



City of Nedlands

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Birdwood Parade Management Plan 2013—2018



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City of Nedlands
(08) 9273 3500
council@nedlands.wa.gov.au
71 Stirling Highway Nedlands 6009
Cover Photo Sally Wallace

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Prepared by: Vicki Shannon, City of Nedlands
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SUMMARY

This section of the City of Nedlands Natural Areas Management Plan 2013 - 2018 is dedicated specifically to the management of the bushland at Birdwood Parade. Detailed information that relates to all natural areas within the City such as mapping methodology, rehabilitation, environmental weed control, climate change, geomorphology and soils, planning information, interpretation, priority flora and fauna, fire management, community involvement, access and feral animal management has been detailed on pages 1 – 76 of the Natural Areas Management Plan 2013 - 2018.

The Birdwood Parade Management Plan 2013 – 2018 has drawn heavily from the following documents:

- The Nedlands Foreshore Bushland Reserves Management Plan 2003–2009 (Ecoscape, 2003),
- Weed Mapping Point Resolution and Birdwood Parade (Ecoscape, 2007); and
- Natural Area Initial Assessment - Birdwood Parade (Orsini, 2008).

A five year Management Plan has been developed that provides management actions and strategies for the conservation and restoration of Birdwood Parade. A summary of key actions for Birdwood Parade are listed below.

Table 1: Summary of Birdwood Parade Management Actions 2013 – 2018

ACTIONS	
BUSHLAND BOUNDARIES	
1.	Manage Birdwood Parade on the basis five zones.
REHABILITATION	
2.	Retain historical orchard trees for their heritage significance.
3.	Focus rehabilitation on <i>Good</i> to <i>Very Good</i> bushland condition areas as a priority.
4.	Use stabilisation materials and methods to terrace steep slopes such as jute matting, coir; and logs.
5.	Undertake annual maintenance of past rehabilitation sites.
6.	Undertake annual maintenance of the bushland edge adjacent to parkland areas.
7.	Maintain and monitor plants found in low abundance Zone 3 and 4 and only revegetate the edge of these areas with similar species.
8.	Maintain current views when rehabilitating the bushland edges and parkland areas.
9.	Consider delineating parkland areas with low garden curbing if parts of the parkland area are revegetated.
10.	Seek advice from DPAW or BGPA in regards to rehabilitation of areas that have dense Black Flag infestations.
REVEGETATION	
11.	Consider only planting overstorey species in areas where Black Flag is present.
12.	Work with local nurseries to grow species found in low abundance.
13.	Use only plant species for rehabilitation if they would have naturally occurred on site such as those found on the Mt Eliza Escarpment at Kings Park.
WEED CONTROL	
14.	Continue to control the following weeds as a high priority: Geraldton Carnation Weed, Bridal Creeper, Perennial Veldt Grass, Black Flag, One-leaf Cape Tulip, <i>Raphanus raphanistrum</i> , <i>Lupinus</i> sp, Freesia, Woody Weeds; and Rose Pelargonium.
15.	Undertake ongoing maintenance of weeds in restoration sites.
16.	Control priority weeds in accordance with management notes detailed in Appendix 4.

17.	Only remove historically planted non indigenous trees if they are invasive.
18.	Where native vegetation exists, mature Black Flag plants that have the potential to set seed should be hand wiped with herbicides to stop them from seeding.
19.	If weed control is undertaken on the steep embankment areas in Zone 4 and 1 erosion control methods should be implemented as part of the restoration project.
MONITORING	
20.	Monitor, control and document the distribution of new invasive weeds as they arise.
21.	Annually monitor weeds with the potential to expand rapidly and map changes in their distribution if required.
22.	Undertake annual monitoring and control of Brazilian Pepper, Geraldton Wax, African Cornflag, Giant Reed, <i>Lantana camara</i> , Marguerite Daisy and <i>Acacia iteaphylla</i> to ensure they do not spread or reestablish.
FIRE MANAGEMENT	
23.	Undertake annual management of Perennial Veldt Grass to reduce fuel loads.
NATIVE ANIMALS	
24.	Undertake ongoing surveying of native fauna if resources allow.
25.	Minimise fires that may destroy tree hollows.
26.	Retain hollows for refuges in large old and dead trees.
27.	Control feral European Bees as they can displace native animals.
28.	Protect nests of Rainbow Bee-eaters if they are encountered.
29.	Continue the fox control program.
30.	Contribute to regional programs being undertaken for feral bird control by DPAW.
COMMUNITY INVOLVEMENT	
31.	Continue to support community events in the Reserve such as Clean Up Australia Day.

BACKGROUND

Study Site

Birdwood Parade bushland is located between the Esplanade and Birdwood Parade in Dalkeith, adjacent to the Swan River. The entire Birdwood Parade Reserve includes bushland and parkland areas to the east and west of the bushland and Gallop House which is located in the middle of the bushland. The focus of this Management Plan is on the management of the bushland area which covers approximately 5.7Ha. The bushland at Birdwood Parade is bordered by parkland to the west and east, a residence to the north and the Sunset Hospital site and Tawarri Reception and Function Centre to the south. It is located within the City of Nedlands approximately 6 km WSW of the Perth CBD, as shown in Figure 1.

Figure 1: Birdwood Parade Bushland



Birdwood Parade is vested to the City of Nedlands as A Class Reserve 1624 for “Parks and Recreation”. The City of Nedlands has the power to lease on Reserve 1624. Birdwood Parade falls within the Swan River Trust’s Development Control Area (DCA). The Swan River Trust acts as an advisory body on any proposals that occur within the DCA.

Figure 2: Swan River Trust Development Control Area Birdwood Parade.



The Swan and Canning River Foreshore Assessment Management Strategy (2008) identifies the riverbank and shorelines of Birdwood Parade as Priority 2 and Priority 3 areas for management and a Priority 2 area for vegetation management. Management strategies recommended for these areas include renourishment where appropriate, foreshore stabilisation including bioengineering to protect infrastructure or recreational amenity; and improve linkage between regionally significant and good quality vegetation areas through planning and action.

Disturbance Factors

Birdwood Parade has a long history of disturbance with parts of the Reserve having been quarried for limestone, farmed and sand mined since the early colonial days. The Nedlands foreshore was also extended through reclamation works in the 1940’s. Prior to these reclamation works the gardens surrounding Gallop House were level with the Swan River and subject to seasonal flooding.

Some existing remnant vegetation exists in small sections in the southern portion of the Reserve which are characterised by a high proportion of herbaceous species not found elsewhere in the Reserve. There are also some dense patches of Coastal Sword Sedge interspersed with Marri trees in *Very Good* condition. In other areas the majority of vegetation consists of an upper or mid storey of native and introduced trees. Currently the Reserve has a high proportion of invasive weeds in certain locations dominating the understorey especially bulbous weeds.

Implementation of Previous Management Plans

Previous management plans developed for Birdwood Parade include the *Birdwood Parade Management Plan* (Bunny, 1993); and *Nedlands Foreshore Bushland Reserves Management Plan 2003–2009* (Ecoscape, 2003) which also included the management of Point Resolution.

The 1993 Management Plan was prepared as part of a University project. This Plan did not include detailed information regarding cultural values, interpretation or biophysical elements. The 2003-2009 Management Plan consolidated, reviewed and updated the information detailed in the 1993 Management Plan. It also included information regarding cultural and biophysical values and flora inventories. Since the development of the 1993 and 2003 Management Plans the bushland has been actively managed by the City of Nedlands. The Friends of Point Resolution also have an interest in the management of Birdwood Parade and have collaborated with the City on Clean Up Australia Day and National Tree Day events.

The 2003 Management Plan prepared by Ecoscape included forty three recommendations for management of the bushland of these thirty four were implemented, three were partially implemented and six were not implemented. The six recommendations that were not implemented included four relating to Cultural Heritage, Interpretation and Education of which will be addressed in future through the Whadjuk Trails Project; one relating to the installation of garden beds on the parkland area which was not supported by the local community and which represents a significant cost to implement; and one recommendation in relation to the monitoring of indigenous species found in low abundance which should aim to be implemented in the 2013 – 2018 Management Plan. The four recommendations that were partially implemented included one relating to the installation of a pathway within Zone 5 once it was revegetated, in which existing pathways were extended once part of Zone 5 was revegetated; one relating to the development of rehabilitation plans for all sites to be intensively managed which was undertaken however not through a formal document prepared and one relating to the maintenance of pathways to a satisfactory standard which are in the process of being implemented however are restricted somewhat by available funding. A summary of the implementation of the 2003 – 2009 recommendations are shown in Appendix 5.

Management Challenges and Success

Historical weed mapping data is only available from 2007 for some species. Therefore it is difficult to determine the reduction of some weed species prior to 2007. Also some species distributions do not appear to have been accurately mapped from knowledge of existing distributions that were evident in 2007.

Over the years there has been a significant reduction in the density and/or distribution of the following environmental weeds:

- African Cornflag (*Chasmanthe floribunda*),
- Geraldton Carnation Weed (*Euphorbia terracina*),
- Freesias (*Freesia alba x leichtlinii*),
- Giant Reed (*Arundo donax*),
- Common Lantana (*Lantana camera*),
- Marguerite Daisy (*Argyranthemum frutescens*); and
- Perennial Veldt Grass (*Ehrharta calycina*).

Unfortunately, Black Flag (*Ferraria crispa*) has been widely distributed across the bushland prior to 2007. It forms dense mats across the Reserve including amongst established vegetation. These areas cannot be targeted for control by herbicides. Careful consideration should be given to

revegetating areas where Black Flag occurs as ongoing management of these areas will be difficult once vegetation re-establishes. Consideration should be given to only planting overstorey species in these areas and liaising with other departments or agencies such as the Department of Parks and Wildlife (DPAW) and Botanic Gardens and Parks Authority (BGPA) to determine possible options for the Reserve. Black Flag also seeds prolifically and where native vegetation exists mature plants that have the potential to set seed should be hand wiped with herbicides to stop them from seeding.

Large dense patches of African Cornflag previously existed in some locations across the bushland. These have been reduced to some isolated individuals and small patches with less than 5% cover. These small patches should be continually monitored and removed as required.

Some non-indigenous species were historically planted such as Mindiyed (*Melaleuca nesophila*) which now have established populations in some areas. As Mindiyed is not considered invasive, provides habitat and cover stopping other invasive weeds from spreading it is not recommended for removal.

Woody weeds such as Brazilian Pepper Trees have largely been removed from the Reserve. Occasionally some isolated plants reseed or resprout from previously removed infestations and these require ongoing monitoring and control. As Birdwood Parade has historical farming significance the removal of remnant orchard trees is not allowed from the Reserve.

Perennial Veldt Grass appears to have increased its distribution from the mapping undertaken in 2007 and again in 2012. It is likely that this mapping is not entirely accurate as an active control program has been in place for many years and from visual assessments it appears to have reduced its density. This could possibly be attributed to different mapping methodology undertaken. In 2012/13, Perennial Veldt Grass and Annual Veldt Grass were mapped together as one species as they could not be differentiated at the time of surveying. This may account for the higher distribution encountered in 2012/13.

Prior to the development of the 2003 Management Plan, a definitive boundary between the bushland and parkland areas in some areas along the Birdwood Parade side of the bushland did not exist. In some areas, there were many informal access points and tracks between the bushland and parkland. These areas have been successfully restored through revegetation and now there is a distinctive parkland/bushland boundary. These areas require ongoing revegetation as native plants die to reinforce the boundary over time.

There is one area towards the Tawarri end of the bushland that has been historically used as a bike jump. This area was jute matted, revegetated and brushed to stop access and restore the area. Within a few weeks these works had been illegally removed. Therefore, it has been accepted that limiting access through this area is not currently achievable.

Significant restoration work has been undertaken in part of Zone 5 where a large stand of Giant Reed previously existed. This area has been successfully restored with established native vegetation. The restoration of parts of Zone 5 should continue when funding is available.

Management Actions 2013 - 2018

ACTIONS	
REHABILITATION	
1.	Seek advice from DPAW or BGPA in regards to rehabilitation of areas that have dense Black Flag infestations.
REVEGETATION	
2.	Consider only planting overstorey species in areas where Black Flag is present.
WEED CONTROL	
3.	Only remove historically planted non indigenous trees if they are invasive.
4.	Where native vegetation exists, mature Black Flag plants that have the potential to set seed should be hand wiped with herbicides to stop them from seeding.

BIOLOGICAL ENVIRONMENT

Landscape Elements

The bushland at Birdwood Parade Reserve occupies a steep elongated embankment with limestone rock formations outcropping at the northern end of the bushland. Birdwood Parade has an elevated position that offers views of the Swan River, Kings Park and Perth City. The parkland area adjacent to Birdwood Parade contains many significant habitat trees such as Marri's and Jarrahs.

Soils and Geomorphology

Birdwood Parade lies on the Spearwood Dunes. The bushland itself occupies a steep bank of Tamala Limestone, for the most part blanketed under grey or brownish grey sand. Apart from some small, isolated outcrops, the limestone is confined to the northernmost 200m section. A very small portion of river terrace near the Perth Flying Squadron Yacht Club is included in the Reserve. The landscape here has been extensively altered, but the soil profile probably preserves elements of the original alluvial sand.

Vegetation

Vegetation Complex Heddlé et al (1980)

On a regional scale the bushland at Birdwood Parade is mapped as occurring on the Karrakatta – Central and South Vegetation Complex. This complex is also represented in Kings Park and consists predominantly of an Open Forest of Tuart-Jarrahs-Marri. In the deeper sands Tuart is replaced by Jarrah, while Marri (*Corymbia calophylla*) is more dominant around moister sites.

The lower portion of Birdwood Parade Reserve was cleared for farming in the early period of the European settlement of Western Australia and would have formed part of the Vasse Complex. This complex is dominated by *Melaleuca* Scrub, *Melaleuca*- Flooded Gum Woodland and Tuart-Jarrahs-Marri Forests. (Department of Conservation and Environment, cited in Ecoscape 2003).

Floristic Community Type Gibson (1994)

Floristic Community Types (FCTs) classify vegetation into groups of plant species that tend to co-occur in small to medium areas. Birdwood Parade forms part of Super Group 4 - Uplands Centred on Spearwood and Quindalup Dunes. Birdwood Parade has not been sampled or inferred as containing a specific FCT.

Structural Plant Communities - Natural Area Initial Assessments 2008

In 2008 through the Natural Area Initial Assessments undertaken one Structural Plant Community was identified as Jarrah (*Eucalyptus marginata*)/Marri (*Corymbia calophylla*) forest. This information is detailed on the Local Biodiversity Projects Natural Area Assessments database for Birdwood Parade.

The dominant trees were identified as Jarrah, Marri and Peppermints; dominant shrubs as *Xanthorrhoea preissii* and *Macrozamia riedlei*; and dominant understorey plants as *Lepidosperma gladiatum*. Other common native species noted as occurring on site included *Acacia cyclops*, *Acacia rostellifera*, *Jacksonia furcellata*, *Spyridium globulosum*, *Grevillea crithmifolia*, *Grevillea vestita*, *Rhagodia baccata*, *Melaleuca lanceolata*, *Hakea prostrata*, *Acanthocarpus preissii*, *Banksia attenuata*, *Petrophile linearis*, *Sowerbaea laxiflora* (1 individual), *Stirlingia latifolia*; and *Desmocladius flexuosa*.

Corridor Value

Birdwood Parade forms important ecological linkages with nearby river foreshore areas such as Point Resolution, Bishop Road and Pelican Point. It is identified as part of Greenway 24 in "A

Strategic Plan for Perth’s Greenways” by Tingay and Associates and it forms part of the regional river foreshore greenway identified in the Western Suburbs Greening Plan stretching approximately 15 km from Kings Park to Fremantle.

Bushland Condition

The methodology followed for bushland condition assessments undertaken in 2012/13 is detailed on pages 27 - 30 of the Natural Areas Management Plan 2013 – 2018. Bushland condition is useful in tracking large changes overtime and should continue to be measured each time this Management Plan is reviewed. This allows changes to be regularly monitored and recorded.

Historical Bushland Condition Assessment Data

Over the years bushland condition has been mapped using different methods and scales. Bushland condition was not mapped in the 1993 Management Plan. It was mapped in the 2003 - 2009 Management Plan using the Kaesehagen Scale. These maps were digitised but they did not use 20 x 20m polygons and condition ratings were allocated strictly on the basis of local native species present.

In 2003 the overall condition of the bushland was assessed as approximately two thirds *Poor* and one third as *Poor – Very Poor* along with some rehabilitation sites. The bushland condition mapping undertaken in 2008 using the Keighery Scale through the Natural Area Initial Assessments assessed the bushland as 44% *Degraded*, 30% *Good* and 26% *Very Degraded*. This survey was undertaken in spring 2008 and like the 2003 mapping the condition ratings were allocated on the basis of local native species present. These maps were not digitised and did not use 20 x 20m polygons.

2012/13 Bushland Condition Assessment

The mapping in 2012/13 was undertaken in spring by adapting the Keighery Scale and divided the bushland into 20 x 20m polygons. The use of 20 x 20m polygons allows a systematic, measurable and repeatable means for collecting data overtime. Where each 20 x 20m polygon represents an individual unit with a GPS coordinate. When bushland condition is undertaken in future this method will allow a quantitative assessment to be undertaken to compare changes overtime.

In 2012/13 the Keighery condition rating was adapted to assess the impact of disturbance on vegetation structure. Each 20 x 20m polygon was provided a rating from *Very Good*, *Good*, *Degraded* to *Completely Degraded*. The main disturbance factors that influenced the condition rating included fire, environmental weeds, selective removal of species (from plant pathogens, frequent fires, grazing and logging for example) and clearing. The existence on non-indigenous plants (through enrichment planting) was not rated as a disturbance unless they displayed signs of causing disturbance to the site such as invasiveness.

In 2012/13 the bushland was assessed as predominantly *Good* condition with some small areas of *Very Good*, *Degraded* and *Completely Degraded*. Refer to Table 2 below and the Bushland Condition map in the map section on page 28.

Table 2 Extent of Bushland Condition 2012/13

Very Good	Good	Degraded	Completely Degraded	Total Area
0.41Ha	4.5Ha	0.8Ha	0.02Ha	5.73Ha

The areas assessed as *Very Good* condition included a small area in the southern part of the bushland that contained a herbaceous, middle and upper storey layer and some other small areas

characterised by an overstorey of Marri trees and an understorey dominated by Coastal Sword Sedge.

In order to attain a *Very Good* condition rating the areas could be impacted by some disturbance such as frequent fires, clearing and aggressive weeds (that were in low abundance or considered a low priority). However they needed to maintain a good native vegetation structure and/or cover. Some other areas along Birdwood Parade had a very good vegetation structure and/or cover however these areas only attained a *Good* rating as they also contained aggressive weeds such as Geraldton Carnation Weed, Perennial Veldt Grass and/or Black Flag.

The *Good* condition rated areas consisted of a band of differing levels of *Good* condition bushland (some of these were more on the *Degraded* side of *Good* condition and others were more on the *Very Good* condition side of *Good* condition bushland). In the *Good* condition bushland areas some introduced native plants may also have formed part of the vegetation structure (such as *Eucalyptus utilis*) and this did not lead to a *Degraded* rating as these species provided vegetation structure, habitat and/or stabilisation and were also not considered invasive.

Some of the areas rated as *Degraded* were located on the steep embankment in the northern section and other locations along the Reserve. These areas had a combination of the following disturbances that lead to their *Degraded* rating:

- High density invasive weeds; and
- Lack of native vegetation cover.

Flora

There are 148 flora species recorded at Birdwood Parade, of these 66 are identified as native species and 82 as introduced weed species. Prior to the development of the 2003 Management Plan there were no flora lists for Birdwood Parade. The flora list (Appendix 1) for Birdwood Parade is based on the following surveys:

- Ecoscape 2003,
- Ongoing observations by City of Nedlands staff; and
- Ian Fordyce 2013.

The suite of species originally present at Birdwood Parade cannot be directly observed due to the long history of degradation at the site such as farming, quarrying and sand mining

On review of previous flora inventories for Birdwood Parade, since 2003, the following native plants have been recorded for the first time:

- *Caladenia latifolia*,
- *Acacia cyclops*,
- *Acacia rostellifera*,
- *Melaleuca lanceolata*,
- *Acanthocarpus preissii*,
- *Sowerbaea laxiflora*,
- *Alexgeorgea nitens*,
- *Scaevola anchusifolia*,
- *Microtis* sp,
- *Trachymene coerulea*,
- *Thysanotus arenarius*,
- *Astroloma macrocalyx*,
- *Stirlingia latifolia*; and

- *Desmocladius flexuosa*.

Since 2003 the following species were introduced through restoration programs in *Degraded* areas and the native garden beds near Gunners Memorial; or were previously present and had not been recorded through surveys.

- *Gompholobium tomentosum*,
- *Melaleuca systema*,
- *Eremophila glabra*,
- *Hemiandra pungens*,
- *Enchylaena tomentosum*,
- *Scaevola crassifolia*,
- *Hypocalymma robustum*,
- *Jacksonia sternbergiana*,
- *Jacksonia sericea*,
- *Kennedia prostrata*; and
- *Rhagodia baccata*.

Prior to introducing these species, an audit was made against those that were naturally found on the Mount Eliza escarpment to ensure only native plants that would have most likely occurred on the site were reintroduced.

Since 2003 the following species were not recorded which were previously detailed as having been noted on site. These include:

- *Dianella divaricata*,
- *Eucalyptus rudis*,
- *Hakea bucculenta*,
- *Hibbertia hypericoides*,
- *Hypocalymma angustifolium*; and
- *Kennedia prostrata*.

Plant Pathogens

A survey of plant pathogens undertaken across the City's natural areas in 2011 isolated the following plant pathogens from 25 trees in the parkland and bushland areas at Birdwood Parade (17 Marris and 8 Jarrahs):

- *Phytophthora aff. Arenaria* (2 Jarrahs),
- *Phytophthora multivora* (6 Marris); and
- Quambalaria canker (13 Marris).

Many trees exhibited signs of stress through epicormic growth, a few had mechanical damage and stem boring insects and one had a possible *Armillaria* infection. The identification and management of plant pathogens and other causes of tree decline has been detailed in the Natural Areas Management Plan 2013 - 2018. In summary strict hygiene protocols are required (of which many are already being implemented), such as ensuring no soil or plant material is transferred between natural areas or restoration sites by brushing excess soil off clothing, machinery and equipment, and sterilising with 70% solutions of methylated spirits.

Trees can also be treated by implementing systemic treatments, which can last for up to three years, so they are not as susceptible to death as a result of plant pathogens. The City implemented some systemic treatments in 2011. These trees are being monitored and follow up treatments may be required in the future. Refer to pages 41 - 44 of the Natural Areas Management Plan 2013 – 2018 for management strategies and hygiene protocols.

Weeds

Of the 82 weed species recorded at Birdwood Parade (listed in Appendix 1) the distribution of 8 of these and woody weeds were mapped in 2012/13. They are shown in the map section on page 28.

Some of the weeds listed in Appendix 1 include those that were intentionally planted such as *Chamelaucium uncinatum*, *Melaleuca nesophila* and *Eucalyptus utilis*. Non-indigenous plants provide habitat and should only be removed only if they are outcompeting native vegetation which is largely site dependant. There are also some trees that have been intentionally planted and provide historical value of the early European settlement of Nedlands. These include some orchard species such as Fig trees and these should be retained for their heritage value.

Weed mapping

Over the years, weeds have been mapped using different methods and cover classes therefore it is difficult to make a quantitative assessment to date. The weed mapping of African Cornflag in 2003 and other weeds in the 2007 mapping undertaken were digitised however 20 x 20m polygons were not used to score cover classes. The mapping in 2012/13 was undertaken in spring using 20 x 20m polygons and DPAW cover classes detailed in their weed mapping Standard Operating Procedure 22.1. These include:

- Individual plants (mapped as GPS points),
- Less than 5%,
- 6-75%; and
- 76-100%.

This method allows a systematic, measurable and repeatable means for collecting weed cover and density overtime. Where each 20 x 20m polygon represents an individual unit with a GPS coordinate.

Target Species for Weed Mapping 2012/13

In 2012/13 the following weeds were mapped Bridal Creeper (*Asparagus asparagoides*), Giant Reed (*Arundo donax*), African Cornflag (*Chasmanthe floribunda*), Perennial Veldt Grass (*Ehrharta calycina*), Geraldton Carnation Weed (*Euphorbia terracina*), Black Flag (*Ferraria crispa*), Freesia (*Freesia aff. leichtlinii*), Rose Pelargonium (*Pelargonium capitatum*); and woody weeds.

Limitations of weed mapping

Only the above listed priority weeds could be mapped due to the time and the cost involved with the mapping. Unfortunately there are always going to be some limitations encountered with weed mapping and these include:

Timing of mapping

Mapping should always be undertaken in spring when weeds are active. There are six natural areas that require mapping and they all cannot all be mapped simultaneously. This means that some weeds that may have germinated may not be flowering at the time of survey, may be covered over by taller weeds and therefore not visible when the surveying is undertaken or have been removed through weeding activities. Also some weeds do not flower every year and therefore may be difficult to identify.

Weather variations from year to year

Some years can have early rain which will provide an early flowering and germination period. Other years have late rain that extends into spring which provides successive germination events by which time the mapping could have concluded.

Fungi

No “Fungi Forays” have been held at Birdwood Parade and prior to the development of this Management Plan, no previous inventories were compiled. Only 4 fungi have been noted as occurring at Birdwood Parade. These have been opportunistically noted by City staff. It is therefore likely that there are a significantly higher number of fungi on site than has been recorded to date. The fungi list for Birdwood Parade should be continually updated as new species are recorded.

Native Fauna

A total of 10 native birds and 3 reptiles have been recorded at Birdwood Parade.

Birds

Of the 10 bird species identified in Appendix 3 two species are listed under the Environmental Protection Biodiversity Conservation Act 1999 (EPBC Act) the Carnaby’s Cockatoo (*Calyptorhynchus latirostris*) which is listed as *Endangered* and the Rainbow Bee-eater (*Merops ornatus*) which is listed as a *Migratory* and a *Marine* species.

Mammals

No native mammals have been recorded at Birdwood Parade to date. However due to their distribution and adaptability it is likely that Brushtail Possums (*Trichosurus vulpecula*) and Goulds Wattle Bats (*Chalinolobus gouldii*) exist on site and possibly the White Stripped Mastiff Bat (*Tadarida australis*).

Herpetofauna (Reptiles & Amphibians)

A total of three Herpetofauna species have been confirmed at Birdwood Parade. These include: The Sands Gould’s Monitor (*Varanus gouldii*), the Fence Skink (*Cyrtoblepharus buchananii*); and the Western Bobtail (*Tiliqua rugosa*).

The three species listed above would only form part of the herpetofaunal species at Birdwood Parade and further informal surveys should be undertaken to update the current species list.

Invertebrates

No native invertebrates have been confirmed onsite. Like herpetofauna, invertebrates should also be informally surveyed and species lists compiled.

Introduced Fauna

Please refer to pages 65 – 69 of the Natural Areas Management Plan 2013 - 2018 for details of feral animal control strategies.

Mammals

Birdwood Parade has the following confirmed introduced mammals: rabbits (*Oryctolagus cuniculus*) and foxes (*Vulpes vulpes*). Other possible (however unconfirmed) introduced fauna include cats (*Felis catus*), the House Mouse (*Mus musculus*) and the Black House Rat (*Rattus rattus*).

Invertebrates

One introduced invertebrate of concern at Birdwood Parade includes the European Honey Bee (*Apis mellifera*).

Introduced Birds

There are five known introduced birds within Birdwood Parade these include the Rock Dove (*Columba livia*), Spotted Dove (*Streptopelia chinensis*), Laughing Dove (*Streptopelia senegalensis*), Rainbow Lorikeet (*Trichoglossus haematodus*); and Laughing Kookaburra (*Dacelo novaeguineae*).

PLAN FOR MANAGEMENT

Please refer to pages 31 - 40 of the Natural Areas Management Plan 2013 – 2018 for general management principles and weed control strategies that relate to all natural areas.

Management Zones

External Boundaries

For management purposes it is important to distinguish between parkland and bushland zones. At Birdwood Parade, the boundaries between bushland and parkland areas are mostly well defined by shrubs and trees between the bushland and parkland areas.

Internal Boundaries

In the 2003 – 2009 Management Plan the bushland was divided into 5 Zones. These 5 Zones form the basis of general management and are intended to facilitate the establishment of guidelines for managing areas of similar terrain and degradation. Specific sites are targeted areas for rehabilitation within Zones. They demarcate the extent of areas where specific works should occur.

Figure 3: Management Zones at Birdwood Parade.



Management Actions 2013 – 2018

ACTIONS	
1.	Manage Birdwood Parade on the basis five zones.

Rehabilitation

The improvement of bushland condition at Birdwood Parade will be achieved by assisting natural regeneration in *Good to Very Good* bushland condition areas and through reconstruction at selected *Degraded* sites.

Sites

Sites are areas within Zones where resources for rehabilitation and monitoring are focused. Areas where rehabilitation has previously occurred are also considered Sites. A rehabilitation plan should be developed for each area requiring reconstruction to minimise any possible detrimental impacts such as trampling, erosion, spraying native species in low abundance or the introduction of weed species.

The priority for rehabilitation is the consolidation and expansion of better condition bushland in all Zones. The Bradley Method should be followed which focuses on targeting better condition bushland areas within these Zones. Restoration of the more *Degraded* bushland areas should be a focus if resources allow, in areas affected by erosion; and in areas directly adjacent to *Good* bushland. If internal funding is not available then these Sites could be the focus of grant funded projects.

Past Rehabilitation Sites

The following rehabilitation sites should have ongoing annual maintenance undertaken.

- Garden Beds,
- Embankment in front of Garden Beds,
- Edge of the first and second pathways,
- Bushland edge along the boundary of the parkland area,
- Large degraded area to the south of Gallop House,
- Revegetation sites in Zone 5 (opposite the Dalkeith and Nedlands Yacht Clubs); and
- Areas of the lower embankment adjacent to Tawarri Reception and Function Centre.

The above listed sites will need to have ongoing annual infill planting undertaken, weed control and maintenance of stabilisation works such as jute matting and brushing.

The bushland edge along the boundary of the parkland area requires ongoing revegetation as plants die and at areas that are becoming eroded. This will reinforce the boundary between the parkland and bushland areas. In the past, significant revegetation of the bushland edge has been undertaken in order to develop a hedge to clearly delineate the bushland boundary. This has achieved a significant reduction of informal access into the bushland. Plant species such as *Grevillea crithmifolia* and *Grevillea vestita* are very good at maintaining the boundary between parkland and bushland areas.

Very Good Condition Bushland in Zone 3 and 4

Some areas in part of Zone 3 and 4 have many native herbs, sedges and shrubs that are not found elsewhere in the bushland. Many of these species cannot be propagated and any weed control carried out in this area needs to be undertaken very carefully so that these herbs, sedges and shrubs are not damaged. The periphery of this area should also only be revegetated with similar species to maintain the community of plants found in this area.

Potential Reconstruction Sites

The following sites are potential reconstruction sites and should only be restored if significant funding is available and after resources have focused on the maintenance of *Good* to *Very Good* bushland condition areas:

- Embankment in Zone 1 and 4; and
- Parkland areas to expand the bushland edge in Zone 5.

Parts of the embankment in Zones 1 and 4 are highly degraded and have very steep embankments. There is little existing understorey vegetation and some of these areas have dense weed infestations. Currently the City does not have the required resources to undertake complete rehabilitation of these areas. This is because available funding is needed to undertake ongoing restoration of previously rehabilitated sites and to manage the restoration of the remainder of the bushland areas. Therefore rehabilitation of these areas is a lower priority for the City.

If and when they are rehabilitated steep slopes that are at risk of soil slippage should be stabilised with jute matting, coir; and/or terraced with logs as these materials can be useful for stabilising fragile slopes as well as suppressing weeds.

Adjacent Parkland Areas

Through the City's Greenway Corridors Policy, some of the parkland area has been earmarked to be revegetated. This aims to increase the bushland buffer and greenway corridor value of Birdwood Parade and to reduce water consumption by reducing the area of reticulated parkland area.

There are no immediate plans for these works to commence however when and if they do proceed, the following points should be considered:

- Delineating these areas by low garden curbing; and
- Maintaining the visual amenity of the area by not reducing current views of the Swan River from the parkland area.

Management Actions 2013 – 2018

ACTIONS	
1.	Focus rehabilitation on <i>Good</i> to <i>Very Good</i> bushland condition areas as a priority.
2.	Use stabilisation materials and methods to terrace steep slopes such as jute matting, coir; and logs.
3.	Undertake annual maintenance of past rehabilitation sites.
4.	Undertake annual maintenance of the bushland edge adjacent to parkland areas.
5.	Maintain and monitor plants found in low abundance Zone 3 and 4 and only revegetate the edge of these areas with similar species.
6.	Maintain current views when rehabilitating the bushland edges and parkland areas.
7.	Consider delineating parkland areas with low garden curbing if parts of the parkland area are revegetated.
8.	Retain historical orchard trees for their heritage significance.

Revegetation

Species Selection

Ideally species used for revegetation in reconstruction sites would consist of the entire collection of plants that naturally occur at Birdwood Parade. This is not always possible as not all species can be propagated and there are also situations where certain species provide specific management functions such as *Acacia pulchella* and *Banksia sessilis* which help to restrict access as they have spiny leaves.

The suite of native species that would have once occurred at Birdwood Parade can be inferred from the Mount Eliza Escarpment in Kings Park which occupies a similar position in the landscape and is less than 3 km away. When developing species lists they should be cross referenced to those that have been found on the Mount Eliza Escarpment.

Species of Significance or Low Abundance

There are a number of species of significance or found in low numbers within Birdwood Parade these are mainly found in Zones 3 and 4. Special consideration should be given to ensure their survival onsite. They should be mapped, monitored and if possible propagated for revegetation at reconstruction sites these include:

- *Caladenia latifolia*,
- *Astroloma macrocalyx*,
- *Hakea bucculenta* (not recorded in 2013),
- *Hibbertia hypericoides* (not recorded in 2013),
- *Myoporum insulare*,
- *Sowerbaea laxiflora*,
- *Desmocladius flexuosus*,
- *Petrophile linearis*; and
- *Thysanotus manglesii*.

Management Actions 2013 – 2018

ACTIONS	
1.	Work with local nurseries to grow species found in low abundance.
2.	Use only plant species for rehabilitation if they would have naturally occurred on site such as those found on the Mt Eliza Escarpment at Kings Park.

Environmental Weed Control

A total of 27 priority weeds have been listed for management at Birdwood Parade (Table 3). Each priority weed has been provided management notes and the Invasive Plant Prioritisation Process rating (DEC, 2008). Priority weeds will be managed according to management notes provided on DPAW's Florabase website at <http://florabase.dec.wa.gov.au> and are detailed in Appendix 4. Priority weeds have been selected from:

- The Swan Region Assessment 2008 (Invasive Plant Prioritisation Process (DEC)),
- 30 highest priority weeds for the Swan Region 2008,
- State and federal weed lists; and
- Their ability to be controlled without causing disturbance.

Table 3: Priority Weeds for Control – Birdwood Parade (Ratings taken from DEC Invasive Plant Prioritisation Process 2008 (Swan Region)).

SPECIES NAME	COMMON NAME	NOTES	RATING
1. <i>Acacia iteaphylla</i>	Flinders Range Wattle	Monitor for reinfestation.	FAR (Further Assessment Required)
2. <i>Avena fatua</i>	Wild Oat	Ongoing control required in conjunction with grass spraying program.	Medium
3. <i>Argyranthemum frutescens</i>	Marguerite Daisy	Monitor for reinfestation.	FAR
4. <i>Arundo donax</i>	Giant Reed	Requires ongoing monitoring and control.	Unrated
5. <i>Asparagus asparagoides</i>	Bridal Creeper	Ongoing biological control required, removal of berries and/or hand removal of small populations.	Very High
6. <i>Brachychiton populneus</i>	Kurrajong	Requires ongoing monitoring and control.	High
7. <i>Brassica barrelieri subsp. Oxyrrhina</i>	Smooth Stem Turnip	Ongoing hand weeding required.	Medium
8. <i>Chamelaucium uncinatum</i>	Geraldton Wax	Ongoing removal of juvenile seedlings.	Medium
9. <i>Chasmanthe floribunda</i>	African Cornflag	Ongoing monitoring and control.	Medium
10. <i>Cynodon dactylon</i>	Couch	Focus control in restoration sites.	Very High
11. <i>Ehrharta calycina</i>	Perennial Veldt Grass	Ongoing control required.	Very High
12. <i>Ehrharta longiflora</i>	Annual Veldt Grass	Ongoing control required in conjunction with grass spraying program.	FAR
13. <i>Euphorbia terracina</i>	Geraldton Carnation Weed	Ongoing hand weeding required.	Very High
14. <i>Ferraria crispa</i>	Black Flag	Ongoing control required.	Very High
15. <i>'Freesia alba x leichtlinii</i>	Freesia	Ongoing control required.	Very High
16. <i>Fumaria capreolata</i>	Whiteflower Fumitory	Hand weeding required if resources allow. Focus control in restoration sites.	Medium/High
17. <i>Lantana camara</i>	Common Lantana	Difficult to control as located on very steep embankment in Zone 1 and removal may cause erosion.	Medium
18. <i>Lactuca saligna</i>	Wild Lettuce	Ongoing hand weeding required.	High
19. <i>Lagurus ovatus</i>	Hare's Tail Grass	Ongoing control required.	High
20. <i>Lupinus angustifolius</i>	Narrowleaf Lupin	Ongoing hand weeding required.	Unrated
21. <i>Lupinus cosentinii</i>	Sandplain Lupin	Ongoing hand weeding required.	Unrated
22. <i>Olea europaea</i>	Olive	Ongoing control required of juvenile/semi mature trees as any large trees may have heritage value.	High
23. <i>Pelargonium capitatum</i>	Rose Pelargonium	Ongoing control required.	Medium/High
24. <i>Pennisetum clandestinum</i>	Kikuyu Grass	Focus control in restoration sites.	High
25. <i>Raphanus raphanistrum</i>	Wild Radish	Ongoing hand weeding required.	FAR
26. <i>Schinus terebinthifolius</i>	Brazilian Pepper	Requires ongoing monitoring for re-infestation/resprouting.	Very High
27. <i>Tamarix aphylla</i>	Athel Pine	Remove juveniles. Only remove mature specimens if causing disturbance and resources allow.	High

Table 4: Alert Weeds for Birdwood Parade.

Species Name	Common Name	Notes
<i>Tamarix aphylla</i>	Athel Pine	Some mature specimens exist
<i>Lantana camara</i>	Common Lantana	Some mature specimens exist in Zone1

Strategy

Priority weeds should be controlled in all Zones and in accordance with management notes in Appendix 4. Of the priority weeds listed in Table 3 the following weeds are considered the highest priority for management:

- Geraldton Carnation Weed,
- Bridal Creeper,
- Perennial Veldt Grass,
- Black Flag,
- *Raphanus raphanistrum*,
- *Brassica sp*,
- *Lupinus sp*,
- Freesia,
- Woody Weeds; and
- Rose Pelargonium.

Fumitory

With the removal of many annual and perennial grass weeds like other reserves Fumitory has increased at Birdwood Parade. Spraying low levels of selective herbicide can control Fumitory when growing amongst native plants. However this is costly and some native plants are particularly sensitive to herbicides. As Fumitory is not considered as high a priority as some other priority weeds that have been managed consistently over the years. Spraying fumitory is therefore not recommended, except in restoration sites. Fumitory can however be successfully removed by hand provided enough resources are available to continue ongoing control of other priority weeds.

Steep Embankment Areas

The steep embankment areas in some parts of Zone 4 and 1 contain priority weeds. The areas in Zone 1 and 4 are somewhat inaccessible and dangerous for contract staff to access and removing the weeds in Zone 1 and 4 may cause erosion of the embankment. Unfortunately priority weeds cannot therefore be controlled in some parts of these Zones. If restoration of these areas does commence, weed removal should only be undertaken if it is not going to cause erosion to the embankment, and that erosion control methods are undertaken as part of the restoration work.

Geraldton Wax

Geraldton Wax has previously been removed from Birdwood Parade Bushland. A few mature specimens exist which provide habitat for birds. The mature specimens should remain however the bushland should be monitored for the germination of seedlings of which should be removed as required.

Orchard Trees

Many orchard trees remain in the Reserve from the time the Reserve was used for farming. These trees should be retained for their historical value and are not proposed for removal.

Maintenance Areas

Numerous weeds are present in restoration sites such as:

- The Garden Beds near Gunners Memorial,
- Embankment in front of Garden Beds,
- Edge of the first and second pathways,
- Large degraded area to the south of Gallop House,
- Revegetation sites in Zone 5 (opposite the Dalkeith and Nedlands Yacht Clubs); and
- Revegetation sites on the lower embankment adjacent to Tawarri Reception and Function Centre.

These areas have weeds such as *Conyza bonariensis* (Tall Fleabane), *Lactuca serriola* (Prickly Lettuce), *Oxalis glabra* and *pes-caprae* (Sour Sob), *Raphanus raphanistrum* (Wild radish), *Lupinus* sp and *Solanum nigrum* (Blackberry nightshade). These areas require ongoing maintenance of weeds so that they do not threaten nearby bushland areas.

Monitoring

Of the 82 weeds identified as occurring within Birdwood Parade, the distributions and densities of 8 weeds were mapped along with woody weeds. These should continue to be mapped every five years as part of management plan reviews.

Highly invasive weeds with the potential to expand their distributions should be monitored and mapped annually (if they have increased their distribution) so that their current distribution can be monitored and controlled as required. These species include Black Flag, Bridal Creeper; and Freesias. New invasive weeds should also be mapped as they arise and controlled as necessary.

Weeds that either have small populations or have previously been removed from the bushland require annual monitoring and control. These include:

- Brazilian Pepper,
- African Cornflag,
- Geraldton Wax,
- Giant Reed,
- *Lantana camara*,
- Marguerite Daisy, and
- *Acacia iteaphylla*.

Management Actions 2013 – 2018

ACTIONS	
WEED CONTROL	
1.	Continue to control the following weeds as a high priority: Geraldton Carnation Weed, Bridal Creeper, Perennial Veldt Grass, Black Flag, One-leaf Cape Tulip, <i>Raphanus raphanistrum</i> , <i>Lupinus</i> sp, Freesia, Woody Weeds; and Rose Pelargonium.
3.	Undertake ongoing maintenance of weeds in restoration sites.
4.	Control priority weeds in accordance with management notes detailed in Appendix 4.
5.	Only remove historically planted non indigenous trees if they are invasive.
6.	If weed control is undertaken on the steep embankment areas in Zone 4 and 1 erosion control methods should be implemented as part of the restoration project.
MONITORING	
7.	Monitor, control and document the distribution of new invasive weeds as they arise.
8.	Annually monitor weeds with the potential to expand rapidly and map changes in their distribution if required.
9.	Undertake annual monitoring and control of Brazilian Pepper, Geraldton Wax, African

Cornflag, Giant Reed, <i>Lantana camara</i> , Marguerite Daisy and <i>Acacia iteaphylla</i> to ensure they do not spread or reestablish.
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FIRE MANAGEMENT

Fire management actions for all natural areas have been detailed on pages 45 - 50 of the Natural Areas Management Plan 2013 – 2018. The City recently undertook bushfire risk assessments in all of City’s natural areas using Australian Standard AS 3959 (*Buildings in Bush Fire Prone Areas*) and ISO AS/NZ 31000-2009 (Risk Management - Principles and Guidelines). As a result of these assessments the following actions were implemented for Birdwood Parade:

- Trim back straggly peppermint trees, remove dead material and trim and maintain grass within 42m of dwelling (northern boundary); and
- Rake and remove accumulated litter, trim and remove any dead limbs and material within 10m of buildings/boundaries (Gallop House and Sunset Hospital).

Ongoing maintenance is required for the areas identified in the fire risk assessments. In addition to those actions fire bans should be maintained at all times at Birdwood Parade Bushland and reduction of fuel loads through grass weed control and annual maintenance of fire access ways are also ongoing fire hazard reduction strategies that need to be implemented.

Management Actions 2013 – 2018

ACTIONS	
1.	Undertake annual management of Perennial Veldt Grass to reduce fuel loads.

ACCESS

The “*Objectives for Access*” have been detailed for all natural areas on pages 51 – 54 of the Natural Areas Management Plan 2013 - 2018. The fences and path network at Birdwood Parade are considered appropriate and rehabilitation has been completed on most informal tracks over recent years. Due to the steepness of the site the path network within the bushland area does not allow for disability access. However, there is some disability access available from the carpark at Birdwood Parade towards Gunners Memorial. The path network is due to be upgraded in accordance with the City’s Natural Area Path Network Policy. Based on current funding allocations the path network is due to be upgraded in 2017/18.

CULTURAL HERITAGE, INTERPRETATION & EDUCATION

Cultural Heritage, Interpretation and Education has been detailed for all natural areas on pages 55 - 62 of the Natural Areas Management Plan 2013 - 2018.

Walking trails linking all bushlands in the Western Suburbs (including Birdwood Parade) are in the process of being developed for the Whadjuk Trails Project. This is a collaborative project involving Lotterywest, natural area Friends Groups across the Western Suburbs, WESROC local governments, the Botanic Gardens and Parks Authority and the Cities of Fremantle and Stirling. A website displaying information about the trails including Birdwood Parade is in the process of being developed where people can download a map and App of sections of the trail network. Interpretive signage will also be installed through the Reserve detailing the cultural and environmental significance of Birdwood Parade.

NATIVE ANIMALS

Background

There are 13 confirmed native animal species in Birdwood Parade (10 birds, and 3 reptiles). Ongoing surveying of native fauna within Birdwood Parade should be undertaken if resources are available.

At present all these species are managed indirectly through improving bushland condition and control of feral animals which have the potential to predate, compete with or displace native animals. This is discussed under the section on feral animal management on pages 65 – 69 of the Natural Areas Management Plan 2013- 2018.

Strategy for Protection of Native Animals

Birds

Of the 10 bird species identified in Appendix 3 two species are protected under the EPBC Act. These include the Carnaby's Cockatoo (*Calyptorhynchus latirostris*) which is listed as *Endangered* and the Rainbow Bee-eater (*Merops ornatus*) which is listed as a *Migratory* and a *Marine* species.

Large flocks of Carnaby's Cockatoos are often seen foraging in the bushland. Carnaby's Cockatoos have a roost site at 104 Adelma Road Dalkeith (GCC36). There are a further two unconfirmed roost sites being researched by the Threatened Cockatoos Project. One of these is in close proximity to Birdwood Parade which is the Sunset Hospital Site Dalkeith (DEC37) and the other is in part of the Reserve itself which is the Birdwood Parade site (DEC37).

Along with providing food habitat remnant trees also provide nesting habitat for birds. The sandy embankment and parkland areas are also used for nesting by the migratory Rainbow Bee-eaters. Rainbow Bee-eaters migrate annually in summer and nest in Perth's sandy soils where they have been seen nesting and foraging at Birdwood Parade. If nests are encountered in the bushland or parkland area they should be protected so that any restoration work undertaken or mowing activities do not disturb their nests. Feral fox control should also be implemented as they can predate on their nests.

Feral birds

Feral birds compete with native birds for foraging material and nesting hollows. Some also carry diseases which have the potential to infect native bird populations such as Rainbow Lorikeets that carry Beak and Feather Disease. DPAW have been undertaking a five year regional feral bird control program focussing on Rainbow Lorikeets and Long Billed Corellas. They are currently seeking funding from Local Governments to continue this program.

The protection of the mammals and birds at Birdwood Parade can be achieved through:

- Minimising fires that may destroy tree hollows,
- Retaining hollows for refuges in large old and dead trees,
- Controlling feral European Bees as they can displace native animals,
- Protecting nests of Rainbow Bee-eaters if they are encountered,
- Continuation of the fox control program; and
- Contributing to regional program being undertaken by DPAW for feral bird control.

Management Actions 2013 – 2018

ACTIONS	
1.	Undertake ongoing surveying of native fauna if resources allow.
2.	Minimise fires that may destroy tree hollows.
3.	Retain hollows for refuges in large old and dead trees.

4.	Control feral European Bees as they can displace native animals.
5.	Protect nests of Rainbow Bee-eaters if they are encountered.
6.	Continue the fox control program.
7.	Contribute to regional programs being undertaken for feral bird control by DPAW.

COMMUNITY INVOLVEMENT

The objectives and strategies for Community Involvement for the City's Community Friends Groups are detailed on pages 63 - 64 Natural Areas Management Plan 2013- 2018. In summary the activities of bushland community groups should continue to be supported by the City through the Bushland Friends Group Policy and assistance should be provided to help Friends Groups remain sustainable through advertising and the volunteer referral centre.

The Friends of Point Resolution formed in 1999 to protect Point Resolution from proposals to install facilities to increase the use of the Reserve. Whilst they formed to protect Point Resolution, the Friends of Point Resolution also have an interest in the management of Birdwood Parade and have collaborated with the City on Clean Up Australia Day and National Tree Day events held at Birdwood Parade.

Management Actions 2013 – 2018

ACTIONS	
1.	Continue to support community events in the Reserve such as Clean Up Australia Day.

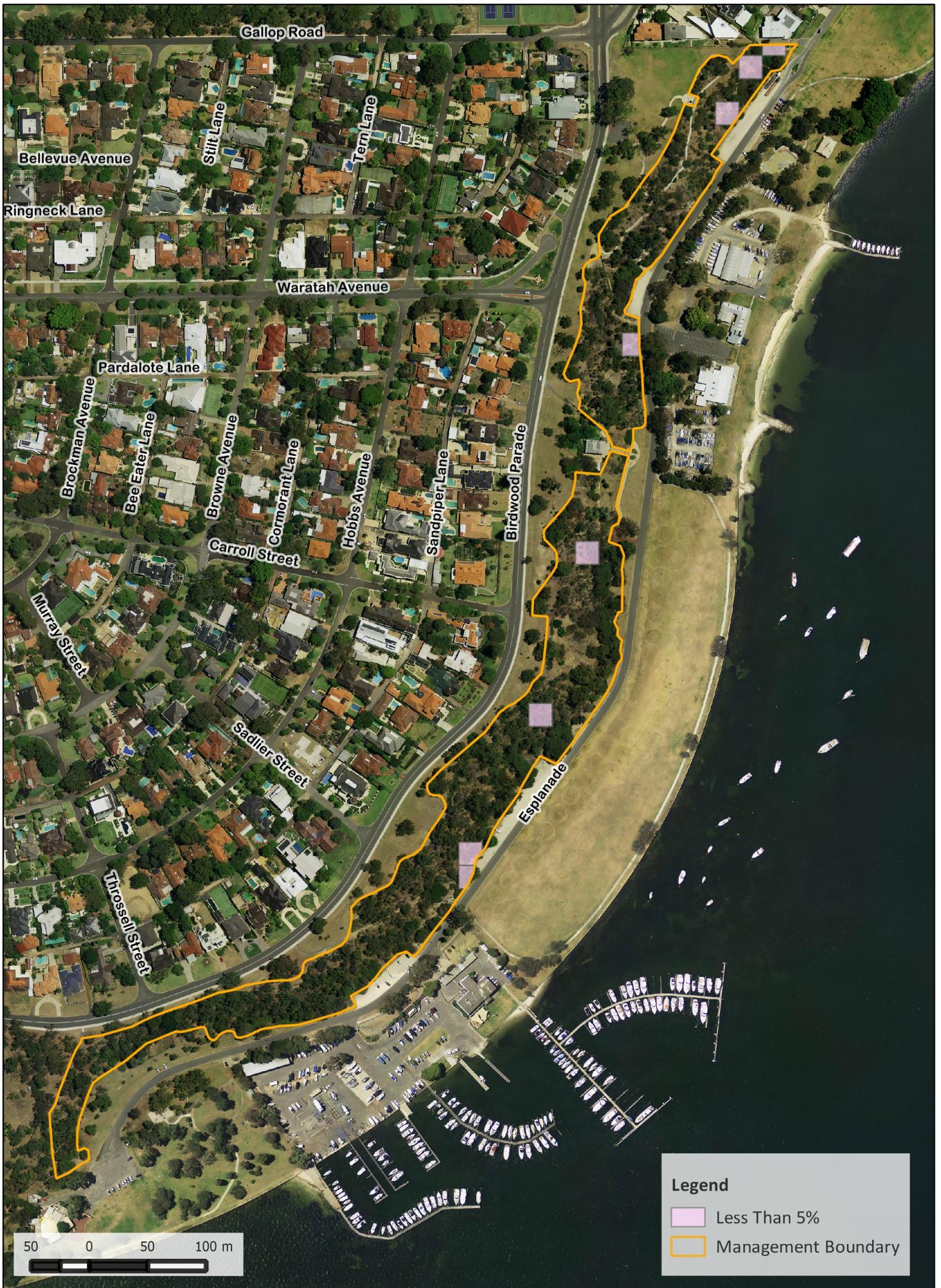
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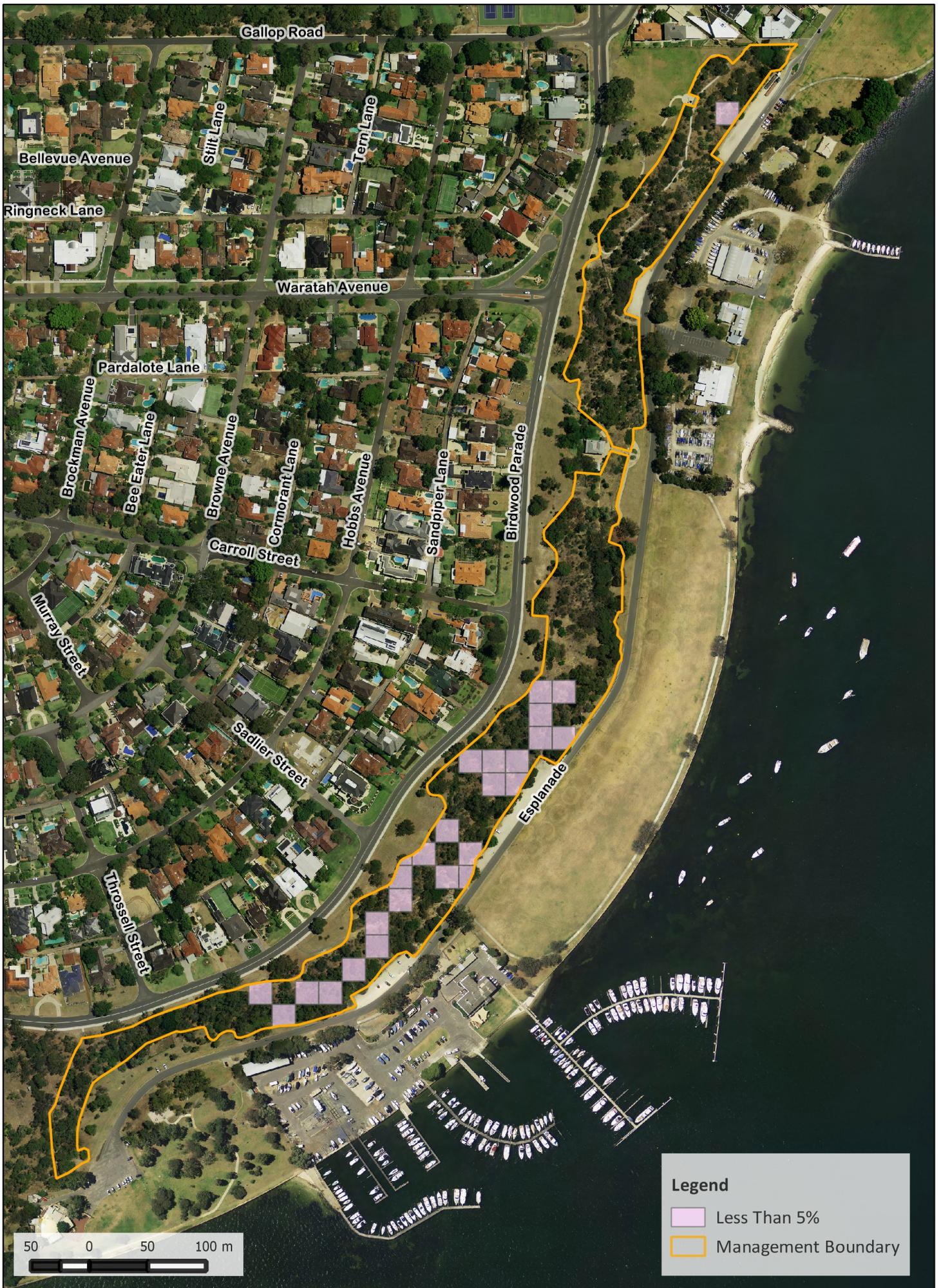




Map 2: Management Zones





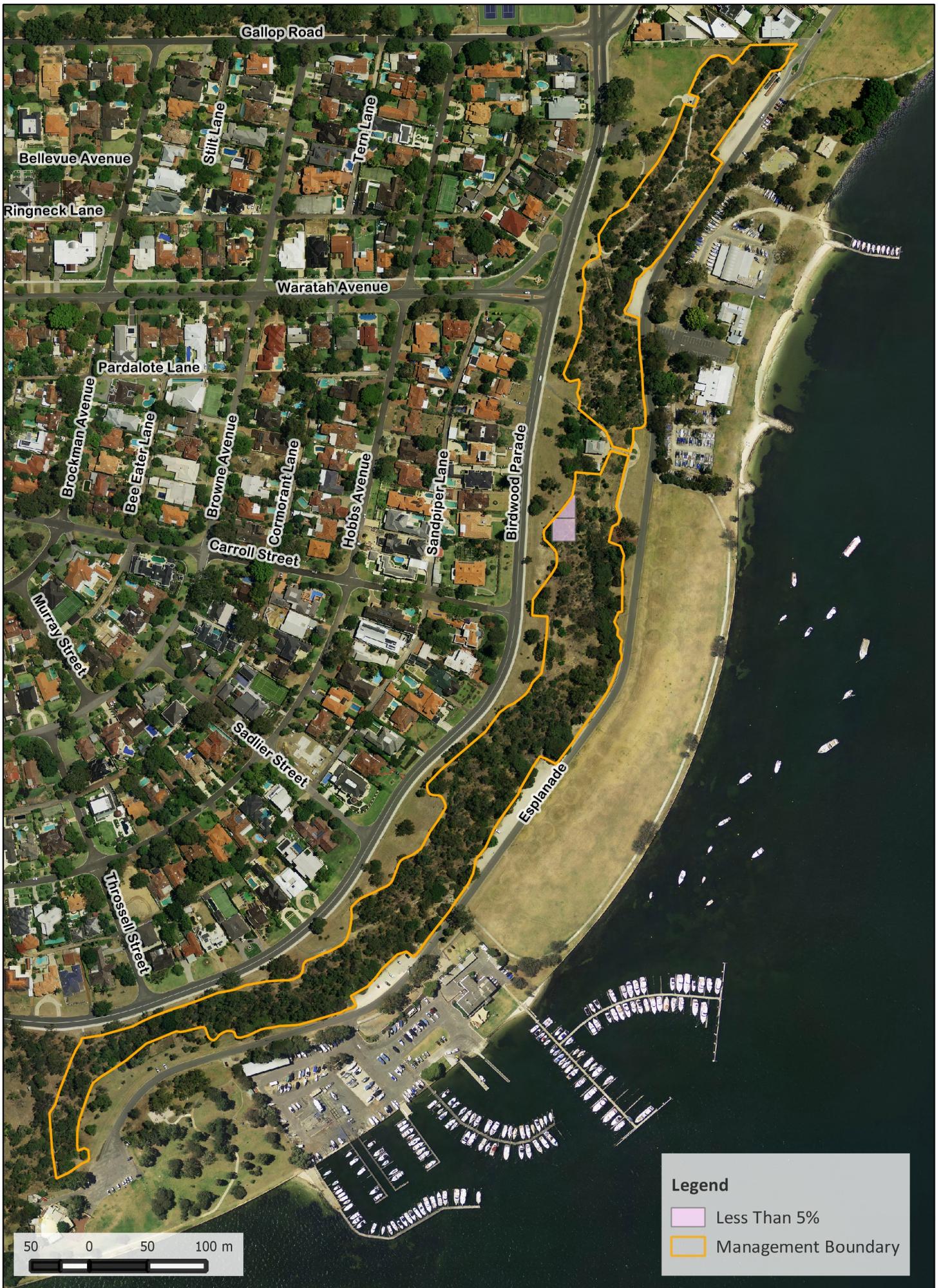








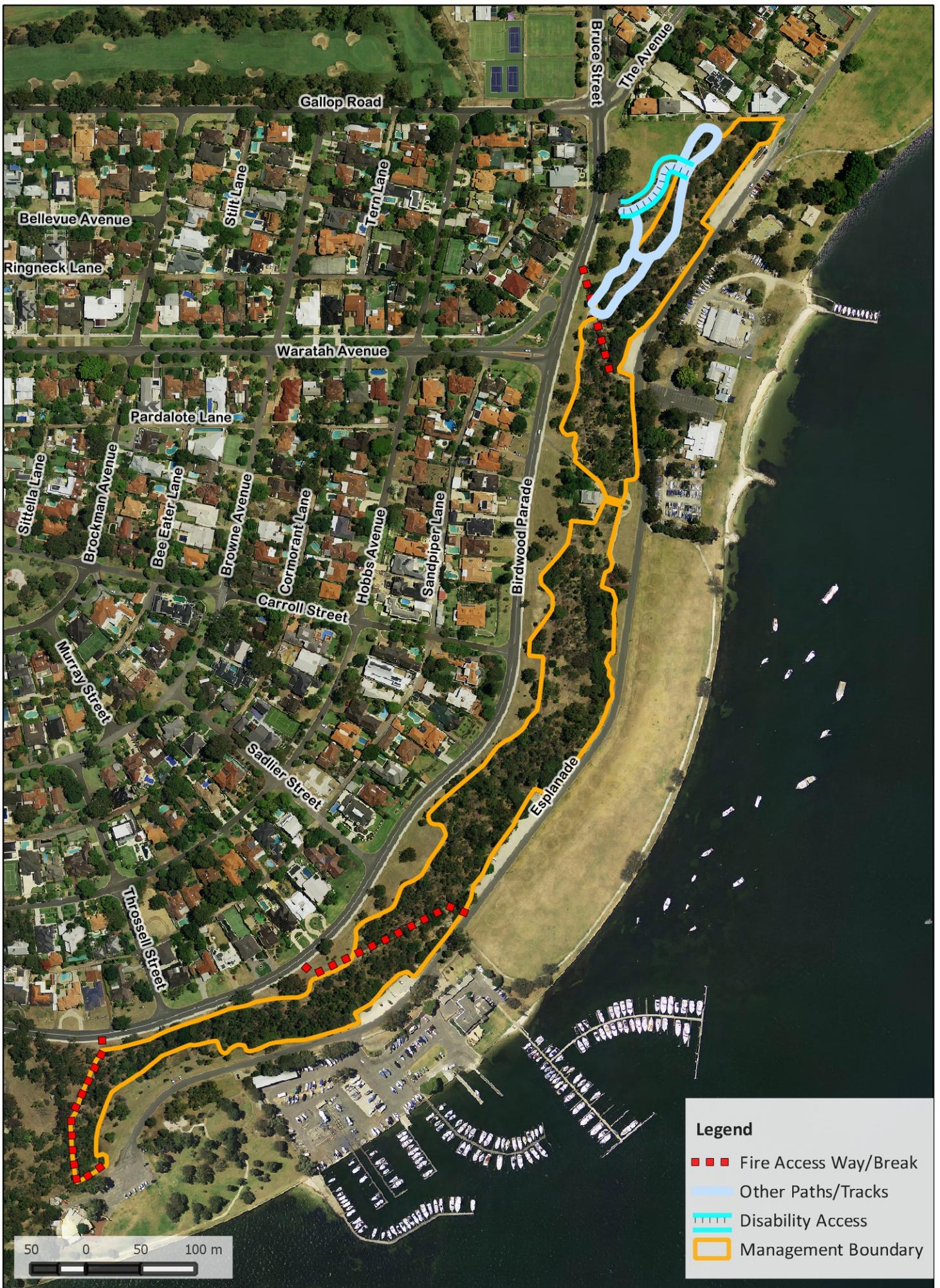








Map 11: Woody Weeds



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Appendix 1

Flora Inventory

Native Plant Inventory

Species	Common Name
<i>Acacia cyclops</i>	Coastal Wattle
<i>Acacia lasiocarpa</i>	Dune Moses
<i>Acacia pulchella</i>	Prickly Moses
<i>Acacia rostellifera</i>	Summer-scented Wattle
<i>Acacia saligna</i>	Golden Wreath Wattle
<i>Acanthocarpus preissii</i>	
<i>Agonis flexuosa</i>	Peppermint
<i>Agonis flexuosa 'nana'</i>	
<i>Alexgeorgea nitens</i>	
<i>Allocasuarina fraseriana</i>	Sheoak
<i>Allocasuarina humilis</i>	Dwarf Sheoak
<i>Astroloma macrocalyx</i>	Swan Berry
<i>Austrostipa flavescens</i>	
<i>Banksia attenuata</i>	Slender Banksia
<i>Banksia grandis</i>	Bull Banksia
<i>Banksia menziesii</i>	Firewood Banksia
<i>Banksia nivea</i>	Honeypot Dryandra
<i>Banksia sessilis</i>	Parrot Bush
<i>Caladenia latifolia</i>	Pink Fairy Orchid
<i>Callistemon phoeniceus</i>	Lesser Bottlebrush
<i>Callitris preissii</i>	Rottnest Island Pine
<i>Calothamnus quadrifidus</i>	One-sided Bottlebrush
<i>Conostylis candicans</i>	Grey Cottonhead
<i>Corymbia calophylla</i>	Marri
<i>Crassula colorata</i>	Dense Stonecrop
<i>Desmocladius flexuosa</i>	
<i>Dianella revolute</i>	Blueberry Lily
<i>Dodonaea hackettiana</i>	Hackett's Hop Bush
<i>Enchylaena tomentosum</i>	Ruby Saltbush
<i>Eremophila glabra</i>	Tar Bush
<i>Eucalyptus gomphocephala</i>	Tuart
<i>Eucalyptus marginata</i>	Jarrah
<i>Ficinia nodosa</i>	Knotted Club Rush
<i>Gompholobium tomentosum</i>	Hairy Yellow Pea
<i>Grevillea crithmifolia</i>	
<i>Grevillea vestita</i>	
<i>Guichenotia ledifolia</i>	
<i>Hakea prostrata</i>	Harsh Hakea
<i>Hardenbergia comptoniana</i>	Native Wisteria
<i>Hemiandra pungens</i>	Snakebush
<i>Jacksonia furcellata</i>	Grey Stinkwood
<i>Jacksonia sternbergiana</i>	Stinkwood

Species	Common Name
<i>Lepidosperma gladiatum</i>	Coast Sword-sedge
<i>Lomandra</i> sp. (probably <i>L. odora</i>)	Tiered Mat Rush
<i>Lomandra caespitosa</i>	Tufted Mat Rush
<i>Macrozamia riedlei</i>	Zamia
<i>Melaleuca huegelii</i>	Chenille Honeymyrtle
<i>Melaleuca lanceolata</i>	Rottnest Tea Tree
<i>Melaleuca systema</i>	Coastal Honeymyrtle
<i>Mesomelaena pseudostygia</i>	
<i>Microtis</i> sp	Mignonette Orchid
<i>Myoporum insulare</i>	Blueberry Tree
<i>Olearia axillaris</i>	Coastal Daisybush
<i>Opercularia</i> sp. (probably <i>O. vaginata</i>)	Dogweed
<i>Petrophile linearis</i>	Pixie Mops
<i>Rhagodia baccata</i>	Berry Saltbush
<i>Scaevola anchusifolia</i>	Silky Scaevola
<i>Scaevola crassifolia</i>	Thick-leaved Fan-flower
<i>Spyridium globulosum</i>	Basket Bush
<i>Sowerbaea laxiflora</i>	Purple Tassels
<i>Stirlingia latifolia</i>	Blueboy
<i>Thysanotus arenarius</i>	
<i>Thysanotus manglesianus</i>	Fringed Lily
<i>Trachymene coerulea</i>	Blue Lace Flower
<i>Tricoryne elatior</i>	Yellow Autumn Lily
<i>Xanthorrhoea preissii</i>	Grass Tree

Weed Inventory

Species	Common Name
<i>Acacia iteaphylla</i>	Flinders Range Wattle
<i>Acacia podalyriifolia</i>	
<i>Aira caryophylla</i>	Silvery Hairgrass
<i>Argyranthemum frutescens</i>	Marguerite Daisy
<i>Arundo donax</i>	Giant Reed
<i>Asparagus asparagoides</i>	Bridal Creeper
<i>Avena barbata</i>	Bearded Oat
<i>Avena fatua</i>	Wild Oat
<i>Bougainvillea glabra</i>	
<i>Brachychiton populneus</i>	Kurrajong
<i>Brassica barrelieri subsp. oxyrrhina</i>	Smooth Stem Turnip
<i>Briza maxima</i>	Blowfly Grass
<i>Briza minor</i>	Shivery Grass
<i>Callistemon sp.</i>	Bottlebrush (fine-leaved form)
<i>Chamelaucium uncinatum</i>	Geraldton Wax
<i>Chasmanthe floribunda</i>	African Cornflag
<i>Conyza bonariensis</i>	Flaxleaf Fleabane
<i>Cotula turbinata</i>	Funnel Weed
<i>Cynodon dactylon</i>	Couch
<i>Dimorphotheca ecklonis</i>	Veldt Daisy
<i>Ehrharta calycina</i>	Perennial Veldt Grass
<i>Ehrharta longiflora</i>	Annual Veldt Grass
<i>Erythrina sykesii</i>	Coral Tree
<i>Eucalyptus caesia</i>	Caesia
<i>Eucalyptus camaldulensis</i> var. <i>obtuse</i>	River Red Gum
<i>Eucalyptus erythrocorys</i>	Illyarrie
<i>Eucalyptus gracilis?</i>	Yorrel
<i>Eucalyptus macrocarpa</i>	
<i>Eucalyptus maculata</i>	Spotted Gum
<i>Eucalyptus paniculata?</i>	Grey Iron Box
<i>Eucalyptus torquata</i>	Coral Gum
<i>Eucalyptus utilis</i>	Coastal Moort
<i>Euphorbia peplus</i>	Petty Spurge
<i>Euphorbia terracina</i>	Geraldton Carnation Weed
<i>Ferraria crispa</i>	Black Flag
<i>Freesia aff. leichtlinii</i>	Freesia
<i>Ficus carica</i>	Edible Fig
<i>Ficus macrophylla</i>	Morton Bay Fig
<i>Fumaria capreolata</i>	Whiteflower Fumitory
	Dove's Foot Cranesbill
<i>Geranium molle</i>	
<i>Gladiolus angustus</i>	Long-tubed Painted Lady
<i>Grevillea robusta</i>	Silky Oak
<i>Hakea petiolaris</i>	Sea Urchin Hakea

Species	Common Name
<i>Hypochaeris glabra</i>	Flatweed
<i>Lactuca serriola</i>	Prickly Lettuce
<i>Lagurus ovatus</i>	Hares Tail Grass
<i>Lantana camara</i>	Common Lantana
<i>Lolium perenne</i>	Perennial Ryegrass
<i>Lupinus angustifolius</i>	Narrow-leaved Lupin
<i>Lupinus cosentinii</i>	Sandplain Lupin
<i>Lysimachia arvensis</i>	Scarlet Pimpernel (blue-flowered form)
<i>Malva parviflora</i>	
<i>Melaleuca armillaris?</i>	Bracelet Honeymyrtle
<i>Melaleuca nesophila</i>	Mindiyeed
<i>Melaleuca raphiophylla</i>	Swamp Paperbark
<i>Melia azedarach</i>	Cape Lilac
<i>Metrosideros excelsa</i>	NZ Christmas Tree, Pohutukawa
<i>Morus</i> sp. (probably <i>M. alba</i>)	Mulberry
<i>Olea europaea</i>	Olive Tree
<i>Orobanche minor</i>	Lesser Broomrape
<i>Oxalis pes-caprae</i>	Soursob
<i>Pelargonium capitatum</i>	Rose Pelargonium
<i>Petrorhagia dubia</i>	Velvet Pink
<i>Phoenix dactylifera</i>	Date Palm
<i>Plumbago capensis</i>	Cape Plumbago
<i>Prunus</i> sp. (possibly <i>P. dulcis</i>)	Almond?
<i>Raphanus raphanistrum</i>	Wild Radish
<i>Ricinus communis</i>	Castor Oil Plant
<i>Romulea rosea</i>	Guildford Grass
<i>Schinus terebinthifolius</i>	Brazilian Pepper
<i>Solanum nigrum</i>	Blackberry Nightshade
<i>Sonchus asper</i>	Rough Sowthistle
<i>Sonchus oleraceus</i>	Sowthistle
<i>Stenotaphrum secundatum</i>	Buffalo Grass
<i>Tamarix aphylla</i>	Athel Pine
<i>Tropaeolum majus</i>	
<i>Trachyandra divaricata</i>	Dune Onion weed
<i>Trifolium campestre</i>	Hop Clover
<i>Tropaeolum majus</i>	Nasturtium
<i>Urospermum picroides</i>	False Hawkebit
<i>Ursinia anthemoides</i>	Ursinia
<i>Wahlenbergia capensis</i>	Cape Bluebell

Appendix 2 Fungi Inventory

Scientific Name	Common Name
<i>Crepidotus sp</i>	
<i>Laetiporus portentosus</i>	White Punk
<i>Pycnoporus coccineus</i>	Scarlet Bracket Fungus
<i>Scleroderma sp.</i>	Earthball

Appendix 3 Fauna Inventory

Bird Inventory

Common Name	Scientific Name	Introduced
Rock Dove (Feral Pigeon)	<i>Columba livia</i>	*
Laughing Dove	<i>Streptopelia senegalensis</i>	*
Spotted Dove	<i>Streptopelia chinensis</i>	*
Carnaby's Cockatoo	<i>Calyptorhynchus latirostris</i>	
Galah	<i>Eolophus roseicapilla</i>	
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	*
Australian Ringneck	<i>Barnardius zonarius</i>	
Laughing Kookaburra	<i>Dacelo novaegainae</i>	*
Rainbow Bee-eater	<i>Merops ornatus</i>	
Variegated Fairy Wren	<i>Malarus lambertii</i>	
Red Wattlebird	<i>Anthochaera carunculata</i>	
Welcome Swallow	<i>Hirundo neoxena</i>	
Australian Magpie	<i>Cracticus tibicen</i>	
Australian Raven	<i>Corvus coronoides</i>	
Silver Eye	<i>Zosterops lateralis</i>	

Mammals and Reptiles Inventory

Mammals		Introduced
Fox	<i>Vulpes vulpes</i>	*
Rabbit	<i>Oryctolagus cuniculus</i>	*
Reptiles		
Sands Gould's Monitor	<i>Varanus gouldii</i>	
Fence Skink	<i>Cyrtoblepharus buechananii</i>	
Western Bobtail	<i>Tiliqua rugosa</i>	

Appendix 4 Priority Weed Management Notes (Taken from Florabase)

Species Name	Common Name	Management Strategy	Timing (optimal)
1. <i>Acacia iteaphylla</i>	Flinders Range Wattle	Manually remove populations.	All Year
2. <i>Avena fatua</i>	Wild Oat	Spray at 3-5 leaf stage with Fusilade Forte at 16 ml/10 L and wetting agent. Repeat treatment over following 2 years. Prevent seed production and seedbank inputs each year. For small infestations hand removal may be feasible.	Aug - Nov
3. <i>Agave americana</i>	Century Plant	Dig out and/or hand remove small infestations. Stem inject into base of leaves 1 part Tordon/5 parts diesel.	Nov - Jan
4. <i>Argyranthemum frutescens</i>	Marguerite Daisy	Manually remove populations.	June - Oct
5. <i>Asparagus asparagoides</i>	Bridal Creeper	Dig out juvenile seedlings in degraded areas. Spray 0.2 g metsulfuron methyl + Pulse in 15 L water (or 2.5 - 5g /ha + Pulse). Best results achieved when flowering. Biological control agents available such as the Leafhopper and the Rust.	July - Aug
6. <i>Brachychiton populneus</i>	Kurrajong	Hand pull seedlings. For mature plants try stem injection with 50-100% glyphosate or apply 250 ml Access in 15 L of diesel to basal 50 cm of trunk (basal bark) or cut and paint with 50% glyphosate.	Sept - April
7. <i>Brassica barrelieri</i> subsp. <i>oxyrrhina</i>	Smooth Stem Turnip	Manually remove populations.	June - Oct
8. <i>Carpobrotus edulis</i>	Hottentot Fig	Manual methods appear to be the most effective means of control. Roll up large mats removing all roots and stem fragments and remove from site. Follow up with removal of any germinating plants. Only remove when flowering.	Sept - Nov
9. <i>Chamelaucium uncinatum</i>	Geraldton Wax	Cut to base and paint with 50% glyphosate. Control seedlings following fire.	All Year
10. <i>Chasmanthe floribunda</i>	African Cornflag	Dig out isolated plants.	June - Sept
11. <i>Cynodon dactylon</i>	Couch	Spray Fusilade Forte at 8 ml/L + wetting agent when plants are small and beginning new growth, or 1% glyphosate (at degraded sites) in late spring/summer and autumn when rhizomes are actively growing.	Nov- Feb
12. <i>Ehrharta calycina</i>	Perennial Veldt Grass	For small infestations, cut out plants ensuring crown removal. Do not slash. Alternatively spray with Fusilade Forte 13 ml/L or 3.3-6.6 L/ha + wetting agent on actively growing and unstressed plants. Use higher rate in dense undergrowth or on older less vigorous plants. Follow-up in subsequent years. Use unplanned fires to spray regrowth and seedlings within 4-6 weeks of germination.	June - Sep (herbicide) and Nov - Feb (manual)
13. <i>Ehrharta longiflora</i>	Annual Veldt Grass	Hand remove small infestations. Alternatively spray with Fusilade Forte 30 ml/10 L or 1.6 L/ha (based on 500 L water/ha) + wetting agent before flowering stem emerges, or at 3-5 leaf stage.	Aug - Oct
14. <i>Euphorbia terracina</i>	Geraldton Carnation Weed	Manually remove populations. Undertake control after any fire event.	June - Nov

Species Name	Common Name	Management Strategy	Timing (optimal)	
15.	<i>Ferraria crispa</i>	Black Flag	Hand remove very small populations in degraded sites. Sift soil to find all corms. Spray 2,2 DPA 10 g/L + Pulse when flowering. In degraded sites try glyphosate 1% + metsulfuron methyl 0.2 g/15 L + Pulse. Takes a number of years to control populations.	Aug - Sept
16.	<i>'Freesia alba x leichtlinii</i>	Freesia	Spot spray metsulfuron methyl 0.2 g/15 L + Pulse or 2.5-5 g/ha + Pulse. Apply just on flowering at corm exhaustion.	July – Aug
17.	<i>Fumaria capreolata</i>	Climbing Fumitory	Hand remove seedlings in good bushland areas.	July – Aug
18.	<i>Leptospermum laevigatum</i>	Coast Teatree	Hand pull seedlings. Fell mature plants. Resprouting has been recorded in some areas. Where resprouting has been observed, apply 250 ml Access in 15 L of diesel to bottom 50 cm of trunk (basal bark).	July - Oct
19.	<i>Lagurus ovatus</i>	Hare's Tail Grass	Prevent seed set. Hand removal small isolated infestations. In selective situations spray with 16 ml/10 L (800 ml/ha) Fusilade Forte + spray oil any time before flowering. A lower rate of 13 ml/10 L Fusilade Forte can be used in winter at the 2-8 leaf stage before stem elongation.	June - Aug
20.	<i>Lupinus angustifolius</i>	Narrowleaf Lupin	Manually remove populations.	June - Oct
21.	<i>Lupinus cosentinii</i>	Sandplain Lupin	Manually remove populations.	June - Oct
22.	<i>Olea europaea</i>	Olive	Hand pull or dig out seedlings and small plants ensuring removal of all roots. For mature plants cut to base and paint 50% glyphosate or apply 250 ml Access in 15 L of diesel to base 50 cm of trunk (basal bark). Monitor sites for seedling recruitment.	March – May and Oct - Dec
23.	<i>Pelargonium capitatum</i>	Rose Pelargonium	Only control when native vegetation has established. Hand pull isolated plants taking care to remove the entire stem as it can reshoot from below ground level. Spot spray metsulfuron methyl 5 g/ha + Pulse. Easily controlled after fire.	June - Oct
24.	<i>Pennisetum clandestinum</i>	Kikuyu Grass	Difficult to manually control as all rhizomes must be removed. Spray with 1% glyphosate or Fusilade Forte at 16mL/L + wetting agent. 2-3 sprays over a single growing season are often required. Use unplanned fire events to effectively control regrowth.	Nov - Jan
25.	<i>Raphanus raphanistrum</i>	Wild Radish	Manually remove populations.	June - Oct
26.	<i>Schinus terebinthifolius</i>	Brazilian Pepper	Hand pull seedlings ensuring removal of all root material. Stem inject older plants using 50% glyphosate or basal bark with 250 ml Access in 15 L of diesel to bottom 50 cm of trunk during summer. Avoid root disturbance until trees are confirmed dead.	Dec - March
27.	<i>Trachyandra divaricata</i>	Dune Onion Weed	Only control when native vegetation has established. Manually remove isolated or small infestations prior to flowering. Wipe with 50% glyphosate solution before flowering. For dense infestations in degraded areas spot spray 0.4 g chlorosulfuron plus 25 ml wetting agent in 10 L of water when plants actively growing.	June - August

Appendix 5: Implementation of the 2003 – 2009 Management Plan.

RECOMMENDATIONS		Implemented Yes/No/ Partially
BUSHLAND BOUNDARIES		
1.	Clearly delineate boundaries between parkland and bushland and heritage precincts.	Yes
2.	Manage the bushland at Birdwood Parade on the basis of 5 zones, as predominately delineated by existing paths.	Yes
3.	Expand the extent of bushland at the base of the scarp at Birdwood Parade Reserve, eastwards to the Esplanade.	Yes
4.	Establish informal garden beds of indigenous plants at least 1 m wide, and preferably several metres wide, between parkland and bushland.	Yes
5.	Install a low limestone wall between the garden beds of indigenous plants and parkland. Establish distinct bushland/parkland boundaries for Zones 1 and 2 at Point Resolution as a priority.	No
6.	Concentrate rehabilitation efforts at identified rehabilitation sites.	Yes
REHABILITATION		
7.	Establish distinct bushland/parkland boundaries for Zones 2 and 3 at Birdwood Parade as priorities.	Yes
8.	Prioritise rehabilitation within and adjacent to areas of bushland in better condition (Zone 3 & 4).	Yes
9.	Revegetate areas in Zone 5 (at the base of the scarp at Birdwood Parade) as a low priority.	Yes
REVEGETATION		
10.	Develop Rehabilitation Plans for all sites to be intensively managed. These should include as a minimum the boundary of works, a planting list and native plants present that require protection.	Partially
11.	Use only plant species for rehabilitation if they would have naturally occurred at the sites, with consideration given to species present onsite, species present on the Mt Eliza Escarpment at Kings Park and expert advice.	Yes
12.	Continue to compile a comprehensive list of species present for both sites.	Yes
13.	Use only forms of plants that would have naturally occurred onsite.	Yes
14.	Consider specific conditions (such as the need to restrict access and slope stability) in developing plant lists for rehabilitation sites.	Yes
15.	Use Jutemat or equivalent on slopes exceeding 25°, particularly where native vegetation is sparse and soils either loose or shallow.	Yes
16.	Document all rehabilitation undertaken including weed control and tree planting.	Yes
17.	Annually remove Tree Guards from seedlings that have not survived.	Yes
18.	Establish a monitoring program for indigenous species, with the location and abundance of species in very low abundance recorded.	No
19.	Consider visual amenity in Site Rehabilitation Plans.	Yes
WEED CONTROL		
20.	Use an integrated approach to weed control including herbicides, manual removal, modifying microclimates (in terms of shade, moisture etc) and biological controls (such as Bridal Creeper Leafhopper and Rust).	Yes

21.	Establish a monitoring program for weed distributions.	Yes
22.	Continue control of African Cornflag and Black Flag as a priority at Birdwood Parade.	Yes
DISEASE CONTROL		
23.	Establish hygiene protocols for Council operations within bushland reserves	Yes
24.	Minimise operations involving movement of soil, such as firebreak and track construction and maintenance, to a minimum, and carry out these operations under strict dieback hygiene practices.	Yes
25.	Ensure that any soil or plant material used for bushland restoration should be certified as Phytophthora-free.	Yes
26.	Ensure that nurseries commissioned to grow plants for revegetation works are accredited dieback-free nurseries.	Yes
FIRE MANAGEMENT		
27.	Ban all open fires at all times should be instigated within the study area.	Yes
28.	Suppress and contain any wildfires within the study area as quickly as possible.	Yes
29.	Document fire history with the extent of fires mapped, and dates and causes recorded.	Yes
30.	Develop a Fire Control Working Plan (FCWP) for the Municipality.	Yes
31.	Supply copies of the FCWP to local Fire Brigades so that they are aware of the biological assets that require protection, and access and infrastructure in the vicinity.	Yes
32.	Control access into burnt areas as soon as possible after the fire.	Yes
ACCESS		
33.	Regularly prune along all paths to be retained.	Yes
34.	Develop standards for bushland paths.	Yes
35.	Maintain all bushland paths to satisfactory standard.	Partially
36.	Maintain the path network at Birdwood Parade Reserve.	Yes
37.	Develop a path within Zone 5 at Birdwood Parade Reserve when this Zone is restored to bushland.	No
38.	Preference be given to access restrictions that not dominate the site such as providing obvious paths maintained to a high standard, garden beds planted at high density and strategically placed prickly plants and kerbing or low limestone walls.	Yes
COMMUNITY INVOLVEMENT		
39.	Develop a programme of activities that could involve the community in bushland rehabilitation activities.	Yes
40.	Develop, in conjunction with interpretation of historical aspects of the reserves, interpretative signage explaining rehabilitation programmes being undertaken.	No
CULTURAL HERITAGE, INTERPRETATION & EDUCATION		
41.	Undertake surveys to determine the location of the old buildings within Birdwood Parade Reserve.	No
42.	Develop an interpretative trail relating the bushland condition and cliff faces to the quarrying and farming undertaken at Birdwood Parade Reserve.	No
43.	Consult with Aborigines to investigate potential for cultural interpretation.	No