the Island, William Spurling Thompson (1868 - 1953). - There is a picnic area along with commemorative obelisk and direction finder. - Potential Viewers: This is a popular location for tourists and locals to have picnics and view the lagoon and to watch marine operations occurring. - Given the popularity of this lookout for recreation and views, the resultant sensitivity is considered to be HIGH	MODERATE - The North Zone site is very close this viewpoint and is only around 250m away. - The view from this location will be impacted by the new fixed piled vessel ramp that will be built on the south-eastern side of the existing jetty which is approximately 40m long (whilst the existing jetty is around 64m long). The new ramp will be visible in the foreground, with the existing jetty visible behind it (given that each structure has a different grading and length) 4 new berthing dolphin (in tripod pile formation) will also be located approximately 102m out into the lagoon from the foreshore edge, or around 38m past the end of the existing jetty. - The expanded hardstand area and new Unstuffing Shed are not visible from this location, and therefore they will not impact the view. - There is little else that can be done to screen or hide the fixed piled vessel ramp and berthing dolphins as they are required to support the new vessel and roll on/roll off operations (refer 7.4 Mitigation Strategies). - The close proximity and scale of the new ramp and dolphins contributes to a higher magnitude of visual effect, however, given the presence of the existing jetty, the magnitude is deemed to be MODERATE	HIGH-MODERATE The combined sensitivity and magnitude of visual effect for this viewpoint result in a HIGH-MODERATE impact rating.



Figure 84: Viewpoint 3 - Memorial Lookout

7.3.8 VIEWPOINT 6 - LOVERS BAY

VIEWPOINT	SENSITIVITY	MAGNITUDE OF VISUAL EFFECT	VISUAL IMPACT
VP6 Lovers Bay Elevation: 6m AHD Distance: 3.2km	HIGH - Lovers Bay resides in the LC7 (Settlement South) character zone. This zone includes the Lord Howe Island Golf Course as well as some residences that are situated higher up Lagoon Road that have exceptional views across the lagoon to the North of the island. - Lovers Bay is a popular picnic and viewing spot and has two Norfolk Island Pine trees with local heritage significance. - Potential Viewers: Locals and tourists would be the main visitors to this location. - Given the popularity of this location for recreation and views, the resultant sensitivity is considered to be HIGH	LOW - This viewpoint is a little over 3km away from the North Zone and has fairly distant views of the existing jetty area. At the time the photos below were taken, the MV Island Trader was docked and the existing jetty was not in view. - This view would be affected by the new fixed piled vessel ramp which will be located directly adjacent to the existing jetty on the eastern side. This would be visible (though from a distance) as one looks back towards the north. It is unlikely that the new jetty would create a noticeable change within this view, as it would almost be a like-for-like replacement of the existing jetty view. - The 4 new berthing dolphins that extend out into the lagoon would alter this view, however given the distance and the narrow scale of the dolphins, they are only likely to have a minor impact on the view, and would be partially hidden from view when the MV Island Trader or new marine vessel is docked. - The hardstand area and proposed new buildings are not visible from this location as they are hidden behind the land mass that forms Thompsons Memorial Park. - The magnitude of visual effect is considered to be LOW, given the views are distant and only comprise the fixed pile ramp and berthing dolphins.	MODERATE The combined sensitivity and magnitude of visual effect for this viewpoint result in a MODERATE impact rating.



Figure 85: Viewpoint 6 – Lovers Bay

7.3.9 SOUTH ZONE VISUAL CATCHMENT

The South Zone Visual Catchment shown in Figure 86 has been prepared based on a new 8m high Waste Management building (the Viewed Location) located within the existing WMF footprint. The mauve-shaded area shows the Theoretical Zone of Visibility (TZV), that is, areas that theoretically have a line of site to the new building based on surface-level changes.

The following table provides a summary of potential viewpoints identified within the TZV for the South Zone, with 7 viewpoints short-listed for inclusion in the VIA based on actual on-site views from those locations.

Table 5: South Zone Identified and Nominated Viewpoints

VIEWPOINT	SITE VISIBLE?	NOMINATED FOR VIA
Mount Eliza	YES	YES (VP7)
Lagoon	YES	YES (VP8)
Transit Hill	YES	YES (VP9)
Cobby's Corner	YES	YES (VP10)
Lovers Bay	YES	YES (VP11)
Mulley Drive	YES	YES (VP12)
Near Goat House Cave	YES	YES (VP13)
North Bay	YES	NO
Intermediate Hill	NO	NO
LHI Golf Club House	NO	NO

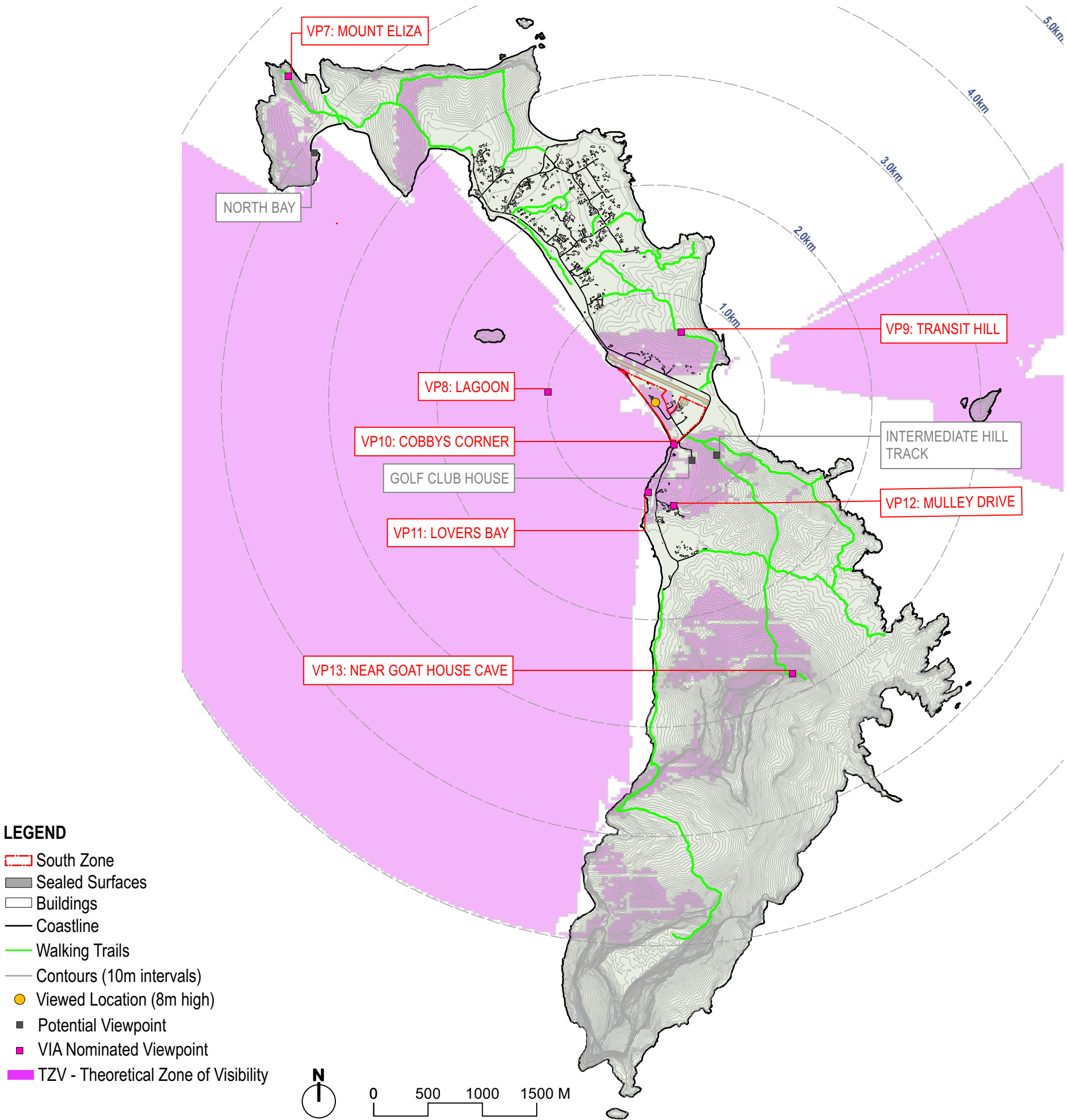


Figure 86: South Zone Visual Catchment

7.3.10 VIEWPOINT 7 - MOUNT ELIZA

VIEWPOINT	SENSITIVITY	MAGNITUDE OF VISUAL EFFECT	VISUAL IMPACT
VP7 MOUNT ELIZA Elevation: 147m AHD Distance: 4.5km	HIGH - Mount Eliza resides in LC1 (PPP North). This is a pristine and densely vegetated area of Permanent Park Preserve - The elevation at the peak is around 147m AHD and offers extensive 360 degree views around the island’s volcanic hills, the lagoon and out to sea. - This area has high ecological value and is largely undisturbed. - Potential Viewers: Mount Eliza can only be accessed on foot via walking trails from Old Settlement Beach or North Bay. Viewers are likely to be tourists and locals visiting the summit for recreation or exercise. - Given the naturalistic setting and scenic beauty from this location, the sensitivity is considered to be HIGH.	LOW - The South Zone site is approximately 4.5km from this viewing location, therefore is relatively distant (as shown in Figure 87). The existing WMF buildings are difficult to identify and the vegetation across the foreshore dune in front of the facility provides good screening. - The view from this location may be impacted by the new WMF buildings and roofs and paved hardstand area (particularly if they are light in colour). - There may also be some distant views of the new dog kennel facility. The fuel bowser is relatively small in scale and is unlikely to be visible from this distance. - Retaining and enhancing the screening planting along the foreshore dune as well as the northern boundary of the WMF facility should aid in providing screening from the lagoon and from viewpoints in the north of the island. - Similarly, screening planting around the dog kennel facility and fuel bowser will also aid in ensuring the predominantly natural and undeveloped vista is retained in this location. - The magnitude of visual effect is considered to be LOW, given the views are partially screened and quite distant.	MODERATE The combined sensitivity and magnitude of visual effect for this viewpoint result in a MODERATE impact rating.



Figure 87: Viewpoint 7 – Mount Eliza

7.3.11 VIEWPOINT 8 - THE LAGOON NEAR THE WMF

VIEWPOINT	SENSITIVITY	MAGNITUDE OF VISUAL EFFECT	VISUAL IMPACT
VP8 THE LAGOON Elevation: 2m AHD Distance: 1.1km	HIGH - This viewpoint resides in LC4 (The Lagoon). This is a pristine, protected marine environment with high biodiversity value. - The Lagoon has high usage from tour operators, tourists and locals who use the lagoon for recreational activities and boating across the lagoon and out to sea. - Views from the lagoon to the foreshore areas of the island have a high sensitivity to change. - The popularity and usage of the lagoon, along with its unique and protected marine environment, result in a HIGH sensitivity rating.	LOW - This viewpoint is approximately 1km from the WMF site. The light coloured roof of the existing WMF storage sheds can be seen from the water, however they are relatively hidden from view behind the foreshore dune vegetation. - A new Storage Shed will be built where the existing shed resides, and it is likely the new roof will be visible. However this will be very similar to the existing view. - The new Organics Processing Workshop will be partially visible from this location. The foreshore dune will hide the lower parts of the building and newly planted dune vegetation should provide additional screening to the rest of the building over time, though the roof may still be visible. - It is unlikely that the hardstand area will be visible as it will sit below the ridge of foreshore dune. It is also unlikely the fuel bowser or dog kennels will be visible from this location given they are set back further away from the water and screened by existing foreshore vegetation. - The use of darker roof colours that blend into the surrounding vegetation that are less reflective will aid in providing camouflage of new buildings. - Given the limited impact to this view, the magnitude of visual effect is deemed to be LOW.	MODERATE The combined sensitivity and magnitude of visual effect for this viewpoint will result in a MODERATE impact rating.



Figure 88: Viewpoint 8 - The Lagoon

7.3.12 VIEWPOINT 9 - TRANSIT HILL

VIEWPOINT	SENSITIVITY	MAGNITUDE OF VISUAL EFFECT	VISUAL IMPACT
VP9 TRANSIT HILL Elevation: 121m AHD Distance: 0.74km	HIGH - Transit Hill resides in LC5 (PPP Central). This is a pristine and densely vegetated area of Permanent Park Preserve - The elevation at the peak is around 121m AHD and an elevated platform offers extensive views around the neighbouring volcanic hills and out to the lagoon and ocean. - This area has high ecological value and is largely undisturbed. - Potential Viewers: Transit Hill can only be accessed on foot via walking trails from the island's Administration Centre or Blinky's Beach. Viewers are likely to be tourists and locals visiting the summit for recreation or exercise. - The naturalistic setting and exceptional view result in a HIGH sensitivity rating.	MODERATE - This viewpoint is within a 1km radius from the WMF site. The light coloured roof of the existing WMF building can be seen along with the existing storage sheds and some of the waste materials that are stored along the foreshore dune area. - The view from this location will be impacted by several additional new WMF buildings and roofs, particularly the Materials Recovery Facility, Organics Processing Workshop and Storage Shed. It is unlikely that the paved hard stand area would be visible from this vantage point due to the dense vegetation behind the site. - It is also likely that the new fuel bowser will be clearly visible from this location, which will be a new (albeit small) built form in this area of the view. Dense planting around the fuel bowser will help to provide some screening from this location. - The new dog kennel location is likely to be hidden by the trees in the foreground that surround the Transit Hill elevated lookout platform. - The retention of all vegetation on the eastern side of the site will continue to provide some screening of buildings from this viewpoint. - The use of darker roof colours that blend into the surrounding vegetation that are less reflective will aid in providing camouflage of new buildings. - Given the partially screened and limited views to the WMF and fuel bowser, the magnitude of visual effect is deemed to be MODERATE	HIGH-MODERATE The combined sensitivity and magnitude of visual effect for this viewpoint result in a HIGH-MODERATE impact rating.



Figure 89: Viewpoint 9 - Transit Hill

7.3.13 VIEWPOINT 10 - COBBY'S CORNER

VIEWPOINT	SENSITIVITY	MAGNITUDE OF VISUAL EFFECT	VISUAL IMPACT
VP10 COBBY'S CORNER Elevation: 2m AHD Distance: 0.42km	HIGH - Cobby's Corner resides in the LC7 (Settlement South) character zone. This zone includes the Lord Howe Island Golf Course as well as some residences that are situated higher up off Lagoon road, that have exceptional views across the Lagoon to the North of the island. - Potential Viewers: Cobby's Corner is a popular picnic spot for locals and tourists, who would be the main viewers at this location. - The popularity of this spot for picnics and its exceptional views across the lagoon, result in a HIGH sensitivity rating.	MODERATE - This viewpoint sits within a 1km radius from the WMF site and offers at grade views of the site. - The existing WMF building can be seen on the southern side of the site. This would be replaced with the new Waste Receival Area. Other new WMF buildings and roofs, such as the Organics Processing Workshop and Storage Shed may also be visible from this location, though the Organics Workshop will be fairly well screened behind the foreshore dune vegetation which will be retained. - On the northern side of the site, some of the waste materials can be seen which are located along the foreshore area. - It is unlikely that the new fuel bowser or dog kennels would be visible from this location as they are set back from the foreshore edge and located behind dense vegetation. - The use of darker roof colours that blend into the surrounding vegetation that are less reflective will also aid in providing camouflage of new roofs. - Existing foreshore dune vegetation will be retained and selectively revegetated. The planting of tall screening trees and shrubs (particularly on the southern and northern ends of the foreshore dune) will aid in screening new buildings like the Waste Receival Area, MRF and Storage Shed from this location. - The magnitude of visual effect is likely to be MODERATE initially, however will reduce to low over time as the newly planted vegetation matures.	HIGH-MODERATE The combined sensitivity and magnitude of visual effect for this viewpoint result in a HIGH-MODERATE impact rating.



Figure 90: Viewpoint 10 – Cobby's Corner

7.3.14 VIEWPOINT 11 - LOVERS BAY

VIEWPOINT	SENSITIVITY	MAGNITUDE OF VISUAL EFFECT	VISUAL IMPACT
VP11 Lovers Bay Elevation: 6m AHD Distance: 0.84km	HIGH - Lovers Bay resides in the LC7 (Settlement South) character zone. This zone includes the Lord Howe Island Golf Course as well as some residences that are situated higher up off Lagoon road that have exceptional views across the Lagoon to the North of the island. - Lovers Bay is a popular picnic/rest stop and has two Norfolk Island Pine trees with local heritage significance. - Potential Viewers: Locals and tourists would be the main visitors to this location. - The popularity of this spot for picnics and its exceptional views across the lagoon, result in a HIGH sensitivity rating.	MODERATE - This viewpoint sits within a 1km radius from the WMF site and offers direct views of the site across the lagoon - The existing WMF building can be seen on the southern side of the site. This would be replaced with the new Waste Receival Area. Other new WMF buildings and roofs, such as the Organics Processing Workshop and Storage Shed are likely to be visible from this location. - On the northern side of the site, some of the waste materials can be seen which are located along the foreshore area. - It is unlikely that the new fuel bowser or dog kennels would be visible from this location as they are set back from the foreshore edge and located behind dense vegetation. - The use of darker roof colours that blend into the surrounding vegetation that are less reflective will also aid in providing camouflage of new roofs. - Existing foreshore dune vegetation will be retained and selectively revegetated. The planting of tall screening trees and shrubs (particularly on the southern and northern ends of the foreshore dune) will aid in screening new buildings like the Waste Receival Area, MRF and Storage Shed from this location. - The magnitude of visual effect is likely to be MODERATE initially, however will reduce to low over time as the newly planted vegetation matures.	HIGH-MODERATE The combined sensitivity and magnitude of visual effect for this viewpoint result in a HIGH-MODERATE impact rating.



Figure 91: Viewpoint 11 - Lovers Bay

7.3.15 VIEWPOINT 12 - MULLEY DRIVE

VIEWPOINT	SENSITIVITY	MAGNITUDE OF VISUAL EFFECT	VISUAL IMPACT
VP12 MULLEY DRIVE Elevation: 39m AHD Distance: 0.96km	HIGH - Mulley Drive resides in the LC7 (Settlement South) character zone. This zone includes the Lord Howe Island Golf Course as well as some residences that are situated higher up above Lagoon road that have exceptional views across the Lagoon to the North of the island. - Most residences along Mulley Drive are likely to have views to the WMF site, similar to that shown in Figure 92 - Potential Viewers: Local residents living on Mulley Drive are likely to be the main viewers in this location. - This viewpoint is deemed to have a HIGH sensitivity rating given that local residents would highly value their existing views and vistas across the island.	MODERATE - This viewpoint sits within a 1km radius from the WMF site and offers elevated views of the site. - From this particular vantage point, only the northern part of the WMF is visible, including storage sheds and waste materials along the foreshore dune. - Proposed changes to this view include the new Organics Processing Workshop (centrally located) and new Storage Shed (on the northern edge of the site). - The new fuel bowser and dog kennels will not be visible from this location due to the vegetation screening in the foreground of the image. - The use of darker roof colours that blend into the surrounding vegetation that are less reflective will also aid in providing camouflage of new roofs. - Existing foreshore dune vegetation will be retained and selectively revegetated. The planting of tall screening trees and shrubs (particularly on the southern and northern ends of the foreshore dune) will aid in screening new buildings like the Organics Processing Workshop and Storage Shed from this location. - The magnitude of visual effect is likely to be MODERATE initially, however will reduce to LOW over time as the newly planted vegetation matures.	HIGH-MODERATE The combined sensitivity and magnitude of visual effect for this viewpoint result in a HIGH-MODERATE impact rating.



Figure 92: Viewpoint 12 – Mulley Drive

7.3.16 VIEWPOINT 13 - NEAR GOAT HOUSE CAVE

VIEWPOINT	SENSITIVITY	MAGNITUDE OF VISUAL EFFECT	VISUAL IMPACT
VP13 NEAR GOAT HOUSE CAVE Elevation: 432m AHD Distance: 2.8km	HIGH - Goat House Cave is located in LC8 (PPP South). This is a pristine and densely vegetated area of Permanent Park Preserve - The elevation is around 432m AHD and panoramic views across the central and northern parts of the island, including the surrounding marine environments and islets. - This area has high ecological value and is largely undisturbed. The only way to access this viewpoint is from the Goat House Track, which connects with the Intermediate Hill Track or commences from the end of Smoking Tree Ridge Road. Given the remote and pristine location, it has a high sensitivity to change. - Potential Viewers: Viewers are likely to be tourists and locals visiting the Goat House Cave for recreation or exercise. - Given the remote location and undisturbed naturalistic setting, this viewpoint has a HIGH sensitivity to change.	LOW - This viewpoint sits within a 3km radius from the WMF site and offers elevated (though somewhat distant) views of the entire South Zone area. - All of the proposed WMF buildings and hardstand would be visible from this location, however the WMF site may appear more ordered than the current view where waste materials are stored along the back of the foreshore dune area. - The new fuel bowser will be located behind a dense stand of native vegetation which is likely to offer good screening of the bowzers and new roof. - The new dog kennel facility will be clearly visible from this location, however newly planted vegetation around the perimeter will provide some screening. - Existing foreshore dune vegetation will be retained and selectively revegetated. The planting of tall screening trees and shrubs will provide some screening of WMF buildings. Similarly, dense shrub and tree planting around the dog kennels will aid in screening this new facility to some extent. - The use of darker roof colours that blend into the surrounding vegetation that are less reflective will also aid in providing camouflage of new roofs from this location. - The magnitude of visual effect is considered to be LOW given the distant and partially screened views from this location.	MODERATE The combined sensitivity and magnitude of visual effect for this viewpoint result in a MODERATE impact rating.



Figure 93: Viewpoint 13 – Near Goat House Cave

7.3.17 VISUAL IMPACT ASSESSMENT SUMMARY

The visual impact assessment of the Lord Howe Island Critical Infrastructure Project is summarised in Table 6. The visual impact assessment has considered the design elements within the Concept and Master Plan designs (dated 30th May 2025) along with proposed mitigation measures such as vegetative screening and camouflage through visually recessive materials and darker colours.

Given the island’s UNESCO World Heritage status and its exceptional scenic character, views and vistas from almost any location are generally spectacular. As such, all of the viewpoints (with the exception of VP3) were considered to have HIGH level of sensitivity given they are also situated in scenic locations where views are a key attraction of the location.

Out of the thirteen viewpoints, the range of visual impact ratings were determined as follows:

- » Nine viewpoints will have a HIGH-MODERATE visual impact
- » Four viewpoints will have a MODERATE visual impact

The resulting visual impact ratings indicate that further mitigation measures may be required in subsequent stages of design to reduce the visual effects of the proposed changes.

Table 6: Landscape Character Assessment Summary

VIEW POINTS		PROPOSED SITE	SENSITIVITY	MAGNITUDE	VISUAL IMPACT
VP1	Kim’s Lookout	North Zone	HIGH	MODERATE	HIGH-MODERATE
VP2	Old Settlement Beach	North Zone	HIGH	MODERATE	HIGH-MODERATE
VP3	Jetty	North Zone	MODERATE	HIGH	HIGH-MODERATE
VP4	The Lagoon	North Zone	HIGH	MODERATE	HIGH-MODERATE
VP5	Memorial Lookout	North Zone	HIGH	MODERATE	HIGH-MODERATE
VP6	Lovers Bay	North Zone	HIGH	LOW	MODERATE
VP7	Mount Eliza	South Zone	HIGH	LOW	MODERATE
VP8	The Lagoon	South Zone	HIGH	LOW	MODERATE
VP9	Transit Hill	South Zone	HIGH	MODERATE	HIGH-MODERATE
VP10	Cobby’s Corner	South Zone	HIGH	MODERATE	HIGH-MODERATE
VP11	Lovers Bay	South Zone	HIGH	MODERATE	HIGH-MODERATE
VP12	Mulley Drive	South Zone	HIGH	MODERATE	HIGH-MODERATE
VP13	Near Goat House Cave	South Zone	HIGH	LOW	MODERATE

7.4 MITIGATION STRATEGIES

A number of urban design and landscape strategies have been incorporated into the Master Plan and Concept Design for the North Zone and South Zone, to minimise impacts to the island’s character and visual beauty. These are summarised below.

Built Form - Fixed Pile Ramp

As outlined in Section 6.6.1 on page 75, the fixed piled vessel must meet key design and functional requirements which dictate its position, form, extent and materiality in relationship to the existing jetty infrastructure and its surrounding context. The new ramp must be safe, efficient, operable and compliant to current standards that supports the vital marine freight service from the mainland to Lord Howe Island. The ramp concept design has sought to minimise its visual impact wherever possible, whilst also meeting the numerous design and functional requirements to effectively and safely support marine operations for the island.

Built Form - Public Boat Ramp

As outlined in 6.6.2 on page 75, the upgraded boat ramp must meet numerous design and functional requirements to support recreational boating on the island for both small and large vessels, whilst complying with current standards for boat launching ramp facilities. Further design refinement of the boat ramp will be required during detailed design to ensure that the ramp dimensions and alignment support the expected boating outcomes and that visual impacts are minimised.

Built Form - Buildings

- » New buildings will be built in a similar style and materiality to the buildings within the local vicinity, to ensure they work in with the existing character of each site location.
- » The new North Zone buildings will be clad in fibre cement and colours will be light in tone with a sandy to off-white range as reflected in that part of the island.
- » The new Waste Management Facility will use visually recessive materials and darker coloured roofs, walls and structure to aid in camouflaging buildings from various viewpoints and adjoining areas. The building forms are simple and industrial to reflect their function, with roof profiles to reflect the nearby Airport Terminal building.
- » The new Dog Kennel building will be clad in fibre cement and

colours will be light in tone to reflect the colouring of the adjacent BOM building. The roof profile will be similar to the nearby Airport Terminal building.

Built Form - Pavements, Retaining Walls and Barriers

- » The majority of hardstand areas will utilise unit paving which is more visually appealing compared with asphalt. This will also support easier ongoing maintenance for the island.
- » Within the North Zone, retaining walls types will include a post and panel wall and a precast concrete panel wall. Wall finishes and colours will complement neighbouring buildings and the surrounding landscape. They will be a light to sandy colour and potentially have an exposed aggregate finish to blend more naturally into the foreshore landscape.
- » Barriers will include timber bollards and steel crash barriers. Whilst barriers must be robust and functionally capable of withstanding heavy forces, effort is also being made to incorporate solutions that are more visually streamlined with a lower visual impact.
- » New fencing at the WMF will be a chain link fence (as per the existing fence type). This has been selected for its simplicity and light-weight permeable mesh.

Vegetation - Existing and Proposed

- » All reasonable measures have been taken to minimise the loss of existing vegetation at both sites, whilst working within existing cleared areas. This was particularly important given the majority of surrounding vegetation at both sites is also considered to be local endemic vegetation with high retention value.
- » Effort has also been made to minimise the clearing of existing trees, in particular the notable Norfolk Island Pine trees that surround the hardstand in the North Zone. These trees contribute significantly to the existing character of that location and two have local heritage significance. They also provide substantial shade and cooling below their canopies.
- » Within the North Zone, screening trees and vines will be used to soften and hide retaining walls. Some new copses of trees will also be planted at selective locations around the hardstand where space allows. These should aid in providing additional screening to new buildings.

- » Within the South Zone, the vegetated foreshore dune provides good screening of the WMF from locations such as the Lagoon and from the Settlement-South character zone. Efforts will be made to minimise the clearing of vegetation along the foreshore dune. In addition, revegetation of specific areas will also be carried out to screen newly built elements.
- » Only provenance plant material (plants grown from locally collected seeds) will be used and all plants will be grown on island. This will ensure that all new plants support the character of the island and its ongoing biosecurity and biodiversity needs.
- » Newly planted trees will be provisioned in 45 litre and 25 litre pot sizes, allowing for reduced growing times to reach their mature heights.

Detailed Design Mitigation Strategies

The following mitigation measures are to be adopted during the Detailed Design stage:

- » Consider whether areas for stockpiling soil, mulch or compost are required and consider options to minimise the visual impacts of these stockpiles
- » Assess opportunities for additional plantings to ensure optimal screening around site facilities
- » Providing further design refinement to built-forms such as buildings and the fixed pile ramp where possible
- » At locations where greater visual impacts have been identified, the specification and planting of more mature sized shrubs and trees could be adopted to help reduce the visual impacts.

Construction Mitigation Strategies

The following mitigation measures are to be adopted during the Construction stage:

- » Detail design and documentation drawings should define the extent of all construction activity, including temporary works to protect areas outside of the boundary during construction
- » Construction facilities will be contained within the construction works zone boundary and occupy the minimum area practicable for their intended use
- » Provide suitable barriers to screen views from adjacent areas during construction
- » Once construction is complete, or progressively throughout the works where possible, return these sites to at least their pre-construction state, and where feasible, improved
- » Keep pollution and dust emissions to a minimum and monitor throughout the construction period
- » Existing trees and vegetation to be retained within construction areas would be identified, protected and maintained
- » Heritage items should be protected as required to avoid damage during construction activities.



8. MATERIALS

8.1 LONG TERM ISLAND SUSTAINABILITY

The Waste Management Facility (WMF) should improve on operational efficiency and minimise environmental impacts on the surrounding landscape and residents. The aim is to harness new technology through decreasing the physical labour and time required to process various material streams and streamlining operations.

The design of the WMF must be tailored to the number of workers available on the island, ensuring it is appropriately scaled and functional. Equipment introduced into the facility should be easy to operate and maintain, avoiding future redundancy or obsolescence.

Future-proofing is a significant consideration, with the facility designed to accommodate potential impacts like sea-level rise and king tides, when setting the finished floor level (RL). The final design offers the possibility of incorporating solar energy and water-sensitive urban design that would improve the facility’s sustainability and long-term resilience.

The facility should be accessible by foot, bike, and vehicle to support efficient waste delivery. Additionally, it must be designed with safety in mind to ensure a secure working environment.



LHI ACCOMMODATION EXAMPLE - LOW RISE, SIMPLE CONSTRUCTION



LHI AERIAL VIEW, HOUSES BETWEEN THE NATURAL VEGETATION



MAIN STREET SHOPS AND CAFES



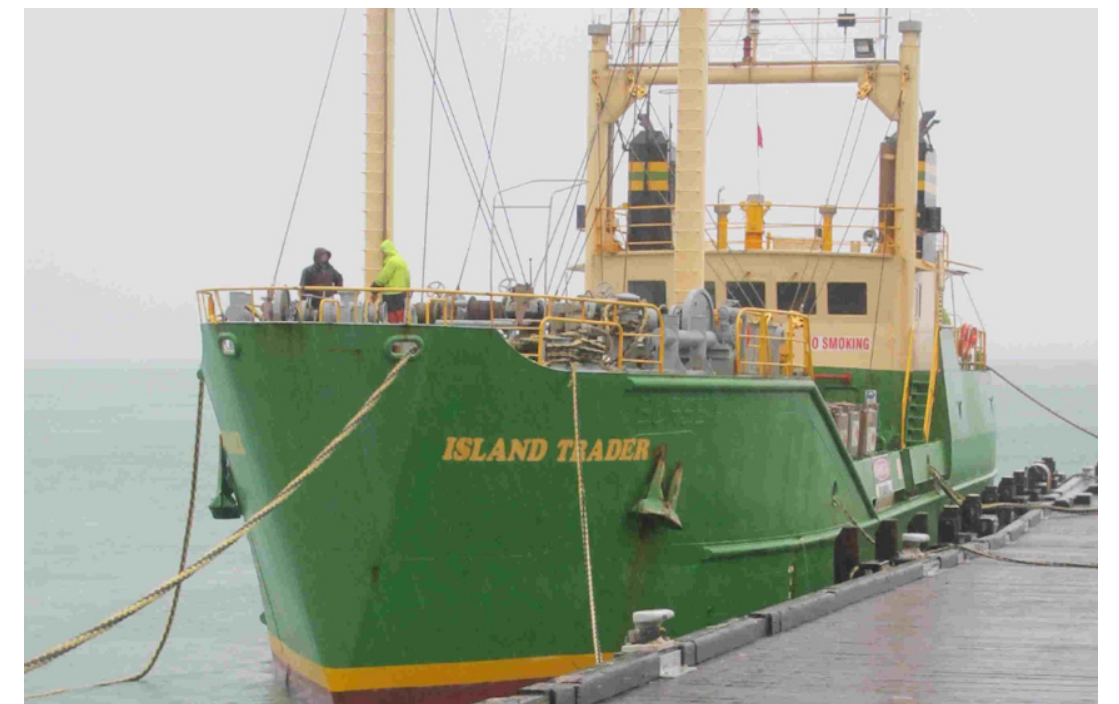
HERITAGE LISTED HOUSE ON THE ISLAND

8.2 CHALLENGES BUILDING ON THE ISLAND

The proposed new infrastructure to the island requires detailed planning, design, and collaboration to develop cost-effective solutions tailored to the island's unique and challenging environment. Novel construction techniques are necessary to address these challenges. The facility layouts, design and material selection will need to adapt accordingly, with many elements subject to regulatory input.

The construction process must be simple and repetitive, facilitating off-site fabrication and quick on-site installation. Quality assurance and quality control (QA/QC) measures should be carried out on the mainland where possible to ensure consistency. The design should prioritise ease of use, availability of materials, and simple maintenance procedures. Concrete batching is unavailable on the island therefore if appropriate precast concrete will need to be considered.

The proposed new infrastructure must blend seamlessly with the island's natural surroundings. It should be visually simple and recessive, with particular consideration of the view from the air. Sustainable design features, such as solar power and natural ventilation, should be incorporated where feasible. The planning should support dual-purpose activities and use of equipment and machinery if possible. The new structures must accommodate for the storage and protection of equipment from the harsh island environment, such as the salt air and strong winds, to ensure longevity and functionality.



8.3 DESIGN AND MATERIAL CONSIDERATIONS

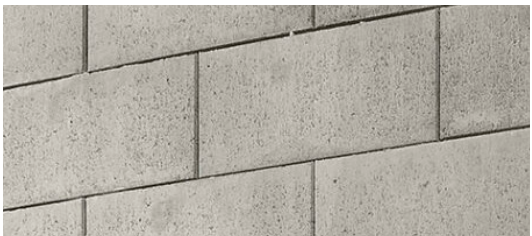
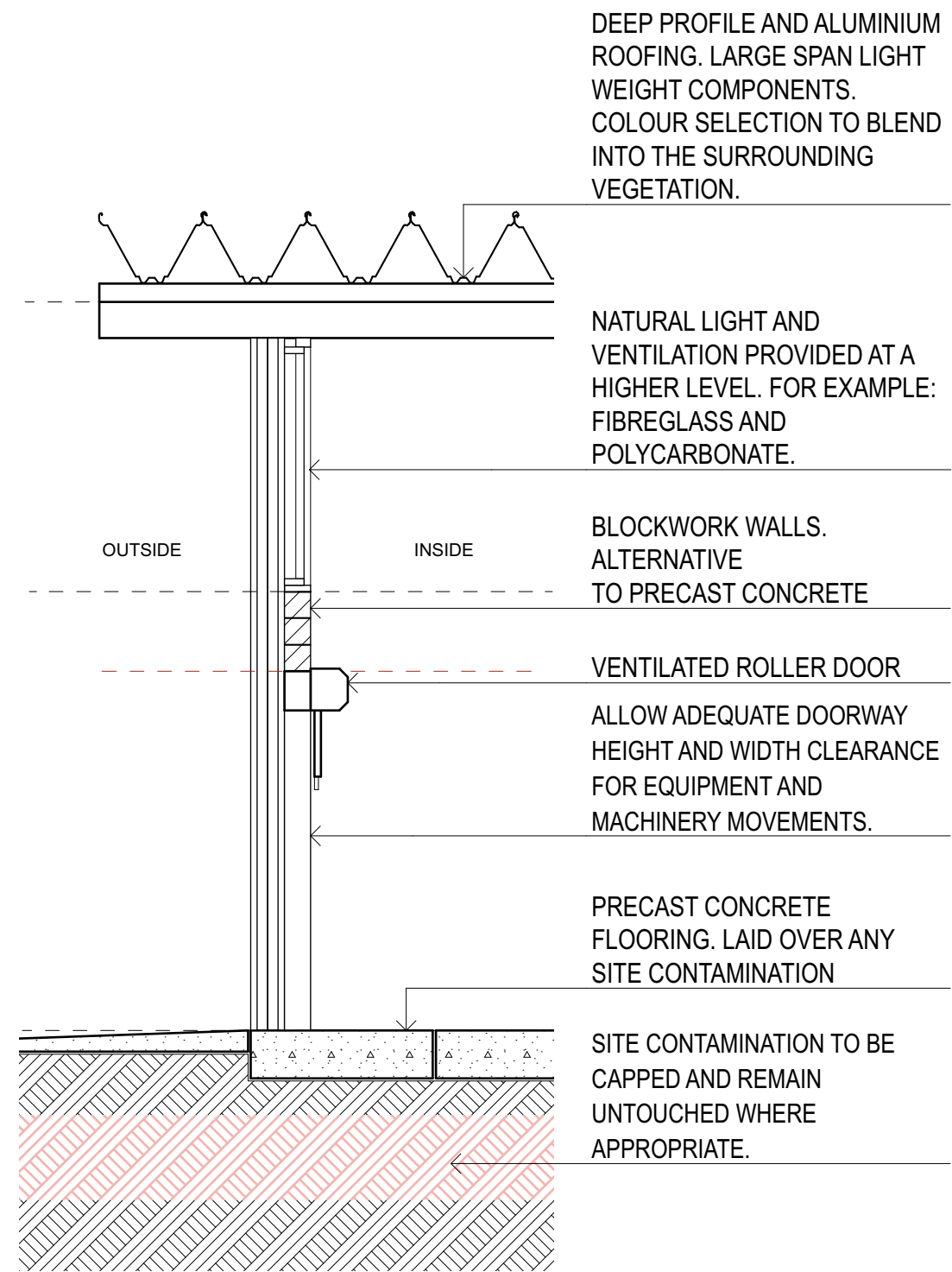
The Waste Management Facility (WMF) material selection should only use durable, long-lasting materials that are cost-effective to maintain, repair, and replace. Materials must blend seamlessly with the surrounding environment, through the application of large-span, lightweight components such as Aramax roofing and flatpack options like precast concrete for easy and cost-effective transport. Recycled materials should be incorporated where appropriate to support sustainability. The design needs to take noise and odour management into account to ensure minimal environmental disruption.

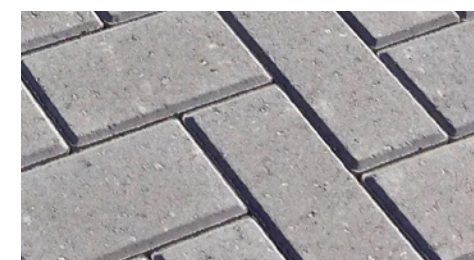
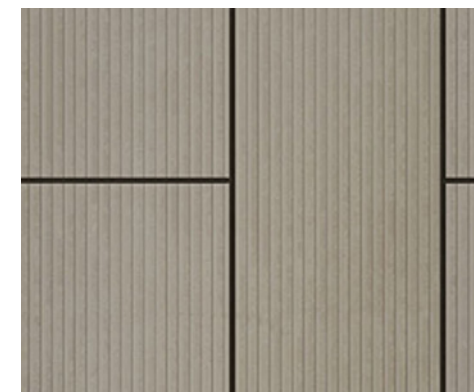
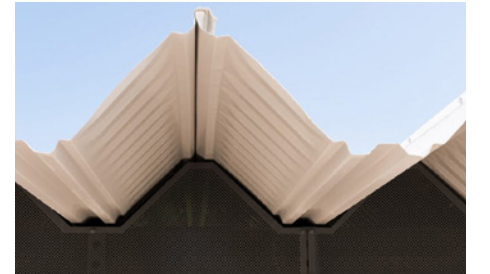
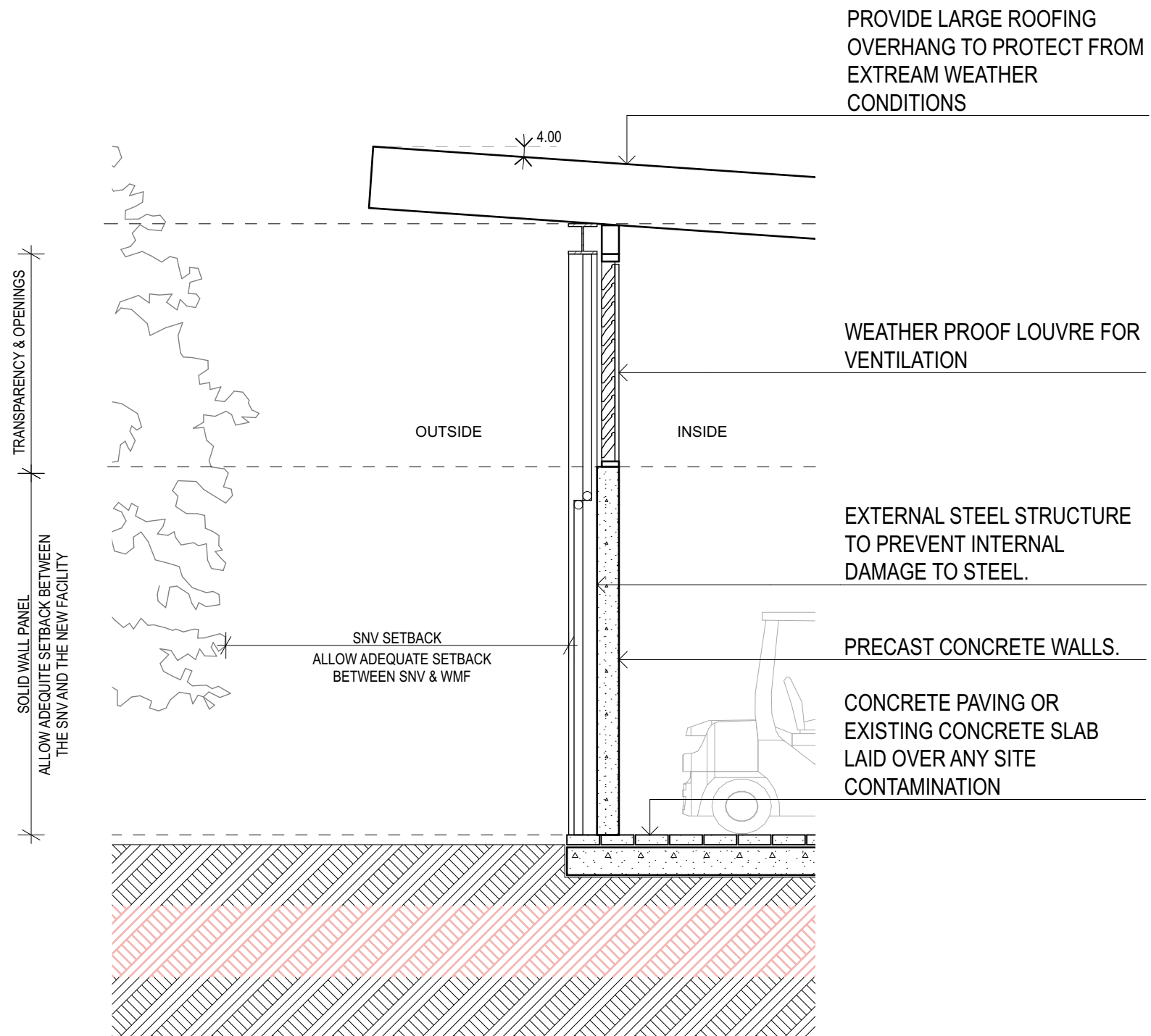
The building’s design will leverage natural elements, including views of the landscape, and utilise sustainable materials for energy efficiency and durability. Maximising natural light and ventilation should be a priority, with features like louvres and screening used to promote airflow and reduce dependence on mechanical systems.

Concrete paving, such as tessellated pavers can be used to assist in simplifying construction and ongoing maintenance. Steel structures and cyclone mesh will contain waste securely.

Materials to be selected should be resistant to corrosion, essential for the island’s harsh environment. Thermal mass will help regulate internal temperatures, reducing the need for mechanical ventilation.

The facility design objective should aim to create a functional, visually appealing facility that minimises environmental impact while maintaining resilience against the challenges of building in a remote location and tailored to suit the island conditions



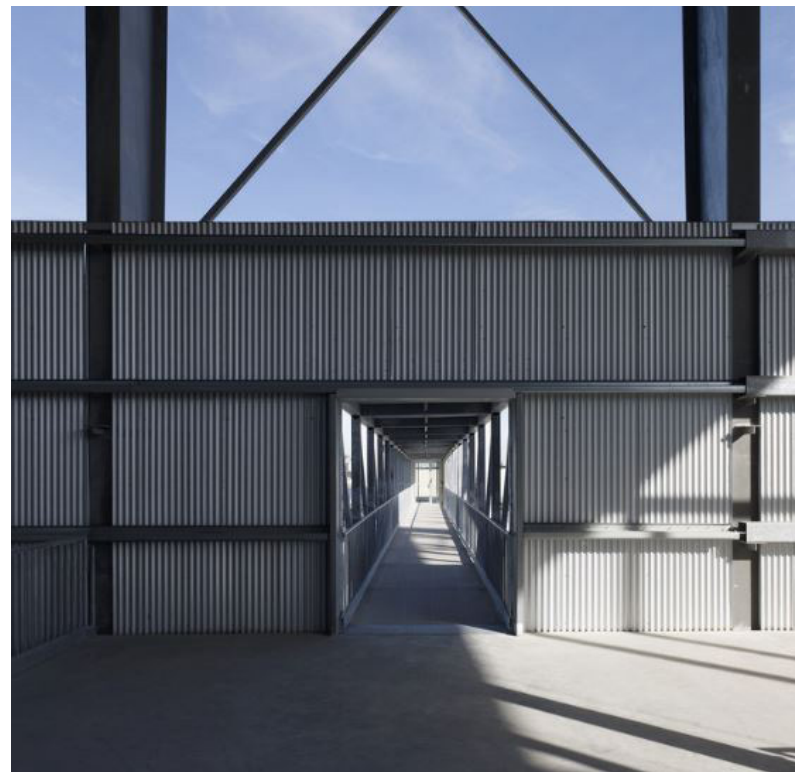


8.4 LONG SPAN STEEL STRUCTURES

Visually the WMF needs to be simple. For example, a skillion or gable roof with 14m free span and columns at 7.5m centres.

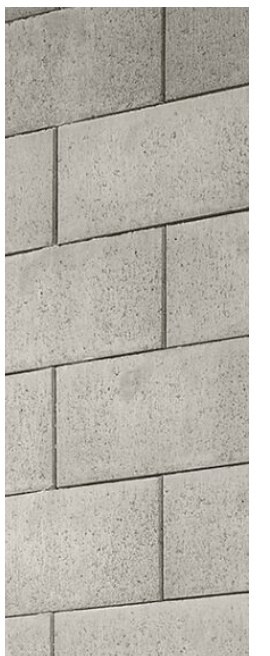
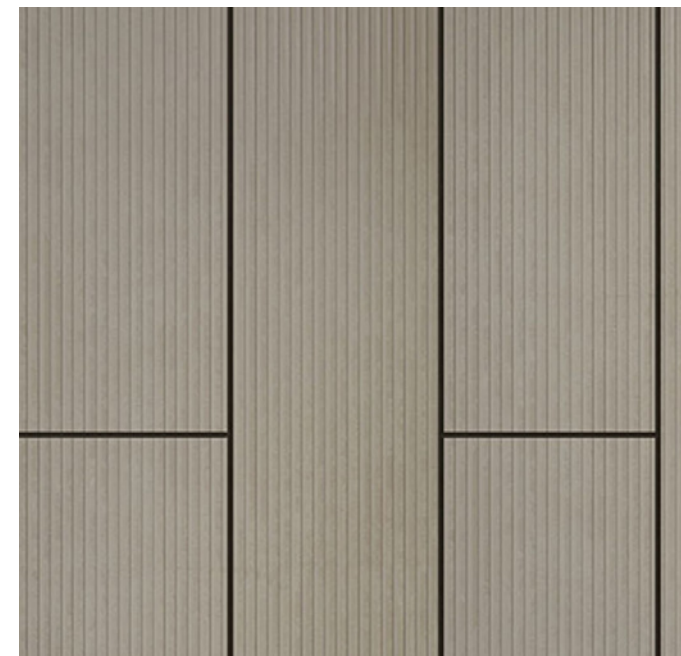
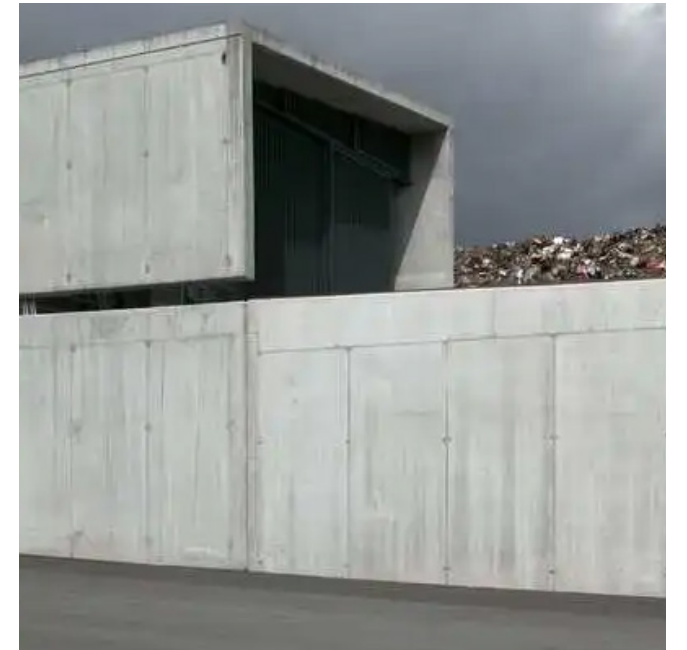
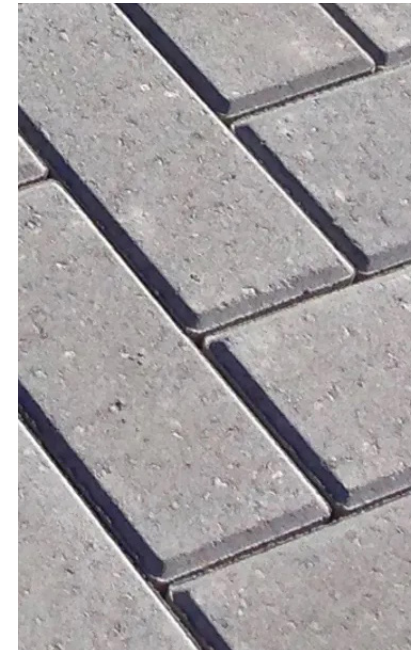
Materials must be easy to transport, cost effective, supplied in Standard and universal structural elements that are readily available and can be replaced with short lead times.

All material selection should be long lasting and hard wearing to last in the salty air. Cost effective options should be considered for example, prefab portal frame as a kit of parts.



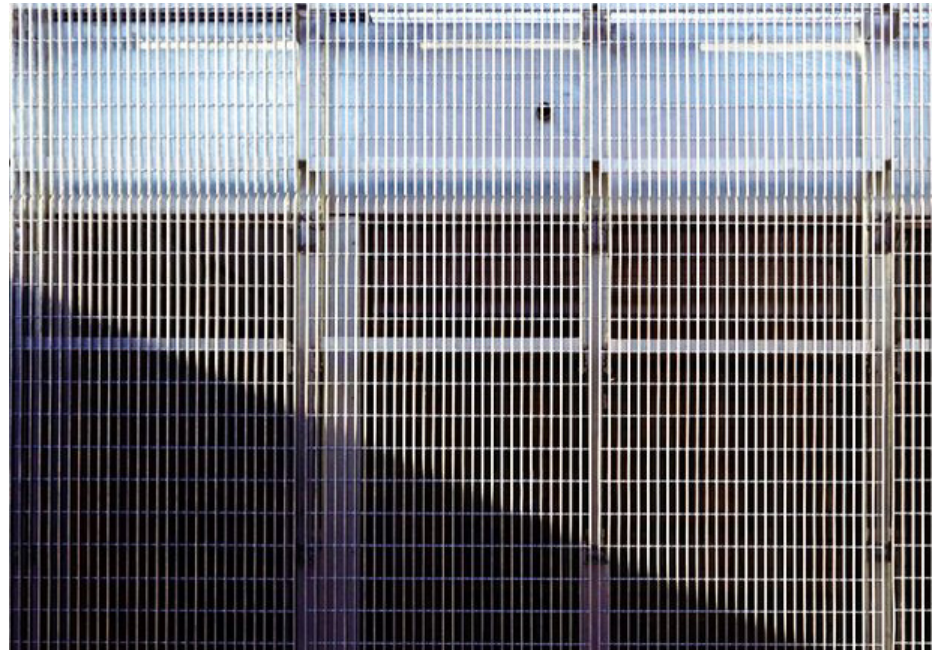
8.5 PREFABRICATED CONCRETE ELEMENTS

- » Precast concrete: Effective in containing noise and odours, long lasting and hard wearing material selection,
- » Fibre Cement Equitone panels could be an alternative on the facades to the precast.
- » Precast concrete stairs could be considered where appropriate.
- » Concrete brick may be easy to transport but would require more manual labour on the island during construction.
- » Prefab concrete pavers could be considered as an alternative to precast floor. Tessellated pavers (e.g. Austral Masonry Zetech Techpave 100 heavy duty concrete pavers).



8.6 SCREENING - TIMBER, METAL AND ALUMINIUM

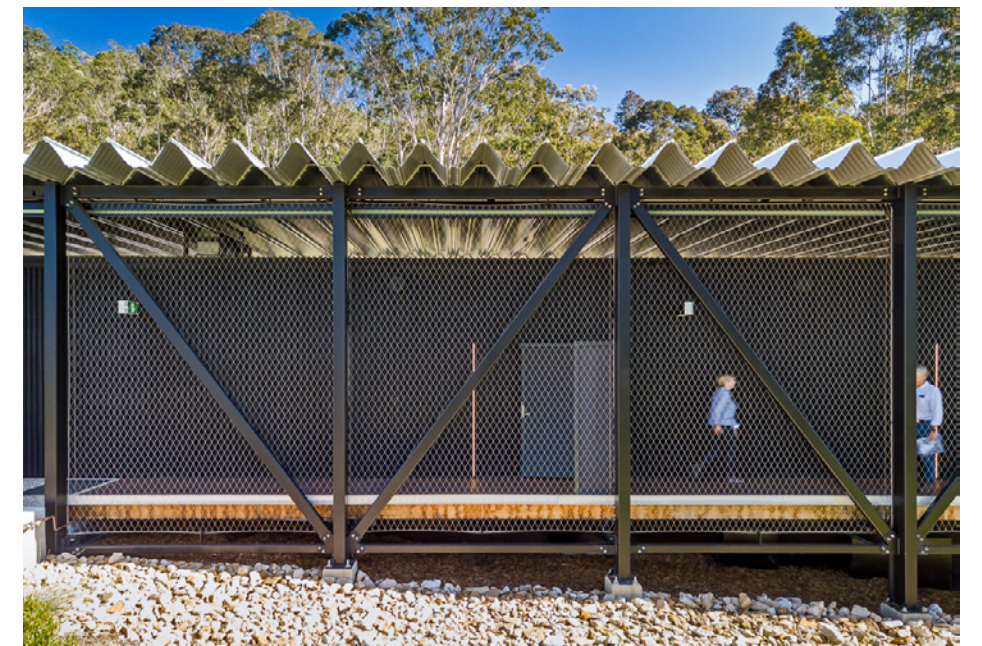
- » Both aluminium and metal screening can be incorporated to achieve natural light and ventilation as an alternative to glazing.
- » Material screening is strong and easy to transport, in some examples light and can be flat packed for transportation.
- » Cost effective and easy to replace smaller panels as required.



8.7 ALUMINIUM DEEP PROFILE ROOFING

The benefits of using both aluminium and a deep profile roofing at the WMF include:

- » Easy transport cost effective (large rolls of the material)
- » Long lasting and hard wearing material selection,
- » Simple to maintain, repair and replace,

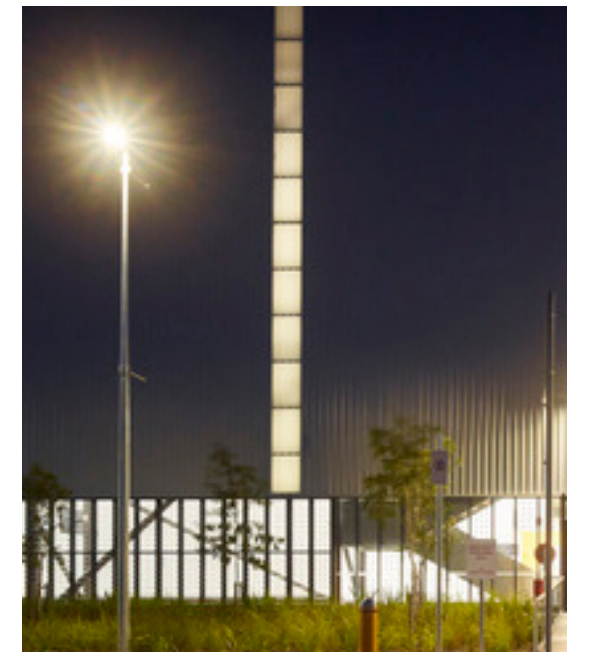
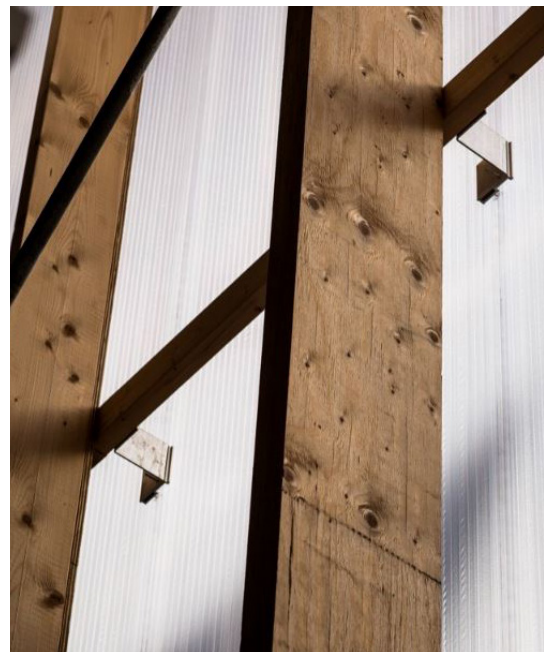
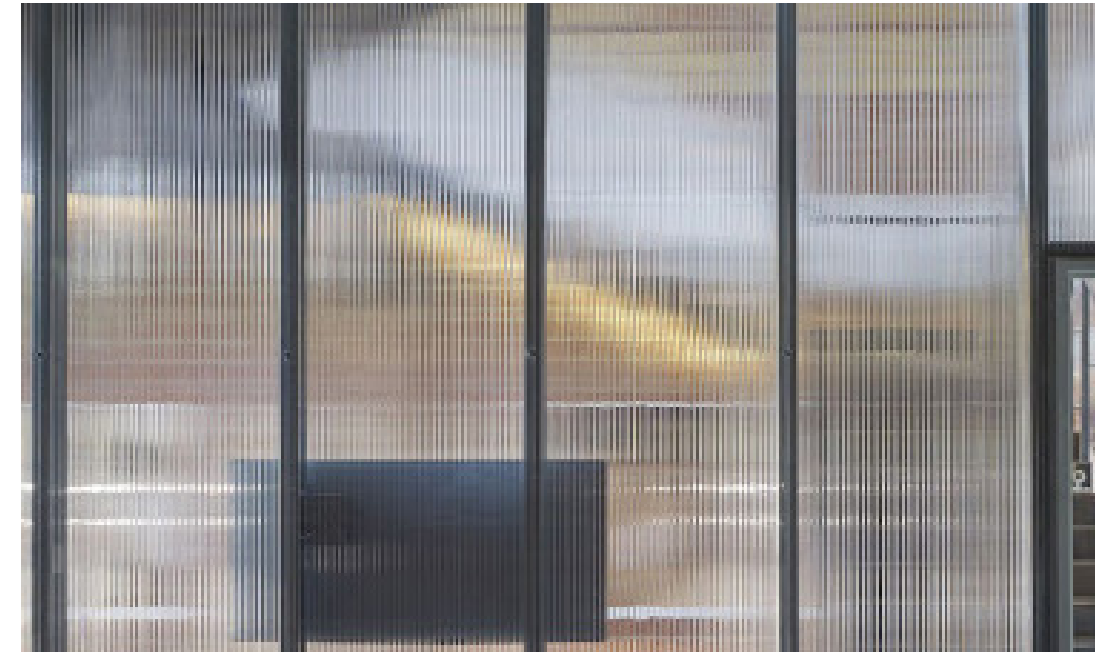
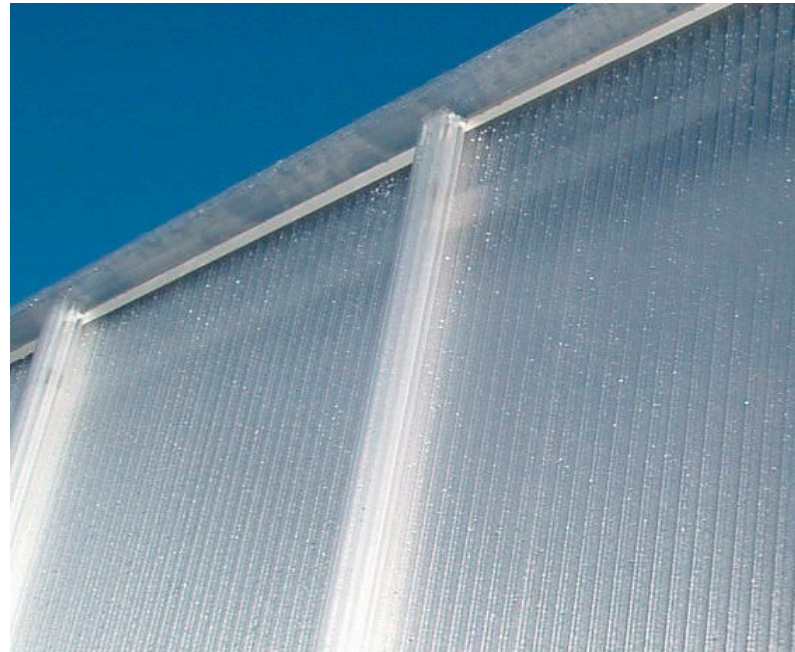


8.8 TRANSLUCENT POLYCARBONATE MATERIALS

Translucent Polycarbonate and Fiberglass materials could be used to increase natural lighting into the large sheds if applied to the walls above the precast concrete.

The material is strong, light and easy to transport by flat packing. It is cost effective and easy to replace smaller panels as required,

Example products include: Translucent Polycarbonate Building Facades. Higher Strength Fiberglass Composite FRP Plastic PP Honeycomb Sandwich Wall Panels.



8.9 CAMOUFLAGE

The facility should blend in with the surrounding environment. The selection of colours, materials and finishes, which drew on the endemic characteristics of the landscape.

Colour Palette

- » Colour selection to match the surroundings.
- » Material colour palette should include: greens, greys and blacks to blend into the surrounding landscape.

Screening and Scale

- » Low built form to blend in to the landscape
- » Built form built into the landscape, landscape screening from all angles – including from above.

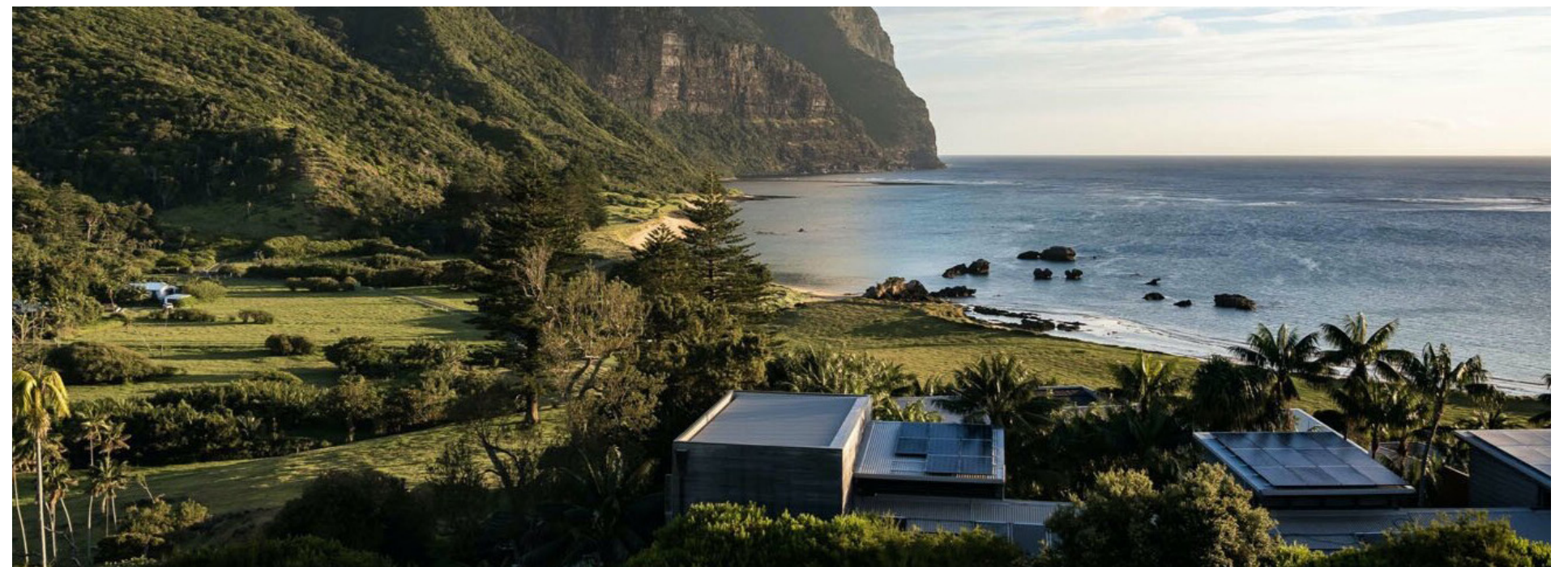


Figure 94: Examples of accommodation on Lord Howe Island

8.10 REDUCE, REUSE AND RECYCLE

- » Continue using the existing compost bays at the north of the site.
- » Reuse the existing stockpile of glass into the future building construction or road materials if appropriate.
- » Reuse the facade materials on the existing sheds to be demolished.
- » Recycle old construction materials in the new facility over sending them off the island where appropriate.
- » Availability - choose cost effective materials to maintain and repair and replace where appropriate.
- » Reduce what is sent to land fill through improving the current infrastructure and systems.





9. LANDSCAPE STRATEGIES & MAINTENANCE

9.1 LANDSCAPE DESIGN

The general approach to the planting design for this project is to integrate any new planting into the existing landscape setting, to revegetate areas impacted by works and to further define and reinforce the landscape character that is part of Lord Howe Island. In order to do this, the planting must strike a balance between screening the works from sensitive visual receptors, enhancing the character of the landscape and maintaining and promoting key views and vistas to the surrounding landscape. Plant species and plant mixes will respond to the endemic vegetation communities that are located within the North Zone and South Zone project areas.

The LHI Plant Importation Strategy restricts the importation of native plants and any media containing soil. As such, all plants will be sourced locally from the LHI Nursery and will have local species provenance. This will ensure that all plants are suited to the local environment, requiring minimal ongoing maintenance, supplemental watering etc. Local topsoils will also be utilised and appropriately enriched where required, avoiding the need to import large amounts of soil. A Pre-Grow contract has been established with the LHI Nursery to commence growing tree stock. This will ensure that 25L and 45L trees are available at the time of planting. Smaller shrubs, grasses and groundcovers will also be grown at the LHI Nursery and initial estimates of plant numbers will be provided to the nursery based on the 20% Detailed Design drawings.

9.1.1 LANDSCAPE DESIGN PRINCIPLES

Landscape Design Principles

The landscape concept has been guided by the following design principles:

- To fit sensitively within the character of the area, in terms of vegetation, topography, local cultural and natural heritage, views, public space and built form.
- Achieve an integrated and coordinated design that is respectful of the Island's character and be a durable, sustainable, safe and minimal maintenance outcome.
- Retain and protect existing planting and endemic vegetation communities as far as possible in order to minimise the degree of visual change.
- Integrate with existing adjacent plant communities.
- Use planting and tree canopy to create favourable microclimates and habitat for local fauna.
- All plants will be sourced locally from the LHI Nursery and will have local species provenance. This will ensure that all plants are suited to the local environment, requiring minimal ongoing maintenance, supplemental watering etc.
- Re-establish vegetation communities where disturbed or affected by construction work to restore ecological and habitat values and help biodiversity protection and recovery, where feasible
- Utilise planting to screen and soften the built forms and integrate them into the landscape
- Consider placement of vegetation and trees to minimise contention with existing and new utility services





9.1.2 LANDSCAPE IMPLEMENTATION

Planting and revegetation assists with the integration of the proposal with the surrounding landscape by responding to the existing character of the place as well as the existing vegetation communities that are (or were), present. The landscape strategy works in combination with the landscape character and visual impact assessment to complete the overall integration of the built forms and infrastructure into the landscape. The planting and revegetation design also aims to minimise the potential ecological impacts of the works by stabilising earthworks, reinforcing habitat areas and substantially contributing to revegetation of local plant communities.

Table 7: Landscape Design Strategies

OBJECTIVE	LANDSCAPE DESIGN STRATEGY
All landscape materials are to comply with the Lord Howe Island Plant Importation Strategy.	The importation of native plants is prohibited. All plants will be sourced locally from the LHI Nursery and will have local species provenance that are suited to the local environment, requiring minimal ongoing maintenance, supplemental watering etc. The importation of soil is prohibited. Local topsoils will be utilised and appropriately enriched where required. Mulch will be locally sourced from the LHI Waste Management Facility. New planting areas will be mulched to support plant development, retain moisture and reduce maintenance. New grassed areas will be seeded with an LHIB approved native grass seed.
Topsoil and other growing media must be free of soil, weeds or other unintended or undesirable species	Compost will not be available from the WMF and cannot be imported. As such, soil additives will include soilless potting mixes, water crystals and perlite, which have been successfully utilised by the LHI Revegetation team in the past.

OBJECTIVE	LANDSCAPE DESIGN STRATEGY
The landscape design must fit sensitively within the character of the area, in terms of vegetation, topography, local cultural and natural heritage, views, public space and built form.	Maintain naturalistic feel and avoid over use of architectural solutions Maximisation of revegetation with appropriate local and endemic species to reduce impact and strengthen the existing landscape character of the island. Selection of plant species should primarily comprise of plants that occur within the North Zone and South Zone Selection of materials, finishes and colours to be appropriate, sympathetic and in keeping with the character and colours of the island.
Revegetation or planting of all areas affected by construction of the upgrade.	All affected areas will be revegetated with appropriate native and endemic planting. Areas within the construction footprint and outside of the operational footprint would be reinstated to their existing condition and would involve appropriate weed management
Utilise planting to screen and soften the built forms and integrate them into the landscape	Screen built forms and walls using low, medium and tall shrubs, vines and trees to provide dense screening that mimics natural vegetation communities. This will help to mitigate visual impacts and integrate the works into the surrounding landscape
Minimise hard paved surface to maximise water infiltration and reduce runoff.	Hard paving will be minimised where possible.
Water Sensitive Urban Design strategies	Implementation of swales and soakpits where possible to promote water infiltration into soils, using appropriate plant species for bio-filtration.
Implement cost effective and robust use of materials	Selection of materials that are of high quality and durability to provide longevity, reduce ongoing maintenance requirements, repair or replacement.

9.2.1 REVEGETATION METHODS

The main revegetation techniques to be used for this project are;

- Planting and Revegetation
- Turf Seeding

Planting and Revegetation

Planting of trees, shrubs, vines, grasses and groundcovers will be undertaken in both the NZ and SZ. Several plant mixes have been established for these areas to represent the native vegetation communities occurring there. This includes:

- » PM1 – Screening Mix: This mix is utilised in the NZ and SZ and used primarily used to screen buildings and walls. It is largely comprised of species within the “Bully Bush – Hopwood shrubland on shallow rocky soils” community, with some additional local feature species included.
- » PM2 – Creepers: This mix is utilised to screen barriers in the NZ. Whilst it is not representative of any specific vegetation community, it utilises creepers are that typically found in the lower elevations around the island.
- » PM3 – Bioswale and Soakpit Mix: Within the SZ, vegetated bio-swales and soakpits have been introduced to support natural stormwater management over engineered solutions. These will be planted out with the PM3 mix which comprises local and endemic sedges, rushes, grasses and perennials.
- » PM4 – Dune Revegetation Mix: This mix is utilised in the SZ around the western foredune area near the WMF. The mix is largely comprised of species within the “Coastal Spinifex – Dune Bean – Club Rush – Melanthera biflora – Saltwater Couch beach strandline grassland” community which occurs there.
- » PM5 – This mix is utilised in the SZ around the eastern side of the WMF. The mix is largely comprised of species within the “Greybark – Blackbutt rainforest at low to intermediate altitudes” community which currently occurs there.

Refer Table 9 for a summary of plant mixes and the locations in which they are utilised.

Table 9: Plant Mix Locations

PLANT MIX	LOCATIONS UTILISED	
	NZ	SZ
PM1 - SCREENING MIX	YES	YES
PM2 - VINES	YES	
PM3 - BIOSWALE & SOAKPIT MIX		YES
PM4 - DUNE REVEGETATION MIX		YES
PM5 - GREYBARK BLACKBUTT RAINFOREST MIX		YES

Refer Section 9.2 for the planting mixes and species that have been utilised across the NZ and SZ.

Turf Seeding

Manual seeding methods will be used to turf areas.

Turf seed mix species to be confirmed during detailed design and documentation.

Pot Sizes

Proposed pot sizes for Dune revegetation are as follows:

- Grasses & Groundcovers = Tubestock
- Shrubs = 150mm to 5L
- Trees = 25L and 45L

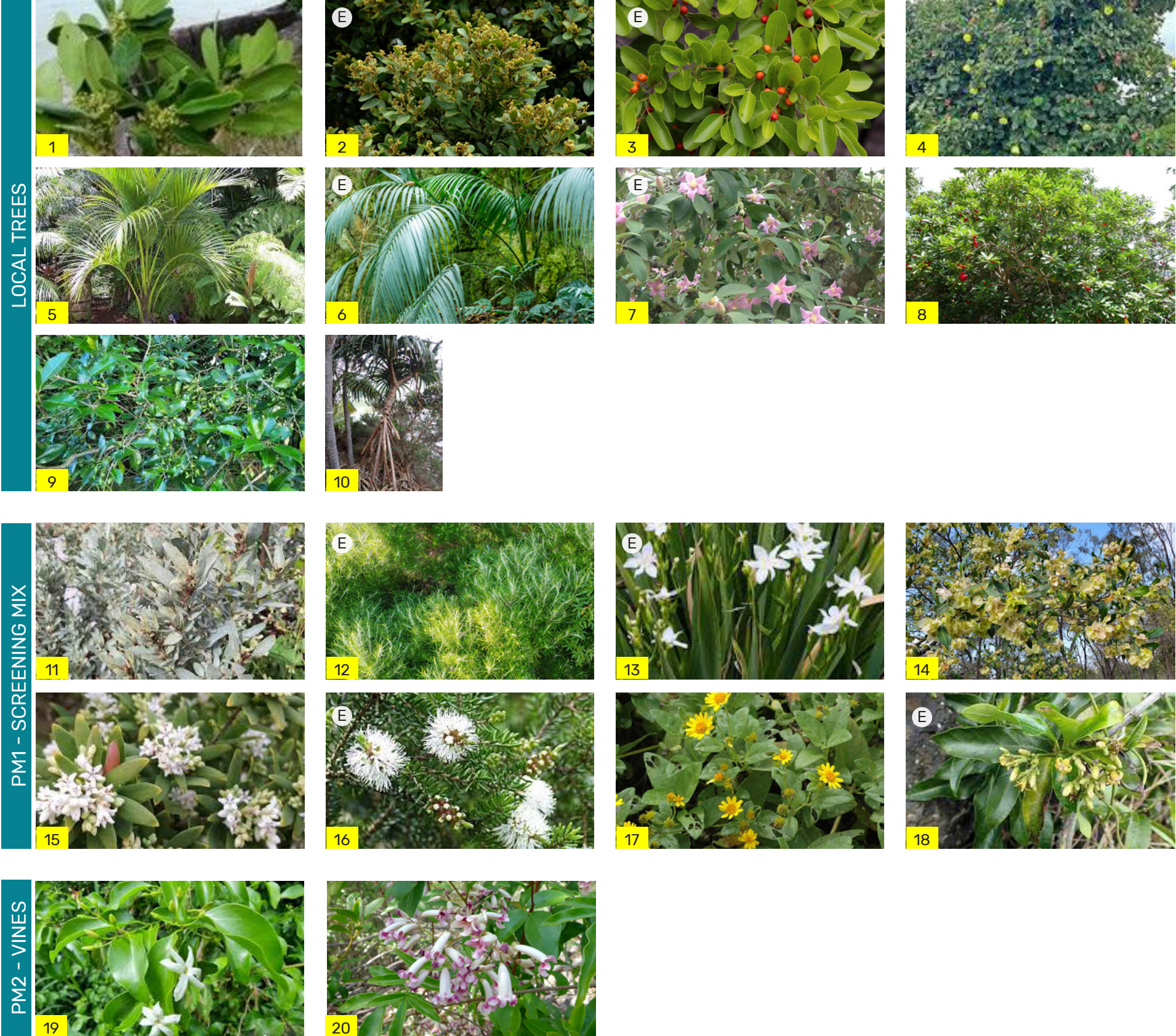
Further details to be confirmed during detailed design and documentation.

9.2 PLANTING PALETTE

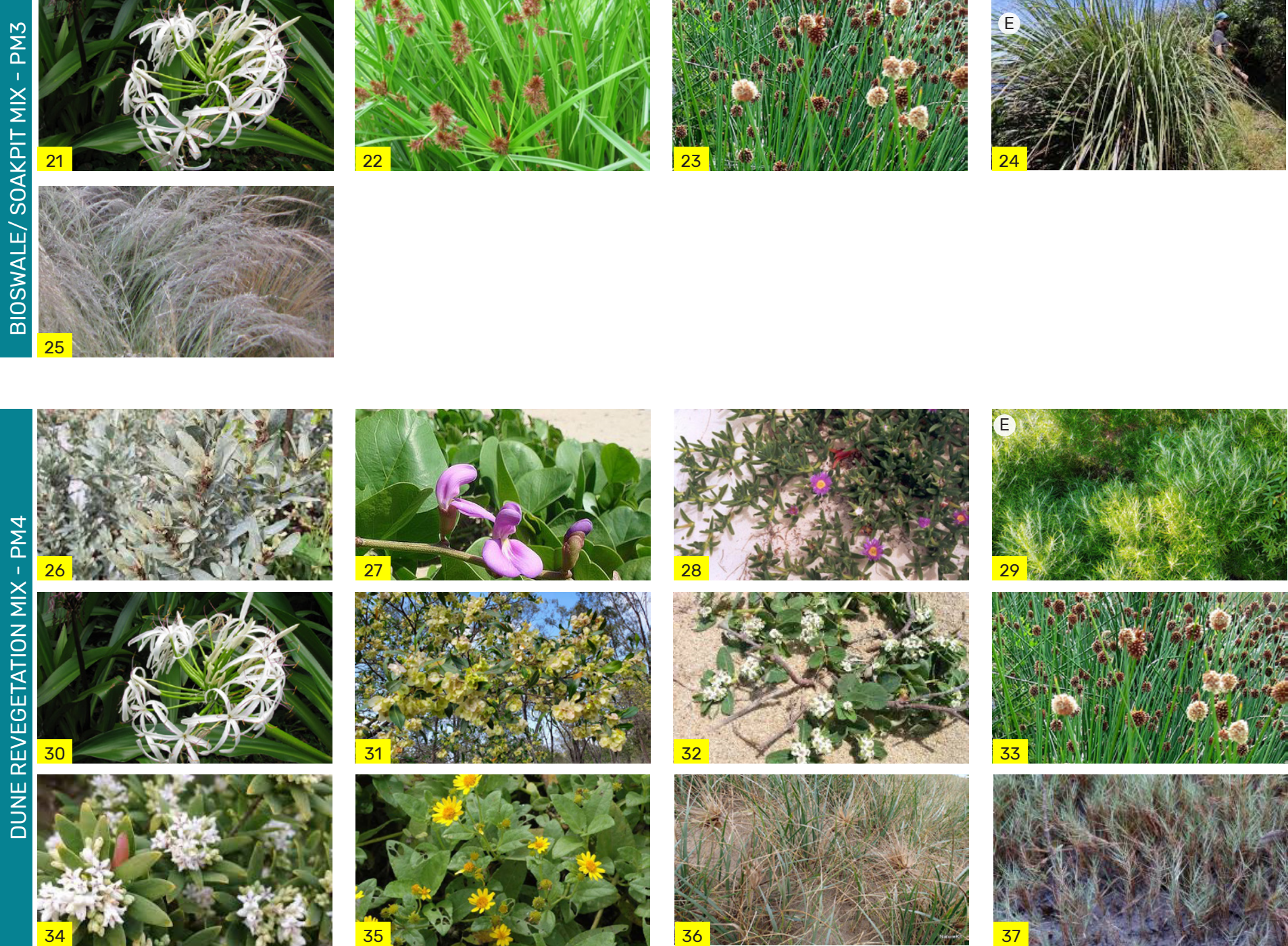
Table 8: Tree Species and Plant Mixes

#	BOTANICAL NAME	COMMON NAME	ENDEMIC
LOCAL TREES (NZ & SZ)			
POT SIZES: 45L/ 25L			
1	<i>Celtis conferta</i> subsp. <i>Amblyphylla</i>	Cottonwood	(E)
2	<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	Native Blackbutt	
3	<i>Drypetes deplanchei</i>	Greybark	
4	<i>Hibiscus tiliaceus</i>	Sea Hibiscus	
5	<i>Howea belmoreana</i>	Curly Palm	(E)
6	<i>Howea forsteriana</i>	Kentia Palm	(E)
7	<i>Lagunaria patersonia</i>	Sallywood	
8	<i>Ochrosia elliptica</i>	Red Berrywood	
9	<i>Olea paniculata</i>	Native Olive	
10	<i>Pandanus forsteri</i>	Forked Tree	(E)

#	BOTANICAL NAME	COMMON NAME	ENDEMIC
PM1 SCREENING MIX (NZ & SZ)			
POT SIZES: 5L/150MM/TUBESTOCK			
11	<i>Atriplex cinerea</i>	Coastal Saltbush	
12	<i>Cassinia tenuifolia</i>	Bullybush	(E)
13	<i>Dietes robinsoniana</i>	Lord Howe Island Wedding Lily	(E)
14	<i>Dodonaea viscosa subsp. burmanniana</i>	Burmans's Hop Bush	
15	<i>Leucopogon parviflorus</i>	Coastal Beard Heath	
16	<i>Melaleuca howeana</i>	Tea tree	(E)
17	<i>Melanthera biflora</i>	Sea Daisy	
18	<i>Parsonsia howeana</i>	Howeana Silk Vine	(E)
PM2 CREEPERS MIX (NZ ONLY)			
POT SIZES: 150MM			
19	<i>Jasminum simplicifolium</i>	Stiff Jasmine	
20	<i>Pandorea pandorana subsp. austrocaledonica</i>	Boat Vine	



#	BOTANICAL NAME	COMMON NAME	ENDEMIC
PM3 - BIOSWALE AND SOAKPIT MIX (SZ ONLY)			
POT SIZES: 150MM/TUBESTOCK			
21	<i>Crinum asiaticum</i> var. <i>pedunculatum</i>	Swamp Lily	
22	<i>Cyperus lucidus</i>	Leafy Flat Sedge	
23	<i>Ficinia nodosa</i>	Knobby Club Rush	
24	<i>Gahnia howeana</i>	Lord Howe Saw-Sedge	(E)
25	<i>Poa poiformis</i>	Coast Tussock Grass	
PM4 - DUNE REVEGETATION MIX (SZ ONLY)			
POT SIZES: 5L/150MM/TUBESTOCK			
26	<i>Atriplex cinerea</i>	Coastal Saltbush	
27	<i>Canavalia rosea</i>	Coastal Jack Bean	
28	<i>Carpobrotus glaucescens</i>	Pigface	
29	<i>Cassinia tenuifolia</i>	Bullybush	(E)
30	<i>Crinum asiaticum</i> var. <i>pedunculatum</i>	Swamp Lily	
31	<i>Dodonaea viscosa</i> subsp. <i>burmanniana</i>	Burmann's Hop Bush	
32	<i>Euphorbia psammogeton</i>	Sand Spurge	
33	<i>Ficinia nodosa</i>	Knobby Club Rus	
34	<i>Leucopogon parviflorus</i>	Coastal Bearded Heath	
35	<i>Melanthera biflora</i>	Sea Daisy	
36	<i>Spinifex sericeus</i>	Coastal Spinifex	
37	<i>Sporobolus virginicus</i> var. <i>virginicus</i>	Saltwater Couch	



#	BOTANICAL NAME	COMMON NAME	ENDEMIC
PM5 - GREYBARK BLACKBUTT RAINFOREST MIX (SZ ONLY)			
POT SIZES: 5L/150MM/TUBESTOCK			
38	<i>Alyxia ruscifolia</i>	Chain Fruit	
39	<i>Asplenium milnei</i>	Spleen Wort	Ⓔ
40	<i>Carex brunnea</i>	Greater Brown Sedge	
41	<i>Dodonaea viscosa subsp. burmanniana</i>	Burmann's Hop Bush	
42	<i>Microsorium pustulatum subsp. howense</i>	Kangaroo Fern	Ⓔ
43	<i>Oplismenus imbecillis</i>	Australian Basket Grass	
44	<i>Smilax australis</i>	Lawyer Vine	





10. APPENDIX



1.0 APPENDIX **PRECEDENTS**

EXISTING

LHI WASTE MANAGENMENT FACILITY NSW

Island Existing Island Population: 400/400 (Visitors at one time)
Existing Area: 5,985m2

Waste Collected: 21/2022 83,2620kgs

Waste Diverted including Compost/Recycling/ Waste to landfill/
handled at wmf 2020-2021 49.3%

Overall recycle rate 53.3% (2022)



PROPOSED

LHI WASTE MANAGENMENT FACILITY NSW

Predicted Future Island Population: 400/400 (Visitors at one time)
Proposed Area:10,800m2

Waste Collected 2030: 0000kgs **TO BE CONFIRMED**

Waste Diverted Compost/Recycling/Waste to landfill/handled at wmf
2030 00.0%

Overall recycle rate 00% (2030) **TO BE CONFIRMED**



Precedent Comparison Diagrams

Scale @ 1: 2000



EPA NSW TARGETS

- Reduce total waste generated by10% per person by 2030
- Have an 80% average recovery rate from all waste streams by 2030
- Significantly increase the use of recycled content by governments and industry
- Phase out problematic and unnecessary plastics by 2025
- Halve the amount of organic waste sent to landfill by 2030
- Reduce litter by 60% by 2030 and plastics litter by 30% by 2025
- Triple the plastics recycling rate by 2030

THE NORFOLK WAVE RECYCLING CENTRE QLD

Island Population: 2,170
Area: 25,100m2

This case study was selected due to its remote island location (east of Lord Howe Island). The island has achieved high community engagement relating to the islands recycling. This has been achieved through the Norfolk Wave Community Dashboard. This Custom-built system that helped and it is also hoped that it will a benchmark for waste management in remote communities.

As of April 2024 they reported the following:

- 547 Tonnes processed
- 406 Tonnes diverted from landfill
- Overall recycle rate 74% (2024)

CESSNOCK WASTE MANAGEMENT CENTRE NSW

Council Population: 67,591
Area: 27,200m2

This case study was selected because it was designed and constructed by SMEC. The design incorporates recycled materials used in the construction such as gabion wall varieties including recycled glass and rock. It is considered best practice on the mainland.

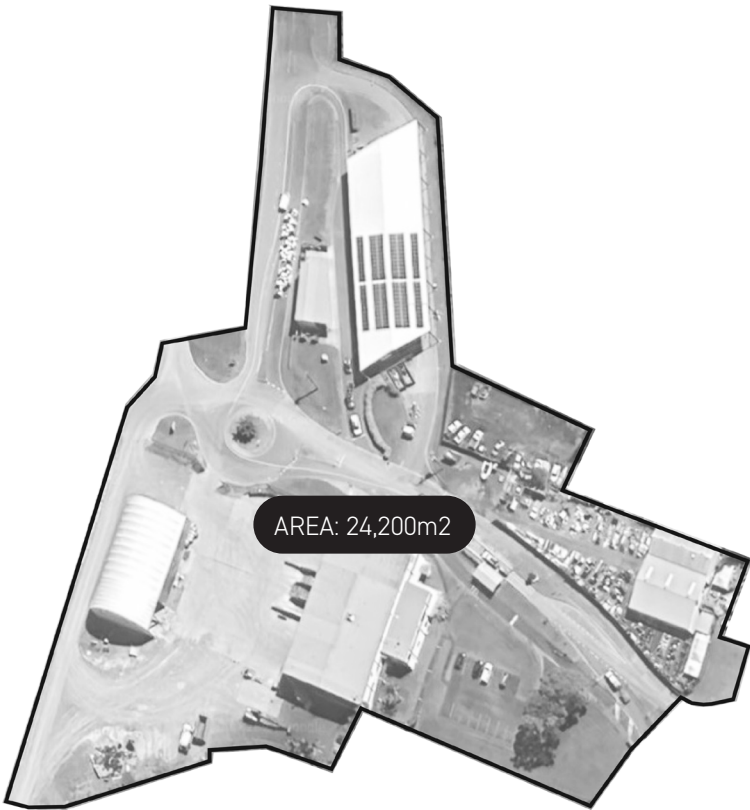
The waste service aims to deliver sustainable waste management & achieve a 70% diversion of waste from landfill.

BALLINA RESOURCE RECOVERY CENTRE NSW

Ballina Council Population: 47,297
Area: 24,200m2

This case study was selected from the 'Station Handbook for Design and Operation of Rural and Regional Transfer Stations'. It has been constructed using simple and cost effective materials, the receival shed is simple and open with just a roof. The transfer station is designed in a saw-tooth pattern, allowing for the placement of six bulk skip bins in the 'teeth', and an additional bulk bin at the end of the transfer station platform. They operate a large and successful salvage shed. The RRC is a branch of North East Waste.

- 60,000tpa received
- 6,000tpa recyclables
- Overall recycle rate TBC% (2024)



Precedent Comparison Diagrams

Scale @ 1: 2000



THE NORFOLK WAVE RECYCLING CENTRE QLD
Island Population 2,170

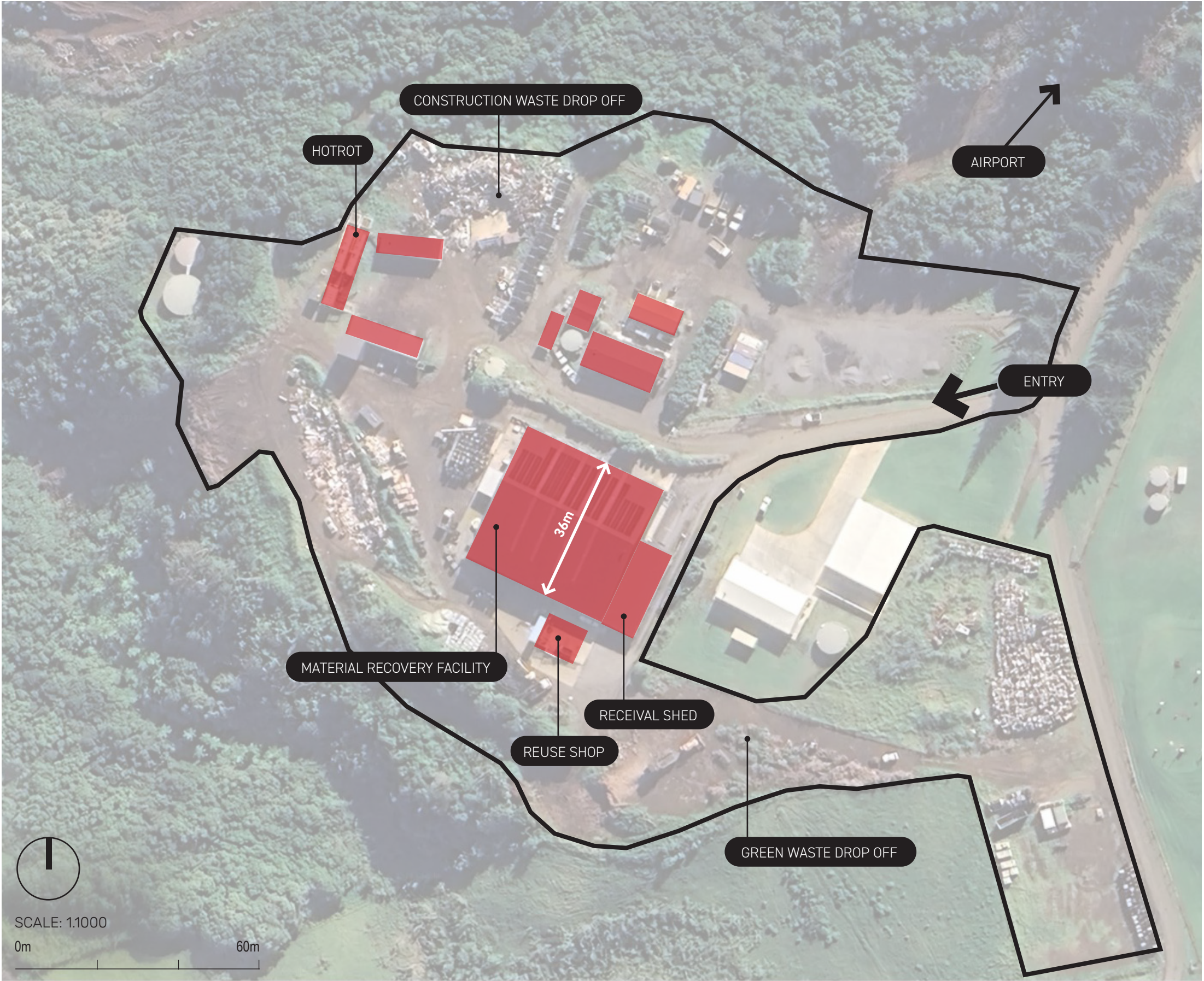
LOCATION
1,412 kilometres directly east of Australia's Evans Head and about 900 kilometres from Lord Howe Island.

OVERVIEW
Norfolk Island Regional Council offers a variety of waste management services to the community. Both domestic and commercial waste management services are provided by contractors, Revolve Your World, at the Norfolk Wave Recycling Centre, while bulky, construction and demolition waste management is operated by Council staff. There is no waste collection service on the Island so residents and businesses are responsible for delivering their sorted waste to the WMC, where it is further sorted and where possible, processed on Island.
As of April 2024 they reported the following:
547 Tonnes processed
406 Tonnes diverted from landfill
Overall recycle rate 74%

- PRODUCTS PRODUCED FROM RECYCLING ON ISLAND**
- Compost, Biochar, Sand
 - Processing our plastic into concrete aggregate, which is a great alternative to landfill, utilise the 'Resin8' plastics process, which is unique in that it can accept ALL plastic types at a given percentage.
 - Hardstand only in the processing shed

ISSUES
Previously the island was burning bulky waste and tipping it into the sea, plus exporting household and commercial waste to landfill in Australia at untenable costs. Due to the significant costs for exporting waste from Island – around \$1,400 per tonne for air freight alone.

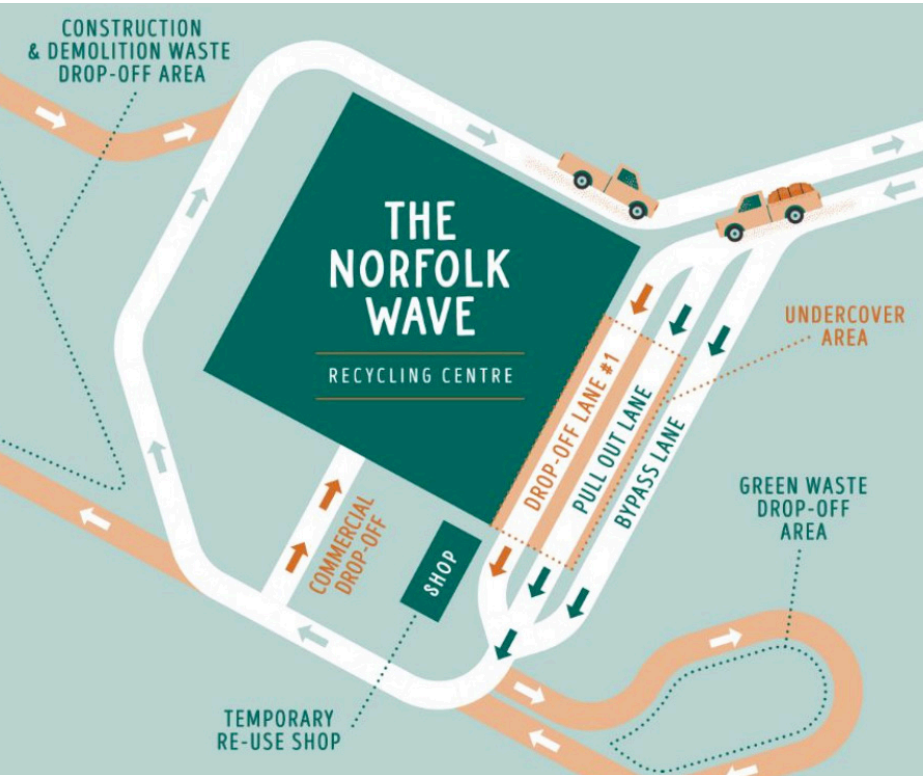
- COMMUNITY ENGAGEMENT**
- Norfolk Wave Community Dashboard: Provides the community with constant updates and stats relating to waste recycled.
 - Facebook social media, www.revolveyourworld.org
 - The NWRC Team, made up of a local and visiting team. Custom built system for the community. but it is also hoped that Norfolk Island will be the benchmark for waste management in remote communities.



THE NORFOLK WAVE RECYCLING CENTRE QLD
Island Population 2,170



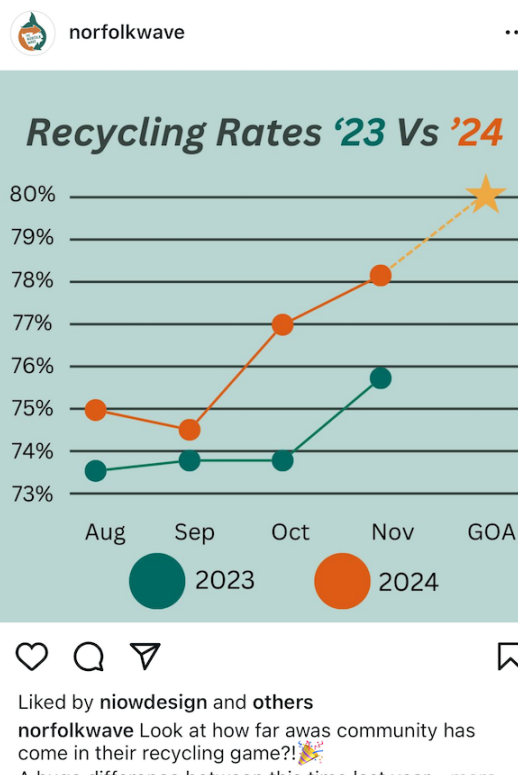
MAIN ENTRANCE - OPERATION HOURS



MOVEMENT DIAGRAM OF THE FACILITY



INSTAGRAM COMMUNITY INFORMATION PAGE



INSTAGRAM COMMUNITY INFORMATION



ISLAND HOTROTS FOR ORGANICS PROSESSING



RESIN8 PLASTICS PROCESS INTO CONCRETE AGGREGATE

BALLINA RESOURCE RECOVERY CENTRE
167 Southern Cross Dr, Cumbalum NSW

The MRF was constructed to allow for sorting of a kerbside collected commingled recyclables stream from the newly introduced MGB kerbside service. This MRF process recyclables from Lismore City Council and Richmond Valley Council areas.

The transfer station is designed in a saw-tooth pattern, allowing for the placement of six bulk skip bins in the 'teeth', and an additional bulk bin at the end of the transfer station platform.

OVERVIEW

- **Cost to build** \$1.2 million
- **Area** 2,519 Ha
- **MRF Shed** 25m x 47m
- **Transfer Station** 56m x 22m
- Council owner and operated
- Flat Greenfield site next to the airport
- **Tonnes per year** 60,000tpa mixed waste
6,000 tpa recyclables

THE RECOVERY CENTRE INCLUDES:

- Single Weighbridge
- MRF Material Recovery Facility
- A Community Recycling Centre for problem waste
- Reviva 'Tip Shop' Second Hand Store
- Materials Recovery Facility Inc. chemical storage
- Men's Shed
- Bicycle repair workshop - Green Bikes
- The Green - Community garden
- Landfill
- Education Centre

WHAT THEY ACCEPT

- Green waste
- Recyclables: Household and commercial, tyres and electronics
- Landfill mixed waste
- Building waste and soil
- Metals
- Other: Household Asbestos Disposal Kit, Mulch, Crushed concrete, motor oils, electronic waste



BALLINA RESOURCE RECOVERY CENTRE
167 Southern Cross Dr, Cumbalum NSW



PUBLIC RECEPTION DROP OFF



SALVAGE SHED



ENTRY WITH MATERIAL DROP OFF INFORMATION



SAW TOOTH BIN DROP OFF



BINS AND SIGNAGE DRIVE THROUGH



SALVAGE SHED

Cessnock Waste Management Centre
1967 Old Maitland Road, Cessnock

The Cessnock Waste Management Centre (CWMC) is a waste landfill that is licensed by the NSW Environment Protection Authority (EPA). The waste service aims to deliver sustainable waste management and achieve a 70% diversion of waste from landfill.

The Centre includes:

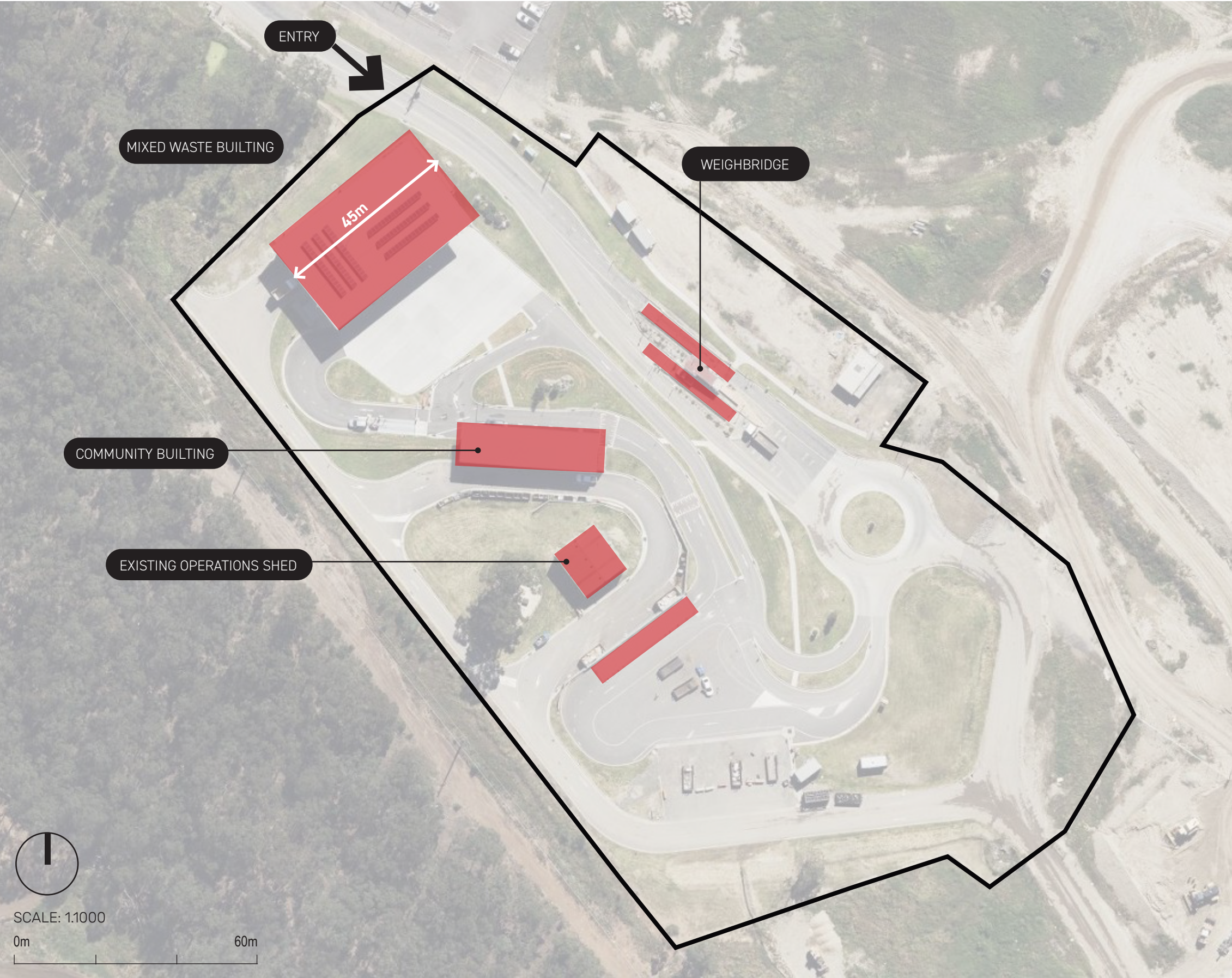
- Future Reuse centre and carpark
- Mixed waste building
- New unmanned weighbridge 3m x17m
- Community drop off building Size 35 x 10m
- Mixed Waste Building
- Existing operations shed
- Building and Green waste hardstand
- Road network - 2 way direction

Facility Construction/materials:

- Gabion Wall varieties
- Recycled glass rock gabion walls
- Coreten Lasercut signage
- Slimline Metal Rainwater Tanks
- Chainlink fencing
- Reinforced concrete pavement slab
- Steel roof frame
- Metal roof sheeting
- Ventelation openings
- Vandal proof lighting
- Roller Shutters with slotted openings

Building scale:

- Mixed Waste Building Shed 5.9m highest point
- The Community Recycling Centre, which is located inside Cessnock Waste Management Centre, provides the community with a safe way to dispose of household problem waste, free of charge.



Cessnock Waste Management Centre
1967 Old Maitland Road, Cessnock



AERIAL VIEW



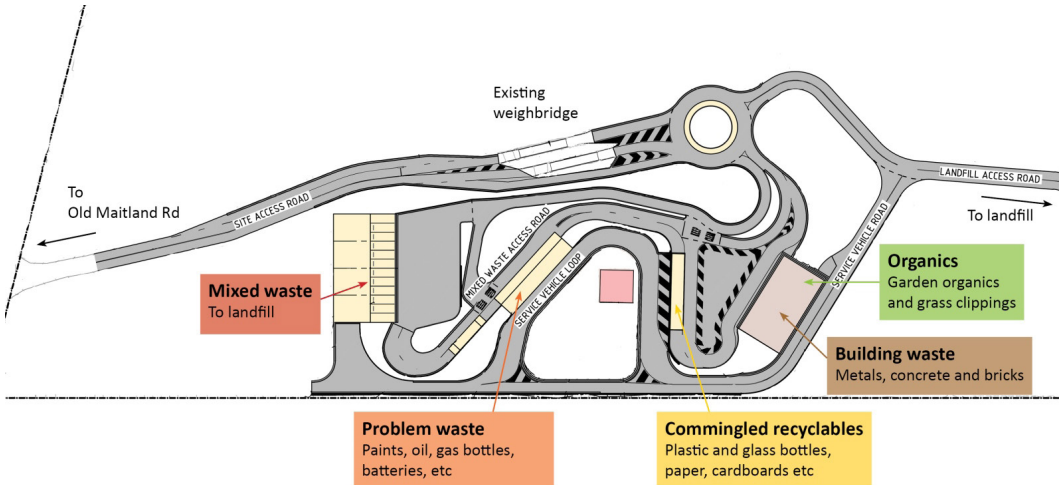
COMMUNITY DROP OFF SHED



RECYCLED GLASS ROCK



ENTRY AND ROCK WALL AND SIGNAGE



MOVEMENT DIAGRAM



CWMC ROCK WALLS

TILOS ISLAND GREECE
Island Population 750

LOCATION:
Tilos Island, situated between Rhodes and Kos in Greece. Tilos is about 14.5 km long, north-west to south-east, with a maximum width of 8 km and an area of about 61 square kilometres. The island has a mountainous limestone interior, volcanic lowlands, pumice beds and red lava sand. It is well supplied by springs. Its coasts are generally rocky or pebbled, but there are also a number of sandy beaches.

OVERVIEW:
The Greek Island of Tilos has shut down its landfill, removed all communal bins from the streets and embarked on the **Just Go Zero Tilos** program – a fully circular waste management system starting with door-to-door collection and resulting in the full recovery of all waste streams produced on the island.

The island is also investing in e-mobility, renewable-driven EV charging infrastructure, sustainable water management, and energy efficiency in the local public lighting sector.

The S4S project is now being implemented in four more island regions in the Northern Aegean and are set to become the new smart green islands with a total guaranteed power.

Previously, 87% of waste headed to landfills; now, it's entirely diverted. The shift has seen the creation of the **Centre for Creative Upcycling**, fostering repair, reuse, and artistic creation.

Polygreen, a Greek circular economy-focused firm, was pivotal in employing education and door-to-door collections for waste separation.

PAST PROBLEMS

- The island gets around 30,000 visitors each summer, and dealing with waste generated by tourists has long been a problem.
- Shops on the island are still selling plastics.

- Tilos has an undersea cable connecting it to Kos via Nisiros. This struggled to cope with the large summer population, and frequently failed. This has been reinforced with solar power, wind turbines and a battery farm, making Tilos self-sufficient with fully renewable electricity.

WIND, SUN, AND STORAGE
Tilos' transition to renewable energy has been achieved by the installation of an 800kW wind turbine and 592 photovoltaic panels with a nominal power of 270Wp each. Also part of the new system are eight inverters with a rated power of 20kW and two batteries with a nominal energy output of 1.4 MWh each.

RECYCLING PLANT OUTPUTS
All waste is now transported for sorting and further processing. The facility includes a composting section and 15 sorting mechanisms. Waste that cannot be recycled is transformed into alternative fuel for cement production.

The Blue Bag: It has a unique QR code so that the volume of materials it contains can be easily recorded after they are weighed at collection. This way, every household can easily monitor its recycling rate.

- Powdered glass
- Cement mix
- Compost
- Fertilizer
- Plastic twine – into 3d printed furniture

COMMUNITY ENGAGEMENT
Using technology, Download the **Just Go Zero App** to receive real-time information about the amount you have recycled as well as useful information about the Just Go Zero Tilos programme.



NOT TO SCALE



AERIAL VIEW



SMALL TRUCK GARBAGE COLLECTORS



THE ISLAND IS RUN ON WIND AND SOLAR



THE MORE YOU SEPARATE, THE MORE VALUABLE THE MATERIALS



SORTING MECHANISIMS

KAMIKATSU ZERO WASTE CENTER & HOTEL

Completed 2020
Tokushima Prefecture Japan 5,557m2 m²

LOCATION:
Located on the island of Shikoku and surrounded by lush nature, Kamikatsu in Tokushima prefecture is a small town with a big ambition: it plans to reuse and recycle all of its waste.

OVERVIEW:
Population of 1,431 in 750 households
The town's current recycling rate is over 80 percent.

The Zero Waste Centre is the town's recycling facility, **where residents can sort their garbage into 45 categories** – there are nine ways to sort paper products alone – before they toss the rest into a pile for the incinerators. The town offers an incentive system in which people can collect recycling points in exchange for eco-friendly products. Hotel Why opened in 2020 as a part of the Zero Waste Center facility



HOTEL WHY



PUBLIC DROP OFF



SORTING FACILITY



SORTING FACILITY

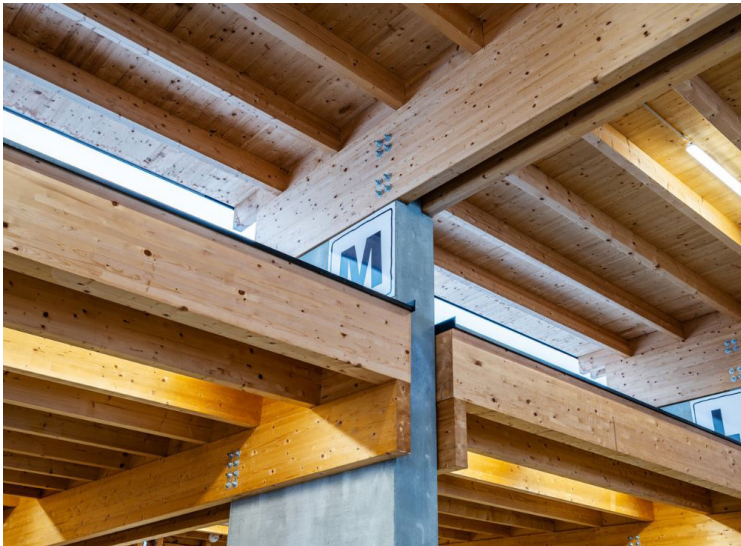


AERIAL VIEW - NOT TO SCALE

COLLECTION CENTER FOR RECYCLABLE MATERIALS

Completed 2019 RUHM ARCHITEKTEN
Schweinern, Austria 1880m2

A project with one objective: to turn former rubbish disposal areas into a user-friendly infrastructure for the collection and separation of recyclable materials in the local community, with a Zero-waste approach. The centre is constructed with timber and concrete. The public area is raised 1.70 m above the operational area, visually linked by a lower concrete wall. The choice of materials was done in the most ecological, resource saving, and low impact way possible, large parts are built as structures from laminated wood, safety areas are made of reinforced concrete with steel columns, whereas all the used insulation is ecological. An energy-efficient, solar-powered, green roof overhangs the structure creating shade, covered with vegetation collecting rainwater.



SMESTAD RECYCLING CENTRE

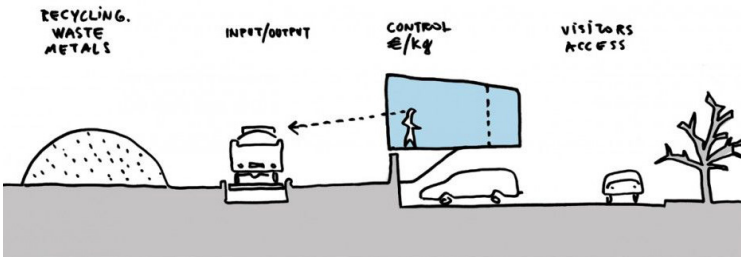
Completed 2017 LONGVA ARKITEKTER
Oslo, Norway 6000 m2

This facility represents a new typology: an indoor facility for public waste sorting and disposal. The project is located near an established residential area, with special care given to the neighbours and surroundings. The building is a robust, open hall with two distinct areas: one for the public and one for operations. There is a climatized zone at one end for service personnel and management.



METAL REYCLING PLANT
Completed 2007 DEKLEVA GREGORIC ARCHITECTS
Pivka, Slovenia

A metal recycle plant, where they first accumulate and then separate different waste metals and prepare them for reuse. The project consists of an immense production plateau and two small buildings on the edge of it. The site uses precast concrete panels, levels for loading materials, metal screening.



SUNSET PARK MATERIAL RECOVERY FACILITY
Completed 2014 SELLDORF ARCHITECTS
Oslo, Norway 130000 m2

The Sunset Park Material Recovery Facility is a processing center for New York City's curbside metal, glass, and plastic recyclables which is being undertaken by Sims Municipal Recycling and the City of New York.

Located on an 11 acre waterfront pier in Sunset Park, the design was influenced by its programmatic use as a recycling center which inspired reuse throughout.

The masterplan organises buildings to support functionality, creates distinct circulation systems to safely separate visitors from operations, and adds two acres of native plantings. Buildings are also organized to create the site's own urban context.

The facility includes an education centre that over looks a viewing platform inside the Processing Facility. The viewing platform allows students and visitors to see the recycling process in action.

