



Somerville Drive Extension (Robertson Drive Intersection) Project, Bunbury, Western Australia

Environmental Offsets Management Plan:

Commonwealth EPBC Act Referral No. 2011/6153, and
State (WA) Clearing Permit CPS 1887

<i>Attachment No. 1:</i>	Location of Environmental Offset Site
<i>Attachment No. 2:</i>	Western Ringtail Possum Observations
<i>Attachment No. 3:</i>	Offsite Site Floristic Community Mapping
<i>Attachment No. 4:</i>	Offset Site Flora List
<i>Attachment No. 5:</i>	Vegetation Condition Mapping
<i>Attachment No. 6:</i>	Offset Site Photographs – September 2012
<i>Attachment No. 7:</i>	Offset Site Management Plan

Document Control

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1.0 Introduction

1.1 Background information

The City of Bunbury (the City) proposes to construct an extension to Somerville Drive and install a new traffic intersection at its junction with Robertson Drive in Bunbury, Western Australia (WA). Fundamentally, “the project” will provide northern access to the College Grove residential development and a link to Robertson Drive.

The project necessitates the clearing of 3.1ha of remnant native vegetation within Lot 929 Somerville Drive and part of Lot 1053 Robertson Drive. Lot 929 comprises a vegetated road corridor for the Somerville Drive extension and is designated for “Public Purposes” in the north and zoned “Urban” in the south, under the Greater Bunbury Region Scheme (GBRS). Lot 1053 is a “Primary Regional Road” under the GBRS where the intersection is proposed on Robertson Drive.

Given the proposed clearing is within remnant vegetation, the City subsequently applied for a native vegetation Clearing Permit that was conditionally granted under the *Western Australian Environmental Protection Act 1986* (EP Act). Specialist biological surveys have been undertaken over the project area to determine and report on its conservation significance. The City also referred the project to the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) in accordance with the *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) as the specialist surveys identified its potential to impact upon matters of national environmental significance.

DSEWPaC reviewed the referral documentation and subsequently set the level of assessment for the project as a “Controlled Action – Preliminary Documentation” required, with the controlling provisions relating to:

- Listed threatened species and communities (EPBC Act, Sections 18 and 18A).

DSEWPaC decided that the project required assessment under the EPBC Act, namely due to its potential impact upon the protected Western Ringtail Possum and requested that the City supply further information to enable their assessment of relevant impacts of the proposed action.

The City has opted to develop one set of documentation to address both the Commonwealth and State Government’s requirements, rather than to treat these as separate issues. To address anticipated requirements under the EPBC Act and to satisfy the conditions under the state government’s approved Clearing Permit 1887 the City has prepared the following two documents:

- **Environmental Management Plan (EMP)** – This provides a detailed response to DSEWPaC’s request for further information, plus addresses the approved Clearing Permit conditions in a comprehensive project EMP. The EMP describes how the City will avoid, minimise and manage project impacts on Western Ringtail Possums, native fauna, remnant vegetation and the receiving environment; and
- **Proposed Environmental Offsets Management Plan (this document)** – This details proposed measures to be implemented by the City to compensate for the project’s residual impacts and to provide a net-gain for Western Ringtail Possums, native fauna/habitat, remnant vegetation protection and the receiving environment.

1.2 Purpose and Scope

This document has been prepared to provide a transparent EPBC Act referral and assessment process for the proposed project. It also includes the conditions pertaining to environmental offsets in the state government's approved Clearing Permit 1887.

The scope of this document includes the following:

- Introduction (background information, purpose and scope).
- Environmental Offset Requirements.
- Environmental Offset Approach.
- Environmental Offset Area Selection and Design.
- Offset Site Description.
- Offset Site Suitability.
- Proposed Environmental Offsets.
- Monitoring Program.
- Contingencies.
- Reporting Commitments.

2.0 Environmental Offset Requirements

The City is required to address both federal and state government environmental offset requirements. This document sets out the key offset requirements administered by the DSEWPaC and the Department of Environment and Conservation (DEC). This document was referred to, and reviewed by, both aforementioned agencies during its referral and assessment process.

For the project site's clearing activity, DSEWPaC has set the level of assessment for the project as a "Controlled Action – Preliminary Documentation" required, with the controlling provisions relating to "Listed threatened species and communities", namely due to its potential impact upon the protected Western Ringtail Possum. Similarly, in the DEC's Clearing Permit decision report, one of the triggers requiring an offset was that the project may be at variance with Clearing Principal (b) that aims to protect habitat for threatened fauna and significant habitat for meta-populations of fauna (DEC, 2009a). For this project, the DEC recognised the site vegetation to be of a structure and composition favoured by Western Ringtail Possums for dreys and feeding habitat. This was later supported and confirmed by the results of two fauna surveys at the project site commissioned by the City (Harewood, 2008 and Harewood, 2011).

The entire offset site herein and proposed management and protection of it in perpetuity has been designed to compensate for the residual impact on Western Ringtail Possums and native fauna. In particular, the entire offset area (18.6 ha) comprises supporting habitat for Western Ringtail Possums (and other conservation values as it is largely intact and the proposed revegetation area will improve habitat for Western Ringtail Possums and native fauna). Therefore, the DEC offset requirement of "1:1 or greater ratio" counts entirely towards the greater ratio of "6:1" that has been identified to meet EPBC Act requirements, within the same site. As a consequence, the detailed management proposed herein provides for both federal (DSEWPaC) and state (DEC) departmental requirements and is considered a realistic approach to achieve a positive conservation gain.

Given the above, the City's evaluation of the offset site is that it contributes to the full extent of meeting both DSEWPaC and DEC requirements. This is consistent with the EPBC Act Environmental Offsets Policy where a "state or territory offset counts towards an offset under the EPBC Act to the extent that it compensates for the residual impact to the protected matter identified under the EPBC Act" (DSEWPaC, 2011). The respective departmental requirements have been considered in preparing this document as outlined below.

2.1 Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)

DSEWPaC is of the view that proponents should preferentially avoid or otherwise mitigate impacts on protected matters and that environmental offsets should only apply in a compensatory manner where residual impacts remain.

The City of Bunbury has clearly demonstrated through its initial project referral and preparation of an Environmental Management Plan (EMP) that complete avoidance of project impacts on Western Ringtail Possums is not possible, but mitigating impacts can be achieved for the project that is of critical importance to the local community.

The City proposes to implement a suite of management measures in all project phases to mitigate and reduce impacts upon Western Ringtail Possums and supporting habitat in and adjacent to the project area where possible, as outlined in the EMP. Key measures include:

- Employing, monitoring and reporting on the compliance with strict protocols to protect the welfare of any Western Ringtail Possums and to allow for their movement to adjacent habitat areas.
- Implementing a broad suite of management measures to protect Western Ringtail Possums and their habitat surrounding the immediate project clearing envelope.
- Providing environmental awareness and clear roles and responsibilities amongst the project delivery team in regard to their activities to avoid, minimise, report and rectify any adverse impacts on Western Ringtail Possums during project activities.
- Implementing longer-term avoidance and mitigation measures including fauna signage, reduced traffic speeds, fencing and preparing this Environmental Offset Management Plan.

Despite the above measures, the project will have a residual impact on Western Ringtail Possums in the area because it fundamentally necessitates the clearing of 3.1ha of foraging and denning habitat for this species, as established through previous fauna survey work commissioned by the City (Harewood, 2008 and Harewood, 2011).

DSEWPaC has advised the City that environmental offsets are required for the project in order to compensate for this residual impact. Also that the best approach to developing the offset management plan would be to address the offsets requirements outlined in DSEWPaC's *Consultation Draft Environmental Offsets Policy 2011* that states suitable offsets must:

1. Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed development.
2. Be efficient, effective, transparent, proportionate, scientifically robust and reasonable.
3. Be built around direct offsets but may include indirect offsets.
4. Be of a size and scale proportionate to the impacts being offset.
5. Be in proportion to the level of statutory protection that applies to the affected species or community.
6. Effectively manage the risks of the offset not succeeding.
7. Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.

2.2 State of Western Australia *Environmental Protection Act 1986* (EP Act)

Based on information available at the time of making a decision on the proposed vegetation clearing, the DEC assessed the project against the ten clearing principals that triggered the need for the City to provide for environmental offsets.

In respect to offsets, the Clearing Permit holder is required to implement an offset in accordance with twelve offset principles that are:

1. Direct offsets should directly counterbalance the loss of the native vegetation.
2. Contributing offsets should complement and enhance the direct offset.
3. Offsets are implemented only once all avenues to avoid, minimise, rectify or reduce environmental impacts have been exhausted.
4. The environmental values, habitat, species, ecological community, physical area, ecosystem, landscape, and hydrology of the offset should be the same as, or better than, that of the area of native vegetation being offset.
5. A ratio greater than 1:1 should be applied to the size of the area of native vegetation that is offset to compensate for the risk that the offset may fail.
6. Offsets must entail a robust and consistent assessment process.
7. In determining an appropriate offset, consideration should be given to ecosystem function, rarity and type of ecological community, vegetation condition, habitat quality and area of native vegetation cleared.
8. The offset should either result in no net loss of native vegetation or lead to a net gain in native vegetation or improve the condition of the natural environment.
9. Offsets must satisfy all statutory requirements.
10. Offsets must be clearly defined, documented and audited.
11. Offset must ensure a long term (10-30 year) benefit.
12. An environmental specialist must be involved in the design, assessment and monitoring of offsets.

3.0 Environmental Offset Approach

The City has opted to develop one set of offsets to address both Commonwealth and State Government requirements, rather than to treat these as separate issues. Direct offsets, as defined in DSEWPaC's EPBC Act Environmental Offsets Policy, Consultation draft (August 2011) are proposed in meeting these requirements. The use of direct offsets is also aligned with the State granted Clearing Permit requirements. Three distinct forms of direct offsets are proposed as follows:

- Conservation in perpetuity of non-secure remnant native vegetation / Western Ringtail Possum habitat.
- Rehabilitation of degraded vegetation to provide supporting Western Ringtail Possum habitat.
- Management of key threats to remnant native vegetation / Western Ringtail Possum habitat.

Each of these direct offsets is described in further detail in section 7.0.

4.0 Environmental Offset Site Selection and Design

It is the City's preference to implement the above offsets at one offset site for management ease.

A range of investigations have been undertaken in order to identify a suitable offset site for the project including:

- A review of relevant State and Federal Government publications.
- The receipt of advice from DSEWPaC's Environmental Assessment Officers (May 2012).
- The receipt of advice from a local specialist zoological consultant regarding known Western Ringtail Possum locations in Bunbury.

- A GIS analysis incorporating relevant site considerations.
- A site survey.

Each of these investigations is outlined further below:

Review of relevant State and Federal Government Publications

The following key government publications were reviewed in supporting the identification of a suitable offset site for the project:

- DSEWPaC EPBC Act Environmental Offsets Policy, Consultation draft (August 2011).
- WA Environmental Offsets Policy (September 2011).
- EPA Guidance Statement No.19 Environmental Offsets – Biodiversity (September 2008).
- EPA Bulletin No. 1 Environmental offsets – Biodiversity (September 2008).
- EPA Position Statement No. 9 Environmental Offsets (January 2006).
- DEC Development Planning Guidelines for Western Ringtail Possums (March 2009).
- DEC Guide to developing a Clearing Permit Offset Proposal (DEC, no date).

Receipt of advice from DSEWPaC's Environment Assessment Officers (May 2012)

Advice was received from DSEWPaC's Environmental Assessment Officers in May 2012 in relation to the following matters concerning the project's offset requirements:

- *Environmental Offset Requirements to Address in the EPBC Act Environmental Offsets Policy, Consultation draft (August 2011).*
DSEWPaC has advised the City that environmental offsets are required for the project in order to compensate for its residual impact. Also that the best approach to developing the offset management plan would be to address the offsets requirements outlined in DSEWPaC's *Consultation Draft Environmental Offsets Policy 2011*.
- *Known Western Ringtail Possum Habitat.*
DSEWPaC advised the City that any proposed environmental offset site for the project must be known to support Western Ringtail Possums through previous records.
- *Offset to Clearing Ratio.*
DSEWPaC advised the City that the project may attract an offset to clearing ratio requirement of 6:1, particularly if the proposed environmental offset package involves the protection of existing habitat. DSEWPaC further advised that a lesser offset to clearing ratio may apply if the proposed environmental offset package were to involve the rehabilitation of degraded habitat. (N.B. rehabilitation of degraded land is viewed as creating new habitat and so attracts a lesser ratio).

The State Clearing permit requires an offset ratio of greater than 1:1 to compensate for the risk that the offset may fail.

The City has chosen to propose an environmental offset using a 6:1 offset to clearing ratio in the interests of conservatism i.e. an 18.6ha area is proposed to offset 3.1 ha of project clearing.

Specialist Zoological Consultant Advice

Further to DSEWPaC's requirement for any proposed offset site for the project to support Western Ringtail Possums as outlined above, advice was sought from a local specialist zoological consultant with considerable experience in undertaking Western Ringtail Possum surveys in the Bunbury area (N.B. the same consultant who prepared the Western Ringtail Possum surveys for the project area, Mr Greg Harewood). The specialist zoological consultant provided advice and Western Ringtail Possum location data to support the identification of a suitable offset site.

GIS Analysis

In seeking to identify potential environmental offset sites for the project, the City undertook a GIS analysis incorporating the key considerations described above. Other key elements incorporated into the GIS analysis include:

- Location, size, and shape (incorporating consideration of the proposed 6:1 offset to clearing ratio)
- Known Western Ringtail Possum records as provided by the specialist zoological consultant.
- Same or similar landform, soils and vegetation as found within the project site.
- Site vegetation condition to be in good to better condition in the greater proportion.
- Opportunities to enhance and protect vegetation / habitat i.e. offers a net-gain.
- Not limited by major encumbrances, future proposed development or other laws.
- Containing no known contaminated site/s under the *Contaminated Sites Act 2003* (WA).
- Appropriate zoning for protection in perpetuity or ability to amend in a reasonable timeframe.

A total of 17 potential environmental offset sites were initially identified through the use of GIS analysis. After considerable screening, a single site, comprising of 18.6ha (6:1 ratio) was selected within part of Crown Reserve 40664.

The City Council has endorsed the use and conservation in perpetuity of part of Crown Reserve 40664 as an environmental offset for the Somerville Drive Extension (Robertson Drive Intersection) at its meeting on 24 July 2012. The chosen site is also preferred by senior management on the basis of its relative compliance with site selection criteria listed above. The remainder of Crown Reserve 40664 and the small square area situated along the offset sites northern boundary (Lot 717 Centenary Road) are currently being considered for use by the City in meeting other anticipated environmental offset requirements for future projects. There is no other development proposed in the aforementioned vegetated areas. The proposed environmental offset site is described further in section 5.0.

Crown Reserve 40664 Site Survey

The City's three environmental officers conducted a site survey at Crown Reserve 40664 on the 23 August 2012 in order to verify desktop information, record plant species, vegetation types and condition mapping, assess site potential to supporting Western Ringtail Possums/habitat and to determine the need and scope of site management to protect, enhance and maintain a viable area Western Ringtail Possums and native fauna.

The City's three environmental officers each hold relevant tertiary qualifications and collectively have over 40 years of experience in the natural resource management industry including experience in terrestrial quantitative and qualitative survey analysis techniques.

The results from the site survey are contained within this report under various sections as described herein.

5.0 Offset Site Description

The proposed offset site comprises of an 18.6ha part of Crown Reserve 40664, which has a total area of 41.0ha. It is located within the suburb of Davenport and is bounded to the east by the South Western Highway, Bunbury Regional Airport to the south and remnant vegetation within Manea Park (designated as Regional Open Space) to the immediate west and north (Attachment 1). N.B. the small square area situated along the offset sites northern boundary, that is, between the offset site and the Regional Open Space area, was not included in the offset site because it forms part of a separate property – Lot 717 Centenary Road.

Crown Reserve 40664 is predominantly vegetated and contains supporting Western Ringtail Possum habitat. The offset site location also adjoins larger intact areas of contiguous remnant vegetation along much of its northern boundary and its entire western boundary (designated as

Regional Open Space for conservation under the GBRS). It is therefore part of a larger remnant offering high value to biota.

The land uses associated with the properties adjoining the offset site are relatively stable in nature (e.g. conservation reserve, regional road, airport etc.) and consequently no intensive development is expected that would encroach on the site and limit its ecological function into the future. The remainder of Crown Reserve 40664 and the small square area situated along the offset sites northern boundary (Lot 717 Centenary Road) have no future development plans. They are currently being considered for use by the City in meeting other anticipated environmental offset requirements associated with other projects. Some minor expansion of the Bunbury Regional Airport (e.g. development of new hangars) is planned at present, however, this can be accommodated within existing land allocations and will not encroach into the offset area.

Crown Reserve 40664 is vested in the City of Bunbury for management. The Department of Regional Development and Lands, as the State Government agency responsible for administering State lands, has provided formal endorsement for the proposed use of part of Crown Reserve 40664 as an offset site for the project and appropriate designation for conservation purposes.

A summary of the offset site's key administrative details is provided in Table 1 below and a description of the site's broader biophysical characteristics follows.

Table 1: Offset Site's Key Administrative Details

Aspect	Description	Comment
Parcel Id	Crown Reserve 40664 Vol. LR3140, Fol. 53	Offset site occurs within part of R40664.
Tenure	Crown Reserve	Scheme amendment required to protect offset area in perpetuity.
Vesting	City of Bunbury	Currently manage the area.
Size and Offset Ratio	Offset site portion = 18.6ha (6:1 offset to clearing ratio) Crown Reserve 40664 (Total Area = 41.0ha)	A 6:1 offset to clearing ratio guarantees a net environmental benefit.
Major Encumbrances	Nil	Western Power transmission lines traverse the area but do not limit its conservation/habitat value.
Contaminated Sites	Nil	The WA DEC considers classified contaminated sites as not suitable for offsets (DEC, no date).

5.1 Landform and Soils

Approximately 80% of the site has been mapped as the “Bassendean B2 Phase” Map Unit by the State of Western Australia (2005), as described below:

“*Bassendean B2 Phase: Flat to very gently undulating sand plain with well to moderately well drained deep bleached grey sands with a pale yellow B horizon or a weak iron-organic hardpan 1-2m*” (SoWA, 2005).

The remaining portion of the site, which is situated to the east and approximately correlates to a wetland area (see “Hydrology” section below), has been mapped as the “Bassendean B4 Phase”:

“*Bassendean B4 Phase: Broad poorly drained sand plain with deep grey siliceous sands or bleached sands, underlain at depths generally greater than 1.5m by clay or less frequently a strong iron-organic hardpan*” (SoWA, 2005).

These units form part of the Bassendean Dune System, which is one of several aeolian, parallel dune systems that typify coastal portions of the Swan Coastal Plain. The Swan Coastal Plain extends from Dunsborough in the south to north of Perth and is bounded by the Indian Ocean to the west and Darling Scarp to the east (Seddon, 1972).

5.2 Surface Hydrology

The majority of the site is non-water gaining, although approximately 25% has been classified as ‘palusplain’ (SoWA, 2005) or seasonally waterlogged flat wetland (Hill *et al.*, 1996). The palusplain area broadly correlates to the Bassendean B4 Phase Map Unit area onsite as described under “Landform and Soils” above.

Under the Department of Environment and Conservation’s Geomorphic Wetlands Swan Coastal Plain dataset (2012), the palusplain has been categorised as “Multiple Use”, which applies to wetlands with few attributes that still provide important wetland functions i.e. highly impacted wetlands (Hill *et al.*, 1996).

5.3 Western Ringtail Possums and Habitat

The majority of Bunbury, including the offset site, has been mapped as Western Ringtail Possum “supporting habitat” under the Federal Government’s “Significant Impact Guidelines for the Vulnerable Western Ringtail Possum (*Pseudocheirus occidentalis*) in the southern Swan Coastal Plain, Western Australia” (DEWHA, 2009).

A local zoologist, Greg Harewood, has undertaken three Western Ringtail Possum surveys in the vicinity of the offset site in recent years (May 2008, July 2012 and August 2012). Western Ringtail Possum individuals were observed as well as dreys within the offset site and the immediate surrounding area during each of these surveys. A map depicting the location of the recorded individual animals and dreys within and proximate to the offset site is included at Attachment 2.

5.4 Native Fauna

The offset site supports remnant vegetation that is contiguous with a larger area of vegetation within Manea Park that extends to within the health and education precincts, totalling some 580 hectares.

Given the lack of impediment to the movement of fauna between these sites, it is likely that many of the fauna species found in the larger area also inhabit and/or utilise offset site, either permanently or on a temporary basis. Native species observed within the larger area include:

- Western Ringtail Possum (*Pseudocheirus occidentalis*)
- Western Grey Kangaroo (*Macropus fuliginosus*)
- Western Brush Wallaby (*Macropus irma*)
- Southern Brown Bandicoot (*Isodon obesulus fusciventer*)
- Tiger Snake (*Notechis scutatus*)

- Dugite (*Pseudonaja affinis*)
- Bobtail Lizard (*Tiliqua rugosa*)
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)
- Carnaby's White-tailed Black Cockatoo (*Calyptorhynchus latirostris*)
- Baudin's White-tailed Black Cockatoo (*Calyptorhynchus baudinii*)
- A broad suite of insectivorous and nectar-feeding birds.

During the site survey on the 23 August 2012, the City's environmental officers opportunistically recorded the following fauna species at the offset site:

- Western Grey Kangaroos (*Macropus fuliginosus*).
- Wedge-tailed Eagle (*Aquila audax*).
- Western Yellow Robin (*Eopsaltria griseogularis*).

5.5 Vegetation and Flora

Vegetation Complexes

Vegetation complexes correspond to regional-scale patterns of vegetation as influenced by key physical factors such as landform, soil and climate (Del Marco et al, 2004). The entirety of the site's vegetation corresponds to the "Southern River Complex" as mapped by Heddle *et al.* (1980). The Southern River Complex is defined as follows:

"Open woodland of *C.calophylla* (Marri) – *Eucalyptus marginata* (Jarrah) – *Banksia* spp. with fringing woodland of *E. rudis* (Flooded Gum) – *Melaleuca raphiophylla* (Paperbark) along creek beds" (Heddle *et al.*, 1980).

Site Floristic Communities

Floristic communities are naturally occurring assemblages of plant species that live within a defined area or habitat (Martin, E, Ruse, M and Holmes, E (eds.), 1996). Floristic communities are of a finer scale than vegetation complexes and several floristic communities may occur within an individual vegetation complex (Gibson *et al.*, 1994).

The City of Bunbury's three qualified environmental officers conducted a site survey at the offset site on the 23 August 2012 and identified four distinct floristic communities. Attachment 3 shows their approximate distribution and descriptions along with an estimated percentage cover, is given below.

CcEmAfBa (approx. 64% of site):

Open Woodland of *Corymbia callophylla* (Marri), *Eucalyptus marginata* (Jarrah) over a Low Woodland of *Agonis flexuosa* (Peppermint), *Banksia attenuata* (Slender Banksia) over an Open Heath to Tall Open Scrub of *Kunzea glabrescens* (Spearwood) and *Xanthorrhoea brunonis* over an Open Herbland of *Dasyopogon bromeliifolius*.

MpAsXb (approx. 20% of site):

Low Open Woodland of *Melaleuca preissiana* (Paperbark), *Acacia saligna* over an Open Shrubland of *Xanthorrhoea brunonis*.

BiAfMpKg (approx. 13% of site):

Low Open Woodland of *B. Illicifolia* (Holly-leaved Banksia), *A. flexuosa*, *M. priessiana* over a Closed Tall Scrub of *K. glabrescens*.

MpKbAsp.LI (approx. 3% of site):

Low Open Woodland of *M. preissiana* over a Tall Open Shrubland of *K. glabrescens* and *Astartea* sp. over a Closed Sedgeland of *Lepidosperma longitudinale*.

Site Flora

During the site survey, the City's environmental officers positively identified 67 individual native plant species within the offset site and 13 exotic species (Attachment 4).

Site Vegetation Condition

Vegetation condition was mapped at the offset site during the site survey on 23 August 2012 using the Keighery's Vegetation Condition Rating Scale (Keighery, 1994). Approximately 8% of the site vegetation was mapped as "Very Good" condition, 72% in "Good" condition and the remaining 20% is "Degraded" (see Attachment 5).

Rare and Priority Flora and Threatened Ecological Communities

A desktop GIS check of DEC's Rare and Priority flora records was undertaken. No threatened flora as listed under Section 23F of the *WA Wildlife Conservation Act 1950* (WC Act) have previously been recorded within the offset site. This may however reflect a lack of survey.

A search of DEC's threatened ecological community (TEC) database records was undertaken. No Tics are present.

5.6 Weeds

A total of 13 weed species have been identified during site visits in 2012. Of these, eight are considered as having the potential to cause some impact to the site and the remainder are common, non-invasive and unlikely to cause a deleterious event based on local knowledge and recognised environmental weed ratings given in the *Environmental Weed Strategy for Western Australia* (CALM, 1999).

The highest density of common paddock weeds and grasses was observed within the degraded eastern area of the site that is not considered as invasive or warranting control. Several small populations of problematic environmental weeds were observed in the southeast corner where targeted control will be implemented.

5.7 *Phytophthora* Dieback

A dieback survey for Manea Park and surrounding areas, including the offset site was completed in 2008 (Glevan, 2008a). The survey classified 63% of the offset site as uninfested with dieback at the time and the remaining 37% was unmappable due to an absence of disease indicator species caused by previous site disturbances e.g. fire and grazing.

The unmappable area was later demarcated as 'unprotectable' from the pathogen due to the high probability of it becoming infested in the short term (if it were not already), associated with its location near major access ways and low position in the landscape. This area broadly correlates to the degraded condition vegetation area described under the "Vegetation Condition" section above.

Dieback has the capacity to spread autonomously as well as through the movement of Dieback in soil, vegetation and water (DWG, 2009). The offset site is isolated and there has been an absence of major earth disturbing works since the time of the 2008 survey. Therefore, it can reasonably be assumed that the spread of the pathogen within this site's vegetation is minimal and autonomous. There is also a risk along the Western Power access tracks where service vehicles undertake inspections and maintenance. These assumptions cannot be confirmed without a formal Dieback re-survey.

5.8 Access and Fencing

Access

The offset site is unlikely to receive a large degree of human visitation due to its relatively remote nature, being located approximately two kilometres from the nearest residential area with no link, surrounded by Manea Park, airport land and a state highway.

The site's shortest boundary, to the east, directly abuts South Western Highway, which is a major transport route with a gazetted speed of 110 kilometres per hour in this location with no roadside rest areas or vista points that could attract the public. This factor and the presence of a good condition fence along the site's eastern boundary will deter opportunistic site access by the public.

The majority of the site's southern boundary abuts an unsealed access track into the Bunbury Clay Target Club. This track has a lockable gate at its entrance from South Western Highway to prevent unauthorised access.

One formal firebreak is present onsite, situated along its eastern boundary and within the existing fence. This firebreak is regularly maintained by the City's Community Law, Safety and Emergency Management Department and is required into the future to provide for fire management access.

A Western Power transmission line bisects the site and splits into separate lines to the Bunbury Regional Airport and Bunbury Clay Target Club. The transmission line is located within an existing ten metre cleared corridor, which will continue to be maintained into the future for continuance of essential services and safety reasons. The remaining internal tracks are surplus and will be closed to prevent 4WD access, then planted primarily with WA Peppermint (*Agonis flexuosa*) and suitable local provenance species.

Fencing

As discussed previously, a good condition fence exists along the site's eastern boundary. During the site survey held on the 23 August, the City's environmental officers observed that a 15 m section of the fence is damaged and needs repair.

A fence also exists along part of the sites southern boundary and inside of the Bunbury Clay Target Club access track. This fence is in good condition but requires extension to the west in order to provide clear separation between the site and the Club along this common boundary.

5.9 Other Site Considerations

Rubbish

During the site survey conducted on the 23 August 2012, small amounts of rubbish dumping, including a rusted car body and bricks was observed in the site. No evidence of contamination or hazardous waste was observed.

Fire

It is understood that the last recorded fire occurred at the site approximately ten years ago.

The City's Community Law, Safety and Emergency Management Department undertake routine fire management works at the site including firebreak maintenance and fuel load reduction (e.g. weed spraying, prescribed burns etc.). These activities are essential for the protection of community members and infrastructure in adjacent areas and also for supporting natural ecology and will continue to occur at the site into the future. All major works (e.g. prescribed burns) are conducted in consultation with relevant State agencies such as the DEC and Fire and Emergency Services Authority (FESA).

6.0 Offset Site Suitability

The suitability of the proposed offset site has been investigated in the context of the following considerations:

- Similarity to the project site.
- Presence of Western Ringtail Possums and supporting habitat.
- Offset to clearing ratio.

Each of these considerations is described in detail below:

Similarity to Project Site

The offset site is located approximately 1.6 kilometres due east of the project site. The two sites are linked by Manea Park, a conservation reserve, and collectively comprise an area of continuous remnant native vegetation.

Both sites share the same dominant geological / geomorphological unit, the Bassendean B2 Phase Map Unit, which comprises approximately 80% of each site.

The sites also share similar proportions of upland and wetland communities (3:1), although in the case of the project site, the wetland area is a dampland rather than a palusplain (SoWA, 2005) Note, Hill *et al.* (1996) establishes that damplands differ from palusplains in that they comprise of basins rather than flats, however, both forms of wetland are seasonally waterlogged in nature.

Mapping of vegetation complexes (broad regional-scale patterning of vegetation) undertaken by Heddle *et al.* (1980) indicates that the offset site forms part of the Southern River Complex as discussed previously. The project site's corresponding vegetation complex is less certain. The GIS dataset derived from the original Heddle mapping indicates that the project site forms part of a separate vegetation complex, the Karrakatta Complex – Central and South, although it is located in close proximity (<250 m) to the transition between the two complexes. Given that the original mapping occurred at a broad scale of 1:250,000, the distance between the project site and the complex transition is likely to have been negligible when originally mapped and consequently the site could fall into either complex. Further field study would be required to confirm this assumption. It is noted that *Eucalyptus gomphocephala* (Tuart), a key element of Heddle's mapped Karrakatta Complex – Central and South, was not observed during either of the two flora surveys previously conducted at the project site.

A description of each vegetation complex is provided below for comparative purposes:

Southern River Complex: Open woodland of *Corymbia calophylla* (Marri) – *Eucalyptus marginata* (Jarrah) – *Banksia* spp. with fringing woodland of *E. rudis* (Flooded Gum) – *Melaleuca raphiophylla* (Paperbark) along creek beds.

Karrakatta Complex – Central and South:

Predominantly open forest of *E. gomphocephala* (Tuart) – *E. marginata* – *C. calophylla* and woodland of *E. marginata* – *Banksia* spp. (Heddle *et al.*, 1980).

In comparing the two vegetation complexes, it is apparent that both share many similarities in terms of the key dominant structural species irrespective of where the project site lies between the two.

tdterms of key dominant structural species including the dominant community at each site, CcEmAfBa and EmAfBi, however, this cannot be formally established without a detailed floristic analysis (e.g. flora plots). Table 2 below highlights the floristic communities recorded at the offset site alongside similar communities recorded at the project site:

Table 2: Potential correlation between floristic communities at the Offset and Project Sites:

Offset Site (Pt R40664)	Project Site
<p>CcEmAfBa (approx. 64% of site)</p> <p>Open Woodland of <i>Corymbia callophylla</i>, <i>Eucalyptus marginata</i> over a Low Woodland of <i>Agonis flexuosa</i>, <i>Banksia attenuata</i> over an Open Heath to Tall Open Scrub of <i>Kunzea glabrescens</i> and <i>Xanthorrhoea brunonis</i> over an Open Herbland of <i>Dasyogon bromeliifolius</i>.</p>	<p>EmAfBi* (approx. 86% of site)</p> <p>Scattered <i>Eucalyptus marginata</i>, <i>Agonis flexuosa</i> and <i>Banksia ilicifolia</i> with Low Woodland of <i>Banksia attenuata</i> over open Heath of <i>Kunzea glabrescens</i> over Shrubland to Low Shrubland of <i>Hibbertia hypericoides</i> and <i>Melaleuca thymoides</i>.</p>
<p>MpAsXb (approx. 20% of site)</p> <p>Low Open Woodland of <i>Melaleuca preissiana</i>, <i>Acacia saligna</i> over an Open Shrubland of <i>Xanthorrhoea brunonis</i>.</p>	<p>No observed equivalent</p>
<p>BiAfMpKg (approx. 13% of site)</p> <p>Low Open Woodland of <i>Banksia ilicifolia</i> <i>Agonis flexuosa</i>, <i>Melaleuca preissiana</i> over a Closed Tall Scrub of <i>Kunzea glabrescens</i></p>	<p>MpAfCc (approx. 9% of site)</p> <p>Open to Low Open Woodland of <i>Melaleuca preissiana</i>. Scattered <i>Agonis flexuosa</i> and <i>Corymbia callophylla</i> over Tall Open Shrubland of <i>Kunzea glabrescens</i> over Shrubland of <i>Xanthorrhoea brunonis</i> over Sedgeland of <i>Baumea juncea</i>.</p>
<p>MpKbAsp.LI (approx. 3% of site)</p> <p>Low Open Woodland of <i>Melaleuca preissiana</i> over a Tall Open Shrubland of <i>Kunzea glabrescens</i> and <i>Astartea</i> sp. over a Closed Sedgeland of <i>Lepidosperma longitudinale</i>.</p>	<p>BIMpKg (approx. 2% of site)</p> <p>Scattered <i>Banksia littoralis</i> with Low Open Woodland of <i>Melaleuca preissiana</i> over Low Open shrubland of <i>Kunzea glabrescens</i> over Open Heath of <i>Pericalymma ellipticum</i> var. <i>ellipticum</i>, <i>Astartea</i> sp. and <i>Hypocalymma angustifolium</i> over Open Sedgeland of <i>Baumea juncea</i> and <i>Lepidosperma longitudinale</i>.</p> <p>*RPS floristic community “EmAfBi” presumed equivalent to Eco Logic floristic community “WEmBiAgKg”.</p> <p>Remaining 3% of site corresponds to cleared portions of Robertson Drive’s road reserve.</p>

Vegetation condition at the offset site was ranked below project site. For example, 72% of the offset sites vegetation is in “Good” condition and 8% in “Very Good” condition compared to 88% of the project site, which is in “Very Good” condition or better. However, the offset site’s vegetation is generally of high quality, is considered worthy of conservation and presents an opportunity for enhancement through site management. The relatively poorer condition of the offset sites vegetation compared to that of the project site is balanced by the proposed large offset to clearing ratio and suite of direct offsets as outlined within this document.

Given the connectivity of vegetation between the offset site and project area, it is likely that many fauna species in the area use both sites equally, asides from those with very narrow habitat preferences.

Both the offset site and project site form part of the Western Ringtail Possum “supporting habitat” area within the Federal government’s “Significant Impact Guidelines for the vulnerable Western Ringtail Possum (*Pseudocheirus occidentalis*) in the southern Swan Coastal Plain, Western Australia” (DEWHA, 2009). Western Ringtail Possums have also been previously recorded at both sites (N.B. also see section 5.3).

DSEWPaC’s online Protected Matters Search Tool was accessed on the 4 September 2012 in order to identify EPBC Act protected matters potentially located within the offset and project sites (search ref. ‘13TUNA’ and ‘PAJBSN’). A narrow search area was applied around each site. The search results for both sites were identical except for one threatened ecological community (SCP09 Dense Shrublands on Clay Flats), which was identified within the project site search area. The threatened ecological community in question is located approximately 50m due east of the project site within Manea Park and will not be impacted by the project.

Both sites have very little weed cover and few environmental weeds of concern.

Phytophthora Dieback is present within both sites. The offset site has a lower proportion of mapped Dieback infested area (37%) when compared to the project site (63%) as at 2008. Some spread of the pathogen at both sites is likely given the time since the last Dieback survey, if only through autonomous means.

Western Ringtail Possum Records at Offset Site

A local zoologist, Greg Harewood, has undertaken three Western Ringtail Possum surveys in the vicinity of the offset site in recent years (6 May 2008, 30 July 2012 and 29 August 2012). Both Western Ringtail Possums and dreys have been recorded within the offset site and surrounding area during each of these surveys. A map depicting the location of the recorded individual animals and dreys within and proximate to the offset site is included at Attachment 2.

Western Ringtail Possum Habitat at Offset Site

Burbidge and de Tores (1998) have illustrated that *Agonis flexuosa* (Peppermint) forms the majority of the species diet when available, otherwise the dominant myrtaceous species are preferred.

In terms of denning habitat, the species has been shown to build dreys as nesting/resting sites and to use tree hollows where available in coastal Peppermint habitat. Although the species is also known to build a wide range of nest sites on or near the ground, this may be unlikely in the offset site (or the project site) due to an absence of predator control (Burbidge and de Tores, 1998).

During the site survey conducted on the 23 August 2012 by the City’s environmental officers, *Agonis flexuosa* was found to be a dominant, structurally important species within two of the four floristic communities recorded (CcEmAfBa and BiAfMpKg), collectively representing approximately 77% of the total site area. Large mature trees up to eight metres in height were observed in several areas, as was seedling recruitment (see photographs at Attachment 6).

Several other myrtaceous species such as Jarrah, Marri and Spearwood, which can provide Western Ringtail Possum denning/foraging resources, are present across much of the offset site, in many cases as dominant, structurally important species. Of particular note were several large, mature Marri trees with observable hollows and dense Spearwood thickets, which offer Western Ringtail Possums denning habitat.

Offset to Clearing Ratio

The offset site has an area of 18.6ha, which is six times the area of vegetation proposed to be cleared as part of the project (i.e. a 6:1 offset to clearing ratio). The magnitude of the offset to clearing ratio serves to compensate for the relatively lesser quality of the offset sites vegetation compared to that of the project site and to ensure that a net environmental benefit will be derived through the project.

Conclusions on Offset Site Suitability

The following key conclusions can be drawn from the information presented above:

- The offset site has been confirmed as supporting Western Ringtail Possums through previous studies. The site contains plant species known to provide foraging and denning habitat for Western Ringtail Possums.
- The project site and the offset site are located in close proximity to each other. They are underlain by the same dominant geological/geomorphological unit and have similar floristic composition.
- The offset site is six times larger than the project clearing area. This serves to compensate for the relatively lesser quality of the offset sites vegetation and to ensure that a net environmental benefit will be derived through the project.
- The offset site is ideally located to minimise public disturbances and it adjoins contiguous remnant vegetation.

In light of these factors, it is the City of Bunbury's view that the offset site is highly suitable for the proposed direct offsets in seeking to compensate for the projects likely residual impact on environmental values at the project site.

7.0 Proposed Environmental Offsets

The details for each of the following three direct offsets are described below.

- **Direct Offset 1:** Conservation in perpetuity of non-secure remnant native vegetation / Western Ringtail Possum habitat.
- **Direct Offset 2:** Rehabilitation of degraded vegetation to provide supporting Western Ringtail Possum habitat.
- **Direct Offset 3:** Management of key threats to remnant native vegetation / Western Ringtail Possum habitat.

Direct Offset 1: Conservation in Perpetuity of Non-secure Remnant Native Vegetation / Western Ringtail Possum Habitat

The City proposes to conserve the entire offset site in perpetuity as a 6:1 ratio direct offset to the project by requesting the State Government to:

1. Designate the site as “Regional Open Space” under the Greater Bunbury Region Scheme; and
2. Classify the site as a Class “A” reserve under the *WA Land Administration Act 1997*.

Note, the above two mechanisms are complementary to one another in that they both will provide for the offset site’s protection in perpetuity and give suitable recognition under both of the State Government’s planning and land administration processes. Each mechanism comprises a separate process and is initiated by different State Government agencies in Western Australia as noted below.

Designation of the offset site as “Regional Open Space” (ROS) under the Greater Bunbury Region Scheme is necessary as the offset site is currently zoned “Rural” under the GBRS and Town Planning Scheme No. 7 (TPS7). Its current Rural zoning means that it could lawfully be fully developed for that purpose under Western Australian planning legislation.

Under the GBRS, the purpose of ROS land is “to protect the natural environment, provide recreational opportunities, safeguard important landscapes and provide for public access”. ROS is currently the highest form of protection available for lands exhibiting conservation values under the Western Australian planning system. Any proposed development on ROS land, aside from some forms of basic site management works, must receive approval from the WAPC in order to lawfully proceed and development that is inconsistent with the purpose of ROS land is unlikely to be permitted.

The City will provide for the offset sites protection under the State Government planning system by requesting the Western Australian Planning Commission (WAPC) to separate the site from the remainder of Crown Reserve 40664 via subdivision followed by an amendment to the GBRS to designate the site as ROS. As TPS7 is subordinate to the GBRS it will automatically reflect this change, thus a separate amendment to TPS7 is not required.

The Department of Planning (DoP), the State Government agency responsible for administering the GBRS and supporting the WAPC, has been initially consulted in relation to the proposal. The DoP advised the City of Bunbury that it is likely to support the proposed reservation of the offset site as ROS, provided all relevant parties are in agreement. Furthermore, the DoP who will be responsible for initiating the amendment process has advised the City that it may be included in a routine multiple GBRS update (referred to as an omnibus-anomalies amendment).

The proposed additional classification of the offset site as a Class “A” reserve under the *WA Land Administration Act 1997* will give it the highest form of protection available for Crown reserves under the WA land administration process. Class “A” reserves cannot be changed in terms of area or purpose and cannot be cancelled without the approval of both houses of Parliament. The “A” classification is used solely to protect areas of high conservation or high community value (DoRDaL, 2010). The Department of Regional Development and Lands (DoRDaL) is the State Government department responsible for administering state lands, has advised the City of Bunbury

that it is willing to support the reservation of the offset site to a Class “A” reserve for the purpose of conservation.

In respect to the total time duration required to resolve the offsets ROS designation and Class A reservation, the City anticipates that both can be reasonably achieved within a 24 month period. This is due to the fact that it may take 6-12 months to establish their initiation through external agencies, followed by a further 12 months to finalise. This is considered as a conservative timeframe that accommodates risk as each process is administered by external agencies. The City will however aim to progress this matter as soon as possible upon receiving State and Federal project clearance.

Additionally, the City is currently investigating the possibility of incorporating the offset site into the proposed Preston River to Ocean Regional Park in the future, particularly as the site abuts the proposed Park making it a logical addition.

The regional park proposal involves the City and DEC managing discrete properties individually but under one common banner and management intent for the Park, that is, the City will retain management authority and responsibility for certain lands. Consistent with this approach, the offset site could be incorporated into the proposed Park but remain under the City's care and control. This arrangement would provide for ongoing transparency and accountability in regard to any conditions placed upon the City by the Commonwealth Government as part of the project's EPBC Act assessment process.

It should be noted that the possibility of incorporating the site into the proposed regional park is not assured at present as it is yet to be endorsed by relevant stakeholders. This option should be viewed as an intention only and is secondary to the primary protection mechanisms of the ROS designation and class “A” classification to protect the area in perpetuity as described above.

Direct Offset 2: Rehabilitation of Degraded Remnant Native Vegetation / Western Ringtail Possum Habitat

The City proposes to revegetate 3.4 ha of degraded land at the offset site with local native plant species. The intent of the revegetation program is two fold:

- To revegetate with species from the mapped floristic community type with dominant vegetation structures that would have originally existed at the site; and
- To preferentially select plant species that support Western Ringtail Possums and their habitat requirements.
- To purchase and plant seedlings in 2013, with ongoing maintenance from 2013 to 2017 such as infill plantings to maintain densities.

The degraded area forms part of floristic community MpAsXb as described under section 5.5. A combination of dominant species from the aforementioned community will be used to revegetate the area. During revegetation species selection, consideration was given to a proximate reference site located immediately east of the offset and highway at GDA 94 377660mE and 630 6770mN. The vegetation at this site was assessed to be in good to very good condition at October 2012. It is noted that this community type may be characteristic of a portion of the total area to be revegetated. The remaining portion of the target revegetation area would have a similar over storey and middle storey but dominated by a *Lepidosperma longitudinale* sedgeland. The dominant vegetation structure in the reference site is:

CCMpBIAfKgMvKrHvXbDbPcLI

Corymbia calophylla Open Woodland over *Melaleuca preissiana* *Banksia littoralis* *Agonis flexuosa*
Low Woodland over *Kunzea glabrescens* *Melaleuca viminea*, *Kunzea recurva* *Hakea varia* Tall
Open Scrub over *Xanthorrhoea brunonis*, *Dasyopogon bromelifolius*, *Phlebocarya ciliatum* Closed
Low Heath.

Further consideration has been given to the potential for *Phytophthora* dieback to kill susceptible planted species. Plant health will be monitored within the revegetation area with *Phytophthora* sampling and adjustments may be applied to the species selection during any contingency/maintenance infill planting.

Given the few internal tracks to be closed do not contain any significant invasive weeds, over time it can be reasonably expected that some natural recruitment of native plants may occur. However, the City proposes to plant along these tracks primarily with *Agonis flexuosa* at 5m intervals and may include other suitable local species (including potentially Dieback resistant jarrah (*Eucalyptus marginata*) depending on their nursery availability. Planting areas along tracks will be monitored with standard Dieback hygiene protocols applied such as monitoring during dry soil conditions to minimise the risk of introducing and spreading *Phytophthora* Dieback.

Attachment 4 lists the key species selected as suitable for revegetation of the degraded portion of the offsite site including local species known to support Western Ringtail Possums.

A planting density of 2,500 stems per hectare within the degraded area will be applied in accordance with DEC's draft "Development Planning Guidelines for Western Ringtail Possums in Busselton and Dunsborough" (DEC, 2009b). It should be noted that the guideline recommends using predominantly *Agonis flexuosa* within offset plantings for projects likely to impact on Western Ringtail Possum habitat areas. This recommendation will be reflected within future plant orders, but does not limit the inclusion of other local species as noted above.

In the open revegetation area, significant planting densities will occur as noted above and the open nature of the area may attract grazing of the seedlings by kangaroos and rabbits. For this reason, where the major effort in revegetation occurs within the degraded area, exclusion fencing will be temporarily installed around its perimeter. Once the plants are sufficiently established, it is intended that the fencing will be removed to enable Western Ringtail Possums to naturally disperse and utilise the area accessing it from the adjacent bush land. It is envisaged that this will occur at approximately five years from the commencement of planting, subject to successful plant establishment.

Ongoing weed management will be undertaken in the degraded revegetation area to support the establishment of the seedlings and to treat any significant environmental weeds.

Direct Offset 3: Management of Key Threats to Remnant Native Vegetation / Western Ringtail Possum Habitat

The following key threats to remnant native vegetation, Western Ringtail Possums and their habitat have been identified at the offset site through the field and desk-top based investigations conducted to date:

- *Phytophthora* Dieback
- Environmental weeds
- Fire
- Rubbish dumping.

The City will employ a range of management measures to address these issues as outlined below. These works have been estimated to require \$165,000 of funding over a five year period, which has been secured through project allocations and internal budgeting processes.

Phytophthora Dieback

Dieback has the potential to drastically alter vegetation structure and species composition as approximately 40% of native species in the south-west of Western Australia are susceptible to the pathogen (DWG, 2009). As complete removal of Dieback from an area is beyond the capacity of available techniques and resources, the optimum management approach for the pathogen at present is to limit its further spread, for example, through the regulation of access and soil movement (Environment Australia, 2002).

In light of these considerations, the City will employ the following key management strategies at the offset site in order to limit the further spread of Dieback:

- Maintaining existing fencing along the offset site's common boundaries with the South Western Highway and the Bunbury Clay Target Club.
- Extending the fence between the offset site and the Bunbury Clay Target Club will occur in 2013 in order to separate the two properties along the full length of their common boundary.
- Close and revegetate surplus access tracks with local native species will occur in 2013 (N.B. Dieback hygiene will be applied during planting with consideration to plants known to be resistant to *Phytophthora* in infested areas).
- Developing a disease management protocol for site visitors in order to regulate site access (N.B. this protocol will be underpinned by a re-survey of dieback occurrence onsite).

Environmental Weeds

Weeds are most abundant in the degraded/revegetation area that includes common paddock weeds and grasses. Several small populations of problematic environmental weeds were observed in the southeast corner. Within the remainder of the site's bush land, there are widely scattered common, non-invasive weeds that are unlikely to cause a deleterious event based on local knowledge and recognised environmental weed ratings given in the *Environmental Weed Strategy for Western Australia* (CALM, 1999).no areas were observed as requiring weed control.

The eight problematic environmental weeds recorded onsite within the revegetation area will be controlled as part of the City's Weed Management Program with particular focus on the southwest corner where small populations were identified (see attachment 7). Weed control using knock-down herbicide will also be applied at points across the degraded revegetation area where plantings will occur to prevent competition during their establishment. Attachment 4 lists the sites exotic weed species and those that will be targeted during weed control.

In addition, opportunistic monitoring of weed species presence, abundance and distribution will occur through day to day management of the site and further control will occur as deemed appropriate.

The proposed access strategies to support the control of Dieback spread will also assist in limiting the introduction of new environmental weeds to the site e.g. through illegal garden waste dumping.

Fire

Whilst fire is an important ecological process in the south west of Western Australia, inappropriate fire regimes have the potential to result in adverse impacts on natural areas (Burrows, 2008).

The City of Bunbury's primary interests in managing fire risk in local reserves are currently focussed upon the protection of the community and infrastructure. However, management measures employed by the City in this regard, for example, firebreak and fuel load maintenance, are likely to have positive outcomes for the natural environment by minimising the severity of fires and maximising suppression outcomes.

The City of Bunbury will continue to undertake such activities at the offset site into the future. All fire management activities undertaken by the City occur in consultation with relevant state government agencies such as the Department of Environment and Conservation and the Fire and Emergency Services Authority. Wherever possible, due regard is given to fire ecology principles in order to minimise adverse environmental impacts.

The access regulation strategies proposed to support the control of Dieback spread are also likely to be of assistance in limiting the future incidence of accidental and deliberate fire ignition within the offset site e.g. by car exhausts in contact with dry vegetation.

Rubbish Dumping

Rubbish dumping has the potential to cause adverse impacts on ecological values e.g. through the dumping of hazardous waste. The access regulation strategies proposed to support the control of Dieback spread are also likely to be of assistance in limiting future rubbish dumping incidents.

The City will collect and appropriately dispose of any rubbish currently onsite where it presents a contamination, health or fire risk. This includes any newly found car bodies, except for the single very old wreckage observed on site that has no rubber or flammable parts remaining and does not present any of the aforementioned risks or reduced amenity situated within the bush land area.

Activity Schedule

The following activity schedule assumes DSEWPaC / DEC approval is obtained on or before the end of 2012. It outlines key actions, timeframes and responsibilities associated with the three proposed direct offsets. Note, the majority of actions will be implemented and completed immediately (i.e. within 6-12 months of receiving approval for this offset management plan). A Site Management Plan has been prepared that spatially identifies the locations where site-based activities will be implemented (see Attachment 7).

Table 3: Activity Schedule

Action	Start Date	Anticipated Completion Date	Responsibility
Direct Offset 1: Conservation in perpetuity of non-secure remnant native vegetation / Western Ringtail Possum habitat			
Commence liaison regarding reservation of offset site as “Regional Open Space” under GBRS	January 2013	June 2013	City of Bunbury, DoP, DEC
Initiate and finalise minor amendment to GBRS to designate offset site as “Regional Open Space” <u>(i.e. a total of 24 months is required from commencing liaison, initiation to final amendment)</u>	On or before July 2013	December 2014	DoP, WAPC
Commence liaison to classify offset site as Class “A” reserve under <i>WA Land Administration Act 1997</i>	January 2013	June 2013	City of Bunbury, DRDaL
Initiate and finalise classification of offset site as Class “A” reserve, <i>WA Land Administration Act 1997</i> <u>(i.e. a total of 24 months is required from commencing liaison, initiation to final amendment)</u>	On or before July 2013	December 2014	DRDaL
Liaison for possible inclusion of offset site into proposed Preston River to Ocean Regional Park	Feb 2013	December 2013	City of Bunbury, DoP, DEC
Inclusion of offset site into proposed Preston River to Ocean Regional Park <u>(if possible and deemed appropriate) – this will not affect ongoing management or the offsets protection in perpetuity under the proposed land zoning/designation measures.</u>	Feb 2014	June 2014	City of Bunbury, DoP, DEC

Action	Start Date	Anticipated Completion Date	Responsibility
Direct Offset 2: Rehabilitation of degraded remnant native vegetation / Western Ringtail Possum habitat			
Fence construction is scheduled for completion in 2013 between Feb and May according to contractor availability.	Feb 2013	May 2013	City of Bunbury, Contractor
Purchase and plant seedlings in 2013. Then undertake ongoing maintenance between 2013-2017 (see Attachment 4 that lists suitable species most likely available from nursery supply as well as those supporting Western Ringtail Possum habitat).	Feb 2013	August 2013 – initial planting completed. Aug 2017 – ongoing maintenance period	City of Bunbury, Contractor
Weed control (to support plant establishment)	Feb 2013	Oct 2014	City of Bunbury, Contractor
Direct Offset 3: Management of key threats to remnant native vegetation / Western Ringtail Possum habitat			
Repair / maintain fences (i.e. following fence construction in 2013, ongoing maintenance and management will occur to 2017)	Feb 2013	Dec 2017	City of Bunbury, Contractor
Extension of offset site / Bunbury Clay Target Club boundary fence (400 m)	Feb 2014	Dec 2014	City of Bunbury, Contractor
Close and plant along closed obsolete access tracks	Feb 2013	Dec 2014	City of Bunbury, Contractor
Development of offset site visitor Dieback protocol	Feb 2013	Feb 2014	City of Bunbury
Environmental weed management	Feb 2013	Ongoing	City of Bunbury, Contractor

Action	Start Date	Anticipated Completion Date	Responsibility
Direct Offset 3 (continued): Management of key threats to remnant native vegetation / Western Ringtail Possum habitat			
Implement fire management works	Feb 2013	Ongoing	City of Bunbury, Contractor
Rubbish collection	Feb 2013	June 2013	City of Bunbury

Notes:

- DoP = WA Department of Planning
- DEC = WA Department of Environment and Conservation
- WAPC = Western Australian Planning Commission
- DRDaL = WA Department of Regional Development and Lands

8.0 Site Actions and Monitoring Program

The offset site monitoring program has been designed to focus on the success (or otherwise) of implementing the site-based actions i.e. revegetation/track plantings, weed control, Dieback management, access management, fencing and rubbish cleanup.

The City will systematically collect site data over time using qualitative and quantitative methodology. A combination of permanent and temporary monitoring areas including 10 m x 10 m quadrats and linear transects will be established to monitor revegetation outcomes. Site actions such as revegetation, closing tracks and monitoring track plantings will occur in dry soil conditions to minimise the risk of introducing and spreading Phytophthora Dieback.

Table 4 sets out the site actions and monitoring program including target objectives, monitoring measures and frequency, and completion criteria. The City will be responsible for undertaking site monitoring that may include assistance from external resources. The results of any monitoring will be included within annual reporting as well as a concise update on the progress of all prescribed management actions (see Section 10).

After five years, the City will continue to manage the area in the same manner as Manea Park. If the City's aspiration of incorporating the offset site into the larger proposed Preston to Ocean Regional Park eventuates, the site will remain under the City's care and control but will be managed consistent with the broader approach applied to the Regional Park. This possibility should be viewed as an intention only and will not affect or reduce the sites protection in perpetuity if it doesn't eventuate.

It is recognised that extreme events such as fire, drought and flood may cause significant and uncontrollable impacts to the offset site. The City's intention is to enhance the offset sites resilience through its site management actions. However, should an uncontrollable impact event occur, the City will investigate the issue and liaise with relevant agencies to determine what actions can reasonably be implemented to remediate and further mitigate such events.

Table 4 Site Actions and Monitoring Program for the offset site within Reserve 40664

Action	Target Objectives	Monitoring Measures	Frequency	Completion Criteria
Revegetation of Degraded Area	<p>To enhance the degraded area with native plants selected from those that would have originally occurred within it and provide for Western Ringtail Possum habitat.</p>	<p><u>Permanent Monitoring</u> Establish three (3) permanent 10 x 10 m monitoring quadrats within the degraded revegetation area. Information to be collected from these quadrats:</p> <ul style="list-style-type: none"> • The total number of plants. • The number of each species planted. • Observed percentage cover of native plants as either <10%, 11 – 30%, 31-70% or >70%. • Average seedling / plant height. • The percentage of over storey, middle storey and understorey species within each quadrat area. • Observed health of native vegetation within the quadrat – as either: poor/good/excellent. Provide comment on any observed plant deaths and the likely cause. <p><u>Temporary Monitoring</u> Undertake monitoring from five (5) 20 m x 2 m wide random transects: Information to be collected from these transects:</p> <ul style="list-style-type: none"> • Total number of planted plants • Total number of each species planted 	<p>Permanent monitoring quadrats are to be established at completion of planting. Monitoring should be undertaken at establishment of quadrats and during the first two weeks of *November in year 1, year 2 and year 5.</p> <p>Monitoring of temporary quadrats is to be undertaken in the first two weeks of *November in year 1, year 2 and year 5.</p> <p>* Monitoring in November will allow time to make a plant order in December with nurseries for seedlings to be ready for the following planting season.</p>	<p>Target composition/diversity to be 70% remaining of all species planted at the end of 2 and 5 years within the degraded area per random hectare monitored and along closed tracks respectively.</p> <p>Planting survival rate of 80% within quadrats and along closed/obsolete tracks at the end of 2 and 5 years.</p> <p>Photographic evidence demonstrates that plant health is ranked as good or excellent within the degraded area, plus along the planted closed/obsolete tracks.</p> <p>The target structure completion criteria for the proposed revegetation within the degraded area is 55% overstorey species, 35% midstorey and 10% understorey based on the site condition, mapped vegetation, reference site and what can realistically be achieved.</p>

Action	Target Objectives	Monitoring Measures	Frequency	Completion Criteria
Revegetation of closed tracks	To create treed sections along the cleared and closed/obsolete tracks.	<p>Permanent Monitoring</p> <p>Establish one (1) x 20 m x 5 m (average width of track c.a 5 m) monitoring quadrat along closed tracks.</p> <p>Information to be collected from this quadrat:</p> <ul style="list-style-type: none"> • Total number of planted plants. • Total number of each species planted. • Average seedling/tree height. • Observed health of native vegetation within the quadrat – as either: poor/good/excellent. <p>Temporary monitoring</p> <p><u>Years 1 and 2</u> : Undertake monitoring from one (1) x 20 m x *5 m random transect along closed tracks.</p> <p><u>Years 4 and 5</u> : Undertake monitoring from two (2) x 20 m x *5 m random transects along closed tracks. One of these monitoring transects must be conducted in the western-most 200m of the closed track revegetation area as identified in Attachment 7.</p> <p>Information to be collected from these transects:</p> <ul style="list-style-type: none"> • Total number of planted plants • Total number of each species planted • Approximate average seedling/tree height • Seedling health <p>*average width of track c.a 5 m</p>	<p>Permanent monitoring quadrats are to be established at completion of planting and monitored during the first two weeks of *November in years 1, 2 and 5.</p> <p>Monitoring of randomly placed temporal quadrats is to be undertaken in the first two weeks of *November in years 1, 2, 4 and 5.</p> <p>* Monitoring in November will allow time to make a plant order in December with nurseries for seedlings to be ready for the following planting season.</p>	<p>Target composition/diversity to be 70% remaining of all species planted at the end of 2 and 5 years within the degraded area per random hectare monitored and along closed tracks respectively.</p> <p>Planting survival rate of 80% within quadrats and along closed/obsolete tracks at the end of 2 and 5 years.</p> <p>Photographic evidence demonstrates that plant health is ranked as good or excellent within the degraded area, plus along the planted closed/obsolete tracks.</p> <p>The target structure completion criteria for the proposed revegetation within the degraded area is 55% overstorey species, 35% midstorey and 10% understorey based on the site condition, mapped vegetation, reference site and what can realistically be achieved.</p>

Action	Target Objectives	Monitoring Measures	Frequency	Completion Criteria
Weed Control	To maintain the revegetation area free of significant targeted environmental weeds that may adversely affect revegetation success.	Inspect all revegetation areas and record the locations, type and coverage (m ²) of any significant weeds requiring control. Record approximate % cover – weeds within degraded area quadrats.	Pre-planting, then at two and five years. (N.B. the City will comply with its responsibilities to control any Declared Pests in accordance with the WA <i>Biosecurity and Agriculture Management Act 2007</i>).	No significant environmental weed infestations within the degraded (revegetation) area or along closed/obsolete tracks at the end of 2 and 5 years. The target weed cover completion criteria is <15% of targeted weed cover remaining within the degraded area at the end of 5 years.
Dieback Management	Avoid and minimise the risk of introduction and/or spread of the Dieback pathogen <i>Phytophthora cinnamomi</i> to vulnerable areas of vegetation.	Documented Dieback protocols have been implemented.	Annually until implemented across stakeholder agencies within 5 years.	Documented evidence that the Dieback protocols have been communicated to key City staff and relevant authorities (i.e. Western Power, DEC and FESA) who may be required to enter the site.
Access Management	Implement and maintain track closures for all non-essential internal tracks.	Photographic evidence of track closures referenced against the locations shown on the Site Management Plan.	Annually until all identified tracks are closed within 5 years.	All unnecessary tracks identified on the Site Works Plan have been closed.

Action	Target Objectives	Monitoring Measures	Frequency	Completion Criteria
Fencing	Repair, inspect and maintain the outer perimeter fence as well as any temporary fencing used to limit kangaroo and rabbit grazing.	Record photographs – pre and post fence repairs/installation.	<p>Within first year repair fence. Inspect and maintain fence (ongoing).</p> <p>On or before 5 years when plants are adequately mature – remove temporary fence to allow WRPs/native fauna access.</p>	<p>Offset site perimeter fencing is intact (N.B. along southern and eastern boundaries only – no need to fence common boundaries with Manea Park).</p> <p>Temporary fence has been removed on or before 5 years.</p>
Site Rubbish	Maintain site free of rubbish/waste and any that presents a risk to health, the environment or a fire hazard.	Record the location and type of any observed rubbish dumping and any removed.	Annually, as applicable up to 5 years.	No rubbish/waste materials present on site at 5 years.

9.0 Contingencies

Contingency actions have been developed for the offset site for implementation where monitoring identifies that the agreed target objectives are not being met or are unlikely to be achieved (Table 5). The City will promptly investigate such issues, implement appropriate remediation works and include this information within the offset site annual report.

Table 5 Contingencies and Remediation Actions

Project Aspect	Trigger	Remediation Actions
Revegetation (in Degraded Area and along track plantings on obsolete/closed tracks)	<p>Less than 70% of planted species diversity remaining in 1 ha of the revegetation area and along track plantings.</p> <p>Less than 80% plant survival in revegetation area and track planting areas after 2 and 5 years.</p> <p>Plant health declines below good to better rankings over the reporting period in the revegetation area and track planting areas.</p> <p>Vegetation structure varies in the revegetation area by >20% per target completion criteria which is 55% overstorey species, 35% midstorey and 10% understorey.</p>	<p>Implement infill planting pre-winter to increase species diversity (assuming no significant limiting factors are observed for a particular plant species) and/or increase plant numbers.</p> <p>Identify cause of plant health/structural decline, consider sampling for <i>Phytophthora</i> sp. and/or or adjusting species mix to include non-Dieback-susceptible plants, consider native fertiliser/soil wetting agents/direct seed.</p> <p>Infill planting to enhance vegetation structural decline and reduced species diversity.</p>
Weed Control	<p>Occurrence of significant environmental weeds within the degraded area and track plantings at the end of 2 and 5 years.</p> <p>Targeted weed cover exceeds 15% of that originally occurring within the degraded area and track plantings at the end of 5 years.</p>	<p>Record the type of weed, its location, extent and employ a contractor to control it. Ensure the contractor employs any applicable Dieback hygiene protocols.</p>

Project Aspect	Trigger	Remediation Actions
Dieback Management	New points of <i>Phytophthora cinnamomi</i> infestation are identified or suspected of impacting native vegetation.	<p>Field sample recent plant deaths and complete laboratory testing for <i>Phytophthora</i> sp.</p> <p>Consider strategic phosphite treatment in the revegetation area and along tracks to assist in protecting susceptible plants against <i>Phytophthora</i> Dieback.</p> <p>Consider engaging an experienced Dieback interpreter to confirm the presence/extent/impact of Dieback affected areas and options for management.</p>
Access Management	Evidence of unauthorised access is observed/recorded.	<p>Investigate nature of unauthorised access including possible responsible party and manage via Local Law under the <i>Local Government Act 1995</i>.</p> <p>Re-instate any damaged track closure point to prevent further unauthorised access as soon as practicable.</p>
Fencing	Observed damage to fencing integrity.	Re-instate damaged fencing.
Rubbish Removal	Hazardous rubbish/waste is found on site that presents a risk to health, the environment or presents a possible fire hazard.	<p>Investigate the type and extent of rubbish/waste (where possible and safe) and the risk it presents to health, the environment or fire hazard.</p> <p>Liaise with the DEC as required (e.g. in regard to contaminated materials and their disposal).</p> <p>Remove, report and/or manage per Local Law and/or the <i>Contaminated Sites Act 2003</i>, as relevant.</p>

10.0 Reporting

The City proposes to prepare a combined *Annual Environmental Offset Report* for submission to both the DSEWPaC and the DEC, rather than to treat these as separate reports for the same area. The details of this approach are given below:

Anticipated Department of Sustainability, Environment, Water, Population and Community Reporting:

In line with advice received during DSEWPaC's review of this document and DSEWPaC's standard conditions of approval, reporting to DSEWPaC is based on the indicative typical conditions below. Note, the final conditions will be complied with by the City and must be referred to in all future site management and reporting in order to meet compliance.

- Within three months of every 12 months anniversary of the commencement of the action, the City of Bunbury will publish a report on the website addressing compliance with each of the approval conditions.
- Maintain accurate records substantiating all activities associated with or relevant to the conditions of approval and make them available upon request to the DSEWPAC.
- Upon the direction of the Minister, the person taking the action must ensure that an independent audit of compliance with conditions of approval is conducted and a report submitted to the Minister.
- If the City of Bunbury wishes to carry out any activity otherwise than in accordance with the management plans as specified in the conditions, the person taking the action must submit to the department for the Minister's written approval a revised version of that management plan. The varied activity shall not commence until the Minister has approved the varied management plan in writing.
- Unless otherwise agreed to in writing by the Minister, the City must publish all management plans referred to in approval conditions on their website. Each management plan must be published on the website within 1 month of being approved.

Department of Environment and Conservation Clearing Permit CPS 1887 Reporting:

- Reporting will be as outlined on Clearing permit per the approved version of the Clearing Permit (and any future amended versions).

An Annual Project Environmental Report will be prepared to address:

- Any record requirements and reporting conditions under the Clearing Permit.
- A concise summary of the offset activities (actions) undertaken.
- Results from any site/revegetation monitoring.
- A summary of how the target objectives are being met and if any contingencies/remediation actions have been implemented or are planned.
- A summary of compliance with any other conditions of approval.
- Supporting information to verify the above or as conditionally required.

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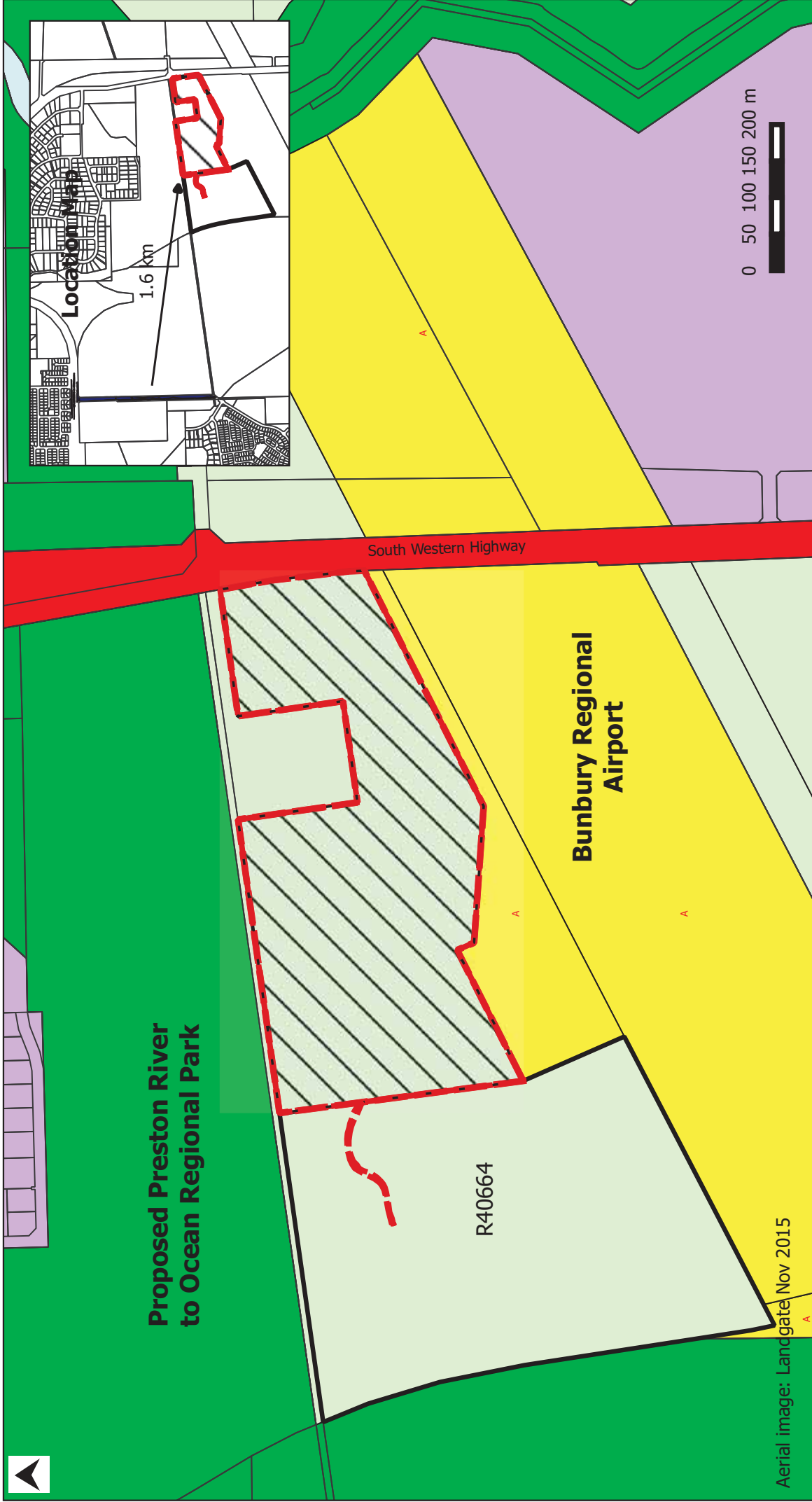
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12.0 Attachments

<i>Attachment No. 1:</i>	Location of Environmental Offset Site Rev 1.1
<i>Attachment No. 2:</i>	Western Ringtail Possum Observations
<i>Attachment No. 3:</i>	Offsite Site Floristic Community Mapping
<i>Attachment No. 4:</i>	Offset Site Flora List & Species Selected for Revegetation_V.2
<i>Attachment No. 5:</i>	Vegetation Condition Mapping
<i>Attachment No. 6:</i>	Offset Site Photographs – September 2012
<i>Attachment No. 7:</i>	Offset Site Management Plan Rev 1.1

Attachment No. 1

Location of Environmental Offset Site



Aerial image: Langgate Nov 2015

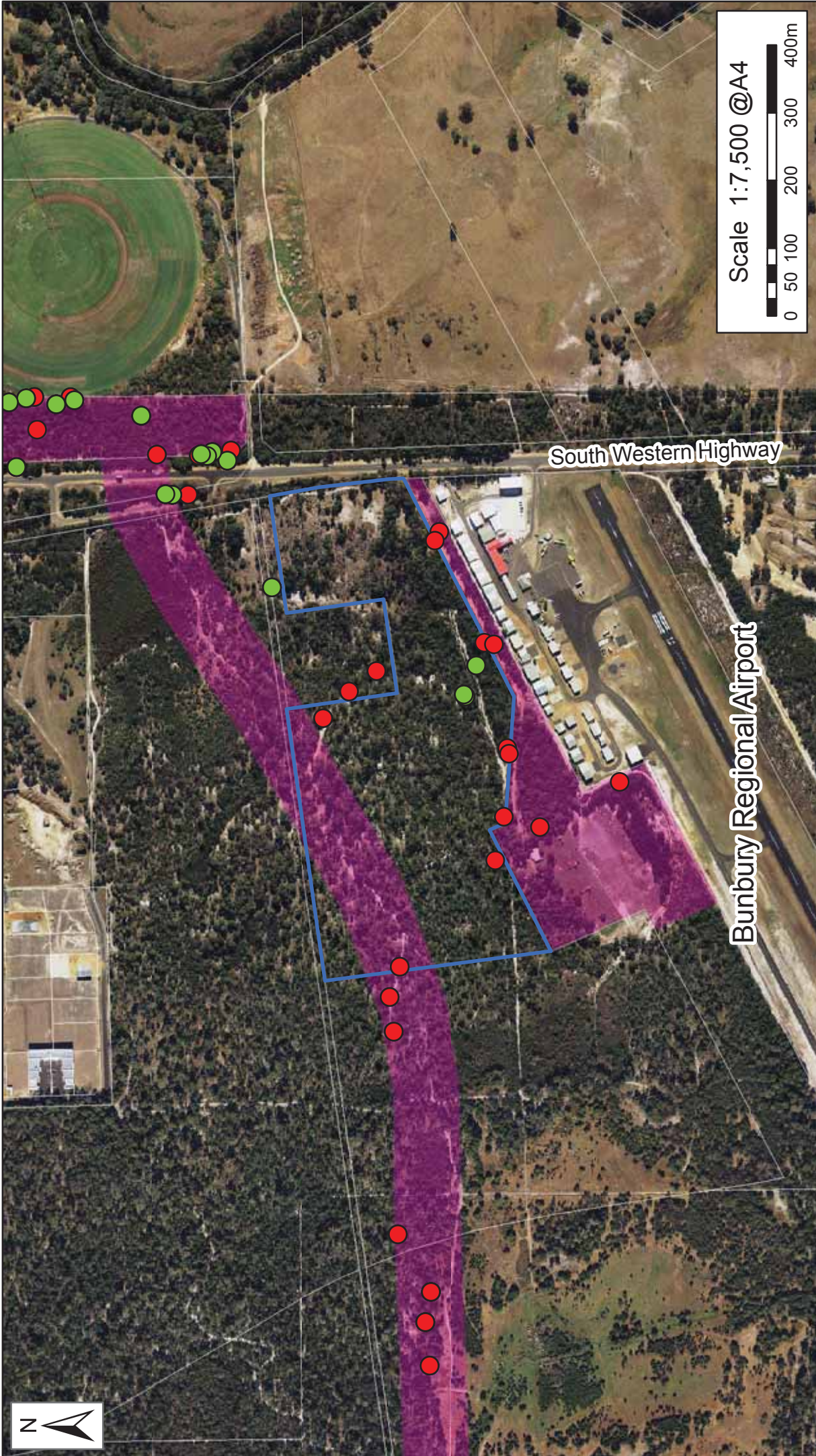
Legend

- Greater Bunbury Region Scheme
 Public Purposes - Airport
- Industrial
 Regional Open Space
- Primary Regional Roads
 Offset Works Area
- Somerville Drive Extension Project
 Intersection Work Area
- R40664
 Cadastre
- Clearing Area
 Offset Area



Attachment No. 2

Western Ringtail Possum Observations



**CITY OF
BUNBURY**
Somerville Drive Extension Project
EPBC Act Referral

Legend:

- Cadastre (Landgate, 2012)
- Offset Site

Western Ringtail Possum Records*

- Drey
- Western Ringtail Possum
- Survey Area

*Composite data from three surveys between 2008 and 2012 (Harewood, 2012)

Attachment 2: Western Ringtail Possum Observations

Attachment No. 3

Offsite Site Floristic Community Mapping



Scale 1:5,000 @A4
 0 25 50 100 150 200m



CITY OF BUNBURY
 Somerville Drive Extension Project
 EPBC Act Referral

Legend:

- Cadastral (Landgate, 2012)
- Floristic Communities:**
- BiAfMpKb
- CcEmAfBaKbXb
- MpAsXb
- MpKbAsp.Li

Floristic Community Data Source: City of Bunbury, 2012

Attachment 3: Offset Site Floristic Community Mapping

Attachment No. 4

Offset Site Flora List and Species Selected for Revegetation_v.2

Attachment 4.

Offset Site Flora List and Species Suitable for Revegetation (x)

Species (* Exotic species) (# Target weed to control)	Selected as suitable for Revegetation of Offset (subject to availability)	Species to support Western Ringtail Possum habitat
*# <i>Acacia longifolia</i>		
<i>Acacia pulchella</i>	X	X
<i>Acacia saligna</i>	X	X
<i>Adenanthos meisneri</i>	X	X
<i>Agonis flexuosa</i>	X	X
<i>Anigozanthos manglesii</i>		
<i>Anigozanthos viridus</i>		
* <i>Anagallis arvensis</i> var. <i>caerulea</i>		
<i>Astartea scoparia?</i>		
<i>Banksia attenuata</i>		
<i>Banksia grandis</i>		
<i>Banksia ilicifolia</i>		
<i>Banksia littoralis</i>	X	X
<i>Caladenia flava</i>		
<i>Caladenia</i> sp.		
<i>Chaemaescilla corymbosa</i>		
<i>Conostylis aculeata</i>		
<i>Corymbia callophyla</i>	X	X
* <i>Cotula turbinata</i>		
<i>Craspedia</i> sp.		
<i>Cyrtostylis</i> sp.		
<i>Dasypogon bromeliifolius</i>		
<i>Daviesia divaricata</i>		
<i>Diuris longifolia</i>		
<i>Drosera</i> sp		
<i>Drosera</i> sp		
<i>Drosera</i> sp		
*# <i>Ehrharta calycina</i>		
*# <i>Ehrharta longiflora</i>		
*# <i>Eragrostis curvula</i>		
<i>Eucaplyptus marginata</i>		
*# <i>Gladiolus undulatus</i>		
<i>Hakea prostrata</i>	X	
<i>Hakea varia</i>	X	
<i>Hardenbergia comptoniana</i>		
<i>Hibbertia cuneiformis</i>		
<i>Hibbertia cunninghamii</i>		
<i>Hibbertia racemosa</i>		
<i>Hibbertia hypericoides</i>		
* <i>Hypochaeris glabra</i>		
<i>Hypoxis occidentalis</i>		
<i>Hovea trisperma</i>		
<i>Hypolaena exsulca</i>		

Species (* Exotic species) (# Target weed to control)	Selected as suitable for Revegetation of Offset (subject to availability)	Suitable to provide Western Ringtail Possum habitat
<i>Jacksonia furcellata</i>	X	X
<i>Juncus pallidus</i>	X	X
<i>Kennedia prostrata</i>		
<i>Kunzea glabrescens</i>	X	X
<i>Kunzea recurva</i>	X	X
<i>Lagenifera huegelii</i>		
<i>Lepidospermum longitudinale</i>		
<i>Lepidospermum sp</i>		
<i>Lomandra preissii</i>		
*# <i>Lupinus sp.</i>		
<i>Lyginia imberbis</i>		
<i>Lyperanthus nigricans</i>		
<i>Macrozamia riedlei</i>		
<i>Melaleuca preissiana</i>	X	X
<i>Melaleuca raphiophylla</i>	X	X
<i>Melaleuca thymoides</i>	X	
<i>Melaleuca viminea</i>	X	X
<i>Nuytsia floribunda</i>		
<i>Ornduffia sp.</i>		
* <i>Oxalis purpurea</i>		
<i>Phyllanthus calycinus</i>		
<i>Philothea spicatus</i>		
<i>Pterostylis sp.</i>		
<i>Pterostylis sp.</i>		
<i>Romulea rosea</i>		
* <i>Sonchus oleraceus</i>		
<i>Sowerbaea laxiflora</i>		
<i>Stylidium sp.</i>		
<i>Thelymitra sp.</i>		
<i>Trachymene pilosa</i>		
* <i>Ursinia anthemoides</i>		
*# <i>Watsonia sp.</i>		
<i>Villarsia sp.</i>		
<i>Viminaria juncea</i>	X	
<i>Xanthorrhoea brunonis</i>		
<i>Xanthorrhoea gracilis</i>		
<i>Xylomelon occidentale</i>		
*# <i>Zantedeschia aethiopica</i>		

Attachment No. 5

Vegetation Condition Mapping







Scale 1:5,000 @A4
 0 25 50 100 150 200m



Somerville Drive Extension Project
 EPBC Act Referral

Legend:

-  Cadastre (Landgate, 2012)
-  Degraded
- Vegetation Condition (Keighery, 1994)**
-  Very Good
-  Good

Vegetation Condition Data Source: City of Bunbury, 2012

Attachment 5: Offset Site Vegetation Condition Mapping

Attachment No. 6

Offset Site Photographs – September 2012



Plate 1. Good Condition Vegetation



Plate 2. Very Good Condition Vegetation



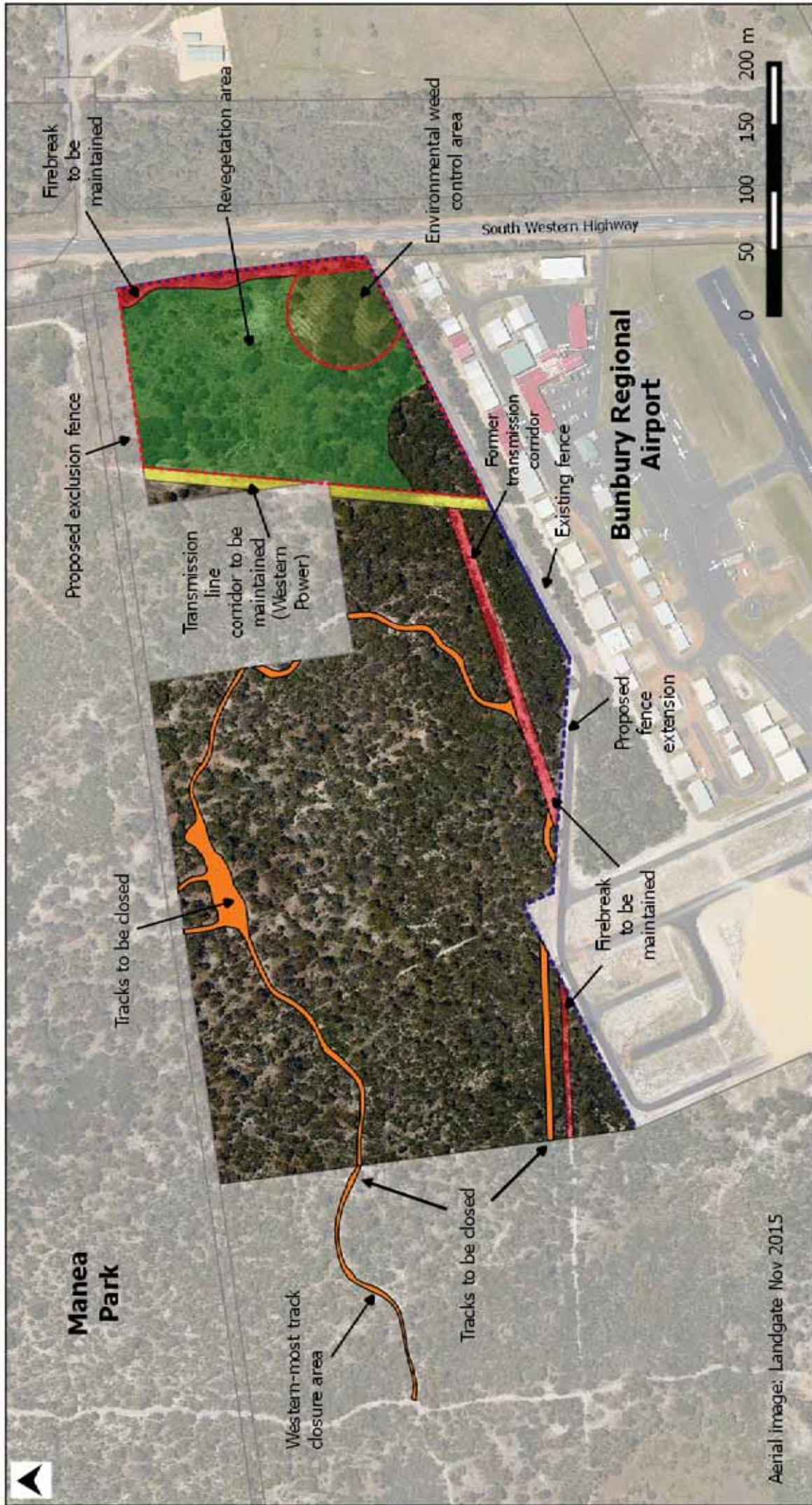
Plate 3. WA Peppermint (*Agonis flexuosa*) natural recruitment



Plate 4. Rubbish found in central part of offset site

Attachment No. 7

Offset Site Management Plan



Legend

-  Environmental Weed Control Area
-  Exclusion Fence
-  Transmission Line Corridor
-  Existing Fence
-  Firebreaks
-  Revegetation Area
-  Proposed Fence Extension
-  Cadastre
-  Proposed Track Closures



Somerville Drive Extension Project