Wildlife Hazard Assessment and Wildlife Management Plan

Patons Lane Resource Recovery Centre
123-179 Patons Lane, Orchard Hills
NSW 2748

Report prepared for SRC Operations Pty Ltd

6 April 2023

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Glossary

Acronym/ Term	Definition
AASF	Australasian Airport Safety Forum
AC	Advisory Circular
ATSB	Australian Transport Safety Bureau
BAM	Biodiversity Assessment Method (NSW)
BC Act	NSW Biodiversity Conservation Act 2016
CASA	Civil Aviation Safety Authority
CEEC	Critically Endangered Ecological Community
DCP	Development Control Plan
DIT	Department of Infrastructure and Transport
DPE	Department of Planning and Environment
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
EP&A Act	NSW Environmental Planning and Assessment Act 1979
FM Act	NSW Fisheries Management Act 1994
Footprint	The extent of direct vegetation clearing or soil disturbance required for the activity to take place. Includes all proposed roads, track, ballast, stockpiles, crossings, laydown areas, parking, site offices, stormwater infrastructure etc.
ha	Hectares
ICAO	International Civil Aviation Organisation
ISEPP	State Environmental Planning Policy (Infrastructure) 2007 (ISEPP).
Km	Kilometre
LGA	Local Government Area
Locality	The area within a 50km radius of the Study Area. The same meaning when describing a local population of a species or local occurrence of an ecological community.
m	Metres
mm	Millimetres
MOS	Manual of Standards
NASF	National Airports Safeguarding Framework
NPWS	NSW National Parks and Wildlife Service
NSW	The state of New South Wales, Australia
OEH	Office of Environment and Heritage (now the Department of Planning and Environment)
Proposal	The activity or action proposed.
SEPP	State Environmental Planning Policy
Study Area	123-179 Patons Lane, Orchard Hills, NSW 2748
Threatened species, populations and ecological communities	Species, populations and ecological communities specified in Schedules 1, 1A and 2 and *threatened species, population or ecological community* means a species, population or ecological community specified in any of those Schedules.
WHMP	Wildlife Hazard Assessment and Wildlife Management Plan (this document)
WSA	Western Sydney Airport

Executive Summary

Jackson Environment and Planning Pty on behalf of SRC Operations Pty Ltd engaged Land Eco to prepare this Wildlife Hazard Assessment and Wildlife Management Plan to help avoid and minimise exacerbating the attraction of birds and bats that may pose a hazard to the proposed aviation activities in and around the Nancy Bird Walton Airport in the Badgerys Creek Aerotropolis. We assessed the attractants that are currently present, and/or may arise because of the modification proposal at 123-179 Patons Lane, Orchard Hills NSW 2748 (the Subject Property) for the Patons Lane Resource Recovery Centre (the development).

The assessment has been informed by one of site visit on 23 March 2023. The study area included the Subject Property.

The assessment found that, the presence of several artificial dams/ponds throughout the Subject Property poses the most significant risk from bird and bat hazards, followed by exotic dominated grassland. However, the modification proposal does not involve any new waterbodies so the change in risk is relatively low. The Subject Property contains habitat values which attract birds and bats that may constitute a risk to the aviation activities however, this baseline risk is prevalent across the entire aerotropolis. The existing habitat in the Subject Land (development footprint) attracts a suite of birds, and this poses a risk to aviation regardless of whether the modification proposal proceeds or not. However, it is important to consider this risk relative to other habitat located outside of the subject property which is likely to attracts birds and bats into the aerotropolis.

The modification proposal has been designed to avoid creation of new habitat features that may attract birds and existing attractants will be monitored and managed to reduce the likelihood of birds and bats becoming attracted in a manner that would pose an unsatisfactory increased risk to aviation safety.

Suggested management options are proposed in this report to address bird and bat hazard during and post construction of the modification proposal as well as operation of the Resource Recovery Centre.

2. Introduction

2.1 Overview

Jackson Environment and Planning Pty Ltd on behalf of SRC Operations Pty Ltd engaged Land Eco Consulting (Land Eco) to prepare this Wildlife Hazard Assessment and Wildlife Management Plan (WHMP) to accompany the Modification Report for the Integrated Water and Leachate Plant modifications (the proposal).

This WHMP will help SRC Operations Pty Ltd avoid and minimise exacerbating the attraction of birds and bats that may pose a hazard to the proposed aviation activities in and around the Nancy Bird Walton Airport in the Badgerys Creek Aerotropolis.

We assessed the attractants that are currently present, and/or may arise because of the proposal considered for 123-179 Patons Lane, Orchard Hills, NSW 2748 (the Subject Property) for the development and provide recommendations to avoid and manage the baseline hazard, and more importantly, prevent inadvertently attracting more hazardous birds and/or bats into the Aerotropolis precinct.

2.2 Subject Property

The Subject Property is located at 123-179 Patons Lane, Orchard Hills, NSW 2748 (Lot 40/-/DP738126) (**Figure 1**), which is in the Penrith Local Government Area.

The site has been historically disturbed through clearing and past quarrying activities. It is the former location of Erskine Park Quarry for the extraction of clay and shale. The Subject Property is currently used as the Patons Lane Resource Recovery Centre (PLRRC). The PLRRC operates under a State Significant Development approval (MP09_0074) as a resource recovery centre and landfill for commercial and industrial (C&I) and construction and demolition (C&D) wastes (non-putrescible general solid waste). The approval was granted in August 2012 by the NSW Land and Environment Court. The current existing infrastructure includes weighbridges, site office, car parking areas, recycling facility, water management structures, dams for storage of leachate and collection/storage or stormwater and internal road network.

Most of the Subject Property is zoned 'RU2 – Rural Landscape' with a small portion mapped 'C2 - Environmental Conservation' in north-western corner of the property, covering the riparian zone surrounding Blaxland Creek (**Figure 2**). The creek itself traverses through the Subject Property at three separate points, including at the north-eastern boundary in the C2 zone, at the middle northern boundary and at the southern boundary of the Subject Property. Several small dams occur within the Subject Property which are used for the operational management of surface water.

The Subject Property is largely cleared with bare ground, exotic dominated grassland, and sporadic shrubs, particularly within the modification proposal footprint. Remnant patches of native vegetation including eucalypts occur along the relatively undisturbed boundaries of the Subject Property.

Several artificial dams/ponds occur on the Subject Property and the surrounding land as part of the existing approved development under consent MP09 – 0074. Maintenance islands with railings for potential perching birds occur within these dams.

Birds are the wildlife group that present the most significant hazard to aeronautical operations. The existing artificial dams and ponds are the most prominent wildlife attractant. While there are some existing flying-fox (bat) attractants in the landscape, these are limited to the remnant, native, flowering trees surrounding the facility outside of the development footprint. The modification proposal is proposing landscaping. The landscape plan will avoid introducing flowering trees that could attract foraging flying-foxes into the area.

2.3 Project Description

The Patons Lane Resource Recovery Centre (PLRRC) is a resource management facility located at123-179 Patons Lane, Orchard Hills (Lot 40, DP 738126) within the former Erskine Park Quarry owned by Bingo Patons Lane Pty Ltd (a wholly owned subsidiary of Bingo Industries).

The PLRRC operates under a State Significant Development approval (MP09_0074) as a resource recovery centre and land fill for commercial and industrial (C&I) and construction and demolition (C&D) wastes (non-putrescible general solid waste) as documented in the Further Modified Preferred Project Report (FMPPR) prepared by R.W. Corkery (September 2011).

Since the existing approval was granted for the Facility by the NSW Land and Environment Court, there has been changes to market conditions, Bingo's broader network operations and the NSW waste management regulatory framework. These changes have highlighted the need for Bingo to adjust site operations at the Facility. This Modification Proposal aims to improve the quality of recovered soils, sands and aggregates from processing of general solid waste (soils) and building and demolition waste, to protect human health and the environment. This plant and investment will help Bingo improve the quality of recovered soils, sands and aggregates, increase diversion rates and better deliver on the objectives of the NSW Government's Waste and Sustainable Materials Strategy 2041, Stage 1–2021-2027.

The Modification Proposal also seeks to upgrade the landfill leachate treatment system to achieve improved water quality outcomes related to the landfill. Provision of a leachate treatment plant would improve the reliability and efficacy of the leachate management system, bringing the site in line with modern best practice and improving environmental outcomes. The proposed elements of the integrated water treatment management system are shown in Figure1.3 and include an additional new raw leachate dam, new contact water dam, Leachate Treatment Plant (LTP), Recycling Water Treatment Plant (RWTP) infrastructure to support the resource recovery centre, and a future connection to sewer and potable water. The RWTP is proposed to be located north-east of the existing PLRRC buildings and within the confines of the earthen bunds of the PLRRC. Existing dual sand conveyors are considered part of the RWTP and will be regularised as part of this Modification Proposal. The proposed LTP is proposed to be located to the north-east of the proposed raw leachate.

The modification proposal will assist in removing silt loads within process water from the resource recovery centre, enabling reuse of this water in the system. This will improve the quality of recovered soils, sands and aggregates from processing of general solid waste (soils) and building and demolition waste, to protect human health and the environment. The modification proposal will also upgrade the landfill leachate treatment system to achieve improved water quality outcomes related to the landfill. Provision of a leachate treatment plant would improve the reliability and efficacy of the leachate management system, bringing the site in line with modern best practice and improving environmental outcomes.

The upgrade of water management infrastructure to support the Patons Lane Resource Recovery centre and ongoing landfill operations is not expected to result in changes to the approved types or volumes of waste accepted at the Facility under the existing Project Approval.

The modification proposal is in line with the strategic goals of the Greater Sydney Region Plan and will provide additional means for the recovery of soil, sand and aggregates for regional markets, diversion of waste from landfill and protection of water quality.

Figure 1. Aerial Map of the Subject Property (NSW DPIE 2023a)

2.4 Overview of the Bird and Bat Strike Issue in Australia

Birds and bats, especially those with large body sizes can cause significant damage to aircraft and have caused significant numbers of human casualties.

The worldwide annual cost of damage from bird strikes is in the order of US $1.2 billion annually (Allan 2002).

The probability of bird/bat strike differs at each airport. Habitat within and surrounding an airport usually determines the bird/bat strike risk. High fertility landscapes with habitat complexity and/or sites on known flyways are more likely to result in bird strikes then poor fertility or low habitat complexity areas.

The presence of wetlands on either side of a runway can attract waterbirds into the strike range of aircraft taking-off or alighting on the runway.

The strike-risk rating of a bird or bat species, depends on its size (length and weight), age, tendency to flock, flight time and elevation range, whether it is sedentary or migratory, whether it follows flight paths. Some bird/bat species are more able to avoid aircraft collision than others.

In Australia the two main wildlife attractant hazards are:

1. Waterbodies and wetlands which attract large flocks of nomadic birds such as waterfowl and shorebirds.

2. Man-made waste facilities that involve uncovered spoilable or putrescible organic waste. These facilities attract flocking species such as *Corvus spp.* (Ravens and Crows), *Milvus migrans* (Black Kite), *Threskiornis moluccus* (Australian White Ibis), *Pelecanus conspicillatus* (Australian Pelican) and *Chroicocephalus novaehollandiae* (Silver Gull). However, this is not relevant to the modification proposal as the existing development does not accept putrescible organic waste.

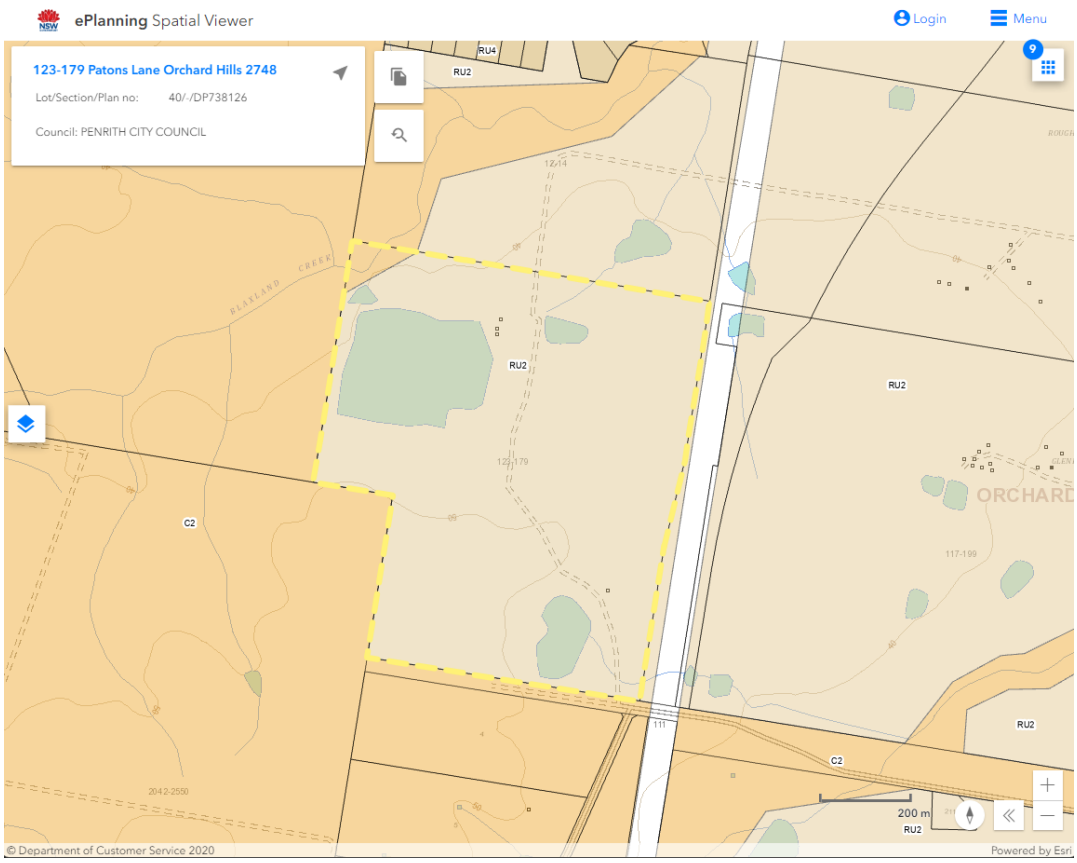

Figure 2. Zoning map of the Subject Property (Lot 40/-/DP738126; NSW DPE 2023a)

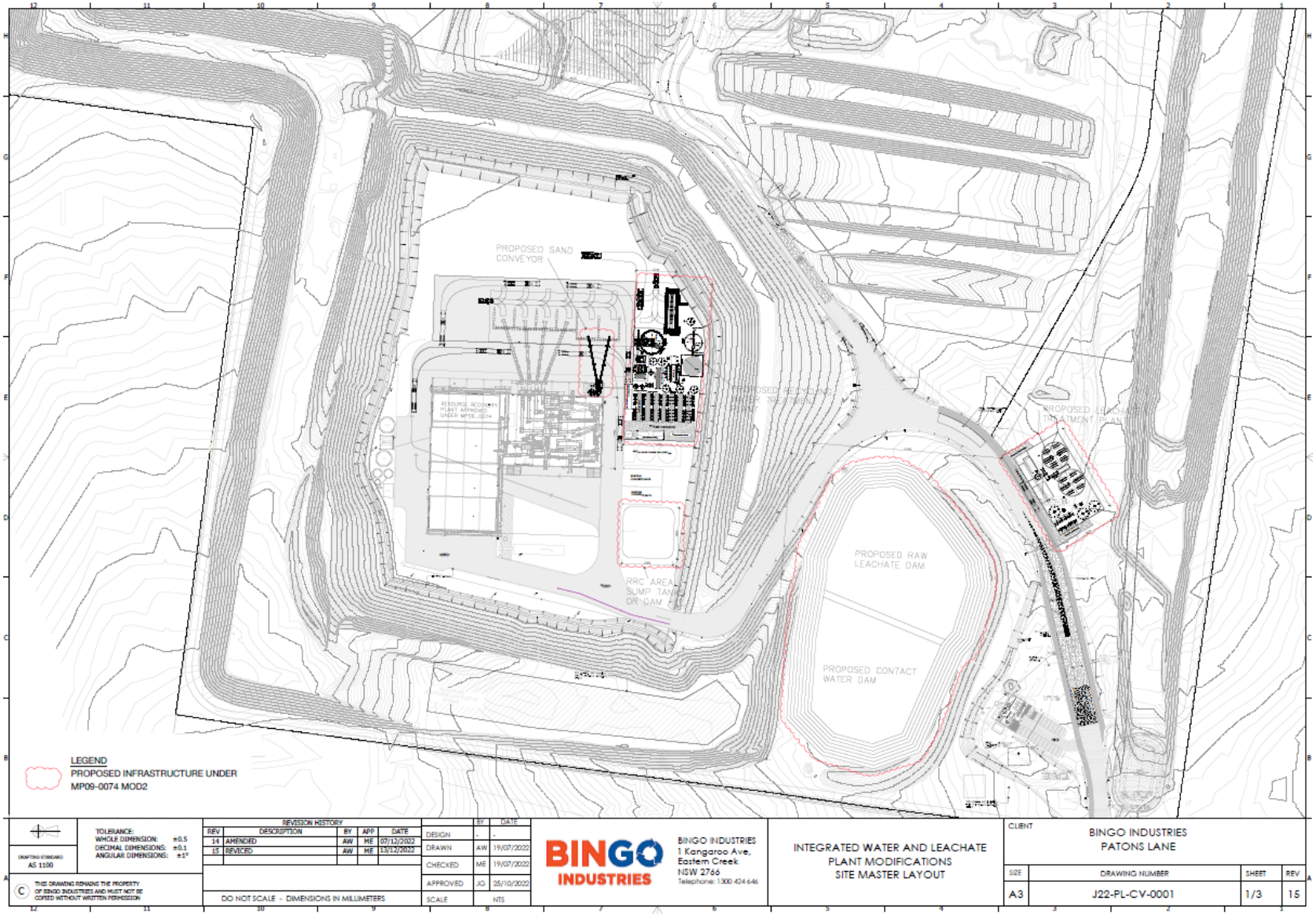

Figure 3. Modification proposal layout

2.5 Ecologist Site Visit

One day of site visit bird survey was carried out by Land Eco Ecologists including Kurtis Lindsay and Semonn Oleksyn.

The survey was carried out in the morning of the 23rd March 2023. The Ecologists walked along the edge, and top of the earth bund surrounding the proposed leachate/contact dam, and the water plant.

Birds were identified by aural or visual means before confirming identification with 10 x 42 Nikon Monarch binoculars.

This survey was carried-out to determine hazardous bird species presence, abundance, and the habitats they were attracted to. This allowed the gathering of information on the movement of bird populations in and around the study area.

2.6 Limitations of this study

This report is based upon the information that was available to Land Eco at the time of our assessment, and our knowledge of bird and bat strike issues derived from literature reviews.

The following limitations apply:

- Limited site visit (only one single day visit) has reduced the power of the dataset to detect diurnal, nocturnal, seasonal or weather related changes in bird and bat usage of the Subject Property.
- This assessment is focused on birds and bats species with body weights that exceed 80g, however, other animals were recorded and these animals may also pose hazards to the landholder and Aerotropolis in general.

3. Regulations, Standards and Guidelines

These international and Australian guidelines and documents provide background for assessments into bat and bird strike risk, along with impact mitigation advice:

- Civil Aviation Safety Authority Advisor Circular AC 139-26(0) (Civil Aviation Safety Authority 2011)
- Civil Aviation Safety Authority Manual of Standards Part 139 – Aerodromes (Civil Aviation Safety Authority 2014)
- Civil Aviation Safety Regulations 19998 (Commonwealth) Regulations
- National Airports Safeguarding Framework – Guideline C: Managing the Risk of the Wildlife Strikes in the Vicinity of Airports (Department of Infrastructure and Transport 2012)
- Recommended Practices No. 1 – Standards for Aerodrome Bird/Wildlife Control (International Birdstrike Committee 2006)
- Airport Services Manual. Part 3: Wildlife Control and Reduction Doc 9137 (International Civil aviation Organisation 2012)
- Convention on International Civil Aviation: Aerodromes, Vol 1 Aerodrome Design and Operation. Annex 14 (International Civil Aviation Organization 2013)
- Western Sydney Aerotropolis Draft Wildlife Management Assessment Report. Western Sydney Planning Partnership. (Avisure 2020).
- Aviation Safeguarding Guidelines: Western Sydney Aerotropolis and surrounding areas. NSW DPE, November 2022. (DPE 2022b)

This document has been prepared with reference to the above guidelines and references and provides management actions to reduce wildlife-hazards in accordance with these guidelines and references where relevant.

3.1 National

The Civil Aviation Safety Authority (CAS) regulates wildlife hazard in accordance with the Civil Aviation Safety Regulations 1998 and the CASA Manual of Standards Part 139 which require monitoring and recording wildlife hazard information. The guidelines also detail the responsibilities of an airport should a wildlife hazard event take place.
The Advisory Circular (AC) 139-26(0) provides guidance to airports to monitor and manage wildlife issues.
An airport is required to monitor bird and bat strike hazards on airport and off airport, and mitigate these hazards through the implementation of a Wildlife Hazard Management Plan

Under the National Airports Safeguarding Framework (NASF) Guideline C '*Managing the Risk of Wildlife Strikes in the Vicinity of Airports*' advice has been established that allocates risk categories to land uses within and around an airport. The categories range from very low to high. Further to this, actions are assigned to address management issue associated with a given development within development zones at three, eight and 13km radius from the airport itself. These actions are assigned one of the following categories 'incompatible', 'mitigate', 'monitor' and 'no action'.

3.2 Western Sydney

The following plans and policies apply to the Subject Property:

- Western Sydney Aerotropolis Plan (WSAP)
- State Environmental Planning Policy (Precincts—Western Parkland City) 2021
- State Environmental Planning Policy (Western Sydney Airport) 2020
- Western Sydney Aerotropolis Precinct Plan March 2022
- Western Sydney Aerotropolis Development Control Plan (DCP) 2022 – Phase 2
- Western Sydney Aerotropolis Development Control Plan (DCP) 2022 – Phase 2 - Appendices

A detailed suite of guidelines and literature has been cited in preparing this report. These references are listed in **section 8** of this report.

3.2.1 State Environmental Planning Policy (Precincts—Western Parkland City) 2021

Wildlife hazards (4.19)

(1) The objective of this section is to regulate development on land surrounding the Airport where wildlife may present a risk to the operation of the Airport.

(2) Development consent must not be granted to relevant development on land in the 13 km wildlife buffer zone unless the consent authority—

(a) has consulted the relevant Commonwealth body, and

(b) has considered a written assessment of the wildlife that is likely to be present on the land and the risk of the wildlife to the operation of the Airport provided by the applicant, which includes—

(i) species, size, quantity, flock behaviour and the times of day or year when the wildlife is likely to be present, and

(ii) whether any of the wildlife is a threatened species, and

(iii) a description of how the assessment was carried out, and

(c) is satisfied that the development will mitigate the risk of wildlife to the operation of the Airport, including, for example, measures relating to—

(i) waste management, landscaping, grass, fencing, storm water or water areas, or

(ii) the dispersal of wildlife from the land by the removal of food or the use of spikes, wire or nets.

(3) Despite subsection (2), development for the following purposes is prohibited on land in the 3 km wildlife buffer zone—

(a) livestock processing industries,

(b) turf farming,

(c) waste or resource management facilities that consist of outdoor processing, storage or handling of organic or putrescible waste.

(4) In this section—

3 km wildlife buffer zone means the land shown as the "3 kilometre wildlife buffer zone" on the Wildlife Buffer Zone Map.

13 km wildlife buffer zone means the land shown as the "13 kilometre wildlife buffer zone" on the Wildlife Buffer Zone Map and includes the 3 km wildlife buffer zone (**Figure 4**). Relevant development means development for the following purposes—

(a) agricultural produce industries,

(b) aquaculture,

(c) camping grounds,

(d) eco-tourist facilities,

(e) garden centres,

(f) intensive livestock agriculture,

(g) intensive plant agriculture,

(h) livestock processing industries,

(i) plant nurseries,

(j) recreation facilities (major),

(k) recreation facilities (outdoor),

(l) sewage treatment plants,

(m) waste or resource management facilities that consist of outdoor processing, storage or handling of organic or putrescible waste,

(n) water storage facilities.

The Subject Property occurs within the 8km wildlife buffer zone which includes the 13km buffer (**Figure 4**). As the Subject Property is outside of the 3km buffer zone, the modification proposal of a waste or resource management facility is permitted. This report was produced to address this clause of the Western Sydney Parkland City SEPP in relation to the modification proposal.

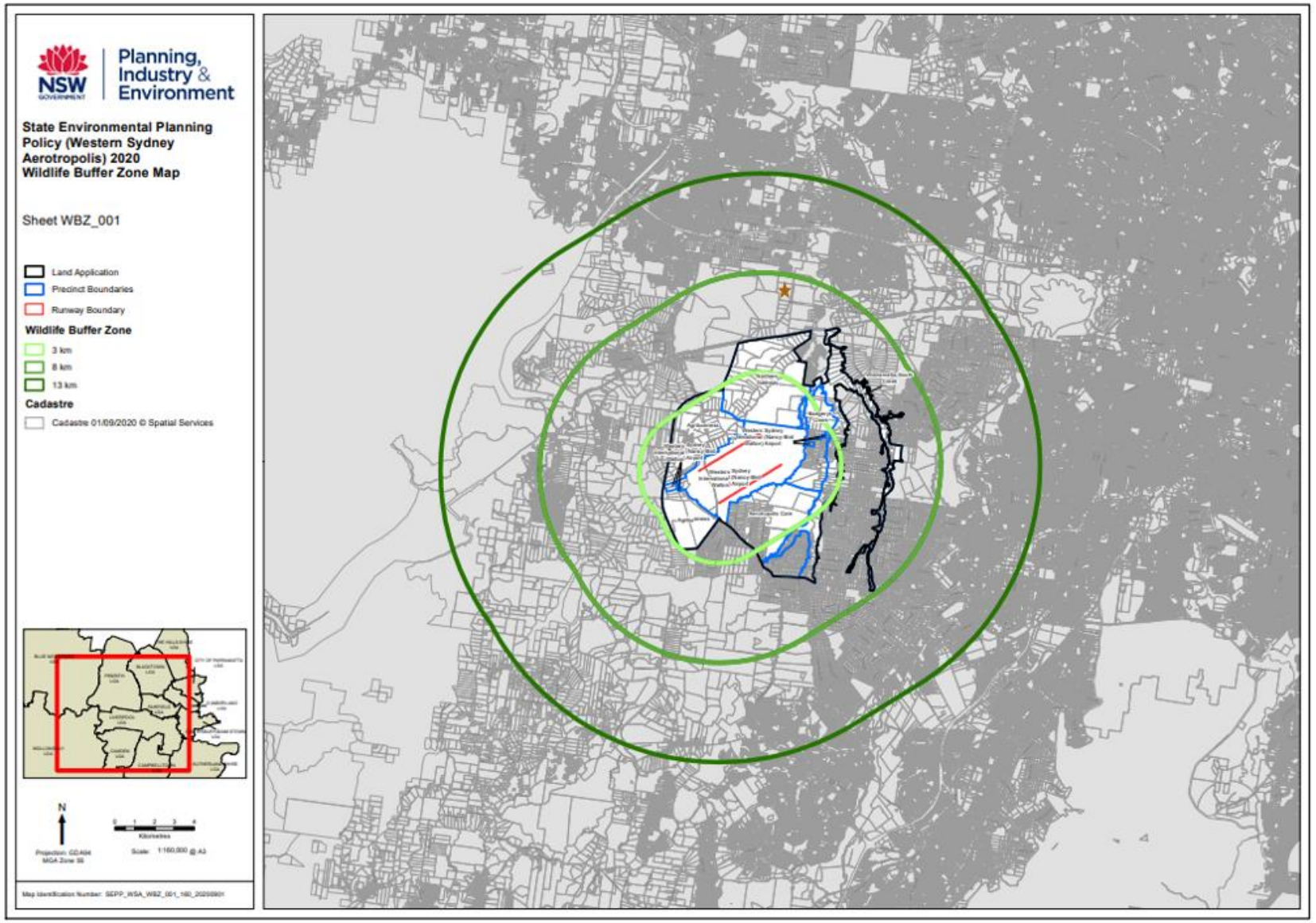

Figure 4. State Environmental Planning Policy (Precincts—Western Parkland City) 2021 Wildlife Buffer Zone Map. The star shows the location of the Subject Property.

3.2.2 Preliminary Western Sydney Airport Bird and Bat Strike Risk Assessment

The '*Preliminary Western Sydney Airport Bird and Bat Strike Risk Assessment*' (Avisure 2016) identified Galah, Straw-necked Ibis, Masked Lapwing, Australian Magpie and Ducks (Pacific-black, Grey Teal, Australian Wood Duck, Hardhead) among the most abundant hazardous birds in the Aerotropolis area. Ibis (Straw-necked and Australian White Ibis) pose the most significant hazard as they are flocking birds, each with a large mass (c 1.3 kg) and are difficult to manage at operational airports.

Avisure (2016) also identified increased risk associated with Common Starling, Feral Pigeon, Cattle Egret as hazardous owing to their flocking behaviours and strike histories at other airports around the world.

The most significant risk for bird strike at Nancy Bird Walton airport comes from the abundance of off-airport farm dams as they attract multiple species of large waterbirds.

Avisure (2016) recommends the preparation and implementation of a Wildlife Hazard Management Plan (WHMP) for developments within 13km of the airport. They advise that bird and bat hazards are at an acceptable risk and can be managed accordingly.

3.2.3 Draft Wildlife Management Assessment Report

The '*Draft Wildlife Management Assessment Report*' (Avisure 2020) states that water birds make up 44% of risk species, and as such, available water sources must be managed to reduce the associated strike risks.

The following evaluation criteria is outlined in the '*Draft Wildlife Management Assessment Report*' (Avisure 2020) to minimise and manage risks:

Evaluation Criteria

Determine potential species use

This should be guided by wildlife species known to occur in the area.
The assessor should consider public accessible sources and expert advice to determine the type of attractants supported by the development (e.g. access to water bodies or foraging opportunities).

Cross reference potential risks against WSA risks

Once potential species are determined, the assessor should cross-reference with the most current wildlife risk assessment results completed by WSA for their on-airport risks.

Evaluate the likelihood contribution to the strike risk

1. Assess the likely attraction of the site to wildlife. Consider species composition, numbers, flocking nature, size, behaviour.
2. Consider the presence of other wildlife attractants within 8km of the proposed land use and likely movement of wildlife between. Evaluate possible incursion into aircraft flight paths.
3. Assess risk based on above.

Assess the risk

Complete a robust risk assessment.

In accordance with the Wildlife Safeguarding Framework (Avisure 2020) (**Figure 5**) the closest matching 'land use' to describe the modification proposed is for a '*Non-putrescible waste facility – landfill*'. When this land use is undertaken in the 8km radius Area B (**Figure 6; Appendix 2**) this land use has a '*Moderate*' Wildlife Attraction Risk. The recommended actions for modification proposal or changes to existing development is to Mitigate and Monitor impacts.

Land Use [12]	Standard Instrument Definition	Wildlife Attraction Risk	Western Sydney Aerotropolis: Actions for Existing Developments					Western Sydney Aerotropolis: Actions for Proposed Developments / Changes to Existing Developments				
			3 km radius (Area A)	3 km radius (Area A)	8 km radius (Area B)	8 km radius (Area B)	13 km radius (Area C)	3 km radius (Area A)	3 km radius (Area A)	8 km radius (Area B)	8 km radius (Area B)	13 km radius (Area C)
			Sub-area A1	Sub-area A2	Sub-area B1	Sub-area B2		Sub-area A1	Sub-area A2	Sub-area B1	Sub-area B2	
Waste collection points (commercial)	N/A	High	Mitigate	Mitigate	Mitigate	Monitor	Monitor	Conditional	Mitigate	Mitigate	Monitor	Monitor
Organic waste facility - enclosed	Waste or resource management facility	Moderate	Mitigate	Monitor	Mitigate	Monitor	Monitor	Mitigate	Monitor	Mitigate	Monitor	Monitor
Putrescible waste facility - landfill - enclosed	Waste disposal facility	Moderate	Mitigate	Monitor	Mitigate	Monitor	Monitor	Mitigate	Monitor	Mitigate	Monitor	Monitor
Putrescible waste facility - transfer station - enclosed	Waste or resource transfer station	Moderate	Mitigate	Monitor	Mitigate	Monitor	Monitor	Mitigate	Monitor	Mitigate	Monitor	Monitor
Non-putrescible waste facility - landfill	Waste disposal facility	Moderate	Mitigate	Monitor	Mitigate	Monitor	Monitor	Mitigate	Monitor	Mitigate	Monitor	Monitor
Dams	Water storage facility	Moderate	Mitigate	Monitor	Mitigate	Monitor	Monitor	Mitigate	Monitor	Mitigate	Monitor	Monitor
Stormwater drains	Water storage facility	Moderate	Mitigate	Monitor	Mitigate	Monitor	Monitor	Mitigate	Monitor	Mitigate	Monitor	Monitor
Non-putrescible waste facility - transfer station	Waste or resource transfer station	Low	Monitor	Monitor	Monitor	No Action	No Action	Mitigate	Monitor	Mitigate	No Action	No Action
Potable water treatment facility	Resource recovery facility	Low	Monitor	Monitor	Monitor	No Action	No Action	Mitigate	Monitor	Mitigate	No Action	No Action
Stormwater management facilities	Water storage facility	Low	Monitor	Monitor	Monitor	No Action	No Action	Mitigate	Monitor	Mitigate	No Action	No Action

Figure 5. Aerotropolis Aviation Wildlife Safeguarding Framework (Avisure 2020)

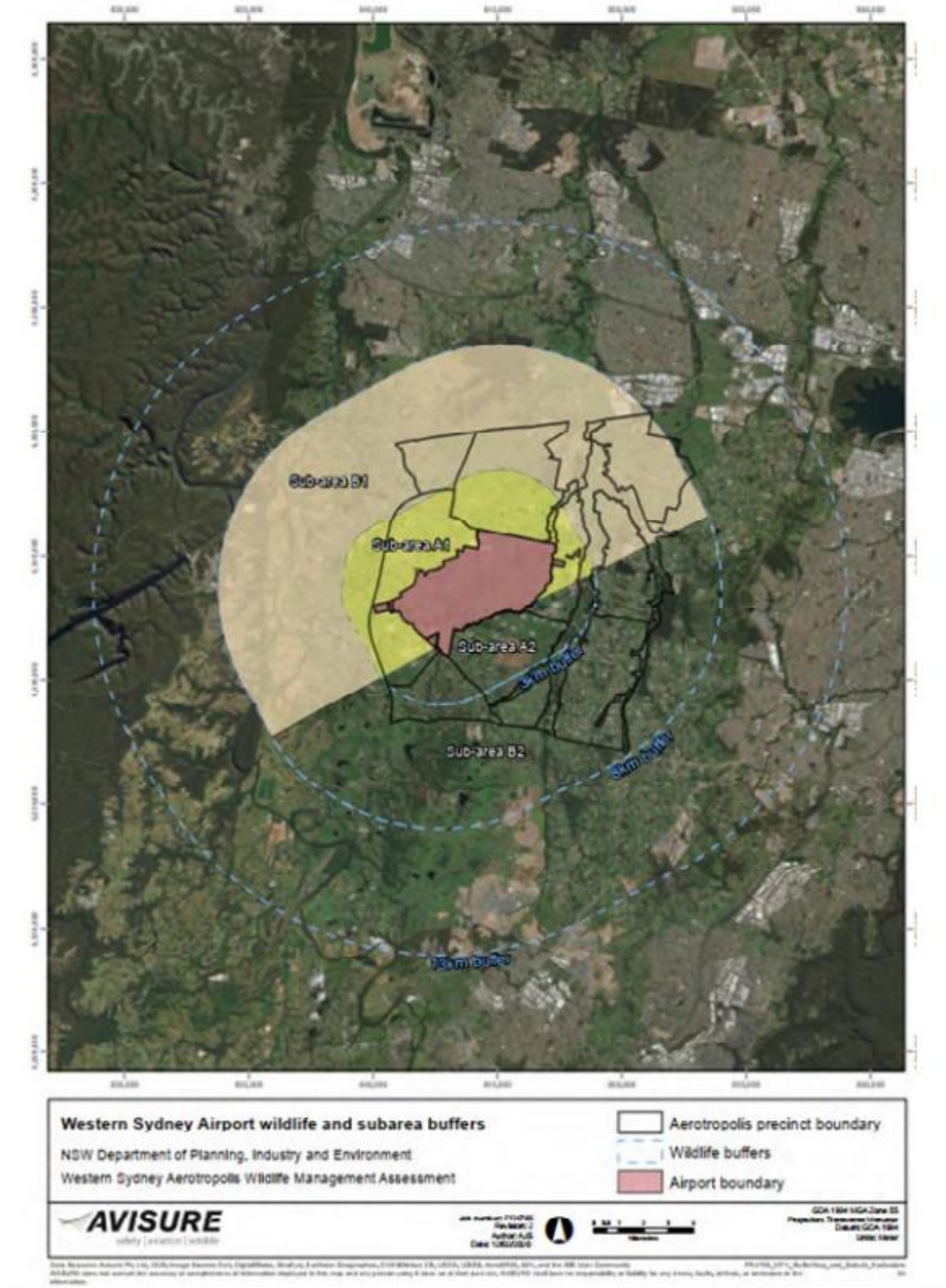

Figure 6. Area shaded green (sub-area A1) in 3km buffer requires more scrutiny (above NASF recommendation) to minimise wildlife crossing the airport to access food/water sources. Aims to reduce wildlife crossing from south-east to north-west. Area shaded yellow (sub-area B1) in 8km buffer requires more scrutiny (above NASF recommendation), but not as rigid as the 3km buffer red zone, to minimise wildlife crossing the airport to access food/water sources (Avisure 2020)

Apply mitigation options

In consulting the '*Draft Wildlife Management Assessment Report*' (Avisure 2020) (Table 17) Land Eco have tabled a suite of robust recommendations to mitigate and manage wildlife attractant hazards associated with the modification.

Establish monitoring protocols

Establish a regular monitoring program that:

- Monitors the presence and behaviour of wildlife.
- Monitors for evidence of wildlife shelter/nesting provided by infrastructure (e.g. buildings, equipment) and/or vegetation.
- Identifies attractants (e.g. water, food).
- Monitors the effectiveness of wildlife mitigation equipment, techniques, designs etc.

Monitoring should be standardised to identify trends and emerging risks over time. Monitoring frequency should be congruent with the hazard level.

Note - WSA should monitor off-airport land uses where the action in accordance with the AAWSF is 'monitor'. The land user is responsible for monitoring, where required, for land uses where the action in accordance with the AAWSF is 'mitigate' or 'conditional'.

Prepare and implement Wildlife Management Plan (WMP)

For land uses assessed as having a moderate or greater risk before mitigation is applied, a WMP should be developed that include:

- regular monitoring surveys (see above Establish monitoring protocols)
- wildlife hazard assessments by qualified ornithologists or biologists
- wildlife awareness and management training for relevant staff
- establishment of wildlife population triggers
- implementation of activities to reduce hazardous wildlife populations; and
- adoption of wildlife deterrent technologies to reduce hazardous wildlife populations
- performance indicators to evaluate implementation and compliance to consent Conditions
- a review process to regularly assess implementation against performance indicators, identify gaps, and ensure currency
- allocation of roles and responsibilities for plan implementation and review.

The Subject Property is mapped within the Sub-area B1 on the modified WSA wildlife buffers map provided in the '*Draft Wildlife Management Assessment Report*' (Avisure 2020; **Appendix 2**).

The modification proposal is a 'Non-putrescible waste facility – landfill'. The *Western Sydney Aerotropolis Wildlife Management Assessment* (Avisure 2020) classifies the wildlife attraction risk of this type of development, as 'Moderate' Wildlife Attraction Risk, and recommends mitigation for proposed developments/ changes to existing developments within the 8km radius sub-area B1 of the aerodrome that attract wildlife (**Figure 5**).

This WHMP meets the requirements of the prescribed wildlife hazard assessment process established by Avisure (2020) (**Figure 7**) and has considered the relevant mitigation options and recommendations (see **Section 5**).

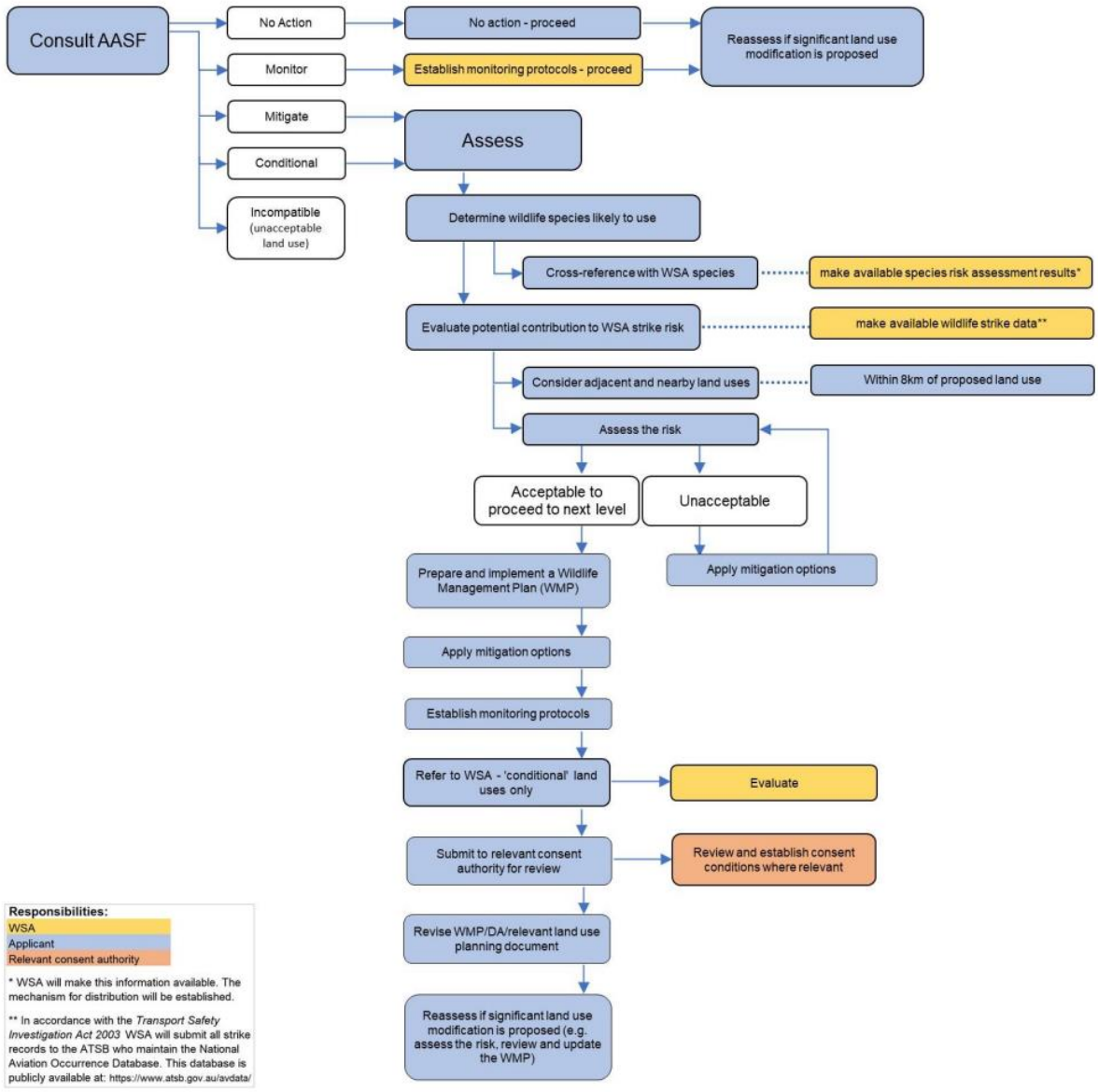

Figure 7. Wildlife hazard assessment process (Avisure 2020)

3.2.4 Aviation Safeguarding Guidelines – Western Sydney Aerotropolis and surrounding areas

Managing the risk of wildlife in the vicinity of airports (4)

Objectives (4.1)

- assess development on land surrounding WSI where wildlife may present a risk to the operation of WSI; and
- ensure planning authorities consider wildlife management provisions when undertaking land use planning for the Aerotropolis and other airports.

Why is it important (4.2)

The safety and efficiency of an airport's operational airspace can be compromised not only by buildings and structures but also congregation of wildlife, particularly birds and bats/flying foxes. There is also the possibility of fatalities and injury to pilots and passengers. Further, wildlife strikes can cause significant economic risk such as delays and cancellations of flights as a result of damage to aircraft.

How to manage the risk and referral triggers (4.3)

Two objectives of the Aerotropolis are to safeguard the 24-hour operations of WSI and to achieve the Western Parkland City vision which includes a landscape-led approach to planning and an increase in tree canopy cover to minimise urban heat island effects. The role of the NSW Government is to balance these two objectives.

NASF Guideline C provides a framework for how to manage the risk of wildlife strike on aircrafts. That framework has been incorporated into the Aerotropolis SEPP, Aerotropolis DCP and Aerotropolis Precinct Plans.

Certain land uses, land embellishments and landscaping have a tendency to attract wildlife which can then migrate onto the airport site or into flights paths, increasing the risk of wildlife strikes. In an effort to mitigate risks of wildlife hazards, land use around WSI is being carefully planned through the implementation of wildlife buffer zones.

Wildlife buffer zones are areas of land which are mapped to control development surrounding WSI's runways for the purposes of reducing the risks of wildlife hazards. Under the Aerotropolis SEPP and the Aerotropolis DCP:

1. certain land uses are prohibited within the 3km buffer zone;

2. development applications for specified uses on land within the 13km buffer zone must be referred to WSA and accompanied by a wildlife hazard assessment and wildlife management plan, incorporating relevant mitigation and monitoring measures;

3. development applications for specified uses on land within the 13km buffer zone must be accompanied by a waste management plan for the operation of the use of the land; and

4. appropriate landscape species should be planted within these buffer zones.

The prohibited and specified land uses are listed in the Aerotropolis SEPP.

If land is within a 13km radius of WSI, the applicant should confirm whether they are required to lodge a wildlife hazard assessment and wildlife management plan with their development application and if so, the applicant is to seek advice from a suitably qualified consultant such as an ornithologist or biologist for the purposes of preparing the wildlife hazard assessment and wildlife management plan.

WSA also has an obligation to monitor up to a 13km radius around WSI for any potential wildlife hazards which may impact the 24-hour operations of WSI. WSA will negotiate with existing landowners/users to mitigate these risks. Any new development on land within the 13km buffer of WSI will be subject to the wildlife management controls contained within the Aerotropolis SEPP and Aerotropolis DCP.

Western Sydney International (Nancy-Bird Walton) Airport wildlife buffer zones (4.4)

The wildlife buffer zones map for WSI can be viewed at **Figure 4**.

The Subject Property lies within the 8km Western Sydney International (Nancy-Bird Walton) Airport buffer zone (**Figure 4**), hence the need to assess and manage wildlife hazard attractants.

3.2.5 Western Sydney Aerotropolis Development Control Plan (DCP) 2022 – Phase 2

As the site is a state significant development, under Clause 2.10 (1) (a) of the *State Environmental Planning Policy (Planning Systems)* 2021, development control plans do not apply. Although, for completeness and thoroughness given the proximity of the site to the aerotropolis the modification proposal has been assessed against the following wildlife hazard DCP control:

Airport Safeguarding (2.10)

Objectives (2.10.3) Wildlife Hazards

- Safeguard the Airport from incompatible development that could compromise safe operations.

Table 1. Performance Outcomes and Benchmark Solutions (2.10.3)

Objective	Performance Outcome	Benchmark Solution
PO1	Development does not attract wildlife which would create a safety hazard to the operations of the Airport.	1. All waste bins are designed and installed with fixed lids. 2. Any bulk waste receptacle or communal waste storage area is contained within enclosures that cannot be accessed by birds or flying foxes. 3. Any stormwater detention within the 3km and 8km wildlife buffer is designed to fully drain within 48 hours after a rainfall event. 4. Buildings and structures are designed to minimise the opportunity for roosting areas.
PO2	Landscaping does not attract wildlife that could create a safety hazard to the operations of the Airport.	1. Refer to Appendix B for a list of suitable landscape species. 2. In areas within the 3km wildlife buffer but outside of the Parkland Priority Areas shown in Figure 8, a report prepared by a suitability qualified and experienced ecologist is to be submitted with any application when the landscaping plan: a. Incorporates alternative landscape species not listed within Appendix B; b. Incorporates landscape species denoted within the landscape species list; c. Will result in more than 5 trees being planted in 1 group (group refers to touching mature canopies); and/or d. Provides a spacing between a group of 5 or more trees that is less than 100m. 3. The ecologist report is to consider building, site, and water body design outcomes and/or landscape maintenance measures that will mitigate bird and flying fox attraction and roosting areas.

3.2.6 Western Sydney Aerotropolis Development Control Plan (DCP) 2022 – Phase 2 - Appendices

Appendix B: Western Sydney Aerotropolis Landscape Species List

The 'Western Sydney Aerotropolis Landscape Species List' in Table 1 of the 'DCP Phase 2 - Appendices' details flora species that are recommended for Landscaping in the Aerotropolis area. Some species in that list are not permitted within the 3km buffer of the WSA without an Ecologist report (Wildlife Hazard Assessment) to support the species selection.

The proposed modification is located outside of this 3km buffer (**Figure 4**).

Any alternative landscaping species and/or groupings and spacing (as specified in the DCP) outside the Western Parkland Vision Government Commitment Areas and within the 3km wildlife buffer will require an ecologist report submitted with the landscape plan (this report). The report will need to discuss wildlife attraction in proximity to the airport and will be subject to a merit-based assessment. The proponent will need to demonstrate suitability in relation to wildlife management and/or encroachments into operational airspace.

Although the DCP does not apply to the site, it is best practice the recommended landscape species list is adhered to minimise the wildlife attractant risk. The provided landscape plan (Huon Designs 2019) includes tree and shrub species that are not listed on the Western Sydney Aerotropolis Species List (table 1 of the DCP Phase 2 Appendices 2022). Anyone involved in plant species selection and planting should undertake an audit of the tree and shrub species proposed for planting (see Huon Designs 2019) and where trees and shrubs are considered likely to attract hazardous wildlife (e.g. large flocks of birds or flying-foxes) then alternative species that are less wildlife attracting should be sought.

Huon Designs (2019) proposes the following species in their landscape plan, these species are not detailed in Table 2 of the DCP Phase 2-Appendices: *Melaleuca linarifolia*, *Exocarpos cupressiformis*, *Acacia falcata*, *Astroloma humifusum*, *Bossiaea prostrata*, *Lissanthe strigose*, *Melaleuca nodosa, Pultenaea mycrophylla*, *Solanum prinophyllum, Aristida vagans, Austrodanthonia racemosa, Dodonaea viscosa, Glycine sp.* and *Wahlenbergia gracilis. Melaleuca thymifolia, Solanum prinophyllum*, *Glycine sp., Persicaria decipiens*, *Cyperus sp.* and *Typha sp.*.

Some of these species already occur on the Subject Property. Many are of low risk as wildlife attractants.
Melaleuca linarifolia, when in flower, is a known attractant of nectivorous birds such as lorikeets and flying-foxes and should be minimised when planting, or swapped for a less, wildlife attracting tree species.
The same treatment should be applied to any *Eucalyptus spp., Angophora spp. or Corymbia spp.* proposed in plants, as these trees flower profusely and are preferred feed trees by many flocking bird and flying-fox species.

D.7 Aviation Safeguarding Assessment

An Aviation Safeguarding Assessment is required when triggered by Section 13 Aviation Safeguarding of this DCP.

A Wildlife Hazards – Wildlife Hazard Assessment and Wildlife Management Plan is required as part of an Aviation Safeguarding Assessment.

Details/assessment required:

Applications for the following uses within the 3 km and 8 km wildlife buffers must be accompanied with a Wildlife Hazard Assessment and Wildlife Management Plan that incorporates relevant mitigation and monitoring measures:

a. Agricultural produce industry;
b. Agriculture;
c. Aquaculture;
d. Camping ground;
e. Garden Centre;
f. Intensive livestock agriculture;
g. Intensive plant agriculture;
h. Livestock processing industry*;
i. Plant nursery;
j. Recreation facility (outdoor);
k. Recreation facility (major);
l. Recreational area;
m. Sewage treatment plant;
n. Waste or resource management facility*;
o. Waste or resource transfer station*; and
p. Water storage facility. Note: Within 3km livestock processing industry, waste or resource management facilities and transfer stations that include any external storage, processing or handling are prohibited.

Wildlife Hazard Assessment Reports must assess the wildlife attraction risk of the land use, the design of the building and ancillary works including proposed landscaping, water facilities (incl. stormwater infrastructure), waste management, and temporary risks associated construction activity.

The Wildlife Management Plan must respond to the findings and recommendations of the wildlife hazard assessment.

Where monitoring is required to be undertaken in accordance with the Management Plan, copies of the report are to be submitted to the airport lessee company within 28 days of completion.

The proposed modification is located within the 8km buffer of WSA thus a 'Wildlife Hazard Assessment and Wildlife Management Plan' this report has been prepared to accompany the application.

4. Bird and Bat Strike Risk Assessment

4.1 National Datasets

The Australian Transport Safety Bureau (ATSB) identified the following bird 'species' as the four most frequently struck at Australian and NSW airports between 2004 and 2013 are detailed in (**Table 2**) (data from ATSB 2014). The most recorded 'multiple strike' species was the Galah with 38% strikes involving more than one bird.

Table 2. Most frequently struck bird and bat species according to ATSB

Species
Masked Lapwing (*Vanellus miles*)
Other 'Lapwings/Plovers'
Black Kite (*Milvus migrans*)
Whistling Kite (*Haliastur sphenurus*)
Black Shouldered Kite (*Elanus axillaris*)
Other 'Kites' or 'Hawks' (including less common kite species, as well as falcons, goshawks and eagles)
Galah (*Eolophus roseicapillus*)
Australian Magpie (*Cracticus tibicen*)
Other 'Magpies' (including butcherbirds and magpie-lark)
'Ducks' (including all Australian species)
Bat/Flying-fox (presumes all Australian *Pteropus* species)

4.2 Baseline Bird Species Assemblage Subject Property

During the one site survey, Land Eco collected actual abundance of all bird and bat species with body weights that exceed 80g in **Table 3**. The highest abundance counts for each species on a particular day are presented, and the habitat they were associated with is outlined.

The bird species and behaviours observed by Land Eco during the site survey confirm that the Subject Property and adjacent land holding attracts birds, including hazardous species, and these species are likely to utilise the site for extended periods of time owing to the availability of habitat (i.e. open waterbodies) that currently occurs and will continue to occur post modification proposal.

Table 3. Bird and bat species with body weights >80g observed in the Study Area.

Class	Species	Length (cm)	Weight (g)	Threat Status	Highest Number of Individuals Observed	Habitat Observed
Birds	Black Swan (*Cygnus atratus*)	131	9000	Protected (NSW BC Act	2	Utilising ponds and associated maintenance islands.
Birds	Little Black Cormorant (*Phalacrocorax sulcirostris*)	62	1200	Protected (NSW BC Act	1	Utilising ponds and associated maintenance islands.
Birds	Pacific Black Duck (*Anas superciliosa*)	55	1114	Protected (NSW BC Act)	5	Utilising ponds and associated maintenance islands.
Birds	Hardhead (*Aythya australis*)	52	850	Protected (NSW BC Act	2	Utilising ponds and associated maintenance islands.
Birds	Sulphur-crested Cockatoo (*Cacatua galerita*)	48	833	Protected (NSW BC Act	1	Flying over.
Birds	Little Pied Cormorant (*Microcarbo melanoleucos*)	58	830	Protected (NSW BC Act	1	Utilising ponds and associated maintenance islands.
Birds	Australian Wood Duck (*Chenonetta jubata*)	47	815	Protected (NSW BC Act	10	Utilising ponds and associated maintenance islands. Using the regenerating exotic grass and bare areas on the earthen mounds.
Birds	Eurasian Coot (*Fulica atra*)	36	720	Protected (NSW BC Act	5	Utilising ponds and associated maintenance islands.
Birds	Grey Teal (*Anas gracilis*)	44	670	Protected (NSW BC Act)	2	Utilising ponds and associated maintenance islands.

Class	Species	Length (cm)	Weight (g)	Threat Status	Highest Number of Individuals Observed	Habitat Observed
Birds	Chestnut Teal (*Anas castanea*)	42	650	Protected (NSW BC Act)	10	Utilising ponds and associated maintenance islands.
Birds	Australian Raven (*Corvus coronoides*)	52	557	Protected (NSW BC Act	2	Using the regenerating exotic grass and bare areas on the earthen mounds.
Birds	White-faced Heron (*Egretta novaehollandiae*)	70	550	Protected (NSW BC Act)	1	Utilising ponds and associated maintenance islands.
Birds	Australian Magpie (*Gymnorhina tibicen*)	44	350	Protected (NSW BC Act)	2	Using the regenerating exotic grass and bare areas on the earthen mounds.
Birds	Hoary-headed Grebe (*Poliocephalus poliocephalus*)	30	240	Protected (NSW BC Act	2	Utilising ponds and associated maintenance islands.
Birds	Australasian Grebe (*Tachybaptus novaehollandiae*)	26	230	Protected (NSW BC Act	10	Utilising ponds and associated maintenance islands.
Birds	Olive-backed Oriole (*Oriolus sagittatus*)	27	96	Protected (NSW BC Act	1	Using the regenerating shrubs on the earthen mounds.

4.3 Existing Bird and Bat Attracting Habitat

4.3.1 Open Grassland and Vegetated Bunds

The Subject Property predominantly consists of derived grasslands that are exotic dominated. Common, grassland-adapted birds may forage in this area, including Australian Raven and Australian Magpie.

4.3.2 Artificial Waterbodies

Several artificial dams/ponds occur within the Subject Property and to the north of the Subject Property. These waterbodies are common in the surrounding locality, attracting a high diversity and abundance of waterbirds. Land Eco recorded the bird species listed in **Table 3** of this report in the Subject Property. Land Eco observed large-bodied waterfowl species such as ducks, cormorants, White-faced Heron (*Egretta novaehollandiae*) and Black Swan (*Cygnus atratus*). These species are flocking birds, that can fly high, and pose a risk to aeronautical operations. These existing waterbodies are used by the operator for managing surface water during operations (e.g. stormwater). There was water in the dams during the site visit, however, the applicant has advised that there are periods when the dams on property contain little to no water at all due to climatic conditions, such as drought. This is typical of most dams in Western Sydney.

4.3.3 Riparian Areas and Watercourses

A riparian zone occurs to the north-western edge of the Subject Property along Blaxland Creek outside of the development footprint. This may attract a suite of waterbirds along with land birds which may attend the water to drink. However, this riparian area/watercourse is not likely to cause any significant effect on the hazardous wildlife that are attracted to the Subject Property.

4.3.4 Remnant Mature Vegetation

Areas of remnant vegetation including mature eucalypts occur along the boundaries of the Subject Property. These areas of forest may provide foraging habitat for birds, and Grey-headed Flying-fox.

Land Eco did not observe any Grey-headed Flying-fox or their roosts. Areas of forest containing flowering trees in the Aerotropolis are likely to attract flocks of Grey-headed Flying-fox during flowering events. At the time of preparing this report the Commonwealth Interactive Flying-fox Web Viewer shows the presence of large colonies of Grey-headed Flying Fox to the north, east and south of the Aerotropolis. The colony at Ropes Creek (6.8km north-east of the Subject Property) had up to 10,000 Grey-headed Flying-fox in 2022. The colony at Emu Plains (9.8 km north-west of the Subject Property) had up to 10,000 Grey-headed Flying-fox in 2019. There were no closer colonies of large bats (Commonwealth of Australia 2022).

Birds, particularly waterbirds present the most prominent wildlife hazard on the Subject Property, and this hazard will continue to occur regardless of whether the proposed modification proceeds.

4.4 Future Bird and Bat Attracting Habitat Associated with the Modification Proposal

The Subject Property is an operational waste management facility. It is highly disturbed, and altered from a natural state.

The landfill is categorised as a Class 2 landfill, signifying that no putrescible waste will be accepted. The applicant does not intend on leaving any biological/putrescible wastes uncovered, including any food scrap waste produced by the workers on site (e.g. discarded lunch scraps); all biological wastes will be kept covered and indoors.
An air quality impact assessment showed very low odour profiles and no offsite odour impacts are predicted from the Modification Proposal. As the proposal does not involve any uncovered spoilable organic waste or similar, it is not likely to attract flocking species.

The artificial dams/ponds will remain present, albeit one will be split into two with one designated for leachate and the other for operational needs. Birds will continue to be attracted to these water sources, however it is not expected that bird species richness, nor abundance will increase above the baseline.

The final landscaping configuration and plant species selections installed as part of the modification, must be carefully considered in light of the recommendations in this report (see **Section 5**) this may mean a deviation from the landscape planting scheme and species selections proposed by Huons Designs (2019).

Overall, it is unlikely that the proposed modification will attract a higher abundance of birds given the high amount of existing waterbird attractants already in the area.

Bird and bat monitoring will take place, as necessary for 'Moderate' risk land uses within the 8km buffer zone of WSA. In the unlikely event wildlife species richness and abundance increases to a level that is unsatisfactory, an experienced Ornithologist will be consulted to guide impact mitigation measures to safely disperse the wildlife and further mitigate the wildlife attractants on the Subject Property.

Engineered deterrents will be introduced to the infrastructure of the facility, as part of the proposed modification and its on-going operations as recommended in the '*Draft Wildlife Management Assessment Report*' (Avisure 2020).

5. Wildlife Hazard Management Options

The management options proposed in this document are based on preliminary datasets and should therefore be refined as more information is available.

The design process has been undertaken to ensure that the attraction of hazardous wildlife has been minimised.

Hazardous birds and bats in the Subject Property will be regularly monitored by qualified Ecologists to assess populations size, behaviour, and associated strike risk. Management options will be enacted if hazards are identified during this monitoring phase.

The clearing, earthworks and construction phases of the modification may disturb birds and bats utilising the habitat and this could cause birds and bats to alter their movement patters as they seek habitat elsewhere. If the works take place at the same time Nancy Bird Walton Airport is operational, then there is risk that the displaced birds could move toward the airport or into airspace.

Table 4. Suggested Management Options

Requirement	Management Option	Stage
Bird Monitoring Surveys	• Conduct two bird and flying-fox surveys every six months for one year after the commencement of construction in accordance with the methods of this document. This is to be reviewed at the conclusion of one year by an experienced ecologist and extended if the ecologist is of the opinion the monitoring will provide value. • Identify any emerging risks	• Post-Construction
Avoid and minimise bird/bat attractants which provide food, water, shelter	• The facility will not accept putrescible wastes. • Induct all site workers of the hazards associated with bird and wildlife attraction. • Enforce bans on littering by site personnel. • Ensure bins are all lockable and never left open. Bin collection collections should be at a suitable frequency to ensure bins do not overflow. • Limit plantings to trees, shrubs and groundcovers that are less likely to attract hazardous wildlife (i.e. avoid flowering or fruiting trees that attract flying-foxes or birds). • Where, perching, roosting or nesting activity is detected on structures like the railing on the dam/ponds, exclusionary devices such as netting or anti perching spikes should be installed. • Adhere to planting guidelines outlined in the DCP appendices document (DPIE 2022c).	• Pre-construction • Construction • Operation
Suitable bird/bat eviction methods	• If monitoring reveals an increase in hazardous wildlife, during construction and operation of the modification, the operator must engage an experienced Ecologist to prepare a suitable bird/bat eviction strategy. • This must be undertaken in the event the modification proposal attracts more birds/bats to the locality (i.e. roost colonies), or if proposed works are considered likely to disturb birds in a manner that could increase risk to WSA	• Pre-construction • Construction • Operation
Manage landscaping to reduce suitability for hazardous bird/bats	• Any areas of exotic grassland should be slashed and managed in a way that is less attractive to birds. • Do not plant trees and shrubs which bear edible berries, fruits, seeds or nuts, or flower profusely. • Avoid species from the Proteaceae family. Commonly used landscaping species include, Banksia spp, Grevillea spp, Hakea spp. The nectar produced by these species	• Pre-construction • Construction • Operation

Requirement	Management Option	Stage
	can attract flying-foxes and various nectar feeding (nectivorous) birds such as lorikeets. • Avoid species from the Myrtaceae family. Commonly used landscaping species include *Callistemon spp, Corymbia, Eucalyptus spp, Lophostemon spp, Melaleuca spp, Syzygium spp* and *Xanthostemon spp*. Many species in this family produce large volumes of nectar that can be highly attractive to flying-foxes and various nectivorous birds. Studies at other airports have shown significant response to flowering Melaleuca by flying-foxes that have created severe strike risks. • Avoid species from the Moraceae family. Commonly used landscaping species include *Ficus spp*. (Figs) due to their decorative and aesthetic appeal. Fig fruits are highly attractive to flying-fox and other fruit eating (frugivorous) birds. • Avoid palm species. These extend across a range of families and should only be used when a strict documented regime of regular fruit and flower cluster removal occurs. • When planting groundcovers Use low prostrate ground cover plants, avoiding profusely fruiting or seeding species. Use ground cover species rather than grasses to reduce the wildlife attraction and minimise ongoing maintenance costs. • Avoid creating landscaped areas that require regular irrigation. Minimise the use of sprinklers and ensure taps do not drip. • If necessary, remove trees and other plants (*only remove if legally permitted) and replace with species that are more appropriate. • Lopping and pruning to alter the structure of trees and shrubs can reduce food and perches and make the plants unsuitable for roosting or nesting. It can, however, be difficult if not impossible, to lop or prune some species of trees such as palms to the extent necessary to prevent birds from roosting or nesting. In such cases, the only effective way of removing the bird problem may be to remove the trees. • The Landscape Plan should only recommend the planting of trees and shrubs in previously unvegetated areas of those species have a lower 'wildlife attractiveness' rating unless approved by an experienced ecologist. Refer to Appendix B of the DCP (DPIE 2022c).	
Prevent access to waste by hazardous birds	• All waste receptacles will be designed to reduce the accessibility of putrescible waste to scavenging birds such as Australian White Ibis and Australian Raven. • Cover all stockpiles during construction • Do not undertake putrescible waste management or disposal on site. • Enforce strict waste management and littering prevention in the Subject Property	• Pre-construction • Construction • Operation

6. Conclusion

Land Eco have identified the presence of hazardous bird species in the location of the proposed modification at Patons Lane Resource Recovery Centre, and these species have been attracted to the site by the existing habitat features which have been

present in the Subject Property for multiple years. Such attractants include artificial dams/ponds, Blaxland Creek, a small drainage inlet, exotic dominated grassland with sporadic shrubs and mature remnant trees.

The proposed modification has been designed to avoid and minimise attracting more hazardous birds and bats into the Aerotropolis.

Two bird and flying-fox surveys will be conducted every six months for one year after the commencement of construction by qualified Ecologists to maintain data on the species and numbers of birds and flying-foxes present within the Subject Property. On the conclusion of one year the monitoring protocols should be reassessed by an experienced ecologist and extended if the ecologist is of the opinion the monitoring will provide value.

Bird and bat strike risk at the Patons Lane Resource Recovery Centre can be managed to an acceptable risk level. It is not expected that the modification proposal and its operation will cause significant increase to the bird and bat hazard presence on the Subject Property above and beyond the current baseline levels detailed in this report.

7. References

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8. Appendix

Appendix 1. Complete list of birds of all weights identified in the Subject Property by Land Eco in March 2023

Bird Species	Scientific Name	Number Observed
Chestnut Teal	*Anas castanea*	10
Grey Teal	*Anas gracilis*	2
Pacific Black Duck	*Anas superciliosa*	5
Black Swan	*Cygnus atratus*	2
Eurasian Coot	*Fulica atra*	5
Australasian Grebe	*Tachybaptus novaehollandiae*	10
Hoary-headed Grebe	*Poliocephalus poliocephalus*	2
Hardhead	*Aythya australis*	2
Superb Fairywren	*Malurus cyaneus*	6
Grey Fantail	*Rhipidura albiscapa*	1
Eastern Yellow Robin	*Eopsaltria australis*	6
Australian Wood Duck	*Chenonetta jubata*	10
White-faced Heron	*Egretta novaehollandiae*	1
Australian Raven	*Corvus coronoides*	2
Little Pied Cormorant	*Microcarbo melanoleucos*	1
Little Black Cormorant	*Phalacrocorax sulcirostris*	1
Red-browed Finch	*Neochmia temporalis*	10
Australian Magpie	*Gymnorhina tibicen*	2
Olive-backed Oriole	*Oriolus sagittatus*	1
Sulphur-crested Cockatoo	*Cacatua galerita*	1
Willie Wagtail	*Rhipidura leucophrys*	1
Silvereye	*Zosterops lateralis*	2
Double-barred Finch	*Taeniopygia bichenovii*	3
Australian Pipit	*Anthus australis*	2

Appendix 2. Modified WSA wildlife buffer map (Avisure 2020). The Subject Property is marked with a 'star'

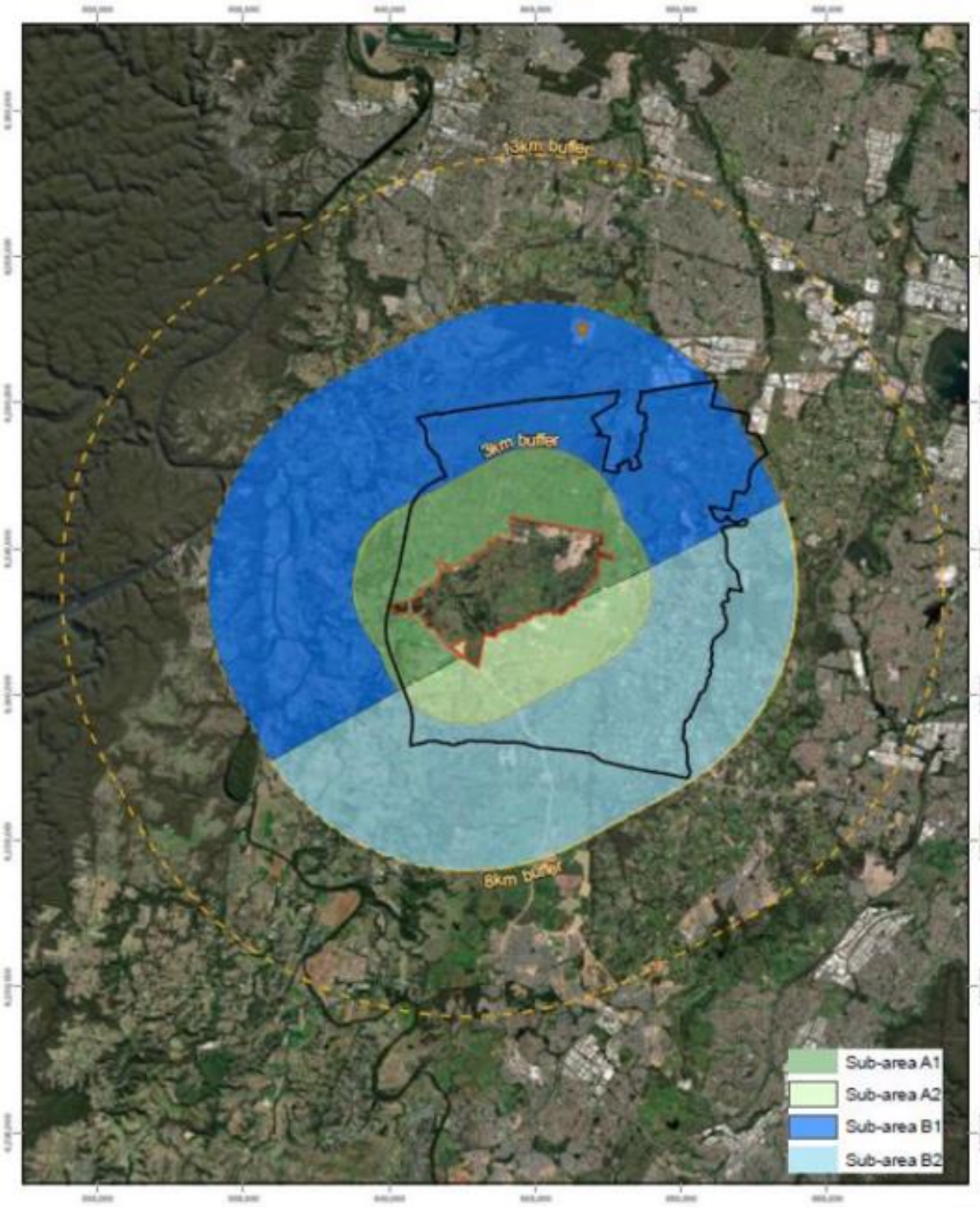

Figure 8. Modified WSA wildlife buffers. Area shaded dark green (sub-area A1) in 3km buffer requires a high level of scrutiny to minimise wildlife crossing the airport to access food/water sources. Aims to reduce wildlife crossing from south-east to north-west across the runways and main approach and departure axis. Area shaded dark blue (sub-area B1) in 8km buffer requires scrutiny, but not as rigid as the 3km buffer, to minimise wildlife crossing the airport to access food/water sources.

Land Eco consulting

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