



Town of  
**Port Hedland**



# **Town of Port Hedland Townsite**

**Coastal Foreshore  
Management Plan**





# ACKNOWLEDGMENT

Shape Urban acknowledge the Kariyarra people as traditional custodians of the land on which we have worked for this project. We recognise their cultural heritage, beliefs and relationship to the land, which continue to be important to the Kariyarra people today.

We pay our respects to Elders past and present, and to the land which they have cared for.



Shape Urban are proud to partner with a great team including AIE, Propagule, and Western Ecological to deliver this project.



# EXECUTIVE SUMMARY

The Port Hedland Townsite is located on a narrow headland surrounded by tidal flats. The coastal zone supports a diversity of transport, services and community infrastructure, urban land and the foreshore reserve.

The coastal zone is a major asset for the Town of Port Hedland and is highly valued by the community as a recreational resource, for its cultural and biodiversity and ecosystem significance and as a significant landscape feature.

However, the coastline is prone to significant pressures including increased coastal erosion, inundation of low lying areas during storm events, increasing human uses, and threats to the biodiversity values.

Inundation has previously affected areas of the West End and Wilson Street and erosion pressures are impacting coastal areas along Kingsmill Street, Sutherland Street and Goode Street.

The Town of Port Hedland is seeking to proactively manage this risk. In 2017 the Town embarked on development of a Coastal Hazard Risk Management and Adaptation Plan (CHRMAP) which was endorsed in 2019.

Within weeks of completion, Tropical Cyclone (TC) Veronica hit the coast, which resulted in significant damage. Condition assessment and studies completed after TC Veronica has led to reconsideration of the CHRMAP recommendations.

There is also a need to identify more specific short term foreshore management actions that work together with the longer term adaptation pathways of the CHRMAP, including consideration of asset management and replacement regimes, planting and vegetation management, development of pathways and coastal access locations.

The Coastal Foreshore Management Plan (CFMP) builds on the outcomes and recommendations of the CHRMAP and previous coastal studies. It details baseline information about the coastal zone, including flora and fauna and the Town of Port Hedland's owned or managed assets, relevant to planning and management of the coastline.

It uses information from the engagement that was undertaken with the Port Hedland community including Traditional Owners and key stakeholders to prioritise important social, cultural, environmental and economic values and assets to the community and to make informed recommendations about assets that should be protected longer term, and where avoidance, retreat or adaption is more appropriate.

The CFMP considers all of these elements and establishes a blueprint to guide the sustainable use and development of the coastal reserves over time that is consistent with federal and state coastal hazard and risk management guidance.

This will allow the Town of Port Hedland to use information in the CFMP to plan, manage and improve its coastal zone for the community, whilst ensuring longer term coastal management is supported.

Management actions are proposed for seven management unit areas that make up the CFMP (see Figure 1).





**FIGURE 1 - COASTAL FORESHORE MANAGEMENT PLAN AREA AND  
MANAGEMENT UNITS 1 - WEST END  
2 - SPOILBANK  
3 - SUTHERLAND STREET**

**4 - COOKE POINT  
5 - PRETTY POOL  
6 - FOUR MILE CREEK  
7 - SIX MILE CREEK**



The management actions are centred around:

- Cleaning up cyclone damage
- Planting / revegetation for dune stabilisation and environmental reasons
- Protecting turtle nesting areas
- Education about environmental and cultural significance across the CFMP area
- Trigger based reconstruction / relocation of coastal paths and construction in a more temporary material like gravel
- Trigger based relocation of coastal assets and infrastructure further inland
- Rationalising and formalising beach access to stabilise dunal systems and associated vegetation
- Sand nourishment in areas at most risk of erosion
- Seawall construction in nominated and planned locations over the longer term with increasing coastal erosion and/or inundation risks.

In addition to coastal hazard risk-responsive management actions, a number of signage and wayfinding actions are proposed, including dual place naming recommended across the CFMP area to promote the Town's Aboriginal identity and allow people to connect to culture, embody tradition and pass on knowledge.

Recommended actions are described in Table 1, with the following acronyms used:

- OM - Overall Management Actions
- WE - West End Management Unit
- SB - Spoilbank Management Unit
- SS - Sutherland Street Management Unit
- CP - Cooke Point Management Unit
- PP - Pretty Pool Management Unit
- FM - Four Mile Creek Management Unit
- SM - Six Mile Creek Management Unit

Timing for management actions is described as short term, medium term, long term or ongoing, where:

Short term = 0 - 5 years

Medium term = 5 - 10 years

Long term = 10 + years

Ongoing = As required

More detailed guidance is provided in Section 6 of this CFMP.



**TABLE 1 - COASTAL FORESHORE MANAGEMENT PLAN RECOMMENDED ACTIONS**

| Action Item | Action                                                                                                              | Responsibility                                                             | Timing     |
|-------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------|
| OM 1        | Replace assets in accordance with the materials and technical specifications                                        | Town of Port Hedland                                                       | Ongoing    |
| OM 2        | Underground and expensive linear infrastructure should be designed to run perpendicular to the coast where possible | Service agencies                                                           | Long term  |
| OM 3        | Adopt and deliver on the 'materials and finishes palette' and the 'planting and vegetation management strategy'     | Town of Port Hedland<br>Individual landowners                              | Ongoing    |
| OM 4        | Develop and deliver on dual place naming for signage across the CFMP area                                           | Town of Port Hedland in partnership with Kariyarra Aboriginal Corporation. | Short term |
| OM 5        | Improve dune under repair signage                                                                                   | Town of Port Hedland                                                       | Short term |
| OM 6        | Undertake a community education process regarding dune repair                                                       | Town of Port Hedland in partnership with Care for Hedland                  | Short term |
| OM 7        | Investigate and plan a citizen science marker program - Section 5.3.3 of the CFMP refers                            | Town of Port Hedland in partnership with Care for Hedland                  | Ongoing    |
| OM 8        | Investigate and plan a turtle sighting signage strategy - Section 5.3.3 of the CFMP Refers                          | Town of Port Hedland in partnership with Care for Hedland                  | Short term |
| OM 9        | Rationalise beach access points and provide directional / wayfinding signage                                        | Town of Port Hedland                                                       | Ongoing    |

**TABLE 1 - COASTAL FORESHORE MANAGEMENT PLAN RECOMMENDED ACTIONS (CONT'D)**

| Action Item | Action                                                                                                                                                   | Responsibility                                      | Timing            |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------------|
| WE 1        | Progress the design and delivery of the 'gap' seawall, ensuring pathways are developed as part of the structure                                          | Town of Port Hedland                                | Short term        |
| WE 2        | Undertake revegetation/planting of coastal vegetation and mangroves along the Management Unit coastline                                                  | Partner with BHP and PPA for mangrove stock         | Short-medium term |
| WE 3        | Redevelop the Richardson Street boat ramp car park for short stay caravan and RV parking in a smaller configuration and revert the balance to vegetation | Town of Port Hedland                                | Medium term       |
| WE 4        | Clean up cyclone damage as and when required                                                                                                             | Town of Port Hedland                                | Ongoing           |
| WE 5        | Construct the Kingsmill Street coastal pathway                                                                                                           | Town of Port Hedland                                | Short term        |
| WE 6        | Formalise and construct dune pathway at the end of Darlot Street.                                                                                        | Town of Port Hedland                                | Short term        |
| WE 7        | Monitor erosion in front of Kingsmill Street properties.                                                                                                 | Town of Port Hedland in partnership with landowners | Short-medium term |
| WE 8        | Once poles, wires, drainage, paths hit degradation point (trigger) to be replaced on the inland side of Richardson Street                                | Service agencies<br>Town of Port Hedland            | Ongoing           |
| WE 9        | Retreat of foreshore infrastructure (bins, seats, signs, other) from coastal edges when at end of life                                                   | Town of Port Hedland                                | Ongoing           |



**TABLE 1 - COASTAL FORESHORE MANAGEMENT PLAN RECOMMENDED ACTIONS (CONT'D)**

| Action Item | Action                                                                                                                                  | Responsibility                                            | Timing            |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------|
| SB 1        | Signpost vehicle access ways across the Spoilbank to encourage the use of more formalised pathways                                      | Town of Port Hedland                                      | Short term        |
| SB 2        | Undertake revegetation/planting of coastal vegetation                                                                                   | Town of Port Hedland in partnership with Care for Hedland | Short-medium term |
| SB 3        | Support the Yacht Club proposal provided that structures can be removed or adequately tied down before destructive cyclone events       | Yatch Club in consultation with Town of Port Hedland      | Short term        |
| SB 4        | Clean up cyclone damage as and when required                                                                                            | Town of Port Hedland                                      | Ongoing           |
| SB 5        | Manage foreshore infrastructure in accordance with the Spoilbank CHRMAP as approved by Council                                          | Town of Port Hedland                                      | Ongoing           |
| SB 6        | Monitor changes in the Spoilbank coast and implement adaptation pathways in accordance with the Spoilbank CHRMAP as approved by Council | Town of Port Hedland                                      | Ongoing           |

**TABLE 1 - COASTAL FORESHORE MANAGEMENT PLAN RECOMMENDED ACTIONS (CONT'D)**

| <b>Action Item</b> | <b>Action</b>                                                                                                                                                    | <b>Responsibility</b>                                     | <b>Timing</b>     |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------|
| SS 1               | Monitor changes to the coastline and take action when triggers are reached                                                                                       | Town of Port Hedland                                      | Ongoing           |
| SS 2               | Undertake revegetation/planting of coastal vegetation                                                                                                            | Town of Port Hedland in partnership with Care for Hedland | Short-medium term |
| SS 3               | Replace damaged coastal paths with gravel road base/temporary materials when relevant                                                                            | Town of Port Hedland in partnership with Care for Hedland | Ongoing           |
| SS 4               | Manage lighting with regard to turtle nesting habitat                                                                                                            | Town of Port Hedland in partnership with Care for Hedland | Short term        |
| SS 5               | Improve wayfinding and signage in proximity to turtle nesting area to better manage unintended impacts from access to the beach during hatching                  | Town of Port Hedland in partnership with Care for Hedland | Short term        |
| SS 6               | Finalise the design of the seawall to enable quick response if funding becomes available.                                                                        | Town of Port Hedland                                      | Short term        |
| SS 7               | Retreat of foreshore infrastructure (bins, seats, signs, other) from coastal edges when at end of life                                                           | Town of Port Hedland                                      | Ongoing           |
| SS 8               | Improve signage and wayfinding from the central section of the Management Unit to indicate nearest beach access points in either westerly or easterly direction. | Town of Port Hedland                                      | Short term        |
| SS 9               | Partner with the Hedland Hotel to manage ad-hoc beach access and undertake revegetation                                                                          | Town of Port Hedland in partnership with Hedland Hotel    | Short term        |



**TABLE 1 - COASTAL FORESHORE MANAGEMENT PLAN RECOMMENDED ACTIONS (CONT'D)**

| <b>Action Item</b> | <b>Action</b>                                                                                                                                                                  | <b>Responsibility</b> | <b>Timing</b> |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|
| SS10               | Repair or replace Crawford and Sutherland Street beach access staircase. Provide wayfinding signage inland to direct tourists to the access point (from overflow caravan site) | Town of Port Hedland  | Short term    |
| SS11               | Replace coastal infrastructure including poles, wires, drainage, paths to the inland side of Sutherland Street once assets hit degradation point (trigger)                     | Town of Port Hedland  | Ongoing       |
| SS12               | Clean up cyclone damage as and when required                                                                                                                                   | Town of Port Hedland  | Ongoing       |

**TABLE 1 - COASTAL FORESHORE MANAGEMENT PLAN RECOMMENDED ACTIONS (CONT'D)**

| Action Item | Action                                                                                                                                                          | Responsibility                                            | Timing            |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------|
| CP 1        | Monitor changes to the coastline and take action if triggers are reached                                                                                        | Town of Port Hedland                                      | Ongoing           |
| CP 2        | Undertake revegetation/planting of coastal vegetation                                                                                                           | Town of Port Hedland in partnership with Care for Hedland | Short-medium term |
| CP 3        | Complete the coastal pathway between Keesing Street north and Dempster Street and establish informal pathways with gravel to access Rock of Ages                | Town of Port Hedland                                      | Short-medium term |
| CP 4        | Manage lighting with regard to turtle nesting habitat                                                                                                           | Town of Port Hedland in partnership with Care for Hedland | Short term        |
| CP 5        | Limit development of foreshore infrastructure (bins, seats, signs, other) from coastal edges                                                                    | Town of Port Hedland                                      | Ongoing           |
| CP 6        | Improve signage and wayfinding to indicate nearest beach access points in either westerly or southerly direction.                                               | Town of Port Hedland                                      | Short term        |
| CP 7        | Replace coastal infrastructure including poles, wires, drainage, paths to the inland side of coastal-adjacent roads once assets hit degradation point (trigger) | Service agencies<br>Town of Port Hedland                  | Ongoing           |
| CP 8        | Clean up cyclone damage as and when required                                                                                                                    | Town of Port Hedland                                      | Ongoing           |
| CP 9        | Use beach access rationalisation as an opportunity for education and awareness                                                                                  | Town of Port Hedland in partnership with Care for Hedland | Short-medium term |

**TABLE 1 - COASTAL FORESHORE MANAGEMENT PLAN RECOMMENDED ACTIONS (CONT'D)**

| Action Item | Action                                                                                                                                                          | Responsibility                                            | Timing            |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------|
| PP 1        | Monitor changes to the coastline and take action if triggers are reached                                                                                        | Town of Port Hedland                                      | Ongoing           |
| PP 2        | Undertake revegetation/planting of coastal vegetation and mangroves                                                                                             | Town of Port Hedland in partnership with BHP              | Short-medium term |
| PP 3        | Finalise the design of the Goode Street seawall to enable quick response if funding becomes available.                                                          | Town of Port Hedland                                      | Short term        |
| PP 4        | Complete the coastal pathway linking Goode Street with temporary materials (gravel road base)                                                                   | Town of Port Hedland                                      | Short-medium term |
| PP 5        | Continue to progress designs for the Pretty Pool pedestrian bridge.                                                                                             | Town of Port Hedland                                      | Medium term       |
| PP 6        | Manage lighting with regard to turtle nesting habitat                                                                                                           | Town of Port Hedland in partnership with Care for Hedland | Short term        |
| PP 7        | Plan for and implement additional bike racks and shade trees at Pretty Pool park.                                                                               | Town of Port Hedland                                      | Medium term       |
| PP 8        | Limit development of foreshore infrastructure (bins, seats, signs, other) from coastal edges                                                                    | Town of Port Hedland                                      | Ongoing           |
| PP 9        | Replace coastal infrastructure including poles, wires, drainage, paths to the inland side of coastal-adjacent roads once assets hit degradation point (trigger) | Service agencies<br>Town of Port Hedland                  | Ongoing           |
| PP 10       | Improve signage and wayfinding for beach access as well as signage of the Staircase to the Moon nodes.                                                          | Town of Port Hedland                                      | Short term        |
| PP 11       | Use beach access management as an opportunity for education and awareness                                                                                       | Town of Port Hedland in partnership with Care for Hedland | Short-medium term |
| PP12        | Clean up cyclone damage as and when required                                                                                                                    | Town of Port Hedland                                      | Ongoing           |



**TABLE 1 - COASTAL FORESHORE MANAGEMENT PLAN RECOMMENDED ACTIONS (CONT'D)**

| Action Item | Action                                                                                               | Responsibility                                                            | Timing            |
|-------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------|
| FM 1        | Undertake further studies to understand the hazards and risks associated with erosion and inundation | Town of Port Hedland                                                      | Short term        |
| FM 2        | Clean up cyclone damage as and when required                                                         | Town of Port Hedland                                                      | Ongoing           |
| FM 3        | Install natural bollards and barriers to discourage four wheel drive access                          | Town of Port Hedland                                                      | Short-medium term |
| FM 4        | Introduce gathering and viewing locations with associated access and signage                         | Town of Port Hedland                                                      | Medium term       |
| FM 5        | Support the development of a ranger program for Traditional Owners                                   | Town of Port Hedland in partnership with Kariyarra Aboriginal Corporation | Short term        |

**TABLE 1 - COASTAL FORESHORE MANAGEMENT PLAN RECOMMENDED ACTIONS (CONT'D)**

| Action Item | Action                                                                                                         | Responsibility                                                            | Timing            |
|-------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------|
| SMC 1       | Employ Kariyarra rangers to manage the area                                                                    | Town of Port Hedland in partnership with Kariyarra Aboriginal Corporation | Short term        |
| SMC 2       | Investigate sharing management responsibility of the SMC management unit with Kariyarra Aboriginal Corporation | Town of Port Hedland in partnership with Kariyarra Aboriginal Corporation | Short-medium term |
| SMC 3       | Clean up cyclone damage as and when required                                                                   | Town of Port Hedland                                                      | Ongoing           |
| SMC 4       | Undertake revegetation/planting of coastal vegetation and mangroves                                            | Town of Port Hedland in partnership with Care for Hedland                 | Ongoing           |
| SMC 5       | Signpost gathering / viewing locations to assist with managing ad-hoc access of dunes                          | Town of Port Hedland                                                      | Short-medium term |
| SMC 6       | Limit four wheel drive access                                                                                  | Town of Port Hedland                                                      | Short term        |
| SMC 7       | Retreat of foreshore infrastructure (bins) from coastal edges at end of life                                   | Town of Port Hedland                                                      | Ongoing           |

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## Document Control

| Version | Modification             | Justification                     | Author      |
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|         |                          |                                   |             |
|         |                          |                                   |             |
|         |                          |                                   |             |

# COMMON DEFINITIONS

The following definitions apply to these words and phrases used through the report.

## CHRMAP (Coastal Hazard Risk Management and Adaptation Plan)

A study that identifies the key hazards and assesses the risk to assets of coastal erosion and inundation.

## Coastal Assets

Resources controlled by an entity - in this CFMP coastal assets under the ownership or care of the Town of Port Hedland - that enable services to be provided or from which future economic benefits are expected.

## Coastal Ecosystem

Is an area where land and water come together. They provide important links between land and marine environments, with some being feeding and breeding grounds for marine species.

Any changes to coastal ecosystems or habitat loss can lead to a range of adverse impacts on the long-term health and resilience of the systems, industries they support and flow-on effects for human well being.

## Ecological Community

A naturally occurring biological assemblage that occurs in a particular type of habitat. Note: The scale at which ecological communities are defined will often depend on the level of detail in the information source, therefore no particular scale is specified.

## Flexible Adaptation Pathway

Flexible adaptation planning is about being ready to manage the risks and impacts of coastal processes a location experiences, by planning for the most appropriate decisions and options to implement over time.

The flexible adaptation pathway approach enables the establishment of a decision-making strategy that is made up of a sequence of decision points over time, preventing a decision-maker from being locked into a risk treatment option (and associated risk management measures), which may not be appropriate for dealing with the long-term problem. The intent is for decision-making to be responsive to changing circumstances over time.

## Habitat

The areas in which an organism and/or assemblage of organisms lives. It includes the abiotic factors (e.g. substrate and topography), and the biotic factors.

## Intolerable Risk

Risk that is unacceptable in any circumstances or at any level.

## Rehabilitation

The re-establishment of ecological attributes in a damaged ecological community although the community will remain modified.

## Sand Nourishment

Sand nourishment is one possible protection adaptation pathway to coastal hazards. It may be a standalone measure for protection, or be used to improve the beach amenity when used in combination with other adaptation measures such as a seawall.

It is considered to be a 'soft' management option and usually mimics natural beach and dune systems.

## S1

The current risk of storm erosion (based on historical storms). In Port Hedland this would now be based on TC Veronica.

## Threatened ecological community (TEC)

Is one which is found to fit into one of the following categories; "presumed totally destroyed", "critically endangered", "endangered" or "vulnerable".

Possible threatened ecological communities that do not meet survey criteria are added to DBCA's Priority Ecological Community Lists under Priorities 1, 2 and 3. Ecological Communities that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

# 1 INTRODUCTION

## 1.1 Purpose and Objectives

The coastal zone is a major asset for the Town of Port Hedland. The coastal foreshore spreads across a narrow headland with significant port infrastructures to the south and west. North and east of the settlement, the coastal foreshore is highly valued by the community as a recreational resource, for its cultural and biodiversity and ecosystem significance and as a significant landscape feature.

However, the coastline is prone to significant pressures including increased coastal erosion, inundation of low lying areas during storm events, increasing human uses, and threats to the biodiversity values.

The CFMP is a blueprint for the future use of the Town's coastal foreshore. It sets out the way the coastal zone can be used and provides specific actions for the management, orderly development and enhancement of the area to best meet the needs of the community.

It does this taking into account the pressures on the coast including those identified in the Port Hedland Townsite CHRMAP, existing social, cultural, environmental and economic values, and costs associated with proposed management responses.

The CFMP:

1. Builds on the outcomes and recommendations of the Port Hedland CHRMAP and contributes to the implementation of local and regional planning strategies.
2. Establishes flora and fauna baseline information and the Town of Port Hedland's owned or managed assets, relevant to the planning and management of the Port Hedland coastline.
3. Speaks to engagement with the Port Hedland community including Traditional Owners which resulted in the identification of important social, cultural, economic and environmental values to these stakeholders, and the according appropriate sustainable management and development of coastal reserves.
4. Establishes a plan to guide the sustainable use and development of the coastal reserves, and determine short and long term investment in infrastructure required to protect and enhance community values whilst considering coastal hazards and risks.

It covers the area from Wedges Street in the West End to Cooke Point at the east end and down to Pretty Pool and the Six Mile Creek area (Figure 1 refers).

## 1.2 Literature Review

The Town of Port Hedland has undertaken a number of studies that inform or are precursors to the CFMP. A review of available documents relating to the study area reveals significant attention paid to the science and engineering factors of the coast, and also the community expectations for use of the area.

These previous studies and reports have been reviewed to understand gaps in the data and information, bridge these gaps with additional investigations and community and stakeholder engagement, and to build a single plan for the townsite study area.

A detailed literature review is available as a separate report, whilst this section provides a high level understanding of the work already undertaken to establish a background for the CFMP.

The previous studies reviewed to inform the preparation of the CFMP are:

- Flora and Vegetation Reconnaissance Survey of Spoilbank Reserve - February 2020 (Strategen)
- Spoilbank Marina Coastal Hazard Risk Management & Adaptation Plan - April 2020 (MP Rogers)
- Pretty Pool Creek Concept Path, Boardwalk & Bridge Design (MP Rogers)
- Draft Port Hedland Parks and Paths Strategy
- Port Hedland Marina Artificial Lighting Impact Assessment Report - February 2020 (RPS)
- Goode St Dune Erosion Concept Adaptation Options Study - January 2020 (MP Rogers)
- Sutherland St Erosion Concept Adaptation Options Study - December 2019 (MP Rogers)
- Tropical Cyclone Veronica Coastal Assessment & Recommendation - April 2019 (MP Rogers)
- Marapikurrinya Park, Richardson Street & Gap Seawalls Design Report - December 2019 (MP Rogers)
- Port Hedland Marina and Waterfront Master Plan and Place Plan - December 2019
- Town of Port Hedland Port Hedland Townsite CHRMAP - April 2019 (GHD)
- Town of Port Hedland Public Open Space Strategy - August 2019
- Port Hedland Foreshore Master Plan - Environmental Synopsis (Acacia Springs Environmental)
- Port Hedland Coastal Geomorphological Study - May 2013 (Cardno)
- Port Hedland Coastal Vulnerability Study Final Report - August 2011 (Cardno)
- Urban Development Program - Regional Hotspots - Port Hedland 2011
- Improvement Plan 50 - Port Hedland West End, and Improvement Scheme No.1
- Pilbara Coast - Geology, Geomorphology and Vulnerability (WAPC, 2013)
- Pilbara Coast - Geology, Geomorphology and Vulnerability (WAPC, 2013)
- National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds
- Draft Port Hedland Parks and Paths Strategy



### 1.2.1 Summary

Key observations from the literature review primarily consider the CHRMAP recommendations, reports post-TC Veronica and the Foreshore Redevelopment Master Plan Report.

They comprise areas of agreement, divergence and factors that inform or influence the stakeholder engagement and development of adaptation pathways and proposed management actions in the CFMP in view of recent extreme weather events.

Observations are broken down into different management units of the coastline, which informs the development of management units proposed in the CFMP.

#### **Management Unit 1 - West End Wedge Street to Howe Street**

Generally all studies reflect that this section of the coastline is affected by significant inundation and erosion. The area is tied to Port activities and land and alternative management measures include sand replenishment, dune stabilisation and rock armour seawalls.

The more recent Marapikurrinya Park, Richardson St & Gap Seawalls Design Report confirms these general management actions, and notes limited ability to protect from inundation due to the levels behind Town Beach and the West End.

The Foreshore Redevelopment Master Plan Report indicates a commitment to foreshore improvement in this area, including significant tree planting and the development of structures such as The Beacon lookout proposal.

The expenditure on foreshore upgrades and developments should closely align with coastal adaptation measures in this location

to ensure efficient and effective outcomes can be achieved.

#### **Management Unit 2 - Spoilbank - Howe Street to Taplin Street**

Reports for this area are dominated by the proposed Port Hedland Marina (see Figure 2). They do not provide direction for the area outside of the marina.

Proposed management actions have been developed through the CFMP planning process, in consultation with Development WA, Pilbara Development Commission and Pilbara Ports Authority, for the areas surrounding the proposed marina development, which reflect community values associated with these areas.

It is noted that the Spoilbank Marina works, and the spoilbank more generally are considered a potential site for mining sand for sand nourishment of other vulnerable locations to facilitate continued protection of the Port Hedland Townsite.









FIGURE 2 - PORT HEDLAND MARINA MASTER PLAN

### **Management Unit 3 - Cemetery Beach and Civic Node - Taplin Street to Crawford Street**

All reports recognise that this area is affected by erosion. TC Veronica illustrated the impact of a significant event, and the monitoring recommended by the CHRMAP is being expedited. The result of this recent event has encouraged more community members and stakeholders to become more active, especially after seeing the impacts on the recently developed Cemetery Beach Park.

The Hotel redevelopment, Botanic Gardens and other proposed landscape treatments presented in the Foreshore Redevelopment Master Plan are reconsidered in the CFMP in light of the CHRMAP and more recent events.

The value to the local community of turtle nesting is noted through this management Unit and Management Unit 4, as something that should be recognised as a key component of the foreshore experience.

This implies a need to retain a natural environment state as much as possible.

The lighting of this section is thus also a critical factor for the CFMP, which will need to specify appropriate standards for light spill which is known to impact turtle breeding activities.

### **Management Unit 4 - Spinifex Hill and Cooke Point - Crawford Street to Cooke Point**

All studies identify the significant erosion effects experienced in this location, and the vulnerability of both the foreshore and adjacent private properties.

However, whilst the CHRMAP suggests short term interim protection, its longer term options include managed retreat or hard passive protection (construction of groynes and sand replenishment, or an interim intertidal rocky platform).

Contrary to these recommendations, the recent events of TC Veronica resulted in the Sutherland Street Erosion Concept Adaptation Options Study, which adds a further hard active protection option of a rock seawall, which was not recommended by the CHRMAP.

Given the community values identified for beach access, it is not surprising that the CHRMAP discarded the seawall option, which would have an impact on beach (sand) retention.

The CFMP process invited the community to reaffirm expectations for this location and the use of the beach continues to be valued.

The Foreshore Redevelopment Master Plan suggests such features as an ocean pool, further tree planting and beach access through paths and active boardwalk areas to the Rock of Ages.

The CFMP will need to continue to balance the expectations of beach retention, protection of private property and protection of public assets including the stairs to the beach that allow for beach use.

A number of the landscape treatments proposed are reconsidered in the proposed adaptation pathways developed in the CFMP.

The lighting of this section is thus also a critical factor for the CFMP, which will need to specify appropriate standards for light spill which is known to impact turtle breeding activities.



### **Management Unit 5 - Cooke Point to Pretty Pool**

The reviewed studies identified significant erosion effects in this location, and the vulnerability of the foreshore and adjacent private properties. Inundation was also noted both from the coast and from inland low lying areas including Pretty Pool and Four Mile Creek.

However, whilst the CHRMAP suggests short term interim protection via sand replenishment, its longer term options include managed retreat or hard passive protection (construction of groynes and sand replenishment, or an interim intertidal rocky platform).

Contrary to these recommendations, the recent events of TC Veronica resulted in the Goode Street Dune Erosion Concept Adaptation Options Study, which adds a further hard active protection option of a rock seawall (not recommended in the CHRMAP).

As per the Crawford Street to Cooke Point section, given the community values identified for beach access, it is not surprising that the CHRMAP discarded the seawall option. However, the Goode Street Dune Erosion Concept Adaptation Options Study report suggests that in this location the seawall would beneficially facilitate beach recovery over time. This has been reconsidered as part of the CFMP.

In the Pretty Pool area, all coastal documents generally encourage monitoring and avoiding of new development in the area, whilst the Foreshore Redevelopment Master Plan suggests a number of pathways and landscape treatments including a creek crossing and viewing platforms, as well as the expansion of a parking area and a dune boardwalk.

These proposed coastal treatments are reconsidered in the CFMP in light of recent

events, with pathways generally included to enable continued community connection and access to this much valued area.

### **Management Unit 6 - Four Mile Creek**

The area from Pretty Pool to Four Mile Creek is recognised as being impacted by inundation and erosion effects. Few of the recent studies define specific solutions, and it is also recognised that some planning for the expansion of the Pretty Pool urban area is proposed towards the coastline.

The CHRMAP recommends short term monitoring and long term interim protection and accommodation.

Connections to this area remain important to the community, whilst protection of the natural environment is also valued. Balancing these expectations are considered in the CFMP.

### **Management Unit 7 - Six Mile Creek**

Six Mile Creek has limited prior reporting. Proposed foreshore treatments have been determined after engagement with the community and key stakeholders.

This area is subject to a Memorandum of Understanding with the local Aboriginal Traditional Owners, the Kariyarra people, and the Town of Port Hedland. The CFMP supports the resolution of key actions for the area between the two parties.



## 1.3 Planning Context

A range of plans, strategies and policies provide the context for the future conservation, development and use of the Port Hedland townsite coastal zone.

The following is a summary of the key statutory and policy mechanisms applicable to the subject land, and that have relevant requirements.

- State Planning Policy 2.6 - State Coastal Planning Policy
- Coastal Hazard Risk Management and Adaptation Planning Guidelines (WAPC, July 2019)
- State Planning Policy 2.9 - Water Resources
- State Planning Policy 3.6 Development Contributions for Infrastructure
- Town of Port Hedland Local Planning Scheme No. 5
- Town of Port Hedland Draft Local Planning Strategy (as modified for public advertising)
- Town of Port Hedland Local Planning Scheme No. 7 (as modified for public advertising)
- Improvement Plan 50 - Port Hedland West End
- Improvement Scheme No.1

### 1.3.1 Summary

The planning context provides significant direction for the CFMP. State Coastal planning Policy 2.6 and the Coastal Hazard Risk Management and Adaptation Planning Guidelines are obviously instructive for this study and provide the basis for longer term strategic thinking in coastal zones.

Importantly, these documents recommend flexible pathways proposed that have no - or limited - regrets for future decision makers. The CFMP recommendations need to think both short and long term to allow for the best

possible decision making to occur at the right time, which may also include limited action in the short term.

State Planning Policy 2.9 provides a directive to minimise water use by using local native vegetation, which is particularly relevant to Port Hedland's coastline, and State Planning Policy 3.6 enables consideration of a user-pays model for longer term protection (where the beneficiary of the protection measure contributes to it).

Local planning is also a key consideration in the CFMP, and the CFMP will need to tie into existing plans and frameworks. The CFMP is impacted generally by the Town of Port Hedland Local Planning Strategy and the draft new Local Planning Strategy and the Town of Port Hedland Local Planning Scheme No. 7 (TPS7 - modified for public advertising).

Recommendations of the Local Planning Strategy that are based on the CHRMAP are addressed further in the CFMP, whilst the draft TPS7 includes Special Control Area 7 (SCA7) which refers to special controls for the at-risk coastal zones.

SCA7 provides a strong indication, for those properties within the areas subject to coastal erosion and inundation, that there is a known risk.

It provides direction to planners and decision makers regarding the potential risk associated with new structure plans, subdivision and development applications, and enables provisions that would support notifications on titles (Section 70A of the Transfer of Land Act 1983). This is largely associated with private development (although some of this development may be undertaken by State Government agencies or trading entities).

As the CFMP is a document which seeks to manage the coastal zone which is the area at primary risk, it would be appropriate that the CFMP also reflects awareness of the risks that are explicitly identified in SCA7.

The CFMP is also more specifically affected by Improvement Plan 50 - Port Hedland West End, and Improvement Scheme No.1. These documents act as a separate scheme to the Town of Port Hedland Local Planning Scheme in the West End (see Figure 3) , and relate to the management of dust impacts in proximity to Port Hedland port.

The Improvement Plan and Scheme work together with a voluntary buy-back scheme for land in the area, which has the effect of making this area particularly prone to changes in land use and land ownership over the short - medium term. The CFMP should take actions which consider the potential future of the area, and not seek to undermine the Improvement Plan and Scheme in any way.

## **1.4 Heritage**

The cultural value of the Port Hedland Townsite includes Aboriginal and European heritage, spiritual connections and historical value.

The history of the townsite is highly valued, and is a key element of the character of the area.

The townsite and coastal area is significant to the culture and identity of the Kariyarra People, the traditional owners and custodians of this area.

Numerous specific sites across the CFMP area have been recognised for their significant importance to Aboriginal culture, and are listed as Aboriginal Sites under the Aboriginal Heritage Act 1972. Figure 4 refers.

It is important to note, however, that places of significance may not be registered, and there are additional areas valued and used by the Aboriginal community beyond formally protected sites.

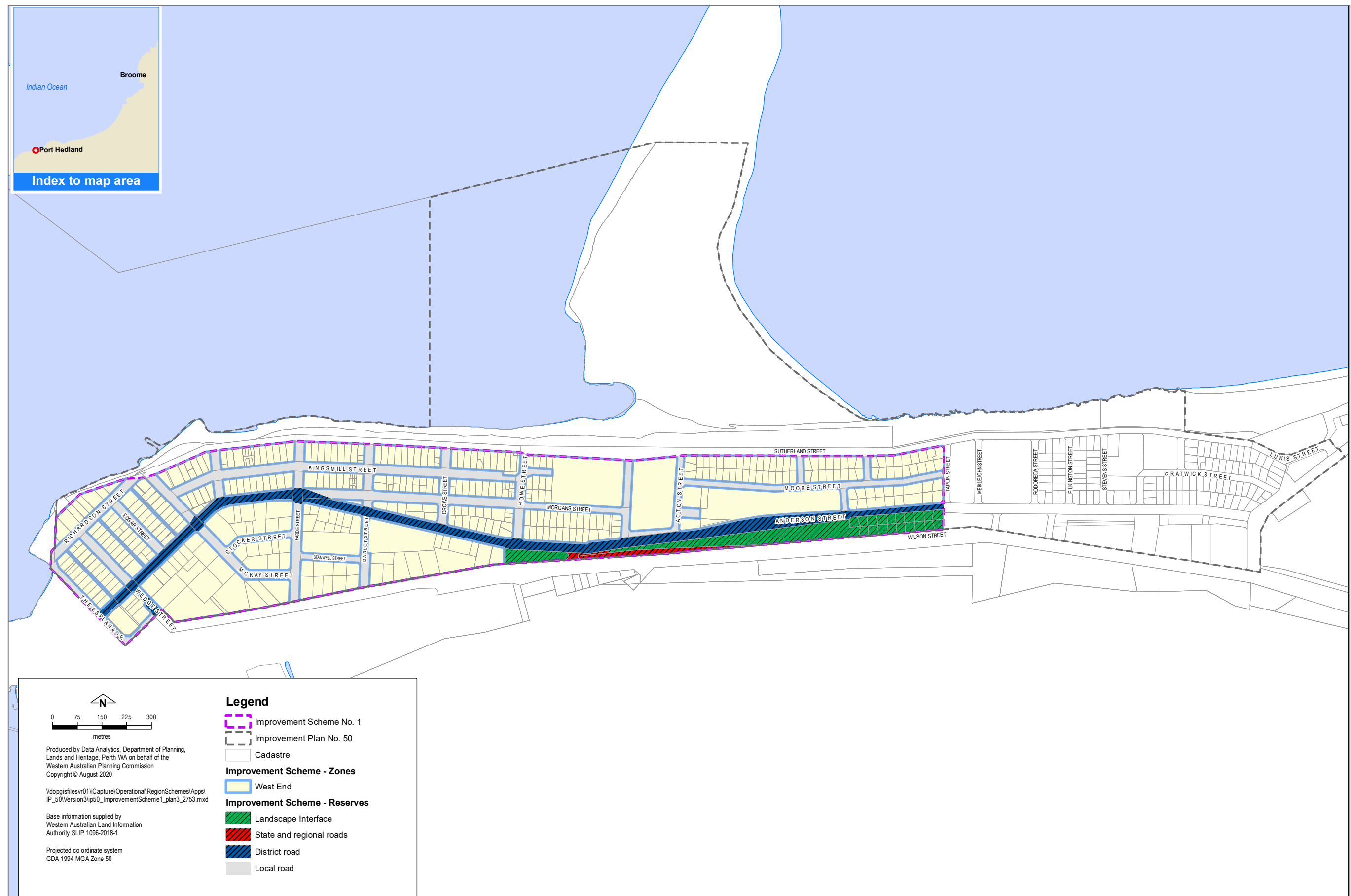


FIGURE 3 - IMPROVEMENT SCHEME NO. 1





FIGURE 4 - ABORIGINAL HERITAGE SITES (CHRMAT, GHD, 2019)



## 2 COASTAL CONTEXT







## 2.1 Location and Coastal Processes

The Pilbara coastline is the most cyclone-prone region of the Australian mainland, with the area immediately surrounding Port Hedland having the highest frequency of Category 4 and 5 cyclones that make landfall. Approximately 3 cyclones per year, on average, influence the conditions at Port Hedland (known as ‘metocean’ conditions).

The region is a macro-tidal environment and is subject to large, semi-diurnal tides which drive water level variations over an approximate two-week spring-neap cycle. Tidal ranges vary between 2m during neap tides up to 7.5m during very large spring periods (Baird for DoT, 2020).

The Port Hedland Townsite CHRMAP (GHD, 2019) noted that the two main considerations in Port Hedland comprise inundation and erosion, with townsite beaches having a moderate to high landform vulnerability to coastal processes.

The CHRMAP also recognised that the town and the coast will become increasingly vulnerable to the impacts of sea level rise, storm surges and changes in natural sediment movement.

Inundation is the flow of water onto previously dry land which could be permanent (sea level rise) or temporary (flooding due to storm and rain events which can also coincide with high or king tides).

Erosion is the loss of sand which may occur over longer periods of time through changes in the wind and wave direction across the seasons or it can be sudden, such as through storm events.

Port Hedland observes significant erosion events, especially during cyclones.

Erosion is often discussed alongside accretion (the ‘return’ of sand), and in a stable shoreline the slow seasonal process of erosion and accretion work together to keep the shoreline balanced.

However, when erosion occurs without complementary accretion, or where there are a number of sudden events such as storms one after the other, it is likely that the shoreline will drift permanently landwards. This permanent change would likely result in a reduction in coastal foreshore reserves, and potentially impact public and private assets.

## 2.2 Coastal Hazard Risk in Port Hedland

As noted in Section 1.2.1 and 1.3.1, SPP 2.6 provides guidance for decision-making within the coastal zone, including for managing development and land use change, the establishment of foreshore reserves, and to protect, conserve and enhance coastal values.

Inundation is most likely to be experienced adjacent tidal creek areas including the Pretty Pool area, along the Spoilbank, the West End, Tjalka Boorda and the low-lying land between Wilson Street and Anderson Street. Whilst these areas are considered in the CFMP, the major focus of the CFMP will be the coastal zone, which will be predominantly affected by erosion.

Areas that will be affected most noticeably by erosion will be sandy beaches such as Cemetery Beach, Cooke Point, the Goode Street foreshore, Spoilbank and Town Beach. Erosion is already very apparent in these locations.

The hazard identification stage was conducted by GHD in developing the CHRMAP, however, as noted in Section 1.2 (Literature Review) the impacts of TC Veronica have required review of some of the proposed responses to immediate coastal inundation and erosion which has become more apparent.

It should be noted that a direct shoreline crossing from a tropical cyclone (i.e. 'hitting' the coast at Port Hedland rather than further along the coast), or a second significant cyclone to impact Port Hedland before the natural replenishment of the beach from the last cyclone event, may result in vastly more impact again than was experienced through TC Veronica.

## 2.2.1 Immediate Risk

Immediate coastal hazards likely to result from seasonal processes including significant storm or cyclonic events are mostly erosion related. These would result in potential for the loss or impact to permanent assets and community values.

In areas where there are high sandy dunes, erosion may also result in instability of the dune, also resulting in potential loss or impact to assets and values

The CHRMAP's risk assessment evaluated the risk to individual assets based on the values that each asset supports. Coastal hazard risk levels and tolerability ratings for each coastal planning area in the immediate, current and long-term are shown in Table 2 with 'triggers' illustrated further in Figure 5.

**TABLE 2 - COASTAL HAZARD RISK TOLERANCE LEVELS AND TRIGGER POINTS (MODIFIED FROM GHD TO MATCH MANAGEMENT UNITS)**

| Management Unit      | Immediate Risk (2020)                               | Current (up to 2060) Risk | Long Term (2060 - 2120) Risk |
|----------------------|-----------------------------------------------------|---------------------------|------------------------------|
| 1. West End          | Intolerable - T3A                                   | Intolerable - T3A         | Intolerable - T3A or 4       |
| 2. Spoilbank         | Not assessed - marina plan includes specific CHRMAP |                           |                              |
| 3. Sutherland Street | Tolerable - T2                                      | Intolerable - T3          | Intolerable - T3A or 4       |
| 4. Cooke Point       | Intolerable - T3                                    | Intolerable - T3          | Intolerable - T3A or 4       |
| 5. Pretty Pool       | Tolerable - T1                                      | Tolerable - T1            | Intolerable - T3A or 4       |
| 6. 4 Mile Creek      | CHRMAP didn't assess                                |                           |                              |
| 7. Six Mile Creek    | CHRMAP didn't assess                                |                           |                              |



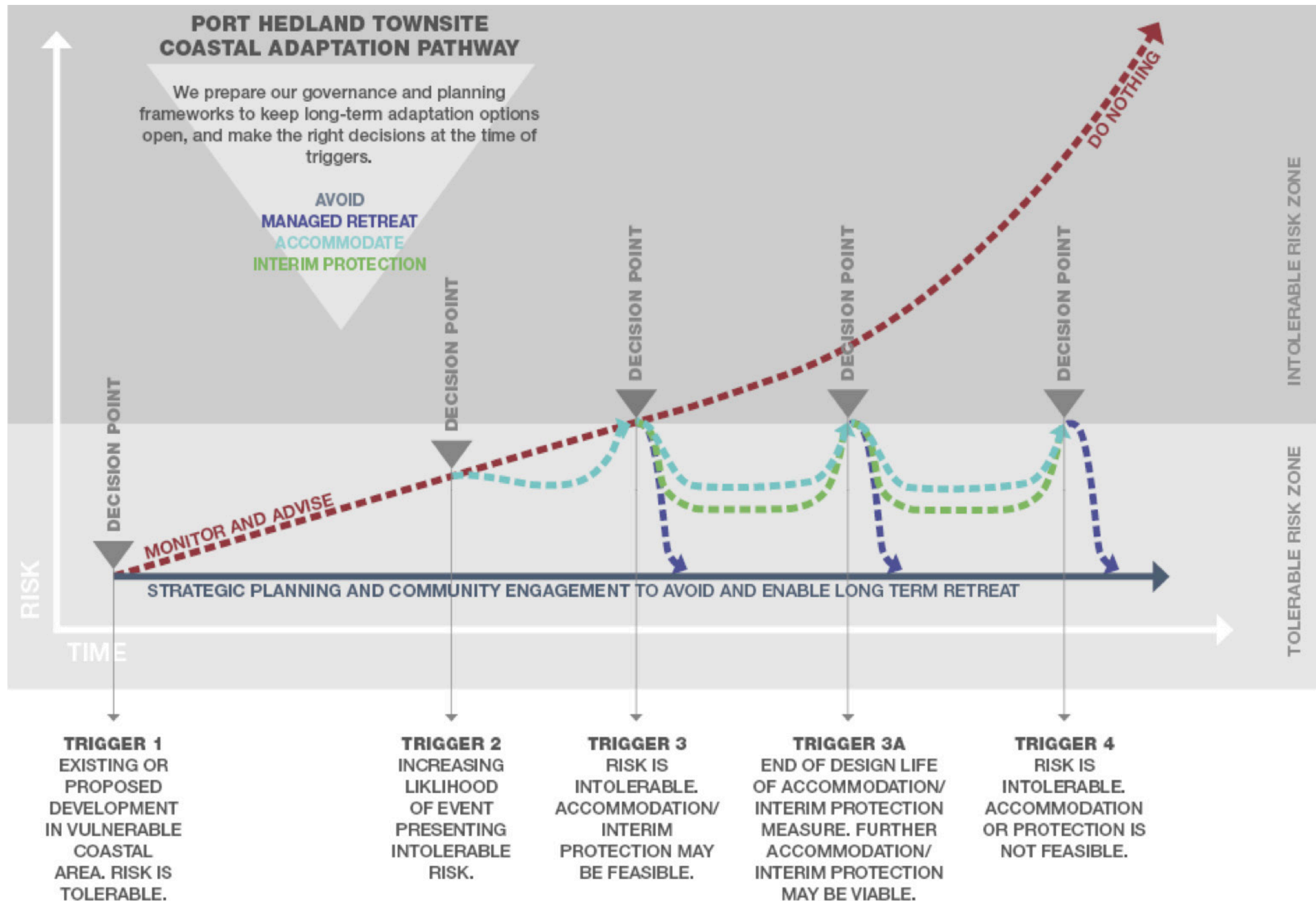


FIGURE 5 - PORT HEDLAND STRATEGIC ADAPTATION PATHWAY - CHRMAP (GHD)

Triggers are used in coastal hazard planning to guide the 'right time' for making decisions. They are not time reliant, rather they are typically associated with the acceptability of risk at any point in time, which can be assessed based on physical and social factors.

SPP refers to a hierarchy of responses to coastal hazards - being 'avoid', 'retreat', 'accommodate' and 'interim protection'

The trigger for a decision whether to avoid, retreat, accommodate, interim protect is made when the risk to assets and community values increases from tolerable to intolerable.

Trigger 1 and Trigger 2 (T1 or T2 in Table 1) are considered tolerable risks because they are not currently likely to impact social, environmental or property values.

Ongoing monitoring of the risk is typically recommended in this case, with forward planning to respond to longer term risks, and as can be seen in Table 1, tolerable risks become intolerable over time.

Triggers 3 and 4 (T3, T3A and T4 in Table 1) reflect a situation when the risk has become intolerable because it would result in impact to social and environmental values within the public foreshore reserve.

For the majority of the coastal areas of Port Hedland, Triggers 3, 3A and 4 would be reached when the width of the public foreshore reserve is less than historical storm erosion (called S1 in CHRMAP terminology), as it is at this time that a sudden change like a cyclone event could have significant and consequential impacts.

As can be seen in Table 1, the risk of erosion to the West End (Management Unit 1) and Cooke Point (Management Unit 4) were considered intolerable in the CHRMAP and immediate adaptation action was recommended.

The events of TC Veronica have since elevated greater concerns regarding Sutherland Street (Management Unit 3) and Pretty Pool (Management Unit 5), with the more immediate concern being Sutherland Street.

This CFMP thus considers the CHRMAP risk assessment and the more recent events in developing its recommendations.

In addition, because this CFMP considers smaller asset management and replacement regimes, planting and vegetation management, development of pathways and coastal access locations within the coastal area, it is able to make much more specific short term actions (5-10 years) that will benefit the longer term CHRMAP adaptation plan.

## **2.2.3 Recommended Actions**

Recommended CHRMAP action options to respond to identified coastal risk are summarised in Section 1.2.1.

The CFMP investigates these options and based on additional stakeholder and community engagement, cost evaluations based on different options for areas, and TC Veronica's impact on the townsite, the CFMP recommends updates to the management actions required.

The CFMP recommendations in Chapter 5 uphold a risk management approach, in accordance with SPP 2.6 and the CHRMAP Guidelines.





IMAGE 1 & 2 - IMPACTS ON THE COASTLINE AFTER TC VERONICA



# 3 ENVIRONMENTAL CONTEXT





### 3.1 Topography

The topography of the CFMP area varies from high sandy dunes with significant elevation above the high water mark to low lying tidal zones associated with mangrove habitat. The specific topography of each Management Unit is one of the main considerations in the CFMP recommendations, as each Management Unit requires a unique response with regard to the interrelationship between coastal processes and topography.

### 3.2 Climate

Port Hedland has a semi arid climate and is warm to hot all year round, with mean maximum temperatures of 36.8 °C in December and 28 °C in June and July (from 1991-2020).

The highest temperature reached in this same period is 49 °C in both January and December. Some 279 days per year exceed 30 °C and 33 days per year exceed 40 °C.

Maximum temperatures in summer are usually moderated by a warm but humid sea breeze. Port Hedland averages 210 sunny days per year and only 31 days with rainfall totalling approximately 335 ml per year, a significant proportion of which is associated with tropical cyclones.

Tropical cyclones have a very significant impact on the climatic context of Port Hedland. The northwest Australian coastline between Broome and Exmouth is the most cyclone-prone region of the entire Australian coastline, having the highest frequency of coastal crossings.

On average about two cyclones cross the coast of WA per year, one of which is severe.

This combination of heat, sunshine and relatively low rainfall (approximately 40% of Perth rainfall) and cyclonic conditions combined with high levels of daily evaporation, must be acknowledged and planned for in developing the CFMP

In general, the CFMP actions should limit the need for water use and provide intelligent responses to shading and shelter at the same time as ensuring safety during cyclones.

### 3.3 Terrestrial Flora and Fauna

The coastal section of the Town of Port Hedland is subjected to significant pressures including, increased coastal erosion, inundation of low-lying areas during storm events, increasing human uses, and as a result threats to the coastal reserve's biodiversity values. There have been several studies and reports concerned with the management of the coast, including the Consolidated Foreshore Redevelopment Plan (UDLA) and the CHRMAP (GHD).

To confirm the results of previous studies of the environmental context of the CFMP area, a terrestrial flora and fauna assessment was completed to consider:

- Flora and fauna in the study area
- Broad vegetation types
- Broad fauna habitat types
- Weeds and introduced pests

The full report can be found in Appendix A.

The terrestrial flora and fauna assessment was undertaken in the context of various legislative and non-legislative measures, which are as follows.

- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) – Australian Government
- Environmental Protection Act 1986 (EP Act) – State

- Biodiversity Conservation Act 2016 (BC Act) – State
- WA Department of Biodiversity, Conservation and Attractions (DBCA) Priority lists for flora, ecological communities and fauna.

The terrestrial flora and fauna assessment was undertaken using both desktop and field assessments.

### 3.3.1 Desktop Assessment

Searches of NatureMap and the EPBC Protected Matters Search Tool (EPBC PMST) were undertaken to identify flora and fauna species of conservation significance potentially occurring in the survey area (DBCA 2020, DAWE 2020).

### 3.3.2 Field Assessment

The field assessment was undertaken from 9-10 September 2020 by a qualified Principal Ecologist. The following survey methods were undertaken in the coastal reserve. It is noted that the assessment was originally planned for late March 2020, however, because of restrictions on movement as a result of the COVID-19 outbreak the assessment was delayed.

#### Flora Assessment

Flora was identified and/or collected (and identified later) from quadrats (20 x 20 m) in the coastal reserve, and the quadrats location (centre of quadrat) taken with a GPS (a representative photo of the quadrat was also taken).

The primary focus was to identify dominant species and other species where possible, noting that the survey was undertaken in September, which is not the preferred time of year to carry out flora and vegetation surveys (March – June is the preferred period).

Assessment sites were chosen in order to best represent the vegetation present in the reserve and to also get a geographical spread of sites across the reserve.

As noted in the background section above the primary focus of the assessment was the northern section of the reserve, consequently, quadrats were located in this area. Flora, including weeds was also collected opportunistically outside of the quadrats in other areas of the reserve.

Very broad vegetation types were described across the entire coastal reserve with this based on dominant vegetation and landscape position. Weeds were also noted when observed.

#### Fauna Assessment

Fauna was identified in the same quadrats as the flora; however, the quadrats dimension was larger at 50 x 50 m (the centre coordinate is the same as the centre of the flora quadrat). Broad terrestrial habitat types were identified based on the dominant vegetation and position in the landscape.

It is important to note that the field assessment did not include the use of techniques such as trapping (Elliott traps, cage traps, pitfall traps and funnel traps) or camera traps, but was based on observations of fauna and their signs (scats, tracks and other signs i.e. burrows and diggings). As a result, the majority of fauna observed were birds – identified either visually (naked eye or with binoculars) or audibly by their calls.

Fauna were also identified opportunistically outside of the quadrats in other areas of the reserve. Noting that most records during surveys like this which are primarily about describing habitat typically come from opportunistic sightings because birds are highly mobile.



### 3.3.3 Summary

#### Flora and Vegetation

The vegetation of the Port Hedland coastal reserve, particularly in the northern section is highly disturbed and degraded as a result of human activity (vehicle tracks and rubbish) and weeds, especially Buffel Grass and Kapok Bush, which are both considered to be invasive environmental weeds.

As a result, flora diversity in the northern section of the reserve is relatively low, however, areas east of Cemetery Beach are somewhat less degraded as the reserve is fenced off and vehicles are prevented from entering the dunes. There is also less Buffel Grass in these areas and native vegetation is much more dense. Other surveys undertaken in the Port Hedland area, including in some sections of the coastal reserve have noted that the vegetation is very degraded (ENV 2011a, JBS&G 2020).

None of the five Priority species present in the NatureMap search was recorded during the assessment. These species have not been previously recorded in the coastal reserve but are present in the wider search area, which was a 10 km radial search area (DBCA 2020, ENV 2011a, JBS&G 2020).

Further to this several of the Priority species present in the database are annual (i.e. *Bonamia oblongifolia* and *Gomphrena pusilla*) and would therefore not be present or identifiable (no reproductive parts) during September when the assessment was undertaken, despite potential habitat being present.

The flora assessment was undertaken outside of the optimum season for the Pilbara (March – June), as this region primarily receives rainfall as a result of Cyclones during the summer months.

Further to this rainfall for 2020 for the last eight months prior to the assessment was below average (BoM 2020).

To some extent this would impact the condition of the vegetation and this was observed during the assessment with much of the vegetation appearing very dry.

During the assessment eight species of weeds were recorded. The most commonly recorded and widespread weed in the survey area was Buffel Grass, followed by Kapok Bush. Of note were the presence of the weeds Rubber Bush on the spoil bank section of the reserve and the Giant Reed (recorded at one location) near assessment site 7.

Finally, it is important to acknowledge that more flora species would have been recorded if the assessment was undertaken during the appropriate season and for a longer duration, however, it was intended as a brief assessment to broadly define the vegetation types present.

#### Field Assessment

The vegetation of the Port Hedland coastal reserve, particularly in the northern section is highly disturbed and degraded as noted by other surveys (ENV 2011a and b, JBS&G 2020).

This degradation is for the most part a result of vehicles and weeds (particularly Buffel Grass) which has reduced flora diversity and the density of vegetation (particularly shrubs) and consequently the amount of cover that is provided to fauna.

This has resulted in for example less leaf litter which can be important habitat for small reptiles. This reduction in the density of vegetation in the shrub layer will also reduce the number of small passerines that utilise this habitat.

However, towards the eastern and southern end of the study area the coastal reserve is not as degraded and the vegetation, particularly the shrub layer, becomes somewhat less dense and there is less Buffel Grass and other weeds such as Kapok Bush.

These areas should support a more diverse group of fauna, particularly small reptiles (i.e. skinks) and small passerines that require more cover. The mangroves of the coastal reserve are important habitat for foraging birds such as the Golden Whistler and Mangrove Grey Fantail and as a roost for the Little Red Flying Fox that was recorded during this assessment.

The fauna species recorded during the assessment are common and widespread and have previously been recorded in the general region of Port Hedland (Biota Environmental Sciences 2008, ENV 2009, ENV 2011b, Johnstone et al. 2013), while some of the species have been recorded beforehand in the coastal reserve (Bennelongia 2011).

There are a number of threatened species present in the database searches that would not occur in the coastal reserve because there is no habitat present e.g. the Northern Quoll and the Bilby.

Further to this marine species such as whales, and sea snakes which weren't considered during this terrestrial fauna assessment.

Four of the species recorded are listed under the EPBC Act as migratory – the Common Sandpiper, Lesser Frigatebird, Caspian Tern and Eastern Osprey. The Port Hedland area, particularly the saltworks, is of international importance to shorebirds, which includes a significant number of species listed as migratory, including the Common Sandpiper (Johnstone et al. 2013).

The coastal reserve is also important habitat (foraging and roosting habitat) for a number of shorebirds listed as migratory under the EPBC Act (Bennelongia 2011). The Bennelongia (2011) survey showed that the coastal reserve is internationally important for the Grey-tailed Tattler (although none were observed).

Despite this assessment not considering marine species, it is noted that areas of the coastal reserve, particularly Cemetery Beach and Pretty Pool are considered regionally significant as a rookery for the EPBC Act listed Flatback Turtle (Imbricata Environmental 2016). Guidelines exist to manage light pollution that is known to impact the nesting behaviours of this species, which should be followed (National Light Pollution Guidelines for Wildlife, Department of Environment and energy 2020).

Whilst nothing unexpected was identified in this terrestrial flora and fauna assessment, it is recognised that the coastal zone provides habitat for important flora and fauna. Including the marine species that are recognised, the CFMP actions should aim to limit further impact and seek to reduce additional degradation of natural areas.

This may include actions that seek to restrict activities that would degrade natural areas, actions that would seek to reduce light spill for marine turtle nesting areas and where planting is required the planting of suitable species.







# 4 SOCIAL AND CULTURAL CONTEXT

## 4.1 Introduction

The CFMP recognises that the coastline is important in the social and cultural context of Port Hedland. These values were stated during engagement on the CHRMAP as well as on the CFMP and include not only the value of built structures and development areas (commercial and residential), but also includes foreshore areas, viewpoints, beach activities and the environment of the coast.

The 'assets' have a social and cultural value as well as a financial value. Key assets include:

- Community infrastructure, including:
- Footpaths
- Street furniture
- Shaded pergolas
- Playground and recreation equipment
- Change rooms and toilets
- Transport infrastructure
- Services infrastructure
- Signage
- Car parks

The beach itself holds numerous values, including:

- Swimming
- Sun bathing
- Fishing
- Walking
- Dog walking
- Photography
- Four-wheel driving
- Turtle nesting

- Relaxing
- Watching and viewing the ocean and the port activities

Based on engagement during the development of the CHRMAP and the CFMP, it was also identified that the community values the coast for education, science and learning, the quality and rarity of the ecology, as a place to sit and interact with friends and family and in its role as an important economic resource for the area.

The way people experience these areas is the essence of the social and cultural environment. This chapter of the CFMP looks at the important elements of that interaction and the challenges and conflicts of maintaining the community's expectations whilst managing the foreshore.

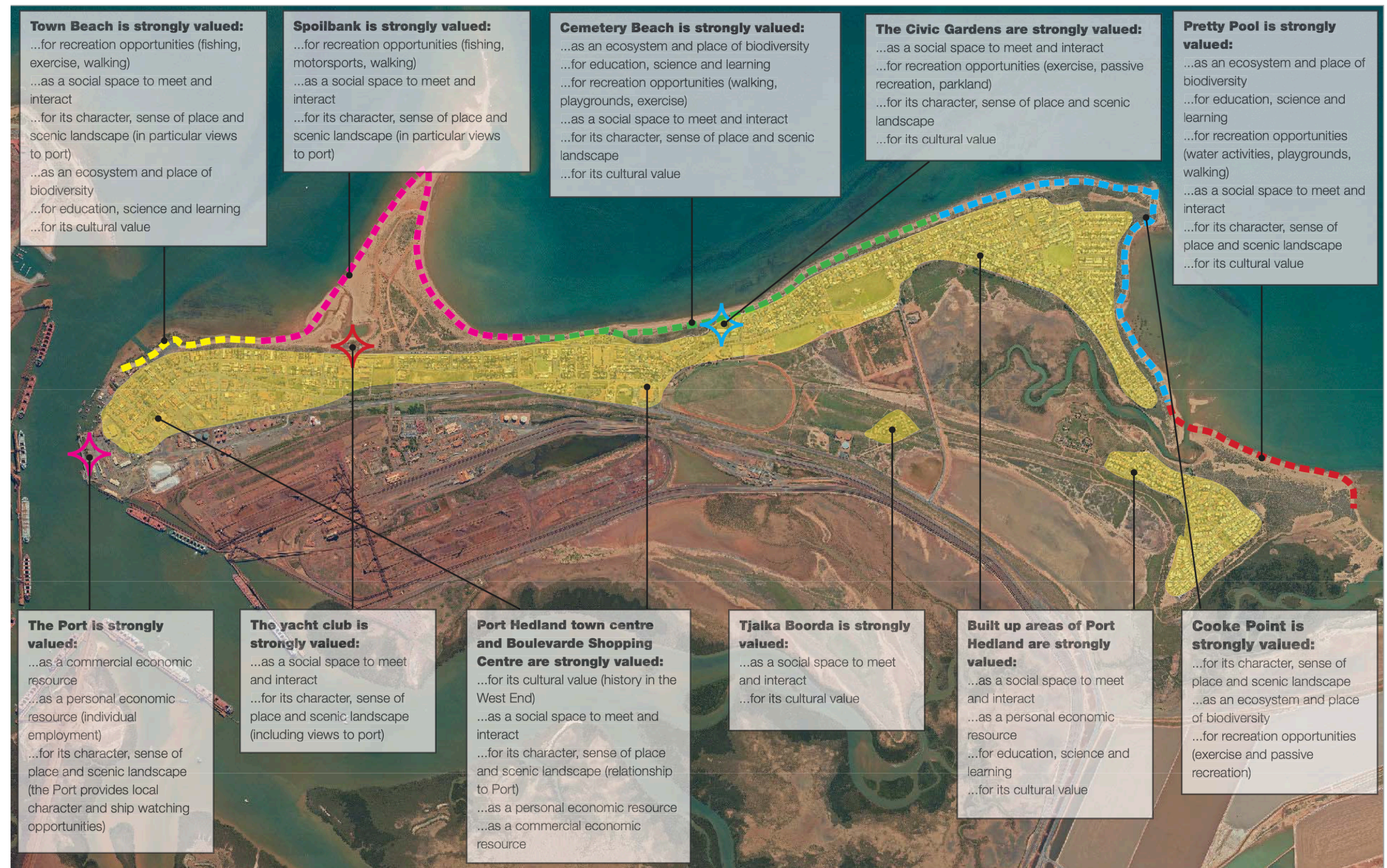
## 4.2 Community Expectations

Stakeholder engagement was undertaken during the development of the CHRMAP and during development of this CFMP. Feedback from both processes is important and instructive for this CFMP.

More than 90 participants engaged in the CHRMAP process between September and December 2017 with substantial feedback on the values and uses along the coast.

Figure 6 illustrates a summary of that feedback (as an extract of the GHD CHRMAP).

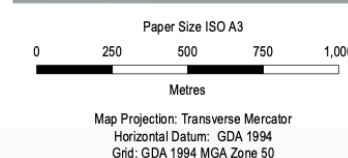




The nodes shown on this map are the areas of Port Hedland that most strongly reflect local coastal values.

Other areas are also valued and frequently used by the community, including:

...intertidal zones and magroves valued as an ecosystem and place of biodiversity...boat ramp for recreation...4 mile beach for recreation and fishing...6 mile fishing sport for recreation...Koombana lookout for scenic landscape... Marapikurrinya Park for recreation and social activities...



Town of Port Hedland  
 Port Hedland Townsite CHRMAP

Port Hedland Coastal Values

Project No. 61-36239  
 Revision No. 0  
 Date 19/01/2018

FIGURE 3-3

FIGURE 6 - COMMUNITY VALUES - CHRMAP EXTRACT (GHD)



Stakeholder engagement was then also undertaken as part of the development of the CFMP. This engagement aimed to further raise awareness of the coastal management challenges of Port Hedland and to confirm and prioritise community values and ensure concerns and aspirations for the townsite coastal zone are understood.

This engagement was also undertaken in the context of the significant and recent effects of TC Veronica, the newly announced Improvement Scheme and buy-back scheme, as well as in the context of recent Native Title determinations in favour of the Kariyarra people.

Through the CFMP engagement community members and stakeholders could visit online project pages, mapping tools and a survey. In order to best link values to locations, survey questions asked the same question in two ways.

1. Firstly; what activities they did in each location.
2. Secondly, where the community enjoyed their various coastal activities the most.

This enabled the project team to get a sense of which locations held the greatest value for specific uses, ranked from most to least important, even though many people did these activities at multiple sites.

This engagement was undertaken from July to September 2020 and included online and face-to-face engagement.

In addition, stakeholders including the Department of Planning, Lands and Heritage and the Department of Transport as well as the Kariyarra Traditional Owners were held to confirm planning, land tenure, heritage and coastal factors that required consideration in the shorter term management of the coast.

83 survey responses and 314 'pins' were placed on the map (see Figure 7).

In total, 783 people were reached with 104 unique stakeholders contributing.

Key issues / opportunities raised through the CFMP engagement were:

- Extending / providing pathways along the coast - Sutherland Street and from West End to the marina
- Shade and seating in foreshore reserves and parks and along paths
- Providing activities for children and families
- More restaurants and cafes along the foreshore
- Protection of turtle nesting areas - Sutherland Street and Pretty Pool
- Education and signage - turtle nesting areas, fishing limits and restricted catches
- Dual place names to recognise Aboriginal history
- Plaques to reflect the people and the Town history
- (Re)vegetation - planting of Mangroves, grassed areas along the foreshore
- Maintaining fishing spots along the coast
- Four wheel driving / off-roading - its maintenance, availability and rationalisation
- Protecting the natural environment for future generations
- Supporting improvements to the area to enhance tourism in Port Hedland
- More gathering spaces - Sutherland St and the Spoilbank in particular.
- Repairing damage from the last cyclone (TC Veronica)





**FIGURE 7 - COMMUNITY SURVEY AND VALUES CONFIRMATION 2020**



### 4.3 First Nations Heritage, Traditional Ownership and Native Title

A recent Native Title determination in favour of the Kariyarra people ensures that the Aboriginal heritage context of Port Hedland has been confirmed, notwithstanding the many people of the Pilbara that call Port Hedland home.

This determination paves the way for self-determination of the local people and enables opportunities such as story telling, formal partnerships for land management and monitoring, and tourism for the Kariyarra people.

There is an opportunity to link some of the CFMP recommendations to the Kariyarra, including coastline monitoring, revegetation, heritage surveys for any works, ranger programs, art and signage, as well as a more direct opportunity to partner with the Kariyarra on management of the Six-Mile Creek area. This area is highly valued for its cultural and spiritual stories, as well as fishing and traditional lore activities.

Dual place naming was also discussed with the Kariyarra people as well as being raised by various other stakeholders and community members during the engagement period, to build upon the preliminary work which has already commenced in this regard.

This was widely supported and is also in line with the launch of the Aboriginal and Dual Place Naming Guidelines (Landgate, 2020) to help preserve and reawaken local languages through Aboriginal place names.

### 4.4 European Heritage

A number of sites of European Heritage significance are located close to the coastline and within the vulnerable areas of Port Hedland considered in this CFMP (predominantly beyond 2060). These are located on the Town's Municipal Heritage Inventory and include two places of 'Considerable' Interest and a number of places with 'Some' interest. The two places of Considerable cultural heritage value are:

- Place 8 (Grade B), the Lightkeeper's Quarters (fmr)
- Place 14 (Grade B), Ellery Cottage (fmr)

It is noted that no feedback was received from the community regarding places of European Heritage, although these places are afforded some protections under the Town Planning Scheme.



## 4.5 Summary

The engagement undertaken has provided a very strong understanding of the social and cultural context of the coastline and what assets the community would like to see protected or repaired into the future.

The multi-engagement approach has allowed for a thorough investigation of community values per management unit and the following areas are considered most important:

- Walking, cycling or exercise - West End and Sutherland Street
- Fishing - West End and Six Mile Creek
- Swimming - Pretty Pool
- Four wheel driving - Spoilbank and the Six Mile Creek area
- Gathering spaces - Pretty Pool and Spoilbank
- Viewing / lookouts - West End, Spoilbank, Sutherland Street

All areas are considered important for environmental and nature conservation.

All stakeholders expressed an interest in future planning for the coastal foreshore, being strongly supportive of repair and clean up of damage associated with cyclones and the need for future structures and assets to be more resistant to coastal erosion and cyclone damage. In particular, beach paths and stair access to the beaches received significant attention.

They are also strongly aligned on the matter of revegetation and planting along the entire study area primarily for the purposes of coastal erosion and creation of additional shade areas for recreation.

They expect to see more beach side recreation and activity opportunities such as tours, cafes and restaurants, and children activities like skate parks, and also support ongoing fishing and four wheel driving accessibility.

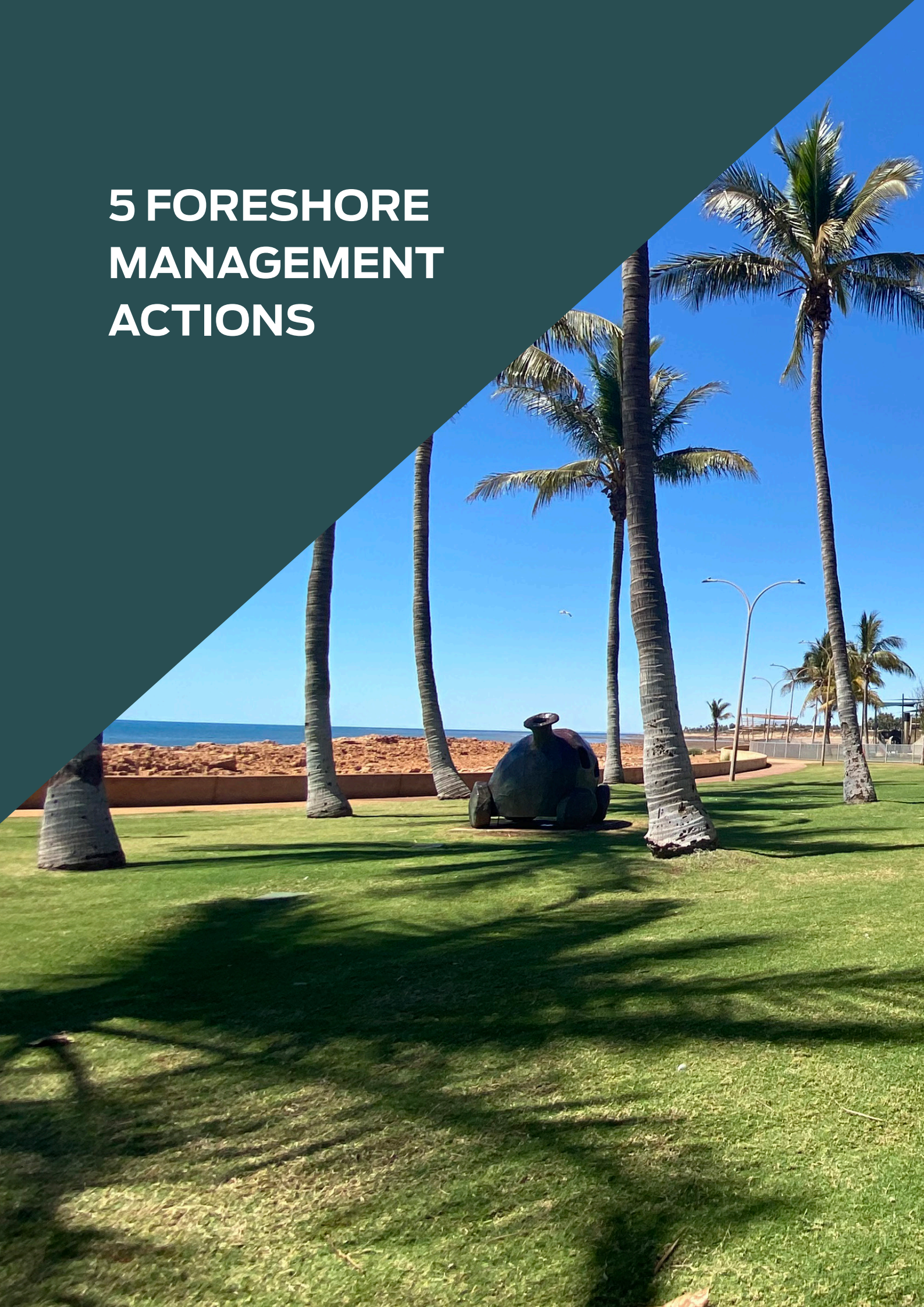
However, all existing and new coastal assets will need to be balanced with the need for protection of dunal ecosystems, vegetation and Aboriginal sites at Six Mile and Aboriginal heritage values along the coastline. They will also need to be considered in light of the approaching coastline, and how long assets can reasonably be expected to survive in the harsh coastal environment.

These principles drive the proposed management actions in the CFMP and ground the outcomes in the community's values.

The CFMP represents an exciting prospect for the community generally. A number of community members have offered to be supporters of some of the proposed management actions, even volunteering time to help. It is apparent that the Town has a strong and passionate community in Port Hedland, that highly value being involved.



# 5 FORESHORE MANAGEMENT ACTIONS





## 5.1 Introduction

The Port Hedland Townsite Coastal CFMP preparation has included:

- Engagement of stakeholders and the community through the planning process leading into the decision making documentation
- Ensuring the community gain an understanding of the vulnerability of assets within the coastal zone
- Identifying assets in the coastal zone
- Acknowledging appropriate flexible coastal adaptation pathways and according realistic management actions
- Consideration of the full range of planning instruments to enable planning for the short, intermediate and medium term (0-10 years) management of the coast.

This section provides specific actions for the proper management, orderly development and enhancement of the Townsite coastal reserves, taking into account the pressures on the coast, the social, cultural, environmental and economic values, and a flexible adaptation pathway route in accordance with SPP 2.6, the Guidelines and the CHRMAP.

Based on previous studies and investigations including the CHRMAP, the townsite coastline has been broken down into sectors according to the underlying coastal geomorphology, and social, cultural, environmental and economic factors at those different locations along the coastline.

## 5.2 How to Read this Section

The CFMP covers Management Actions for the entire coastline generally and then for each of the specific Management Units 1-7 (refer Figure 1). This Section reflects these sequentially from Overall Management Actions, to the West End (Management Unit 1) and along the coast to Six Mile Creek (Management Unit 7).

There is an introduction to each type of the areas/management units before the coastal hazard risks, recommended management actions, costs and triggers for each are detailed.

The CFMP considers only the land within the foreshore reserves. However, coastal processes, flora and fauna, the social, cultural, environmental and economic considerations, and the management options proposed are considered with regard to adjoining land and the impacts of the proposed management options on those landholdings and assets.

The management actions are centred around:

- Community values for different sections of the coastline
- Education about environmental and cultural significance across the CFMP area
- Trigger based reconstruction / relocation of coastal paths in more temporary material like gravel
- Trigger based relocation of coastal assets and infrastructure to the land side
- Rationalising beach access to stabilise dunal systems and associated vegetation

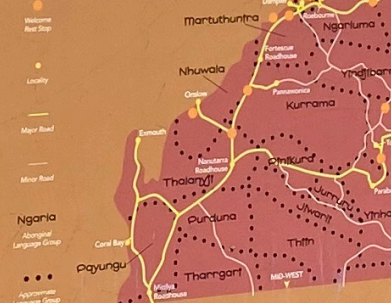
- Existing and proposed planning requirements
- Requirements for management actions post cyclone which were observed post TC Veronica

Welcome to  
Kariyarra country.

Port Hedland, established in 1896, is now the largest port in the world, with a population of some 20,000. As well as its beaches, mangroves and wildlife, these things are worth

- Experience the local art and culture at the Courthouse
- See the world's most impressive trains at the Redbank
- Discover the region's rich pastoral history and an insight into its Indigenous people at the Dalgety House Museum
- Watch the giant ore carriers and salt ships from Macquarie
- Witness the annual Flatback Turtle nesting season

For Main Roads' road conditions information call 130 138.





## 5.3 Overall Management Actions

There are a number of management actions, as well as materials and specifications, that can be applied across the CFMP area. These comprise of 'hard assets', 'natural management' and 'community strategies'. These are listed in Table 2.

### 5.3.1 Hard Assets

The foreshore comprises a number of hard assets including seating, shelters, lighting, fencing etc. At present, these assets comprise a variety of styles and materials, making the foreshore aesthetic somewhat disjointed in parts and also making asset maintenance and repair an unnecessarily complicated task for the Town's works department.

The CFMP recommends that the Town adopt a simple and consistent brand along the foreshore from the materials and finishes palette attached to the CFMP at Appendix C, and that this materials and finishes palette forms the basis for asset replacement going forward.

The materials and finishes palette comprises all manner of hard assets that will be required along the length of the CFMP area, including seating, bins, shelters, signage, edging, fences, pathways and lighting.

Unique Eḡḡḡḡḡḡḡ ḡ ḡḡḡḡḡ may propose alternative or higher specification finishes and materials, and these should not be constrained where the Town feels a special approach is required. However, where possible, these should be blended back in to the standard materials and finishes.

The proposed materials and finishes palette has been chosen to complement the Port Hedland environment both in design quality, durability and colours/styles.

In addition, where possible, it is recommended that any linear infrastructure such as power or pipes that might be found underground be provided perpendicular to the coastline such that any retreat or relocation of the infrastructure does not render the entire asset redundant. This may evolve over time and should be considered a long term strategy.

### 5.3.2 Natural Management

The retention of hardy and cyclone resistant trees and the enhancement of coastal vegetation and rehabilitation will assist in coastal protection, user comfort and visual amenity and will also provide for ecological enrichments through the expansion and protection of habitat.

Rehabilitation of natural dunes within the CFMP area will assist in protecting the dunes from wind and unintended foot traffic erosion. Reinforcing surrounding natural areas will also improve potential for habitat to support biodiversity, help define pathways and assist in controlling weeds.

The CFMP recommends that the Town adopt a planting and vegetation management strategy along the foreshore as provided in Appendix D.

The planting and vegetation management strategy includes direction regarding weeds, surface preparation, species selection, planting methods, scheduling, watering, drainage and site maintenance.

The planting and vegetation management strategy has been prepared respecting the natural flora and fauna in the area whilst also providing for effective and efficient maintenance for asset managers.

### **5.3.3 Community Strategies**

There are a number of strategies that can be employed along the coastline that have a more education and community oriented focus.

#### **Signage**

The physical signage is discussed in Section 6.3.1, however, in addition to coastal hazard risk-responsive management actions, dual place naming is recommended across the CFMP area to promote the Town's Aboriginal identity and allow people to connect to culture, embody tradition and pass on knowledge.

It will also acknowledge the relationship between the community, Country and language.

The CFMP recommends that the Town engage with the Kariyarra people to develop a dual place naming procedure in line with the State Government's Aboriginal and Dual Place Naming Guidelines.

#### **Dune Repair**

'Dune Under Repair' signs have great intention, but are often not well understood by the community as being critical for coastal protection.

This CFMP recommends that the Town implement improved signage for dunes under repair providing greater information on the purpose of the dune repair, and explicitly noting that it is being undertaken in order to protect the coast, protect property and reduce costs to the community.

This could be undertaken in conjunction with a community education process under the banner of the 'Our Coastal Future' brand, which is already synonymous with the coastal management projects of the Town.

#### **Markers**

Much of the action being proposed in Management Unit 1-7 is associated with the coastal hazards being experienced by the Town. Unfortunately, these things are often not well understood by the community, both due to the long term and uncertain nature of coastal hazard risk, and to the fact that the coastline ebbs and flows naturally over many year cycles, making visible risks seems less significant at various times.

The CFMP recommends adopting a citizen science type project whereby temporary markers are placed along the coastline at trigger points for action (in line with the CHRMAP and noted in this CFMP). Markers proposed are similar to those which you would see on major highways in flood ways, where high water marks can be seen for years to come as a reminder of those risks.

Such a program would have the benefit of providing visible and ongoing evidence of potential change (and risk), whilst establishing an ongoing narrative of how the coast might change, building a better understanding of the decisions that Council will need to make over time.

#### **Turtle Sighting Strategy**

The turtle nesting habitat of Port Hedland is important to the community of Port Hedland and is much loved. Protection of nesting behaviours is already championed by Care for Hedland and others, and this could be expanded on through a program which encourages reporting of sightings.

The CFMP recommends working with community organisations to formalise sighting of nesting turtles through temporary signage such as flags (similar to life guard flags). An opportunity exists to partner with organisations to distribute flags that can be used to signal sighting, which may reduce turtle injury due to accidental deaths by vehicles, animals and fishing.



### **Rationalising Beach Access**

Multiple beach access points can have the effect of damaging the dunes whilst also resulting in many more assets that require maintenance and repair after significant storms.

The CFMP recommends an ongoing process of beach access path rationalisation, which would also include ensuring that provided paths are well sign posted and fenced to avoid 'off-path' walking.

In some cases it may be relevant to provide signage indicating the distance to the closest access point along coastal pathways and inland to key origin points such as the caravan overflow area.

**TABLE 3 - OVERALL MANAGEMENT ACTIONS**

| Action Item | Action                                                                                                              | Comment                                                                                                                                      | Responsibility                                                             | Timing *   |
|-------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------|
| OM 1        | Replace assets in accordance with the materials and technical specifications                                        | If possible, replace these further away from the coast if space allows                                                                       | Town of Port Hedland                                                       | Ongoing    |
| OM 2        | Underground and expensive linear infrastructure should be designed to run perpendicular to the coast where possible | When replacing underground linear infrastructure, investigate if risks can be mitigated if not removed                                       | Service agencies                                                           | Long term  |
| OM 3        | Adopt and deliver on the 'materials and finishes palette' and the 'planting and vegetation management strategy'     |                                                                                                                                              | Town of Port Hedland<br>Individual landowners                              | Ongoing    |
| OM 4        | Develop and deliver on dual place naming for signage across the CFMP area                                           |                                                                                                                                              | Town of Port Hedland in partnership with Kariyarra Aboriginal Corporation. | Short term |
| OM 5        | Improve dune under repair signage                                                                                   | Complete as signs require replacement                                                                                                        | Town of Port Hedland                                                       | Short term |
| OM 6        | Undertake a community education process regarding dune repair                                                       | Consider running through partner organisations with coastal interests such as Care for Hedland, four-wheel driving groups and boating groups | Town of Port Hedland in partnership with Care for Hedland                  | Short term |
| OM 7        | Investigate and plan a citizen science marker program - Section 5.3.3 of the CFMP refers                            | Consider working with a partner organisation such as Care for Hedland                                                                        | Town of Port Hedland in partnership with Care for Hedland                  | Ongoing    |
| OM 8        | Investigate and plan a turtle sighting signage strategy - Section 5.3.3 of the CFMP refers                          | Consider running through partner organisations with coastal interests such as Care for Hedland, four-wheel driving groups and boating groups | Town of Port Hedland in partnership with Care for Hedland                  | Short term |
| OM 9        | Rationalise beach access points and provide directional / wayfinding signage                                        |                                                                                                                                              | Town of Port Hedland                                                       | Ongoing    |

\* Where:





## LEGEND



### BEACH ACCESS

boardwalk or stairs | gravel path 1.8m



### CONCRETE PAVING

dual use path 3m | access path 1.8m



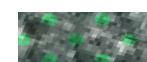
### PROPOSED TREE

native evergreen | feature tree



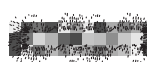
### DUNE REHABILITATION

weed control | fencing | planting | seeding



### MANGROVE REHABILITATION

research | planting | monitoring



### SEA WALL

mass granite boulder protection



### TRIGGER POINT

erosion line where action is triggered



### ACCESS CONTROL

fencing | boulders | bollards | gates



### MAJOR INTERPRETIVE NODE

information hub | interpretive signage



### MINOR WAY FINDING NODE

rules of access signage | interpretive signage



### PUBLIC TOILETS

universal access change facilities



### RESTAURANT | CAFE

bistro | bar | alfresco | kiosk



### PARKING FACILITIES

one tree every 5 bays



### PICNIC SHELTER | REST STOP

open-sided shelter | tables + bench seating



### BEACH TERRACES

integrated with sea wall



### BEACH STAIR

light weight | viewing platforms



### REHABILITATION ZONE

weed control | revegetation | fenced



### NATURE PLAY GATHERING NODE

log hops & boulder balance interactives



### INTEGRATED ARTWORK

interpretive paving | sculptures | urban art



### OUTDOOR MEETING NODE

log & boulder seating for 30+ persons



### 4WD ACCESS PROHIBITED

traffic control | fencing | bollards | signage



### 4WD ACCESS PERMITTED

seasonal traffic control | signage



### DOG EXERCISE AREA

waste control | signage



### TURTLE ROOKERIES

seasonal lighting controls | interpretive signage





## 5.4 West End - Management Unit 1

Management Unit 1 takes in the area from the public jetty at the entrance to the port through to the corner of Howe Street and Sutherland Street including Richardson Street and the Esplanade. It is tied to Port activities and land.

There are several assets including boardwalks, a boat ramp, footpaths, an open space area, roads, carpark and dunes in this area. There are also a large number of residential properties backing onto the beach from Kingsmill Street.

In the western most part of this Management Unit, there are a number of assets immediately adjacent to an existing seawall or beach access.

Several assets in the area have been impacted by erosion and inundation in recent extreme weather events. Although there was no direct impact on road infrastructure within this management unit, there is likely to be limited protection for these when impacts increase.

The West End foreshore is protected by two lengths of seawall, one extending from the Nelson Point Tug harbour to Marrapikurinya Park and the other protecting the boat ramp and boat trailer carpark adjacent to Richardson Street.

At present the section of foreshore between these two seawalls is vulnerable from erosion during significant storm events as there is minimal dune buffer between assets and the area of the beach face that coastal processes will act on during a storm event. Plugging this 'gap' with an additional seawall is currently being designed and is likely to be funded at a cost of approximately \$2.7 million.

The additional seawall will protect the social values of the broader community by maintaining Marapikurrinya Park and adjacent public assets.

Further to the east is the Richardson Street boat ramp. This asset will become partially redundant once the marina boat ramp is developed. Whilst the ramp will not be decommissioned and will be retained for boat launching in emergencies, the large boat trailer parking area is a prime area of waterfront that may be able to be better utilised as it reaches the end of its maintenance cycle.

Recent events have also confirmed the potential impact of erosion on other infrastructure and assets in proximity to the water and beach. The properties backing onto the beach from Kingsmill Street are threatened in the short to medium term, with the recent erosion undermining fences and outbuildings along this line.



A number of studies including the CHRMAP and the more recent coastal investigations consider a seawall to the back of the Kingsmill Street properties as a hard protection measure, however, it is noted that a seawall in this area will predominantly protect private development. As a result, it is unlikely that the Town of Port Hedland could attract public funding for this seawall in the short term, and especially in light of the changes proposed as part of the Improvement Scheme in this area. Funding would instead have to be found from capital works budgets at a cost to ratepayers of approximately \$13.3 million

In addition, some changes to the coastline in this area may eventuate as a result of the changed coastal environment from the marina development. This could lead to some accretion of sand in the short term. Further development sites west of the marina may further enhance this affect, although these are some years away.

A coastal pathway is also proposed in this area along an existing gazetted road that separates the Kingsmill Street properties from the coast.

#### **5.4.1 Recommended Actions**

A flexible approach is proposed in this Management Unit. It is recommended that the Town continue to progress the planning for the West End 'gap' seawall, as this is substantially progressed and funded, and will protect much valued public assets.

Advantage should be taken of the development, including ensuring pathways and lighting along this edge reflect the broader strategy of materials, finishes and planting, as well as providing continual coastal pathways.

Further to the east, the existing Richardson Street boat ramp should be modified to

reduce the parking area after the marina ramp is open. This site could be reformed to provide a space for caravan and RV parking (not overnight) close to the commercial area with an opportunity to overlook the ocean. This would provide a much needed space for large vehicles to park whilst accessing town. The balance of the car park could be revegetated and returned to nature over time. It is recommended that this action be undertaken in conjunction with a supply analysis of parking in the West End.

Along the Kingsmill Street section, it is recommended that a coastal pathway be constructed and pathway to the beach at the end of Darlot Street carefully formalised and managed to improve the current ad-hoc crossing of the dunes which is leading to some disrepair. The Town may consider local laws to issue fines for crossing the dunes where no pathways exist.

There is also an option to limit development along this section of coast to ensure further development is not put at risk, although this will largely be resolved through the Improvement Scheme.

Monitoring of the erosion in front of these properties is recommended in line with the CHRMAP and there is a potential to provide some sand nourishment if required in the short term, also noting the potential lack of availability of fill.

The trigger for this action would be the reduction in the usable beach width during normal conditions to less than 20m measured to the high water mark. Note during storm events it is expected that the beach width will temporarily reduce while water levels are elevated.

As sea level rises over the longer term, this option will reduce in effectiveness, with sand likely to be required to be placed at an ever increasing frequency/volume.

Cyclone damage should be cleaned up as and when required and replacement of assets should be carefully considered based on each event.

Notwithstanding, the Town should continue to strive for removal of underground infrastructure in parallel to the coast where possible.

Finally, the CFMP recommends revegetation of the mangrove and the coastal vegetation where possible in this Management Unit.

Table 4 and Figure 8 & 9 illustrate the proposed Management Actions.



**TABLE 4 - WEST END MANAGEMENT UNIT 1 MANAGEMENT ACTIONS**

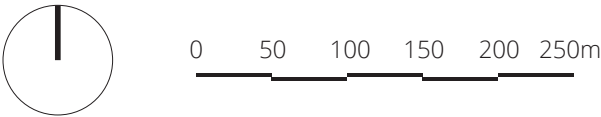
| Action Item | Action                                                                                                                                                   | Comment                                                                                   | Responsibility                                      | Timing            |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------------|
| WE 1        | Progress the design and delivery of the 'gap' seawall, ensuring pathways are developed as part of the structure                                          |                                                                                           | Town of Port Hedland                                | Short term        |
| WE 2        | Undertake revegetation/planting of coastal vegetation and mangroves along the Management Unit coastline                                                  | Partner with BHP and PPA for mangrove stock                                               | Town of Port Hedland in partnership with BHP        | Short-medium term |
| WE 3        | Redevelop the Richardson Street boat ramp car park for short stay caravan and RV parking in a smaller configuration and revert the balance to vegetation | Parking supply should be reviewed when a development proposal for the site is considered. | Town of Port Hedland                                | Medium term       |
| WE 4        | Clean up cyclone damage as and when required                                                                                                             |                                                                                           | Town of Port Hedland                                | Ongoing           |
| WE 5        | Construct the Kingsmill Street coastal pathway                                                                                                           |                                                                                           | Town of Port Hedland                                | Short term        |
| WE 6        | Formalise and construct dune pathway at the end of Darlot Street.                                                                                        | Consider establishing a local law to manage ad-hoc crossing of the dunes.                 | Town of Port Hedland                                | Short term        |
| WE 7        | Monitor erosion in front of Kingsmill Street properties.                                                                                                 | Consider limiting development to relocatable/sacrificial in this area                     | Town of Port Hedland in partnership with landowners | Short-medium term |
| WE 8        | Once poles, wires, drainage, paths hit degradation point (trigger) to be replaced on the inland side of Richardson Street                                |                                                                                           | Service agencies<br>Town of Port Hedland            | Ongoing           |
| WE 10       | Retreat of foreshore infrastructure (bins, seats, signs, other) from coastal edges when at end of life                                                   |                                                                                           | Town of Port Hedland                                | Ongoing           |



West End - Management Unit 1



FIGURE 8 - WEST END MANAGEMENT UNIT 1 LANDSCAPE PLAN





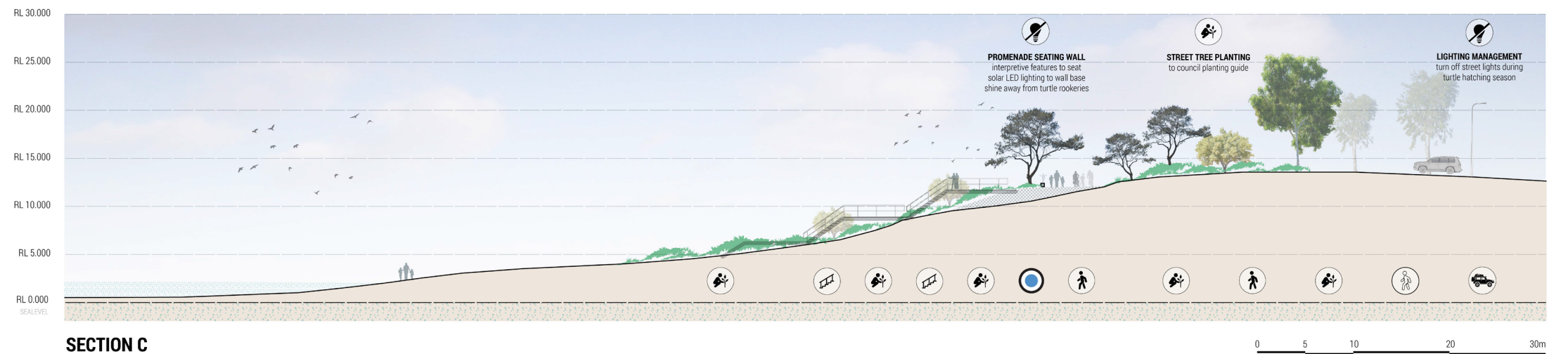
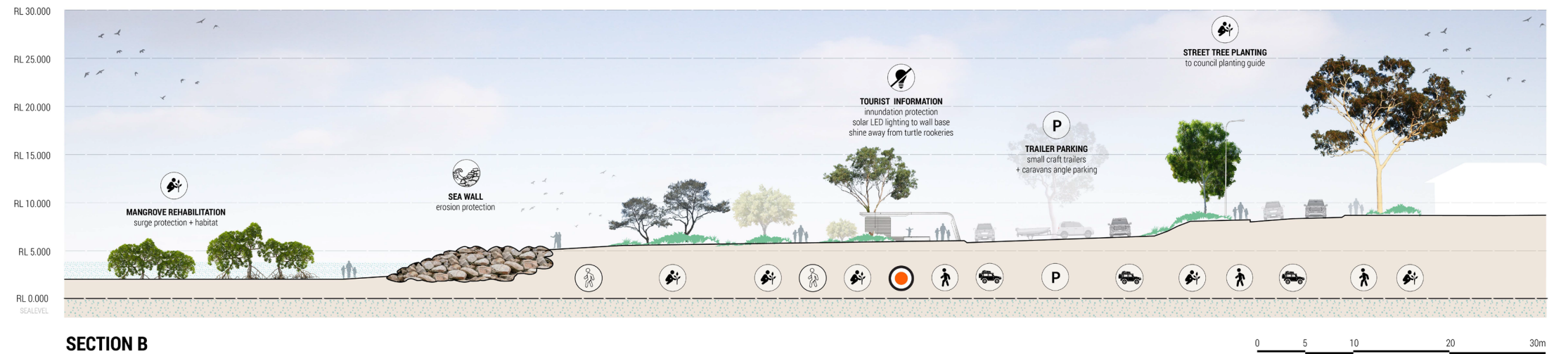
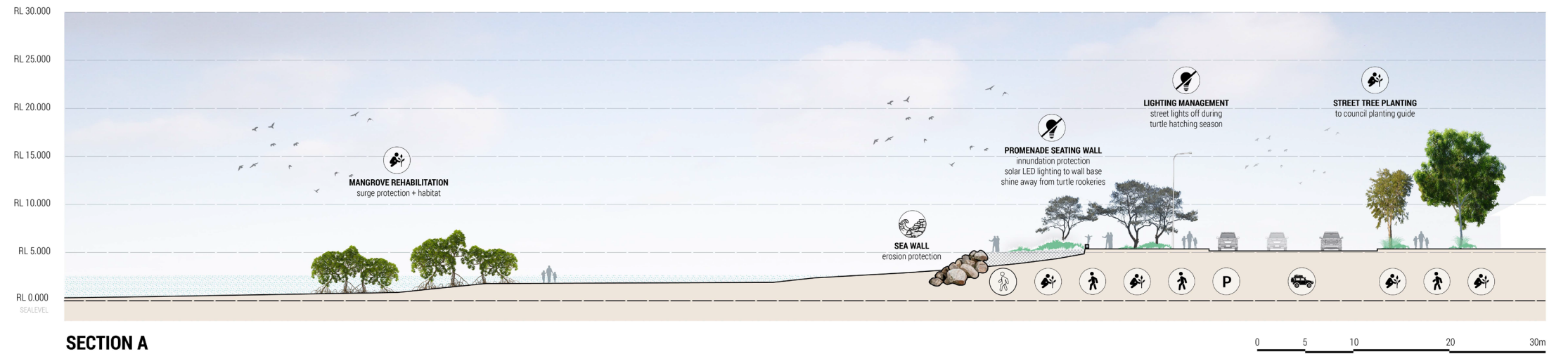


FIGURE 9 - WEST END MANAGEMENT UNIT 1 CROSS SECTIONS



## 5.5 Spoilbank - Management Unit 2

Management Unit 2 relates to the area from Howe Street through to Rodereda Street and takes in the whole of the Spoilbank. The Port Hedland Yacht Club is located on the western side of the Spoilbank, with the proposed Port Hedland Marina development also proposed on this side and the area closest to the Port Hedland townsite largely planned out over several stages.

Assets in this area include the yacht club buildings and associated infrastructure including a carpark, unconstructed vehicle access ways, walking paths, sparse vegetation, dunes and signage.

The Spoilbank is highly valued by the community for four wheel driving and fishing, but is also a moving coastline subject to tidal movements and storm events.

The Spoilbank area is at risk of inundation and erosion from increased storm activity and raised water levels. Additionally, four wheel drive activity increases the erosion of low-lying land and damages vegetation that helps stabilise the area.

The Town of Port Hedland is planning to construct a road for the marina development which will serve the Spoilbank until the marina is developed and will then likely become an alternative emergency access.

It is recognised that the proposed marina development will provide some protection

for sections of the Spoilbank from erosion.

There are limited assets on the Spoilbank beyond the marina location; some shelters, signage, gravels 'roads' and some rock to stabilise the most landward parts of the Spoilbank. Beyond this, the Spoilbank is relatively untouched.

However, the yacht club is currently proposing a junior yacht club on the eastern side of the Spoilbank close to existing shelters. Consideration is being given for a sea container type storage facility which may be utilised for refreshments during race events.

### 5.5.1 Recommendations

The CFMP supports the rationalisation of formal vehicular access to the Spoilbank. Vehicle access paths should be well sign posted to encourage the 'right' paths rather than ad-hoc crossing of the vegetated part of the dunes.

The CFMP proposes a program of planting to allow revegetation to stabilise the dunes, with an opportunity for community involvement in planting.

While existing off-road four wheel drive access is proposed to be retained, it is recommended that this is monitored longer term to ensure there aren't additional access paths made which results in degradation of the vegetation on the Spoilbank and further destabilisation of the dunes.



Some sand nourishment may be considered if the coast of the Spoilbank changes dramatically in locations closest to the Port Hedland coastline where impact may be experienced by landward properties, however, this should be limited as it is recognised that the Spoilbank is a moving land mass.

Cyclone damage should be cleaned up as and when required and replacement of assets should be carefully considered based each event.

Table 5 and Figure 10 & 11 illustrate the proposed Management Actions.

**TABLE 5 - SPOILBANK MANAGEMENT UNIT 2 MANAGEMENT ACTIONS**

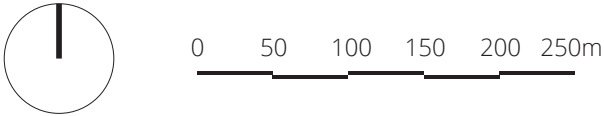
| Action Item | Action                                                                                                                                  | Comment                                                                              | Responsibility                                            | Timing            |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------|
| SB 1        | Signpost vehicle access ways across the Spoilbank to encourage the use of more formalised pathways                                      | Monitor use of unmarked pathways to determine if more formalised paths are required. | Town of Port Hedland                                      | Short term        |
| SB 2        | Undertake revegetation/planting of coastal vegetation                                                                                   |                                                                                      | Town of Port Hedland in partnership with Care for Hedland | Short-medium term |
| SB 3        | Support the Yacht Club proposal provided that structures can be removed or adequately tied down before destructive cyclone events       |                                                                                      | Yacht Club in consultation with Town of Port Hedland      | Short term        |
| SB 4        | Clean up cyclone damage as and when required                                                                                            |                                                                                      | Town of Port Hedland                                      | Ongoing           |
| SB 5        | Manage foreshore infrastructure in accordance with the Spoilbank CHRMAP as approved by Council                                          |                                                                                      | Town of Port Hedland                                      | Ongoing           |
| SB 6        | Monitor changes in the Spoilbank coast and implement adaptation pathways in accordance with the Spoilbank CHRMAP as approved by Council |                                                                                      | Town of Port Hedland                                      | Ongoing           |



Spoilbank - Management Unit 2



FIGURE 10 - SPOILBANK MANAGEMENT UNIT 2 LANDSCAPE PLAN





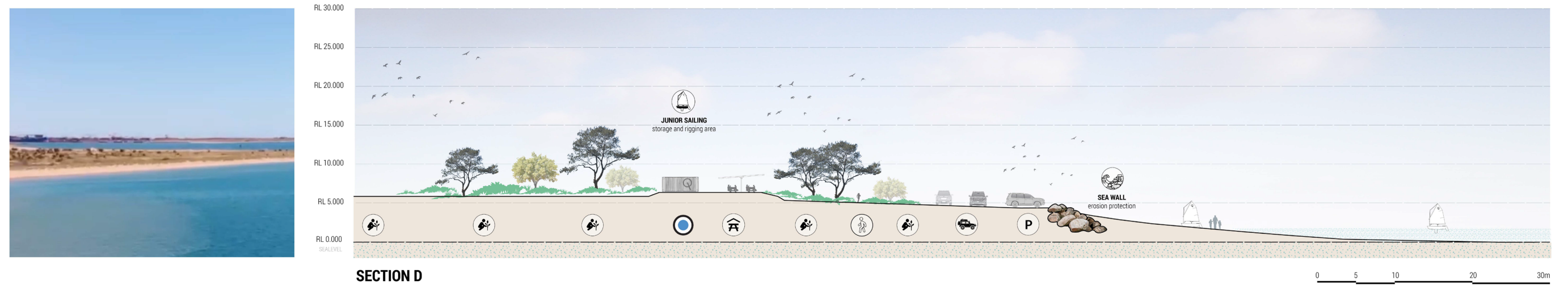


FIGURE 11 - SPOILBANK MANAGEMENT UNIT 2 CROSS SECTION





## 5.6 Sutherland Street - Management Unit 3

The Sutherland Street management unit covers the area from Rodereda Street to Clark Street. This includes Cemetery Beach and the Civic Centre area.

Assets in this area include the Cemetery Beach Park, beach access, footpaths, vegetation, car parking, a turtle nesting and hatching area, educational signage, beach-fronting residential and commercial properties and supporting service infrastructure like light poles and roads.

At the eastern end of this area, the Civic precinct contains several assets including parks, gardens and the Gratwick Aquatic Centre.

Beach access stairs at the point where Crawford Street and Sutherland Street meet have been significantly impacted by TC Veronica and remain closed, although the community has made makeshift access down the side of the stairs, impacting on the stability of the dune.

The Cemetery Beach end of this Management Unit is largely protected by existing rocky cliffs which shelter the coastline. As a result this area has remained largely stable over the long term.

Notwithstanding, the effects of TC Veronica on the parklands were significant, and many paths and some community infrastructure such as playgrounds, shelters and seating areas were impacted.

There are high social values associated with the Cemetery Beach Playground and this section of the coast for the community and visitors. This includes the turtle monitoring and sighting area.

In the section of this coastline between Webster Street and the Koombana Lookout, erosion is visible with a substantially shifting shoreline which can be affected by severe storm events. Again in this zone, TC Veronica revealed the vulnerability of both the foreshore and adjacent properties, including the Hedland Hotel.

The vegetation along the shoreline here is affected by weed varieties, and there are no access paths to the beach in this location leading to some confusion for how to access the beach. This is especially the case for visitors staying at the accommodation at the Hedland Hotel, and leads to ad-hoc crossing of the dunes to get to the beach. The shoreline here is gently undulating from Sutherland Street to the Beach and appears a wide distance.

Between Koombana Lookout and Clarke Street the environment changes again, making this one of the most varied Management Units in the CFMP. From this point the landward properties are more significantly elevated (approximately 10 metres) and the distance from the property and/or road and path infrastructure to the beach front is much narrower.

TC Veronica's impact on this section of coastline, particularly at the location of the Crawford and Sutherland Street, was considerable, with damage to the existing vegetation that helps to stabilise dunes, and substantial and visible erosion of the primary dune in close proximity (approximately 1-2 metres) to the footpath. The resultant vertical scarp exposed is 1-2 metres in height.

Both previous studies and TC Veronica in March 2019 reveal the vulnerability of both the foreshore and adjacent private properties in this location.

The CHRMAP suggested short term interim protection (e.g. sand replenishment, or an interim intertidal rocky platform), with longer term options such as managed retreat or hard passive protection.

However, as a result of the damage from TC Veronica the Sutherland Street Erosion Concept Adaptation Options Study was prepared, which proposes an additional hard active protection option of a rock seawall.

The rock seawall is proposed for a relatively short section as a rocky platform is visible along the beach at around the location of Moseley Street, which appears to protect the coast eastwards of that line.

Sand nourishment in this location is estimated at \$12.5 million dollars as a capital cost and an annual operating cost of \$5 million.

Managed retreat, which would affect 22 private residences, fencing and lighting, pathways, shade structures, roads and assets within the Gratwick Aquatic Centre, has been estimated at approximately \$62 million, which includes acquisition of those properties.

The seawall is estimated at \$7.5 million with annual operating costs (maintenance) of \$53,000. Whilst the cheaper of the options, it is noted that a seawall in this area will predominantly protect private development.

As a result, it is unlikely that the Town of Port Hedland could attract public funding for this seawall in the short term, and funding would have to be found from capital works budgets at a cost to ratepayers of approximately \$12.1 million over 25 years. Notwithstanding, the Town has progressed detailed design for this wall and this leaves the Town in a good position to move quickly should funding be made available.

The CFMP considers community values in this area and the coastal processes experienced here, to inform its recommendations. This includes the value of accessing a beach for walking and swimming etc, also recognising that access to these activities is quite challenging at present.



### 5.6.1 Recommended Actions

The CHRMAP recommends a variety of responses in this Management Unit that reflect the varied coastline, although monitoring and revegetation/planting is proposed along the entire Management Unit.

Where the Cemetery Beach coast is largely protected, proposed actions are relatively simple and staged, including an approach to asset management and replacement that reduces cost implications over time.

This includes the relocation of any shade, shelter and seating further away from the coastline if significantly damaged (e.g. cyclone damage), and the replacement of hard formed coastal paths with gravel base that can be easily replaced after storms. The materials and finishes specifications provide for this.

Whilst gravel paths are not universally accessible, Cemetery Beach has multiple pathways and access points which will remain accessible, and as such these small moves away from hard formed paths will have limited overall impact.

In the section between Webster Street and the Koombana Lookout it is recommended to provide better signage and wayfinding to beach access pathways. This will reduce ad-hoc destabilisation of the dunes in the area. A partnership with the Hedland Hotel for planting and signage may improve tourist behaviours associated with this coastline as well.

Recommended actions between Koombana Lookout and Clarke Street are more complicated and a flexible approach is being proposed.

Whilst monitoring is proposed, it is also recognised that risk in this location currently intolerable. To ensure that a seawall option can be progressed in the future, it is recommended that short term actions include sand nourishment and revegetation. This approach would only seek to maintain the coastline for as long as possible before a further decision would need to be made.

A sand supply location would need to be identified, and at this time it is recommended that the Town consider dredge materials from the marina development as an option. The design of the seawall should be finalised to enable quick response if funding becomes available.

At the same time, it is recommended that the Town consider relocating assets on the inland side of Sutherland Street when they require replacement (due to degradation or severe storm events). This would include the pedestrian path, signs, lights, bins and seats. Whilst the coastal edge is where the community wants to walk, such a program of relocation will signal that change is required, and provide the community with greater awareness of coastal hazard risks.

It is recommended that the beach access stairway be reinstated, and signed to clearly indicate that off path beach access is not suitable due to dune repair.

Cyclone damage should be cleaned up as and when required and replacement of assets should be carefully considered based each event. Notwithstanding, the Town should continue to strive for removal of underground infrastructure in parallel to the coast where possible.

Table 6 and Figure 12 & 13 illustrate the proposed Management Actions.

**TABLE 6 - SUTHERLAND STREET MANAGEMENT UNIT 3 MANAGEMENT ACTIONS**

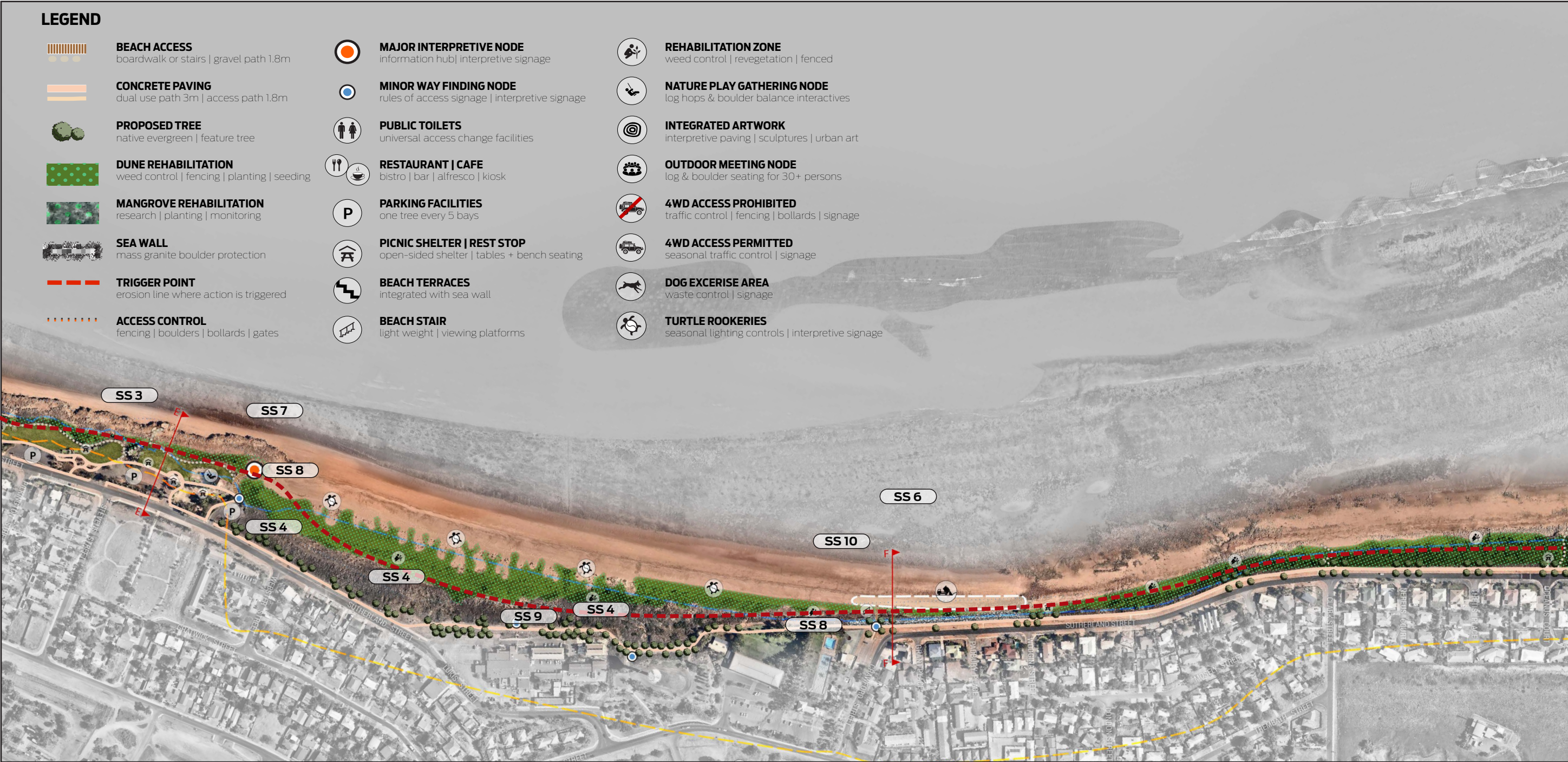
| Action Item | Action                                                                                                                                                           | Comment                                                                          | Responsibility                                            | Timing            |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------|
| SS 1        | Monitor changes to the coastline and take action when triggers are reached                                                                                       |                                                                                  | Town of Port Hedland                                      | Ongoing           |
| SS 2        | Undertake revegetation/planting of coastal vegetation                                                                                                            |                                                                                  | Town of Port Hedland in partnership with Care for Hedland | Short-medium term |
| SS 3        | Replace damaged coastal paths with gravel road base/temporary materials when relevant                                                                            | Ensure that at least one universally accessible path remains along the foreshore | Town of Port Hedland in partnership with Care for Hedland | Ongoing           |
| SS 4        | Manage lighting with regard to turtle nesting habitat                                                                                                            |                                                                                  | Town of Port Hedland in partnership with Care for Hedland | Short term        |
| SS 5        | Improve wayfinding and signage in proximity to turtle nesting area to better manage unintended impacts from access to the beach during hatching                  | Link to OM 8                                                                     | Town of Port Hedland in partnership with Care for Hedland | Short term        |
| SS 6        | Finalise the design of the seawall to enable quick response if funding becomes available.                                                                        |                                                                                  | Town of Port Hedland                                      | Short term        |
| SS 7        | Retreat of foreshore infrastructure (bins, seats, signs, other) from coastal edges when at end of life                                                           |                                                                                  | Town of Port Hedland                                      | Ongoing           |
| SS 8        | Improve signage and wayfinding from the central section of the Management Unit to indicate nearest beach access points in either westerly or easterly direction. |                                                                                  | Town of Port Hedland                                      | Short term        |



**TABLE 6 - SUTHERLAND STREET MANAGEMENT UNIT 3 MANAGEMENT ACTIONS (CONT'D)**

| Action Item | Action                                                                                                                                                                         | Comment | Responsibility                                         | Timing     |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------------------------------------------------|------------|
| SS 9        | Partner with the Hedland Hotel to manage ad-hoc beach access and undertake revegetation                                                                                        |         | Town of Port Hedland in partnership with Hedland Hotel | Short term |
| SS10        | Repair or replace Crawford and Sutherland Street beach access staircase. Provide wayfinding signage inland to direct tourists to the access point (from overflow caravan site) |         | Town of Port Hedland                                   | Short term |
| SS11        | Replace coastal infrastructure including poles, wires, drainage, paths to the inland side of Sutherland Street once assets hit degradation point (trigger)                     |         | Town of Port Hedland                                   | Ongoing    |
| SS12        | Clean up cyclone damage as and when required                                                                                                                                   |         | Town of Port Hedland                                   | Ongoing    |

Sutherland Street - Management Unit 3





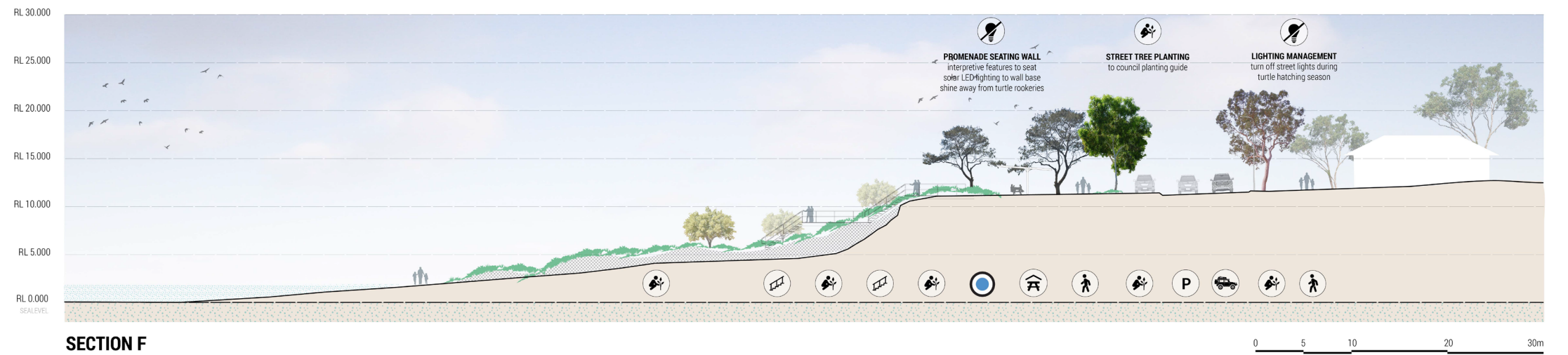
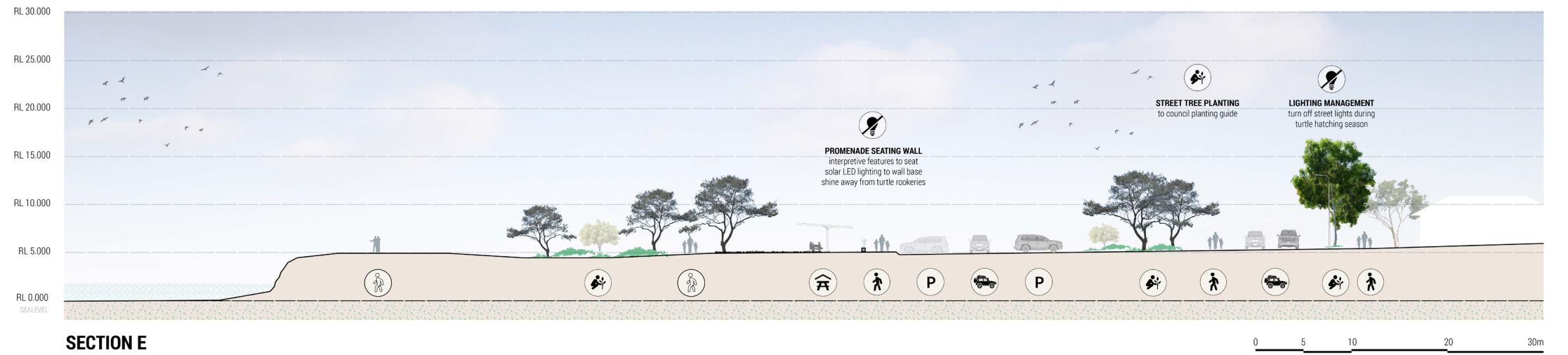


FIGURE 13 - SUTHERLAND STREET MANAGEMENT UNIT 3 CROSS SECTION



## 5.7 Cooke Point - Management Unit 4

The Cooke Point management unit stretches from Clarke Street to Cooke Point. The area covers the northern coastline and the headland to Rock of Ages.

Assets in this area include roads and associated lighting infrastructure, drainage and other support services, vegetation, walking paths, beach-fronting or beach-adjacent residential development and dunes.

A large section of this coastline is comprised of an underlying hard rock therefore erosion, whilst still a concern in this location, is less of a risk compared to the rest of the coastline.

The community values access to this location, and the area is notably absent of clearly signposted or accessible pathways. The draft Port Hedland Parks and Paths Strategy identifies a pathway connection through this Management Unit between Keesing Street north and Dempster Street.

The community has also indicated it may be pleasant to have somewhere to stop and rest near the Rock of Ages where views are expansive. An opportunity may exist to establish a coastal cafe or similar on the old Port Hedland Detention Centre site on Dempster Street.

Given the existing conditions and underlying geomorphology, an adaptation pathway of monitoring, managed retreat of coastal assets and avoiding new development has been recommended. Pathways and landscape treatments recommended in a number of documents and desired by the community are recommended to be constructed in a manner that is less costly but functional, given impending coastal risks.

There are a number of beach access points (formal and informal) along this section of coastline and it would be opportune to formalise and clearly signpost these pathways at such time as they require repair and maintenance.

There is also a sporadic / opportunistic turtle nesting habitat along this section of coastline.

There is also limited evidence of four wheel drive access tracks across the area, although this is not a designated four wheel drive area. This activity damages the existing vegetation and reduces the stability of the dunes, increases erosion risk in the future.

There are no formal access paths along the coast or to Rock of Ages, which may encourage four wheel driving through this area.



### **5.7.1 Recommended Actions**

Monitoring and revegetation is proposed throughout this Management Unit.

Completion of the coastal path that is important for walking and cycling (for recreation and commuting) is recommended. Formed pathways should be located as close as possible to adjacent roads, whilst some gravel road base pathways are encouraged to access the Rock of Ages, in a temporary/sacrificial style as proposed in other coastal locations.

Better control of access to stop four wheel driving in this location is encouraged. Controlled access can provide opportunities for education and awareness as well as improved public facilities such as bins and signage at access points.

In general, a low scale approach to this Management Unit is proposed, with some formalisation of access in line with community values.

Table 7 and Figure 14 & 15 illustrate the proposed Management Actions.

**TABLE 7 - COOKE POINT MANAGEMENT UNIT 4 MANAGEMENT ACTIONS**

| Action Item | Action                                                                                                                                                          | Comment | Responsibility                                            | Timing            |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------------------------------------------------------|-------------------|
| CP 1        | Monitor changes to the coastline and take action if triggers are reached                                                                                        |         | Town of Port Hedland                                      | Ongoing           |
| CP 2        | Undertake revegetation/planting of coastal vegetation                                                                                                           |         | Town of Port Hedland in partnership with Care for Hedland | Short-medium term |
| CP 3        | Complete the coastal pathway between Keesing Street north and Dempster Street and establish informal pathways with gravel to access Rock of Ages                |         | Town of Port Hedland                                      | Short-medium term |
| CP 4        | Manage lighting with regard to turtle nesting habitat                                                                                                           |         | Town of Port Hedland in partnership with Care for Hedland | Short term        |
| CP 5        | Limit development of foreshore infrastructure (bins, seats, signs, other) from coastal edges                                                                    |         | Town of Port Hedland                                      | Ongoing           |
| CP 6        | Improve signage and wayfinding to indicate nearest beach access points in either westerly or southerly direction.                                               |         | Town of Port Hedland                                      | Short term        |
| CP 7        | Replace coastal infrastructure including poles, wires, drainage, paths to the inland side of coastal-adjacent roads once assets hit degradation point (trigger) |         | Service agencies<br>Town of Port Hedland                  | Ongoing           |
| CP 8        | Clean up cyclone damage as and when required                                                                                                                    |         | Town of Port Hedland                                      | Ongoing           |
| CP 9        | Use beach access rationalisation as an opportunity for education and awareness                                                                                  |         | Town of Port Hedland in partnership with Care for Hedland | Short-medium term |



Cooke Point - Management Unit 4



FIGURE 14 - COOKE POINT MANAGEMENT UNIT 4 LANDSCAPE PLAN

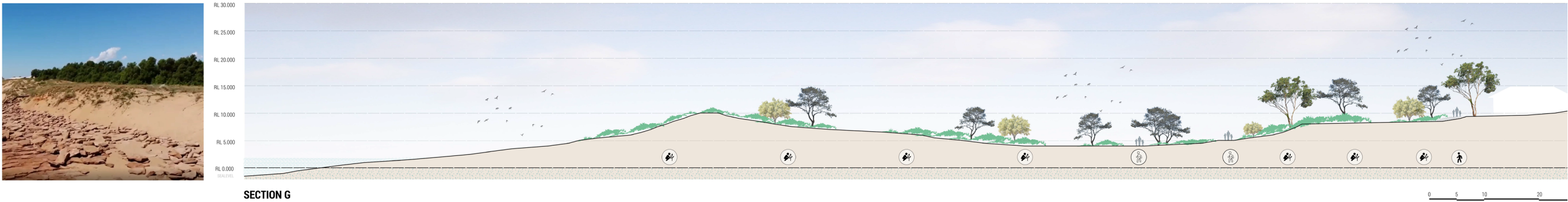


FIGURE 15 - COOKE POINT MANAGEMENT UNIT 4 CROSS SECTION





## 5.8 Pretty Pool Management Unit 5

The Pretty Pool management area covers the area from Cooke Point to Four Mile Creek, with Paniya Parade at the southern end of the study area. It includes the Pretty Pool parklands, beach and boat access area, parking, toilets and playgrounds as well as lighting, bins and inland along the creek.

Assets in this area also include road and lighting infrastructure, footpaths and a large number of residential properties backing onto the beach and vegetation.

In the northern most section of the Management Unit, the main risks for the assets in this areas are from the erosion of dunes and encroachment towards residential properties specifically near Barker Court and the southern section of Goode Street. There is also risk to path, road and tourism infrastructure in this area, which may lead to property loss and reduced connections through damage to infrastructure.

As storm severity increases, the dune system loses its ability to recover, and the risk of erosion to the public beach and dunes will become intolerable. The limited buffer zone between the area of active coastal processes and adjacent assets aids encroachment towards residential properties.

The CHRMAP considered a managed retreat option in this area, and other interim protection options. Managed retreat in this area is estimated at approximately \$11 million including the acquisition of five private residences.

Whilst the CHRMAP did not recommend a seawall in this location, as a result of the damage from TC Veronica the Goode Street Erosion Concept Adaptation Options Study was prepared, which proposes an additional hard active protection option of a rock seawall.

It is noted that a seawall in this area will predominantly protect private development. As a result, it is unlikely that the Town of Port Hedland could attract public funding for this seawall in the short term, and funding would have to be found from capital works budgets at a cost to ratepayers of approximately \$3-4.5 million with maintenance required every 5-10 years.

Notwithstanding, the Town has progressed detailed design for this wall and this leaves the Town in a good position to move quickly should funding be made available.

The community values access to this location, and the area is notably absent of consistent coastal pathways. The draft Port Hedland Parks and Paths Strategy identifies a pathway connection through this Management Unit linking the two sections of Goode Street.



The southern portion of this area is recognised as being impacted by inundation and erosion effects. Few of the recent studies define specific solutions as there is an expectation of detailed planning associated with the Pretty Pool urban development area. The CHRMAP recommends short term monitoring and long term interim protection and accommodation.

Options in the CHRMAP include the use of tidal gates across tidal creeks and levees around tidal creeks, however, a number of factors affect the feasibility of these measures including the number of roads that would need to be rebuilt, the impact on drainage and the geotechnical conditions of the area.

These solutions would also have large environmental and social impact on the tidal creeks at Pretty Pool and Four Mile Creek including the important mangrove habitats.

The draft Port Hedland Parks and Paths Strategy also identifies a pathway connection south from Goode Street and crossing Pretty Pool, for which a preliminary pedestrian bridge design has been developed.

Pretty Pool remains a highly valued location for beach access, recreation, fishing and gathering. Notwithstanding the importance of the natural environment in this area to the community, there is obviously unfettered four wheel drive access on the creek side which destabilises the area and weakens the natural protections of vegetated dunes.

### **5.8.1 Recommended Actions**

The CFMP considers the values associated with this area and recommends proposed management actions including monitoring and dune stabilisation through revegetation across the entire Management Unit.

It is also recommended that the town finalise detailed plans for the Goode Street seawall such that it is ready if funding becomes available, whilst also progressing plans to revegetate the mangroves and replant the dunes.

Path ways connections indicated in the draft Port Hedland Parks and Paths Strategy are recommended, although it is noted that sections of this path may need to be constructed of more temporary materials such as gravel, as these linear pathways will continue to be vulnerable.

The Town should continue to encourage the development of the Pretty Pool pedestrian bridge, which will form a key pedestrian and cyclist connection off the major road network.

A number of specific actions to Pretty Pool are recommended; establishment of bike racks, more shade trees and ongoing maintenance and upkeep of the parking area and toilets.

The current access management to the south of Pretty Pool is relatively informal in style (large boulders), which add to the natural feel of the area whilst managing some four wheel drive access.

More education and awareness of avoiding the vegetated dunes should be undertaken, to reduce destabilisation of the dune area, although beach access would not be limited.

As with other Management Units, where infrastructure is located on the coastal side of roads adjacent the coast, it is recommended that the replacement of the damaged coastal paths with paths of a more temporary material like gravel that will respond to extreme weather events occur, and formed paths and linear service infrastructure be gradually relocated to the inland side of the road.

Improved signage and wayfinding would be desirable, as well as better signage at the Staircase to the Moon node.

Table 8 and Figure 16 & 17 illustrate the proposed Management Actions.

**TABLE 8 - PRETTY POOL MANAGEMENT UNIT 5 MANAGEMENT ACTIONS**

| Action Item | Action                                                                                                 | Comment                                            | Responsibility                                            | Timing            |
|-------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------|-------------------|
| PP 1        | Monitor changes to the coastline and take action if triggers are reached                               |                                                    | Town of Port Hedland                                      | Ongoing           |
| PP 2        | Undertake revegetation/planting of coastal vegetation and mangroves                                    | Partner with BHP to access mangrove planting stock | Town of Port Hedland in partnership with BHP              | Short-medium term |
| PP 3        | Finalise the design of the Goode Street seawall to enable quick response if funding becomes available. |                                                    | Town of Port Hedland                                      | Short term        |
| PP 4        | Complete the coastal pathway linking Goode Street with temporary materials (gravel road base)          |                                                    | Town of Port Hedland                                      | Short-medium term |
| PP 5        | Continue to progress designs for the Pretty Pool pedestrian bridge.                                    |                                                    | Town of Port Hedland                                      | Medium term       |
| PP 6        | Manage lighting with regard to turtle nesting habitat                                                  |                                                    | Town of Port Hedland in partnership with Care for Hedland | Short term        |



**TABLE 8 - PRETTY POOL MANAGEMENT UNIT 5 MANAGEMENT ACTIONS (CONT'D)**

| <b>Action Item</b> | <b>Action</b>                                                                                                                                                   | <b>Comment</b> | <b>Responsibility</b>                                     | <b>Timing</b>     |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------|-------------------|
| PP 7               | Plan for and implement additional bike racks and shade trees at Pretty Pool park.                                                                               |                | Town of Port Hedland                                      | Medium term       |
| PP8                | Limit development of foreshore infrastructure (bins, seats, signs, other) from coastal edges                                                                    |                | Town of Port Hedland                                      | Ongoing           |
| PP 9               | Replace coastal infrastructure including poles, wires, drainage, paths to the inland side of coastal-adjacent roads once assets hit degradation point (trigger) |                | Service agencies<br>Town of Port Hedland                  | Ongoing           |
| PP 10              | Improve signage and wayfinding for beach access as well as signage of the Staircase to the Moon nodes.                                                          |                | Town of Port Hedland                                      | Short term        |
| PP 11              | Use beach access management as an opportunity for education and awareness                                                                                       |                | Town of Port Hedland in partnership with Care for Hedland | Short-medium term |
| PP12               | Clean up cyclone damage as and when required                                                                                                                    |                | Town of Port Hedland                                      | Ongoing           |



Pretty Pool - Management Unit 5



FIGURE 16 - PRETTY POOL MANAGEMENT UNIT 5 LANDSCAPE PLAN

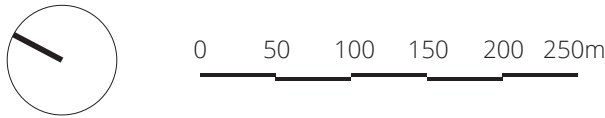






FIGURE 17 - PRETTY POOL MANAGEMENT UNIT 5 CROSS SECTIONS



## 5.9 Four Mile Creek - Management Unit 6

Management Unit 6 covers the area from the mouth of the creek inland to the intersection of Wilson Street and Gray Street. It covers the extent of Four Mile creek and its adjacent flats and plains.

Management Unit 6 is predominantly characterised by natural assets. There is a risk of inundation from increased storm activity and raised water levels.

The most western area lies adjacent to the residential area at Pretty Pool, with uncontrolled four wheel drive / off road access trails in the north-west and south-west sections. The uncontrolled four wheel drive activity across the management unit increases erosion of low lying land and damages tracts of existing vegetation which stabilise the underlying sand forms.

Assets in this area include the creek, a significant mangrove population, other vegetation, dunes and walking and cycling paths. There are bollards and signage along vehicle tracks and surrounding an informal parking area which are in need of repair.

In the northern section of this management unit the Town is investigating a cycling path that extends from Dowding Way in the south-eastern edge of the residential area in Pretty Pool south to Wilson Street (the main road) to create a pedestrian and cyclist circuit.

Future extensions of the path could be considered to include areas within Four Mile Creek.

In addition to the above mentioned assets, there are two Registered Aboriginal sites within the Management Unit:

- Register Aboriginal Site 6332 - Port Hedland Midden, located near the Wilson and Gray Streets
- Registered Aboriginal Site 731 - Four Mile Engravings, located south east of the mouth of the creek

### 5.9.1 Recommended Actions

There are very few studies relating to Management Area 6. The CHRMAP does not cover this area and therefore the hazards and risks of coastal processes are not fully understood. It is recommended that further studies be undertaken to better understand how erosion and inundation will impact on this area of coast to determine what, if any, more specific management of assets is required.

Cyclone damage should be cleaned up as and when required and replacement of assets should be carefully considered based each event.



Four wheel drive access may be more appropriate in locations where it will not have adverse impacts on coastal erosion. Replacement of the existing bollards with more natural barriers such as rocks, will encourage people not to travel on the informal tracks and reduce the potential for further and future coastal erosion.

Using structures that are temporary in nature or sacrificial, such as rocks for bollards, will minimise the cost of installation and reduce the need for maintenance by the Town.

Directional and educational information and signage about the local environmental and cultural significance of the area would also assist the local community to understand the importance of maintaining the coastal area.

It is recommended that the Town work with local Aboriginal groups to employ Aboriginal rangers to manage activity in the area.

Table 9 and Figure 18 illustrate the proposed Management Actions.

**TABLE 9 - FOUR MILE CREEK MANAGEMENT UNIT 6 MANAGEMENT ACTIONS**

| Action Item | Action                                                                                               | Comment | Responsibility                                                            | Timing            |
|-------------|------------------------------------------------------------------------------------------------------|---------|---------------------------------------------------------------------------|-------------------|
| FM 1        | Undertake further studies to understand the hazards and risks associated with erosion and inundation |         | Town of Port Hedland                                                      | Short term        |
| FM 2        | Clean up cyclone damage as and when required                                                         |         | Town of Port Hedland                                                      | Ongoing           |
| FM 3        | Install natural bollards and barriers to discourage four wheel drive access                          |         | Town of Port Hedland                                                      | Short-medium term |
| FM 4        | Introduce gathering and viewing locations with associated access and signage                         |         | Town of Port Hedland                                                      | Medium term       |
| FM 5        | Support the development of a ranger program for Traditional Owners                                   |         | Town of Port Hedland in partnership with Kariyarra Aboriginal Corporation | Short term        |



Four Mile Creek - Management Unit 6



FIGURE 18 - FOUR MILE CREEK MANAGEMENT UNIT 6 LANDSCAPE PLAN



0 50 100 150 200 250m





## 5.10 Six Mile Creek - Management Unit 7

The Six Mile Creek management unit covers the reserve at the end of Grey Street and extends inland to the salt ponds. The western boundary of the Six Mile Creek area abuts the salt ponds at the intersection of Wilson Street and Gray Street.

Six Mile Creek is recognised for its current and future use for ceremony for Traditional Owners. There are three registered Aboriginal sites in this location.

Six Mile Reserve (Reserve 39913) is currently under a memorandum of understanding between the Kariyarra Aboriginal Corporation (KAC) and the Town of Port Hedland for the joint management of the reserve. Ongoing reserve management responsibility is being reviewed.

There are limited assets on the Six Mile Creek area, including two solar shelters, Gray Street which runs through the management unit to the coast, a boat ramp, signage and bins. Beyond this Six Mile Creek is relatively untouched.

There is sparse vegetation, dunes and unconstructed four wheel drive access tracks that run from Gray Street to different sections of the beach in the Six Mile Creek area.

The recreational value of Six Mile Creek is highly regarded by residents and tourists alike. The area is used by the community for fishing, picnicking, kayaking, dog walking and boat launching.

Six Mile Creek is also recognised for its tourism potential.

The CHRMAP did not consider this management unit.

The Six Mile Creek area is at risk of inundation and erosion from increased storm activity and raised water levels. Additionally, four wheel drive activity across the area contributes to increased erosion of low-lying land and the degradation of vegetation and destabilisation of dunes in the management unit area.

### 5.10.1 Recommended Actions

Upholding and maintaining the Aboriginal heritage value of Six Mile Creek is central to recommended management actions.

There is a risk that Aboriginal heritage may not be protected if the area is promoted and there is increased local and visitor visitation. The area's potential for future tourism and increased local and visitor visitation will therefore need to be balanced with the Aboriginal significance of Six Mile Creek.



The CFMP recommends that the Town support the development of a ranger program for Traditional Owners to assist in protecting the area and educating visitors on the area's cultural and environmental values.

Further, the Town should consider sharing management responsibility of the Six Mile Creek management unit area with the KAC. The Town may want to investigate the potential for partnerships with BHP, Rio Tinto, the Department of Biodiversity, Conservation and Attractions (DBCA) and DPLH to fund paid local positions for Aboriginal rangers.

Four wheel drive access within the management unit should be rationalised to protect it as water levels rise and erosion becomes worse. The CFMP recommends prohibiting four wheel drive access at various locations and the revegetation of old four wheel drive access tracks.

The Town may consider local laws to issue fines for crossing the dunes where no signposted pathways exist.

The CFMP proposes a program of planting to allow revegetation to stabilise the dunes, with an opportunity for community involvement in planting.

As with the Four Mile Creek management unit, formalised gathering / viewing locations with associated directional and educational signage could be provided to encourage appropriate gathering.

It is recommended that the existing bins at the coastal edge be relocated further inland at the end of their life.

Table 10 and Figure 19 illustrate the proposed Management Actions.

**TABLE 10 - SIX MILE CREEK MANAGEMENT UNIT 7 MANAGEMENT ACTIONS**

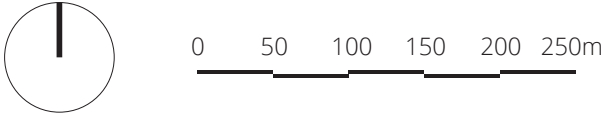
| Action Item | Action                                                                                                         | Comment                                                                                                           | Responsibility                                                            | Timing            |
|-------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------|
| SMC 1       | Employ Kariyarra rangers to manage the area                                                                    | To enable protection and education on cultural and environmental values                                           | Town of Port Hedland in partnership with Kariyarra Aboriginal Corporation | Short term        |
| SMC 2       | Investigate sharing management responsibility of the SMC management unit with Kariyarra Aboriginal Corporation | Consider partnership models for funding and grants                                                                | Town of Port Hedland in partnership with Kariyarra Aboriginal Corporation | Short-medium term |
| SMC 3       | Clean up cyclone damage as and when required                                                                   |                                                                                                                   | Town of Port Hedland                                                      | Ongoing           |
| SMC 4       | Undertake revegetation/planting of coastal vegetation and mangroves                                            |                                                                                                                   | Town of Port Hedland in partnership with Care for Hedland                 | Ongoing           |
| SMC 5       | Signpost gathering / viewing locations to assist with managing ad-hoc access of dunes                          | Monitor use of unmarked pathways to determine if signposts are adequate or local laws to issue fines are required | Town of Port Hedland                                                      | Short-medium term |
| SMC 6       | Limit four wheel drive access                                                                                  | This should be undertaken in conjunction with SMC 4 and SMC 5                                                     | Town of Port Hedland                                                      | Short term        |
| SMC 7       | Retreat of foreshore infrastructure (bins) from coastal edges at end of life                                   |                                                                                                                   | Town of Port Hedland                                                      | Ongoing           |



Six Mile Creek - Management Unit 7



FIGURE 19 - SIX MILE CREEK MANAGEMENT UNIT 7 LANDSCAPE PLAN





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# APPENDICES

## **Appendix A - Flora and Fauna Report**



4 November 2020

## **Flora and Fauna Assessment – Port Hedland**

To: Anna Kelderman – Director

Company: Shape Urban

Email: [anna@shapeurban.place](mailto:anna@shapeurban.place)

Our Reference: SU 001

# **1. Introduction**

## **1.1 Background**

The coastal section of the Town of Port Hedland (TPH) occurs around a narrow headland with substantial port infrastructure to the south and west. The coastal reserve along the north and east of the Town is used by the community as a recreational resource. However, this coastline is subjected to significant pressures including, increased coastal erosion, inundation of low-lying areas during storm events, increasing human uses, and as a result threats to the reserves biodiversity values. There have been several studies and as a result reports concerned with the management of the coast, including two important reports:

- Port Hedland Consolidated Foreshore Redevelopment Master Plan (UDLA 2013)
- Port Hedland Townsite CHRMAP Coastal Hazard Risk Management and Adaptation Plan (GHD 2019).

As result of these reports and the visible ongoing pressures to the reserve, the TPH is currently undertaking a number of projects that will result in the production of a Coastal Reserve Management Plan (CRMP).

Consequently, Western Ecological (WE) was commissioned by Shape Urban to undertake a terrestrial flora and fauna assessment of the TPH coastal reserve from the western end to the south eastern end (Figure 1). However, it is important to note that the primary focus of the assessment was the northern section of the reserve, and the area to the south east was less of a focus as WE were informed that this area has a different level of management applied to it.

## **1.2 Objectives and Scope**

The primary objectives and scope of work (SoW) to be undertaken was as follows:

- Flora and fauna in the study area will be sampled and identified at a number of quadrats spaced across the survey area/coastal reserve and opportunistically
- Broad vegetation types will be mapped with this based on the dominant flora species present and landscape position
- Broad fauna habitat types will be mapped with this based on the dominant flora species present, vegetation structure and position in the landscape
- Weeds and introduced pests will also be recorded when present.
- Document the above in a letter report.

It is important to note that the flora and fauna assessment was being undertaken to provide input into the CRMP, and not for an environmental impact assessment, as such flora and fauna survey guidance documents published by the Western Australian (WA) Environment Protection Authority (EPA) are not considered relevant for this work. Further to this, the flora and fauna assessment was not detailed and extensive in its scope, but brief and broad in scope, but fit for purpose.

### 1.3 Legislative context

Fauna in Western Australia is protected formally and informally by various legislative and non-legislative measures, which are as follows:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) – Australian Government
- *Environmental Protection Act 1986* (EP Act) – State
- *Biodiversity Conservation Act 2016* (BC Act) – State.

Non-legislative measures:

- *WA Department of Biodiversity, Conservation and Attractions (DBCA) Priority lists for flora, ecological communities and fauna.*

A short description of each is given below. Other definitions, including species conservation categories, are provided in Appendix 1.

#### EPBC Act

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) aims to protect matters of national environmental significance, which are detailed in Appendix 1. Under the EPBC Act, the Commonwealth Department of Agriculture, Water and the Environment (DAWE) lists protected species and Threatened Ecological Communities (TECs) by criteria set out in the Act. Species are conservation significant if they are listed as Threatened (i.e. Critically Endangered, Endangered and Vulnerable) or Migratory.

Bird species protected as Migratory under the EPBC Act include those listed under international migratory bird agreements relating to the protection of birds, which migrate between Australia and other countries, for which Australia has agreed. This includes the Japan-Australia Migratory Bird Agreement (JAMBA), the China-Australia Migratory Bird Agreement (CAMBA), the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA) and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

Some marine fauna or terrestrial fauna that use marine habitats are listed as Marine under the EPBC Act. These species are only considered conservation significant when a proposed development occurs in a Commonwealth marine area (i.e. any Commonwealth Waters or Commonwealth Marine Protected Area). Outside of such areas, the EPBC Act does not consider these species to be matters of national environmental significance, so are not protected under the Act.

#### BC Act

The *Biodiversity Conservation Act 2016* (BC Act) replaced both the *Wildlife Conservation Act 1950* and the *Sandalwood Act 1929* and came into effect on 1 January 2019. The aim of the new Act is to conserve and protect biodiversity and to promote the ecologically sustainable use of biodiversity components in the State, and will bring more activities within the scope of biodiversity laws.

Taxa listed as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1a, 1b, and 1c), or is a rediscovered species to be regarded as threatened species under section 26(2) of the BC Act. Other categories include extinct or extinct in the wild and they are listed under section 23 (1) of the BC Act (Appendix 1).

If species meet one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection, they are covered under section 13(1) of the BC Act and are called specially protected species. Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act can't also be listed as Specially Protected species (see Appendix 1 for a more detailed description of each threat category).





Threatened Ecological Communities (TECs) are also covered under the BC Act and are placed into three categories of critically endangered, endangered or vulnerable under section 27(1a, 1b, and 1c) of the BC Act depending on their threat status.

#### **DBCA Priority Species and Communities**

DBCA lists species that are possibly threatened but that do not meet criteria for listing under the BC Act, or are otherwise data deficient, and adds them to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Consideration of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations (see Appendix 1 for more detail of the priority codes).

The DBCA also has a list of Priority Ecological Communities (PECs) that have scant information available to be considered a TEC, or which are rare but not currently threatened. Ecological communities that do not meet survey criteria or that are not sufficiently defined are added to the PEC list under priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community, and evaluation of conservation status, so that consideration can be given to their declaration as a TEC. Ecological communities that are adequately known, and are rare but not threatened or meet criteria for near threatened, or that have been recently removed from the threatened list, are placed in priority 4. These ecological communities require regular monitoring. Conservation dependent ecological communities are placed in priority 5.

#### **Informal Recognition of Threatened Fauna**

Certain populations or communities of fauna may be of local significance or interest because of their patterns of distribution and abundance. For example, fauna may be locally significant because they are range extensions to the previously known distribution or are newly discovered species (and have the potential to be of conservation significance). In addition, many species are in decline as a result of threatening processes (land clearing, grazing, and changed fire regimes) and relict populations of such species assume local importance for DBCA. It is not uncommon for DBCA to make comment on these species of interest.

## 2. Methods

### 2.1 Desktop Assessment

Searches of NatureMap and the EPBC Protected Matters Search Tool (EPBC PMST) were undertaken to identify flora and fauna species of conservation significance potentially occurring in the survey area (DBCA 2020, DAWE 2020). Searches with a 10 km buffer were centred on the following coordinates 118° 36' 33" E, 20° 19' 12" S (Appendix 2).

### 2.2 Field Assessment

The field assessment was undertaken from 9-10 September 2020 by one qualified Principal Ecologist. As per the scope and proposal, the following survey methods were undertaken in the coastal reserve. Please note that the assessment was originally planned for late March 2020, however, because of restrictions on movement as a result of the COVID-19 outbreak the assessment was delayed.

#### 2.2.1 Flora assessment

Flora was identified and/or collected (and identified later) from quadrats (20 x 20 m) in the coastal reserve, and the quadrat location (centre of quadrat) taken with a GPS (a representative photo of the quadrat was also taken). The primary focus was to identify dominant species and other species where possible, noting that the survey was undertaken in September, which is not the preferred time of year to carry out flora and vegetation surveys (March – June is the preferred period).

Assessment sites were chosen in order to best represent the vegetation present in the reserve and to also get a geographical spread of sites across the reserve. As noted in the background section above the primary focus of the assessment was the northern section of the reserve, consequently, quadrats were located in this area.

Flora, including weeds was also collected opportunistically outside of the quadrats in other areas of the reserve.

Very broad vegetation types were described across the entire coastal reserve with this based on dominant vegetation and landscape position. Weeds were also noted when observed.

#### 2.2.2 Fauna assessment

Fauna was identified in the same quadrats as the flora; however, the quadrats dimension was larger at 50 x 50 m (the centre coordinate is the same as the centre of the flora quadrat). Broad terrestrial habitat types were identified based on the dominant vegetation and position in the landscape.

It is important to note that the field assessment did not include the use of techniques such as trapping (Elliott traps, cage traps, pitfall traps and funnel traps) or camera traps, but was based on observations of fauna and their signs (scats, tracks and other signs i.e. burrows and diggings). As a result, the majority of fauna observed were birds – identified either visually (naked eye or with binoculars) or audibly by their calls.

Fauna were also identified opportunistically outside of the quadrats in other areas of the reserve. Noting that most records during surveys like this which are primarily about describing habitat typically come from opportunistic sightings because birds are highly mobile.

#### 2.2.3 Photo points

A series of photos (photo points) were taken throughout the coastal reserve in order to further help describe and display the vegetation and habitats, particularly, in the south eastern section where flora and fauna quadrats were not placed because of the scope of this work, which are a result of the different levels of management that the TPH applies across the coastal reserve (see background section above).





## 3. Results

### 3.1 Database Results

The results of the databased searches are outlined below for flora and fauna. The database result numbers we refer to are from NatureMap. It is important to note, that the EPBC PMST is not entirely based on point records, but also on broader information, including bioclimatic distribution models, whereas NatureMap is based on point records. Consequently, the results of the EPBC PMST are in some cases less accurate, particularly at a local scale (e.g. the Night Parrot [*Pezoporus occidentalis*]). As a result, the EPBC PMST can include species that do not occur in the survey area because, for example, there is no habitat available or they are now known to be locally extinct (the results produced are generic, but still somewhat informative)

In addition, many species are not distributed evenly across the landscape, being more abundant in some places than others where they can be more readily detectable (Currie 2007). Furthermore, some small, common, ground-dwelling reptile and mammal species tend to be habitat specific, and many bird species can occur as regular migrants, occasional visitors or vagrants.

#### 3.1.1 Flora results

There were 290 species of plants from 66 families present in the database searches (Appendix 2). Of these 290 species, five were Priority species and 36 were weeds.

The most diverse families were the Fabaceae (this family includes the genus *Acacia*), Poaceae (grass family) and Malvaceae (this family includes the *Hibiscus*) with 61, 42 and 21 species respectively.

None of the flora species present in the NatureMap search are listed as threatened under the EPBC Act or BC act.

#### 3.1.2 Fauna results

There were 365 species of animals from 135 families present in the database searches (Appendix 2). Of these 365 species, 37 were covered under international agreements (for example because they are birds covered by migratory agreements with countries such as Japan), 12 are listed as threatened species (either listed under the EPBC Act or BC act or both), four are Priority species and one is listed as other specially protected fauna under the BC Act.

The most diverse families were the Scolopacidae (this family includes the Sandpipers, Stints and other genera), Scincidae (this family includes the many small skinks and larger members such as the Blue-tongue) and Elapidae (this family includes highly venomous snakes such as the Mulga and Brown snakes and other genera) with 25, 19 and 14 species respectively (Appendix 2).

It is important to note that the database search results also include marine species (particularly the EPBC PMST) such as turtles, sea snakes and whales, that are not part of this terrestrial fauna assessment (Appendix 2).

### 3.2 Field Assessment Results

#### 3.2.1 Flora results

A total of 42 species of flora from 14 families were recorded during the assessment, both in assessment sites and opportunistically throughout the coastal reserve (Appendix 3). The most diverse families were the Fabaceae with 12 species (mostly *Acacia* species), followed by Poaceae (the grasses in genera such as *Aristida*, *Spinifex* and *Triodia*) with nine species and there were then four families with three species each (Appendix 3). None of the species recorded are of conservation significance.

During the assessment eight species of weeds were recorded (see Table 1 below and Appendix 3). The most commonly recorded and widespread weed in the survey area was the grass *Cenchrus ciliaris* (Buffel Grass), followed by *Aerva javanica* (Kapok Bush).

**Table 1. List of weeds recorded in the survey area during the assessment.**

| Family        | Species                            | Common Name  |
|---------------|------------------------------------|--------------|
| Amaranthaceae | <i>Aerva javanica</i>              | Kapok Bush   |
| Asparagaceae  | <i>Agave sp.</i>                   | Agave        |
| Poaceae       | <i>Arundo donax</i>                | Giant Reed   |
| Areaceae      | <i>Areaceae sp. (unknown Palm)</i> | Palm         |
| Apocynaceae   | <i>Calotropis procera</i>          | Rubber Bush  |
| Poaceae       | <i>Cenchrus ciliaris</i>           | Buffel Grass |
| Cucurbitaceae | <i>Cucumis melo</i>                | Melon        |
| Tamaricaceae  | <i>Tamarax aphylla</i>             | Athel Tree   |

### 3.2.2 Vegetation results

Five broad vegetation types were described for the survey area and these are outlined below in Table 2 and are mapped on Figure 2 and can be seen in Appendix 4. The vegetation descriptions were based on flora species identified in eight assessment sites and species identified opportunistically outside of the assessment sites.

As can be seen from photos in Appendix 4, some sections of the reserve are quite degraded, particularly those areas in the north of the reserve from assessment site 1 through to assessment site 4. As you progress in an easterly direction from assessment site 5 through to 8 and then to the south, the coastal reserve is not as degraded and the vegetation becomes somewhat denser and there is less Buffel Grass and other weeds such as Kapok Bush (Figure 2, Appendix 4 and 5).

**Table 2. Broad vegetation types recorded in the survey area during the assessment.**

| Broad Vegetation Type | Broad Vegetation Description                                                                                                                                                                                                                                                                                                | Size of Area (ha) |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Dune 1                | A low and mostly open <i>Acacia stellaticeps</i> , <i>Acacia bivenosa</i> and <i>Acacia ampliceps</i> shrubland with lower shrubs of <i>*Aerva javanica</i> over a <i>Triodia epactia</i> and <i>*Cenchrus ciliaris</i> (with some <i>Spinifex longifolius</i> ) open grassland over scattered <i>Gomphrena canescens</i> . | 108               |
| Dune 2                | A <i>Spinifex longifolius</i> open grassland with <i>Ipomoea pes-caprae</i> and scattered <i>Canavalia rosea</i> shrubs.                                                                                                                                                                                                    | 13.5              |
| Mangroves             | A high closed <i>Avicennia marina</i> , <i>Bruguiera exaristata</i> and <i>Rhizophora stylosa</i> shrubland.                                                                                                                                                                                                                | 82                |
| Saltpan/Mudflats      | A low and mostly open <i>Acacia spp.</i> shrubland over a <i>Triodia sp.</i> open grassland.                                                                                                                                                                                                                                | 5.4               |
| Open Acacia Shrubland | Very scattered <i>Avicennia marina</i> shrubs over a low open <i>Tecticornia spp.</i> shrubland.                                                                                                                                                                                                                            | 148               |

### 3.2.3 Photo points

During the assessment 12 photo points were taken to further help illustrate the vegetation and habitats of the coastal reserve, particularly of areas in the south east (Appendix 5). These photo points also help to illustrate and reiterate the condition of the reserve.

### 3.2.4 Fauna results

A total of 37 species of fauna from 23 families were recorded during the assessment, both in assessment sites and opportunistically throughout the coastal reserve (Appendix 6). The most diverse families were the Accipitridae with three species (Black Kite, Brahminy Kite and Osprey), Ardeidae with three species (Eastern Reef Egret, Intermediate Egret and Striated Heron), Columbidae with three species (Bar-shouldered Dove, Diamond Dove and Peaceful Dove) and the Meliphagidae with three species (Brown Honeyeater, White-plumed Honeyeater and Yellow-throated Miner (Appendix 6).



Four of the species recorded during the assessment are listed as migratory under the EPBC Act, and these species include the Common Sandpiper, Lesser Frigatebird, Caspian Tern and Eastern Osprey. None of the other species recorded are of conservation significance i.e. they are not listed under either the EPBC Act or BC Act.

The five broad fauna habitats described in the coastal reserve during the assessment match those characterised for vegetation and include Dune 1, Dune 2, Mangroves, Saltpan/ Mudflats and Open Acacia Shrubland (see Table 2 above). These habitats are somewhat degraded and provide relatively little vegetative cover in some sections of the reserve, most notably in the northern section between assessment site 1 and assessment site 4. There is also no large trees that provide large hollows for larger birds, particularly nesting birds, or hollow logs for fauna like small mammals and reptiles to shelter in. However, the mangroves may provide some hollows for smaller passerine birds to nest in.

## 4. Discussion

### 4.1 Flora and Vegetation

The vegetation of the Port Hedland coastal reserve, particularly in the northern section is highly disturbed and degraded as a result of human activity (vehicle tracks and rubbish) and weeds, especially Buffel Grass and Kapok Bush, which are both considered to be invasive environmental weeds. As a result, flora diversity in the northern section of the reserve is relatively low, however, areas east of Cemetery Park are somewhat less degraded as the reserve is fenced off and vehicles are prevented from entering the dunes. There is also less Buffel Grass in these areas and native vegetation is much denser (see photos in Appendix 5 and 6). Other surveys undertaken in the Port Hedland area, including in some sections of the coastal reserve have noted that the vegetation is very degraded (ENV 2011a, JBS&G 2020).

None of the five Priority species present in the NatureMap search was recorded during the assessment. These species have not been previously recorded in the coastal reserve but are present in the wider search area, which was a 10 km radial search area (DBCA 2020, ENV 2011a, JBS&G 2020). Further to this several of the Priority species present in the database are annual (i.e. *Bonamia oblongifolia* and *Gomphrena pusilla*) and would therefore not be present or identifiable (no reproductive parts) during September when the assessment was undertaken, despite potential habitat being present.

The flora assessment was undertaken outside of the optimum season for the Pilbara (March – June), as this region primarily receives rainfall as a result of Cyclones during the summer months. Further to this rainfall for 2020 was for the last eight months prior to the assessment below average (BoM 2020). This would impact to some extent the condition of the vegetation and this was observed during the assessment with much of the vegetation appearing very dry. The flora assessment was originally planned for late March 2020, however, because of restrictions on movement as a result of the COVID-19 outbreak the assessment was delayed and undertaken out of season.

During the assessment eight species of weeds were recorded (see Table 1 above and Appendix 3). The most commonly recorded and widespread weed in the survey area was Buffel Grass, followed by Kapok Bush. Of note were the presence of the weeds Rubber Bush on the spoil bank section of the reserve and the Giant Reed (recorded at one location) near assessment site 7.

Finally, it is important to acknowledge that more flora species would have been recorded if the assessment was undertaken during the appropriate season and for a longer duration, however, it was intended as a brief assessment to broadly define the vegetation types present.

### 4.2 Fauna

As mentioned above the vegetation of the Port Hedland coastal reserve, particularly in the northern section is highly disturbed and degraded as noted by other surveys (ENV 2011a and b, JBS&G 2020). This degradation is for the most part a result of vehicles and weeds (particularly Buffel Grass) which has reduced flora diversity and the density of vegetation (particularly shrubs) and consequently the amount of cover that is provided to fauna. This has resulted in for example less leaf litter which

can be important habitat for small reptiles. This reduction in the density of vegetation in the shrub layer will also reduce the number of small passerines that utilise this habitat. However, as you progress in an easterly direction from assessment site 5 through to 8 and then to the south, the coastal reserve is not as degraded and the vegetation, particularly the shrub layer becomes somewhat denser and there is less Buffel Grass and other weeds such as Kapok Bush (Figure 2, Appendix 4 and 5). These areas should support a more diverse group of fauna, particularly small reptiles (i.e. skinks) and small passerines that require more cover. The mangroves of the coastal reserve are important habitat for foraging birds such as the Golden Whistler and Mangrove Grey Fantail and as a roost for the Little Red Flying Fox that was recorded during this assessment.

The fauna species recorded during this assessment are common and widespread and have previously been recorded in the general region of Port Hedland (Biota Environmental Sciences 2008, ENV 2009, ENV 2011b, Johnstone et al. 2013), while some of the species have been recorded beforehand in the coastal reserve (Bennelongia 2011). There are a number of threatened species present in the database searches that would not occur in the coastal reserve because there is no habitat present e.g. the Northern Quoll and the Bilby and this is because the database search takes in a much larger area (10 km radial search – see Appendix 2) that encompasses many more habitats than are present in the coastal reserve. Further to this marine species such as whales, and sea snakes which weren't considered during this terrestrial fauna assessment.

Four of the species recorded are listed under the EPBC Act as migratory – the Common Sandpiper, Lesser Frigatebird, Caspian Tern and Eastern Osprey. The Port Hedland area, particularly the saltworks is of international important to shorebirds, which includes a significant number of species listed as migratory, including the Common Sandpiper (Johnstone et al. 2013). The coastal reserve is also important habitat (foraging and roosting habitat) for a number of shorebirds listed as migratory under the EPBC Act (Bennelongia 2011). The Bennelongia (2011) survey showed that the coastal reserve is internationally important for the Grey-tailed Tattler. The count for this species exceeded 1% of the flyway population (588 vs 1% estimate of 500) (Bennelongia 2011).

Despite this survey not considering marine species, it is worth briefly mentioning that areas of the coastal reserve, particularly Cemetery Beach and Pretty Pool Beach are considered regionally significant as a rookery for the EPBC Act listed Flatback Turtle (Imbricata Environmental 2016).

Lastly, it is important to recognise that more fauna species would have been recorded if the assessment had included techniques such as trapping (Elliott traps, cage traps, pitfall traps and funnel traps) and camera traps that are typically undertaken over multiple days (typically at least eight days in WA). However, the scope was based on undertaking a brief assessment (primarily observational) to broadly define the terrestrial habitats of the coastal reserve.



## 5. References

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## **Figures**



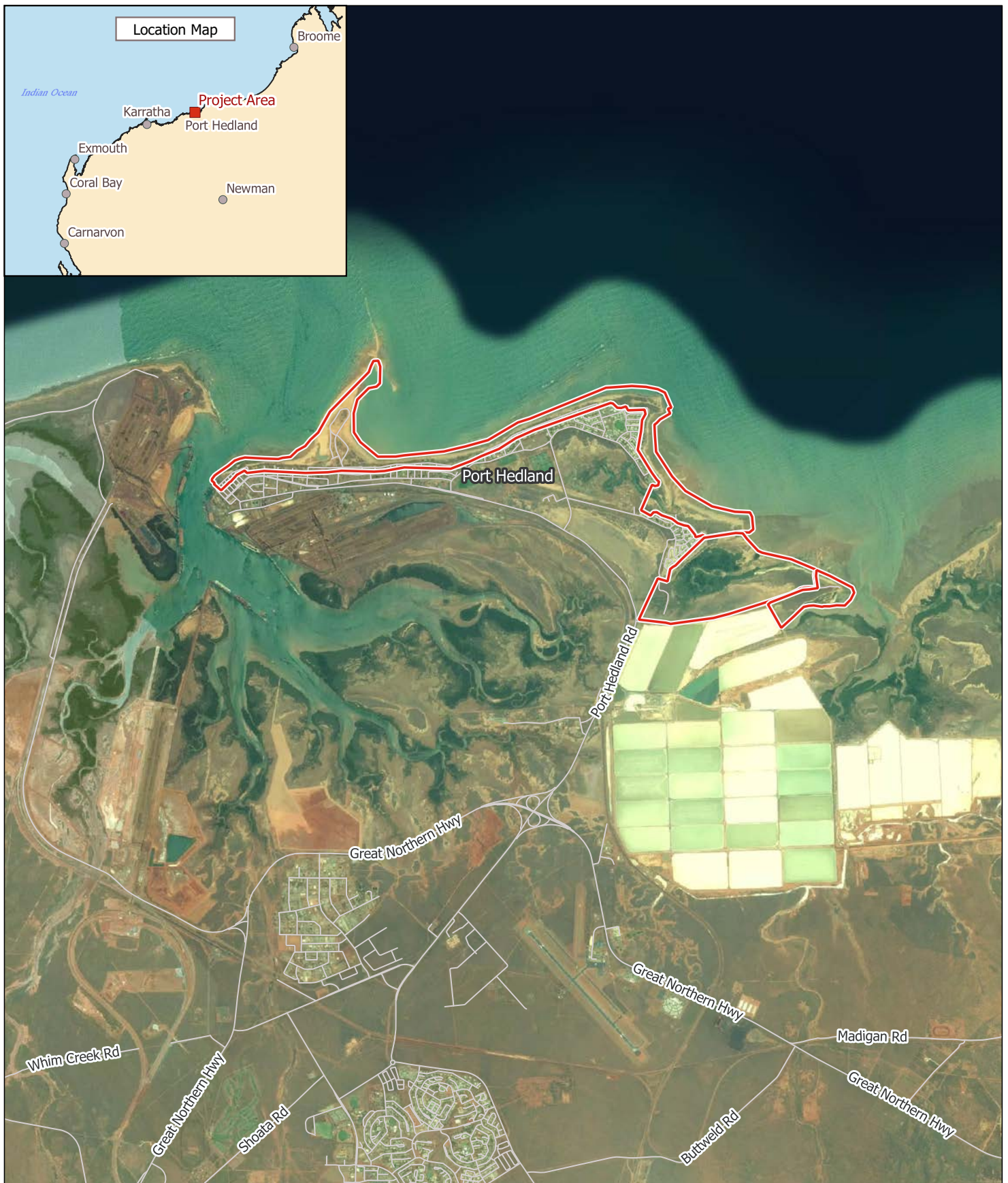
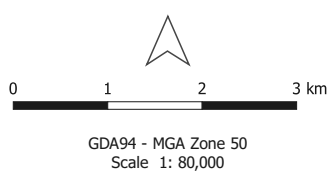


Figure 1: Site Overview



#### Legend

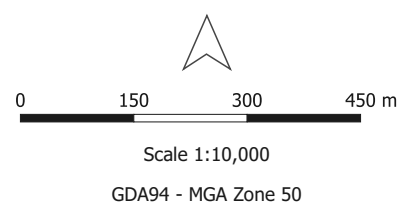
Survey Boundary







Figure 2: Broad Vegetation and Fauna Habitat Types



Legend

- |                 |                               |           |         |
|-----------------|-------------------------------|-----------|---------|
| Photo Point     | Survey Area                   | Dune2     | Planted |
| Assessment Site | <b>Vegetation and Habitat</b> | Mangroves |         |
|                 | Dune1                         |           |         |







Figure 2: Broad Vegetation and Fauna Habitat Types

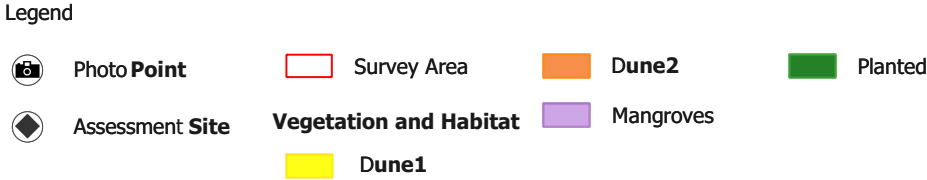
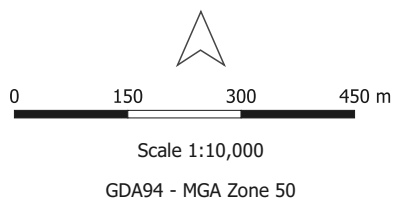
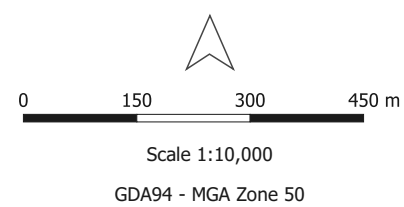






Figure 2: Broad Vegetation and Fauna Habitat Types



Legend

- |                 |                                |                       |           |
|-----------------|--------------------------------|-----------------------|-----------|
| Photo Point     | <b>Vegetation and Habitats</b> | Mangroves             | Disturbed |
| Assessment Site | Dune1                          | Open Acacia Shrubland |           |
| Survey Area     | Dune2                          | Salt Pan/Mud Flats    |           |







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## **Appendix 1: Conservation Categories**



**Categories of Threatened Fauna Species under the EPBC Act**

| Conservation Code | Description                                                                                                                                                                                                                                                                                                                                                    |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ex                | Extinct<br>Taxa which at a particular time if, at the time, there is no reasonable doubt that the last member of the species has died.                                                                                                                                                                                                                         |
| ExW               | Extinct in the Wild<br>Taxa which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form. |
| CE                | Critically Endangered<br>Taxa which at a particular time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.                                                                                                                                                     |
| En                | Endangered<br>Taxa which is not critically endangered and it is facing a very high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.                                                                                                                                                         |
| Vu                | Vulnerable<br>Taxa which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.                                                                                                                                                   |

Source: Environment Protection and Biodiversity Conservation Act 1999.

# CONSERVATION CODES

## For Western Australian Flora and Fauna

Threatened, Extinct and Specially Protected fauna or flora<sup>1</sup> are species<sup>2</sup> which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

**The *Wildlife Conservation (Specially Protected Fauna) Notice 2018* and the *Wildlife Conservation (Rare Flora) Notice 2018* have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018* to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016*.**

Categories of Threatened, Extinct and Specially Protected fauna and flora are:

### **T**     **Threatened species**

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

**Threatened fauna** is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

**Threatened flora** is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

### **CR**     **Critically endangered species**

Threatened species considered to be “*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

### **EN**     **Endangered species**

Threatened species considered to be “*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

### **VU**     **Vulnerable species**

Threatened species considered to be “*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.



**Extinct species**

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

**EX Extinct species**

Species where “*there is no reasonable doubt that the last member of the species has died*”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

**EW Extinct in the wild species**

Species that “*is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

**Specially protected species**

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

**MI Migratory species**

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

**CD Species of special conservation interest (conservation dependent fauna)**

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

**OS Other specially protected species**

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

**P Priority species**

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

**1 Priority 1: Poorly-known species**

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

**2 Priority 2: Poorly-known species**

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

**3 Priority 3: Poorly-known species**

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

**4 Priority 4: Rare, Near Threatened and other species in need of monitoring**

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

<sup>1</sup> The definition of flora includes algae, fungi and lichens

<sup>2</sup> Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).





## ***Appendix 2: Database Searches***

# NatureMap Species Report

Created By Guest user on 01/03/2020

Method 'By Circle'

Centre 118° 36' 33" E, 20° 19' 12" S

Buffer 10km

Group By Family

| Family            | Species    | Records    |
|-------------------|------------|------------|
| Acanthaceae       | 2          | 5          |
| Aizoaceae         | 4          | 19         |
| Amaranthaceae     | 15         | 43         |
| Anadyomenaceae    | 1          | 1          |
| Apocynaceae       | 1          | 4          |
| Asteraceae        | 15         | 23         |
| Bignoniaceae      | 1          | 2          |
| Bonnemaisoniaceae | 1          | 1          |
| Boraginaceae      | 5          | 7          |
| Byblidaceae       | 1          | 1          |
| Campanulaceae     | 1          | 1          |
| Capparaceae       | 1          | 2          |
| Caryophyllaceae   | 2          | 2          |
| Caulerpaceae      | 2          | 4          |
| Chenopodiaceae    | 19         | 62         |
| Cladophoraceae    | 1          | 1          |
| Cleomaceae        | 2          | 5          |
| Commelinaceae     | 1          | 1          |
| Convolvulaceae    | 10         | 12         |
| Cucurbitaceae     | 3          | 3          |
| Cymodoceaceae     | 1          | 2          |
| Cyperaceae        | 4          | 7          |
| Dasyaceae         | 1          | 3          |
| Dasycladaceae     | 2          | 6          |
| Droseraceae       | 1          | 1          |
| Euphorbiaceae     | 9          | 17         |
| Fabaceae          | 61         | 163        |
| Frankeniaceae     | 1          | 4          |
| Galaxauraceae     | 2          | 2          |
| Gelidiellaceae    | 1          | 1          |
| Goodeniaceae      | 6          | 13         |
| Gyrostemonaceae   | 1          | 1          |
| Haloragaceae      | 1          | 1          |
| Hemerocallidaceae | 2          | 8          |
| Hydrocharitaceae  | 1          | 1          |
| Loranthaceae      | 1          | 1          |
| Malvaceae         | 21         | 38         |
| Marsileaceae      | 1          | 1          |
| Menispermaceae    | 1          | 2          |
| Molluginaceae     | 2          | 3          |
| Montiaceae        | 3          | 3          |
| Moraceae          | 2          | 2          |
| Myrtaceae         | 4          | 5          |
| Nyctaginaceae     | 1          | 2          |
| Papaveraceae      | 1          | 1          |
| Phyllanthaceae    | 1          | 1          |
| Pittosporaceae    | 1          | 1          |
| Plantaginaceae    | 1          | 1          |
| Plumbaginaceae    | 1          | 3          |
| Poaceae           | 42         | 68         |
| Polygalaceae      | 1          | 1          |
| Portulacaceae     | 3          | 4          |
| Proteaceae        | 1          | 2          |
| Rhizophoraceae    | 3          | 12         |
| Rhodomelaceae     | 1          | 3          |
| Rubiaceae         | 1          | 1          |
| Sapindaceae       | 1          | 1          |
| Scrophulariaceae  | 1          | 1          |
| Sebdeniaceae      | 1          | 1          |
| Siphonocladaceae  | 1          | 1          |
| Solanaceae        | 5          | 10         |
| Stylidiaceae      | 1          | 1          |
| Thymelaeaceae     | 1          | 1          |
| Udoteaceae        | 2          | 6          |
| Violaceae         | 1          | 1          |
| Zygophyllaceae    | 1          | 4          |
| <b>TOTAL</b>      | <b>290</b> | <b>611</b> |

Name ID Species Name

Naturalised

Conservation Code

<sup>1</sup>Endemic To Query Area

## Acanthaceae

1. 6828 *Avicennia marina* (White Mangrove)
2. 14555 *Avicennia marina* subsp. *marina*

NatureMap is a collaborative project of the Department of Biodiversity, Conservation and Attractions and the Western Australian Museum.



Department of Biodiversity,  
Conservation and Attractions





| Name ID                  | Species Name                                                        | Naturalised | Conservation Code | <sup>1</sup> Endemic To Query Area |
|--------------------------|---------------------------------------------------------------------|-------------|-------------------|------------------------------------|
| <b>Aizoaceae</b>         |                                                                     |             |                   |                                    |
| 3.                       | 44240 <i>Trianthema cusackianum</i>                                 |             |                   |                                    |
| 4.                       | 2830 <i>Trianthema portulacastrum</i> (Giant Pigweed)               | Y           |                   |                                    |
| 5.                       | 44362 <i>Trianthema triquetrum</i>                                  |             |                   |                                    |
| 6.                       | 44360 <i>Trianthema turgidifolium</i>                               |             |                   |                                    |
| <b>Amaranthaceae</b>     |                                                                     |             |                   |                                    |
| 7.                       | 2646 <i>Aerva javanica</i> (Kapk Bush)                              | Y           |                   |                                    |
| 8.                       | 18363 <i>Gomphrena canescens</i> subsp. <i>canescens</i>            |             |                   |                                    |
| 9.                       | 2677 <i>Gomphrena celosioides</i> (Gomphrena Weed)                  | Y           |                   |                                    |
| 10.                      | 2680 <i>Gomphrena cunninghamii</i>                                  |             |                   |                                    |
| 11.                      | 2686 <i>Gomphrena pusilla</i>                                       |             | P2                |                                    |
| 12.                      | 2695 <i>Ptilotus arthrolasius</i>                                   |             |                   |                                    |
| 13.                      | 2696 <i>Ptilotus astrolasius</i>                                    |             |                   |                                    |
| 14.                      | 2699 <i>Ptilotus axillaris</i> (Mat Mulla Mulla)                    |             |                   |                                    |
| 15.                      | 2704 <i>Ptilotus calostachyus</i> (Weeping Mulla Mulla)             |             |                   |                                    |
| 16.                      | 2717 <i>Ptilotus divaricatus</i> (Climbing Mulla Mulla)             |             |                   |                                    |
| 17.                      | 2721 <i>Ptilotus exaltatus</i> (Tall Mulla Mulla)                   |             |                   |                                    |
| 18.                      | 2725 <i>Ptilotus fusiformis</i>                                     |             |                   |                                    |
| 19.                      | 2746 <i>Ptilotus nobilis</i> (Tall Mulla Mulla)                     |             |                   |                                    |
| 20.                      | 2766 <i>Ptilotus villosiflorus</i>                                  |             |                   |                                    |
| 21.                      | 2768 <i>Pupalia lappacea</i>                                        | Y           |                   |                                    |
| <b>Anadyomenaceae</b>    |                                                                     |             |                   |                                    |
| 22.                      | 35872 <i>Anadyomene plicata</i>                                     |             |                   |                                    |
| <b>Apocynaceae</b>       |                                                                     |             |                   |                                    |
| 23.                      | 12832 <i>Gymnanthera cunninghamii</i>                               |             | P3                |                                    |
| <b>Asteraceae</b>        |                                                                     |             |                   |                                    |
| 24.                      | 7903 <i>Calotis hispidula</i> (Bindy Eye)                           |             |                   |                                    |
| 25.                      | 47174 <i>Chrysocephalum apiculatum</i> subsp. <i>pilbarensense</i>  |             |                   |                                    |
| 26.                      | 7939 <i>Conyza bonariensis</i> (Flaxleaf Fleabane)                  | Y           |                   |                                    |
| 27.                      | 45972 <i>Cyanthillium cinereum</i> var. <i>cinereum</i>             | Y           |                   |                                    |
| 28.                      | 35558 <i>Flaveria trinervia</i> (Speedy Weed)                       | Y           |                   |                                    |
| 29.                      | 17816 <i>Pluchea ferdinandi-muelleri</i>                            |             |                   |                                    |
| 30.                      | 8168 <i>Pluchea rubelliflora</i>                                    |             |                   |                                    |
| 31.                      | 8170 <i>Pluchea tetranthera</i>                                     |             |                   |                                    |
| 32.                      | 8189 <i>Pseudognaphalium luteoalbum</i> (Jersey Cudweed)            |             |                   |                                    |
| 33.                      | 41224 <i>Pterocaulon intermedium</i>                                |             |                   |                                    |
| 34.                      | 8192 <i>Pterocaulon sphacelatum</i> (Apple Bush, Fruit Salad Plant) |             |                   |                                    |
| 35.                      | 8236 <i>Streptoglossa cylindriceps</i>                              |             |                   |                                    |
| 36.                      | 8240 <i>Streptoglossa odora</i>                                     |             |                   |                                    |
| 37.                      | 25902 <i>Symphyotrichum squamatum</i> (Bushy Starwort)              | Y           |                   |                                    |
| 38.                      | 8252 <i>Tridax procumbens</i> (Tridax, Tridax Daisy)                | Y           |                   |                                    |
| <b>Bignoniaceae</b>      |                                                                     |             |                   |                                    |
| 39.                      | 48390 <i>Dolichandrone occidentalis</i>                             |             |                   |                                    |
| <b>Bonnemaisoniaceae</b> |                                                                     |             |                   |                                    |
| 40.                      | 26486 <i>Asparagopsis taxiformis</i>                                |             |                   |                                    |
| <b>Boraginaceae</b>      |                                                                     |             |                   |                                    |
| 41.                      | 6704 <i>Heliotropium conocarpum</i>                                 |             |                   |                                    |
| 42.                      | 6705 <i>Heliotropium crispatum</i>                                  |             |                   |                                    |
| 43.                      | 6706 <i>Heliotropium cunninghamii</i>                               |             |                   |                                    |
| 44.                      | 17309 <i>Heliotropium pachyphyllum</i>                              |             |                   |                                    |
| 45.                      | 6727 <i>Trichodesma zeylanicum</i> (Camel Bush, Kumbalin)           |             |                   |                                    |
| <b>Byblidaceae</b>       |                                                                     |             |                   |                                    |
| 46.                      | 18073 <i>Byblis filifolia</i>                                       |             |                   |                                    |
| <b>Campanulaceae</b>     |                                                                     |             |                   |                                    |
| 47.                      | 7393 <i>Wahlenbergia tumidiflora</i>                                |             |                   |                                    |
| <b>Capparaceae</b>       |                                                                     |             |                   |                                    |
| 48.                      | 48291 <i>Capparis spinosa</i> subsp. <i>nummularia</i>              |             |                   |                                    |
| <b>Caryophyllaceae</b>   |                                                                     |             |                   |                                    |
| 49.                      | 2902 <i>Polycarpaea involucrata</i>                                 |             |                   |                                    |
| 50.                      | 2903 <i>Polycarpaea longiflora</i>                                  |             |                   |                                    |
| <b>Caulerpaceae</b>      |                                                                     |             |                   |                                    |
| 51.                      | 42620 <i>Caulerpa chemnitzia</i>                                    |             |                   |                                    |
| 52.                      | 44539 <i>Caulerpa cylindracea</i>                                   |             |                   |                                    |

| Name ID               | Species Name                                                               | Naturalised | Conservation Code | <sup>1</sup> Endemic To Query Area |
|-----------------------|----------------------------------------------------------------------------|-------------|-------------------|------------------------------------|
| <b>Chenopodiaceae</b> |                                                                            |             |                   |                                    |
| 53.                   | 2476 <i>Atriplex semilunaris</i> (Annual Saltbush)                         |             |                   |                                    |
| 54.                   | 2499 <i>Dissocarpus paradoxus</i> (Curious Saltbush)                       |             |                   |                                    |
| 55.                   | 2504 <i>Dysphania plantaginella</i>                                        |             |                   |                                    |
| 56.                   | 11890 <i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>         |             |                   |                                    |
| 57.                   | 12064 <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> (Barrier Saltbush) |             |                   |                                    |
| 58.                   | 2573 <i>Neobassia astrocarpa</i>                                           |             |                   |                                    |
| 59.                   | 2582 <i>Rhagodia eremaea</i> (Thorny Saltbush)                             |             |                   |                                    |
| 60.                   | 30434 <i>Salsola australis</i>                                             |             |                   |                                    |
| 61.                   | 11650 <i>Sclerolaena bicornis</i> var. <i>bicornis</i> (Goathead Burr)     |             |                   |                                    |
| 62.                   | 2616 <i>Sclerolaena glabra</i>                                             |             |                   |                                    |
| 63.                   | 2617 <i>Sclerolaena hostilis</i>                                           |             |                   |                                    |
| 64.                   | 2638 <i>Suaeda arbusculoides</i>                                           |             |                   |                                    |
| 65.                   | 31616 <i>Tecticornia auriculata</i>                                        |             |                   |                                    |
| 66.                   | 33236 <i>Tecticornia halocnemoides</i> (Shrubby Samphire)                  |             |                   |                                    |
| 67.                   | 33238 <i>Tecticornia halocnemoides</i> subsp. <i>tenuis</i>                |             |                   |                                    |
| 68.                   | 33319 <i>Tecticornia indica</i> subsp. <i>bidens</i>                       |             |                   |                                    |
| 69.                   | 33318 <i>Tecticornia indica</i> subsp. <i>leiostachya</i> (Samphire)       |             |                   |                                    |
| 70.                   | 33220 <i>Tecticornia pterygosperma</i> subsp. <i>denticulata</i>           |             |                   |                                    |
| 71.                   | 2644 <i>Threlkeldia diffusa</i> (Coast Bonefruit)                          |             |                   |                                    |
| <b>Cladophoraceae</b> |                                                                            |             |                   |                                    |
| 72.                   | 26612 <i>Chaetomorpha melagonium</i>                                       |             |                   |                                    |
| <b>Cleomaceae</b>     |                                                                            |             |                   |                                    |
| 73.                   | 29101 <i>Cleome uncifera</i> subsp. <i>uncifera</i>                        |             |                   |                                    |
| 74.                   | 2988 <i>Cleome viscosa</i> (Tickweed, Tjinduwadhu)                         |             |                   |                                    |
| <b>Commelinaceae</b>  |                                                                            |             |                   |                                    |
| 75.                   | 1165 <i>Commelina ensifolia</i> (Wandering Jew, Buargu)                    |             |                   |                                    |
| <b>Convolvulaceae</b> |                                                                            |             |                   |                                    |
| 76.                   | 6603 <i>Bonamia alatisemina</i>                                            |             |                   |                                    |
| 77.                   | 11167 <i>Bonamia erecta</i>                                                |             |                   |                                    |
| 78.                   | 6606 <i>Bonamia media</i>                                                  |             |                   |                                    |
| 79.                   | 6607 <i>Bonamia oblongifolia</i>                                           |             | P3                |                                    |
| 80.                   | 11200 <i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>                 |             |                   |                                    |
| 81.                   | 6635 <i>Ipomoea pes-caprae</i>                                             |             |                   |                                    |
| 82.                   | 11312 <i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i>                 |             |                   |                                    |
| 83.                   | 6637 <i>Ipomoea polymorpha</i>                                             |             |                   |                                    |
| 84.                   | 6651 <i>Operculina aequiseipala</i>                                        |             |                   |                                    |
| 85.                   | 6653 <i>Polymeria ambigua</i> (Morning Glory)                              |             |                   |                                    |
| <b>Cucurbitaceae</b>  |                                                                            |             |                   |                                    |
| 86.                   | 48838 <i>Citrullus amarus</i>                                              | Y           |                   |                                    |
| 87.                   | 15036 <i>Coccinia grandis</i>                                              | Y           |                   |                                    |
| 88.                   | 12032 <i>Trichosanthes cucumerina</i> var. <i>cucumerina</i>               |             |                   |                                    |
| <b>Cymodoceaceae</b>  |                                                                            |             |                   |                                    |
| 89.                   | 131 <i>Halodule uninervis</i>                                              |             |                   |                                    |
| <b>Cyperaceae</b>     |                                                                            |             |                   |                                    |
| 90.                   | 750 <i>Bulbostylis barbata</i>                                             |             |                   |                                    |
| 91.                   | 751 <i>Bulbostylis burbridgeae</i>                                         |             | P4                |                                    |
| 92.                   | 777 <i>Cyperus bulbosus</i> (Bush Onion, Tjanmata)                         |             |                   |                                    |
| 93.                   | 806 <i>Cyperus polystachyos</i> (Bunchy Sedge)                             |             |                   |                                    |
| <b>Dasyaceae</b>      |                                                                            |             |                   |                                    |
| 94.                   | 26930 <i>Heterosiphonia crassipes</i>                                      |             |                   |                                    |
| <b>Dasycladaceae</b>  |                                                                            |             |                   |                                    |
| 95.                   | 44548 <i>Neomeris bilimbata</i>                                            |             |                   |                                    |
| 96.                   | 27099 <i>Neomeris van-bosseae</i>                                          |             |                   |                                    |
| <b>Droseraceae</b>    |                                                                            |             |                   |                                    |
| 97.                   | 3093 <i>Drosera burmanni</i> (Tropical Sundew)                             |             |                   |                                    |
| <b>Euphorbiaceae</b>  |                                                                            |             |                   |                                    |
| 98.                   | 4583 <i>Adriana tomentosa</i>                                              |             |                   |                                    |
| 99.                   | 17422 <i>Adriana tomentosa</i> var. <i>tomentosa</i>                       |             |                   |                                    |
| 100.                  | 4617 <i>Euphorbia australis</i> (Namana)                                   |             |                   |                                    |
| 101.                  | 35303 <i>Euphorbia australis</i> var. <i>subtomentosa</i>                  |             |                   |                                    |
| 102.                  | 4619 <i>Euphorbia biconvexa</i>                                            |             |                   |                                    |
| 103.                  | 4635 <i>Euphorbia myrtilloides</i>                                         |             |                   |                                    |
| 104.                  | 12097 <i>Euphorbia tannensis</i> subsp. <i>eremophila</i> (Desert Spurge)  |             |                   |                                    |
| 105.                  | 42879 <i>Euphorbia trigonosperma</i>                                       |             |                   |                                    |



|                      | Name ID | Species Name                                                              | Naturalised | Conservation Code | <sup>1</sup> Endemic To Query Area |
|----------------------|---------|---------------------------------------------------------------------------|-------------|-------------------|------------------------------------|
| 106.                 | 4656    | <i>Jatropha gossypifolia</i> (Bellyache Bush)                             | Y           |                   |                                    |
| <b>Fabaceae</b>      |         |                                                                           |             |                   |                                    |
| 107.                 | 3198    | <i>Acacia acradenia</i>                                                   |             |                   |                                    |
| 108.                 | 3214    | <i>Acacia ancistrocarpa</i> (Fitzroy Wattle)                              |             |                   |                                    |
| 109.                 | 3241    | <i>Acacia bivenosa</i>                                                    |             |                   |                                    |
| 110.                 | 44588   | <i>Acacia bivenosa</i> x <i>sclerosperma</i> subsp. <i>sclerosperma</i>   |             |                   |                                    |
| 111.                 | 17013   | <i>Acacia colei</i> var. <i>colei</i>                                     |             |                   |                                    |
| 112.                 | 3377    | <i>Acacia inaequilatera</i> (Baderi)                                      |             |                   |                                    |
| 113.                 | 3434    | <i>Acacia maitlandii</i> (Maitland's Wattle)                              |             |                   |                                    |
| 114.                 | 29015   | <i>Acacia pyrifolia</i> var. <i>pyrifolia</i>                             |             |                   |                                    |
| 115.                 | 30071   | <i>Acacia robeorum</i>                                                    |             |                   |                                    |
| 116.                 | 13078   | <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>                     |             |                   |                                    |
| 117.                 |         | <i>Acacia</i> sp.                                                         |             |                   |                                    |
| 118.                 | 19456   | <i>Acacia stellaticeps</i>                                                |             |                   |                                    |
| 119.                 | 13070   | <i>Acacia synchronicia</i>                                                |             |                   |                                    |
| 120.                 | 3579    | <i>Acacia trachycarpa</i> (Minni Ritchi, Balgali)                         |             |                   |                                    |
| 121.                 | 20319   | <i>Acacia tumida</i> var. <i>pilbarensis</i>                              |             |                   |                                    |
| 122.                 | 3609    | <i>Albizia lebbbeck</i>                                                   |             |                   |                                    |
| 123.                 | 17147   | <i>Alysicarpus muelleri</i>                                               |             |                   |                                    |
| 124.                 | 11055   | <i>Cajanus cinereus</i>                                                   |             |                   |                                    |
| 125.                 | 10972   | <i>Cajanus marmoratus</i>                                                 |             |                   |                                    |
| 126.                 | 3749    | <i>Canavalia rosea</i> (Wild Jack Bean)                                   |             |                   |                                    |
| 127.                 | 3769    | <i>Clitoria ternatea</i>                                                  | Y           |                   |                                    |
| 128.                 | 3774    | <i>Crotalaria cunninghamii</i> (Green Birdflower, Bilbun)                 |             |                   |                                    |
| 129.                 | 19378   | <i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>                  |             |                   |                                    |
| 130.                 | 17118   | <i>Cullen leucanthum</i>                                                  |             |                   |                                    |
| 131.                 | 15714   | <i>Cullen stipulaceum</i>                                                 |             |                   |                                    |
| 132.                 | 3853    | <i>Desmodium filiforme</i>                                                |             |                   |                                    |
| 133.                 | 19333   | <i>Desmodium scorpiurus</i>                                               | Y           |                   |                                    |
| 134.                 | 3942    | <i>Glycine tomentella</i> (Woolly Glycine)                                |             |                   |                                    |
| 135.                 | 14587   | <i>Indigastrium parviflorum</i>                                           |             |                   |                                    |
| 136.                 | 3973    | <i>Indigofera colutea</i> (Sticky Indigo)                                 |             |                   |                                    |
| 137.                 | 3981    | <i>Indigofera linnaei</i> (Birdsville Indigo)                             |             |                   |                                    |
| 138.                 | 16061   | <i>Indigofera oblongifolia</i>                                            | Y           |                   |                                    |
| 139.                 | 16062   | <i>Indigofera sessiliflora</i>                                            | Y           |                   |                                    |
| 140.                 | 3987    | <i>Indigofera trita</i>                                                   |             |                   |                                    |
| 141.                 | 4054    | <i>Leptosema anomalum</i>                                                 |             |                   |                                    |
| 142.                 | 3613    | <i>Leucaena leucocephala</i> (Leucaena)                                   | Y           |                   |                                    |
| 143.                 | 3614    | <i>Neptunia dimorphantha</i> (Sensitive Plant)                            |             |                   |                                    |
| 144.                 | 3673    | <i>Parkinsonia aculeata</i> (Parkinsonia)                                 | Y           |                   |                                    |
| 145.                 | 3675    | <i>Petalostylis labicheoides</i> (Slender Petalostylis)                   |             |                   |                                    |
| 146.                 | 4191    | <i>Rhynchosia minima</i> (Rhynchosia)                                     |             |                   |                                    |
| 147.                 | 12307   | <i>Senna glutinosa</i> subsp. <i>glutinosa</i>                            |             |                   |                                    |
| 148.                 | 12312   | <i>Senna notabilis</i>                                                    |             |                   |                                    |
| 149.                 | 10848   | <i>Senna occidentalis</i>                                                 | Y           |                   |                                    |
| 150.                 | 18445   | <i>Senna stricta</i>                                                      |             |                   |                                    |
| 151.                 | 4196    | <i>Sesbania cannabina</i> (Sesbania Pea)                                  |             |                   |                                    |
| 152.                 | 4198    | <i>Sesbania formosa</i> (White Dragon Tree)                               |             |                   |                                    |
| 153.                 | 43320   | <i>Stylosanthes guianensis</i> var. <i>guianensis</i>                     | Y           |                   |                                    |
| 154.                 | 12353   | <i>Stylosanthes hamata</i> (Verano Stylo)                                 | Y           |                   |                                    |
| 155.                 | 4242    | <i>Swainsona pterostylis</i>                                              |             |                   |                                    |
| 156.                 | 4272    | <i>Tephrosia leptoclada</i>                                               |             |                   |                                    |
| 157.                 | 4280    | <i>Tephrosia rosea</i> (Flinders River Poison, Bungoo'dah)                |             |                   |                                    |
| 158.                 | 41825   | <i>Tephrosia rosea</i> var. <i>Fortescue</i> creeks (M.I.H. Brooker 2186) |             |                   |                                    |
| 159.                 | 41920   | <i>Tephrosia rosea</i> var. <i>Port Hedland</i> (A.S. George 1114)        |             | P1                |                                    |
| 160.                 | 19531   | <i>Tephrosia rosea</i> var. <i>clementii</i>                              |             |                   |                                    |
| 161.                 | 19529   | <i>Tephrosia rosea</i> var. <i>rosea</i>                                  |             |                   |                                    |
| 162.                 | 4281    | <i>Tephrosia simplicifolia</i>                                            |             |                   |                                    |
| 163.                 | 15947   | <i>Tephrosia</i> sp. <i>B Kimberley Flora</i> (C.A. Gardner 7300)         |             |                   |                                    |
| 164.                 | 17768   | <i>Tephrosia</i> sp. <i>Bungaroo Creek</i> (M.E. Trudgen 11601)           |             |                   |                                    |
| 165.                 | 15949   | <i>Tephrosia</i> sp. <i>D Kimberley Flora</i> (R.D. Royce 1848)           |             |                   |                                    |
| 166.                 | 40060   | <i>Tephrosia</i> sp. <i>clay soils</i> (S. van Leeuwen et al. PBS 0273)   |             |                   |                                    |
| 167.                 | 18661   | <i>Zornia muelleriana</i>                                                 |             |                   |                                    |
| <b>Frankeniaceae</b> |         |                                                                           |             |                   |                                    |
| 168.                 | 5188    | <i>Frankenia ambita</i>                                                   |             |                   |                                    |
| <b>Galaxauraceae</b> |         |                                                                           |             |                   |                                    |
| 169.                 | 29615   | <i>Dichotomaria obtusata</i>                                              |             |                   |                                    |
| 170.                 | 26835   | <i>Galaxaura rugosa</i>                                                   |             |                   |                                    |

| Name ID                  | Species Name                                                      | Naturalised | Conservation Code | <sup>1</sup> Endemic To Query Area |
|--------------------------|-------------------------------------------------------------------|-------------|-------------------|------------------------------------|
| <b>Gelidiellaceae</b>    |                                                                   |             |                   |                                    |
| 171.                     | 26842 <i>Gelidiella acerosa</i>                                   |             |                   |                                    |
| <b>Goodeniaceae</b>      |                                                                   |             |                   |                                    |
| 172.                     | 7490 <i>Goodenia armitiana</i>                                    |             |                   |                                    |
| 173.                     | 7509 <i>Goodenia forrestii</i>                                    |             |                   |                                    |
| 174.                     | 7526 <i>Goodenia microptera</i>                                   |             |                   |                                    |
| 175.                     | 10982 <i>Goodenia stobbsiana</i>                                  |             |                   |                                    |
| 176.                     | 12723 <i>Scaevola amblyanthera</i>                                |             |                   |                                    |
| 177.                     | 13178 <i>Scaevola amblyanthera</i> var. <i>centralis</i>          |             |                   |                                    |
| <b>Gyrostemonaceae</b>   |                                                                   |             |                   |                                    |
| 178.                     | 2778 <i>Codonocarpus cotinifolius</i> (Native Poplar, Kundurangu) |             |                   |                                    |
| <b>Haloragaceae</b>      |                                                                   |             |                   |                                    |
| 179.                     | 6174 <i>Haloragis gossei</i>                                      |             |                   |                                    |
| <b>Hemerocallidaceae</b> |                                                                   |             |                   |                                    |
| 180.                     | 1285 <i>Corynotheca micrantha</i> (Sand Lily)                     |             |                   |                                    |
| 181.                     | 1286 <i>Corynotheca pungens</i>                                   |             |                   |                                    |
| <b>Hydrocharitaceae</b>  |                                                                   |             |                   |                                    |
| 182.                     | 169 <i>Thalassia hemprichii</i>                                   |             |                   |                                    |
| <b>Loranthaceae</b>      |                                                                   |             |                   |                                    |
| 183.                     | 2383 <i>Amyema preissii</i> (Wireleaf Mistletoe)                  |             |                   |                                    |
| <b>Malvaceae</b>         |                                                                   |             |                   |                                    |
| 184.                     | 4895 <i>Abutilon lepidum</i>                                      |             |                   |                                    |
| 185.                     | 18410 <i>Corchorus carnarvonensis</i>                             |             |                   |                                    |
| 186.                     | 4857 <i>Corchorus elachocarpus</i>                                |             |                   |                                    |
| 187.                     | 17339 <i>Corchorus incanus</i>                                    |             |                   |                                    |
| 188.                     | 25847 <i>Corchorus incanus</i> subsp. <i>incanus</i>              |             |                   |                                    |
| 189.                     | 13659 <i>Corchorus laniflorus</i>                                 |             |                   |                                    |
| 190.                     | 13467 <i>Corchorus trilocularis</i>                               |             |                   |                                    |
| 191.                     | 4867 <i>Corchorus walcottii</i> (Woolly Corchorus)                |             |                   |                                    |
| 192.                     | 4910 <i>Gossypium australe</i> (Native Cotton)                    |             |                   |                                    |
| 193.                     | 4913 <i>Gossypium hirsutum</i> (Upland Cotton)                    | Y           |                   |                                    |
| 194.                     | 29317 <i>Hibiscus austrinus</i> var. <i>austrinus</i>             |             |                   |                                    |
| 195.                     | 4922 <i>Hibiscus brachychlaenus</i>                               |             |                   |                                    |
| 196.                     | 4930 <i>Hibiscus goldsworthii</i>                                 |             |                   |                                    |
| 197.                     | 4933 <i>Hibiscus leptocladus</i>                                  |             |                   |                                    |
| 198.                     | 5051 <i>Melhania oblongifolia</i>                                 |             |                   |                                    |
| 199.                     | 46816 <i>Seringia elliptica</i> (Showy fire-bush)                 |             |                   |                                    |
| 200.                     | 46821 <i>Seringia nephrosperma</i> (Free carpel fire-bush)        |             |                   |                                    |
| 201.                     | 4972 <i>Sida clementii</i>                                        |             |                   |                                    |
| 202.                     | 4977 <i>Sida fibulifera</i> (Silver Sida)                         |             |                   |                                    |
| 203.                     | 13481 <i>Triumfetta ramosa</i>                                    |             |                   |                                    |
| 204.                     | 5106 <i>Waltheria indica</i>                                      |             |                   |                                    |
| <b>Marsileaceae</b>      |                                                                   |             |                   |                                    |
| 205.                     | 76 <i>Marsilea hirsuta</i> (Nardoo)                               |             |                   |                                    |
| <b>Menispermaceae</b>    |                                                                   |             |                   |                                    |
| 206.                     | 2942 <i>Tinospora smilacina</i> (Snakevine, Oondala)              |             |                   |                                    |
| <b>Molluginaceae</b>     |                                                                   |             |                   |                                    |
| 207.                     | 48203 <i>Hypertelis cerviana</i>                                  |             |                   |                                    |
| 208.                     | 48201 <i>Trigastrotheca molluginea</i>                            |             |                   |                                    |
| <b>Montiaceae</b>        |                                                                   |             |                   |                                    |
| 209.                     | 40825 <i>Calandrinia pentavalvis</i>                              |             |                   |                                    |
| 210.                     | 2870 <i>Calandrinia stagnensis</i>                                |             |                   |                                    |
| 211.                     | 2872 <i>Calandrinia tepperiana</i>                                |             |                   |                                    |
| <b>Moraceae</b>          |                                                                   |             |                   |                                    |
| 212.                     | 31578 <i>Ficus aculeata</i> var. <i>indecora</i> (Ranji)          |             |                   |                                    |
| 213.                     | 19648 <i>Ficus brachypoda</i>                                     |             |                   |                                    |
| <b>Myrtaceae</b>         |                                                                   |             |                   |                                    |
| 214.                     | 17073 <i>Corymbia aspera</i>                                      |             |                   |                                    |
| 215.                     | 14650 <i>Corymbia flavescens</i>                                  |             |                   |                                    |
| 216.                     | 5923 <i>Melaleuca lasiandra</i>                                   |             |                   |                                    |
| 217.                     | 6005 <i>Osbornia octodonta</i> (Myrtle Mangrove)                  |             |                   |                                    |
| <b>Nyctaginaceae</b>     |                                                                   |             |                   |                                    |
| 218.                     | 2770 <i>Boerhavia coccinea</i> (Tar Vine, Wituka)                 |             |                   |                                    |



| Name ID               | Species Name                                                          | Naturalised | Conservation Code | <sup>1</sup> Endemic To Query Area |
|-----------------------|-----------------------------------------------------------------------|-------------|-------------------|------------------------------------|
| <b>Papaveraceae</b>   |                                                                       |             |                   |                                    |
| 219.                  | 17797 <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>             | Y           |                   |                                    |
| <b>Phyllanthaceae</b> |                                                                       |             |                   |                                    |
| 220.                  | 4680 <i>Phyllanthus maderaspatensis</i>                               |             |                   |                                    |
| <b>Pittosporaceae</b> |                                                                       |             |                   |                                    |
| 221.                  | 19744 <i>Pittosporum angustifolium</i>                                |             |                   |                                    |
| <b>Plantaginaceae</b> |                                                                       |             |                   |                                    |
| 222.                  | 12489 <i>Stemodia lathraia</i>                                        |             |                   |                                    |
| <b>Plumbaginaceae</b> |                                                                       |             |                   |                                    |
| 223.                  | 6490 <i>Muellerolimon salicorniaceum</i>                              |             |                   |                                    |
| <b>Poaceae</b>        |                                                                       |             |                   |                                    |
| 224.                  | 17651 <i>Andropogon gayanus</i>                                       | Y           |                   |                                    |
| 225.                  | 211 <i>Aristida hygrometrica</i> (Northern Kerosene Grass)            |             |                   |                                    |
| 226.                  | 240 <i>Bothriochloa ewartiana</i> (Desert Bluegrass)                  |             |                   |                                    |
| 227.                  | 258 <i>Cenchrus ciliaris</i> (Buffel Grass)                           | Y           |                   |                                    |
| 228.                  | 41568 <i>Cenchrus setaceus</i> (Fountain Grass)                       | Y           |                   |                                    |
| 229.                  | 29721 <i>Cenchrus setiger</i> (Birdwood Grass)                        | Y           |                   |                                    |
| 230.                  | 266 <i>Chloris barbata</i> (Purpletop Chloris)                        | Y           |                   |                                    |
| 231.                  | 272 <i>Chloris virgata</i> (Feathertop Rhodes Grass)                  | Y           |                   |                                    |
| 232.                  | 273 <i>Chrysopogon fallax</i> (Golden Beard Grass)                    |             |                   |                                    |
| 233.                  | 280 <i>Cymbopogon bombycinus</i> (Silky Oilgrass)                     |             |                   |                                    |
| 234.                  | <i>Cynodon radiatus</i>                                               |             |                   |                                    |
| 235.                  | 288 <i>Dactyloctenium aegyptium</i> (Coast Button Grass)              | Y           |                   |                                    |
| 236.                  | 290 <i>Dactyloctenium radulans</i> (Button Grass)                     |             |                   |                                    |
| 237.                  | 311 <i>Digitaria ciliaris</i> (Summer Grass)                          | Y           |                   |                                    |
| 238.                  | 48378 <i>Diplachne fusca</i> subsp. <i>fusca</i>                      |             |                   |                                    |
| 239.                  | 360 <i>Enneapogon lindleyanus</i> (Wiry Nineawn, Purple-head Nineawn) |             |                   |                                    |
| 240.                  | 365 <i>Enneapogon polyphyllus</i> (Leafy Nineawn)                     |             |                   |                                    |
| 241.                  | 12749 <i>Enneapogon purpurascens</i> (Purple Nineawn)                 |             |                   |                                    |
| 242.                  | 368 <i>Enteropogon ramosus</i> (Windmill Grass, Curly Windmill Grass) |             |                   |                                    |
| 243.                  | 375 <i>Eragrostis cumingii</i> (Cuming's Love Grass)                  |             |                   |                                    |
| 244.                  | 378 <i>Eragrostis dielsii</i> (Mallee Lovegrass)                      |             |                   |                                    |
| 245.                  | 380 <i>Eragrostis eriopoda</i> (Woollybutt Grass, Wangurnu)           |             |                   |                                    |
| 246.                  | 381 <i>Eragrostis falcata</i> (Sickle Lovegrass)                      |             |                   |                                    |
| 247.                  | 17609 <i>Eragrostis pilosa</i>                                        | Y           |                   |                                    |
| 248.                  | 400 <i>Eriachne aristidea</i>                                         |             |                   |                                    |
| 249.                  | 411 <i>Eriachne helmsii</i> (Buck Wanderrie Grass)                    |             |                   |                                    |
| 250.                  | 414 <i>Eriachne obtusa</i> (Northern Wandarrie Grass)                 |             |                   |                                    |
| 251.                  | 464 <i>Iseilema membranaceum</i> (Small Flinders Grass)               |             |                   |                                    |
| 252.                  | 468 <i>Lamarckia aurea</i> (Goldentop)                                | Y           |                   |                                    |
| 253.                  | 503 <i>Panicum decompositum</i> (Native Millet, Kaltu-kaltu)          |             |                   |                                    |
| 254.                  | 518 <i>Paspalidium clementii</i> (Clements Paspalidium)               |             |                   |                                    |
| 255.                  | 529 <i>Paspalum fasciculatum</i>                                      | Y           |                   |                                    |
| 256.                  | 606 <i>Setaria dielsii</i> (Diels' Pigeon Grass)                      |             |                   |                                    |
| 257.                  | 611 <i>Setaria sphacelata</i> (South African Pigeon Grass)            | Y           |                   |                                    |
| 258.                  | 619 <i>Sorghum plumosum</i> (Plume Canegrass)                         |             |                   |                                    |
| 259.                  | 625 <i>Spinifex longifolius</i> (Beach Spinifex)                      |             |                   |                                    |
| 260.                  | 672 <i>Themeda avenacea</i> (Native Oatgrass)                         |             |                   |                                    |
| 261.                  | 13131 <i>Triodia epactia</i>                                          |             |                   |                                    |
| 262.                  | 700 <i>Triodia secunda</i>                                            |             |                   |                                    |
| 263.                  | 706 <i>Triraphis mollis</i> (Needle Grass)                            |             |                   |                                    |
| 264.                  | 728 <i>Whiteochloa cymbiformis</i>                                    |             |                   |                                    |
| 265.                  | 730 <i>Xerochloa imberbis</i> (Rice Grass)                            |             |                   |                                    |
| <b>Polygalaceae</b>   |                                                                       |             |                   |                                    |
| 266.                  | 41357 <i>Polygala saccopetala</i>                                     |             |                   |                                    |
| <b>Portulacaceae</b>  |                                                                       |             |                   |                                    |
| 267.                  | 2875 <i>Portulaca australis</i>                                       |             |                   |                                    |
| 268.                  | 43981 <i>Portulaca decipiens</i>                                      |             |                   |                                    |
| 269.                  | 2884 <i>Portulaca oleracea</i> (Purslane, Wakati)                     |             |                   |                                    |
| <b>Proteaceae</b>     |                                                                       |             |                   |                                    |
| 270.                  | 2079 <i>Grevillea pyramidalis</i> (Caustic Bush, Tjungu)              |             |                   |                                    |
| <b>Rhizophoraceae</b> |                                                                       |             |                   |                                    |
| 271.                  | 5291 <i>Bruguiera exaristata</i> (Ribbed Mangrove)                    |             |                   |                                    |
| 272.                  | 39680 <i>Ceriops australis</i>                                        |             |                   |                                    |
| 273.                  | 5295 <i>Rhizophora stylosa</i> (Spotted-leaved Red Mangrove)          |             |                   |                                    |

| Name ID                 | Species Name                                                   | Naturalised | Conservation Code | <sup>1</sup> Endemic To Query Area |
|-------------------------|----------------------------------------------------------------|-------------|-------------------|------------------------------------|
| <b>Rhodomelaceae</b>    |                                                                |             |                   |                                    |
| 274.                    | 26441 <i>Acanthophora spicifera</i>                            |             |                   |                                    |
| <b>Rubiaceae</b>        |                                                                |             |                   |                                    |
| 275.                    | 13339 <i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>     |             |                   |                                    |
| <b>Sapindaceae</b>      |                                                                |             |                   |                                    |
| 276.                    | 4759 <i>Dodonaea coriacea</i>                                  |             |                   |                                    |
| <b>Scrophulariaceae</b> |                                                                |             |                   |                                    |
| 277.                    | 17158 <i>Myoporum montanum</i> (Native Myrtle)                 |             |                   |                                    |
| <b>Sebdeniaceae</b>     |                                                                |             |                   |                                    |
| 278.                    | 27274 <i>Sebdenia flabellata</i>                               |             |                   |                                    |
| <b>Siphonocladaceae</b> |                                                                |             |                   |                                    |
| 279.                    | 26769 <i>Dictyosphaeria cavernosa</i>                          |             |                   |                                    |
| <b>Solanaceae</b>       |                                                                |             |                   |                                    |
| 280.                    | 6971 <i>Nicotiana benthamiana</i> (Tjuntiwari)                 |             |                   |                                    |
| 281.                    | 11856 <i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i> |             |                   |                                    |
| 282.                    | 20652 <i>Physalis angulata</i>                                 | Y           |                   |                                    |
| 283.                    | 7002 <i>Solanum diversiflorum</i>                              |             |                   |                                    |
| 284.                    | 7029 <i>Solanum phlomoides</i>                                 |             |                   |                                    |
| <b>Stylidiaceae</b>     |                                                                |             |                   |                                    |
| 285.                    | 7711 <i>Stylidium desertorum</i>                               |             |                   |                                    |
| <b>Thymelaeaceae</b>    |                                                                |             |                   |                                    |
| 286.                    | 5230 <i>Pimelea ammodharis</i>                                 |             |                   |                                    |
| <b>Udoteaceae</b>       |                                                                |             |                   |                                    |
| 287.                    | 27348 <i>Udotea argentea</i>                                   |             |                   |                                    |
| 288.                    | 35302 <i>Udotea glaucescens</i>                                |             |                   |                                    |
| <b>Violaceae</b>        |                                                                |             |                   |                                    |
| 289.                    | 5215 <i>Hybanthus aurantiacus</i>                              |             |                   |                                    |
| <b>Zygophyllaceae</b>   |                                                                |             |                   |                                    |
| 290.                    | 4380 <i>Tribulus occidentalis</i> (Perennial Caltrop)          |             |                   |                                    |

**Conservation Codes**  
T - Rare or likely to become extinct  
X - Presumed extinct  
IA - Protected under international agreement  
S - Other specially protected fauna  
1 - Priority 1  
2 - Priority 2  
3 - Priority 3  
4 - Priority 4  
5 - Priority 5

<sup>1</sup> For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.



# NatureMap Species Report

Created By Guest user on 01/03/2020

**Kingdom** Animalia  
**Current Names Only** Yes  
**Core Datasets Only** Yes  
**Method** 'By Circle'  
**Centre** 118° 36' 33" E, 20° 19' 12" S  
**Buffer** 10km  
**Group By** Family

| Family           | Species | Records |
|------------------|---------|---------|
| Acanthizidae     | 2       | 14      |
| Accipitridae     | 13      | 167     |
| Aegothelidae     | 1       | 1       |
| Agamiidae        | 8       | 12      |
| Alaudidae        | 1       | 17      |
| Anatidae         | 7       | 112     |
| Anhingidae       | 1       | 5       |
| Antennariidae    | 1       | 2       |
| Apogonidae       | 2       | 3       |
| Ardeidae         | 8       | 64      |
| Artamidae        | 6       | 76      |
| Batrachoididae   | 2       | 7       |
| Belontiidae      | 1       | 2       |
| Blenniidae       | 3       | 3       |
| Boidae           | 3       | 6       |
| Bovidae          | 1       | 2       |
| Bufonidae        | 1       | 6       |
| Burhinidae       | 1       | 1       |
| Cacatuidae       | 1       | 2       |
| Campephagidae    | 2       | 45      |
| Canidae          | 2       | 3       |
| Caprimulgidae    | 1       | 1       |
| Carangidae       | 3       | 3       |
| Carphodactylidae | 1       | 2       |
| Casuariidae      | 1       | 1       |
| Centropodidae    | 1       | 1       |
| Centropodidae    | 1       | 1       |
| Charadriidae     | 9       | 136     |
| Cheloniidae      | 3       | 2209    |
| Ciconiidae       | 1       | 5       |
| Clupeidae        | 3       | 5       |
| Colubridae       | 1       | 3       |
| Columbidae       | 8       | 174     |
| Corvidae         | 3       | 11      |
| Cracticidae      | 2       | 5       |
| Cuculidae        | 2       | 2       |
| Dactylopteridae  | 1       | 1       |
| Dasyuridae       | 5       | 117     |
| Delphinidae      | 1       | 1       |
| Dicruridae       | 4       | 142     |
| Diplodactylidae  | 4       | 9       |
| Drepanidae       | 1       | 1       |
| Dugongidae       | 1       | 1       |
| Elapidae         | 14      | 29      |
| Eleotridae       | 1       | 1       |
| Emballonuridae   | 2       | 4       |
| Ephippidae       | 1       | 2       |
| Equidae          | 1       | 2       |
| Estrilidae       | 3       | 62      |
| Falconidae       | 3       | 34      |
| Felidae          | 1       | 3       |
| Fregatidae       | 1       | 9       |
| Gekkonidae       | 5       | 11      |
| Gerreidae        | 1       | 1       |
| Glareolidae      | 2       | 6       |
| Gobiidae         | 3       | 5       |
| Gruidae          | 1       | 1       |
| Haematopodidae   | 2       | 48      |
| Halcyonidae      | 4       | 40      |
| Hemiramphidae    | 3       | 3       |
| Hemiscylliidae   | 1       | 2       |
| Heterodontidae   | 1       | 2       |
| Hirundinidae     | 4       | 67      |
| Hydrobatidae     | 1       | 2       |
| Hylidae          | 5       | 14      |
| Labridae         | 1       | 1       |
| Lamponidae       | 1       | 4       |
| Laridae          | 10      | 131     |
| Leporidae        | 1       | 2       |
| Leptobramidae    | 1       | 1       |
| Limnodynastidae  | 2       | 17      |
| Lutjanidae       | 1       | 2       |
| Macropodidae     | 4       | 6       |
| Maluridae        | 2       | 19      |
| Megalopidae      | 1       | 1       |

|                   |            |             |
|-------------------|------------|-------------|
| Meliphagidae      | 2          | 49          |
| Meropidae         | 1          | 48          |
| Molossidae        | 2          | 6           |
| Monodactylidae    | 1          | 3           |
| Motacillidae      | 2          | 3           |
| Mugilidae         | 2          | 3           |
| Muridae           | 6          | 61          |
| Myobatrachidae    | 2          | 2           |
| Nemipteridae      | 2          | 2           |
| Opistognathidae   | 1          | 2           |
| Ostraciidae       | 2          | 2           |
| Otididae          | 1          | 3           |
| Pachycephalidae   | 3          | 32          |
| Pardalotidae      | 2          | 2           |
| Passeridae        | 1          | 30          |
| Pelecanidae       | 1          | 37          |
| Petroicidae       | 2          | 3           |
| Phalacrocoracidae | 5          | 44          |
| Phasianidae       | 1          | 10          |
| Plotosidae        | 1          | 2           |
| Podargidae        | 1          | 1           |
| Podicipedidae     | 2          | 27          |
| Polynemidae       | 1          | 1           |
| Pomacentridae     | 2          | 2           |
| Pseudochromidae   | 1          | 1           |
| Psittacidae       | 5          | 44          |
| Ptilonorhynchidae | 1          | 1           |
| Pygopodidae       | 5          | 15          |
| Rallidae          | 4          | 19          |
| Recurvirostridae  | 3          | 51          |
| Salmonidae        | 1          | 1           |
| Salticidae        | 1          | 1           |
| Scatophagidae     | 1          | 4           |
| Sciaenidae        | 1          | 1           |
| Scincidae         | 19         | 52          |
| Scolopacidae      | 25         | 396         |
| Scolopendridae    | 2          | 5           |
| Scombridae        | 2          | 2           |
| Scorpaenidae      | 1          | 1           |
| Scyliorhinidae    | 1          | 2           |
| Serranidae        | 4          | 5           |
| Sillaginidae      | 2          | 4           |
| Sparidae          | 2          | 6           |
| Sturnidae         | 2          | 10          |
| Sylviidae         | 1          | 1           |
| Synanceiidae      | 1          | 2           |
| Syngnathidae      | 1          | 1           |
| Synodontidae      | 1          | 1           |
| Terapontidae      | 3          | 3           |
| Theridiidae       | 1          | 1           |
| Threskiornithidae | 3          | 40          |
| Thylacomyidae     | 1          | 2           |
| Trochanteridae    | 1          | 3           |
| Turnicidae        | 1          | 7           |
| Tytonidae         | 1          | 1           |
| Uranoscopidae     | 1          | 2           |
| Urodacidae        | 1          | 1           |
| Varanidae         | 6          | 7           |
| Vespertilionidae  | 4          | 6           |
| Zosteropidae      | 1          | 29          |
| <b>TOTAL</b>      | <b>365</b> | <b>5016</b> |



|                       | Name ID | Species Name                                                                          | Naturalised | Conservation Code | <sup>1</sup> Endemic To Query Area |
|-----------------------|---------|---------------------------------------------------------------------------------------|-------------|-------------------|------------------------------------|
| <b>Acanthizidae</b>   |         |                                                                                       |             |                   |                                    |
| 1.                    | 24276   | <i>Gerygone tenebrosa</i> (Dusky Gerygone)                                            |             |                   |                                    |
| 2.                    | 30948   | <i>Smicrornis brevirostris</i> (Weebill)                                              |             |                   |                                    |
| <b>Accipitridae</b>   |         |                                                                                       |             |                   |                                    |
| 3.                    | 25535   | <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)                                 |             |                   |                                    |
| 4.                    | 24285   | <i>Aquila audax</i> (Wedge-tailed Eagle)                                              |             |                   |                                    |
| 5.                    | 24288   | <i>Circus approximans</i> (Swamp Harrier)                                             |             |                   |                                    |
| 6.                    | 24289   | <i>Circus assimilis</i> (Spotted Harrier)                                             |             |                   |                                    |
| 7.                    |         | <i>Elanus axillaris</i>                                                               |             |                   |                                    |
| 8.                    | 25540   | <i>Elanus caeruleus</i> (Black-shouldered Kite)                                       |             |                   |                                    |
| 9.                    | 24290   | <i>Elanus caeruleus</i> subsp. <i>axillaris</i> (Australian Black-shouldered Kite)    |             |                   |                                    |
| 10.                   | 24293   | <i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)                               |             |                   |                                    |
| 11.                   | 25541   | <i>Haliastur indus</i> (Brahminy Kite)                                                |             |                   |                                    |
| 12.                   | 24295   | <i>Haliastur sphenurus</i> (Whistling Kite)                                           |             |                   |                                    |
| 13.                   | 47965   | <i>Hieraaetus morphnoides</i> (Little Eagle)                                          |             |                   |                                    |
| 14.                   | 25542   | <i>Milvus migrans</i> (Black Kite)                                                    |             |                   |                                    |
| 15.                   | 48591   | <i>Pandion cristatus</i> (Osprey, Eastern Osprey)                                     |             | IA                |                                    |
| <b>Aegothelidae</b>   |         |                                                                                       |             |                   |                                    |
| 16.                   | 25544   | <i>Aegotheles cristatus</i> (Australian Owlet-nightjar)                               |             |                   |                                    |
| <b>Agamidae</b>       |         |                                                                                       |             |                   |                                    |
| 17.                   | 30833   | <i>Amphibolurus longirostris</i> (Long-nosed Dragon)                                  |             |                   |                                    |
| 18.                   | 25458   | <i>Ctenophorus caudicinctus</i> (Ring-tailed Dragon)                                  |             |                   |                                    |
| 19.                   | 24865   | <i>Ctenophorus caudicinctus</i> subsp. <i>caudicinctus</i> (Ring-tailed Dragon)       |             |                   |                                    |
| 20.                   | 25459   | <i>Ctenophorus isolepis</i> (Crested Dragon, Military Dragon)                         |             |                   |                                    |
| 21.                   | 24876   | <i>Ctenophorus isolepis</i> subsp. <i>isolepis</i> (Crested Dragon, Military Dragon)  |             |                   |                                    |
| 22.                   | 24882   | <i>Ctenophorus nuchalis</i> (Central Netted Dragon)                                   |             |                   |                                    |
| 23.                   | 24907   | <i>Pogona minor</i> subsp. <i>minor</i> (Dwarf Bearded Dragon)                        |             |                   |                                    |
| 24.                   | 24908   | <i>Pogona minor</i> subsp. <i>mitchelli</i> (Dwarf Bearded Dragon)                    |             |                   |                                    |
| <b>Alaudidae</b>      |         |                                                                                       |             |                   |                                    |
| 25.                   | 25545   | <i>Mirafra javanica</i> (Horsfield's Bushlark, Singing Bushlark)                      |             |                   |                                    |
| <b>Anatidae</b>       |         |                                                                                       |             |                   |                                    |
| 26.                   | 24312   | <i>Anas gracilis</i> (Grey Teal)                                                      |             |                   |                                    |
| 27.                   | 24316   | <i>Anas superciliosa</i> (Pacific Black Duck)                                         |             |                   |                                    |
| 28.                   | 24318   | <i>Aythya australis</i> (Hardhead)                                                    |             |                   |                                    |
| 29.                   | 24322   | <i>Cygnus atratus</i> (Black Swan)                                                    |             |                   |                                    |
| 30.                   | 24324   | <i>Dendrocygna arcuata</i> (Wandering Whistling Duck, Chestnut Whistling Duck)        |             |                   |                                    |
| 31.                   | 24325   | <i>Dendrocygna eytoni</i> (Plumed Whistling Duck)                                     |             |                   |                                    |
| 32.                   | 24326   | <i>Malacorhynchus membranaceus</i> (Pink-eared Duck)                                  |             |                   |                                    |
| <b>Anhingidae</b>     |         |                                                                                       |             |                   |                                    |
| 33.                   | 47414   | <i>Anhinga novaehollandiae</i> (Australasian Darter)                                  |             |                   |                                    |
| <b>Antennariidae</b>  |         |                                                                                       |             |                   |                                    |
| 34.                   |         | <i>Lophiocharon trisignatus</i>                                                       |             |                   |                                    |
| <b>Apogonidae</b>     |         |                                                                                       |             |                   |                                    |
| 35.                   |         | <i>Apogon rueppellii</i>                                                              |             |                   |                                    |
| 36.                   |         | <i>Glossamia aprion</i>                                                               |             |                   |                                    |
| <b>Ardeidae</b>       |         |                                                                                       |             |                   |                                    |
| 37.                   | 25557   | <i>Ardea garzetta</i> (Little Egret)                                                  |             |                   |                                    |
| 38.                   | 25558   | <i>Ardea ibis</i> (Cattle Egret)                                                      |             |                   |                                    |
| 39.                   | 25559   | <i>Ardea intermedia</i> (Intermediate Egret)                                          |             |                   |                                    |
| 40.                   | 41324   | <i>Ardea modesta</i> (great egret, white egret)                                       |             |                   |                                    |
| 41.                   | 24341   | <i>Ardea pacifica</i> (White-necked Heron)                                            |             |                   |                                    |
| 42.                   | 47897   | <i>Butorides striata</i> (Striated Heron, Mangrove Heron)                             |             |                   |                                    |
| 43.                   |         | <i>Egretta garzetta</i>                                                               |             |                   |                                    |
| 44.                   |         | <i>Egretta novaehollandiae</i>                                                        |             |                   |                                    |
| <b>Artamidae</b>      |         |                                                                                       |             |                   |                                    |
| 45.                   | 25566   | <i>Artamus cinereus</i> (Black-faced Woodswallow)                                     |             |                   |                                    |
| 46.                   | 24352   | <i>Artamus cinereus</i> subsp. <i>melanops</i> (Black-faced Woodswallow)              |             |                   |                                    |
| 47.                   | 25567   | <i>Artamus leucorhynchus</i> (White-breasted Woodswallow)                             |             |                   |                                    |
| 48.                   | 24354   | <i>Artamus leucorhynchus</i> subsp. <i>leucopygialis</i> (White-breasted Woodswallow) |             |                   |                                    |
| 49.                   | 24356   | <i>Artamus personatus</i> (Masked Woodswallow)                                        |             |                   |                                    |
| 50.                   | 24357   | <i>Artamus superciliosus</i> (White-browed Woodswallow)                               |             |                   |                                    |
| <b>Batrachoididae</b> |         |                                                                                       |             |                   |                                    |

| Name ID                 | Species Name                                                               | Naturalised | Conservation Code | <sup>1</sup> Endemic To Query Area |
|-------------------------|----------------------------------------------------------------------------|-------------|-------------------|------------------------------------|
| 51.                     | <i>Batrachomoeus dahlia</i>                                                |             |                   |                                    |
| 52.                     | <i>Halophryne diemensis</i>                                                |             |                   |                                    |
| <b>Belonidae</b>        |                                                                            |             |                   |                                    |
| 53.                     | <i>Strongylura strongylura</i>                                             |             |                   |                                    |
| <b>Blenniidae</b>       |                                                                            |             |                   |                                    |
| 54.                     | <i>Omobranchus</i> sp.                                                     |             |                   |                                    |
| 55.                     | <i>Salarias sexfilum</i>                                                   |             |                   |                                    |
| 56.                     | <i>Salarias</i> sp.                                                        |             |                   |                                    |
| <b>Boidae</b>           |                                                                            |             |                   |                                    |
| 57.                     | 25318 <i>Antaresia perthensis</i> (Pygmy Python)                           |             |                   |                                    |
| 58.                     | 25320 <i>Aspidites melanocephalus</i> (Black-headed Python)                |             |                   |                                    |
| 59.                     | 25236 <i>Aspidites ramsayi</i> (Woma)                                      |             |                   |                                    |
| <b>Bovidae</b>          |                                                                            |             |                   |                                    |
| 60.                     | 24251 <i>Bos taurus</i> (European Cattle)                                  | Y           |                   |                                    |
| <b>Bufonidae</b>        |                                                                            |             |                   |                                    |
| 61.                     | 42306 <i>Platyplectrum spenceri</i> (Centralian Burrowing Frog)            |             |                   |                                    |
| <b>Burhinidae</b>       |                                                                            |             |                   |                                    |
| 62.                     | 47938 <i>Esacus magnirostris</i> (Beach Stone-curlew, Beach Thick-knee)    |             |                   |                                    |
| <b>Cacatuidae</b>       |                                                                            |             |                   |                                    |
| 63.                     | <i>Eolophus roseicapillus</i>                                              |             |                   |                                    |
| <b>Campephagidae</b>    |                                                                            |             |                   |                                    |
| 64.                     | 25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)          |             |                   |                                    |
| 65.                     | 24367 <i>Lalage tricolor</i> (White-winged Triller)                        |             |                   |                                    |
| <b>Canidae</b>          |                                                                            |             |                   |                                    |
| 66.                     | 48920 <i>Canis familiaris</i> (Dog, Dingo)                                 | Y           |                   |                                    |
| 67.                     | 24040 <i>Vulpes vulpes</i> (Red Fox)                                       | Y           |                   |                                    |
| <b>Caprimulgidae</b>    |                                                                            |             |                   |                                    |
| 68.                     | 24368 <i>Eurostopodus argus</i> (Spotted Nightjar)                         |             |                   |                                    |
| <b>Carangidae</b>       |                                                                            |             |                   |                                    |
| 69.                     | <i>Caranx ignobilis</i>                                                    |             |                   |                                    |
| 70.                     | <i>Caranx</i> sp.                                                          |             |                   |                                    |
| 71.                     | <i>Scomberoides commersonnianus</i>                                        |             |                   |                                    |
| <b>Carphodactylidae</b> |                                                                            |             |                   |                                    |
| 72.                     | 24969 <i>Nephurus levis</i> subsp. <i>pilbarensis</i>                      |             |                   |                                    |
| <b>Casuariidae</b>      |                                                                            |             |                   |                                    |
| 73.                     | 24470 <i>Dromaius novaehollandiae</i> (Emu)                                |             |                   |                                    |
| <b>Centropodidae</b>    |                                                                            |             |                   |                                    |
| 74.                     | <i>Centropus vaigiensis</i>                                                |             |                   |                                    |
| <b>Centropodidae</b>    |                                                                            |             |                   |                                    |
| 75.                     | 25600 <i>Centropus phasianinus</i> (Pheasant Coucal)                       |             |                   |                                    |
| <b>Charadriidae</b>     |                                                                            |             |                   |                                    |
| 76.                     | 25575 <i>Charadrius leschenaultii</i> (Greater Sand Plover)                |             | T                 |                                    |
| 77.                     | 25576 <i>Charadrius mongolus</i> (Lesser Sand Plover)                      |             | T                 |                                    |
| 78.                     | 24377 <i>Charadrius ruficapillus</i> (Red-capped Plover)                   |             |                   |                                    |
| 79.                     | 24378 <i>Charadrius veredus</i> (Oriental Plover)                          |             | IA                |                                    |
| 80.                     | 47937 <i>Elseya melanops</i> (Black-fronted Dotterel)                      |             |                   |                                    |
| 81.                     | 24379 <i>Erythronyx cinctus</i> (Red-kneed Dotterel)                       |             |                   |                                    |
| 82.                     | 24382 <i>Pluvialis fulva</i> (Pacific Golden Plover)                       |             | IA                |                                    |
| 83.                     | 24383 <i>Pluvialis squatarola</i> (Grey Plover)                            |             | IA                |                                    |
| 84.                     | 25577 <i>Vanellus miles</i> (Masked Lapwing)                               |             |                   |                                    |
| <b>Cheloniidae</b>      |                                                                            |             |                   |                                    |
| 85.                     | 25336 <i>Chelonia mydas</i> (Green Turtle)                                 |             | T                 |                                    |
| 86.                     | 25342 <i>Eretmochelys imbricata</i> subsp. <i>bissa</i> (Hawksbill Turtle) |             | T                 |                                    |
| 87.                     | 25344 <i>Natator depressus</i> (Flatback Turtle)                           |             | T                 |                                    |
| <b>Ciconiidae</b>       |                                                                            |             |                   |                                    |
| 88.                     | 25578 <i>Ephippiorhynchus asiaticus</i> (Black-necked Stork)               |             |                   |                                    |
| <b>Clupeidae</b>        |                                                                            |             |                   |                                    |
| 89.                     | <i>Herklotsichthys koningsbergeri</i>                                      |             |                   |                                    |
| 90.                     | <i>Herklotsichthys lippa</i>                                               |             |                   |                                    |
| 91.                     | <i>Nematalosa vlaminghi</i>                                                |             |                   |                                    |

|                        | Name ID | Species Name                                                        | Naturalised | Conservation Code | <sup>1</sup> Endemic To Query Area |
|------------------------|---------|---------------------------------------------------------------------|-------------|-------------------|------------------------------------|
| <b>Colubridae</b>      |         |                                                                     |             |                   |                                    |
| 92.                    | 25327   | <i>Fordonia leucobalia</i> (White-bellied Mangrove Snake)           |             |                   |                                    |
| <b>Columbidae</b>      |         |                                                                     |             |                   |                                    |
| 93.                    | 24399   | <i>Columba livia</i> (Domestic Pigeon)                              | Y           |                   |                                    |
| 94.                    | 24401   | <i>Geopelia cuneata</i> (Diamond Dove)                              |             |                   |                                    |
| 95.                    | 24402   | <i>Geopelia humeralis</i> (Bar-shouldered Dove)                     |             |                   |                                    |
| 96.                    | 25585   | <i>Geopelia striata</i> (Zebra Dove)                                |             |                   |                                    |
| 97.                    | 24403   | <i>Geopelia striata subsp. placida</i> (Peaceful Dove)              |             |                   |                                    |
| 98.                    | 24404   | <i>Geophaps plumifera</i> (Spinifex Pigeon)                         |             |                   |                                    |
| 99.                    | 24407   | <i>Ocyphaps lophotes</i> (Crested Pigeon)                           |             |                   |                                    |
| 100.                   | 24411   | <i>Phaps histrionica</i> (Flock Bronzewing, Flock Pigeon)           |             |                   |                                    |
| <b>Corvidae</b>        |         |                                                                     |             |                   |                                    |
| 101.                   | 24416   | <i>Corvus bennetti</i> (Little Crow)                                |             |                   |                                    |
| 102.                   | 25593   | <i>Corvus orru</i> (Torresian Crow)                                 |             |                   |                                    |
| 103.                   | 24418   | <i>Corvus orru subsp. ceciliae</i> (Western Crow)                   |             |                   |                                    |
| <b>Cracticidae</b>     |         |                                                                     |             |                   |                                    |
| 104.                   | 24420   | <i>Cracticus nigrogularis</i> (Pied Butcherbird)                    |             |                   |                                    |
| 105.                   | 25595   | <i>Cracticus tibicen</i> (Australian Magpie)                        |             |                   |                                    |
| <b>Cuculidae</b>       |         |                                                                     |             |                   |                                    |
| 106.                   | 42307   | <i>Cacomantis pallidus</i> (Pallid Cuckoo)                          |             |                   |                                    |
| 107.                   | 24431   | <i>Chrysococcyx basalis</i> (Horsfield's Bronze Cuckoo)             |             |                   |                                    |
| <b>Dactylopteridae</b> |         |                                                                     |             |                   |                                    |
| 108.                   |         | <i>Dactyloptena papilio</i>                                         |             |                   |                                    |
| <b>Dasyuridae</b>      |         |                                                                     |             |                   |                                    |
| 109.                   | 30903   | <i>Dasycercus blythi</i> (Brush-tailed Mulgara, Ampurta)            |             | P4                |                                    |
| 110.                   | 24089   | <i>Dasycercus cristicauda</i> (Crest-tailed Mulgara, minyiminyl)    |             | P4                |                                    |
| 111.                   | 24091   | <i>Dasykaluta rosamondae</i> (Little Red Kaluta)                    |             |                   |                                    |
| 112.                   | 24093   | <i>Dasyurus hallucatus</i> (Northern Quoll)                         |             | T                 |                                    |
| 113.                   | 24120   | <i>Sminthopsis youngsoni</i> (Lesser Hairy-footed Dunnart)          |             |                   |                                    |
| <b>Delphinidae</b>     |         |                                                                     |             |                   |                                    |
| 114.                   | 30954   | <i>Tursiops aduncus</i> (Indo-Pacific Bottlenose Dolphin)           |             |                   |                                    |
| <b>Dicruridae</b>      |         |                                                                     |             |                   |                                    |
| 115.                   | 24443   | <i>Grallina cyanoleuca</i> (Magpie-lark)                            |             |                   |                                    |
| 116.                   | 48096   | <i>Rhipidura albiscapa</i> (Grey Fantail)                           |             |                   |                                    |
| 117.                   | 25614   | <i>Rhipidura leucophrys</i> (Willie Wagtail)                        |             |                   |                                    |
| 118.                   | 24457   | <i>Rhipidura phasiana</i> (Mangrove Grey Fantail)                   |             |                   |                                    |
| <b>Diplodactylidae</b> |         |                                                                     |             |                   |                                    |
| 119.                   | 24926   | <i>Diplodactylus conspicillatus</i> (Fat-tailed Gecko)              |             |                   |                                    |
| 120.                   | 30933   | <i>Lucasium stenodactylum</i>                                       |             |                   |                                    |
| 121.                   | 24924   | <i>Strophurus ciliaris subsp. aberrans</i>                          |             |                   |                                    |
| 122.                   | 24932   | <i>Strophurus jeanae</i>                                            |             |                   |                                    |
| <b>Drepaneidae</b>     |         |                                                                     |             |                   |                                    |
| 123.                   |         | <i>Drepane punctata</i>                                             |             |                   |                                    |
| <b>Dugongidae</b>      |         |                                                                     |             |                   |                                    |
| 124.                   | 24084   | <i>Dugong dugon</i> (Dugong)                                        |             | S                 |                                    |
| <b>Elapidae</b>        |         |                                                                     |             |                   |                                    |
| 125.                   | 25243   | <i>Acanthophis pyrrhus</i> (Desert Death Adder)                     |             |                   |                                    |
| 126.                   |         | <i>Acanthophis wellsei</i>                                          |             |                   |                                    |
| 127.                   | 25331   | <i>Brachyurophis approximans</i> (North-western Shovel-nosed Snake) |             |                   |                                    |
| 128.                   | 25297   | <i>Demansia rufescens</i> (Rufous Whipsnake)                        |             |                   |                                    |
| 129.                   |         | <i>Demansia torquata</i>                                            |             |                   | Y                                  |
| 130.                   | 25301   | <i>Furina ornata</i> (Moon Snake)                                   |             |                   |                                    |
| 131.                   | 25363   | <i>Hydrelaps darwiniensis</i>                                       |             |                   |                                    |
| 132.                   | 25366   | <i>Hydrophis elegans</i> (Elegant Seasnake, Bar-bellied Seasnake)   |             |                   |                                    |
| 133.                   | 43385   | <i>Hydrophis stokesii</i> (Stoke's Seasnake, Sea Snake)             |             |                   |                                    |
| 134.                   | 25261   | <i>Pseudechis australis</i> (Mulga Snake)                           |             |                   |                                    |
| 135.                   | 42416   | <i>Pseudonaja mengdeni</i> (Western Brown Snake)                    |             |                   |                                    |
| 136.                   | 25263   | <i>Pseudonaja modesta</i> (Ringed Brown Snake)                      |             |                   |                                    |
| 137.                   | 25264   | <i>Pseudonaja nuchalis</i> (Gwardar, Northern Brown Snake)          |             |                   |                                    |
| 138.                   | 25305   | <i>Simoselaps anomalus</i> (Desert Banded Snake)                    |             |                   |                                    |
| <b>Eleotridae</b>      |         |                                                                     |             |                   |                                    |
| 139.                   |         | <i>Butis butis</i>                                                  |             |                   |                                    |
| <b>Emballonuridae</b>  |         |                                                                     |             |                   |                                    |



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| 140.                  | 24174   | <i>Saccolaimus flaviventris</i> (Yellow-bellied Sheath-tailed Bat) |             |                   |                                    |
| 141.                  | 24175   | <i>Taphozous georgianus</i> (Common Sheath-tailed Bat)             |             |                   |                                    |
| <b>Ephippidae</b>     |         |                                                                    |             |                   |                                    |
| 142.                  |         | <i>Zabidius novemaculeatus</i>                                     |             |                   |                                    |
| <b>Equidae</b>        |         |                                                                    |             |                   |                                    |
| 143.                  | 24258   | <i>Equus caballus</i> (Horse)                                      | Y           |                   |                                    |
| <b>Estrilidae</b>     |         |                                                                    |             |                   |                                    |
| 144.                  | 24631   | <i>Emblema pictum</i> (Painted Finch)                              |             |                   |                                    |
| 145.                  | 25685   | <i>Neochmia ruficauda</i> (Star Finch)                             |             |                   |                                    |
| 146.                  | 30870   | <i>Taeniopygia guttata</i> (Zebra Finch)                           |             |                   |                                    |
| <b>Falconidae</b>     |         |                                                                    |             |                   |                                    |
| 147.                  | 25621   | <i>Falco berigora</i> (Brown Falcon)                               |             |                   |                                    |
| 148.                  | 25622   | <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)     |             |                   |                                    |
| 149.                  | 25623   | <i>Falco longipennis</i> (Australian Hobby)                        |             |                   |                                    |
| <b>Felidae</b>        |         |                                                                    |             |                   |                                    |
| 150.                  | 24041   | <i>Felis catus</i> (Cat)                                           | Y           |                   |                                    |
| <b>Fregatidae</b>     |         |                                                                    |             |                   |                                    |
| 151.                  | 24478   | <i>Fregata ariel</i> (Lesser Frigatebird)                          |             | IA                |                                    |
| <b>Gekkonidae</b>     |         |                                                                    |             |                   |                                    |
| 152.                  | 24956   | <i>Gehyra pilbara</i>                                              |             |                   |                                    |
| 153.                  | 24958   | <i>Gehyra punctata</i>                                             |             |                   |                                    |
| 154.                  | 24959   | <i>Gehyra variegata</i>                                            |             |                   |                                    |
| 155.                  | 25232   | <i>Hemidactylus frenatus</i> (Asian House Gecko)                   | Y           |                   |                                    |
| 156.                  | 24961   | <i>Heteronotia binoei</i> (Bynoe's Gecko)                          |             |                   |                                    |
| <b>Gerreidae</b>      |         |                                                                    |             |                   |                                    |
| 157.                  |         | <i>Gerres subfasciatus</i>                                         |             |                   |                                    |
| <b>Glareolidae</b>    |         |                                                                    |             |                   |                                    |
| 158.                  | 24481   | <i>Glareola maldivarum</i> (Oriental Pratincole)                   |             | IA                |                                    |
| 159.                  | 24482   | <i>Stiltia isabella</i> (Australian Pratincole)                    |             |                   |                                    |
| <b>Gobiidae</b>       |         |                                                                    |             |                   |                                    |
| 160.                  |         | <i>Bathygobius fuscus</i>                                          |             |                   |                                    |
| 161.                  |         | <i>Periophthalmodon freycineti</i>                                 |             |                   |                                    |
| 162.                  |         | <i>Yongeichthys nebulosus</i>                                      |             |                   |                                    |
| <b>Gruidae</b>        |         |                                                                    |             |                   |                                    |
| 163.                  | 24484   | <i>Grus rubicunda</i> (Brolga)                                     |             |                   |                                    |
| <b>Haematopodidae</b> |         |                                                                    |             |                   |                                    |
| 164.                  | 25627   | <i>Haematopus fuliginosus</i> (Sooty Oystercatcher)                |             |                   |                                    |
| 165.                  | 24487   | <i>Haematopus longirostris</i> (Pied Oystercatcher)                |             |                   |                                    |
| <b>Halcyonidae</b>    |         |                                                                    |             |                   |                                    |
| 166.                  | 25547   | <i>Dacelo leachii</i> (Blue-winged Kookaburra)                     |             |                   |                                    |
| 167.                  | 25548   | <i>Todiramphus chloris</i> (Collared Kingfisher)                   |             |                   |                                    |
| 168.                  | 42351   | <i>Todiramphus pyrrhopygius</i> (Red-backed Kingfisher)            |             |                   |                                    |
| 169.                  | 25549   | <i>Todiramphus sanctus</i> (Sacred Kingfisher)                     |             |                   |                                    |
| <b>Hemiramphidae</b>  |         |                                                                    |             |                   |                                    |
| 170.                  |         | <i>Arrhamphus sclerolepis</i>                                      |             |                   |                                    |
| 171.                  |         | <i>Hyporhamphus quoyi</i>                                          |             |                   |                                    |
| 172.                  |         | <i>Hyporhamphus</i> sp.                                            |             |                   |                                    |
| <b>Hemiscylliidae</b> |         |                                                                    |             |                   |                                    |
| 173.                  |         | <i>Chiloscyllium punctatum</i>                                     |             |                   |                                    |
| <b>Heterodontidae</b> |         |                                                                    |             |                   |                                    |
| 174.                  |         | ? ?                                                                |             |                   |                                    |
| <b>Hirundinidae</b>   |         |                                                                    |             |                   |                                    |
| 175.                  | 24491   | <i>Hirundo neoxena</i> (Welcome Swallow)                           |             |                   |                                    |
| 176.                  | 25630   | <i>Hirundo rustica</i> (Barn Swallow)                              |             | IA                |                                    |
| 177.                  | 48060   | <i>Petrochelidon ariel</i> (Fairy Martin)                          |             |                   |                                    |
| 178.                  | 48061   | <i>Petrochelidon nigricans</i> (Tree Martin)                       |             |                   |                                    |
| <b>Hydrobatidae</b>   |         |                                                                    |             |                   |                                    |
| 179.                  | 24497   | <i>Oceanites oceanicus</i> (Wilson's Storm-petrel)                 |             | IA                |                                    |
| <b>Hylidae</b>        |         |                                                                    |             |                   |                                    |
| 180.                  | 25371   | <i>Cyclorana australis</i> (Giant Frog)                            |             |                   |                                    |
| 181.                  | 25375   | <i>Cyclorana maini</i> (Sheep Frog)                                |             |                   |                                    |

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| 182.                   | 25380   | <i>Litoria caerulea</i> (Green Tree Frog)                                           |             |                   |                                    |
| 183.                   | 25391   | <i>Litoria rothii</i> (Northern Laughing Tree Frog)                                 |             |                   |                                    |
| 184.                   | 25392   | <i>Litoria rubella</i> (Little Red Tree Frog)                                       |             |                   |                                    |
| <b>Labridae</b>        |         |                                                                                     |             |                   |                                    |
| 185.                   |         | <i>Choerodon cyanodus</i>                                                           |             |                   |                                    |
| <b>Lamponidae</b>      |         |                                                                                     |             |                   |                                    |
| 186.                   |         | <i>Lamponina scutata</i>                                                            |             |                   |                                    |
| <b>Laridae</b>         |         |                                                                                     |             |                   |                                    |
| 187.                   | 41332   | <i>Chlidonias leucopterus</i> (White-winged Black Tern, white-winged tern)          |             | IA                |                                    |
| 188.                   |         | <i>Chroicocephalus novaehollandiae</i>                                              |             |                   |                                    |
| 189.                   | 48587   | <i>Hydroprogne caspia</i> (Caspian Tern)                                            |             | IA                |                                    |
| 190.                   | 25637   | <i>Larus novaehollandiae</i> (Silver Gull)                                          |             |                   |                                    |
| 191.                   | 24521   | <i>Sterna bengalensis</i> (Lesser Crested Tern)                                     |             |                   |                                    |
| 192.                   | 25642   | <i>Sterna hirundo</i> (Common Tern)                                                 |             | IA                |                                    |
| 193.                   | 25643   | <i>Sterna hybrida</i> (Whiskered Tern)                                              |             |                   |                                    |
| 194.                   | 48593   | <i>Sternula albifrons</i> (Little Tern)                                             |             | IA                |                                    |
| 195.                   |         | <i>Thalasseus bengalensis</i>                                                       |             |                   |                                    |
| 196.                   | 48597   | <i>Thalasseus bergii</i> (Crested Tern)                                             |             | IA                |                                    |
| <b>Leporidae</b>       |         |                                                                                     |             |                   |                                    |
| 197.                   | 24085   | <i>Oryctolagus cuniculus</i> (Rabbit)                                               | Y           |                   |                                    |
| <b>Leptobramidae</b>   |         |                                                                                     |             |                   |                                    |
| 198.                   |         | <i>Leptobrama muelleri</i>                                                          |             |                   |                                    |
| <b>Limnodynastidae</b> |         |                                                                                     |             |                   |                                    |
| 199.                   | 25422   | <i>Neobatrachus aquilonius</i> (Northern Burrowing Frog)                            |             |                   |                                    |
| 200.                   | 25430   | <i>Notaden nicholli</i> (Desert Spadefoot)                                          |             |                   |                                    |
| <b>Lutjanidae</b>      |         |                                                                                     |             |                   |                                    |
| 201.                   |         | <i>Lutjanus carponotatus</i>                                                        |             |                   |                                    |
| <b>Macropodidae</b>    |         |                                                                                     |             |                   |                                    |
| 202.                   | 24128   | <i>Lagostrophus fasciatus</i> subsp. <i>fasciatus</i> (Banded hare-wallaby, Memine) |             | T                 |                                    |
| 203.                   | 25489   | <i>Macropus robustus</i> (Euro, Biggada)                                            |             |                   |                                    |
| 204.                   | 24135   | <i>Macropus robustus</i> subsp. <i>erubescens</i> (Euro, Biggada)                   |             |                   |                                    |
| 205.                   | 48034   | <i>Osphranter robustus</i> (Euro, Biggada)                                          |             |                   |                                    |
| <b>Maluridae</b>       |         |                                                                                     |             |                   |                                    |
| 206.                   | 25651   | <i>Malurus lamberti</i> (Variegated Fairy-wren)                                     |             |                   |                                    |
| 207.                   | 25652   | <i>Malurus leucopterus</i> (White-winged Fairy-wren)                                |             |                   |                                    |
| <b>Megalopidae</b>     |         |                                                                                     |             |                   |                                    |
| 208.                   |         | <i>Megalops cyprinoides</i>                                                         |             |                   |                                    |
| <b>Meliphagidae</b>    |         |                                                                                     |             |                   |                                    |
| 209.                   | 25661   | <i>Lichmera indistincta</i> (Brown Honeyeater)                                      |             |                   |                                    |
| 210.                   | 24583   | <i>Manorina flavigula</i> (Yellow-throated Miner)                                   |             |                   |                                    |
| <b>Meropidae</b>       |         |                                                                                     |             |                   |                                    |
| 211.                   | 24598   | <i>Merops ornatus</i> (Rainbow Bee-eater)                                           |             |                   |                                    |
| <b>Molossidae</b>      |         |                                                                                     |             |                   |                                    |
| 212.                   | 24181   | <i>Chaerephon jobensis</i> (Greater Northern Freetail-bat, Northern Mastiff Bat)    |             |                   |                                    |
| 213.                   |         | <i>Mormopterus (Ozimops) cobourgianus</i>                                           |             |                   |                                    |
| <b>Monodactylidae</b>  |         |                                                                                     |             |                   |                                    |
| 214.                   |         | <i>Monodactylus argenteus</i>                                                       |             |                   |                                    |
| <b>Motacillidae</b>    |         |                                                                                     |             |                   |                                    |
| 215.                   | 25670   | <i>Anthus australis</i> (Australian Pipit)                                          |             |                   |                                    |
| 216.                   | 24602   | <i>Motacilla flava</i> subsp. <i>simillima</i> (Yellow Wagtail)                     |             | IA                | Y                                  |
| <b>Mugilidae</b>       |         |                                                                                     |             |                   |                                    |
| 217.                   |         | <i>Liza vaigiensis</i>                                                              |             |                   |                                    |
| 218.                   |         | <i>Mugil cephalus</i>                                                               |             |                   |                                    |
| <b>Muridae</b>         |         |                                                                                     |             |                   |                                    |
| 219.                   | 24223   | <i>Mus musculus</i> (House Mouse)                                                   | Y           |                   |                                    |
| 220.                   | 24224   | <i>Notomys alexis</i> (Spinifex Hopping-mouse)                                      |             |                   |                                    |
| 221.                   | 24234   | <i>Pseudomys delicatulus</i> (Delicate Mouse)                                       |             |                   |                                    |
| 222.                   | 24235   | <i>Pseudomys desertor</i> (Desert Mouse)                                            |             |                   |                                    |
| 223.                   | 24237   | <i>Pseudomys hermannsburgensis</i> (Sandy Inland Mouse)                             |             |                   |                                    |
| 224.                   | 24239   | <i>Pseudomys nanus</i> (Western Chestnut Mouse)                                     |             |                   |                                    |
| <b>Myobatrachidae</b>  |         |                                                                                     |             |                   |                                    |

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| 225.                     | 25445 | <i>Uperoleia russelli</i> (Northwest Toadlet)                                 |             |                   |                                    |
| 226.                     | 25446 | <i>Uperoleia talpa</i> (Ratcheting Toadlet)                                   |             |                   |                                    |
| <b>Nemipteridae</b>      |       |                                                                               |             |                   |                                    |
| 227.                     |       | <i>Pentapodus porosus</i>                                                     |             |                   |                                    |
| 228.                     |       | <i>Scaevius milii</i>                                                         |             |                   |                                    |
| <b>Opistognathidae</b>   |       |                                                                               |             |                   |                                    |
| 229.                     |       | <i>Opistognathus inornatus</i>                                                |             |                   |                                    |
| <b>Ostraciidae</b>       |       |                                                                               |             |                   |                                    |
| 230.                     |       | <i>Ostracion</i> sp.                                                          |             |                   |                                    |
| 231.                     |       | <i>Rhynchostracion nasus</i>                                                  |             |                   |                                    |
| <b>Otididae</b>          |       |                                                                               |             |                   |                                    |
| 232.                     | 24610 | <i>Ardeotis australis</i> (Australian Bustard)                                |             |                   |                                    |
| <b>Pachycephalidae</b>   |       |                                                                               |             |                   |                                    |
| 233.                     | 25675 | <i>Colluricincla harmonica</i> (Grey Shrike-thrush)                           |             |                   |                                    |
| 234.                     | 24620 | <i>Pachycephala lanioides</i> (White-breasted Whistler)                       |             |                   |                                    |
| 235.                     | 25678 | <i>Pachycephala melanura</i> (Mangrove Golden Whistler)                       |             |                   |                                    |
| <b>Pardalotidae</b>      |       |                                                                               |             |                   |                                    |
| 236.                     | 24627 | <i>Pardalotus rubricatus</i> (Red-browed Pardalote)                           |             |                   |                                    |
| 237.                     | 25682 | <i>Pardalotus striatus</i> (Striated Pardalote)                               |             |                   |                                    |
| <b>Passeridae</b>        |       |                                                                               |             |                   |                                    |
| 238.                     | 24642 | <i>Passer montanus</i> (Eurasian Tree Sparrow)                                | Y           |                   |                                    |
| <b>Pelecanidae</b>       |       |                                                                               |             |                   |                                    |
| 239.                     | 24648 | <i>Pelecanus conspicillatus</i> (Australian Pelican)                          |             |                   |                                    |
| <b>Petroicidae</b>       |       |                                                                               |             |                   |                                    |
| 240.                     | 24653 | <i>Eopsaltria pulverulenta</i> (Mangrove Robin)                               |             |                   |                                    |
| 241.                     |       | <i>Peneoenanthe pulverulenta</i>                                              |             |                   |                                    |
| <b>Phalacrocoracidae</b> |       |                                                                               |             |                   |                                    |
| 242.                     |       | <i>Microcarbo melanoleucos</i>                                                |             |                   |                                    |
| 243.                     | 25697 | <i>Phalacrocorax carbo</i> (Great Cormorant)                                  |             |                   |                                    |
| 244.                     | 25698 | <i>Phalacrocorax melanoleucos</i> (Little Pied Cormorant)                     |             |                   |                                    |
| 245.                     | 24667 | <i>Phalacrocorax sulcirostris</i> (Little Black Cormorant)                    |             |                   |                                    |
| 246.                     | 25699 | <i>Phalacrocorax varius</i> (Pied Cormorant)                                  |             |                   |                                    |
| <b>Phasianidae</b>       |       |                                                                               |             |                   |                                    |
| 247.                     | 25701 | <i>Coturnix ypsilophora</i> (Brown Quail)                                     |             |                   |                                    |
| <b>Plotosidae</b>        |       |                                                                               |             |                   |                                    |
| 248.                     |       | <i>Paraplotosus albilabris</i>                                                |             |                   |                                    |
| <b>Podargidae</b>        |       |                                                                               |             |                   |                                    |
| 249.                     | 25703 | <i>Podargus strigoides</i> (Tawny Frogmouth)                                  |             |                   |                                    |
| <b>Podicipedidae</b>     |       |                                                                               |             |                   |                                    |
| 250.                     | 24681 | <i>Poliiocephalus poliocephalus</i> (Hoary-headed Grebe)                      |             |                   |                                    |
| 251.                     | 25705 | <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe) |             |                   |                                    |
| <b>Polynemidae</b>       |       |                                                                               |             |                   |                                    |
| 252.                     |       | <i>Eleutheronema tetradactylum</i>                                            |             |                   |                                    |
| <b>Pomacentridae</b>     |       |                                                                               |             |                   |                                    |
| 253.                     |       | <i>Abudefduf bengalensis</i>                                                  |             |                   |                                    |
| 254.                     |       | <i>Amphiprion clarkii</i>                                                     |             |                   |                                    |
| <b>Pseudochromidae</b>   |       |                                                                               |             |                   |                                    |
| 255.                     |       | <i>Labracinus</i> sp.                                                         |             |                   | Y                                  |
| <b>Psittacidae</b>       |       |                                                                               |             |                   |                                    |
| 256.                     | 25715 | <i>Cacatua roseicapilla</i> (Galah)                                           |             |                   |                                    |
| 257.                     | 25716 | <i>Cacatua sanguinea</i> (Little Corella)                                     |             |                   |                                    |
| 258.                     | 24736 | <i>Melopsittacus undulatus</i> (Budgerigar)                                   |             |                   |                                    |
| 259.                     | 24742 | <i>Nymphicus hollandicus</i> (Cockatiel)                                      |             |                   |                                    |
| 260.                     | 24747 | <i>Platycercus spurius</i> (Red-capped Parrot)                                |             |                   |                                    |
| <b>Ptilonorhynchidae</b> |       |                                                                               |             |                   |                                    |
| 261.                     | 24757 | <i>Ptilonorhynchus maculatus</i> subsp. <i>guttatus</i> (Western Bowerbird)   |             |                   |                                    |
| <b>Pygopodidae</b>       |       |                                                                               |             |                   |                                    |
| 262.                     | 24997 | <i>Delma butleri</i>                                                          |             |                   |                                    |
| 263.                     | 25002 | <i>Delma pax</i>                                                              |             |                   |                                    |
| 264.                     | 25004 | <i>Delma tincta</i>                                                           |             |                   |                                    |



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| 265.                    | 25005   | <i>Lialis burtonis</i>                                                                  |             |                   |                                    |
| 266.                    | 25009   | <i>Pygopus nigriceps</i>                                                                |             |                   |                                    |
| <b>Rallidae</b>         |         |                                                                                         |             |                   |                                    |
| 267.                    | 25727   | <i>Fulica atra</i> (Eurasian Coot)                                                      |             |                   |                                    |
| 268.                    | 25730   | <i>Gallirallus philippensis</i> (Buff-banded Rail)                                      |             |                   |                                    |
| 269.                    | 25731   | <i>Porphyrio porphyrio</i> (Purple Swamphen)                                            |             |                   |                                    |
| 270.                    | 24769   | <i>Porzana fluminea</i> (Australian Spotted Crane)                                      |             |                   |                                    |
| <b>Recurvirostridae</b> |         |                                                                                         |             |                   |                                    |
| 271.                    | 24774   | <i>Cladorhynchus leucocephalus</i> (Banded Stilt)                                       |             |                   |                                    |
| 272.                    | 25734   | <i>Himantopus himantopus</i> (Black-winged Stilt)                                       |             |                   |                                    |
| 273.                    | 24776   | <i>Recurvirostra novaehollandiae</i> (Red-necked Avocet)                                |             |                   |                                    |
| <b>Salmonidae</b>       |         |                                                                                         |             |                   |                                    |
| 274.                    |         | <i>Kathala axillaris</i>                                                                |             |                   | Y                                  |
| <b>Salticidae</b>       |         |                                                                                         |             |                   |                                    |
| 275.                    |         | <i>Holoplatys meda</i>                                                                  |             |                   |                                    |
| <b>Scatophagidae</b>    |         |                                                                                         |             |                   |                                    |
| 276.                    |         | <i>Selenotoca multifasciata</i>                                                         |             |                   |                                    |
| <b>Sciaenidae</b>       |         |                                                                                         |             |                   |                                    |
| 277.                    |         | <i>Protonibea diacanthus</i>                                                            |             |                   |                                    |
| <b>Scincidae</b>        |         |                                                                                         |             |                   |                                    |
| 278.                    | 25017   | <i>Carlia triacantha</i> (Desert Rainbow Skink)                                         |             |                   |                                    |
| 279.                    | 25024   | <i>Ctenotus angusticeps</i> (Airlie Island Ctenotus, Northwestern coastal Ctenotus)     |             | P3                |                                    |
| 280.                    | 25036   | <i>Ctenotus duricola</i>                                                                |             |                   |                                    |
| 281.                    | 25043   | <i>Ctenotus grandis</i> subsp. <i>titan</i>                                             |             |                   |                                    |
| 282.                    | 25044   | <i>Ctenotus hanloni</i>                                                                 |             |                   |                                    |
| 283.                    | 25045   | <i>Ctenotus helenae</i>                                                                 |             |                   |                                    |
| 284.                    | 25064   | <i>Ctenotus pantherinus</i> subsp. <i>ocellifer</i> (Leopard Ctenotus)                  |             |                   |                                    |
| 285.                    | 25062   | <i>Ctenotus piankai</i>                                                                 |             |                   |                                    |
| 286.                    | 25069   | <i>Ctenotus rufescens</i>                                                               |             |                   |                                    |
| 287.                    | 25073   | <i>Ctenotus saxatilis</i> (Rock Ctenotus)                                               |             |                   |                                    |
| 288.                    | 25077   | <i>Ctenotus serventyi</i>                                                               |             |                   |                                    |
| 289.                    | 25092   | <i>Egernia depressa</i> (Southern Pygmy Spiny-tailed Skink)                             |             |                   |                                    |
| 290.                    | 41409   | <i>Eremiascincus musivus</i> (Mosaic Desert Skink)                                      |             |                   |                                    |
| 291.                    | 25125   | <i>Lerista bipes</i>                                                                    |             |                   |                                    |
| 292.                    | 30928   | <i>Lerista clara</i>                                                                    |             |                   |                                    |
| 293.                    | 25155   | <i>Lerista muelleri</i>                                                                 |             |                   |                                    |
| 294.                    | 25184   | <i>Menetia greyii</i>                                                                   |             |                   |                                    |
| 295.                    | 25193   | <i>Morethia ruficauda</i> subsp. <i>exquisita</i>                                       |             |                   |                                    |
| 296.                    | 25202   | <i>Tiliqua multifasciata</i> (Central Blue-tongue)                                      |             |                   |                                    |
| <b>Scolopacidae</b>     |         |                                                                                         |             |                   |                                    |
| 297.                    | 41323   | <i>Actitis hypoleucos</i> (Common Sandpiper)                                            |             | IA                |                                    |
| 298.                    | 25736   | <i>Arenaria interpres</i> (Ruddy Turnstone)                                             |             | IA                |                                    |
| 299.                    | 24778   | <i>Arenaria interpres</i> subsp. <i>interpres</i> (Ruddy Turnstone)                     |             | IA                |                                    |
| 300.                    | 24779   | <i>Calidris acuminata</i> (Sharp-tailed Sandpiper)                                      |             | IA                |                                    |
| 301.                    | 24780   | <i>Calidris alba</i> (Sanderling)                                                       |             | IA                |                                    |
| 302.                    | 25738   | <i>Calidris canutus</i> (Red Knot, knot)                                                |             | IA                |                                    |
| 303.                    | 24784   | <i>Calidris ferruginea</i> (Curlew Sandpiper)                                           |             | T                 |                                    |
| 304.                    | 24786   | <i>Calidris melanotos</i> (Pectoral Sandpiper)                                          |             | IA                |                                    |
| 305.                    | 24788   | <i>Calidris ruficollis</i> (Red-necked Stint)                                           |             | IA                |                                    |
| 306.                    | 24789   | <i>Calidris subminuta</i> (Long-toed Stint)                                             |             | IA                |                                    |
| 307.                    | 24790   | <i>Calidris tenuirostris</i> (Great Knot)                                               |             | T                 |                                    |
| 308.                    | 24793   | <i>Gallinago stenura</i> (Pin-tailed Snipe)                                             |             | IA                |                                    |
| 309.                    | 25739   | <i>Limicola falcinellus</i> (Broad-billed Sandpiper)                                    |             | IA                |                                    |
| 310.                    | 24795   | <i>Limnodromus semipalmatus</i> (Asian Dowitcher)                                       |             | IA                |                                    |
| 311.                    | 30932   | <i>Limosa lapponica</i> (Bar-tailed Godwit)                                             |             | IA                |                                    |
| 312.                    | 24796   | <i>Limosa lapponica</i> subsp. <i>menzbieri</i> (Bar-tailed Godwit (northern Siberian)) |             | T                 |                                    |
| 313.                    | 25741   | <i>Limosa limosa</i> (Black-tailed Godwit)                                              |             | IA                |                                    |
| 314.                    | 24798   | <i>Numenius madagascariensis</i> (Eastern Curlew)                                       |             | T                 |                                    |
| 315.                    | 24799   | <i>Numenius minutus</i> (Little Curlew, Little Whimbrel)                                |             | IA                |                                    |
| 316.                    | 25742   | <i>Numenius phaeopus</i> (Whimbrel)                                                     |             | IA                |                                    |
| 317.                    | 24803   | <i>Tringa brevipes</i> (Grey-tailed Tattler)                                            |             | P4                |                                    |
| 318.                    | 24806   | <i>Tringa glareola</i> (Wood Sandpiper)                                                 |             | IA                |                                    |
| 319.                    | 24808   | <i>Tringa nebularia</i> (Common Greenshank, greenshank)                                 |             | IA                |                                    |
| 320.                    | 24809   | <i>Tringa stagnatilis</i> (Marsh Sandpiper, little greenshank)                          |             | IA                |                                    |
| 321.                    | 41351   | <i>Xenus cinereus</i> (Terek Sandpiper)                                                 |             | IA                |                                    |

| Name ID                  | Species Name                                                         | Naturalised | Conservation Code | <sup>1</sup> Endemic To Query Area |
|--------------------------|----------------------------------------------------------------------|-------------|-------------------|------------------------------------|
| <b>Scolopendridae</b>    |                                                                      |             |                   |                                    |
| 322.                     | <i>Scolopendra laeta</i>                                             |             |                   |                                    |
| 323.                     | <i>Scolopendra morsitans</i>                                         |             |                   |                                    |
| <b>Scombridae</b>        |                                                                      |             |                   |                                    |
| 324.                     | <i>Rastrelliger serventyi</i> (invalid)                              |             |                   | Y                                  |
| 325.                     | <i>Scomberomorus semifasciatus</i>                                   |             |                   |                                    |
| <b>Scorpaenidae</b>      |                                                                      |             |                   |                                    |
| 326.                     | <i>Parascorpaena picta</i>                                           |             |                   |                                    |
| <b>Scyliorhinidae</b>    |                                                                      |             |                   |                                    |
| 327.                     | <i>Atelomycterus</i> sp.                                             |             |                   | Y                                  |
| <b>Serranidae</b>        |                                                                      |             |                   |                                    |
| 328.                     | <i>Cephalopholis boenak</i>                                          |             |                   |                                    |
| 329.                     | <i>Epinephelus areolatus</i>                                         |             |                   |                                    |
| 330.                     | <i>Epinephelus malabaricus</i>                                       |             |                   |                                    |
| 331.                     | <i>Epinephelus quoyanus</i>                                          |             |                   |                                    |
| <b>Sillaginidae</b>      |                                                                      |             |                   |                                    |
| 332.                     | <i>Sillago analis</i>                                                |             |                   |                                    |
| 333.                     | <i>Sillago schomburgkii</i>                                          |             |                   |                                    |
| <b>Sparidae</b>          |                                                                      |             |                   |                                    |
| 334.                     | <i>Acanthopagrus australis</i>                                       |             |                   |                                    |
| 335.                     | <i>Acanthopagrus latus</i>                                           |             |                   |                                    |
| <b>Sturnidae</b>         |                                                                      |             |                   |                                    |
| 336.                     | 47954 <i>Gelochelidon nilotica</i> (Gull-billed Tern)                |             | IA                |                                    |
| 337.                     | 47955 <i>Gelochelidon nilotica subsp. affinis</i> (Gull-billed Tern) |             | IA                | Y                                  |
| <b>Sylviidae</b>         |                                                                      |             |                   |                                    |
| 338.                     | 24837 <i>Eremiornis carteri</i> (Spinifex-bird)                      |             |                   |                                    |
| <b>Synanceiidae</b>      |                                                                      |             |                   |                                    |
| 339.                     | <i>Synanceia horrida</i>                                             |             |                   |                                    |
| <b>Syngnathidae</b>      |                                                                      |             |                   |                                    |
| 340.                     | <i>Filicampus tigris</i>                                             |             |                   |                                    |
| <b>Synodontidae</b>      |                                                                      |             |                   |                                    |
| 341.                     | <i>Synodus sageneus</i>                                              |             |                   |                                    |
| <b>Terapontidae</b>      |                                                                      |             |                   |                                    |
| 342.                     | <i>Amniataba caudavittata</i>                                        |             |                   |                                    |
| 343.                     | <i>Leiopotherapon unicolor</i>                                       |             |                   |                                    |
| 344.                     | <i>Terapon jarbua</i>                                                |             |                   |                                    |
| <b>Theridiidae</b>       |                                                                      |             |                   |                                    |
| 345.                     | <i>Latrodectus hasseltii</i>                                         |             |                   |                                    |
| <b>Threskiornithidae</b> |                                                                      |             |                   |                                    |
| 346.                     | 24842 <i>Platalea regia</i> (Royal Spoonbill)                        |             |                   |                                    |
| 347.                     | 24843 <i>Plegadis falcinellus</i> (Glossy Ibis)                      |             | IA                |                                    |
| 348.                     | 24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis)            |             |                   |                                    |
| <b>Thylacomyidae</b>     |                                                                      |             |                   |                                    |
| 349.                     | 24168 <i>Macrotis lagotis</i> (Bilby, Dalgyte, Ninu)                 |             | T                 |                                    |
| <b>Trochanteriidae</b>   |                                                                      |             |                   |                                    |
| 350.                     | <i>Morebilus diversus</i>                                            |             |                   |                                    |
| <b>Turnicidae</b>        |                                                                      |             |                   |                                    |
| 351.                     | 24851 <i>Turnix velox</i> (Little Button-quail)                      |             |                   |                                    |
| <b>Tytonidae</b>         |                                                                      |             |                   |                                    |
| 352.                     | <i>Tyto delicatula</i>                                               |             |                   |                                    |
| <b>Uranoscopidae</b>     |                                                                      |             |                   |                                    |
| 353.                     | <i>Ichthyoscopus spinosus</i>                                        |             |                   |                                    |
| <b>Urodacidae</b>        |                                                                      |             |                   |                                    |
| 354.                     | <i>Urodacus hoplurus</i>                                             |             |                   |                                    |
| <b>Varanidae</b>         |                                                                      |             |                   |                                    |
| 355.                     | 25209 <i>Varanus acanthurus</i> (Spiny-tailed Monitor)               |             |                   |                                    |
| 356.                     | 25210 <i>Varanus brevicauda</i> (Short-tailed Pygmy Monitor)         |             |                   |                                    |
| 357.                     | 30825 <i>Varanus bushi</i> (Pilbara Mulga Monitor)                   |             |                   |                                    |
| 358.                     | 25212 <i>Varanus eremius</i> (Pygmy Desert Monitor)                  |             |                   |                                    |
| 359.                     | 25218 <i>Varanus gouldii</i> (Bungarra or Sand Monitor)              |             |                   |                                    |

|                         | Name ID | Species Name                                                | Naturalised | Conservation Code | <sup>1</sup> Endemic To Query Area |
|-------------------------|---------|-------------------------------------------------------------|-------------|-------------------|------------------------------------|
| 360.                    | 25524   | <i>Varanus panoptes</i> (Yellow-spotted Monitor)            |             |                   |                                    |
| <b>Vespertilionidae</b> |         |                                                             |             |                   |                                    |
| 361.                    | 24186   | <i>Chalinolobus gouldii</i> (Gould's Wattled Bat)           |             |                   |                                    |
| 362.                    | 24192   | <i>Nyctophilus arnhemensis</i> (Arnhem Land Long-eared Bat) |             |                   |                                    |
| 363.                    | 24194   | <i>Nyctophilus geoffroyi</i> (Lesser Long-eared Bat)        |             |                   |                                    |
| 364.                    | 24205   | <i>Vespadelus finlaysoni</i> (Finlayson's Cave Bat)         |             |                   |                                    |
| <b>Zosteropidae</b>     |         |                                                             |             |                   |                                    |
| 365.                    | 24857   | <i>Zosterops luteus</i> (Yellow White-eye)                  |             |                   |                                    |

**Conservation Codes**  
T - Rare or likely to become extinct  
X - Presumed extinct  
IA - Protected under international agreement  
S - Other specially protected fauna  
1 - Priority 1  
2 - Priority 2  
3 - Priority 3  
4 - Priority 4  
5 - Priority 5

<sup>1</sup> For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.





# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 01/03/20 15:10:48

[Summary](#)

[Details](#)

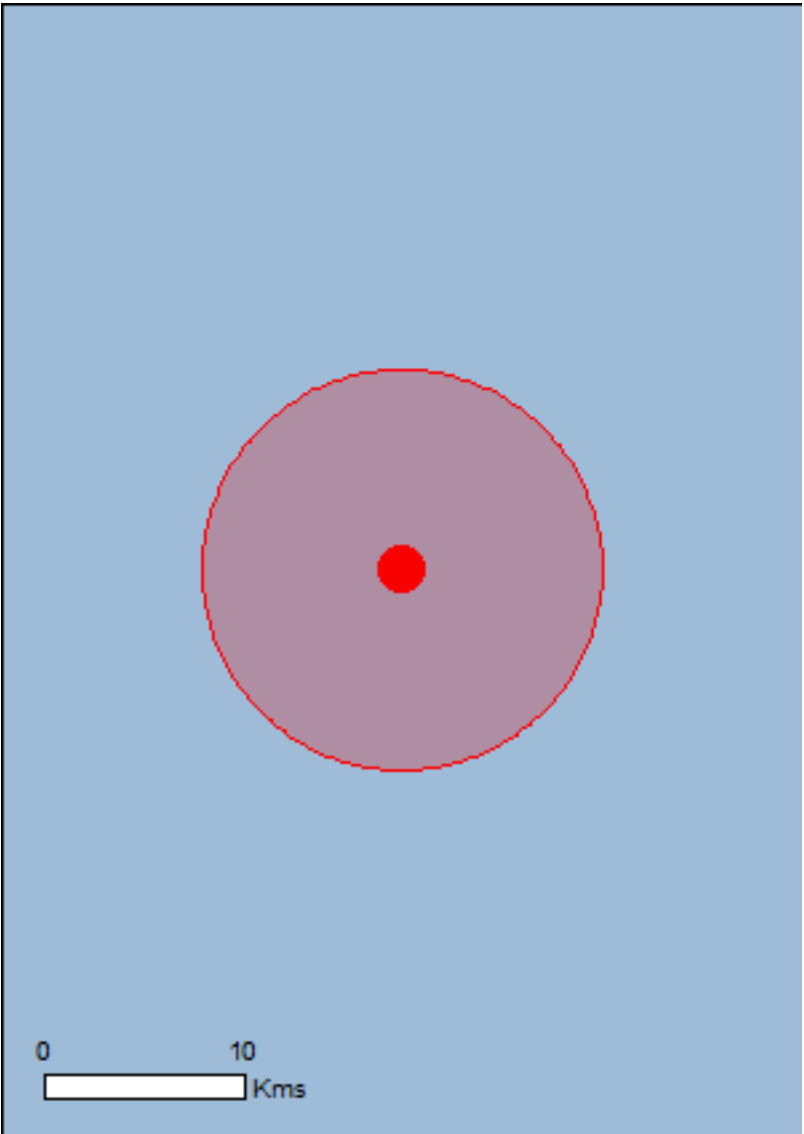
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

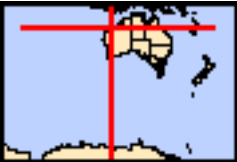
[Acknowledgements](#)



This map may contain data which are  
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[Coordinates](#)

Buffer: 10.0Km



# Summary

## Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

|                                                           |      |
|-----------------------------------------------------------|------|
| <a href="#">World Heritage Properties:</a>                | None |
| <a href="#">National Heritage Places:</a>                 | None |
| <a href="#">Wetlands of International Importance:</a>     | None |
| <a href="#">Great Barrier Reef Marine Park:</a>           | None |
| <a href="#">Commonwealth Marine Area:</a>                 | 1    |
| <a href="#">Listed Threatened Ecological Communities:</a> | None |
| <a href="#">Listed Threatened Species:</a>                | 28   |
| <a href="#">Listed Migratory Species:</a>                 | 55   |

## Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

|                                                    |      |
|----------------------------------------------------|------|
| <a href="#">Commonwealth Land:</a>                 | 1    |
| <a href="#">Commonwealth Heritage Places:</a>      | None |
| <a href="#">Listed Marine Species:</a>             | 95   |
| <a href="#">Whales and Other Cetaceans:</a>        | 12   |
| <a href="#">Critical Habitats:</a>                 | None |
| <a href="#">Commonwealth Reserves Terrestrial:</a> | None |
| <a href="#">Australian Marine Parks:</a>           | None |

## Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

|                                                  |      |
|--------------------------------------------------|------|
| <a href="#">State and Territory Reserves:</a>    | None |
| <a href="#">Regional Forest Agreements:</a>      | None |
| <a href="#">Invasive Species:</a>                | 14   |
| <a href="#">Nationally Important Wetlands:</a>   | None |
| <a href="#">Key Ecological Features (Marine)</a> | None |

# Details

## Matters of National Environmental Significance

Commonwealth Marine Area

[ Resource Information ]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside the Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area. Generally the Commonwealth Marine Area stretches from three nautical miles to two hundred nautical miles from the coast.

Name

EEZ and Territorial Sea

Marine Regions

[ Resource Information ]

If you are planning to undertake action in an area in or close to the Commonwealth Marine Area, and a marine bioregional plan has been prepared for the Commonwealth Marine Area in that area, the marine bioregional plan may inform your decision as to whether to refer your proposed action under the EPBC Act.

Name

[North-west](#)

Listed Threatened Species

[ Resource Information ]

| Name | Status | Type of Presence |
|------|--------|------------------|
|------|--------|------------------|

Birds

|                                                                                                                          |                       |                                                        |
|--------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------------------------------|
| <a href="#">Calidris canutus</a><br>Red Knot, Knot [855]                                                                 | Endangered            | Species or species habitat known to occur within area  |
| <a href="#">Calidris ferruginea</a><br>Curlew Sandpiper [856]                                                            | Critically Endangered | Species or species habitat known to occur within area  |
| <a href="#">Calidris tenuirostris</a><br>Great Knot [862]                                                                | Critically Endangered | Species or species habitat known to occur within area  |
| <a href="#">Charadrius leschenaultii</a><br>Greater Sand Plover, Large Sand Plover [877]                                 | Vulnerable            | Species or species habitat known to occur within area  |
| <a href="#">Charadrius mongolus</a><br>Lesser Sand Plover, Mongolian Plover [879]                                        | Endangered            | Species or species habitat known to occur within area  |
| <a href="#">Limosa lapponica baueri</a><br>Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]         | Vulnerable            | Species or species habitat known to occur within area  |
| <a href="#">Limosa lapponica menzbieri</a><br>Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432] | Critically Endangered | Species or species habitat likely to occur within area |
| <a href="#">Macronectes giganteus</a><br>Southern Giant-Petrel, Southern Giant Petrel [1060]                             | Endangered            | Species or species habitat may occur within area       |
| <a href="#">Numenius madagascariensis</a><br>Eastern Curlew, Far Eastern Curlew [847]                                    | Critically Endangered | Species or species habitat known to occur              |



| Name                                                                                                                          | Status                | Type of Presence                                                  |
|-------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------------------|
|                                                                                                                               |                       | within area                                                       |
| <a href="#">Pezoporus occidentalis</a><br>Night Parrot [59350]                                                                | Endangered            | Species or species habitat may occur within area                  |
| <a href="#">Rostratula australis</a><br>Australian Painted Snipe [77037]                                                      | Endangered            | Species or species habitat may occur within area                  |
| Mammals                                                                                                                       |                       |                                                                   |
| <a href="#">Balaenoptera musculus</a><br>Blue Whale [36]                                                                      | Endangered            | Species or species habitat likely to occur within area            |
| <a href="#">Dasyurus hallucatus</a><br>Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331] | Endangered            | Species or species habitat likely to occur within area            |
| <a href="#">Macroderma gigas</a><br>Ghost Bat [174]                                                                           | Vulnerable            | Species or species habitat likely to occur within area            |
| <a href="#">Macrotis lagotis</a><br>Greater Bilby [282]                                                                       | Vulnerable            | Species or species habitat likely to occur within area            |
| <a href="#">Megaptera novaeangliae</a><br>Humpback Whale [38]                                                                 | Vulnerable            | Species or species habitat known to occur within area             |
| <a href="#">Rhinonictoris aurantia (Pilbara form)</a><br>Pilbara Leaf-nosed Bat [82790]                                       | Vulnerable            | Species or species habitat may occur within area                  |
| Reptiles                                                                                                                      |                       |                                                                   |
| <a href="#">Aipysurus apraefrontalis</a><br>Short-nosed Seasnake [1115]                                                       | Critically Endangered | Species or species habitat likely to occur within area            |
| <a href="#">Caretta caretta</a><br>Loggerhead Turtle [1763]                                                                   | Endangered            | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Chelonia mydas</a><br>Green Turtle [1765]                                                                         | Vulnerable            | Breeding known to occur within area                               |
| <a href="#">Dermochelys coriacea</a><br>Leatherback Turtle, Leathery Turtle, Luth [1768]                                      | Endangered            | Breeding likely to occur within area                              |
| <a href="#">Eretmochelys imbricata</a><br>Hawksbill Turtle [1766]                                                             | Vulnerable            | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Liasis olivaceus barroni</a><br>Olive Python (Pilbara subspecies) [66699]                                         | Vulnerable            | Species or species habitat likely to occur within area            |
| <a href="#">Natator depressus</a><br>Flatback Turtle [59257]                                                                  | Vulnerable            | Breeding known to occur within area                               |
| Sharks                                                                                                                        |                       |                                                                   |
| <a href="#">Carcharodon carcharias</a><br>White Shark, Great White Shark [64470]                                              | Vulnerable            | Species or species habitat may occur within area                  |
| <a href="#">Pristis clavata</a><br>Dwarf Sawfish, Queensland Sawfish [68447]                                                  | Vulnerable            | Species or species habitat known to occur within area             |
| <a href="#">Pristis zijsron</a><br>Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]                                     | Vulnerable            | Breeding likely to occur within area                              |

| Name                                                                                                                                   | Status     | Type of Presence                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------|
| <a href="#">Rhincodon typus</a><br>Whale Shark [66680]                                                                                 | Vulnerable | Species or species habitat may occur within area                  |
| Listed Migratory Species                                                                                                               |            | [ <a href="#">Resource Information</a> ]                          |
| * Species is listed under a different scientific name on the EPBC Act - Threatened Species list.                                       |            |                                                                   |
| Name                                                                                                                                   | Threatened | Type of Presence                                                  |
| Migratory Marine Birds                                                                                                                 |            |                                                                   |
| <a href="#">Anous stolidus</a><br>Common Noddy [825]                                                                                   |            | Species or species habitat may occur within area                  |
| <a href="#">Apus pacificus</a><br>Fork-tailed Swift [678]                                                                              |            | Species or species habitat likely to occur within area            |
| <a href="#">Calonectris leucomelas</a><br>Streaked Shearwater [1077]                                                                   |            | Species or species habitat may occur within area                  |
| <a href="#">Fregata ariel</a><br>Lesser Frigatebird, Least Frigatebird [1012]                                                          |            | Species or species habitat known to occur within area             |
| <a href="#">Macronectes giganteus</a><br>Southern Giant-Petrel, Southern Giant Petrel [1060]                                           | Endangered | Species or species habitat may occur within area                  |
| Migratory Marine Species                                                                                                               |            |                                                                   |
| <a href="#">Anoxypristis cuspidata</a><br>Narrow Sawfish, Knifetooth Sawfish [68448]                                                   |            | Species or species habitat likely to occur within area            |
| <a href="#">Balaenoptera edeni</a><br>Bryde's Whale [35]                                                                               |            | Species or species habitat may occur within area                  |
| <a href="#">Balaenoptera musculus</a><br>Blue Whale [36]                                                                               | Endangered | Species or species habitat likely to occur within area            |
| <a href="#">Carcharodon carcharias</a><br>White Shark, Great White Shark [64470]                                                       | Vulnerable | Species or species habitat may occur within area                  |
| <a href="#">Caretta caretta</a><br>Loggerhead Turtle [1763]                                                                            | Endangered | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Chelonia mydas</a><br>Green Turtle [1765]                                                                                  | Vulnerable | Breeding known to occur within area                               |
| <a href="#">Dermochelys coriacea</a><br>Leatherback Turtle, Leathery Turtle, Luth [1768]                                               | Endangered | Breeding likely to occur within area                              |
| <a href="#">Dugong dugon</a><br>Dugong [28]                                                                                            |            | Species or species habitat known to occur within area             |
| <a href="#">Eretmochelys imbricata</a><br>Hawksbill Turtle [1766]                                                                      | Vulnerable | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Manta alfredi</a><br>Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994] |            | Species or species habitat known to occur within area             |
| <a href="#">Manta birostris</a><br>Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995] |            | Species or species habitat likely to occur within area            |

| Name                                                                                                                                   | Threatened            | Type of Presence                                       |
|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------------------------------|
| <a href="#">Megaptera novaeangliae</a><br>Humpback Whale [38]                                                                          | Vulnerable            | Species or species habitat known to occur within area  |
| <a href="#">Natator depressus</a><br>Flatback Turtle [59257]                                                                           | Vulnerable            | Breeding known to occur within area                    |
| <a href="#">Orcinus orca</a><br>Killer Whale, Orca [46]                                                                                |                       | Species or species habitat may occur within area       |
| <a href="#">Pristis clavata</a><br>Dwarf Sawfish, Queensland Sawfish [68447]                                                           | Vulnerable            | Species or species habitat known to occur within area  |
| <a href="#">Pristis zijsron</a><br>Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]                                              | Vulnerable            | Breeding likely to occur within area                   |
| <a href="#">Rhincodon typus</a><br>Whale Shark [66680]                                                                                 | Vulnerable            | Species or species habitat may occur within area       |
| <a href="#">Sousa chinensis</a><br>Indo-Pacific Humpback Dolphin [50]                                                                  |                       | Species or species habitat likely to occur within area |
| <a href="#">Tursiops aduncus (Arafura/Timor Sea populations)</a><br>Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900] |                       | Species or species habitat known to occur within area  |
| Migratory Terrestrial Species                                                                                                          |                       |                                                        |
| <a href="#">Hirundo rustica</a><br>Barn Swallow [662]                                                                                  |                       | Species or species habitat known to occur within area  |
| <a href="#">Motacilla cinerea</a><br>Grey Wagtail [642]                                                                                |                       | Species or species habitat may occur within area       |
| <a href="#">Motacilla flava</a><br>Yellow Wagtail [644]                                                                                |                       | Species or species habitat known to occur within area  |
| Migratory Wetlands Species                                                                                                             |                       |                                                        |
| <a href="#">Actitis hypoleucos</a><br>Common Sandpiper [59309]                                                                         |                       | Species or species habitat known to occur within area  |
| <a href="#">Arenaria interpres</a><br>Ruddy Turnstone [872]                                                                            |                       | Species or species habitat known to occur within area  |
| <a href="#">Calidris acuminata</a><br>Sharp-tailed Sandpiper [874]                                                                     |                       | Species or species habitat known to occur within area  |
| <a href="#">Calidris alba</a><br>Sanderling [875]                                                                                      |                       | Species or species habitat known to occur within area  |
| <a href="#">Calidris canutus</a><br>Red Knot, Knot [855]                                                                               | Endangered            | Species or species habitat known to occur within area  |
| <a href="#">Calidris ferruginea</a><br>Curlew Sandpiper [856]                                                                          | Critically Endangered | Species or species habitat known to occur within area  |
| <a href="#">Calidris melanotos</a><br>Pectoral Sandpiper [858]                                                                         |                       | Species or species habitat likely to occur within area |



| Name                                                                                     | Threatened            | Type of Presence                                      |
|------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------|
| <a href="#">Calidris ruficollis</a><br>Red-necked Stint [860]                            |                       | Species or species habitat known to occur within area |
| <a href="#">Calidris subminuta</a><br>Long-toed Stint [861]                              |                       | Species or species habitat known to occur within area |
| <a href="#">Calidris tenuirostris</a><br>Great Knot [862]                                | Critically Endangered | Species or species habitat known to occur within area |
| <a href="#">Charadrius leschenaultii</a><br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable            | Species or species habitat known to occur within area |
| <a href="#">Charadrius mongolus</a><br>Lesser Sand Plover, Mongolian Plover [879]        | Endangered            | Species or species habitat known to occur within area |
| <a href="#">Charadrius veredus</a><br>Oriental Plover, Oriental Dotterel [882]           |                       | Species or species habitat known to occur within area |
| <a href="#">Glareola maldivarum</a><br>Oriental Pratincole [840]                         |                       | Species or species habitat may occur within area      |
| <a href="#">Limicola falcinellus</a><br>Broad-billed Sandpiper [842]                     |                       | Species or species habitat known to occur within area |
| <a href="#">Limosa lapponica</a><br>Bar-tailed Godwit [844]                              |                       | Species or species habitat known to occur within area |
| <a href="#">Limosa limosa</a><br>Black-tailed Godwit [845]                               |                       | Species or species habitat known to occur within area |
| <a href="#">Numenius madagascariensis</a><br>Eastern Curlew, Far Eastern Curlew [847]    | Critically Endangered | Species or species habitat known to occur within area |
| <a href="#">Numenius minutus</a><br>Little Curlew, Little Whimbrel [848]                 |                       | Species or species habitat known to occur within area |
| <a href="#">Numenius phaeopus</a><br>Whimbrel [849]                                      |                       | Species or species habitat known to occur within area |
| <a href="#">Pandion haliaetus</a><br>Osprey [952]                                        |                       | Breeding known to occur within area                   |
| <a href="#">Pluvialis fulva</a><br>Pacific Golden Plover [25545]                         |                       | Species or species habitat known to occur within area |
| <a href="#">Pluvialis squatarola</a><br>Grey Plover [865]                                |                       | Species or species habitat known to occur within area |
| <a href="#">Tringa brevipes</a><br>Grey-tailed Tattler [851]                             |                       | Species or species habitat known to occur within area |
| <a href="#">Tringa glareola</a><br>Wood Sandpiper [829]                                  |                       | Species or species habitat known to occur within area |
| <a href="#">Tringa nebularia</a><br>Common Greenshank, Greenshank [832]                  |                       | Species or species                                    |

| Name                                                                           | Threatened | Type of Presence                                                                                |
|--------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------------------|
| <a href="#">Tringa stagnatilis</a><br>Marsh Sandpiper, Little Greenshank [833] |            | habitat known to occur within area<br><br>Species or species habitat known to occur within area |
| <a href="#">Xenus cinereus</a><br>Terek Sandpiper [59300]                      |            | Species or species habitat known to occur within area                                           |

### Other Matters Protected by the EPBC Act

|                   |                          |
|-------------------|--------------------------|
| Commonwealth Land | [ Resource Information ] |
|-------------------|--------------------------|

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

| Name                |
|---------------------|
| Commonwealth Land - |

|                       |                          |
|-----------------------|--------------------------|
| Listed Marine Species | [ Resource Information ] |
|-----------------------|--------------------------|

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

| Name                                                               | Threatened | Type of Presence                                       |
|--------------------------------------------------------------------|------------|--------------------------------------------------------|
| Birds                                                              |            |                                                        |
| <a href="#">Actitis hypoleucos</a><br>Common Sandpiper [59309]     |            | Species or species habitat known to occur within area  |
| <a href="#">Anous stolidus</a><br>Common Noddy [825]               |            | Species or species habitat may occur within area       |
| <a href="#">Apus pacificus</a><br>Fork-tailed Swift [678]          |            | Species or species habitat likely to occur within area |
| <a href="#">Ardea alba</a><br>Great Egret, White Egret [59541]     |            | Species or species habitat known to occur within area  |
| <a href="#">Ardea ibis</a><br>Cattle Egret [59542]                 |            | Species or species habitat may occur within area       |
| <a href="#">Arenaria interpres</a><br>Ruddy Turnstone [872]        |            | Species or species habitat known to occur within area  |
| <a href="#">Calidris acuminata</a><br>Sharp-tailed Sandpiper [874] |            | Species or species habitat known to occur within area  |
| <a href="#">Calidris alba</a><br>Sanderling [875]                  |            | Species or species habitat known to occur within area  |
| <a href="#">Calidris canutus</a><br>Red Knot, Knot [855]           | Endangered | Species or species habitat known to occur              |

| Name                                                                                     | Threatened            | Type of Presence                                       |
|------------------------------------------------------------------------------------------|-----------------------|--------------------------------------------------------|
|                                                                                          |                       | within area                                            |
| <a href="#">Calidris ferruginea</a><br>Curlew Sandpiper [856]                            | Critically Endangered | Species or species habitat known to occur within area  |
| <a href="#">Calidris melanotos</a><br>Pectoral Sandpiper [858]                           |                       | Species or species habitat likely to occur within area |
| <a href="#">Calidris ruficollis</a><br>Red-necked Stint [860]                            |                       | Species or species habitat known to occur within area  |
| <a href="#">Calidris subminuta</a><br>Long-toed Stint [861]                              |                       | Species or species habitat known to occur within area  |
| <a href="#">Calidris tenuirostris</a><br>Great Knot [862]                                | Critically Endangered | Species or species habitat known to occur within area  |
| <a href="#">Calonectris leucomelas</a><br>Streaked Shearwater [1077]                     |                       | Species or species habitat may occur within area       |
| <a href="#">Charadrius leschenaultii</a><br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable            | Species or species habitat known to occur within area  |
| <a href="#">Charadrius mongolus</a><br>Lesser Sand Plover, Mongolian Plover [879]        | Endangered            | Species or species habitat known to occur within area  |
| <a href="#">Charadrius ruficapillus</a><br>Red-capped Plover [881]                       |                       | Species or species habitat known to occur within area  |
| <a href="#">Charadrius veredus</a><br>Oriental Plover, Oriental Dotterel [882]           |                       | Species or species habitat known to occur within area  |
| <a href="#">Chrysococcyx osculans</a><br>Black-eared Cuckoo [705]                        |                       | Species or species habitat may occur within area       |
| <a href="#">Fregata ariel</a><br>Lesser Frigatebird, Least Frigatebird [1012]            |                       | Species or species habitat known to occur within area  |
| <a href="#">Glareola maldivarum</a><br>Oriental Pratincole [840]                         |                       | Species or species habitat may occur within area       |
| <a href="#">Haliaeetus leucogaster</a><br>White-bellied Sea-Eagle [943]                  |                       | Species or species habitat known to occur within area  |
| <a href="#">Heteroscelus brevipes</a><br>Grey-tailed Tattler [59311]                     |                       | Species or species habitat known to occur within area  |
| <a href="#">Himantopus himantopus</a><br>Pied Stilt, Black-winged Stilt [870]            |                       | Species or species habitat known to occur within area  |
| <a href="#">Hirundo rustica</a><br>Barn Swallow [662]                                    |                       | Species or species habitat known to occur within area  |
| <a href="#">Limicola falcinellus</a><br>Broad-billed Sandpiper [842]                     |                       | Species or species habitat known to occur within area  |



| Name                                                                                         | Threatened            | Type of Presence                                      |
|----------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------|
| <a href="#">Limosa lapponica</a><br>Bar-tailed Godwit [844]                                  |                       | Species or species habitat known to occur within area |
| <a href="#">Limosa limosa</a><br>Black-tailed Godwit [845]                                   |                       | Species or species habitat known to occur within area |
| <a href="#">Macronectes giganteus</a><br>Southern Giant-Petrel, Southern Giant Petrel [1060] | Endangered            | Species or species habitat may occur within area      |
| <a href="#">Merops ornatus</a><br>Rainbow Bee-eater [670]                                    |                       | Species or species habitat may occur within area      |
| <a href="#">Motacilla cinerea</a><br>Grey Wagtail [642]                                      |                       | Species or species habitat may occur within area      |
| <a href="#">Motacilla flava</a><br>Yellow Wagtail [644]                                      |                       | Species or species habitat known to occur within area |
| <a href="#">Numenius madagascariensis</a><br>Eastern Curlew, Far Eastern Curlew [847]        | Critically Endangered | Species or species habitat known to occur within area |
| <a href="#">Numenius minutus</a><br>Little Curlew, Little Whimbrel [848]                     |                       | Species or species habitat known to occur within area |
| <a href="#">Numenius phaeopus</a><br>Whimbrel [849]                                          |                       | Species or species habitat known to occur within area |
| <a href="#">Pandion haliaetus</a><br>Osprey [952]                                            |                       | Breeding known to occur within area                   |
| <a href="#">Pluvialis fulva</a><br>Pacific Golden Plover [25545]                             |                       | Species or species habitat known to occur within area |
| <a href="#">Pluvialis squatarola</a><br>Grey Plover [865]                                    |                       | Species or species habitat known to occur within area |
| <a href="#">Recurvirostra novaehollandiae</a><br>Red-necked Avocet [871]                     |                       | Species or species habitat known to occur within area |
| <a href="#">Rostratula benghalensis (sensu lato)</a><br>Painted Snipe [889]                  | Endangered*           | Species or species habitat may occur within area      |
| <a href="#">Stiltia isabella</a><br>Australian Pratincole [818]                              |                       | Species or species habitat known to occur within area |
| <a href="#">Tringa glareola</a><br>Wood Sandpiper [829]                                      |                       | Species or species habitat known to occur within area |
| <a href="#">Tringa nebularia</a><br>Common Greenshank, Greenshank [832]                      |                       | Species or species habitat known to occur within area |
| <a href="#">Tringa stagnatilis</a><br>Marsh Sandpiper, Little Greenshank [833]               |                       | Species or species habitat known to occur within area |
| <a href="#">Xenus cinereus</a><br>Terek Sandpiper [59300]                                    |                       | Species or species                                    |

| Name                                                                                                     | Threatened | Type of Presence                                 |
|----------------------------------------------------------------------------------------------------------|------------|--------------------------------------------------|
|                                                                                                          |            | habitat known to occur within area               |
| Fish                                                                                                     |            |                                                  |
| <a href="#">Bulbonaricus brauni</a><br>Braun's Pughead Pipefish, Pug-headed Pipefish [66189]             |            | Species or species habitat may occur within area |
| <a href="#">Campichthys tricarinatus</a><br>Three-keel Pipefish [66192]                                  |            | Species or species habitat may occur within area |
| <a href="#">Choeroichthys brachysoma</a><br>Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194] |            | Species or species habitat may occur within area |
| <a href="#">Choeroichthys suillus</a><br>Pig-snouted Pipefish [66198]                                    |            | Species or species habitat may occur within area |
| <a href="#">Doryrhamphus janssi</a><br>Cleaner Pipefish, Janss' Pipefish [66212]                         |            | Species or species habitat may occur within area |
| <a href="#">Doryrhamphus negrosensis</a><br>Flagtail Pipefish, Masthead Island Pipefish [66213]          |            | Species or species habitat may occur within area |
| <a href="#">Festucalex scalaris</a><br>Ladder Pipefish [66216]                                           |            | Species or species habitat may occur within area |
| <a href="#">Filicampus tigris</a><br>Tiger Pipefish [66217]                                              |            | Species or species habitat may occur within area |
| <a href="#">Halicampus brocki</a><br>Brock's Pipefish [66219]                                            |            | Species or species habitat may occur within area |
| <a href="#">Halicampus grayi</a><br>Mud Pipefish, Gray's Pipefish [66221]                                |            | Species or species habitat may occur within area |
| <a href="#">Halicampus nitidus</a><br>Glittering Pipefish [66224]                                        |            | Species or species habitat may occur within area |
| <a href="#">Halicampus spinirostris</a><br>Spiny-snout Pipefish [66225]                                  |            | Species or species habitat may occur within area |
| <a href="#">Haliichthys taeniophorus</a><br>Ribboned Pipehorse, Ribboned Seadragon [66226]               |            | Species or species habitat may occur within area |
| <a href="#">Hippichthys penicillus</a><br>Beady Pipefish, Steep-nosed Pipefish [66231]                   |            | Species or species habitat may occur within area |
| <a href="#">Hippocampus angustus</a><br>Western Spiny Seahorse, Narrow-bellied Seahorse [66234]          |            | Species or species habitat may occur within area |
| <a href="#">Hippocampus histrix</a><br>Spiny Seahorse, Thorny Seahorse [66236]                           |            | Species or species habitat may occur within area |
| <a href="#">Hippocampus kuda</a><br>Spotted Seahorse, Yellow Seahorse [66237]                            |            | Species or species habitat may occur within area |
| <a href="#">Hippocampus planifrons</a><br>Flat-face Seahorse [66238]                                     |            | Species or species                               |

| Name                                                                                                                        | Threatened | Type of Presence                                      |                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------|-------------------------------------------------------------------|
| <a href="#">Hippocampus trimaculatus</a><br>Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]          |            | habitat may occur within area                         |                                                                   |
| <a href="#">Micrognathus micronotopterus</a><br>Tidepool Pipefish [66255]                                                   |            | Species or species habitat may occur within area      |                                                                   |
| <a href="#">Solegnathus hardwickii</a><br>Pallid Pipehorse, Hardwick's Pipehorse [66272]                                    |            | Species or species habitat may occur within area      |                                                                   |
| <a href="#">Solegnathus lettiensis</a><br>Gunther's Pipehorse, Indonesian Pipefish [66273]                                  |            | Species or species habitat may occur within area      |                                                                   |
| <a href="#">Solenostomus cyanopterus</a><br>Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]                       |            | Species or species habitat may occur within area      |                                                                   |
| <a href="#">Syngnathoides biaculeatus</a><br>Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]       |            | Species or species habitat may occur within area      |                                                                   |
| <a href="#">Trachyrhamphus bicoarctatus</a><br>Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]       |            | Species or species habitat may occur within area      |                                                                   |
| <a href="#">Trachyrhamphus longirostris</a><br>Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281] |            | Species or species habitat may occur within area      |                                                                   |
| Mammals                                                                                                                     |            |                                                       |                                                                   |
| <a href="#">Dugong dugon</a><br>Dugong [28]                                                                                 |            | Species or species habitat known to occur within area |                                                                   |
| Reptiles                                                                                                                    |            |                                                       |                                                                   |
| <a href="#">Acalyptophis peronii</a><br>Horned Seasnake [1114]                                                              |            | Species or species habitat may occur within area      |                                                                   |
| <a href="#">Aipysurus apraefrontalis</a><br>Short-nosed Seasnake [1115]                                                     |            | Critically Endangered                                 | Species or species habitat likely to occur within area            |
| <a href="#">Aipysurus duboisii</a><br>Dubois' Seasnake [1116]                                                               |            |                                                       | Species or species habitat may occur within area                  |
| <a href="#">Aipysurus eydouxii</a><br>Spine-tailed Seasnake [1117]                                                          |            |                                                       | Species or species habitat may occur within area                  |
| <a href="#">Aipysurus laevis</a><br>Olive Seasnake [1120]                                                                   |            |                                                       | Species or species habitat may occur within area                  |
| <a href="#">Aipysurus tenuis</a><br>Brown-lined Seasnake [1121]                                                             |            |                                                       | Species or species habitat may occur within area                  |
| <a href="#">Astrotia stokesii</a><br>Stokes' Seasnake [1122]                                                                |            |                                                       | Species or species habitat may occur within area                  |
| <a href="#">Caretta caretta</a><br>Loggerhead Turtle [1763]                                                                 |            | Endangered                                            | Foraging, feeding or related behaviour known to occur within area |



| Name                                                                                     | Threatened | Type of Presence                                                  |
|------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------|
| <a href="#">Chelonia mydas</a><br>Green Turtle [1765]                                    | Vulnerable | Breeding known to occur within area                               |
| <a href="#">Dermochelys coriacea</a><br>Leatherback Turtle, Leathery Turtle, Luth [1768] | Endangered | Breeding likely to occur within area                              |
| <a href="#">Disteira kingii</a><br>Spectacled Seasnake [1123]                            |            | Species or species habitat may occur within area                  |
| <a href="#">Disteira major</a><br>Olive-headed Seasnake [1124]                           |            | Species or species habitat may occur within area                  |
| <a href="#">Emydocephalus annulatus</a><br>Turtle-headed Seasnake [1125]                 |            | Species or species habitat may occur within area                  |
| <a href="#">Ephalophis greyi</a><br>North-western Mangrove Seasnake [1127]               |            | Species or species habitat may occur within area                  |
| <a href="#">Eretmochelys imbricata</a><br>Hawksbill Turtle [1766]                        | Vulnerable | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Hydrelaps darwiniensis</a><br>Black-ringed Seasnake [1100]                   |            | Species or species habitat may occur within area                  |
| <a href="#">Hydrophis czeblukovi</a><br>Fine-spined Seasnake [59233]                     |            | Species or species habitat may occur within area                  |
| <a href="#">Hydrophis elegans</a><br>Elegant Seasnake [1104]                             |            | Species or species habitat may occur within area                  |
| <a href="#">Hydrophis mcdowellii</a><br>null [25926]                                     |            | Species or species habitat may occur within area                  |
| <a href="#">Hydrophis ornatus</a><br>Spotted Seasnake, Ornate Reef Seasnake [1111]       |            | Species or species habitat may occur within area                  |
| <a href="#">Natator depressus</a><br>Flatback Turtle [59257]                             | Vulnerable | Breeding known to occur within area                               |
| <a href="#">Pelamis platurus</a><br>Yellow-bellied Seasnake [1091]                       |            | Species or species habitat may occur within area                  |

| Whales and other Cetaceans                                                            |            | [ Resource Information ]                               |
|---------------------------------------------------------------------------------------|------------|--------------------------------------------------------|
| Name                                                                                  | Status     | Type of Presence                                       |
| Mammals                                                                               |            |                                                        |
| <a href="#">Balaenoptera acutorostrata</a><br>Minke Whale [33]                        |            | Species or species habitat may occur within area       |
| <a href="#">Balaenoptera edeni</a><br>Bryde's Whale [35]                              |            | Species or species habitat may occur within area       |
| <a href="#">Balaenoptera musculus</a><br>Blue Whale [36]                              | Endangered | Species or species habitat likely to occur within area |
| <a href="#">Delphinus delphis</a><br>Common Dolphin, Short-beaked Common Dolphin [60] |            | Species or species habitat may occur within area       |

| Name                                                                                                                                   | Status     | Type of Presence                                       |
|----------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------------------------------|
| <a href="#">Grampus griseus</a><br>Risso's Dolphin, Grampus [64]                                                                       | Vulnerable | Species or species habitat may occur within area       |
| <a href="#">Megaptera novaeangliae</a><br>Humpback Whale [38]                                                                          |            | Species or species habitat known to occur within area  |
| <a href="#">Orcinus orca</a><br>Killer Whale, Orca [46]                                                                                |            | Species or species habitat may occur within area       |
| <a href="#">Sousa chinensis</a><br>Indo-Pacific Humpback Dolphin [50]                                                                  |            | Species or species habitat likely to occur within area |
| <a href="#">Stenella attenuata</a><br>Spotted Dolphin, Pantropical Spotted Dolphin [51]                                                |            | Species or species habitat may occur within area       |
| <a href="#">Tursiops aduncus</a><br>Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]                                |            | Species or species habitat likely to occur within area |
| <a href="#">Tursiops aduncus (Arafura/Timor Sea populations)</a><br>Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900] |            | Species or species habitat known to occur within area  |
| <a href="#">Tursiops truncatus s. str.</a><br>Bottlenose Dolphin [68417]                                                               |            | Species or species habitat may occur within area       |

Extra Information

Invasive Species

[ [Resource Information](#) ]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

| Name                                                           | Status | Type of Presence                                       |
|----------------------------------------------------------------|--------|--------------------------------------------------------|
| Birds                                                          |        |                                                        |
| Columba livia<br>Rock Pigeon, Rock Dove, Domestic Pigeon [803] |        | Species or species habitat likely to occur within area |
| Passer montanus<br>Eurasian Tree Sparrow [406]                 |        | Species or species habitat likely to occur within area |
| Mammals                                                        |        |                                                        |
| Camelus dromedarius<br>Dromedary, Camel [7]                    |        | Species or species habitat likely to occur within area |
| Canis lupus familiaris<br>Domestic Dog [82654]                 |        | Species or species habitat likely to occur within area |
| Equus asinus<br>Donkey, Ass [4]                                |        | Species or species habitat likely to occur within area |
| Felis catus<br>Cat, House Cat, Domestic Cat [19]               |        | Species or species habitat likely to occur within area |

| Name                                                                                                                                     | Status | Type of Presence                                       |
|------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------|
| Mus musculus<br>House Mouse [120]                                                                                                        |        | Species or species habitat likely to occur within area |
| Sus scrofa<br>Pig [6]                                                                                                                    |        | Species or species habitat likely to occur within area |
| Vulpes vulpes<br>Red Fox, Fox [18]                                                                                                       |        | Species or species habitat likely to occur within area |
| Plants                                                                                                                                   |        |                                                        |
| Andropogon gayanus<br>Gamba Grass [66895]                                                                                                |        | Species or species habitat likely to occur within area |
| Cenchrus ciliaris<br>Buffel-grass, Black Buffel-grass [20213]                                                                            |        | Species or species habitat likely to occur within area |
| Jatropha gossypifolia<br>Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507] |        | Species or species habitat likely to occur within area |
| Reptiles                                                                                                                                 |        |                                                        |
| Hemidactylus frenatus<br>Asian House Gecko [1708]                                                                                        |        | Species or species habitat likely to occur within area |
| Ramphotyphlops braminus<br>Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]                                               |        | Species or species habitat may occur within area       |



# Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

## Coordinates

-20.32 118.60917

# Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [Office of Environment and Heritage, New South Wales](#)
- [Department of Environment and Primary Industries, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [Department of Environment, Water and Natural Resources, South Australia](#)
- [Department of Land and Resource Management, Northern Territory](#)
- [Department of Environmental and Heritage Protection, Queensland](#)
- [Department of Parks and Wildlife, Western Australia](#)
- [Environment and Planning Directorate, ACT](#)
- [Birdlife Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [Museum Victoria](#)
- [Australian Museum](#)
- [South Australian Museum](#)
- [Queensland Museum](#)
- [Online Zoological Collections of Australian Museums](#)
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Canberra](#)
- [University of New England](#)
- [Ocean Biogeographic Information System](#)
- [Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [Geoscience Australia](#)
- [CSIRO](#)
- [Australian Tropical Herbarium, Cairns](#)
- [eBird Australia](#)
- [Australian Government – Australian Antarctic Data Centre](#)
- [Museum and Art Gallery of the Northern Territory](#)
- [Australian Government National Environmental Science Program](#)
- [Australian Institute of Marine Science](#)
- [Reef Life Survey Australia](#)
- [American Museum of Natural History](#)
- [Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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### ***Appendix 3: Flora Species List***



*Abutilon lepidum*  
*Acacia ampliceps*  
*Acacia bivenosa*  
*Acacia colei*  
*Acacia sphaerostachya*  
*Acacia stellaticeps*  
*Acacia tumida* var. *pilbarensis*  
*Acacia* sp.  
\**Aerva javanica*  
\**Agave* sp.  
*Amaranthus undulatus*  
\**Arundo donax*  
\**Arecaceae* sp.  
*Aristida contorta*  
*Avicennia marina*  
*Bruguiera exaristata*  
\**Calotropis procera*  
*Canavalia rosea*  
\**Cenchrus ciliaris*  
*Chrysopogon* sp.  
*Corchorus laniflorus*  
*Crotalaria cunninghamii*  
\**Cucumis melo*  
*Dactyloctenium radulans*  
*Eragrostis* sp.  
*Euphorbia* sp.  
*Evolvulus* sp.  
*Gomphrena canescens*  
*Indigofera* sp.  
*Ipomoea pes-caprae*  
*Rhagodia* sp.  
*Rhynchosia minima*  
*Rhizophora stylosa*  
*Salsola australis*  
*Sesbania cannabina*  
*Spinifex longifolius*  
*Sporobulus* sp.  
\**Tamarix aphylla*  
*Tecticornia* spp.  
*Triodia epactia*  
*Triodia* sp.

\*= Weed species.

Please note that the species list is presented in alphabetical order and not taxonomic order.



## ***Appendix 4: Flora and Fauna Assessment Site Data***



**Assessment Site 1.**

Flora Quadrat: 20 x 20 m, Fauna Quadrat: 50 x 50 m

Centre Coordinates: GDA94, Zone 50 665135 E, 7753582 N, Location: On sand dune near Hardie Street.

Broad Vegetation/ Habitat Type: Sand Dune 1

Flora Species:

Fauna Species:

*Acacia stellaticeps*

*Merops ornatus* (Rainbow Bee-eater)

\**Aerva javanica*

\**Cenchrus ciliaris*

*Rhynchosia minima*

*Salsola australis*

*Spinifex longifolius*

*Sida* sp.

Disturbance: Weeds, rubbish, and tracks





**Assessment Site 2.**

Flora Quadrat: 20 x 20 m, Fauna Quadrat: 50 x 50 m

Centre Coordinates: GDA94, Zone 50 666371 E, 7754324 N, Location: On spoil bank at northern end.

Broad Vegetation/ Habitat Type: Sand Dune 1

Flora Species:

*Acacia ampliceps*

\**Aerva javanica*

\**Cenchrus ciliaris*

*Rhynchosia minima*

*Salsola australis*

*Spinifex longifolius*

Disturbance: Weeds and tracks

Fauna Species:

*Malurus leucopterus* (White-winged Fairy-wren)

*Taeniopygia guttata* (Zebra Finch)



**Assessment Site 3.**

Flora Quadrat: 20 x 20 m, Fauna Quadrat: 50 x 50 m

Centre Coordinates: GDA94, Zone 50 666475 E, 7753675 N, Location: On spoil bank at southern end.

Broad Vegetation/ Habitat Type: Sand Dune 1

Flora Species:

*Acacia ampliceps*

*Acacia colei*

*Acacia tumida*

\**Cenchrus ciliaris*

*Indigofera* sp.

*Rhynchosia minima*

*Salsola australis*

*Sesbania cannabina*

Disturbance: Weeds

Fauna Species:

*Coracina novaehollandiae* (Black-faced Cuckoo-shrike)



**Assessment Site 4.**

Flora Quadrat: 20 x 20 m, Fauna Quadrat: 50 x 50 m

Centre Coordinates: GDA94, Zone 50 666958 E, 7753544 N, Location: On dune near corner of Sutherland and Taplin. Streets

Broad Vegetation/ Habitat Type: Sand Dune 1

Flora Species: Fauna Species:

*Acacia stellaticeps* None observed

\**Aerva javanica*

\**Cenchrus ciliaris*

*Gomphrena* sp.

*Rhynchosia minima*

*Spinifex longifolius*

Disturbance: Weeds and tracks





**Assessment Site 5.**

Flora Quadrat: 20 x 20 m, Fauna Quadrat: 50 x 50 m

Centre Coordinates: GDA94, Zone 50 667845 E, 7753602 N, Location: On fore dune just east of Cemetery Beach Park.

Broad Vegetation/ Habitat Type: Sand Dune 2

Flora Species: Fauna Species:

\**Aerva javanica* None observed

*Canavalia rosea*

*Ipomoea pes-caprae*

*Spinifex longifolius*

Disturbance: Weeds



**Assessment Site 6.**

Flora Quadrat: 20 x 20 m, Fauna Quadrat: 50 x 50 m

Centre Coordinates: GDA94, Zone 50 669499 E, 7754220 N, Location: On dune near corner of Sutherland and Thompson Streets.

Broad Vegetation/ Habitat Type: Sand Dune 1

Flora Species: Fauna Species:

*Acacia stellaticeps* None observed

\**Aerva javanica*

*Amaranthus undulatus*

*Canavalia rosea*

\**Cenchrus ciliaris*

*Euphorbia* sp.

*Ipomoea pes-caprae*

*Gomphrena canescens*

*Rhynchosia minima*

*Spinifex longifolius*

*Triodia epactia*

Disturbance: Weeds and tracks



**Assessment Site 7.**

Flora Quadrat: 20 x 20 m, Fauna Quadrat: 50 x 50 m

Centre Coordinates: GDA94, Zone 50 670894 E, 7754580 N, Location: On dune off Dempster Street

Broad Vegetation/ Habitat Type: Sand Dune 1

Flora Species:

*Acacia stellaticeps*

\**Aerva javanica*

*Amaranthus undulatus*

\**Cenchrus ciliaris*

*Euphorbia* sp.

*Rhynchosia minima*

*Spinifex longifolius*

*Triodia epactia*

Disturbance: Weeds and tracks

Fauna Species:

*Artamus leucorhynchus leucopygialis* (White-breasted Woodswallow)

*Geopelia cuneata* (Diamond Dove)

*Lichenostomus ornatus* (White-plumed Honeyeater)





**Assessment Site 8.**

Flora Quadrat: 20 x 20 m, Fauna Quadrat: 50 x 50 m

Centre Coordinates: GDA94, Zone 50 671999 E, 7752589 N, Location: On dune off Dowding Street (behind Pretty Pool Beach)

Broad Vegetation/ Habitat Type: Sand Dune 1

Flora Species:

Fauna Species:

*Acacia stellaticeps*

*Artamus leucorhynchus leucopygialis* (White-breasted Woodswallow)

\**Aerva javanica*

\**Cenchrus ciliaris*

*Euphorbia* sp.

*Rhynchosia minima*

*Spinifex longifolius*

*Triodia epactia*

Disturbance: Weeds and tracks



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## **Appendix 5: Photo Points**



**Photo Point 1.** Mangroves at Richardson Street Car Park.



**Photo Point 2.** Dunes opposite Wodgina Street.



**Photo Point 3.** Dunes opposite Hall Street.





**Photo Point 4.** Pretty Pool Mangroves.



**Photo Point 5.** Ecotone between Dune and Mangroves near Dowding Street.



**Photo Point 6.** Saltpan/ Mudflats near Dowding Street.



**Photo Point 7.** Dune looking south from Dowding Street towards Mangroves and Saltpan/ Mudflats.



**Photo Point 8.** Looking north towards Saltpan/ Mudflats in foreground and Mangroves in background.



**Photo Point 9.** Acacia Shrubland.





**Photo Point 10.** In Saltpan/ Mudflats looking south.



**Photo Point 11.** Mangroves at the end of Gray Street.



**Photo Point 12.** Dunes near the end of Gray Street.





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## **Appendix 6: Fauna Species List**

*Actitis hypoleucos* (Common Sandpiper) - MI  
*Ardea intermedia* (Intermediate Egret)  
*Artamus leucorhynchus leucopygialis* (White-breasted Woodswallow)  
*Butorides striata* (Striated Heron)  
*Cacatua sanguinea* (Little Corella)  
*Coracina novaehollandiae* (Black-faced Cuckoo-shrike)  
*Corvus orru* (Torresian Crow)  
*Cracticus nigrogularis* (Pied Butcherbird)  
*Cracticus tibicen* (Australian Magpie)  
*Egretta sacra* (Eastern Reef Egret)  
*Falco cenchroides* (Australian Kestrel)  
*Fregata ariel* (Lesser Frigatebird) - MI  
*Geopelia cuneata* (Diamond Dove)  
*Geopelia humeralis* (Bar-shouldered Dove)  
*Geopelia striata placida* (Peaceful Dove)  
*Gerygone tenebrosa* (Dusky Gerygone)  
*Grallina cyanoleuca* (Magpie-lark)  
*Haematopus fuliginosus* (Sooty Oystercatcher)  
*Haematopus longirostris* (Pied Oystercatcher)  
*Haliastur indus* (Brahminy Kite)  
*Haliastur spheonurus* (Whistling Kite)  
*Hydroprogne caspia* (Caspian Tern) - MI  
*Lichenostomus ornatus* (White-plumed Honeyeater)  
*Lichmera indistincta* (Brown Honeyeater)  
*Macropus sp. scats*  
*Merops ornatus* (Rainbow Bee-eater)  
*Malurus lamberti* (Variegated Fairy-wren)  
*Malurus leucopterus* (White-winged Fairy-wren)  
*Manorina flavigula* (Yellow-throated Miner)  
*Pandion cristatus* (Eastern Osprey) - MI  
*Phalacrocorax melanoleucos* (Little Pied Cormorant)  
*Pteropus scapulatus* (Little Red Flying-fox)  
*Larus novaehollandiae* (Silver Gull)  
*Taeniopygia guttata* (Zebra Finch)  
*Varanus gouldii* (Sand Monitor) diggings  
*Rhipidura leucophrys* (Willie Wagtail)  
*Zosterops luteus* (Yellow White-eye)

MI = Migratory species covered under international agreements (IA) and listed under the EPBC Act.

Please note that the species list is presented in alphabetical order and not taxonomic order.

**Appendix B - Town of Port Hedland Townsite Asset List**



| gml_id   | ID | NAME                                          | DESCRIPTION                                   | ASSET ID          | NAME 2                                  | REPLACEMENT DATE | Code |
|----------|----|-----------------------------------------------|-----------------------------------------------|-------------------|-----------------------------------------|------------------|------|
| Asset.1  | 1  | Six Mile Bins                                 | 20325296,<br>118.667429                       |                   |                                         |                  | SIX  |
| Asset.2  | 2  | Six Mile Fishing Regs Sign                    |                                               |                   |                                         |                  | SIX  |
| Asset.3  | 3  | Welcome Rest Stop Shelter 2                   | Shelter,                                      |                   |                                         |                  | WEL  |
| Asset.4  | 4  | Welcome Rest Stop Signage                     |                                               |                   |                                         |                  | WEL  |
| Asset.5  | 5  | Welcome Rest Stop Boat Ramp                   |                                               |                   |                                         |                  | WEL  |
| Asset.6  | 6  | Welcome Rest Stop Bin                         |                                               |                   |                                         |                  | WEL  |
| Asset.7  | 7  | Welcome Rest Stop Bin                         |                                               |                   |                                         |                  | WEL  |
| Asset.8  | 8  | Access track to Welcome Rest Stop             |                                               |                   | CCTV                                    |                  | CCTV |
| Asset.9  | 9  | Grey Street                                   | Access to Six Mile                            |                   |                                         |                  |      |
| Asset.12 | 12 | Public art 4 mile lookout                     |                                               |                   |                                         |                  | PAS  |
| Asset.11 | 11 | MON0036 - Public Art                          | 4 mile lookout - Birds on Steel structure     | MON0036           | Yellow and Steel Bird on Deck           | 2017             | MON  |
| Asset.13 | 13 | FPN0409_004                                   |                                               |                   |                                         |                  | FPN  |
| Asset.15 | 15 | Rock Boulders (Bollards)                      |                                               |                   |                                         |                  | ROC  |
| Asset.16 | 16 | BL0009 - Bollard                              | Pretty Pool Park Bike Locker? \$8250          | BL0009            | Pretty Pool Park                        | 2017             | BL   |
| Asset.17 | 17 | Rock Bollards                                 |                                               |                   |                                         |                  | ROC  |
| Asset.18 | 18 | Sign - Optional Clothing Beach                |                                               |                   |                                         |                  | SIG  |
| Asset.19 | 19 | BLD367 public Toilets                         | Pretty Pool public Toilets                    | BLD367            | Pretty Pool Park Ablutions              | 2017             | BLD  |
| Asset.20 | 20 | VP 0003 - Cooke Point Viewing Platform        | Stairway to Moon \$194,400                    |                   |                                         |                  | VP   |
| Asset.21 | 21 | Access~† to beach Wooden Stairs.              |                                               |                   | CCTV                                    |                  | CCTV |
| Asset.22 | 22 | Stormwater Drain outlet                       | 8m Erosion from Cyclone Veronica              |                   |                                         |                  | STO  |
| Asset.23 | 23 | Drainage outlet                               | Check the Location                            |                   |                                         |                  | DRA  |
| Asset.24 | 24 | ST0001- stairs                                | in need of repair. \$44,000                   | ST0001            | Steps                                   | 2028             | ST   |
| Asset.25 | 25 | Viewing Platform                              | Thajarrauka Jina Signage and viewing platform |                   |                                         |                  | VIE  |
| Asset.26 | 26 | Viewing Platform                              |                                               |                   |                                         |                  | VIE  |
| Asset.27 | 27 | Viewing Platform                              | Thajarrauka Jina Signage and viewing platform |                   |                                         |                  | VIE  |
| Asset.28 | 28 | Public Artwork                                | Three palms                                   |                   |                                         |                  | PAS  |
| Asset.29 | 29 | Sign No Dogs and doggy bag receptacle         |                                               |                   |                                         |                  | SIG  |
| Asset.30 | 30 | Sign Prohibited.- Turtle rookery              |                                               |                   |                                         |                  | SIG  |
| Asset.31 | 31 | STR0063 - Thajarrauka Jina~† viewing platform |                                               | STR0063           | Viewing Platform                        | 2028             | STR  |
| Asset.32 | 32 | FPP 00038 - Ramp to Viewing Platform          |                                               | \$68,696 FPP00038 | Cemetery Beach ramp to Viewing Platform | 2017             | FPP  |
| Asset.33 | 33 | STR0061 - Shelter                             |                                               | \$28,400 STR0061  | Sutherland Street - General Shelter     | 2017             | STR  |
| Asset.34 | 34 | Bin                                           |                                               | Bin               | Welcome Rest Stop - Six Mile            | 2017             | BIN  |

|          |    |                                 |                                                       |         |                                                  |      |      |
|----------|----|---------------------------------|-------------------------------------------------------|---------|--------------------------------------------------|------|------|
| Asset.35 | 35 | PLG002 - Playground             | CEMETERY BEACH<br>PLAYGROUND<br>\$276500              | PLG002  | Cemetery<br>Beach<br>Playground<br>Area          | 2017 | PLG  |
| Asset.36 | 36 | STR0008                         | Cemetery Beach -<br>Picnic Shelter<br>\$106500        | STR0008 | Cemetery<br>Beach - Picnic<br>Shelter            | 2017 | STR  |
| Asset.37 | 37 | Access Road to Spoilbank        |                                                       |         | CCTV                                             |      | CCTV |
| Asset.38 | 38 | STR0059 - Gazebos               | \$162,000                                             | STR0059 | Spoilbank<br>Gazebos                             | 2017 | STR  |
| Asset.39 | 39 | STR0059 - Gazebos               |                                                       |         |                                                  |      | STR  |
| Asset.40 | 40 | Shelter                         |                                                       |         |                                                  |      | SHE  |
| Asset.41 | 41 | Shelter                         |                                                       |         |                                                  |      | SHE  |
| Asset.42 | 42 | Seat                            |                                                       |         |                                                  |      | ST   |
| Asset.43 | 43 | WL0016 - Limestone Walls        | Sutherland Street,<br>Nodes Limestone<br>Wall \$46960 | WL0016  | Sutherland<br>Street, Nodes<br>Limestone<br>Wall | 2017 | WL   |
| Asset.44 | 44 | STG0026 Seaing                  | \$15,000                                              | STG0026 | Sutherland<br>Street, Nodes                      | 2017 | STG  |
| Asset.45 | 45 | Shelter                         |                                                       |         |                                                  |      | SHE  |
| Asset.46 | 46 | Shelter                         |                                                       |         |                                                  |      | SHE  |
| Asset.47 | 47 | STG0026 - Seating               | Sutherland Street<br>Nodes                            |         |                                                  |      | STG  |
| Asset.48 | 48 | Drain inlet                     |                                                       |         |                                                  |      | DRA  |
| Asset.49 | 49 | Shelter                         |                                                       |         |                                                  |      | SHE  |
| Asset.50 | 50 | RD 0317 - Spoilbank Access Road |                                                       |         |                                                  |      | RD   |
| Asset.51 | 51 | Car Park                        |                                                       |         |                                                  |      | CAR  |
| Asset.52 | 52 | BS1 - Bus Shelter               | Sutherland St, Stop<br>\$6357 -                       | BS1     | Sutherland<br>Street, Stop                       | 2019 | BS   |
| Asset.53 | 53 | BLD 081 - Exeloo Toilet         | Port heldand Boat<br>Ramp Exeloo                      | BLD081  | Port Hedland<br>Boat Ramp -<br>Exeloo            | 2017 | BLD  |
| Asset.54 | 54 | BRP002 - Boat Ramp              | Boat Ramp - \$520,425                                 |         |                                                  |      | BRP  |
| Asset.55 | 55 | WL0002 - Seawall                | \$538,353                                             | WL0002  | Captain Bert<br>Madigan Park<br>Sea Wall         | 2017 | WL   |
| Asset.56 | 56 | Groyne                          |                                                       |         |                                                  |      |      |
| Asset.57 | 57 | BLD031                          | Marrapikurinya Park<br>Ablutions \$173760             | BLD031  | Marrapikuriny<br>a Park<br>Ablutions             | 2017 | BLD  |
| Asset.58 | 58 | PLG009 - Playground             | Marrapikurinya Park<br>Play Equipment<br>\$206110     | PLG009  | Marapikurriny<br>a Park Play<br>Equipment        | 2017 | PLG  |
| Asset.59 | 59 | CPF0045 - CARPARK               | \$298,667                                             | CPF0045 | Marapikurriny<br>a Park                          | 2058 | CPF  |
| Asset.60 | 60 | Carpark                         |                                                       |         |                                                  |      | CAR  |
| Asset.61 | 61 | Shelter                         | 3 Tables and Benches                                  |         |                                                  |      | SHE  |
| Asset.62 | 62 | Bins                            |                                                       |         |                                                  |      | BIN  |
| Asset.63 | 63 | CPF0017                         | Cemetery Beach<br>Community Park<br>ROADS \$74299     | CPF0017 | Cemetery<br>Beach<br>Community<br>Park           | 2066 | CPF  |
| Asset.64 | 64 | CPF0018                         | Cemetery Beach<br>Community Park<br>\$69428           | CPF0018 | Cemetery<br>Beach<br>Community<br>Park           | 2066 | CPF  |

|          |    |                         |                                        |             |                         |      |     |
|----------|----|-------------------------|----------------------------------------|-------------|-------------------------|------|-----|
| Asset.65 | 65 | BS2 - Bus Shelter       | Acton Street \$6357                    | BS2         | Acton Street            |      | BS  |
| Asset.66 | 66 | BS 3 - Bus Shelter      | Richardson Street, \$6357.             | BS3         | Richardson Street       |      | BS  |
| Asset.67 | 67 | BS 6 - Bus Shelter      | Styles Road \$6357                     | BS6         | Styles Road             |      | BS  |
| Asset.68 | 68 | FPB 0003 -Footpath      | Gratwick Aquatic Centre footpath       | FPB0003     | Gratwick Aquatic Centre | 2017 | FPB |
| Asset.69 | 69 | FPB 0005 Footpath       | Gratwick Aquatic Centre. \$171,220     | FPB0005     | Gratwick Aquatic Centre | 2017 | FPB |
| Asset.70 | 70 | FPB 0004 Footpath       | Civic Centre \$39,860                  | FPB0004     | Civic Centre            | 2017 | FPB |
| Asset.71 | 71 | FPN 0004_001 - Footpath | Richardson Sttreet Footpath \$8190     | FPN0004_001 | RICHARDSON STREET       | 2017 | FPN |
| Asset.72 | 72 | FPN0004_002 - Footpath  | Richardson Street \$13008.             | FPN0004_002 | RICHARDSON STREET       | 2017 | FPN |
| Asset.73 | 73 | FPN0004_003 - Footpath  | Richardson Street - \$ 7641            | FPN0004_003 | RICHARDSON STREET       | 2017 | FPN |
| Asset.74 | 74 | FPN0004_004 - Footpath  | Richardson Street - ~+\$20,687         | FPN0004_004 | RICHARDSON STREET       | 2017 | FPN |
| Asset.75 | 75 | FPN0004_005 Footpath    | Richardson Street~+ footpath \$37005   | FPN0004_005 | RICHARDSON STREET       | 2017 | FPN |
| Asset.76 | 76 | FPN0004_006 Footpath    | Richardson Street \$8908               | FPN0004_006 | RICHARDSON STREET       | 2017 | FPN |
| Asset.77 | 77 | FPN0004_007 Footpath    | Richardson Street \$5505               | FPN0004_007 | RICHARDSON STREET       | 2017 | FPN |
| Asset.78 | 78 | FPN0004_008 Footpath    | Richardson Street Footpath \$11044     | FPN0004_008 | RICHARDSON STREET       | 2017 | FPN |
| Asset.79 | 79 | FPN0004_009 Footpath    | Richardson Street Footpath \$~+38875   | FPN0004_009 | RICHARDSON STREET       | 2017 | FPN |
| Asset.80 | 80 | FPN0004_010 - Footpath  | Richardson Street Footpath - \$10196   | FPN0004_010 | RICHARDSON STREET       | 2017 | FPN |
| Asset.81 | 81 | FPN0004_011 Footpath    | Richardson Street Footpath - \$14763   | FPN0004_011 | RICHARDSON STREET       | 2017 | FPN |
| Asset.82 | 82 | FPN0015_001 Footpath    | Sutherland Street footpath \$1025      | FPN0015_001 | SUTHERLAND STREET       | 2019 | FPN |
| Asset.83 | 83 | FPN0015_002 Footpath    | Sutherland Street Footpath --+178453   | FPN0015_002 | SUTHERLAND STREET       | 2037 | FPN |
| Asset.84 | 84 | FPN0015_003 - Footpath  | Sutherland Street Footpath \$304,660   | FPN0015_003 | SUTHERLAND STREET       | 2041 | FPN |
| Asset.85 | 85 | FPN0015_004 - Footpath  | Sutherland Street footpath - \$564,849 | FPN0015_004 | SUTHERLAND STREET       | 2041 | FPN |



|           |     |                        |                                       |                 |                      |      |     |
|-----------|-----|------------------------|---------------------------------------|-----------------|----------------------|------|-----|
| Asset.86  | 86  | FPN0015_005~+Footpath  |                                       |                 |                      |      | FPN |
| Asset.87  | 87  | FPN0015_006~+Footpath  | Sutherland Street<br>Footpath \$37404 | FPN0015_0<br>06 | SUTHERLAND<br>STREET | 2041 | FPN |
| Asset.88  | 88  | FPN0015_007 Footpath   | Sutherland Street<br>Footpath \$67560 | FPN0015_0<br>07 | SUTHERLAND<br>STREET | 2037 | FPN |
| Asset.89  | 89  | FPN0015_008~+Footpath  | Sutherland Street<br>Footpath \$18868 | FPN0015_0<br>08 | SUTHERLAND<br>STREET | 2038 | FPN |
| Asset.90  | 90  | FPN0015_009 Footpath   | Sutherland Street<br>Footpath \$3303  | FPN0015_0<br>09 | SUTHERLAND<br>STREET | 2017 | FPN |
| Asset.91  | 91  | FPN0015_0012~+Footpath | Sutherland Street<br>Footpath \$726   |                 |                      |      | FPN |
| Asset.92  | 92  | FPN0015_013~+Footpath  | Sutherland Street<br>Footpath \$52819 | FPN0015_0<br>13 | SUTHERLAND<br>STREET | 2041 | FPN |
| Asset.93  | 93  | FPN0015_0015 Footpath  | Sutherland Street<br>Footpath \$21494 |                 |                      |      | FPN |
| Asset.94  | 94  | FPN0015_0017 Footpath  | Sutherland Street<br>Footpath \$57162 |                 |                      |      | FPN |
| Asset.95  | 95  | FPN0015_018~+Footpath  | Sutherland Street<br>Footpath \$21066 | FPN0015_0<br>18 | SUTHERLAND<br>STREET | 2049 | FPN |
| Asset.10  | 10  | Boardwalk 4 Mile       |                                       |                 |                      |      | BW  |
| Asset.96  | 96  | FPN0015_019~+Footpath  | Sutherland Street<br>Footpath \$18340 | FPN0015_0<br>19 | SUTHERLAND<br>STREET | 2041 | FPN |
| Asset.97  | 97  | FPN0015_020~+Footpath  | Sutherland Street<br>Footpath \$27907 | FPN0015_0<br>20 | SUTHERLAND<br>STREET | 2041 | FPN |
| Asset.98  | 98  | FPN0015_022~+Footpath  |                                       | FPN0015_0<br>22 | SUTHERLAND<br>STREET | 2049 | FPN |
| Asset.99  | 99  | FPN0015_021~+Footpath  | Sutherland Street<br>Footpath \$30643 | FPN0015_0<br>21 | SUTHERLAND<br>STREET | 2049 | FPN |
| Asset.100 | 100 | FPN0015_016 Footpath   | Sutherland Street<br>Footpath \$50582 | FPN0015_0<br>16 | SUTHERLAND<br>STREET | 2037 | FPN |
| Asset.101 | 101 | FPN0015_011~+Footpath  | Sutherland Street<br>Footpath \$847   | FPN0015_0<br>11 | SUTHERLAND<br>STREET | 2019 | FPN |
| Asset.102 | 102 | FPN0015_014 Footpath   | Sutherland Street<br>Footpath \$13180 | FPN0015_0<br>14 | SUTHERLAND<br>STREET | 2049 | FPN |
| Asset.103 | 103 | FPN0015_010 Footpath   | Sutherland Street<br>Footpath \$3303  | FPN0015_0<br>10 | SUTHERLAND<br>STREET | 2025 | FPN |
| Asset.104 | 104 | FPN0041_001. Footpath  | Goode Street<br>Footpath - \$74809    | FPN0041_0<br>01 | GOODE<br>STREET      | 2041 | FPN |
| Asset.105 | 105 | FPN0041_002. Footpath  | Goode Street<br>Footpath \$16234      | FPN0041_0<br>02 | GOODE<br>STREET      | 2041 | FPN |
| Asset.106 | 106 | FPN0041_004 Footpath   | Goode Street<br>Footpath \$8811       | FPN0041_0<br>04 | GOODE<br>STREET      | 2029 | FPN |
| Asset.107 | 107 | FPN0041_003 Footpath   | Goode Street<br>Footpath \$8588       | FPN0041_0<br>03 | GOODE<br>STREET      | 2041 | FPN |

|           |     |                       |                                          |             |                               |      |     |
|-----------|-----|-----------------------|------------------------------------------|-------------|-------------------------------|------|-----|
| Asset.108 | 108 | FPN0220_003 Footpath  | Styles Rd Footpath.<br>\$253532          | FPN0220_003 | STYLES ROAD                   | 2017 | FPN |
| Asset.109 | 109 | FPN0220_006~+Footpath | Styles Rd Footpaths<br>\$14639           | FPN0220_006 | STYLES ROAD                   | 2017 | FPN |
| Asset.110 | 110 | FPN0220_005~+Footpath | Styles Rd Footpath \$<br>34879           | FPN0220_005 | STYLES ROAD                   | 2017 | FPN |
| Asset.111 | 111 | FPN0220_004~+Footpath | Styles Rd Footpath<br>\$43639            | FPN0220_004 | STYLES ROAD                   | 2017 | FPN |
| Asset.112 | 112 | FPN0220_001~+Footpath | Styles Rd Footpath<br>\$40872            | FPN0220_001 | STYLES ROAD                   | 2017 | FPN |
| Asset.113 | 113 | FPN0220_002~+Footpath | Styles Rd Footpath<br>\$22624            | FPN0220_002 | STYLES ROAD                   | 2017 | FPN |
| Asset.114 | 114 | FPN0308_002 Footpath  | Counihan Creascent<br>Footpath \$123987  | FPN0308_002 | COUNIHAN<br>CRESCENT          | 2017 | FPN |
| Asset.115 | 115 | FPN0308_001 Footpath  | Counihan Crescent<br>Footpath \$16654    | FPN0308_001 | COUNIHAN<br>CRESCENT          | 2017 | FPN |
| Asset.116 | 116 | FPN0308_003 Footpath  | Counihan Cres<br>Footpath \$28224        | FPN0308_003 | COUNIHAN<br>CRESCENT          | 2017 | FPN |
| Asset.117 | 117 | FPP0001 - Footpath    | Cemetery Beach<br>Footpath \$183454      | FPP0001     | Cemetery<br>Beach             | 2017 | FPP |
| Asset.118 | 118 | FPP0003 Footpath      | Cemetery Beach<br>Footpath \$146448      | FPP0003     | Cemetery<br>Beach             | 2017 | FPP |
| Asset.119 | 119 | FPP0002 Footpath      | Cemetery Beach<br>Footpath. \$8120       | FPP0002     | Cemetery<br>Beach             | 2017 | FPP |
| Asset.120 | 120 | FPP00029-004 Footpath |                                          |             |                               |      | FPP |
| Asset.121 | 121 | FPP0008 Footpath      | Civic Centre Path<br>\$9349              | FPP0008     | Civic Centre                  | 2017 | FPP |
| Asset.122 | 122 | FPP0009 Footpath      | Civic Centre Path<br>\$6889              | FPP0009     | Civic Centre                  | 2017 | FPP |
| Asset.123 | 123 | FPP0018 - Footpath    | Marapikurrinya Park<br>Path \$13188      | FPP0018     | Marapikurriny<br>a Park       | 2017 | FPP |
| Asset.124 | 124 | FPP0024 Footpath      | Pretty pool Park<br>Path~+ \$16140       | FPP0024     | Pretty Pool                   | 2017 | FPP |
| Asset.125 | 125 | FPP0025 Footpath      | Pretty Pool Footpath -<br>\$6298         | FPP0025     | Pretty Pool                   | 2017 | FPP |
| Asset.126 | 126 | FPP0027 Footpath      | Yikara Park / Dowding<br>Way Path \$7479 | FPP0027     | Yikara Drive /<br>Dowding Way | 2017 | FPP |
| Asset.127 | 127 | FPP0029 Footpath      | Koombana Park<br>Footpath \$78217        | FPP0029     | Koombana<br>Park              | 2017 | FPP |
| Asset.128 | 128 | FPP0028. Footpath     | Koombana Lookout<br>Footpath \$ 149270   | FPP0028     | Koombana<br>Park              | 2017 | FPP |

|           |     |                  |                                            |         |                           |      |     |
|-----------|-----|------------------|--------------------------------------------|---------|---------------------------|------|-----|
| Asset.129 | 129 | FPP0037 footpath | Captain Bert Madigan Park footpath \$18699 | FPP0037 | Captain Bert Madigan Park | 2017 | FPP |
| Asset.130 | 130 | BBQ001 - BBQ     | Captain Bert Madigan Park BBQ \$10000      | BBQ001  | Captain Bert Madigan Park | 2017 | BBQ |
| Asset.131 | 131 | BBQ002 - BBQ     | Cemetery Beach BBQ \$70,000                | BBQ002  | Cemetery Beach            | 2017 | BBQ |
| Asset.132 | 132 | BBQ003           | Civic Centre BBQ \$10000                   | BBQ003  | Civic Centre              | 2017 | BBQ |
| Asset.133 | 133 | BBQ005           | Gratwick Aquatic Centre BBQ \$10000        | BBQ005  | Koombana Lookout          | 2017 | BBQ |
| Asset.334 | 334 | Street Light     |                                            |         |                           |      | STR |
| Asset.134 | 134 | BBQ005           | Koombana Lookout BBQ \$100000              | BBQ005  | Koombana Lookout          | 2017 | BBQ |
| Asset.135 | 135 | BBQ 008          | Marapikurrinya Park \$10000                | BBQ008  | Pretty Pool Park          | 2017 | BBQ |
| Asset.136 | 136 | BBQ009           | Marapikurrinya Park BBQ \$10000            | BBQ009  | Yikara Drive, Pretty Pool | 2017 | BBQ |
| Asset.137 | 137 | BBQ011           | Pretty Pool BBQ \$10000                    |         |                           |      | BBQ |
| Asset.138 | 138 | BBQ 014          | Yikara Drive, Pretty Pool BBQ \$20000      |         |                           |      | BBQ |
| Asset.139 | 139 | BIN001           | Captain Bert Madigan Park Bin \$15600      | BIN001  | Captain Bert Madigan Park | 2017 | BIN |
| Asset.140 | 140 | BIN002           | Cemetery Beach Bin \$11700                 | BIN002  | Cemetery Beach            | 2017 | BIN |
| Asset.141 | 141 | BIN003           | Cemetery Beach BIN \$42900                 | BIN003  | Cemetery Beach            | 2017 | BIN |
| Asset.142 | 142 | BIN004           | CIVIC CENTRE BIN \$7800                    | BIN004  | Civic Centre              | 2017 | BIN |
| Asset.143 | 143 | BIN005           | Koombana Lookout BIN \$11700               |         |                           |      | BIN |
| Asset.144 | 144 | BIN014           | Marapikurrinya Park BIN 7800               | BIN014  | Marapikurrinya Park       | 2017 | BIN |
| Asset.145 | 145 | BIN 013          | Marapikurrinya Park BIN \$31200            | BIN013  | Marapikurrinya Park       | 2017 | BIN |
| Asset.146 | 146 | BIN020           | PRETTY POOL PARK \$15600                   | BIN020  | Pretty Pool Park          | 2017 | BIN |
| Asset.147 | 147 | BIN019           | PRETTY POOL PARK-\$2800                    | BIN019  | Pretty Pool Park          | 2017 | BIN |
| Asset.148 | 148 | BIN029           | Yikara Drive, Pretty Pool \$1400           | BIN029  | Yikara Drive, Pretty Pool | 2017 | BIN |
| Asset.149 | 149 | BIN028           | Yikara Drive, Pretty Pool \$19500          | BIN028  | Yikara Drive, Pretty Pool | 2017 | BIN |



|           |     |                             |                                                       |         |                                                 |      |     |
|-----------|-----|-----------------------------|-------------------------------------------------------|---------|-------------------------------------------------|------|-----|
| Asset.150 | 150 | BKR 01                      | CEMETERY BEACH<br>BIKE RACK \$1000                    | BKR01   | Cemetery<br>Beach                               | 2017 | BKR |
| Asset.151 | 151 | CS0016 - Irrigation control | Cemetery Beach<br>Irrigation Control<br>\$42237       | CS0016  | Cemetery<br>Beach<br>Irrigation<br>Control      | 2017 | CS  |
| Asset.152 | 152 | DF002-† - Drinking Fountain | CEMETERY BEACH<br>Drinking Fountain<br>\$14800        | DF002   | Cemetery<br>Beach                               | 2017 | DF  |
| Asset.153 | 153 | FC0009-† - Fencing          | CEMETERY BEACH<br>Fence-† \$ 20700                    | FC0009  | Cemetery<br>Beach                               | 2017 | FC  |
| Asset.154 | 154 | FC0010 - Fencing            | CEMETERY BEACH<br>Fencing \$10650                     | FC0010  | Cemetery<br>Beach                               | 2017 | FC  |
| Asset.155 | 155 | IRR004                      | Cemetery Beach<br>IRRIGATION \$65310                  | IRR004  | Cemetery<br>Beach                               | 2017 | IRR |
| Asset.156 | 156 | IRR005                      | CEMETERY BEACH<br>IRRIGATION \$156420                 | IRR005  | Cemetery<br>Beach                               | 2017 | IRR |
| Asset.157 | 157 | LT006                       | LIGHT CEMETERY<br>BEACH \$40,000                      |         |                                                 |      | LT  |
| Asset.158 | 158 | LT008                       | CEMETERY BEACH<br>LIGHT \$ 72000                      | LT0008  | Cemetery<br>Beach                               | 2017 | LT  |
| Asset.159 | 159 | LT0009                      | CEMETERY BEACH<br>LIGHT \$64000                       | LT0009  | Cemetery<br>Beach                               | 2017 | LT  |
| Asset.160 | 160 | PAS004                      | PUBLIC ART<br>CEMETERY BEACH \$<br>272995             | PAS004  | Cemetery<br>Beach                               | 2017 | PAS |
| Asset.161 | 161 | PT0004 - Stormwater Pit     | Stormwater Pit-†<br>\$79425                           | PT0004  | Cemetery<br>Beach                               | 2017 | PT  |
| Asset.162 | 162 | STR0005                     | Cemetery Beach -<br>Shade Sail \$105,000              | STR0005 | Cemetery<br>Beach - Shade<br>Sail               | 2017 | STR |
| Asset.163 | 163 | STR0006                     | Cemetery Beach -<br>Poles for Shade Sail-†<br>\$30000 | STR0006 | Cemetery<br>Beach - Poles<br>for Shade Sail     | 2017 | STR |
| Asset.164 | 164 | STR0009                     | Cemetery Beach -<br>General Shelter<br>\$336000       | STR0009 | Cemetery<br>Beach -<br>General<br>Shelter       | 2017 | STR |
| Asset.165 | 165 | TEL001 - telescope          | Telescope \$7200                                      | TEL001  | Cemetery<br>Beach                               | 2017 | TEL |
| Asset.166 | 166 | WL0003                      | Cemetery Beach<br>Limestone Walls                     | WL0003  | Cemetery<br>Beach<br>Limestone<br>Walls 0-0.5 m | 2017 | WL  |
| Asset.167 | 167 | CPF0019                     | Cemetery Beach<br>Community Park<br>\$49172           | CPF0019 | Cemetery<br>Beach<br>Community<br>Park          | 2066 | CPF |
| Asset.168 | 168 | CPF0020                     | Cemetery Beach<br>Community Park<br>\$67109           | CPF0020 | Cemetery<br>Beach<br>Community<br>Park          | 2058 | CPF |

|           |     |                                              |                                                      |         |                                                  |      |     |
|-----------|-----|----------------------------------------------|------------------------------------------------------|---------|--------------------------------------------------|------|-----|
| Asset.169 | 169 | OTHSST008                                    | Cemetery Beach Park -<br>Shelters \$200000           |         |                                                  |      | OTH |
| Asset.14  | 14  | Original Port Hedland Primary<br>School Sign | Unconfirmed location.                                |         |                                                  |      |     |
| Asset.170 | 170 | BLD139                                       | Cemetery Beach Park -<br>Exeloo \$300,000            | BLD139  | Cemetery<br>Beach Park -<br>Exeloo<br>(western)  | 2017 | BLD |
| Asset.171 | 171 | BLD360 - Exeloo                              | Cemetery Beach Park -<br>Exeloo \$300000             | BLD360  | Cemetery<br>Beach Park -<br>Exeloo               | 2017 | BLD |
| Asset.263 | 263 | STG0016 - Seating                            | \$3,000                                              | STG0016 | Marapikurriny<br>a Park                          | 2017 | STG |
| Asset.172 | 172 | STR0073                                      | Marrapikurinya Park<br>Playground Shelter            | STR0073 | Marrapikuriny<br>a Park<br>Playground<br>Shetler | 2017 | STR |
| Asset.173 | 173 | CS0018 - Irrigation control                  | Pretty Pool Irrigation<br>control \$38262            | CS0018  | Pretty Pool<br>Irrigation<br>Control             | 2017 | CS  |
| Asset.174 | 174 | DF010 - Drinking Fountain                    | Pretty pool Park<br>Drinking Fountain<br>\$3700      | DF010   | Pretty Pool<br>Park                              | 2017 | DF  |
| Asset.175 | 175 | FC0044 Fencing                               | Foreshore Pretty Pool<br>\$135630                    | FC0044  | Foreshore -<br>Pretty Pool                       | 2017 | FC  |
| Asset.176 | 176 | IRR025 - Irrigation                          | Pretty Pool Park<br>Irrigation \$28940               | IRR025  | Pretty Pool<br>Park                              | 2017 | IRR |
| Asset.177 | 177 | LT0035 - lighting                            | Pretty Pool Park Light<br>\$44000                    | LT0035  | Pretty Pool<br>Park                              | 2017 | LT  |
| Asset.178 | 178 | PLG 015 - Playground                         | Pretty Pool Park Play<br>Equipment \$75200           | PLG015  | Pretty Pool<br>Park Play<br>Equipment            | 2017 | PLG |
| Asset.179 | 179 | PT0020 - Stormwater overland<br>flow         | Pretty Pool Park<br>Stormwater Pit<br>\$15,885       | PT0020  | Pretty Pool<br>Park                              | 2017 | PT  |
| Asset.180 | 180 | STR0039                                      | Pretty Pool Park -<br>Poles for Shade Sail<br>\$7500 | STR0039 | Pretty Pool<br>Park - Poles<br>for Shade Sail    | 2017 | STR |
| Asset.181 | 181 | STR0040                                      | Pretty Pool Park Picnic<br>Shelter \$21300           | STR0040 | Pretty Pool<br>Park Picnic<br>Shelter            | 2017 | STR |
| Asset.182 | 182 | STR0041                                      | Pretty Pool Park -<br>Shade Sail \$15,000            | STR0041 | Pretty Pool<br>Park - Shade<br>Sail              | 2017 | STR |
| Asset.183 | 183 | STR0025                                      | Marapikurrinya Park<br>Shed \$24500                  | STR0025 | Marapikurriny<br>a Park Shed                     | 2017 | STR |
| Asset.184 | 184 | STR0026                                      | Marapikurrinya Park<br>Picnic Shelter                | STR0026 | Marapikurriny<br>a Park Picnic<br>Shelter        | 2017 | STR |
| Asset.185 | 185 | STR0027                                      | Marapikurrinya Park<br>Gazebo \$32890                | STR0027 | Marapikurriny<br>a Park Gazebo                   | 2017 | STR |
| Asset.186 | 186 | STR0028                                      | Marapikurrinya Park<br>Viewing Platform              | STR0028 | Marapikurriny<br>a Park<br>Viewing<br>Platform   | 2017 | STR |

|           |     |                                  |                                                                      |          |                                                     |      |      |
|-----------|-----|----------------------------------|----------------------------------------------------------------------|----------|-----------------------------------------------------|------|------|
| Asset.187 | 187 | STR0029                          | Marapikurrinya Park Playground Shelter                               | STR0029  | Marapikurrinya Park Playground shelter              | 2017 | STR  |
| Asset.188 | 188 | STR0073                          | Marrapikurinya Park Playground Shetler \$234316                      |          |                                                     |      | STR  |
| Asset.189 | 189 | FC0023 - Fence                   | Marapikurrinya Park fence-+ \$ 16950                                 | FC0023   | Koombana Lookout                                    | 2017 | FC   |
| Asset.190 | 190 | IRR 019                          | Marapikurrinya Parkv irrigation \$57345                              | IRR019   | Marapikurrinya Park                                 | 2017 | IRR  |
| Asset.191 | 191 | IRR049                           | Marapikurrinya Park including Richardson ST Median \$19362           | IRR049   | Marapikurrinya Park including Richardson St Medians | 2017 | IRR  |
| Asset.192 | 192 | BL0002 - Bollard                 | Bollards \$8250                                                      | BL0002   | Cemetery Beach                                      | 2017 | BL   |
| Asset.193 | 193 | DF0001 - Drinking Fountain       | Captain Bert Madigan Park Drinking Fountain \$3700                   | DF001    | Captain Bert Madigan Park                           | 2017 | DF   |
| Asset.194 | 194 | FC0008 - Fence                   | Fence \$37840                                                        | FC0008   | Captain Bert Madigan Park                           | 2017 | FC   |
| Asset.195 | 195 | FC0040-1 Fencing                 | Turtle Board Walk Fencing - \$25091                                  | FC0040-1 | Turtle Board Walk                                   | 2017 | FC   |
| Asset.196 | 196 | FC0040 - Fencing                 | Turtle interpretive loop. - Fencing \$32943                          | FC0040   | Turtle Interpretive Loop                            | 2017 | FC   |
| Asset.197 | 197 | MON 0003 - ART WORK              | CEMETERY BEACH PUBLIC ART- Silver, blue and orange gumnuts \$150,000 | MON0003  | Silver, blue and orange gumnuts                     | 2017 | MON  |
| Asset.198 | 198 | MON0037 - Public art             | Turtle Mosaic \$5620                                                 | MON0037  | Turtle Mosaic                                       | 2017 | MON  |
| Asset.199 | 199 | Bin                              | Six Mile Bin                                                         | Bin      | Welcome Rest Stop - Six Mile                        | 2017 | BIN  |
| Asset.200 | 200 | Welcome Rest stop - Main Shelter | Shelter,                                                             |          |                                                     |      | WEL  |
| Asset.201 | 201 | Picnic Table                     |                                                                      |          |                                                     |      | PIC  |
| Asset.202 | 202 | Picnic Table                     |                                                                      |          |                                                     |      | PIC  |
| Asset.203 | 203 | Access Road to 4 Mile            | Unsealed                                                             |          | CCTV                                                |      | CCTV |
| Asset.204 | 204 | Access Road to 4 Mile            |                                                                      |          | CCTV                                                |      | CCTV |
| Asset.205 | 205 | Car Park 4 Mile                  | Unformed Car Park                                                    |          |                                                     |      | CAR  |
| Asset.206 | 206 | Sign - Dune Repair               |                                                                      |          |                                                     |      | SIG  |
| Asset.207 | 207 | Sign - Dune Repair               |                                                                      |          |                                                     |      | SIG  |
| Asset.208 | 208 | Rock Boulder Bollards            |                                                                      |          |                                                     |      | ROC  |
| Asset.209 | 209 | Rock Boulder Bollards            |                                                                      |          |                                                     |      | ROC  |
| Asset.210 | 210 | VP0002_ Viewing Platform         | \$73,738                                                             |          |                                                     |      | VP   |
| Asset.211 | 211 | Signage - Thajarrauka Jina       |                                                                      |          |                                                     |      | SIG  |
| Asset.212 | 212 | Signage - Thajarrauka Jina       |                                                                      |          |                                                     |      | SIG  |
| Asset.213 | 213 | Sign - Thajarrauka Jina          |                                                                      |          |                                                     |      | SIG  |
| Asset.214 | 214 | Sign - Thajarrauka Jina          |                                                                      |          |                                                     |      | SIG  |
| Asset.215 | 215 | STR0060 - Picnic Shelter         | \$7,100                                                              | STR0060  | Sutherland Street - Picnic Shelter                  | 2017 | STR  |



|           |     |                                            |                            |         |                                                               |      |     |
|-----------|-----|--------------------------------------------|----------------------------|---------|---------------------------------------------------------------|------|-----|
| Asset.216 | 216 | STR0062 - Shelter                          | \$14,200                   | STR0062 | Sutherland Street - General Shelter                           | 2017 | STR |
| Asset.217 | 217 | RD 0015 - Sutherland Road                  |                            |         |                                                               |      | RD  |
| Asset.218 | 218 | RD0015 -SUTHERLAND STREET                  |                            |         |                                                               |      | RD  |
| Asset.219 | 219 | RD0041 - GOODE STREET                      |                            |         |                                                               |      | RD  |
| Asset.220 | 220 | RD0041 - GOODE STREET                      |                            |         |                                                               |      | RD  |
| Asset.221 | 221 | CPf0040 - CARPARK                          | \$449,000                  |         |                                                               |      | CPF |
| Asset.222 | 222 | BKR02 - Bike Rack                          | \$1,000.00                 | BKR02   | Civic Centre                                                  | 2017 | BKR |
| Asset.223 | 223 | WL004 - Limestone wall                     |                            |         | Civic Centre<br>Decorative Wall 0.5-1 m \$26,680              |      | WL  |
| Asset.224 | 224 | WL0001 - Limestone retaining wall          | \$4,640                    | WL0001  | Captain Bert Madigan Park Limestone wall                      | 2017 | WL  |
| Asset.225 | 225 | WL0013 - Limestone walls                   |                            |         | Pretty Pool Park Limestone walls \$35960                      | 2017 | WL  |
| Asset.226 | 226 | WL0017 - Limestone wall                    |                            |         | Turtle Interpretive Loop Limestone Walls at Nodes 1-4 \$46980 | 2017 | WL  |
| Asset.227 | 227 | WL0017 - Limestone Walls                   |                            |         |                                                               |      | WL  |
| Asset.228 | 228 | WL0017-Limestone Wall                      |                            |         |                                                               |      | WL  |
| Asset.229 | 229 | BLD070 - Exeloo                            |                            |         | Civic Centre - Exeloo \$192000                                | 2017 | BLD |
| Asset.230 | 230 | Sign Sutherland St Dune Protection Project |                            |         |                                                               |      | SIG |
| Asset.231 | 231 | Drain outlet                               |                            |         |                                                               |      | DRA |
| Asset.232 | 232 | Drain Outlet                               |                            |         |                                                               |      | DRA |
| Asset.233 | 233 | Seawall                                    |                            |         |                                                               |      | SW  |
| Asset.234 | 234 | Rockwall                                   |                            |         |                                                               |      | ROC |
| Asset.235 | 235 | Concrete sleepers barrier                  |                            |         |                                                               |      | CON |
| Asset.236 | 236 | Concrete sleepers barrier                  |                            |         |                                                               |      | CON |
| Asset.237 | 237 | Fence                                      |                            |         |                                                               |      | FEN |
| Asset.238 | 238 | Drain Outlet                               |                            |         |                                                               |      | DRA |
| Asset.239 | 239 | MON0006 - Public Art                       | Steel Car ??? \$15,000     | MON0006 | Steel Car                                                     | 2017 | MON |
| Asset.240 | 240 | MON0035 - Sculpture - Sea Creature         | \$15,000                   | MON0035 | Sea Creature                                                  | 2017 | MON |
| Asset.241 | 241 | Bin                                        |                            | Bin     | Welcome Rest Stop - Six Mile                                  | 2017 | BIN |
| Asset.242 | 242 | Bin                                        |                            | Bin     | Welcome Rest Stop - Six Mile                                  | 2017 | BIN |
| Asset.243 | 243 | VP0001 - Viewing Platform                  | \$110,700                  |         |                                                               |      | VP  |
| Asset.244 | 244 | BW0003 - Boardwalk                         | \$28,800                   | BW0003  | Boardwalk                                                     | 2023 | BW  |
| Asset.245 | 245 | BW0001 - Boardwalk                         | \$70,200                   | BW0001  | Boardwalk                                                     | 2033 | BW  |
| Asset.246 | 246 | JET001 - Jetty                             | Boat Ramp Jetty - \$25,000 | JET001  | Jetty                                                         | 2028 | JET |

|           |     |                                 |                   |                |                                              |      |     |
|-----------|-----|---------------------------------|-------------------|----------------|----------------------------------------------|------|-----|
| Asset.247 | 247 | CPN0409 - on street parking     | \$13,220          | CPN0409_01120L | Dowding Way: 1120 m Left                     | 2068 | CPN |
| Asset.248 | 248 | CPN 0409 - on street carparking | \$14,535          | CPN0409_00934L | Dowding Way: 934 m Left                      | 2069 | CPN |
| Asset.249 | 249 | CPN0409 - on street car parking | \$8,195           | CPN0409_00969R | Dowding Way: 969 m Right                     | 2069 | CPN |
| Asset.250 | 250 | CPF0036 - carpark               | \$175,902         | CPF0036        | South Cemetery                               | 2017 | CPF |
| Asset.251 | 251 | CPF0038 - Carpark               | \$64,403          | CPF0038        | Pretty Pool                                  | 2058 | CPF |
| Asset.252 | 252 | CS0019 - Irrigation Control     | \$32,296          | CS0019         | Captain Bert Madigan Park Irrigation Control | 2017 | CS  |
| Asset.253 | 253 | DF015 - Drinking Fountain       | \$3,700           | DF015          | Sutherland Street, Nodes                     | 2017 | DF  |
| Asset.254 | 254 | BL0005 Bollards                 | Bollards \$16,960 | BL0005         | Marapikurrinya Park                          | 2017 | BL  |
| Asset.255 | 255 | IRR003 -irrigation              | \$21,080          | IRR003         | Captain Bert Madigan Park                    | 2017 | IRR |
| Asset.256 | 256 | IRR034 - Irrigation             | \$7,695           |                |                                              |      | IRR |
| Asset.257 | 257 | PLG021 - Playground             | \$206,110         | PLG021         | Marrapikurrinya Park play Equipment          | 2017 | PLG |
| Asset.258 | 258 | LT006 - Lighting Twin           | \$40,000          | LT0006         | Captain Bert Madigan Park                    | 2023 | LT  |
| Asset.259 | 259 | LT0025 - Feature Light          | \$43,452          | LT0025         | Marapikurrinya Park                          | 2017 | LT  |
| Asset.260 | 260 | LT0043 - lighting               | \$5,834           | LT0043         | Turtle Interpretive Loop                     | 2017 | LT  |
| Asset.261 | 261 | LT0044 - Lighting               | \$8,600           | LT0044         | Turtle Interpretive Loop                     | 2017 | LT  |
| Asset.262 | 262 | STG0015 - seating               | \$7,500           | STG0015        | Marapikurrinya Park                          | 2017 | STG |
| Asset.333 | 333 | Stormwater Pit                  |                   |                |                                              |      | STO |
| Asset.264 | 264 | STG0001 - Seating               | \$4,000           | STG0001        | Captain Bert Madigan Park                    | 2017 | STG |
| Asset.265 | 265 | STG00026 - Seating              |                   |                |                                              |      | STG |
| Asset.266 | 266 | STG0027                         | \$10,200          | STG0027        | Turtle Interpretive Loop                     | 2017 | STG |
| Asset.267 | 267 | STG0027 - seating               |                   |                |                                              |      | STG |
| Asset.268 | 268 | PT0003 - park tables            |                   | PT0003         | Captain Bert Madigan Park                    | 2017 | PT  |
| Asset.269 | 269 | PT0004 - Park Tables            |                   |                | CCTV                                         |      | PT  |
| Asset.270 | 270 | PT00016 - Park tables           |                   | PT0016         | Marapikurrinya Park                          | 2017 | PT  |

|           |     |                                     |                              |        |                            |      |       |
|-----------|-----|-------------------------------------|------------------------------|--------|----------------------------|------|-------|
| Asset.271 | 271 | PT0017 - Park tables                |                              | PT0017 | Marapikurriny<br>a Park    | 2017 | PT    |
| Asset.272 | 272 | PT00014 - Park tables               |                              | PT0014 | Marapikurriny<br>a Park    | 2017 | PT    |
| Asset.273 | 273 | PT 0015 - Park Tables               |                              | PT0015 | Marapikurriny<br>a Park    | 2017 | PT    |
| Asset.274 | 274 | BIN 027 - BIN                       |                              |        |                            |      | BIN   |
| Asset.275 | 275 | BLD013 - residence                  |                              | BLD013 | 85 Sutherland<br>Street    | 2017 | BLD   |
| Asset.276 | 276 | BLD020 - Residence                  |                              | BLD020 | 57A Lukis<br>Street        | 2017 | BLD   |
| Asset.277 | 277 | BLD026 - Residence                  | Vacant Land?                 | BLD026 | 96 Sutherland<br>Street    | 2017 | BLD   |
| Asset.278 | 278 | BLD093 - Residence                  |                              | BLD093 | 82 Sutherland<br>Street    | 2017 | BLD   |
| Asset.279 | 279 | BLD167 - Gratwick Aquatic<br>Centre |                              | BLD167 | Gratwick<br>Aquatic Centre | 2017 | BLD   |
| Asset.280 | 280 | BLD191 - Gratwick Aquatic<br>Centre |                              | BLD191 | Gratwick<br>Aquatic Centre | 2017 | BLD   |
| Asset.281 | 281 | BLD200 Residence                    |                              | BLD200 | 57B Lukis<br>Street        | 2017 | BLD   |
| Asset.282 | 282 | BLD334 - Residence                  |                              | BLD334 | 18 Counihan<br>Crescent    | 2017 | BLD   |
| Asset.283 | 283 | STG??                               | Seating on Concrete<br>block |        |                            |      | STG   |
| Asset.284 | 284 | Hydrant                             |                              |        |                            |      | HYD   |
| Asset.285 | 285 | Bollard                             |                              |        |                            |      | BL    |
| Asset.286 | 286 | Underground power dome              |                              |        |                            |      | UND   |
| Asset.287 | 287 | Street Light                        |                              |        |                            |      | STR   |
| Asset.288 | 288 | Street Light                        |                              |        |                            |      | STR   |
| Asset.289 | 289 | Street Light                        |                              |        |                            |      | STR   |
| Asset.290 | 290 | Street Light                        |                              |        |                            |      | STR   |
| Asset.291 | 291 | Street Light                        |                              |        |                            |      | STR   |
| Asset.292 | 292 | Seating                             |                              |        |                            |      | STG   |
| Asset.293 | 293 | Bollard                             |                              |        |                            |      | BL    |
| Asset.294 | 294 | Street Light                        |                              |        |                            |      | STR   |
| Asset.295 | 295 | Street Light                        |                              |        |                            |      | STR   |
| Asset.296 | 296 | Street Light                        |                              |        |                            |      | STR   |
| Asset.297 | 297 | Street Light                        |                              |        |                            |      | STR   |
| Asset.298 | 298 | Street Light                        |                              |        |                            |      | STR   |
| Asset.299 | 299 | Street Light                        |                              |        |                            |      | STR   |
| Asset.300 | 300 | Bollard                             |                              |        |                            |      | BL    |
| Asset.301 | 301 | Street Light                        |                              |        |                            |      | STR   |
| Asset.302 | 302 | Light                               |                              |        |                            |      | LIGHT |
| Asset.303 | 303 | CCTV                                |                              |        |                            |      | CCTV  |
| Asset.304 | 304 | Street Light                        |                              |        |                            |      | STR   |
| Asset.305 | 305 | Street Light                        |                              |        |                            |      | STR   |
| Asset.306 | 306 | Road Warning Sign                   | Corner                       |        |                            |      | ROA   |
| Asset.307 | 307 | Road Warning Sign                   | Arrows                       |        |                            |      | ROA   |
| Asset.308 | 308 | Road Warning Sign                   | Arrows                       |        |                            |      | ROA   |
| Asset.309 | 309 | Concrete Sleepers                   |                              |        |                            |      | CON   |
| Asset.310 | 310 | Street Light                        |                              |        |                            |      | STR   |



|           |     |                            |             |       |
|-----------|-----|----------------------------|-------------|-------|
| Asset.311 | 311 | Street Warning Sign        | End of road | STR   |
| Asset.312 | 312 | Street Light               |             | STR   |
| Asset.313 | 313 | Street Light               |             | STR   |
| Asset.314 | 314 | Street Warning Sign        | End of Road | STR   |
| Asset.315 | 315 | Street Light               |             | STR   |
| Asset.316 | 316 | Mobile Phone Tower         |             |       |
| Asset.317 | 317 | Crash Barrier              |             |       |
| Asset.318 | 318 | Street Light               |             | STR   |
| Asset.319 | 319 | Street Light               |             | STR   |
| Asset.320 | 320 | Street Light               |             | STR   |
| Asset.321 | 321 | Street Light               |             | STR   |
| Asset.322 | 322 | Street Light               |             | STR   |
| Asset.323 | 323 | Street Light               |             | STR   |
| Asset.324 | 324 | Street Light               |             | STR   |
| Asset.325 | 325 | Street Light               |             | STR   |
| Asset.326 | 326 | Street Light               |             | STR   |
| Asset.327 | 327 | Street Light               |             | STR   |
| Asset.328 | 328 | Sign No Camping            |             | SIG   |
| Asset.329 | 329 | Sign Directions - Business |             | SIG   |
| Asset.330 | 330 | Street Light               |             | STR   |
| Asset.331 | 331 | Street Light               |             | STR   |
| Asset.332 | 332 | Street Light               |             | STR   |
| Asset.335 | 335 | Stormwater Pit             |             | STO   |
| Asset.336 | 336 | Street Light               |             | STR   |
| Asset.337 | 337 | Street Light               |             | STR   |
| Asset.338 | 338 | Street Light               |             | STR   |
| Asset.339 | 339 | Street Light               |             | STR   |
| Asset.340 | 340 | Street Light               |             | STR   |
| Asset.341 | 341 | Street Light               |             | STR   |
| Asset.342 | 342 | Street Light               |             | STR   |
| Asset.343 | 343 | Street Light               |             | STR   |
| Asset.344 | 344 | Street Light               |             | STR   |
| Asset.345 | 345 | Street Light               |             | STR   |
| Asset.346 | 346 | Street Light               |             | STR   |
| Asset.347 | 347 | Street Light               |             | STR   |
| Asset.348 | 348 | Street Light               |             | STR   |
| Asset.349 | 349 | Street Light               |             | STR   |
| Asset.350 | 350 | Street Light               |             | STR   |
| Asset.351 | 351 | Sign -Solar School zone    |             | SIG   |
| Asset.352 | 352 | Street Light               |             | STR   |
| Asset.353 | 353 | Street Light               |             | STR   |
| Asset.354 | 354 | Street Light               |             | STR   |
| Asset.355 | 355 | Stormwater Drain           |             | STO   |
| Asset.356 | 356 | Street Light               |             | STR   |
| Asset.357 | 357 | Street Light               |             | STR   |
| Asset.358 | 358 | Light                      |             | LIGHT |
| Asset.359 | 359 | Point 359                  |             | POI   |
| Asset.360 | 360 | Street Light               |             | STR   |
| Asset.361 | 361 | Street Light               |             | STR   |
| Asset.362 | 362 | Street Light               |             | STR   |
| Asset.363 | 363 | Street Light               |             | STR   |
| Asset.364 | 364 | Street Light               |             | STR   |
| Asset.365 | 365 | Street Light               |             | STR   |
| Asset.366 | 366 | Street Light               |             | STR   |
| Asset.367 | 367 | Street Light               |             | STR   |
| Asset.368 | 368 | Street Light               |             | STR   |
| Asset.369 | 369 | Street Light               |             | STR   |
| Asset.370 | 370 | Street Light               |             | STR   |
| Asset.371 | 371 | Street Light               |             | STR   |
| Asset.372 | 372 | Street Light               |             | STR   |
| Asset.373 | 373 | Street Light               |             | STR   |
| Asset.374 | 374 | Street Light               |             | STR   |

|           |     |                            |     |                              |      |     |
|-----------|-----|----------------------------|-----|------------------------------|------|-----|
| Asset.375 | 375 | Street Light               |     |                              |      | STR |
| Asset.376 | 376 | Street Light               |     |                              |      | STR |
| Asset.377 | 377 | Street Light               |     |                              |      | STR |
| Asset.378 | 378 | Street Light               |     |                              |      | STR |
| Asset.379 | 379 | Street Light               |     |                              |      | STR |
| Asset.380 | 380 | Street Light               |     |                              |      | STR |
| Asset.381 | 381 | Street Light               |     |                              |      | STR |
| Asset.382 | 382 | Street Light               |     |                              |      | STR |
| Asset.383 | 383 | Street Light               |     |                              |      | STR |
| Asset.384 | 384 | Street Light               |     |                              |      | STR |
| Asset.385 | 385 | Street Light               |     |                              |      | STR |
| Asset.386 | 386 | Street Light               |     |                              |      | STR |
| Asset.387 | 387 | Bollard                    |     |                              |      | BL  |
| Asset.388 | 388 | Fence                      |     |                              |      | FEN |
| Asset.389 | 389 | Street light               |     |                              |      | STR |
| Asset.390 | 390 | Street light               |     |                              |      | STR |
| Asset.391 | 391 | Street light               |     |                              |      | STR |
| Asset.392 | 392 | Street light               |     |                              |      | STR |
| Asset.393 | 393 | Street light               |     |                              |      | STR |
| Asset.394 | 394 | Street light               |     |                              |      | STR |
| Asset.395 | 395 | Street light               |     |                              |      | STR |
| Asset.396 | 396 | Street light               |     |                              |      | STR |
| Asset.397 | 397 | Street light               |     |                              |      | STR |
| Asset.398 | 398 | Street light               |     |                              |      | STR |
| Asset.399 | 399 | Street light               |     |                              |      | STR |
| Asset.400 | 400 | Street light               |     |                              |      | STR |
| Asset.401 | 401 | Street light               |     |                              |      | STR |
| Asset.402 | 402 | Street light               |     |                              |      | STR |
| Asset.403 | 403 | Street light               |     |                              |      | STR |
| Asset.404 | 404 | Street light               |     |                              |      | STR |
| Asset.405 | 405 | Fence                      |     |                              |      | FEN |
| Asset.406 | 406 | Bin                        | Bin | Welcome Rest Stop - Six Mile | 2017 | BIN |
| Asset.407 | 407 | Bollard                    |     |                              |      | BL  |
| Asset.408 | 408 | Fence                      |     |                              |      | FEN |
| Asset.409 | 409 | Sign - Dune Rehabilitation |     |                              |      | SIG |
| Asset.410 | 410 | Sign - Keep off Dunes      |     |                              |      | SIG |
| Asset.411 | 411 | Sreet Warning sign         |     |                              |      | SRE |
| Asset.412 | 412 | Footpath                   |     |                              |      |     |
| Asset.413 | 413 | Sign - Prohibited          |     |                              |      | SIG |
| Asset.414 | 414 | Street light               |     |                              |      | STR |
| Asset.415 | 415 | Bin                        | Bin | Welcome Rest Stop - Six Mile | 2017 | BIN |
| Asset.416 | 416 | Bin                        | Bin | Welcome Rest Stop - Six Mile | 2017 | BIN |
| Asset.417 | 417 | Street light               |     |                              |      | STR |
| Asset.418 | 418 | Street light               |     |                              |      | STR |
| Asset.419 | 419 | Sign                       |     |                              |      | SIG |
| Asset.420 | 420 | Bin                        | Bin | Welcome Rest Stop - Six Mile | 2017 | BIN |
| Asset.421 | 421 | Street light               |     |                              |      | STR |
| Asset.422 | 422 | Street light               |     |                              |      | STR |
| Asset.423 | 423 | Bin                        | Bin | Welcome Rest Stop - Six Mile | 2017 | BIN |
| Asset.424 | 424 | Sign                       |     |                              |      | SIG |
| Asset.425 | 425 | Street light               |     |                              |      | STR |
| Asset.426 | 426 | Shed Structure ? x2        |     |                              |      | SHE |

|           |     |                                 |      |       |
|-----------|-----|---------------------------------|------|-------|
| Asset.427 | 427 | Sign                            |      | SIG   |
| Asset.428 | 428 | Street light                    |      | STR   |
| Asset.429 | 429 | Sign - Warning                  |      | SIG   |
| Asset.430 | 430 | Street light                    |      | STR   |
| Asset.431 | 431 | Formal Access Road - 4 Mile     |      |       |
| Asset.432 | 432 | BS3 Bus Shelter                 | CCTV | BS    |
| Asset.433 | 433 | FPN0005_001                     |      | FPN   |
| Asset.434 | 434 | FPN0005_002 - Footpath          |      | FPN   |
| Asset.435 | 435 | FPN0005_003 - Footpath          |      | FPN   |
| Asset.436 | 436 | FPN0007_001 - Footpath          |      | FPN   |
| Asset.437 | 437 | FPN0012_002                     |      | FPN   |
| Asset.438 | 438 | FPN0022_002 Footpath            |      | FPN   |
| Asset.439 | 439 | FPN0023_001                     |      | FPN   |
| Asset.440 | 440 | FPN0024_001                     |      | FPN   |
| Asset.441 | 441 | FPN0024_002                     |      | FPN   |
| Asset.442 | 442 | FPN0032_001                     |      | FPN   |
| Asset.443 | 443 | FPN0035_001                     |      | FPN   |
| Asset.444 | 444 | FPN0039_001                     |      | FPN   |
| Asset.445 | 445 | FPN0040_006                     |      | FPN   |
| Asset.446 | 446 | FPN0044_002                     |      | FPN   |
| Asset.447 | 447 | FPN0047_001                     |      | FPN   |
| Asset.448 | 448 | FPN0048_001                     |      | FPN   |
| Asset.449 | 449 | FPN0243_001                     |      | FPN   |
| Asset.450 | 450 | FPN0434_001                     |      | FPN   |
| Asset.451 | 451 | FPN0434_002                     |      | FPN   |
| Asset.452 | 452 | Sign - Blue                     |      | SIG   |
| Asset.453 | 453 | WIFI _ Not working              |      | WIF   |
| Asset.454 | 454 | Sheds - Western Power?          |      | SHE   |
| Asset.456 | 456 | BIN                             |      | BIN   |
| Asset.457 | 457 | Sign                            |      | SIG   |
| Asset.458 | 458 | Sign                            |      | SIG   |
| Asset.459 | 459 | Sign                            |      | SIG   |
| Asset.461 | 461 | Sign Cooke Point Interpretative |      | SIG   |
| Asset.462 | 462 | Sign Dog Walking                |      | SIG   |
| Asset.463 | 463 | Sign - No Offroad Vehicles      |      | SIG   |
| Asset.464 | 464 | Fence                           |      | FEN   |
| Asset.455 | 455 | Access Rd                       | CCTV | CCTV  |
| Asset.460 | 460 | Mangroves                       |      |       |
| Asset.465 | 465 | Bollard                         |      | BL    |
| Asset.466 | 466 | Lights                          |      | LIGHT |
| Asset.467 | 467 | Light                           |      | LIGHT |
| Asset.468 | 468 | Light                           |      | LIGHT |
| Asset.469 | 469 | Light                           |      | LIGHT |
| Asset.470 | 470 | Sign                            |      | SIG   |
| Asset.471 | 471 | Gate                            |      |       |
| Asset.472 | 472 | Crocodile Sculpture             |      |       |



**Appendix C - Materials and Finishes Palette**

# Symbol References

## Existing Conditions



### STORM SURGE

Subject to seasonal and cyclonic storm surge in major weather events. Potential to cause severe coastal erosion.



### INUNDATION

Subject to seasonal and major weather event inundation from storm surge and flooding.



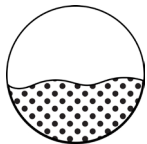
### ROCK-BASED SHORE

Loose and outcropping rock shoreline with minimal marine-based sand deposits evident.



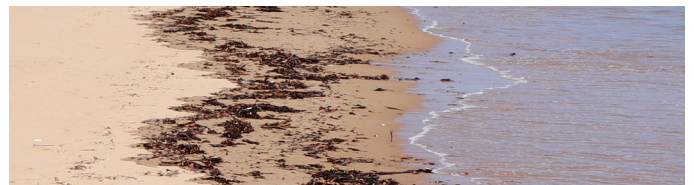
### MIXED ROCK + SAND

Loose and outcropping rock with overlying beach sand and dunes.



### SAND-BASED SHORE

Predominantly sandy beaches and bars. Potential for underlying rock near rocky-based shorelines.



### TURTLE BREEDING

Significant conservation area for turtle egg-laying and hatchlings emergence. Special lighting controls apply.



## Proposed Management Options

### SURRENDER

Long term retreat and surrender of infrastructure and assets. Minimize protection measures to rehabilitation.



### PROTECT

Take measures to protect infrastructure, properties and assets from coastal processes and erosion.



### SEA WALL

Mass rock edge structures to protect infrastructure, properties and assets from coastal processes and erosion.



### GROYNE

Rock groyne structure to intercept longshore coastal processes to accrete sand and protect erosion areas



### REPLENISH

Sand nourishment to beach area.

Note: Turtle sensitive areas will require approved sand source & composition.



### 4WDs PROHIBITED

Sensitive dune vegetation and beach areas to be protected from vehicular erosion and access damage.



## LEGEND



#### BEACH ACCESS

boardwalk or stairs | gravel path 1.8m



#### CONCRETE PAVING

dual use path 3m | access path 1.8m



#### PROPOSED TREE

native evergreen | feature tree



#### DUNE REHABILITATION

weed control | fencing | planting | seeding



#### MANGROVE REHABILITATION

research | planting | monitoring



#### PARKING FACILITIES

one tree every 5 bays



#### MAJOR INTERPRETIVE NODE

information hub | interpretive signage



#### MINOR WAY FINDING NODE

rules of access signage | interpretive signage



#### PUBLIC TOILETS

universal access change facilities



#### RESTAURANT | CAFE

bistro | bar | alfresco



#### KIOSK | CAFE

coffee | ice creams | alfresco



#### PICNIC SHELTER | REST STOP

open-sided shelter | tables + bench seating



#### REHABILITATION ZONE

advanced monitoring | fenced



#### NATURE PLAY GATHERING NODE

log hops & boulder balance interactives



#### INTEGRATED ARTWORK

interpretive paving | sculptures | urban art



#### OUTDOOR MEETING NODE

log & boulder seating for 30+ persons



#### 4WD ACCESS PROHIBITED

traffic control | fencing | bollards



### Feature Insitu Paving



Name: In situ Coloured Concrete Path

Finish: Exposed Aggregate

### Tactile Paving



Name: Urban Stone - TGSI Type A + B

Finish: Shotblast finish , Colour - Noir

### Dual-use Path



Name: Natural Grey Concrete Paving

Finish: Broomed

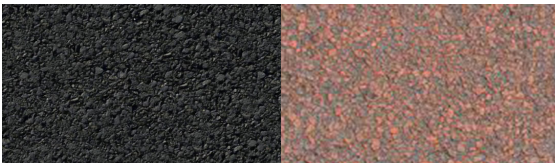
### Decking



Name: Composite Decking

Finish: Natural Anti-slip finish

### Road Pavement



Name: Asphalt Road + Pathways

Colour: Black to roads | Red to paths

### Retaining Walls



Name: Sandstone Wall (Local Stone)

Finish: Drystone or raked joints

### Granular Paving



Name: Local Gravel Fines

Finish: Compacted / consolidated

Colour: Light coloured, warm tones

\* Coastal pathways subject to erosion

### Boulders



Name: Locally-sourced Boulders

Finish: Natural Iron Stone

Dimensions: 1000 - 1500mm size

## Hardscape

A simple, durable, safe and distinctive palette of hard landscape materials has been selected consisting of concrete in a variety of colours, textures and formats as well as composite decking, local stone, stainless steel and corrosion-resistant aluminium.

The materials are arranged to emphasize the hierarchy of public spaces and key east - west routes across the site. These complementary materials will be installed using simple, coordinated detailing and a high quality of workmanship.

Hardscape material selections and have been made on the basis of the following sustainability considerations:

Low embodied energy

- Low water footprint
- High durability (offset against cost)
- Low maintenance requirements
- High recyclable content
- Natural local material

Decking has been included within the hardscape materials palette to provide a level of warmth and seaside comfort not offered by stone and concrete.

The use of concrete in the public domain is limited to the use of 'low-heat' cement-base concrete for in situ paving, steps, retaining walls and footings to minimise the impact of energy and water input in the production of cement. This product is made up 40% recycled fly ash. A by-product from steel smelting processes.

Concrete finishes will be varied from off-form, exposed aggregate, broomed and patterned, dependent on its location and relative to the precinct character guidelines interpretation strategy to be developed in the next phase of design.





Park Table and Benches - aluminium battens and frame



Litter Bin - stainless steel



Park Bench Seat - aluminium battens and frame



Bike Hoop - stainless steel



Informal Picnic Tables - recycled plastic + concrete seating



Drinking Fountain - DDA stainless steel + dog bowl



Mass Granite Terraces (accessible sea wall edges)



Bollards - recycled plastic



## **Furnishings**

The furnishings for Port Hedland's Foreshore are selected for durability in the coastal environs and organized to encourage a broad range of social interactions. A series of generously dimensioned seating elements are placed strategically at key locations along the foreshore where coastal erosion risk is minimal. Where furnishings are damaged by storm events they will not be replaced in those locations.

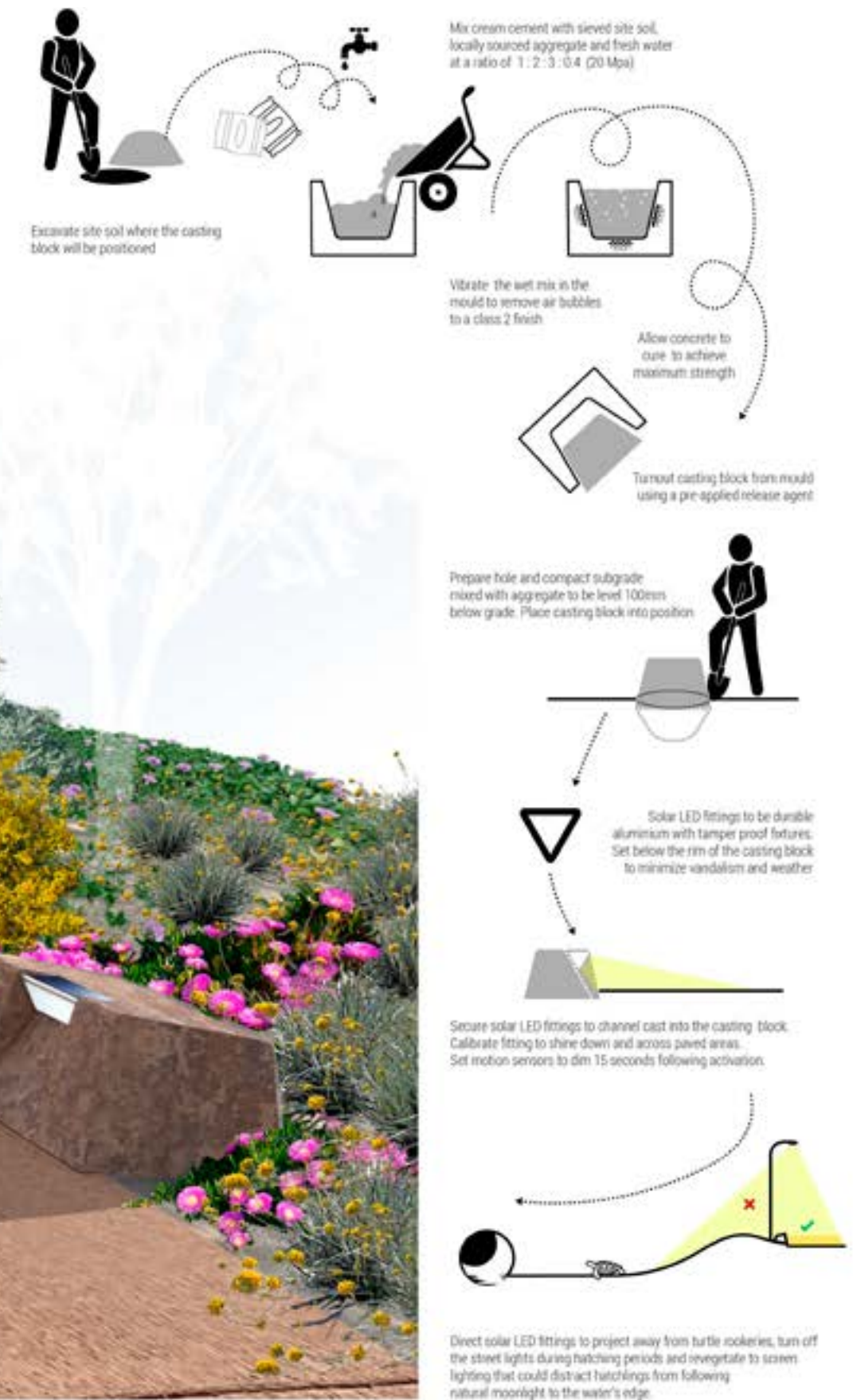
All furniture will be located in positions that are not obstructive, and will help to guide people through the site and offer views to the coastal features. The furniture will be supplemented by planter edges, walls and occasional boulders which will act as informal perching spots and play elements.

The furniture will be a mixture of permanent features and dual-purpose elements incorporating way-finding and interpretive signage, low-level lighting and public art.

A series of standard, off-the-shelf street furnishings - including bicycle stands, bins bollards and seating has also been selected.

The manufacturers and model of these street furnishings will be consistent with Town of Port Hedland's street furniture palette and their established maintenance requirements.





## Lighting

Evening lighting along this coastline is seasonally sensitive to turtle hatchlings emerging that naturally follow the light of the moon to the water's edge. Street and artificial lighting can distract hatchlings from reaching their destination to the ocean and this requires management.

The lighting alternative above is designed to be produced locally and to highlight the dual use pathway along the coast with minimal light overspill. These coupled with a longer-term strategy to revegetate the dunes to screen lighting that could affect sensitive rookery areas.





4WD's are a common feature of Port Hedland beaches



4WD dune erosion



Lockable gates to entry points to control seasonal access



Bollards - removeable



Visual bollard markers in sensitive areas to deter drivers



Flatback Turtle on beach



## **Vehicular Access**

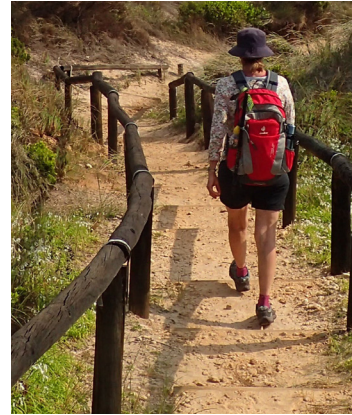
Vehicular access and four wheel drive (4WD's) are a key management issue for the foreshore reserve in Port Hedland. Many local residents and visitors are accustomed to driving along the beach despite these environments being sensitive to wheel disturbance and degradation of vegetation cover along the coast.

Turtle hatcheries along the coast are particularly sensitive to vehicular traffic and management of access to hatcheries during the turtle breeding season is recommended to ensure young turtles find their safely back to the ocean as they emerge.

Outside of Turtle breeding and hatchery season 4WD access to areas where erosion is less of an issue should be permitted with educational signage incorporated at key entry points and with driving and fishing clubs to establish a code of conduct when off road. Drivers should be made aware that destroying coastal vegetation has ongoing implications for management, revegetation and erosion. Where erosion and loss of vegetation is clearly caused by off road vehicles access should be limited and policed by Rangers to protect the coastal environment, minimise further damage and reinforce educational messages to the community.



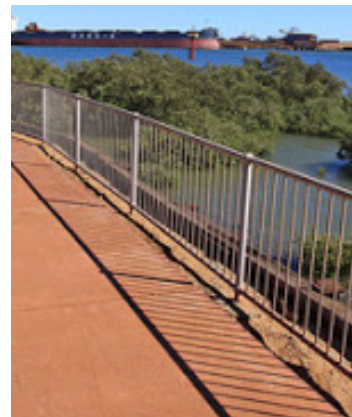
Visual deterrent seating walls



Guiding railing



Secure fencing - black plastic coated chain mesh infill



Safety railing - galvanised



Timber or steel stairs to steep access points



Raised board walks

## **Pedestrian Access**

Pedestrian access to the dunes and the beach are equally important to manage. The key to providing well organised, convenient and legible walking trails is to identify where people currently walk and address those routes first by reinforcing desire-lines with guiding signage, wayfinding mechanisms and fencing where needed.

Pathways should be well defined with a firm, durable and consistent surface material like concrete paving, asphalt, board walks or stabilised gravel where paths are subject to occasion storm surge erosion. If a paved pathway is impacted by a major storm or erosion event the spoils should be removed and replaced with a stabilised gravel finish that can be reinstated at low cost in future. If erosion or washouts pose a safety risk the accessibility should retreat and be fenced off if reinstatement is not practical.

Sensitive areas or popular places subject to regular inundation may justify elevated board walks for pedestrian access. Recycled plastic and composite decking are good alternatives to timber where termites and maintenance issues are prevalent.

At junctions and nodes, low masonry walling built to a seating height will guide pedestrians to the preferred access points. These masonry elements should be well setback from active erosion edges and incorporate low level solar lighting (directed away from turtle rookeries) to assist with evening navigation where seasonal lighting is reduced.

To minimise visual clutter along the coast, interpretive signage should be incorporated into seating wall surfaces along with artwork and interesting facts about that location. Art initiatives should also include local indigenous stories, artwork and community -based projects to provide a local custodianship of the foreshore environment.





01



02



03



04



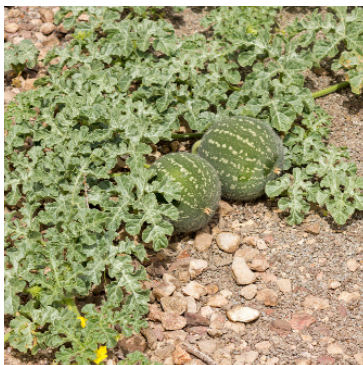
05



06



07



08

## Trees

### Species

- 01 *Calotropis procera*
- 02 *Cocos nucifera*
- 03 *Tamarix aphylla*

### Common name

- Apple of Sodom
- Coconut Palm
- Athel Tamarisk

## Shrubs

### Species

- 04 *Aerva javanica*
- 05 *Agave americana*
- 06 *Arundo donax*

### Common name

- Kapok Bush
- Agave
- Giant Reed

## Groundcovers

### Species

- 07 *Cenchrus ciliaris*
- 08 *Cucumis myriocarpus*

### Common name

- Buffel Grass
- Paddy Melon

## Weed Control

The introduction and spread of weeds poses one of the biggest threats to Port Hedland's coastal environment. Weeds displace native species changing the natural diversity of ecological communities leading to further habitat degradation and necessitates ongoing management efforts.

The widespread nature of weed infestations across on the foreshore reserve represents a significant task to control them, particularly Buffel Grass and Kapok Bush. Woody weeds and trees can be effectively controlled by physical removal, however re-infestation from neighbouring private lots will continue to present management issues until that species can be eradicated from the area.

Weed control should be focussed on parcels of the foreshore earmarked for rehabilitation first to give new planted native plants an opportunity to establish without being choked out by prolific weeds like Buffel Grass. These efforts should occur preceding and throughout the wet season to allow rehabilitation planting and seeding to establish on natural rainfall patterns.

Similarly the physical removal or spraying of weeds should be closely followed by revegetation efforts to maintain vegetative cover in order to minimise the impacts of wind and tidal erosion.





Bruguiera exaristata



Rhizophora stylosa



Acacia adoxa



Acacia ampliceps



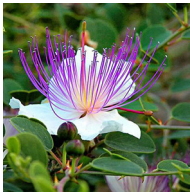
Acacia bivenosa



Acacia sclerosperma



Acacia stellaticeps



Capparis spinosa



Cochlospermum fraseri



Crotalaria cunninghamii.



Tecticornia lepidosperma



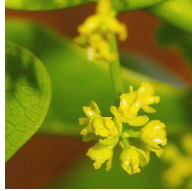
Themeda triandra



Cynanchum floribundum



Gossypium australe



Tinospora smilacina



Triodia epactia



Scaevola crassifolia



Senna artemisioides ssp oligophylla



Aristida inaequiglumis



Canavalia rosea



Enchylaena tomentosa



Euphorbia australis



Ipomoea pes-caprae



Ptilotus exaltatus



Solanum lasiophyllum



Spinifex longifolius

## Trees

### Species

*Bruguiera exaristata*

*Rhizophora stylosa*

### Common name

Ribbed Mangrove

Stilted Mangrove

## Shrubs

### Species

*Acacia adoxa*

*Acacia ampliceps*

*Acacia bivenosa*

*Acacia sclerosperma*

*Acacia stellaticeps*

*Capparis spinosa*

*Cochlospermum fraseri*

*Crotalaria cunninghamii*

*Cynanchum floribundum*

*Gossypium australe*

*Scaevola crassifolia*

*Senna artemisioides ssp oligophylla*

*Teucrium racemosum*

### Common name

Grey Whorled Wattle

Salt Wattle

Two Nerved Wattle

Limestone Wattle

Northern Star Wattle

Caper Bush

Kapok bush

Green birdflower

Dumara Bush

Cotton Plant

Thick Leaf Scaevola

Silver Senna

Grey Germander

## Groundcovers

### Species

*Aristida inaequiglumis*

*Canavalia rosea*

*Cymbopogon ambiguus*

*Enchylaena tomentosa*

*Euphorbia australis*

*Grevillia thelemanniana*

*Ipomea muelleri*

*Ipomea pes-caprae*

*Ipomoea brasiliensis*

*Ipomoea costata*

*Ipomoea muelleri*

*Ptilotus exaltatus*

*Solanum lasiophyllum*

*Spinifex longifolius*

*Swainsona pterostylis*

*Tecticornia lepdidosperma*

*Themeda triandra*

*Tinospora smilacina*

*Triodia epactia*

*Triraphis mollis*

### Common name

Feathertop Threeawn

Northern Tinsel Flower

Lemon Scented Grass

Dampier Pea

Namana

Sea Spray

Poison Morning Glory

Beach Morning Glory

Goat's Foot Creeper

Rock Morning Glory

Native Morning Glory

Tall Mulla mulla

Bush Tomato

Beach Spinifex

Dampier Pea

WA Samphire

Kangaroo Grass

Snake Vine

Soft Spinifex

Needle Grass



## Primary Dune Rehabilitation



The primary dune is the area adjacent the littoral zone along the coast that is at most risk of coastal erosion. Establishing vegetative cover to this zone is critical in stabilising wind blown sand and will assist in combating erosion of inshore environments for smaller, more frequent storm events.

Establishment of plants in this hostile environment is difficult and requires careful planning with seasonal rains to ensure recruitment of plants is widespread and achieves good coverage. Short term stabilisation measures using rabbit guards and geofabrics in active erosion areas will need to be planned to ensure the stabilisation measures do not mobilise and become a source of pollution along the coast and in the marine environment.

Certain pioneer species like *Ipomea*, *Canavalia* and *Spinifex* are the first wave of rehabilitation efforts that will bind the soil and create sheltered pockets for larger, slower-growing species to be introduced in subsequent planting efforts. It is also important to select plants suited to the proximity to the waters edge. The larger woody species are more likely to establish further from the waters edge and in more elevated positions.



Acacia citrinoviridis



Acacia distans



Acacia dunnii



Acacia pruinocarpa



Acacia victoriae



Casuarina equisetifolia



Corymbia zygomphyla



Cupaniopsis anacardioides



Hakea lorea



Myoporum montanum



Eucalyptus camaldulensis



Lysiphillum cunninghamii



Ptilotus calostachyus



Ptilotus rotundifolius



Melaleuca leucadendra



Mimusops elengi



Senna glutinosaa



Senna notabilis



Templetonia retusa



Brachyscombe iberidifolia



Eremophila compacta



Eremophila pterocarpa



Grevillea eriostachya



Grevillea refracta

## Trees

### Species

*Acacia citrinoviridis*

*Acacia distans*

*Acacia dunnii*

*Acacia holosericea*

*Acacia pruinocarpa*

*Acacia victoriae*

*Casuarina equisetifolia*

*Corymbia zygomphyla*

*Cupaniopsis anacardioides*

*Eucalyptus camaldulensis*

*Lysiphillum cunninghamii*

*Melaleuca leucadendra*

*Mimusops elengi*

*Owenia reticulata*

*Terminalia cattapa*

### Common name

Pilbara Jam

Manggurda Wattle

Elephant ear wattle

Strap wattle

Western Gidgee

Sandhill Tea-tree

River Sheoak

Broome Bloodwood

Tuckeroo

River Red Gum

Native Bauhinia

Paper Bark

Red Condoo

Pundul Tree

Beach Almond

## Shrubs

### Species

*Acacia acradenia*

*Acacia ancistrocarpa*

*Acacia atkinsiana*

*Acacia coriacea*

*Acacia cowleana*

*Acacia levata*

*Acacia maitlandi*

*Acacia monticola*

*Acacia orthocarpa*

*Acacia pyrifolia*

*Acacia spondylophylla*

*Acacia trachycarpa*

*Acacia translucens*

*Acacia tumida*

*Eremophila compacta*

*Eremophila fraseri*

*Eremophila glabra*

*Eremophila maculata*

*Eremophila pterocarpa*

*Eucalyptus gamophylla*

*Grevillea eriostachya*

*Grevillea pyramidalis*

*Grevillea refracta*

*Hakea lorea ssp lorea*

*Melaleuca nervosa*

*Myoporum montanum*

*Ptilotus rotundifolius*

*Senna glutinosa ssp glutinosa*

*Senna notabilis*

*Templetonia retusa*

### Common name

Silky Wattle

Maiden Wattle

Atkins Wattle

Dogwood

Wathmallu

Woodstock Wattle

Maitlands Wattle

Curly-bark Wattle

Pilbara Weeping Wattle

Ranji Bush

Curry Wattle

Pilbara Minni Ritchi

Poverty Bush

Pindan Wattle

Emu bush

Turpentine Bush

Tar Bush

Spotted Emu Bush

Silver Poverty Bush

Twin Leaf Mallee

Yellow Flame Grevillea

West Pilbara

Silver Leaf Grevillea

Bootlace Oak

Broad-leafed Paperbark

Native Myrtle

Royal Mulla Mulla

Green Acacia

Cockroach Bush

Cookies Tongue

## Groundcovers

### Species

*Brachyscombe iberidifolia*

*Grevillia obtusifolia*

*Ptilotus calostachyus*

*Swainsona maccullochiana*

### Common name

Pilbara Daisy

Gin Gin Gem

Weeping Mulla Mulla

Ashburton Pea

## Secondary Dune Rehabilitation



The primary dune is the area directly behind the primary dunes and tends to be more elevated and undulating. A wider variety of plants will survive here, further from the salt water and active erosion edge. Several trees are able to cope with this slightly less hostile environment with wider range of shrubs grasses and groundcovers suited to rehabilitation works.

This area tends to be subject to erosion in major storm events and sands will mobilise with wind erosion if vegetation is removed. This is often where natural blow-outs occur along the coastline and once denuded, revegetation can be difficult to manage and re-establish. Seeding in this environment will be more successful than the primary dunes due to pockets of shelter offered by established vegetation and dunal swales. This will also support weeds more readily and invasive species will be important to manage where revegetation is proposed.

Many of the plants that will grow in this zone have spectacular floral displays that are best appreciated at close range and are not easily seen from passing vehicles. Rehabilitating the natural flora will attract people to appreciate the local environment and plants will provide numerous interpretive opportunities and indigenous bush knowledge and stories.





Atalaya hemiglauca



Corymbia hamersleyana



Corymbia opaca



Corymbia aparrerinja



Erythrina vespertilio



Eucalyptus alba



Eucalyptus leucophloia



Eucalyptus socialis



Acacia colei



Acacia hilliana



Eucalyptus victrix



Melaleuca argenta



Acacia wanyu



Brachyscome ciliaris



Terminalia canescens



Terminilia platyphylla



Eremophila glabra



Eremophila macdonnellii



Gomphrena canescens



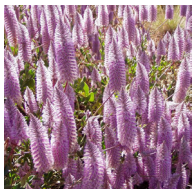
Grevillea wickhamii



Melaleuca glomerata



Newcastelia cladotricha



Ptilotus exaltatus



Swainsona formosa

Trees

Species

Acacia cyperophylla  
Atalaya hemiglauca  
Brachychiton gregorii  
Corymbia aparrerinja  
Codonocarpus cotinifolius  
Corymbia deserticola  
Corymbia hamersleyana  
Corymbia opaca  
Erythrina vespertilio  
Eucalyptus alba  
Eucalyptus leucophloia  
Eucalyptus socialis  
Eucalyptus victrix  
Melaleuca argentea  
Terminalia canescens  
Terminalia platyphylla

Common name

Red Mulga  
Whitewood  
Desert Kurrajong  
Ghost Gum  
Desert Poplar  
Desert Bloodwood  
Pilbara Bloodwood  
Desert Bloodwood  
Yulbar  
White Gum  
Snappy Gum  
Red Mallee  
Coolibah  
Silver Cadjeput  
Native Almond  
Wild Plum

Shrubs

Species

Acacia arida  
Acacia colei  
Acacia dictyophleba  
Acacia hilliana  
Acacia wanyu  
Eremophila macdonnellii  
Grevillea wickhamii  
Melaleuca glomerata

Common name

Arid Wattle  
Strap Wattle  
Waxy Wattle  
Hill's Tabletop Wattle  
Wanyu  
Desert Fuchsia  
Wickhams Grevillea  
Inland Tea

Groundcovers

Species

Brachyscome ciliaris  
Eremophila glabra  
Ptilotus exaltatus  
Newcastelia cladotricha  
Swainsona formosa

Common name

Variable Daisy  
Tar Bush  
Tall Mulla mulla  
Pink Gem  
Sturts Desert Pea

## Tertiary Dune Rehabilitation



The tertiary dunal area consists of the most inland parts of the foreshore reserve. Trees are more likely to establish in this zone and with potential access to irrigation, most of the trees in the Town's preferred planting guide will be viable options. The primary aim here is to improve canopy cover along the coast coupled with mixed native understorey species, vegetative cover could be dramatically enhanced.

The trees nominated left are typically native species to the area and efforts to replace exotic trees with local species in both public and private land holdings will help to ensure a better habitat is promoted for improve natural and cultural values.

The tertiary dunal zone is the most frequented area by the public and planting selections will need careful consideration with regard to maintaining and framing views, planting and shade around car parks and creating interest and shade along dual use path alignments.

▼ The foreshore is a much loved playground for locals and visitors alike, and adds a unique respite from the hot and dry of the Pilbara.

The Town of Port Hedland Coastal Foreshore Management Plan will serve the Town as a blueprint for the future use of its highly valued coastal foreshore.

