



DRAFT East Fremantle Foreshore Master Plan



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East Fremantle Foreshore Master Plan
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- Gary Clark, Acting CEO Town of East Fremantle



EXECUTIVE SUMMARY

The river foreshore is one of the Town of East Fremantle's most important assets as it contains physical, biological, cultural, aesthetic and recreational diversity. In fact, it is one the most diverse foreshore areas on the entire Swan Canning River system. The functioning of the foreshore is underpinned by important foreshore infrastructure such as seawalls, groins and headlands which limit the erosive forces of the river and help create and maintain sandy beaches which are a focus for recreation. Over the years the Town of East Fremantle has maintained and developed the foreshore on an as-needs basis. However with demand for the foreshore increasing the Town in association with the Department of Parks and Wildlife (Parks and Wildlife) realised that there was a need for a foreshore master plan to guide future development of the foreshore.

The objectives of the foreshore master plan were:

- prepare a strategic vision for the protection and enhancement of the foreshore to mitigate erosion impacts which threaten environmental, recreational, aesthetic and cultural values of the foreshore
- undertake a detailed desktop and site analysis of the East Fremantle foreshore
- improve the enjoyment of the foreshore by addressing identified risks to public amenity values, public safety, infrastructure and the environment
- prepare management recommendations to address the physical, social, and biological issues identified in the plan
- prepare an action plan that prioritises and provides indicative cost of proposed works to address the management recommendations that can also be used for possible future funding applications
- develop a plan that can be readily adopted by the council and the community.

For the purposes of the study the river was divided into three zones: the Wall Zone, Reclaimed Zone and Natural Zone. A built foreshore assets assessment was undertaken using an agreed condition scale. Overall the condition of the river wall in the Wall Zone was found to be average, whereas it ranged from poor to excellent in the Reclaimed Zone and good to average in the natural

zone. A costed maintenance program was developed for the sustainable maintenance of the wall and other structures.

The master plan broadly examined the facilities that occur along the foreshore and identified which areas have the highest public use. During the process of formulating the master plan a number of big issues such as the alignment of the Riverside Road, the sale of Leeuwin Barracks and demand of foreshore recreation areas were considered.

The master plan identified a number of design changes to the foreshore which will enable a more coherent and sustainable foreshore environment. The designs will enhance recreation use, activate relatively unused parts of the foreshore, improve environmental management, generate civic pride and potentially provide increased revenue for the Town. A number of recommendations with a staged program and cost estimates are provided in the report.

1.0 INTRODUCTION

1.1 BACKGROUND

The Town of East Fremantle's (Town) foreshore is one of the most diverse foreshore areas along the Swan River in terms of the topography, recreation use, club based activities, food and beverage venues in an aesthetically pleasing setting. It is also positioned on one of the narrowest sections of the river and is subject to erosive forces from boat wash, storm events and tides. It has a high level of cultural and historical significance due to Aboriginal use of the area for food gathering and camping, as well as the role the foreshore played in the development of Perth and Fremantle.

The foreshore area contains a range of passive and active recreation areas which are used on a regular basis. Some venues are also very popular such as the Left Bank, Zephyr and Dome Cafe. The river setting for these venues is a primary driver for their high level of patronage and the fact that there are a limited number of similar venues on the Swan River.

The foreshore has been the subject of a number of studies which were undertaken many of years ago. The East Fremantle Foreshore Landscape Plan prepared by Ecoscape in 1993 has been used by the Town to inform foreshore planning and management. However the foreshore has been subject to change and therefore requires a new master plan which is cognisant of the current status of the foreshore and its requirement for sustainable development.

1.1.1 Study Area

The study area comprises the Swan River foreshore within the Town. It extends from East Street to Petra Street and principally included the foreshore reserve between Riverside Drive and Jerratt Drive and the municipal boundary roughly in the centre of the Swan River. It also includes the limestone cliffs and embankment between Andrews Road and the Leeuwin Barracks (**Figure 1**).

The study area has been divided into three zones (**Figure 1**):

- Wall zone – East Street to boat launching facility
- Reclaimed zone – boat launching facility to W Wayman Reserve eastern end
- Natural zone – W Wayman Reserve to Petra Street.



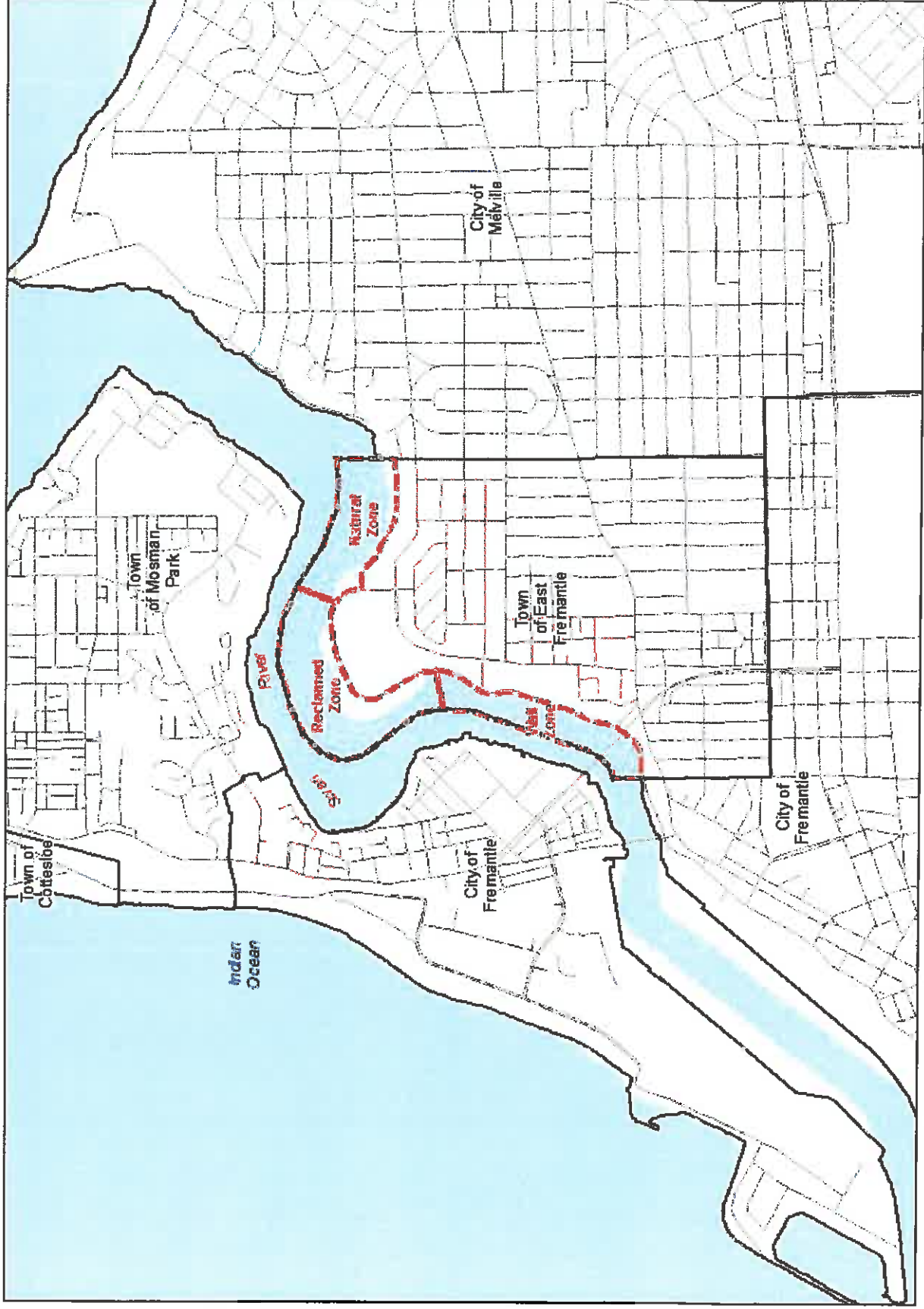


Figure 1: Study area location

1.2 STUDY OBJECTIVES

The objectives of the master plan are to:

- prepare a strategic vision for the protection and enhancement of the foreshore to mitigate erosion impacts which threaten environmental, recreational, aesthetic and cultural values of the foreshore
- undertake a detailed desktop and site analysis of the East Fremantle foreshore
- improve the enjoyment of the foreshore by addressing identified risks to public amenity values, public safety, infrastructure and the environment
- prepare management recommendations to address the physical, social, and biological issues identified in the plan
- prepare an action plan that prioritises and provides indicative cost of proposed works to address the management recommendations that can also be used for possible future funding applications
- develop a plan that can be readily adopted by the council and the community.

1.3 STUDY APPROACH

A staged approach was adopted for the study which consisted of the following:

- collection, collation and review of existing material
- site based field work including detailed survey of foreshore physical assets eg walls and drainage
- site analysis for recreation use, park use, furniture and its condition and landscape treatments
- site analysis of natural vegetation noting condition and management issues
- stakeholder consultation
- determination of opportunities and constraints
- preparation of maps, concept designs and drawings
- preparation of report.

Liaison with the Town and the Parks and Wildlife was maintained throughout the study process via Steering Group meetings.



2.0 CONTEXT AND SITE ANALYSIS

2.1 REGIONAL AND LOCAL CONTEXT

2.1.1 Physical Environment

Climate

Temperature and Rainfall

The study area is characterised by a mild Mediterranean type climate with hot dry summers and mild wet winters. The climate varies seasonally, with rainfall, temperature and winds following a well-defined annual cycle. The majority of the rainfall occurs in the winter months with 90% falling between April and October.

Historic temperature records from the Swanbourne Metropolitan weather station, located approximately 9 km north-west of the study area, indicate that lowest temperatures are in July with an average daily minimum and maximum temperature of approximately 9.6 °C and 18.4 °C, respectively. The highest temperatures occur in February with an average daily minimum and maximum temperatures of 18.7 °C and 30.7 °C, respectively. The mean annual rainfall is 725.9 mm. Mean summer rainfall is minimal, between 6.6 and 14.6 mm. The amount of rainfall begins to increase in May and is highest in July with 149.5 mm, before beginning to decline in September. (Bureau of Meteorology 2015). The mean monthly temperatures and rainfall are illustrated in (Figure 2)

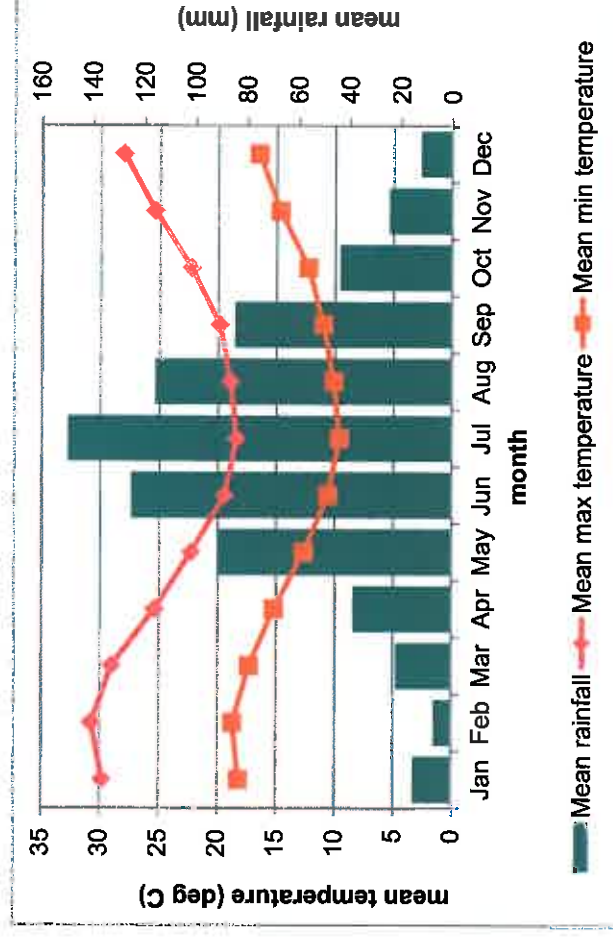


Figure 2: Mean temperature and rainfall for Swanbourne (BOM 2015)

Climate Change Sea Level Rise

Sea level rise within the coastal waters of WA and its application to coastal planning is addressed within the document prepared by the Department of Transport (DoT 2010). Information within this document was largely derived from the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report, released in 2007 and the Commonwealth Science and Industrial Research Organisation (CSIRO) technical report "Climate Change in Australia". CSIRO provided a regional assessment of observed climate change around Australia, the likely causes and projections of future changes to Australia's climate.

The Department of Transport (DoT) summarised these broader studies in context of Western Australia and the implications for coastal planning. As a result, the following graph was provided in order to provide appropriate allowances for sea level rise to 2110 (**Figure 3**).

This shows that a sea level rise of approximately 0.4 m is expected by 2070 and a 0.9 m rise would occur by approximately 2110. This foreshore master plan has a short to medium term focus of the next 5 to 15 years. Therefore, during this time, it would be expected that sea levels would rise approximately +0.05 to +0.10 m by approximately 2030.

The recent Fifth Assessment Report released by the IPCC (IPCC 2014) indicate that they have increased their confidence in projections of mean sea level rise because of improved physical understanding of the components of sea level, the improved agreement of process based models with observations and the inclusion of ice sheet dynamical changes. Over the range of different emissions scenarios modelled, the estimate of global mean sea level rise to 2100 will be in the range of +0.26 to +0.98 m relative to 2005. The likely range (95th percentile) of the highest emissions scenario RCP 8.5 is +0.45 to +0.82 m with a mean of 0.63m. Sea level rise is not predicted to be linear, and the likely range of sea level rise for this RCP 8.5 scenario by 2065 is 0.22 to 0.38 with a mean of 0.30 m. Global sea level rise will also not be uniform. IPCC (2014) suggest that it is expected 70% of the world's coastline will have a value within 20% of the global mean sea level.

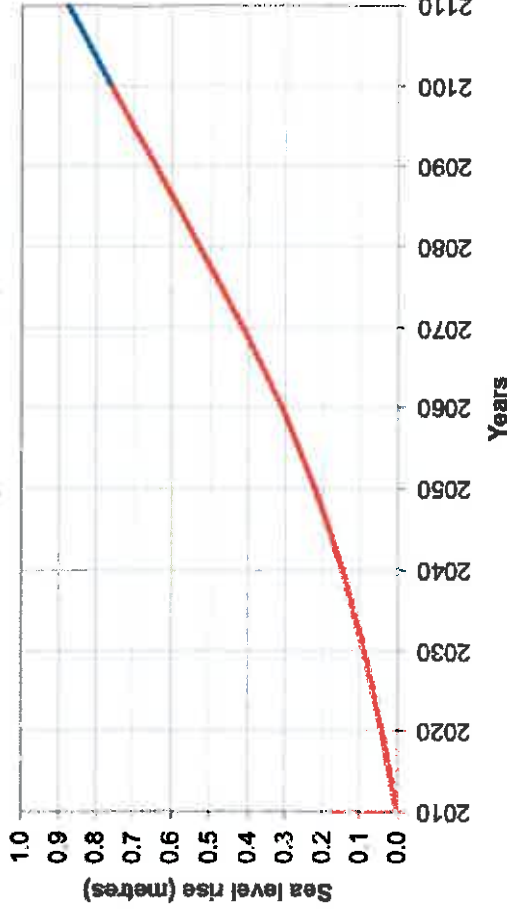
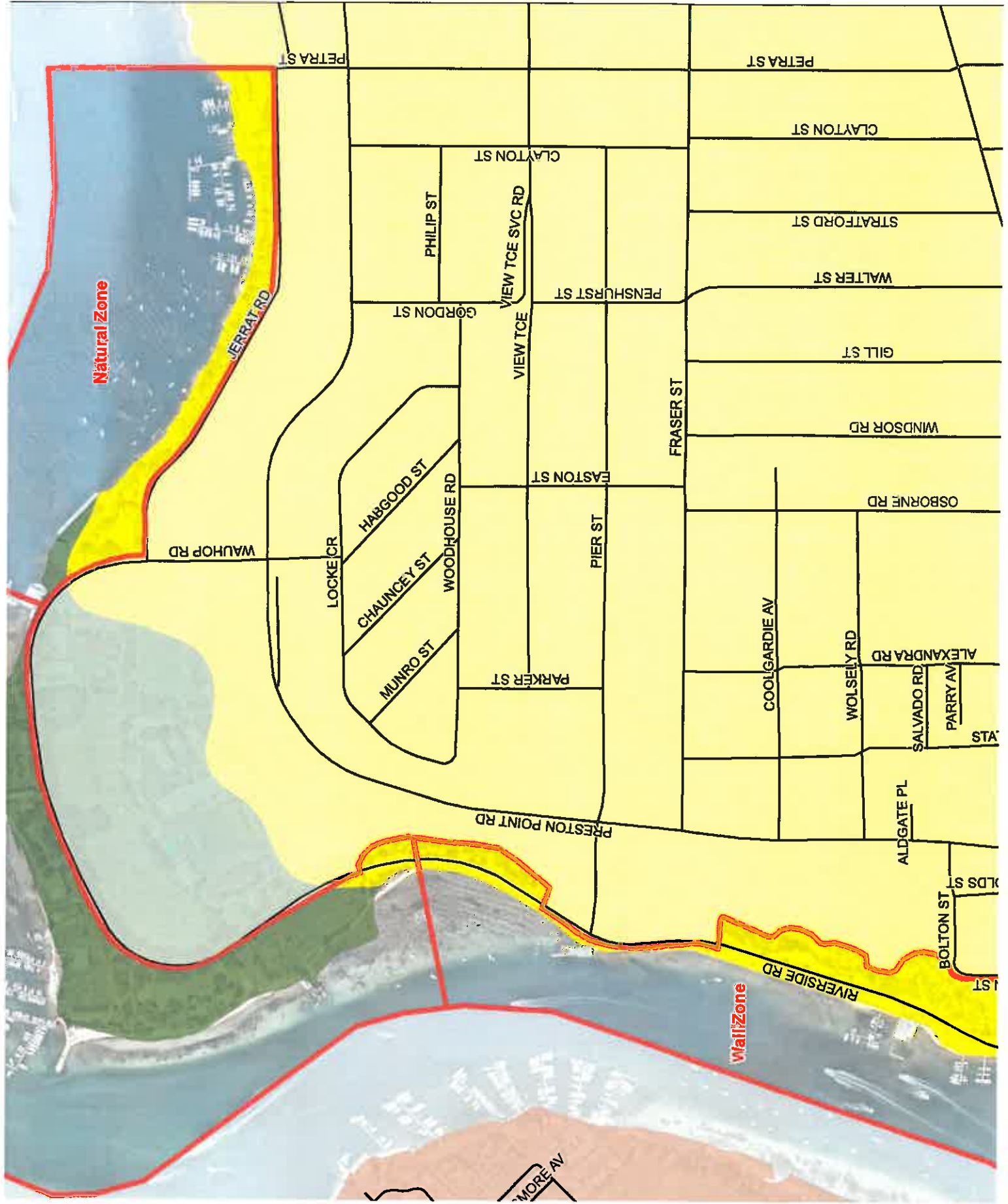


Figure 3: Recommended allowance for sea level rise in coastal planning in Western Australia

The policy for the allowance of sea level change in coastal planning adopted by Western Australian Planning Commission (WAPC) is still consistent with these latest reviews on mean sea level increases. Climate change may also affect weather patterns and storminess, which may further alter extreme water levels for the region. These are not analysed as part of DoT's study.

Implications for Infrastructure

The effects of Climate Change on the river infrastructure assets around the East Fremantle foreshore are likely to be minimal over the next 5 to 15 years. The small increase due to mean sea level increases will be within the natural variability of the mean sea level offshore from Fremantle due to other effects such as El Nino / La Nino on the Leeuwin current where the contribution from the effects of El Nino / La Nino on the Leeuwin current have held water levels at Fremantle consistently higher than 0.1m above the mean sea level for several months.

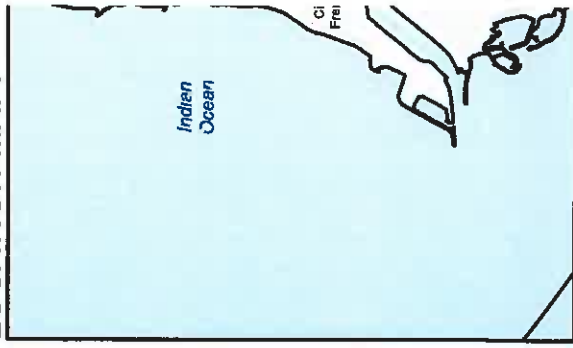


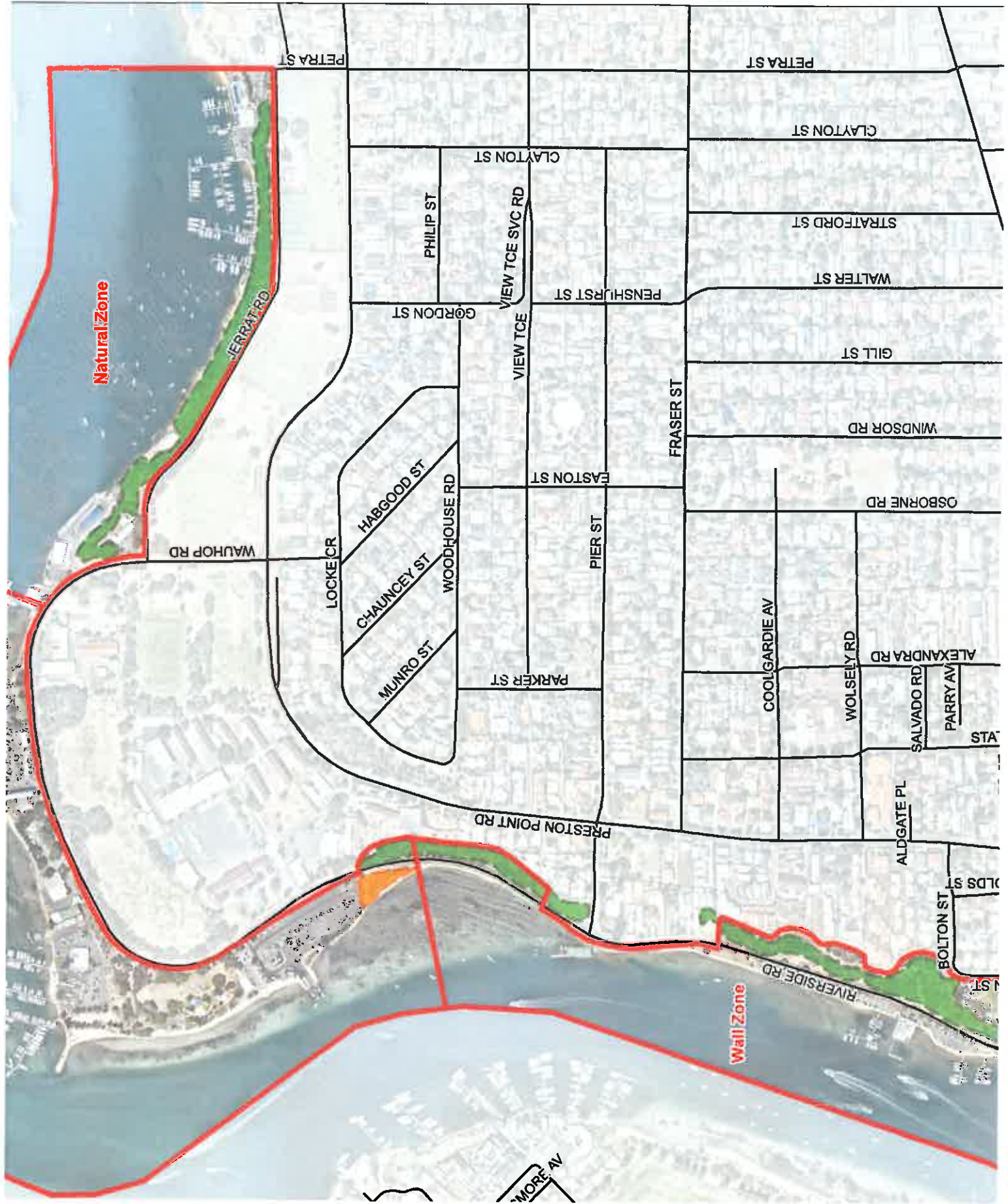
- 211Sp S14 Spearwood San
- 211Sp S7 Spearwood Sand

LOCATION MAP:

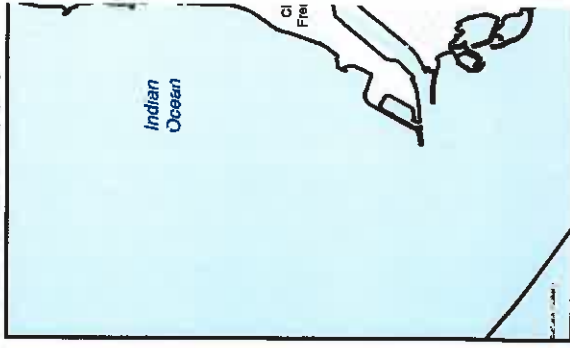


LOCATION MAP:





LOCATION MAP:



FORESHORE

CI

At water levels that cause inundation of the pathways along the East Fremantle foreshore which occurred in January 2011, the percentage of time that these structures are inundated and the number of events that occur per year may increase slightly. There may also be some additional backflow through the stormwater network or nuisance flooding from higher downstream water levels.

With the majority of the riverwalls at approximately +1 m AHD, the percentage of time these structures are inundated may increase. Based on the submergence curve for Fremantle Harbour this is still below approximately 1% of the year. In generic terms, the number of occurrences of the riverwall being overtopped may increase from approximately 8 times per year to approximately 16 that the wall be overtopped for approximately 5 hours at a time.

If the pathway and adjacent infrastructure is designed to accommodate this, then there is little impact from the inundation. It is expected that some of the natural foreshores will respond to the higher water level. This response is primarily through some erosion of the upper levels of the riverbank.

Given that the majority of the East Fremantle foreshore is reclaimed, this may enhance this erosion in some locations as the foreshore is already out of a natural equilibrium. Some locations may be able to accommodate this new shoreline position by allowing some retreat of the foreshore to allow it to flatten the riverbank profile. In areas where retreat cannot occur and the item of value cannot be moved, some additional coastal management may be required.

The Swan River Trust Climate Change Risk Assessment Project 2007 provides a consequence rating for the level of impacts of climate change on infrastructure. In the case of the East Fremantle foreshore, infrastructure impacts from increased frequency of inundation of paths would have a consequence between Insignificant (Score = 1) to Moderate (Score = 3). Moderate consequences would only occur where people do not have an alternative route. These impacts of climate change have low consequences. Given the low impacts, it is recommended that no immediate action to retrofit existing infrastructure is required.

Any work new should be designed with a serviceability life of 50 years which would include regular maintenance.

Topography

The general topography experienced within the wall and reclaimed zones of the study area is slight. The land representing the river fringe has an elevation of less than 5 m AHD. The area within the natural zone slopes towards the north northeast falling from 15 m AHD to less than 5 m AHD across a distance of approximately 25 to 50 m with some areas of very steep relief.

To the east and south of the study area the landscape rises to heights between 40 and 60 m AHD with north and west facing slopes directing drainage towards the river. Some areas consist of breakaways and small cliff faces which create a characteristic visual effect for the area.

Geomorphology and Soils

Landform and Soil

The entire foreshore comprises of Spearwood soils (McArthur & Bettenay 1960; Seddon 1972). The Spearwood Dune System is dunes of variable topography mostly occurring slightly inland from the coast. The surface soils have been leached over time, moving the carbonate below, forming layers of hard, compact limestone which has been exposed in places by erosion. The sands are yellow-brown and contain an appreciable level of iron.

The main soil sub-system in the study area consists of soil type 211Sp L51 (Limestone). The area comprising the majority of Preston Point (reclaimed zone) and a small section at the southern end of the study area consists of soil type 211 Sp S14 (Sand). The soil subsystem types are further described in **Table 1** and their distribution presented on **Map 1**.

Table 1: Soil landscape Subsystems of East Fremantle Foreshore

Unit	Description
211 Sp LS1	LIMESTONE - light, yellowish brown, fine to coarse-grained, sub-angular to well rounded, quartz, trace of feldspar, shell debris, variably lithified, surface kankar, of eolian origin. Minor heavy minerals.
211 Sp S14	SAND - pale grey to white, medium-grained sub-angular, quartz and feldspar, well sorted, abundant whole and broken bivalves and gastropod shells, of alluvial origin

Acid Sulphate Soils

Acid sulphate soils (ASS) occur in sulphide soils, and often occur in Perth's wetlands. Active ASS (AASS) soils are generally naturally occurring soils containing sulphides that have reacted with oxygen to produce acids. Potential ASS (PASS) contain sulphides that have not reacted with oxygen, usually due to being permanently waterlogged. They produce acids when exposed to air by excavation, filling, creation of artificial water courses, or groundwater abstraction/dewatering.

The impacts associated with ASS can be associated with the increase in acidity and/or the release of heavy metals into the environment. This can result in:

- wetlands degradation
- localised reduction in habitat and biodiversity
- deterioration of surface and groundwater quality
- loss of groundwater for irrigation
- increased health risks associated with arsenic and heavy metals contamination in surface and groundwater, and acid dust
- risk of long-term infrastructure damage through corrosion of sub-surface pipes and foundations by acid water
- invasion by acid tolerant water plants and dominance of acid tolerant plankton species causing loss of biodiversity.

The entire foreshore is declared to be High to Moderate risk PASS. Inland, Preston Point is declared Moderate to Low risk PASS. The distribution of PASS is illustrated on **Map 2**.

Site Contamination

No sites listed on the Department of Environment Regulation (DER) contaminated sites register were identified within the study area following interrogation of the current DER dataset dated 13-11-2014.

However, the Swan River Trust (SRT 2007) detected hotspots of the contaminant tributyltin (TBT) within the sediments surrounding of Swan and East Fremantle Yacht Clubs and Aquarama marina. The level and location of TBT hotspots of these sites are summarised in Table 2.

Table 2: Level and location of tributyltin hotspots of East Fremantle Foreshore yacht club and marinas

Yacht Club/ Marina	Location	TBT Hotspot concentration (mg/kg)
Aquarama	Wash down area	> 1000
	Slip area	> 1000
	East boundary of pen area	325.6
East Fremantle Yacht Club	West boundary of pen area	87.9
	East boundary of pen area	723
Swan Yacht Club	Wash down area	490

TBT is an organotin compound which has been used for over 40 years as a biocide in anti-fouling paint. It is applied to hulls of ships to reduce growth of organisms such as barnacles on the ship's hull. The compound gradually leaches from the paint into the marine environment. TBT readily attaches to sediment particles and sink to the sea bed. Hotspots may occur in seabeds where ships are stored or regularly washed over long periods of time, such as pens and slipways (SRT 2007).

Even at extremely low concentrations (1-2 ng/L), TBT is highly toxic to a wide range of organisms, including algae, plankton, molluscs, larvae and even birds. However impacts of TBT on the Swan River are considered to be minimal as the hotspots were only found around yacht clubs and marinas, and not throughout the river. Current levels of TBT in the Swan River are considered to be a negligible risk to humans as it is very unlikely that people would continually consume large amounts of seafood from these sites (SRT 2007).

SRT (2007) also detected levels of copper at Aquarama that were greater than the ANZECC/ARMCANZ (2000) Environmental Quality Guidelines for sediments. However none of the yacht clubs or marinas metal concentrations that exceeded Department of Environment (2003) Health Investigation Levels.

2.1.2 Biological Environment

Vegetation

Vegetation Complexes

Heddle, Loneragan and Havel (1980) mapped and described the vegetation of the Darling System in Western Australia, according to a system of twenty eight complexes, each with shared distinctive characteristics such as flora species composition, soil types and landform.

The remnant bushland in the study area comprises the Cottesloe Central and South complex as described in Heddle et al (1980).

The description of this vegetation complex is:

A Mosaic of woodland of *Eucalyptus gomphocephala* and open forest of *Eucalyptus gomphocephala* - *Eucalyptus marginata* - *Corymbia calophylla* closed heath on the limestone outcrops.

An indication of the extent and examples of this complex on the Swan Coastal Plain is given in Table 3. The distributions of this remnant vegetation in and around the Reserve are illustrated on Map 3.

Table 3: Cottesloe Central and South Vegetation Complexes on Swan Coastal Plain

Vegetation Complex	Typical Vegetation	Area uncleared on Swan Coastal Plain ¹	Area in secure tenure on Swan Coastal Plain ¹	Area remaining in Swan Coastal Plain ¹	
				ha	%
Cottesloe Central & South	• Tuart woodlands • Tuart - Jarrah - Marri open forest • closed heath on limestone	18,474 ha	3,951 ha	18,474	41.1

¹ EPA (2003) * SCP vegetation area calculations based from (1993) EPA Guidance Statement 10

The amount remaining of Heddle et al (1980) complexes found on the Swan Coastal Plain is summarised below in Table 3.

EPA (2003) defines several levels to describe the status of a vegetation complex within the metropolitan region and southwest. These are:

- **Threshold level** – 30% of the pre-clearing extent is the level at which species loss appears to accelerate exponentially at an ecosystem level
- **Endangered level** – 10% of the original extent is regarded as being a level representing “endangered”.

The Cottesloe Complex – Central and South has approximately 41.1% of its original area remaining in the Swan Coastal Plain. This complex is above the Threshold level.

The total area of this vegetation complex in the study area is approximately 4 hectares.

Vegetation Communities

Vegetation complexes are broad categorisations of vegetation assemblages and are used to describe vegetation at a regional level. Vegetation communities however describe the vegetation at a localised level. There are two areas where remnant native vegetation exists within the study area as shown on Map 3. Both areas of remnant vegetation have been disturbed over the years resulting in the invasion of various weed species eg Fennel

(*Foeniculum vulgare*), various grass weeds (eg Veld grass), exotic tree species (Ficus, Japanese Pepper tree, olive trees) however both natural areas still contain a diverse range of native floral species.

The first of the two natural foreshore vegetation areas occurs between Andrews Road and the Leeuwin Barracks on the cliff and embankment area in the Wall zone. It consists of an overstorey of Tuart trees (*Eucalyptus gomphocephala*), Peppermint Tree (*Agonis flexuosa*), Fremantle Marlock (*Eucalyptus decipiens*), Fremantle Mallee (*Eucalyptus foecunda*), Rottneest Island Pine (*Callitris preissii*) and understorey species of *Acacia xanthina*, *Acacia rostellifera*, *Phyllanthus calcinus*, *Sporidium globulosum*, *Acanthocarpus preissii* (Prickly Lilly) and a number of native herbs.

The second area of bushland occurs on the cliff and embankment area below Jerratt Drive between the East Fremantle Yacht Club and the Navy store and jetty in the Natural zone. A previous study (Ecoscape, 1993) identified 40 indigenous native flora, 36 exotic weed species and 16 planted species (eg various eastern states Eucalypts). This area represents the most floristically diverse area on the foreshore. It consists of Tuarts (*Eucalyptus gomphocephala*), Peppermint Trees (*Agonis flexuosa*), Banksia species, *Acacia xanthina*, *Acacia rostellifera* (Summer-Scented Wattle) over *Leschenaultia linearioides*, *Rhagodia baccata* and *Acanthocarpus preissii*. This area has been subject to fires in the past due to arson events which has impacted on the floristic composition of the site. Weed management and additional revegetation was proposed by Ecoscape (1993) to help reduce flash fires due to grass weeds.

Flora

Significant Flora

A database search of the East Fremantle foreshore revealed that *Grevillea thelemanniana* subsp. *thelemanniana* (Spider Net Grevillea) is a Priority Two Listed Species.

Two species of local importance are the Fremantle Mallee (*Eucalyptus foecunda*) and the Rottneest Island Pine (*Callitris preissii*), the only original endemic populations left in the Fremantle region.

Fauna

Fauna Habitat Value

The remaining natural bushland in the study area is important as it is the only remaining bushland habitat to support native fauna. While no detailed fauna surveys have been undertaken it can be deduced that it supports habitat for a range of bird, reptile, amphibian and insect species. The only likely native mammals to be present in the locality are bat species such as the White-striped bat (*Tadarida australis*) and Gould's Wattle bat (*Chalinolobus gouldii*).

The bushland is particularly important for aquatic waterbird species such as Pied Cormorant, Rufous Night Heron and Sacred Kingfisher as roosting and potential breeding areas.

Significant Fauna

Two significant fauna species have been recorded in the study area, these are

Rainbow Bee-eater – Schedule 3 (Migratory)

A common summer visitor to the foreshore area of the south-west, where it breeds in sandy banks. This species is present in the study area seasonally (approx. Nov-Feb) especially along the Jerratt Drive embankment where it forms breeding borrows.

Carnaby's Black-Cockatoo – Schedule 1 (Endangered)

This species has declined due to loss of breeding habitat in the wheatbelt and of foraging habitat along the west coast, partly due to urban expansion. The progressive loss of bushland (and therefore feeding habitat) is an ongoing concern for this species. Carnaby's Black-Cockatoo is known to feed on proteaceous vegetation such as Banksia species, Eucalypts such as Marri and also on plantation pine (*Pinus* sp.) (Johnstone & Storr 1998). This species is likely to use the vegetation in the study area as foraging habitat.

2.2 LAND ZONING, TENURE AND LAND USE

2.2.1 Land Zoning and Tenure

The entire study area is zoned as Parks and Recreation under the Town's Town Planning Scheme No. 3. Under the Metropolitan Region Scheme (MRS) the study area is also reserved for Parks and Recreation. The Town boundary extends to the centre of the river. The river is reserved as Waterways under the MRS and East Fremantle's TPS 3.

All of in the study area is crown land vested as either A Class or C Class reserves which are leased to various clubs and organisations. The exception is the land occupied by the Fremantle Rowing Club which has a 99 year lease (started in 1969) and is owned in fee simple by the Town. The Rowing Club lease part of their building to the Tai Chi Club. Their leased land also includes the carpark to the east of the building and part of Norm McKenzie Park, which is leased back to the Town.

From 1 July 2015, the staff and functions of the Swan River Trust were merged with the Department of Parks and Wildlife, principally under a new Rivers and Estuaries Division. Parks and Wildlife assumes all planning authority for the *Swan and Canning Rivers Management Act 2006* (SCRM Act 2006) and the *Swan and Canning Rivers Management Regulations 2007*. It is responsible for the Swan Canning Development Control Area (DCA) which extends over the study area. Parks and Wildlife has overall planning, protection and management responsibility for the Swan Canning River system under the *SCRM Act 2006*. The department provides advice, makes recommendations to and comes under the jurisdiction of the Minister for Environment.



Land Use

The foreshore contains a range of land uses which are primarily recreation based and are associated with specific foreshore leases, these include:

- yacht clubs, rowing clubs and marinas
- food and beverage outlets
- boat storage facilities
- public boat ramp
- maritime teaching facility
- parks with recreation and playground equipment
- pedestrian and cycle ways
- conservation/bushland areas (embankments and cliff areas).

2.3 EXISTING CHARACTER AND HERITAGE

2.3.1 Landscape Character/ A Sense of Place

The East Fremantle foreshore has a unique character and sense of place defined by the river, landform, built form, natural vegetation and tree plantings. One of the dominant elements is the river which is narrow along much of the length of the foreshore but expands out at Preston Point. The foreshore is defined by low lying flats and vegetated limestone cliffs which work together to give topographic variety and provide extensive viewing areas of the river environment and surrounding area.

The variety displayed by the foreshore is also defined by built form which consists of historic buildings such as (Left Bank, Drovers House), modern and more utilitarian buildings including sheds. Boats both penned and moored are a dominant feature of the foreshore. The dominant foreshore edge character is limestone block sea walls or similar structures to protect important assets. However at Preston Point sandy beaches are prevalent which provide a soft contrast to the hard wall edge.

One element which contributes to the character of the study area is the planted ornamental trees along the foreshore, in particular the palm trees provide vertical scale, species include Canary Island Date Palm (*Phoenix canariensis*), Mexican Fan Palm (*Washingtonia robusta*). London Plane trees (*Platanus x acerifolia*) have been planted in the median strip of Riverside Drive.

Other major plantings include the endemic Tuart tree (*Eucalyptus gonphocephala*) which have been planted on mass on the verges of Riverside Drive between the Leeuwin Barracks and Wauhop Street.

In terms of the Swan and Canning Rivers the East Fremantle foreshore is one of the most activated foreshore areas in the Perth metropolitan area. Nowhere else is there an equivalent density of foreshore uses in terms of clubs, facilities and food and beverage outlets.

2.3.2 Heritage

Indigenous Heritage

The East Fremantle foreshore is part of Nyungar country. It was traditionally occupied during the summer months when food gathering in the form of fishing and bush tucker harvesting was at its best. They were excellent fisher people and used large fires at night to attract fish before spearing them (Ecoscape 1993).

In the summer all of the Aboriginal tribes would travel from the hills along the Swan River to congregate in Fremantle area. The men would follow the north of the river and the women would follow the south, including through East Fremantle. They would meet at Fremantle area, where they could cross to join each other, as this area had abundant supplies. The congregation in Fremantle would last as long as the food lasted (Ecoscape 1993).

Preston Point is known as *Niergarup* to the local Nyungars which means 'the place where the pelicans are located'. A trail, the Niergarup Trail, has been established as part of the 2001 Community Centenary Project at cliff top level above Riverside Drive which offers comprehensive interpretive material of the Aboriginal and European heritage of the foreshore.

The Department of Aboriginal Affairs (DAA 2015) *Aboriginal Heritage Inquiry System* (AHIS) online database indicated the following heritage sites are located in the study area. None of the registered heritage sites have restricted access. Two further non registered sites were also recorded on the foreshore (Table 4).

Table 4: Indigenous Search results for East Fremantle Foreshore (DAA 2015)

ID	No.	Name	Type
Registered Sites			
3536	S02548	Swan River	River
Unregistered Sites			
3775	S02168	South Fremantle	Ceremonial, Mythological
21253	none	Mosman Park	Artefacts/ Scatter, Ceremonial, Grinding Patches/ Grooves, Historical, Mythological

European Heritage

The European history of the East Fremantle foreshore has been extensively documented by Ecoscape (1993). East Fremantle's foreshore contains a rich historical tapestry which includes commercial horticulture, boat building, camping and recreation, oyster beds, brewery and swimming baths.

The first road to link Fremantle to Perth was constructed along the foreshore to where the current Department of Defence Navy facility is located at the end of Wauhop Road. At this point a horse drawn ferry would provide passage to a point opposite in Mosman Park and then the road continued to Perth.

The Gourley brothers had substantial orchards along the foreshore and grew exotic fruits such as guavas, plantains and pomegranates. These brothers also were highly regarded and renowned for their boat building skills. Their boat yards formed part of the early foreshore infrastructure.

One of the main early industries on the foreshore was Castlemain Brewery which had a substantial operation where the current Stirling Bridge intersects with the foreshore.

Recreation was historically a strong focus of the foreshore as it is today. There were swimming baths near Pier Street and a major camping ground at Preston Point which was crowded during the summer months as people camped under the Peppermint and Tuart trees and spent time fishing, crabbing and swimming (Ecoscape 1993).

The foreshore originally contained a number of historic buildings, many of which have been demolished. One important historic building which remains on the foreshore today is at 15 Riverside Drive which is known as the Boat Builders House as it was built by boat builder Thomas Harry Carrol and is on the municipal heritage trail and the Town's heritage list. It is currently a food and beverage outlet known as Left Bank.

2.4 OPEN SPACE AND LANDSCAPE VALUES

The foreshore's unique landform and connection with the river provides a number of landscape and open space values, these include:

- visual and physical connection to the river by car, bike or foot
- cliffs and native vegetation
- ornamental trees and mass planting of Tuart trees
- change from narrowness and enclosure of the foreshore adjacent to cliffs to a flatter more open landscape at Preston Point
- boating activity on the river
- the open space created by the ovals and sporting areas adjoining the foreshore
- prominent and excellent views of the surrounding area - many views with high aesthetic appeal, eg, the port at night.

2.5 URBAN DESIGN CONSTRAINTS

In order to enhance and improve the open space and landscape values of the foreshore a number of urban design issues require consideration. They include:

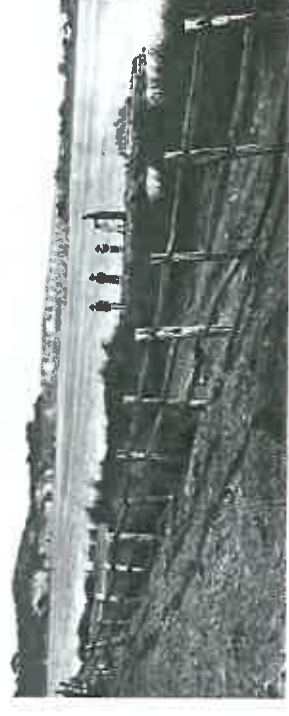
- the current alignment of the Riverside Road constrains the available area of foreshore for public use
- no design themes are evident on the foreshore in terms of planting, park furniture and hard structures
- while the foreshore contains both important Aboriginal and European heritage there is little evidence of this reflected in signage and urban design elements
- the use of good design associated with built form would assist in lifting the visual quality and amenity functions of building

- breaching the seawall and the installation of steps could facilitate access to the water's edge and recreation use.

2.6 SITE RESPONSIVE OPPORTUNITIES

The following opportunities have been identified based on the site context and appreciation of the natural and cultural complexities of the foreshore:

- integration of Aboriginal and European history into the foreshore design narrative
- improving the landscape detailing through redesign of key areas so that the aesthetic outcomes are enriched
- compress and realign the road to increase the foreshore recreation space
- planting themes could be structured to act as highlights in the landscape
- many of the parks along the foreshore require redesign to ensure structures and equipment are upgraded in line with contemporary design approaches
- maintain and extend sandy beaches where possible to maximise significant community recreation areas
- increase access to the foreshore
- encourage better integration of foreshore leased areas
- improve the quality of the existing natural areas through weed control and replanting of appropriate local native species



3.0 COMMUNITY FACILITIES

3.1 DEMOGRAPHIC PROFILE OF COMMUNITY

3.1.1 Past Community

In 1996 there were approximately 6,245 people living in East Fremantle. The average age was 36 years. The majority of demographic were born in Australia with the United Kingdom, New Zealand and Italy being the other major countries which citizens had immigrated to Australia. There were some 32 nationalities which comprised the population of East Fremantle. Seventy five percent of the residents lived in detached houses whilst the other 25% lived in semi-detached houses or units or single or multi storey apartments. The average house size was 2.3 people. The median weekly household income was \$500-\$700 (Australian Bureau of Statistics, www.abs.gov.au, 2015).

In 2006 there were approximately 6,695 people living in East Fremantle with an average age of 40 years. Children aged 0-14 years made up 19.9% of the population and people over 55 years of age made up 24.8% of the population. 68.7% of the people were born in Australia, 14.9% were born in the United Kingdom, New Zealand and the USA and the remainder from various countries. Sixty eight percent of people lived in detached housing, 20% lived in semi-detached, row or terrace houses and townhouses, 12% lived in flats or apartments. The average household size was 2.4 people. The median weekly household income was \$1,265(Australian Bureau of Statistics, www.abs.gov.au, 2015).

3.1.2 Present Community

The latest census data was from the 2011 census. The next census will be in 2016 which should provide a more accurate demographic profile of East Fremantle and potentially capture the change to apartment style developments.

In the 2011 census there were 6,930 people living in East Fremantle. The average age was 42. Children aged 0-14 years made up 18.7% of the population and people aged 55 years and over made up 28.3% of the population. Seventy one percent of people lived in detached housing, 16.3% lived in semi-detached, terrace or town houses and 12.4% lived in a flats or apartments. The average number of people per household was 2.5 and the average household weekly income was \$1,834 (Australian Bureau of Statistics, www.abs.gov.au, 2015).

3.2 AUDIT OF EXISTING FACILITIES IN THE LOCALITY

The foreshore currently has a wide array of assets, all in good to excellent condition. The assets mostly serve the public in terms of:

- general parking (car parks and bays)
- passive exercise such as walking and bike riding (bike racks, paths, water fountains, information signs, water fountain, staircases, wayfinding signs, public art)
- family activities (rotundas, barbeques, playgrounds)
- active exercise (exercise stations, showers)
- boating (boat ramps, washing bays, paid boat trailer parking areas).

Bins, benches and dog bag dispensers are scattered in all three zones, although in lower numbers in the Natural Zone (Table 5). There is shade provided for the playgrounds and as rotundas, however benches and exercises area are unshaded. Picnic and facilities exist in John Tonkin Park and Norm McKenzie Park, however there are no barbeques in the latter reserve.

Some public amenities are limited or not present. There are three water fountains, mostly confined to the southern end of the study area. Public toilets are provided adjacent to the Zephyr Café and are maintained by the Cafe. Only a few small kids bike racks are present in the Reclaimed Zone, which are not enough for riders during peak periods, such as weekend mornings.

Table 5: Town assets in East Fremantle foreshore

FACILITIES	WALL ZONE	RECLAIMED ZONE	NATURAL ZONE	TOTAL
Barbeque		3		3
Bench	12	17	1	30
Bike rack		3		3
Bike sign	1			1
Bin	16	31	4	51
Boat ramp		1		1
Boat washing down bay		3		3
Carpark	7	5	2	14
Dog bag dispenser	8	3	2	13
Exercise area	1	1		2
Information sign	2	2	3	7
Mooring Pen Jetties	2			
Parking pay station		2		2
Playground		2		2
Public art	1	1		2
Rotunda	3	9		12
Shower	1			1
Staircase			1	1
Water fountain	2	1		3
Wayfinding Sign	5			5

3.3 EXISTING SPORT AND RECREATION PROGRAMMES IN THE LOCALITY

The foreshore provides several river-centric recreation and training programmes (Table 6). In the Wall Zone, the Marine Education Boatshed offers several certified marine training courses for Western Australian high schools. In the Reclaimed Zone, the Department of Defence has training facilities for navy cadets. And in the Natural Zone, the 1st Fremantle Sea Scouts have facilities including a jetty.

The foreshore also has a wide range of boat themed social clubs, including the Swan Yacht Club, East Fremantle Yacht Club, Fremantle Rowing Club and the Fremantle Swan Dragon Boat Club.

In addition, the lands adjacent to the Natural Zone and part of the eastern end of the Reclaimed Zone locality consist of several playing fields. This allows many different sporting clubs to host a wide range of sports, including cricket, football, lacrosse, hockey, soccer, tee-ball and tennis. The Fremantle Rowing Club also leases a room for the Taoist Tai Chi Society.



Table 6: Sports and Recreation programmes in locality of East Fremantle foreshore

PROGRAM	WALL ZONE	RECLAIMED ZONE	NATURAL ZONE
Foreshore			
Dragon Boat		✓	
Marine Education	✓		
Navy Cadets		✓	
Rowing		✓	✓
Sea Scouts			✓
Tai chi		✓	
Yachting/ boating		✓	✓
Adjacent to Foreshore			
Cricket			✓
Football			✓
Hockey			✓
Lacrosse			✓
Soccer		✓	
Tennis			✓

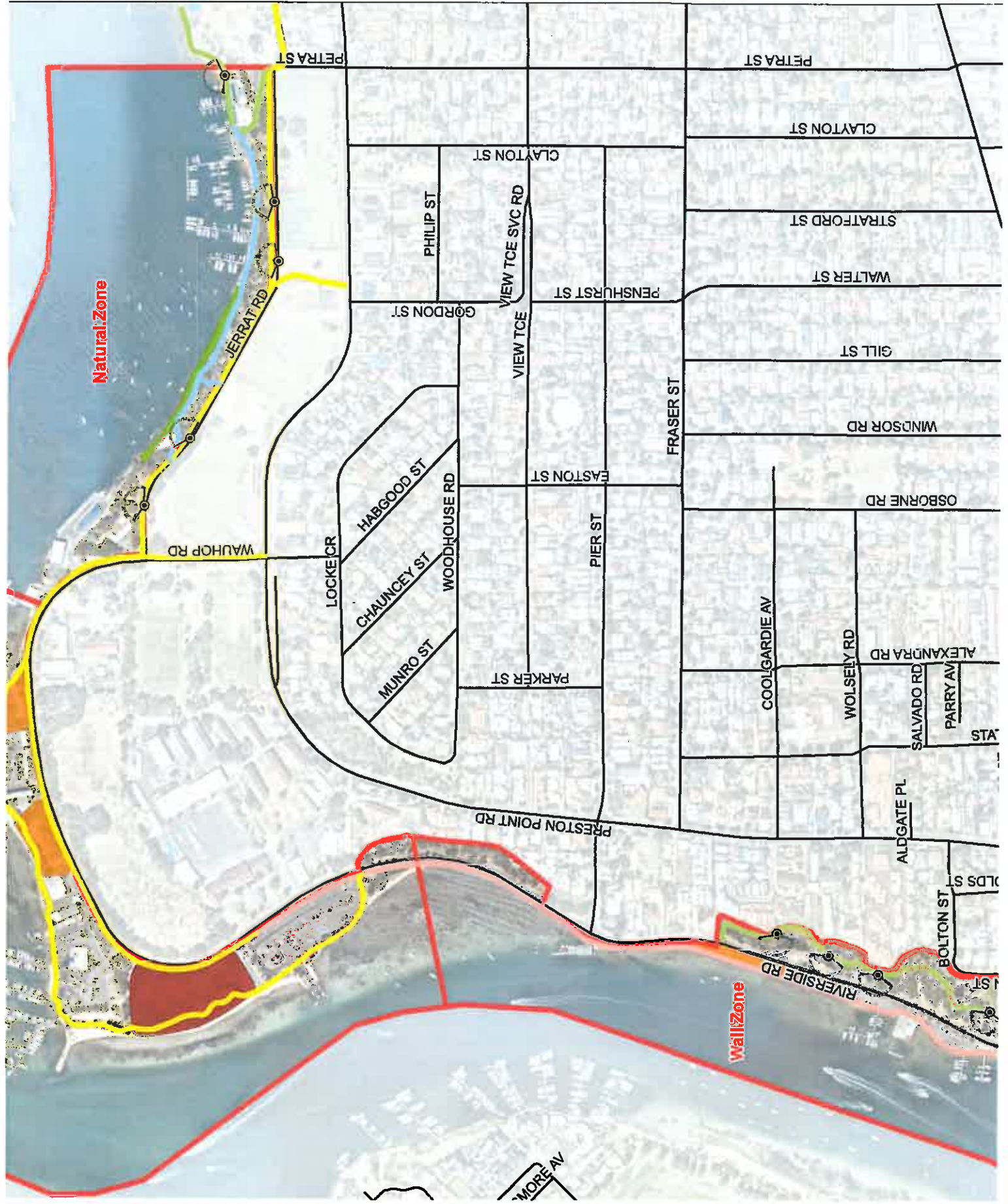
3.4 NON-CLUB AND PASSIVE RECREATION

The foreshore is also well used by the public for non-club recreation activities (Table 7), whether it is for exercising or enjoying social locales and the river (Map 4 - Map 7).

Many members of the public use the foreshore for passive and active exercising. Walking and jogging is extremely popular amongst a wide range of age groups, whether alone, in groups, pushing prams or walking dogs. Many take advantage of the exercise stations and staircases along the pathways. Bike riders frequently take advantage of the bike lanes along Riverside Road. These activities are more intense in the Wall and Reclaimed Zones. An off-leash dog beach immediately north of John Tonkin Park is well used by dog walkers, however access is limited as it is inundated during high tides. The Town should consider establishing new off-leash areas as shown on Map 6.

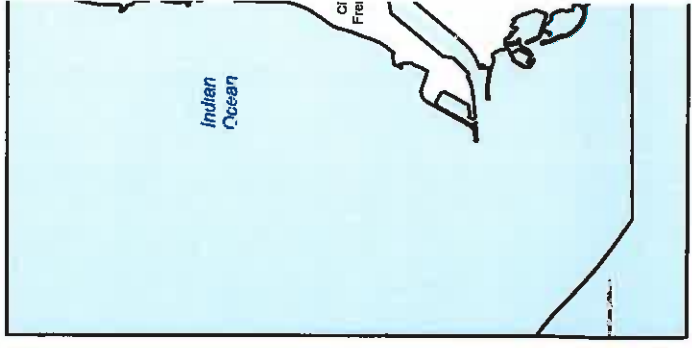
A number of social locales with river views occur along the foreshore. The Dome Café, Zephyr Café, Eat Greek Restaurant, Swan Yacht Club and East Fremantle Yacht Club offer drinking and dining experiences the latter two also can be booked for functions. John Tonkin Park is a very popular destination for family outings, as it is adjacent to the Zephyr Café and its toilet facilities and has playground, barbeque facilities and a beach. Norm McKenzie Reserve is also used, as it has rotundas, beach and a playground, however it is less popular as the trees hide it from the road, there are no barbeques, water fountains or toilet facilities and extremely limited parking. A number of small, informal beaches also occur along the foreshore.

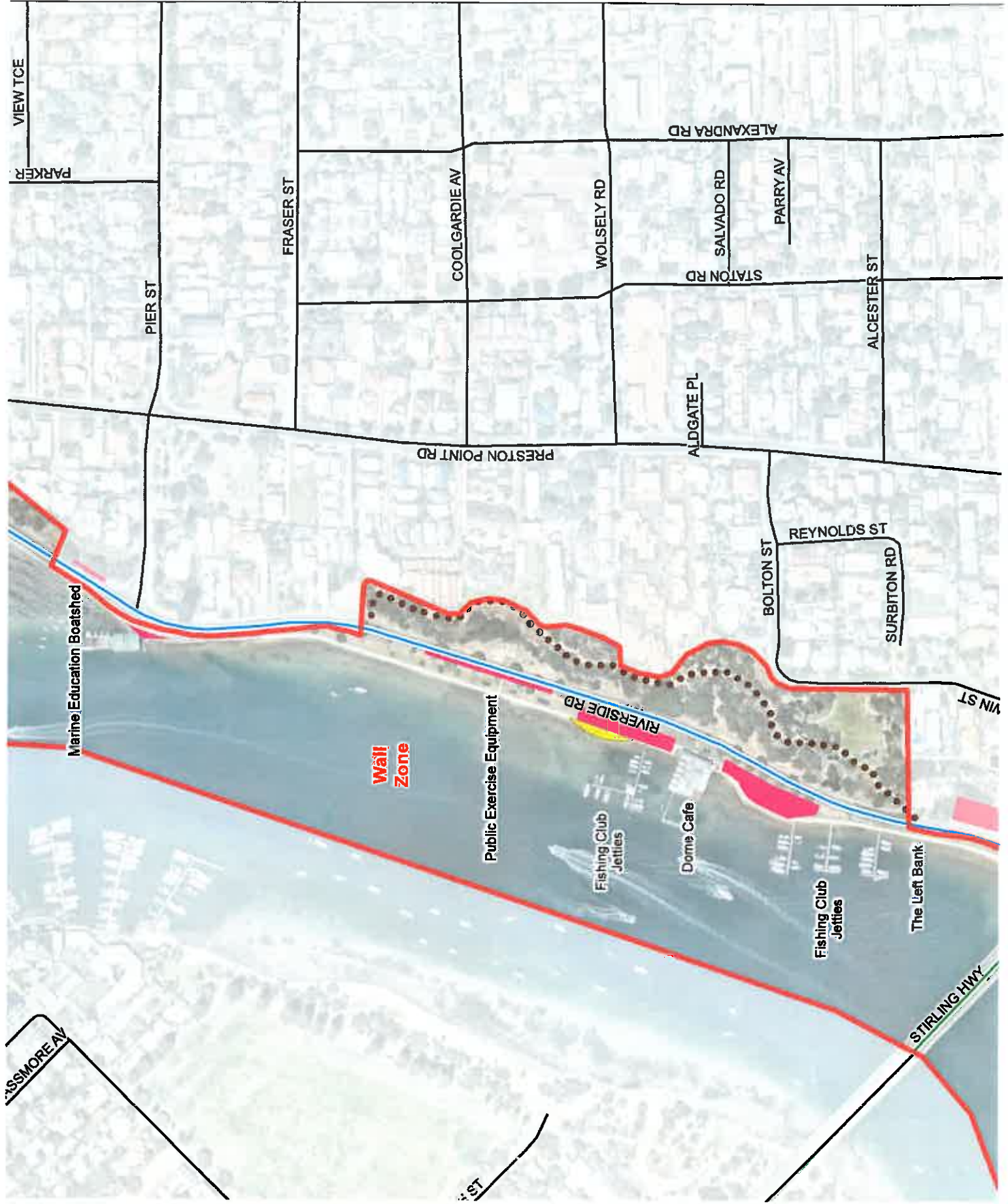
The river attracts many recreational users. Private boat owners access the river via leased jetties and moorings, the Leeuwin boat ramp, or through the boat stacking facilities at Aquarama. Others use the river for rowing, paddle boarding, canoeing, swimming and fishing, although access to the water can be difficult for those carrying canoes or boards in some areas.



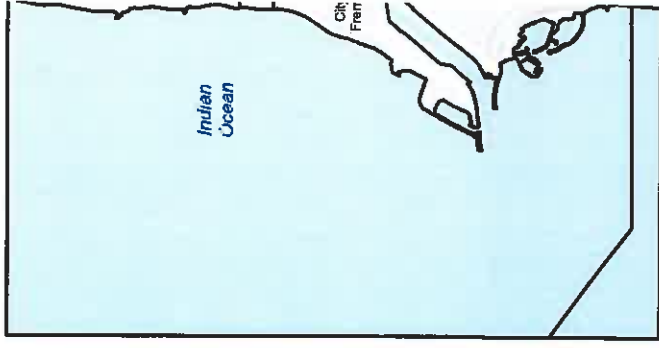
- Low**
- High**
- Very High**
- Parks**
- Low**
- Moderate**
- High**

LOCATION MAP:





LOCATION MAP:



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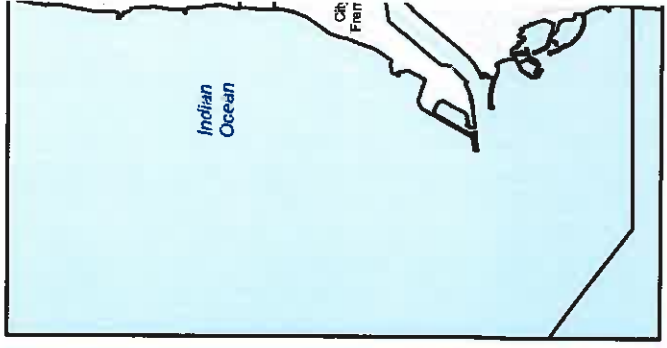
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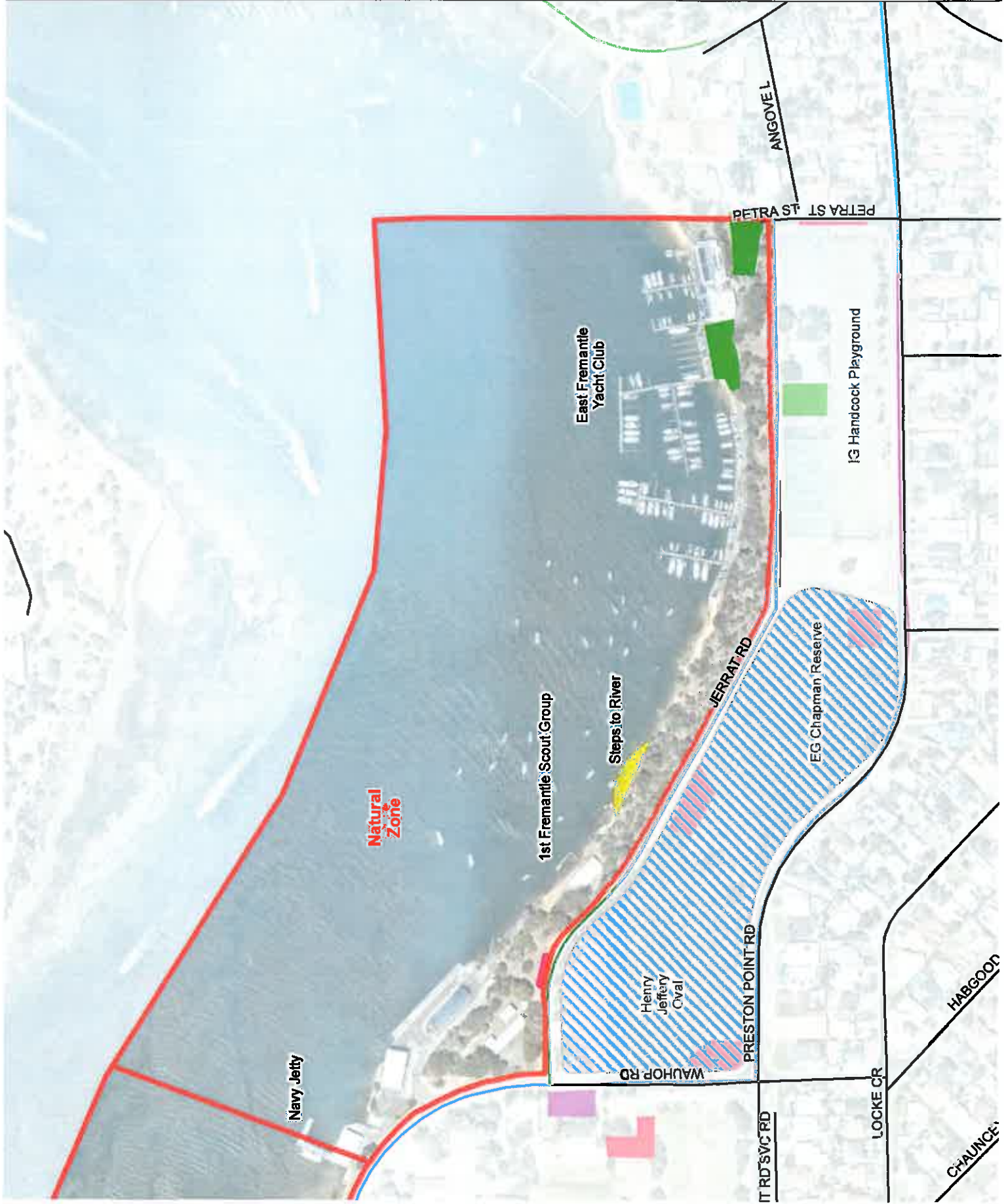
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- • • Nieragup Trail
- Beach Areas
- Car Parks
- Public Free
- Public Paid
- Private
- Informal
- Dog Exercise Zones
- Dogs Off Leash Area
- Dogs Off Leash Area (where)

LOCATION MAP:





- Nieragup Trail
- Beach Areas
- Car Parks
- Public Free
- Public Paid
- Private
- Informal
- Dog Exercise Zones
- Dogs Off Leash Area
- Dogs Off Leash Area (wherever)

LOCATION MAP:

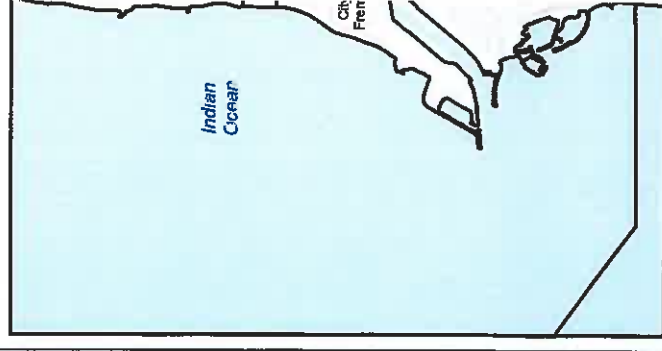


Table 7: Public usage patterns along East Fremantle Foreshore

USE	WALL ZONE	RECLAIMED ZONE	NATURAL ZONE
Exercise			
Bike riding	high	high	moderate
Dog Beach	-	high	-
Exercise station	high	high	-
Jogging	high	high	moderate
Stair climbing	low	-	low
Walking, dog walking	high	high	moderate
Locale			
Beaches	low	moderate	low
Dining/ drinking	high	moderate	moderate
Picnic/ barbeque/ playground	high	high	-
River			
Canoeing and paddle boarding	low	low	low
Fishing	low	-	low
Private boating	high	high	moderate
Swimming	low	low	low



4.0 USER SUSTAINABILITY

4.1 STAKEHOLDER CONSULTATION

Stakeholder consultation was undertaken in the following manner:

- a list of foreshore stakeholders, including clubs and businesses, was compiled in conjunction with the Town of East Fremantle
- stakeholders were sent a proforma letter outlining the Foreshore Master Plan context and consultation process
- stakeholders were invited to contact Ecoscape to arrange a meeting.

Some stakeholders, despite numerous attempts to contact them, did not respond to the consultation request. The following section articulates the main points, in terms of issues and opportunities, identified by different stakeholders during the consultation process.

4.1.1 Wall Zone

Marine Education Boat Shed

The Marine Education Boat Shed building was originally constructed by the Navy in the 1940s and eventually transferred to the Department of Transport (DoT). The portion of River reserve that the Boatshed occupies is managed by Parks and Wildlife who have granted a lease for the area to DoT. The Marine Education Boat Shed provides education for high schools in Perth in marine safety, boat safety, swimming survival, and yachting.

Issues

1. Restoration works required to the river wall immediately south of building. Tidal movements are extracting sand through cracks in the river wall, causing sump holes on the adjacent shore.
2. There are severe parking space restrictions. There used to be originally seven parking bays in front of the boat shed building, however these were removed as part of the road realignment. Currently the Marine Education Boat Shed has a signed agreement with the rangers to use the four hour parking bays across the road,

provided they display a residential parking permit, however the number of bays are not enough for all staff during busy periods. School buses cannot park at the boat shed building and instead must park at Dome café. This results in slightly shorter lessons as students have to walk between the bus and building. Also, only two buses can park at the Dome café at one time, however sometimes three or more buses may be present during the interchange of classes.

4. Pier Street is a steep slope. On rainy days, cars occasionally slide into Riverside Road intersection, causing accidents with oncoming traffic. Any road realignment plans should consider how to make this intersection safer.
5. There has been a gradual build-up of silt around the boat shed building over the years. The water depth next to building used to be deep enough for yachts, however it is now too shallow. Also, some of the adjacent moorings are becoming too shallow for boats.
6. There is a lack of public facilities within the Wall Zone, resulting in members of the public constantly asking to use the toilets or for drinking water.

Opportunities

1. The Marine Education Boat Shed would like to have 2 parking bays properly installed immediately south of the building (on the land with sump holes and adjacent to the degrading wall). The Marine Education Boat Shed is prepared to part fund such works.
2. Increase public amenities along Wall Zone (shade, toilets, water fountain).
3. The double path immediately south of building is a potential niche. The Town could install benches and shade on the lower path, which would not block the main upper path.
4. Increase public access to the water along the river wall, such as adding steps or creating small beaches. This would particularly be helpful for recreational fishermen and paddle boarders who frequently use the zone.

4.1.2 Reclaimed Zone

Aquarama Marina and Eat Greek Restaurant

The Aquarama Marina started in 1963 and was rebuilt in 1985. It provides boat services for the public, including 210 wet berths, a three tier boat stacker, mechanical and fuel service, slippage and sales. It currently has 5 tenants, including the Eat Greek restaurant. The company currently has 12 years left on its lease.

Issues

1. Aquarama must allow egress to the public access walkway along the water front, including across the boat slippage zone. However sometimes the public ignore the blinking lights and warning sounds of boats being slipped in and out of the water, leading to conflict with boat operators. WorkSafe has assessed the conflict areas several times in the path in an attempt to resolve this.
2. In addition to the Town providing many rubbish bins in the area, Aquarama hires many large bins to provide for the boaters and restaurant, particularly during the summer period. Despite this, litter is often left along the road.
3. Aquarama has increasing demand for boat storage and therefore wants to expand its water boundary for jetties and pens, however this expansion is restricted by the Town and Rivers and Estuaries Division (DPaW).
4. Similarly, there is an increased need for more boat stacking to cater for the increasing number of boat owners in Perth.
5. There is limited parking space for boaters and restaurant users.
6. The Eat Greek restaurant is off the beaten track, is not well known and is not easy for the public to access.

Opportunities

1. The adjacent parks Norm McKenzie Reserve and W. W. Wayman Reserve are popular with exercisers and on summer weekends for families. The reserves could be promoted and provided with more facilities such as barbeques.

Zephyr Café

The Zephyr Café provides an outdoor eatery for local and tourist patronage including, Defence personnel, passenger cruisers, tourists, families, cyclists, paddle boarders and boaters. The owners have recently submitted a proposal to the Town to upgrade the toilet facilities. The café has signed a 20 year lease 10 years ago.

Issues

1. The adjacent John Tonkin Park is heavily used in the summer months for families with young children. However there are line of sight issues for parents keeping an eye on their children when they are playing on the beach, in the playground or going to the toilets.
2. The building is not built for winter weather, resulting in low customers for half of the year.
3. The power infrastructure in the area is over 60 years old and not enough for current demands, often resulting in black outs during peak periods.
4. There is not enough parking for customers and park users.
5. There has been an increase in bike riders frequenting the café, but not enough bike racks to secure bikes.
6. The beach in front of the café is constantly being eroded and requires regular renourishment.
7. The abundance of turf in East Fremantle is putting pressure on reticulation bores, often resulting in dead patches of lawn in the park.

Opportunities

1. Install a natural entrance to the park to welcome visitors.
2. Promote 3 hour walk trail between the Fremantle port and Point Walter for tourists, especially passenger liners.
3. The Zephyr Café owners would like to expand its operations and offer kayak hire facility. This would also provide different travelling options for walk trail tourists.

4. The toilet block upgrading could include a recycled water treatment plant. Recycled water could be used to reticulate the park's turf, resulting in less pressure on the bores and ensure greener lawns in summer.
5. The café could refurbish the building to offer better catering for park users and visitors during the winter months.

Fremantle Rowing Club and Taoist Tai Chi Society

Fremantle Rowing Club signed a 99 year lease for the building site and most of the adjacent Norm McKenzie Park in 1962. The building is currently at capacity and the club currently have submitted plans for a two storey expansion to house more rowboats.

The Taoist Tai Chi Club has been leasing a room from the Fremantle Rowing Club for over twenty years. It has over 400 members, mostly from surrounding suburbs and is actively growing.

Issues

1. The club is in a Parks and Recreation Zone title, and is restricted to use the site for rowing purposes only. The title currently prevents the club from expanding into other undertakings which may help raise revenue to support its activities.
2. Difficult to maintain the beach as the Rivers and Estuaries Division (DPaW) has stopped renourishment of sand. In a recent assessment, MP Rogers recommended a gabion cage style groyne be constructed to help trap sand and prevent further loss, however it is highly expensive and difficult to install.
3. Some conflict between rowing club members and public to access the foreshore in front of the club building. Some confusion in who has access.
4. Lack of room to store long boat trailer so must be parked outside near footpath. Also, traffic must be briefly blocked when backing trailer onto Riverside Road.
5. Parking can be very difficult, especially in summer months and weekends. Request for more buses to ease parking congestion.

Opportunities

1. Rowing Club could install a café as part of the redevelopment. This will assist club in raising revenue, as well as catering to the local public and users of the Port to Point Walter walk trail.

Friends of East Fremantle Foreshore

The Friends of East Fremantle Foreshore consists of over 200 members, many of which are long term residents. The Friends group is focused on sustaining and promoting the environmental and social values within the Town, particularly within the Reclaimed Zone.

Issues

1. The dog off-leash area (John Tonkin Park) is often cut off by high tides. Dog walkers wanting to access the most northern part of the beach must put their dogs onto a leash, otherwise risk getting a fine from the ranger.
2. Parts of the John Tonkin Reserve shoreline are being eroded, undercutting some trees and destabilising the pathway.
3. Some of the trees in John Tonkin Park are being damaged from children frequently climbing over them.
4. Vagrants occasionally camp in the remnant vegetation pockets in John Tonkin Reserve.
5. Dredging spoil from the Swan Yacht Club is being disposed offsite. It is unknown whether the sand has been tested and if they can be used to renourish the adjacent beaches.



Opportunities

1. Explore potential options for dog owners to exercise their dogs in other beaches without conflicting with other site users. One option is for dogs to be allowed off their leashes within the foreshore before 7am and after 7pm. Another option is to consider allowing the beach along the Leeuwin boat ramp to be a dog beach.
2. Move the carpark next to the beach in John Tonkin Park to a less used area near Riverside Road, to expand the parkland area adjacent to the beach.
3. Offer shade for the picnic tables.
4. Promote education on the water spring in the Natural Zone.

4.1.3 Natural Zone

East Fremantle Yacht Club

The East Fremantle Yacht Club was formed in 1933 and moved to its current site around 1945. It offers its members training, racing, and social events as well as use of the building, pens and moorings. The bar and restaurant are also open to the public for bookings and functions. The club has relationships with the adjacent East Fremantle Lawn Tennis club and to a lesser extent, the 1st Fremantle Sea Scouts.



Issues

1. The club has long had problems with overflow parking. The club have attempted to collaborate with the adjacent Tennis Club to collaborate their parking however there was no resolution. The club has investigated further parking opportunities at Ig Handcock playground.
2. There is similar parking issues along Petra Street, which the Town shares with the City of Melville. The nearby Melville Water Polo Club does not have parking facilities so their members frequently park along Petra Street, adding to parking congestion. Signage along the street needs to be updated, and consider allowing trailer parking for boat users.
3. There is often conflict on Petra Street between car drivers and inattentive walkers and bike riders.
4. The fence line along Jerrat Drive is old, unattractive and parts are hazardous.
5. There are public moorings adjacent to the Yacht Club. Owners need to use dingies to access their moored boats, however there is no proper shore access, making it difficult for boat owners. Also, there are no storage facilities for the dingies. Effort to store and access their boats may result in trampling and damaging the foreshore.
6. The cliff slope is full of weedy trees (eg Japanese Peppers) and grass weeds (eg Fountain Grass). The grass weeds increase the possibility of fire ignition, increasing the risk of a bushfire in the cliff vegetation. The Club has held busy bees to try and control the weeds, however much more work is needed.
7. There has been some theft from boats, cars and buildings, as well as occasional vandalism.

Opportunities

1. A number of freshwater springs occur along the cliff which had historic importance to the indigenous Aboriginals as a water source. There is a possible opportunity to provide education on the significance of the spring to locals and foreshore users.

2. The Natural Zone has elevated areas overlooking the Swan River. Viewing platforms could be installed to promote the viewpoints for locals and visitors.

4.2 SUMMARY OF STAKEHOLDER ISSUES AND OPPORTUNITIES

4.2.1 General

Issues

1. Parking congestion, especially during summer weekends.
2. Lack of toilet facilities, particularly after hours.
3. Lack of shade for playgrounds, exercise areas, chairs.
4. Constant high amounts of litter.
5. Bike riders increasing in numbers, but not enough bike racks for them, particularly near café's.
6. Generally a lot of lawn turf in East Fremantle, putting pressure on reticulation bores, making it difficult to water.
7. Lack of dog leash free areas, particularly along the foreshore.
8. Potential conflict between dogs off leash and kids in parks.

Opportunities

1. Tourist walk trail to Point Walter, particularly Cruise Ships:
 - a) options include kayak and bike hire and Segways
 - b) educational opportunities
 - c) viewing platforms.
2. Improve dog walking activities:
 - a) dogs can be leash free on foreshores by 7am and after 7pm
 - b) consider establishing other off-leash dogs areas.

4.2.2 Wall Zone

Issues

1. Benches and exercise area not shaded.
2. No benches at most northern end of zone.

Opportunities

1. Shaded picnic tables in Wall Zone.
2. Small recreation niche under Stirling Highway bridge (eg fishing, beach).
3. Block off road for street events.

4.2.3 Reclaimed Zone

Issues

1. Path access issues for Aquarama, providing 24/7 access for public through slipway.
2. Boating companies want to expand water boundaries and ship stacking,
 - a) every year increasing number of boat licences issued and increasing demand for pens/ mooring.
3. Power infrastructure over 60 years old is not adequate for current demands, as there are frequent black outs during peak periods.
4. Constant foreshore erosion, washing away beaches and eroding trees in John Tonkin Reserve.
5. Dog Beach cut off by tide, in the adjacent area
 - a) dogs must be leashed or risk being fined by the ranger when trying to access the other side of the dog beach.
6. Carpark in John Tonkin Reserve is right next to the foreshore and may be impacted due to erosion issues.

Opportunities

1. Barbeque facilities and shading for picnic/exercise area adjacent to Aquarama to increase usage.
2. Recycled water treatment plant for Zephyr's toilet facilities, water used for local reticulation to create greener lawns.
3. Extend gabion caging in John Tonkin Reserve foreshore by 10 m to protect trees.
4. Investigate more effective sand nourishment techniques/ strategies.
5. Move carpark in John Tonkin Reserve its current location to further inland which is a less used area.

4.2.4 Natural Zone

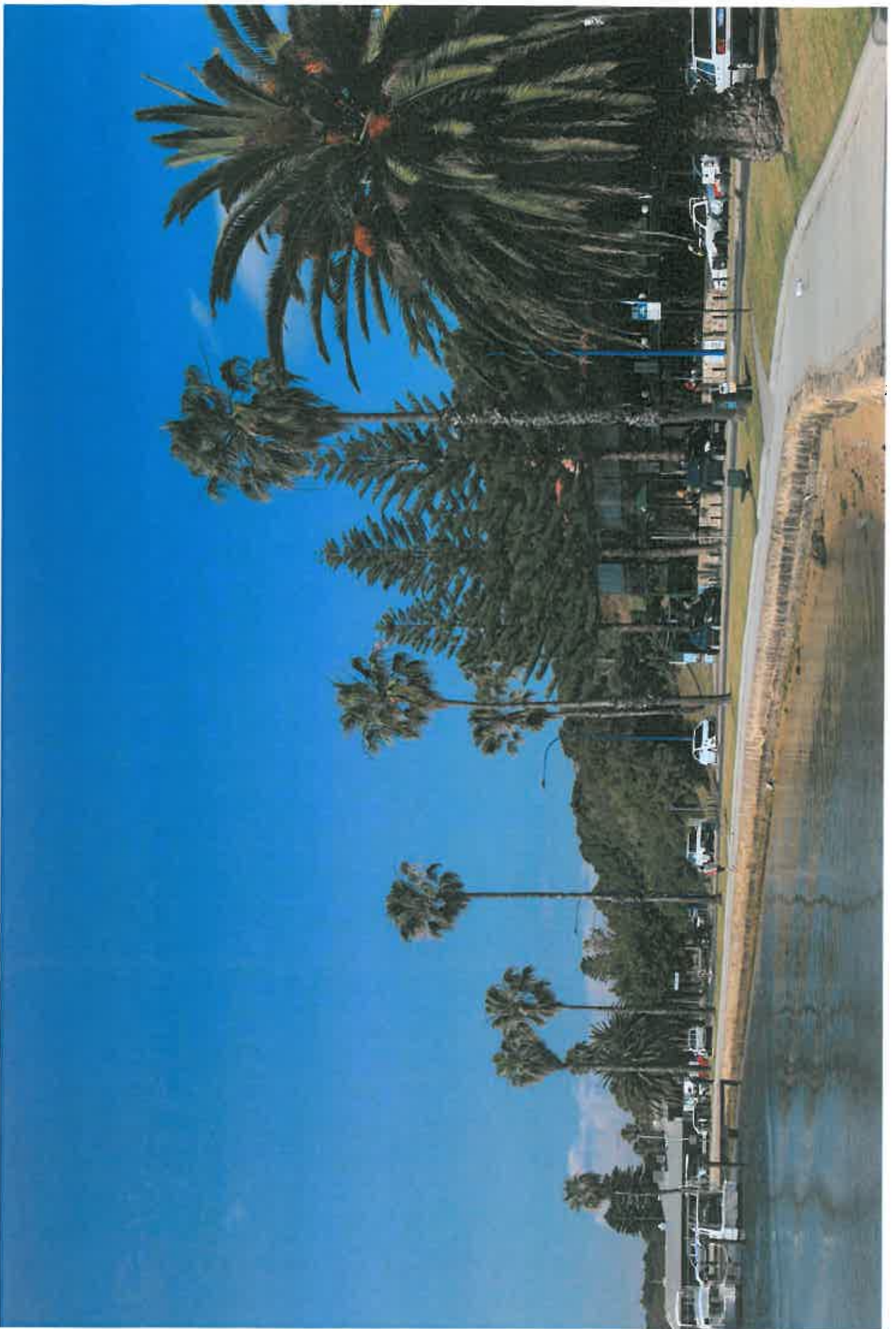
Issues

1. Petra Street:
 - a) City of Melville needs to update signage
 - b) no trailer parking allowed on Petra Street
 - c) conflict between inattentive bike riders/ walkers and car drivers.
2. No access path link to Point Walter.
3. Jerrat Drive fence is unattractive and in parts hazardous.
4. Better dingy storage and access needed for boats in moorings.
5. Cliff full of woody weeds and grass weeds.
6. Fire risk from cliff vegetation and potential impact on boats.
7. Stability concerns for limestone cliff.

Opportunities

1. Public education on local freshwater springs at the base of the cliff.
2. Develop viewing platforms at clifftop level along Jerrat Drive.





5.0 BUILT FORESHORE ASSETS

5.1 BUILT FORESHORE ASSETS RATINGS

5.1.1 Riverwalls

M.P. Rogers and Associates (MRA) assessed the condition of the riverwalls using a scale based on a rating system developed by the City of Perth, Parks and Wildlife and MRA (**Table 8**). The riverwalls were divided into sections according to the Parks and Wildlife foreshore codes. A summary of the ratings for the riverwall sections are presented in **Table 9**. The assessment did not include any private jetty structures or structures associated with private leases, such as the yacht clubs and restaurants along the foreshore.

Table 8: Condition Ratings for limestone block riverwalls

CONDITION RATING	DESCRIPTION
1 Excellent	Sound physical condition No voids, cracks or erosion present No works required
2 Good	Acceptable physical condition; Minimal short term failure risk but potential for deterioration. Minor erosion to blocks or joints Minor Work Required
3 Average	Significant deterioration evident; failure unlikely in near future but further deterioration likely. Joints have voids or blocks eroding, or voids present behind wall Work Required but asset is still serviceable
4 Poor	Failure likely in the short term. Large voids or crack in wall, blocks eroded Substantial work required in short term, asset barely serviceable
5 Very Poor	Failed or failure imminent / Safety risk. Footing undermined or blocks/ joints heavily eroded Major work or replacement required urgently

Almost all of the riverwall was rated 3 (Average). Common condition issues noted were:

- heavy weathering
- loss of mortar
- eroding of the stone pitching.

All of the riverwalls in the Wall Zone were rated 3 (Average). The riverwalls in the Reclaimed Zone were highly variable, rating between 1 (Excellent) and 4 (Poor). The riverwalls along the Natural Zone varied slightly between 2 (Good) and 3 (Average).

The area of best condition was around the northern half of John Tonkin Park at Preston Point (SLEFr04 John Tonkin Park and Preston Point. B01) which was rated 1 (Excellent). The limestone groyne was constructed in the 1990s and is relatively new compared to the rest of the foreshore infrastructures. Similarly the areas around Zephyr Café and the southern half of John Tonkin Park (SLEFr04 John Tonkin Park and Preston Point. B04 to SLEFr04 John Tonkin Park and Preston Point. B02) were rated 2 (Good), as these areas also had recent works in the form of reno mattresses, limestone and granite spalls, a granite gabion and a small limestone rock offshore headland.

The most degraded is the foreshore area of the Navy Cadets and Fremantle Rowing Club (SLEFr03 Norm McKenzie Reserve.B04), which is rated 3-4 (Average to Poor). There is some damage to the gabion baskets and the structure is on a slight forward rotation.

Table 9: Condition Ratings for sections of East Fremantle Foreshore riverwalls

SRT CODE RIVERWALL SECTION	CONDITION RATING
Wall Zone	
SLEFr01 Fremantle Bridge.B01	3
SLEFr06 Stirling Bridge J Dolan Park. B03	3
SLEFr06 Stirling Bridge J Dolan Park. B02	3
SLEFr06 Stirling Bridge J Dolan Park. B01	3
SLEFr05 Merv Cowan Park. B05	3
SLEFr05 Merv Cowan Park. B04	3
SLEFr05 Merv Cowan Park. B03	3
SLEFr05 Merv Cowan Park. B03	3
SLEFr05 Merv Cowan Park. B02	3
SLEFr05 Merv Cowan Park. B01	3
Reclaimed Zone	
SLEFr04 John Tonkin Park and Preston Point. B06	3
SLEFr04 John Tonkin Park and Preston Point. B05	2
SLEFr04 John Tonkin Park and Preston Point. B04	2
SLEFr04 John Tonkin Park and Preston Point. B02	2
SLEFr04 John Tonkin Park and Preston Point. B01	1
SLEFr03 Norm McKenzie Reserve. B05	2-3
SLEFr03 Norm McKenzie Reserve. B04	3-4
SLEFr03 Norm McKenzie Reserve. B01	2
Natural Zone	
SLEFr02 Wayman Reserve – Jerrat Drive. B02	3
SLEFr02 Wayman Reserve – Jerrat Drive. B01	3
SLEFr02 Wayman Reserve – Jerrat Drive. B04	3
SLEFr02 Wayman Reserve – Jerrat Drive. B03	2
SLBic02 Wayman Reserve – Jerrat Drive. B03	2
SLBic02 Wayman Reserve – Jerrat Drive. B01	3

5.1.2 Stormwater Drains

MRA mapped and assessed all drainage pipes along the foreshore study area for condition, activity, siltation, flushing and presence of gross pollutant traps.

The majority of the drains around the Town foreshore are concrete pipes straight out through the retaining walls. It is unclear how many of these drains are actually active. Recent experience on similar drainage outlets around the Swan River suggests that despite the outlets appearing to be in a very degraded state, the actual internal pipe condition was very good. It is suspected that this would be a similar situation for the outfalls and stormwater pipes around the Town foreshore however without a detailed inspection of the internal pipe network, it cannot be confirmed.

Some of the drains are suffering from siltation, particularly the large culvert underneath Stirling Bridge in the Wall Zone and some smaller drains that exit the beach near Zephyr Café in the Reclaimed Zone. Given the elevation along the majority of the adjacent suburbs and significant fall to the river edge, it is likely that most drains will be able to self-clear under significant rainfall.

Some of the reclaimed areas around Zephyr Café, Leeuwin Barracks and Swan Yacht Club may suffer from flat grade lines and therefore the stormwater system may not be able to flush adequately. Some nuisance flooding in these areas may occur, particularly if the stormwater flows are coincident with higher storm surge levels within the Swan River.

It was not clear in many of the drains if gross pollutant traps were incorporated into the stormwater network. It is suggested that if the Town are planning on any capital upgrades to the stormwater system that they incorporate the recent improvements to stormwater management best practice into their drainage network.

5.2 MAINTENANCE PLAN

As a start for programming infrastructure maintenance activities along the foreshore, the following plan could be adopted. It is recommended that the actual priority of works is reviewed depending on the rate of deterioration of different segments. Some sections may fail quickly and be required to be attended to immediately, while others may degrade slowly and be deferred to later years. This would require a yearly inspection of the items of infrastructure. This approach has recently been adopted by Main Roads WA for their Kwinana Freeway foreshore assets and the identification and quick repair of minor issues has allowed them to reduce the instances of large failures and concentrate on rehabilitation and capital upgrades rather than reactive replacements.

Given the size of the Town, yearly totals for repair works have been kept in the range of \$200,000 to \$300,000 per year to better fit within the Town's budget. Should other funding sources be made available, such as contribution funding from Parks and Wildlife, then the Town may be able to progress some sections quicker.

Recommendation 1:

The Town use the following process to repair the riverwalls and other foreshore infrastructure.

Year 1

- undertake investigations into areas of concern
- documentation of generic specification for riverwall repairs and drawings for Year 2 projects
- undertake minor works able to be accommodated into current finances
- prepare funding applications for Year 2 projects.

Year 2

- undertake first round of moderate repair projects in Year 2 / 3 summer
- undertake condition inspection for Year 3 priority areas
- update and prepare documentation for Year 3 projects to be undertaken over Year 3/4 summer period.

Year 3

- undertake second round of moderate repair projects
- undertake condition inspection for Year 4 priority areas.
- update and prepare documentation for Year 4 projects.

An 8 year maintenance plan for the Town foreshore with probable costs is presented in **Table 10**.

Table 10: Probable costs for maintenance work projects for the East Fremantle Foreshore over 8 years

MAINTENANCE WORKS PROJECT		ZONE	PROBABLE COST
Year 1			
Jerratt Drive Stairs. Backfill under and provide scour protection to sides.		Natural	\$20,000
Prepare generic repair specification and documentation for J Dolan Park Repointing Works in Year 2		Wall	\$15,000
John Tonkin Park – Leeuwin Boat Ramp Stone Pitching repairs and toe protection		Reclaimed	\$25,000
East Street Rock Revetment Investigation		Natural	\$10,000
Check of Sea Scout Jetty Piles		Wall	\$20,000
Merv Cowan Park Sloped Stone Pitching near Dome. Minor repairs to mortar and toe protection		-	\$20,000
Minor repairs as required			\$110,000
Year 1 Total			
Year 2			
J Dolan Park Repoint and minor repairs to stairs. (Approximately 100 to 300 m depending on funding)		Wall/ Natural	\$200,000
Minor repairs as required		-	\$20,000
Year 2 Total			\$220,000
Year 3			
Finish J Dolan Park repointing works		Wall	\$100,000
Wayman Reserve – Jerratt Drive Limestone Spall Retaining wall toe protection and repairs		Reclaimed/ Natural	\$70,000
Wall repairs to south side of DoT Boatshed		Wall	\$70,000
Minor repairs as required		-	\$20,000
Year 3 Total			\$260,000
Year 4			
Merv Cowan Park repointing between Left Bank and Dome		Wall	\$150,000
Allowance for East Street Rock revetment works		Natural	\$150,000
Year 4 Total			\$300,000
Year 5			
Repointing between Dome and Boatshed		Wall	\$175,000
Leeuwin Boat Ramp minor maintenance		Reclaimed	\$30,000
Minor repairs as required		-	\$20,000
Year 5 Total			\$225,000
Year 6			
Finish repointing between Dome and Boatshed		Wall	\$175,000
Repack Zephyr Café offshore headland		Reclaimed	\$5,000
Year 6 Total			\$180,000
Year 7			
Repointing of Sea Scouts walling and some repairs to damaged sections of wall		Natural	\$75,000
Repointing to walling north of Boatshed		Wall	\$100,000
Year 7 Total			\$175,000
Year 8			
Finish Repointing to walling north of Boatshed		Wall	\$100,000
East Fremantle Yacht Club retaining wall		Natural	\$15,000
Bicton Baths stone pitching			
Year 8 Total			\$115,000
GRAND TOTAL			\$1,585,000 (Average \$200,000/year)



6.0 FORESHORE MASTER PLANS

What defines a character of a city is its public space, not its private space. What defines the value of the private assets of the space are not the assets by themselves but the common assets. The value of the public good affects the value of the private good. We need to show every day that public spaces are an asset to the city UN-HABITAT Executive Director Joan Clos i Mathieu

Attractive, active, well-functioning public open space is a springboard for a healthy, functional and productive city and its community. It helps build a sense of community, civic identity and culture. Public open space facilitates social capital, economic development and community revitalisation. The foreshore is the jewel in the Town's public open space system. Investment in delivering quality to foreshore public open space will provide manifold returns to the Town in terms of strengthening social fabric, providing economic opportunity, and boosting the wellbeing of the local and regional community.

This section describes the foreshore firstly in terms of a broad overview focusing on four elements; Riverside Road, expanding the foreshore resource, a regional trail and public event space and secondly, in more detail for the three zones.

6.1 BROAD MASTER PLAN IDEAS

6.1.1 Riverside Road

Riverside Road is an important infrastructure asset on the foreshore as it provides easy access to the foreshore for a large cross section of the public. Average daily vehicle movements along the road are high. Riverside Road functions as a commuter road for both vehicles and bicycle's because it is a very pleasant drive and avoids a number of traffic lights along Canning Highway, therefore access to and from Fremantle is often via this road.

Despite previous attempts to calm and thereby reduce traffic volumes along the road there are still high levels of use by a range of vehicle types. The road alignment and width could be modified to enable the expansion of the

foreshore area adjacent to the river. This would provide greater opportunities for recreation use by a larger number of people. It would work to help calm the road and enable its development as a scenic tourist road.

A modified road alignment could potentially add more area to the foreshore to cater for increased use and redefine the structure and use of the foreshore. This idea is explored in the master plans **Master Plan 1: SK01 - Master Plan 6: SK06** which incorporates the following:

- changes to the alignment where possible
- narrowing of the road through removal of central median
- removal of cycleway on either side of existing carriageway and establishment of a single riverside principal shared path
- incorporation of stormwater runoff biofilters and basins
- incorporation of parallel parking where road adjoins public open space
- incorporation of angle parking in other areas to maximise capacity of use.

Substantial modifications to the road would require significant infrastructure funds and therefore is unlikely to occur in the near future as the road is within its serviceable life. However at some time in the future, should funds become available, consideration of how the road could best support the public amenity provisions and environmental values of the foreshore should be undertaken.

Recommendation 2:

The Town to undertake a cost benefit analysis of modifications to Riverside Road to improve public amenity and environmental outcomes for the foreshore.

6.1.2 Expanding the Foreshore Resource

Demand for foreshore recreation areas is bound to increase upon the sale and redevelopment of the existing Department of Defence (DoD) Leeuwin Barracks. A likely scenario will be a high density development which could potentially support a large number of residents. The proximity and easy access to the foreshore by a new population of residents will place additional pressure on the existing foreshore public open space network.

As part of this study we have examined an option for increasing foreshore areas to cater for the potential increased demand. One of the most sought after foreshore areas is John Tonkin Park because it contains features which have wide appeal – particularly to families. These features include; sandy beach, shallow water, large turfed area, playground equipment, park facilities including barbeques, parking and a café.

One scenario would be to better integrate John Tonkin Park and Norm McKenzie Park and look at options of expanding Norm McKenzie Park. The proposed sale and development of the Leeuwin Barracks may offer an opportunity to relocate and reorientate Riverside Road. If such a scenario is considered in conjunction with statutory public open space provisions associated with the development of the DoD land it may provide options for modifying the lease areas of foreshore clubs. For example, there may be an option to narrow and consolidate the widths of the leases but expand them inland as shown in **Figure 4**. The effect of this arrangement or similar will potentially increase the foreshore available for public use and thereby spread future foreshore recreation pressure.

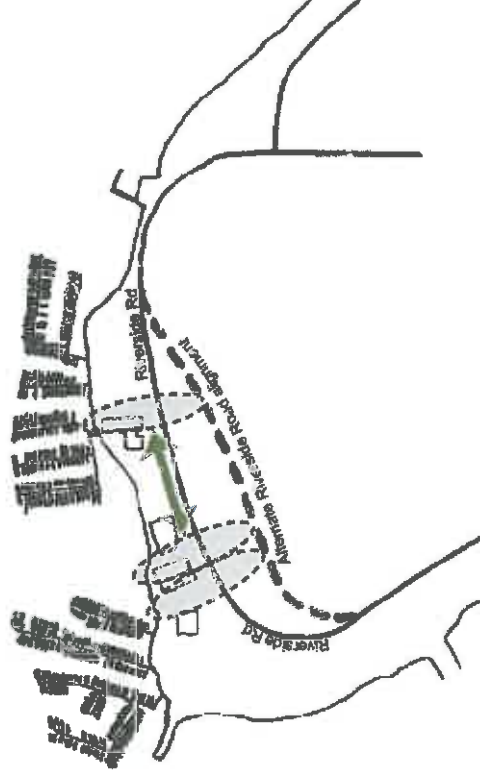


Figure 4: Reconfigured lease arrangements with increased foreshore

There may be a number of alternatives that could be negotiated through the planning and development process of Leeuwin Barracks.

Recommendation 3:

The Town should consider the implications and potential impacts of the sale of the Leeuwin Barracks on the foreshore public open space arrangement. The Town should also consider existing foreshore lease arrangements in the provision of the most sustainable use of the foreshore resource.

6.1.3 Foreshore Events Areas

Public event areas provide opportunities for economic, social and cultural uplifting of public open space. These are areas where there is a large gathering of people for a cultural, festival, outdoor movies, market, performance, musical, food or athletic event. They can be regular or seasonal depending on need. These events can attract large crowds to an area and help bond the community to public space. They have the potential to improve culture, generate new ideas, increase philanthropy and are revenue sources for the local government authority.

The foreshore of Perth and South Perth host some of the largest public events on the river, however there are no similar areas on the river in the Fremantle region.

Three event areas are proposed on the foreshore, these are (**Map 8**):

1. Between Andrews Road and Pier Street including Merv Cowan Park.
This is a long linear stretch of foreshore which contains two food and beverage outlets; Left Bank and Dome café. It is also relatively separated from the residential areas by topography. Traffic could easily be diverted up both Andrews Road and Pier Street during event times (with provision for vehicle access for Riverside Drive residents and venue service vehicles).
2. John Tonkin Park is also an ideal venue in that it is has no neighbouring residential properties and has a range of facilities, a sandy beach and easy access to the river.

3. Henry Jeffery and EG Chapman Reserve are two large sporting ovals that adjoin the study area and have one the best outlooks over the river due to their topographic elevation. Their large space could facilitate events plus associated parking.

Recommendation 4:

The Town should consider the use of the foreshore for special events. An analysis of event use of the foreshore should be undertaken to consider implication on the foreshore resource and surrounding community.

6.1.4 Port to Point Regional Trail

Trails provide a number of benefits to the community, trail users and local government authorities including education, tourism and place activation. The idea for the Port to Point Trail came through the community consultation process for this project and was suggested by owners of the Zephyr Café. The idea is to create a foreshore trail which links the Port (Victoria Quay) to Point Walter (Map 9).

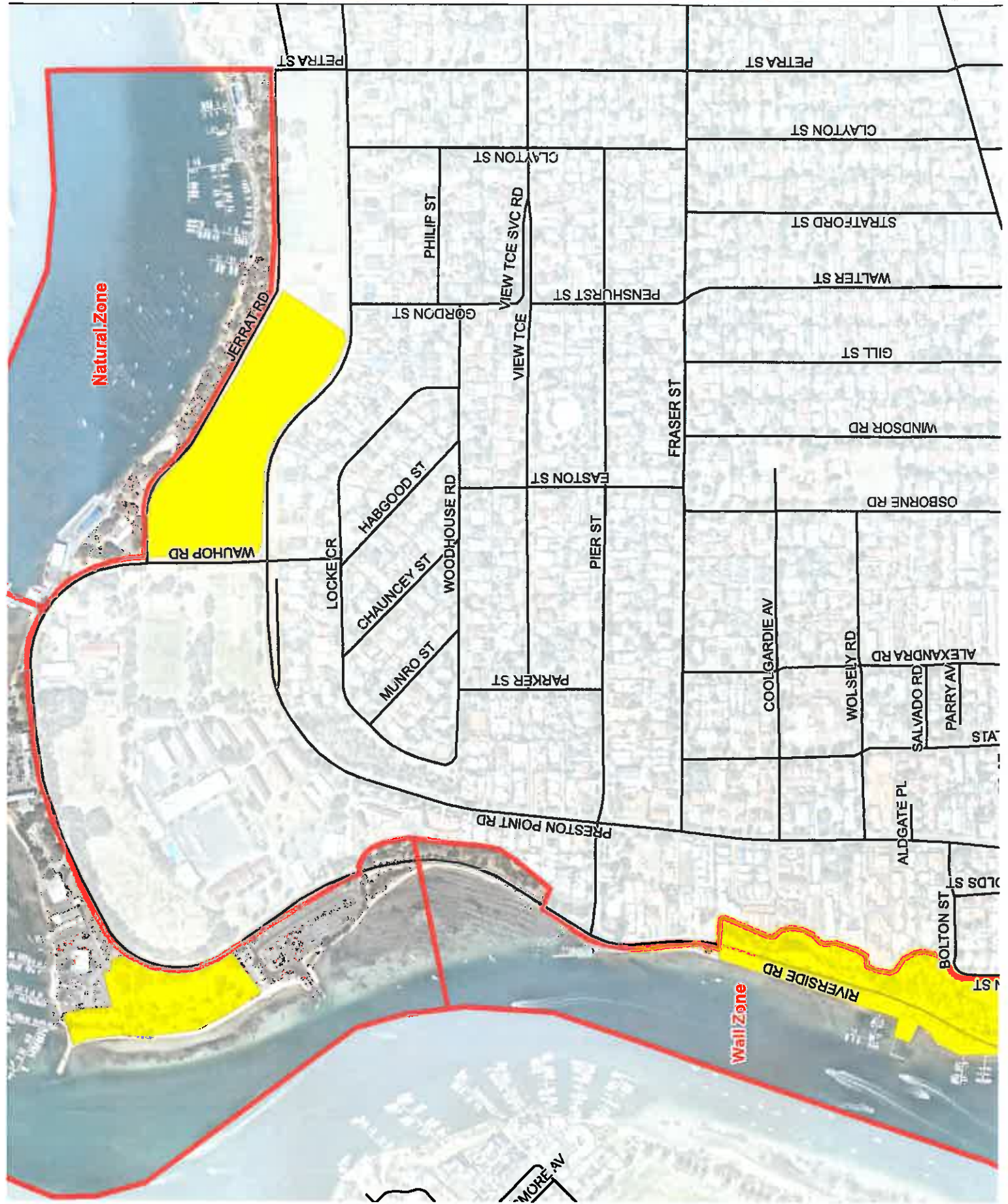
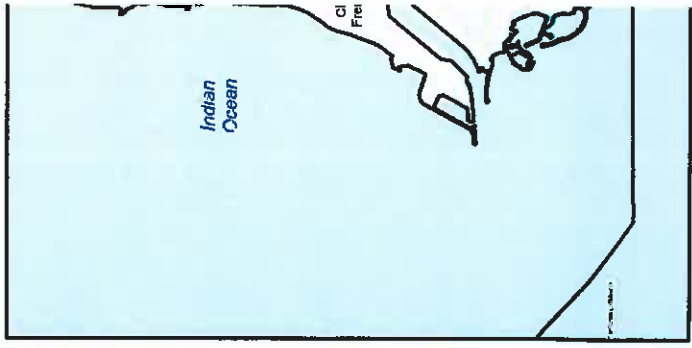
The trail length is approximately 7 kilometres long (one way) which could be undertaken by foot, bike, motorised bike, segways (upright motorised scooters) and others vehicles. It may also be possible to do it by canoe or boat. The trail would be both interesting and scenic providing excellent views of the river, a good range of cafés and eateries, natural bushland, beaches, cliffs, cultural and historic information and a great fitness trail.

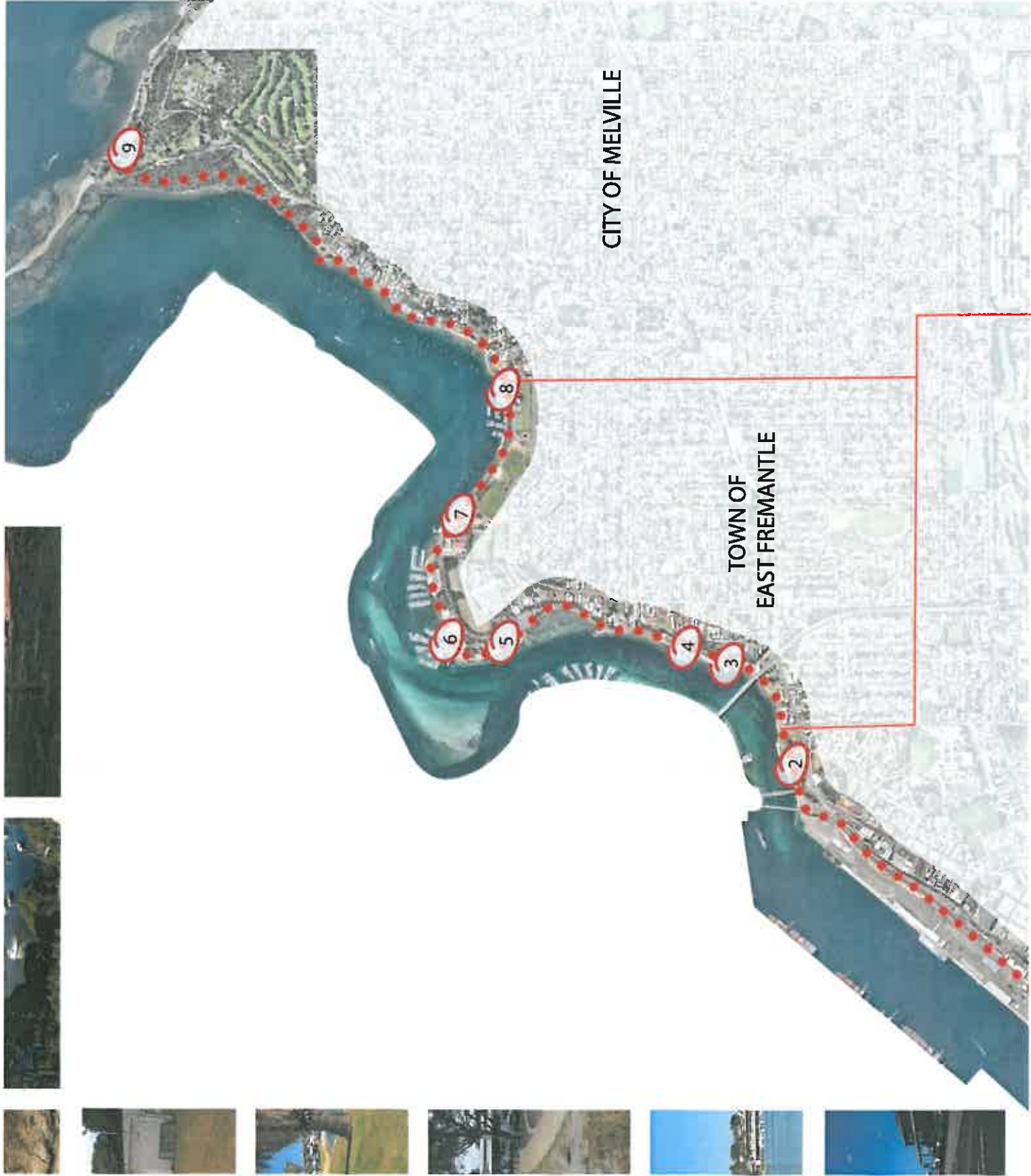
Recommendation 5:

The Town liaise with Fremantle Ports, Parks and Wildlife, City of Fremantle and City of Melville to consider the establishment of a regional trail from the Port to Point Walter. Trail development funding is available through Lotterywest trail grants.



LOCATION MAP:





3. Left Bank
4. Dome cafe
5. Zephyr cafe
6. Swan Yacht club
7. Eat Greek
8. East Fremantle Yacht Club
9. Point Walter Cafe

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6.2 THREE ZONE MASTER PLANS

6.2.1 Wall Zone

The Wall Zone between East Street and Leeuwin Barracks is the longest section of the foreshore and contains a narrow foreshore reserve at the base of a limestone cliff and embankment. It is also a very busy part of the foreshore where activity is created by a busy Riverside Drive, food and beverage outlets, pedestrian paths and river based activity.

As previously stated the condition of the river wall for this zone of the study area was 3 (average condition) which means that while significant deterioration was evident failure of the wall is unlikely in the near future. However further deterioration will occur if maintenance work is not carried out. Protection of this important asset is a priority for this part of the foreshore.

One of the themes in this section of the foreshore is to try and increase the area of public open space to encourage more passive recreational use of the foreshore. One of the biggest obstacles to achieving this is due to the constraints of the existing alignment of Riverside Drive. The master plans (**Master Plan 1: SK01** - **Master Plan 6: SK06**) illustrates a potential realignment of the road to increase the available public open space on the foreshore. In doing so it frees up more open space adjacent to the river allowing the creation of larger linear passive recreation area.

A signature feature of the foreshore in the Wall Zone is the use of palm trees regularly spaced along most of its length. The master plan reinforces this arrangement and considers the mass planting at focal points along the foreshore, creating a gateway effect. Other trees, which provide more shade, are proposed to be planted amongst the palm trees so that better passive recreational use of the foreshore can be undertaken.

The natural vegetation along the cliff and embankment should be environmentally managed to remove weeds and most of the exotic vegetation (eg fig trees) and restore it to a more diverse natural state that encourages more wildlife. Presently the vegetation is in relatively poor condition and therefore it has diminished resilience. A process of ecological

restoration will improve the bushland's condition and thereby uplift its resilience and biodiversity values.

There is potential to extend the aesthetic created by natural vegetation to other parts of the foreshore through formal arrangements of endemic trees such as the Rottneest Island Teatree (*Maleleuca lanceolata*) and Peppermint tree (*Agonis flexuosa*). Both these species are ideal shade trees.

The wall along the foreshore edge limits access to the river. Breaching of the wall in places to create steps to the water will allow access to small sandy beach areas and access for river uses such as paddle boarders and canoeists. The points where modification to the wall design is proposed is shown on **Master Plan 1: SK01** - **Master Plan 6: SK06**.

Merv Cowan Park is an important park on the foreshore as it offers outstanding views of river, East and North Fremantle and the harbour. It is also a relatively large area of open space but is limited by its topography that restricts the full use of the park. A significant proportion of the levelled area of the park is taken up by irrigation lakes and old and ineffective shelters. A redesign of the park could significantly improve the usability of the park and thereby enhance passive recreation activities. The park is also a trail head for the Neigarup Trail which meanders along the foreshore at clifftop level offering outstanding views and interpretative material. The waterfall and pond at ground level are an unnecessary landscape feature because it is artificial and out of context and does not significantly benefit the recreational, environmental or aesthetic value of the foreshore. One alternative would be to remove the irrigation lakes in Merv Cowan Park and redesign the water body at the base of the waterfall as a natural seepage waterhole. Instead of a waterfall it could be a low-flow seep which mimics the freshwater seeps that existed along the foreshore at the time of settlement. The pond at the waterfall base could be redesigned to take on dual functions of aesthetics and ecology; providing habitat for frogs and native fish.

The **Master Plan 10: SK10** has highlighted additional parking under Stirling Bridge through the expansion of the existing carpark further west. Further carpark could be created through the realignment of the Riverside Road especially around the Dome Café (**Master Plan 7: SK07**). All carpark

expansion should incorporate water sensitive drainage design to ensure biofiltration of stormwater prior to discharge to the river (**Master Plan 8: SK08**).

A skate park and additional exercise equipment has been proposed for the foreshore north of the Dome carpark (**Master Plan 7: SK07** and **Master Plan 8: SK08**). This is a suitable setting for a skatepark as it is away from residential areas, in full public view and easily accessible. There should also be limited conflicts with other users such as foreshore path users.

The existing native vegetation on the cliff/embankment between Pier Street and the Leeuwin Barrack contributes to the natural aesthetic of the foreshore. There is an opportunity to improve the condition and resilience of this vegetation through additional weed control and revegetation activities.

The main ornamental trees occurring along this section of the foreshore include: Phoenix palms (*Phoenix dactylifera*), Fan palms (*Washingtonia robusta*), Norfolk Island Pines (*Araucaria heterophylla*), New Zealand Christmas Tree (*Metrosideros excelsa*), Coral Tree (*Erythrina x stykesii*) and London Plane Trees (*Platanus x acerifolia*). These trees dominate the narrow western side of the foreshore whereas native species and occasional exotic Ficus species occur on the eastern side of Riverside Road.

A small stand of native Saltwater paperbarks (*Melaleuca cuticularis*) and rushes have been planted on the foreshore at the southern end of the boat-ramp carpark. This beautiful stand of trees, which has successfully established in this environment, provides an intimate enclosed foreshore space. In order for the public to enjoy the ambience of the space a small boardwalk has been proposed through the trees to provide an alternative passage along the foreshore pedestrian path. Access to the beach is also proposed at the northern and southern ends of site (**Master Plan 3: SK03**).

Recommendation 6:

Examine the potential for increasing the carpark under the Stirling Bridge. In order to soften the carpark consider planting trees in strategic areas of the carpark.

Recommendation 7:

Improve the amenity of the J Dolan Park through the following:

- create a node of Washingtonia palms at the western end of the J Dolan Park as an entry experience to the foreshore
- increase the numbers of shade trees in the park
- provide steps to the sandy beach area adjoining the park
- gradually replace existing shelters with new larger purpose designed shelters.

Recommendation 8:

Where possible plant shade trees next to existing seating.

Recommendation 9:

Redesign Merv Cowan Park to improve recreation and general amenity, the new design should consider:

- the removal of the irrigation lakes and associated infrastructure
- the creation of new recreation areas that are generally topographically level to encourage passive recreation activities
- development of new purpose designed shelters
- signage and interpretive material of the viewing area eg Fremantle Harbour and cultural and historic material etc
- sculpturing of different passive recreation environments into the park
- redesign of gardens to link into existing foreshore bushland
- improve access to park.

Recommendation 10:

Develop an Environmental Management Plan for the bushland along the cliff of Riverside Road. The management plan should include weed control, removal of exotic tree species, revegetation using local native species, working with Friends of East Fremantle foreshore and local indigenous custodians and the adjoining local residents, improvement of access and management of fire threats.

Recommendation 11:

Redesign the linear park north of Dome Cafe which currently contains lawn and exercise equipment to provide greater recreation and amenity value. The design and development of the space should consider the following:

- creating a purpose designed intergenerational skate park

- providing larger purpose designed shelters
- providing additional shade trees (eg Rottneest Island Tea-tree)
- breaching the river wall to create stairs to the river's edge to facilitate access for canoes and stand-up boards
- provision of barbecues
- provision of additional exercise equipment.

The scale of development in this area will depend on whether the road can be moved eastward to create greater available area of public open space.

Recommendation 12:

Consider realigning the Riverside Road between Pier Street and Leeuwin Barracks to slow vehicular traffic and create additional foreshore open space that adjoins the edge of the river. The amenity of the additional open space to be improved through planting of suitable native trees and provision of seating.

6.2.2 Reclaimed Zone

Some of the most intense activity on the foreshore occurs in this zone. It contains the foreshore's most popular passive recreation area along with active clubs, food and beverage outlets and boating related activities.

John Tonkin Park is one of the most popular parks in the Fremantle region because it offers a great setting, sandy beaches and shallow water, shade, café, play equipment, barbecues, shelters and good parking. It is particularly popular with mothers with young children, families and the older generation. It is also one of the few places on the foreshore that people can walk their dogs' off-leash (northern area only).

In order to improve the amenity of the park a number of changes are proposed which are shown on **Master Plan 9: SK09**. These include:

- relocating the existing carpark away from the foreshore to free up valuable foreshore area and improve pedestrian circulation
- creating a continuous stretch of permanent sandy beach through the placement of discreet low-impact off-shore rock groins – this will limit erosion of the foreshore and provide greater beach amenity
- reorientation of existing paths to improve circulation

- improved access to the foreshore beaches
- development of a nature based playground
- additional planting to foreshore
- creation of unique East Fremantle foreshore shelters
- placement of additional facilities eg barbecues.

The concept for a series of offshore headlands along the John Tonkin Park was proposed to best fit with the amenity and recreational values of the area and proposed master planning improvements to the recreational space.

Given that the area has been reclaimed, currents in the area are reasonably strong and the site is open to a significant amount of boat traffic, the site has been subject to some historical erosion during high water level events. This has required some protection methods in the form of Reno mattresses to be installed to prevent the undercutting of some of the existing vegetation at John Tonkin Park and an offshore headland to be placed in front of Zephyr Café.

At some times, the beach is quite narrow. Master planning for the area indicated that the recreational values of the area could be enhanced by providing a wider beach section for recreational values. This would also provide a benefit as the beach would provide a soft engineering solution and buffer to manage erosion without the need for a large protection structure such as a revetment or walling. It is likely that the beaches will still require ongoing management by the Town, through backpassing of sand or periodic sand nourishment over time.

Offshore headlands were proposed as the most beneficial measure for the widening of the existing beach and increasing the recreational amenity as they provide an uninterrupted beach length for users. Offshore headlands provide a reduced protection value compared to a seawall or a series of groynes, however the recreational and amenity values of the site and provided by the offshore headland concept were seen to outweigh that of the slightly increased management requirements. The wider beach sections provided by the offshore headlands would provide a buffer to erosion of the existing vegetation, providing the Town with time to respond to any possible erosion of the formed beaches without the loss of infrastructure.

The concept of offshore headlands in this area would require further engineering assessment and preliminary and detailed design to confirm the extent and location of the structures.

The following protection options were also considered:

- Series of Groynes – discounted due to the interruption to the amenity and creation of discrete beach pockets rather than a wide open beach area.
- Rock Revetments – discounted due to the loss of interaction between the recreational space of John Tonkin Park and the waters edge. Also likely to lose beach over time.
- Gabion Revetments – same as revetment option above.
- Retreat of shoreline – discounted due to the likely extent of losses and erosive pressure that it would place on the Zephyr café building.

One aim in this part of the foreshore is to better integrate John Tonkin Park and Norm MacKenzie Park through better connectivity. This can be achieved visually and structurally through the pathway systems along the river's edge and Riverside Road. The integration of these two areas will provide more recreation opportunity and diversity. Landscape treatments including signage along the connecting foreshore and Riverside Road pathway could facilitate the linkage between the two areas.

The design of Norm McKenzie Park has been developed to improve use and amenity of the space (**Master Plan 10: SK10**). Changes include:

- reorientation of the carpark to allow better access and use of the foreshore
- enhancing visual access to the park through uplifting of tree branches and removal of some trees of lower amenity value
- development of a forecourt to the north-east corner of the rowing club building to support the potential development of a café at the site (Fremantle Rowing Club current proposal)
- realignment of the pathway at the river's edge to increase use of the sandy beach
- placement of additional shelters and barbeque facilities
- provision of additional stairs to access the beach.

W.W. Wyman Park is a discrete but valuable park at the eastern end of the Reclaimed Zone. The main changes to this park include the following:

- improving legibility of access through Aquarama
- clumped planting of palm trees to act as a foreshore gateway
- activation of the space through the inclusion of a children's cycle track
- the removal of old playground equipment and replacement with new equipment
- creation of strong interpretation of the original river crossing through the use of water based rings (visual alignment of the rings will define the original route).

Recommendations 13:

In order to enhance the pedestrian user experience the path should be reorientated through the grove of Saltwater Paperbarks at the southern end of the public boat launching carpark. Storage of dinghies in this area should be considered with respect to the Swan Canning Riverpark Dinghy Management Policy SRT/D26.

Recommendation 14:

John Tonkin Park should be the focus of a major redesign and development to improve the functionality and amenity of the park. The Town should undertake the following:

- relocate the public carpark to the position shown on the master plan drawing
- stabilise and enhance the sandy foreshore beach area through the placement of strategic rock groins with the aim to increase the beach area and provide stability to the foreshore
- redevelop the path network as shown on the master plan
- undertake negotiations with the Swan Yacht Club for the integration of their foreshore lease area (western area) with John Tonkin Park, this includes visual, recreational, access and general amenity.

Recommendation 15:

Improve the connectivity between John Tonkin Park and Norm McKenzie Reserve through landscape and urban design treatments to encourage better use of both parks. The treatments should be along Riverside Road and the river's edge.

Recommendation 16:

Redevelop Norm McKenzie Park as identified in the master plan. This includes:

- reorientate the car park to increase recreational use of the foreshore
- move the existing pathway away from the foreshore edge to increase foreshore use
- increase the area of lawn as shown on the plan
- improve visual access through the pruning and removal of certain trees and shrubs
- provide steps from the foreshore pathway to sandy beach
- in conjunction with the Fremantle Rowing Club activate the north east corner of the building to café use or similar
- liaise with the Sea Scouts to improve the amenity of their forecourt area as shown on the Master Plan.

Recommendation 17:

Redevelop W W Wayman Park as identified in the Master Plan. This includes:

- establishing a grove of Washingtonia palms at the eastern end of the park to provide entry experience to the foreshore (ie to complement the palms proposed at J Dolan Park)
- consider the installation of an artwork (eg circle) to interpret the historic river crossing point for the original road between Fremantle and Perth (liaison with the Town of Mosman Park to establish a complimentary artwork on their foreshore should be undertaken)
- remove existing play equipment and replace with new play equipment including a purpose designed children's trainer cycle track, basketball half-court, and kick-about-space
- construct iconic purpose designed shade shelters over existing exercise equipment
- add barbeque facilities to the park.

6.2.3 Natural Zone

The Natural Zone is unique in the study area because it offers a different setting to other areas of the foreshore. Firstly it is dominated by a vegetated cliff and embankment which, at the top, has outstanding views of the Swan River and environs, particularly Blackwall Reach. It also has at either end the East Fremantle Yacht Club and the Sea Scouts – both are concerned with boating activities. The East Fremantle Yacht Club has a long association with the site and was first established as the Melville Yacht Club in 1933 (changing to the East Fremantle Yacht Club in 1962). This zone is dominated by the natural rather than the built environment. The experience at the base of the cliff amongst the natural vegetation is one of serenity and peacefulness surrounded by nature. It is more frequented by local people rather than the general public.



Access to the site is also difficult with the three mainpoints of entry being via step at the western end, a concrete stairway roughly in the centre of the site (Jerrat Drive to river) and access via the East Fremantle Yacht Club at the eastern end of the site. Some informal tracks also occur in the steep embankment area.

The bushland area on the embankment and cliffs requires management to enhance the biodiversity values and to ensure the resilience of the area. Some concerns have been expressed on the bushfire threat of the site to adjoining moored boats. In a previous management plan (Ecoscape 1993) weed control and other measures were proposed to reduce the fire threat.

The management plan also advocated closing off unwanted access tracks and planned storage facilities for shoreline boat tenders (dinghies). The management plan should be revisited to determine a program of works for the restoration of the bushland.

The views at certain points along Jerrat Drive along of the Swan River have significance because they are unique and outstanding as they highlight a combination of the natural environment (the original untouched environment ie at Blackwall Reach) juxtaposed with the human influence on the river environment over time. The proportions, colours, textures and river based activity all contribute to an outstanding viewing experience. Two areas have been selected as viewing areas (**Master Plan 6: SK06**) that provide the best opportunities to experience the views as well as some interpretative material of the river environs.

Recommendation 18:

Review the existing Jerrat Drive Foreshore Rehabilitation Plan and undertake an audit on recommendations that have been implemented. Update the Plan to match the current status of the foreshore. Seek adjoining clubs (eg East Fremantle Yacht Club) involvement in the formulation and implementation of the revised Plan.

Recommendation 19:

Improve pedestrian access along the foreshore at river level through the development of a natural accessway along the foreshore. For example, this could include placement of flat limestone stepping stones, short lengths of boardwalk and pruning of overhanging tree branches.

Recommendation 20:

Create additional viewing node along Jerrat Drive for the public to take in the outstanding views of the river environment. Place interpretive material at both the existing viewing node and proposed node to describe the view and relevant historical and cultural information. Upgrade the aesthetic and amenity value of the existing viewing node.

6.3 ENVIRONMENTAL MANAGEMENT PLAN

6.3.1 Natural Areas Management

An existing environmental management plan titled Jerrat Drive Foreshore Rehabilitation Plan was prepared by Ecoscape in 1993. The Plan describes the biophysical environment of the foreshore, lists environmental management issues, identifies a number of ecological restoration zones and provides cost estimates for works. The existing Plan should be reviewed and updated and a new plan of works with yearly budget allocations prepared.

There is no environmental management plan for the cliffs and embankment area between Andrews Road and the Leeuwin Barracks. This is an important environmental area in the as it contains locally significant endemic plant species and contributes to the foreshore's natural character; therefore it should be the subject of a separate environmental management plan which specifically addresses weed control, fire management, revegetation with appropriate endemic flora, access management and interpretation.

Recommendation 21:

The Town prepare an Environmental Management Plan (EMP) for the cliffs and embankment area between Andrews Road and Leeuwin Barracks.

6.3.2 Stormwater Management

A number of stormwater outfall pipes occur along the river edge as shown on the master plans which discharge stormwater directly into the river. An assessment of the drains was carried out as part of this study which is described in section 5.1.2. The condition survey revealed that despite the poor condition of exposed pipe infrastructure the internal and functional abilities of the drains appear to be satisfactory. It is also unknown whether any structural stormwater management processes such as gross pollutant traps (GPT's) are incorporated into the pipe network. GPT's filter large particulate matter from stormwater runoff prior to it flowing into the river environment.

Direct discharge to the river environment without any filtering of pollutants is an outdated method of stormwater disposal because of potential environmental impacts on sensitive aquatic environments such as the Swan River. Water Sensitive Urban Design (WSUD) methods employing structural and non-structural interventions are now largely used to filter stormwater before it is discharged to environmentally sensitive environments. The study area is part of the Swan River ESA (Environmental Sensitive Area) and therefore the Town should consider modifying its current outfall system to a more environmentally appropriate one.

To improve stormwater quality both structural methods (eg as GPT's) and non-structural methods (eg biofilters) could be incorporated into the network system. Biofilters (biofiltration systems) are excavated basins or trenches filled with appropriate porous material into which vegetation (eg native rushes) is planted. Together they provide physical, chemical and biological processes to filter stormwater runoff. The boat launching carpark south of John Tonkin Park contains such biofiltration systems.

The master plans (**Master Plan 8: SK08**) for this study highlight where biofilters could be incorporated into a modified road geometry and design. An urban water management plan should be undertaken to determine appropriate solutions for improving the quality of stormwater runoff which discharges directly into the river

Recommendation 22:

The Town prepare an Urban Water Management Plan (UWMP) for the stormwater network outfalling into the Swan River.



6.4 PRIORITISED DRAFT RECOMMENDATIONS/ STAGING

The prioritisation was based on maintaining critical infrastructure assets (to minimise long terms costs), developing high use recreation assets, achieving quick cost effective amenity outcomes and initiating the management of important ecological assets.

No.	Recommendation	Priority
1	The Town use the following process to repair the riverwalls and other foreshore infrastructure. Year 1 - undertake investigations into areas of concern - documentation of generic specification for riverwall repairs and drawings for Year 2 projects - undertake minor works able to be accommodated into current finances - prepare funding applications for Year 2 projects. Year 2 - undertake first round of moderate repair projects in Year 2 / 3 summer - undertake condition inspection for Year 3 priority areas - update and prepare documentation for Year 3 projects to be undertaken over Year 3/4 summer period. Year 3 - undertake second round of moderate repair projects - undertake condition inspection for Year 4 priority areas - update and prepare documentation for Year 4 projects.	HIGH
2	The Town to undertake a cost benefit analysis of modifications to Riverside Road to improve public amenity and environmental outcomes for the foreshore.	MEDIUM
3	The Town should consider the implications and potential impacts of the sale of the Leeuwin Barracks on the foreshore public open space arrangement. The Town should also consider existing foreshore lease arrangements in the provision of the most sustainable use of the foreshore resource.	HIGH
4	The Town should consider the use of the foreshore for special events. An analysis of event use of the foreshore should be undertaken to consider implication on the foreshore resource and surrounding community.	MEDIUM
5	The Town liaise with Parks and Wildlife, Fremantle Ports, City of Fremantle and City of Melville to consider the establishment of a regional trail from the Port to Point Walter. Trail development funding is available through Lotterywest trail grants.	MEDIUM
6	Examine the potential for increasing the carpark under the Stirling Bridge. In order to soften the carpark consider planting trees in strategic areas of the carpark.	LOW

No.	Recommendation	Priority
7	Improve the amenity of the J Dolan Park through the following: • create a node of Washingtonia palms at the western end of the J Dolan Park as an entry experience to the foreshore • increase the numbers of shade trees in the park • provide steps to the sandy beach area adjoining the park • gradually replace existing shelters with new larger purpose designed shelters.	MEDIUM
8	Where possible plant shade trees next to existing seating.	HIGH
9	Redesign Merv Cowan Park to improve recreation and general amenity, the new design should consider: • the removal of the irrigation lakes and associated infrastructure • the creation of new recreation areas that are generally topographically level to encourage passive recreation activities • development of new purpose designed shelters • signage and interpretive material of the viewing area eg Fremantle Harbour and cultural and historic material etc • sculpturing of different passive recreation environments into the park • redesign of gardens to link into existing foreshore bushland • improve access to park.	MEDIUM
10	Develop an Environmental Management Plan for the bushland along the cliff of Riverside Road. The management plan should include weed control, removal of exotic tree species, revegetation using local native species, working with Friends of East Fremantle foreshore and the adjoining local residents, improvement of access and management of fire threats.	MEDIUM
11	Redesign the linear park north of Dome Café which currently contains lawn and exercise equipment to provide greater recreation and amenity value. The design and development of the space should consider the following: • creating a purpose designed intergenerational skate park • providing larger purpose designed shelters • providing additional shade trees (eg Rottneest Island Tea-tree) • breaching the river wall to create stairs to the river's edge to facilitate access for canoes and stand-up boards • provision of barbeques • provision of additional exercise equipment.	MEDIUM
12	Consider realigning the Riverside Road between Pier Street and Leeuwin Barracks to slow vehicular traffic and create additional foreshore open space that adjoins the edge of the river. The amenity of the additional open space to be improved through planting of suitable native trees and provision of seating.	LOW
13	In order to enhance the pedestrian user experience the path should be reorientated through the grove of Saltwater Paperbarks at the southern end of the public boat launching carpark. Storage of dinghies in this area should be considered with respect to the Swan Canning Riverpark Dinghy Management Policy SRT/D26.	LOW

No.	Recommendation	Priority
14	John Tonkin Park should be the focus of a major redesign and development to improve the functionality and amenity of the park. The Town should undertake the following: - relocate the public carpark to the position shown on the master plan drawing - stabilise and enhance the sandy foreshore beach area through the placement of strategic rock groins – the aim is to increase the beach area and provide stability to the foreshore - redevelop the path network as shown on the master plan - undertake negotiations with the Swan Yacht Club for the integration of their foreshore lease area (western area) with John Tonkin Park, this includes visual, recreational, access and general amenity.	HIGH
15	Improve the connectivity between John Tonkin Park and Norm McKenzie Reserve through landscape and urban design treatments to encourage better use of both parks. The treatments should be along Riverside Road and the river's edge.	HIGH
16	Redevelop Norm McKenzie Park as identified in the master plan. This includes: - reorientate the car park to increase recreational use of the foreshore - move the existing pathway away from the foreshore to increase foreshore edge use - increase the area of lawn as shown on the plan - improve visual access through the pruning and removal of certain trees and shrubs - provide steps from the foreshore pathway to sandy beach - in conjunction with the Fremantle Rowing Club activate the north east corner of the building to café use or similar - liaise with the Sea Scouts to improve the amenity of their forecourt area as shown on the master plan.	HIGH
17	Redevelop W W Wayman Park as identified in the master plan. This includes: - establishing a grove of Washingtonia palms at the eastern end of the park to provide entry experience to the foreshore (ie to compliment the palms proposed at J Dolan Park) - consider the installation of an artwork (eg circle) to interpret the historic river crossing point for the original road between Fremantle and Perth (liaison with the Town of Mosman Park to establish a complimentary artwork on their foreshore should be undertaken) - remove existing play equipment and replace with new play equipment including a purpose designed children's trainer cycle track, basketball half-court, and kick-about-space - construct iconic purpose designed shade shelters over existing exercise equipment - add barbeque facilities to the park.	LOW
18	Review the existing Jerratt Drive Foreshore Rehabilitation Plan and undertake an audit on recommendations that have been implemented. Update the Plan to match the current status of the foreshore. Seek adjoining clubs (eg East Fremantle Yacht Club) involvement in the formulation and implementation of the revised Plan.	HIGH
19	Improve pedestrian access along the foreshore at river level through the development of a natural accessway along the foreshore. For example, this could include placement of flat limestone stepping stones, short lengths of boardwalk and pruning of overhanging tree branches.	LOW

No.	Recommendation	Priority
20	Create additional viewing node along Jerrat Drive for the public to take in the outstanding views of the river environment. Place interpretive material at both the existing viewing node and proposed node to describe the view and relevant historical and cultural information. Upgrade the aesthetic and amenity value of the existing viewing node.	MEDIUM
21	The Town prepare an Environmental Management Plan (EMP) for the cliffs and embankment area between Andrews Road and Leeuwin Barracks.	HIGH
22	The Town prepare an Urban Water Management Plan (UWMP) for the stormwater network outfalling into the Swan River.	MEDIUM

6.5 DRAFT IMPLEMENTATION PROGRAMME/ SCHEDULE WITH RESPONSIBILITIES

Item	Responsibility	Priority	Timeframe
1	Undertake a maintenance program for sea wall	H	Ongoing
2	Undertake cost benefit analysis of modifying Riverside Road.	M	2016
3	Critically examine the impact of the development of Leewin Barracks on the amenity and functionality of the foreshore (assuming the site becomes a high density urban development).	H	2015/16
4	Prepare a trails master plan for the Port to Point Trail.	M	2016/17
5	Undertake community consultation, detailed design, engineering and cost analysis for modifications to John Tonkin Park as per Foreshore Master Plan. Liaise closely with the Rivers and Estuaries Division, Parks and Wildlife.	H	2016/17
6	Undertake an audit of stormwater infrastructure that outfalls into the river and develop best practise approach to stormwater management. eg GPT's and biofilters.	M	2016/17
7	Develop master plan for Merv Cowan Park which improves the public amenity, reduces the pond area, places the existing shelters and integrates the park with Neigarup Trail.	M	2016/17
8	Prepare and update existing management plans for the foreshore bushland natural areas and implement bush regeneration activities.	M	2016/17
9	Prepare detailed design for Norm McKenzie Park in line with master plan in this report. Liaise with adjoining lease holders and community.	M	2016/17
10	Prepare detailed design for W W Wayman Park in line with master plan in this report. Undertake design of old river crossing art work.	L	2018/19
11	Establish lookout area along Jerratt Drive. Replace existing fence with a purpose designed one. Include interpretative material at lookout areas.	L	2018/19
12	Prepare detailed design for Riverside Rd Linear Park as per master plan in this report. Implement design.	M	2018/19

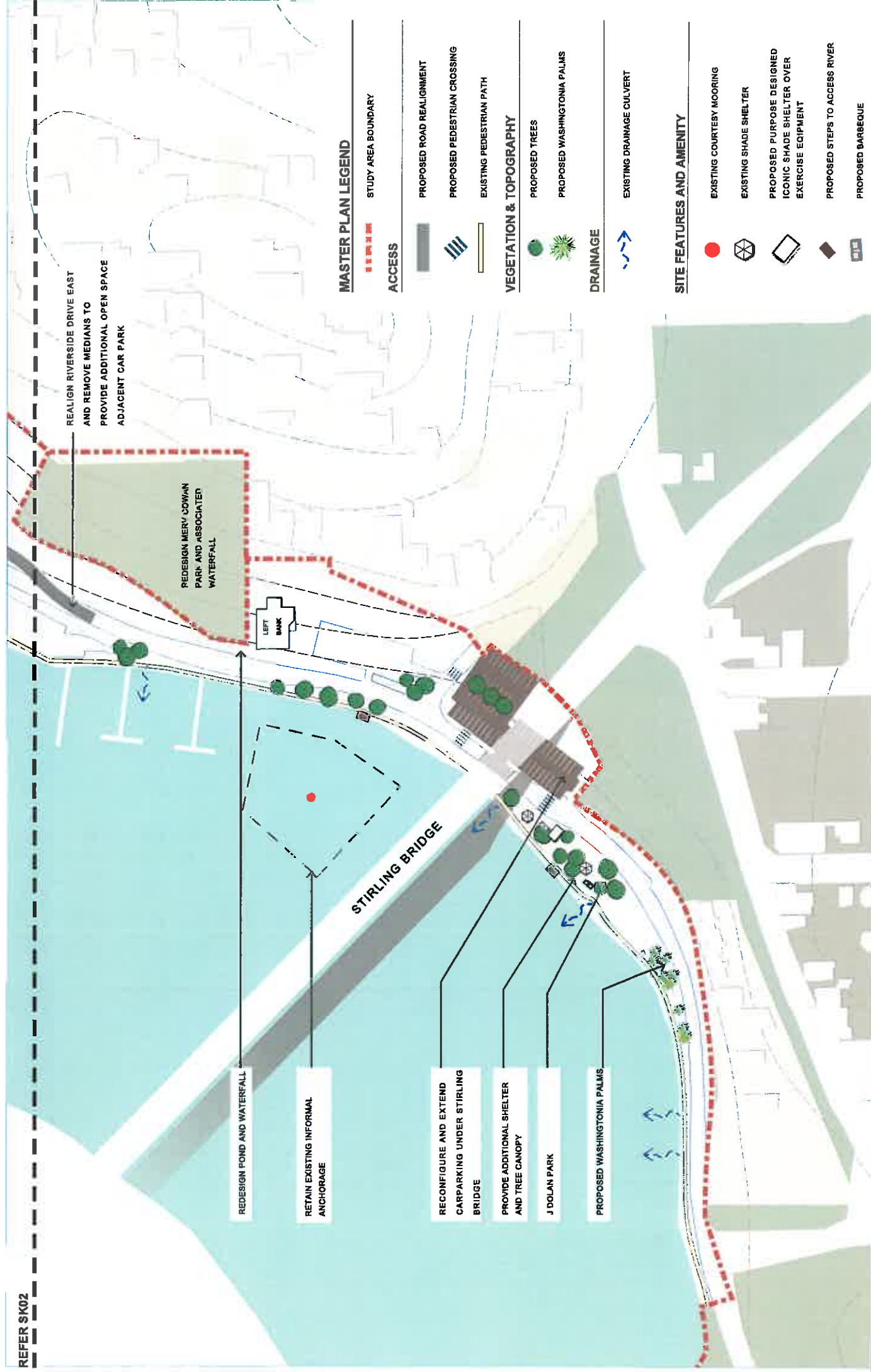
6.6 ORDER OF COSTS OF INDIVIDUAL PROJECTS AND STAGES

ITEM	OPINION OF PROBABLE COSTS
WALL ZONE	
J Dolan Park	
New river steps	\$4-5K
Additional palms (10)	\$5K
Shade trees (5)	\$2000
New shelter (2) @ \$30K	\$60K
Redo carpark under Stirling Bridge	\$100K
Merv Cowan Park	
Redesign/Master Plan	\$20K
Redevelop park to new design standards. Including path system	\$500K Stage 1
Cliff Vegetation Management	
Develop Environmental Management Plan	\$10K
Management of cliff vegetation	\$40K Initially then \$20K/yr
Linear Park	
Skate park	\$400K
Shelter (5)	\$150K
New river step (2)	\$10K
Shade trees (10)	\$3K
Irrigation	\$15K
Pathways	\$10K
RECLAIMED ZONE	
Boatramp carpark	
New access path	\$8K
John Tonkin Park	
Headlands	\$300-500K
Path modifications	\$70K
Demolishing carpark and redevelop new one	\$100K
Nature playground	\$50K
New shelters (20) @ \$30K	\$60K
Trees	\$10K
Clean-up foreshore	\$15K
New fencing	\$10K
Installation of new turf	\$12K

ITEM	OPINION OF PROBABLE COSTS
Norm McKenzie Park	
New carpark	\$40K
Realign path	\$8K
New shelters	\$9K
BBQ	\$10K
Pruning and reinstating new trees	\$10K
New lawn and irrigation	\$6K
W.W Wayman Reserve	
New palm trees	\$5K
New shelter	\$30K
Childrens bike path	\$10K
Regrading new grass	\$8K
Half court	\$15k
New BBQ (2)	\$20K
New plants/gardens	\$12K
Artwork	\$50K
NATURAL ZONE	
Lookout (2)	\$40K
Cliff management	\$20K/yr
Improve foreshore access	\$50K
TOTAL	\$2,608,000.000

Note: New road alignment not included.

MASTER PLANS SK01-SK12



MASTER PLAN LEGEND

STUDY AREA BOUNDARY

ACCESS

PROPOSED ROAD REALIGNMENT

PROPOSED PEDESTRIAN CROSSING

EXISTING PEDESTRIAN PATH

VEGETATION & TOPOGRAPHY

PROPOSED TREES

PROPOSED WASHINGTONIA PALMS

DRAINAGE

EXISTING DRAINAGE CULVERT

SITE FEATURES AND AMENITY

EXISTING COURTESY MOORING

EXISTING SHADE SHELTER

PROPOSED PURPOSE DESIGNED
ICONIC SHADE SHELTER OVER
EXERCISE EQUIPMENT

PROPOSED STEPS TO ACCESS RIVER

PROPOSED BARBEQUE

MASTER PLAN LEGEND

STUDY AREA BOUNDARY

ACCESS

PROPOSED ROAD REALIGNMENT

EXISTING PEDESTRIAN PATH

PROPOSED PEDESTRIAN PATH

VEGETATION & TOPOGRAPHY

PROPOSED TREES

EXISTING TREES / PALM

TURF

DRAINAGE

EXISTING DRAINAGE CULVERT

SITE FEATURES AND AMENITY

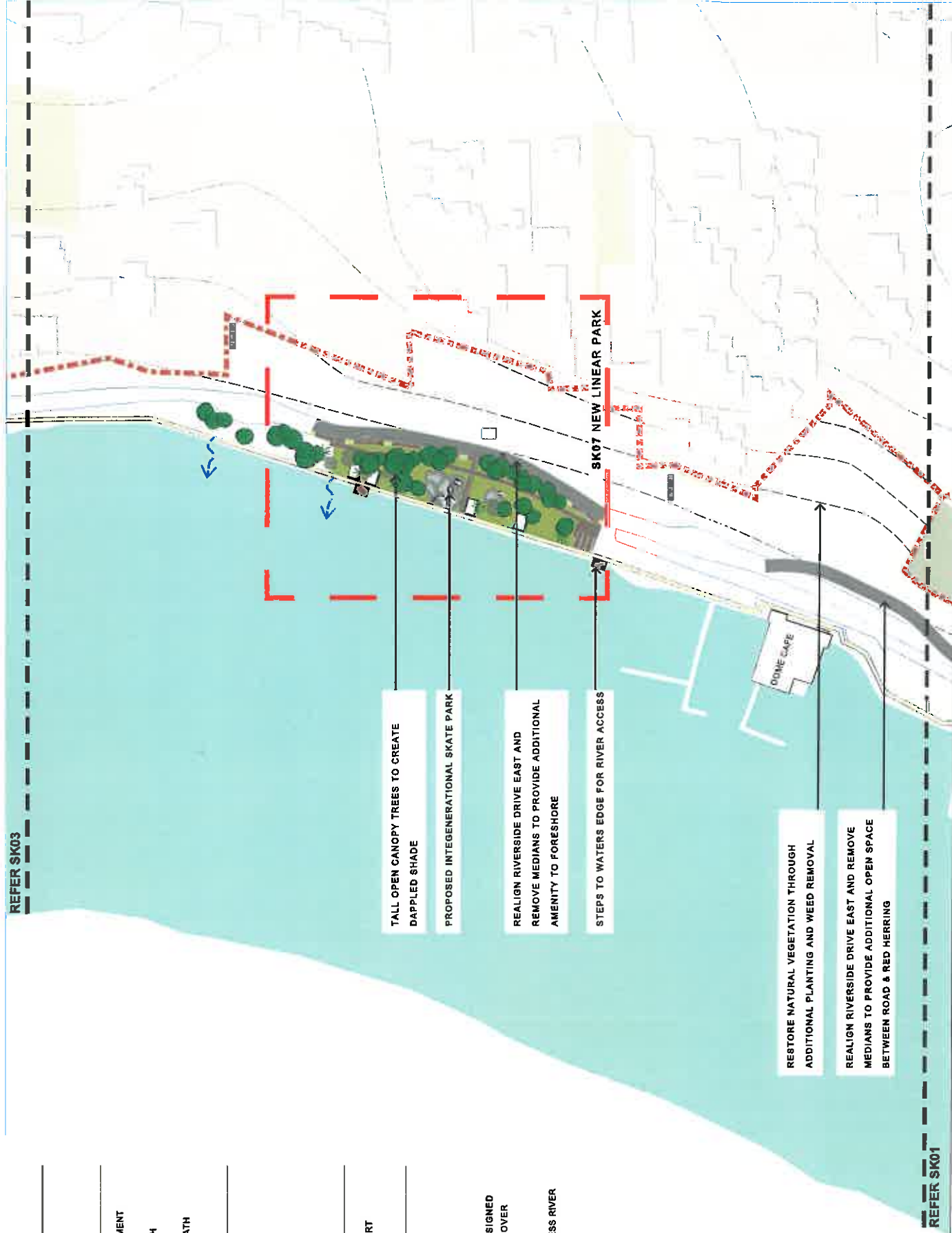
EXISTING SHADE SHELTER

EXISTING STAIRS

PROPOSED PURPOSE DESIGNED
ICONIC SHADE SHELTER OVER
EXERCISE EQUIPMENT

PROPOSED STEPS TO ACCESS RIVER

PROPOSED SKATE PARK



MASTER PLAN LEGEND

STUDY AREA BOUNDARY

ACCESS

PROPOSED ROAD REALIGNMENT

EXISTING PEDESTRIAN PATH

PROPOSED PEDESTRIAN PATH

VEGETATION & TOPOGRAPHY

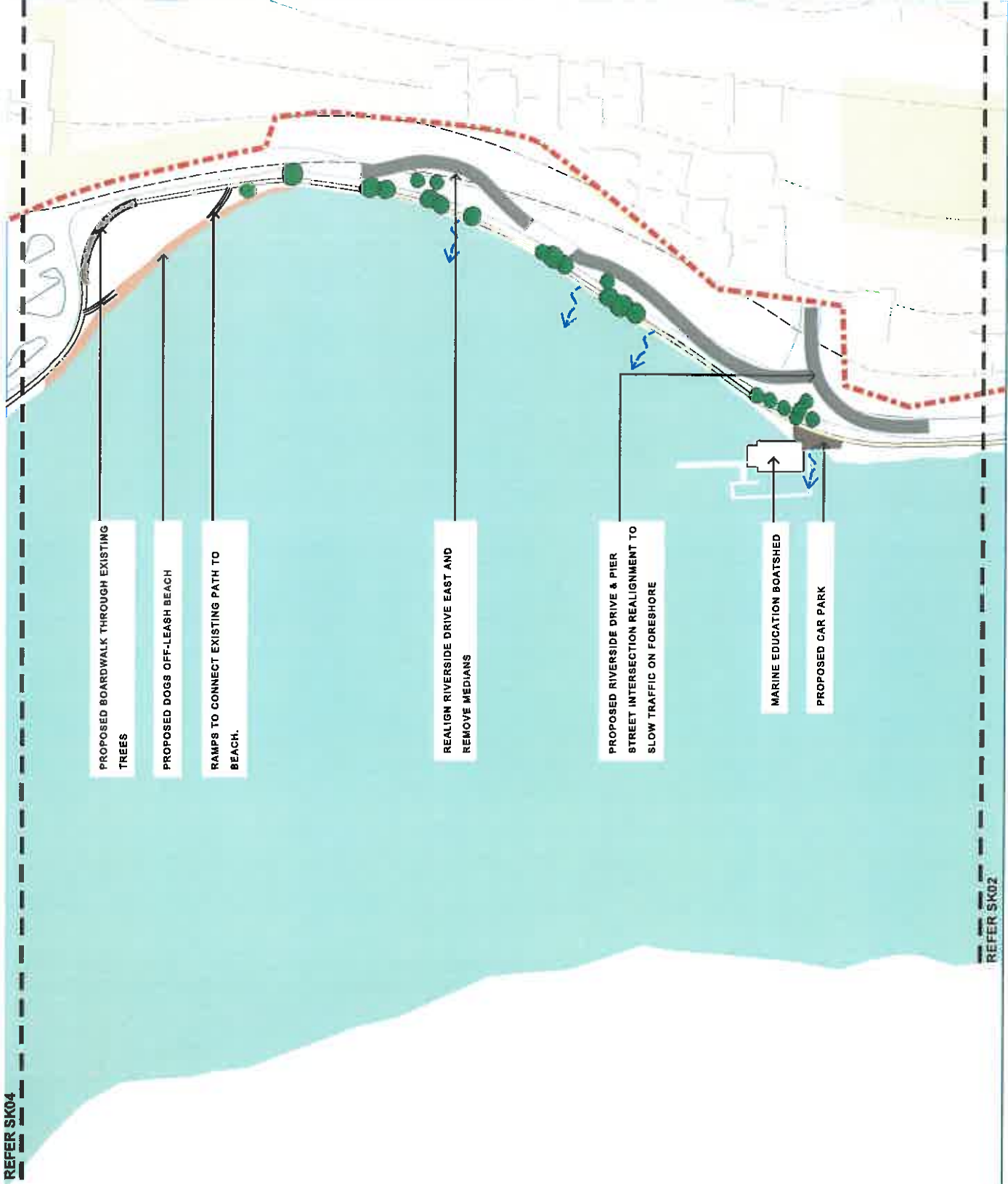
PROPOSED TREES

DRAINAGE

EXISTING DRAINAGE CULVERT

SITE FEATURES AND AMENITY

ACCESS RAMP

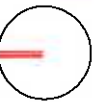


MASTER PLAN
SK03

EAST FREMANTLE FORESHORE
MASTER PLAN
TOWN OF EAST FREMANTLE

PROJECT NO: 3362-14
SCALE 1:2000 @ A4
100m

AUTHOR: TC
QA: SP
50



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MASTER PLAN LEGEND

STUDY AREA BOUNDARY

ACCESS

PROPOSED ROAD REALIGNMENT

EXISTING PEDESTRIAN PATH

PROPOSED PEDESTRIAN PATH

VEGETATION & TOPOGRAPHY

PROPOSED TREES

EXISTING TREES / PALM

DRAINAGE

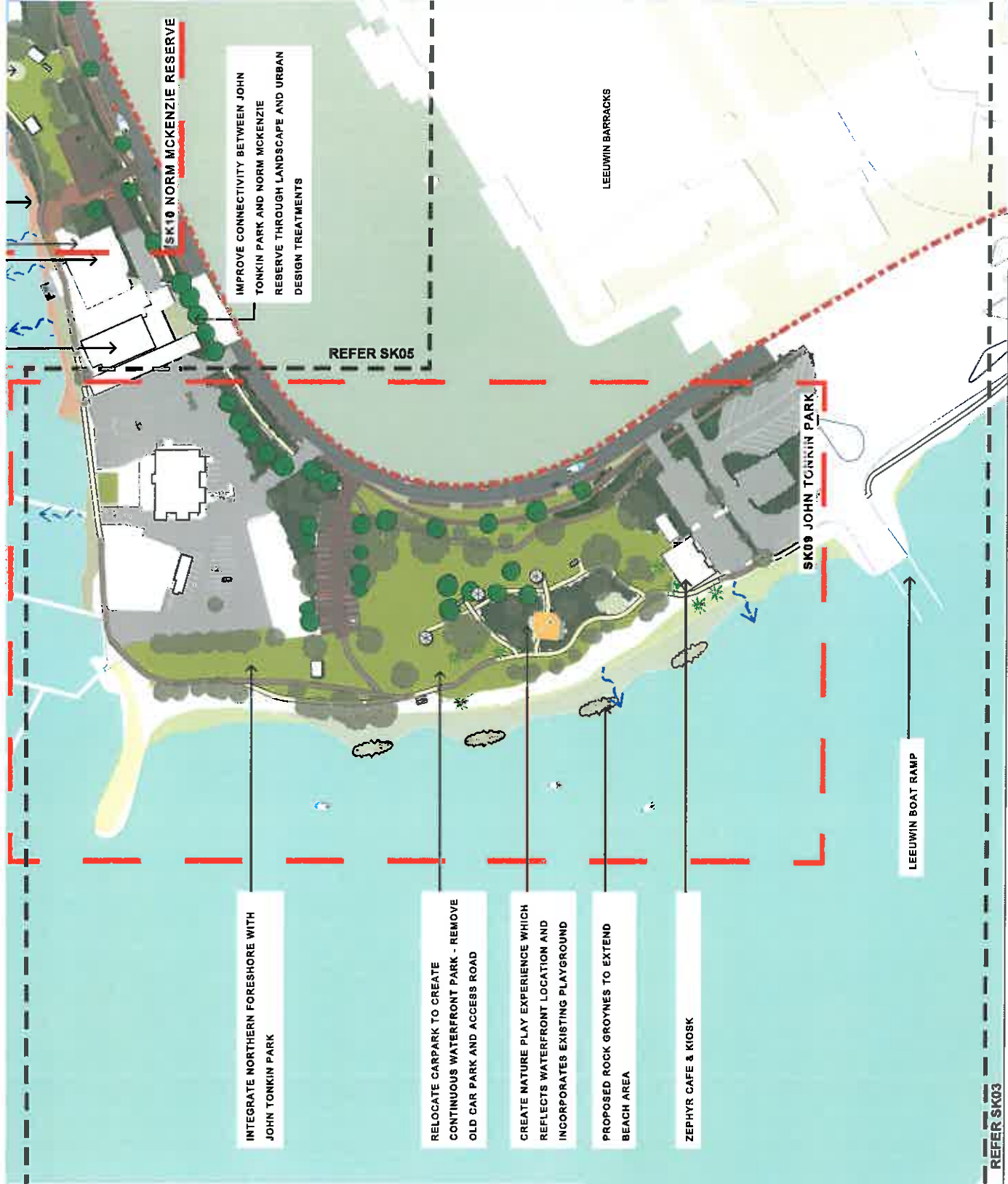
EXISTING DRAINAGE CULVERT

SITE FEATURES AND AMENITY

EXISTING SHADE SHELTER

PROPOSED PURPOSE DESIGNED
ICONIC SHADE SHELTER OVER
EXERCISE EQUIPMENT

EXISTING BARBEQUE



MASTER PLAN LEGEND

STUDY AREA BOUNDARY

ACCESS

PROPOSED ROAD REALIGNMENT

EXISTING PEDESTRIAN PATH

PROPOSED PEDESTRIAN PATH

VEGETATION & TOPOGRAPHY

PROPOSED TREES

PROPOSED WASHINGTONIA PALMS

EXISTING TREES / PALM

DRAINAGE

EXISTING DRAINAGE CULVERT

SITE FEATURES AND AMENITY

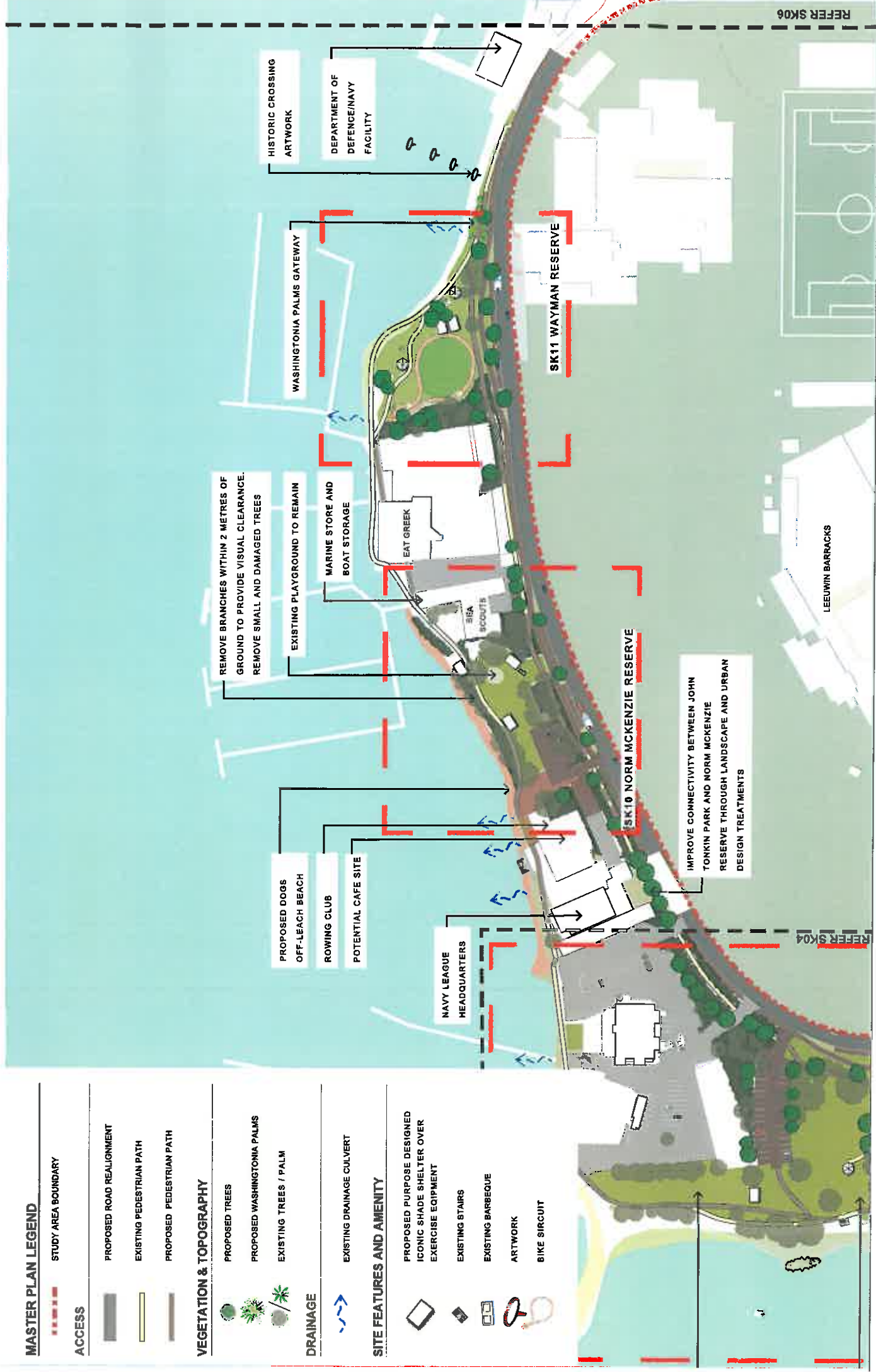
PROPOSED PURPOSE DESIGNED
ICONIC SHADE SHELTER OVER
EXERCISE EQUIPMENT

EXISTING STAIRS

EXISTING BARBEQUE

ARTWORK

BIKE CIRCUIT



PROVIDE ADVENTURE ACCESS ALONG RIVER
EDGE EG. FLAT LIMESTONE ROCKS

RESTORE CLIFF VEGETATION THROUGH
WEED CONTROL AND REVEGETATION

STAIRS AND RIVER ACCESS

SEA SCOUT

DEPARTMENT OF
DEFENCE/NAVY FACILITY

DEPARTMENT OF
DEFENCE/NAVY FACILITY

UPGRADE EXISTING LOOKOUT
AND PROVIDE INTERPRETIVE
MATERIAL

JERRAT DRIVE

EXISTING STAIRS AND
RIVER ACCESS

PROVIDE NEW LOOKOUT
WITH INTERPRETIVE
MATERIAL

EAST
FREMANTLE
YACHT CLUB

MASTER PLAN LEGEND

STUDY AREA BOUNDARY

DRAINAGE

EXISTING DRAINAGE CULVERT

MASTER PLAN LEGEND

PROPOSED ACCESS

- PROPOSED ROAD AND PARKING LAYOUT
- PROPOSED CYCLE WAY
- EXISTING PEDESTRIAN PATH
- PROPOSED PEDESTRIAN PATH

VEGETATION & TOPOGRAPHY

- EXISTING TREES / PALM
- TREE TO BE REMOVED
- PROPOSED TREES
- EXISTING LANDSCAPE PLANTING
- PROPOSED LANDSCAPE PLANTING
- VERGE BIOFILTER
- TURF

SITE FEATURES AND AMENITY

- PROPOSED PURPOSE DESIGNED
ICONIC SHADE SHELTER OVER EXISTING
AND PROPOSED EXERCISE EQUIPMENT
- KAYAK / PEDESTRIAN STAIRS



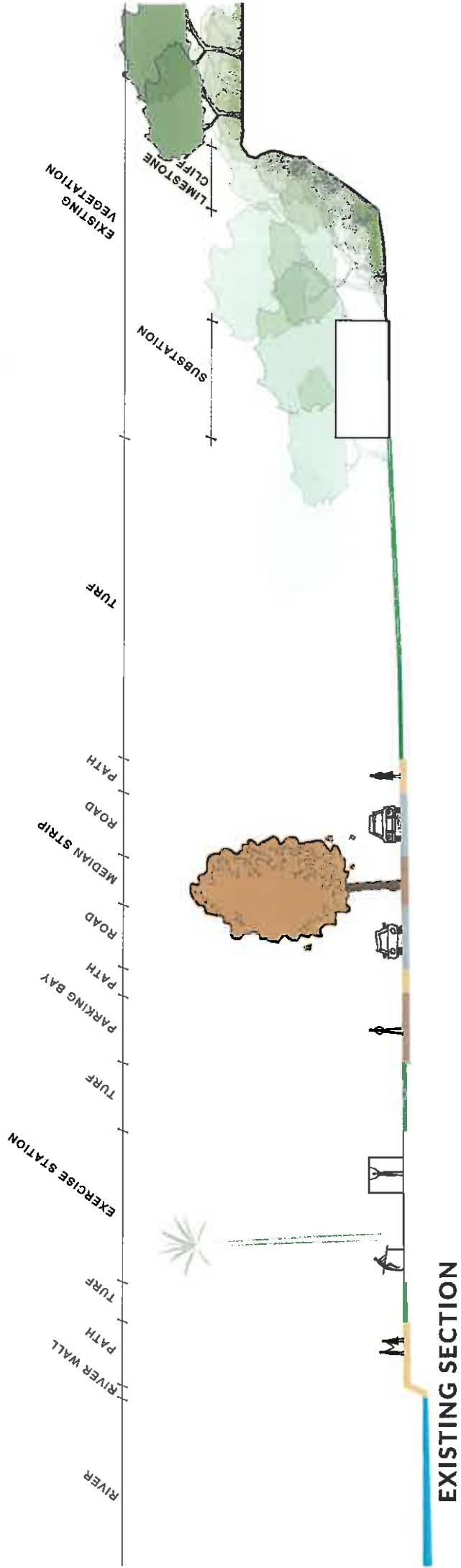
AUTHOR: TC

QA: SP

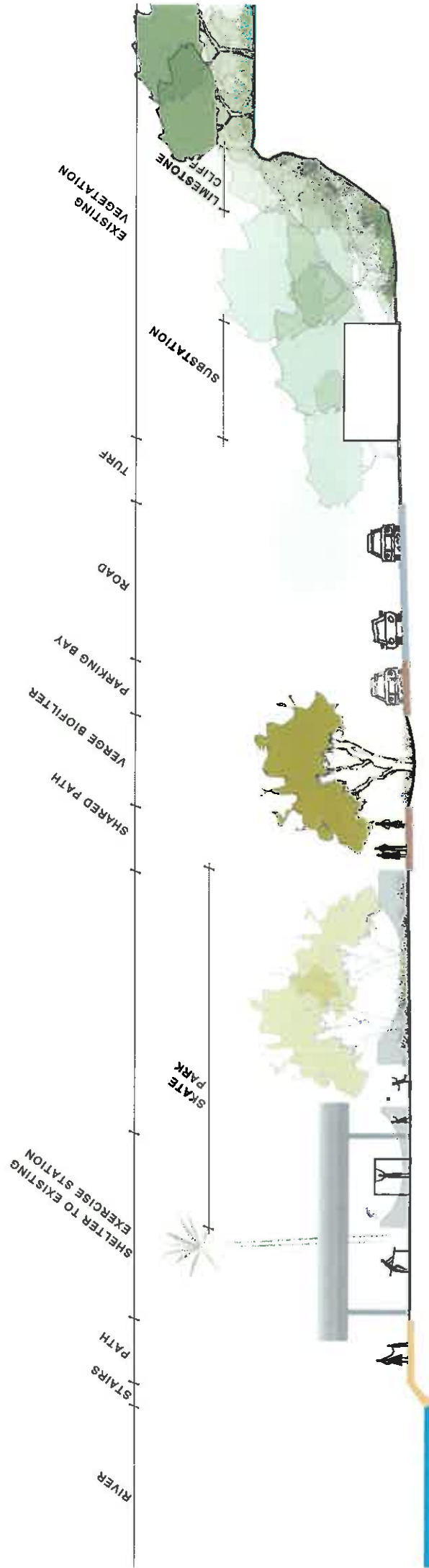
PROJECT NO: 3362-14

SCALE 1:800 @ A4

20m



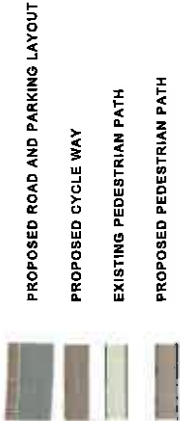
EXISTING SECTION



PROPOSED SECTION

MASTER PLAN LEGEND

PROPOSED ACCESS



VEGETATION & TOPOGRAPHY

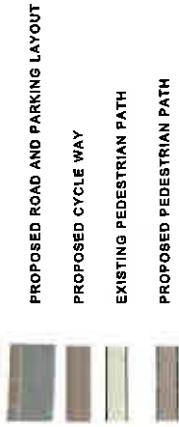


SITE FEATURES AND AMENITY



MASTER PLAN LEGEND

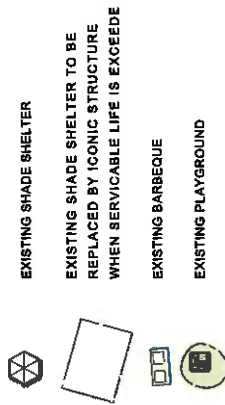
PROPOSED ACCESS



VEGETATION & TOPOGRAPHY



SITE FEATURES AND AMENITY



MASTER PLAN LEGEND

PROPOSED ACCESS

- PROPOSED ROAD AND PARKING LAYOUT
- PROPOSED CYCLE WAY
- EXISTING PEDESTRIAN PATH
- PROPOSED PEDESTRIAN PATH

VEGETATION & TOPOGRAPHY

- EXISTING TREES / PALM
- EXISTING PINE TREE
- TREE TO BE REMOVED
- PROPOSED PALM
- EXISTING LANDSCAPE PLANTING
- PROPOSED LANDSCAPE PLANTING
- TURF

SITE FEATURES AND AMENITY

- EXISTING BARBEQUE
- EXISTING SHADE SHELTER TO BE REPLACED BY ICONIC STRUCTURE WHEN SERVICABLE LIFE IS EXCEEDED
- PROPOSED PURPOSE DESIGNED ICONIC SHADE SHELTER OVER EXERCISE EQUIPMENT
- HALF BASKETBALL COURT
- KIDS BIKE CIRCUIT

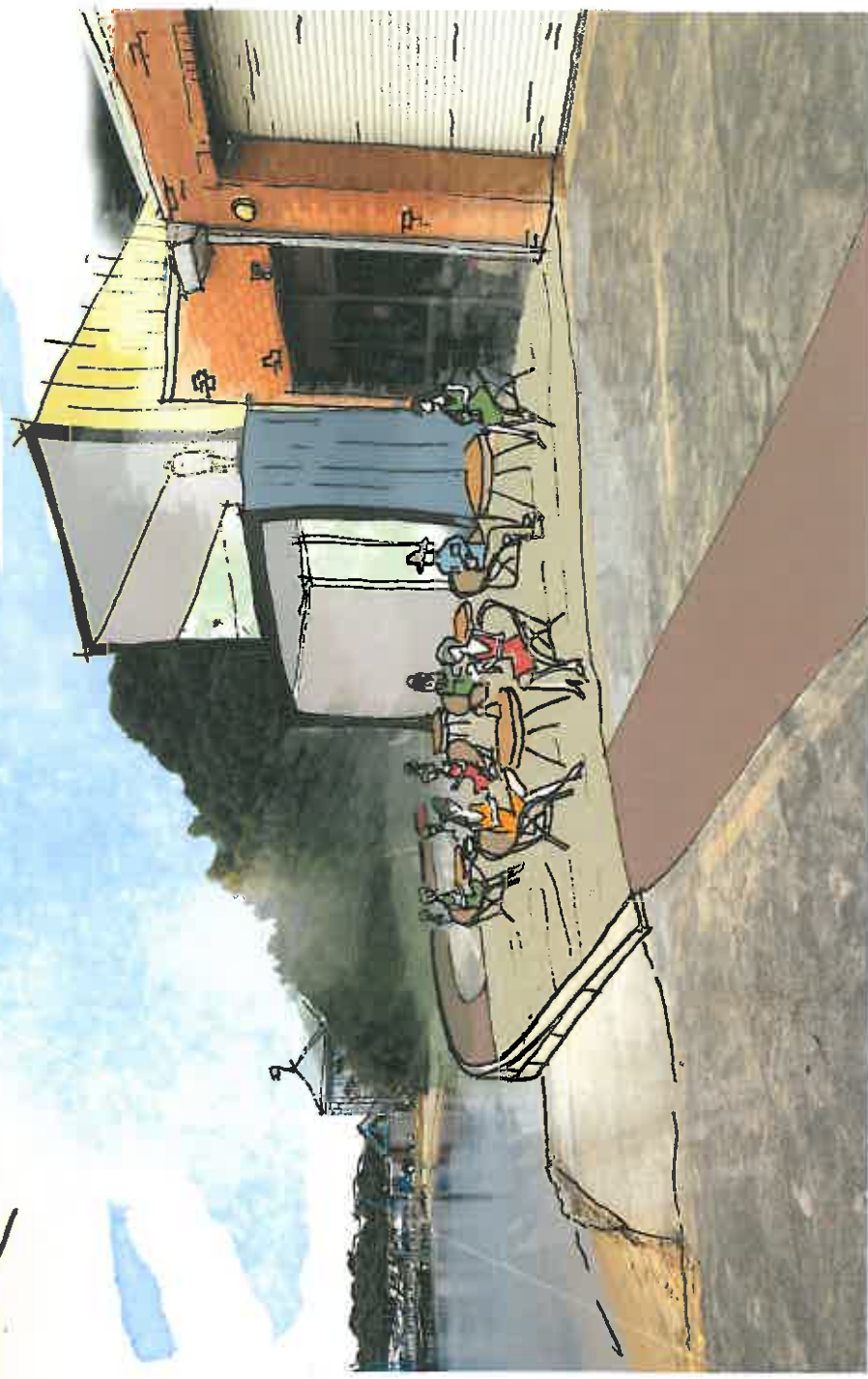


HERITAGE CROSSING ARTWORK RING





- 1 ZEPHYR
- 2 SWAN YACHT CLUB
- 3 PROPOSED CAFE AT NORM MCKENZIE RESERVE
- 4 EAT GREEK



POTENTIAL WATERFRONT ACTIVATION AT LOCATION 3 NORM MCKENZIE RESERVE



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