Contents

3J.1 Introduction

This Part provides a means of assessing the effect of aircraft noise on development proposals by utilising an appropriately endorsed Australian Noise Exposure Forecast (ANEF) chart that takes into account long-term operating procedures and air traffic forecasts at Sydney (Kingsford-Smith) Airport. This Part also provides potential applicants with an understanding of the predicted level of the potential height limits due to prescribed airspace on proposed development sites and the potential for proposed developments to cause mechanical windshear.

3J.1.1 Land to which this Part Applies

The aircraft noise controls apply to all development in the City of Botany Bay within the 20 ANEF and above contour on the ANEF chart applicable to the City of Botany Bay. The ANEF chart for Sydney Airport will be the ANEF chart adopted by Council based on the most up-to-date information on operating procedures and air traffic forecasts at Sydney (Kingsford Smith) Airport.

The potential height limit controls, due to prescribed airspace for Sydney (Kingsford Smith) Airport, apply to all land within the Botany Bay LGA.

The map at **Schedule 2** shows the area of the Botany Bay LGA in which development may require an assessment for mechanical wind shear.

Note: In regards to minor development including non-habitable development or minor alterations and additions (i.e laundries) contact Council for further advice.

3J.1.2 Definitions

ANEF - Australian Noise Exposure Forecast:

A single number index for predicting the cumulative noise exposure levels in communities near an airport during a specified time period. It is based on a forecast of aircraft movement numbers, aircraft types, destinations and the location of runways at the airport. The most appropriate ANEF, as adopted by Council from time to time, is located in Council's Administration Centre, Coward Street, Mascot.

Australian Standard (AS) 2021-2015 - Acoustics - Aircraft Noise Intrusions - Building Siting and Construction:

The Standard provides guidance to State & Local Government authorities regarding land use planning, building construction and on the acoustic adequacy of existing buildings in areas in the vicinity of airports and aircraft flight paths.

Applicants can refer to the supplementary Handbook published by the Standards Australia Committee “Acoustics – Guidance on producing information on aircraft noise.” (Publication SA HB 149:2016) to gain understanding of aircraft noise and its impacts.

Indoor design sound level:

The maximum A-weighted sound pressure level from an aircraft fly-over which, when heard inside a building by the average listener, will not be judged as intrusive or annoying by that listener while carrying out a specified activity.

3J.1.3 General Objectives

Objectives

O1 To provide a planning approach that is capable of variation in the event of differing circumstances arising from changed aircraft operating procedures and traffic volumes associated with Sydney (Kingsford-Smith) Airport; and

O2 To ensure, to the extent practicable when applying an endorsed ANEF noise metric, that developers, property owners and purchasers/occupiers are aware of the predicted level of aircraft noise, potential height limits due to prescribed airspace for Sydney (Kingsford Smith) Airport on properties, the subject of development, and the possibility that certain development in certain areas in the vicinity of Sydney Airport may cause mechanical wind shear.

3J.2 Aircraft Noise Exposure Forecast

Objective

O1 To provide a discretionary approach by Council in the assessment of proposed development within localities affected by aircraft noise.

Controls

Development Classified as "Acceptable"

C1 Where the building site is classified as "acceptable" under Table 2.1 of AS2021-2015, development may take place subject to Council consent, there being no need, in the case of building construction, to provide protection specifically against aircraft noise.

Note:
Where the height of the proposed development is higher than the existing height of the localised building stock (and the proposed development has a direct line of sight to the seaport and/or the airport) an acoustical assessment by an accredited acoustical consultant is required which takes into account noise from the operations of Port Botany and Sydney Kingsford Smith Airport.

Development Classified as "Conditional"

C2 Where the building site is classified as "conditional" under Table 2.1 of AS2021-2015, development may take place, subject to Council consent and compliance with the requirements of AS2021-2015.

Note:
Where the height of the proposed development is higher than the existing height of the localised building stock (and the proposed development has a direct line of sight to the seaport and/or the airport) an acoustical assessment by an accredited acoustical consultant is required which takes into account noise from the operations of Port Botany and Sydney Kingsford Smith Airport.

Development Classified as "Unacceptable"

C3 In certain circumstances, and subject to Council discretion, Council may grant consent to development where the building site has been classified as "unacceptable" under Table 2.1 of AS2021-2015. For Council to be able to consider such applications for development, the following factors must be complied with:

(i) Submission of specialist acoustic advice by an accredited acoustical consultant certifying full compliance with the requirements of Table 3.3 of AS2021-2015;

(ii) Submission of plans and documentation indicating the subject premises will be fully air-conditioned or mechanically ventilated in accordance with Council guidelines; and

(iii) Any additional information considered necessary by Council to enable it to make a decision.

Note: The Standard also requires that the external environment to a dwelling within a 25 to 30 ANEF Contour be considered for aircraft noise impacts. This process has to take the following into account:

1. Whether or not there is an existing residential dwelling on site;
2. What the application of the Standard applies to;
3. Does the dwelling have access to a rear yard within the property, which is currently available for outdoor recreational use by residents of the dwelling; and
4. Does the outdoor environment given the curfew and current operating patterns are such that in daylight hours there will be sufficient opportunity to resort to the private open space without the presence of aircraft noise.

Note: Where the height of the proposed development is higher than the existing height of the localised building stock (and the proposed development has a direct line of sight to the seaport and/or the airport) an acoustical assessment by an accredited acoustical consultant is required which takes into account noise from the operations of Port Botany and Sydney Kingsford Smith Airport.

General

C4 Notwithstanding the above controls, no applications for new residential development, new educational establishments, new child care centres, new hospitals, new nursing homes, or any other use which, in the opinion of Council, is considered to be aircraft noise sensitive will be supported by Council where the property is located within the 30+ ANEF contour.

C5 Where a building site is considered by Council to be located on or immediately adjacent to an ANEF contour and could be affected by aircraft noise the subject development will be assessed as if it was located within the relevant ANEF contour.

C6 For residential development located within the 25+ ANEF contour the external environment (i.e deck and pergola) to the dwelling must be considered for aircraft noise impacts. The acoustic report must consider the external environment in accordance with AS 2021-2015.

Note: Advice from the Department of Infrastructure and Regional Development's website:

AS 2021 provides an assessment of potential aircraft noise exposure around airports based on the Australian Noise Exposure Forecast (ANEF) metric which applies to the development of airport master plans and is applied in strategic land use planning in the vicinity of airports.

AS2021 currently specifies that it is 'acceptable' to construct noise sensitive developments in areas where the ANEF is less than 20. This may lead to the mistaken perception that intrusive aircraft noise stops at the 20 ANEF contour and that properties immediately adjacent to the contour will not be adversely impacted. For further information please access the Department of Infrastructure and Regional Developments website.

3J.3 Aircraft Height Limits and Prescribed Zones

Botany Bay Local Government Area lies within the prescribed airspace for Sydney (Kingsford Smith) Airport. The prescribed airspace for Sydney over Botany Bay LGA consists of Procedures for Air Navigation Systems Operations (PANS-OPS) and Obstacle Limitation Surfaces (OLS).

The critical component of the prescribed airspace over Botany Bay is the Inner Horizontal Surface (51.0 metres AHD) of the OLS for Sydney (Kingsford Smith) Airport. Any intrusion into prescribed airspace would constitute a controlled activity and as such, must be referred to Sydney Airports Corporation Limited (SACL) for an approval process (*Airports Act 1996* Section 186).

Note: Section 182 of the *Airports Act 1996* defines 'Controlled Activities' as: constructing a building, or other structure, that intrudes into the prescribed airspace; altering a building or other structure so as to cause the building or structure to intrude into the prescribed airspace; any other activity that causes a thing attached to, or in physical contact with the ground to intrude into the prescribed airspace. It also makes reference to artificial lighting, light reflection and the generation of air turbulence and emissions such as smoke, dust, steam or gases or other particulate matter.

The approval process involves referral of the application to the Civil Aviation Safety Authority (CASA) and Airservices Australia (AsA) for assessment relating to safety, efficiency and regularity of air traffic using Sydney (Kingsford Smith) Airport. These assessments, once received, along with SACL recommendations, are forwarded to the Department of Infrastructure and Regional Development, for consideration and approval. The approval will nominate a building height limit that will not interfere with the prescribed air space or aircraft movements. The approval will also consider the impact of the proposed building envelope and building materials on airport navigation systems.

Note: Permanent controlled activities' are not permitted to penetrate the Procedures for Air Navigation Services Operations surfaces (PAN-OPS) component of the prescribed airspace. 'Permanent controlled activity' is considered to be any structure erected for a period of more than 3 months.

Objectives

O1 To provide potential applicants with an understanding of the predicted level of the potential height limits due to prescribed airspace on proposed development sites;

O2 To ensure, to the extent practicable, that developers, property owners and purchasers/occupiers are aware of the height limits on properties and the impact of controlled activities;

O3 To provide guidance to applicants of the approval process required in areas impacted by Sydney (Kingsford Smith) Airport - Procedures for Air Navigation Systems Operations (PANS-OPS) and Obstacle Limitation Surfaces (OLS); and

O4 To ensure that developments do not adversely impact on the PANS-OPS or OLS for Sydney (Kingsford Smith) Airport.

Controls

C1 If the building is located within a specific area identified on the OLS map or seeks to exceed the height limit specified in the map the application must be referred to Civil Aviation Safety Authority and Airservices Australia for assessment.

Note 1: Any development over 7.62 metres from existing ground level in the area bounded by Hollingshed Street, Sutherland Street, Sparks Street, Wentworth Avenue, Myrtle Street, Lord Street and Botany Road is required to be referred to Sydney Airport Corporation for consideration on height grounds.

Note 2: Development outside the area detailed in **Note 1** above, which is 15.24 metres or over in height is required to be referred to Sydney Airport Corporation for consideration on height grounds.

C2 Developments must consider the operating heights of all construction cranes or machinery (short-term controlled activities) that may exceed the OLS height limits thereby penetrating the prescribed airspace. Consideration should be given to the timing and location for the proposed controlled activity on site for referral to Civil Aviation Safety Authority and Airservices Australia.

C3 Approval to operate construction equipment (i.e. cranes) shall be obtained prior to any commencement of construction, where the prescribed airspace is affected.

Note: Please contact Council for advice to whether or not your Development Application is required to be referred to SACL.

3J.4 National Airports Safeguarding Framework

The National Airports Safeguarding Framework is a national land use planning framework that aims to:

- Improve community amenity by minimising aircraft noise-sensitive developments near airports including through the use of additional noise metrics and improved noise-disclosure mechanisms; 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 National Airports Safeguarding Advisory Group (NASAG), comprising of Commonwealth, State and Territory Government planning and transport officials, the Australian Government Department of Defence, the Civil Aviation Safety Authority (CASA), Airservices Australia and the Australian Local Government Association (ALGA), has developed the National Airports Safeguarding Framework (the Framework).

Relevant Commonwealth, State (including NSW) and Territory Ministers considered and agreed to the Framework at the Ministerial Standing Council on Transport and Infrastructure (SCOTI) meeting in May 2012.

Additional information on the National Airports Safeguarding Framework can be found at http://www.infrastructure.gov.au/aviation/environmental/airport_safeguarding/nasf/

Note: For all development please refer to:

- *Guideline B: Managing the Risk of Building Generated Windshear and Turbulence at Airports;*
- *Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports, this risk needs to be addressed and minimised;*
- *Guideline D: Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation; and*
- *Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports.*
- *Guideline G: Protecting Aviation Facilities - Communication, Navigation and Surveillance (CNS)*

With respect to Guideline B, a procedure has been prepared on behalf of Sydney Airport Corporation Limited by wind engineering and air quality consultants Cermak Peterka Petersen that can be used to determine whether or not an assessment for mechanical wind shear impacts is needed for any development proposed to occur in the area of the Botany Bay LGA shown in the map at **Schedule 2**. The procedure is reproduced in full at **Schedule 3**.

SCHEDULE 1 - AUSTRALIAN STANDARDS 2021-2015

The following tables have been reproduced from AS2021-2015 and set out the criteria to be used in the siting of buildings (Table 2.1) and in the setting of indoor design sound levels (Table 3.3).

BUILDING SITE ACCEPTABILITY BASED ON ANEF ZONES

Source: AS2021-2015 (to be used in conjunction with Table 3.3)

Building Type	ANEF Zone of Site		
	Acceptable	Conditional	Unacceptable
House, home unit, flat, caravan park	Less than 20 ANEF (Note 1)	20 to 25 ANEF (Note 2)	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	25-30 ANEF	Greater than 30 ANEF
School, university	Less than 20 ANEF (Note 1)	20 to 25 ANEF (Note 2)	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF (Note 1)	20 to 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF (Note 1)	20 to 30 ANEF	Greater than 30 ANEF
Commercial building	Less than 25 ANEF	25 to 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Other industrial	Acceptable in all ANEF zones		

Notes:

1. The actual location of the 20 ANEF contour is difficult to define accurately, mainly because of variation in aircraft flight paths. Because of this, the procedure of Clause 2.3.2 may be followed for building sites outside but near to the 20 ANEF contour.

2. Within 20 ANEF to 25 ANEF, some people may find that the land is not compatible with residential or educational uses. Land use authorities may consider that the incorporation of noise control features in the construction of residences or schools is appropriate (see also Figure A1 of Appendix A).

3. There will be cases where a building of a particular type will contain spaces used for activities which would generally be found in a different type of building (e.g. an office in an industrial building). In these cases Table 2.1 should be used to determine site acceptability, but internal design noise levels within the specific spaces should be determined by Table 3.3.

4. This standard does not recommend development in unacceptable areas. However, where the relevant planning authority determines that any development may be necessary within existing build-up areas designed as unacceptable, it is recommended that such development should achieve the required ANR determined according to Clause 3.2. For residences, schools, etc., the effect of aircraft noise on outdoor areas associated with the buildings should be considered.

5. In no case should new development take place in greenfield sites deemed unacceptable because such development may impact airport operations.

INDOOR DESIGN SOUND LEVELS FOR DETERMINATION OF AIRCRAFT NOISE REDUCTION

Source: AS2021-2015 - These indoor design levels are not intended to be used for measurement of adequacy of construction.

Building Type and Activity	Indoor Design Sound Level, dB(A)
Houses, home units, flats, caravan parks	
Sleeping areas, dedicated lounges	50
Relaxing or sleeping areas	55
Normal domestic	60
Hotels, motels, hostels	
Relaxing or sleeping	55
Social activities	70
Service activities	75
Schools, universities	
Libraries, study areas	50
Teaching areas, assembly areas (see Note 5)	55
Workshops, gymnasia	75
Hospitals, nursing homes	
Wards, theatres, treatment and consulting rooms	50
Laboratories	65
Service areas	75
Public buildings	
Churches, religious activities	50
Theatres, cinemas, recording studios (see Note 4)	40
Court houses, libraries, galleries	50
Commercial buildings, offices and shops	
Private offices, conference rooms	55
Drafting, open offices	65
Typing, data processing	70
Shops, supermarkets, showrooms	75
Industrial	
Inspection, analysis, precision work	75
Light machinery, assembly, bench work	80
Heavy machinery, warehouse, maintenance	85

Notes:

1. The indoor design sound levels in Column 2 are hypothesised values which are based on Australian experience. A design sound level is the maximum level (dB(A)) from an aircraft fly-over which, when heard inside a building by the average listener, will be judged as not intrusive or annoying by that listener while carrying out the specified activity. Owing to the variability of subjective responses to aircraft noise, these figures will not provide sufficiently low interior noise levels for occupants who have a particular sensitivity to aircraft noise.

2. Some of these levels, because of the short duration of individual aircraft fly-overs, exceed some other criteria published by Standards Australia for indoor background noise levels (see AS2107).

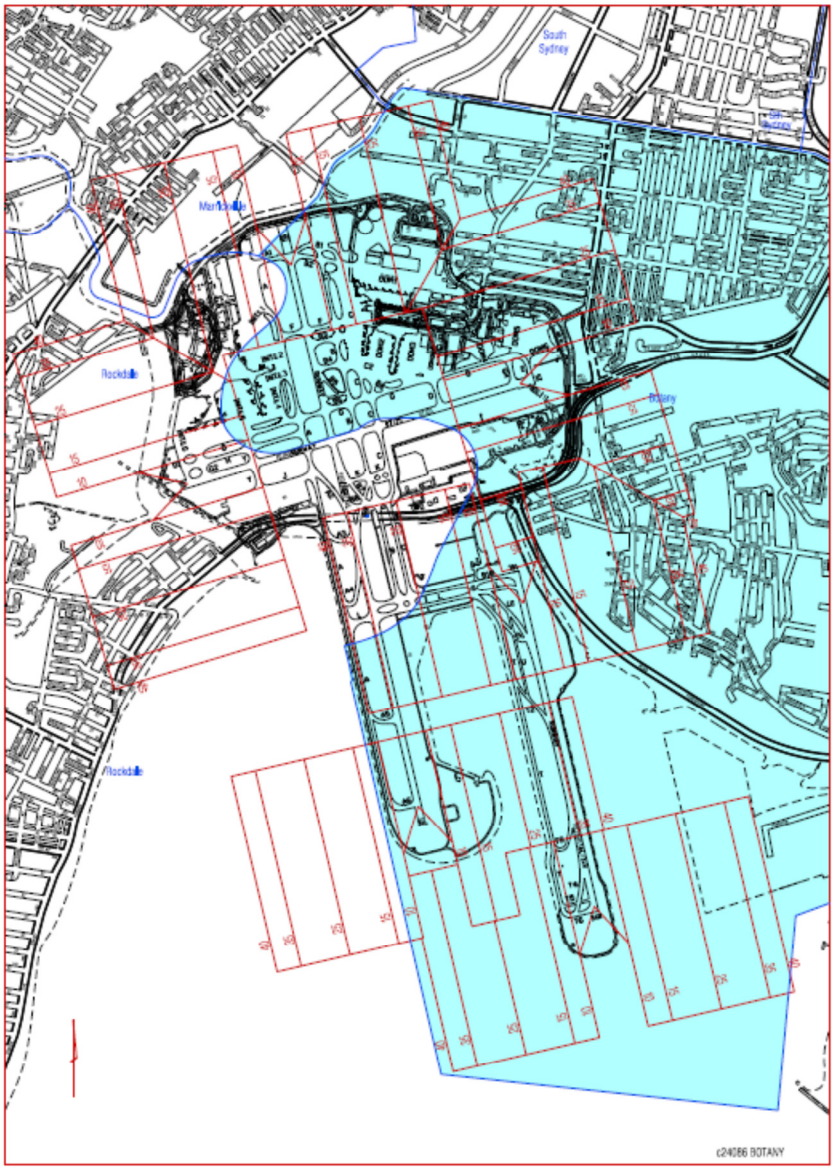
3. The indoor design sound levels are intended for the sole purpose of designing adequate construction against aircraft noise intrusion and are not intended to be used for assessing the effects of noise. Land use planning authorities may have their own internal noise level requirements which may be used in place of the levels above.

4. For opera and concert halls and theatres, and for recording, broadcast and television studios and similar buildings where noise intrusion is unacceptable, specialist acoustic advice should always be obtained.

5. Certain activities in schools may be considered particularly noise sensitive and 50 dB(A) may be a more desirable indoor sound level to select for any teaching areas used for such activities. However, the effect of other noise sources should be considered.

6. The provisions of this standard relating to different internal design sound levels for different indoor spaces could result in the use of different construction of materials in contiguous spaces, and require the construction of substantial barriers between habitable spaces, e.g. heavy self-closing internal doors, detracting from the amenity of the building. Therefore consideration should be given to a uniform perimeter insulation approach.

Schedule 2 – Map showing shaded blue area in which proposed development may require assessment for mechanical wind shear



SCHEDULE 3 - PROCEDURE TO USE TO DETERMINE WHETHER OR NOT AN ASSESSMENT FOR MECHANICAL WIND SHEAR IMPACTS IS NEEDED

The following has been supplied by Sydney Airport Corporation[1] to Council for applicants to follow when assessing whether an assessment for mechanical wind shear is required and whether the development application needs to be forwarded to SACL for its assessment.

Assessment Procedure

In terms of a procedure a series of steps have been defined for the wind shear assessment of development applications. It has been assumed through the development of this assessment process that the building height would not penetrate the obstacle limitation surface (OLS) for the airport, and that the operating wind criterion for using a Runway is limited by a 3 s gust wind speed measured at the control anemometer location of 30 kt in the cross-wind direction.

Step 1: Location of the development

If the proposed development is wholly outside the zoned plan area presented in Figure 1 then the development does not require any additional assessment.

Step 2: Height of the development

If the development is below the height surface presented in Figure 1 then the development does not require any additional assessment. The height limit surface varies linearly with distance perpendicular to the centreline of the runway.

It is assumed that the height of the building is less than the OLS, which is a maximum of 51 m AHD for the assessment areas.

[1] Letter dated 23 April 2014 from Cermak Peterka Petersen, Wind Engineering and Air Quality Consultants to Sydney Airport Corporation Limited

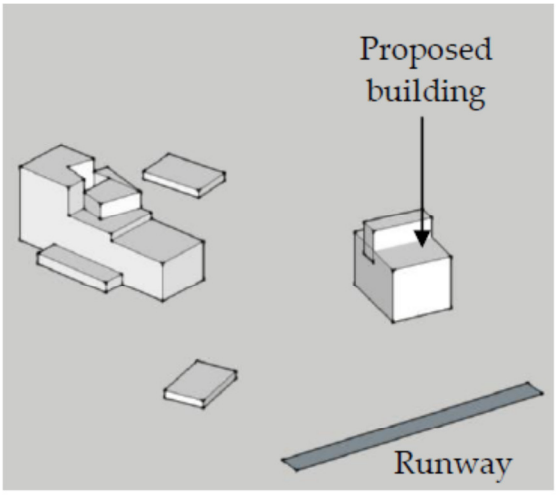

RUNWAY
25
15
10
35
40

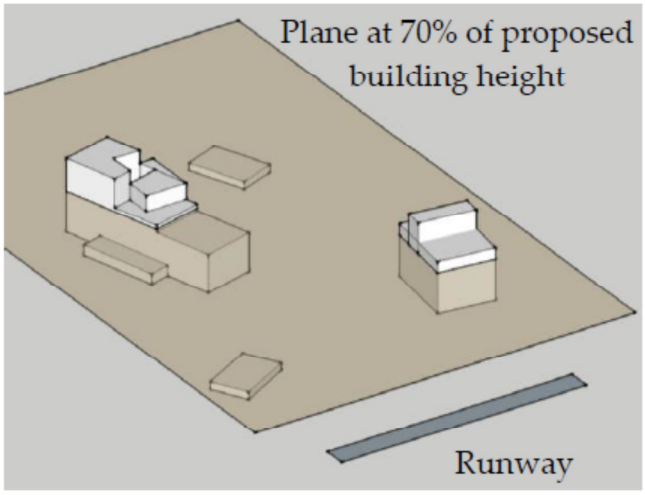
Figure 1: NASAG zones showing minimum height limits requiring assessment and OLS relative to AHD

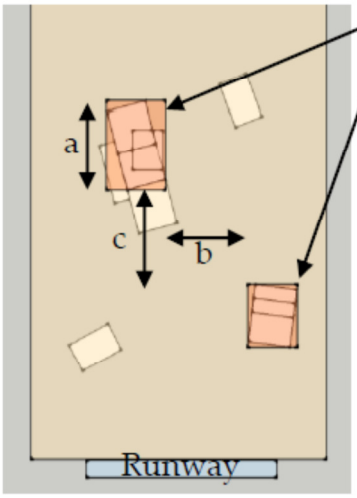
Step 3: Type of development: isolated or compound

To determine whether a building is isolated, all existing (or Council approved) buildings with a height greater than 70% of the proposed building should be considered. The plan-form shape for each building should be taken as the enveloping rectangle parallel to the runway for all building elements above the plane through the 70% height of the proposed building. This is illustrated in Figure 2.

The proposed building is classified as isolated, if the distance between the proposed and the adjacent existing (or Council approved) buildings of height greater than 70% of the proposed building, is less than the maximum dimension of the two enveloping rectangles.







Enveloping plan-form rectangles in runway axis for all buildings above 70% of proposed building height.

Where a is the largest dimension of both enveloping rectangles, b and c are the distances parallel and perpendicular to the runway respectively between the portion of the buildings exceeding the 70% of proposed building height limit.

If b>a or c>a, then the proposed building is classified as isolated for that combination of buildings,
If b≤a and c≤a then the proposed building is classified as multiple for that combination of buildings, with the total width defined in Figure 3.

Figure 2: Schematic for determining isolated building

For determining the compound size of multiple buildings, the proposed building should be assessed in the first instance individually with all neighbouring existing and Council approved buildings. If a compound building is determined the assessment should progressively expand from the perimeter building, using the dimensions of the individual buildings, not the compound shape.

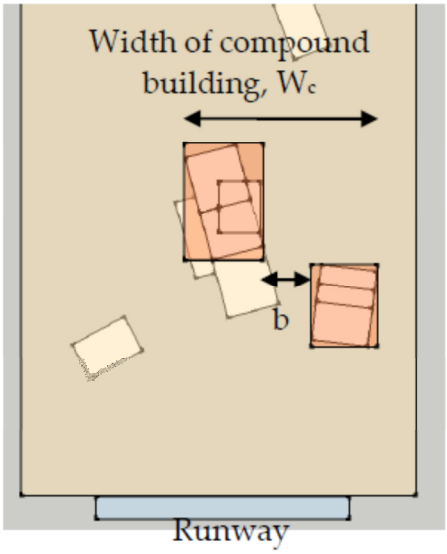
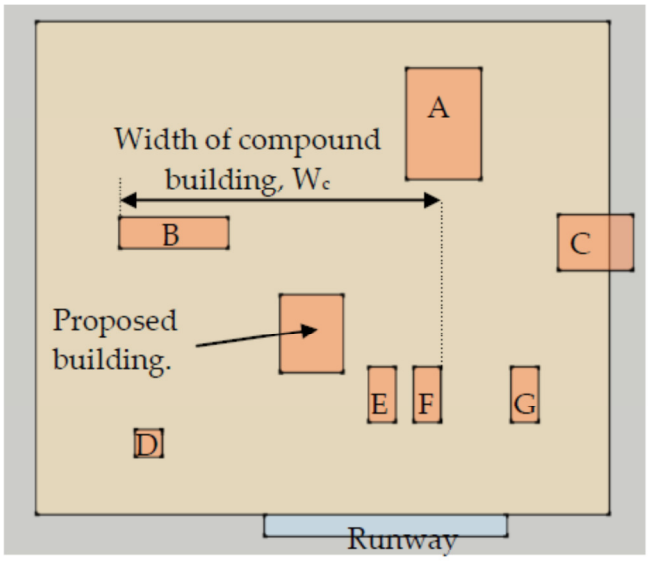


Figure 3: Width of compound building for adjacent buildings

In the example sketched in Figure 4, the proposed building was assessed independently with all buildings and only buildings B and E were classified as compound. Building E is on the edge of the compound shape and should be assessed with neighbouring Building F using their respective building envelopes, not the building envelope of the compound shape, W_c. As Building E and F are considered compound, Building F is on the edge of the compound shape and should be similarly assessed with neighbouring Building G. The width of the compound building is the overall width parallel to the runway as noted in Figure 4.



Building envelopes in the assessment area exceeding 70% the height of the proposed building.

Figure 4: Example for assessing compound size of multiple buildings

Step 4: Isolated building assessment

If the enveloping rectangle dimension parallel to the Runway, W, is less than one third of the distance from the rear face of the building to the Runway Centreline, D, then the building does not require any further wind shear assessment. If W>D/3, then the building requires a qualitative assessment in accordance with NASAG (2012).

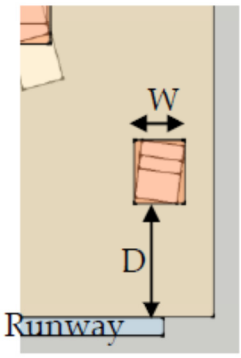


Figure 5: Definition for assessing an isolated building

Step 4: Compound building assessment

If the width of a compound building parallel to the Runway, W_c, is less than one third of the distance from the rear face of the compound building to the edge of the Runway, D, Figure 6, then the building does not require any further wind shear assessment. If W>D/3, then the building requires a qualitative or quantitative assessment in accordance with NASAG (2012).

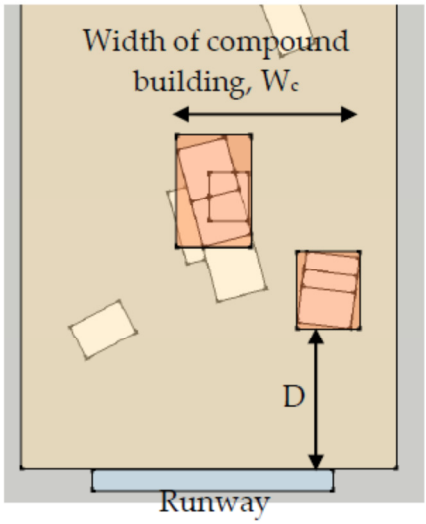


Figure 6 Definition for assessing a compound building

Conclusions

A procedure has been developed to assist with the wind shear assessment of proposed development applications for Council. The assessment is based on the procedures outlined in NASAG (2012) in combination with the upper height restrictions defined in the Sydney Airport OLS (51 m AHD), and an operational 3 s gust wind speed of 30 kt in the cross-wind direction.