

National Airports Safeguarding Advisory Group
NSW Department of Planning and Environment

15 December 2022

To the National Airports Safeguarding Advisory Group (NASAG),

RE: Review of the NASF Guideline C

Avisure has responded to NASAG's request for comment on Guideline C of the National Airports Safeguarding Framework (NASF).

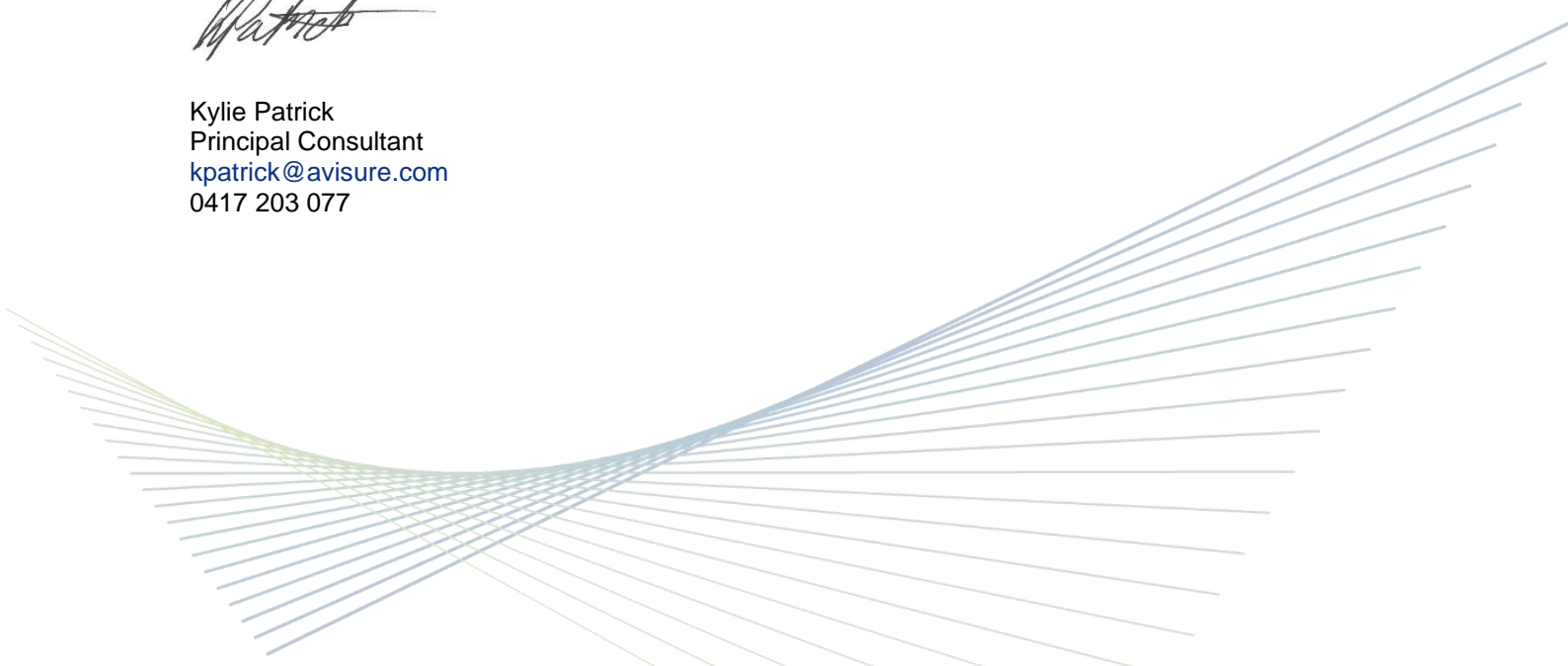
Overall, we feel that compared to other airport safeguarding documents we have reviewed from across the globe, the NASF is of a high standard. It succeeds in meeting the objectives of ICAO reference documents (primarily ICAO DOC 9184 - Airport Planning Manual Part 2 - Land Use and Environmental Control) and provides enough detail to develop basic risk-based land use plans in the vicinity of aerodromes. However, some deficiencies prevent it from being comprehensively applied which reduces its contribution to wildlife strike mitigation on and around airports.

Our submission addresses these deficiencies and responds to the discussion questions detailed in the NASAG Issues Paper.

Yours sincerely,



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About Avisure

Since 1996 Avisure has consulted on aircraft-wildlife collision prevention with 156 airport, regulator, airline and industry association clients throughout the Middle East, Asia-Pacific and North America. We regularly contribute to technical innovation and policy development in the aviation wildlife management arena and we currently host and report on the global database of fatalities, hull losses and serious incidents due to wildlife-aircraft collision. We are (or have been) represented on the executive of the International Bird Strike Committee, the Birdstrike Association of Canada, the Australian Aviation Wildlife Hazard Working Group and the Australian Airports Association. We are current members of the World Birdstrike Association, the Wildlife Disease Association, The Environmental Institute of Australia and New Zealand, and the International Society of Air Safety Investigators. Our corporate experience encompasses wildlife hazard management, airport emergency planning, airside safety and works safety operations. We have applied both practice and policy across a global range of airports, jurisdictions and biomes and consequently suggest that we can offer a broad and comprehensive insight for the Guideline C.

Context

The consequence of wildlife strikes with aircraft can be very serious. Wildlife strikes have caused 581 human fatalities and 654 aircraft losses since the beginning of aviation (Shaw & Dolbeer, 2022¹). Wildlife strikes, which involve more than just the repair of damaged engines and airframes, cost the commercial civil aviation industry an estimated USD\$1.2 billion per annum (Allan, 2002²). In Australia, annual estimates range from AUD\$11.9 million per year (Parsons, 2022³) to AUD\$103 million per year (Avisure 2022, unpublished data). Although wildlife strikes rarely have catastrophic outcomes for aircraft, in Australia, it remains the leading single cause of occurrence to airline transport category operations. Even apparently minor strikes which result in no obvious damage can significantly increase airline operating costs due to downtime associated with damage investigations and repair.

In civil aviation around 93% of strikes occur at below 3500 feet AGL (Dolbeer 2011⁴), with 96% of flying-fox strikes recorded at or below 1000 feet AGL (Parsons et al 2008⁵). Consequently, management focusses largely on terminal airspace and management responsibility has typically resided with aerodrome operators. However, aircrew and air traffic controllers must be engaged in strike risk and

¹ Shaw, P., and Dolbeer R., 2022. *Database of Human Fatalities and Destroyed Civil Aircraft Due to Wildlife Strikes, 1912 to Present* [ONLINE]. Available at: <https://avisure.com/wp/serious-accident-database/> [Accessed 8 December 2022].

² Allan, J., 2002. *The Costs of Birdstrikes and Birdstrike Prevention*. in Clarke L (ed.) *Human Conflicts with Wildlife: Economic Considerations* pp 147-153. United States Department of Agriculture, Fort Collins.

³ Parsons, D., 2022, *Using Machine Learning to Estimate Wildlife Strike Costs in Australia*. Proceedings of the Australian Aviation Wildlife Hazard Group 2022 Forum, Adelaide, Australia

⁴ Dolbeer, A (2011) *Increasing Trend of Damaging Bird Strikes with Aircraft Outside the Airport Boundary: Implications for Mitigation Measures*. *Human-Wildlife Interactions* 5(2):235-248, Fall 2011

⁵ Parsons, J., et al (2008) *Flying-fox (Megachiroptera: Pteropodidae) Flight Altitudes Determined via an Unusual Sampling Method: Aircraft Strikes in Australia*. *Acta Chiropterologica* 10(2): 377-379

mitigation processes that include predicted or observed wildlife movement patterns. It is also critical that external stakeholders, including wildlife authorities, local planning authorities and land users, are engaged to monitor and mitigate wildlife hazards, and that both on- and off-aerodrome hazards are critically assessed. It is particularly pertinent for land use planning to consider wildlife strikes where the areas surrounding airports are being developed.

Guideline – actions and responsibilities

Discussion Question 1: How could guidelines be reordered or changed to be clearer or more usable?

Modify the wording of the Purpose of the Guideline as follows: *This document provides guidelines to State/Territory and local government decision makers for inclusion in state and local planning policies and procedures to manage the risk of collisions between wildlife and aircraft at or near airports where that risk may be increased by the presence of wildlife-attracting land uses*

For the section titled ‘Why is it Important’, we suggest removing the examples from point 4, and rather than say *significantly influence*, we recommend saying that *the wildlife attractiveness of land use in the vicinity of airports can significantly contribute to wildlife strike risk at airports.*

For ‘Roles and Responsibilities’ update all references to the CASR Part 139 MOS to align with the latest version published in 2019.

Point 14 in ‘Guidelines for Managing the Risk of Wildlife Strikes in the Vicinity of Airports’ would be better placed in the ‘Why it is Important’ section.

Point 15 in ‘Guidelines for Managing the Risk of Wildlife Strikes in the Vicinity of Airports’ would be better placed in the ‘Key Considerations for Managing Risk of Wildlife Strikes in the Vicinity of Airports’ section.

Point 19 in ‘Guidelines for Managing the Risk of Wildlife Strikes in the Vicinity of Airports’ would be better placed in the ‘Roles and Responsibilities’ section.

Point 20 in ‘Guidelines for Managing the Risk of Wildlife Strikes in the Vicinity of Airports’ would be better placed in the ‘Why it is Important’ section.

Discussion Question 2: What additional guidance would improve the clarity of the guideline (e.g., detail around landscaping and design)?

The guideline only accounts for broad land use types and does not address how site-nuanced attributes such as landscaping or water availability could increase the wildlife attraction, even for those land use types assessed as low risk. Determining the attractiveness of landscaping depends on the wildlife populations in the local area and the range of other resources that are available. The guideline should establish landscaping and water guidance for all land uses. This may include

recommendations around:

- Regular and long-term monitoring to determine if the wildlife attraction is significant
- Risk assessments to help determine the impact on aviation risk.
- The application of mitigation measures to manage the wildlife attraction
- The development of landscape plans to establish an appropriate plant species palette.

Discussion Question 3: How could the guidelines be updated to better align with current planning and engagement practices?

As a national guideline, it is difficult to align with the various state/territory planning principles and practices around airports. However, examples can be provided on developing performance outcomes and acceptable solutions such as those exemplified in Discussion Question 12.

Discussion Question 4: What changes could clarify roles and responsibilities for planning authorities and airport operators?

There is ambiguity around responsibility for assessments, action plans, management, monitoring, etc. We recommend establishing clarity around the responsibilities of the airport, the planning authority, and the land user, and relocate points 21-24 in 'Guidelines for Managing the Risk of Wildlife Strikes in the Vicinity of Airports' to the 'Roles and Responsibilities' section.

Attachments – land uses, activity types and buffers

Discussion Question 5: How should the land use and activity types listed in Attachment 1 be improved?

The current guideline offers insufficient, or ambiguous, land use types. The generic nature of the NASF means that the available options do not account for all possible land use types or relate to the terminology used in each jurisdiction. We recommend expanding the land use types to include, at least, those in the table below.

Agriculture
Abattoir
Turf farm
Piggery
Orchard
Fish processing /packing plant
Aquaculture
Farm dam
Crops (e.g. wheat, grains, rice, legumes)

Grain storage
Cattle /dairy farm
Poultry farm
Plant nursery
Viticulture
Market farms and gardens
Forestry
Horticulture
Conservation and Natural Areas
Wildlife sanctuary - wetland
Conservation area - wetland
Wildlife breeding/roosting
Flying-fox camp
Wetland
Wildlife sanctuary - dryland
Conservation area - dryland
Waterway (e.g. creeks, rivers)
Natural areas
Recreation
Showground
Fish cleaning facilities
Public feeding of wildlife
Urban open space (e.g. cycleways, green areas, pedestrian walkways)
Racetrack / horse riding school
Golf course
Sports facility (tennis, bowls, etc)
Sports fields
Park / Playground
Picnic / camping ground
Water sport facilities
Boat ramps
Recreational fishing areas
Commercial
Food processing
Fast food / drive-in / outdoor restaurant
Construction / Earthworks
Warehouse (food storage)
Shopping centre
Marina
Zoo
Markets

Office building
Hotel / motel
Car park
Cinemas
Warehouse (non-food storage)
Petrol station
Public transport facility
School/university
Utilities
Organic waste facility - open
Putrescible waste facility - landfill - open
Putrescible waste facility - transfer station: - open
Sewage / wastewater treatment facility
Water retention basins
Water detention basins
Waste collection points (commercial)
Organic waste facility - enclosed
Putrescible waste facility - landfill - enclosed
Putrescible waste facility - transfer station - enclosed
Non-putrescible waste facility - landfill
Dams
Stormwater drains
Non-putrescible waste facility - transfer station
Potable water treatment facility
Stormwater management facilities
Landscaping and Vegetation
Landscaping: parks and gardens
Landscaping: natural area revegetation
Landscaping: streets and transport corridors
Landscaping: roads and motorways
Landscaping: rooftop gardens

Discussion Question 6: How should the actions in Attachment 1 (e.g., monitor, mitigate) be clarified?

Provide guidance around what monitoring should entail (i.e., a description of basic methodology).

Recommend monitoring programs:

- Monitor the presence and behaviour of wildlife.
- Monitor for evidence of wildlife shelter/nesting provided by infrastructure (e.g., buildings, equipment) and/or vegetation.

- Identify attractants (e.g., water, food).
- Monitor the effectiveness of wildlife mitigation equipment, techniques, designs etc.
- Standardise to identify trends and emerging risks over time. Robust standardised monitoring programs that regularly collect meaningful data will inform decisions relating to wildlife management programs, identify emerging risks, and determine wildlife activity trends over time
- Allocate a monitoring frequency congruent with the hazard level (e.g., high risk sites could be monitored monthly, moderate risk sites quarterly, and low risk sites annually).

Provide guidance around the basic types of wildlife hazard mitigation measures that could be applied but acknowledge that although not all the recommendations are feasible in every situation, it is strongly recommended that they are applied, to some extent, wherever possible and where required to meet acceptable risk outcomes. The types of mitigation applied will vary depending on the land use type, the nature and extent of the hazard, and the location of the hazard relative to the airport, aircraft flight paths and other nearby hazards. Note that monitoring underpins all wildlife hazard mitigation and airport safeguarding. Examples of mitigation could be provided for key wildlife attractants such as vegetation, waste, water, etc.

Consider adding 'conditional' to the action options and define this as a land use that may be acceptable depending on the nature of the land use, its location relative to an airport and other off-airport wildlife hazards, wildlife mitigation applied, and particular design/operational features that exclude or deter wildlife.

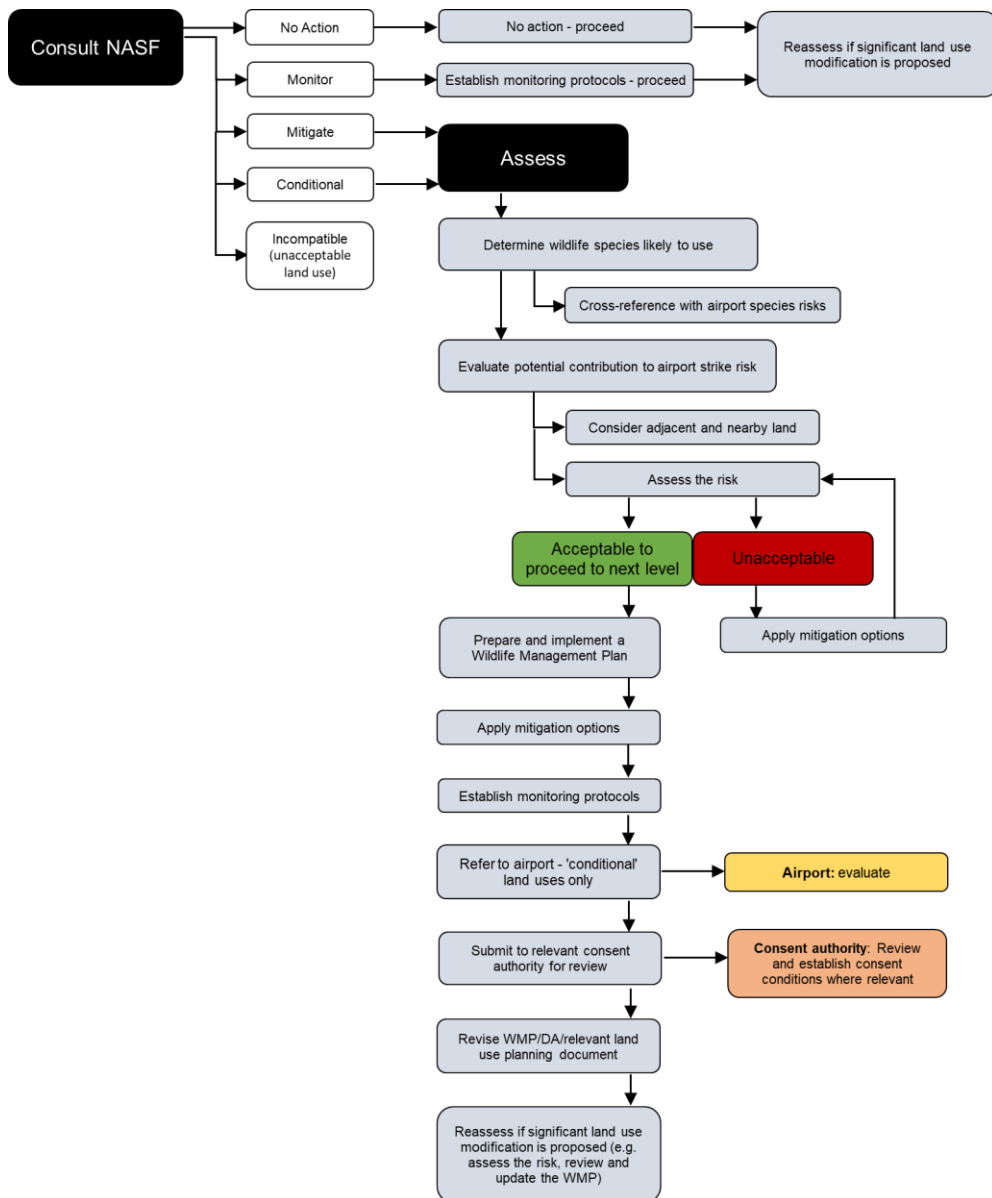
Discussion Question 7: How should Attachment 1 address the balance between certainty and flexibility?

This balance cannot be achieved due to the number of variables that contribute to a land use's wildlife attraction and how this then contributes to an airport's strike risk. Assessments should be done on a case-by-case basis and Guideline C should be used as an initial guide.

Discussion Question 8: What additional information would make Attachment 1 clearer or more usable?

See Question 5 response regarding expanding the land use types.

Refer to the wildlife attraction risk as 'indicative' or 'preliminary' and urge guideline users to assess their own land uses on a case-by-case basis. A basic flowchart could be used to trigger an assessment, for example:



Discussion Question 9: How should airport buffers be calculated and utilised?

Establish the 3km, 8km and 13km wildlife buffers based on distance from runway ends rather than from the ARP. The location of the ARP may mean the 3km buffer barely extends beyond the airport's perimeter fence.

Some land uses beyond the 13km buffer may be contributing an unacceptable risk. In these instances the guideline should recommend an assessment to determine the level of risk and to identify mitigation options. For example, nature conservation area that supports a flying-fox colony may sit outside the 13km buffer, however they could still contribute a significant strike risk because of their known foraging radius and the position of food trees relative to the colony and the airport. Flying-fox can travel 100 kilometres in a single night with a foraging radius of up to 50 kilometres from their camp (McConkey

et al. 2012⁶) and have been recorded travelling over 500 kilometres in two days between camps (Roberts et al. 2012⁷).

Other parts of Guideline C

Discussion Question 10: What additional information would make the guideline clearer or more usable?

It is difficult to embed the elements of the guideline into a planning framework. Planning frameworks require certainty for acceptable versus unacceptable practice. Wildlife strike management is based on risk, so each land use requires an understanding of the specific context of that location in relation to surrounding habitat features that cause wildlife to utilise the airspace that could be co-occupied in space and time, with aircraft. The risk presented by a land use may not only relate to the airspace above the land use, but also to the interaction of it as a habitat feature with other habitat features in the landscape, potentially causing wildlife to intersect aircraft flightpaths. A land use may also contribute to the productivity of wildlife populations, by for instance, providing an unnatural supply of food resource. The guideline could address this by suggesting methods for assessing risks relative to land uses and airports.

Discussion Question 11: How could the guideline structure be improved?

We do not have any additional recommendations for this question.

Discussion Question 12: How could the guideline better align with current planning and engagement practices?

Local and state governments may be reluctant to adopt it into their planning frameworks as it is a guidance document and not bound by law. There are no penalties or implications for local, state and territory planning departments for not adopting the principles. If the guideline could be integrated into state planning policies, or even endorsed by broad elements of the industry (e.g., CASA, ATSB, AAWHG, AAA, AUSALPA, ICAO), it would be more frequently referred to and likely to be embedded into local planning frameworks.

Provide guidance around how the guideline could be incorporated into performance outcomes and acceptable solutions, reference some examples including those identified in the following table.

Reference	Description
Christchurch District Council Christchurch District Plan	Lists acceptable plant species for use in and around the creation of water bodies and stormwater basins in the Birdstrike Management

⁶ McConkey, KR, Prasad, S, Corlett, RT, Campos-Arceiz, A, Brodie, JF, Rogers, H and Santamaria, L 2012, *Seed dispersal in changing landscapes*, Biological Conservation, vol. 146, pp. 1–13, doi:10.1016/j.biocon.2011.09.018

⁷ Roberts, BJ, Catterall, CP, Eby, P and Kanowski, J 2012, *Long-Distance and Frequent Movements of the Flying-Fox Pteropus poliocephalus: Implications for Management*, PLoS ONE, vol. 7, no. 8, e42532.

	<p>Area. Refer to Appendix 6.11.9 for the species list. Refer to 6.7.4.3.1 Permitted Activities for full description (see P3).</p> <p>These provisions give effect to:</p> <ul style="list-style-type: none"> • 6.7.2.1.2 Policy – Avoidance or mitigation of navigational or operational impediments: <ul style="list-style-type: none"> a. Avoid or mitigate the potential effects of activities that could interfere with the safe navigation and control of aircraft, including activities that could interfere with visibility or increase the possibility of birdstrike. • 3.3.12 Objective – Infrastructure: <ul style="list-style-type: none"> b. Strategic infrastructure, including its role and function, is protected from incompatible development and activities by avoiding adverse effects from them, including reverse sensitivity effects. This includes: <ul style="list-style-type: none"> iv. managing the risk of birdstrike to aircraft using Christchurch International Airport.
<p>City of Gold Coast City Plan</p>	<p>PO6: Development in the bird/bat strike zones of Gold Coast Airport, as identified on the Airport environs – wildlife hazard buffer zones overlay map, does not exacerbate the potential for bird or bat strike on aircraft:</p> <ul style="list-style-type: none"> • AO6.1: In locations within 3km of the Gold Coast Airport, as identified on Airport environs – wildlife hazard buffer zones overlay map, where planting as part of a development could result in increased attraction of birds or bats, with the possibility of creating a hazard for aircraft operations, plant species will be selected which are not subject to heavy flowering or fruiting. <p>Editors Note: The operator of Gold Coast Airport maintains a preferred plant species list that is available for the assistance of development proponents, if required.</p> <ul style="list-style-type: none"> • AO6.2: In the case of any development within an allotment located within 3km of the Gold Coast Airport, as identified on Airport environs – wildlife hazard buffer zones overlay map, with the potential to create or increase a hazard of bird or bat strike on aircraft evidence is provided to confirm that approval has been obtained from the operator of Gold Coast Airport. <p>See all AOs linked to PO6.</p>
<p>Brisbane City Council</p>	<p>Airport environs overlay code</p>

Brisbane City Plan	<p>PO4: Development does not attract birds and bats into operational airspace in significant numbers likely to cause a safety hazard to airport operations.</p> <ul style="list-style-type: none"> • AO4.2: Development involving landscaping or drainage works, including artificial water bodies located within the distance from airport 0-3km sub-category, are designed and installed to minimise the potential to attract birds and bats.
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Discussion Question 13: What changes are needed to ensure facts and references are correct and up-to-date?

Establish a regular review process, at least every two years. Invite key industry representatives to assist.

Discussion Question 14: What references or terms should be included or updated in the glossary?

Add *Wildlife Strike* to the definitions.

Add the following references for airports, planning authorities and land users to provide additional guidance and further reading:

- Department of Climate Change, Energy, the Environment and Water *National Flying-fox Monitoring Viewer*. Available at: <https://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf>
- Western Sydney Airport Safeguarding Tool. Available at: <https://www.westernsydney.com.au/your-airport/airport-safeguarding>
- International Civil Aviation Organization *Annex 14, Volume 1 (Aerodrome Design and Operation)*
- International Civil Aviation Organization *Airport Services Manual Doc. 9184: Part 2 Land Use and Environmental Control*
- International Civil Aviation Organization *Airport Services Manual Doc 9137: Part 3, Wildlife Control and Reduction*
- World Birdstrike Association *International Best Practice Standards for Airport Bird Control*
- Federal Aviation Administration (USA) Advisory Circulars:
 - 150/5200-33C - *Hazardous Wildlife Attractants on or near Airports*
 - 150/5190-4B - *Airport Land Use Compatibility Planning*
 - 150/5200-34A - *Construction or Establishment of Landfills near Public Airports*