

Aviation Safeguarding Guidelines

Western Sydney
Aerotropolis and
surrounding areas

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Abbreviations

Aerotropolis	Western Sydney Aerotropolis
Aerotropolis DCP	Western Sydney Aerotropolis Development Control Plan
Aerotropolis SEPP	State Environmental Planning Policy (Western Sydney Aerotropolis) 2020
ANEC	Australian Noise Exposure Concept
ANEF	Australian Noise Exposure Forecast
BRA	Building restricted area
CASA	Civil Aviation Safety Authority
CNS	Communications, navigation and surveillance facilities
DITRDC	Department of Infrastructure, Transport, Regional Development and Communications
HIAL	High intensity approach lighting
LHD	Local health district
NASAG	National Airports Safeguarding Advisory Group
NASF	National Airports Safeguarding Framework
OLS	Obstacle limitation surface
PANS-OPS	Procedures for air navigation services – aircraft operations
PSA	Public safety area
SHLS	Strategic helicopter landing site
WSA	Western Sydney Airport (the operator of WSI)
WSI	Western Sydney International (Nancy-Bird Walton) Airport

1 Purpose and background

1.1 Purpose of these guidelines

The purpose of these guidelines are to:

- assist relevant planning authorities, consultants and proponents when assessing and, preparing development applications which are impacted by aviation safeguarding controls;
- protect community safety and amenity; and
- safeguard the 24-hour operations of the Western Sydney International (Nancy-Bird Walton) Airport (WSI).

NSW Government has sought input and data from the Department of Infrastructure, Transport, Regional Development and Communications (DITRDC); Western Sydney Airport (WSA); and other relevant stakeholders to develop these guidelines. The intention is to provide a consolidated set of aviation safeguarding planning guidelines for the Western Sydney Aerotropolis (Aerotropolis) which utilises a single source of data.

These guidelines are advisory only. In the event of any inconsistency with relevant legislative requirements and the Aerotropolis DCP, the legislative requirements and Aerotropolis DCP prevail.

1.2 Application of these guidelines

Several aviation planning constraints (relating to noise, operational airspace, lighting, wildlife, wind turbines and communication, navigation and surveillance facilities) extend beyond the Aerotropolis boundary. These guidelines will be used by relevant planning authorities to help inform land use planning decisions and by proponents to prepare applications on land impacted by aviation safeguarding controls.

The final airspace design is expected to be confirmed closer to the opening of the Airport in 2026. Notwithstanding, land use planning will progress based on the most up-to-date information and will respond to any changes accordingly.

1.3 Vision for the Western Sydney Aerotropolis

The Aerotropolis is Australia's next global gateway, built around the world-class, curfew free WSI. The development of the Aerotropolis is a unique opportunity to drive transformational change in the Western Parkland City. It will embed a new landscape-led approach to planning and urban design, greatly improving opportunity, amenity and sustainability for workers and residents in Western Sydney.

Land use planning and development within the Aerotropolis will need to safeguard the 24-hour operations of WSI, while also including appropriate protections for the community.

1.4 National Airports Safeguarding Framework

The National Airports Safeguarding Framework (NASF), developed by the National Airports Safeguarding Advisory Group (NASAG), was first considered by all Australian governments at the Standing Council on Transport and Infrastructure meeting on 18 May 2012. The NASF offers a

nationally consistent approach to ensure an appropriate balance is maintained between the social, economic and environmental needs of the community and the effective use of airports.

The NASF is a national land use planning framework that aims to:

- improve community amenity by minimising aircraft noise-sensitive developments near airports; and
- improve safety outcomes by ensuring aviation safety requirements are recognised in land use planning decisions through guidelines being adopted by jurisdictions on various safety-related issues.

The NASF currently comprises nine guidelines which have been approved by NASAG:

- Guideline A: Measures for Managing Impacts of Aircraft Noise;
- Guideline B: Managing Risks of Building Windshear and Turbulence at Airports;
- Guideline C: Managing Risks of Wildlife Strike in the Vicinity of Airports;
- Guideline D: Managing Risks Associated with Wind Turbines;
- Guideline E: Managing Risks of Distractive Lighting in Vicinity of Airports;
- Guideline F: Managing Risks of Intrusion into Protected Airspace;
- Guideline G: Protecting Aviation Facilities – Communications, Navigation and Surveillance;
- Guideline H: Protecting Strategically Important Helicopter Landing Sites; and
- Guideline I: Managing the Risks in Public Safety Areas at the ends of Runways.

It is the responsibility of each jurisdiction to implement the NASF into their respective planning systems. Each state and territory will align their respective planning processes with the NASF principles and guidelines, as appropriate.

NSW Government supports the NASF with the exception of Guideline A. Guideline A was not supported by NSW as it sought to introduce new policy (N contours) in respect of land use and development outcomes in the vicinity of airports that lacked scientific rigor and community consultation. Instead, DPIE relies on ANEF contours and Australian Standard AS2021-2015 Acoustics – Aircraft Noise Intrusion Building Siting and Construction.

The NASF will be implemented through these guidelines, where appropriate.

1.5 Relationship to other documents and instruments

These guidelines and subsequent amendments should be read in conjunction with the *Western Sydney Aerotropolis Plan*, *State Environment Planning Policy (Western Sydney Aerotropolis) 2020* (Aerotropolis SEPP), *Western Sydney Aerotropolis Development Control Plan* (Aerotropolis DCP and Ministerial Directions 3.5 and 7.8.

The Aerotropolis SEPP which was released on 1 October 2020, applies to the 11,200-hectare area surrounding WSI, except for the Mamre Road Precinct. The Mamre Road Precinct was zoned under State Environment Planning Policy (Western Sydney Employment Area) 2009. Part 3 of the

Aerotropolis SEPP relates to aviation safeguarding provisions and in some instances relates to land outside the Aerotropolis boundary.

The Aerotropolis SEPP is an environmental planning instrument which aims to facilitate and promote the sustainable, orderly and transformational development of the Aerotropolis whilst ensuring development is compatible with the long-term growth and development of WSI, including in relation to the operation of WSI 24 hours a day.

The Aerotropolis SEPP is supported by the Aerotropolis DCP which identifies the objectives, performance outcomes and benchmark solutions to allow appropriate development within the Aerotropolis, including those relating to aviation safeguarding. The aviation safeguarding controls within the SEPP and DCP have also helped inform the Aerotropolis Precinct Plans.

1.6 Referrals under Western Sydney Aerotropolis Planning Framework

WSA is the Airport Lessee Company under the Airports Act 1996. Accordingly, where the Aerotropolis SEPP references the 'relevant Commonwealth body', it is referring to WSA. Any referrals triggered under the Aerotropolis planning framework are to be sent to WSA who will coordinate formal responses from the Civil Aviation Safety Authority (CASA), Airservices Australia and the Commonwealth Department of Infrastructure, Transport, Regional Development and Communications.

1.7 Western Sydney Airport Aviation Safeguarding Mapping Tool

WSA has developed a supplementary online aviation safeguarding mapping tool which interprets some of the planning protection overlays referred to in Part 3 of the Aerotropolis SEPP, on any particular parcel of land in the vicinity of WSI. The tool shows:

1. The maximum height at which a building may be constructed on land within the Aerotropolis, without breaching the obstacle limitation surface and becoming an obstacle or hazard to aircraft operations;
2. Wildlife buffer zones, being land within certain radiuses of WSI where consideration of wildlife hazard issues is required;
3. Land within the lighting intensity areas which significant lighting and/or coloured lighting is restricted or is required to be designed to minimise risk of distraction to pilots;
4. Areas of land which are likely to be affected by aircraft operations and which must therefore undergo strict assessment in terms of the type of development that can be carried out on the land and the mitigation measures required to ensure that the development does not result in unnecessary constraints on airport operations;
5. Areas of land within a certain proximity of WSI where buildings have the potential to generate or increase wind turbulence or windshear and therefore aircraft instability during landing or take-off;
6. The areas of land at the end of WSI runways which are considered to be risk areas for aircraft incidences involving take-off or landing which must be strictly controlled and managed to reduce the amount of people that may be affected in the event of such incident.

A link to WSA's online aviation safeguarding mapping tool is provided below.

<http://westernsydney.com.au/your-airport/airport-safeguarding-tool>

Please note the conditions of use of this tool which can be viewed at the above link. This includes that the information is of a general nature and is for guidance only. Please also note that the height of prescribed surfaces (such as the OLS surface) in relation to any land affected by those surfaces is illustrated in the WSI Safeguarding Tool, however, the tool only provides an estimation of ground level elevations. A detailed site and topographic survey should be undertaken to determine actual ground levels.

Information on protected airspace and the application process is available on the WSA website. Proponents of proposed controlled activities must apply to WSA for approval.

2 Managing impacts of aircraft noise

2.1 Objectives

- manage the impacts of aircraft noise on the community and noise sensitive uses;
- ensure development around WSI does not result in unnecessary constraints on airport operations; and
- ensure planning authorities consider the aircraft noise guidelines and noise exposure contour maps when undertaking land use planning for the Aerotropolis and surrounding areas of influence.

2.2 Why is it important?

Over the long-term, inappropriate development around airports can result in unnecessary constraints on airport operations and negative impacts on community amenity. These impacts need to be managed in a balanced way.

2.3 How to measure noise impacts

Definitions:

- **Australian Noise Exposure Forecast (ANEF)**, refers to approved forecasts (by Airservices Australia) of future noise exposure patterns around an airport that constitute the contours on which land use planning authorities base their controls. An ANEF is presented as contours, for example ANEF 20-25 contour, ANEF 25-30 contour, ANEF 30-35 contour and ANEC/ANEF 35+ contour. A higher number represents a higher exposure to aircraft noise.
- **Australian Noise Exposure Concept (ANEC)**, refers to anticipated forecasts of future noise exposure patterns based on indicative flight paths around an airport that constitute the contours.
- **N contours**, indicate potential noise exposure where the noise level from a single aircraft exceeds 60dB(A), 65dB(A) or 70dB(A) per day, as opposed to the annual average approach that informs the application of ANEF contours.

2.4 How to manage noise impacts

NSW Government position on managing aircraft noise impacts

The NSW Government supports the NASF with the exception of Guideline A. Guideline A was not supported by NSW as it sought to introduce new policy (N contours) in respect of land use and development outcomes in the vicinity of airports that lacked scientific rigor and community consultation. Guideline A would potentially have resulted in significant new restrictions being applied to housing and communities in the vicinity of airports and was not considered superior to the existing policy of the Department of Planning, Industry and Environment which relies on ANEF contours and Australian Standard AS2021-2015 Acoustics – Aircraft Noise Intrusion Building Sitting and Construction. NSW Government has endorsed the use of ANEF for land use planning, not the N contours.

Western Sydney International (Nancy-Bird Walton) Airport and Western Sydney Aerotropolis

Until the ANEF contour is approved for WSI, the ANEC contour is to be used to inform land use planning.

In preparing planning controls for the Aerotropolis and surrounding areas, a precautionary approach to aircraft noise controls, particularly noise sensitive development within the ANEC/ANEF 20 and above contours was taken.

Noise sensitive development means development for the following purposes:

- a) centre-based childcare facilities
- b) educational establishments
- c) exhibition homes
- d) exhibition villages
- e) funeral homes
- f) hospitals
- g) information and education facilities
- h) places of public worship
- i) residential accommodation
- j) respite day care centres
- k) school-based child care (other than in an existing school).

A precautionary approach will protect the amenity of community and safeguard the curfew-free operations of WSI. As such, no intensification of noise sensitive development (including residential development) will be permitted within the ANEC 20 and above contours. For example, dual occupancies, secondary dwellings and the subdivision of land for residential purposes that have not already been approved, will not be permitted.

However, both the Aerotropolis SEPP and the Western Sydney Aerotropolis Plan clarifies that in existing residential areas or on land already approved for residential development, the ability to construct dwelling houses will not be removed. Additionally, renovations to existing dwelling houses or extensions will still be allowed. Further, any development for the purposes of dwelling houses within the ANEC 20 and above contours will be subject to the development meeting indoor design sound levels shown in Table 3.3 (Indoor Design Sound Levels for Determination of Aircraft Noise Reduction) in AS 2021—2015, Acoustics—Aircraft noise intrusion—Building siting and construction. The above is reflected in clause 19(4) of the SEPP.

Existing Use Rights

The NSW planning system under Section 4.65 of the *Environmental Planning and Assessment Act 1979* includes protections for uses that currently exist and operate (prior to a new plan being in place) on a site under a lawful planning approval. These protections are known as ‘existing use rights’.

All land owners are allowed to continue the use of their land if the use has lawfully commenced at the time of the rezoning under the Aerotropolis SEPP or the use has not been abandoned.

It is possible to enlarge, expand or intensify, alter, or extend an existing use but only with the approval of the relevant consent authority.

In addition, an existing and lawful use stays with the property and will therefore transfer to any new owner.

As the circumstances of existing use rights varies from site to site, a landowner may wish to seek professional advice on these matters.

2.5 Western Sydney International (Nancy-Bird Walton) Airport noise exposure contours

The noise exposure map for WSI can be viewed at the link below.

https://eplanningdlprod.blob.core.windows.net/pdfmaps/SEPP_WSA_NEC_001_150_20200901.pdf

3 Managing the risk of building windshear and turbulence

3.1 Objectives

- safeguard airport operations from the risk of building generated windshear and building generated turbulence;
- identify the assessment trigger area around runways, within which buildings should be assessed and referred to CASA for comment;
- map the windshear and turbulence area of influence for WSI; and
- ensure planning authorities consider these building generated windshear and turbulence guidelines when undertaking land use planning for the Aerotropolis and surrounding areas of influence.

3.2 Why is it important?

Building-induced windshear and turbulence can be a problem for aviation operations in cases where structures are situated close to airport runways. When a significant obstacle is located in the path of a crosswind to an operational runway, the wind flow will be diverted around and over the building and can cause the crosswind speed to vary along the runway. This can cause an aircraft's intended flight path to be involuntarily altered or impacted on landing and/or take off.

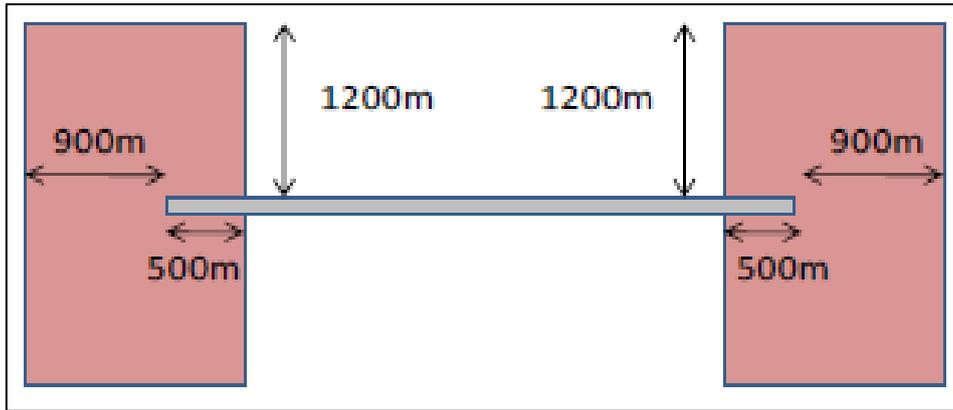
3.3 How to manage the risk and referral triggers

NASF Guideline B presents a layered risk approach to the siting and design of buildings near airport runways to assist land use planners and airport operators to reduce the risk of building generated windshear and turbulence.

Buildings that could pose a safety risk are those located within a rectangular assessment trigger area around the runway ends (as shown in **Figure 1**). This has been incorporated into the Aerotropolis SEPP as the 'Windshear Assessment Trigger Area'. The rectangular assessment trigger area is located within:

- 1200m or closer perpendicular from the runway centreline (or extended runway centreline); and
- 900m or closer in front of runway threshold (towards the landside of the airport); and
- 500m or closer from the runway threshold along the runway.

Figure 1: Assessment trigger area around runways, within which buildings should be assessed (DITRDC, 2019)



However, only those buildings that penetrate a 1:35 surface within the assessment trigger areas pose a risk and require further consideration. The 1:35 surface is to be applied to rule out buildings that will clearly not pose a risk and therefore don't require referral to WSA.

The 1:35 surface is very conservative and any building that does not penetrate the surface is not expected to create unsafe wind effects. For example, a building that exceeds 10m in height within 350m of the centreline of the runway will require a windshear/turbulence assessment and referral. However, a building that is 10m in height 400 metres from the centreline of the runway will not need any windshear/turbulence assessment or referral.

Any development that does require referral is to be accompanied by a windshear and turbulence risk assessed prepared by a suitably qualified wind engineer.

A plan view of the 1:35 surface within the assessment trigger area is shown below in **Figure 2**. An elevation view of the 1:35 surface, looking down the runway centreline is shown in **Figure 3**. Proponent should consult WSA for the exact location of the runway centreline.

Figure 2: Plan view of 1:35 surface for windshear/turbulence assessment trigger area (DITRDC, 2019)

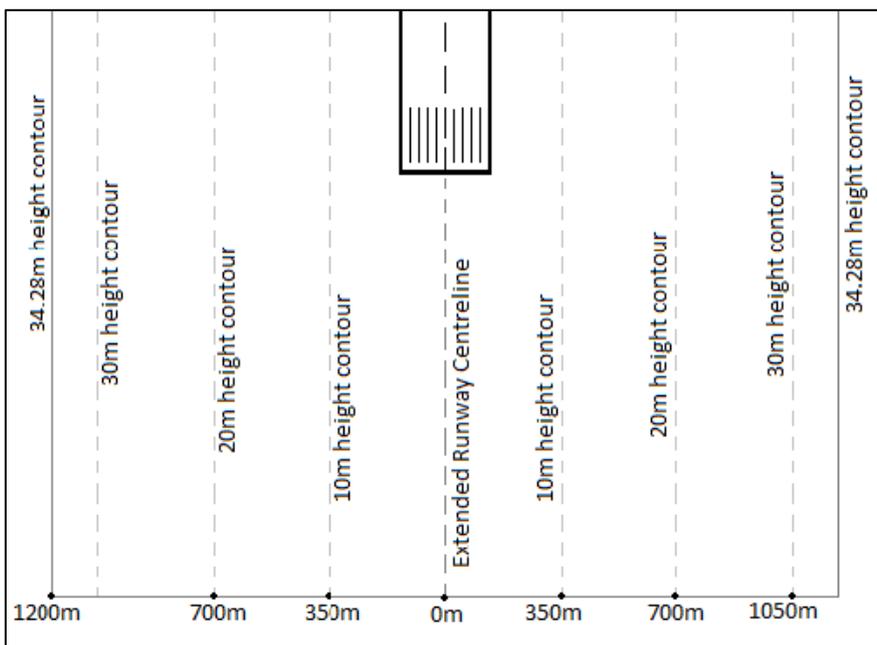
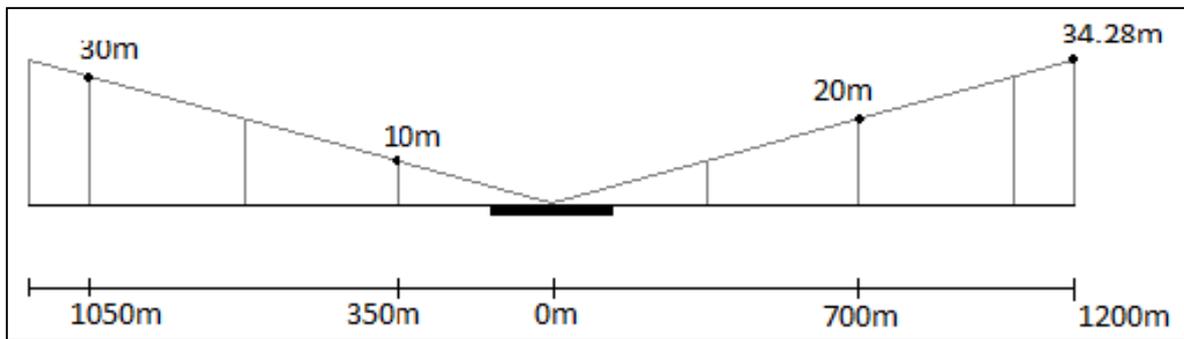


Figure 3: Elevation view of 1:35 surface for windshear/turbulence assessment trigger area (DITRDC, 2019)



It is important that local approval authorities/decision makers consider the potential risks of windshear and turbulence when approving off-airport buildings heights and refer relevant applications to WSA. If hazardous buildings are approved, airport safety and/or capacity may be compromised.

3.4 Western Sydney International (Nancy-Bird Walton) Airport building generating windshear and turbulence area of influence

The windshear and turbulence area of influence map for WSI can be viewed at the link below.

https://eplanningdlprod.blob.core.windows.net/pdfmaps/SEPP_WSA_LIW_001_080_20200901.pdf

4 Managing the risk of wildlife in the vicinity of airports

4.1 Objectives

- 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.

4.2 Why is it important?

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.

4.3 How to manage the risk and referral triggers

Western Sydney Aerotropolis

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 flight 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.

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

The wildlife buffer zones map for WSI can be viewed at the link below.

https://eplanningdlprod.blob.core.windows.net/pdfmaps/SEPP_WSA_WBZ_001_160_20200901.pdf

5 Managing the risk of wind turbines as physical obstacles to air navigation

5.1 Objectives

- safeguard airports operations from the risk of wind turbines, wind farms and wind monitoring towers; and
- provide guidance to decision makers and developers early in the process to address the risk of wind farms and wind monitoring towers.

5.2 Why is it important?

Wind turbines can be hazardous to aviation as they are tall structures with the potential to come into conflict with low flying aircraft. Temporary and permanent wind monitoring towers can be erected in anticipation of, or in association with, wind farms and can also be hazardous to aviation, particularly given their low visibility.

These structures can also affect the performance of communications, navigation and surveillance facilities (see Section 8 for further detail on communication, navigation and surveillance facilities) operated by Airservices Australia and the Department of Defence.

5.3 How to manage the risk and referral triggers

Consultation

Consultation with aviation stakeholders is strongly encouraged in the early stages of planning for wind turbine developments. This should include:

- early identification and consultation with nearby airports.
- immediate consultation with any nearby aerodrome owners;
- preliminary assessment by an aviation consultant of potential issues;
- confirmation of the extent of the obstacle limitation surface;
- consultation with Defence;
- registration on the Royal Australian Air Force Aeronautical Information Service database of any structure 30 metres or more above ground level;
- consultation with local agricultural pilots and nearby unlicensed airstrip owners; and
- consultation with WSA (who will liaise with CASA and Airservices Australia), for wind turbines and wind monitoring towers within 30km of WSI.

Risk Assessment

Following preliminary assessment by an aviation consultant of potential issues, proponents are to commission a formal assessment of any risks to aviation safety posed by the proposed development.

This assessment is to address any issues identified during stakeholder consultation. The risk assessment, is to address whether the proposed structure is:

- hazardous, but that the risks to aircraft safety would be reduced by the provision of approved lighting and/or marking; or
- hazardous and should not be built, either in the location and/or to the height proposed as an unacceptable risk to aircraft safety will be created; or
- not a hazard to aircraft safety.

If advice from the relevant Commonwealth body (CASA) is that the proposal is hazardous and should not be built, planning authorities should not approve the proposal. Planning decision makers should not approve a wind turbine to which WSA has objected.

5.4 Wind turbines within 30km of Western Sydney International (Nancy-Bird Walton) Airport

Wind turbines are prohibited within 3km of the WSI. In all other circumstances, wind turbines within 30km of WSI are to be referred to WSA who will coordinate responses from other Commonwealth bodies such as CASA, Airservices and DITRDC.

6 Managing the risk of lighting distractions to pilots in the vicinity of airports

6.1 Objectives

- safeguard airport operations from the risk of lighting distractions to pilots;
- map the lighting zones of influence around WSI;
- maintain compliance with Regulation 94 of the *Civil Aviation Regulations 1988*; and
- ensure planning authorities consider lighting guidelines when undertaking land use planning around WSI.

6.2 Why is it important?

Pilots are reliant on the specific patterns of aeronautical ground lights during inclement weather and outside daylight hours. These aeronautical ground lights, such as runway light and approach lights, play a vital role in enabling pilots to align their aircraft with the runway in use. They also enable the pilot to land the aircraft at the appropriate part of the runway. The NASF guideline provides examples of new sources of significant lighting that may impact pilots vision including:

- motorway/freeway lighting;
- refinery flare plumes;
- stadium flood lighting; and
- construction lighting.

6.3 How to manage the risk and referral triggers

NASF Guideline E provides a 6km buffer (applied from the centre point of the runway) and four zones of lighting influence (A, B, C and D). Each zone specifies the maximum intensity of light sources measured at 3 degrees above the horizontal (**Figure 4**).

External lighting within the 6km lighting intensity buffer Aerotropolis SEPP map must not exceed a maximum intensity of light of:

- 0 candelas in zone A
- 50 candelas in zone B
- 150 candelas in zone C
- 450 candelas in zone D

A candela is a unit of luminous intensity in the International System of Units.

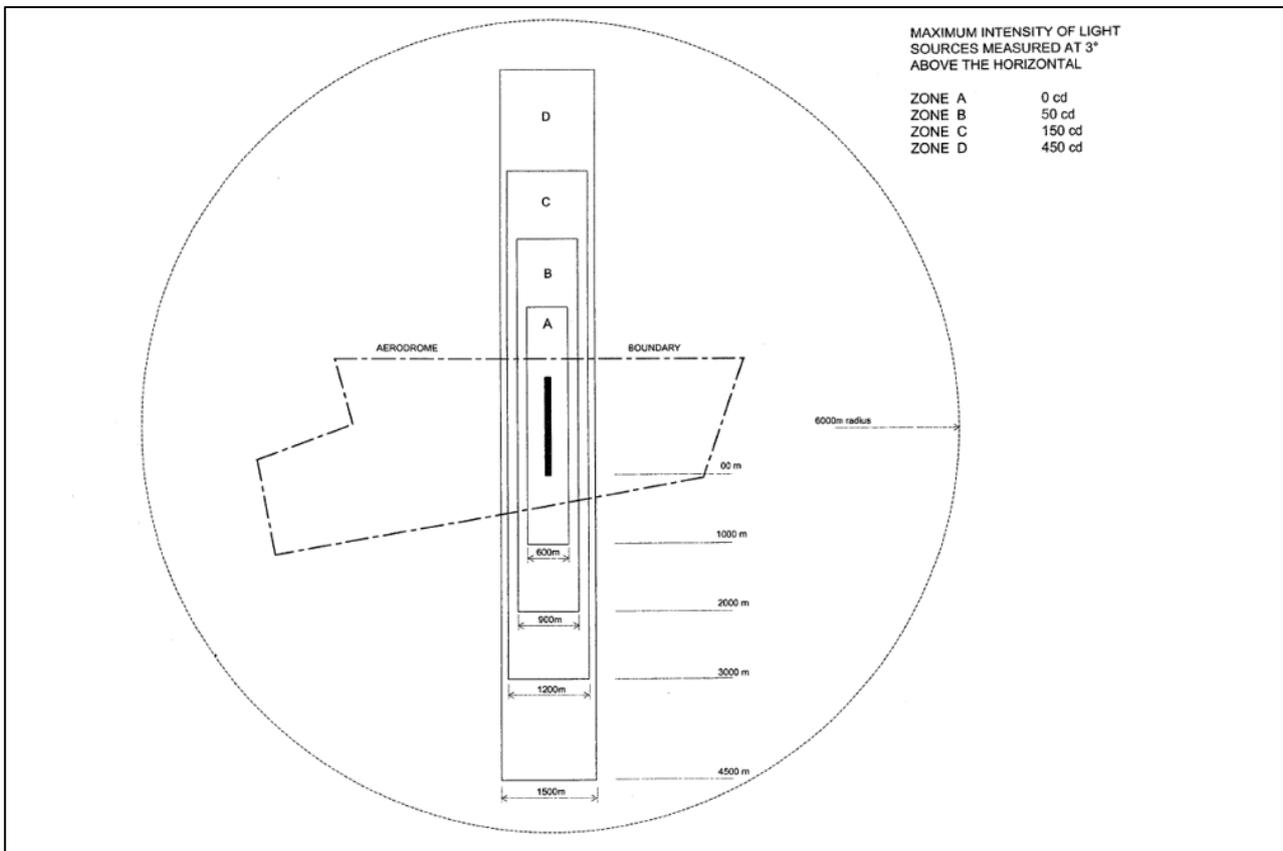
In accordance with the Aerotropolis SEPP, development consent must not be granted to development for the following purposes on land shown on the Aerotropolis SEPP Lighting Intensity Map unless the consent authority has consulted with WSA:

- a) installation and operation of external lighting (whether coloured or white lighting) in connection with development for the following purposes—
- i. classified roads
 - ii. freight transport facilities
 - iii. heavy industrial storage establishments
 - iv. recreation facilities (major)
 - v. recreation facilities (outdoor).
- b) installation and operation of external lighting in connection with construction works that is likely to be obtrusive or create light spill outside the land on which the construction works are carried out.

Additionally, buildings are to be designed to reduce distraction to pilots as a result of reflected sunlight.

Additional provisions are contained within the DCP to reduce the impact of light emission on pilots. For example, the fitting of lights with shrouds and not incorporating flashing or coloured lights within developments.

Figure 4: Lighting zones of influence arounds airports example (DITRDC, 2019)



6.4 Western Sydney International (Nancy-Bird Walton) Airport lighting zones of influence

The lighting zones of influence map for WSI can be viewed at the link below.

https://eplanningdlprod.blob.core.windows.net/pdfmaps/SEPP_WSA_LIW_001_080_20200901.pdf

7 Managing the risk of intrusions into protected airspace of airports

WHAT IS PROTECTED AIRSPACE?

International standards have been adopted which define a number of invisible surfaces above an airport and its surrounds. The airspace above these surfaces forms the airport's protected airspace. These surfaces are established with the aim of protecting aircraft from obstacles or activities that could be a threat to safety.

7.1 Objectives

- ensure development around airports do not impede on airspace required for aviation purposes;
- avoid impacts on safe aviation operations from development and associated activities surrounding airports;
- ensure WSA can map, record and monitor any approved encroachments and intrusions (known as controlled activities); and
- ensure planning authorities consider the airspace requirements when determining applications surrounding WSI.

7.2 Why is it important?

Structures and other activities that intrude into protected airspace have the potential to impact safe aviation operations at airports. Such activities/intrusions must be managed or mitigated in accordance with the advice of WSA, CASA, Airservices Australia and DITRDC.

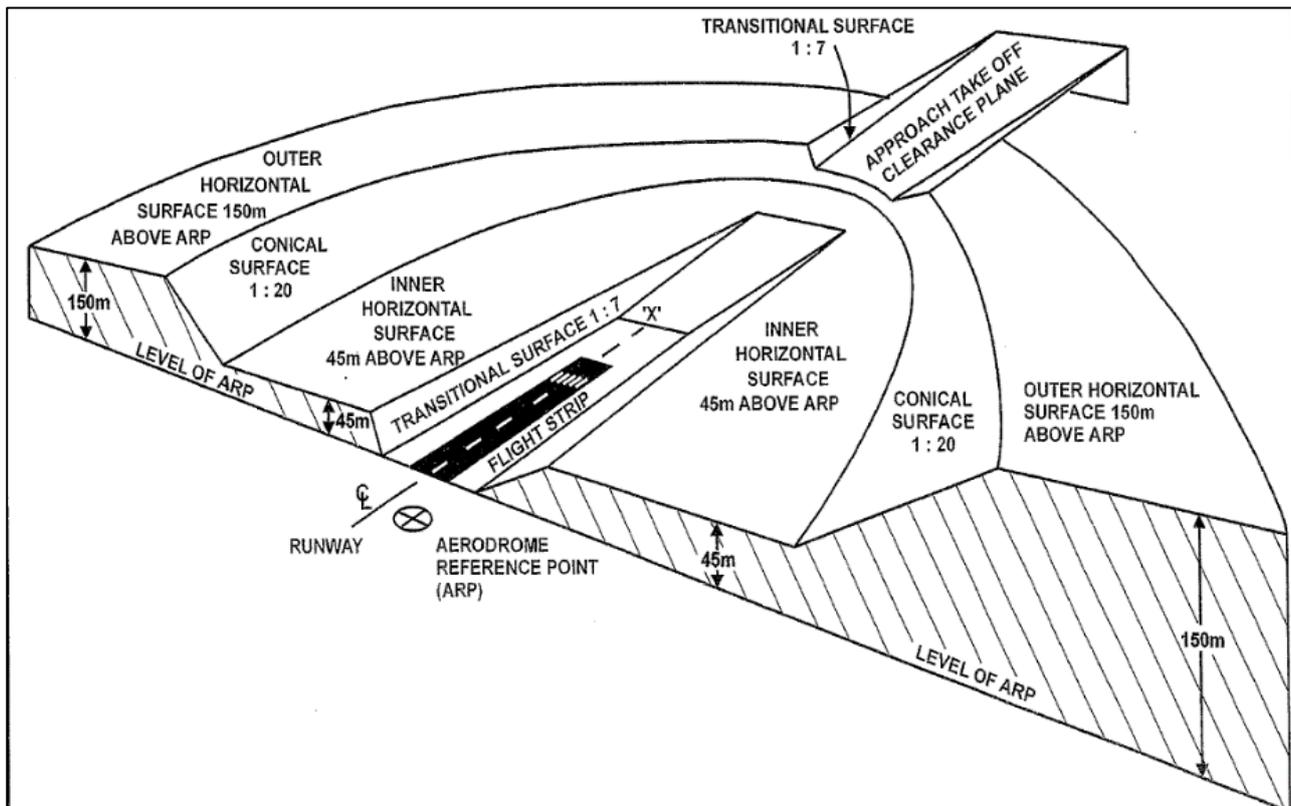
Intrusions into prescribed airspace that do not have prior approval under the Airports (Protection of Airspace) Regulations 1996 or present an unacceptable impact on the safety of airport operations are not permitted. Under Part 12 of the Airports Act 1996, it is an offence to carry out a controlled activity in relation to prescribed airspace without the necessary approval under the Airports (Protection of Airspace) Regulations 1996. Such offences are punishable on conviction by a penalty of up to 250 penalty units for an individual and 1,250 penalty units for a corporation.

7.3 How to manage the risk

Protected airspace associated with airports typically includes the following key surfaces:

- **Obstacle limitation surface (OLS)** – a series of surfaces that define the limits to which structures or objects may project into the airspace to ensure the safety of aircraft in visual flight conditions (good weather conditions). Broadly, the OLS comprises an Inner Horizontal Surface, an Outer Horizontal Surface, approach / take off clearance planes from each runway, and a series of transitional surfaces, as shown in **Figure 5**. An OLS has been prepared for WSI and is available on WSA's website.

Figure 5: Isometric/explanatory view of an OLS (DITRDC, 2019)



- **Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS)** – a surface generally above the OLS and is designed to safeguard an aircraft from collision with obstacles when the aircraft's flight may be guided solely by instruments, in conditions of poor visibility. A PANS-OPS for WSI will be prepared once flight paths have been designed and finalised.
- **Other surfaces** – defined to ensure off-airport obstacles do not interfere with signals from ground-based air navigation equipment (such as radar) or obscure airport safety lights (such as high intensity approach lights (HIAL)). If radar signals are interfered with, a pilot may receive inaccurate information about the location of the aircraft in relation to the airport. If the HIAL are obscured, particularly in low visibility conditions when they are most needed, a pilot may lose sight of the runway just before landing. Both scenarios pose an obvious risk to safety.

Land use and development planning for the Western Sydney Aerotropolis

Development that intrudes into airspace that is prescribed for WSI should be avoided. As part of the assessment of a development application for development that intrudes into airspace that is prescribed for WSI, Clause 24 of the SEPP requires the consent authority to consult with WSA.

In addition, separate approvals under the Airports (Protection of Airspace) Regulations 1996 are required for activities that intrude into airspaces that is prescribes for WSI. Those activities, referred to as 'controlled activities' are listed in section 182 of the Airports Act 1996 and include:

- permanent structures, such as buildings, antennas plumes etc intruding into prescribed airspace;

- temporary structures such as cranes intruding into prescribed airspace (information for crane operators); and
- any activities causing intrusions into prescribed airspace through glare from artificial light or reflected sunlight, air turbulence from stacks or vents, smoke, dust, steam or other gases or particulate matter.

Under the Protection of Airspace Regulations, some proposed permanent and temporary structures around the Airport may be temporarily exempt until 2025 (prior to WSI becoming operational). However, proponents should consult WSA where required to ensure that all proposed activities that may intrude into prescribed airspace are identified and assessed for their potential impact on aircraft operations. The assessment will enable a determination on whether the intrusion is permissible, and if so, whether any risk mitigations measures such as lighting and marking should be imposed.

The height of the OLS surface in relation to any land affected by those surfaces, is illustrated in WSA's online aviation safeguarding mapping tool. The tool only provides an estimation of ground level elevations. A development proposal will need to be accompanied by a detailed site and topographic survey to determine actual ground levels.

The charts and associated heights of other prescribed surfaces will also be made available via WSA's website once the flight path designs have been finalised and the relevant surfaces have been declared under the Airports (Protection of Airspace) Regulations 1996.

7.4 Western Sydney International (Nancy-Bird Walton) Airport obstacle limitation surface

The obstacle limitation surface map for the WSI can be viewed at the link below.

https://eplanningdlprod.blob.core.windows.net/pdfmaps/SEPP_WSA_OLS_001_140_20200901.pdf

8 Protecting aviation facilities – communications, navigations and surveillance

WHAT ARE COMMUNICATIONS, NAVIATION AND SURVEILLANCE (CNS) FACILITIES?

- **Communication facilities** enable air-to-ground communications between pilots and air traffic control, or communications between major air traffic control and other aviation facilities. Signal reception between aircraft and ground facilities is by line of sight or via a satellite link.
- **Navigation facilities** refer to a network of ground-based navigation aids and is used for instrument navigation by pilots of suitably equipped aircraft. Generally, navigation aids are located at airports or at key points on air routes.
- **Surveillance facilities** monitor air routes and aircraft movements to assist traffic control with more accurate information on aircraft position. This reduces the need for voice communications between air traffic control and the pilot.

8.1 Objectives

- provide land use planning outcomes to better protect airport CNS facilities and to safely manage the flow of aircraft into, out of and across Australian airspace; and
- inform procedures which ensure development and associated activities within building restricted areas of CNS facilities do not adversely affect the facility or cause interference for air traffic controllers or aircraft in transit.

8.2 Why is it important?

CNS facilities are crucial to the safety of aviation. Airservices Australia and the Department of Defence rely on them to ensure the safety of civilian and military aircraft operations, maximising aircraft flying safely.

CNS infrastructure and facilities enable:

- pilots to navigate while enroute between airports;
- pilots to utilise navigation aids to conduct instrument approach procedures;
- dialogue between pilots and air traffic control; and
- air traffic control to monitor and confirm an aircraft location.

If not properly assessed and managed, inappropriate development located in the building restricted areas of CNS facilities can compromise their effectiveness.

8.3 How to manage the risk

Building restricted areas

The building restricted area (BRA) is defined as a space where development has the potential to cause unacceptable interference to CNS facilities. However, the BRA of a CNS facility can extend up to 15 kilometres from a facility in some instances, increasing the potential for new development to adversely impact on its effectiveness.

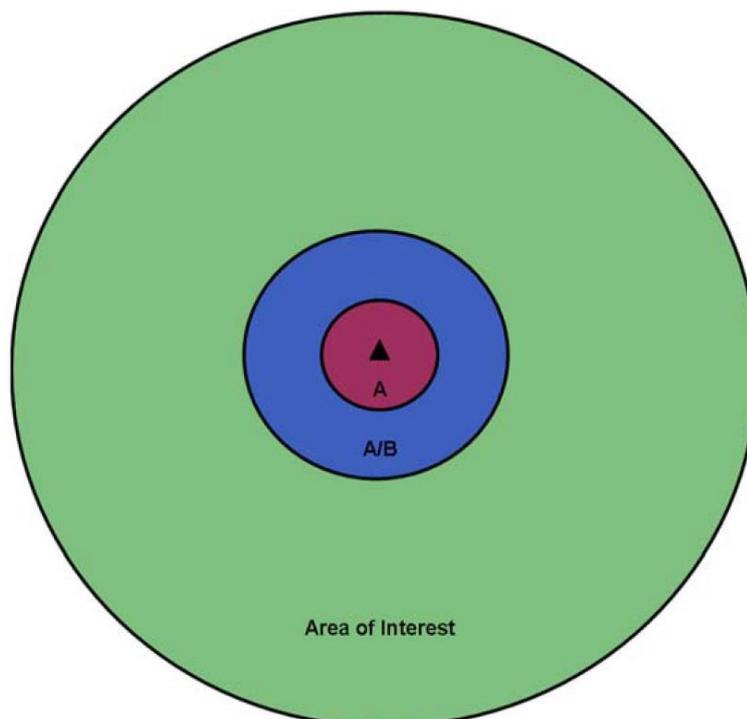
The purpose of BRAs is to trigger an assessment of potential impacts on CNS facilities from proposed developments. They are not intended to prohibit development, except where it would lead to an adverse impact on a CNS facility.

Generally, a BRA should be kept clear of permanent or temporary:

- obstructions (e.g. buildings, other structures or trees) to the 'line of sight' between transmitting and receiving devices;
- objects (e.g. turbines) which act as reflectors or deflect signals used by aviation facilities;
- radio frequency interference;
- electromagnetic emissions (e.g. such as those emitted by arc welding associated with steel fabrication); or
- plume rises (as defined in the *Airports (Protection of Airspace) Regulations 1996*).

The extent of the BRA depends on the type of CNS facility. It is usually divided into zones A, A/B and an area of interest, within which different types of development are considered compatible (**Figure 6**).

Figure 6: Building restricted area zones of interest (DITRDC, 2019)



Land use planning

When allocating land uses in areas where development or activity has the potential to impact on the functioning of CNS facilities, preference should be given to those uses that are unlikely to impact on a facility's BRA.

As WSI is not yet operational, the location of all CNS facilities is yet to be confirmed. As this information becomes available it is essential that land use planners incorporate updated information into their assessment. Until then those CNS facilities that are known are to be protected.

Development assessment

Development which may trigger an assessment include:

- buildings (multistorey offices or residential, private houses, sheds, car parks);
- hangars and warehouses;
- infrastructure including bridges and motorway overpasses;
- power station stacks and plumes;
- power lines, power poles and light poles;
- telecommunications towers;
- commercial signage and advertising billboards;
- wind turbines and wind monitoring masts; and
- construction equipment such as cranes (e.g. mobile, tower and luffing) and concrete pumpers.

The proponent should seek advice from the relevant planning authority to ascertain whether that proposed development infringes a BRA.

In cases where proposed development will potentially infringe a BRA, the consent authority refers the proposal to WSA who will consult with Airservices Australia for specialist engineering analysis.

Once assessed, advice will be provided to the consent authority regarding any impact on performance of the CNS facility and, where possible, appropriate mitigation measures.

Once a decision is made the consent authority is to notify Airservices Australia, the airport and the Department of Defence, where relevant, of the final decision including any mitigation measures.

8.4 Western Sydney International (Nancy-Bird Walton) Airport communications, navigation and surveillance facilities

Mapping for WSI's CNS facilities is currently under development. A link to the relevant mapping will be provided in the final Aviation Safeguarding Guidelines.

9 Protecting strategically important helicopter landing sites

9.1 Objectives

- encourage the protection of strategically important landing sites (SHLSs) in strategic land use planning decisions; and
- provide guidance on those development applications/proposals that require referral due to their potential impact on the safe and efficient operation of a SHLS;

9.2 Why is it important?

Not all helicopter landing sites (HLS) will require protection from land use or development due to the nature or frequency of use. However, where an HLS is identified as being of strategic importance these sites must be protected from surrounding incompatible uses and encroachment into their flight paths.

The safety, viability and efficient operation of aircraft accessing a SHLS can be compromised by surrounding development including permanent buildings and temporary structures (including cranes), gaseous plumes, telecommunication towers, overhead wires and power lines as well as landscape features (such as trees).

Over recent years, there have been incidents where hospital helicopter landing sites have been decommissioned due to safety concerns arising from the impact of nearby development. In some instances, the flight paths to/from the SHLS have been able to be adjusted. However, this is not always possible due to the extent of development that already exists around the SHLS and other considerations, including prevailing winds.

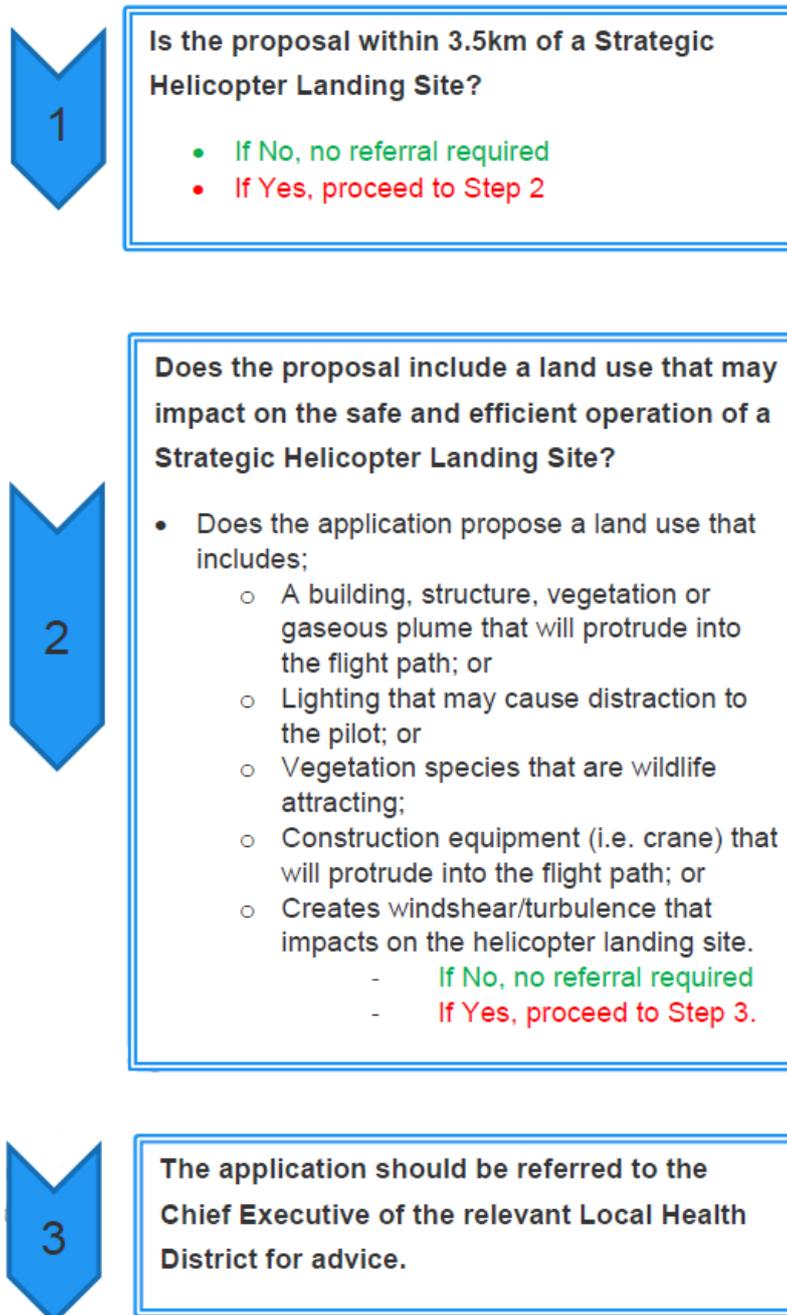
Health Infrastructure and Ambulance NSW have advised that only a small number of councils are referring applications that could impact upon a SHLS. They are only becoming aware of these obstructions once construction has started or a crane is installed. There are no formal referral trigger requirements to Local Health District (LHD) to assess the impact of development on SHLS.

9.3 How to manage the risk and referral triggers

NSW Department of Planning, Industry and Environment have consulted with Ambulance NSW and Health Infrastructure to identify those SHLS that require protection in NSW.

When an application is received that is within 3.5km of a SHLS and has the potential to impact on the safe and efficient operation of that SHLS, the relevant approval authority should refer the application to the Chief Executive of the LHD (**Figure 7**). The LHD will assess the proposal to determine potential impacts on the SHLS and provide advice to the approval authority.

Figure 7: Referral checklist for Strategic Helicopter Landing Sites



9.4 Strategic helicopter landing sites and the Western Sydney Aerotropolis

NSW Health have indicated that there are no plans for any new hospitals within the Aerotropolis. In addition, no surrounding hospitals (Nepean Hospital, Mt Druitt Hospital, Blacktown Hospital and Liverpool Hospital) are within 3.5km of WSI. These guidelines should be considered if any hospitals or health care facilities are to be located within or in proximity of the Aerotropolis in the future.

10 Managing the risk in public safety areas at the ends of runways

10.1 Objectives

- limit the number of people living, working or congregating within PSAs through appropriate land use planning;
- avoid the location of bulk storage and handling of hazardous materials within PSAs; and
- ensure land-use planners consider public safety areas when assessing development, considering rezoning requests and developing strategic land use plans.

10.2 Why is it important?

While Australia has an excellent aviation safety record, there will always be an inherent risk associated with flying and the operation of aircraft at or around airports. The use of PSAs in land use planning can further reduce the already low risk of an air transport accident affecting people who live, work or travel in close proximity to airports.

While air crashes are rare events, historically, the majority occur in the vicinity of airports during take-off or landing of aircraft. Analysis of commercial airliner crash data indicates that over 50% of aircraft accidents occur in the initial stages of take-off and climb, and the final stages of approach and landing, when aircraft are below 1,000ft elevation and aligned with the runway. In many cases, but not all, these areas extend beyond the boundaries of airports.

The way land use is managed at the end of runways, including beyond airport boundaries, can contribute to mitigating the risk of on-ground fatalities from aircraft incidents.

10.3 How to manage the risk

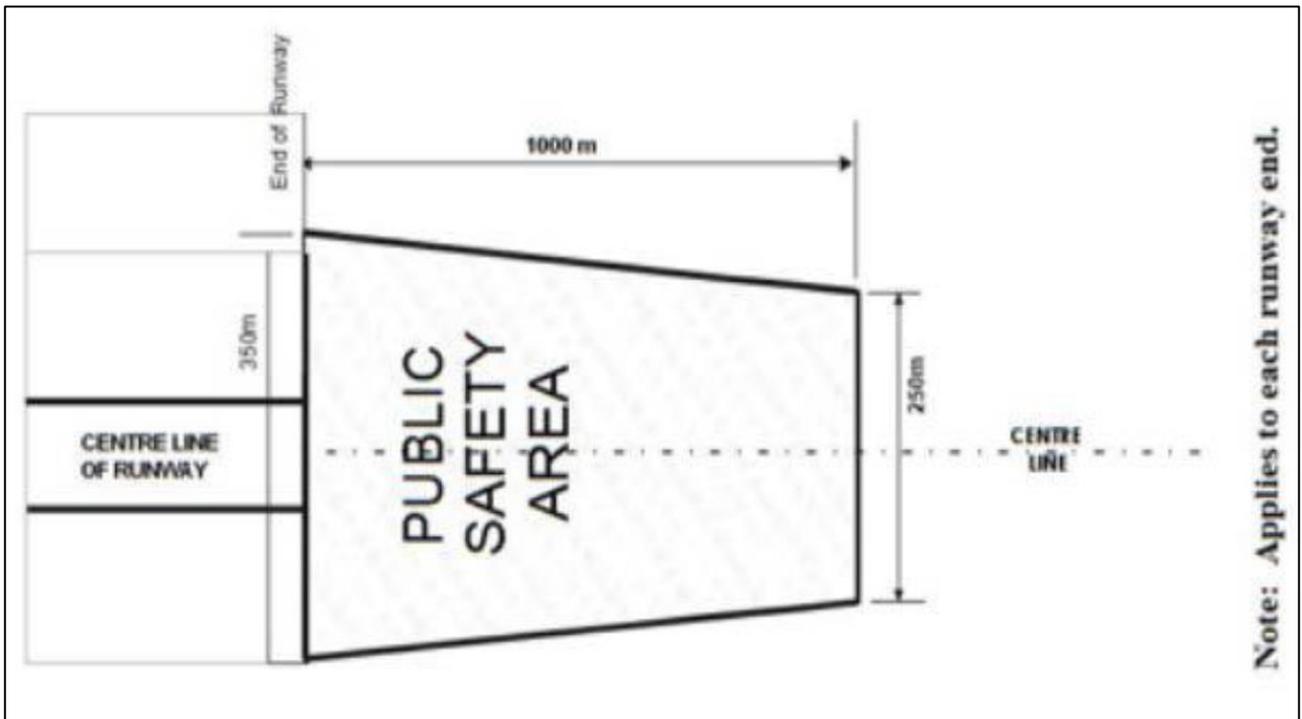
NASF Guideline I – managing the risks in PSAs at the ends of runways

NASF Guideline I was adopted in November 2018 and recommends the consideration of two PSA models, being the Queensland PSA model and UK PSA model.

- *Queensland PSA approach*

The Queensland PSA model applies a single defined PSA template to all runways that meet certain criteria in terms of aircraft movements. The Queensland PSA model forms the shape of an isosceles trapezoid—1000 metres long, 350 metres wide closest to the runway end, tapering to a width of 250 metres furthest from the runway.

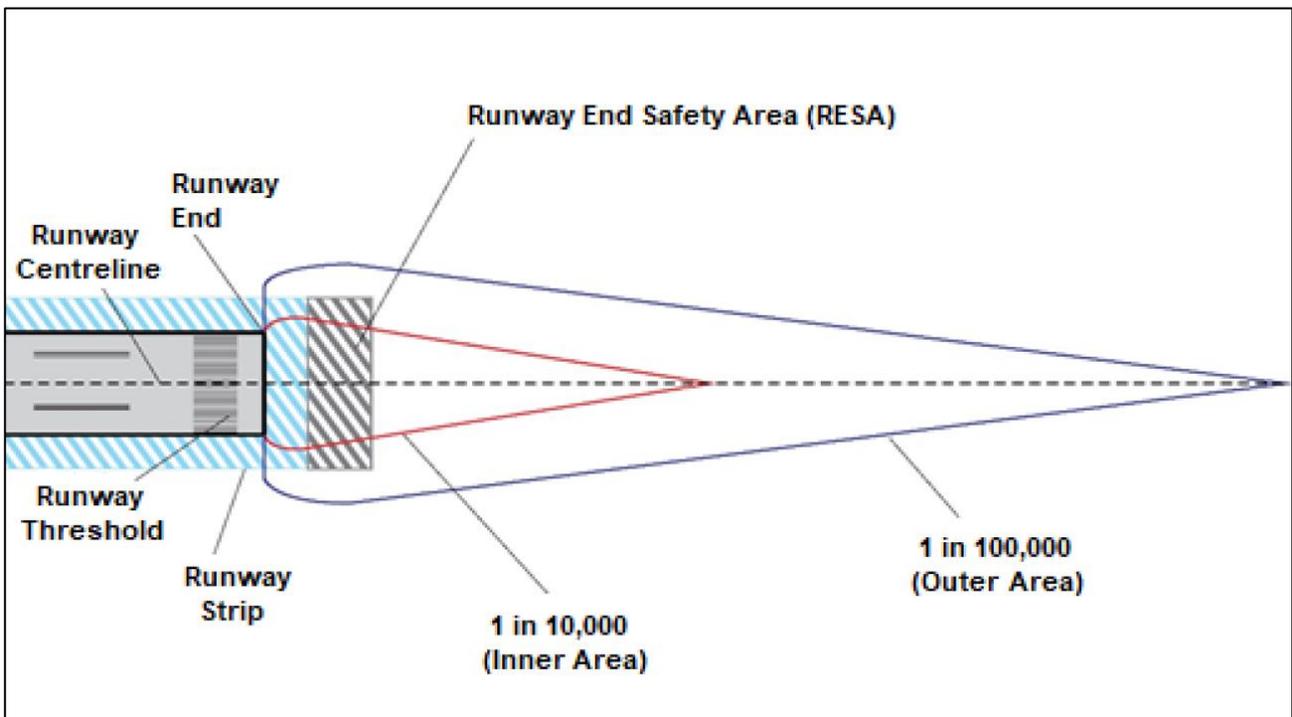
Figure 8: Queensland PSA mode (DITRDC, 2019)



- UK PSA approach

The UK PSA model applies two contours at the end of airport runways. The first contour represents a 1 in 10,000 chance per year of being killed as a result of an aircraft incident. The second contour represents a 1 in 100,000 chance per year of being killed as a result of an aircraft incident.

Figure 9: UK PSA model (DITRDC, 2019)



NASF Guideline I states when considering general approaches to public safety risk, the ‘as low as reasonably practicable’ approach is commonly used. In addition, it is the responsibility of each state and territory to implement Guideline I into their respective planning systems, as appropriate.

Western Sydney International (Nancy-Bird Walton) Airport public safety areas

NSW Government has endorsed the use of the UK PSA model for WSI to inform the public safety area identified at the runway ends.

In accordance with Clause 25 of the Aerotropolis SEPP, development for the following purposes is prohibited on land shown as the public safety area on the Public Safety Area Map:

- Camping grounds; Caravan parks; Cemeteries; Centre-based child care facilities; Commercial premises; Community facilities; Correctional centres; Crematoria; Eco-tourist facilities; Education establishments; Entertainment facilities; Function centres; Funeral homes; Health services facilities; Heavy industrial storage establishments; Industrial retail outlets; Industrial training facilities; Industries; Information and education facilities; Passenger transport facilities; Places of public worship; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Registered clubs; Residential accommodation; Service station; and Tourist and visitor accommodation.

Further, development consent must not be granted to development within a PSA for a purpose not specified in Clause 25 of the SEPP unless the consent authority:

- a) has considered a written assessment of the risk of the development to persons provided by the applicant, which includes –
 - i. the risk of persons on the land in the event of an emergency or other incident at or around WSI
 - ii. the likely number of people who will use or otherwise be present on the land
 - iii. the compatibility of the development with the risk, including in relation to the number of people who will use or otherwise be present on the land: and
- b) is satisfied that the development will adequately mitigate the risk to persons on the land, including by limiting the number of people or vehicles.

10.4 Western Sydney International (Nancy-Bird Walton) Airport public safety area contours

The public safety area map for the WSI can be viewed at the link below.

https://eplanningdlprod.blob.core.windows.net/pdfmaps/SEPP_WSA_PSA_001_060_20200901.pdf