CONSERVATION AREA MANAGEMENT PLAN (COMMONWEALTH)

Alkimos Beach

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SUMMARY

Background

The Alkimos Beach Conservation Area Management Plan (CAMP) has been prepared to guide the ongoing management of the existing and proposed rehabilitation of Carnaby's Black-Cockatoo habitat. The CAMP area is an approximate 6 hectare (ha) area of Conservation Public Open Space (POS) bounded by the "Urban" zoned portion of the Alkimos Beach to the east and the foreshore reserve to the west (Figures A and B). The focus of this management plan is to rehabilitate at least 2 ha of the POS area and contribute to the 1 ha supplementary planting of Carnaby's Black-Cockatoo foraging habitat required across the POS and adjacent coastal Regional Open Space (ROS) foreshore areas.

The conservation POS and the ROS foreshore areas addressing the Carnaby's Black-Cockatoo revegetation areas are illustrated in Figure 1.

This management plan has been prepared to meet the requirements of the South Alkimos *Environment Protection Biodiversity and Conservation Act 1999* (EPBC Act) (EPBC 2011/5902) approval decision.

Conservation Area Management Plan (CAMP) – site context

Alkimos Beach (formerly known as "South Alkimos") is an approved master-planned residential development located approximately 40 kilometres (km) north-west of the Perth Central Business District within the City of Wanneroo (Figure 1).

The Alkimos Beach residential project is being developed by Lendlease Communities (Alkimos) Pty Ltd (Lendlease) in partnership with LandCorp.

Alkimos Beach CAMP – study area

The CAMP area is located on a primary coastal dune system, historically subject to illegal recreational 4WD vehicles with a limited range of Carnaby's Black-Cockatoo foraging habitat. The CAMP area, as shown in Figures B and C, has two areas separated by a connector road. Area B (or the westward area) of the CAMP is adjacent to the foreshore reserve (the ROS) and this area will be used for a portion of the supplementary plantings of at least 1 ha.

A core objective of the Carnaby's Black-Cockatoo rehabilitation program is to complement the existing tuart trees (Eucalyptus gomphocephala) with an additional 2 ha of Carnaby's Black-Cockatoo foraging habitat species and contributes to the supplementary planting equivalent to at least 1ha of Carnaby's Black-Cockatoo foraging habitat across the conservation POS (CAMP area) and ROS (foreshore reserve area) in the project area.

Purpose of the CAMP

The purpose of this Alkimos Beach CAMP is to establish a management framework that responds specifically to Conditions 10(a) and (b) (which focuses on the management of the rehabilitation of 2 ha and a portion of the supplementary plantings (at least 1 ha) of Carnaby's Black Cockatoo foraging habitat within the Conservation POS (CAMP) area) of the South Alkimos EPBC Act (EPBC 2011/5902) approval decision. The Commonwealth EPBC Act approval conditions for the Alkimos Beach development is provided in Appendix A.

A summary of the Ministerial Conditions and Carnaby's Black-Cockatoo rehabilitation areas is presented below:

- Condition 10(a) – requires 2 ha of Carnaby's Black-Cockatoo foraging habitat rehabilitation.
- Condition 10(b) – requires 1 ha of Carnaby's Black-Cockatoo foraging habitat supplementary planting (spread within the Conservation POS & ROS (which is the Alkimos coastal foreshore) areas).

- Condition 11(a) – requires 1 ha of Carnaby's Black-Cockatoo foraging habitat supplementary planting.

In November 2018 a variation to the EPBC Act Conditions 2011/5902 was approved. The variation to the Conditions 10, 11 and 12 was approved to specifically facilitate the handover of the Conservation POS (CAMP area) and also the Foreshore Management Plan (FMP) and the Precinct Landscape and Revegetation Plan areas. The variations to the conditions are included in Appendix A.

The 1 ha of supplementary planting of Carnaby's Black Cockatoo foraging habitat is addressed in both this CAMP and in the coastal foreshore reserve which is addressed in the FMP.

Figure 1 demonstrates the proposed Carnaby's Black-Cockatoo revegetation areas within the CAMP, the FMP (or ROS area) and the additional supplementary planting area located across the CAMP and FMP area against the required Ministerial Condition areas. In summary, the proposed revegetation areas demonstrate the following:

1. Ministerial Condition 10a – (2 ha Carnaby's Black-Cockatoo revegetation requirement). The CAMP will deliver a 2 ha revegetation area.

2. Ministerial Condition 10b – (1 ha supplementary Carnaby's Black-Cockatoo revegetation requirement). The CAMP and the FMP will deliver a 1 ha Carnaby's Black-Cockatoo revegetation area. The proposed Carnaby's Black-Cockatoo revegetation area is estimated at 1.34 ha.

3. Ministerial Condition 11a - (1 ha supplementary Carnaby's Black-Cockatoo revegetation requirement). The FMP will deliver Carnaby's Black-Cockatoo revegetation area of 1 ha. The proposed Carnaby's Black-Cockatoo revegetation area in the FMP is estimated at 1.22 ha.

In accordance with Ministerial Condition 2 Lendlease will provide the Commonwealth annual reports on the Carnaby's Black-Cockatoo revegetation area, and compliance with Conditions 10a, 10b and 11a.

Ministerial Condition	Required Carnaby's black cockatoo habitat revegetation areas	Proposed Carnaby's black cockatoo habitat revegetation areas
Ministerial condition 10a	2 ha	2.08 ha
Ministerial condition 10b (within both the FMP (regional open space area) and CAMP (conservation public open space area) boundaries)	1 ha	1.34 ha
Ministerial condition 11a	1 ha	1.22 ha
Total area	4 ha	4.64 ha

Figure 1: Alkimos Beach EPBC Act 2011/5902 – Required and actual Carnaby's black cockatoo revegetation areas within the CAMP and the coastal foreshore (or ROS)

Tranen Revegetation Systems have been commissioned by Lendlease to prepare specific rehabilitation plans to address the planting and management of at least 2 ha of Carnaby's Black-Cockatoo foraging habitat and the additional 1 ha of supplementary planting (spread across both the ROS and CAMP area) of Carnaby's Black-Cockatoo foraging habitat.

Regarding Condition 10(b) this CAMP revegetation program will undertake a 0.08 ha contribution to the 1 ha additional supplementary planting. The FMP will contribute at least 0.93 ha towards the Carnaby's Black-Cockatoo foraging habitat supplementary planting.

Tranen has prepared both CAMP and FMP Revegetation Management Plans. The CAMP Revegetation Management Plan is provided in Appendix B.

The CAMP Revegetation Plan (for the Conservation POS) addresses the Carnaby's Black-Cockatoo rehabilitation components of the CAMP, which includes:

- Delineating the rehabilitation areas within the CAMP site
- Providing specific details of the rehabilitation program including seedling propagation, site preparation and erosion control, weed and rabbit management
- Planting densities, completion criteria, rehabilitation monitoring and corrective measures.

Amendment to the Matters of National Environmental Significant (MNES)

In May 2013, the Graceful Sun Moth was removed from the Commonwealth's threatened species list and is therefore no longer a listed threatened species under the EPBC Act. The then Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) (ow the Department of Environment and Energy (DEE)) confirmed in a letter dated 13 June 2013 the key EPBC Act approval conditions relating to the Graceful Sun Moth were no longer applicable to the Alkimos Beach project (EPBC 2011/5902).

The relevant MNES to this CAMP specifically relates to the existing and proposed rehabilitation of Carnaby's Black-Cockatoo habitat.

Key performance indicator

The key performance indicators for this management plan is the successful rehabilitation of at least 2 ha of Carnaby's Black-Cockatoo foraging habitat (within areas of the Conservation POS), and to contribute (0.08 ha) to the additional 1 ha of supplementary Carnaby's Black-Cockatoo planting over a three-year period.

Key management measure

Table 1 provides the key actions, corrective measures and monitoring actions for the Carnaby's Black-Cockatoo rehabilitation within the CAMP study area.

Responsibility

Responsibility for the Carnaby's Black-Cockatoo rehabilitation program and associated management actions will be with Lendlease for three years following the commencement of the rehabilitation program and until achievement of rehabilitation and revegetation completion criteria. For this purpose, Lendlease contractors and staff will act under the direction of Lendlease.

Lendlease will hand over management of the Conservation POS (the CAMP) area, inclusive of the Carnaby's Black-Cockatoo rehabilitation areas, to the City of Wanneroo.

Table 1: Alkimos Beach CAMP management plan implementation schedule

Activity	Management objective	Key actions	Key performance indicator/s	Corrective measures	Monitoring	Timing
CAMP Carnaby's Black-Cockatoo foraging habitat rehabilitation and weed management program						
Rehabilitation	The objective of the rehabilitation program is to: • Rehabilitate at least 2 ha of Carnaby's Black-Cockatoo foraging habitat species within the CAMP area. • Contribute to supplementary planting equivalent to at least 1 ha of Carnaby's Black-Cockatoo foraging habitat across conservation POS and ROS. • Minimise the impact of activities that could degrade Carnaby's Black-Cockatoo habitat.	• Prepare and implement the CAMP Revegetation Management Plan (Tranen 2015) • Rehabilitate at least 2 ha of Carnaby's Black-Cockatoo foraging habitat. This will be undertaken in various locations within the 6 ha CAMP area. • Tube stock will be planted at an average density of two plants per m^2 (range from 1.7 m^2 to 2 m^2) dependent on the specific plant species used. • Conduct a proportion of the rehabilitation works on old vehicle access tracks. Unused vehicle tracks will be blocked at both ends to prevent future vehicle access in these areas. • Weed spraying undertaken, rubbish and debris removed and disposed of appropriately	Within the Carnaby's Black-Cockatoo rehabilitation areas (post 3 years of management and monitoring) the completion criteria are: • 70% survival post 2 years • 50% plant coverage (% area of visual ground cover measured by a botanist/ revegetation consultant) • 10% or less weed cover. • Closure of all old vehicle access tracks for rehabilitation.	• Undertake additional rehabilitation works to meet the 2 ha rehabilitation requirements outlined in Condition 10 of the EPBC Act approval in accordance with the rehabilitation completion criteria. Undertake additional weed management i.e. herbicide treatments within the rehabilitation areas. • Undertake other general maintenance activities such as further rabbit control or brushing for erosion control. • Undertake additional rehabilitation and/or weed monitoring	• A monitoring plot of 2.5 m × 5 m will be established per rehabilitation area as well as one permanent photograph reference point at each monitoring plot. • The rehabilitation monitoring will occur bi-annually (includes weed monitoring) each spring and autumn and maintained for a three-year period after seeding/planting within each site. • A monitoring report will be undertaken biannually (spring and autumn) to assess if there are any issues requiring attention. The outcomes will be recorded in the Alkimos Beach	Rehabilitation program is ongoing (commenced in 2015 and will continue until the completion criteria are achieved)

Activity	Management objective	Key actions	Key performance indicator/s	Corrective measures	Monitoring	Timing
		• Brushing and / or mulching will be used to stabilise actively eroding and erosion prone locations to assist the planting of seedlings in the degraded areas of the primary dune.			compliance report	
Weed management	Minimise the impact from weeds that could degrade Carnaby's Black-Cockatoo existing and revegetated foraging habitat.	Weed control events will take place in spring of the year prior to the rehabilitation. Post the rehabilitation planting weed control will be undertaken each spring and autumn to reduce competition and optimise seedling establishment rates.	10% or less weed cover	• Undertake additional weed management i.e. herbicide treatments. • Undertake additional rehabilitation works to meet the 2 ha rehabilitation and a portion of the supplementary planting requirements outlined in Conditions 10(a) and (b) of the EPBC Act approval in accordance with the rehabilitation completion criteria.	• A monitoring plot of 2.5 m × 5 m will be established per revegetation area as well as one permanent photograph reference point at each monitoring plot. • The revegetation monitoring includes weed monitoring each spring and autumn and maintained for a three-year period after seeding/planting within each site.	The weed management program is ongoing (commenced in 2015).
Feral pest						
Pest management, particularly rabbits, will contribute to the improved habitat quality for	Control rabbits to a level where they do not prejudice the Carnaby's Black-Cockatoo revegetation completion criteria	• A combination of rabbit exclusion fencing, tree guards, and targeted rabbit control will be employed over a three year period.	Within the Carnaby's Black-Cockatoo revegetation areas there are measurable targets of:	Implement additional rabbit control measures including further fencing or biological controls based on the following observations:	• Monitoring will occur as part of the Carnaby's Black-Cockatoo existing and rehabilitation habitat areas	Pest management is ongoing (commenced in 2015).

Activity	Management objective	Key actions	Key performance indicator/s	Corrective measures	Monitoring	Timing
Carnaby's Black-Cockatoos.		• A rabbit control program will also be initiated in advance of site works to provide longer term protection to seedlings. This will include a combination of warren destruction, rabbit haemorrhagic disease virus (RHDV) release, and Pindone baiting.	• 70% survival post 2 years • 50% plant coverage (% area of visual ground cover measured by a botanist/ revegetation consultant) • Installation of rabbit exclusion fencing • Where appropriate tube stock will be fitted with a plastic guard.	• Presence of rabbits – visual observation • Evidence of rabbits eating the planted seedlings and destroying the tree guards • Rabbit warrens • Re-plant seedlings / revegetate areas impacted by rabbits to meet the EPBC Act Ministerial conditions 10(a) and (b) which is to provide a minimum 2 ha and a portion of the supplementary planting rehabilitation requirements outlined in Conditions 10(a) and (b) of the EPBC Act approval in accordance with the rehabilitation completion criteria. • Repair rabbit fencing and replace damaged tree guards as required	biannual monitoring program (occurring in spring and autumn) and maintained for a three-year period. • The key monitoring points will focus on the impacts to planted Carnaby's Black-Cockatoo habitat seedlings, tree guards and ensuring the rabbit fence remains intact. The monitoring program occurs for a three-year period • Evidence of the presence of rabbits such as visual observations of the seedlings being eaten, rabbit warrens in the local area and opportunistically foxes and feral cats will also be monitored and reported as part	

Activity	Management objective	Key actions	Key performance indicator/s	Corrective measures	Monitoring	Timing
					of the rehabilitation monitoring program. • The monitoring report will be submitted to Lendlease following each formal monitoring event. The outcomes will be recorded in the Alkimos Beach compliance report	
Bushfire						
Bushfire management	Protect the ecological integrity and biological values of the Carnaby's Black-Cockatoo existing and rehabilitated areas.	• No rubbish or vegetation will be burnt on site • Construct the perimeter roads and pathways between the CAMP and residential areas to act as the key firebreak(s) • During construction works semi-permanent fencing will be installed around the CAMP / Conservation POS boundary interface with the road and urban development (subdivision) works to prevent access into the revegetated areas	• Within the Carnaby's Black-Cockatoo rehabilitation areas there are measurable targets of: – 70% survival post 2 years – 50% plant coverage (% area of visual ground cover measured by a botanist/ revegetation consultant) • Provide records of any fires in the CAMP area to the City of Wanneroo / Department of Fire and Emergency Services (DFES).	• If fire occurs within the existing and rehabilitation areas – re-planting of Carnaby's Black-Cockatoo habitat will be required to fulfil the EPBC Act Ministerial conditions 10(a) and (b) which is to provide a minimum 2 ha and a portion of the supplementary planting rehabilitation requirements outlined in Conditions 10(a) and (b) of the EPBC Act approval	• Any bushfire event in the foreshore will be reported to DFES and the City of Wanneroo. • The annual monitoring report of the rehabilitation area will also include details (e.g. dates, time, location and duration) of any fire events. • The monitoring of the Carnaby's Black-Cockatoo existing and rehabilitation foraging areas	Bushfire management is ongoing (commenced in 2016).

Activity	Management objective	Key actions	Key performance indicator/s	Corrective measures	Monitoring	Timing
		and the broader CAMP area.	• Evidence of a semi-permanent fencing installed along the perimeter of the CAMP area adjacent to the constructed road and urban development.	in accordance with the rehabilitation completion criteria. • Repair damage to the fence as required.	will be undertaken bi-annually each spring and autumn and maintained for a three-year period.	
Erosion control						
Erosion management People management	Protect the ecological integrity and biological values of the Carnaby's Black-Cockatoo existing and rehabilitation areas.	• Undertake rehabilitation of bare/open areas in accordance with the CAMP Revegetation Management Plan (Tranen 2015). • During construction works a semi-permanent fencing will be installed around the CAMP / Conservation POS boundary interface with the road and urban development (subdivision) works to prevent access into the revegetated areas and the broader CAMP area. • Conservation fencing to the City of Wanneroo's requirements will be installed along the borders of the Conservation POS which is adjacent to	• Within the Carnaby's Black-Cockatoo rehabilitation areas there are measurable targets of: – 70% survival post 2 years – 50% plant coverage (% area of visual ground cover measured by a botanist/ revegetation consultant) • Evidence of a semi-permanent fencing installed along the perimeter of the CAMP area adjacent to the constructed road and urban development. • Closure of old vehicle access tracks for rehabilitation in accordance with the CAMP Revegetation	• Undertake additional brush / mulch as required over rehabilitation areas as required. • Undertake additional rehabilitation in areas impacted by erosion to meet the EPBC Act Ministerial conditions 10(a) and (b) which is to provide a minimum 2 ha and a portion of the supplementary planting rehabilitation requirements outlined in Conditions 10(a) and (b) of the EPBC Act approval in accordance with the rehabilitation completion criteria.	• Monitoring for erosion will occur as part of the Carnaby's Black-Cockatoo existing and rehabilitation foraging areas bi-annual monitoring program (occurring in spring and autumn). The monitoring program occurs for a three-year period. • The monitoring report will be submitted to Lendlease following each formal monitoring event, to assess if there are any erosion issue(s) requiring attention.	Erosion management is ongoing (commenced in 2015).

Activity	Management objective	Key actions	Key performance indicator/s	Corrective measures	Monitoring	Timing
		the Alkimos Beach subdivision and the eastern and western roads which bound the Conservation POS prior to handover to the City of Wanneroo. • A proportion of the rehabilitation works will be undertaken on old vehicle access tracks. These tracks are to be blocked at both ends to prevent future vehicle access in these areas	Management Plan (Tranen 2015)	• Damaged fencing will be repaired or replaced		
CAMP access management						
People management	Provide an appropriate level of access while protecting and enhancing the ecological values of the Carnaby's Black Cockatoo existing foraging habitat and the rehabilitation areas	• Closure of old vehicle access tracks for rehabilitation in accordance with the CAMP Revegetation Management Plan (Tranen 2015). • During construction works a semi-permanent fencing will be installed around the CAMP / Conservation POS boundary interface with the road and urban development (subdivision) works to prevent access into the revegetated areas and the broader CAMP area.	• Within the Carnaby's Black-Cockatoo rehabilitation areas there are measurable targets of: – 70% survival post 2 years – 50% plant coverage (% area of visual ground cover measured by a botanist/ revegetation consultant) • Closure and rehabilitation of tracks not required for pedestrian access. Installation of temporary fencing	• Undertake additional rehabilitation work of areas impacted from any unauthorised access to meet the EPBC Act Ministerial conditions 10(a) and (b) which is to provide a minimum 2 ha and a portion of the supplementary planting rehabilitation requirements outlined in Conditions 10(a) and (b) of the EPBC Act approval	• Monitoring for unauthorised access will occur as part of the rehabilitation monitoring (bi-annually spring and autumn) which will be occur for a three-year period. • The monitoring report will be submitted to Lendlease following each formal monitoring event, to assess if there are any erosion issue(s) requiring attention.	People / access management is ongoing (commenced in 2015).

Activity	Management objective	Key actions	Key performance indicator/s	Corrective measures	Monitoring	Timing
		• Conservation fencing to the City of Wanneroo's requirements will be installed along the borders of the Conservation POS which is adjacent to the Alkimos Beach subdivision and the eastern and western roads which bound the Conservation POS prior to handover to the City of Wanneroo.	in/around the rehabilitation areas. • Evidence of a semi-permanent fencing installed along the perimeter of the CAMP area adjacent to the constructed road and urban development. • Conservation fencing installed along the borders of the Conservation POS which is adjacent to the Alkimos Beach subdivision and the eastern and western roads which bound the Conservation POS	in accordance with the rehabilitation completion criteria. • Undertake additional weed management if the monitoring determines the weed cover is above the 10% cover • Ensure the fences if damaged are repaired or replaced.		

1 INTRODUCTION

Alkimos Beach (formerly known as “South Alkimos”) is an approved master-planned residential development located approximately 40 kilometres (km) north-west of Perth’s Central Business District within the City of Wanneroo (Figure A). The Commonwealth approved Alkimos Beach project area is 224 hectare (ha).

An outcome of the Commonwealth approvals process requires a Conservation Area Management Plan (CAMP) to be prepared and implemented. The CAMP area is an approximate 6 hectare (ha) area of Conservation Public Open Space (POS) which is bounded by the “Urban” zoned portion of the Alkimos Beach to the east and the foreshore reserve to the west (Figure B).

The Alkimos Beach residential project is being developed by Lendlease in partnership with LandCorp.

1.1 Alkimos Beach CAMP objective and scope

The objective for the Alkimos Beach CAMP is to protect habitat for Carnaby’s Black-Cockatoo by implementing a management framework that responds specifically to Condition 10 of the South Alkimos *Environment Protection Biodiversity and Conservation Act 1999* (EPBC Act) (EPBC 2011/5902) approval which states:

To protect habitat for listed threatened species, the person taking the action must prepare and submit a Conservation Area Management Plan (CAMP) detailing management of Public Open Space (POS) (designated Conservation POS at Attachment A), for approval by the Minister. The CAMP must include:

a. At least 2 ha of Carnaby’s Black-Cockatoo foraging habitat to be retained and rehabilitated in POS on the project area, as shown in Attachment A, to be managed for habitat recover, protection and conservation

b. Details of supplementary planting equivalent to at least 1 ha of Carnaby’s Black-Cockatoo foraging habitat on the project area (to be spread across conservation POS and ROS), including timeframes and survival targets proposed for plantings.

c. Measures to manage weed and feral pests

d. Bushfire prevention and management measures

e. Erosion control measures

f. Access management (including pathways, signage and fencing)

g. Performance indicators and corrective measures

h. Monitoring and reporting measures

i. Roles and responsibilities of contractors, staff and the person taking the action

j. Time frames for the implementation and management of the above measures.

As outlined in Condition 10, this Alkimos Beach CAMP addresses the only Matter of National Environmental Significance (MNES) detailed in the EPBC Act approval documentation, the Carnaby’s Black-Cockatoo.

The key purpose for this CAMP is to define the management actions to rehabilitate at least 2 ha of Carnaby’s Black-Cockatoo foraging habitat and contribute to at least 1 ha of supplementary planting equivalent to approximately 0.07 ha with the remaining 0.92 ha will be undertaken in the adjacent foreshore reserve (or the ROS). The key management measures addressed the identified threats including weeds, feral pests, bushfires, erosion and access.

1.2 Report structure

To address the outlined above objectives and scope, the CAMP report has been divided into the following key sections:

1. Introduction.
2. Planning approval and land use zoning context.
3. Environmental context – includes Carnaby's Black-Cockatoo MNES.
4. Alkimos Beach CAMP area management measures.
5. Monitoring and reporting program.
6. References.

2 PLANNING APPROVAL AND LAND USE ZONING CONTEXT

The Alkimos Beach project (included as part of the broader Alkimos-Eglinton site) was subject to a Metropolitan Region Scheme (MRS) Amendment 1029/33. MRS Amendment 1029/33 was formally assessed as an "Environmental Review" under Section 48A of the *Environmental Protection Act 1986* by the Environmental Protection Authority (EPA). The EPA supported MRS Amendment 1029/33 re-zonings in its Bulletin released in 2005 (Bulletin 1207).

2.1 CAMP area context

The CAMP area, as it is located on a primary coastal dune system and historically subject to illegal recreational 4WD vehicles, currently has a limited range of Carnaby's Black-Cockatoo foraging habitat.

The 2 ha of Carnaby's Black-Cockatoo foraging habitat species occurs within the CAMP area, additionally the CAMP revegetation includes a portion of the supplementary Carnaby's Black-Cockatoo planting. The 1 ha of supplementary Carnaby's Black-Cockatoo foraging habitat planting will be undertaken across the Conservation POS (CAMP area) and the ROS (foreshore reserve) areas.

2.1.1 South Alkimos (Alkimos Beach) local structure plan

The South Alkimos Local Structure Plan (LSP) provides the next level of detailed planning for the 224 ha parcel of land. The majority of the South Alkimos LSP area is zoned "Urban" in the MRS. According to the EPA (2005) there are no known areas of regional conservation significance within the "Urban" zoned portion in the South Alkimos LSP site. The approved LSP did include the CAMP study area as an east–west "conservation POS" linkage (Figure 3).

2.1.2 Commonwealth approval and ministerial conditions

The Alkimos Beach LSP area supports habitat for the Graceful Sun Moth and Carnaby's Black-Cockatoo which were both protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) at the time of original 2011 Commonwealth referral. The South Alkimos LSP was referred to the Commonwealth Minister for the Environment for assessment under the EPBC Act in March 2011. The project was assessed by the then Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) as a "Controlled Action" in May 2011 due to the potential impacts on the Graceful Sun Moth and Carnaby's Black-Cockatoo. The project was approved subject to Ministerial conditions on 30 June, 2012.

2.1.3 Amendment to the matters of national environmental significant (MNES)

In May 2013, the Graceful Sun Moth was removed from the Commonwealth's threatened species list and is therefore no longer a species of MNES under the EPBC Act. The DSEWPC confirmed in a letter dated 13 June 2013 the key EPBC Act approval conditions relating to the Graceful Sun Moth were no longer applicable to the Alkimos Beach project (EPBC 2011/5902).

The relevant MNES to this CAMP now only specifically relates to the existing and the revegetated Carnaby's Black-Cockatoo foraging habitat.

The original and revised EPBC Act Approval and Conditions is provided in Appendix A.

2.2 Relevant documents

2.2.1 Alkimos Beach foreshore management plan (FMP)

The foreshore reserve (which is a dedicated ROS Reserve in the MRS) abuts the Alkimos Beach CAMP (Figure B).

The Alkimos Beach FMP responds specifically to Condition 11 of the Alkimos Beach EPBC Act (EPBC 2011/5902). The Alkimos Beach FMP details on the portion of the additional supplementary planting of Carnaby's Black-Cockatoo foraging habitat including time frames and survival rates proposed for plantings.

3 ENVIRONMENTAL CONTEXT

To appropriately plan and manage the Alkimos Beach CAMP area (particularly in the context of the adjacent Alkimos Beach residential development) it is important to understand the receiving environment.

The relatively tall dunes within the CAMP area provide some protection from the prevailing south-westerly and easterly winds to the western section, lower lying parts of the eastern section. However, in the degraded areas of higher elevation there is greater exposure to the wind and this has led to greater instability of the surface soils in those areas. Consequently, two blowouts have formed; one within the CAMP area and one immediately adjacent to the north. The blowouts have formed on the northern leeward side of the dunes to the prevailing south-westerly winds.

3.1 Flora and vegetation

The dominant remnant vegetation complex is the Quindalup vegetation complex. A vegetation and flora survey was undertaken by Bennett in 2004 for ATA Environmental and the following vegetation associations were identified within the CAMP study area:

MsLm	Melaleuca systena and Lomandra maritima Low Open Heath.
Eg	Eucalyptus gomphocephala (Tuart) Open Woodland to Woodland over Banksia attenuata, Acacia saligna and Xanthorrhoea preissii.
Ar	Acacia rostellifera Low Closed Forest.
AsJf	Acacia saligna and Jacksonia furcellata Open Scrub.

Approximately 63% of the CAMP study area is classified as being in very good to excellent condition, 12% in ‘degraded’ to ‘good’ condition, and 25% is in ‘completely degraded’ condition. Degradation has been caused by frequent intensive off-road vehicle activity, exacerbated by the strong prevailing winds encountered along the WA coast (Tranen 2015).

3.2 Fauna

3.2.1 Carnaby’s Black-Cockatoo

3.2.1.1 Overview

Carnaby’s Black-Cockatoos are often observed in small groups however, they will often congregate in large flocks. Carnaby’s Black-Cockatoos are widespread in the south-west of Western Australia, they are highly mobile and display seasonal migration linked to breeding. During the breeding season, adults form solitary pairs. Breeding occurs mainly in the Wheatbelt in eucalypt woodlands but has been recorded on the Swan Coastal Plain (near Lake Clifton). Carnaby’s Black-Cockatoos nest in large hollows in eucalypts (DSEWPC 2013). During the non-breeding season adults move to higher rainfall areas along the Swan Coastal Plain and south coast (Saunders 1980, 1990, DEC 2012).

3.2.1.2 Foraging area within the CAMP

The conservation area contains limited areas (0.15 ha) of Carnaby’s Black-Cockatoo foraging habitat (Tuart trees). The key foraging / roosting habitat identified was tuart trees (Eucalyptus gomphocephala). The observed / recorded Carnaby’s Black-Cockatoo foraging habitat area within the CAMP study area is shown in Figure D.

3.2.2 Identified threats to Carnaby’s Black-Cockatoo

The current Carnaby’s Black-Cockatoo habitat located in the Alkimos Beach CAMP area faces potential threats from erosion, recreation users and weed infestation. The approved LSP and the EPBC Act approval focused on rehabilitating of Carnaby’s Black-Cockatoo habitat within the larger Conservation POS area.

3.2.2.1 CAMP pathways

Lendlease has determined that construction of pathways within the 6 ha CAMP area would cause increased and unnecessary disturbance to the area, and therefore be contrary to the overall objectives of the Conservation POS, which is “to manage and protect the conservation area inclusive of the Carnaby’s Black-Cockatoo revegetation area”.

The potential impacts from constructing the paths through a steep primary dune on the conservation area include clearing to create the path and engineering batters to accommodate universal access). This has the potential to impact on the Conservation POS and 2 ha Carnaby’s Black Cockatoo rehabilitation areas. As a result, Lendlease in consultation with the City of Wanneroo determined the construction of pathways within the Conservation POS (CAMP) area will not be advanced.

Pathways will now be located external to Conservation POS / CAMP area, the pathways will be constructed within the adjacent road reserve and/or the urban subdivision land (Figure E).

The CAMP area currently has semi-permanent fencing along the perimeter adjacent to the Alkimos Beach development and adjacent road infrastructure.

As the CAMP is fenced and the pathways are located outside of the CAMP area, there is a lower risk to the existing Carnaby’s Black-Cockatoo and proposed rehabilitation foraging habitat degradation through trampling / physical removal and littering.

3.2.3 Carnaby’s Black-Cockatoo conservation advice

The then Department of Environment and Conservation (DEC) released the Carnaby’s Cockatoo Recovery Plan (DEC 2012). This Recovery Plan details the key actions required to prevent further decline in Carnaby’s Black-Cockatoo numbers. The specific management actions outlined below are relevant for private land holders:

- Protect and manage important habitat. The protection and management of important habitat is essential to minimise habitat loss. Planting of species that support Carnaby’s Black-Cockatoo is effective, over long-term protection and regeneration of existing habitat is more effective.

- Management of breeding habitat and associated feeding habitat. Ensure protection of existing and potential breeding habitat through protection from grazing, clearing, management of fire and maintain water sources.

- Management of other factors. Monitor patterns, trends and impacts of people such as motor vehicles, collisions and illegal activities.

4 ALKIMOS BEACH CONSERVATION AREA MANAGEMENT MEASURES

4.1 Introduction

This Alkimos Beach CAMP provides a set of management actions to assist in the long-term protection of both the existing Carnaby's Black-Cockatoo habitat and the proposed 2 ha of rehabilitation areas within the CAMP area.

The key management measures in accordance with the Commonwealth EPBC Act approval conditions are:

- The retention of Carnaby's Black-Cockatoo vegetation (tuart trees) in the conservation POS (subject to this CAMP) and the foreshore reserve (subject to the FMP)
- Rehabilitation and weed control (to at least 2 ha) of Carnaby's Black-Cockatoo foraging habitat, undertaken within the 6 ha CAMP area. This includes time frames and survival targets for the plantings
- Details of supplementary planting equivalent to at least 1 ha of Carnaby's Black-Cockatoo foraging habitat (spread across POS and ROS) including timeframes and survival rates proposed for plantings. This CAMP and the Alkimos Beach FMP detail the additional 1 ha supplementary planting including time frames and survival rates proposed for plantings
- Measures to manage weed and feral pests
- Bushfire prevention and management measures
- Erosion control measures
- Access management (including visitor facilities, pathways, signage and fencing).

4.2 CAMP rehabilitation and monitoring program

This section outlines in accordance with the EPBC Act conditions the rehabilitation program and includes time frames and survival targets proposed for the plantings. The proposed rehabilitation areas subject to the specific management actions are shown in Figures D and F.

4.2.1 Objective

The objective of the rehabilitation program is to:

- Rehabilitate at least 2 ha of Carnaby's Black-Cockatoo foraging habitat species within the CAMP area.
- Protect and complement the existing 0.15 ha of Carnaby's Black-Cockatoo habitat (tuart trees - Eucalyptus gomphocephala) within the CAMP area.
- Minimise the impact of activities that could degrade Carnaby's Black-Cockatoo habitat.

4.3 CAMP rehabilitation and monitoring program

The CAMP area totals approximately 6 ha, the proposed rehabilitation (and associated management actions) will occur in specific areas across the CAMP study area as shown in Figure D.

4.3.1 Carnaby's black-cockatoo habitat – revegetation species

This section provides a summary of the key rehabilitation actions. The actions are based upon the Tranen's Revegetation Management Plan, which is provided in Appendix B.

The CAMP area has a limited range of Carnaby's Black-Cockatoo foraging habitat. The rehabilitation program will both complement the existing tuart trees (Eucalyptus gomphocephala) with an additional 2 ha and a portion (0.08 ha) of the 1 ha supplementary planting of Carnaby's Black-Cockatoo foraging habitat. The species to be used in the rehabilitation program (which occur within locally within the primary coastal dune system) include:

- *Acacia saligna*
- *Allocasuarina lehmanniana*
- *Eucalyptus gomphocephala*.

4.4 Black cockatoo foraging habitat rehabilitation methodology

4.4.1 Plant propagation

A seed bank has been established for Alkimos Beach, and there are significant quantities of local provenance seed available of a wide range of species for use in the rehabilitation program. Where possible seedlings will be propagated from the seed bank. Where seed is not available of desired species, seed and seedlings will be sourced from the nearest available provenance. Some species are grown from cuttings and where possible these will also be sourced from on site.

4.4.1.1 Seedling propagation

Due to the site conditions, the recommended pot for all seedlings is a 50 mm x 50 mm x 125 mm forestry tube with root trainers. These pots produce seedlings of good root ball size and transfer well from pot to final environment, maximising survival rates. Should plants of this size not be available for any reason at the time of planting, the next closest available tubestock size will be used.

Plant orders will be ideally placed in winter the year before planting to ensure sufficient seedlings are available (subject to seed availability and species propagation timing). Seedlings will be grown by nurseries that are accredited by the Nursery Industry Accreditation Scheme of Australia (NIASA) which will guarantee the quality of supplied material.

4.4.2 Site protection – prior to rehabilitation

A proportion of the 2 ha and supplementary planting of Carnaby's Black-Cockatoo habitat rehabilitation works will be undertaken on old vehicle access tracks. These tracks are to be blocked at both ends to prevent future vehicle access in these areas. They will be blocked by pushing up soil and placing large objects such as limestone boulders or large logs in front of the mounds. Some tracks will be left open to allow vehicles access through the area, to discourage vehicles from creating new accesses.

Another potential factor affecting the rehabilitation success outcomes is rabbit herbivory. To mitigate the potential impacts a combination of rabbit exclusion fencing, tree guards, and targeted rabbit control will be employed. Larger completely degraded areas without existing vegetation that could potentially hide burrows will be protected by the exclusion fencing. Where appropriate, seedlings located outside of these areas will be protected with tree guards. Once the plants are large enough to survive without the guards they will be removed.

A rabbit control program will also be initiated in advance of site works to provide longer term protection to seedlings. This will include a combination of warren destruction, rabbit haemorrhagic disease virus (RHDV) release, and Pindone baiting. Baiting and virus release will only be undertaken during certain times of year relating to weather and animal growth stages where these treatments are effective. Warren destruction will be employed between these periods.

To avoid accidental impacts from construction activities and prevent unauthorised access to the Carnaby's Black-Cockatoo rehabilitation areas the following actions will be undertaken:

- Semi-permanent fencing adjacent to roads and urban subdivision areas during the construction phase

- All construction activities will be restricted to the subdivision areas and will avoid the rehabilitation area
- Historical tracks within the rehabilitation areas will be physically blocked off, therefore, preventing access to construction equipment, four-wheel drivers and the public.

4.4.3 Rehabilitation site preparation

To maximise the potential for rehabilitation success, the areas that are subject to rehabilitation will be prepared in the following manner:

- Weed spraying undertaken, rubbish and debris removed and disposed of appropriately
- Brushing and / or mulching will be used to stabilise actively eroding and erosion prone locations as required.

4.4.4 Rehabilitation method

Planting and seeding are the key rehabilitation methods to be employed in the rehabilitation works. Species selection is the key to reaching a successful outcome for the project in a coastal setting. Species must be carefully selected based on the surrounding floristic community type(s), topography and hydrology to ensure species are in the areas in which they are most likely to survive in both short and long-term.

Tube stock used in the rehabilitation program will be sourced from local accredited nurseries.

Planting will be carried out in winter; around June–July when the soil moisture content is optimal for seedling growth without irrigation and after the existing weeds have germinated and have been sprayed. Where appropriate, tube stock will be planted with a plastic guard to prevent rabbits feeding on plant stock and to protect plantings from strong winds.

Tube stock will be planted at an average density of two plants per m^2 dependent on the specific plant species used, i.e. acacia and tuart trees are of sprawling form and grow quite large and therefore require more space between seedlings. The planting density can range from 1.7 m^2 to 2 m^2.

Rabbit guards will be used with tube stocks in the rehabilitation areas.

4.4.5 Watering

Some tube stock will be planted with tablets / water crystals during planting to help improve survival rates. The plant species to be used in the rehabilitation of the CAMP study area will be drought tolerant and therefore it is not anticipated these natives will be required irrigation or extensive hand watering.

4.4.6 Seedling planting

Seedlings will be directly planted using planting tubes, which negates the need for repeated bending for excavation of planting holes. Seedlings will be watered before delivery to site on the day of planting to reduce the potential for transplant shock, and provided the soil is moist no other watering is considered necessary.

4.4.7 Seed treatment and direct seeding

All seed to be utilised will be pre-treated prior to seeding to break dormancy factors. This will include aerosol smoke treatment, mechanical scarification, or hot water treatment as appropriate to individual species. Seed will then be combined with a bulking agent to facilitate even distribution across the site. Clean yellow sand provides good mixing and distribution properties for this purpose. Hand broadcasting will be the application technique as this will permit even dispersal of all seed sizes, which can be an issue with some types of mechanical spreaders.

4.4.8 Signage

To assist in preventing unauthorised access and trampling of rehabilitation efforts, signage where appropriate will be installed. This signage (as required) will inform residents and visitors to Alkimos Beach of the rehabilitation works. Plate 1 below shows an example of a public awareness signage.

Plate 1: Rehabilitation signage and plantings using rabbit guards

4.5 Rehabilitation strategy

The key management measures in accordance with the EPBC Act approval conditions are shown in Table 2.

Table 2: Key measures and general management strategies

Measure	Management strategy
The retention of 0.15 ha of Carnaby's Black-Cockatoo vegetation (tuart trees) in the CAMP	The 0.15 ha of retained Carnaby's Black-Cockatoo vegetation. Weed control will be undertaken within these areas.
Rehabilitation of at least 2 ha of Carnaby's Black-Cockatoo habitat. This includes time frames and survival targets for the plantings	Planting and weed control will be undertaken in over an approximate 2.00 ha area in various locations within the CAMP area (Figure 1).
Details of supplementary planting equivalent to at least 1 ha of Carnaby's Black-Cockatoo foraging habitat (spread across POS and ROS)	Planting and weed control will be undertaken within the coastal foreshore ROS i.e. coastal foreshore as there is insufficient additional area within the CAMP to undertake the rehabilitation activities. However, a portion (approximately 0.08 ha) of the rehabilitation within the CAMP contributes to the supplementary planting as required under Condition 10(b) of the EPBC Act approval. The remainder i.e. at least 0.93 ha of the supplementary planting works is within the ROS. The ROS supplementary planting is subject to a separate Foreshore Management Plan Revegetation Plan (Tranen 2015)

Tranen's CAMP Revegetation Management Plan (Appendix B) has broken up the rehabilitation areas into separate areas. Table 3 details the treatment methods and the proposed revegetation areas within the CAMP.

Table 3: Proposed revegetation zones and Carnaby's Black-Cockatoo area calculations

Zone name	Area (m^2)	Carnaby's black-cockatoo approx. Rehabilitation area (m^2)
West Black Cockatoo Retained	1,538	1,538
Western Conservation POS (Guarded)	4,225	4,225
Western Conservation POS (Fenced)	4,637	4,637
Eastern Conservation POS (Guarded)	1,883	1,883
Eastern Conservation POS (Fenced)	9,961	9,961
Total (m2)	22,244	22,244

Re-profiling of the degraded areas of the coastal dunes will occur in all areas where scour from vehicle activity and wind funnelling has contributed to the existing alteration in the soil profiles. Once areas of the dune where rehabilitation is to occur is stabilised, the degraded parts of the site will be revegetated with Carnaby's Black-Cockatoo foraging habitat.

The 'Completely Degraded' areas will be planted at an average density of 1.8 plants / m^2 (the density planting can range from 1.7 m^2 to 2 m^2) dependent on the Carnaby's Black-Cockatoo foraging habitat species plant as some plants i.e. Tuart trees and *Acacia saligna* which require more space to effectively grow and survive. Based on the coastal setting the Carnaby's Black-Cockatoo foraging habitat species will primarily be *Allocasuarina lehmanniana*, *Acacia saligna* and *Eucalyptus gomphocephala*.

The Carnaby's Black-Cockatoo foraging plants will be concentrated mostly in the valleys and adjacent to the retained trees of the same species. Weed control will be undertaken each spring and autumn to reduce competition and optimise seedling establishment rates.

Tranen's CAMP revegetation areas are illustrated in Figure F.

4.5.1 Weed management

If weeds are considered an issue within the rehabilitation area, a weed spraying program to control weed species, prior to installation of seeds and seedlings will be implemented.

Weed control events will take place in spring of the year prior to the rehabilitation. Post the rehabilitation planting weed control will be undertaken each spring and autumn to reduce competition and optimise seedling establishment rates.

Weed management is an important component for the establishment of native vegetation within the CAMP. Weed control will be achieved primarily through herbicide application. Herbicides will be selected for the target species, considering the surrounding coastal environment and the constraints this presence. Amongst the existing remnant native vegetation, selective herbicides (i.e. grass or broadleaf-specific) will be favoured over general knockdown herbicides, to keep off-target damage to a minimum. To ensure that off-target damage is minimised, herbicide spraying operators will only be engaged if they:

- Are appropriately qualified and licensed in herbicide application
- Have demonstrated experience in the ability to identify, and distinguish between, native and weed species
- Are familiar with the most appropriate control measures, timing, herbicides, and application rates for the target species.

Table 4 details the herbicide application at the optimum application rate according to the manufacturer's guidelines and seasonal timing for specific weed species. The Tranen weed control timing (spring and autumn) addresses the weed management seasonal timing.

Table 4: Weed species list

Weed species	Weed control method	Timing
Avena barbata	Cut out plants, ensure rhizomes are removed; spray with grass-selective herbicide in winter/spring. Follow-up with seedling control.	June to September
Briza maxima	Prevent seed set; hand pull or spray at 3–5 leaf stage with Fusilade 10 mL/10 L (500 mL/ha) + wetting agent; repeat for 2–3 years.	Year-round
Briza minor	Prevent seed set - hand pull or spray at 3–5 leaf stage with Fusilade 10 mL/10 L (500 mL/ha) + wetting agent; repeat for 2–3 years.	Year-round
Carpobrotus edulis	Roll up large mats removing all roots (shallow-rooted) and stem fragments. Follow up with removal of any germinating plants. Spray with glyphosate at label rates.	August to November
Euphorbia terracina	Remove by hand small isolated infestations. Long tap root. Consider possible dune erosion.	June to September
Hypochaeris glabra	Spray grazing with 2,4-D amine provides partial control.	May to September
Lagurus ovatus	Prevent seed set; spray with 10 mL/10 L (500 mL/ ha) Fusilade + spray oil at 2–8 leaf stage before stem elongation.	July to December
Lolium rigidum	Prevent seed set; hand-pull or spray with grass-selective herbicide 4–6 weeks after opening rains.	
Lupinus cosentinii	Remove by hand scattered plants. Spray dense infestations metsulfuron-methyl 0.1 g/15 L (2–3 g/ha) + wetting agent.	August to November
Orobanche minor	Pre-emergence imazethapyr and chlorsulfuron provide good control. Pre-emergence imazaquin, triasulfuron, primisulfuron, acetochlor and metazachlor provide suppression. Post-emergence glyphosate at low rates around 100 mL/ha of Roundup CT is useful in some crops and pastures.	
Pelargonium capitatum	Remove by hand isolated plants, taking care to remove entire stem – will reshoot from below ground level. Spot spray metsulfuron methyl 5 g/ha + Pulse. Easy target after fire.	June to October
Romulea rosea	Spot spray metsulfuron methyl 0.2 g/15 L + Pulse®.	July to August
Sonchus oleraceus	Slashing often ineffective as flowers continue to be produced. Rosette stage preferred time for effective chemical control. Lontrel® at 10 mL in 10 L of water + 25 mL wetting agent.	June to August
Trachyandra divaricate	Wipe with 50% glyphosate solution before flowering. Dense infestations in degraded areas spot spray 0.4 g chlorosulfuron plus 25 mL wetting agent in 10 L of water when plants actively growing.	June to August

Sources: Brown and Brooks (2002), Herbiguide (2010) and Florabase (2010

NA = Not Available

4.6 Post-rehabilitation management

To ensure longer-term success of the 2 ha rehabilitation and supplementary planting areas, the rehabilitation areas will be monitored and maintained for three years following initial seedling installation, to ensure the completion targets are met and will continue to be met in the future.

4.6.1 Completion criteria

The completion criteria to demonstrate effective management of the CAMP area are specified in Table 5.

If the completion criteria are not met, further infill planting and/or weed control will be undertaken until the completion criteria are demonstrated to have been achieved over two consecutive monitoring events.

Table 5: Rehabilitation and weed management completion criteria

Year after planting	Year 1	Year 2
Survival (established plant density – both planting and seeding)	90%	70%
Average planting density (plants/m^2)	1.7 to 2	1.7 to 2
Plant coverage (% area of visual ground cover measured by a botanist/revegetation consultant)	25%	50%
Weeds coverage	No greater than 10% cover	No greater than 10% cover

4.7 Rehabilitation and weed monitoring and performance criteria

At the end of rehabilitation activities, a report will be provided detailing the quantities of seedlings used and seed broadcast, and any variations from the Tranen revegetation plan. This will be used as baseline data for comparison in future monitoring assessments.

The rehabilitation areas will be formally monitored bi-annually (includes weed monitoring) each spring and autumn, for a three-year period after installation. A monitoring report will be undertaken following each formal monitoring event, to assess if corrective measures are required.

The season has been nominated rather than a specific month, as the timing of these assessments are related to plant growth cycles, which is influenced by the weather conditions.

One monitoring plot of 2.5 m × 5 m will be established per rehabilitation area as well as one permanent photograph reference point at each monitoring plot. Photographic records will be captured prior to construction and annually to qualitatively assess density, diversity and weed cover.

The first assessment in spring will assess the developing threats, the stabilisation of each rehabilitation area and the short-term survival of the seedlings and weed cover. Any problems will be identified early so that comprehensive treatment(s) of the issue can be undertaken, and additional seedlings propagated if required.

The second assessment in the following spring. This assessment will determine if there are any losses over the dry summer period, and this will form the basis for the maintenance winter program. The first summer is the expected period of greatest mortality, and plants that survive this period are generally hardy and more likely to survive in the longer term. The emergence of summer weeds will also be assessed, so that control can be scheduled as required.

The third and subsequent rehabilitation assessments will occur in autumn and then the subsequent spring. The long-term success of the rehabilitation operation will be indicated, and this will determine whether any further remedial works are required. This may include:

- Additional revegetation works
- Weed management
- Other general maintenance activities such as rabbit control
- Additional monitoring requirements.

The monitoring of weeds will be undertaken biannually each spring and autumn and maintained for a three-year period. The monitoring report will be undertaken to assess if further weed management is required.

4.7.1 Corrective measures

If the plant survival success falls below 70% of original numbers in two consecutive monitoring events, corrective measures will be implemented to ensure the success of the rehabilitation program. The monitoring program will identify risks to planting success rates so they can be dealt with in an appropriate and timely manner. Corrective measures may include:

- Re-brushing or re-mulching areas
- Additional weed control
- Additional plantings
- Tree guard repair / replacement
- Fence and sign maintenance.

Where the % weed species, cover exceeds the 10% cover limit, additional weed spraying will be undertaken to reduce the abundance and spread of weed species into and within the CAMP area.

All the contingency measures listed in Table 6 will be implemented if the target seedling survival completion criteria fall below 70% in two consecutive events.

Table 6: Rehabilitation and weed management contingency measures

Item	Issue	Contingency action
Plants	Plant death Storm / wind damage Vandalism	Plant additional tube stock in subsequent plantings
Weeds	Excessive weeds in rehabilitation areas	Undertake additional weed control measures e.g. weed spraying
Erosion	Erosion Storm damage	Apply brushing, hydro-mulch (with no seed) or matting over the surface of any eroded areas
Revegetation	Plant survival does not meet completion criteria	Replant seedlings and care for them for an additional two years Replace plant guards

4.8 Feral pests

Pest management, particularly for rabbits, will contribute to achieving the rehabilitation completion criteria.

4.8.1 Objective

The objective of feral pest management in the rehabilitation area is to:

- Control rabbits, to a level where do not prejudice the Carnaby's Black-Cockatoo rehabilitation completion criteria.

4.8.2 Key threats

Rabbits pose the highest threat to the rehabilitation area and supplementary plantings in the CAMP area.

4.8.3 Management overview

There are a number of control techniques that can be utilised to manage rabbits in the CAMP area.

Conventional control techniques are the most appropriate for natural areas near human settlement. These include the following:

- Temporary fencing
- Tree guards – where appropriate
- Biological control
- Rabbit warren destruction
- Baiting / poisons.

4.8.3.1 Rabbits

Rabbits pose the highest risk to the success of the Carnaby's Black-Cockatoo foraging habitat rehabilitation works.

To mitigate the potential impacts a combination of rabbit exclusion fencing, tree guards, and targeted rabbit control will be employed over a three year period. Larger completely degraded areas without existing vegetation that could potentially hide burrows will be protected by the exclusion fencing. Where appropriate, seedlings located outside of these areas will be protected with tree guards. The guards will be rigid corflute held in place with hardwood stakes.

Once the plants are large enough to survive without the guards they will be removed. A rabbit control program will also be initiated in advance of site works to provide longer term protection to seedlings. This will include a combination of warren destruction, rabbit haemorrhagic disease virus (RHDV) release, and Pindone baiting. Baiting and virus release will only be undertaken during certain times of year relating to weather and animal growth stages where these treatments are effective. Warren destruction will be employed between these periods.

4.8.4 Key actions

The key action for feral pest management in the rehabilitation areas are outlined in Table 7.

Table 7: Feral pest key actions

No.	Key action
1.	A combination of rabbit exclusion fencing, tree guards, and targeted rabbit control will be employed over a three year period
2.	Where appropriate, seedlings located outside of these areas will be protected with tree guards. The guards will be rigid corflute held in place with hardwood stakes
3.	A rabbit control program will also be initiated in advance of site works to provide longer term protection to seedlings. This will include a combination of warren destruction, rabbit haemorrhagic disease virus (RHDV) release, and Pindone baiting.
4.	Each tube stock will be planted with a plastic guard to prevent rabbits feeding.

4.8.5 Corrective measures

The key corrective measures for feral pests are outlined in Table 8.

Table 8: Feral pest corrective measures

No.	Key action
1.	Implement additional rabbit control measures including further fencing or biological controls based on the following observations undertaken during the bi-annual rehabilitation monitoring program: presence of rabbits – visual observation evidence of rabbits eating the planted seedlings and destroying the tree guards rabbit warrens fox and cat sightings
2.	Re-plant seedlings / revegetate areas impacted by rabbits to meet the 2 ha and a portion of the supplementary planting rehabilitation requirements outlined in Conditions 10(a) and (b) of the EPBC Act approval in accordance with the rehabilitation completion criteria.
3.	Repair rabbit exclusion fencing and replace damaged tree guards.

4.8.6 Monitoring and reporting

Feral pest, particularly the potential impacts from rabbits on the rehabilitation works will be monitored biannually each spring and autumn and maintained for a three-year period. The key monitoring and reporting for feral pest management is summarised below:

- Monitoring will occur as part of the Carnaby's Black-Cockatoo existing and rehabilitation habitat areas biannual monitoring program (occurring in spring and autumn) and maintained for a three-year period.
- The key monitoring points will focus on the impacts to planted Carnaby's Black-Cockatoo habitat seedlings, tree guards and ensuring the rabbit fence remains intact. The monitoring program occurs for a three-year period.
- Evidence of the presence of rabbits such as visual observations of the seedlings being eaten, rabbit warrens in the local area and opportunistically foxes and feral cats will also be monitored and reported as part of the rehabilitation monitoring program.

The monitoring report will be submitted to Lendlease following each formal monitoring event. The outcomes will be recorded in the Alkimos Beach compliance report points will focus on the impacts to planted seedlings, tree guards and ensuring the rabbit fence remains intact.

4.9 Bushfire

4.9.1 Objective

The objective of bushfire management is to:

- Protect the ecological integrity and biological values of the Carnaby's Black-Cockatoo existing and rehabilitation areas.

4.9.2 Key threats

Fire has the potential to destroy the Carnaby's Black-Cockatoo existing habitat and rehabilitation works within the CAMP area.

4.9.3 Management overview

The Alkimos Beach LSP has deliberately positioned roads / path infrastructure adjacent to the CAMP area. These designated roads / paths acts as key firebreak(s) between the CAMP area (and therefore the rehabilitation areas) and the adjacent residential area.

Alkimos Beach is a gazetted fire district and as such is under control of the Fire and Emergency Services Authority (FESA). The primary response team for fires within Alkimos Beach area is the Joondalup Fire and Rescue Station.

Property owners in the City of Wanneroo are required to clear firebreaks by November of each year and maintain them until the following April. The City of Wanneroo's Rangers / Fire Control Officers conduct firebreak inspections on all vacant land.

To reduce the risk of fire the following key elements have been adopted in the bushfire management response:

- Hazard reduction
- Fire buffer management.

4.9.4 Key actions

The key actions for bushfire management in the rehabilitation area are outlined in Table 9.

Table 9: Bushfire management key actions

No.	Key action
1.	No rubbish or vegetation will be burnt on the project site
2.	Construct perimeter roads and pathways between the CAMP and residential areas to act as the key firebreak(s)
3.	During construction works a semi-permanent fencing will be installed around the CAMP / Conservation POS boundary interface with the road and urban development (subdivision) works to prevent access into the revegetated areas and the broader CAMP area.

4.9.5 Corrective measures

The key corrective measures for bushfire management are outlined in Table 10.

Table 10: Bushfire management corrective measures

No.	Key action
1.	If fire occurs within the existing and rehabilitation areas – re-planting of Carnaby's Black-Cockatoo habitat will be required to fulfil the EPBC Act Ministerial condition 10 which is to provide a minimum 2 ha and a portion of the supplementary planting rehabilitation requirements outlined in Conditions 10(a) and (b) of the EPBC Act approval in accordance with the rehabilitation completion criteria.
2.	Repair damage to the fence as required

4.9.6 Monitoring and reporting

The monitoring of the Carnaby's Black-Cockatoo existing and rehabilitation foraging areas will be undertaken biannually each spring and autumn and maintained for a three-year period. The key monitoring requirements and reporting for bushfire management is summarised below:

- Any bushfire event in the foreshore will be reported to DFES and the City of Wanneroo.
- The annual monitoring report of the rehabilitation area will also include details (e.g. Dates, time, location and duration) of any fire events.
- The monitoring of the Carnaby's Black-Cockatoo existing and rehabilitation foraging areas will be undertaken biannually each spring and autumn and maintained for a three-year period.

4.10 Erosion

4.10.1 Objective

The objective of erosion management is to:

- Protect the ecological integrity and biological values of the Carnaby's Black-Cockatoo existing and rehabilitation areas.

4.10.2 Key threats

Erosion has a number of possible impacts on the environment such as:

- Loss of the Carnaby's Black-Cockatoo existing habitat and rehabilitation works vegetation from erosion damage.

4.10.3 Management overview

In the CAMP, the rehabilitation area formal pathways or tracks are not required for pedestrian access. Formal access is restricted to pathways located outside of the Conservation POS / CAMP area.

In the Carnaby's Black-Cockatoo foraging habitat rehabilitation areas the key management response will be the placement of brush / mulch to prevent erosion. Brush will be spread over the steeper sections of the tracks, and mulch spread to a depth of 50 mm to stabilise over the balance of the sand to prevent the loss of further soil from wind erosion.

All vehicle tracks in the CAMP will be blocked at both ends using large boulders or logs to prevent further vehicle access.

4.10.4 Key actions

There are a number of management measures that can be implemented to reduce the likelihood of erosion. The actions for erosion control are outlined in Table 11.

Table 11: Erosion control key actions

No.	Key action
1.	Undertake rehabilitation of bare/open areas in accordance with the CAMP Revegetation Management Plan (Tranen 2015).
2.	During construction works a semi-permanent fencing will be installed around the CAMP / Conservation POS boundary interface with the road and urban development (subdivision) works to prevent access into the revegetated areas and the broader CAMP area.
3.	Conservation fencing to the City of Wanneroo's requirements will be installed along the borders of the Conservation POS which is adjacent to the Alkimos Beach subdivision and the eastern and western roads which bound the Conservation POS prior to handover to the City of Wanneroo.
4.	A proportion of the rehabilitation works will be undertaken on old vehicle access tracks. These tracks are to be blocked at both ends to prevent future vehicle access in these areas

4.10.5 Corrective measures

The key corrective measures for erosion are outlined in Table 12.

Table 12: Erosion control corrective measures

No.	Key action
1.	Undertake additional brush / mulch as required over rehabilitation areas as required
2.	Undertake additional rehabilitation in areas impacted by erosion to meet 2 ha and a portion of the supplementary planting rehabilitation requirements outlined in Conditions 10(a) and (b) of the EPBC Act approval in accordance with the rehabilitation completion criteria.
3.	Damaged fencing will be repaired or replaced

4.10.6 Monitoring and reporting

The key monitoring and reporting for erosion control is summarised below:

- Monitoring for erosion will occur as part of the Carnaby's Black-Cockatoo existing and rehabilitation foraging areas biannual monitoring program (occurring in spring and autumn). The monitoring program occurs for a three-year period.
- The monitoring report will be submitted to Lendlease following each formal monitoring event, to assess if there are any erosion issue(s) requiring attention.

4.11 Access management

4.11.1 Objective

The objective of access management is to:

- Provide an appropriate level of access while preserving and enhancing the ecological values of the Carnaby's Black-Cockatoo existing foraging habitat and the rehabilitation areas.

4.11.2 Key threats

A risk for the Alkimos Beach CAMP rehabilitation areas is inappropriate pedestrian access which could result in direct damage to the planted seedlings, exacerbate erosion areas and create the opportunity for weed invasion.

4.11.3 Management overview

Access to the conservation area for passive recreation use is of high importance for the Alkimos community and visitors. However, it is acknowledged this must be managed to protect Carnaby's Black-Cockatoo existing habitat and the 2 ha (and a portion of the supplementary planting) rehabilitation and improved the ecological integrity.

Access will be managed through restricting access to the Carnaby's Black-Cockatoo existing habitat and rehabilitation works. The access pathways will be located adjacent to the CAMP area i.e. outside of the CAMP and the associated Carnaby's Black-Cockatoo rehabilitation areas.

Figure E shows the proposed location of the proposed dual use path network adjacent to the Conservation POS / CAMP area.

4.11.3.1 Fencing

During construction works a semi-permanent fencing will be installed around the CAMP/ Conservation POS boundary interface with the road and urban development (subdivision) works to prevent access into the revegetated areas and the broader CAMP area.

Post-construction works and prior to handing over the Conservation POS to the City of Wanneroo conservation fencing will be installed along the perimeter of the Conservation POS / CAMP area adjacent to the either the roads and/or the residential development. This fencing will clearly demarcate the boundary of the Conservation POS / CAMP area.

4.11.4 Key action

The key actions for access management are outlined in Table 13.

Table 13: Access management key actions

No.	Key Action
1.	Closure of old vehicle access tracks for rehabilitation in accordance with the CAMP Revegetation Management Plan (Tranen 2015).
2.	During construction works a semi-permanent fencing will be installed around the CAMP / Conservation POS boundary interface with the road and urban development (subdivision) works to prevent access into the revegetated areas and the broader CAMP area.
3.	Conservation fencing to the City of Wanneroo's requirements will be installed along the borders of the Conservation POS which is adjacent to the Alkimos Beach subdivision and the eastern and western roads which bound the Conservation POS prior to handover to the City of Wanneroo.

4.11.5 Corrective measures

The key corrective measures for access management are outlined in Table 14.

Table 14: Access management corrective measures

No.	Key action
1.	The temporary fence if damaged will be repaired / replaced.
2.	The signage if damaged will be repaired or replaced – only for the proposed paths that go through or near the rehabilitation areas

4.11.6 Monitoring and reporting

Lendlease will monitor annually the integrity of the fencing and signage until the Conservation POS / CAMP area is handed over to the City of Wanneroo. The key monitoring requirements and reporting for access management is summarised below:

- Monitoring for unauthorised access will occur as part of the rehabilitation monitoring (biannually spring and autumn) which will be occur for a three-year period.
- The monitoring report will be submitted to Lendlease following each formal monitoring event, to assess if there are any erosion issue(s) requiring attention.

5 COMPLIANCE REPORTING

To satisfy Condition 3 of the EPBC Act approval, Lendlease will publish a compliance report every 12 months from the commencement of the construction works.

The compliance report will contain a Conservation POS (CAMP) area Carnaby's Black-Cockatoo habitat rehabilitation section which will include the following:

- Rehabilitation completion criteria and weed monitoring
- Revegetation and weed contingency actions if required
- Erosion monitoring within the rehabilitation area
- Observations of feral pests
- Temporary fencing and signage of the rehabilitation area
- Fire incidences and the response.

The management actions with corrective measures (if required) are outlined in Table 1.

5.1 Land ownership and funding

All infrastructure proposed for the CAMP study area and rehabilitation (including weed management) efforts will be implemented by Lendlease within the first three years, prior to hand over to the City of Wanneroo.

Lendlease will provide initial infrastructure within the rehabilitation area, such as fencing, in consultation with the City of Wanneroo. The long-term management and responsibility of the Alkimos Beach CAMP study area will be the City of Wanneroo.

6 CITY OF WANNEROO HANDOVER AND LONG-TERM MANAGEMENT

6.1 EPBC Act 2011/5902 approval context

Lendlease is responsible for the management measures defined in this CAMP and the overall implementation of the CAMP under their EPBC Act approval 2011/5902 inclusive of the approved variations (November 2018).

As outlined in the November 2018 approved variation for Condition 12A[1], Lendlease (the person taking the action) may, with written agreement of the Minister, cease to implement the CAMP. If Lendlease wishes to cease implementing this CAMP, they must submit a request to the Minister which:

1. Includes a report demonstrating that the outcomes and performance indicators of the approved CAMP have been achieved
2. Specifies the entity that will implement the CAMP in the future
3. Includes written agreement from the entity to implementing the approved CAMP
4. Sets out the entity's capacity to implement the CAMP.

Once Lendlease submits the required information and the Minister agrees to the request, the person taking the action (Lendlease) may cease to implement the CAMP, to maintain associated records (Condition 2) and/or report on implementation of the CAMP (Condition 3).

6.2 Post-handover implementation

Key management actions defined in this CAMP are the responsibility of Lendlease for a period of three years or until the area or parts thereof are handed over to the City of Wanneroo. Post the third year and once Lendlease is in a position to hand over the area or parts thereof to the City, an audit report demonstrating compliance with the CAMP management actions will be provided to the Commonwealth Department of Environment and Energy and the City of Wanneroo.

The Commonwealth and the Alkimos Beach community hold an expectation that the management actions implemented through this CAMP will be maintained in the long term. As the long-term land managers, the City of Wanneroo plays an important role in the protection and conservation of biodiversity and in engaging and educating the community in the value of local biodiversity assets.

Specifically, regarding this CAMP the key management actions outlined in this plan and below would have been implemented to the satisfaction of both the Commonwealth and the City:

- Carnaby's Black Cockatoo revegetation and weed management
- Fencing and signage installed
- Feral pest management implemented
- Bushfire, erosion and access management implemented.

[1] It is noted that Condition 12A refers to all three management plans, the CAMP, the FMP and the PLRP. In the context of this document, reference has been made to the CAMP only.

The long-term management objective (post Lendlease handover to the City of Wanneroo) for the key MNES (Carnaby's Black Cockatoo), is therefore focused on managing the revegetated CBC habitat areas.

The City of Wanneroo is strongly committed to maintaining and improving the conservation of the local biodiversity and has matched this commitment through the City's endorsed Local Biodiversity Plan 2018/19 – 2023/24 (City of Wanneroo 2018).

The City's Local Biodiversity Plan identified the Alkimos Beach Conservation POS as an area that would meet the following Local Natural Area criteria. Local Natural Areas are defined as unprotected natural areas over which the City can exercise the most control through its decision-making powers, policies and reserve management.

Local Natural Areas include:

- Natural areas located on private property, which the City has some control over through Policy and decision making (such as planning approvals) – this is applicable to the CAMP area
- Natural areas located in public or regional open space, managed by the City of Wanneroo but not fully recognised as being managed for the purpose of conservation – applicable to the CAMP area
- State Government freehold land not zoned Parks and Recreation under the Metropolitan Region Scheme (MRS) – applicable to the CAMP area.

In adopting the Local Biodiversity Plan 2018/19 – 2023/24 the City has agreed to the following strategy for biodiversity protection applicable to the long-term management of the CAMP area. The implementation of this strategy is focused on the protection, retention and management of biodiversity values within the City of Wanneroo.

The City is committed to developing and implementing a Natural Areas Asset Class Plan (NAACP). The NAACP would provide context, technical and policy framework for the management of all natural areas reserves within the City of Wanneroo (City of Wanneroo 2018), including the Alkimos Beach CAMP area.

The NAACP would establish a consistent, holistic planning methodology to achieve and maintain a cohesive approach to the management of all natural areas across the City of Wanneroo. It would act as an overarching management document to individual management plans that relate to specific site conditions of reserves.

Based on the City's long-term natural area strategy, the Alkimos Beach Conservation POS (or CAMP) would be subject to a specific NAACP.

The implementation of the City of Wanneroo's Local Biodiversity Plan is supported by the municipal rates. The City in 2018/19 has allocated $24 million towards parks and conservation area management and $6.7 million for beach management. The City has staff engaged dedicated to the management of parks, natural bushland and foreshore reserve areas.

6.3 City of Wanneroo proposed management

The City's long-term management action is focused on maintaining the 6.4 ha Conservation POS (CAMP) area including the approximate 2.08 ha of revegetated Carnaby's Black-Cockatoo foraging habitat (within areas of the Conservation POS) at handover from Lendlease.

The core management focus to prevent impacts to the revegetated Carnaby's Black Cockatoo foraging areas is on the following:

- Managing weeds
- Controlling access / erosion
- Managing feral animals

- Maintaining existing bushfire risk.

The City will undertake the ongoing management measures following handover as detailed below in line with its adopted maintenance standards and practises for natural bushland and coastal reserve areas.

6.3.1 Key long term management action

Table 15 summarises general long term (post-handover) management actions for the CAMP area. The management actions represent the general standard actions undertaken by the City in managing natural bushland and coastal reserve areas and consistent with the local community's expectations.

It must be noted that following post-handover to the City, the City will not be responsible for any further reporting or audit actions. The ongoing management of the CAMP will be in line with the City's conservation maintenance schedule for bushland areas as outlined in Table 15.

Table 15: Summary of management actions

Issue	Aim	Long term management
Fencing, access points and signage	To manage access into the CAMP area (for maintenance purposes) and to limit damage to the revegetation areas	Maintain gates, locks and fences in good repair and working order. If required organise repairs by the fencing contractor. Ensure all signs are visible and well maintained. Replace signs if required.
Rubbish removal	To monitor and limit the amount of rubbish in the CAMP area to prevent bushfires and water contamination	Remove any additional rubbish on an as needed basis.
Weed Control	Maintain the handover level weed density in the CAMP area as per seasonal requirements	Spraying of weeds in the CAMP in accordance with identified optimal control periods and industry best practise.
Native Vegetation	To maintain the existing native vegetation in the CAMP area	Retain and monitor all native vegetation and revegetated areas in the CAMP except that on designated firebreaks. Retain all vegetation that is critical to Carnaby's Black Cockatoo.
Bushfire Management	To protect the CAMP and surrounds from bushfire	Maintain firebreaks around the CAMP area and keep area clear of fire prone weeds and rubbish. Carry out seasonally programmed fire mitigation in conjunction with FESA and relevant state fire regulations.

6.3.2 Monitoring

Table 16 summarises the long term monitoring actions to be undertaken to monitor the management of the CAMP. There is no reporting or compliance requirements on the City of Wanneroo.

Table 16: Summary of monitoring actions

Factor	Type of monitoring	Frequency	Timing
Fencing and signage	Drive / walk on the perimeter of the CAMP and check signs for damage. Review installed signs	Annually Once at handover	Initial site assessment at handover from Lendlease and then every 12 months
Rubbish	Inspection of the CAMP area	Annually	Ongoing
Weed Control	Monitor weed density and weed types to ensure low density of priority weeds	Annually	Initial site assessment at handover from Lendlease and then every 12 months
Existing native vegetation	Visual assessment of vegetation health	Annually	Initial site assessment at handover from Lendlease and then every 12 months
Carnaby's Black Cockatoo Revegetation Areas	Visual assessment of revegetation area health / density and weed density	Annually	Initial site assessment at handover from Lendlease and then every 12 months

Factor	Type of monitoring	Frequency	Timing
Pest fauna	Visual assessment for rabbit activity (burrows, scat, diggings)	Annually	Post-handover from Lendlease
Bushfire Management	Driving inspection around the perimeter and along designated fire tracks	Annually	Post-handover from Lendlease

7 REFERENCES

City of Wanneroo 2011. Local Biodiversity Strategy. City of Wanneroo, Perth.

City of Wanneroo, 2018. City of Wanneroo Local Environment Plan 2018/19 – 2023/24 Government of Western Australia.

Department of Environment and Conservation 2012. Carnaby's Cockatoo (*Calyptorhynchus latirostris*) Recovery Plan. DEC, Perth.

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Environmental Protection Authority. 2005. Bulletin 1207 – Alkimos–Eglinton MRS Amendment 1029/33, prepared for the Minister for the Environment.

Johnstone, R.E. and Storr, G.M. (1998). Handbook of Western Australian Birds, Volume I, Non-passerines (Emu to Dollarbird). Western Australian Museum, Perth

Saunders, D.A. (1980). Food and movements of the short-billed form of the White-tailed Black Cockatoo. Australian Wildlife Research. 7: 257-269.

Tranen Revegetation Systems. (2015) P521E Alkimos Beach Conservation Area Management Plan (CAMP) Revegetation Plan. Unpublished report prepared for Lendlease.

FIGURES

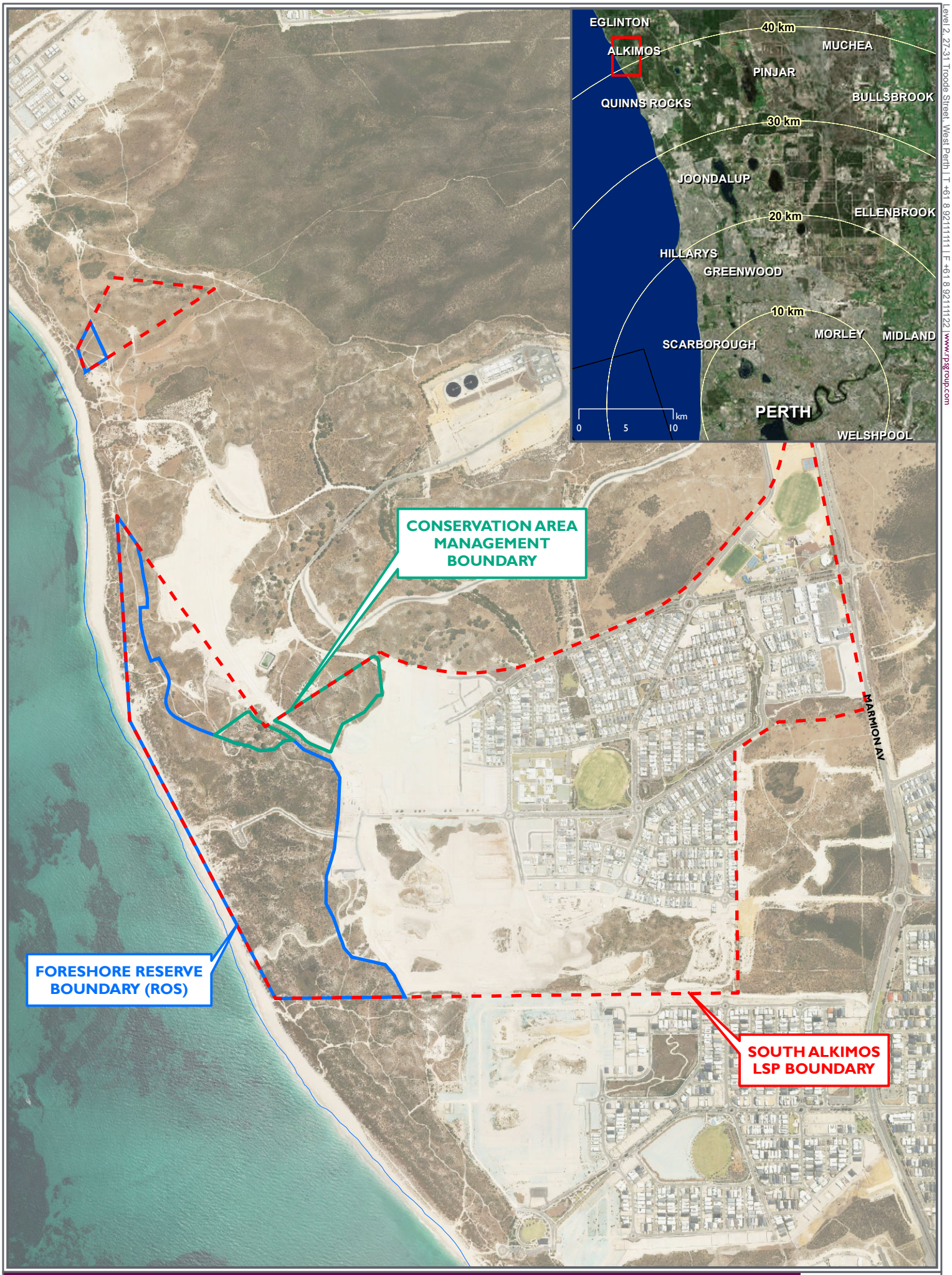

Figure A

Site location

GDA 1994 MGA Zone 50

0 125 250 500 m

Job Number: L12347-001 CAMP
Doc Number: 001
Date: 14.06.19
Scale: Map 1:15,000 Overview 1:500,000 @ A4
Created by: MA
Source: Imagery - Landgate

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Figure B

Conservation area management boundary

GDA 1994 MGA Zone 51

0 25 50 100 m

Job Number: L1234701 CAMP
Date: 14.06.19
Doc no: 002
Scale: 1: 4,000 @ A3
Drafted by: MA

Source: Cadastre, Relief & Orthophoto - Landgate, 2012. Lomandra - RPS 2012.

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Legend

- Structure Plan Area
- Village 1 Boundary

Reserves

- Public Use - (PS) Primary School
- Regional Parks & Recreation (Foreshore Reserve)
- Conservation POS
- Active POS

Zones

- Residential
- Commercial
- Mixed Use
- Conservation Area Management Boundary
- Foreshore Reserve

Other

- Indicative STS Route
- Precinct Boundary
- Social / Pedestrian / Cycle Linkage
- Indicative Foreshore Pedestrian and Cycle Link (as per Alkimos-Eglinton District Structure Plan)

Precincts

- (1) Gateway
- (2) Central Village
- (3) Residential
- (A) Strategic Public Open Space - Refer to Table 3 of Part 1 - Statutory Section

AREA SUBJECT TO FURTHER PLANNING

ROAD CONNECTION TO LOT 9001

1012

9001

ROAD CONNECTION TO LOT 9001

ROAD CONNECTION TO LOT 9001

AREA SUBJECT TO FURTHER PLANNING

Left in/ left out intersectin in accordance with Figure 1 - Road Hierachy and Arterial Access of Attacment D.

Full access T-intersection is permitted until such time that either of the four-way intersections to the south or north are constructed to provide suitable access to the LSP area.

ROMEO ROAD

NORTHERN SUBURBS RAILWAY

CONNECTION TO TRINITY

AVENUE

PS

1002

CONNECTION TO TRINITY

CONNECTION TO TRINITY

MARMION

HIGH SCHOOL / DISTRICT OPEN SPACE

INDIAN OCEAN

ROAD CONNECTION ON TO LOT 9

ROAD CONNECTION ON TO LOT 9

ROAD CONNECTION ON TO LOT 9

Figure C

Local structure plan

Job Number: L12347-001 CAMP
Doc Number: 003
Date: 14.06.19
Scale: NTS @ A3
Created by: MA
Source: LSP - Roberts Day 01.03.12

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Figure D

Carnaby's black-cockatoo habitat

GDA 1994 MGA Zone 51

0 25 50 100 m

Job Number: L1234701 CAMP
Date: 14.06.19
Doc no: 004
Scale: 1: 4,000 @ A3
Drafted by: MA

Source: Cadastre, Relief & Orthophoto - Landgate, 2012. Lomandra - RPS 2012.

Document Path: G:\Jobs\L_Jobs\L12347 - Alkimos FMP amd CAMP proposal for Federal process\Figures CAMP\L1234701_G_CAMP_FigD_CBC Habitat_190614.mxd

Figure E

CAMP Pathway locations

GDA 1994 MGA Zone 51

0 12.5 25 50 m

Job Number: L1234701 CAMP
Date: 14.06.19
Doc no: 005
Scale: 1: 4,000 @ A3
Drafted by: MA

Source: Cadastre, Relief & Orthophoto - Landgate, 2012. Lomandra - RPS 2012.

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Figure F

CAMP Proposed revegetation areas

GDA 1994 MGA Zone 50

0 25 50 100 m

Job Number: L12347-001 CAMP
Doc Number: 006
Date: 20.06.19
Scale: 1:2,000 @ A3
Created by: MA
Source: Orthophoto - Landgate, Feb 2019

Document Path: G:\Jobs\L_Jobs\L12347 - Alkimos FMP amd CAMP proposal for Federal process\Figures CAMP\L1234701_G_FMP_FigF_CAMP Proposed revegetation_190620.mxd

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Appendix A

South Alkimos EPBC 2011/5902 Conditions and the November 2018 Amendments

Australian Government
Department of the Environment and Energy

Ms Nadja Kampfhenkel
Sustainability Manager
Lendlease Communities Australia
Level 2, 10 Ord Street
WEST PERTH WA 6005

EPBC 2011/5902: Urban Development – Lot 1004, 80L Romeo Road and 2611 Marmion Avenue, Alkimos: variation to conditions of approval.

Dear Ms Kampfhenkel,

Thank you for contacting the Department regarding future management of public open space required under the *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act) conditions of approval for EPBC 2011/5902. I understand the Department recommended the conditions of approval be varied, and that you agreed to the Department's draft variation on 21 November 2018.

Officers of this Department have advised me on the proposed variation. As a delegate of the Minister for the Environment and Energy, I have decided to vary the conditions of approval so that Lendlease may seek agreement from the Minister to transfer implementation of plans specified under Conditions 10, 11 and 12 to, for example, the City of Wanneroo. If agreed, Lendlease would no longer be obliged to maintain relevant records and to report on plan implementation. I have also varied the conditions of approval so that:

- Lendlease may request to the Minister that Lendlease no longer publish and report on compliance with the conditions of approval (Condition 3). This provision may be especially relevant following transfer of all management plans; and

- the Minister no longer has the power to require changes to approved management plans. I have revoked Condition 5 as this power is no longer appropriate with the management plans transferred to an entity that is not a holder of the approval.

Please refer to the attached variation notice that specifies the varied conditions of approval, and note that the variation will soon be published on the Department's referral notices webpage.

Should you require any further information regarding the variation please contact Vaughn Cox on (02) 6274 2005 or by email to postapproval@environment.gov.au.

Yours sincerely

Gregory Manning
Assistant Secretary
Assessment (WA, SA, NT) & Post Approvals Branch
Environment Standards Division

30 November 2018

Attach: Variation to conditions of approval for EPBC 2011/5902.

Australian Government
Department of the Environment and Energy

VARIATION TO CONDITIONS ATTACHED TO APPROVAL

Urban Development – Lot 1004, 80L Romeo Road and 2611 Marmion Avenue, Alkimos, Western Australia (EPBC 2011/5902)

This decision to vary a condition of approval is made under section 143 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Person to whom the approval is granted	Lend Lease Communities (Alkimos) Pty Limited ABN: 145 185 468
Approved action	The clearing of approximately 97 ha of native vegetation for urban development at Lot 1004, 80L Romeo Road and 2611 Marmion Avenue, Alkimos, WA [See EPBC Act referral 2011/5902].

Variation

Variation of conditions of approval	The variation is: Revoke Condition 5 attached the approval. Delete Condition 3 attached to the approval and substitute with Condition 3 specified in the table below. Add condition 12A to the approval as specified in the table below.
Date of effect	This variation has effect on the date the instrument is signed.

Person authorised to make decision

Name and position	Gregory Manning Assistant Secretary Assessment (WA, SA, NT) & Post Approvals Branch
Signature	
Date of decision	30 November 2018

Date of decision	Conditions attached to approval
Original dated 30/06/2012	**1.** Within 30 days after the commencement of **construction**, the person taking the action must advise **the Department** in writing of the actual date of commencement.
Original dated 30/06/2012	**2.** The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the management plans required by this approval, and make them available upon request to **the Department**. Such records may be subject to audit by **the Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on **the Department**'s website. The results of audits may also be publicised through the general media.
As varied on the date this instrument was signed	**3.** Unless otherwise agreed to in writing by the **Minister**, the person taking the action must, within three months of every 12 month anniversary of the commencement of the action: a) publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions; and b) provide to the Department documentary evidence of the date of publication and non-compliance with any of the conditions of this approval.
Variation dated 19/08/2016	**4.** a) The person taking the action may choose to revise the CAMP, FMP and PLRP approved by the **Minister** under conditions 10, 11 and 12 without submitting it for approval (including approval under section 143A of the **EPBC Act**), if the taking of the action in accordance with the revised plan would not be likely to have a **new or increased impact**. If the person taking the action makes this choice they must: i. Notify **the Department** in writing that the approved plan has been revised and provide **the Department** with: • an electronic copy of the revised plan; • an explanation of the differences between the revised plan and the approved plan; and • the reasons the person taking the action considers that taking the action in accordance with the revised plan would not be likely to have a **new or increased impact**. ii. Declare in writing a date on which the revised plan will first be implemented by the person taking the action. That date of initial implementation must be at least 28 days after the revised plan is submitted. b) The person taking the action may revoke their choice under condition 4.a) at any time by giving written notice to **the Department**, in which case from the following day the person taking the action must implement the approved plan. c) If the **Minister** gives a notice to the person taking the action that the **Minister** is satisfied that the taking of the action in accordance with the revised plan would be likely to have a **new or increased impact**, then: i. Condition 4.a) does not apply, or ceases to apply, in relation to the revised plan; and ii. The person taking the action must implement the approved plan.

Date of decision	Conditions attached to approval
	To avoid any doubt, this condition does not affect any operation of conditions 4.a) and 4.b) in the period before the day the notice is given. At the time of giving the notice the **Minister** may also notify that for a specified period of time condition 4.a) does not apply for one or more specified plans required under the approval. Note: This condition is not intended to limit the operation of section 143A of the **EPBC Act** which allows the person taking the action to submit a revised action management plan to the **Minister** for approval.
As varied on the date this instrument was signed	**5. Revoked**
Original dated 30/06/2012	**6.** If, at any time after five years from the date of this approval, the person taking the action has not substantially commenced the action, then the person taking the action must not substantially commence the action without the written agreement of the **Minister.**
Original dated 30/06/2012	**7.** Unless otherwise agreed to in writing by the **Minister**, the person taking the action must publish all management plans referred to in these conditions of approval on their website. Each management plan must be published on the website within 1 month of being approved and must remain on the website for the life of the project.
Original dated 30/06/2012	**8.** The person taking the action must not clear more than 21.1ha of **Carnaby's Black-Cockatoo** foraging habitat from Lot 1004, 80L Romeo Road and 2611 Marmion Avenue, Alkimos, Western Australia.
Variation dated 13/06/2013	**9. Revoked**
Variation dated 13/06/2013	**10.** To protect habitat for listed threatened species, the person taking the action must prepare and submit a Conservation Area Management Plan (CAMP) detailing management of **POS** (designated Conservation **POS** at Attachment A), for approval by the **Minister**. The CAMP must include: (a) at least 2ha of **Carnaby's Black-Cockatoo** foraging habitat to be retained and rehabilitated in **POS** on the **project area**, as shown in Attachment A, to be managed for habitat recovery, protection and conservation; (b) details of supplementary planting equivalent to at least 1ha of **Carnaby's Black-Cockatoo** foraging habitat on the **project area** (to be spread across conservation **POS** and **ROS**), including timeframes and survival targets proposed for plantings; (c) measures to manage weeds and feral pests; (d) bushfire prevention and management measures; (e) erosion control measures; (f) access management (including boardwalks, pathways, signage and fencing); (g) performance indicators and corrective measures; (h) monitoring and reporting measures; (i) roles and responsibilities of contractors, staff and the person taking the action; and (j) time frames for the implementation and management of the above measures. The CAMP must be submitted to **the Department** within 12 months of the date of approval. If the **Minister** approves the CAMP, the approved plans must be implemented. No **construction** can commence in the area shown as the No Clearing area on Attachment C until the CAMP is approved by the **Minister.**

Date of decision	Conditions attached to approval
Variation dated 13/06/2013	**11.** To protect habitat for listed threatened species, the person taking the action must prepare and submit a Foreshore Management Plan (FMP) detailing management of **ROS** on the **project area** (designated Regional Parks and Recreation at Attachment A), for approval by the **Minister**. The FMP must include: (a) details of supplementary planting and weed control equivalent to at least 1ha of **Carnaby's Black-Cockatoo** foraging habitat on the **project area**, (to be spread across conservation **POS** and **ROS)**, including timeframes and survival targets proposed for plantings; (b) details of funding to be provided for long-term conservation management of **ROS** and details of the entity who will be responsible for management of **ROS**; (c) measures to manage weed and feral pests; (d) bushfire prevention and management measures; (e) erosion control measures; (f) access management (including visitor facilities, boardwalks, pathways, signage and fencing); (g) performance indicators and corrective measures; (h) monitoring and reporting measures; (i) roles and responsibilities of contractors, staff and the person taking the action; and (j) time frames for the implementation and management of the above measures. The FMP must be submitted to **the Department** within 12 months of the date of approval. If the **Minister** approves the FMP, the approved plans must be implemented. No **construction** can commence in the area illustrated shown as No Clearing on Attachment C until the FMP is approved by the **Minister.**
Original dated 30/06/2012	**12.** To protect habitat for listed threatened species the person taking the action must prepare and submit a Precinct Landscape and Revegetation Plan (PLRP) for the **project area**, for approval by the **Minister**. The PLRP must include: a) measures to establish the equivalent of at least 5ha of **Carnaby's Black-Cockatoo** habitat on the **project area**, through streetscape and landscape planting; b) at least 50% of plantings of trees and shrubs in streetscape and landscape planting must consist of plant species known to be **primary feeding plants** for **Carnaby's Black-Cockatoo**; c) timeframes and survival targets proposed for plantings; d) contingency measures if survival targets are not achieved; e) monitoring and reporting measures; f) roles and responsibilities of contractors, staff and the person taking the action; and g) time frames for the implementation and management of the above measures. The PLRP must be submitted to **the Department** for approval by the **Minister** within 12 months of the date of approval. If the **Minister** approves the PLRP, the approved plan must be implemented. No **construction** can commence in the area shown as the No Clearing area on Attachment C until the PLRP is approved by the **Minister**.
As varied on the date this instrument was signed	**12A.** The person taking the action may, with written agreement of the **Minister**, cease to implement the CAMP, FMP and/or PRLP. If the person taking the

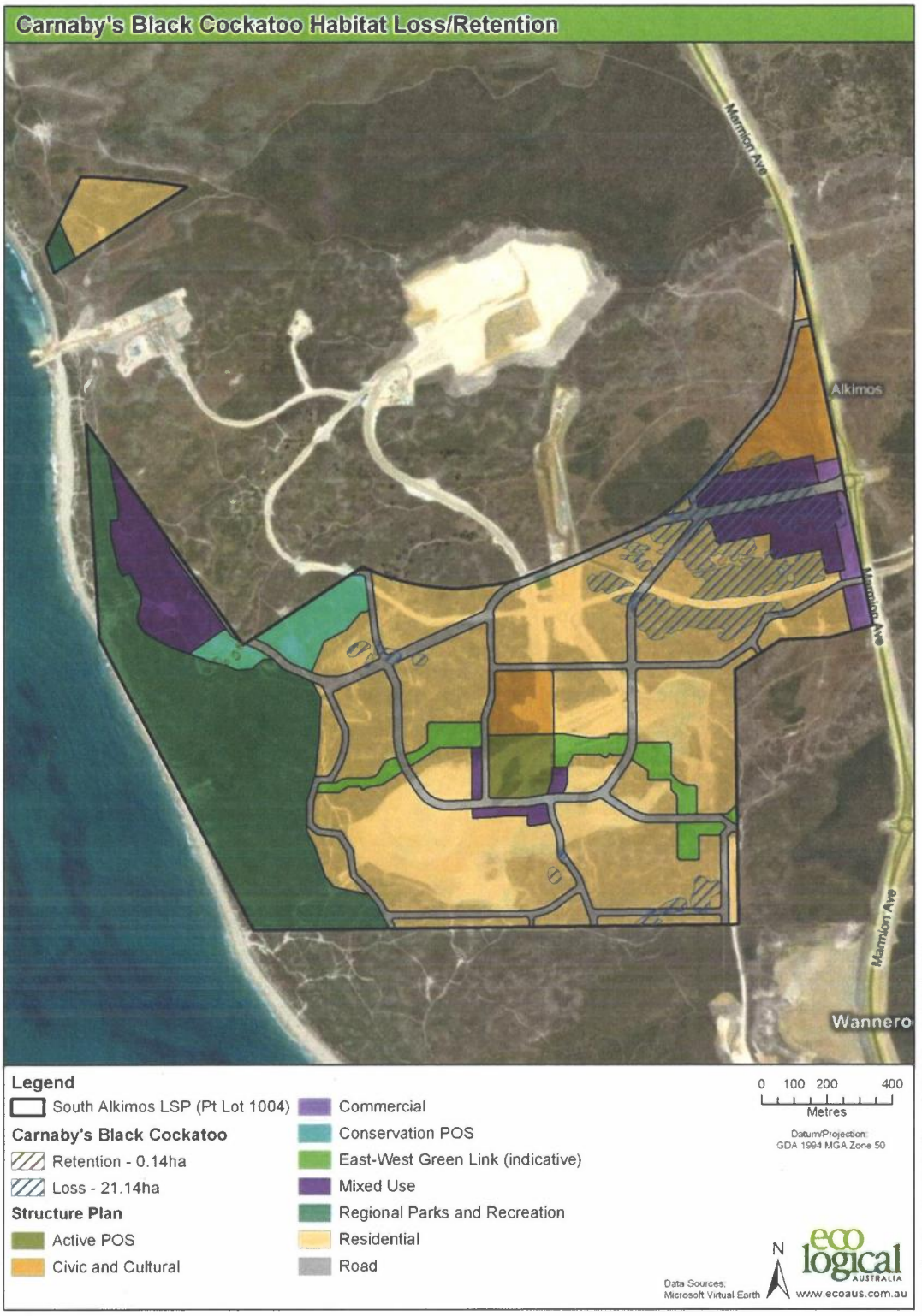
Date of decision	Conditions attached to approval
	action wishes to cease implementing the CAMP, FMP and/or PRLP, the person taking the action must submit a request to the **Minister** which: a) includes a report demonstrating that the outcomes and performance indicators of the approved CAMP, FMP and/or PRLP have been achieved; b) specifies the entity that will implement the CAMP, FMP and/or PRLP in the future; c) includes written agreement from the entity to implementing the approved CAMP, FMP and/or PRLP; and d) sets out the entity's capacity to implement the CAMP, FMP and/or PRLP. If the **Minister** agrees to the request, the person taking the action may cease to implement the CAMP, FMP and/or PRLP, to maintain associated records (Condition 2) and/or report on implementation of the CAMP, FMP and/or PRLP (Condition 3).
Original dated 30/06/2012	**13.** To offset the loss of habitat for **Carnaby's Black-Cockatoo**, the person taking the action must, within 12 months of the commencement of **construction**, provide funds to **WA DEC** for the acquisition, and a contribution to management of the offset described in *Alkimos Lot 1004 Residential Development Mitigation and Offsets Strategy for Matters of National Environmental Significance* (Eco Logical Australia, January 2012). The offset land must be at least 126ha of freehold land in the Gingin area and contain vegetation that has equivalent or better foraging habitat for **Carnaby's Black-Cockatoo**, including *Banksia* woodland/shrubland. Within 4 weeks of the funding being provided to the **WA DEC**, the person taking the action must provide written evidence to **the Department** of the payment.
Variation dated 24/08/2012	**14.** Within 12 months of the commencement of **construction**, the person taking the action must provide **the Department** with a description and map clearly defining the location and boundaries of the offset property described at Condition 13, which must be accompanied with the **offset attributes** and a **shapefile.**
Variation dated 13/06/2013	**15. Revoked**.
Variation dated 13/06/2013	**16. Revoked**.
Variation dated 13/06/2013	**17. Revoked**.

Date of decision	Definitions attached to approval
Variations dated 13/06/2013, 19/08/2016	**Carnaby's Black Cockatoo** (*Calyptorhynchus latirostris*) is an endangered large brownish-black cockatoo. **Construction** includes any preparatory works required to be undertaken including clearing vegetation, the erection of any fences, signage or on-site temporary structures and the use of construction or excavation equipment on site for the purpose of breaking the ground for buildings or infrastructure. **EPBC Act** is the *Environment Protection and Biodiversity Conservation Act 1999.* **Minister** is the Minister administering the *Environment Protection and Biodiversity Conservation Act 1999* and includes a delegate of the Minister.

Date of decision	Definitions attached to approval
	New or increased impact is a new or increased impact on any matter protected by the controlling provisions for the action, when compared to the net impact resulting from implementing the plan that has been approved by the Minister. **Offset attributes** means an '.xls' file capturing relevant attributes of the Offset Area, including the EPBC reference ID number, the physical address of the offset site, coordinates of the boundary points in decimal degrees, the EPBC protected matters that the offset compensates for, any additional EPBC protected matters that are benefiting from the offset, and the size of the offset in hectares. **POS** is Public Open Space set aside in the Alkimos Local Structure Plan for recreation. **Primary feeding plants** for Carnaby's Black Cockatoo include: any Banksia sp., any plants identified in a search of the WA DEC's Plants for Carnaby's Search Tool (at http://www.dec.wa.gov.au/content/view/5983/1556/), or other plants approved in writing by the Department. **Project area** is Lot 1004, 80L Romeo Road and 2611 Marmion Avenue, Alkimos, Western Australia. **ROS** is Regional Open Space areas set aside in the Alkimos Local Structure Plan for conservation. **Shapefile** means an ESRI Shapefile containing '.shp', '.shx' and '.dbf' files and other files capturing attributes of the Offset Area, including the shape, EPBC reference ID number and EPBC protected matters present at the relevant site. Attributes should also be captured in '.xls' format. **The Department** is the Australian Government Department administering the *Environme Protection and Biodiversity Conservation Act 1999.* **WA DEC** is Western Australia Government's Department of Environment and Conservation (or equivalent agency).

Variation dated 19/08/2016

Attachment A



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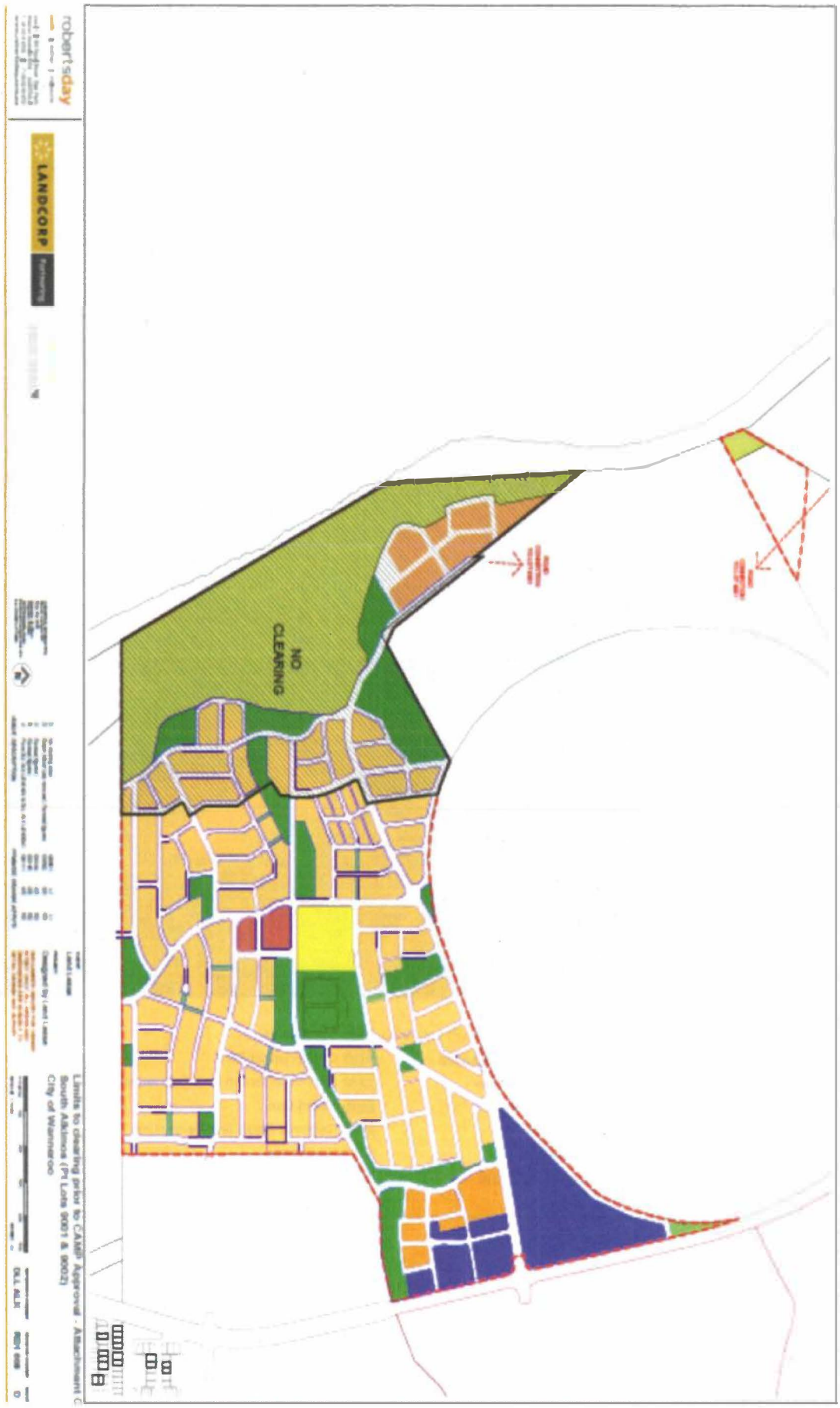


Approval

Urban Development – Lot 1004, 80L Romeo Road and 2611 Marmion Avenue, Alkimos, WA (EPBC 2011/5902)

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999*.

Proposed action

person to whom the approval is granted	Lend Lease Communities (Alkimos) Pty Limited
proponent's ACN (if applicable)	ACN: 145 185 468
proposed action	The clearing of approximately 97 ha of native vegetation for urban development at Lot 1004, 80L Romeo Road and 2611 Marmion Avenue, Alkimos, WA [See EPBC Act referral 2011/5902].

Approval decision

Controlling Provision	Decision
Listed threatened species and communities (sections 18 & 18A)	Approved

conditions of approval

This approval is subject to the conditions specified below.

expiry date of approval

This approval has effect until 31 December 2037

Decision-maker

name and position	Barbara Jones Assistant Secretary Environment Assessment Branch
signature	
date of decision	30 June 2012

Conditions attached to the approval

1. Within 30 days after the commencement of **construction**, the person taking the action must advise **the Department** in writing of the actual date of commencement.

2. The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the management plans required by this approval, and make them available upon request to **the Department**. Such records may be subject to audit by **the Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on **the Department**'s website. The results of audits may also be publicised through the general media.

3. Within three months of every 12 month anniversary of the commencement of the action, the person taking the action must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the **Department** at the same time as the compliance report is published. Each management plan must be published on the website for the length of the approval.

4. If the person taking the action 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. The **Minister** will not approve a varied management plan unless the revised management plan would result in an equivalent or improved environmental outcome over time. If the **Minister** approves the revised management plan that management plan must be implemented in place of the management plan originally approved.

5. If the **Minister** believes that it is necessary or convenient for the better protection of Listed threatened species and communities (sections 18 & 18A) to do so, the **Minister** may request that the person taking the action make specified revisions to the management plan specified in the conditions and submit the revised management plan for the **Minister's** written approval. The person taking the action must comply with any such request. The revised approved management plan must be implemented. Unless the **Minister** has approved the revised management plan then the person taking the action must continue to implement the management plan originally approved, as specified in the conditions.

6. If, at any time after five years from the date of this approval, the person taking the action has not substantially commenced the action, then the person taking the action must not substantially commence the action without the written agreement of the **Minister**.

7. Unless otherwise agreed to in writing by the **Minister**, the person taking the action must publish all management plans referred to in these conditions of approval on their website. Each management plan must be published on the website within 1 month of being approved and must remain on the website for the life of the project.

8. The person taking the action must not clear more than 21.1ha of **Carnaby's Black Cockatoo** foraging habitat from Lot 1004, 80L Romeo Road and 2611 Marmion Avenue, Alkimos, Western Australia.

9. The person taking the action must not clear more than 75.2ha of **Graceful Sun Moth** habitat from Lot 1004, 80L Romeo Road and 2611 Marmion Avenue, Alkimos, Western Australia.

10. To protect habitat for listed threatened species, the person taking the action must prepare and submit a Conservation Area Management Plan (CAMP) detailing management of **POS** (designated Conservation **POS** at Attachment A), for approval by the **Minister**. The CAMP must include:

    (a) at least 2ha of **Carnaby's Black-Cockatoo** foraging habitat to be retained and rehabilitated in **POS** on the **project area**, as shown in Attachment A, to be managed for habitat recovery, protection and conservation;
    (b) retention of 4.5ha on the **project area**, as shown in Attachment B, for the purposes of **Graceful Sun Moth** habitat recovery, protection and conservation;
    (c) details of supplementary planting equivalent to at least 1ha of **Carnaby's Black-Cockatoo** foraging habitat on the project area (to be spread across conservation **POS** and **ROS**), including timeframes and survival targets proposed for plantings;
    (d) details of a program of annual, appropriately timed, monitoring of **Graceful Sun Moth** populations in **POS**;
    (e) details of a program of annual monitoring of the health and condition of *Lomandra maritima* in **POS**;
    (f) measures to manage weeds and feral pests;
    (g) bushfire prevention and management measures;
    (h) erosion control measures;
    (i) access management (including boardwalks, pathways, signage and fencing);
    (j) performance indicators and corrective measures;
    (k) monitoring and reporting measures;
    (l) roles and responsibilities of contractors, staff and the person taking the action; and
    (m) time frames for the implementation and management of the above measures.

    The CAMP must be submitted to **the Department** within 12 months of the date of approval. If the **Minister** approves the CAMP, the approved plans must be implemented. No **construction** can commence in the area shown as the No Clearing area on Attachment C until the CAMP is approved by the **Minister.**

11. To protect habitat for listed threatened species, the person taking the action must prepare and submit a Foreshore Management Plan (FMP) detailing management of **ROS** on the **project area** (designated Regional Parks and Recreation at Attachment A), for approval by the **Minister**. The FMP must include:

    (a) retention of 16.1ha of **ROS** on the **project area**, as shown in Attachment B, for the purposes of **Graceful Sun Moth** habitat recovery, protection and conservation;
    (b) details of supplementary planting and weed control equivalent to at least 1ha of **Carnaby's Black-Cockatoo** foraging habitat on the **project area**, (to be spread across conservation **POS** and **ROS)**, including timeframes and survival targets proposed for plantings;
    (c) details of funding to be provided for long-term conservation management of **ROS** and details of the entity who will be responsible for management of **ROS**;
    (d) details of a program of annual monitoring of the health and condition of *Lomandra maritima* in **ROS**;
    (e) measures to manage weed and feral pests;
    (f) bushfire prevention and management measures;
    (g) erosion control measures;
    (h) access management (including visitor facilities, boardwalks, pathways, signage and fencing);
    (i) performance indicators and corrective measures;
    (j) monitoring and reporting measures;
    (k) roles and responsibilities of contractors, staff and the person taking the action; and
    (l) time frames for the implementation and management of the above measures.

    The FMP must be submitted to **the Department** within 12 months of the date of approval. If the **Minister** approves the FMP, the approved plans must be implemented. No **construction** can commence in the area illustrated shown as No Clearing on Attachment C until the FMP is approved by the **Minister.**

12. To protect habitat for listed threatened species the person taking the action must prepare and submit a Precinct Landscape and Revegetation Plan (PLRP) for the **project area**, for approval by the **Minister**. The PLRP must include:

    (a) measures to establish the equivalent of at least 5ha of **Carnaby's Black-Cockatoo** habitat on the **project area**, through streetscape and landscape planting;
    (b) at least 50% of plantings of trees and shrubs in streetscape and landscape planting must consist of plant species known to be **primary feeding plants** for **Carnaby's Black-Cockatoo**;
    (c) timeframes and survival targets proposed for plantings;
    (d) contingency measures if survival targets are not achieved;
    (e) monitoring and reporting measures;
    (f) roles and responsibilities of contractors, staff and the person taking the action; and
    (g) time frames for the implementation and management of the above measures.

    The PLRP must be submitted to **the Department** for approval by the **Minister** within 12 months of the date of approval. If the **Minister** approves the PLRP, the approved plan must be implemented. No **construction** can commence in the area shown as the No Clearing area on Attachment C until the PLRP is approved by the **Minister.**

13. To offset the loss of habitat for **Carnaby's Black-Cockatoo**, the person taking the action must, within 12 months of the commencement of **construction**, provide funds to **WA DEC** for the acquisition, and a contribution to management of the offset described in *Alkimos Lot 1004 Residential Development Mitigation and Offsets Strategy for Matters of National Environmental Significance* (Eco Logical Australia, January 2012). The offset land must be at least 126ha of freehold land in the Gingin area and contain vegetation that has equivalent or better foraging habitat for **Carnaby's Black-Cockatoo**, including *Banksia* woodland/shrubland. Within 4 weeks of the funding being provided to the **WA DEC**, the person taking the action must provide written evidence to **the Department** of the payment.

14. Before the commencement of **construction**, the person taking the action must provide to **the Department** with a description and map clearly defining the location and boundaries of the offset property described at Condition 13, which must be accompanied with the **offset attributes** and a **shapefile.**

15. Within 12 months of the commencement of **construction**, the person taking the action must provide written evidence of payment of $250 000 to **WA DEC** for the purposes of funding the preparation and implementation of an operational management plan for the management of a minimum of 400ha of *Lomandra maritima* in Wilbinga Conservation Park, approximately 20km north of the **project area**.

16. Within 12 months of the commencement of **construction**, the person taking the action must provide written evidence of payment of $90 000 to **WA DEC** for the purpose of funding future **Graceful Sun Moth** surveys in priority areas of Crown Reserve, Nature Reserve or Unallocated Crown Land, to be determined by **WA DEC**.

17. Within 12 months of the commencement of **construction**, the person taking the action must, in consultation with **WA DEC**, enter into an agreement with a recognised **research body** to fund a **research project** that will aid in the future persistence of the **Graceful Sun Moth** through the propagation and translocation of *Lomandra sp.*

    (a) The person taking the action must provide written evidence to **the Department** that the agreement, has been entered into within 12 months of commencement of **construction**.

    (b) Prior to the commencement of the **research project**, the person taking the action must submit to **the Department** for approval, a document detailing the full scope of the **research project**, including:

    - objectives of the project;
    - specifics of trial design;

- methodologies for translocation and propagation actions;
- timing and approach for implementation of research trials;
- parameters and timing of monitoring;
- criteria against which to assess trial outcomes;
- timing and scope of reporting; and
- a copy of the research agreement with the recognised **research body**.

(c) The person taking the action must provide the sum of $190 000 to a recognised **research body** for a **research project**, in accordance with the research agreement. Within 4 weeks of the payment being made, the person taking the action must provide written evidence to **the Department**.

Definitions:

Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) is an endangered large brownish-black cockatoo.

Construction includes any preparatory works required to be undertaken including clearing vegetation, the erection of any fences, signage or on-site temporary structures and the use of construction or excavation equipment on site for the purpose of breaking the ground for buildings or infrastructure.

EPBC Act is the *Environment Protection and Biodiversity Conservation Act 1999.*

Graceful Sun Moth (*Synemon gratiosa)* is a medium sized diurnal flying sun moth that is similar in appearance to a butterfly.

Minister is the Minister administering the *Environment Protection and Biodiversity Conservation Act 1999* and includes a delegate of the Minister.

Offset attributes means an '.xls' file capturing relevant attributes of the Offset Area, including the EPBC reference ID number, the physical address of the offset site, coordinates of the boundary points in decimal degrees, the EPBC protected matters that the offset compensates for, any additional EPBC protected matters that are benefiting from the offset, and the size of the offset in hectares.

POS is Public Open Space set aside in the Alkimos Local Structure Plan for recreation.

Primary feeding plants for Carnaby's Black Cockatoo include: any Banksia sp., any plants identified in a search of the WA DEC's Plants for Carnaby's Search Tool (at http://www.dec.wa.gov.au/content/view/5983/1556/), or other plants approved in writing by the Department.

Project area is Lot 1004, 80L Romeo Road and 2611 Marmion Avenue, Alkimos, Western Australia.

Research body is an organisation, university or entity with the capacity to scientifically and accurately undertake research, prepare and finalise a scientific document, have the document peer reviewed and published in an academic journal.

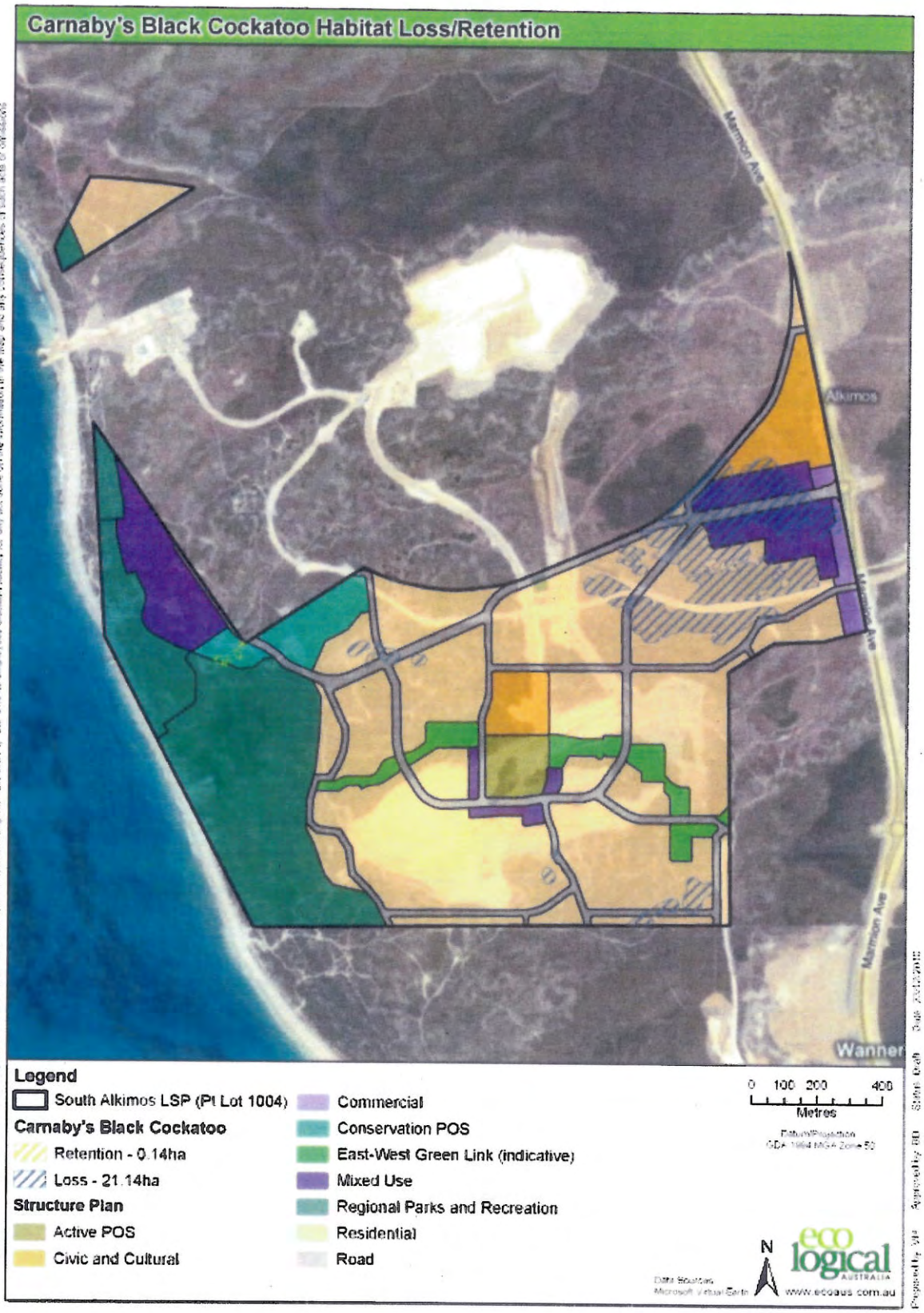
Research project is a project that will aid in the future persistence of the Graceful Sun Moth in Western Australia.

ROS is Regional Open Space areas set aside in the Alkimos Local Structure Plan for conservation.

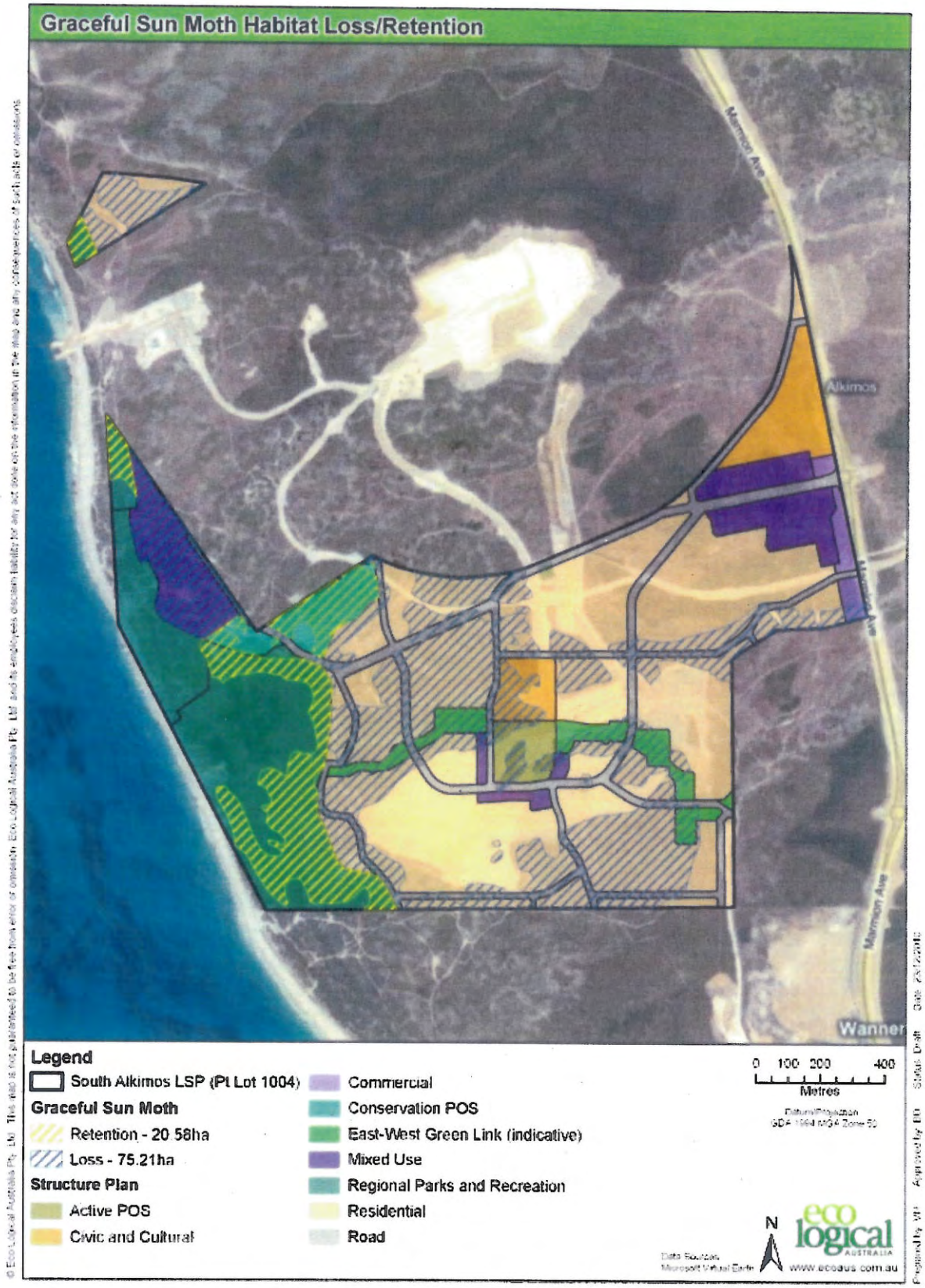
Shapefile means an ESRI Shapefile containing '.shp', '.shx' and '.dbf' files and other files capturing attributes of the Offset Area, including the shape, EPBC reference ID number and EPBC protected matters present at the relevant site. Attributes should also be captured in '.xls' format.

The Department is the Australian Government Department administering the *Environment Protection and Biodiversity Conservation Act 1999.*

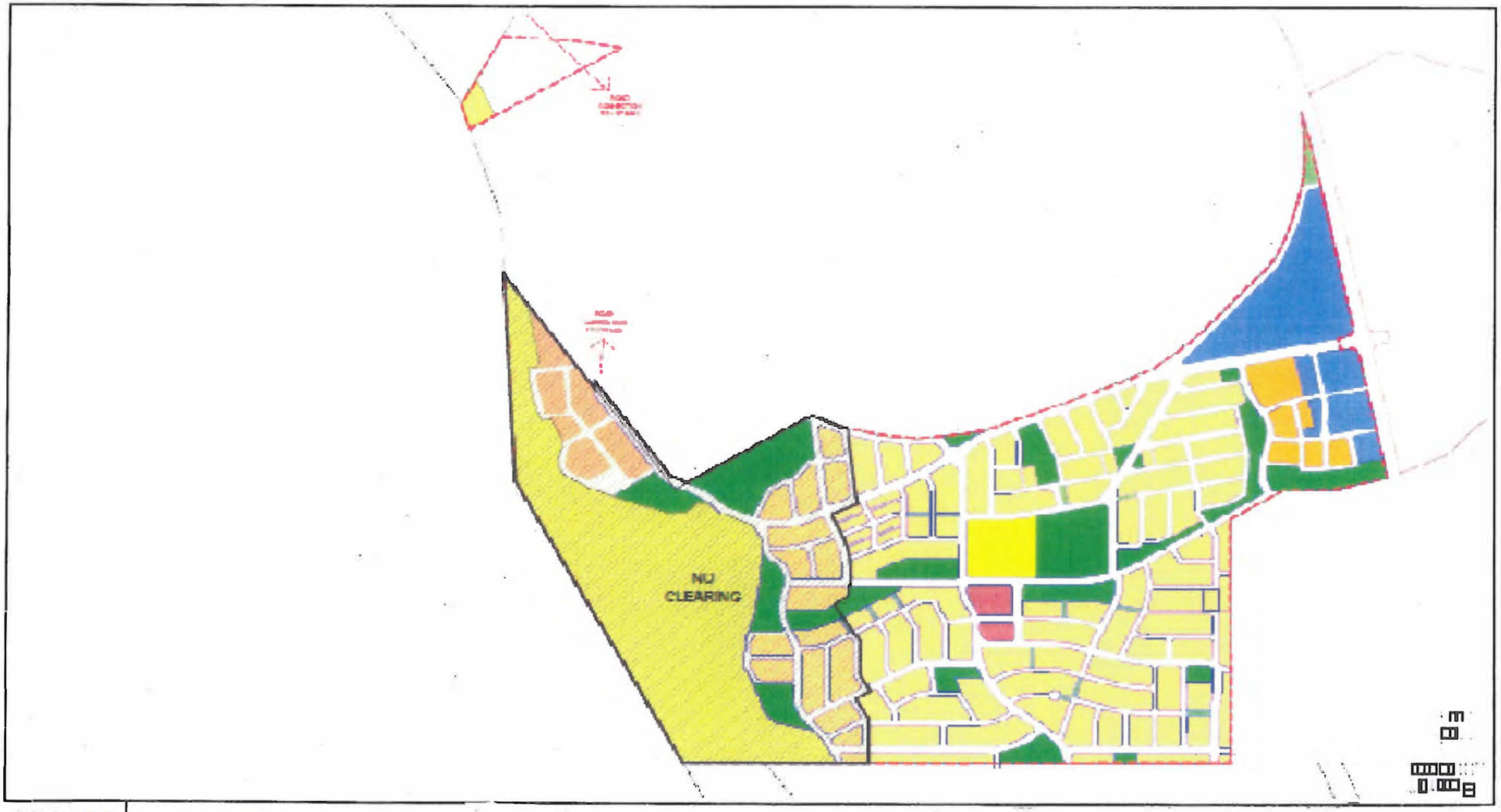
WA DEC is Western Australia Government's Department of Environment and Conservation (or equivalent agency).



Attachment A



Attachment B



LANDCORP

Attachment C

Australian Government

Department of Sustainability, Environment, Water, Population and Communities

VARIATION TO CONDITIONS ATTACHED TO APPROVAL

Urban Development – Lot 1004, 80L Romeo Road and 2611 Marmion Avenue, Alkimos, WA (EPBC 2011/5902)

This decision to vary a condition of approval is made under section 143 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Approved action

Person to whom the approval is granted	Lend Lease Communities (Alkimos) Pty Limited ACN: 145 185 468
Approved action	The clearing of approximately 97 ha of native vegetation for urban development at Lot 1004, 80L Romeo Road and 2611 Marmion Avenue, Alkimos, WA [See EPBC Act referral 2011/5902]

Variation

Variation of conditions of approval	The variation is: Delete condition **9**, **10**, **11**, **15**, **16**, **17**, **Attachment B** and definitions '**Graceful Sun Moth**', '**Research body**' and '**Research project**' attached to the approval dated 30 June 2012 and substitute condition 10 and 11 specified below.
Date of effect	This variation has effect on the date the instrument is signed

Person authorised to make decision

name and position	**Shane Gaddes** A/g Assistant Secretary Compliance & Enforcement Branch
Signature	S. Gaddes
Date of decision	13 June 2013

Conditions attached to the approval

10. To protect habitat for listed threatened species, the person taking the action must prepare and submit a Conservation Area Management Plan (CAMP) detailing management of **POS** (designated Conservation **POS** at Attachment A), for approval by the **Minister**. The CAMP must include:

(a) at least 2ha of **Carnaby's Black-Cockatoo** foraging habitat to be retained and rehabilitated in **POS** on the **project area**, as shown in Attachment A, to be managed for habitat recovery, protection and conservation;
(b) details of supplementary planting equivalent to at least 1ha of **Carnaby's Black-Cockatoo** foraging habitat on the project area (to be spread across conservation **POS** and **ROS**), including timeframes and survival targets proposed for plantings;
(c) measures to manage weeds and feral pests;
(d) bushfire prevention and management measures;
(e) erosion control measures;
(f) access management (including boardwalks, pathways, signage and fencing);
(g) performance indicators and corrective measures;
(h) monitoring and reporting measures;
(i) roles and responsibilities of contractors, staff and the person taking the action; and
(j) time frames for the implementation and management of the above measures.

The CAMP must be submitted to **the Department** within 12 months of the date of approval. If the **Minister** approves the CAMP, the approved plans must be implemented. No **construction** can commence in the area shown as the No Clearing area on Attachment C until the CAMP is approved by the **Minister.**

11. To protect habitat for listed threatened species, the person taking the action must prepare and submit a Foreshore Management Plan (FMP) detailing management of **ROS** on the **project area** (designated Regional Parks and Recreation at Attachment A), for approval by the **Minister**. The FMP must include:

(a) details of supplementary planting and weed control equivalent to at least 1ha of **Carnaby's Black-Cockatoo** foraging habitat on the **project area**, (to be spread across conservation **POS** and **ROS)**, including timeframes and survival targets proposed for plantings;
(b) details of funding to be provided for long-term conservation management of **ROS** and details of the entity who will be responsible for management of **ROS**;
(c) measures to manage weed and feral pests;
(d) bushfire prevention and management measures;
(e) erosion control measures;
(f) access management (including visitor facilities, boardwalks, pathways, signage and fencing);
(g) performance indicators and corrective measures;
(h) monitoring and reporting measures;
(i) roles and responsibilities of contractors, staff and the person taking the action; and
(j) time frames for the implementation and management of the above measures.

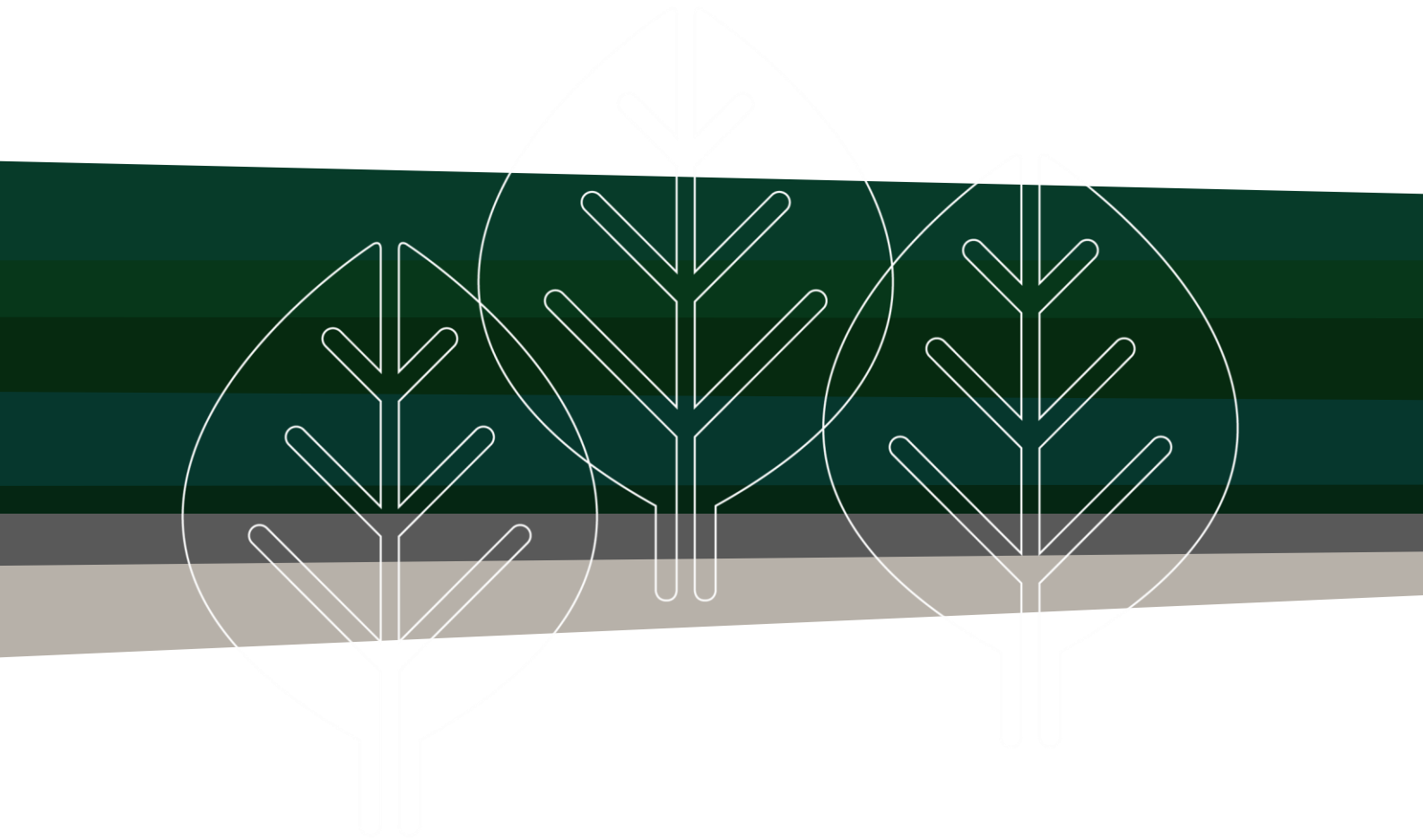
The FMP must be submitted to **the Department** within 12 months of the date of approval. If the **Minister** approves the FMP, the approved plans must be implemented. No **construction** can commence in the area illustrated shown as No Clearing on Attachment C until the FMP is approved by the **Minister.**

Appendix B

CAMP revegetation management plan (Tranen 2015)

revegetating
rehabilitating
restoring

tranen
revegetation systems



P521E Alkimos Beach Conservation Area Management Plan (CAMP) Revegetation Plan

Lend Lease Communities

P521E-02-Rev2

August 2015

Disclaimer

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Document Version Control				
Rev	**Date**	**Description**	**Author**	**Review**
0	24//10/14	Initial document	DG	JL
1	3/2/15	Revised following client review	DG	
2	31/8/15	Revised following change in scope	DG	

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1 INTRODUCTION AND BACKGROUND

In October 2014 Tranen Revegetation Systems was commissioned by Lend Lease Communities (Alkimos) Pty Ltd (Lend Lease) to prepare a revegetation plan for the conservation reserve at Alkimos Beach. The conservation area totals approximately 5.93 hectares (ha) in area, and a Conservation Area Management Plan (CAMP) (RPS, 2013) has already been approved by the Department of the Environment in April 2014. The CAMP is a strategic document, and this revegetation plan has been developed to provide the specific details of how the revegetation requirements are to be achieved.

The original version of this plan was approved in February 2015. This revision in August 2015 incorporates small changes to the boundary of the CPOS due to the realignment of the road that bisects the western and eastern portions of the site.

1.1 Background

The Alkimos Beach residential project is being developed by Lend Lease in partnership with LandCorp. Alkimos Beach (formerly known as "South Alkimos") is an approved master planned residential development located approximately 40 kilometres (km) north-west of Perth's Central Business District within the City of Wanneroo (see Appendix 1).

The Conservation Area Management Plan (CAMP) study area is centred on a small area of conservation Public Open Space (POS) which is bounded by the "Urban" zoned portion of the Alkimos Beach to the east and the foreshore reserve to the west (see Appendix 2). The CAMP study area totals 6.4 ha.

The objective for the Alkimos Beach CAMP is to develop a management framework that responds specifically to Condition 10 of the South Alkimos Environment Protection Biodiversity and Conservation Act 1999 (EPBC Act) (EPBC 2011/5902) approval document.

In May 2013, the Graceful Sun Moth was removed from the Commonwealth's threatened species list and is therefore no longer a species of Matter of National Environmental Significance (MNES) under the EPBC Act. The Commonwealth Department of Sustainability, Environment, Water, Population and Communities (now Department of Environment (DoE)) confirmed in a letter dated 13 June 2013 the key EPBC Act approval conditions relating to the Graceful Sun Moth were no longer applicable to the Alkimos Beach project (EPBC 2011/5902). The relevant MNES to this CAMP now specifically relate to Carnaby's Black-Cockatoo foraging habitat.

1.2 Approvals and Conditions

Conditional approval to proceed with development of the project was granted by the Department of Sustainability, Environment, Water, Population and Communities under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999* on the 30th of June 2012, and amended on 13 June 2013. The CAMP was prepared to address Condition 10 of this approval.

"10. To protect habitat for listed threatened species, the person taking the action must prepare and submit a Conservation Area Management Plan (CAMP) detailing

management of Public Open Space (POS) (designated Conservation POS at Attachment A), for approval by the Minister. The CAMP must include:

a) At least 2 ha of Carnaby's Black-Cockatoo foraging habitat to be retained and rehabilitated in POS on the project area, as shown in Attachment A, to be managed for habitat recover, protection and conservation;
b) Details of supplementary planting equivalent to at least 1 ha of Carnaby's Black-Cockatoo foraging habitat on the project area (to be spread across conservation POS and ROS), including timeframes and survival targets proposed for plantings;
c) Measures to manage weed and feral pests;
d) Bushfire prevention and management measures;
e) Erosion control measures;
f) Access management (including boardwalks, pathways, signage and fencing);
g) Performance indicators and corrective measures;
h) Monitoring and reporting measures;
i) Roles and responsibilities of contractors, staff and the person taking the action;
j) Timeframes for the implementation and management of the above measures."

This revegetation plan provides specific details relating to conditions 10 a, b, c, e, f (part), g, h, i, and j of the development approval.

1.3 Documentation

This report is based on the following information provided by Lend Lease Communities:

- Conservation Area Management Plan (Commonwealth) Alkimos Beach, prepared by RPS (Document No: L1234701:2 Rev 1, September 2013); and
- Approval, Urban Development – Lot 1003, 80L Romeo Road and 2611 Marmion Avenue, Alkimos, WA (EPBC 2011/5902) - Department of Sustainability, Environment, Water, Population and Communities.

1.4 Objectives

The primary objective of this revegetation plan is to convert the revegetation components in the strategy of the CAMP into an actionable management plan that:

- delineates the areas where the works will take place within the site;
- provides specific details of what those works will be; and
- outlines the indicative project implementation schedule for these works.

2 SITE DESCRIPTION

2.1 Site Location and Size

Alkimos Beach is an approved master planned residential development located approximately 40 km north-west of Perth's Central Business District within the City of Wanneroo.

The Commonwealth approved Alkimos Beach project area is 224 ha, located adjacent to 1.7 km of coastal foreshore and 41.93 ha of coastal foreshore reserve which is designated Regional Open Space (ROS). The conservation area (CAMP) abuts the ROS in the north and is separated into two parts by a future road reserve. Appendix 2 shows the Local Structure Plan for Alkimos Beach project area and delineates these areas.

2.2 Land Form and Soils

Topography of the site varies from 45 m above sea level (AHD) in the east of the site to less than 5 m AHD to the west in the foreshore reserve. The landscape is undulating, dominated by consolidated Quindalup dune formations with swales between dune phases.

The dominant soil type on the LSP (Local Structure Plan) site is Quindalup (Q3) which is classified as loose, calcareous sand with some organic matter in the first 10 cm and incipient cementation at depth (RPS, 2011).

The CAMP study area is split into an eastern and western zone, bisected by a future road reserve. The western section is lower lying and relatively sheltered from the wind. However, the eastern section is more exposed, increasing in elevation from a low valley in the west to several tall dunal peaks in the east.

2.3 Vegetation Assessment

The dominant remnant vegetation complex is the Quindalup vegetation complex. A vegetation and flora survey was undertaken by Bennett in 2004 for ATA Environmental and the following vegetation associations were identified within the CAMP study area:

MsLm	Melaleuca systena and Lomandra maritima Low Open Heath.
Eg	Eucalyptus gomphocephala (Tuart) Open Woodland to Woodland over Banksia attenuata, Acacia saligna and Xanthorrhoea preissii.
Ar	Acacia rostellifera Low Closed Forest.
AsJf	Acacia saligna and Jacksonia furcellata Open Scrub.

Around 63% of the CAMP study area is classified as being in very good to excellent condition, 12% in degraded to good condition, and 25% is in completely degraded condition. Degradation has been caused by frequent intensive off-road vehicle activity, exacerbated by the strong prevailing winds encountered along the WA coast.

2.4 Site Stability

The relatively tall dunes provide some protection from the prevailing south-westerly and easterly winds to the western section, lower lying parts of the eastern section. However, in the degraded areas of higher elevation there is greater exposure to the wind and this has led to greater instability of the surface soils in those areas. Consequently two blowouts have formed, one within the CAMP area and one immediately adjacent to the north. The blowouts have formed on the northern leeward side of the dunes to the prevailing south-westerly winds.

2.5 Fauna

Calyptorhynchus latirostris (Carnaby's Black-Cockatoo (CBC)), is listed as "Schedule 1" fauna under the *Wildlife Conservation Act 1950* and "Endangered" under the EPBC Act. It is likely to fly regularly over the area due to the good quality foraging habitat that exists nearby. There is very limited foraging habitat (e.g. *Banksia sessilis*) available for the cockatoo on the Alkimos LSP site which may occasionally be used by the cockatoo for foraging; however, the site does not contain a significant food resource for this species compared to other areas in Alkimos–Eglinton and surrounds.

The federal approval conditions require at least 2 ha of Carnaby's Black-Cockatoo foraging habitat be retained and rehabilitated in the Conservation POS on the project area, and supplementary planting equivalent to at least 1 ha spread across the conservation POS and ROS (DSEWPaC, 2012). As detailed in the CAMP the EPBC referral identified a very limited range of Carnaby's Black-Cockatoo habitat in the conservation POS. A core aim is to complement the existing tuart trees (*Eucalyptus gomphocephala*) in the CAMP study area in accordance with the EPBC Act referral and subsequent conditions. The key Carnaby's Black-Cockatoo foraging habitat species likely to be used (but not restricted to) in the revegetation program include:

- *Acacia saligna*;
- *Allocasuarina lehmanniana*; and
- *Eucalyptus gomphocephala*.

2.6 Conservation Value

The Alkimos LSP site includes the majority of the foreshore reserve along its western margin. This area is part of Bush Forever site 397 which forms part of a semi-contiguous north–south vegetated coastal strip. The recommendations pertinent to the CAMP study area in the EPA report, Alkimos–Eglinton Metropolitan Region Scheme Amendment No. 1029/33 (EPA, 2005) centred on increasing the size of the foreshore reserve around Karli Spring to include additional areas of consolidated Quindalup Dunes to protect Aboriginal Heritage values and approximately 2.8 ha area of *Allocasuarina lehmanniana* (dune sheoak). The dune sheoaks may be used as foraging habitat by Carnaby's Black-Cockatoo and other bird species (RPS, 2013).

The LSP site also abuts the east–west conservation linkage associated with the Alkimos Waste Water Treatment Plant buffer on the northern margin. This area is not a Bush Forever site, however it is zoned for "Parks and Recreation" and "Public Purposes" (Conservation) in the MRS.

2.7 Existing Uses

Approximately 62% of the site is undisturbed and currently has no special purpose. Unauthorised recreational 4WD vehicles have caused the majority of the disturbance to the remainder of this site, and it appears to still be frequently utilised, despite recent access restrictions throughout the Alkimos area.

3 CAMP MANAGEMENT MEASURES

The following approved measures extracted from the CAMP (RPS, 2013) have been used to guide the revegetation strategy for each of the areas as detailed in the next section.

3.1 Carnaby's Black-Cockatoo Species to be Used

A range of indigenous plant species will be used in this revegetation program for the CAMP study area. A range of overstorey and understorey species will be planted in order to provide diversity to the vegetation structure and fauna habitat.

The CAMP area currently has a limited range of Carnaby's Black-Cockatoo foraging habitat, and a core aim is to complement the existing tuart trees (*Eucalyptus gomphocephala*) in accordance with the EPBC Act referral and subsequent conditions. The key Carnaby's Black-Cockatoo foraging habitat species likely to be used in the revegetation program include:

- *Acacia saligna*;
- *Allocasuarina lehmanniana*; and
- *Eucalyptus gomphocephala.*

3.2 Revegetation Methodology

3.2.1 Site Protection – Prior to Revegetation

In order to avoid accidental clearing from construction activities and prevent unauthorised access, the identified Carnaby's Black-Cockatoo habitat in the revegetation area will be fenced. All construction activities will be restricted to the subdivision areas and will avoid the revegetation area.

Signage will be placed on the fences around the revegetation area to inform workers the area is prohibited for construction activities.

3.2.2 Revegetation Site Preparation

To maximise the potential for revegetation success, the area(s) that are subject to revegetation will be prepared in the following manner:

- weed spraying commenced, rubbish and debris will be removed and disposed of appropriately if required; and
- brushing and / or mulching if required may be used to assist stabilising soil in erosion prone locations as required.

3.2.3 Revegetation Method

Planting and seeding are the key methods to be employed in the revegetation areas within the CAMP study area. Species selection is the key to reaching a successful outcome for the project. Species must be carefully selected based on the surrounding floristic community type(s), topography and hydrology to

ensure species are located in the areas in which they are most likely to survive in both short and long-term.

Species selected will take into account existing and identified use of the area. Revegetation species will be subdivided into four categories:

1. Beach grasses and herbaceous species adopted for the most exposed locations.
2. Semi-stable dune colonisers adapted to partially protected areas.
3. Plants of protected dunal situations.
4. Plants of protected well stabilised and vegetated areas.

Tuart trees, the identified Carnaby's Black-Cockatoo habitat species to be retained in the conservation POS, are located in Category 3 and 4 areas.

3.2.4 Scheduling

Tube stock used in the revegetation program will be sourced from local accredited nurseries.

Planting will be carried out in winter; around June–July when the soil moisture content is high enough for optimum seedling growth without irrigation and after the existing weeds have germinated and have been sprayed. Each tube stock will be planted with a plastic guard to prevent rabbits feeding on plant stock and to protect from strong winds. Tube stock will mostly be planted at a density of 2 plants / m^2 (as a minimum, species dependent) for rehabilitation.

Rabbit guards will be used (if required) for tube stock in the revegetation areas.

3.2.5 Watering

Some tube stock will be planted with tablets / water crystals during planting to help improve survival rates. The plant species to be used in the revegetation of the CAMP study area will be drought tolerant and therefore it is not anticipated these natives will required irrigation or extensive hand watering.

4 REVEGETATION STRATEGY

The key management measures in accordance with the Commonwealth EPBC Act approval conditions are shown in Table 1 below:

Table 1 Key Measures and General Management Strategies

Measure	Management Strategy
1. The retention of 0.14 ha of Carnaby's Black-Cockatoo vegetation (tuart trees) in the conservation POS (subject to this CAMP) and the foreshore reserve (subject to the FMP).	The 0.14 ha of retained CBC vegetation as referenced in item 1 above is delineated in Appendix 4. Weed control will be undertaken within these areas.
2. Supplementary planting (revegetation) and weed control (to at least 2 ha) of Carnaby's Black-Cockatoo habitat. This includes time frames and survival targets for the plantings.	Planting and weed control will be undertaken in over 2.071 ha within the conservation POS in various locations as detailed within this section.
3. Details of supplementary planting equivalent to at least 1 ha of Carnaby's Black-Cockatoo foraging habitat (spread across POS and ROS).	Planting and weed control will be undertaken over 1.96 ha within the ROS as there is insufficient additional area within the conservation POS to undertaken these activities. The works in the ROS are the subject of a separate Foreshore Management Plan Revegetation Plan (Tranen, 2015) and are therefore not detailed further within this revegetation plan.

Around 63% of the CAMP study area is classified as being in very good to excellent condition, 12% in degraded to good condition, and 25% is in completely degraded condition. Degradation has been caused by frequent intensive off-road vehicle activity, exacerbated by the strong prevailing winds. The focus of the revegetation efforts is protection of the existing vegetation by closing former vehicle tracks, stabilisation of blowouts, and creation / protection of CBC foraging habitat.

The conservation POS is to be broken up into separate parcels each with its own management strategy as delineated in Appendix 4. Table 2 details the treatment methods and area sizes for each of the zones delineated in Appendix 4.

Table 2 Revegetation Zones and CBC Foraging Area Calculations

Zone Name	Area (m^2)	CBC Revegetation Area (m^2)
West CBC Retained	1,538	1,538
Western Conservation POS (Guarded)	4,225	4,225
Western Conservation POS (Fenced)	4,637	4,637
Eastern Conservation POS (Guarded)	1,883	1,883
Eastern Conservation POS (Fenced)	9,961	9,961
Total	**22,244**	**22,244**

Descriptions of the revegetation zones and their proposed treatment strategies are provided in the remainder of this section. The specific techniques and methodologies that will be employed to satisfy the objectives are detailed further in later sections.

In addition to the conservation objectives, access paths will be created within both zones for public access. In the western zone the track will be constructed to facilitate vehicle movements. In the east the track will be for pedestrian access only, and will lead up to a lookout on the westernmost peak that has sweeping views of the ocean and foreshore ROS. Track locations have been indicatively marked on the revegetation plan in Appendix 4 and have been located to make best use of existing vehicle tracks and the topography.

4.1 West CBC Retained

Figure 1 West CBC Retained

The West CBC Retained areas comprise five small pockets of Tuart (*Eucalyptus gomphocephala*) trees totalling 1,538 m^2. The trees are well established and some are quite tall as they are located in a valley that is sheltered from the prevailing winds. Beneath and around the trees the understorey is partially degraded with high levels of opportunistic weed species amongst native shrub and understorey species.

The only activity proposed with the retained areas is the control of the opportunistic weed species. Removing these weed species will reduce competition with the native species and encourage their natural re-establishment, providing long term protection for the established trees.

4.2 Western Conservation POS

Figure 2 Western Conservation POS

Table 3 Western Conservation POS Condition and Areas

Condition	Total Area (m^2)
Completely Degraded	8,862
Good to Excellent	12,934
Total	**21,796**

The Western Conservation POS covers 2.18 ha, and contains the five retained CBC habitat areas (although two do extend into the adjoining foreshore ROS). Approximately 59% is in good to excellent condition, and the remaining 41% is completely degraded. A dune peak in the west (left side in Figure 2 has three off-road vehicle tracks leading up to it, and a small blowout has formed on the top. The eastern side is in a sheltered valley and although disturbed by vehicles has not been as impacted by natural processes. Weed incursion is evident within the first 5 – 10 m along the tracks disturbed by vehicles but is limited beyond that.

The primary focus in this area will be the closure of the vehicle access tracks and stabilisation of the disturbed areas. This will be required to facilitate successful rehabilitation of CBC habitat. Sand re-nourishment will be required in areas to recreate a natural profile, as vehicles and erosion have created deep scour areas along the tracks and in the small blowout at the top.

Following the earthworks, brush will be spread over the steeper sections of the tracks, and mulch spread to a depth of 50 mm to stabilise over the balance of the sand to prevent the loss of further soil from wind erosion. All vehicle tracks will then be blocked at both ends using large boulders or logs to prevent further vehicle access. The timing for installation of the permanent vehicle access track is unknown at this stage and may not be constructed for some time. This section of the track will be left open so if there is any vehicle access required there is at least one track providing thoroughfare, which will prevent new accesses from being created.

Once stabilised, the degraded parts of the site will be revegetated to re-establish CBC habitat. Completely degraded areas will be planted at a density of 2 plants / m^2 as per the requirements of the CAMP Management Plan. This will include both CBC foraging and habitat species as well as other non-CBC species found within the same communities. CBC species will be planted at a density of 1 plant / 10 m^2 using primarily *Allocasuarina lehmanniana*, and *Acacia saligna*. *Eucalyptus gomphocephala* will be planted in lesser numbers, concentrated mostly in the valleys and adjacent to the retained trees of the same species. Weed control will be undertaken each spring and autumn to reduce competition and optimise seedling establishment rates.

Where practical, rabbit exclusion fencing will be used to isolate and protect large areas of seedling planting. Where it is not practical or economic to do so, tree guards will be used to provide protection to seedlings from rabbit herbivory.

4.3 Eastern Conservation POS

Figure 3 Eastern Conservation POS Tracks

Figure 4 Eastern Conservation POS Blowout

Table 4 Eastern Conservation POS Condition and Areas

Condition	Total Area (m^2)
Completely Degraded	11,844
Good to Excellent	28,751
Total	**40,595**

The Eastern Conservation POS covers 4.06 ha. Approximately 71% is in good to excellent condition, and the remaining 29% is completely degraded. The best condition parts of the site are found in the north-east where two dune peaks are located. Most of the degradation occurs in the south-west part of the site in which a large blowout has formed on the lee side of a dune ridge (eastern side of the POS), extending into a valley in the middle, before rising to another dune ridge on the north / western boundary. Several other vehicle tracks are present in the middle of the zone.

The primary focus in this area will again be the closure of the vehicle access tracks, and stabilisation of the large blowout and other disturbed areas. This will be required to facilitate successful rehabilitation of CBC habitat. Sand re-nourishment will be required in some areas to recreate a natural profile that blends with the surroundings, and blocks the wind funnels that have formed on some tracks leading to the blowout formation.

Following the earthworks, brush will be spread over the steeper sections of the tracks, and mulch spread to a depth of 50 mm to stabilise over the balance of the sand to prevent the loss of further soil from wind erosion. All vehicle tracks will then be blocked

at both ends using large boulders or logs to prevent further vehicle access. The pedestrian access path location has been indicatively marked on the revegetation plan. The exact location of the path and the construction schedule will be determined a later date. The indicative footprint will be stabilised and revegetated until such time as the alignment is decided.

Once stabilised, the degraded parts of the site will be revegetated to re-establish CBC habitat. Completely degraded areas will be planted at a density of 2 plants / m^2 as per the requirements of the CAMP Management Plan. This will include both CBC foraging and habitat species as well as other non-CBC species found within the same communities. CBC species will be included at a density of 1 plant / 10 m^2 using primarily *Allocasuarina lehmanniana*, and *Acacia saligna*. *Eucalyptus gomphocephala* will be planted in lesser numbers, concentrated mostly in the valleys. Weed control will be undertaken each spring and autumn to reduce competition and optimise seedling establishment rates.

5 IMPLEMENTATION METHODOLOGY

5.1 Scheduling

The revegetation works will require several years to establish, and planting is scheduled to commence in winter 2015. Civil works (e.g. access tracks and lookout formalisation) are not currently scheduled and will occur independently of the revegetation efforts. Preparatory works will commence in early 2015 in advance of revegetation, including pre-emptive weed and rabbit control, ripping, and track closures. Seed collections have already been undertaken from within the project area and an extensive seed bank is available for use.

As per the approved CAMP, once initial revegetation activities are complete the site will then be monitored and maintained for a further five years to ensure that the revegetation objectives are achieved in the longer term.

5.2 Weed Management

Weed management is an important component for the establishment of native vegetation. Weed control will be achieved primarily through herbicide application. Herbicides will be selected for the target species, taking into account the surrounding environment and the constraints this may present. Amongst remnant native vegetation, selective herbicides (i.e. grass or broadleaf-specific) will be favoured over general knockdown herbicides, to keep off-target damage to a minimum.

To ensure that off-target damage is minimised, herbicide spraying operators will only be engaged if they:

- are appropriately qualified and licensed in herbicide application;
- have demonstrated experience in the ability to identify, and distinguish between, native and weed species; and
- are familiar with the most appropriate control measures, timing, herbicides, and application rates for the target species.

5.3 Re-profiling and Surface Stabilisation

Re-profiling will occur in all areas where scour from vehicle activity and wind funnelling has contributed to a drastic alteration in the soil profiles (see Figure 5). Sand will be moved from the blowout to fill in the deep scours, to return the landscape to a more natural looking profile that will be stable in the long term, and to encourage surrounding vegetation to naturally expand their root structures into the replenished soil profile.

Figure 5 Scour on Vehicle Track in the Eastern Conservation POS

Surface stabilisation is required in all disturbed sections of the main blowout and on all the completely degraded vehicle access tracks within the zone following re-profiling. This will be achieved through the use of a composted coarse mulch spread to a depth of 75 mm. Once mulching activities are complete the former tracks will be blocked off to prevent further vehicle activity and consequent degradation.

5.4 Surface Preparation

Compacted vehicle tracks will be ripped to a depth of 40 cm to loosen the soil. This will optimise moisture infiltration rates, and allow for faster and easier root development of planted seedlings.

5.5 Species Selection and Plant Allocations

All species have been selected based on observations made during Tranen site assessments and seed collection activities throughout the Alkimos Beach development and the greater Alkimos area. Appendix 5 contains the detailed breakdown of species and plant numbers allocated to each area. Numbers are indicative only, as supply may not be possible at the time of order or delivery. Should desired quantities of species not be available, substitutions may occur within the included species lists. Should species not included in the list be available as suitable substitutes, these will be proposed for approval to the relevant authorities prior to inclusion.

5.6 Alkimos Beach Local Provenance Seed Bank

A seed bank has been established for Alkimos Beach, and there are significant quantities of local provenance seed available of a wide range of species for use in the revegetation program. Where possible seedlings will be propagated from the seed bank. Where seed is not available of desired species, seed and seedlings will be sourced from the nearest available provenance. Some species are grown from cuttings and where possible these will also be sourced from on site.

5.7 Seedling Propagation

Due to the site conditions, the recommended pot for all seedlings is a 50 mm x 50 mm x 125 mm forestry tube with root trainers. These pots produce seedlings of good root ball size and transfer well from pot to final environment, maximising survival rates. Should plants of this size not be available for any reason at the time of planting, the next closest available tubestock size will be used.

Plant orders will be ideally placed in winter the year before planting to ensure sufficient seedlings are available (subject to seed availability and species propagation timing). Seedlings will be grown by nurseries that are accredited by the Nursery Industry Accreditation Scheme of Australia (NIASA) which will guarantee the quality of supplied material.

Seedlings will be supplied true to industry standards:

- Soil in containers at the time of delivery will be free of weeds, insects and disease (e.g. dieback);
- All plants will be true to species name, well-formed and hardened off nursery stock;
- The root system will be fibrous and firmly established but not root bound and with no large roots growing out of the container; and
- Leaves to be of normal size, colour and texture for the specified species.

5.8 Seedling Planting

Seedlings will be directly planted using planting tubes, which negates the need for repeated bending for excavation of planting holes. Seedlings will be watered before delivery to site on the day of planting to reduce the potential for transplant shock, and provided the soil is moist no other watering is considered necessary.

A 10 g native fertiliser tablet (low in P) will be buried adjacent to each seedling (except in the base of the swale) to promote faster root and foliage development in the stages following initial transplant. Tranen research has shown this to have a significant impact on plant development and survival rates.

5.9 Seed Treatment and Direct Seeding

All seed to be utilised will be pre-treated prior to seeding to break dormancy factors. This will include aerosol smoke treatment, mechanical scarification, or hot water treatment as appropriate to individual species. Seed will then be combined with a bulking agent to facilitate even distribution across the site. Clean yellow sand provides

good mixing and distribution properties for this purpose. Hand broadcasting will be the application technique as this will permit even dispersal of all seed sizes, which can be an issue with some types of mechanical spreaders.

5.10 Site and Plant Protection

Due to extensive off-road vehicle activity the revegetation areas will be fenced off to restrict access to vehicles. A proportion of the revegetation works will be undertaken on current vehicle access tracks. These tracks are to be blocked at both ends to prevent future vehicle access in these areas. They will be blocked by pushing up soil and placing large objects such as limestone boulders or large logs in front of the mounds. Some tracks will be left open to allow vehicles access through the area, to discourage vehicles from creating new accesses.

Another potential factor affecting the outcomes is rabbit herbivory. To mitigate the potential impacts a combination of rabbit exclusion fencing, tree guards, and targeted rabbit control will be employed. Larger completely degraded areas without existing vegetation that could potentially hide burrows will be protected by the exclusion fencing (see Appendix 4). All seedlings located outside of these areas will be protected with tree guards. The guards will be rigid corflute held in place with hardwood stakes. Once the plants are large enough to survive without the guards they will be removed.

A rabbit control program will also be initiated in advance of site works to provide longer term protection to seedlings. This will include a combination of warren destruction, rabbit haemorrhagic disease virus (RHDV) release, and Pindone baiting. Baiting and virus release will only be undertaken during certain times of year relating to weather and animal growth stages where these treatments are effective. Warren destruction will be employed between these periods.

The CAMP states that “In order to avoid accidental clearing from construction activities and prevent unauthorised access, the identified Carnaby’s Black-Cockatoo habitat in the revegetation area will be fenced. All construction activities will be restricted to the subdivision areas and will avoid the revegetation area.” The habitat areas within the conservation POS are currently some distance away from civil construction areas, and as the greater site will be fenced off and tracks physically blocked off, those areas will not be accessible to construction equipment. In time a permanent conservation fence will be installed around the area and this will provide longer term separation from residential and construction areas. Indicative future development plans show the conservation POS expanding further to the north, but this planning has not yet reached the detailed design stage. It is recommended that once this boundary has been formally defined, that the extended conservation POS permanent conservation fence be installed.

6 POST-INSTALLATION MANAGEMENT

To ensure longer-term project success, the site will be monitored and maintained for three years following initial seedling installation, to ensure the completion targets are met and will continue to be met in the future. At the end of the maintenance period, assuming all targets have been achieved, the site will be handed to the City of Wanneroo for ongoing management.

6.1 Completion Criteria and Success Targets

The key actions / target completion criteria to monitor the success of the revegetation efforts are specified in Table 5 . As committed to the CAMP revegetation efforts will be undertaken and monitored for a period of three years from the commencement of the revegetation plantings. If the completion criteria are not met, further action will be undertaken to improve the condition to the required standards.

Table 5 Revegetation and Weed Management Key Actions (RPS, 2013)

Year After Planting	Year 1	Year 2	Responsibility for Five Years Post-Commencement of Works
Survival of planted seedlings	90%	70%	Lend Lease
Minimum plant diversity (% of original number of planted species in project area that have survived)	70%	70%	Lend Lease
Plant coverage (% area of visual ground cover measured by a botanist/ revegetation consultant)	25%	50%	Lend Lease
Weeds coverage	10% cover	10% cover	Lend Lease

6.2 Vegetation Monitoring and Performance Criteria

At the end of the installation, a report will be provided detailing the actual quantities of seedlings installed and seed broadcast, and any variations from the original revegetation plan. This will be used as baseline data for comparison in future monitoring assessments.

The revegetation areas will be formally monitored biannually (includes weed monitoring) each spring and autumn, for a three-year period after installation. A monitoring report will be submitted to Lend Lease following each formal monitoring event, to assess if there are any issues requiring attention.

The season has been nominated rather than a specific month, as the timing of these assessments should be related to plant growth cycles, which in turn is influenced by the weather conditions at the time.

One monitoring plot of 5 m × 5 m will be established per revegetation area as well as one permanent photograph reference point at each monitoring plot. Photographic

records will be captured prior to construction and annually to qualitatively assess density, diversity and weed cover.

The first assessment in spring will assess the developing threats, the stabilisation of each area and the short-term survival of the seedlings and weed cover. Any problems will be identified early so that comprehensive treatment(s) of the issue can be undertaken and additional seedlings propagated if required.

The second assessment in the following autumn will determine if there are any losses over the dry summer period, and this will form the basis for the maintenance winter program. The first summer is the expected period of greatest mortality, and plants that survive this period are generally hardy and more likely to survive in the longer term. The emergence of summer weeds will also be assessed, so that control can be scheduled as required.

After the third and subsequent assessments the long term success of the revegetation operation will be indicated, and this will determine whether any further remedial works are required. This may include:

- Additional revegetation works;
- Weed management;
- Other general maintenance activities; and
- Additional monitoring requirements.

Informal assessments will also be undertaken between formal assessments. The purpose of these assessments is to visually monitor progress, and to identify and counter emerging issues before they have a chance to become significant. Timing of the assessments will be adjusted to the appropriate stages of plant growth, which are influenced by annual weather conditions. The results of each monitoring assessment will be compared to determine germination and establishment rates, and provide a quantitative measure of progress.

6.3 Site Maintenance

If planting success falls below 70% of original numbers in two consecutive monitoring events, contingency measures will be implemented to increase the success of the revegetation program. The monitoring program will identify issues to any plant success rates so they can be dealt with in an appropriate and timely manner.

Maintenance activities may include:

- re-brushing;
- ongoing weed management;
- re-planting in areas;
- tree guard repair / replacement; and / or
- undertake fence, sign and pathway maintenance as required.

All the contingency measures listed in Table 6 below will be reviewed if the target completion criteria fall below 70% in two consecutive events.

Table 6 Revegetation and Weed Management Contingency Measures (RPS, 2013)

Item	Issue	Contingency Action	Responsibility for Five Years Post-commencement of Works
Plants	Plant death. Storm/wind damage Vandalism	Plant additional tube stock in subsequent plantings.	Lend Lease
Weeds	Excessive weeds in revegetation areas.	Undertake weed control measures e.g. weed spraying.	Lend Lease
Erosion	Erosion Storm damage	Apply brushing, hydromulch (with no seed) and/or matting over the surface of any eroded areas.	Lend Lease
Revegetation Success	Plant survival does not meet completion criteria	Replant seedlings and care for them for an additional two years. Replace plant guards.	Lend Lease

7 REFERENCES

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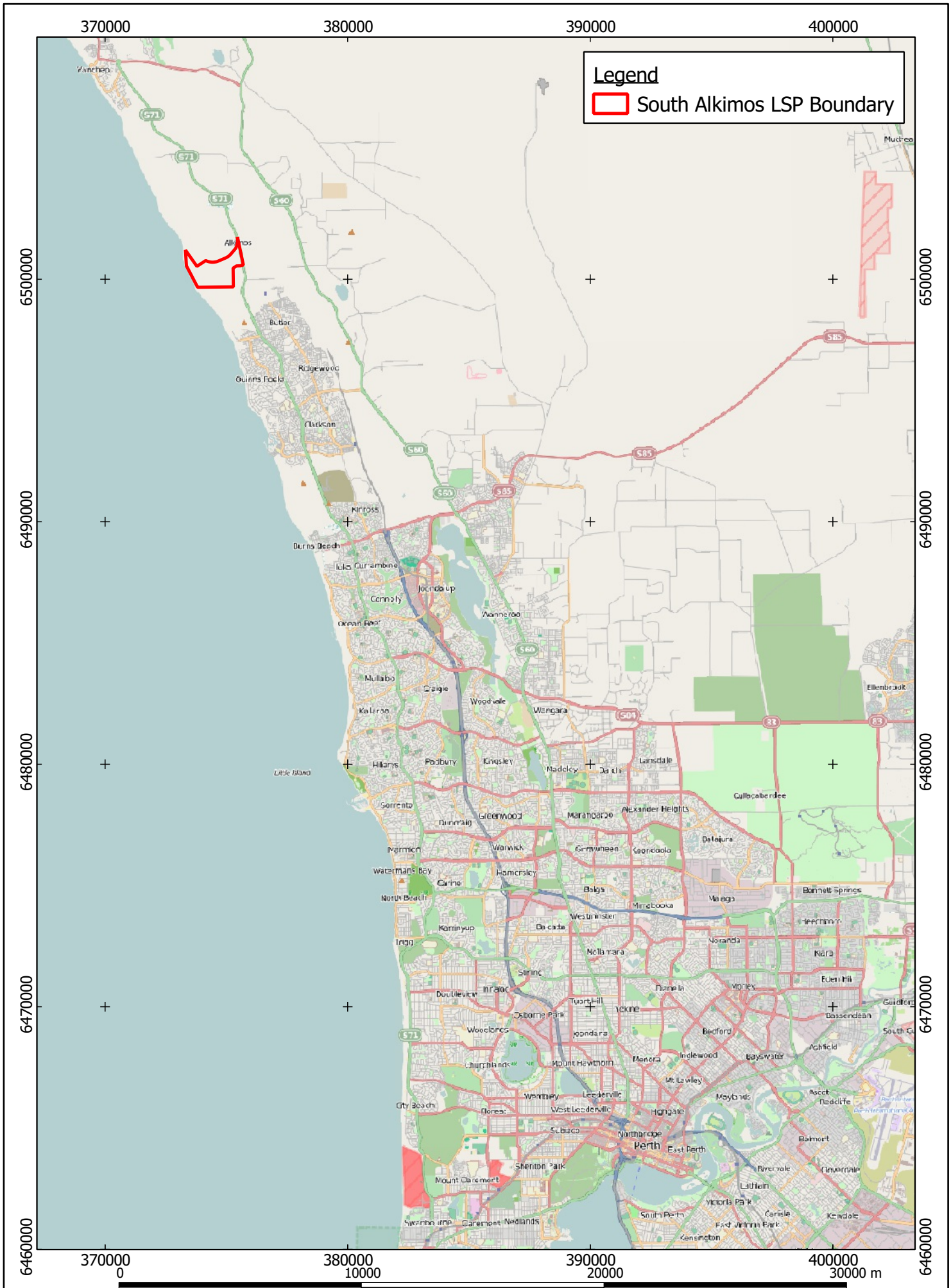
Tranen, 2014. Alkimos Beach Foreshore Management Plan (FMP) Revegetation Plan. Prepared for Lend Lease Communities by Tranen. Report No: P521E-01-Rev1. December 2014.

Tranen, 2015. Alkimos Beach Foreshore Management Plan (FMP) Revegetation Plan. Prepared for Lend Lease Communities by Tranen. Report No: P521E-01-Rev2. February 2015.

Appendix 1 Site Location



tranen revegetation systems

Project: South Alkimos
Project Number: P521
Client: Lend Lease

Drawing: Site Location Map
Drawing Number: P521-02
Revision: 0

Date: 21/8/12
Drawn By: DG

N

Appendix 2 Local Structure Plan

Legend

Structure Plan Area

Reserves
- Public Use - (PS) Primary School
- Regional Parks & Recreation (Foreshore Reserve)
- Conservation POS
- Active POS

Zones
- Residential
- Commercial
- Mixed Use
- Private Clubs/Recreation

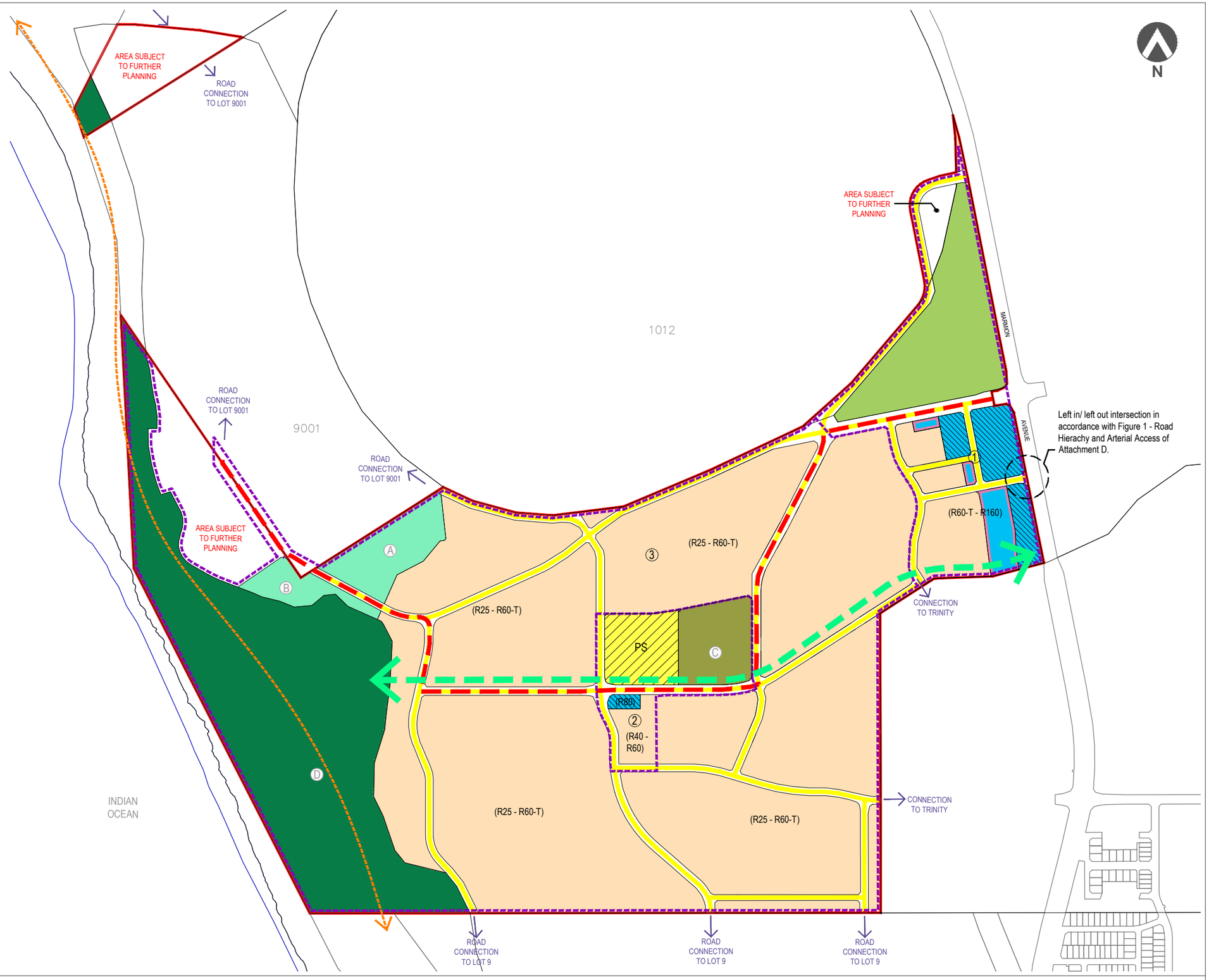
Other
- Indicative STS Route
- Neighbourhood Connector
- Precinct Boundary
- Social / Pedestrian / Cycle Linkage
- Indicative Foreshore Pedestrian and Cycle Link (as per Alkimos-Eglinton District Structure Plan)

Precincts
- (1) Gateway
- (2) Central Village
- (3) Residential
- (A) Strategic Public Open Space - Refer to Table 3 of Part 1 - Statutory Section

NOTES:

1. Areas identified as being of National Environmental Significance under the Environmental Protection and Biodiversity Conservation Act 1999 may be subject to assessment by the Federal Department of Sustainability, Environment, Water, Population and Communities, in accordance with this Act. The outcome of any such assessment may require either a modification to the LSP or minor variations from the LSP at the subdivision and/or development stage.

2. The clearing of habitat such as Lomandra hermaphrodita and Maritima that includes the taking of individual Graceful Sun Moths requires the permission of the Minister for Environment, or their delegate, pursuant to the Wildlife Conservation Act 1950. Evidence is to be provided to the WAPC at the time of subdivision that the licence (if required) has been issued by the Department of Environment and Conservation.



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SIZE A3

1:10,000 (0 metres 100 200 300 400 500)

LOCAL STRUCTURE PLAN No.72 (AMENDMENT No.04)

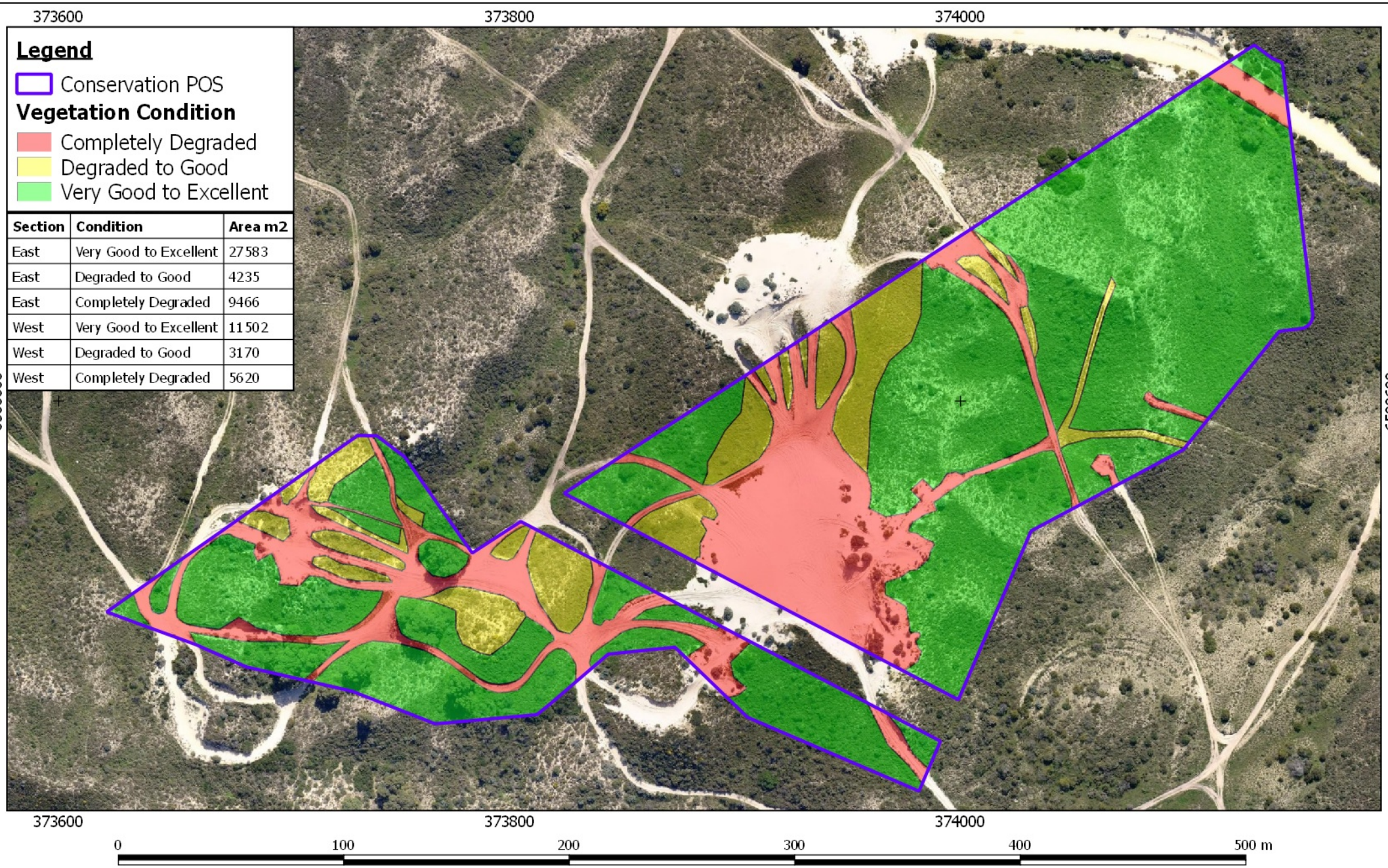
Alkimos Beach, South Alkimos

City of Wanneroo

REF NO.	DRAW NO.	REV.
DLL ALK	**RD1 008**	**M**

DISCLAIMER: ISSUED FOR DESIGN INTENT ONLY. ALL AREAS AND DIMENSIONS ARE SUBJECT TO DETAIL DESIGN AND SURVEY

Appendix 3 Vegetation Condition



Section	Condition	Area m2
East	Very Good to Excellent	27583
East	Degraded to Good	4235
East	Completely Degraded	9466
West	Very Good to Excellent	11502
West	Degraded to Good	3170
West	Completely Degraded	5620

tranen revegetation systems

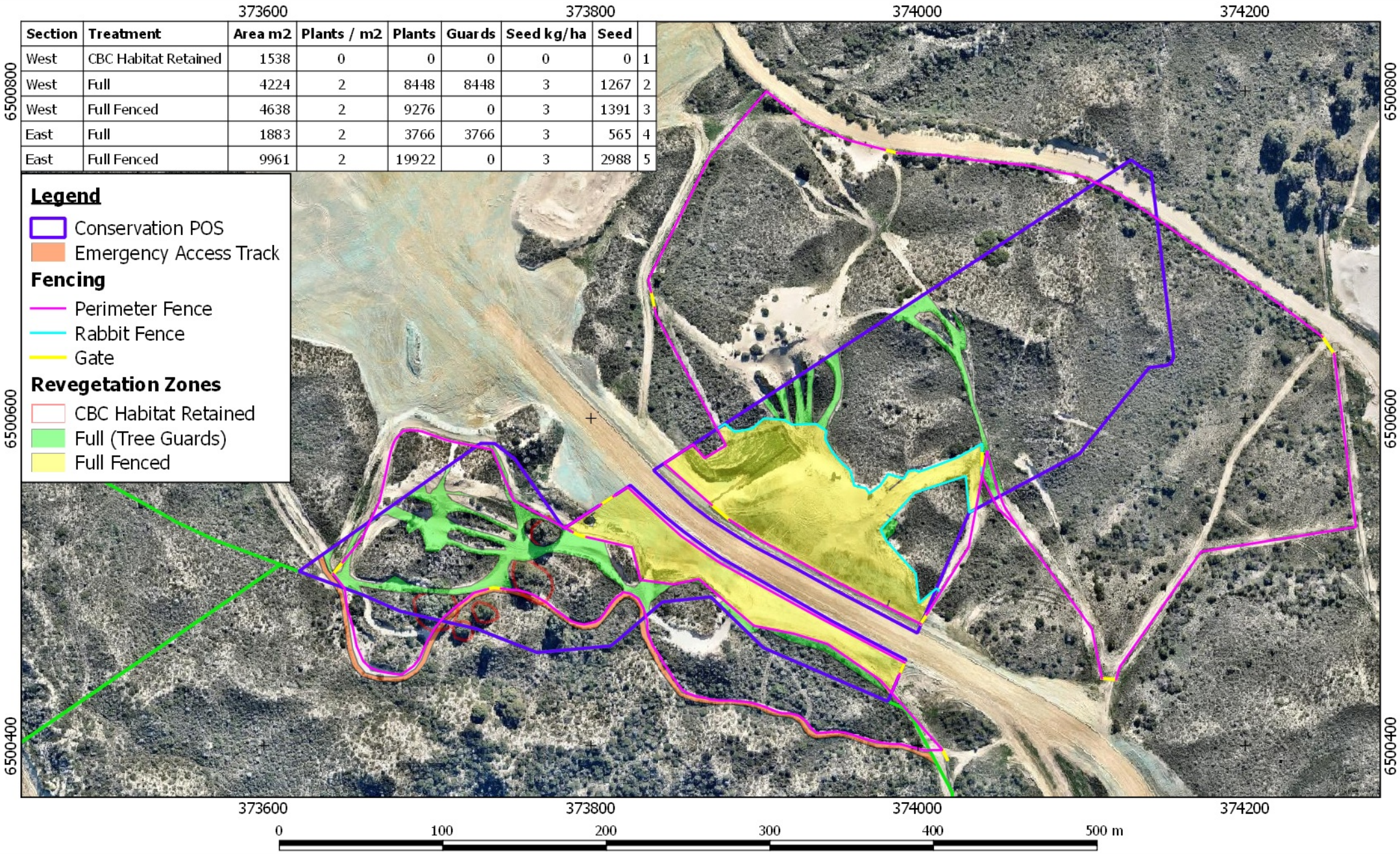
Project: Alkimos Beach
Project Number: P521E
Client: Lend Lease

Drawing: Conservation Area Vegetation Condition
Drawing Number: P521E-03
Revision: 1

Date: 18/12/14
Drawn By: DG

Appendix 4 Rehabilitation Zones

Section	Treatment	Area m2	Plants / m2	Plants	Guards	Seed kg/ha	Seed	
West	CBC Habitat Retained	1538	0	0	0	0	0	1
West	Full	4224	2	8448	8448	3	1267	2
West	Full Fenced	4638	2	9276	0	3	1391	3
East	Full	1883	2	3766	3766	3	565	4
East	Full Fenced	9961	2	19922	0	3	2988	5



tranen revegetation systems

Project: Alkimos Beach
Project Number: P521E
Client: Lend Lease

Drawing: Conservation Area Revegetation Zones
Drawing Number: P521E-04
Revision: 2

Date: 01/09/15
Drawn By: DG

N

Appendix 5 Species List and Allocations

tranen revegetation systems

Alkimos Beach CAMP
Seed and Tubestock Allocations

Location Name			Western Conservation		Western Conservation		Eastern Conservation		Eastern Conservation		Overall Total	
Area (m2)			4,225		4,637		1,883		9,961		20,706	
Treatment			Seedlings	Seed (kg)	Seedlings	Seed (kg)	Seedlings	Seed (kg)	Seedlings	Seed (kg)	Seedlings	Seed (kg)
Density (plants/m2 or kg/ha)			2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0		
Total			8,450	1.268	9,274	1.391	3,766	0.565	19,922	2.988	41,412	6.212
Species		Seed Bank Stock On Hand (kg)**										
Acacia cyclops	Large shrub	1.249	341	0.038	375	0.042	156	0.017	826	0.091	**1,698**	**0.188**
Acacia lasiocarpa	Shrub	1.611	532	0.072	583	0.078	237	0.032	1,255	0.170	**2,607**	**0.352**
*Acacia saligna**	Large shrub	3.242	460	0.055	505	0.060	192	0.025	1,014	0.130	**2,171**	**0.270**
Acacia truncata	Shrub	0.419	381	0.072	418	0.078	170	0.032	899	0.170	**1,868**	**0.352**
Acanthocarpus preissii	Shrub	0.958	0	0.072	0	0.078	0	0.032	0	0.168	**0**	**0.350**
*Allocasuarina lehmanniana**	Large shrub	0.289	0	0.038	0	0.042	0	0.019	0	0.101	**0**	**0.200**
Atriplex isatidea	Shrub	0.520	39	0.045	42	0.049	17	0.020	92	0.106	**190**	**0.220**
Calothamnus quadrifidus	Shrub	0.246	0	0.052	0	0.058	0	0.022	0	0.114	**0**	**0.246**
Carpobrotus virescens	Groundcover	0.622	615	0.092	675	0.100	274	0.040	1,451	0.209	**3,015**	**0.441**
Conostylis candicans	Groundcover	0.000	470	0.000	515	0.000	209	0.000	1,107	0.000	**2,301**	**0.000**
Eremophila glabra	Groundcover	0.124	91	0.035	100	0.039	41	0.008	215	0.042	**447**	**0.124**
*Eucalyptus gomphocephala**	Tree	1.315	57	0.000	63	0.000	19	0.000	101	0.000	**240**	**0.000**
Ficinia nodosa	Groundcover	0.644	646	0.088	709	0.097	288	0.040	1,525	0.209	**3,168**	**0.434**
Gompholobium tomentosum	Shrub	0.159	0	0.040	0	0.044	0	0.012	0	0.063	**0**	**0.159**
Hardenbergia comptoniana	Groundcover	2.512	625	0.111	685	0.121	279	0.055	1,473	0.290	**3,062**	**0.577**
Hemiandra pungens	Groundcover	0.077	574	0.007	631	0.008	256	0.010	1,356	0.052	**2,817**	**0.077**
Kennedia prostrata	Groundcover	0.000	555	0.000	609	0.000	248	0.000	1,309	0.000	**2,721**	**0.000**
Leucophyta brownii	Groundcover	0.497	302	0.088	332	0.097	135	0.040	713	0.209	**1,482**	**0.434**
Melaleuca cardiophylla	Large shrub	0.205	62	0.038	69	0.042	29	0.020	151	0.105	**311**	**0.205**
Melaleuca huegelii	Large shrub	1.562	353	0.054	388	0.059	161	0.024	849	0.126	**1,751**	**0.263**
Melaleuca systena	Shrub	0.263	634	0.040	696	0.044	283	0.018	1,495	0.094	**3,108**	**0.196**
Olearia axillaris	Shrub	0.000	309	0.000	339	0.000	138	0.000	728	0.000	**1,514**	**0.000**
Phyllanthus calycinus	Shrub	0.461	48	0.048	53	0.052	21	0.021	114	0.109	**236**	**0.230**
Rhagodia baccata	Shrub	1.149	563	0.072	618	0.078	251	0.032	1,328	0.168	**2,760**	**0.350**
Scaevola crassifolia	Shrub	0.603	82	0.072	90	0.078	36	0.032	193	0.168	**401**	**0.350**
Spyridium globulosum	Large shrub	0.194	546	0.041	600	0.045	249	0.017	1,320	0.091	**2,715**	**0.194**
Threlkeldia diffusa	Groundcover	0.000	164	0.000	180	0.000	77	0.000	410	0.000	**831**	**0.000**
TOTAL		**18.921**	**8,449**	**1.268**	**9,275**	**1.391**	**3,766**	**0.565**	**19,924**	**2.988**	**41,414**	**6.212**

*CBC species

** Takes into account seed allocated to the FMP revegetation plan implementation

Appendix 6 Implementation Schedule

tranen
revegetation systems

Alkimos Beach CAMP
Implementation Schedule

Year	2015				2016				2017				2018			
Season	**Summer**	**Autumn**	**Winter**	**Spring**	**Summer**	**Autumn**	**Winter**	**Spring**	**Summer**	**Autumn**	**Winter**	**Spring**	**Summer**	**Autumn**	**Winter**	**Spring**
Activity																
Installation Program																
Seedling propagation																
Weed control																
Brush installation																
Ripping																
Tubestock planting																
Track closures																
Rabbit control																
Completion of installation program																
Maintenance																
Monitoring																
Weed control																
Seedling propagation																
Tubestock planting																
Rabbit control																
Completion of maintenance period																