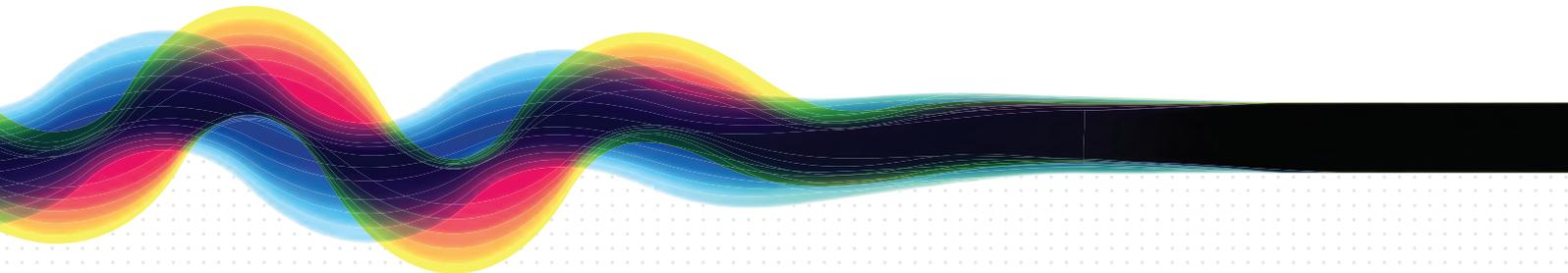


# Stables

## Structure Plan

December 2020 | 20-213



We would like to acknowledge the Kariyarra, Ngarla, and Nyamal people as the Traditional Custodians of the Town of Port Hedland lands.

We recognise their strength and resilience and pay our respects to their Elders past and present.

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Document ID: /Volumes/Graphics/2020/20-213 Port Hedland, Stables Structure Plan and Scheme Amendment/Structure Plan Report/20-213 Structure Plan Stables Report Folder/FINAL/20-213 Structure Plan Stables Report V2 Folder/20-213 Structure Plan Stables Report Final Dec.indd

Issue	Date	Status	Prepared by	Approved by
1	17.07.20	DRAFT	Justin Page	Matt Raymond
2	23.07.20	DRAFT	Justin Page	Matt Raymond
3	24.07.20	FINAL	Justin Page	Matt Raymond

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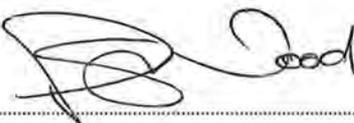
## CERTIFICATION OF APPROVED STRUCTURE PLAN

This Structure Plan is prepared under the provisions of the **Town of Port Hedland Local Planning Scheme No. 5** and in accordance with the *Planning and Development (Local Planning Schemes) Regulations 2015*

IT IS CERTIFIED THAT THIS STRUCTURE PLAN  
WAS APPROVED BY RESOLUTION OF  
THE WESTERN AUSTRALIAN PLANNING COMMISSION ON:

20/1/2021 Date

Signed for and on behalf of the Western Australian Planning Commission

  
.....

An officer of the Commission duly authorised by the Commission pursuant to section 16 of the *Planning and Development Act 2005* for that purpose, in the presence of:

  
.....Witness

20/1/2021 Date

20/1/2031 Date of Expiry of this Structure Plan

# Table of Amendments to Structure Plan

Amendment No.	Description of Amendment	Amendment Type	Date Endorsed by WAPC

# Executive Summary

This structure plan has been prepared for the ‘Stables’ future urban development site within the East End of Port Hedland. The site comprises various Crown Land allotments (totalling approximately 27.16 hectares) with management under the Town of Port Hedland, Regional Power Corporation or is unallocated Crown Land. The structure plan is intended to guide the future use, subdivision and development of land within the site area.

There is an emerging need to ensure an adequate supply of housing in Port Hedland, triggered by anticipated population growth and the need to reduce residential land use in West End, due to concerns over dust and public health. The local planning framework has identified Port Hedland’s East End as a suitable area to accommodate future population growth and the potential relocation of residential use from West End. The Stables site is one of the identified areas for potential future residential development.

This structure plan is prepared concurrent with the Town of Port Hedland Town Planning Scheme No. 5 – Scheme Amendment No. 84. Amendment No. 84 proposes to reclassify and rezone the subject site to ‘Urban Development’ zone. With the adoption of the Town of Port Hedland Coastal Hazard Risk Mapping and Adaptation Plan (CHRMAP) in April 2019, there is sufficient planning guidance for decision making to consider the proposed structure plan.

A CHRMAP is required under State Planning Policy 2.6 ‘State Coastal Planning’ to inform the viability (including any adaptation measures) for consideration of locating future residential areas in areas potentially subject to coastal hazard risk (i.e. flood inundation). The CHRMAP findings indicated urban development could be considered on the Stables site, subject to the provision of appropriate coastal protection works and further planning investigations.

Based on discussions with key stakeholders and a review of the knowledge and understanding of the site’s significance and environmental context, in the Pretty Pool Creek area, the proposed structure plan appropriately balances planning, heritage and environmental aspects.

Key considerations adopted under the proposed structure plan include:

- CHRMAP management of coastal hazard risks including provision of adequate coastal protection works;
- Appropriate residential densities, building form and height to restrict urban light spill impacts to turtle nesting sites at Cemetery Beach and Pretty Pool Beach,
- Protection of significant cultural aboriginal heritage sites (i.e. site containing a midden and engravings)
- Creation of a foreshore reserve to adequately buffer the Pretty Pool Creek mangrove habitat from urban development
- Provision of adequate public open space
- Appropriate interface of urban development with foreshore reserve
- Management of stormwater drainage, and
- Continued use of intertidal mudflats for recreation and wildlife habitat.

The following table is a summary of the proposed structure plan.

Item	Data	Section number referenced within the Structure Plan Report
Total area covered by the Structure Plan	27.16 hectares	1.2.2
Area of each land use proposed		
• Residential	9.04 hectares	5.2
• Roads	3.36 hectares	
• Public Open Space and Drainage	1.82 hectares	
• Foreshore Reserve	12.94 hectares	
Total estimated lot yield	188 lots	5.2
Estimated number of dwellings	188 single/grouped dwellings	5.2
Estimated residential density		
• Per site hectare	20 dwellings per site hectare	5.2
Estimated Population (average 2.8 people/household)	526 people	5.2
Estimated area and percentage of public open space given over to:		5.4
• Local Parks	0.75 ha (7.6% POS)	
• Foreshore	12.94 ha (No credit as POS)	
• Drainage	0.36 ha (No credit as POS)	

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# **PART ONE**

# **IMPLEMENTATION**

# Part One – Implementation

## 1. Structure Plan Area

The structure plan is identified as the Stables Structure Plan (plan reference 20-213 ST-1). This structure plan shall apply to the land contained within the inner edge of the line denoting the structure plan boundary on the Structure Plan Map.

## 2. Operation

The date the structure plan comes into effect is the date the structure plan is approved by the Western Australian Planning Commission as set out in the Structure Plan - Certification Page.

## 3. Staging

Development in the structure plan is likely to be delivered in at least two stages, mainly influenced by market forces, once the existing Port Hedland Pony Club and Port Hedland Turf Club users have left the site. There are no specific triggers for staging of development.

The boundary and extent for Stage 1 would likely encompass the majority of the site around the existing Pony Club facility all the way to the eastern boundary of the structure plan. This area requires the least amount of fill. Stage 1 would include the construction of the public open space.

Permanent coastal protection works (i.e. rock revetment) would be constructed interfacing with the foreshore reserve, with the extent during Stage 1 to be determined as part of subdivision approval. The initial Stage 1 western boundary around the edge of the linear residential use would require the build-up of temporary 'soft edge' (battered) coastal protection works on its western edge behind the permanent coastal protection works. Provision of the temporary coastal protection works would be to the satisfaction of the Town of Port Hedland.

Stage 2 would likely cover the remaining balance western linear strip extending from the main residential area of the structure plan. The timeframe for undertaking Stage 2 is unlikely to be delayed for any long period of time, as the temporary 'soft edge' coastal protection works would require continual on-going monitoring and maintenance by the developer, under an agreed foreshore management plan with the Town. As soon as the next stage is ready to commence, it is envisaged it will be undertaken as quickly as possible, so that permanent coastal protection works can be installed.

Staging of development would be reflected in a Foreshore Management Plan, which would identify works and responsibilities for management of the foreshore area during staging.

## 4. Subdivision and Development Requirements

### 4.1 Land Use and Permissibility

The structure plan outlines the Zones and Reserves applicable within the structure plan area and these will guide future subdivision and development of the land. Land use permissibility within the structure plan area shall generally be in accordance with the corresponding Zone and/or Reserve under the Town of Port Hedland Local Planning Scheme.

## 4.2 Residential Density

- i) The structure plan defines the areas for low and medium density residential codes that apply to the structure plan. Residential densities for lots are to be assigned in accordance with a Residential Code Plan, in consultation with the local authority and approved by the Western Australian Planning Commission.
- ii) A Residential Code Plan shall be prepared in consultation with the local authority and shall be submitted at the time of subdivision to the Western Australian Planning Commission. The Residential Code Plan shall indicate the R-Code applicable to each lot within the subdivision and shall be consistent with the structure plan locational criteria herein provided.
- iii) Approval of the Residential Code Plan shall be undertaken at the time of the determination of the subdivision application by the Western Australian Planning Commission. The approved Residential Code Plan shall then form part of the structure plan and shall be used for the determination of future development applications.
- iv) Variations to the Residential Code Plan will require further approval of the Western Australian Planning Commission, with a revised Residential Code Plan submitted generally consistent with the approved plan of subdivision issued by the Western Australian Planning Commission. The revised Residential Code Plan shall be consistent with the structure plan locational criteria.
- v) A revised Residential Code Plan, consistent with (v) above will replace, wholly or partially, the previously approved residential density code plan, and shall then form part of the structure plan as outlined in (iv) above.
- vi) Residential Code Plans are not required if the Western Australian Planning Commission considers that the subdivision is for one or more of the following:
  - the amalgamation of lots;
  - consolidation of land for “superlot” purposes to facilitate land assembly for future development;
  - the purposes for facilitating the provision of access, services or infrastructure; or
  - land which by virtue of its zoning or reservation under the structure plan cannot be developed for residential purposes.

### Locational Criteria

The allocation of residential densities on the Residential Code Plan shall be in accordance with the following criteria:

#### Residential Low Density

- 1) The R20 code applies as the base code to areas identified as Residential Low Density on the structure plan map.

#### Residential Medium Density

- 2) The R25 code applies as the base code to areas identified as Residential Medium Density on the structure plan map.
- 3) The R40 code may be applied to lots within Residential Medium Density areas (only) where there is a desire to provide for diverse housing accommodation and the lots are within a 200m walking distance of public open space.

## 4.3 Public Open Space

Public open space is to be provided in accordance with the requirements of the Western Australian Planning Commission's Liveable Neighbourhoods framework (as amended) and generally situated as shown in the Structure Plan Map.

An updated Public Open Space Schedule is to accompany application(s) for subdivision approval in respect of the first stage of development.

#### 4.4 Local Development Plans

A Local Development Plan(s) is required to be prepared and implemented pursuant to the provisions of the Planning & Development (Local Planning Schemes) Regulations 2015, for lots with the following site attributes:

- (i) Lots abutting public open space and/or land required for drainage infrastructure.
- (ii) Lots accessed via a laneway (if required).
- (iii) Lots fronting or abutting Styles Road to ensure appropriate location of garages/carports and crossovers from internal subdivision roads and interface with Styles Road.
- (iv) Lots subject to transport noise.
- (v) Lots subject to the requirements of bushfire planning framework.

#### 4.5 Artificial light impact on wildlife

- a) Prior to subdivision and/or development approval, the developer shall prepare a detailed **Artificial Light Management Plan**, in accordance with and to the specifications of the Commonwealth National Light Pollution Guidelines for Wildlife and the Environmental Assessment Guideline for Protecting Marine Turtles from Light Impacts (Environmental Protection Authority 2010). The recommendations of the Artificial Light Management Plan shall inform subdivision design and urban built form to mitigate light spill impacts on wildlife, including turtle nesting sites at Pretty Pool Beach and Cemetery Beach. The plan shall be provided to all prospective purchasers.
- b) All landowners within the structure plan shall comply with the recommendations of the Artificial Light Management Plan.
- c) All residential development shall have a single storey maximum building height.

#### 4.6 Notifications on Title

In respect of applications for the subdivision of land the Town of Port Hedland may recommend to the Western Australian Planning Commission that a condition be imposed on the grant of subdivision approval for a notification to be placed on the Certificate(s) of Title(s) to advise of the following:

- (i) Land or lots deemed to be affected by a Bush Fire Hazard
- (ii) Building setbacks and construction standards required to achieve a Bushfire Attack Level 29 or lower in accordance with Australian Standards (AS3959-2009): Construction of buildings in bushfire prone areas
- (iii) Recommendations of the estate Mosquito Management Plan in relation to the structure plan proximity to Pretty Pool Creek, which is a known breeding area for mosquitos.
- (iv) Lots subject to transport noise.

#### 4.7 Coastal Planning Flooding Finished Development Level

- (i) All residential development shall have a minimum finished habitable development level of 6.7m AHD.
- (ii) The following are to be completed prior to the Western Australian Planning Commission granting subdivision conditional approval:
  - The developer is to submit to the Commission a detailed design and modelling of the coastal protection works to satisfy the requirements of SPP 2.6;
  - The developer is to submit to the Commission a suitable Statement/s of Undertaking from both the developer and the Town of Port Hedland, whereby these parties agree to satisfy the requirements of SPP 2.6 Policy Measure 5.7(iii)(b), through the collaborative preparation of a Foreshore Management Plan, which amongst other matters, sets the specific funding arrangements for the construction and ongoing care, control and maintenance of coastal protection works; and
  - The developer is to consult with the Town of Port Hedland and Department of Planning, Lands and Heritage and agree upon the scope and content required for the preparation of a Foreshore Management Plan, which is to address the requirements of SPP 2.6 and of which is to form the basis for the preparation and approval of a detailed Foreshore Management Plan as a condition of subdivision approval.

## 4.8 Styles Road restricted access

There shall be no vehicular and/or pedestrian access to lots abutting Styles Road. All vehicular and pedestrian access to lots abutting Styles Road is to be from proposed internal subdivision roads. As a condition of subdivision approval, the Western Australian Planning Commission may impose a restrictive covenant to be placed on titles for lots abutting Styles Road to restrict such access.

## 4.9 Transport Noise

The Western Australian Planning Commission may impose a condition subdivision approval that an Acoustic Assessment be undertaken to identify and make recommendations as to mitigation measures to address any potential impacts from transport noise on residential use. Mitigation measures are to be addressed as part of subdivision approval.

## 5. Additional Information

To facilitate subdivision of the land, the following documentation and management plans are to be prepared, as applicable, to the satisfaction of the relevant authority as outlined in Table 1:

Documentation	Stage of development	Relevant authority
<b>Cultural Heritage Management Plan</b>	Subdivision application stage	Department of Planning, Lands and Heritage
<b>Bushfire Management Plan</b>	Subdivision application stage	Department of Fire and Emergency Services
<b>Artificial Light Management Plan</b>	Subdivision application stage	Department of Biodiversity, Conservation and Attractions
<b>Mosquito and Midge Management Plan</b>	Subdivision application stage	Town of Port Hedland
<b>Marine Turtle Management Plan</b>	As a condition of subdivision approval	Department of Biodiversity, Conservation and Attractions
<b>Foreshore Management Plan</b>	As a condition of subdivision approval	Western Australian Planning Commission
<b>Mangrove Management Plan</b>	As a condition of subdivision approval	Department of Biodiversity, Conservation and Attractions
<b>Acid Sulfate Soil Management Plan</b>	As a condition of subdivision approval	Town of Port Hedland
<b>Urban Water Management Plan</b>	As a condition of subdivision approval	Western Australian Planning Commission Department of Water and Environmental Regulation
<b>Nutrient and Irrigation Management Plan</b>	As a condition of subdivision approval	Department of Water and Environmental Regulation
<b>Construction Management Plan</b>	Prior to commencement of subdivision or development site works	Town of Port Hedland



**Legend**

**Local Scheme Reserves**

-  Public Open Space
-  Environmental Conservation

**Local Scheme Zones**

-  Residential (Low Density)
-  Residential (Medium Density)

**Other**

-  Structure Plan Boundary
-  Existing Lot Boundaries
-  Local Road
-  Full Movement Intersection
-  No Vehicle Access
-  Drainage Overland Path
-  Drainage

**Notes**

- 1** No development (i.e. coastal protection works, road or drainage infrastructure etc.) is to encroach within the land parcels subject to the Kariyarra Native Title Determination

**Stables Structure Plan**



**PART TWO**  
**EXPLANATORY**

# 1. Introduction

The Stables site is government owned land comprising of various Crown Land lots. Most of the lots are managed by the Town of Port Hedland, with one lot being managed by Regional Power Corporation and others being unallocated Crown Land.

The central portion of the site has been developed as an equestrian centre for the Port Hedland Pony Club and for use by the Port Hedland Turf Club, under leases granted by the Town of Port Hedland. The balance of the site is vacant land comprising of mostly coastal dune scrub/grasses and tidal flats.

The area of the Stables urban development site is approximately 27.16 hectares and is currently undergoing a rezoning and reclassification of its existing rural zone and public purpose reservation respectively. Amendment No. 84 proposes the site to be rezoned/reclassified to 'Urban Development' zone under the Town of Port Hedland Town Planning Scheme No. 5 (TPS 5).

The urban development zone will establish a broad footprint for which further planning investigations can be undertaken to determine an appropriate use and layout for urban development. In general, planning investigations are to consider what land uses are suitable, what areas should be set aside for open space/conservation, what should be the future built form for development, provision of adequate coastal protection works and future on-going management requirements for desired uses in the structure plan area.

In May 2017 the Minister for Planning refused Amendment No. 77 to rezone/reclassify the site to urban development zone. Subsequently, although the site was identified as a future urban development site in the local planning framework, no further planning was progressed.



Image 1. The East End coastal area of Pretty Pool is unique and offers an attractive place for people to live. The Stables site is centrally located within the Pretty Pool area. (Source: Town of Port Hedland, 2020)

One of the primary reasons for the Minister's refusal of Amendment No. 77 related to outstanding planning issues pertaining to the provisions within the State Planning Policy 2.6 'State Coastal Planning Policy' - coastal and flooding hazards and the absence of a Coastal Hazard Risk Mapping and Adaptation Plan (CHRMAP) for Port Hedland. These matters have now been resolved, with the adoption of the Town's CHRMAP in April 2019.

In terms of the Stables site's potential for urban development, the site is identified in the Town of Port Hedland Port City Growth Strategy (and Draft Local Planning Strategy 2020) for future residential development. Based on planning investigations, the proposed Stables Structure Plan balances both planning, heritage, coastal, community and environmental expectations.

With a planned reduction of residential use in Port Hedland's West-End, the East-End offers opportunities to open up land for new residential development - the Stables site is one of those areas.

The Stables Structure Plan envisages a new place for people to live, one where residents can share an intimacy with the site's history and natural environment.

The tidal flats and mangroves at Pretty Pool Creek are familiar to many residents. The tidal flats and mangroves form part of Port Hedland's unique landscape and scenery, adding to a sense of place and identity. The Stables development will have a strong visual and physical connection with this iconic landscape.

The tidal flats and Pretty Pool Creek area also has significant heritage value for Aboriginal people as a place. The Stables Structure Plan development will therefore have a strong sense of place and identity. Its proximity and outlook to Pretty Pool Creek will make it an appealing place to live.

## 1.1 Project Background

Port Hedland's growth since the 1960's has largely been driven by the iron ore industry. Today Port Hedland is the largest bulk export port in the world for iron ore, with an export output of 247 million tonnes during 2012 and 513 million tonnes in 2019. Future export volume is forecast by the Port Hedland Industries Council to be 700 million tonnes by 2027. As a result of a significant increase in port operations and export movements in the last decade, concerns have been raised as to the public health risk of iron ore dust in the West End of Port Hedland.

The WA Department of Health undertook investigations into the issue of dust in West End and published the report *Port Hedland Air Quality Health Risk Assessment for Particulate Matter* (February 2016). The report concluded that there is sufficient evidence suggesting the possible negative effects on human health from dust in West End. The Department recommended improved dust management, monitoring controls and land use planning measures to reduce community exposure to dust.

In October 2018 the WA State Government adopted a whole of government approach to dealing with the management of dust in Port Hedland. This includes a proposed Improvement Plan and Scheme (IP50) that seeks to reduce the number of residential land use in the West End of Port Hedland.

As part of the Town of Port Hedland new Local Planning Strategy, future residential growth areas have been identified in the east-end of Port Hedland that fall outside of IP50. The Stables site is one of those identified areas for potential future residential development.

The Minister's refusal of Amendment No. 77 in May 2017 was primarily on the basis of an inconsistency with State Planning Policy 2.6 – State Coastal Planning Policy (SPP2.6). That inconsistency being the Town of Port Hedland had not (at that time) completed its CHRMAP. A CHRMAP is an important planning tool that informs the viability (including any adaptation measures) for locating future residential areas in the context of coastal processes and flood inundation, arising from climate change and forecast sea level rise.

In April 2019 the Town of Port Hedland adopted a CHRMAP for Port Hedland that identifies and assesses coast hazard risks, culminating in a recommended adaptation pathway to address the identified short-term and long-term risks to the area. The findings of the adopted CHRMAP provide a framework to guide future development of the Port Hedland town site. The CHRMAP informs proposed finished development levels and mitigation measures and strategies that will be necessary for development on land which is subject to coastal and tidal impacts.

The Town's adopted CHRMAP and the subsequent technical erosion and flood modelling undertaken for the structure plan supports the development of the Stables site for residential use.

The proposed Stables Structure Plan considers the original urban design layout that accompanied Amendment No. 77 (refer to Figure 1). The original design was based on various technical investigations which demonstrated urban development is feasible.

*Refer to Figure 1 – Original Amendment No. 77 urban planning design for the Stables site*



Figure 1. Original Amendment No. 77 urban planning design for the Stables site

However, the Stables Structure Plan proposes modifications to the original design philosophy. Based on discussions with key stakeholders and a review of the knowledge and understanding of the site's significance and environmental context in the Pretty Pool Creek area, the proposed structure plan has sought to more appropriately balance planning, heritage and environmental aspects.

The structure plan provides the statutory framework for determining future land uses, urban design and implementation of the desirable planning, environmental and heritage outcomes. These will inform the planning decision making for future subdivision and development approvals for the Stables site.

## 1.2 Site Description

### 1.2.1 Site Location

The subject site comprises a portion of land in the Port Hedland that is generally bound by Pretty Pool Creek to the north, the Pretty Pool residential area to the east, Styles Road to the south, and Cooke Point Road to the west.

The Stables site is located approximately 5.5 kilometres east of the Port Hedland Town Centre, in the East End of Port Hedland.

*Refer to Figure 2 – Location Plan*

### 1.2.2 Site Tenure

The subject site comprises a number of Crown Land parcels, totalling 27.16 hectares. This includes both Unallocated Crown Land and Crown Reserves vested in the Town and the Regional Power Corporation (Horizon Power).

*Refer to Figure 3 – Aerial and Cadastral Plan*

A detailed description of the land in the subject site is provided in Table 1.

**Table 1 – Land Description**

Lot			
Pt 300	P53035	R29044 for 'Caravan Park and Equestrian Activities'	Town of Port Hedland
Pt 340	P72895	Vacant Crown Land	N/A.
Pt 556	P74214	R30768 for 'Recreation'	Town of Port Hedland
5755	P216870	R31506 for 'Electricity Sub Station and Weather Station'	Regional Power Corporation (Horizon Power)
5770	P188290	R31462 for 'Equestrian Activities'	Town of Port Hedland
5966	P188290	R30768 for 'Recreation'	Town of Port Hedland

It is understood that temporary leases over portions of Crown Reserve 31462 have also been granted by the Town to the Port Hedland Pony Club, the Port Hedland Turf Club and several individual stable operators. It is also understood that there is a sublease arrangement between the Port Hedland Pony Club and the Care for Hedland organisation to provide for a Community Garden on Lot 5770.

In preparing the structure plan, preliminary consultation has been undertaken with all relevant management authorities and lessees, who raised no objections to the proposed structure plan.

### 1.2.3 Existing Use

The subject site comprises partial development and vacant, unimproved landholdings. Lot 5770 is utilised by various organisations, including the Port Hedland Pony Club and Port Hedland Turf Club, for the agistment of horses and recreational equestrian activities. This includes various buildings and structures on Lot 5770 to facilitate this existing use, including stables and other ancillary buildings.

The western portion of the site is undeveloped and this comprises of the limestone ridge that runs parallel adjacent to Styles Road.



Figure 2. Location Plan (element, 2020)

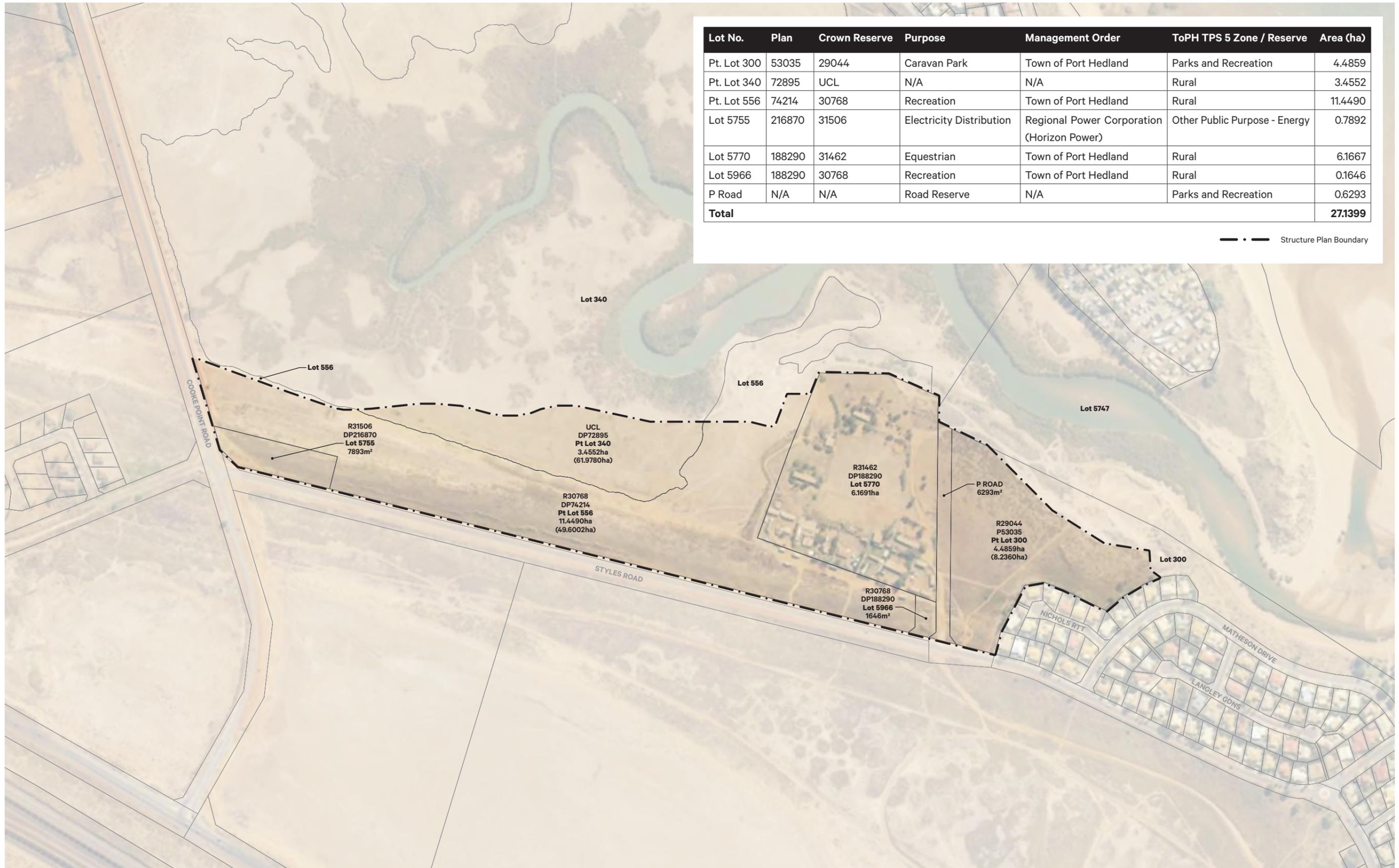


Figure 3. Aerial and Cadastral Plan (element, 2020)

## 1.2.4 Surrounding Context

Within the context of the Town of Port Hedland and East End, the subject site is identified as potential future residential land. At present much of the site is undeveloped. The subject site is influenced by the high and low tide fluctuations within Pretty Pool Creek, which connects with the ocean. Pretty Pool Creek north of the site is a natural surface waterway forming a narrow winding low velocity creek spanned by mangroves on either side. The adjacent mud tidal flats on either side of the creek are often inundated by the daily tidal movement. Tidal inundation is generally not greater than 0.5m water depth.



Image 2. Existing development of the Port Hedland Pony Club. (Source: RPS, 2015)



Image 3. Vacant land east of Pony Club with existing residential in background. (Source: DevelopmentWA, 2020)

Presently the furthest extent of the high tide water mark extends generally to the edge of where the coastal scrub/grass vegetation begins at the base of the secondary dune system. Based on aerial imagery from 1995, the line of vegetation separating the mud tidal flats from the secondary dune formation has remained relatively consistent.

However, during large storms or cyclonic events, flooding inundation can temporarily extend into the site's secondary dune formation beyond the daily tidal extent.

Within the context of the Town of Port Hedland, the subject site is identified as potential future residential land, being a potential new stage of the existing Pretty Pool residential development.

Styles Road forms the southern boundary of the site with undeveloped rural land on the southern side of Styles Road extending to the railway line and Wilson Street.

Cooke Point Road forms the western boundary of the site and is the major entry road servicing urban areas in the east-end from Wilson Street. To the north and north-east is the natural area of Pretty Pool Creek, which includes mangroves along the creek and estuarine tidal flats.

### **Pretty Pool – High Amenity Residential Living**

Pretty Pool residential area lies directly adjacent to the east and south-east and contains predominantly low density single residential dwellings.

The locality of Pretty Pool is considered to have high amenity for residential living. The more recent development in Pretty Pool to the far south-east encompassing Dowding Way demonstrates a strong market demand for residential living in Pretty Pool. It also demonstrates a market demand for more contemporary residential accommodation (i.e. multiple dwellings, rear loaded laneway lots) within the east-end of Port Hedland in proximity to areas of natural environment and amenity.

The Stables site has high amenity being in proximity to Pretty Pool Creek and having uninterrupted views of Pretty Pool Creek on the higher parts of the site. It also forms part of an existing community and is near the gateway into Port Hedland.

*Refer to Figure 4 – Surrounding Context*



Figure 4. Surrounding Context (element, 2020)



## 2. Subject Site

The following section is a general description of the site characteristics of the subject land. This section demonstrates that there are no significant constraints to urban development which cannot be adequately addressed. A broad opportunities and constraints analysis is provided in Figure 5.

*Refer to Figure 5 – Opportunities and Constraints Plan*

### 2.1 Landforms and topography

There are two distinguishable landforms found within the subject site, being the bare tidal salt flats (mudflats) and secondary dune system, which comprises dunal sand deposits and limestone.

The north-western portion of the site generally forms the lower lying intertidal samphire mudflats that surround Pretty Pool Creek and fringing mangrove habitat. The remaining area of the site predominantly consists of a higher elevated secondary dune system.

The natural level of the tidal flats is approximately 2.0m – 2.8m AHD, which is subject to daily tidal inundation. This is confirmed during recent site inspections, particularly during a super full moon period when the high tide water level was observed to not extend beyond the 3.0m AHD topographical contour. The existing line of scrub vegetation is at a level of approximately 3.0m – 3.5m AHD.

The topography varies across the site, from a high point of approximately 8.0m AHD in the coastal dune system in the north-eastern corner of the subject site, to a low point of approximately 2.4 metres AHD at the estuarine flats adjacent to Pretty Pool Creek. In addition to the coastal dunes and estuarine environments, the subject site is also characterised by a limestone ridge that runs parallel to Styles Road.

The structure plan design has considered the natural landforms and topography and proposes urban development primarily limited on the secondary dune system. The original Stables Amendment No. 77 concept design proposed urban development within the intertidal mudflats and this approach has been abandoned. The tidal mudflats is proposed to be retained in its natural form as an environmental and recreational asset.

### 2.2 Geology and soils

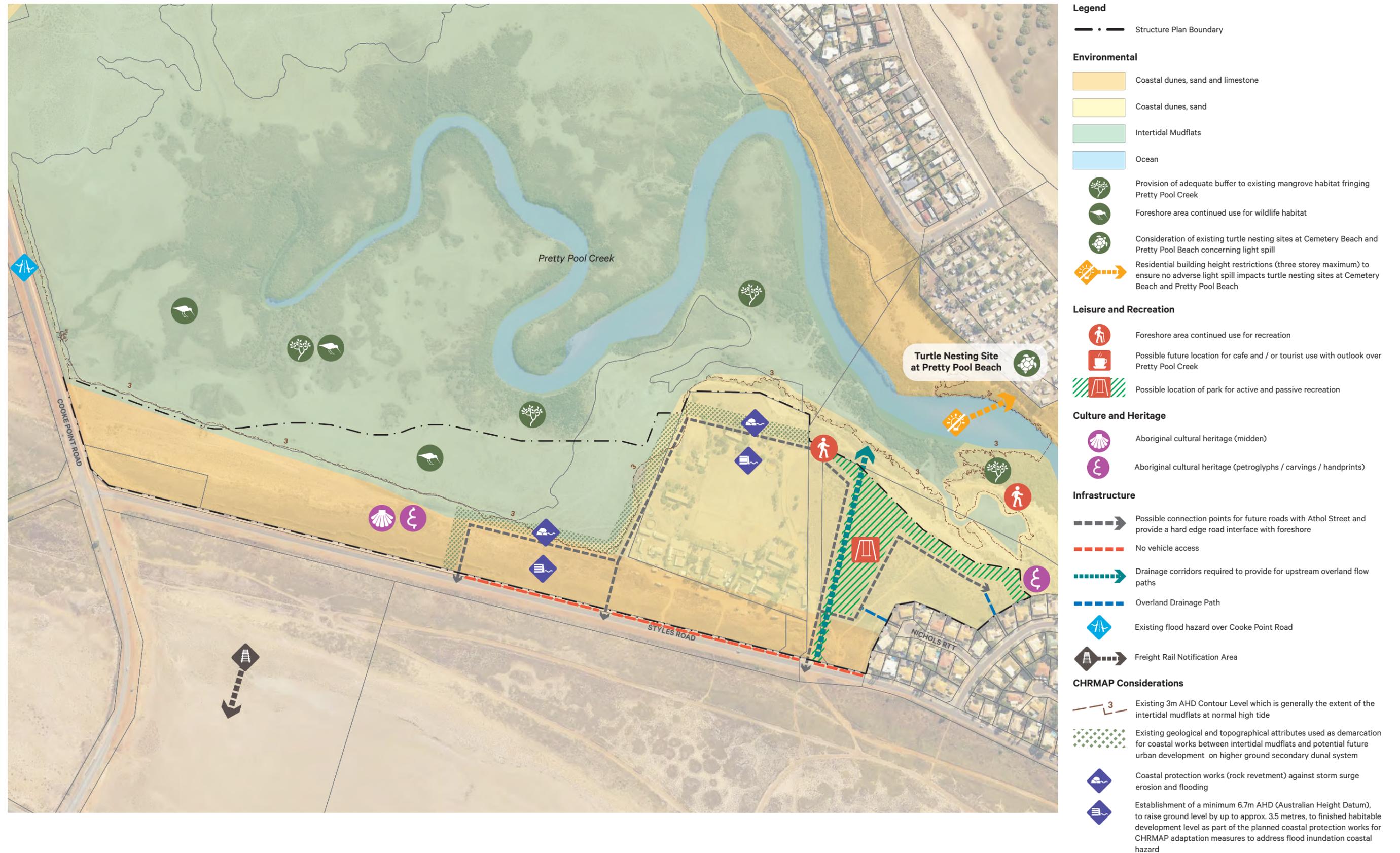
The soil conditions at the site have been assessed and categorised into three areas in the accompanying geotechnical report. The geotechnical investigations are included as an appendix in the Local Water Management Strategy. Essentially the geological characteristics are described in Table 2 and in Figure 6 – Geological Formations.

**Table 2 – Soil and Ground Conditions**

Area	Unit	Description
A	Dune Sand	Fine to coarse grained sand with trace silt and gravels and shell, loose to medium dense
B	Estuarine Deposits	Sandy Clay/Clay: low to high plasticity grey and brown, generally very soft to soft, stiff to hard in some areas
C	Limestone	Pale brown/yellow, well to very well cemented, low to high strength, occasional voids.

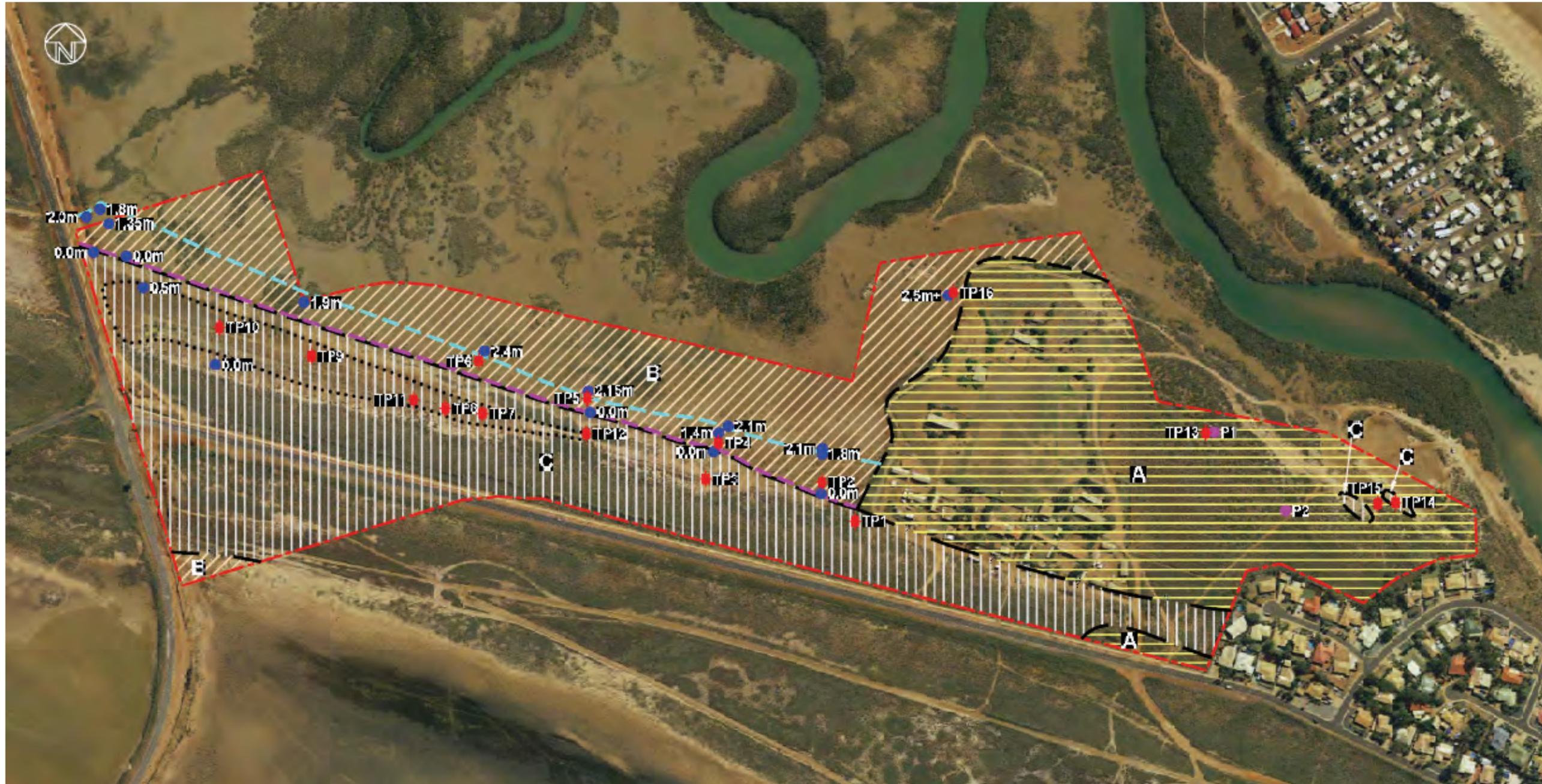
*Refer to Appendix 1 – Environmental Assessment Report (Geological Report part of the appendices)*

*Refer to Figure 6 – Geological Formations*



- Legend**
- Structure Plan Boundary
- Environmental**
- Coastal dunes, sand and limestone
  - Coastal dunes, sand
  - Intertidal Mudflats
  - Ocean
  - Provision of adequate buffer to existing mangrove habitat fringing Pretty Pool Creek
  - Foreshore area continued use for wildlife habitat
  - Consideration of existing turtle nesting sites at Cemetery Beach and Pretty Pool Beach concerning light spill
  - Residential building height restrictions (three storey maximum) to ensure no adverse light spill impacts turtle nesting sites at Cemetery Beach and Pretty Pool Beach
- Leisure and Recreation**
- Foreshore area continued use for recreation
  - Possible future location for cafe and / or tourist use with outlook over Pretty Pool Creek
  - Possible location of park for active and passive recreation
- Culture and Heritage**
- Aboriginal cultural heritage (midden)
  - Aboriginal cultural heritage (petroglyphs / carvings / handprints)
- Infrastructure**
- Possible connection points for future roads with Athol Street and provide a hard edge road interface with foreshore
  - No vehicle access
  - Drainage corridors required to provide for upstream overland flow paths
  - Overland Drainage Path
  - Existing flood hazard over Cooke Point Road
  - Freight Rail Notification Area
- CHRMAP Considerations**
- Existing 3m AHD Contour Level which is generally the extent of the intertidal mudflats at normal high tide
  - Existing geological and topographical attributes used as demarcation for coastal works between intertidal mudflats and potential future urban development on higher ground secondary dunal system
  - Coastal protection works (rock revetment) against storm surge erosion and flooding
  - Establishment of a minimum 6.7m AHD (Australian Height Datum), to raise ground level by up to approx. 3.5 metres, to finished habitable development level as part of the planned coastal protection works for CHRMAP adaptation measures to address flood inundation coastal hazard

Figure 5. Opportunities and Constraints Plan (element, 2020)



**LEGEND**

- TEST PIT LOCATION
- PERMEABILITY TEST LOCATION
- HAND PROBE TEST LOCATION
- - - SITE BOUNDARY
- ⋯ SHALLOW BASIN OF ESTUARINE DEPOSIT OVERLYING LIMESTONE
- AREA A - DUNE SAND
- AREA B - ESTUARINE DEPOSIT
- AREA C - LIMESTONE
- 2m ESTUARINE DEPOSIT THICKNESS CONTOUR
- 0m ESTUARINE DEPOSIT THICKNESS CONTOUR

Figure 6. Geological Formations (Coffey, 2015)



Image 4. View from Cooke Point Road verge looking east (with Styles Road intersection to the far right) with estuarine deposits on the far left and limestone ridge in the centre. (Source: Coffey, 2015)



Image 5. View from western end on top of the limestone ridge looking east across dune grass. (Source: DevelopmentWA, 2020)

In reviewing the geology of the site, urban (residential) development is feasible within the secondary dune system sand, but the mud tidal flats pose more significant constraints. The mudflats would not be suitable for conventional residential foundation without amending the geology to improve the ground. Preliminary geotechnical investigations indicate that pre-loading would need to be carried out to consolidate the intertidal estuarine deposit material. Consolidation would be in the order of 300mm - 500mm as a result of the final filling of the site.

Upon review of the geological formations and soils, the structure plan limits urban development to the secondary dune system, which can better support residential development.

The requirements to amend the geology of the mudflats to support urban development would be challenging and costly. The tidal mudflats will therefore be retained in its natural state and left undeveloped. Coastal protection infrastructure would generally commence at the base of the secondary dune system and rise up to the finished levels of development. Thus, only very limited development (or if any can be avoided) is proposed extending out onto the tidal flats.

## 2.3 Acid Sulfate Soils

A desktop review of acid sulfate soils mapping provided by Department of Water and Environmental Regulation indicates a 'Moderate to Low Risk' within 3 metres of the natural soil surface for the northern half of the site including the secondary dune system. A 'High to Moderate Risk' is identified for the northern portion within the tidal mudflats. The acid sulfate soil mapping can be found in the structure plan Environmental Assessment Report.

*Refer to Appendix 1 – Environmental Assessment Report*

Where required for any coastal protection works or urban infrastructure being proposed on or near the edges of the estuarine deposits, further acid sulfate soils investigation may be necessary, to identify whether there is a need for specific acid sulfate soil management measures to be implemented during construction. Overall the proposed area of the structure plan to be developed for residential use is not significantly constrained by acid sulphate soils and can be adequately managed, particularly as the site will require substantial filling.

## 2.4 Flora and Vegetation

The Environmental Assessment Report provides a description of the flora and vegetation found within the subject site.

*Refer to Appendix 1 – Environmental Assessment Report*

### Vegetation types

The coastal secondary dune system within the subject site typically comprises of Low open shrubland (*Acacia stellaticeps* over hummock grassland of *Triodia epactia*) with open herbland of *Euphobia tannensis*.

The intertidal mudflats are typically bare, with salt tolerate species of dwarf shrubland of *Tecticornia halocnemoides*, *Hemichroa adiandra* and *Frankenia pauciflora*, with patches of grassland *Sporobolus virginicus*.

### Conservation of significant vegetation

There were no known occurrences of Threatened Ecological Communities (TECs) protected under the EPBC Act within or adjacent to the subject site. This has also been confirmed by other external studies that have been undertaken in the *Pilbara 4 Bioregion*.

### Conservation significant flora

There are no known occurrences of Threatened flora species recorded within or immediately surrounding the subject site.

The Environmental Assessment Report identifies that one Priority 2 species (*Gomphrena pusilla*) was recorded by survey within the Low open shrubland of Lot 300 in the eastern portion of the site. *Gomphrena pusilla* has been recorded in reasonable numbers in other similar locations near mangroves along the Port Hedland coastline. It is considered that *Gomphrena pusilla* is well represented in the locality and therefore the occurrences found on site will not require any specific conservation measures.

## Condition of Vegetation

The condition of the majority of existing vegetation found on the Stables site was determined to range from 'Degraded' to 'Completely Degraded'.

The secondary dune system vegetation found on the subject site is relatively common in Port Hedland and does not have any significant environmental value. The structure plan proposes all of the vegetation within the secondary dune system to be removed (with the land predominantly filled) to accommodate urban development.

The structure plan seeks to avoid development on the tidal mudflats, with coastal protection infrastructure being accommodated at and beyond generally the 3.0m AHD topographical contour. Subsequently there would be limited removal or impact of existing vegetation on the mudflats.



Image 6. View from central area within site looking east over tidal mudflat vegetation exposed at low tide with secondary dune system in background. (Source: DevelopmentWA, 2020)



Image 7. View in central area within eastern portion of site looking west across typical secondary dune coastal scrub vegetation. (Source: DevelopmentWA, 2020)

## Benthic communities and habitat – Pretty Pool Creek mangroves

The site is situated to the south of the Pretty Pool Creek intertidal zone mangrove habitat. The mangroves potentially support a variety of fauna, including crustaceans, birds and bats. The structure plan proposes urban development to be adequately setback from the mangroves (as demonstrated in the Environmental Assessment Report) by both distance and vertical separation, due to the site's higher elevation above the level of the mangroves. This height difference will result in a low impact to the mangrove habitat.

The structure plan proposes filling of the secondary dune system area to accommodate urban development to a finished level of 6.7m AHD, as required to address the coastal hazard risk of flood inundation. Flood modelling undertaken confirms that the filling of the structure plan area will not have any adverse impact upon the long-term sustainability of the mangrove community. This detailed analysis is also contained in the Environmental Assessment Report.

## 2.5 Fauna

A desktop review of likely fauna to inhabit the secondary dune system and tidal flats can be found in the Environmental Assessment Report. Within the secondary dune the types of fauna that could potentially be found include reptiles, such as snakes (woma, Pilbara olive python) and skinks (Airlie Island skink).

The most noticeable fauna found on the intertidal mudflats are the various species of foraging shorebirds.



Image 8. A common shorebird species, the Bar-tailed Godwit is shown foraging on intertidal flats during a falling tide. (Source: parks.dpaw.wa.gov.au, 2020)

## Marine Turtles

Pretty Pool Beach (approximately 480m east of the site) and Cemetery Beach (approximately 1.8km north-west of the site) are known nesting sites for the *Flatback* turtle. These turtles are listed as 'Vulnerable' under *Environmental Protection and Biodiversity Conservation Act* and 'Threatened' under the *Wildlife Conservation (WC) Act*.

Female Flatback turtles come ashore onto beaches to nest and lay their eggs. Turtle hatchlings have an innate instinct that leads them towards the brightest direction which, at the time of hatching on a dark beach, is usually moonlight reflecting off the ocean.

Excess artificial light generated from human activities (such as from the urban environment) can cause hatchlings to become disorientated and wander inland towards the artificial light. The excess lighting from the nearshore buildings and streets can thus draw hatchlings towards land, where they perish from dehydration or predation. It is critical therefore that light spill from the structure plan is not direct nor excessive to have an adverse impact on the Flatback turtle nesting sites.

The natural height of the coastal primary dunes running along Pretty Pool Beach and Cemetery Beach provide shielding from direct impacts of urban light spill. If building and urban infrastructure height is appropriately controlled and managed, artificial light impacts to turtle nesting sites from the structure plan would be restricted to *sky glow*.

The Commonwealth *National Light Pollution Guidelines for Wildlife including marine turtles, seabirds and migratory shorebirds* (2019) indicates that there is no one source of sky glow. Management of sky glow (and measures to mitigate and minimise artificial light) needs to be undertaken on a regional and collaborative basis, addressed by the community, regulators, councils and industry. The guidelines recommend that where appropriate, an **Artificial Light Management Plan** should be developed in collaboration with all relevant light owners and managers to mitigate impacts on wildlife.

The Environmental Assessment Report contains a Line of Sight assessment from the site to Pretty Pool Beach and Cemetery Beach. The assessment indicates that direct light spill from built infrastructure within the structure plan area can be suitably managed through building height controls. It is recommended that building height at Stables site be restricted to a maximum single storey height limit within the structure plan area. This will adequately address any potential adverse artificial light spill pollution impacting the turtle nesting sites at Pretty Pool Beach and Cemetery Beach. This is consistent with advice from environmental agencies.



Image 9. Flatback turtles frequent Pretty Pool Beach and Cemetery Beach during nesting season. (Source: seeturtles.org, 2020)

## Biodiversity Value

Much of the site has been disturbed by human activity and development. The structure plan area where urban development is proposed is on land which has limited biodiversity value. The balance area within the proposed foreshore area (i.e. intertidal mudflats) will be relatively undisturbed and will be appropriately managed for conservation and recreation.

## 2.6 Hydrology and Coastal Flooding

### Groundwater

There is limited historical groundwater data for the subject site. However, groundwater data from the coastal plain aquifers in the Pretty Pool area indicates the general groundwater to be highly saline to brackish.

Groundwater levels were assessed and identified at approximately R.L. 2.5m AHD to R.L. 3.0m AHD across the subject site. This generally coincides with a groundwater level perched on the estuarine deposits identified above. This results in the potential for significant changes in groundwater levels, particularly after heavy rain events during the wet season. Groundwater levels across the site generally lie at 0.9m - 1.9m or deeper below existing natural ground levels.

The depth of groundwater found on the tidal flats poses challenges for urban development along with the requirement for an amended geology solution to support residential use. However, the depth of groundwater encountered within the secondary dune system poses less challenges in terms of distance between groundwater and sub-soil urban infrastructure. With the minimum 6.7m AHD fill requirement, which will provide an adequate finished habitable level to address the coastal flooding constraint, the separation to groundwater from urban infrastructure can be adequately managed.

## Surface water

No natural surface watercourses exist within the site, however the north-eastern portion of the site is located within the marine intertidal zone of Pretty Pool Creek. The creek itself is a natural watercourse which meanders south of the site, flowing to and joining with the coast. Surface water run-off within the Pretty Pool Creek catchment moves as overland flow towards the intertidal zone and fringing mangroves and into the creek. There are no natural surface watercourses or wetlands that constrain the structure plan area.



Image 10. Drone image of Stables site intertidal mudflats taken from the west seen at high tide, during a super full moon phase on 26 April 2020. (Source: Town of Port Hedland, 2020)



Image 11. Drone image of Stables site northern interface with Pretty Pool Creek mangrove habitat at high tide, during a super full moon phase on 26 April 2020. (Source: Town of Port Hedland, 2020)



Image 12. Drone image of the eastern area of the Stables site during a high tide super full moon phase on 26 April 2020. (Source: Town of Port Hedland, 2020)

## Coastal flooding

Port Hedland is often impacted by large storms and seasonal cyclonic events, resulting in coastal storm surge and potential flooding. The Town's CHRMAP has identified the site as being affected by coastal flood inundation. Accordingly, a minimum finished development habitable level of 6.7m AHD has been determined to adequately address the coastal flood hazard. This will be further discussed in this report under 'State Planning Policy 2.6 – State Coastal Planning'.

## 2.7 Contamination

A search of the Department of Water and Environment Regulation indicates that there are no recorded contaminated site(s) for the subject land. However, given the equestrian and turf club use of the site and use of building construction materials, possibly containing asbestos, preliminary site contamination investigation may be necessary, to determine the extent (if any) and remedial actions (if any) at later stages of planning. Notwithstanding, the above, the site is not constrained by contamination and can support future residential use.

## 2.8 Transport Noise (Road and Rail)

The Stables site, at its closest point abutting the intersection of Styles Road/Cooke Point Road, is located approximately 530m from the railway line to the south used by the mining industry. The western portion of the site is affected by railway noise.

Transport noise emanating from BHP Billiton's Nelson Point Railway line potentially impacts the western portion of the subject site as outlined in the acoustic assessment accompanying this report.

In addition, Styles Road has a posted speed limit of 80km/hr and has forecast traffic volumes >3,000 vehicles per day, plus is sometimes used by heavy vehicles. Accordingly lots abutting Styles Road are impacted by transport road noise.

A noise assessment was undertaken which considered potential noise impacts from vehicles and railway noise. The assessment confirmed that transport noise can be adequately managed to comply with State Planning Policy SPP 5.4 'Road and Rail Noise' standards. The impacts of transport noise can be adequately managed through noise mitigation measures (i.e. quiet house design packages) to those areas within the site affected by noise. This will be an environmental consideration that will need to be addressed as a condition of subdivision as recommended in the structure plan. Transport noise impact is therefore not a significant constraint to urban development.

It should be noted that the posted speed limit along Styles Road changes from 80km/hr down to 50km/hr on approach to the built-up urban areas in Pretty Pool. If the structure plan is developed, the section of Styles Road between the Port Hedland Pony Club and the intersection with Cooke Point Road, that is currently 80km/hr, should be reduced down to 50km/hr. The effect of the speed reduction would significantly reduce the impact of road noise and a revised noise assessment would be undertaken at subdivision stage.

*Refer to Appendix 1 – Environmental Assessment Report (Acoustic Assessment in Appendices)*

## 2.9 Cultural Heritage Significance

Aboriginal people have continually occupied the coastal lands of the Pilbara for many thousands of years. The marine resources of the coastal lands have provided sustenance for the Aboriginal people, along with a cultural connection.

Lot 340 within the structure plan area is subject to a native title claim of the *Kariyarra* people. The *Marapikurrinya* people also have a connection with the site. Currently there are no recorded aboriginal sites under the Department of Aboriginal Affairs database.

Previous heritage investigations were undertaken in 2015 including consultation with the traditional owners of the land, the *Kariyarra* people. Four separate sites or places of cultural heritage significance on the subject site were identified. This includes three engraving sites and one midden site. All of these cultural sites are proposed to be retained in the foreshore reserve ('Environmental Conservation' reservation).

A shell midden is distinguished from a natural accumulation of shells (which can naturally occur through local geomorphological processes), in that the shells are generally intact (not fragmented), usually of one or two species of local edible shellfish and may contain some shells burnt by fire.

The details of the identified aboriginal heritage sites are further discussed in the the 'Report on Aboriginal Heritage Advice for the Stage 3 East Port Hedland Project' (Anthropos Australis WA, May 2015).

*Refer to Appendix 3 – Report on Aboriginal Heritage Advice for the Stage 3 East Port Hedland Project*

The protection of Aboriginal heritage will be an important ongoing consideration during later stages of planning for the future development of the subject site. This is likely to involve ongoing engagement with the local *Marapikurrinya* people and *Kariyarra* people. The protection of identified heritage assets will be ensured via the preparation of a **Cultural Heritage Management Plan** to support the future development of the area, which will include consideration of:

- Establishing a set of work procedures for the subject site that align with Department of Planning, Lands and Heritage (DPLH) Guidelines and the aspirations of the traditional owners;
- Ensuring that construction is undertaken in a manner that protects Aboriginal heritage assets, by retaining these assets in areas of proposed public open space;
- Liaising with *Kariyarra* Aboriginal Corporation, as the representatives of the traditional owners, regarding Aboriginal heritage management during the pre-construction, construction, post construction and post-development stages of the project;
- Ensuring that discoveries of previously unidentified Aboriginal sites or objects are dealt with in accordance with the requirements of the *Aboriginal Heritage Act 1972*, including the implementation of appropriate Stop Work Procedures; and
- Creating opportunities for the enhancement of identified Aboriginal cultural assets, with the active engagement and participation of the *Marapikurrinya* people at all times.

It is important that continual land and water access to the Pretty Pool Creek system be provided for the aboriginal people, to maintain their cultural connection with the area. The aboriginal sites and continued accessibility to the Pretty Pool Creek natural area are considerations that will be incorporated and addressed in a Foreshore Management Plan.

*Refer to Figure 7 – Aboriginal Sites*

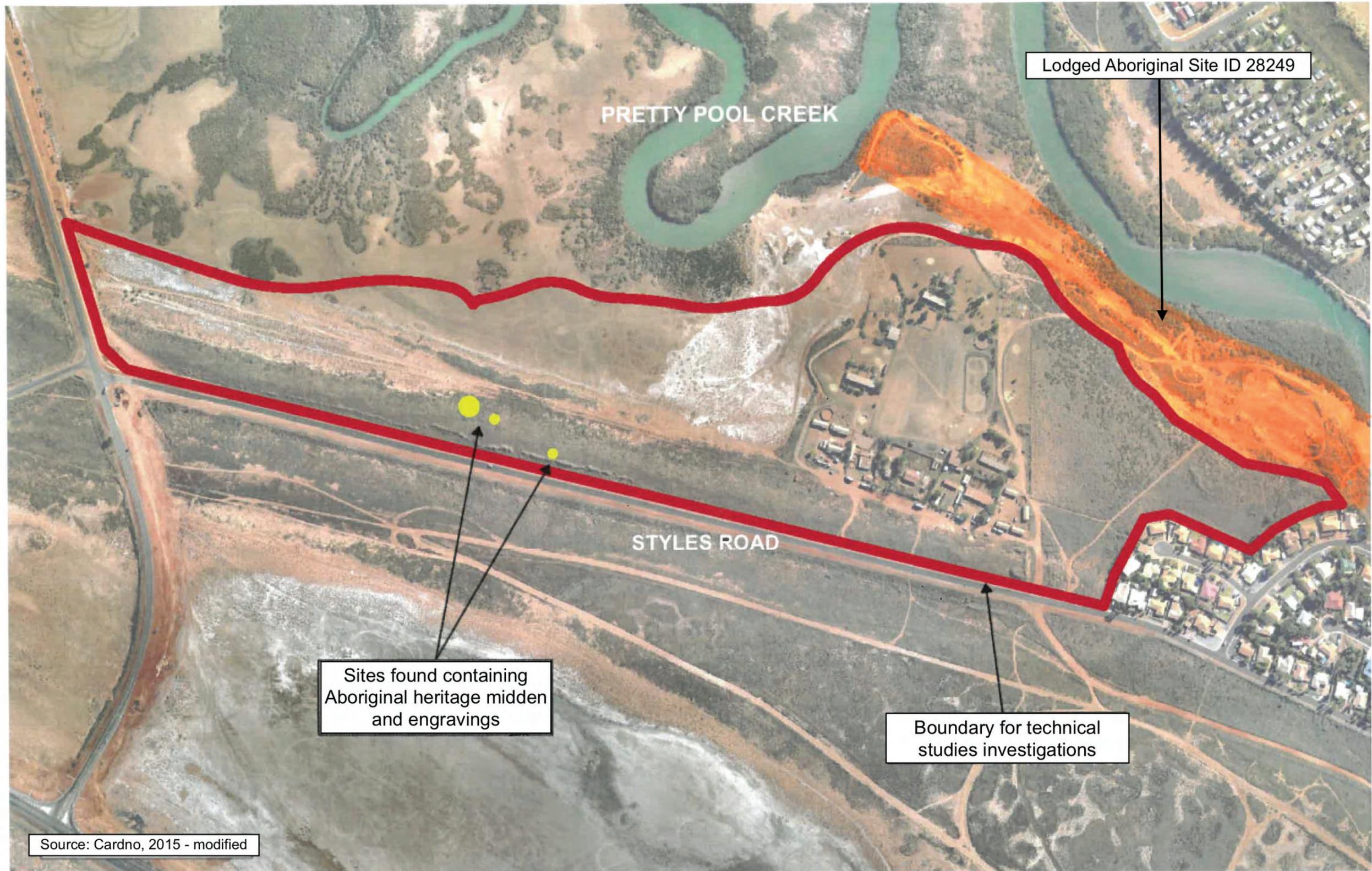


Figure 7. Aboriginal Sites (Cardno, 2015)

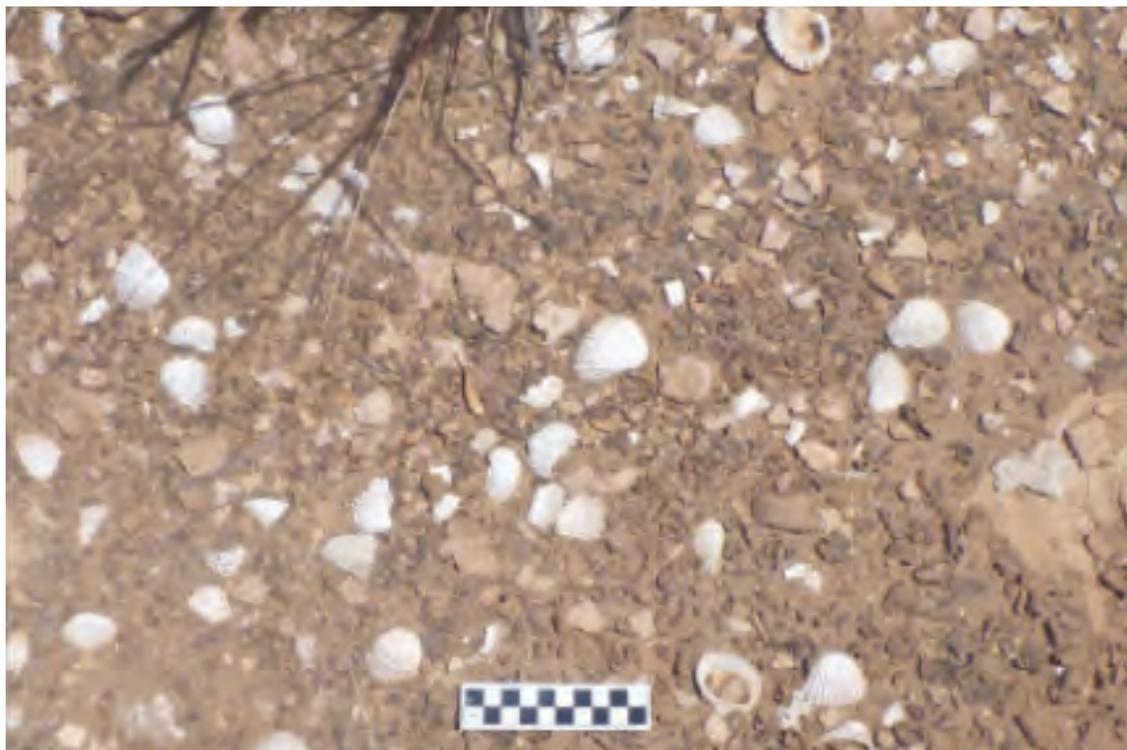


Image 13. Photograph of aboriginal midden in the western portion of the Stables site. (Source: Anthropos Australis, 2015)



Image 14. Photograph of aboriginal engraving on rock in the western portion of the Stables site in proximity to the midden. (Source: Anthropos Australis, 2015)

## 2.10 Bushfire management

The Stables site is within the Department of Fire and Emergency Services Bushfire Prone Mapping and is subject to the planning considerations in the state bushfire planning framework. A Bushfire Management Plan has been prepared for the structure plan, which details the fire management methods and requirements to provide for fire protection and fire management.

The main threat of fire is from the low shrubland and grassland within the site and adjacent lands. The majority of the vegetation on-site will be cleared for urban development as proposed by the structure plan. The threat of fire from the vegetation within the intertidal mudflats is low.

The main threat of fire will be from areas of existing shrubland and grassland vegetation in adjacent land, which will pose a moderate hazard level. Management of vegetated areas adjacent to staged development as well as adjacent lands is addressed in the Bushfire Management Plan, including the need for interim and permanent asset protection zone/s.

The provision of secondary accessways outlined in the Bushfire Management Plan, to provide for safe access and egress to two different destinations for the development, will be further reviewed at subdivision stage. The Bushfire Management Plan provides for a level of compliance by demonstrating the provision of secondary access. However, this policy measure will need to be further investigated and reviewed with the relevant authorities, against the significantly high costs of development and provision of desired planning outcomes.

Implementation of the Bushfire Management Plan will ensure that no lots within the structure plan will have a Bushfire Attack Level (BAL) rating greater than BAL 29. Overall the risk of fire is not a significant constraint to urban development and can be adequately managed at later stages of planning.

## 2.11 Mosquitos

Mosquito surveillance of Pretty Pool Creek undertaken by the Town indicates the high presence of mosquitos as a potential breeding area. Mosquitos captured in traps during surveillance monitoring include the mosquito species *Culex annulirostis*, which is a known carrier of the Ross River virus, which can affect humans. Mosquito activity and the recorded cases of Ross River virus in Port Hedland is a public health concern, particularly under certain environmental conditions.

The subject site is within the mosquito dispersal distance from the low-lying areas around Pretty Pool Creek, which when become inundated by wet season flooding, can provide for mosquito breeding habitat. It is noted that mosquitos that breed in the Pretty Pool Creek area have capable dispersal of up to several kilometres from Pretty Pool, so mosquito health risks are an on-going impact that affects the wider Port Hedland community.

For the proposed development, a Mosquito Management Plan is recommended to be prepared and approved in consultation with the Town of Port Hedland as part of later stages of planning. A detailed Mosquito Management Plan can assist in protecting the amenity and health of future residents by addressing mitigation measures, including but not limited to:

- Design of stormwater infrastructure to reduce potential mosquito breeding habitat
- Mosquito monitoring to inform the location and timing of controlled measures (i.e. spraying)
- Provision of advice, notifications on title and building design recommendations for future residents, to assist in protecting residents from being bitten (i.e. insect screening and ways to reduce exposure to biting insects).

## 3. Pre-lodgement consultations

The Stables Structure Plan follows on from the former Town of Port Hedland TPS 5 Scheme Amendment No. 77 (which contained original earlier concept planning) and aligns with the more recent Scheme Amendment No. 84. Extensive consultation with key stakeholders was undertaken for the previous Amendment No. 77. There was an understanding from the key stakeholders that the Stables site is earmarked for future urban development, but that more detailed planning investigations would consider the most appropriate form of development.

Pre-lodgement consultations for the current proposed structure plan have been undertaken with key stakeholders, along with a community consultation event, which involved a pop-up display booth at the Port Hedland shopping centre on Saturday 18 July 2020. Community feedback on the Stables site was also obtained from the Town's Draft Local Planning Strategy community engagement and consultations.

### 3.1 Town of Port Hedland Draft Local Planning Strategy

During the recent **Shaping Hedland's Future** engagement campaign, the Town asked the community their priorities and insights regarding future housing growth within Port Hedland. The results from this engagement were used to inform the preparation of the Draft Local Planning Strategy for the Town.

The draft strategy identifies up to six potential residential growth areas in East End, being the Telstra tower site, the former recreation centre and detention centre sites, the remediated wastewater treatment plant site, Athol Street site, the Stables site and a portion of the McGregor Street sporting precinct.

*Refer to Figure 8 – East End potential future urban sites*

Community and stakeholders were asked to consider what was their preferred staging for future housing in Port Hedland and why. In relation to the Stables site, those people who engaged in the conversation at meetings, events or through the online community survey:

- Acknowledged that the existing Port Hedland Pony Club and Port Hedland Turf Club would be relocated and that the site would revert to residential development.
- Acknowledged that only a portion of the Stables site would likely be suitable for staged housing, when considering storm surge inundation and the need to conserve the natural environmental assets.
- Reinforced the significance of Aboriginal heritage, and the priority to maintain access to and protect significant cultural assets.

While there was general support for a staged development across suitable portions of the Stables site, more investigation was seen to be required to understand the constraints or opportunities within this broadly defined area.



Figure 8. East End potential future urban sites

## 3.2 Athol Street and the Stables Street Precincts East Port Hedland Engagement Outcomes

An engagement consultant was appointed by the proponent to assist with obtaining and collating information/preliminary feedback from key stakeholders and the community. These would inform the preparation of structure plans for the Athol Street site and Stables site, as well as Scheme Amendment No. 84. The report entitled 'Athol Street and the Stables Street Precincts East Port Hedland – Engagement Outcomes Report' (Element, July 2020) provides a summary of related community and stakeholder engagements, outcomes, and recommendations that were considered by the project team in the preparation of the structure plans. Overall, the structure plan addresses and provides for the community and stakeholder major considerations, including protection of marine turtles and Pretty Pool Creek mangrove environment, coastal protection works and Aboriginal heritage considerations.

*Refer to Appendix 7 - Athol Street and the Stables Street Precincts East Port Hedland – Engagement Outcomes Report*

### Recent pre-lodgement consultations with key stakeholders

The following Table 3 is a list of key stakeholders that were consulted during the preparation of the Amendment.

**Table 3 – Key Stakeholder Consultations in May - July 2020**

Stakeholder	Comments	Actions
<b>Department of Planning, Lands and Heritage</b> <b>Land Use Planning - Regional North</b>	<b>First Pre-Lodgement Meeting</b> Reviewed background and planning reasons for refusal for Amendment No. 77. Proposed structure plan to be progressed concurrently with proposed Amendment No. 84. The structure plan needs to address the Town's CHRMAP considerations and potential for provision of an adequate foreshore for coastal protection infrastructure.	Noted. Technical reports to be updated to reflect CHRMAP.
<b>Port Hedland Pony Club</b>	Port Hedland Pony Club raised no objections and acknowledges the site is earmarked for future urban development, in context of existing lease arrangements.	Noted. Applicant to continue on-going dialogue with the club.
<b>Port Hedland Turf Club</b>	Port Hedland Turf Club raised no objections and acknowledges the site is earmarked for future urban development, in context of existing lease arrangements.	Noted. Applicant to continue on-going dialogue with the club.
<b>Department of Water and Environment Regulation</b>	DWER raised no objections at this preliminary stage. A formal review and assessment will be undertaken once the amendment is referred to DWER for comment.	Noted.
<b>Kariyarra Aboriginal Corporation</b>	Scheduled meeting with the Kariyarra Board on 24 June 2020. Initial consultation undertaken with Elder Diana Brown. Diana commented on maintaining an adequate buffer from high environmental and heritage values of Pretty Pool Creek. Meeting on 23 June 2020 with Kerry Robinson (Kariyarra Elder who also speaks for the Marapikurrinya area however is not on the Kariyarra Aboriginal Corporation Board) where East end projects were discussed, including Athol and Stables sites. Raised no objections however any works on these sites (particularly excavation) will require a Heritage monitor to be present in case any skeletal remains, artefacts or the like are uncovered.	Noted and project team to consider in structure plan design. Archaeological monitoring would be covered in the Cultural Heritage Management Plan.
<b>Horizon Power</b>	Raised no objections at this preliminary stage. Continued discussions will occur to update land assets within the site.	Noted

Stakeholder	Comments	Actions
Care for Hedland	Formal letter dated 30 June 2020 provided to the Town outlining environmental expectations for both Athol Street and Stables sites. Expectations were outlined concerning flooding impacts/ CHRMAP considerations, sediment, runoff and site drainage, use of native species for landscaping, litter/waste management, fill import to be suitable/complimentary for use, waterwise landscaping and careful species selection, protection of fauna (i.e. birds, bats, etc), indigenous heritage, light impacts on Flatback turtle nesting sites and best practice development.	Noted and considered by the project team.
Department of Planning, Lands and Heritage Land Use Planning - Regional North Coastal Team	<b>Second Pre-Lodgement Meeting</b> Discussions focused on coastal planning, specifically coastal modelling, coastal protection infrastructure and maintenance requirements and agreement with the Town, coastal hazard risk management and adaptation planning requirements of adjoining landholdings, management at sediment cell level, local water management strategy considerations, provision of an adequate foreshore reserve and planning application timeframes. At the meeting it was agreed that balance land between the proposed development and Pretty Pool Creek would fall within a future foreshore reserve, which would be covered by a Foreshore Management Plan.	Applicant noted guidance by DPLH officers in addressing DPLH expectations in relation to coastal planning and CHRMAP considerations.
Western Australian Planning Commission	WAPC letter dated 9 July 2020 to developer advising of Commission's consent to prepare a structure plan for the Stables site.	Noted. Stables structure plan to progress concurrently with Amendment No. 84.
Town of Port Hedland	Town officer email dated 6 July 2020 to developer <b>Movement network</b> Removal of western neighbourhood linear blocks, in the draft Stables concept plan, extending along the entire length of Styles up to Cooke Point Road resolves issues regarding the numerous proposed subdivision local roads intersecting with Styles Road. <b>Built Form/Zoning</b> Restricted access to Styles Road is supported. Consideration of urban design principles for lots fronting Styles Road to address the height difference between finished lot levels and existing Styles Road level.	Noted and considered by the project team.

## 4. Key Planning Framework

### 4.1 State Planning Framework

#### 4.1.1 State Planning Strategy 2050

Included in the diverse range of initiatives, the strategy seeks to encourage the population growth of regional towns. In particular, the strategy recognises the role of the Pilbara Cities initiative in developing Port Hedland into a stronger regional centre with growing appeal as a place to live.

Opening up new areas within Port Hedland that have high residential amenity is a key to attracting permanent population growth that choose Port Hedland as a desirable place to live.

The Stables site is one example of a high amenity residential living location, adjacent to Port Hedland's iconic Pretty Pool coastal environment.

#### 4.1.2 Pilbara Planning and Infrastructure Framework

A key part of the framework is its role in supporting the implementation of the Pilbara Cities vision, which encourages the growth of Port Hedland to support a residential population of 50,000 by 2035. This is part of a broader initiative to consolidate population growth in the region's main urban centres.

This includes a desire to deliver nearly 15,000 new dwellings in Port Hedland by 2035, with a focus on:

- Achieving an efficient supply of land for future urban growth;
- Providing areas of high amenity for residential living;
- Facilitating private sector involvement in urban land development;
- Accelerating land releases for the development of new housing; and
- Providing residential land in identified growth areas to meet the needs of the labour market.

The proposed structure plan is consistent with the framework, as it is a potential residential greenfield site with high amenity, that can positively contribute towards accommodating population growth.

#### 4.1.3 State Planning Policy 2.0 – Environmental and Natural Resources Policy

State Planning Policy 2 – Environmental and Natural Resources Policy (SPP2.0) defines the key principles and considerations that inform good and responsible planning outcomes with respect to issues relating to the environment and natural resources. An assessment against the relevant provisions of SPP2.0 is provided below.

##### General Measures

Various technical environmental, geotechnical, noise and engineering studies have been undertaken to consider the suitability of the site for future residential use. These form the appendices of this report.

Collectively, these technical studies confirm that the site can be developed for residential use, in a manner that is consistent with the general measures outlined under SPP2.0. These include:

- Providing for the implementation of effective environmental management measures to ensure quality environmental outcomes for the Pretty Pool Creek system and associated mangrove habitat.
- Providing for the protection of identified cultural heritage assets, as identified through engagement with the traditional owners, the Marapikurrinya and Kariyarra people, including:
  - Protecting the sensitive Pretty Pool Creek environment to prevent any adverse impact, whilst maintaining public access; and

- Providing for the ongoing protection of the four identified heritage sites within the boundary of the subject site, consistent with the recommendations of the accompanying Cultural Heritage Assessment Report.
- Considering the impact of changing climatic conditions and associated coastal processes, in accordance with the adopted Port Hedland Townsite Coastal Hazard Risk Management Plan (CHRMAP), and the accompanying site specific Coastal Hazard Assessment.

Other specific matters dealt with under SPP2.0 are generally discussed below.

### Water Resources

This report is accompanied by a Local Water Management Strategy (refer to appendices within Appendix 1 – Environmental Assessment Report). The LWMS demonstrates that urban stormwater will be managed in accordance with the WAPC’s Better Urban Water Management Guidelines. The strategy outlines that any potential impacts can be readily managed so as not to have any significant impact on the natural water resources.

### Air Quality

The *Port Hedland Air Quality and Noise Management Plan* seeks to consolidate future residential development in the East End of Port Hedland, in response to dust and air quality concerns in the established West End residential areas. The proposed structure plan will assist in providing a supply of suitable land for residential development in the East End, where land use conflict and associated air quality impacts are within acceptable levels.

### Soil and Land Quality

The suitability of the land for future residential development has been addressed in detail through the various geotechnical, environmental and engineering servicing investigations. These assessments conclude that:

- Development on the estuarine deposits poses earthworks and servicing challenges for urban development. In the context of the Town’s CHRMAP and in considering the constraints of developing on the estuarine deposits, the structure plan limits the extent of proposed urban development within intertidal mudflat areas.
- The subject site does not contain any registered contaminated sites. However, given the equestrian and turf club use of the site and building construction materials possibly containing some use of asbestos, preliminary site contamination investigation may be necessary at later stages of planning. Notwithstanding, subject to the preliminary site contamination investigations (and any remedial actions if necessary), the site is not constrained by contamination and can support future residential use.

### Biodiversity

The structure plan is accompanied by a detailed Environmental Assessment Report, which includes a Mangrove and Erosion Impact Assessment. The findings of the environmental report confirm there are no significant impacts on the environment.

In addition, it is noted that the environmental studies undertaken to date will be supported by further detailed investigations and management plans to be prepared at later stages of planning, which are outlined in the Part One section. This will ensure the implementation of appropriate environmental management measures as part of the future subdivision and development of the subject site.

### Landscape

The ecological, aesthetic and social value of Pretty Pool Creek and the associated mangrove system is acknowledged, and the proposed structure plan seeks to facilitate development that complements and does not detract from established landscape character of the area. In this regard, it is noted that:

- The development of the subject site will not adversely affect the landscape value of Pretty Pool Creek;
- Due consideration has been given to retaining the biodiversity values of the surrounding area, as detailed above; and
- Public access to Pretty Pool Creek from the subject site is provided for in the structure plan, to be delivered as part of the future subdivision and development of the site. This is in recognition of the recreational value and level of amenity the Pretty Pool Creek area offers to existing and future residents.

#### 4.1.4 State Planning Policy 2.6 – State Coastal Planning

State Planning Policy 2.6 – State Coastal Planning (SPP2.6) sets out a range of policy measures to ensure that development in coastal locations appropriately takes into account the potential impact of coastal hazards. This includes considerations relating to coastal hazard risk management and the sustainable use of the Western Australian coastline that are relevant in the context of this proposed structure plan.

SPP2.6 places particular emphasis on the need for adequate coastal hazard risk management and adaptation planning, which has been addressed through the preparation of the Port Hedland Townsite Coastal Hazard Risk Management and Adaptation Plan (CHRMAP) – reference *Port Hedland Townsite Coastal Hazard Risk Management and Adaptation Plan (GHD 2019; File Ref: 6136239 - April 2019. Version: Rev 0 - 29/03/2019)*.

Essentially the adopted CHRMAP supports further development in the east end of Port Hedland, including urbanisation of the subject site. Urbanisation can be accommodated by adaptation measures, specifically filling to a minimum finished development level of 6.7m AHD and provision of adequate coastal protection works to ensure the sustained longevity of the finished development level. Compliance with the SPP2.6 objectives and provisions and planning considerations relative to the Town’s CHRMAP are discussed below in Table 4 and policy measure sub-headings.

**Table 4 – Compliance with policy objectives.**

SPP 2.6 Policy Objectives	Structure Plan Compliance
1. Ensure that development and the location of coastal facilities takes into account coastal processes, landform stability, coastal hazards, climate change and biophysical criteria.	The structure plan minimum finished development level of 6.7m AHD provides adequate separation from coastal hazards and processes (i.e. flooding) identified from the Town’s CHRMAP. The intertidal mudflats present a less stable landform to accommodate urban development, however with geotechnical amendment, the mudflats can support development. Notwithstanding, urban development in the structure plan is intentionally proposed on the more stable secondary dune system, where the sand deposit soil type is more stable and does not require geotechnical amendment.
2. Ensure the identification of appropriate areas for the sustainable use of the coast for housing, tourism, recreation, ocean access, maritime industry, commercial and other activities.	Within the urban development zone footprint, the structure plan ensures a good balance of the proposed land uses of housing (urban development) and foreshore reserve (recreational and environmental values). The outcome provides for a sustainable use of the land in proximity to the coast consistent with the planning framework. The extent of the urban development footprint acknowledges the continued use of the intertidal mudflats for recreation and wildlife habitat. Implementation of an approved Foreshore Management Plan will ensure the appropriate use (and opportunities for environmental enhancement) of the foreshore reserve. The management plans required for urban development (as a condition of subdivision and development approval) will ensure long term sustainable use of the land for residential.
3. Provide for public coastal foreshore reserves and access to them on the coast.	A considerable area of the structure plan is set aside as foreshore reserve, where the intertidal zone can continue to be used as a unique area for public recreation. The structure plan ‘hard edge’ road provides a suitable interface and access to the foreshore. The location of public open space adjacent to the foreshore reserve strategically provides for public interaction between both recreational spaces. Access is to be provided from public open space adjacent to the foreshore reserve (i.e. via stairs) and this is detailed in the Foreshore Management Plan.
4. Protect, conserve and enhance coastal zone values, particularly in areas of landscape biodiversity and ecosystem integrity, indigenous and cultural significance.	The intertidal mudflat and mangrove areas around Pretty Pool Creek form part of the Port Hedland iconic landscape. The large foreshore area set aside in the structure plan ensures the continued protection and conservation of this landscape. Implementation of the Foreshore Management Plan will provide opportunities to enhance the foreshore area in terms of maintaining biodiversity and ecosystem integrity. Provision of the large foreshore reserve also recognises the indigenous cultural value of the heritage sites in the western portion of the site, as well as maintaining and enhancing access to Pretty Pool Creek.

During DPLH pre-lodgement consultations, there were certain specific matters in SPP 2.6 that were particularly important planning considerations for the Stables site, which included:

- Policy Measure 5.7 – Coastal protection works
- Policy Measure 5.9 – Coastal foreshore reserve
- Policy Measure 5.10 – Coastal strategies and management plans
- Local Water Management Strategy – Coastal modelling and cumulative impacts considerations

The above matters will be discussed under the various sub-headings.

### **Policy Measure 5.5 – Coastal hazard risk management and adaptation planning**

The Town's CHRMAP and local planning framework identifies the Stables site as potential land for future urban use, to meet the on-going demand for residential land to accommodate Port Hedland's growing population. Demand for new residential land within the east end of Port Hedland will also be driven from the recently announced Port Hedland Voluntary Buy-Back Scheme - associated with the planned gradual relocation of residents out of the west end of Port Hedland, due to dust and public health concerns.

In considering the site's constraints and the high environmental/recreational/community values placed on the intertidal mudflats and mangroves, the proposed structure plan generally avoids residential development on the mudflats. As the balance of the site beyond the mudflats is subject to coastal hazard (i.e. flood inundation), protective measures are provided that suitably address the identified risks. These are further outlined in this report.

Although the site is proposed as greenfield development on land affected by coastal hazards, the Town's CHRMAP and structure plan investigations confirm that the level of coastal hazard risk is acceptable and can be adequately managed.

Policy Measure 5.5 provides a basis for hierarchy or risk management and encourages avoiding new greenfield development in areas where coastal hazards exist, particularly where such development would require a substantial 'protection works' solution. With this in mind, the Stables site is considered acceptable as a greenfield development site, in that:

- Greenfield urban expansion in Port Hedland is already extensively constrained by coastal hazards (i.e. storm surge inundation), as identified by the Town's CHRMAP.
- Policy Measure 5.5 does not preclude new greenfield development within coastal-hazard affected areas.
- The Town's CHRMAP has given proper consideration of coastal hazards and it is concluded that appropriate coastal protection measures can be provided, that will facilitate an appropriate urban development outcome for the Stables site.
- The Town's draft Local Planning Strategy and local planning framework identifies Stables site as a potential greenfield urban expansion site, subject to the required further planning and technical investigations. These have been fundamentally addressed through the structure planning process. Further detailed work will be undertaken at the subdivision and development approval stage.
- As shown in Figure 7, the Stables site is one of a number of potential urban development sites in the east end of Port Hedland. Selection of preferred residential development sites, with a focus on prioritisation in the short-term, is a separate decision-making process, outside of structure plan approval.
- A preliminary memorandum of understanding will be undertaken between the developer and the Town to reduce any uncertainty over coastal protection works capital upfront and maintenance funding post-development.

A strategic spatial plan for long-term coastal adaption in Port Hedland is provided in the Town's CHRMAP Figure 5-1 Long Term Settlement Planning Opportunities (at page 65). This plan is achieved by focusing growth, urban expansion and increased development potential in the eastern part of the existing townsite.

The long-term settlement plan for Port Hedland is to avoid growth and expansion in West End (which is subject to dust and inundation), avoid new development in the coastal strip (which is affected by coastal processes erosion) and ultimately focus on a managed retreat from these areas. This enables long-term investment into feasible protection of inundation in East End, which is unconstrained by dust. This will enable the full suite of urban uses that could not otherwise be supported in the West End (CHRMAP, GHD 2019). The provision of high amenity alternative residential land options in East End, for residents relocating from West End, gives the opportunity for residents to stay in Port Hedland.

Due to the coastal hazards identified in the Town's CHRMAP, much of Port Hedland's coastal interface over time will take on the form of an **engineered coastline**. The adaptation measures envisaged for East End (and for many other areas of Port Hedland) will require engineered coastal protection works. This is the nature and requirement for continued settlement in Port Hedland over the planning 100 year timeframe.

The structure plan provides for an implementable adaptation plan that is technically sound, viable and that outlines the key tenure and management responsibilities for the future coastal adaptation and protection measures.

### Policy Measure 5.7 – Coastal protection works

The Town's CHRMAP identifies the need for new coastal protection works to be adapted for the Stables site. Currently there is limited existing coastal protection works for the site to address CHRMAP considerations, notwithstanding that much of the site is elevated at 6.0m+ AHD and contains existing equestrian development.

Styles Road is currently protected from storm surge inundation and erosion by the existing secondary dune sand and limestone ridge that extends from the equestrian facility up to Cooke Point Road. The highest elevation of the ridge is approximately 7.0m AHD, with the 'plateau' of the ridge ranging 6.0m AHD – 6.5m AHD.

Cook Point Road has some coastal protection works along its eastern boundary facing the intertidal area. The works are limited to a 'soft edge' sand bund with some rock scour protection at the base, all contained within the road reserve, which is outside of the structure plan boundary.

The Town of Port Hedland is the responsible authority for the construction and management of coastal protection works necessary for both Cooke Point Road and Styles Road. The developer of the Stables Structure Plan will not be responsible for the implementation of and on-going future management of coastal protection works for these public infrastructure items and associated land.

#### Type of coastal protection work

There are various types of coastal protection works, which can perform the same function, yet have contrasting appearance and levels of maintenance. For instance, there is a vast difference between providing coastal protection 'soft edge', compared with an engineered 'hard edge'.

A 'soft edge' coastal protection work can include creating an artificial landscaped 'sand dune'. The dune or sand bund would typically slope down from the finished development level towards the lower lying coastal area. The sand bund can be overlaid with vegetation brushing, landscaping and geotextile matting to encourage stabilisation and vegetation growth. The base would typically have scour protection, where rocks are commonly used.

A soft edge type coastal protection work presents as a more natural look. Geotextile sandbags can also be used to reinforce the soft edge, which in the short term are relatively hardy, but in the longer term are susceptible to wear and damage, requiring replacement and on-going maintenance.

Although in the short term a soft edge coastal protection work is less costly to deliver, over time it attracts higher maintenance costs, to counter weather impacts and erosion. In a large major storm event, damage to soft edge protection works can be catastrophic, requiring a re-construction.



Image 15. View of the Cooke Point Road wastewater pumping station eastern boundary showing an example of 'soft edge' coastal protection using geotextile matting over sand bund with rock scour protection at the base.

In contrast, 'hard edge' coastal protection works can take on a more engineered form with a higher upfront construction cost. This includes masonry or concrete seawall or rock revetment. Rock revetment appears less artificial than a man-made vertical seawall. A rock revetment is considered better suited to the Stables site, given rock revetments are more familiar in Port Hedland – for instance, used in the port areas and protection of mining infrastructure. The engineered coast appearance of the rock revetment necessary to accommodate the structure plan will therefore not be too unfamiliar to within the Port Hedland landscape. Figure 8 provides an illustrative example of how the proposed coastal protection works would be incorporated into the urban design.

*Refer to Figure 9 – Section Coastal Protection Works (Single Dwellings)*

The strong permanent nature of a rock revetment coastal protection works ensures the upfront delivery of a standard of infrastructure that satisfies 'future proofing'. This would reduce the Town's financial risk and uncertainty for the on-going future maintenance, by establishing at the beginning a type of coastal protection works which is more durable in the longer term. This would bring a certain level of comfort for future Stables residents and for the Town, concerning long-term coastal protection from flooding and financial management.

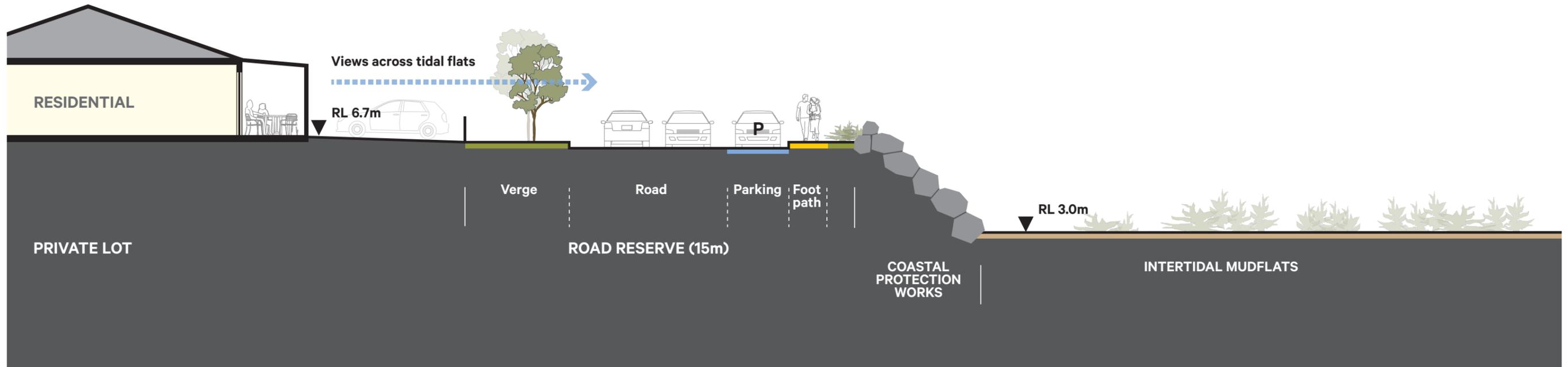


Image 16. Example of rock revetment coastal protection works.

Overall, at this structure planning early design stage, the use of rock revetment, as a coastal protection (edge treatment) work, along the interface of the urban development with the foreshore area is a conservative (yet 'future proofing') approach. Should rock revetment be the preferred coastal protection work, further design of the revetment will be required as the project progresses. Preliminary investigations for the structure plan indicated that the initial proposed rock armour size was estimated based on a solution implemented in the inner harbour, looking at aerial images of similar revetment and exposure to limited wave action. As a first pass for the structure plan, this demonstrates a satisfactory solution of the requirement for the site.

A range of other coastal protection edge treatment design options will be considered at a later stage of the design process, where material sourcing constraints and cost may drive an alternative choice of material and design. A combination of formation and construction types is not excluded and will be considered at the optioneering stage, to select a preferred solution to address the total vertical transition, which is approximately 5m (i.e. 7.0m AHD crest, 2.0 m AHD toe). Consideration of other requirements such as public safety, public access to the foreshore, construction cost, contractor skills, maintenance, etc will be factored into the selection process of the preferred coastal protection works.

Similar to the example of the 'soft edge' coastal protection works for the Water Corporation pump station site on Cooke Point Road (which survived the flooding associated with Cyclone Veronica), the use of a sacrificial buffer solution (without rock revetment) can be considered and may be implemented to offset development cost, particularly for the interface between construction stages. This would be a temporary measure and subject to adequate reactive maintenance in response to any substantial erosion episode. At future stages of planning, further consultation between the developer and the Town of Port Hedland would be required for the selection of an appropriate coastal protection work solution.



Indicative section showing relationship of road, pedestrian footpath, coastal protection works and level change to mudflats.

Figure 9. Section Coastal Protection Works (Single Dwellings)

### Site filling cumulative impacts on adjacent lands

The structure plan proposes substantial fill of the land to achieve the required minimum finished habitable floor level of 6.7m AHD. This will require approximately 217,000 cubic metres of imported fill. A level of 6.7m AHD (compared with the rare inundation level of 6.6m AHD in the Town's CHRMAP) has been adopted for the structure plan as the required minimum habitable finished development level. This is based on a recent review and estimate of the 500 year ARI for the year 2120 at the site, in accordance with SPP 2.6 and after review of the Town's CHRMAP and Port Hedland Coastal Vulnerability Study (Cardno, 2011).

The proposed coastal protection works (i.e. filling and rock revetment) for the Stables development will have a nominal impact on the adjacent environment within the sediment cell. This is demonstrated by the modelling undertaken for the structure plan as set out in the Coastal Hydrodynamic Modelling report (Cardno, 2020) contained as an appendix in the Local Water Management Strategy.

*Refer to Appendix 1 – Environmental Assessment Report (Local Water Management Strategy part of the appendices)*

Whilst the filling of the Stables site on its own will not have a significant impact on adjacent lands, the cumulative filling of the Athol Street site, Stables site and former Port Hedland wastewater treatment plant site (PHWWTP) could alter the flood flow pattern in Pretty Pool Creek and could potentially increase the inundation depth (in the order of 0.1m) to land between the PHWWTP site and Wilson Street. However, the modelled pre-development inundation depth in this area is in the order of 2 – 3 metres under the 500yr storm tide event. The pre-development inundation depth already poses significant risk of inundation to the land between PHWWTP and Wilson Street. So the adding of an additional 0.1m to the inundation depth does not change the already significant inundation risk in this area. Furthermore, the 0.1m change in inundation depth, as a result of the cumulative filling of the above urban development sites, is also a relatively minor change.

Land between the PHWWTP and Wilson Street (i.e. Residential Area '59' in the CHRMAP – refer to Figure 9a in this report), will need to protect against the risk of inundation for any redevelopment of the land. This includes raising land levels to address the pre-development inundation depth of 2 – 3m for the 500yr event. This is consistent with the Town's CHRMAP, which adopts a 'Protect' pathway as the preferred risk management and adaptation strategy, for the strategic development of urban sites in the Pretty Pool Creek area as shown in Figure 6a. Thus, for future urban expansion areas affected by inundation, the CHRMAP adopts the risk management measure of raising land level, in addition to investigating the feasibility of accommodating the possible and/or rare event hazards. For existing developed areas (e.g. Residential Area '59'), the CHRMAP adopts the risk management approach of accommodating or raising land levels in redevelopment. Accordingly the structure plan (and cumulative impacts of urban development in the Pretty Pool area) will not have any significant adverse impacts on adjacent lands, which are already subject to the inundation risks identified in the Town's CHRMAP.

*Refer to figure 9a - Town CHRMAP Coastal Assets and Land Uses*

*Refer to Appendix 2 - Site Specific CHRMAP*

### Impact on Pretty Pool Creek mangroves

Filling of the subject site has the potential to alter the natural patterns of water movement in adjacent areas. This may impact the existing Pretty Pool Creek mangrove habitat. The findings of the Local Water Management Strategy, which contains the modelling of the impacts of filling of the subject site, demonstrates that the subject site (in conjunction with the development of other future urban sites in East End) will not have a significant adverse impact on the mangrove habitat.

### Cooke Point Road

Cooke Point Road is an important piece of public transport infrastructure that provides direct access to Pretty Pool from Wilson Street. The section of Cooke Point Road extending south from Styles Road is relatively low lying (around 4.0m AHD – 5.0m AHD). Cooke Point Road is already identified in the Town's CHRMAP as being vulnerable to coastal inundation for the 500 ARI event.

During Cyclone Veronica in March 2019, storm surge swept over the section of Cooke Point Road between Tindale Street and Styles Road, essentially flooding the road inhibiting transport movement.

The flooding caused by the cyclone caused damage to this section of road, which was repaired by the Town. The section of Cooke Point Road between Styles Road and Wilson Street is more resilient to flooding and forms part of the Town's flood emergency management for alternative road access, in the event Cooke Point Road becomes flooded.

*Refer to Figure 10 – East End flood management alternative road access*

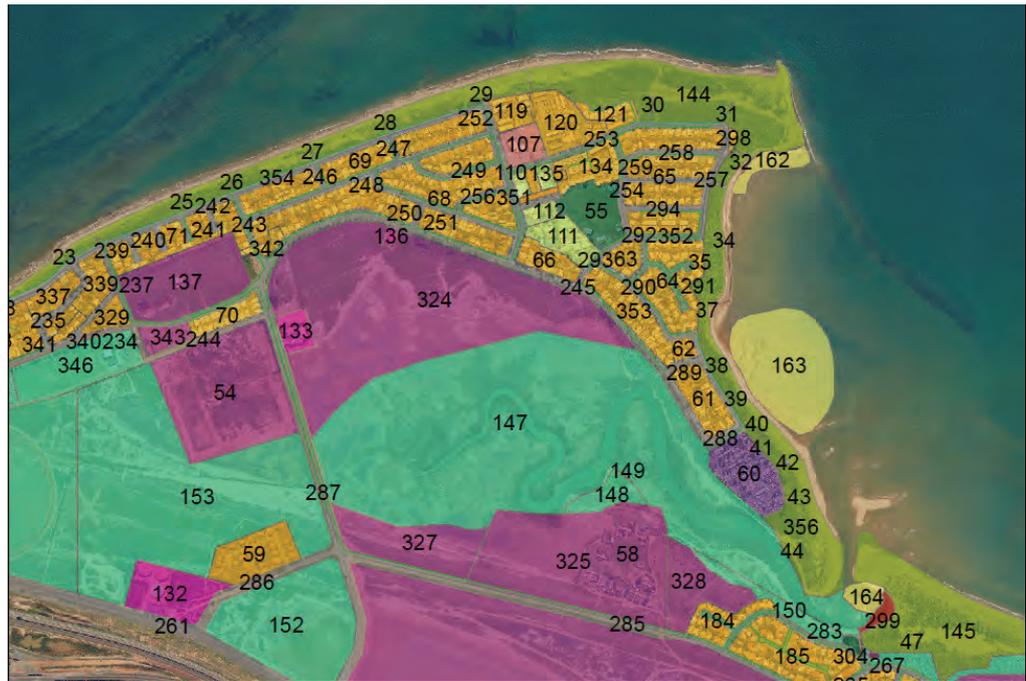


Figure 9a. CHRMAP Coastal Assets and Land Uses (Source: Town of Port Hedland, Port Hedland Town Site CHRMAP Coastal Hazard Risk Management and Adaption Plan, GHD April 2019)

The proposed development does not impact the current vulnerability of Cooke Point Road. Based on the Town's CHRMAP, future works will be required to upgrade Cooke Point Road to address coastal inundation from storm surge and flooding. The modelling demonstrates that the impacts of the proposed development (and cumulative development of Stables, Athol and PHWWTP sites) on Cooke Point Road are negligible and that the need to upgrade Cooke Point Road to manage flooding risk is not the result of the filling of the structure plan site for urban development. The upgrading of Cooke Point Road will be the responsibility of the Town of Port Hedland.

### **Delivering upfront adequate coastal protection and its management**

The main adaptive coastal management measures and considerations to facilitate urban development of the Stables site include:

- Establishing a minimum finished development level of 6.7m AHD by filling the site.
- Establishing coastal protection works which can withstand the impacts of weathering and erosion to maintain an acceptable freeboard development level above the forecast flood level.
- Management of adjoining lands, as a result of implementing the filling and coastal protection works for the site, will not be required due to the minimal impact on adjoining lands.

It is envisaged that the delivery of the above will occur indicative as follows:

- Developer to source locally suitable fill material (i.e. sand) to achieve a minimum 6.7m AHD finished development level. One possible source option for local fill could be from dredging material (i.e. port channel or spoil bank marina) with the agreement of the port authority.
- For any staging of development, there will be a provision of temporary coastal protection works on the side edges of staging boundary/s, generally behind the main coastal protection work front.
- The cost of delivering the coastal protection works (i.e. rock revetment) upfront would be borne by the developer and once satisfactorily constructed, would then be handed over to the Town of Port Hedland (i.e. after an agreed developer maintenance period) for future monitoring and maintenance, at the Town's cost, within a Crown Land reserve with management order to the Town.

### **Staging and temporary coastal protection works**

If the development is undertaken in a single stage, the entire adaptive coastal management measures would be implemented upfront, including the filling of the site to a minimum of 6.7m AHD and construction of the coastal protection works along the entire southern interface with the intertidal area.

Where development is staged, it is envisaged that filling would be localised to the staging area only. Construction of the permanent coastal protection works would be designed and built along the alignment of the staging boundary consistent with the southern extent of urban development as shown on the structure plan. The permanent coastal protection works might extend slightly further than the staging area, as deemed necessary to provide for adequate coastal flooding protection. The extent of the construction of permanent coastal protection works would be determined to the satisfaction of the Town at subdivision approval stage.

At the internal staging boundary, temporary coastal protection works would likely take on the form of a 'soft edge' treatment. This may comprise of a sand/geotextile bund, which could withstand to some degree the impacts of weathering and erosion. However, importantly these soft edge temporary coastal protection works would need to be monitored continually and maintained as necessary by the developer, until further staging is undertaken and so on. These temporary coastal protection works would be located within the developer's land. Therefore the management of the temporary coastal protection works would therefore be at the liability, cost and responsibility of the developer.

### **Coastal protection works tenure and responsibilities**

The foreshore reserve provided within the southern half of the structure plan area is identified in the structure plan as 'Environmental Conservation' reservation - reflecting its current and future intended use for conservation and restricted recreational use. The coastal protection works will be solely contained within this reservation, so that the management of the coastal protection works can be included in the Foreshore Management Plan.

As shown on the Concept Plan, the coastal protection works is indicatively shown within an approximate 20m wide strip of land extending along the northern and western edge of the urban development area. This ensures that the coastal protection works will be retained in perpetuity within public land (designated foreshore reserve).

*Refer to Figure 11 – Concept Plan*



Figure 10. East End flood management alternative road access



Figure 11. Concept Plan (element, 2020)

### Public access to foreshore

The intertidal mudflats currently fall within public land which is controlled and managed by the Town for public recreation. Adequate public access to the foreshore from the development and existing streets is considered important and identified in the structure plan, to provide on-going use of the foreshore area for local recreational opportunities.

The coastal protection works will therefore be designed to provide for legible, safe and accessible public pedestrian connectivity, between the foreshore reserve and the proposed urban development. A Foreshore Management Plan will be prepared and approved by the Town of Port Hedland that addresses public access, use and management of the foreshore area. This will occur at later stages of planning.



Image 17. Example of a road along a foreshore reserve which provides for a pathway and street parallel parking bays. A similar concept is envisaged for the Stables site for the foreshore hard edge road adjacent to the coastal protection works (as pictured above). (Source: Google maps street view, 2020)

### Policy Measure 5.9 – Coastal foreshore reserve

The establishment of the proposed publicly-owned foreshore reserve is based on the biophysical characteristics associated with the site's coastal environmental context. This approach is adopted, rather than using a nominal setback requirement. It is noted that the Stables site is located inland, away from the direct influences of coastal processes and as such, is not affected by planning for a coastal processes setback. The setting of the foreshore reserve is primarily influenced by the biophysical characteristics and the community and recreational foreshore values.

The location of the structure plan foreshore reserve boundary preserves the physical, biological and ecological attributes of the Pretty Pool Creek intertidal mudflats. A main relevant consideration for the structure plan is whether the foreshore reserve makes adequate allowance for the provision of coastal protection works (i.e. flood management) over the 100 year planning timeframe. It has been determined through preliminary engineering investigations that the proposed foreshore reserve area is sufficiently large enough, to provide adequate area to accommodate the necessary coastal protection works.

Most of the foreshore reserve will be used for environmental conservation and recreation. The Stables site is not an area of regional or district significance. The site is mostly frequented by Port Hedland residents for local recreation (and other uses currently under the existing leases).

There is no foreshore classification in the relevant strategic planning framework for the Stables site – whereby the site is identified for future urban development. Pretty Pool Creek is identified as a significant conservation and recreational area. The Town's Trails Masterplan identifies a future trail through the Pretty Pool Creek area, with a bridge crossing the creek to access the northern side of the creek. Accordingly, only limited facilities and infrastructure is required for the foreshore reserve, given the restricted, low scale and intensity of use. The foreshore reserve for the structure plan is considered appropriate.

The proposed public open space located adjacent to the foreshore reserve will be developed to provide for active and passive recreational use, along with the necessary amenities to enjoy the foreshore area. The public open space park is situated behind the coastal protection works, where it will be protected during the planning timeframe and not be impacted by coastal inundation.

Similarly, the hard edge road located adjacent to the foreshore area is also located behind the coastal protection works, where it will be protected. The road provides a public realm where a pathway and street parallel parking bays can be provided. These enhance the accessibility of the foreshore area when considered in conjunction with strategically located stair access points.

The detailed design of the public open space park, shared pathways, street parking bays and stair access points connected with the foreshore area would be determined at later stages of planning. These elements are sufficient for the provision of adequate public amenities in Pretty Pool (for the Stables southern side of Pretty Pool Creek) for the values, functions and use of the Pretty Pool Creek coastal area over the planning 100 year timeframe.

## Policy Measure 5.10 – Coastal strategies and management plans

### Foreshore Management Plan

The preparation of a Foreshore Management Plan (FMP) is an appropriate approach to addressing the SPP 2.6 Policy Measure 5.7 requirements. These include the assignment of management and responsibilities for the delivery and maintenance of the coastal protection works.

As well as establishing the funding arrangements for the construction and ongoing care, control and maintenance of the proposed coastal protections works, a FMP would also detail the managed use and any landscape opportunities for the foreshore reserve. The appropriate level of recreational amenity would also be determined in view of the environmental values of the foreshore area.

Policy Measure 5.10 encourages a FMP to be prepared as part of the early stages of planning for development within areas affected by coastal hazards. For the Stables site, a FMP would be more logical at subdivision stage – as the final subdivision design, depicting the foreshore boundaries and its area, including the details of engineering coastal protection works to be used, will be determined at the subdivision stage.

In addition, sufficient time is required post structure plan approval, to allow for the undertaking of consultation with the broader community, indigenous people and relevant public authorities, in the preparation of the FMP. The structure plan should however set the scope for the future FMP for the site, which should include but not be limited to the following considerations.

**Table 5 – Scope for future Foreshore Management Plan**

<b>Foreshore Management Plan Considerations</b>	<b>Scope and matters to be included</b>
<b>Environmental Considerations</b>	Ecological values, water quality, climate change, protection of existing vegetation and environmental values, marine turtles, mangrove protection, rehabilitation opportunities.
<b>Cultural and Heritage Considerations</b>	Indigenous site protection (i.e. middens, archaeological monitoring etc), interpretations and educational values.
<b>Planning Considerations</b>	Coastal hazards, landform and stability, natural vulnerability, coastal node tenure, uses and form of development, identify types of recreational use, public access and any restricted areas, landscape and visual values, extent of foreshore reserve/boundaries, landscaping opportunities.
<b>Administrative Considerations</b>	Foreshore tenure and management authority, staging of development and interim coastal protection works required and management thereof and financial responsibilities for ongoing maintenance and management of foreshore area including coastal protection works.

The above scope can be the basis for future discussions with the relevant stakeholders and the developer, as required in Part One Clause 4.7 preliminary considerations for the preparation of a Foreshore Management Plan.

### Preliminary undertakings to address Policy Measure 5.10

Consistent with the approach taken for other similar coastal development sites in Western Australia, the following are to be completed prior to Department of Planning, Lands and Heritage (DPLH) recommending the WA Planning Commission supports the proposed structure plan:

- The developer is to submit to DPLH a detailed design and modelling of the coastal protection works to satisfy Policy Measure 5.7(iii)(a) of SPP 2.6; and
- The developer is to submit to DPLH a suitable Statements of Undertaking from both the developer and the Town of Port Hedland whereby these parties agree to satisfy Policy Measure 5.7(iii)(b) of SPP 2.6 through the collaborative preparation of a FMP which sets the specific funding arrangements for the construction and ongoing care, control and maintenance of coastal protection works.

The developer and the Town should then partner with DPLH to scope and prepare the FMP, which could then form the basis for formal FMP approval at subdivision and development approval stage.

#### **Local Water Management Strategy – Coastal modelling and cumulative impacts considerations**

The Town's CHRMAP notes that a risk with areas affected by inundation is that with rising sea levels, the ability to drain inundated areas with drainage infrastructure will also reduce as tail water levels will be higher in the future. The impacts of the combination of high rainfall events with coastal inundation and high tail waters is likely to increase, although the CHRMAP focuses only on flooding from the marine environment and not rainfall.

The LWMS provides for stormwater management to address the 1:100yr event, but does not provide for this with a combined 1:500yr coastal inundation event. Such an event would be highly unlikely, but could be further considered at the subdivision stage, to determine whether additional filling may be required to demonstrate adequate drainage for such a rare event.

The impact of the proposed structure plan, in the context of other sites being developed for East End (refer to Figure 8), on surrounding hydrological characteristics is not significant. The hydrological modelling confirms that ocean inundation from Pretty Pool, once the Stable site, Athol site and the former WWTP site are fully developed, will not adversely impact the Pretty Pool Creek mangroves and adjacent lands.

*Refer to Figure 8 – East End future development sites*

#### **4.1.5 State Planning Policy 2.9 – Water Resources**

State Planning Policy 2.9 – Water Resources provides guidance to planning decision-makers in relation to managing impacts on water resources at various stages in the planning process, including local structure planning. This includes a focus on mitigating potential adverse impacts to water resources and promoting total water cycle management, to ensure best practice for the sustainable use of urban water resources.

The LWMS demonstrates that urban stormwater will be managed in accordance with the WAPC's Better Urban Water Management Guidelines. The strategy outlines that any potential impacts can be readily managed so as not to have any significant impact on the natural water resources.

#### **4.1.6 State Planning Policy 3.4 – Natural Hazards and Disasters**

State Planning Policy 3.4 – Natural Hazards and Disasters (SPP3.4) seeks to implement a systematic approach to the consideration of natural hazards and disasters in the planning process, including in the assessment of structure plans. In response to the provisions of SPP3.4 the proposed structure plan acknowledges the findings of the Town's adopted CHRMAP and makes provision for compliance with the policy measures under SPP 2.6 coastal planning.

#### **4.1.7 State Planning Policy 3.7 – Planning in Bushfire Prone Areas**

State Planning Policy 3.7 – Planning in Bushfire Prone Areas (SPP3.7) sets out the policy measures that apply to development in identified bushfire prone areas under the Department of Fire and Emergency Services State Map of Bush Fire Prone Areas.

As the subject site is located within an identified bushfire prone area, this application is supported by a Bushfire Management Plan (BMP). The BMP demonstrates that the relevant requirements under SPP3.7 can be appropriately addressed to comply with the policy.

*Refer to Appendix 4 – Bushfire Management Plan*

#### **4.1.8 Liveable Neighbourhoods**

Liveable Neighbourhoods (LN) has been prepared to guide the sustainable development of communities. It addresses both strategic and operational aspects of structure planning and subdivision for both 'greenfield' and larger urban infill sites.

The structure plan has been designed in accordance with the principles of LN, in particular the layout of roads, lots and public open space (POS). Consistent with LN, the structure plan provides a high level of connectivity with good external linkages to existing and planned road, cycle and pedestrian transport networks. The Figure 9 – Concept Plan demonstrates (along with the supporting technical reports) how the structure plan can be subdivided at later stages of planning.

The road design in the structure plan is legible and reduces car travel distances by creating alternative routes. These aspects are further addressed in the report.

LN encourages walkable access to local parks within POS. All future lots within the structure plan are within 400 metres walking distance from existing or planned POS areas. This provides residents with opportunities for active lifestyle and recreation within five minutes walking distance from residences. The structure plan provides for a relatively large functional active POS area for existing and future residents adjacent the foreshore reserve. This park will have a high level of amenity, being close to the foreshore and having views overlooking Pretty Pool Creek. The park will contribute towards achieving a sense of identity and place for the local residents.

Consistent with LN, it is important for the structure plan design to respond to site characteristics and site context. The structure plan design has taken into consideration the natural topography, the geological formations (i.e. estuarine deposits and secondary dune system), surrounding land uses, solar orientation and existing development. The proposed road layout can generally provide opportunity for residential lots to achieve an east-west or north-south orientation, which provides good opportunity for cross-breeze ventilation and solar orientation for dwelling design and outdoor living areas.

Within the structure plan, lots that face the POS and foreshore areas can increase opportunity for passive surveillance and interaction with public spaces. Lot shape and proportion of width to depth is considered important and the neighbourhood block layout in the structure plan has been designed to provide opportunity for lots to be rectangular in shape with a greater depth than width wherever possible. This ensures ability to develop the lots with high quality housing and built form and conformity with the Residential Design Codes of Western Australia and to the Pilbara housing and market expectations.

Other aspects of LN principles, such as local water management and road hierarchy are addressed further in this report. In addition, the proposed commercial use at the coastal node in the structure plan is discussed in further detail.

## 4.2 Local Planning Framework

### 4.2.1 Pilbara's Port City Growth Plan

Pilbara's Port City Growth Plan operates as the Town's current adopted local planning strategy and seeks to guide the continued growth of Port Hedland into a Port City for the Pilbara region.

The primary aim of the plan is to promote the growth of Port Hedland as “*A nationally significant, friendly city, where people want to live and be proud to call home*”. This includes a specific focus on housing diversity and land supply capacity, to provide an adequate supply of affordable land and housing choice to cater for a diverse and permanent residential population. The location of new housing is also important, in that locations of high amenity should be preferred, in order to attract people to live permanently.

There is an intent to develop 23,043 new residential dwelling throughout Port Hedland and South Hedland. In particular, the East End of Port Hedland is to be developed as a high amenity coastal community that offers significant housing density and diversity, together with sport and recreation opportunities, and education and community facilities.

The subject site is located within 'Precinct 2 – East End Urban Village' under the plan and is identified for medium density residential development, along with other sites (refer to Figure 12).

*Refer to Figure 12 – Pilbara's Port City Growth Plan (East End)*

### 4.2.2 Draft Local Planning Strategy

The Town's draft local planning strategy (advertised in June-July 2020) seeks to replace and update the Pilbara's Port City Growth Plan. The draft strategy is based on the findings of the Town's CHRMAP and thus reflects the long-term planning of the Town to address coastal hazards and SPP 2.6. The Athol Street site is identified in the draft strategy for future urban development, subject to the relevant planning and technical investigations to inform decision making.

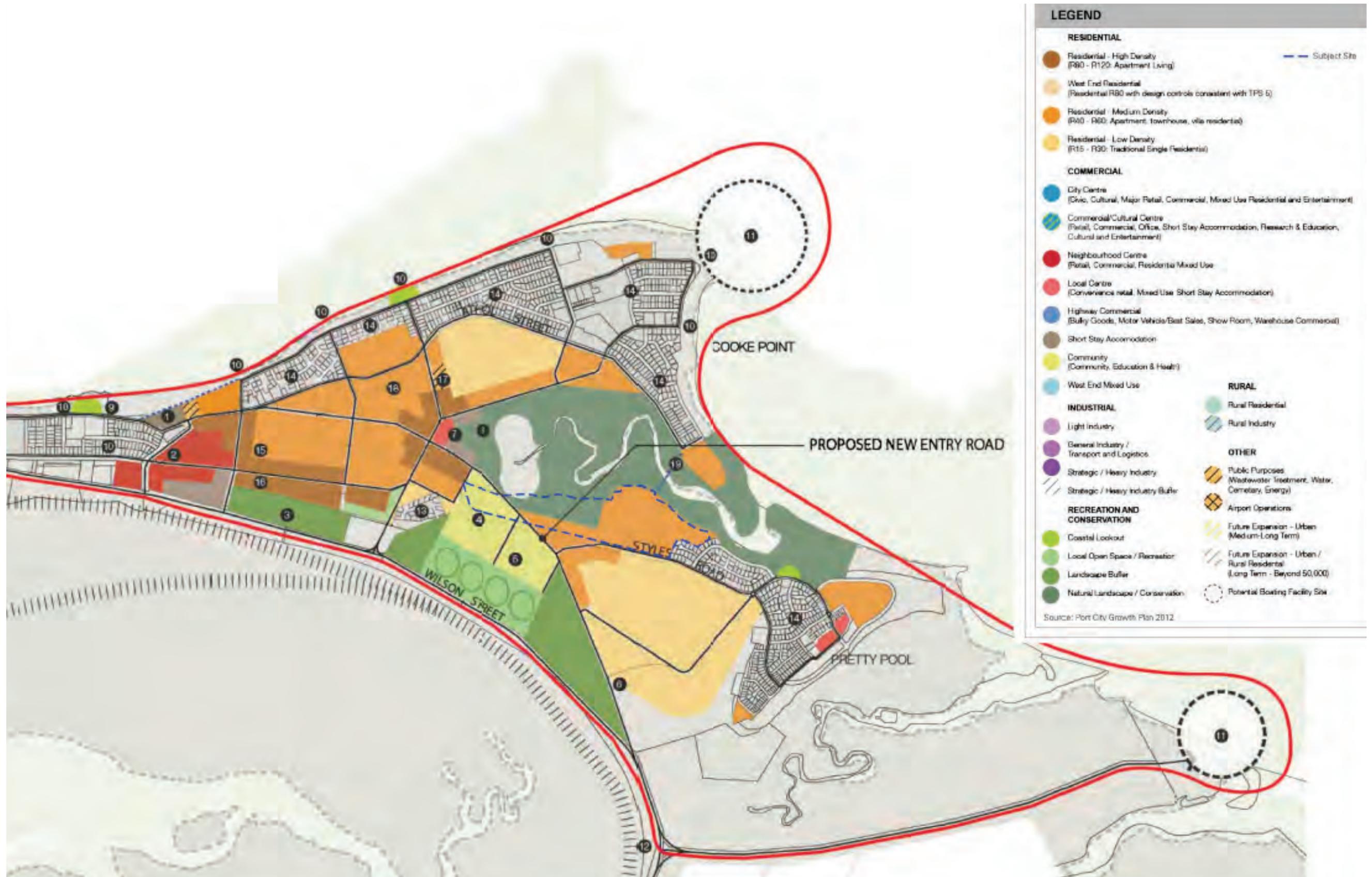


Figure 12. Pilbara's Port City Growth Plan (East End) (RFF Chesterman)

### 4.2.3 Town of Port Hedland Town Planning Scheme No. 5 and Draft Town Planning Scheme No. 7

The Town of Port Hedland Town Planning Scheme No. 5 (TPS5) is the primary statutory control on land use and development within the Town. The Stables site is currently zoned 'Rural' and 'Other Public Purposes: Energy' and 'Parks and Recreation' reservation.

Amendment No. 84 reclassifies and rezones the subject site by:

1. Reclassifying Crown Reserve 31506 (Lot 5755) and portion of Reserve 29044 (Lot 300) Styles Road, Port Hedland and Johnson Lane (road reserve) from 'Other Public Purposes: Energy' and 'Parks and Recreation' local reservations to 'Urban Development' zone.
2. Rezoning Crown Reserve 30768 (Lot 5966), Crown Reserve 31462 (Lot 5770) and portion of Johnson Lane and portion of Reserve 30768 (Lot 556) and portion of Unallocated Crown Land Lot 340 Styles Road, Port Hedland from 'Rural' zone to 'Urban Development' zone.
3. Modify Appendix 10 – 'Urban Development Additional Development Requirements' of TPS5 to reflect the proposed 'Urban Development' zoning over the subject site, introduce appropriate development controls and incorporate the land into the existing 'Pretty Pool 2' precinct.

The reclassification/rezoning to 'Urban Development' will facilitate future subdivision and development in accordance with the Stables Structure Plan.

The 'Urban Development' zone requires the preparation and approval of a structure plan prior to the subdivision and development of land. As such, the proposed structure plan will provide the necessary planning framework and guidance for the preparation and approval of more detailed subdivision and development proposals.

### 4.2.4 Port Hedland Townsite CHRMAP

The Port Hedland Townsite Coastal Hazard Risk Management and Adaptation Plan (CHRMAP), adopted in April 2019, identifies and considers coastal hazards and risks for the Port Hedland Townsite. This culminates in a recommended adaptation pathway that includes a range of actions to assist in adapting to immediate coastal inundation and erosion risks, and in undertaking appropriate planning to address increasing risks over time.

The adopted adaptation pathway accords with SPP2.6 and indicates that areas in East End are subject to a comparatively low coastal hazard risk compared with high risk areas in West End, where a managed retreat strategy is recommended.

Accordingly, the adopted CHRMAP recognises and supports the potential for future urban expansion in East End of Port Hedland. This will enable long-term investment into feasible protection of inundation in East End, which is not constrained by dust and noise impacts associated with port operations, and is capable of accommodating the full suite of urban uses, that could not otherwise be supported in West End.

In accordance with the above, the proposed structure plan provides for a design which adequately responds to the identified actions and recommendations under the CHRMAP.

### 4.2.5 Draft East End Village District Structure Plan

In 2012, DevelopmentWA (then LandCorp) engaged a consultant team to prepare a district structure plan to inform the future development of Port Hedland's East End. Whilst this document has not been formally adopted by the Town or the WAPC, and therefore has no statutory weight, it does serve to further inform the broader urban settlement vision for Port Hedland's East End.

*Refer to Figure 13 – Draft District Structure Plan*



Source: East End Concept Plan (RPS 2012)

Figure 13. Draft District Structure Plan (RFF Chesterman)

## 5. Structure Plan

### 5.1 Land Uses

The structure plan provides for a number of land uses including:

- Residential
- Public Open Space
- Drainage
- Foreshore

The foreshore area comprises most of the north-east and western half of the structure plan area and includes the intertidal mudflats, which poses challenges to accommodate residential development. The coastal protection works (i.e. rock revetment) will form the demarcation edge between the foreshore area and the urban residential area.

Within the urban residential area, the structure plan proposes residential use with well-connected roads to the existing road network, drainage corridors to provide for stormwater management and a relatively centrally located park in the east adjacent to the foreshore.

Residential use is predominantly medium density (R25) with potential pockets of higher density (R40) around high amenity areas, with densities to be allocated under a Residential Code Plan at subdivision stage. Low density residential is proposed along the rear of existing residential lots in Nichols Retreat and Matheson Drive.

### 5.2 Residential Yield and Densities

The Concept Plan (Figure 11) provides one option for the urban development of the subject site, with an estimated 188 dwellings that could be accommodated. The concept plan could provide for a mix of dwellings, predominately single dwellings on 12.5m – 15.0m frontage lots ranging in area from 375m<sup>2</sup> – 450m<sup>2</sup>, and larger lots that are >600m<sup>2</sup> where considered desirable.



Image 18. Only single storey dwellings (such as this example in Cooper Place, Pretty Pool) will be the permitted form of housing envisaged for the structure plan residential use, in order to minimise any adverse artificial light impact on turtle nesting sites on local beaches. (Source: Google maps street view, 2020)structure plan residential use. (Source: Google maps, 2020)

Smaller medium density strata lots (R40) could be provided on larger parent lot sites to provide for a mix of accommodation types. Due to the maximum single storey height limit, no multiple dwellings would be permitted.

The concept plan could accommodate up to approximately 526 people, based on an average household of 2.8 persons and 188 lots. The final lot yield and design would be determined as part of detailed subdivision at later stages of planning.

Table 6 provides an overview of development statistics based on the concept plan. Although the concept plan is indicative only at this structure plan level of planning (and not the subject of approval), the structure plan technical reports have been based on the concept plan. The concept plan provides a point of reference to demonstrate the capability of the proposed structure plan design over the subject site.

Table 7 demonstrates that the structure plan design, with a baseline average density code of R25 delivers approximately 20 dwellings per site hectare, which meets the Liveable Neighbourhoods density expectations for the site's locational context.

The initial estimated 188 single/grouped dwellings lots in Table 7 is based on an estimated residential housing composition as shown below:

**Table 6 – Estimated dwelling yield and lot typology**

Housing Typology	Estimated Dwelling Yield	Percentage
Single Dwelling (R20) (Low Density) (Typical 20m x 30m – 600m <sup>2</sup> )	34	18%
Single Dwelling (R25) (Medium Density) (Typical 15m x 30m – 450m <sup>2</sup> )	102	54%
Single Dwelling (R25) (Medium Density) (Typical 12.5m x 30m – 375m <sup>2</sup> )	44	24%
Single/Grouped Dwelling (R40) (Medium Density) (Typical 10m x 30m – 300m <sup>2</sup> )	8	4%
<b>Total Yield</b>	<b>188</b>	<b>100%</b>

**Table 7 – Development Statistics (based on the Concept Plan)**

	Site Outcomes	Target Density
Total Structure Plan Area	271,600m <sup>2</sup>	-
Area set aside for foreshore, roads, drainage & POS	181,200m <sup>2</sup> (approximate)	-
Balance area for residential development	90,400m <sup>2</sup> (approximate)	-
Estimate ultimate number of single/grouped dwellings	188 dwellings	-
Estimated number dwellings per site hectare <sup>1</sup>	20 dwellings per site hectare	Liveable Neighbourhoods 12 – 20 dwellings per site hectare for standard lot layouts; or 20 – 30 dwellings per site hectare for areas within 400m of neighbourhood centres

<sup>1</sup> Liveable Neighbourhoods definition of site hectare is the area available for residential development excluding roads, non-residential uses, public open space and drainage areas.

## 5.3 Movement Network

A Traffic Report has been prepared to inform the structure planning for the subject site. Based on the concept plan, the transport assessment demonstrates that the proposed structure plan will not have any significant impact on the existing and planned transport movement network.

*Refer to Appendix 5 – Traffic Report*

### 5.3.1 Existing Roads

The subject site is currently accessible via Styles Road, which connects to Cooke Point Road. The structure plan precludes any vehicle access from Styles Road, except for proposed subdivision roads.

Styles Road is a local distributor road carrying a forecast volume <3,000 vehicles per day. It is constructed with a 7.2m wide pavement and has a footpath on its northern side. For its intended function, Styles Road would typically be classed as a 'Neighbourhood Connector B' under Liveable Neighbourhoods. Lots within the structure plan will either side or back onto Styles Road, with access from proposed internal subdivision roads.

*Refer to Figure 14 – Diagram Styles Road Interface*

*Refer to Figure 15 – Section Styles Road Interface*

Cooke Point Drive is a local distributor road that provides the primary access from Wilson Street (main road entry into Port Hedland) to East End. The road is constructed with a standard 7.2m wide pavement. The structure plan does not propose any new access connections onto Cooke Point Road, other than a secondary (emergency) access. The secondary access would be locked at both ends and only open in case of emergencies or for routine maintenance.

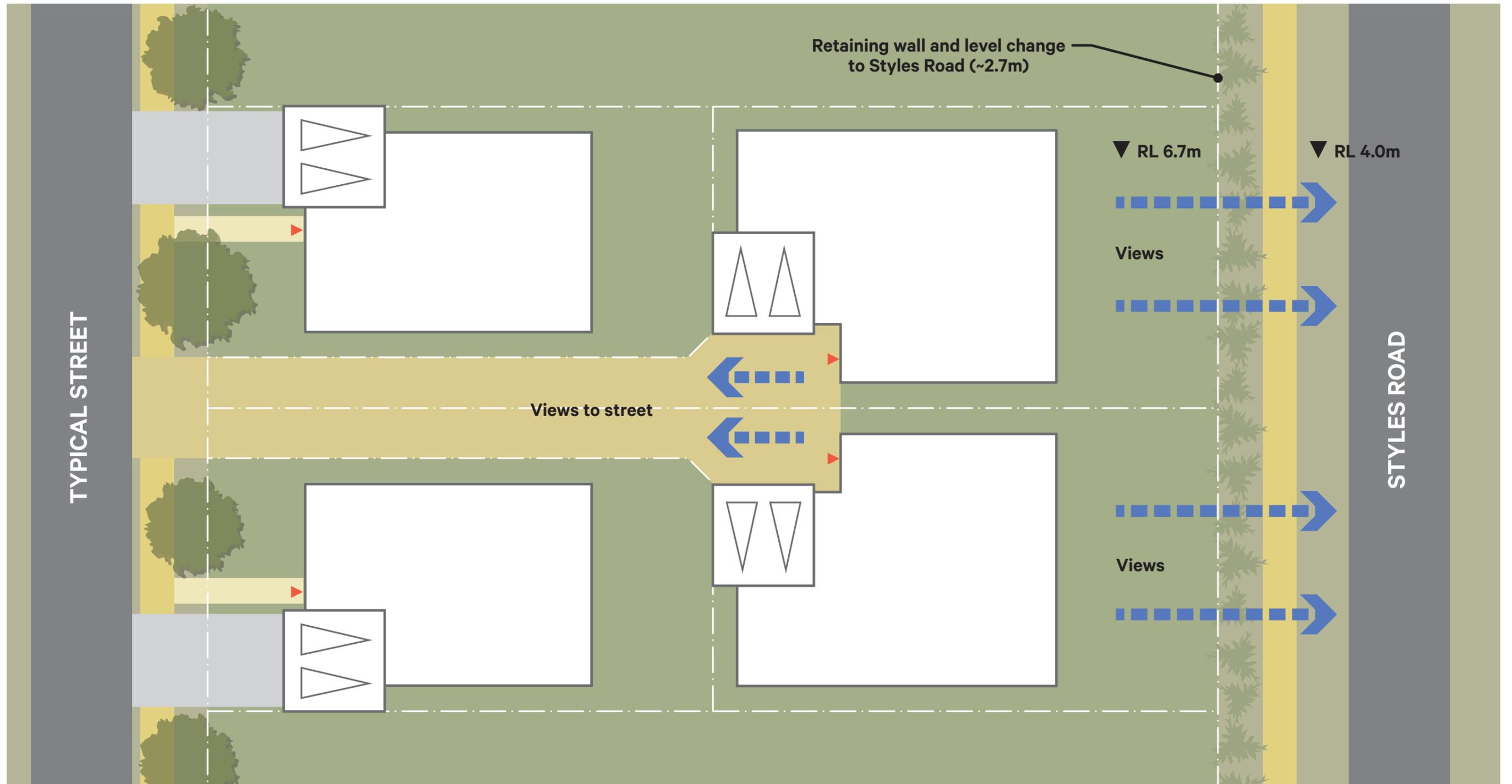
The proposed volume of traffic generated from the structure plan development will not require any additional upgrading or widening to the existing roads abutting the structure plan boundary. All new intersection connections from internal subdivision roads to Styles Road would be constructed to the Town's satisfaction.



Image 19. Residential development near the intersection of McGregor Street/Cooke Point Road with visually permeable developer uniform fencing on top of the retaining wall. The site has been raised to address coastal hazard flood inundation. The proposed structure plan development interface with Styles Road will likely take on a similar form as this existing development. (Source: Google maps street view, 2020)

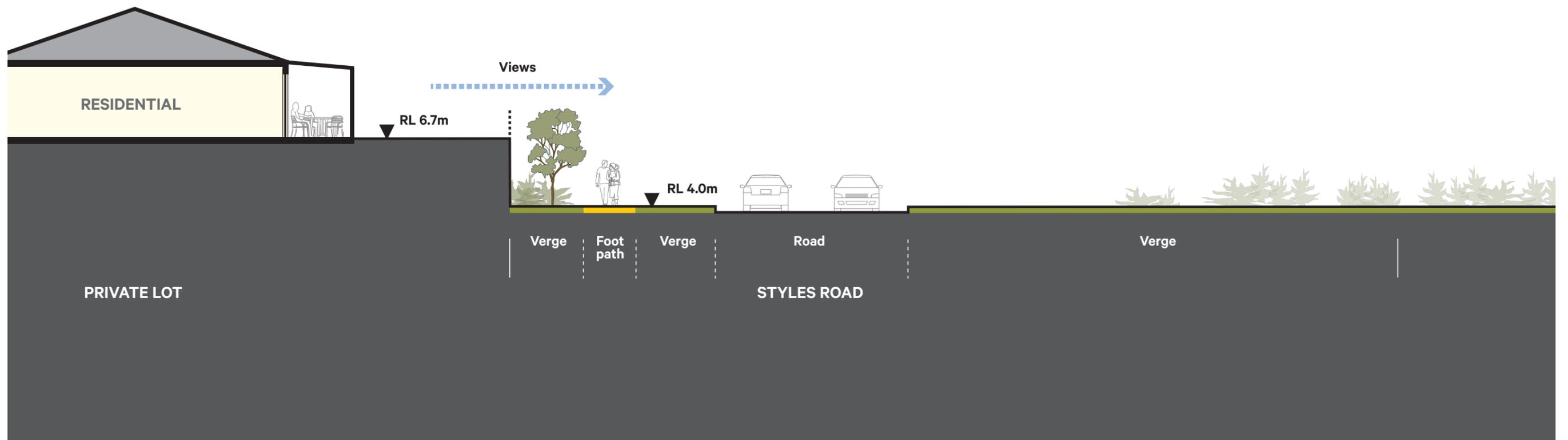


Image 19a. Example in Tindale Street, Port Hedland of landscaping in road reserve to screen retaining walls (Source: Google maps street view, 2020)



Indicative section showing proposed residential development, level change to Styles Road and views beyond.

Figure 14. Diagram Styles Road Interface (element, 2020)



Indicative section showing proposed residential development, level change to Styles Road and views beyond.

Figure 15. Section Styles Road Interface (element, 2020)

### 5.3.3 Proposed Roads

The structure plan proposes new internal subdivision roads connecting to Styles Road. The connections are likely to be full movement 'T' intersections. The structure plan road layout provides an appropriate responsive design to the existing site levels and landforms to accommodate servicing of lots and stormwater drainage.

The roads within the structure plan are classified as local access roads which is consistent with Liveable Neighbourhoods, given the relatively low volumes of traffic on these roads. New subdivision roads are anticipated to be kerbed with a pavement width between 6m – 7m. Local access roads shall generally have a road reserve width consistent with Liveable Neighbourhoods, as shown in Figure 16.

*Refer to Figure 16 – Road Hierarchy Plan*

*Refer to Figure 17 – Indicative Road Reserve Widths and Cross-sections*

The proposed road along the edge of the foreshore area and public open space will provide for a 'hard edge' interface. Within this foreshore road reserve, it is envisaged that provision will be made for the following public infrastructure in addition to standard road infrastructure (refer to Image 17 and Figure 9 as illustrative examples):

- Pathway along the edge of the foreshore reserve and coastal protection works;
- Street parking parallel bays to provide for public parking facilities and access to the foreshore.

### 5.3.4 Pathways and Stair Access

There is an existing pathway on the northern side of Styles Road and eastern side of Cooke Point Road. The structure plan design allows for provision of pathways at detailed subdivision stage on proposed roads to connect with the existing pathway network. The general proposed pedestrian and cyclist pathway strategy for the structure plan is illustrated in Figure 18, which shows indicative pathways.

The structure plan recognises the importance of retaining recreational access to the foreshore area. In this instance, the structure plan proposes stair access to the foreshore area from the existing and planned urban development.

The exact location of pathways and stair access to the foreshore area will be determined in liaison with the Town at the subdivision stage once a more specific form of development for the subject site is proposed. In general, pathways are proposed to be provided on all streets in accordance with the requirements of Liveable Neighbourhoods.

The Town's Trails Masterplan identifies a future trail through the Pretty Pool Creek area, with a bridge crossing the creek to access the northern side of the creek. A connection from the structure plan to the Pretty Pool Creek trail network could be provided at later stages of planning.

*Refer to Figure 18 – Open Space and Pathways Plan*

## 5.4 Public Open Space

The structure plan makes provision for approximately 7.6% public open space (POS), which is below the standard minimum 10% POS requirement. Notwithstanding, the one large and accessible park within the structure plan area provides for an adequate level of POS for future residents. Furthermore, the large foreshore area ('Environmental Conservation' reservation) will provide for restricted recreational use, such as active walking and passive wildlife watching.

Due to the significantly high development costs (i.e. associated with filling), provision of the required 10% POS would add substantially to development costs. Whereas the proposed POS forms a sizeable park (at least 0.75 hectares in area), that is unconstrained and can provide for the recreational needs of future residents, supplemented by the foreshore reserve which can also be used for recreation.

The provision of a single large park is consistent with the Town's public open space strategy for providing less (but bigger) parks for ease of maintenance and function. As shown in Figure 18, all residents will have convenient walkable access to POS. The proposed structure plan POS will also be accessible to the existing established residential community to the east.

*Refer to Figure 18 – Open Space and Pathways Plan*

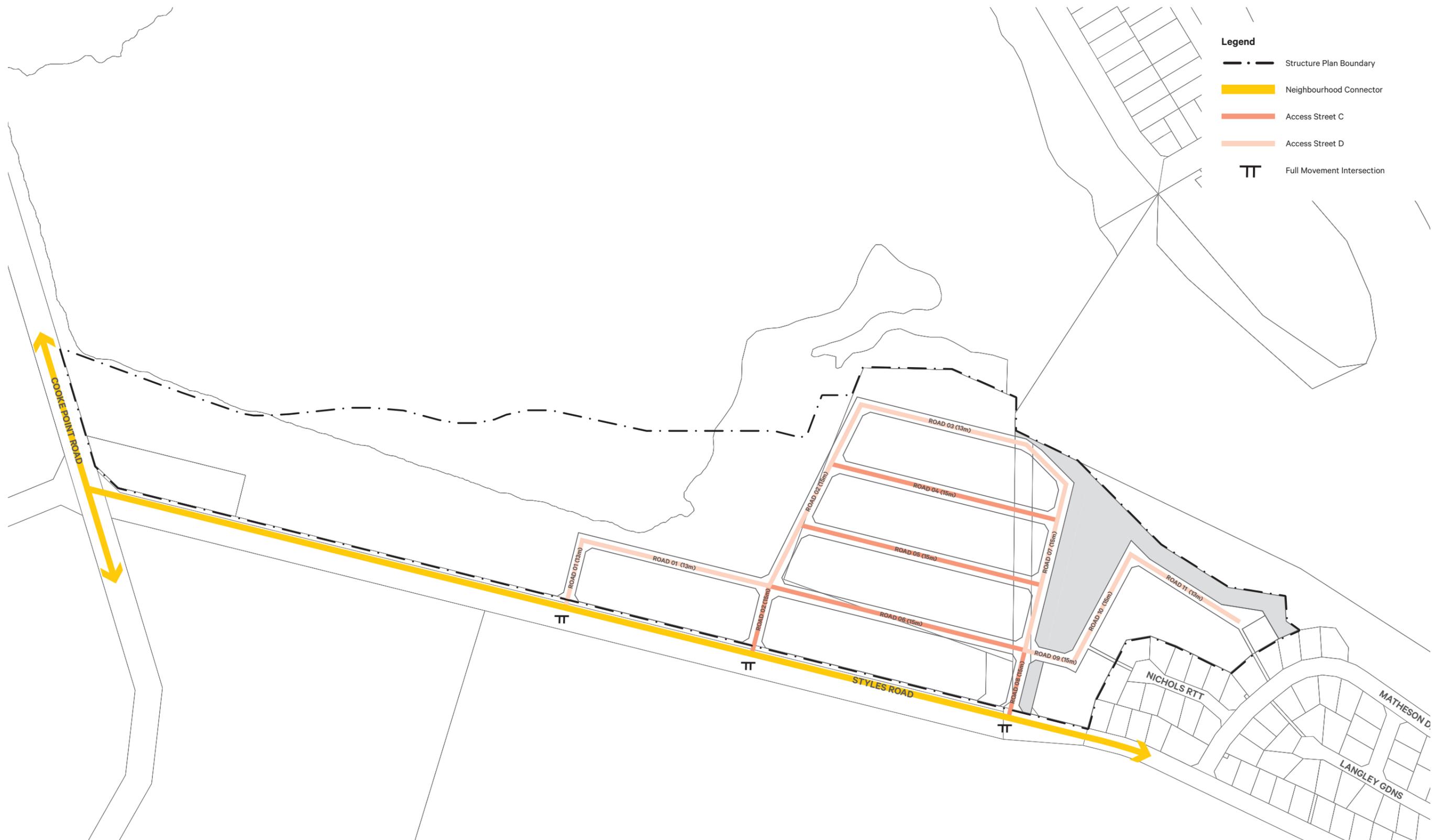
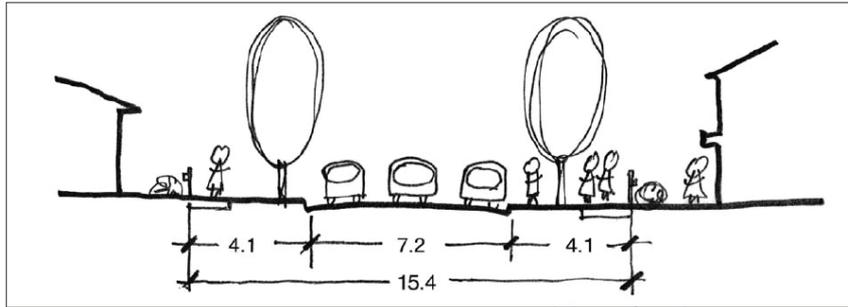
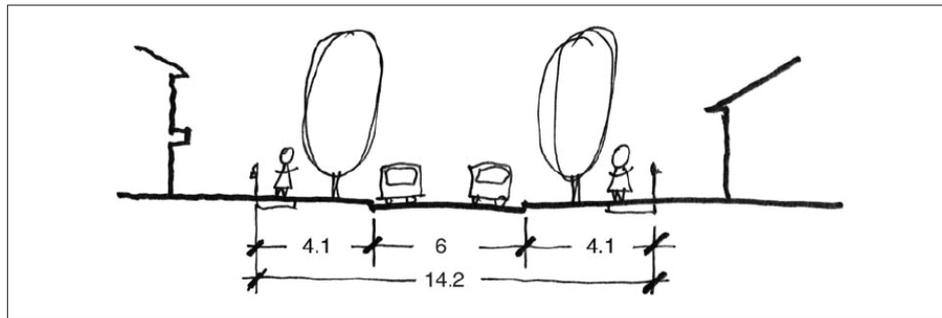


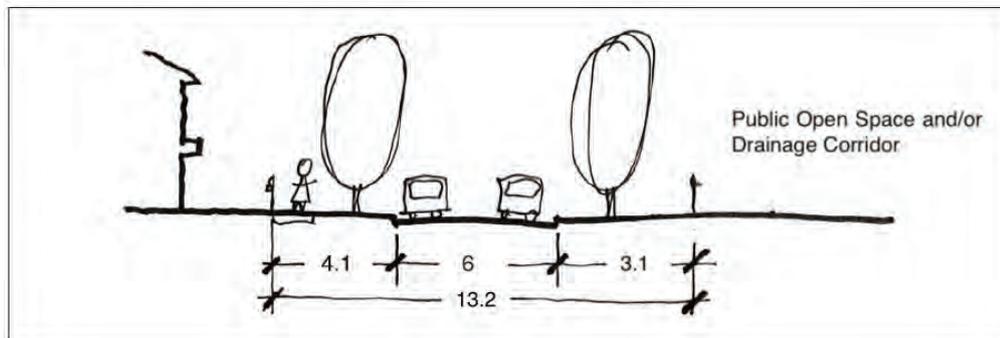
Figure 16. Road Hierarchy Plan (element, 2020)



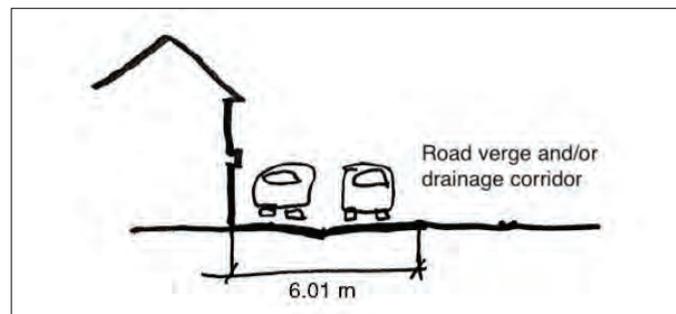
**'Access Street C' - typical cross section for local street**



**'Access Street D' - typical cross section for local street  
(Development on both sides)**



**'Access Street D' - typical cross section for local street  
(Development on one side)**



**'Laneway' - typical cross section  
(Development on one side)**

Figure 17. Indicative Road Reserve Widths and Cross-sections



Figure 18. Open Space and Pathways Plan (element, 2020)



Image 20. Example of stairs integrated with coastal protection works to allow pedestrian access and connectivity with the foreshore area. (Source: Fraser Chronicle, 2020)



Image 21. Extract from the Town's Trails Masterplan which shows potential trails and crossings in the Pretty Pool Creek area adjacent to the structure plan. (Source: RPS, 2020)

### 5.4.1 Proposed park

The proposed park is adequately shaped and conveniently located adjacent to the foreshore area. This makes the park attractive, as it will have an elevated panoramic outlook to Pretty Pool Creek and the intertidal mudflats and fringing mangroves. Currently there is no park in the immediate area comparable, in terms of its size and views overlooking intertidal mudflats and mangrove habitat. Yikara Park in Pretty Pool is located approximately 890m south-east of the Stables site. This park services the southern end of Pretty Pool. The proposed Stables structure plan POS can ideally service the northern end of Pretty Pool.

The POS park could incorporate contemporary landscaping, using Pilbara native species and other waterwise species appropriate for the park setting. Some turf areas could also be considered for active recreation. Community art and other park amenities, along with shade structures could also be included. A park concept plan would be prepared and approved at later stages of planning.

Drainage corridors have also been included in the structure plan, primarily to accommodate the rapid transfer of stormwater during high rainfall events. These drainage corridors could serve a multiple use, by incorporating pathways alongside stormwater infrastructure to increase permeability for pedestrians and cyclists. The drainage infrastructure would comprise of swales with rock pitching to reduce water flow velocity and minimise erosion. Landscaping could be incorporated within the swales and corridors for amenity.

Table 8 is the structure plan POS schedule based on the development concept plan. The structure plan POS and drainage corridors, along with indicative locations for pathways, are identified in Figure 18.



Image 22. Example of a landscaped open sloping swale drain in Harrier Street, South Hedland. (Source: Google maps street view, 2020)

### 5.4.2 Landscaping, street trees and water conservation

Landscaping is anticipated to focus on planting local, endemic species in areas of POS, road reserves and drainage corridors. Street trees will provide 'soft works' and 'cooling effect' within the road reserves and will enhance the streetscape amenity. A street tree masterplan would be provided to the Town for approval at the subdivision stage.

The use of potable water for irrigation is restricted, due to tighter restrictions centred on improving water efficiency and conservation, until new sources of water are tapped by Water Corporation. Accordingly, the use of plants species that need minimal long-term irrigation and fertiliser application and that can tolerate the hot semi-arid climate of Port Hedland are ideal. Landscaping plans for POS and drainage areas would be submitted to the Town for approval at the subdivision approval stage.

Table 8 – Public Open Space Schedule based on Concept Plan

Calculation of Required POS Provision	Ha	Ha
Total Site Area (ha) – urban development zone	27.16	27.16
Deductions		
Foreshore Reserve	12.94	
Dedicated Drainage	0.36	
Surplus restricted use POS	0.47	
<b>Total Deductions</b>		<b>13.77</b>
<b>Gross Subdivisible area (total area minus deductions)</b>		<b>13.39</b>
<b>Required POS (10%)</b>		<b>1.33</b>
Breakdown of POS Provided		
May comprise:		
• Minimum 80 per cent unrestricted POS	1.06	
• Maximum 20 per cent restricted use POS	0.27	
Restricted Public Open Space		
POS 2 – Portion of park containing interface with foreshore (landscaping)	0.27	
<b>Total Restricted POS Credited to a maximum of 20%</b>		<b>0.27</b>
Unrestricted Public Open Space : by function		
POS 1 – Local park		0.75
<b>Total Unrestricted POS</b>		<b>1.02</b>
<b>Public open space provision provided</b>		<b>1.02</b>
POS Provision as Percentage of Gross Subdivisible Area		(7.6%) <sup>1</sup>

**Notes** <sup>1</sup> Final POS calculations will be subject to detailed survey and approved Urban Water Management Plan. A minimum of 10% POS land contribution to be provided at Survey Deposited Plan final approval stage.

## 5.5 Education, employment and community uses

Under the existing planning framework there is no identified requirement for any educational establishments, public utilities and/or community uses within the subject land.

## 5.6 Servicing

An engineering servicing report has been prepared that demonstrates the site can be developed for urban development through provision of the necessary servicing. There are some challenges to provide for a fully serviced urban development, including the provision of the necessary fill, coastal protection works and extension of servicing infrastructure. However, there are no significant servicing constraints impacting the structure plan – with identified constraints able to be adequately managed. Subdivision and/or development for urban use would be subject to consultation with service providers and the necessary upgrades to existing infrastructure to support development.

Refer to Appendix 6 – Engineering Servicing Report

### 5.6.1 Reticulated Sewer

There is an existing gravity sewer main in Styles Road reserve that services the existing Pretty Pool development to the east. Effluent is discharged to a wastewater pump station located near the intersection of Sharman Mews and Styles Road. All effluent is ultimately pumped southwards to the South Hedland Wastewater Treatment Plant. The Water Corporation has indicated that its wastewater planning for the area has factored in urban development at the Stables site. Further consultation, at subdivision stage, will be required with Water Corporation, to determine the proposed reticulated sewer design to service future lots within the structure plan.

## 5.6.2 Reticulated Water Supply

Reticulated potable water supply from the East Pilbara Water Supply Scheme is readily available to the site from existing infrastructure in both the Athol Street and Cooke Point Road road reserves. The Water Corporation confirms that there is sufficient water supply to service the development. Water supply is provided via the existing reticulated water main in Styles Road.

## 5.7 Power, Telecommunications & Gas

Sufficient power supply exists servicing Port Hedland to supply the structure plan urban development. Existing reticulated power supply infrastructure is located in Styles Road. Typically all internal power reticulation lines and transformer installations will be constructed at the cost of the developer. Transformer sites will be determined at the detailed subdivision design stage.

The site can be adequately serviced by existing telecommunication infrastructure in Styles Road. The provision of a pit and pipe system (predominantly within road reserves) to accommodate future NBN and broadband supplier will be required as part of subdivision. There is no reticulated gas supply in Port Hedland.

## 5.8 Local and Urban Water Management

A local water management strategy has been prepared for the structure plan, which demonstrates that stormwater generated by proposed urban development can be adequately treated and managed. The strategy will guide the preparation and approval of an Urban Water Management Plan at subdivision stage.

Due to the intense rain events experienced in Port Hedland and the poor capacity of the local soil types to provide for adequate localised infiltration, stormwater runoff generated by residential development is not expected to be managed within individual lots.

The primary means for managing stormwater drainage will be to utilise the road network to collect and transfer stormwater runoff into drains beside the road. Drainage structures will typically consist of a kerb break and stone pitching to allow water to adequately discharge into the open drains.

Open drains are proposed to have mild longitudinal grades to avoid erosion and provide opportunities for nutrient stripping using landscaping. Drains would generally be landscaped typically using appropriately selected native species. The side slopes would typically be sloped at 1:6, but could be increased to 1:3 in certain places, or in lieu of a batter provision of retaining walls.



Image 23. Example in Gannet Street, South Hedland of rock pitching and kerb break to allow stormwater to discharge from road into the roadside open drain. (Source: Google maps street view, 2020)

The overall drainage strategy would not intend to retain stormwater, which would result in standing bodies of water over long periods. This would encourage the undesirable breeding of mosquitos. During high intense rainfall events, stormwater is proposed to be conveyed in a controlled manner into the foreshore area, using vee notch (or similar) weirs to reduce the peak flows draining into the foreshore and reduce sediment inflow. Gross pollutant traps would be installed to ensure an acceptable level of treatment, prior to discharging into the marine intertidal zone of Pretty Pool Creek.

## 5.9 Earthworks

The majority of the Stables site where urban development is proposed has a surface ground level of around 4.0m - 6.0m AHD. Preliminary civil engineering investigations indicate that the subject land will need to be filled to a minimum 6.7m AHD finished habitable development level to accommodate urban development. This will require substantial earthworks involving filling.

Some localised cut and fill and removal of topsoil would occur where existing site levels are higher than 6.7m AHD, particularly in the eastern portion of the site where natural levels rise up to 7.5m AHD. It is anticipated that rock breaking will be required in certain places where limestone underlies the dune sand deposits. Limestone would be crushed and blended with fill material.

Site works will be required to create level lots for dwelling construction and provision of roads and services. Level sites reflect the ideal building site to reduce housing cost and improve housing affordability.

Use of retaining walls may be necessary to absorb any level differences. The height of retaining walls are expected to be minimal, with mostly low height (<1.0m) retaining walls. All retaining walls will be constructed to the City's satisfaction.

Due to the substantial amount of fill being introduced onto the site, there will be sufficient clearance to groundwater for all underground services and residential foundations. The sourcing of local fill could include dredge material, but this would be subject to consultation with the port authority and Town of Port Hedland. Suitable fill could also be sourced from local quarries.

## 5.10 Staging of development

The structure plan is likely to be delivered in two stages due to a number of factors, being:

- Relatively small nature of the greenfield development.
- Market forces;
- Availability of locally sourced adequate fill material;
- Costs associated with coastal protection works.

There are no specific triggers for staging of development, except that the initial Stage 1 will likely commence where the equestrian facility is located and on the higher elevated land in the eastern portion of the structure plan. Land within the eastern portion of the structure plan identified for urban development is on higher ground, requiring less filling.

*Refer to Figure 19 – Staging Plan*

The boundary and extent for Stage 1 would likely be formed on the western side of the first entry road approaching the development from Cooke Point Road. Permanent coastal protection works (i.e. rock revetment) would be constructed interfacing with the foreshore reserve. A single subdivision approval could be sought over the Stage 1 area, which would comprise the bulk of the overall structure plan lots. The subdivision could then be progressed in sub-stages of 30 - 50 lots or more.

The initial stage 1 boundary would require the construction of temporary 'soft edge' coastal protection works on its western edge, behind the permanent coastal protection works front. This would be to the satisfaction of the Town of Port Hedland.

Stage 2 would likely cover the remaining balance western area of the structure plan. This would include the construction and completion of the permanent coastal protection works edge extending up to Styles Road.

The timeframe for undertaking Stage 2 is unlikely to be delayed for any long period of time, as the temporary 'soft edge' coastal protection works would require continual on-going monitoring and maintenance by the developer under a foreshore agreement with the Town. As soon as the next stage can occur, it is envisaged it will be undertaken, so that the permanent coastal protection works can be completed.

The Foreshore Management Plan would be prepared to reflect the intending staging and identify works and responsibilities for management of the foreshore area.

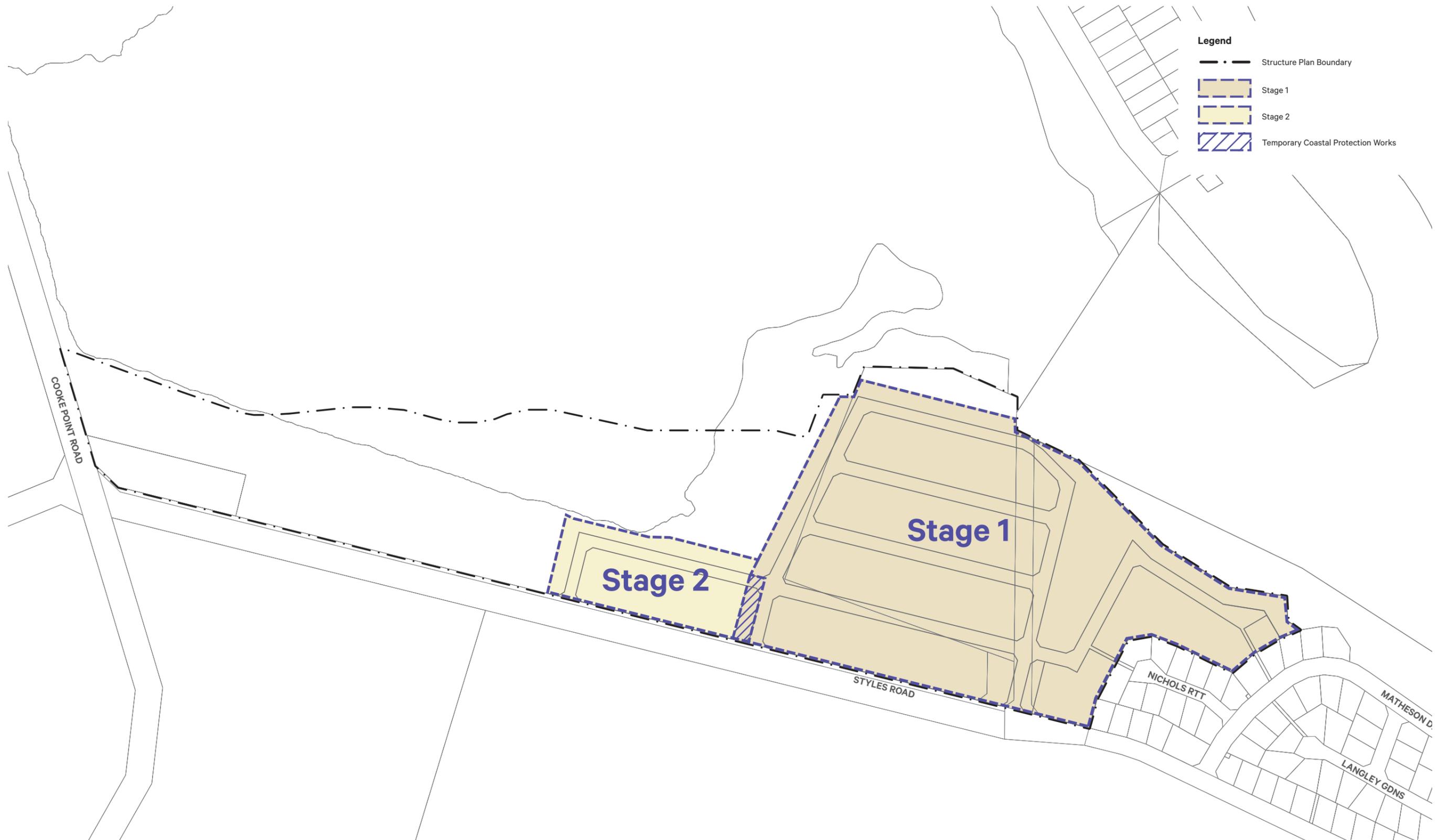


Figure 19. Staging Plan (element, 2020)



## 6. Conclusion

The Stables Structure Plan proposal is consistent with the established planning framework. The site is identified in the framework as a potential future urban development site in East End. The structure plan technical and planning investigations has determined:

- The relevant coastal hazard risks identified in the Town's CHRMAP can be properly addressed, through adaptive measures including the provision of coastal protection works.
- An appropriate level and design response to the site's biophysical characteristics and surrounding context; and
- The site can adequately be planned and serviced to accommodate residential development.

The Stables site is regarded as a potentially high amenity residential development site. Urban development of the site will contribute towards providing sufficient land supply to accommodate housing for population growth in the future. The site will also provide for additional residential land supply associated with the planned reduction of residential use in West End. The provision of high amenity alternative residential land options in East End, for residents relocating from West End, gives the opportunity for residents to stay in Port Hedland.

The relevant coastal planning considerations under WAPC SPP 2.6 have been addressed. The Town's CHRMAP identifies the subject site to be within a coastal hazard risk area susceptible to flood inundation. The structure plan modelling undertaken demonstrates that the SPP 2.6 coastal hazard risks (i.e. coastal flood inundation) for the 100 year planning timeframe can be satisfied by the following adaptation measures:

- Filling of the site to a minimum 6.7m AHD habitable finished development level; and
- Provision of suitable 'hard edge' engineered coastal protection works (i.e. rock revetment), providing for a high degree of protection against erosion and flood inundation.
- Provision of a Foreshore Management Plan to ensure the sustainable protection and maintenance of coastal protection works over the long term.

The structure plan balances the components of planning, heritage and environmental aspects and values to deliver a high amenity residential development, which capitalises on the site's strategic location and orientation outlook adjacent to Pretty Pool Creek. The structure plan Part One implementation provisions ensure the key planning considerations for the urban development of the site are addressed and will be addressed at later stages of planning. The timing of development is subject to market forces and the logistical sourcing of fill material. Approval of the structure plan will ensure that when the timing is ready, the next step of subdivision approval can be progressed.

