Shire of Busselton
Geographe Bay

EAST BUSSELTON
FORESHORE MANAGEMENT PLAN

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on behalf of the Shire of Busselton.

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1. INTRODUCTION

1.1 BACKGROUND

In October 2001, the Shire of Busselton completed the Geographe Bay Foreshore Management Plan[1] providing an integrated coastal management strategy for Geographe Bay and broad management direction for nine foreshore precincts within Geographe Bay, including what was referred to as the "Port Geographe" or East Busselton precinct.

Following a brief scoping study in 2006 involving landowners and residents in the East Busselton precinct to gauge community expectations and desires for the management of the area, the Shire commenced the process of preparing the detailed management plan for the area by preparing a project brief and engaging a consultant (Litoria Ecoservices) to prepare a draft management plan.

The planning process for the development of the East Busselton Foreshore Management Plan (EBFMP) involves:

1. Preparation of draft EBFMP by the consultant.
2. Draft EBFMP reviewed and approved for advertisement by Shire of Busselton.
3. Public advertising of the draft documents and formal community consultation process.
4. Final EBFMP prepared after consideration of submissions received.
5. Management Plan adopted by Council and implemented by Shire of Busselton.

1.2 PURPOSE AND SCOPE OF THE MANAGEMENT PLAN

Litoria Ecoservices prepared the plan over a fourteen-week period between March and June 2007, following consultation with local residents, community and agency stakeholders and relevant Shire staff. The EBFMP provides detailed site information and management strategies for the area to supplement the broad direction of the Geographe Bay Foreshore Management Plan. Development involved:

- assessment of the current physical and ecological state of the site including native vegetation, weed burden, erosion-prone areas, pedestrian and vehicular access and recreational usage;
- input from local residents and community and agency stakeholders; and
- development of detailed, prioritised management recommendations for improving and preserving the site values.

The purpose of this management plan is to identify management recommendations to maintain and improve the key qualities of the foreshore site, namely:

- recreation values;
- social values;
- conservation values; and
- erosion buffer function.

The objectives are to:

1. facilitate sustainable recreation;
2. maintain and enhance conservation values of the site; and
3. foster community ownership of and responsibility for the foreshore.

Limitations must be acknowledged in relation to the term and timing of the project (for example, outside of peak recreational season). The scope of the works did not include a detailed flora and fauna survey of the site nor did it include a detailed analysis of the Port Geographe rockwall, mouth opening or interactions which is largely under the control of other management plans and approvals (refer Section 1.4.1).

1.3 THE STUDY AREA

This management plan covers the Geographe Bay foreshore area between Ford Road and Freycinet Drive, East Busselton (Figure 1). It is approximately 3 kilometres in length and for the most part is bounded to the south and south east by Geographe Bay Road. It varies in width from approximately 40 to 120 metres.

1.4 LEGISLATIVE AND POLICY FRAMEWORK

A broad range of legislation, as well as local and state government policy and guidelines apply to foreshore areas and the following have been considered in the preparation of this plan:

- Geographe Bay Foreshore Management Plan (2001);
- The Coastal Planning and Management Manual (2003);
- Shire of Busselton Reserves and Foreshores Local Law;
- Busselton District Town Planning Scheme No. 20 (1999);
- Port Geographe - Coastal Management Works Program and Management Plan;
- Wildlife Conservation Act (1950); and
- Shire of Busselton Community Infrastructure Division Technical Standards and Specifications.

1.4.1 Geographe Bay Foreshore Management Plan

In 2001, the Shire of Busselton in conjunction with Geocatch had the Geographe Bay Foreshore Management Plan prepared. This overarching document covered the Geographe Bay Foreshore area from Dunsborough to Port Geographe and in addition to generic recommendations on foreshore management throughout Geographe Bay, the report provided a small number of recommendations for each foreshore 'precinct'.

Within the 'Geographe' precinct (Ford Road to Port Geographe) the following proposals were provided:

- **Proposal 81:** Beach access paths should be reviewed on the basis of one path per 100 metres, approximately. Surplus paths should be closed, brushed and possibly fenced. Fencing of entry and (encouraging) beach users to take the formal paths.
- **Proposal 82:** Bare sandy areas within the dune vegetation area should be brushed if the sand becomes mobile.
- **Proposal 83:** Parking areas at Morgan and Russell Streets should be formalised by providing edge barriers (pine log) and fencing of beach access paths.
- **Proposal 84:** Post and rail fencing should be erected to manage pedestrian access to adjacent reserves via formal pathways.

1.4.2 Port Geographe Sand Bypass

It is recognised that several elements of the Port Geographe development, including the management of the mouth opening and the annual program of sand bypass from the 'sand trap area' at the eastern end of the study area to Wonnerup beach, are issues of significant interest to the local community and of importance to the East Busselton foreshore area. These issues are covered in detail by a four year management plan (Port Geographe - Coastal Management Works Program and Management Plan) which is subject to annual review and revision by the Port Geographe Working Group and as such it is beyond the scope and terms of reference of this document to address these issues.

Following consultation, the EBFMP has been prepared based on the assumptions and understanding that:

- the sand bypass program is likely to continue into the future utilising the 'extended sand trap area' which extends west to Guerin Street;
- there will be an ongoing need for machinery to access the beachfront within the 'extended sand trap area' via the dedicated access provided at Freycinet Drive;
- there will no longer be a need for machinery to access the beachfront across the dunes immediately west of Guerin Street; and
- the landward extent of the 'sand trap area' will be clearly delineated to contractors at all times to ensure that dunal areas and vegetation are not disturbed by the bypass works extending beyond the designated area.

1.5 STAKEHOLDER CONSULTATION

The development of the EBFMP builds upon a community survey undertaken in 2005 and a scoping study undertaken by the Shire in 2006 which provided information on the issues of concern to local residents and the community's expectations and desires for the management of the area. Further consultation undertaken directly during the preparation of the plan included:

- 'one-on-one' conversations with key stakeholders or residents who, as part of the scoping study expressed an interest in further involvement;
- input from discussions with locals and visitors encountered during site work; and
- individual and group comments received during two consultation sessions held on Sunday April 15 at the end of Herring Street and Guerin Street, at 11am and 1:30pm respectively. People identified through the scoping study as interested in further involvement were notified by mail of the consultation sessions and a notice was placed in the "Council for Community" page of the Busselton - Dunsborough Mail.

Indigenous representatives were contacted for input and also representatives from the following organisations:

- Department of Planning and Infrastructure;
- Geocatch;
- Busselton Dunsborough Environment Centre;
- Port Geographe Working Group; and
- Busselton Beach Resort.

2. CURRENT STATE AND RECOMMENDATIONS: BIOPHYSICAL FEATURES

2.1 SITE DESCRIPTION, VESTING AND PURPOSE

The East Busselton foreshore encompasses approximately 24ha of dunal and near coastal vegetation bordered to the south/ south-east by Geographe Bay Road and predominantly residential housing. Geographe Bay lies to the north/ north-west, the site adjoins similar foreshore reserves to the west and Port Geographe is to the east.

A dual use cycle/ pedestrian pathway runs the length of the site. Six formal car parks exist within the site plus many informal parking areas on the edge of Geographe Bay Road.

The area covers a number of reserves and areas including:

- Reserves 24455 and 26354 currently under a Management Order with the Shire of Busselton, as C Class Reserves for the purpose of Public Recreation;
- Reserve 44314 currently vested with the Shire of Busselton as C Class Reserves for the purpose of Public Recreation; and
- Portion of the Geographe Bay Road Reserve north of the existing bitumen road extent.

It is recommended that the vested purpose of the three Reserves (24455, 26354 and 44314) be changed to "Public recreation and foreshore protection". The Foreshore Management Plan details what is meant by the purpose of 'Public recreation and foreshore protection'.

2.2 CLIMATE

Located in Western Australia's south-west, the area experiences a Mediterranean climate with hot dry summers and cool wet winters. Busselton has an average annual rainfall of 817 mm with 85% of this rain falling between May and October.

Geographe Bay generally experiences one tidal exchange per day with tidal movements averaging 0.5m. The passage of low pressure systems and associated northerly winds through the area in winter can generate storm surges with the ability to cause considerable erosion[1]. Typically the area experiences five or six erosive storms each year[1].

2.3 COASTAL PROCESSES

The Geographe Bay foreshore is a low energy but dynamic, sandy coastline in the lee of Cape Naturaliste with a relatively unique northerly aspect[1]. A longshore drift from west to east predominates along the Bay. The Geographe Bay coast experiences zones of accretion and erosion with an overall trend towards accretion since 1941[2]. Due to the normally low wave energy and subsequent restricted sediment supply, recovery from erosion events can be slow[3].

The seagrass meadows and sandbars just offshore are noted for their contribution to 'bottom resistance' and a resultant reduction in wave impact on the foreshore. In addition the dead seagrass or wrack that accumulates on the shoreline with the winter storms also serves to reduce the wave impact on the foreshore.

The East Busselton foreshore has previously been identified as stable or accreting and many local residents consulted during the preparation of the plan attest to the accumulation of sand through most of the area in recent years.

Coffee rock is evident in the swale area at points along the site and on the beachfront following storm events; this material is the remains of previous beach stabilisation works. Sand has now accreted over and in front of this material with subsequent changes to the

shoreline and foreshore. Other factors may have contributed to the foreshore condition. These may include the effects of cyclone Alby, the surplus of excavated material from the construction of the dual use pathway and improvement to the Geographe bay Road drainage and potential changes in tidal patterns.

2.4 TOPOGRAPHY

The study area is characterised by low coastal dunes generally less than 3m in height. It generally consists of a beach, intertidal zone and low incipient foredune, followed by a wide area (up to 70m) of undulating low dunes with shallow intervening swales, rising to a low foredune and swale.

2.5 GEOLOGY

The study area lies within the southern portion of the Swan Coastal Plain, characterised by low lying marine and fluvial sediments. The site is characterised by unconsolidated calcareous sands of Holocene origin.

2.6 SITE VEGETATION

2.6.1 Existing Vegetation

Vegetation is an important factor in coastal planning and management due to its role in buffering against coastal erosion, enhancing the appeal of the area and creating a 'sense of place', and providing habitat for fauna. Dune and foreshore vegetation is easily damaged by pedestrian and other traffic, and protection and careful management is therefore necessary where potential for damage to vegetation exists.[1] Figures 2A-D show vegetation aspects of the study area.

Site vegetation is relatively uniform and consistent across the length of the site with vegetation grading from an open or closed herbland where vegetation commences above the high water mark at the incipient foredune, through to open heathland at the back of the foredunes near Geographe Bay Road. The area generally has a sparse vegetative cover dominated by herbaceous weed and introduced species. Due to this dominance of introduced and weed species, the vegetation condition of most of the site would be considered 'degraded' according to Keighery's[4] condition rating scale provided in Appendix 1.

Appendix 2 shows species, both native and introduced or weed, found within the study area. The dominant species varies along the length of the site and includes Sea Rocket* (*Cakile maritima*), Rose Pelargonium* (*Pelargonium capitatum*), Sea Spurge* (*Euphorbia paralias*), Dune Onion Weed* (*Trachyandra divaricata*), Hairy Spinifex (*Spinifex hirsutus*), Marram Grass* (*Ammophila arenaria*), Sea Spinach* (*Tetragonia decumbens*), Dune Cabbage* (*Arctotheca populifolia*) and Thick-leaved Fan-flower (*Scaevola crassifolia*). (* indicates weed or introduced species).

Occasional specimens or isolated clumps of local native species occur, scattered throughout the area. In general, these are found along the landward edge of the study area or in the swale behind the incipient foredune. The species generally making up these areas include: Rigid Wattle (*Acacia cochlearis*), Shark's Tooth Wattle (*Acacia littorea*), Coastal Wattle (*Acacia cyclops*), WA Peppermint (*Agonis flexuosa*), Coastal Sword-sedge (*Lepidosperma gladiatum*), Knotted Club Rush (*Ficinia nodosa*), Berry Saltbush (*Rhagodia baccata* subsp. *baccata*), Rottnest Teatree (*Melaleuca lanceolata*) and Quondong (*Santalum acuminatum*).

The foreshore vegetation between Freycinet Drive and Groyne Road is somewhat distinct to the rest of the site and warrants specific attention. This area is dominated by mixed shrub and

tree species that have grown rapidly since being planted (in revegetation undertaken by the developers of the adjacent residential area) or introduced in mulch brought into the site following the revegetation plantings (refer to Appendix 2 for species list.) Where this vegetation has not been thinned or removed a closed scrub has formed.

While the majority of species within this area do occur locally, and there are areas with a species mix to be expected in foreshore areas of Geographe Bay, there are many species within the area that do not belong in the foreshore area (eg. various Eucalypt species, landscaping cultivars, eastern states' weed species (Horsetail She Oak) and various garden plantings. The Blueberry Tree or Boobiala (*Myoporum insulare*) is forming thick, dominant stands through much of this area.

It was widely communicated by residents during the scoping study and consultation phase that the Blueberry Tree is not local to the area. However, a search of the Western Australian Herbarium's online database 'Florabase'[5] records the plant as occurring from Shark Bay to Esperance including Geographe Bay and the Capes region. Nevertheless, it is noted that this species is currently dominating the site at the exclusion of the range of species that are generally common along similar areas of healthy foreshore vegetation.

2.6.2 Weed Burden

Introduced and weed species dominate the site vegetation and in some areas represent as much as 90% of the vegetation cover. However, it must be noted that many of the introduced species currently serve a valuable role in this environment, stabilising and colonising dunes. As a general rule, control of the weed species dominating the site vegetation is not considered a priority until such time when locally native vegetation has successfully established through the site. The clearing or control of small patches or spots to facilitate planting of native vegetation may be of benefit.

Several species do however represent a moderate to high priority for control or close monitoring, namely:

- Isolated clumps and individuals of Victorian Tea Tree (*Leptospermum laevigatum*) due to the relatively low current levels of this highly invasive weed;
- The isolated patches of the Agave species near the end of Morgan Street and Guerin Street, due to the difficulty of removing large masses of this plant and the potential Health and Safety risk posed by it;
- The control of the White Arctotis (*Arctotis stoechadifolia*) between Herring and Mann Streets and at Guerin St;
- Tamarisks (*Tamarix aphylla*) adjacent to Russell St; and
- Horsetail She Oak (*Casuarina equisetifolia*) in the plantings in front of Groyne Road.

Appendix 3 summarises relevant weed control methods.

2.6.3 Damage to Vegetation

While limited native vegetation exists on site, there is still evidence and numerous reports of damage to native vegetation occurring within the foreshore reserve. Some of this damage seems to have occurred with the approval of Shire Works officers and other appears to have occurred illegally without Shire permission.

Illegal damage to vegetation represents a significant threat to foreshore vegetation along the Geographe Bay foreshore particularly in the East Busselton precinct. Ensuring that the management of native vegetation within the study area occurs in accordance with the Shire's policies is critical in preserving the values of the area and should ensure that decisions surrounding the maintenance and management of vegetation occur in the interest of the area as a whole and with consideration of all foreshore users.

Any work involving damage to native vegetation within the foreshore area should only be undertaken by the Shire and local landholders should contact the Shire to ensure that legitimate issues requiring attention can be assessed and where necessary acted upon.

2.6.4 Revegetation

For revegetation planning, the study area is broken into two zones:

- Ford Road to Groyne Road; and
- Groyne Road to Freycinet Drive.

Ford Road to Groyne Road

There is significant need to establish much more native vegetation throughout this foreshore area in order to improve the amenity, habitat value and the stability of the dunes during future storm events. Ideally, revegetation would include the full range of locally native species that occur in similar areas of Geographe Bay, ie. including tall shrub and low tree species such as WA Peppermints and Rottnest Island TeaTree.

Through the scoping study and consultation phase of the study it was identified that many local residents were strongly opposed to the replanting of tall vegetation in the foreshore areas as it was felt that this would interrupt sightlines from properties on Geographe Bay Rd. As such revegetation between Ford Rd and Groyne Rd involves two distinct different elements involving:

1. widespread planting of native understorey species; and
2. cluster planting of tree species such as WA Peppermints at key nodes along the foreshore.

Understorey Planting

While the majority of the foreshore area would benefit from more native vegetation and would ideally be regenerated (naturally or assisted), Figures 2A-D identify the priority areas for understorey revegetation over the next few years. These areas generally represent the swale areas behind the foredune which is wetter, more protected and easier to establish vegetation in and also lower, reducing the potential for negative impacts on views from adjoining properties.

In many instances, the areas identified have bare ground available for planting into; in others minor weed control in spots or lines maybe required prior to planting. In most instances, widespread weed control is not considered appropriate until native species are well established.

Species to make up the core of these plantings would include*:

- Berry Saltbush (*Rhagodia baccata*)
- Rigid Wattle (*Acacia cochlearis*)
- Coastal Wattle (*Acacia cyclops*)
- Prickle Lily (*Acanthocarpus preissii*)
- Knotted Club Rush (*Ficinia nodosa*)
- Shark's Tooth Wattle (*Acacia littorea*)
- Coastal Sword Sedge (*Lepidosperma gladiatum*)
- Thick-leaved Fan-flower (*Scaevola crassifolia*)
- Coastal Daisybush (*Olearia axillaris*)
- Quandong (*Santalum acuminatum*)
- Cutleaf Hibbertia *(Hibbertia cuneiformis)*
- Southern Diplolaena *(Diplolaena dampieri)*

*Appendix 2 identifies a broad range of species appropriate for use in revegetation plantings.

It is recommended that adjoining residents be advised prior to planting occurring and that low-key signage accompany planting to identify the fact that the revegetation does not include tall/ overstorey species.

The consultation with Indigenous representatives highlighted a desire to see the existing small stands of Quandong supplemented by the proposed revegetation.

Cluster Plantings

Cluster plantings of WA Peppermints, Rottnest Island Tea Tree and Basket Bush are recommended for key nodes along the foreshore area including:

- adjacent to the end of the side streets meeting Geographe Bay Road (Ford Rd, Atkinson St, Wakeford St, Herring St, Mann St, Russell St, Morgan St and Guerin Rd);
- adjacent to other major beach access tracks (eg. Easements 1 and 2); and
- at approximately 100m intervals along the foreshore between Ford Rd and Groyne Rd.

It was determined that such cluster plantings of WA Peppermints would improve the amenity and habitat value of the area and should be undertaken in such a way as to minimise any potential negative impact on views of Geographe Bay from adjacent properties. It is recommended that these cluster plantings (of 3-4 WA Peppermints) be strategically located and maintained by the Shire to maximise the amenity and habitat value and minimise the impact on residents' views. It is recommended that adjoining residents on Geographe Bay Road and the side streets be consulted prior to planting to help identify exact planting locations. The approximate location of these planting nodes are shown on Figures 2A-D.

Groyne Road to Freycinet Drive

It is recommended to undertake a staged revegetation to improve the habitat and amenity value of the vegetation through this stretch of the study area. Essentially, this involves the gradual replacement of inappropriate and non-local species (eg. Blueberry Tree, East Coast Eucalypts, landscaping cultivars etc) with locally native species commonly found on the Geographe Bay Foreshore (predominantly WA Peppermints and a range of understorey species).

It is envisaged that this staged approach would be undertaken over a number of years and would involve the planting in existing gaps or in small gaps created by initial removal or control of inappropriate species, followed by subsequent stages of small-scale control of inappropriate species as planted species mature. This revegetation would need to address the Kikuyu invading the eastern portion of this area and involve consultation of adjoining landholders.

It should be noted that given the established nature of the vegetation already existing through this area that the revegetation of this section is considered a lower priority than the revegetation components between Ford Road and Groyne Road.

Species to make up the core of these plantings would include*:

- WA Peppermint (*Agonis flexuosa*)
- Basket Bush (*Spyridium globulosum*)
- Coastal Daisybush (*Olearia axillaris*)
- Rigid Wattle (*Acacia cochlearis*)
- Coastal Wattle (*Acacia cyclops*)
- Shark's Tooth Wattle (*Acacia littorea*)
- Berry Saltbush (*Rhagodia baccata*)
- Prickle Lily (*Acanthocarpus preissii*)
- Coastal Sword Sedge (*Lepidosperma gladiatum*)
- Knotted Club Rush (*Ficinia nodosa*)
- Thick-leaved Fan-flower (*Scaevola crassifolia*)
- Quandong (*Santalum acuminatum*)

* Appendix 2 identifies a broad range of species appropriate for use in revegetation plantings.

2.7 NATIVE FAUNA AND FERAL ANIMALS

It was beyond the scope of this project to conduct a detailed assessment of the fauna inhabiting the site. However, the degraded nature of the site vegetation indicates that the site is presently unlikely to contain the listed species (Western Ringtail Possum and Quenda or Southern Brown Bandicoot), and no sightings of these species were recorded during the site assessment or were reported by locals during the consultation. However these species do

inhabit other areas of Geographe Bay foreshore and it is possible that these species utilise the site to some extent periodically travelling from better habitat to the west and south.

It has previously been identified that the Shire Foreshore Reserves represent some of the last opportunities to establish or maintain east-west faunal corridors along the Shire and given the recognition of the Western Ringtail Possum under the Commonwealth's Environment Protection and Biodiversity Conservation Act and the Western Australian Wildlife Conservation Act as Vulnerable (to extinction) there is good justification for enhancing the habitat value of the site for this species.

Addressing the weed burden of the site coupled with the recommendations regarding revegetation will improve the habitat value of the site for a range of native species.

Rabbits were identified by residents as being present in significant numbers at the eastern end of the study area sheltering amongst the rocks of the western rockwall of Port Geographe. Although they do not currently appear to be significantly impacting on native vegetation in the area, revegetation through this area will need to consider the impact of the rabbit population and utilise tree bags and stakes. The heavy use of the area by young children and domestic animals and the nature of the rabbit harbourage area rule out traditional control methods such as 1080 baiting, Pindone baiting, fumigation, or harbourage destruction.

Given the minimal current impact on the foreshore itself and the inability to undertake traditional baiting, monitoring of the current population and its impact is recommended. Should the population become a significant management issue in the future, potential control options include:

- The introduction of a myxomatosis infected rabbit into the colony;
- Baiting with RCD (Calicivirus); and
- Capture and injection with RCD (Calicivirus) of rabbits and re-release.

It should be noted that these methods really need to be considered within the broader context of the rabbit problem within the local area and should be planned with a much broader area in mind than just this site.

Foxes are identified to be present in many adjoining foreshore areas of Geographe Bay and may utilise the site. However, given that no signs were recorded during the site assessment and long-term residents and tourism operators did not report fox sightings, they are not considered likely to represent a significant issue. Residents should be encouraged to report fox sightings in the area in order to ascertain if management is warranted in the future. It is noted that feral and/or wandering domestic cats may also utilise the site. A broader education campaign may assist in reducing the potential negative impacts of domestic pets on native fauna.

2. 8 FIRE MANAGEMENT

The Geographe Bay Foreshore Management Plan[1] identifies fire as a low risk throughout the East Busselton foreshore that can be managed through standard fire protection procedures. It is identified that standard Shire policy and practice does not support prescribed burns in foreshore areas and this appears to be appropriate management practice for the East Busselton stretch of foreshore. Consultation feedback supported an exclusion of prescribed burning in the area due to the length of time taken for vegetation to recover and the associated weed infestation.

2.9 EROSION

It was beyond the scope of this report to investigate long-term erosion risks or threats, or to address the need for major coastal works in relation to sand capture. Serious erosion was not

observed through the area during the site assessment and it is understood that given the accreting nature of this stretch of the Bay, erosion is not currently a major issue of concern.

It is noted, however, that the recent pattern of accretion does not guarantee that it will continue to do so; zones of accretion and erosion can move laterally along the Geographe Bay foreshore in the long-term due to the gradual longshore movement of 'slugs' of sand from west to east.[1,5] The potential for significant sea level rise in the coming decades has the potential to seriously impact on the existing shoreline. Furthermore, seagrass decline in Geographe Bay is of significant concern as "this leads to coastal accretion that will continue until the sediment supply is exhausted, at which point coastal erosion rates will become very high"[1].

The Department of Planning and Infrastructure (DPI) and the Shire of Busselton is currently undertaking a significant study into the issue of erosion, in the form of the 'Shoreline Scoping Study Geographe Bay (Busselton)'. It is understood that this study will guide further research and works required for management of coastal erosion processes[6]. It is considered important that upon release of the scoping study, the findings and recommendations be considered and where appropriate, implemented.

Vegetation is identified as essential to the long term stability of the coastline and implementation of the revegetation recommendations detailed in Section 2.6.2 will aid in the long term stabilisation of the foreshore area.

3. CURRENT STATE AND RECOMMENDATIONS: HUMAN USE ATTRIBUTES

3.1 INDIGENOUS HERITAGE

The Geographe Bay foreshore area has been used extensively by Nyungar people with their occupation of the area dating back at least 47,000 years[1]. As such, protection and enhancement of Indigenous values associated with the foreshore area is considered critical.

As part of the preparation of the plan, a search of the Department of Indigenous Affairs Register of Aboriginal Sites was conducted. This highlighted many Aboriginal Heritage Sites in the Shire of Busselton, and although no existing registered sites were located in the East Busselton foreshore study area it is acknowledged that many significant sites are not yet formally registered and found on the system. It was beyond the scope of this report to undertake a detailed survey.

Representatives of the two Native Title claimants over the Geographe Bay coastline (the South West Boojarah and Harris Family) were consulted individually, in-person, as part of the preparation of this plan.

While no major earthworks are proposed for the study area, if any significant earthworks are to be undertaken as part of future management, Indigenous representatives should be informed (as per the State and Commonwealth Heritage Acts and the Native Title Act 1993).

Potential exists for raising awareness of the Indigenous use of the foreshore areas of Geographe Bay (strictly with permission of local elders) in interpretive signage for the site.

3.2 RECREATIONAL USE

The study area encompasses reserves that are to be managed for the primary purpose of recreation, with the area readily and frequently accessed by local residents and visitors.

The study area is utilised for:

- Walking, cycling and exercising
- The Busselton Iron Man and Half Iron Man
- Promenading
- Fishing
- Boating
- Dog exercise
- Swimming, snorkelling and other water pursuits, including kitesurfing
- Beach activities

These uses are well catered for.

Although summertime is the peak period for recreational use, locals and smaller numbers of visitors recreate in the area year-round.

Each year the Busselton Half Iron Man and the Busselton Iron Man, in May and December respectively, represent peak days of usage with the run leg utilising the dual use path and the bike leg utilising Geographe Bay Road through the study area. The Guerin Road carpark is a key turn around point for the half ironman run leg and aid stations are situated along the study area for both the run and cycle legs.

The event attracts large numbers of competitors, spectators and volunteers and while the study area doesn't need to accommodate the large numbers of spectators associated with the start or finish of the event, these are still the highest use days of the year. Residents reported trampling of dune vegetation as occurring in the past where large numbers of spectators congregate. It is identified that sensitive areas of vegetation and areas undergoing revegetation should be temporarily fenced for these events to minimise the potential for disturbance.

3.3 FACILITIES AND INFRASTRUCTURE

3.3.1 Pedestrian and Bicycle Access

Pedestrian and bicycle access is facilitated by the dual use pathway (DUP) which runs the entire east–west length of the study area. This path accommodates access by people with disabilities and using mobility aids. It is popular with locals for exercising, socialising and commuting and with visitors for appreciating Geographe Bay. It is also identified as a key component of the ironman and half ironman events.

The DUP is a bitumen surface and in general is in good order and requires little maintenance. The multi-use nature and popularity of the DUP suggests directional and regulatory signage would be advantageous. It is identified that at some stage in the future in order to safely accommodate the volume and nature of traffic utilising the DUP, widening to 3m may become necessary. However, this should only be considered following an assessment of the entire DUP and it is beyond the scope of this report to comment on this aspect. It is recommended, however, that should widening of the DUP occur, wherever possible this should occur to the roadside of the existing path.

Figures 3A-D show the major beach access paths, including:

End of Ford Rd: Sandy track from bitumen carpark. Fenced on eastern side of the track only.
End of Atkinson Rd: Unfenced sandy track with a bitumen crossover adjacent to the DUP. Good seat in place near DUP.
End of Wakeford Rd: Unfenced sandy track with gravel and bitumen crossover. Good seat in place near DUP.
End of Herring: Sandy track with degraded fencing in need of repair or replacement.
End of Mann: Sandy track in need of an improved crossover. Good seat in place near DUP.
End of Russell St and Russell St carpark: Sandy tracks in need of an improved crossover from carpark area. Good seats in place near DUP.
‘Easement 1’: from Marine Tce to Geographe Bay Rd between Russell and Morgan St. Sandy track with good concrete crossover.
End of Morgan St: Sandy track with shower and good timber seating. Currently only a sandy crossover from the carpark to the DUP which could be improved/ formalised.
End of Guerin St: Sandy track with good bitumen crossovers.
Busselton Beach Resort 1: Sandy track.
Busselton Beach Resort 2: Sandy track.
‘Easement 2’: from Marine Tce to Geographe Bay Rd between Guerin Rd and Groyne Rd.
Groyne Rd: Sandy track with good crossovers and seating.
Riedle Rd: Concrete path.
End of Leseur Rd: Concrete path.
End of Freycinet: Concrete path.

Multiple informal or minor beach access points are evident throughout the site. The areas between Russell and Mann Streets, and Morgan Street and Easement 1 have a particularly higher density of informal beach access tracks. Through these areas the frequency of informal beach access tracks is often much greater than the one path per 100 metres recommended in the Geographe Bay Foreshore Management Plan. However, it is noted that in the main, these access tracks are only used by a few adjoining residents and as such receive relatively minimal traffic and are not causing significant damage or degradation to the foreshore area. The relatively low usage coupled with the accreting shoreline has meant that erosion as a result of these access tracks is not currently a significant issue.

Rather than closing tracks that aren't causing problems it is recommended to:

1. Identify major beach access tracks where increased services are provided and encourage usage of these: install/ repair (see below) low pine fencing at the entrances of each major beach access track;
2. Closely monitor the state and impact of the existing minor beach access tracks and where necessary close with brushing and replanting or if this is unsuccessful, fencing; and
3. Close any new tracks that arise via brushing and replanting.

Existing Fencing

Ford Road to Guerin Street: majority of this western end of the site currently lacks fencing other than low pine fencing at the start of the beach access tracks at Ford Rd and Herring St. It is recommended that the fencing at these tracks be repaired and maintained and similar 'funnel' fencing be installed at the entrances of the pathways at Atkinson St, Wakeford St, Mann St, Russell St, Russell St carpark, 'Easement 1', Morgan St and Guerin St to identify these as major beach accessways.

Guerin Street to Groyne Road: low pine fencing exists at beach access tracks and along the length of the DUP. This is generally in good condition and should be maintained.

Groyne Road to Freycinet Drive: pine and 'chain mesh' fencing along the DUP and beach access tracks. A small number of sections require minor repair; otherwise general maintenance is recommended.

Additional bollards or markers are recommended in front of Busselton Beach Resort to delineate the limit of mowing and landscaping maintenance. This line should be located significantly landward of the swale to facilitate and protect revegetation efforts through this stretch.

Crossovers

Between Ford Road and Guerin Street, the provision of 'crossovers' from Geographe Bay Road onto the DUP is an important issue. In many instances, even adjacent to the major beach access tracks, a steep loose bank or a sandy path must be traversed to reach the DUP. This is considered a significant obstacle to elderly and disabled users and a potential safety issue. It is recommended that where appropriate provision is not in place at major beach access tracks that appropriate bitumen 'crossovers' be installed.

Bicycles

Given the high usage of the area by cyclists and a current lack of bike racks along the stretch it is recommended that the Shire consider the provision of bike racks at key locations eg. Ford Road, Guerin Street, Freycinet Drive.

3.3.2 Vehicle Access and Parking

Six formal car parking areas are provided at regular intervals along the length of the study area:

- Ford Road: this area represents a bitumen car parking space for approximately 5-6 cars. This area is considered sufficient given the large provision of formal and informal parking spaces immediately to the west of Ford Road.
- Russell Street: the Russell St carpark provides parking for about 8-9 cars but is currently loose gravel in nature and there exists some merit in formalising this to bitumen.
- Morgan Street: the limestone/gravel carpark at Morgan St provides about 6-7 parking spaces and is in reasonable condition. There exists some merit in formalising this to bitumen.
- Guerin Road: Guerin Rd provides good bitumen parking space for about 6-7 cars.
- Groyne Road: Groyne Rd provides bitumen parking for 10 cars.
- Freycinet Drive: a major parking area immediately south of the foreshore area accommodating about 45 cars.

Informal parking is also possible along most of Geographe Bay Road and at some other street ends eg. Riedle Close and Leseur Close. There does not appear to be a significant need for additional formal car parking and no new car parks are recommended along the area.

Provision for authorised vehicle access within the eastern portion of the study area is necessary to facilitate the Port Geographe bypass operations.

It was noted that vehicles have continued to access the beach over the dune area immediately west of Guerin Rd. This is the area previously utilised for beach access by contractors working on the Port Geographe sand bypassing project. It is understood that with changes in the nature of operations, this access is no longer needed for the bypass operations. As such, it is recommended that this access point be revegetated and if necessary fenced to prevent unauthorised vehicle access.

3.3.3 Facilities

One public amenities block is located at the end of Freycinet Drive at the very eastern end of the study area. An additional public amenities block is located approximately 200m west of the study area at the Georgette Street boatramp. It was raised in the community consultation that there was a large distance between public toilets and that there was a need for an additional toilet within the 3.5 km length between Freycinet Drive and the Georgette Street boatramp toilets.

If an additional toilet/ public amenities block was to be situated within the study area then adjacent to the existing Russell Street carpark would be a logical location for it given the wide area between Geographe Road and the DUP at this location, the presence of an existing carpark and its location as approximately halfway between existing facilities. However, given the cleared and flat nature of the foreshore at this point a toilet block would significantly impact on the visual amenity of the area and is likely to be strongly opposed by adjoining residents. As such it is not recommended at this point in time. The provision of extra toilet facilities in the general locality, however, may need to be considered at some time in the future.

Seating is provided at most street ends/ major access ways. It is currently lacking from the following major access tracks and installation is recommended at:

- Herring Street
- Guerin Street
- Easement 1.

These locations would represent priorities for providing new seating within the study area in order to encourage and support the use of the foreshore and is consistent with the focus of infrastructure at street ends.

Given the lack of overstorey vegetation at the site, shade is lacking and reduces the amenity of these areas particularly in summer. Clustered plantings of WA Peppermints are proposed at 100m intervals along the foreshore in order to provide shade and amenity to the area and specifically the entrance to the major beach access tracks (refer Section 2.6.4). Shade structures on the beach are considered inappropriate due to the potential for damage during storm events.

Beach showers are provided at Ford Road, Morgan Street and Freycinet Drive. It is recommended that water conservation be promoted and water saving devices be utilised at these locations.

3.3.4 Rubbish and Dog Waste

During the assessment of the area, a moderate amount of litter was observed adjacent to the DUP through parts of the site particularly in the area between Guerin Street and Ford Road. Some of this litter was obviously quite old and it does not appear to be the case that large amounts of rubbish are being dropped through the study area. Nevertheless, a clean up is recommended either as part of 'Clean Up Australia' day in March each year, or to coincide with the Capes Beach Clean Up held in October annually, or as part of an initial 'Friends of' group activity.

Rubbish bins are currently provided and maintained by the Shire of Busselton's Parks and Gardens staff, at Ford Road, Atkinson Road, Herring Street, Russell Street, Morgan Street, Groyne Road and Freycinet Drive. It is recommended that these existing bins be supplemented with new bins located at the Wakeford Street, Mann Street, Easement 1 and Guerin Street access points.

Dog waste bags are located intermittently along the site and correspond well with the designated dog exercise areas at Ford Road and the eastern portion of the site. Used bags can be disposed of in rubbish bins which are located in the vicinity. Locals reported that the bag dispensers needed some improvement as they were frequently dislodged and left lying on the ground and high winds sometimes resulted in bags blowing around and becoming a litter issue.

The dumping of green waste was evident at a number of sites throughout the study area. This has the potential to further degrade the reserve, introduce new weed species into the area and impact on the visual amenity of the area. In some instances it is believed that residents may consider they are doing the right thing by 'lining' access paths with grass clippings. The message needs to be reinforced to the community that the dumping of green waste in bushland and foreshore reserves is inappropriate due to the potential introduction of nutrients and weeds, and is illegal. In order to try to avoid the need for additional signage in the foreshore area it is recommended that the Shire advise (by letter) households adjacent to the hotspots, of the importance of this.

3.3.5 Signage and Lighting

Currently signs are scattered throughout the study area, ranging from regulations and prohibited activities to liability advices. Several of the signs are old, faded or fallen over and as such are ineffective, an eyesore and hazardous eg. Guerin Street car park. It is recommended to remove and where necessary replace these.

Social, recreational and conservation values of the study area can be promoted and improved via interpretive signage. It is recommended that a short series of interpretive signs be developed, covering flora and fauna facts, Indigenous cultural facts, marine coastal processes and ways of minimising human impacts on the foreshore. This could fit within an overarching signage plan, should one be developed, for the whole Geographe foreshore area/ DUP.

At present, lighting along the DUP within the study area is very limited. In view of the high use of the DUP on summer evenings some local residents suggested lighting the DUP. Any consideration of lighting needs to consider the entire length of the DUP and not just this precinct. Lighting of the DUP would be problematic, with significant cost and maintenance issues, lightpole location issues in relation to the dynamic foreshore system, liability and safety issues and impact on nocturnal species all needing to be carefully considered. It is not currently considered necessary to install lighting along the DUP within the study area.

4.0 MANAGEMENT ACTIONS

4.1 INTRODUCTION

Management actions have been developed based on the stated objectives, site assessment, literature reviews and stakeholder consultation, and then grouped according to the four key qualities of the foreshore: recreational, social, conservation and erosion values/ functions. They have been identified as high, medium or low priority and many of the recommendations meet more than one of the three stated objectives. Guiding principles provide the overarching framework and rationale behind the selection and prioritisation of the specific management actions.

4.2 GUIDING PRINCIPLES

4.2.1 Recreation

- Recognise 'recreation' as a designated purpose and a priority value of the study area. As per the Geographe Bay Foreshore Management Plan, 'recreational activities should be given a high priority as a beach use along the Geographe Bay Foreshore'[1].
- Residential development in the locality means the usage of the study area will increase over time and management must address the associated pressures.
- Existing informal tracks and beach access paths to be closed only where there are clear signs of damage or degradation.
- There are sufficient beach access tracks in place, negating the need to create any new paths.
- Public vehicle access (outside of designated car parks) is not considered appropriate in the study area.
- Signs and maps should be utilised at strategic points to direct movement through the foreshore and to enhance the recreational experience. They should enhance the landscape rather than detract from it.
- Safe access should be facilitated along and to the DUP, including for disabled users.

4.2.2 Social/ Community

- Recognise the importance of local ownership of the area, and the associated sense of place and pride, which contribute to a stronger sense of community and a sense of responsibility for the area.
- Recognise the concern for, and interest in, the area expressed by local residents and provide ongoing opportunities for involvement in foreshore management.
- Recognise the long-term significance of the Geographe Bay Foreshore to the Nyungar people.
- Recognise the opportunity and value for people to recreate in and experience the natural coastal environment.
- Recognise the constraints on financial and other resources available to the Shire of Busselton to manage the foreshore, and encourage collaborative actions and community involvement.

4.2.3 Conservation

<u>Weed Management</u>

- Weed management should start in areas of good condition and work outwards towards heavily infested/ degraded areas.
- Site and soil disturbance should be minimised as it promotes further weed growth.

- The rate of native plant regeneration should determine the rate of weed removal.
- Weed management should focus primarily on priority weeds not yet extensively established within the site and with the greatest potential to degrade the site.
- Recognise that preventing weeds entering the site is one of the most effective and efficient methods of weed control.
- Recognise that weed species can have positive benefits on the site (eg foredune stabilisation).

Revegetation

- Natural regeneration is favoured over revegetation. However, most parts of the site are sufficiently degraded to suggest that revegetation is needed in order to re-establish native vegetation.
- Revegetation should only utilise locally native species and stock of local provenance. Species appropriate for revegetating the relevant zones are identified in Appendix 2. It is noted that the Geographe Community Landcare Nursery can supply native species of local provenance if pre-arranged and ordered.
- Revegetation will generally require the use of plant protection devices (ie tree bags), due to the likelihood of rabbits on-site and the harsh coastal environment of the foreshore.
- Planting should be scheduled to coincide with winter rainfall (ie May – September) in order to increase survival rates and minimise on-going maintenance.
- Planting activities should be co-ordinated and guided by someone with appropriate bush regeneration skills in order to select appropriate placement and density for each species at each site.

Fauna

- The area has potential to provide significant habitat for a range of fauna species including the Western Ringtail Possum and Quenda if revegetated using a suite of local native trees, shrubs and understorey plants.
- Recognise the potential of feral fauna, namely foxes and rabbits, to impact on the conservation and recreation values of the site.

Fire

- In accordance with general Shire practice within foreshore areas, prescribed burning is not recommended within the Broadwater precinct.
- Open fires are inappropriate for the site and are prohibited under Shire by-laws.

4.2.3 Coastal Erosion

- While erosion is not an immediate concern for the area it is considered appropriate to vegetate and stabilise dunes as protection against large storm events and changing coastal conditions including predicted sea level rise.

4.3 RECOMMENDED ACTIONS

	#	MANAGEMENT ACTIONS	Priority
GENERAL	G1	Change the purpose of Reserves 24455, 26354 and 44314 to "Public recreation and foreshore protection".	M
	G2	Any Shire works on the foreshore, involving earthwork (roadwork, drainage, parking, pathway) shall be appropriately graded, stabilised and replanted as soon as possible after construction.	M
	G3	Delineate the extent to which the sand by-passing work can occur.	M
CONSERVATION	C1	Promote the "Green Verge" program to landholders adjacent to the foreshore between Groyne Road and Busselton Beach Resort.	L
	C2	Eradicate isolated Victorian TeaTree patches/ individuals: • adjoining Atkinson Street; • adjoining and immediately north of Wakeford Street; • midway between Russell Street and Morgan Street; and • immediately east of the Busselton Beach Resort. (Refer to Appendix 3)	H
	C3	Remove Agave, Bryophyllum spp. and succulents immediately west of Morgan Street and near Guerin Street.	H
	C4	Closely monitor spread of Athel Pines/Tamarisk throughout the site from existing trees near Russell Street. as identified on Figure 2B. If these start to spread, control new infestations and remove existing trees.	H
	C5	Eradicate the *Casuarina equisetifolia* at Groyne Road and replace with WA Peppermints.	M
	C6	Control the White Arctotis between Herring and Mann Streets and at Guerin Street. Replace with local ground cover species such as Berry Saltbush, Thick Leaved Fan Flower, Prickle Lily, Coastal Sword Sedge and Knotted Club Rush.	M
	C9	Promote the Foreshore Vegetation Protection Policy as a deterrent for further illegal vegetation damage in the area.	H
	C10	Promote the appropriate procedure for applying for vegetation removal for legitimate reasons.	M
	C11	Undertake understorey revegetation of areas identified on Figures 2A-D (Refer to Section 2.6.4).	H
	C12	Undertake staged revegetation of the Groyne Road to Freycinet Drive area (Refer to Section 2.6.4).	M
	C13	Undertake cluster plantings as identified and detailed in Section 2.6.4.	H
	C14	Consider installing bollards/ fencing to delineate mowing and landscaping boundaries in front of the Busselton Beach Resort.	L
	C15	Monitor rabbit numbers throughout the site, particularly at the eastern end of the area and the impact upon revegetation efforts. Undertake appropriate control as required (Refer to Section 2.7).	M
	C16	Encourage residents to report fox and feral cat sightings and implement management program as necessary.	M

	#	MANAGEMENT ACTIONS continued	Priority
RECREATION	R1	Ensure that all areas of significant vegetation and areas undergoing revegetation are temporarily fenced off during the Full and Half Ironman events to avoid trampling.	H
	R2	Identify and delineate all major beach access tracks with the installation of post and rail fencing in a funnel formation at the entrance of each major beach access track between Ford Road and Guerin Street.	H
	R3	Monitor the impact and usage of the informal beach access tracks through the area. Consider brushing, revegetation and fencing where erosion, vegetation disturbance or blow outs become an issue.	H
	R4	Monitor the development of any new informal beach access tracks through the area, and discourage use/ close.	M
	R5	Repair accessway fencing between Freycinet Dr and Groyne Rd as required.	M
	R6	Construct and/or formalise with bitumen, pedestrian crossovers from Geographe Bay Road or adjacent carparks onto the DUP at: Ford Rd and Wakeford, Herring, Mann, Russell and Morgan Streets.	H
	R7	Revegetate and, if necessary, fence or bollard off access to vehicles west of Guerin Road.	M
	R8	Formalise carpark surfaces at Russell Street and Morgan Street.	M
	R9	Consider installation of bike racks at Ford Road, Guerin Street and Freycinet Drive.	M
	R10	Install Waterwise shower devices and signage or logos at showers at Ford Road, Morgan Street and Freycinet Drive.	L
	R11	Install seating at the following major access tracks: Herring Street, Guerin Street and Easement 1.	M
	R12	Provide additional rubbish bins at the Wakeford St, Mann St, Guerin St and Easement 1 access paths.	M
	R13	Undertake initial cleanup of identified litter hotspots so as to maintain the amenity.	M
	R14	Remove and where appropriate, replace old rusted signs eg. Guerin St carpark.	M
	R15	Consider a signage plan for the entire DUP to encompass directional and regulatory messages.	L
	R16	Investigate alternative dog bag dispensers that address the plastic bag litter issue and that attach effectively to existing signage and fencing.	L
EROSION	E1	Consider the findings of the Shoreline Scoping Study Geographe Bay (Busselton) when it is released and adopt relevant recommendations.	M
SOCIAL	S1	Advertise and support the establishment of a 'Friends of East Busselton Foreshore' group to participate in ongoing management of the precinct.	H
	S2	Develop a series of coastal interpretive signs to be placed along the DUP in the East Busselton Foreshore. Design to complement directional and regulatory signage as per R15 and/or as part of an overarching DUP signage plan.	M

Priorities: L = low, M= medium, H = high

REFERENCES

1. CoastWise (2001). *Geographe Bay Foreshore Management Plan: Technical Report.* Prepared for the Shire of Busselton and the Geographe Catchment Council.

2. Samson, GC. (1982). *Proposals for Coastal Management at East Busselton.*

3. Extract from *Busselton Foreshore – Erosion Management of Residential Development* report provided by Shire of Busselton.

4. Keighery, BJ. (1994). *Bushland Plant Survey: A guide to plant community survey for the community*. Wildflower Society of Western Australia (Inc.), Nedlands.

5. Personal Communication with I. Elliot, Coastal Scientist, University of Western Australia, November 2006.

6. 'Florabase'(viewed May 2007): http://florabase.calm.wa.gov.au/

7. Personal communication with L. Dubczuk, Coastal Engineer, Department of Planning and Infrastructure, June 2007.

8. Brown, K. and Brooks, K. (2002). *Bushland Weeds: A practical guide to their management*. Environmental Weeds Action Network (Inc.), Greenwood.

APPENDIX 1: VEGETATION CONDITION SCALE

CONDITION	DESCRIPTION
Pristine	Pristine or nearly so, no obvious signs of disturbance
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non aggressive
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas re often described as 'parkland cleared' with the flora composing weed or crop species with isolated native trees or shrubs.

Source: Keighery (1994)[4]

APPENDIX 2: SPECIES LIST

Species	Common Name	Ford Road – Groyne Road	Groyne Road – Freycinet Drive
Acacia cochlearis	Rigid Wattle	C*	I*
Acacia cyclops	Coastal Wattle	I*	I*
Acacia littorea	Shark's Tooth Wattle	I*	R*
Acanthocarpus preissii	Prickle Lilly	I*	C*
Agonis flexuosa	Peppermint	I[C]	C*
Atriplex isatidea	Coast Saltbush	R*	I*
Carpobrotus virescens	Coastal Pigface	R*	I
Ficinia nodosa (formerly Isolepis)	Knotted Club Rush	C*	I*
Hakea prostrata			I
Hardenbergia comptoniana	Native Wisteria	R*	I
Lepidosperma gladiatum	Coastal Sword-sedge	I*	C*
Leucopogon parviflorus	Coastal Beardheath	R	I
Melaleuca lanceolata	Rottnest Teatree	I[C]	I*
Meleleuca huegelii	Chenille Honeymyrtle		I
Myoporum insulare	Blueberry Tree		C
Olearia axillaris	Coastal Daisybush	R*	I*
Rhagodia baccata subsp. Baccata	Berry Saltbush	I*	C*
Santalum acuminatum	Quandong	I*	*
Scaevola crassifolia	Thick-leaved Fan-flower	I*	I*
Spinifex hirsutus	Hairy Spinifex	C	C
Spinifex longifolius	Beach Spinifex		C
Sporobolus virginicus	Marine Couch	I	I
Spyridium globulosum	Basket Bush	I[C]	I*
Templetonia recurva	Cockie's Tongue	R	R

D - Dominant C - Common I - Isolated patches R - Rare

*** Recommended revegetation species for this zone.**

[C] Possible cluster planting species.

Notes:

1. A number of landscape or garden species have been planted within the study area (particularly between Groyne Rd and Freycinet Dr) and these species have not been included within this list.

2. This list is not intended to be comprehensive but rather indicative and useful for planning and implementing revegetation and weed control efforts.

APPENDIX 2 continued: SPECIES LIST

Species	Common Name	Ford Road – Groyne Road	Groyne Road – Freycinet Drive
INTRODUCED/WEED SPECIES			
Agave spp	Agave	I	
Ammophila arenaria	Marram Grass	C	I
Arctotheca calendula	Capeweed	I	I
Arctotheca populifolia	Dune Cabbage	I	
Arctotis stoechadifolia	White Arctotis	I	
Avena barbata	Bearded Oat	C	C
Bryophyllum spp		I	
Cakile maritima	Sea Rocket	C	C
Casuarina equisetifolia	Horsetail She Oak		R
Cynodon dactylon	Couch	I	I
Euphorbia paralias	Sea Spurge	D	I
Gazania linearis	Gazania	C	
Lagurus ovatus	Hare's Tail Grass	I	
Leptospermum laevigatum	Victorian Teatree	R	
Limonium spp.	Sea Lavender	R	
Malva linnaei	Cretan Mallow	I	I
Pelargonium capitatum	Rose Pelargonium	D	C
Pennisetum clandestinum	Kikuyu		I
Stenatophrum secundatum	Buffalo Grass	I	
Tamarix aphylla	Athel Pine/ Tamarisk	R	
Tetragonia decumbens	Sea Spinach	C	I
Trachyandra divaricata	Dune Onion Weed	C	I
Yucca spp	Yucca	R	
Zantedeschia aethiopica	Arum Lily		R

D - Dominant C - Common I - Isolated patches R - Rare

*** Recommended revegetation species for this zone.**

[C] Possible cluster planting species.

Notes:

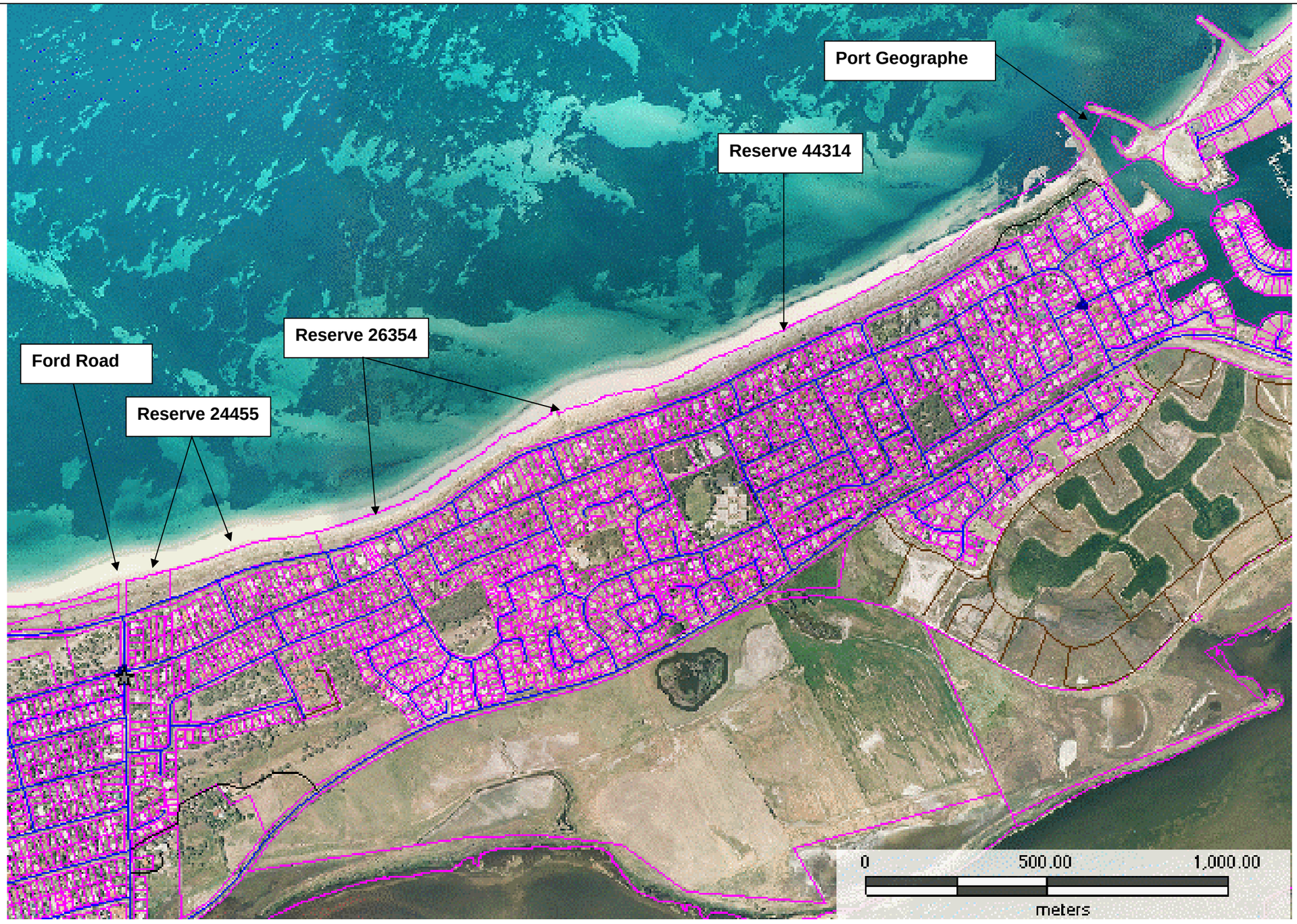
1. A number of landscape or garden species have been planted within the study area (particularly between Groyne Rd and Freycinet Dr) and these species have not been included within this list.

2. This list is not intended to be comprehensive but rather indicative and useful for planning and implementing revegetation and weed control efforts.

APPENDIX 3: METHODS OF WEED CONTROL

Species	Nature of Infestation	Some suggested methods of management and control*
Agave *Agave spp*	Isolated	Manual removal.
Victorian TeaTree *Leptospermum laevigatum*	Isolated	Cut and paint immediately with neat Glyphosate. Remove cut material to safe location as branches hold seed for a long period.
Horse Tail Sheoak *Casuarina equisetifolia*	Isolated	Cut and paint immediately with neat Glyphosate. Remove any material holding seed.
White Arctotis *Arctotis stoechadifolia*	Isolated	Spray with 1% Glyphosate.
Gazania spp.	Widespread	Spray with 1% Glyphosate.
Athel Pine/ Tamarisk *Tamarix aphylla*	Isolated	Cut and paint immediately with neat Glyphosate. Remove any material holding seed.
Soursob *Oxallis pes-caprae*	Scattered	Spot spray with 0.2g/15L plus wetting agent or 1% Glyphosate.
Arum Lily *Zantedeschia aethiopica*	Isolated	Spray/wipe with 1g/10L water plus wetting agent.
Couch *Cynodon dactylon*	Scattered	Spray with 1% Glyphosate or Fusilade 5ml/L plus wetting agent, in late spring/summer; repeat in autumn.
Kikuyu *Pennisetum clandestinum*	Scattered	Spray with 1% Glyphosate or Fusilade 10ml/L plus wetting agent; repeat 2-3 times over the growing season.
Buffalo Grass *Stenotaphrum secundatum*	Scattered	Spray with 1% Glyphosate or Fusilade 8ml/L plus wetting agent; repeat 2-3 times over the growing season.
Rose Pelargonium *Pelargonium capitatum*	Widespread	Hand-pull isolated plants removing the entire stem, spot spraying with Metsulfuron methyl 5g/ha + Pulse.
Dune Onion Weed *Trachyandra divaricata*	Widespread	Wipe with 50% Glyphosate solution before flowering.

***Notes:**
1. These management methods are adapted from those suggested within *Bushland Weeds: A practical guide to their management*.[8]
2. Before commencing, check that the suggested methods are still currently recommended and that the chemical is registered for the intended purpose.
3. Only appropriately trained, qualified and equipped people should undertake chemical control and it is recommended that chemical use within the study area only occur under the supervision of or by appropriately trained Shire of Busselton staff or by a qualified contractor.



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East Busselton Foreshore Management Plan
Figure 1: Study Area

Produced on:
Monday, 4 June 2007

N

Legend

- Major pathway
- Minor pathway
- Native vegetation
- Weeds and introduced species
- GWD — Green Waste Dumping
- VTT — Victorian TeaTree
- Recommendation
- Cluster Planting node

- Control/ remove garden escapees, plantings.
- Raise awareness of the impacts of GWD.

Garden escapees, plantings and Green Waste Dumping

Weed control.

Weed control.

Understorey revegetation.

VTT

VTT

VTT

VTT

GWD

GWD

GWD

HERRING ST

WAKEFORD ST

ATKINSON ST

MILLS PL

HESTER ST

FORD RD

WEBB

0 100 200

meters

Shire of Busselton
Geographe Bay

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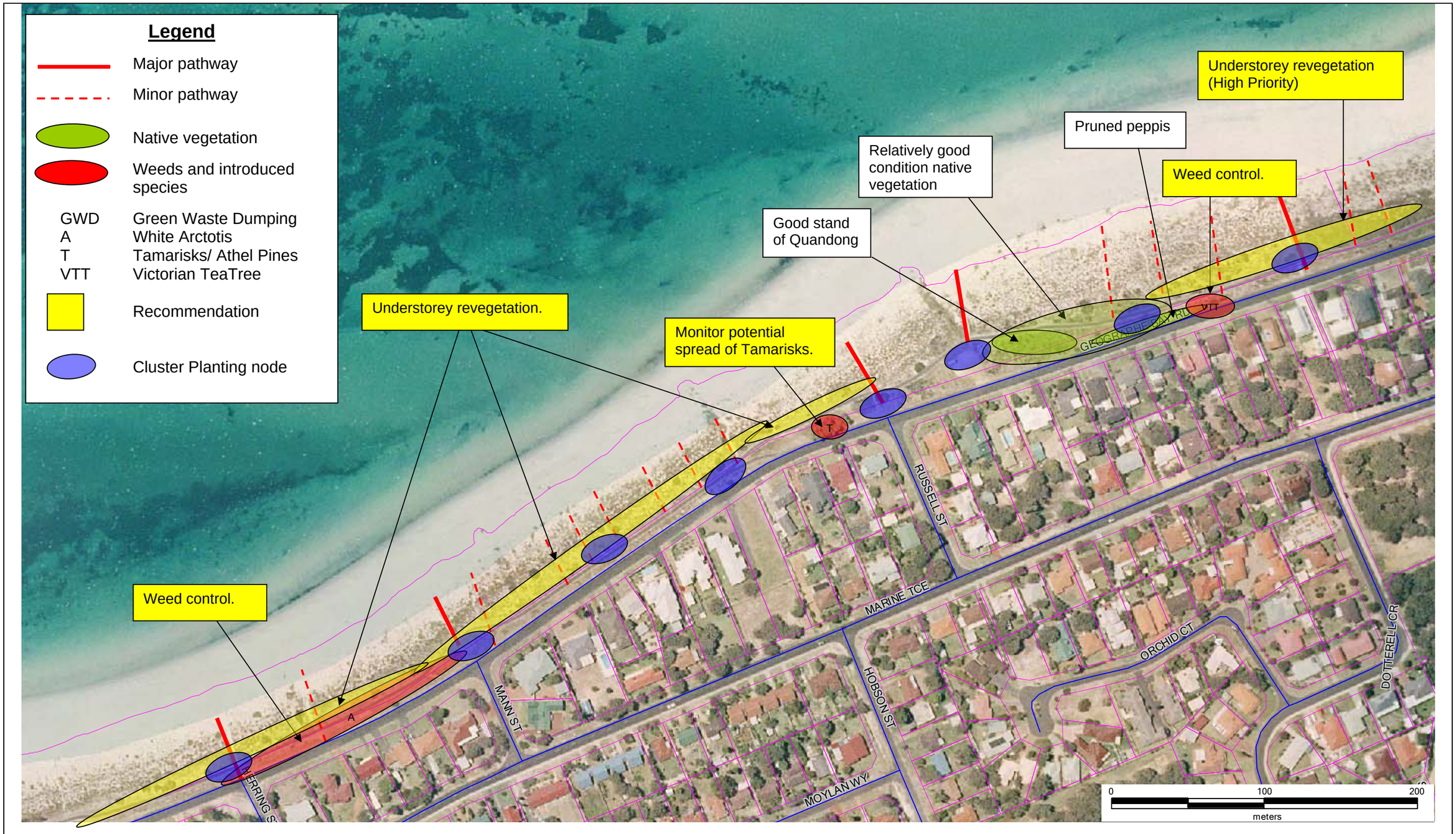
East Busselton Foreshore Management Plan

Figure 2A: Vegetation Aspects

Produced on:
Monday, 4 June 2007

Map Scale:
1:3500 at A4

N



Shire of Busselton
Geographe Bay

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East Busselton Foreshore Management Plan
Figure 2B: Vegetation Aspects

Produced on:
Monday, 4 June 2007

Map Scale:
1:3500 at A4

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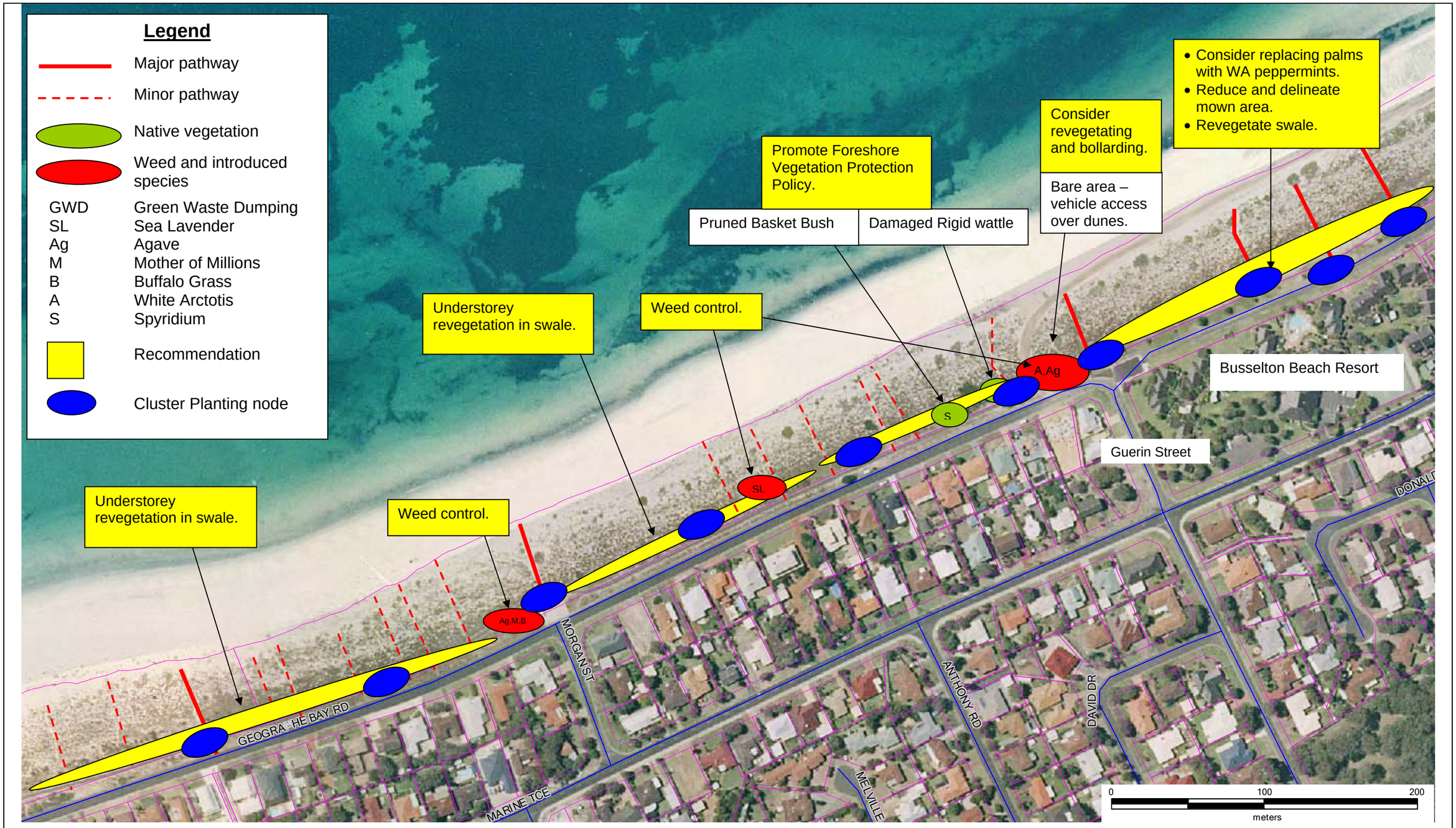
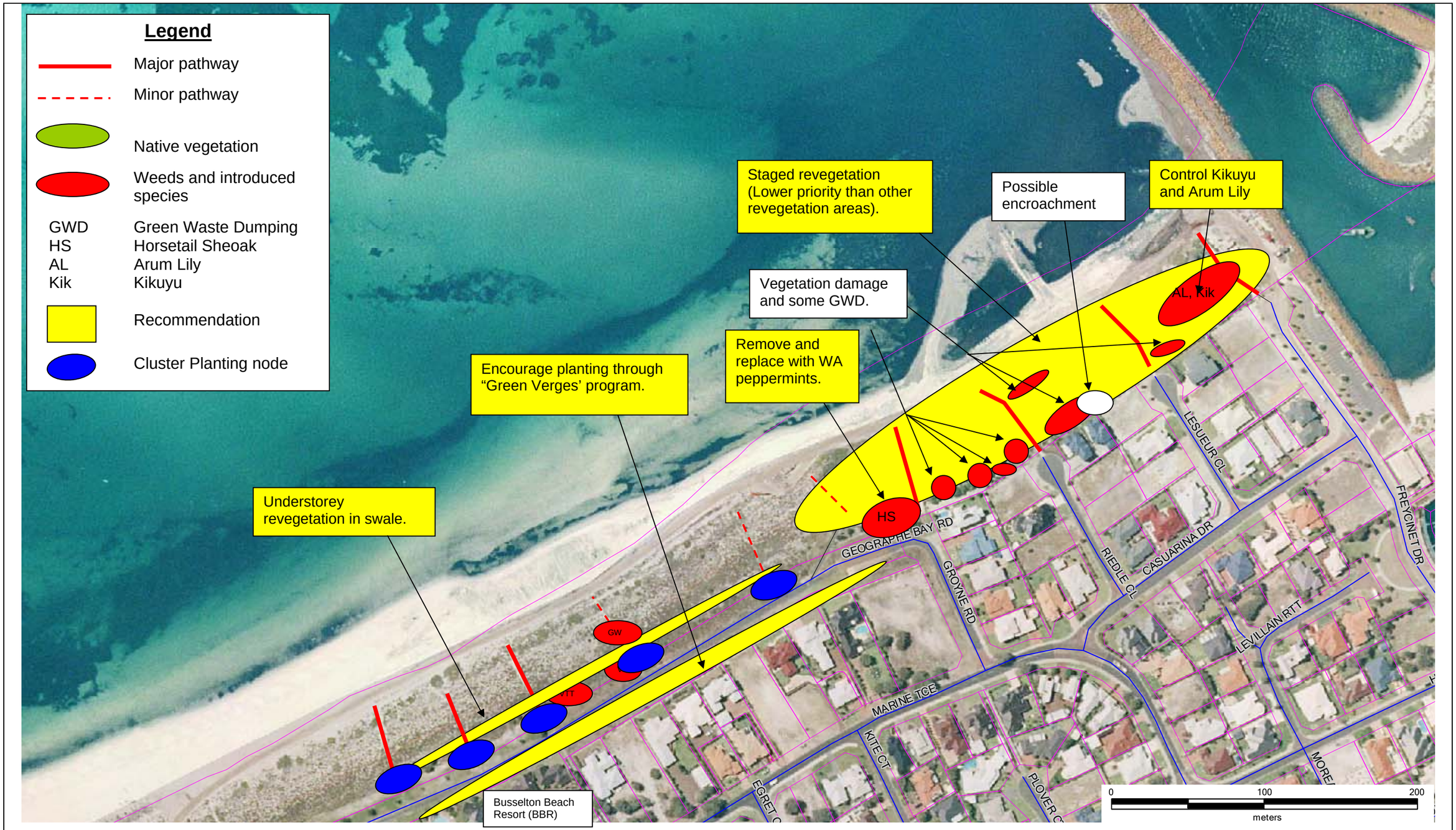


Shire of Busselton Geographe Bay	Disclaimer: All effort have been made to make the information displayed here as accurate as possible. This process is ongoing and the information is therefore ever changing and can not be disseminated as accurate. Care must be taken not to use this information as correct or legally binding. To verify information contact the Shire of Busselton office.	**East Busselton Foreshore Management Plan** Figure 2C: Vegetation Aspects	Produced on: Monday, 4 June 2007 Map Scale: 1:3500 at A4	N



Shire of Busselton Geographe Bay

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East Busselton Foreshore Management Plan

Figure 2D: Vegetation Aspects

Produced on:
Monday, 4 June 2007

Map Scale:
1:3500 at A4

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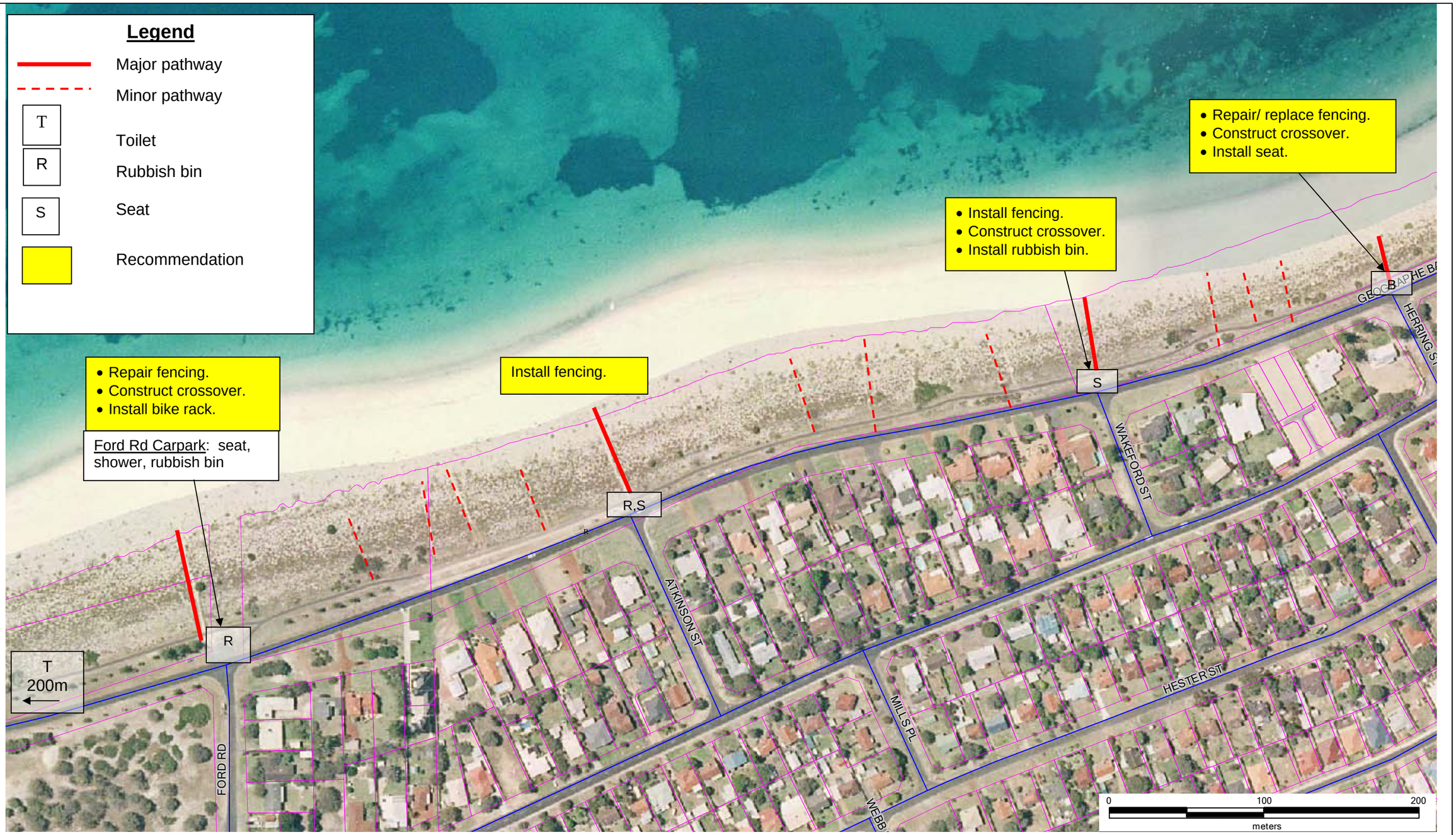

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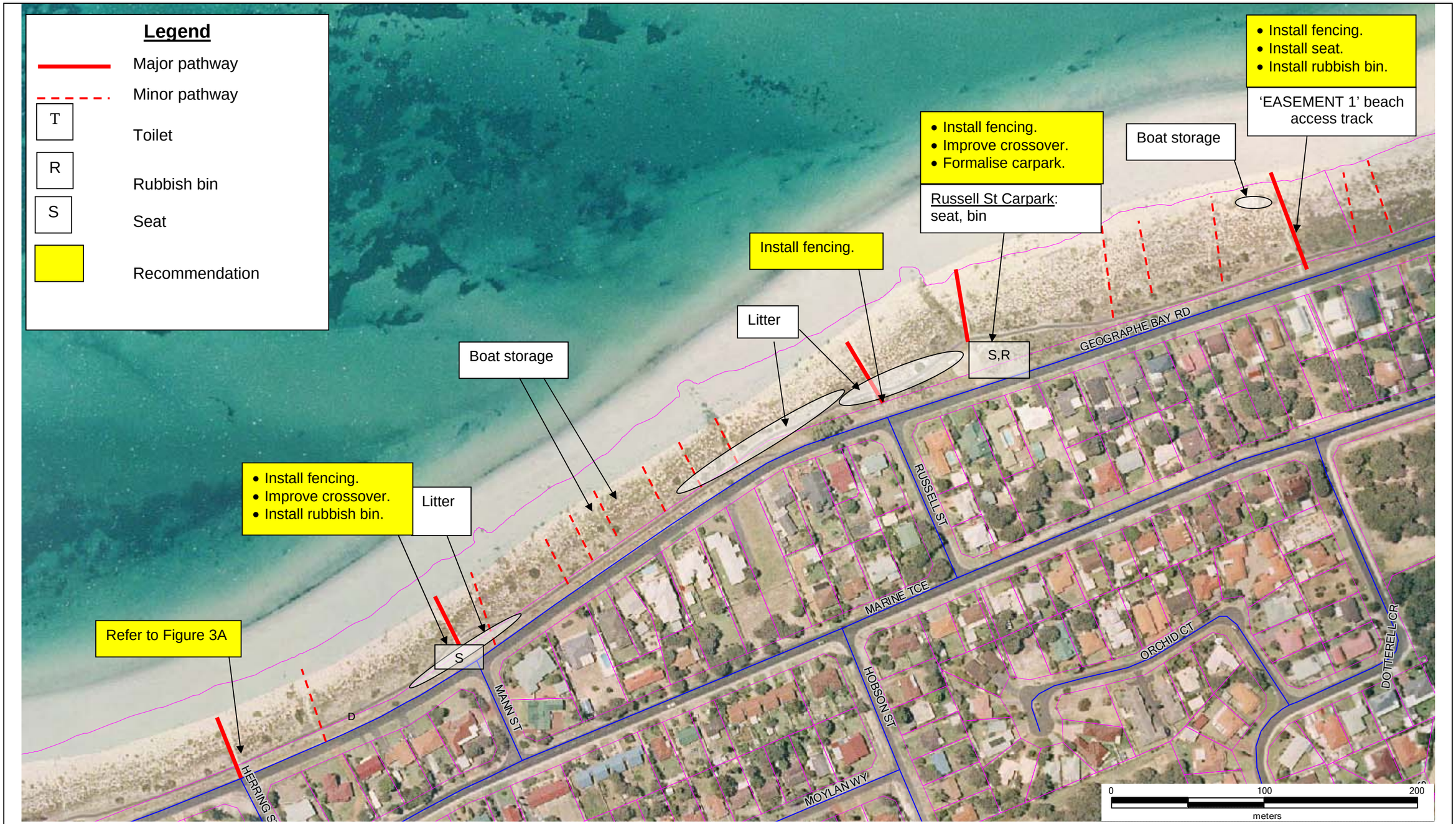

Shire of Busselton
Geographe Bay

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East Busselton Foreshore Management Plan
Figure 3B: Access and Facilities

Produced on:
Monday, 4 June 2007

Map Scale:
1:3500 at A4

N

Legend

- Major pathway
- Minor pathway
- R — Rubbish bin
- S — Seat
- Recommendation

Revegetate and/or fence off to restrict vehicle access over dunes.

Old access point for vehicles involved in sand bypass – no longer required.

Bare area – unauthorised trailer access over dunes.

- Repair fencing.
- Install seat, rubbish bin, bike rack.
- Repair/ replace signage.

‘EASEMENT 2 ‘ beach access track

Guerin St Carpark

Low pine fencing, generally in good condition along DUP between Guerin St and Groyne Rd

BBR 2

BBR 1

Boat storage and flagpole

- Install fencing.
- Improve crossover.
- Formalise carpark.

Busselton Beach Resort

Morgan St. Carpark: bollards, shower, seats, rubbish bin

Guerin Street

Refer to Figure 3B

‘EASEMENT 1’ beach access track

GEOGRAPHE BAY RD

MORGAN ST

MARINE TCE

MELVILLE

ANTHONY RD

DAVID DR

0 100 200

meters

Shire of Busselton Geographe Bay

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East Busselton Foreshore Management Plan

Figure 3C: Access and Facilities

Produced on: Monday, 4 June 2007

Map Scale: 1:3500 at A4

N

Legend

- Major pathway
- Minor pathway
- R — Rubbish bin
- S — Seat
- Recommendation

Access point to beach for authorised vehicles

Repair fencing as required.

Install bike rack.

Freycinet Dr Carpark: toilets, rubbish bin, shower

Repair fencing (minor) as required.

Groyne Rd Carpark: seat, rubbish bin

Low pine fencing, generally in good condition along DUP between Guerin St and Groyne Rd

'EASEMENT 2' beach access track

BBR 2

BBR 1

Busselton Beach Resort

GEOGRAPHE BAY RD

GROYNE RD

MARINE TCE

KITE CT

EGRET CT

PLOVER CT

RIEDLE CL

CASUARINA DR

LESUEUR CL

FREYCINET DR

LEVILLAIN RTT

0 100 200

meters

Shire of Busselton Geographe Bay

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East Busselton Foreshore Management Plan

Figure 3D: Access and Facilities

Produced on: Monday, 4 June 2007

Map Scale: 1:3500 at A4

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