

**LOT 4 UNDERWOOD AVENUE,
SHENTON PARK
CONSERVATION MANAGEMENT PLAN**

Prepared for:

The University of Western Australia
35 Stirling Highway
CRAWLEY WA 6009

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1 INTRODUCTION

1.1 Background

The University of Western Australia (UWA) has applied to develop the north eastern portion of Lot 4 Underwood Avenue, Shenton Park (Figure 1) for residential purposes. The total development area of Lot 4 is 33.4 hectares (ha), of which approximately 11.9ha of bushland will be retained for conservation and passive recreation and 13ha will be cleared for a residential subdivision. The remaining 8.5ha will continue to be used for University purposes but is set aside for future development. This area will not be cleared and earthworked until the future land use is determined through the planning process. The 11.9ha of bushland consists of two Bush Forever areas (Conservation Areas) totalling 10ha set aside for conservation purposes and an inter-connecting vegetated Public Open Space (POS) area covering approximately 1.88ha (Figure 2).

The proposal to subdivide the landholding has been assessed by the Environmental Protection Authority (EPA) under assessment number 1403. This Conservation Management Plan (CMP) has been prepared by Coffey Environments (formerly ATA Environmental) to guide the management of the two Conservation Areas, plus an area of 3.9ha which is currently set aside for future development (labelled Area 2 on Figure 2).

The Shenton Park Conservation Association Inc. (SPCA), an incorporated association has been established to assist and advise the UWA on the conservation and management of Lot 4 Underwood Avenue. The SPCA will covenant with the UWA to manage the Conservation Areas in accordance with this CMP.

1.2 Purpose

This CMP has been prepared to satisfy the following Ministerial Conditions:

4 Compliance Reporting

- 4-1 The proponent shall submit to the CEO environmental compliance reports annually reporting on the previous twelve-month period, unless required by the CEO to report more frequently.
- 4-2 The environmental compliance report shall address each element of an audit program approved by the CEO and shall be prepared and submitted in a format acceptable to the CEO.
- 4-3 The environmental compliance reports shall:
 - 1. be endorsed by signature of the proponent's Vice Chancellor or a person, approved in writing by the CEO, delegated to sign on behalf of the proponent's Vice Chancellor;
 - 2. state whether the proponent has complied with each condition and procedure contained in this statement;
 - 3. provide verifiable evidence of compliance with each condition and procedure contained in this statement;
 - 4. state whether the proponent has complied with each key action contained in any environmental management plan or program required by this statement;

5. provide verifiable evidence of conformance with each key action contained in any environmental management plan or program required by this statement;
 6. identify all non-compliances and non-conformances and describe the corrective and preventative actions taken in relation to each non-compliance;
 7. review the effectiveness of all corrective and preventative actions taken; and
 8. describe the statement of implementation of the proposal.
- 4-4 The proponent shall make the environmental compliance reports required by condition 4-1 publicly available in a manner approved by the CEO.

6 Rehabilitation Plan

- 6-1 Within six months following the formal authority issued to the decision-making authorities under section 45(7) of the *Environmental Protection Act 1986*, the proponent shall prepare a Rehabilitation Plan for the area identified as "Area 2" on Figure 1, to the requirements of the Minister for the Environment on advice of the Department of Environment and Conservation.

The objective of this Plan is to provide for rehabilitation of the existing degraded area of native vegetation and enhancement of its biodiversity values through planting of local native species of local provenance and weed control.

This Plan shall address the following:

1. planting and/or seeding of appropriate local native vegetation species;
 2. removal of weeds; and
 3. management to maintain and enhance bush values.
- 6-2 The Rehabilitation Plan required by condition 6-1 shall be modified as necessary to exclude areas for which the proponent has received written advice from the Minister for the Environment under condition 5-2.
- 6-3 The proponent shall implement the Rehabilitation Plan required by condition 6-1.
- 6-4 The proponent shall make the Rehabilitation Plan required by condition 6-1 publicly available in a manner approved by the CEO.

1.3 Scope

The CMP addresses the following items to achieve the objective of restoring and maintaining the Conservation Areas' environmental values:

- the values and attributes of the Conservation Areas, including vegetation units and condition, significant flora and fauna;
- the regional conservation context of the Conservation Areas, including a description of ecological linkages;
- the rehabilitation methodology to incorporate continued rehabilitation of the vegetation in less than 'good condition' within the Conservation Areas and Area 2, with the aim of eventually bringing these areas to 'very good' condition;

- condition assessment;
- weed and feral animal control and management;
- assessment and management of conservation compatible land uses;
- fencing and management of public access;
- signage and interpretation;
- fuel management (addressed in Fire Suppression and Management Plan);
- time lines for implementation; and
- community involvement.

2 VALUES AND ATTRIBUTES OF THE CONSERVATION AREAS AND AREA 2

Environmental investigations of the whole of Lot 4 were conducted in December 1997 and July 1998 by ATA Environmental on behalf of UWA. Additional work, including a spring survey was conducted in September to November 2000 by ATA Environmental as well as a Level 1 Fauna Assessment in November 2003. A targeted survey of *Banksia prionotes* was conducted in November 2007. The following section provides a description of the values and attributes of the Conservation Areas and Area 2.

The majority of the survey work was completed before the issue of EPA Guidance Statements No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA, 2004a) and No. 56: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia (EPA, 2004b) in June 2004. The EPA formally assessed the development proposal relating to Lot 4 Underwood Avenue in October 2007 in Bulletin 1272 (EPA, 2007).

The location and shape of the two Conservation Areas was determined using a range of criteria and followed an extensive consultation process with relevant government agencies including the Bush Forever office of the Department of Planning and Infrastructure (DPI) and the Department of Environmental Protection (now the Department of Environment and Conservation, DEC). The principal criteria for the selection of the Conservation Areas were to protect as many of the vegetation associations, flora and fauna on the site in a position that maintained the ecological linkage to other bushland reserves nearby. The University's requirements to develop the land in accordance with the existing zoning was also a factor in determining the size of the Conservation Areas.

2.1 Vegetation Description

2.1.1 Vegetation Associations and Condition

Conservation Area A (refer to Figure 2) occupies a total area of 8ha and is located in the southeast corner of Lot 4 adjacent to Selby Street. Conservation Area B (refer to Figure 2) occupies 2ha and is located in the western portion of the proposed developable area.

The vegetation of Lot 4 is dominated by a *Eucalyptus/Banksia/Allocasuarina* Low Woodland to Open Woodland which can be divided into six vegetation associations consisting of a Jarrah (*Eucalyptus marginata*)/*Banksia*/Sheoak (*Allocasuarina fraseriana*) Low Woodland, *Banksia attenuata*/*B. menziesii* Low Woodland, a *Banksia prionotes* Closed Scrub, Jarrah and Tuart (*Eucalyptus gomphocephala*) Open Woodland, *Eucalyptus decipiens* Low Woodland and a Jarrah Woodland.

The vegetation of Conservation Area A consists entirely of a Jarrah dominated Woodland with scattered Tuart and Marri trees over a lower tree canopy of *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana*. Typical taller shrub species include *Jacksonia furcellata*, *Hakea prostrata*, *Xanthorrhoea preissii* and *Macrozamia fraseri*. Common understorey species include *Gompholobium tomentosum*, *Hibbertia hypericoides*, *Acacia pulchella*, *Calytrix fraseri*, *Mesomelaena pseudostygia*, *Desmocladius flexuosus* and *Petrophile linearis*.

The bushland in Conservation Area A is mainly in Very Good to Good condition or better (Figure 3).

Conservation Area B contains a greater variety of vegetation associations than Conservation Area A (Figure 2). It mostly comprises *Banksia menziesii* – *B. attenuata* woodland over *Allocasuarina fraseriana* and *Hakea prostrata*. In places, there is stunted Jarrah or emergent Tuart. Species common in the understorey of the Banksia Low Woodland include *Hakea prostrata* up to 2m and low shrubs of *Mesomelaena pseudostygia*, *Xanthorrhoea preissii*, *Petrophile linearis* and *P. macrostachya*. *Alexgeorgea nitens*, *Desmocladius flexuosus*, *Dryandra lindleyana* and several weed species dominate the ground cover. However, also protected in this area is Jarrah Open Woodland over *Banksia menziesii* Low Woodland and a *Eucalyptus decipiens* stand. A stand of *Eucalyptus decipiens* is also conserved in Conservation Area B, which is not a Priority or Declared Rare Flora (DRF) species but is uncommon in the Perth Metropolitan Region, usually occurring in very small stands on shallow sand over limestone. Also protected in this conservation area are two populations of the Priority 4 species *Jacksonia sericea*. As illustrated in Figure 2, these populations are located in the north west and centre of Conservation Area B.

The bushland in Conservation Area B is mapped mainly as Good to Very Good condition (Figure 3). The balance of Conservation Area B is mapped as Good.

The composition of the Conservation Areas and Area 2 according to vegetation associations is shown in Table 1.

Table 1
Vegetation Associations in the Conservation Areas and Area 2.

Vegetation Association	Conservation Areas A & B	Area 2
Jarrah/Banksia/Sheoak Low Woodland	7.98ha	0.08ha
Jarrah/Tuart Open Woodland	-	0.42ha
<i>Banksia attenuata</i> / <i>B. menziesii</i> Woodland	1.57ha	
<i>Eucalyptus decipiens</i> Low Woodland	0.1ha	
Jarrah over <i>Banksia menziesii</i> Low Woodland	0.33ha	0.7ha
Cleared	0.01ha	2.7ha
Total	10ha	3.9ha

The condition of the vegetation on the subject land has been re-assessed since the previous report of ATA Environmental (November 2000) largely as a result of a fire which swept through most of the site in January 2002.

The 10ha of conservation area consists of 9.7ha Good to Very Good (4.87ha Very Good; 3.67ha Good to Very Good; and 1.16ha Good) condition vegetation and 0.3ha Degraded. Weed invasion is the dominant disturbance factor influencing the condition of the vegetation. Dominant weeds include Veldt Grass (*Ehrharta calycina*, *E. longifolia*), Blowfly Grass (*Briza maxima*), Lupin (*Lupinus* sp.), and Gladiolus (*Gladiolus caryophyllaceus*).

The majority of Area 2 (2.7ha) is cleared, with 0.34ha in Good Condition and 0.14ha in Very Good to Good condition. Rehabilitation of the eastern and southeastern portions of Area 2 was conducted by ATA Environmental in 2004-2005, however due to the proposed development this program did not continue and the condition of Area 2 has since declined. An area of approximately 0.88ha (Figure 5) is currently used for University research purposes and will not be rehabilitated. The majority of the remainder of Area 2 will require further rehabilitation.

UWA is committed to rehabilitating the Degraded areas to at least a Good condition and other weedy sections to a Very Good condition (refer to Section 4).

2.1.2 Flora

A total of 149 species of vascular plants has been recorded from the vegetated portion of Lot 4. The Conservation Areas have been designed to retain representative examples of each vegetation association on the whole site. Based on the variety of vegetation associations retained and the general high quality of the bushland in the Conservation Areas it can be expected that a significant proportion of the species recorded on Lot 4 occur in the Conservation Areas.

Of the total species recorded on Lot 4, 112 are native to the site and 37 are introduced species not native to the area (includes native Australian species which are garden escapes). Two populations of the Priority 4 species *Jacksonia sericea* occur in Conservation Area B.

In addition to the vegetation associations listed in Table 1, Coffey Environments conducted a targeted *Banksia prionotes* search on 13 November 2007 which revealed there are populations of *B. prionotes* occurring in both Conservation Areas A and B. Figure 4 shows the locations of *B. prionotes* in each of the Conservation Areas.

The targeted survey revealed that the few saplings that occur in Conservation Area B are yet to flower. The large population of *Banksia prionotes* occurring on the eastern edge of Conservation Area A contains a large number of saplings some of which flowered last season (refer to Table 2).

Although not recorded during the ATA Environmental surveys of the site, *Lomandra hermaphrodita* was recorded in two quadrats during a quadrat-based survey conducted by Bronwen Keighery and Rebecca Ryan of the EPA Service Unit in 2003. This species is important for the breeding cycle of the endangered Graceful Sun Moth (*Synemon gratiosa*). Although the species is likely to be found elsewhere on site, the two quadrats containing *L. hermaphrodita* are located within the Conservation Areas ensuring populations of this species will be retained on Lot 4.

Table 2
Recordings of *Banksia prionotes*.

Area	Name	GPS	Photo	Height (m)	# of plants	Health	Flowering status	Seedling presence
B	BP3	CTR 386391, 6464455 NE 386398, 6464461 SE 386397, 6464445 SW 386382, 6464450 NW 386377, 6464465	284	to 5	50	H	Flowered previously (some last season)	Seedlings
B	BP4	386368, 6464436		to 3.5	2	H	Few flowers last season	
B	BP5	386349, 6464454		to 3.5	2	H		Seedlings
B	BP7	386325, 6464450		to 3.5	1	H		Seedlings
A	BP8	386602, 6464237		to 2	12	H	No flowers previously	
A	BP9	386627, 6464230		to 7	20	H	Flowered previously (some last season)	Seedlings
A	BP10	386646, 6464234		to 2	6	H	No flowers previously	
A	BP11	386671, 6464229		to 1	1	H	No flowers previously	
A	BP12	Nth 386966, 6464336 Sth 386968, 6464295		to 3	56	H	Flowered previously 1/3 flowered for first time last season	Few seedlings
A	BP13	Sth 386967, 64643647 Nth 386964, 6464432	289	to 3	150	HD	1/4 flowered before some last season	Few seedlings
A	BP14	386711, 6464433		to 0.5	4	H	No flowers previously	
A	BP15	386681, 6464425		to 1	3	H	No flowers previously	
A	BP16	386688, 6464401		1	1	H	No flowers previously	
A	BP17	386693, 6464246		1	1	H	No flowers previously	
A	BP18	386663, 6464244		to 1	1	H	No flowers previously	

2.1.3 Vertebrate Fauna

The bushland on Lot 4 is considered to support around 77 species of vertebrate fauna, including 46 bird species, 28 reptile species and 3 amphibian species. This is based on the size and range of habitat available, surveys of similar habitats in Lemnos Street bushland and Bold Park and the known distribution and habitat of species.

One bird species, Carnaby's Cockatoo is currently listed on Schedule 1 under the Wildlife Conservation (Specially Protected Fauna) Notice 2003 and several other bird species including the Painted Button Quail, Brown Goshawk, Collared Sparrowhawk, Weebill, Varied Sittella and Yellow-rumped Thornbill have reduced distributions or declining population levels on the Swan Coastal Plain as a result of urbanisation and other disturbance factors (Government of WA, 2000).

The habitats present in the proposed Conservation Areas are likely to be suitable for all the vertebrate species previously recorded from the site. In particular, the threatened Carnaby's Cockatoo is an autumn and winter feeding visitor to the site and mainly feeds on the seeds of *Banksia* species which are present in the proposed Conservation Areas.

2.1.4 Invertebrate Fauna

Historically, the Graceful Sun Moth (*Synemon gratiosa*) has been recorded at nine locations between Wanneroo and Mandurah. It has not been recorded at the Underwood Avenue site, however it was found in March 2004 at the nearby Shenton Bushland (Matt Williams, DEC, personal comment). All sites where the Graceful Sun Moth has been identified contained mat rush (*Lomandra hermaphrodita*) which the moths use the base of to lay their eggs on (Willers, 2007). Although not recorded during the ATA Environmental surveys of the site, *L. hermaphrodita* was recorded during a quadrat-based survey conducted by the EPA Service Unit in 2003. *L. hermaphrodita* was recorded in 2 quadrats which are both located within the Conservation Areas. Mat rush is likely to be located in other areas of the Underwood Avenue site, although it is highly unlikely to be common or widespread.

2.2 Ecological Linkages

The existing bushland area at Underwood Avenue provides a corridor function in the Perth Metropolitan Region for bird species, both in a north-south and east-west directions, and more locally between Kings Park, Shenton Park bushland and Bold Park. The implementation of this management plan will contribute to the maintenance of a portion of the linkage.

The high number of roads and development around the site would prevent movement of reptiles and amphibia between Lot 4 and other bushland sites. The main potential bushland linkage from the site for fauna other than birds, is to the south through to the Shenton Bushland area.

2.3 Regional Conservation Value

The adequacy of the Conservation Areas in protecting the core conservation values of the Bush Forever site will be assessed by the EPA according to the criteria used for identifying bushland of regional significance as utilised in Bush Forever (Government of WA, 2000). The regional conservation values of the Conservation Areas according to the Bush Forever criteria is summarised in Table 3.

Table 3
Regional Significance of the Conservation Areas.

Bush Forever Criterion	Conservation Areas Attributes
Representation of Ecological Communities	The Conservation Areas include 10ha of Karrakatta - Central and South Vegetation Complex.
Diversity	The Conservation Areas include representative examples of all six vegetation associations occurring over the balance of the site. Retains representative examples of each vegetation association at the site and based on the general high quality of the bushland it can be expected that a significant proportion of the species recorded at the site occur in the conservation area.
Rarity	Two populations of the Priority 4 species, <i>Jacksonia sericea</i> and a species uncommon in the PMR, <i>Eucalyptus decipiens</i> occur in the Conservation Areas.
Maintaining Ecological Processes or Natural Systems	The Conservation Areas provide a linkage to the south to the Lemnos Street Bushland and a fragmented linkage to Bold Park in the west.
Regional recreation resource	Primary management objective for the Conservation Areas is conservation but there will be provision of passive recreation facilities for the local community.
Significance to Aboriginal people	The Conservation Areas include part of a dune ridge which is considered important to Aboriginal heritage.
Historic significance	The Conservation Areas also includes a site identified as a tap, which the local Aboriginal people used as a water source for some time after European settlement.
Social value to a community group	Designation of the Conservation Areas is likely to generate significant interest from community groups.
Aesthetic values or landscape feature	Incorporates the ridge and allows for 360° views to the City and to Bold Park.

2.4 Aboriginal Heritage

Extensive consultation with Aboriginal spokespersons and Native Title Claimants with a heritage interest have identified that the study area has spiritual and cultural significance to Aboriginal people (MacIntyre Dobson and Associates, 2002). According to McDonald Hales and Associates (1998), the study area is considered to be 'part of a remnant cultural landscape'.

According to MacIntyre Dobson and Associates (2002), the study area includes a number of sites of significance to Aboriginal people. These include an archaeological site known as the Scarred Tree (Shenton Park) (S 02431) and two campsites.

The Scarred Tree was removed from the Aboriginal Sites Register following an Aboriginal Cultural Materials Committee resolution that the tree had been destroyed by bushfire and was no longer regarded as a site. According to MacIntyre Dobson and Associates (2002), the delisting of the site was disputed in the field by Aboriginal consultants who stated that the spirituality and sacredness of the site remained, even though the tree had been burnt down. In addition to the Scarred Tree, two interlocking Eucalypts were identified at the site as a significant point of reference to Aboriginal people.

The two campsites were located at the site by Nyungar elder Mr. W. Bodney who camped at the Shenton Park fringe camp. The camp was used on and off for a number of years and was part of the Lemnos Street campsite (MacIntyre Dobson and Associates, 2002).

Information collected during Aboriginal consultation by MacIntyre Dobson and Associates also demonstrated that the study area was part of the habitational hunting and collecting grounds of the fringedwellers who lived at the Lemnos Street fringe camps, and that the Lemnos Street camps extended to the Underwood Avenue bushland. It was identified that the area has historical, spiritual, cultural, habitational and ethnobotanical significance to living Aboriginal people.

Five sites were located within Lot 4 using the Department of Indigenous Affairs' (DIA) Aboriginal Heritage Enquiry System in June, 2007. They are listed in Table 4 below.

Table 4
Aboriginal Sites Located Within Lot 4 Underwood Avenue.

Site ID	Status	Site Name	Site Type/Other Information	Coordinates
3549	Stored Data	Shenton Park Scarred Tree	Modified Tree	386414mE 6464396mN
19934	Interim Register	Underwood Avenue Camp 1	Camp	386471mE 6464498mN
19935	Interim Register	Underwood Avenue Camp 2	Camp	386584mE 6464470mN
19936	Interim Register	Underwood Avenue Jarrah Trees	Meeting Place, Natural Feature	386643mE 6464492mN
20059	Interim Register	Underwood Avenue FS4	Historical, Spiritual Significance	386598mE 6464410mN

The map produced by the DIA Aboriginal Enquiry System showed 4 of these 5 sites are located within the POS or Conservation Areas. Site ID 19934 is not located within these areas. UWA is required to seek consent under section 18 of the *Aboriginal Heritage Act 1972* to disturb any Aboriginal site that may be affected by the development proposal.

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3 MANAGEMENT CONCEPTS FOR THE CONSERVATION AREAS AND AREA 2

3.1 Background

The retention of the Conservation Areas provides for the reservation of a range of vegetation associations from the Karrakatta – Central and South Vegetation Complex, and provides a linkage for birds between other regional bushland areas such as Bold Park, Shenton Park bushland and King's Park.

The retention of the bushland in an urban setting will also provide an important function of improving the community's appreciation and understanding of the bushland flora, vegetation and associated fauna. In this way, while conservation of the flora and fauna values of the bushland will be the management priority, the bushland will also function as an educational resource for the local and broader community.

On this basis, the objectives of the Conservation Areas will be to:

- Ensure the native flora, vegetation and fauna values are maintained and protected through appropriate management of the site;
- Improve community awareness and appreciation by utilising the Conservation Areas for educational purposes consistent with maintaining the conservation value of the bushland; and
- Maintain linkage with other nearby bushland areas.

The purpose of the following section is to outline the key environmental strategies that will be implemented by UWA to maintain the conservation value of the bushland following development of the adjacent land for residential purposes. A number of these strategies, including revegetation and weed control, are discussed in more detail in Section 4.

3.2 Overall Concept

The delineation of the Conservation Areas provides for the protection of 10ha of bushland generally in good condition or better to be set aside primarily for conservation purposes. The Conservation Areas are linked by an area of Public Open Space (POS) totalling 1.88ha. The POS will provide a direct linkage to the bushland area for passive recreational activities such as bush walking, jogging, nature observation and education. The POS and Conservation Areas have also been located to recognise the Aboriginal heritage values of the region.

Degraded sections of Area 2 will be rehabilitated and maintained until such time as approval to develop this portion of Lot 4 is given through an Outline Development Plan.

Management of the POS will be undertaken by the local authority and as such will be addressed in a separate Management Plan.

3.3 Vegetation Management

The location and shape of the Conservation Areas was selected to conserve a representative portion of the bushland in good or better condition, with high floristic diversity and which provides habitat value to native fauna.

The Conservation Areas comprise a Jarrah Woodland with scattered Tuarts and Marri trees over a lower tree canopy of *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana*. Typical taller shrub species include *Jacksonia furcellata*, *Hakea prostrata*, *Xanthorrhoea preissii* and *Macrozamia fraseri*. Common understorey species include *Gompholobium tomentosum*, *Hibbertia hypericoides*, *Acacia pulchella*, *Calytrix fraseri*, *Mesomelaena pseudostygia*, *Desmocladius flexuosus* and *Petrophile linearis*. Parrot Bush (*Dryandra sessilis*) occurs in one small stand near the eastern boundary, possibly indicating the presence of limestone at shallow depths below the sand. The Woodland shows limited signs of disturbance such as weed invasion, vegetation trampling, fire, logging and disease and, as a result, most of this area is identified in good to very good condition.

In order to maintain and improve the condition of the existing native bushland in the Conservation Areas following development of the surrounding land, the following existing and potential issues will require management:

- Maintaining the existing native plant composition and structure;
- Rehabilitation of degraded areas of bushland;
- Control of the introduction and spread of weed species;
- Controlling access to feral animals and domestic pets;
- Prevent the introduction of plant diseases; and
- Fire prevention and control.

3.4 Access Management

Access will be provided within the Conservation Areas but will be restricted to designated paths. The construction of paths in bushland areas requires careful consideration as too many paths can cause problems such as fragmentation of bushland and an increase the boundary to area ratio. Consequently, heavily disturbed edges may be open to weed invasion and could result in the loss of sensitive native species found within the bushland.

Following the fencing of the site in 1995 the establishment of informal paths and tracks in the bushland has been significantly reduced. However, a number of tracks have been cleared in and around the bushland to allow vehicle access for fire and maintenance purposes.

The Management Plan proposes to upgrade some of the more appropriately aligned tracks for pedestrian access. Tracks which are surplus to these requirements will be rehabilitated.

All paths which are to be maintained and upgraded in the Conservation Areas will be sealed with crushed sterile limestone to prevent further establishment of informal tracks. The system of tracks (Figure 5) will allow people movement from north to south along the green corridor between Shenton Park bushland and Bold Park.

Access to the internal path system will be via gates at a few selected points. The gates will be designed to allow pedestrian, bicycles and disabled access into the Conservation Area.

3.4.1 Fencing

To ensure that the environmental values of the Conservation Areas and Area 2 are maintained in the long-term, a 1.5m high post and ring-lock fence will be installed at the periphery of the Conservation Areas. The construction materials have been selected to ensure that the fence prevents uncontrolled access and is aesthetically pleasing. The boundary between the POS area and the Conservation Areas will be fenced and gates provided for access (refer to Figure 5). Gates will be installed at appropriate locations to prevent motorbike and other vehicle access. Locked gates will be installed along the firebreak in the south-east and south-west corner for maintenance and fire-fighting purposes.

The fencing will be completed in two stages. The first stage will include continuous fencing along the northern boundary of Conservation Areas A, B and Area 2 and along the western boundary of Conservation Area B and further south to provide a barrier to Area 2. Existing 2m high cyclone fencing already exists along the southern and eastern boundaries of the property.

A second stage of fencing will be implemented if Area 2 is developed and will include fencing the entire boundary of both Conservation Areas A and B (Figure 5).

3.4.2 Signage and Interpretation

Interpretive signage will be installed in the Conservation Areas to provide the local community and visitors with information relating to the bushland environment, orientation and to advise of user restrictions.

Interesting and informative signage will be installed which provides straightforward information and diagrams describing native fauna, the attributes of native flora, flora and fauna interactions and vegetation patterns.

3.5 Control of Feral Animals and Domestic Pets

The control of introduced and domestic animals in the bushland will reduce the potential for destruction to the native vegetation and death or distress to native fauna.

The Conservation Areas are known to support populations of introduced animals such as rabbits and rodents. In addition, cats frequent the bushland possibly from the surrounding residential areas.

UWA will consult with the local authority, DEC and the Department of Agriculture and Food (WA) to determine the most appropriate method to control feral animals (particularly cats) in the Conservation Areas.

3.6 Fire Management

The protection of life, property and environmental and community values in the bushland will be the important components of fire management within the proposed development area.

The incidence and impact of potential unplanned fires in the Conservation Areas will be reduced through maintaining a strategic fire access system and implementing measures to control weeds which contribute to a high fuel load (such as Grass species like Veldt Grass).

In addition, early detection of fires and rapid attack will play an important role in fire control in the Conservation Areas. More detail regarding fire management strategies in the Conservation Areas will be provided in a Fire Suppression Management Plan.

3.7 Drainage Management

Management of stormwater in the adjoining subdivision will be in accordance with the Department of Water's *Stormwater Management Manual for Western Australia* (2004-2007). It is proposed to adopt a water sensitive design approach to the drainage design for the adjoining subdivision so that any incident rainfall is collected and disposed of into the natural sands of the site in order to mimic the natural recharge of aquifers prior to the development. The highly permeable sand subgrade will easily allow the disposal of incidental rainfall.

It is intended to use localised stormwater systems which rely on a combination of soakwells within lots and underground storages and swales within open space areas to dispose of stormwater.

A preliminary review of the drainage requirements indicates that two infiltration basins are required, to the north-east and north-west of the site. The current planning layout allows sufficient area within designated POS for the drainage disposal requirements, ensuring there will be no drainage infrastructure within the Conservation Areas.

3.8 Community Involvement

3.8.1 General

The earthworks and construction activities for the subdivision will commence once all approvals are in place. Community involvement in the management of the Conservation Areas will be encouraged by the UWA, following a two year establishment period. This will also allow time for the proposed subdivision of the residential area north/east of the Conservation Areas to take shape.

Encouraging community involvement (i.e. local residents, schools, interest groups) is desirable to foster a sense of ownership of the Conservation Areas by the local community. This will assist in providing a level of protection against the threat of damage by fire and vandals. In addition, promoting an understanding of the sensitivity of the bushland ecosystem amongst local residents and the community will assist in reducing the impacts of less visible threats such as excessive fertiliser applications in gardens and inappropriate use of the Conservation Areas (i.e. uncontrolled access, rubbish dumping).

The development of a sense of ownership can be achieved by involving the local community in the future planning for the Conservation Areas and implementation of conservation activities, for example:

- Assisting in seed collection, tree planting and weed removal.
- Developing programs in association with local schools for seed collecting, planting etc and to assist in the monitoring process.
- Seeking the input of local residents as part of the process of implementation and review of this Management Plan.

Liaison between community volunteers and a member of the SPCA will be essential to ensure a coordinated approach.

3.8.2 Working Groups

Local community interest in the management and appreciation of urban bushland parcels is evidenced by the number of established working groups associated with nearby bushland remnants including the Friends of Shenton Bushland, Friends of Bold Park and Friends of Kings Park. The proposed development of Lot 4 prompted the formation of a community interest group, the Friends of Underwood Avenue, in 1999. The continued involvement of this group in formulating community interest and enthusiasm for bushland protection and management is strongly encouraged by UWA.

3.8.3 Research Opportunities

As opportunities arise UWA will encourage or undertake research relevant to the management of the Conservation Areas. Research may be linked to current studies being undertaken at UWA, Botanic Gardens and Parks Authority, and the DEC.

Research may include determining and updating methods of weed control, fire management, revegetation techniques and identification of appropriate genetic sources of seeds or seedlings to be used in re-vegetation programs. Another element which will require continued research will include determining the impact of access on the vegetation and fauna habitats in the Conservation Areas.

3.8.4 Schools

The Conservation Areas present opportunities to implement significant regeneration and management projects with considerable student involvement. The Conservation Areas are located in close proximity to four public and private schools including Jolimont Primary, Rosalie Primary, Floreat Park Primary and John XXIII College. Some of these schools may have already commenced projects to rehabilitate local bushland areas or established nurseries to grow local native seedlings. The UWA will encourage these types of projects in the Conservation Areas and determine the potential for other projects which relate to the conservation objectives of the bushland.

Activities to promote the Conservation Areas to schools and other institutions may include the following:

- Utilise the Conservation Areas as the focus of demonstrating the theoretical and practical aspects of bush regeneration.
- Provide expert advice and guidance to school groups during theoretical and practical exercises.
- Ensure bushland regeneration and landscaping plans are submitted to appropriate staff at UWA during the development of projects. Expert advice should be sought where required, to ensure appropriate management techniques are adopted.

4 REHABILITATION

4.1 Introduction

The Conservation Areas and Area 2 contain native vegetation in a range of condition from Very Good to Degraded. This rehabilitation section identifies the methods of weed control and revegetation with native species (such as *Banksia prionotes*) that will be implemented by UWA in order to achieve improvement in the vegetation condition of degraded areas (as shown in Figure 3).

4.2 Areas to be rehabilitated

Figure 3 shows the vegetation condition of the Conservation Areas and Area 2. The main areas to be rehabilitated are shown in Figure 5 and described below:

Conservation Area A –

- Degraded/Degraded to Good area in the south west corner
- Good to Degraded area along the eastern boundary
- Good area along the southern boundary

Conservation Area B –

- Good area in the south east corner
- Good area in the centre

Area 2 –

- Cleared areas in the north and south of Area 2, not including the area marked for existing UWA research use

4.3 Treatment Requirements

The treatment requirements for these areas to be rehabilitated vary in accordance with the rehabilitation outcomes to be achieved. Table 5 shows the rehabilitation outcome that will be achieved for each vegetation condition type.

Table 5
Rehabilitation Outcomes to be Achieved.

Current Vegetation Condition	Rehabilitation Outcome to be Achieved
Degraded	Good or better than Good
Good to Degraded	Good or better than Good
Degraded to Good	Good or better than Good
Good	Very Good

A site investigation by ATA Environmental, in conjunction with Dr Harry Butler and Ecosystem Management Services (EMS), determined the general management techniques that should be implemented in the Conservation Areas based on the existing condition (i.e. type and density of weeds, condition and composition of the native vegetation) and the required outcome, as listed in Table 6.

Table 6
General Treatment for Rehabilitation.

Current Vegetation Condition	General Management Techniques to be applied
Degraded / Degraded-Good	Weed control by herbicide application over balance; intensive seeding/planting
Good to Degraded	Weed control (herbicide application); follow-up planting/seeding
Good	Weed control (herbicide application); follow-up planting/seeding where required

4.3.1 Identification of Weed Species

The principal weed species, as recorded during site investigations by ATA Environmental in July 2003, are listed in Table 7.

Table 7
Weed Species Identified in the Conservation Areas.

Weed Species	Common Name
<i>Acacia iteaphylla</i>	Flinders Range Wattle
<i>Asteraceae sp.</i>	
<i>Avena fatua</i>	Wild Oats
<i>Briza maxima</i>	Blowfly Grass
<i>Carpobrotus edulis</i>	Pigface
<i>Chamaecytisus palmensis</i>	Tagasaste
<i>Cynodon dactylon</i>	Couch Grass
<i>Ehrharta calycina</i>	Perennial Veldt Grass
<i>Ehrharta longifolius</i>	Annual Veldt Grass
<i>Eucalyptus sp.</i>	Eucalypts
<i>Freesia</i>	Freesia
<i>Gladiolus caryophyllaceus</i>	Gladiolus
<i>Helipterum roseum</i>	Everlastings

Weed Species	Common Name
<i>Hypochaeris glabra</i>	Flat Weed
<i>Lagurus ovatus</i>	Hare's Tail Grass
<i>Lupinus sp.</i>	Lupin
<i>Oxalis compressa</i>	Sour Grass
<i>Other grasses</i>	
<i>Pelagonium capitatum</i>	Rose Pelargonium
<i>Pennisetum villosus</i>	Feather top Grass
<i>Vicia sativa</i>	
<i>Romulea rosea</i>	Guildford Grass
<i>Trifolium spp.</i>	Clover
<i>Ursinia anthemoides</i>	Ursinia
<i>Poa annua</i>	Winter grass

4.3.2 Weed Control Techniques

Table 8 provides the specifications of weed control techniques to be implemented in the Conservation Areas. The control techniques prescribed in Table 8 are based on the presence and density of the weeds.

Table 8
Weed Control Techniques proposed to be implemented in the Conservation Areas.

Method	Specifications	Application in Conservation Area
Slashing / mowing	<ul style="list-style-type: none"> Aim is to exhaust the seed supply. A lawn mower, whipper-snipper or slasher may be used to remove seed heads of undesirable species with care to avoid destroying native species. Applicable to grasses such as Veldt Grass, <i>Pennisetum sp.</i> 	Will be used in open areas.

Method	Specifications	Application in Conservation Area
Herbicide Application	<ul style="list-style-type: none"> The application of Fusilade (Fluazifop-p-butyl) by broad or spot spraying will be implemented in the Conservation Areas to actively control grasses and other species. It is a selective herbicide in that it will not affect most native species. It is rapidly absorbed by the weed and is rain-fast within 1 hour. Weeds will begin to wilt within 1-2 weeks of application, and may take up to 5 weeks to die. To be most effective, spraying will be undertaken before flowering. Control of broad-leaf species (such as Flat Weed) will be undertaken by application of Brushoff (Metsulfuron-methyl) or Glean (Chlorsulfuron) which are selective herbicides. 	Selective herbicide application will be undertaken in all management zones or in combination with another technique.

4.3.3 Replanting and Species Enrichment

Revegetation works will be implemented in all Degraded/Degraded-Good/Good-Degraded areas. The revegetation will involve the use of native seed stock and local provenance seed (preferably collected from Lot 4, especially from areas to be cleared prior to development) and local tubestock.

In 2004 Coffey Environments (formerly ATA Environmental) on behalf of UWA undertook rehabilitation of a 0.92ha area of Lot 4 Underwood Avenue, that was mapped as 'Degraded'. Rehabilitation involved a seed collection program from Lot 4. The 0.92ha area was then planted in Spring 2004 with seedlings grown from the seed collected on site and supplemented by other species. *Banksia prionotes* seedlings were planted as part of this program. An assessment of the site 2 years after planting in October 2006 identified successful establishment and growth of a number of species, including *B. prionotes* seedlings which had grown to a height of 0.5-1m. Therefore, it is Coffey Environments advice that *B. prionotes* could be successfully incorporated into and be a major part of the rehabilitation of degraded areas of Lot 4 Underwood Avenue.

The seed mix quantities will be determined for the areas to be revegetated and will be based on a number of parameters, including the seed viability and establishment rate of the seed. A seeding rate will be determined that allows for low establishment rates due to potentially poor seed stock and other external factors. It is anticipated that to enhance the success of the seeding program, measures such as smoke application to the seed mix will be implemented. Mature plants will also be salvaged and translocated from areas to be cleared.

In addition, other measures relating to the manipulation of factors such as the moisture retention ability of the soil, will be investigated to improve the establishment rates of the seed.

The indicative planting densities for any tubestock used in revegetation works is presented in Table 9. The precise planting locations will be determined at the time of implementation and will be based on the mixed pattern of species distribution found in the surrounding native vegetation. Block plantings of one species of plant will be avoided.

Plant establishment and growth will be monitored regularly following initial works and reseedling or further planting undertaken if significant losses occur.

Table 9
Recommended Planting Densities.

Species Form	Recommended Planting Density
Tree	1 plant / 10m ²
Shrub	1 plant / 5m ²
Understorey – sedge, herb etc.	1 plant / 1m ²
Groundcover	1 plant / 1m ²

Native Species Selection

Site investigations by ATA Environmental have determined the appropriate species mix for revegetation works within each Management Zone, as listed in Table 10. All species have been identified within each Zone based on the vegetation within the Zone and in the adjacent area.

Table 10
Locally Occurring Native Species to be used in Revegetation of Rehabilitation Areas.

Species	Stratum	Seed Collection Timing	Area A	Area B
<i>Acacia pulchella</i>	Understorey		✓	
<i>Allocasuarina fraseriana</i>	Overstorey	All year ¹	✓	✓
<i>Banksia attenuata</i>	Overstorey	All year; autumn best ¹		✓
<i>Banksia grandis</i>	Overstorey	All year; autumn best ¹		✓
<i>Banksia menziesii</i>	Overstorey	All year; autumn best ¹		✓
<i>Banksia prionotes</i>	Overstorey	All year; autumn best ¹	✓	✓
<i>Burchardia umbellata</i>	Understorey	summer	✓	✓
<i>Conostylis aculeata</i>	Understorey			✓
<i>Conostylis aurea</i>	Understorey			✓

¹ Seeds lose their viability so plant soon after extraction.

Species	Stratum	Seed Collection Timing	Area A	Area B
<i>Corynotheca micrantha</i>	Understorey	Late summer – autumn		
<i>Dianella divaricata</i>	Understorey	summer		✓
<i>Eucalyptus decipiens</i>	Overstorey	All year		✓
<i>Eucalyptus gomphocephala</i>	Overstorey	All year; autumn best	✓	
<i>Eucalyptus marginata</i>	Overstorey	All year	✓	✓
<i>Gompholobium</i>	Understorey	Late summer – autumn	✓	✓
<i>Haemodorum laxum</i>	Understorey		✓	✓
<i>Haemodorum spicatum</i>	Understorey			✓
<i>Hakea prostrata</i>	Middlestorey	All year	✓	✓
<i>Hardenbergia comptoniana</i>	Understorey	Late spring-summer	✓	✓
<i>Hibbertia hypericoides</i>	Understorey		✓	✓
<i>Hypocalymma robustum</i>	Middlestorey		✓	✓
<i>Jacksonia furcellata</i>	Middlestorey	Dec-April	✓	✓
<i>Jacksonia sericea</i>	Understorey	Autumn		✓
<i>Kennedia prostrata</i>	Understorey	Summer		✓
<i>Lepidosperma</i>	Understorey			
<i>Lepidosperma scabrum</i>	Understorey			✓
<i>Leucopogon propinquus</i>	Understorey	Late autumn – winter		✓
<i>Lomandra sp.</i>	Understorey			✓
<i>Macrozamia fraseri</i>	Middlestorey		✓	✓
<i>Mesomeleana</i>	Understorey		✓	✓
<i>Olearia axillaris</i>	Understorey	Spring		✓
<i>Scaevola canescens</i>	Understorey			✓
<i>Schoenus grandiflorus</i>	Understorey			✓
<i>Stirlingia latifolia</i>	Understorey		✓	
<i>Synaphea spinulosa</i>	Understorey			✓
<i>Xanthorrhoea preissii</i>	Middlestorey	Feb-May	✓	✓

Source of Plants/Seed

It is proposed to make every effort to facilitate the collection of endemic seed material prior to the development of the surrounding area. As demonstrated previously, native species such as *Banksia prionotes* are able to establish successfully at the site from seed collected and seedlings propagated. This will contribute positively to on-going biodiversity within the Conservation Areas and will further ensure the retention of indigenous species.

Native seed collection will be undertaken throughout the year to obtain seed from as many native species present at the site, as possible. The seed stock will then be stored or propagated, as appropriate, by the UWA for use in the revegetation works in the Conservation Areas.

If necessary, seedlings will be sourced from a NIASA accredited nursery to prevent the importation of plant pathogens.

Timing

The general sowing time for native seed and seedlings is late autumn to late winter (May to August) due to the presence of adequate soil moisture levels.

Where hand sowing methods are used, it may be possible to sow later into the season because the environmental 'niche' created by this technique limits the evaporation around the seedling. Warmth of the soil and air can promote rapid establishment of seedlings at these later times.

An important advantage of direct seeding over planting of tubestock is that if the weather conditions are not suitable, you can elect to store the seed for another year until conditions improve. This is not always possible or advisable for container grown plants.

Irrigation of seeded and planted areas may be required in the initial stages of seedling development depending on the amount of rainfall during this period. Access to reticulated water is currently available outside of the Conservation Areas and will be utilised during the rehabilitation works, if required, to encourage the growth of seed and seedlings.

Seedling Protection

It may be necessary to install protective barriers around the restoration sites or individual seedlings. Installing plant guards around new seedlings can protect the plant from disturbance and may also be useful as a barrier to herbicide drift. The installation of plant guards will also provide protection from rabbits which may graze on newly planted seedlings and shrubs. Baiting may also be an option to reduce the impact of rabbits on the rehabilitation works.

Conservation fencing and signage will be installed at the periphery of the Conservation Areas to prevent disturbance to rehabilitation works, particularly trampling during seedling establishment.

4.3.4 Indicative Costings

Table 11 provides a rough estimate of the costs involved with the rehabilitation procedures outlined in this CMP.

Table 11
Indicative Costings for Rehabilitation Procedures.

Procedure	Indicative Costing
Stage 1 Fencing and Gates	\$5,850
Stage 2 Fencing and Gates	\$2,050
Pedestrian and Vehicular Paths	\$187,000
Weed Control (chemical and mechanical)	\$1,500
Re-planting (based on use of seedlings, tree guards and labour)	\$27,500
Signage (interpretive, safety and community awareness)	\$6,000
Total Cost	\$229,900

4.3.5 Timing of Rehabilitation Works

The indicative timing for rehabilitation works within the Conservation Areas is shown in Table 12.

Table 12
Timing for Rehabilitation Works.

Item	2008				2009				2010				2011		
	autumn	winter	spring	summer	autumn	winter	spring	summer	autumn	winter	spring	summer	autumn	winter	spring
<i>Weed Control</i>															
- herbicide application															
Install Conservation Fence															
Native Seed Collection ²															
Propagation															
Revegetation															
<i>Monitoring</i>															
- weed control															
- revegetation															

² Refer to Table 10 for timing of individual species seed collection.

4.4 Monitoring

The following section describes the criteria and methodology that will be applied to the Conservation Areas.

4.4.1 General Monitoring

A monitoring program will be established which will include the installation of permanently marked plots within each revegetation zone following implementation of revegetation works. The plots will include 10m x 10m plots to assess revegetation success with nine 1m x 1m plots located along one side of the 10m x 10m plot, as shown in the following diagram. The 1m x 1m plots will be used to assess the success of weed control works and will record weed types and density cover.

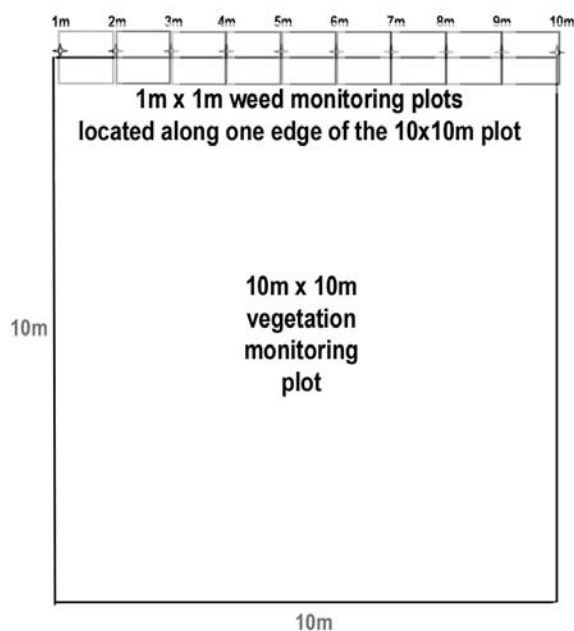


Diagram showing the location of weed monitoring plots (1m x 1m) in relation to the 10m x 10m plot.

The monitoring plots will be surveyed annually, in Spring, until the assessment criteria has been met and then a general inspection will be undertaken annually thereafter. Inspections by the relevant government authorities will be undertaken annually in Spring.

All seeded and planted areas will be inspected following initial seeding/planting to determine whether there are any sites where establishment has been poor and further seeding/planting is required. A general assessment of germination, weed infestation and overall success of planted and seeded sites will be conducted at least on a quarterly basis from time of revegetation/weed control until criteria have been met. This will allow identification of areas requiring augmentation or remedial works to be identified early and appropriately planned.

4.4.2 Assessment Criteria

The completion of rehabilitation works will involve achieving the appropriate level of vegetation condition as outlined in Table 5. This will be assessed by reviewing the findings of the plot-based monitoring and assessment using the vegetation condition scale of Bush Forever (Government of WA, 2000).

In addition, the following criteria will be used to determine the success of the rehabilitation works in the Conservation Areas:

- Rehabilitation works within the Conservation Areas will initially achieve a minimum species richness of 50% of the natural richness of the surrounding vegetation. This will be determined using a plot based assessment.

The location and number of the monitoring plots will be agreed in consultation between UWA and the DEC.

- Assessment of tree species within rehabilitation zones. Tree species such as Tuart, Jarrah, Sheoak, *Banksia attenuata* and *B. menziesii* that will be planted in the rehabilitation zones will be assessed to ensure that they are growing in a healthy condition that is able to achieve a mature height consistent with the surrounding vegetation. However, it is not necessary for the trees to reach a mature height to achieve success.
- The density of the trees to be equivalent to the natural bush in the Conservation Areas.
- Density of understorey species to be at least 75% of the natural bush in the Conservation Areas and with the ability to eventually achieve 100% of the natural cover.
- The number and density of weeds within the Conservation Areas has not increased 2 years after implementation. Environmental weeds have been controlled to an extent where their impacts on new plant growth are of decreasing significance.
- The results achieved in the monitoring plots should be consistent with the remainder of the areas being rehabilitated.

4.4.3 Compliance Reporting

The UWA will prepare an Annual Environmental Compliance Report which will be submitted to the CEO of the DEC and will address each element of the audit program. The environmental compliance report shall:

- Be endorsed by signature of the UWA's Vice Chancellor (or a person approved in writing by the UWA's CEO).
- Report on the progress of the implementation of recommended actions contained in this CMP.
- Provide verifiable evidence of compliance with each key action contained in this CMP.
- Identify any non-compliances and describe the corrective and preventative actions taken in relation to each non-compliance.
- Provide an assessment of the effectiveness of all corrective and preventative actions taken.

The Annual Environmental Compliance Report will be made publicly available in a manner approved by the CEO of the DEC.

5 IMPLEMENTATION, TIMING AND RESPONSIBILITIES

5.1 Prioritisation of Management Procedures

Table 13 prioritises the management procedures for the Conservation Areas and Area 2 and identifies the maintenance requirements according to the management categories outlined in Section 4.

Table 13
Prioritisation and Responsibility for Management Proposals.

Strategy	Specification	Priority	Responsibility
Access Management	Install perimeter fencing	High ³	SPCA
	Install dual use paths utilising existing informal tracks and avoiding existing native vegetation.	Medium ⁴ -High	SPCA
Rehabilitation	Implement weed control	High	SPCA
	Rehabilitate degraded areas by direct seeding / planting using local native species where possible.	High	SPCA
Native Fauna Management	Revegetation works to consider the creation of habitat important to native fauna species	Medium-High	SPCA
	Maintain existing habitat features (logs, rocks etc) within the conservation area, and utilise material from areas to be cleared	Medium	SPCA
	Install nest boxes	Low ⁵ -Medium	SPCA
Control of Pests	Use tree guards and/or brush to protect revegetation works	High	SPCA
	Consider the implementation of curfews for pets or alternatively, a total ban of allowing cats within the development area	High	SPCA
Signage	Develop consistent signage for the Conservation Areas for directional, interpretative and public safety.	Medium	City of Nedlands
Fire Management	Liaise with the FESA and the City of Nedlands to determine responsibilities for fire control in the Conservation Areas	High	SPCA
Community Involvement	Liaise with local schools, community and conservation groups to assist in rehabilitation projects	Medium-High	SPCA
General Maintenance and Monitoring	Inspect areas where management strategies have been implemented. Assess if further works or general repairs are required.	As Required	SPCA

³ High Priority = 1-2 years

⁴ Medium Priority = 3-5 years

⁵ Low Priority = 5-10 years

5.2 Allocation of Responsibilities

The Shenton Park Conservation Association Inc. (SPCA) is an incorporated association pursuant to the *Association Incorporation Act 1987* (WA).

The objective of the SPCA is to promote the interests of the community of Shenton Park by assisting and advising the UWA in the conservation and management of Lot 4 Underwood Avenue. The property and income of SPCA are applied solely towards promoting this object.

The SPCA has been established to implement the recommendations and commitments made in this CMP, as well as the ongoing management and maintenance of the Conservation Areas. The SPCA will covenant with the UWA to manage the Conservation Areas in accordance with this CMP. The SPCA will review the CMP at intervals not exceeding 10 years.

The members of SPCA are a number of suitably qualified personnel of the UWA, including the Vice-Chancellor and the Dean of the Faculty of Nature and Agricultural Sciences. Other persons may be nominated for membership in SPCA by the University.

6 REFERENCES

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7 **DISCLAIMER**

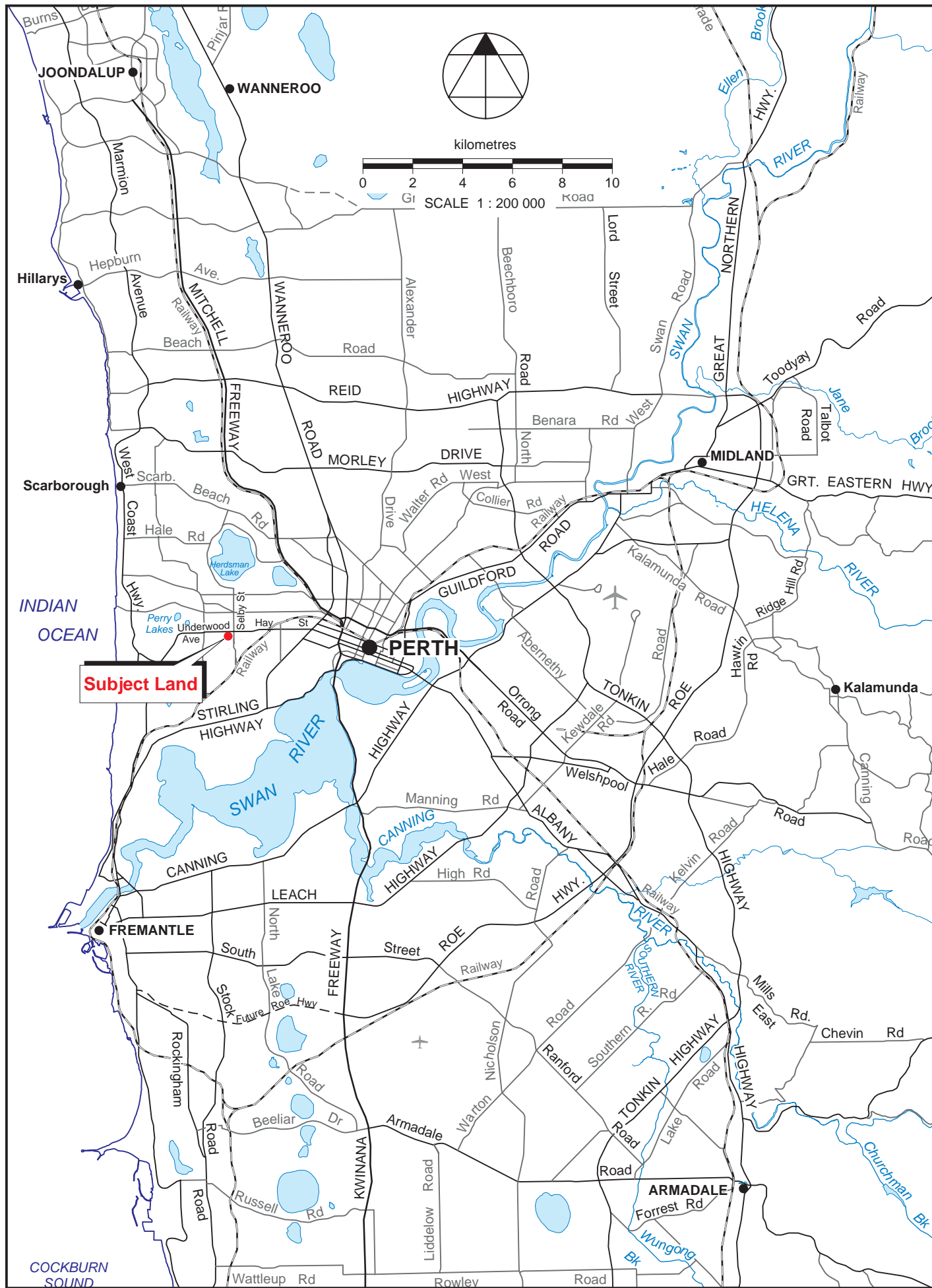
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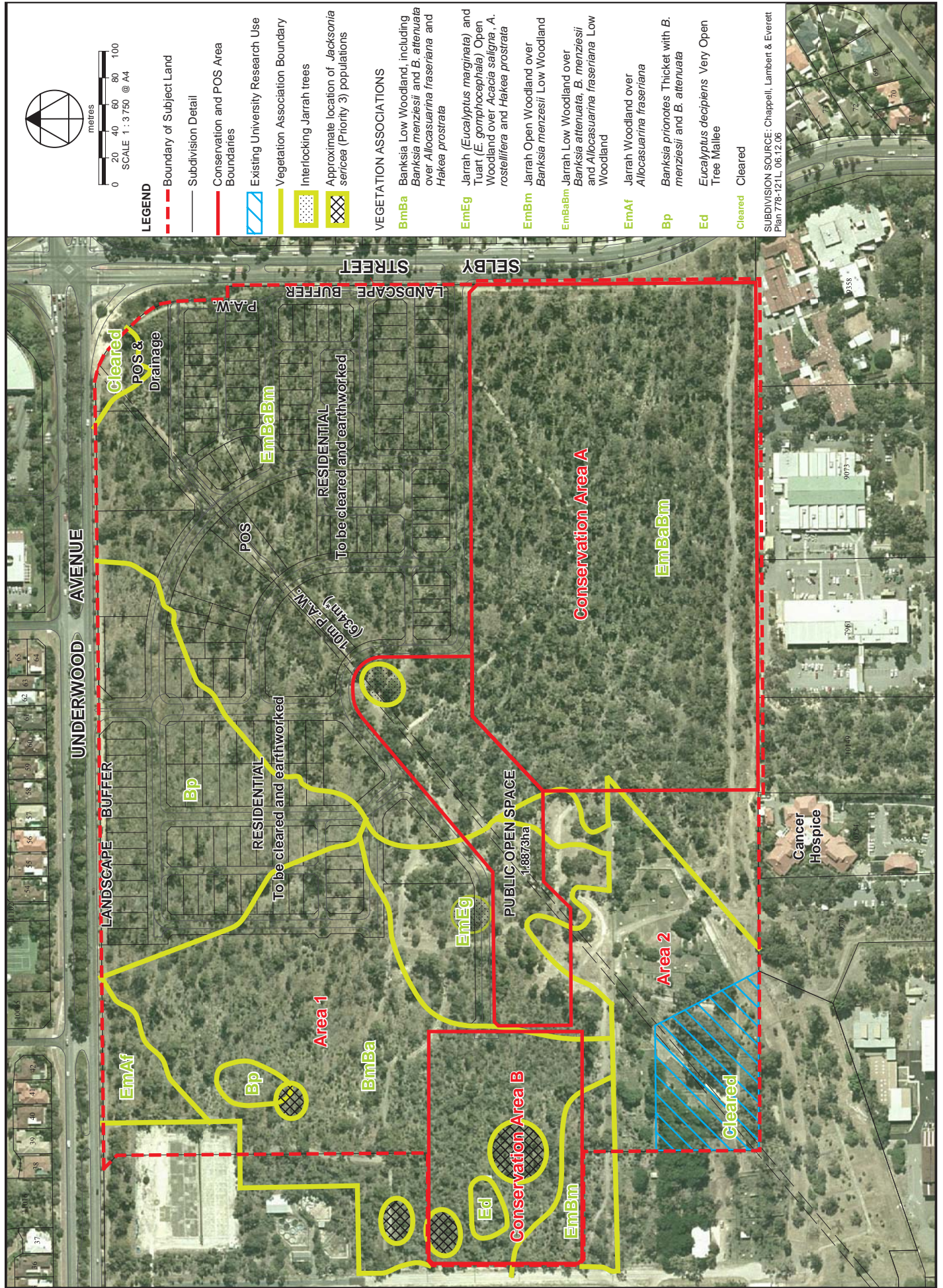
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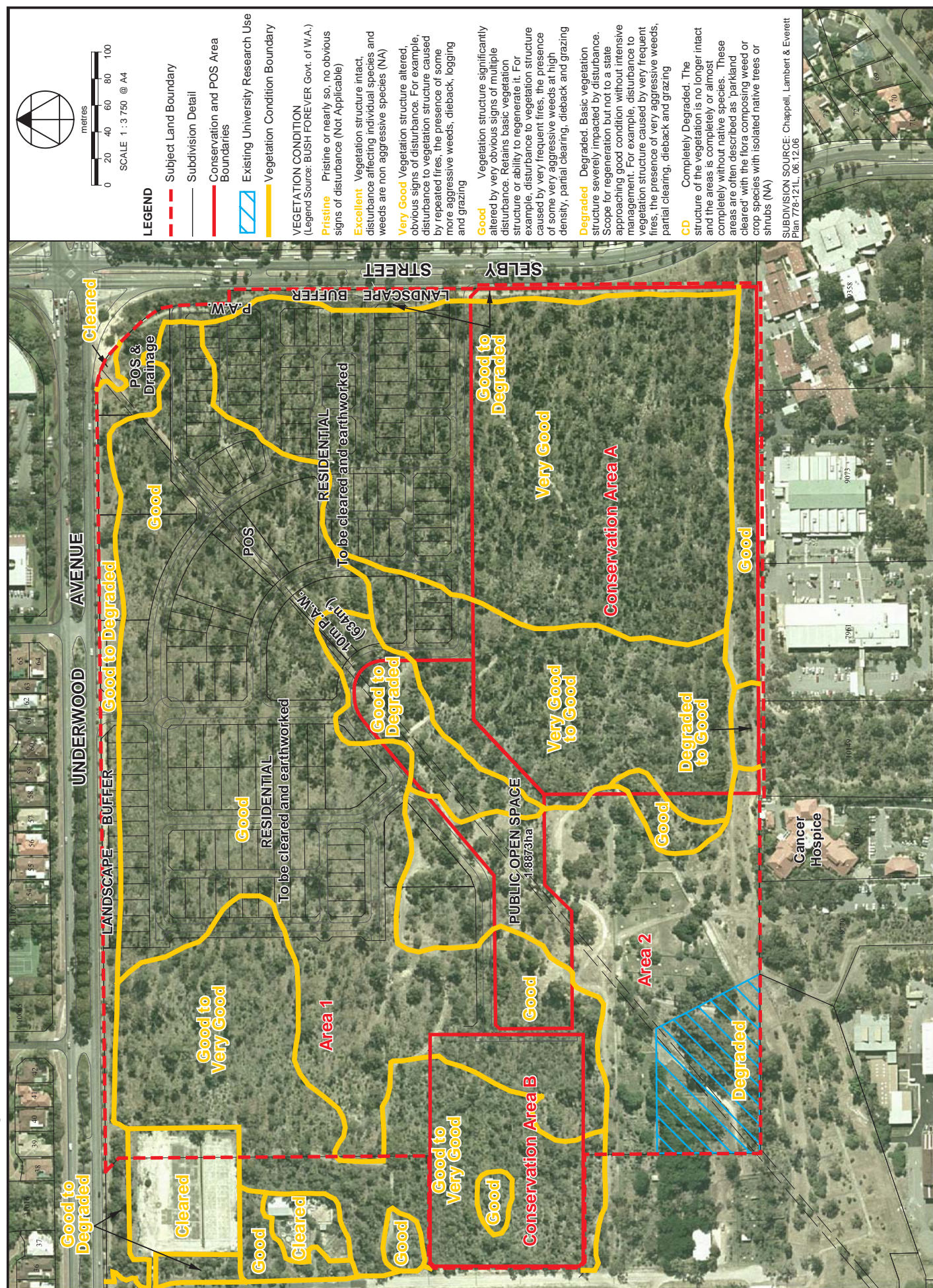
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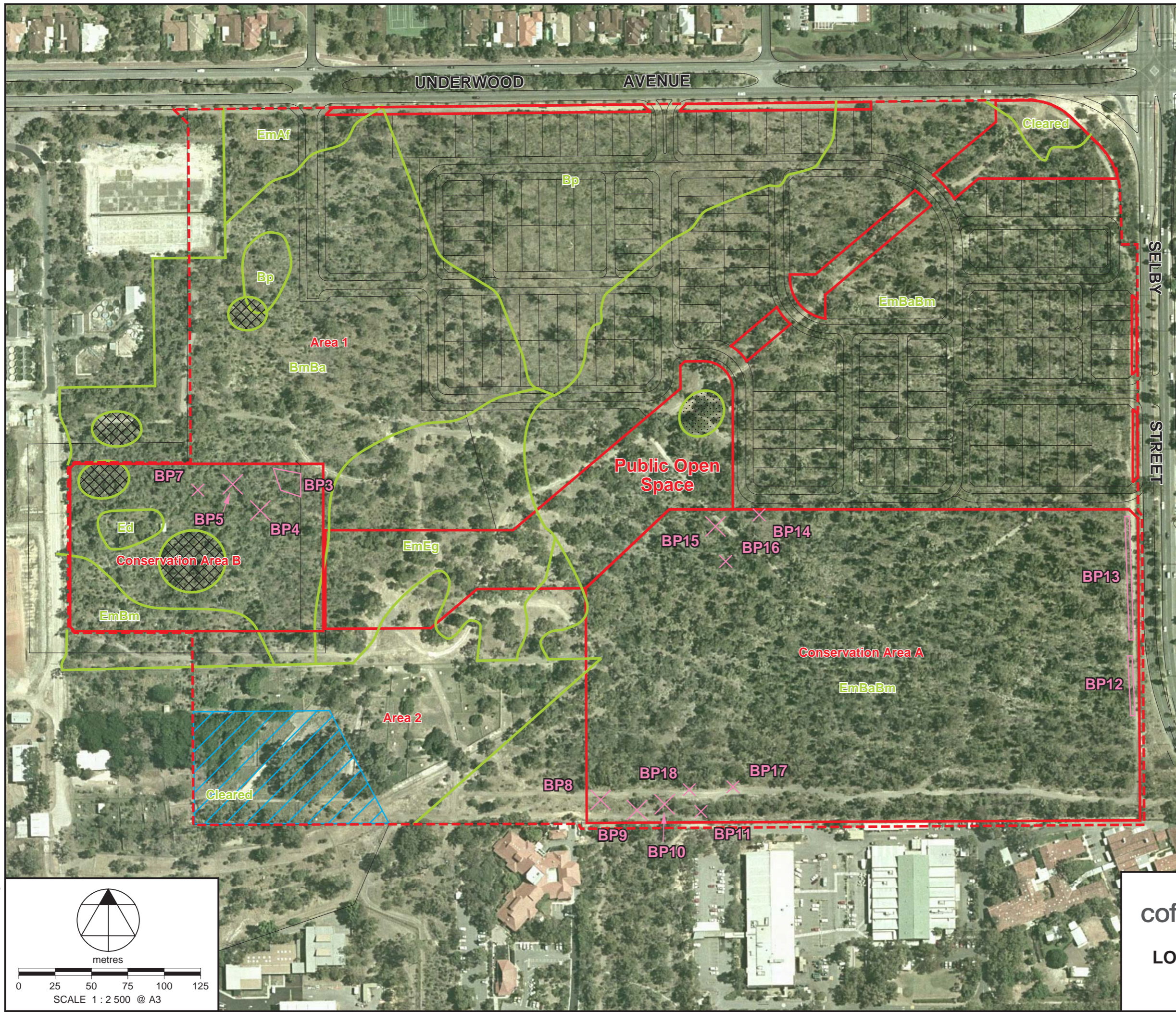
Figures

**Conservation Management Plan
Lot 4 Underwood Avenue, Shenton Park**









LEGEND

- Boundary of Subdivision Area
- Subdivision Detail
- Conservation/POS Area Boundary
- [Blue Hatched Box] Existing University Research Use
- Vegetation Association Boundary
- [Dotted Box] Interlocking Jarrah trees
- [Cross-hatched Box] Approximate location of *Jacksonia sericea* (Priority 4) populations
- [Pink X] Location of *Banksia Prionotes*
- [Pink X] Individual
- [Pink X with Circle] Population, small
- [Pink Rectangle] Population, showing extent

BP18 ID

VEGETATION ASSOCIATIONS

- BmBa** Banksia Low Woodland, including *Banksia menziesii* and *B. attenuata* over *Allocasuarina fraseriana* and *Hakea prostrata*
- EmEg** Jarrah (*Eucalyptus marginata*) and Tuart (*E. gomphocephala*) Open Woodland over *Acacia saligna*, *A. rostellifera* and *Hakea prostrata*
- EmBm** Jarrah Open Woodland over *Banksia menziesii* Low Woodland
- EmBaBm** Jarrah Low Woodland over *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Woodland
- EmAf** Jarrah Woodland over *Allocasuarina fraseriana*
- Bp** *Banksia prionotes* Thicket with *B. menziesii* and *B. attenuata*
- Ed** *Eucalyptus decipiens* Very Open Tree Mallee
- Cleared** Cleared

BASE SOURCE: Chappell, Lambert & Everett;
Photo 2002; Subdivision 07-06-07 (778 143g)

coffey environments
SPECIALISTS IN LIVING AND WORKING PLACES

LOCATION OF *Banksia prionotes* IN CONSERVATION AREAS

FIGURE 4

