



ADVISORY CIRCULAR

Reporting of tall structures and hazardous plume sources

AC 139-08

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Audience

This Advisory Circular (AC) applies to:

- a person who owns, controls or operates a building or structure, including wind farm proponents
- a person who owns, controls or operates any plant or equipment which may release a hazardous plume into airspace utilised by aircraft
- Airservices Australia
- Geoscience Australia
- Part 173 of CASR instrument flight procedure designers
- local government planning bodies
- aerodrome operators
- Department of Defence
- aircraft with a maximum take-off weight (MTOW) above 5,700 kg complying with Civil Aviation Order (CAO) 20.7.1B.

Purpose

The purpose of this AC is to provide some guidance to those authorities and persons involved in the planning, approval, erection, extension or dismantling of tall structures or sources of hazardous plumes so that they may understand the vital nature of the information they provide.

Information on tall structures is managed by Airservices Australia in conjunction with Geoscience Australia. Information is also provided to a range of aviation organisations so that tall structures can be identified on aeronautical charts etc.

For further information

For further information on this AC, contact CASA's Air Navigation, Airspace and Aerodromes Branch (telephone 131 757).

Status

This version of the AC is approved by the Manager, Flight Standards Branch.

Version	Date	Details
v2.0	March 2018	Revised to reflect requirements in Part 175 of CASR.
(0)	April 2005	Initial AC on this subject.

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1 Reference material

1.1 Acronyms

The acronyms and abbreviations used in this AC are listed in the table below.

Acronym	Description
AC	Advisory Circular
CAR	<i>Civil Aviation Regulations 1988</i>
CASA	Civil Aviation Safety Authority
CASR	<i>Civil Aviation Safety Regulations 1998</i>
DIRDC	Department of Infrastructure, Regional Development and Cities
ICAO	International Civil Aviation Organization
MOS	Manual of Standards
RAAF	Royal Australian Air Force

1.2 Definitions

Term	Definition
Obstacle	All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that: <ol style="list-style-type: none">1. are located on an area intended for the surface movement of aircraft or2. extend above a defined surface intended to protect aircraft in flight; or3. stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.
Tall structure	Any obstacle, or parts thereof, that are located 100 m or more above ground level. Note: For notification of tall structures to the RAAF, these are defined as obstacles, or parts thereof, that are: <ul style="list-style-type: none">- 30 m or more above ground level within 30 km of an aerodrome or <ul style="list-style-type: none">- 45 m or more above ground level elsewhere.
Plume rise	A rise in an air mass due to the temperature difference between the point of release (from the stack) and the ambient air. The resultant energy may pose a hazard for aircraft.

1.3 References

Regulations

Regulations are available on the Federal Register of Legislation website <https://www.legislation.gov.au/>

Document	Title
Part 139	Aerodromes
Part 175	Aeronautical information management
<i>Airports (Protection of Airspace) Regulations 1996</i>	
<i>Airports Act 1996</i>	

Advisory material

Document	Title
Annex 4 to the Chicago Convention	Aeronautical Charts
Annex 14 to the Chicago Convention	Aerodromes
Annex 15 to the Chicago Convention	Aeronautical Information Services

2 Reporting of tall structures and hazardous plume sources

2.1 What aviation regulations apply to tall structures and plumes?

- 2.1.1 Part 139 of the *Civil Aviation Safety Regulations 1998* (CASR) requires that:
- Any object that extends to a height of 110 m or more above local ground level, must be notified to CASA by the proponent or owner.
 - Additionally, Annex 14 to the Chicago Convention considers any object that extends to a height of 150 m or more above local ground level must be regarded as an obstacle unless an aeronautical study indicates that it does not constitute a hazard. The height of 150 m (500 ft) above ground level is the lower limit of navigable airspace defined under Civil Aviation Regulation (CAR) 157
 - The operator of a certified or registered aerodrome must monitor their airspace and notify CASA of any development or proposed construction in the vicinity (i.e. within 15 km) of an aerodrome if that development or construction is likely to be a hazard to air navigation.
 - The operator of a certified or registered aerodrome must monitor their airspace and notify CASA of any gaseous efflux (plume rise) which has a velocity exceeding 4.3 metres per second.
 - CASA may also determine that gaseous efflux (plume rise) exceeding 4.3 metres per second is likely to pose a hazard to air navigation.
- 2.1.2 Around leased federal airports, i.e. airports regulated under the *Airports Act 1996*, the *Airports (Protection of Airspace) Regulations 1996* also applies. Activities that could penetrate the protected airspace of leased federal airports must be approved before the proposed penetration is permitted to occur. Those regulations require the Department of Infrastructure, Regional Development and Cities (DIRDC) to assess applications to carry out controlled activities and to impose conditions on any approval granted. DIRDC may delegate the assessment and approval of temporary intrusions—of less than three months—to the relevant airport operator.¹ DIRDC may also refuse to approve any activity that affects the safety or accessibility of aircraft operations at leased federal airports.
- 2.1.3 Subpart 175.E of CASR specifies the data collection and provision requirements about structures that pose a risk to aviation safety.
- 2.1.4 Mandatory collection criteria under Part 175 of CASR are broader than under Part 139 of CASR and include structures that meet at least one of the following criteria:
- have a maximum height of at least 100m above ground level
 - penetrate the obstacle limitation surface of an aerodrome
 - penetrate an obstacle data collection surface, as mentioned in Appendix 8 of Annex 15, Aeronautical Information Services to the Chicago Convention on International Civil Aviation

¹ Further information is available at <https://infrastructure.gov.au/aviation/safety/protection/leased.aspx>.

- are an obstacle that is required to be included on an Aerodrome Obstacle Chart—ICAO Type A, as mentioned in Annex 4 to the Chicago Convention
- are an obstacle that is required to be included on an Aerodrome Obstacle Chart—ICAO Type B, as mentioned in Annex 4 to the Chicago Convention
- if Airservices Australia requires data about the object or structure in the interests of aviation safety.

2.2 What do I need to report?

2.2.1 If you are the person who owns, controls or operates the object, structure or a source of a hazardous plume which is either present, imminent or has been approved for erection/construction, details need to be provided about:

- the construction, extension or dismantling of tall structures if the top is:
 - o 100 m or more above ground level
 - or
 - o affects the obstacle limitation surface of an aerodrome as defined in Part 139 of CASR.
- gaseous effluxes (plume rises) with a velocity of more than 4.3 metres per second affecting either:
 - o airspace higher than 100 m or more above ground level
 - or
 - o the obstacle limitation surface of an aerodrome.

2.2.2 In addition, the RAAF requires information on structures that are 30 m or more above ground level—within 30 km of an aerodrome or 45 m or more above ground level elsewhere which may pose a specific hazard for their operations.

2.2.3 Information provided for the database should be accurate and readily interpreted. The tall structure report form has been designed to help owners and/or developers in this respect. The form is available on the Airservices Australia website at:

http://www.airservicesaustralia.com/wp-content/uploads/ATS-FORM-0085_ObstacleNotificationForm.pdf

2.2.4 Further information about where obstacle data is held is detailed in Chapter 2.5 below.

2.3 Why do I need to report tall structures and hazardous plume sources?

2.3.1 Under regulation 157 of CAR, pilots must fly at a minimum height of 1000 ft over cities or populous areas but can fly as low as 500 ft everywhere else. Pilots must take into account objects and maintain a height of 500 ft above known obstacles. At night, under the Visual Flight Rules (VFR), an aircraft must not be flown at a height of less than 1000 ft above the highest obstacle located within 10 miles of the aircraft vicinity.

2.3.2 Pilots however are permitted to descend below these altitudes during take-off and landing manoeuvres. Some pilots are also given special permission to fly below 500 ft subject to regulatory approval. Such operations occur throughout Australia and include but are not limited to:

- specialist flying activities (e.g. crop-dusting, cattle mustering, pipeline inspection, fire-fighting)
 - search and rescue operations
 - military low-level flying operations.
- 2.3.3 An altitude of 500 ft translates to a height of 150 m above ground level. Therefore, any buildings or structures including wind turbines that are 150 m or more above the ground are generally considered a hazard for aircraft. Other buildings at lower heights, such as those 30 m or more above ground level within 30 km or an aerodrome or 45 m above ground level elsewhere, may also pose a hazard — particularly for military aircraft.
- 2.3.4 The hazards that such buildings or structures may pose to aircraft requires assessment. CASA routinely performs such assessments however needs to be first notified of the obstacle, structure of source of a hazardous plume. The need to report such hazards is outlined in this AC.
- 2.3.5 If, following the assessment, the building or structure is determined as posing a hazard to aircraft operations, a recommendation will be made as to whether the risk to aircraft can be mitigated by marking or lighting of the building, structure or wind turbine.
- 2.3.6 Plume rises can pose a hazard to air navigation if the energy they release exceeds the capability of the aircraft and/or the pilot to maintain normal operation. Mitigation against hazardous plume sources is more challenging and may require further analysis between CASA and the proponent. This process is outlined further in [Advisory Circular 139-05 Plume rise assessments](#).
- 2.3.7 For aircraft conducting low-level flying operations, a significant number of accidents are caused by collision with tall structures. In addition to the risk to aircraft operations, a collision with a tall structure poses several other risks, such as:
- business continuity if the services provided from the tall structure are unavailable e.g. communications services
 - costs associated with repair/erection of a new structure
 - liability issues.
- 2.3.8 The risk a tall structure poses to aircraft safety can be minimised if information about the tall structure is conveyed to pilots, so they can fly at a safe height above the structure. This information can be made available to pilots if an obstacle, including wind turbines, is published on aeronautical charts or included in an obstacle database.

2.4 Obstacle database

- 2.4.1 The Australian aviation community has identified a need to have information on tall structures available for publication on aeronautical charts and, more importantly, available in an obstacle database.
- 2.4.2 The Royal Australian Air Force (RAAF) has an additional requirement to know about the existence of low-level structures. The trigger height of these structures is:
- 30 m or more above ground level, within 30 km of an aerodrome
 - 45 m or more above ground level elsewhere.

- 2.4.3 Before Part 175 of CASR came into effect, the RAAF managed the database of tall structures. This responsibility now belongs to Airservices Australia.
- 2.4.4 The database will also be available for use by mapping agencies, such as Geoscience Australia, and domestic and international aviation organisations.

2.5 Where will the information about tall structures be held?

- 2.5.1 The information about all tall structures is held in a central database that is managed by Airservices Australia.
- 2.5.2 Information on tall structures and any queries about the database should be directed to:

Business Reply Post
GPO Box 367, Canberra, ACT, 2600
AIRSERVICES AUSTRALIA
ATTN: AIR TRAFFIC MANAGEMENT: DATA SERVICES

Telephone: (02) 6268 5596
Email: vod@airservicesaustralia.com