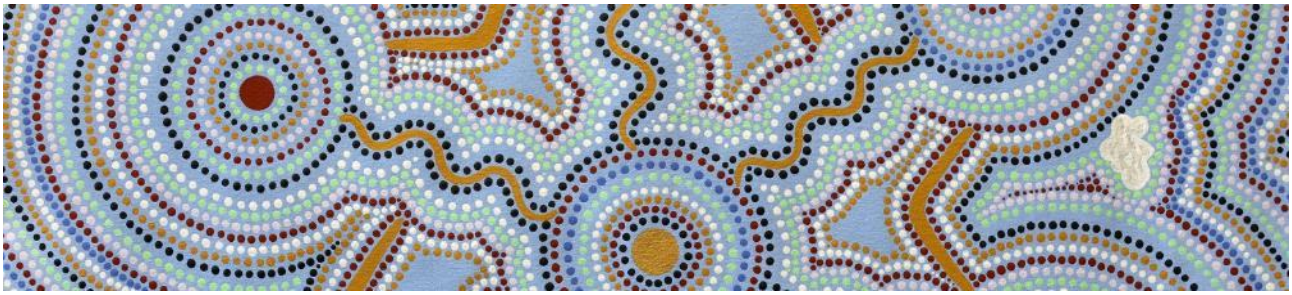
Australian Government
Civil Aviation Safety Authority

ANNEX B TO AC 133-01 V4.1

Performance class 3 operations - Operation over populous areas

December 2024

Contents



Acknowledgement of Country

The Civil Aviation Safety Authority (CASA) respectfully acknowledges the Traditional Custodians of the lands on which our offices are located and their continuing connection to land, water and community, and pays respect to Elders past, present and emerging.

Artwork: James Baban.

1 Performance class 3 operations over populous areas

1.1 Overview

1.1.1 Regulation 133.340 of CASR, sections 10.26 and 10.29 of the Part 133 Manual of Standards (MOS), and sections 10.41 through 10.44 inclusive of the Part 133 MOS are all relevant to the conduct of an air transport operations in Performance Class 3 (PC3).

1.1.2 These rules require an operator and their pilot(s) in command (PIC) to meet multiple requirements before commencing air transport operations in PC3 in the following circumstances:

- over a populous area where a suitable forced landing area (SFLA) is available
- over a populous area where a SFLA is not available.

> **Note:** An SFLA is defined in regulation 133.010 of CASR.

1.1.3 In particular, the following matters must be considered and addressed:

- operating the rotorcraft in a manner where it does not create hazards to persons on the ground or water under the rotorcraft's flight path
- determining the most suitable flight path for take-off
- take-off obstacle avoidance
- enroute obstacle avoidance
- determining the most suitable flight path for the approach and landing, or any baulked landing
- baulked landing climb obstacle avoidance
- ensuring the rotorcraft is flown in a manner which maximises the availability, for the route over the populous area, of SFLA
- ensuring the aircraft is equipped with a particle detection system as outlined in *paragraph 10.26 (c) of the Part 133 Manual of Standards (MOS)*

> **Note:** The particle detection system must monitor the main and tail rotor transmission gearboxes and include a flight deck caution indicator for each gearbox.

- inclusion of, and compliance with, exposition procedures for:
  - risk assessment, management and acceptance requirements for operations over populous areas
  - additional pilot training requirements.

1.1.4 This Annex provides expanded information to allow operators and pilots to work through the practical application of the rules mentioned in paragraph 1.1.1. The operational example will be a rotorcraft conducting VFR by day passenger transport scenic flight operations over a populous area in accordance with PC3 requirements.

1.2 What are operations over a populous area?

1.2.1 In Part 1 of CASR Dictionary located in Volume 5 of the CASR, a populous area is defined as:

populous area includes a city and a town.

1.2.2 The following additional guidance is provided about this definition:

Populous area definition

As this definition is expressed to 'include' cities and towns, this also means it includes areas that are not cities or towns but are nonetheless populous. The Macquarie Dictionary defines city, town, populous and area as follows:

city

1.

a. a large or important town; a town so nominated.

b. an area within a large and extended city which has been nominated as a city even though it is essentially suburban as the City of Parramatta within Greater Sydney or the City of Nunawading within Greater Melbourne.

2. an urban area the extent of which is subject at all times to redefinition but which

a. (in the cases of Adelaide, Melbourne, Sydney and Perth between 1839 and 1842) was originally so nominated by royal charter.

b. in NSW, SA, Tasmania (by special Act), and WA, was originally so nominated by a Colonial or subsequently a State Government on the basis of its population, its annual revenue, the presence of a cathedral, etc.

town

a small group of houses and other buildings thought of as a place, and given a name: *the word `town' is employed with generosity in Australia –WA WINTERIRVING, 1977.

2. a distinct densely populated area of considerable size, having some degree of self-government.

populous

adjective full of people or inhabitants, as a region; well populated.

area

noun 1. any particular extent of surface; region; tract: the settled area.

A populous area is anywhere people are living or gathered for a purpose.

If your aircraft were to malfunction, or an operational error was made that led to a forced landing or crash, and it could pose a risk to the life, safety or property of a person in the area, it is likely the area would be a populous area.

Examples of this include a beach with persons on it, a busy road, a sporting event, a gold course, a concert or a wedding. or towns that are taken to be populous.

1.2.3 When operating within or over a populous area, regulation 91.265 of CASR applies to the flight. This regulation specifies the minimum height requirements for flying a rotorcraft over populous areas and public gatherings.

1.2.4 Paragraph 91.265(3)(a) of CASR requires the minimum height to be calculated by reference to the highest feature or obstacle within a horizontal radius of 300 m of the point on the ground or water immediately below the rotorcraft.

1.2.5 The implication of this 300 m horizontal distance is that if the rotorcraft is operating outside of this distance from a populous area or public gathering, then it is not being flown over a populous area or public gathering and the minimum height rules of regulation 91.267 of CASR in relation to flight over 'other areas' would apply instead of regulation 91.265.

1.2.6 The following paragraphs will not further mention public gatherings since the Part 133 PC3 rules discussed in this Appendix only relate to flights over populous areas and not to flights over public gatherings.

1.2.7 Operators and PIC must be aware that the PC3 rules relating to flight over populous areas still apply if your pre-planned emergency strategies for a flight that normally would track over non-populous areas involves turning towards and landing in a populous area.

Example

You intend to track coastal or over a national park, but your inflight emergency strategies involve turning towards and landing on a crowded beach, or on a golf course, or any other place which would be considered a populous area.

In these circumstances, your risk assessment for the flight must consider these hazards as if you were operating over the populous area or public gathering itself.

Notes:

1. Regulation 91.055 of CASR also imposes a requirement on the PIC to avoid operating an aircraft in a manner that creates a hazard to another aircraft, a person or property. The GM 91.055 entry in the Part 91 AMC/GM document discusses how flying over a populous area in the normal course of navigation is not considered, for the purposes of regulation 91.055, to be creating a hazard.
2. Paragraph 10.26(a) of the Part 133 MOS also requires a PIC to operate a rotorcraft flown over a populous area in a manner that maximises the availability of SFLA.
3. Refer to section 8.5 of AC 133-01 for guidance on this issue.

1.3 Complying with regulation 133.340 of CASR and section 10.26 of the Part 133 MOS

1.3.1 This regulation applies to a flight using PC3 over a populous area when a SFLA is not available. In this circumstance, the requirements of section 10.26 of the Part 133 MOS must be met. These MOS requirements are:

- the PIC must operate the rotorcraft to maximise the availability of SFLA
- the rotorcraft must be equipped with a particle detection system that monitors the main and tail rotor transmission gearboxes and includes a flight deck caution indicator for each gearbox.

1.3.2 If the operator and PIC determine that a SFLA is available, then the requirements of section 10.26 of the Part 133 MOS do not need to be met.

1.3.3 For an operator to determine that an SFLA is available, the following questions must be answered in the affirmative:

- Is there a reasonable expectation the rotorcraft would be able to reach a SFLA in the event of an engine failure, or other land immediately, or land as soon as possible aircraft emergency (for example: a transmission problem)?
- When determining whether a landing area is an SFLA, is there a reasonable expectation that the landing area meets SFLA requirements?
  - For example, does it has sufficient size and surface conditions to be a SFLA?
  - In the event of a landing, including an autorotative landing, would there be no injuries to persons in the rotorcraft, or on the ground or water area?
- In relation to selecting an area of water to be an SFLA, are the additional requirements of subregulations 133.010(2), (3) and (4) all met?

1.3.4 Refer subsections 4.1 and 4.2, and section 8, of AC 133-01 for guidance on compliance with this requirement.

Note: Operators and PIC are recommended to exercise particular care when deciding to nominate landing areas where there is sport or recreational use as a SFLA. These kinds of locations may be occupied during weekends, school terms and public holidays, thus reducing their potential suitability.

1.4 Risk assessment - exposition requirements for PC3 over a populous area with no SFLA - Paragraph 10.29 (4) (a) of the Part 133 MOS

1.4.1 The operator's exposition must include a risk assessment and management procedures for flights over populous areas.

1.4.2 Appendix A of this Annex provides a sample risk assessment and management procedure for flight over populous areas.

1.5 Pilot training - exposition requirements for PC3 over a populous area with no SFLA - Paragraph 10.29 (4) (b) of the Part 133 MOS

1.5.1 The operator's exposition must include:

- training for pilots in conducting autorotative descents to locations with limited access to suitable forced landing areas.
- training for pilots in recognising and reacting to inflight emergencies in accordance with the requirements in the rotorcraft's flight manual.

1.5.2 Whilst it is expected an operator and pilot will meet the rotorcraft proficiency check requirements in accordance with Part 61 of CASR, which would be expected to include competency in autorotation's. This additional requirement is a means of maximising the pilot skill set, via the operator's Part 133 of CASR training and checking system, for situations

which can arise in the event of an engine failure over a populous area. Therefore, it would be reasonable to expect the following addition to normal autorotation training:

- precision autorotative flight skill set development exercises, including extended range performance configuration considerations and very close landing site operations
- 180- and 360-degree autorotative flight to a nominated site to go round
- Practice forced landings to a nominated confined area site to go round.

1.5.3 Competency training and assessment consideration should be made for rotorcraft specific emergencies which may include but not be limited to the following:

- autorotation
- transmission malfunctions
- tail rotor failures including fixed pitch settings
- stuck pedals
- electrical system malfunctions
- governor failures.

1.5.4 As a mitigation of risk, the aim for an operator would be to build competence and confidence to ensure there is a reasonable expectation the pilot can utilise this skill set should an engine failure occur.

Note: As with all training exercises these additional items must themselves only be conducted by appropriately trained and competent training pilots, in situations and scenarios which ensure any additional training risks are managed appropriately, and in conditions which are considered suitable by the operator.

2 Summary

2.1 In summary, Part 133 of CASR and the Part 133 MOS provide for PC3 operations over populous areas both when SFLA's are available and when they are not always available.

2.2 Section 10.26 the Part 133 MOS provides a method for operators and pilots to conduct flight over a populous area when a SFLA is not available.

2.3 The intent is to apply suitable and consistent risk mitigators to protect both the persons in the rotorcraft and on the ground or water.

2.4 A summary of the process in assessing the requirements of regulation 133.340 of CASR would be for the operator and PIC to determine that:

- air transport operations will be conducted
- the rotorcraft will be operated in PC3
- a SFLA is not available (for all or some elements of the flight)
- the safety of persons or property under the rotorcraft have been considered
- the flight time where an SFLA is available along the route has been maximised
- the required particle detection system is fitted to the rotorcraft
- risk assessment and management procedures are included in the exposition
- the exposition risk assessment and management procedures have been followed for the flight
- the pilot is trained in relevant rotorcraft emergencies
- the pilot is trained in precision autorotative descents to limited areas

2.5 Appendix A provides a sample on how an operator and PIC might assess and comply with the requirements of regulation 133.340 of CASR.

Appendix A
Sample flight risk assessment

A.1 Overview

A.1.1 An air transport operator based at Moorabbin airport (YMMB) has decided to commence scenic flight operations in a Robinson R44 rotorcraft incorporating the Melbourne CBD and return.

A.1.2 The following information is a sample of how the operator and pilot might assess the route and apply the risk mitigation outlined in subsection 10.29 (4) of the Part 133 MOS.

A.2 Assumptions and performance calculations (nil wind)

A.2.1 The following assumptions have been made in relation to aircraft performance:

- TAS – 100 kts
- Rate of descent in autorotation – 1300 feet per minute
- Airspeed in autorotation – 60 KIAS
- Time to descend 1000 feet in autorotation – 45 seconds
- Maximum horizontal distance travelled per 1000 feet descended – 0.75 NM.

A.1 Flight Path selection

A.2.2 The flight path selected is as follows:

- Depart YMMB on climb to 1000 feet AMSL
- Track direct to Cerberus at 1000 feet AMSL
- Track coastal to Station Pier on climb to 2500 feet AMSL
- Commence a clockwise orbit of the CBD
- Exit via the Melbourne Cricket Ground
- Track direct to the Academy on descent to 1500 feet AMSL
- Return to YMMB at 1500 feet AMSL.

A.3 Identification of possible SFLA

A.3.1 YMMB to Cerberus (4.2 NM)

A.3.1.1 This leg is expected to take approximately 3 minutes with the potential SFLA highlighted shown with red circles in Figure 1 below, and the direct route between these two locations as a yellow line.

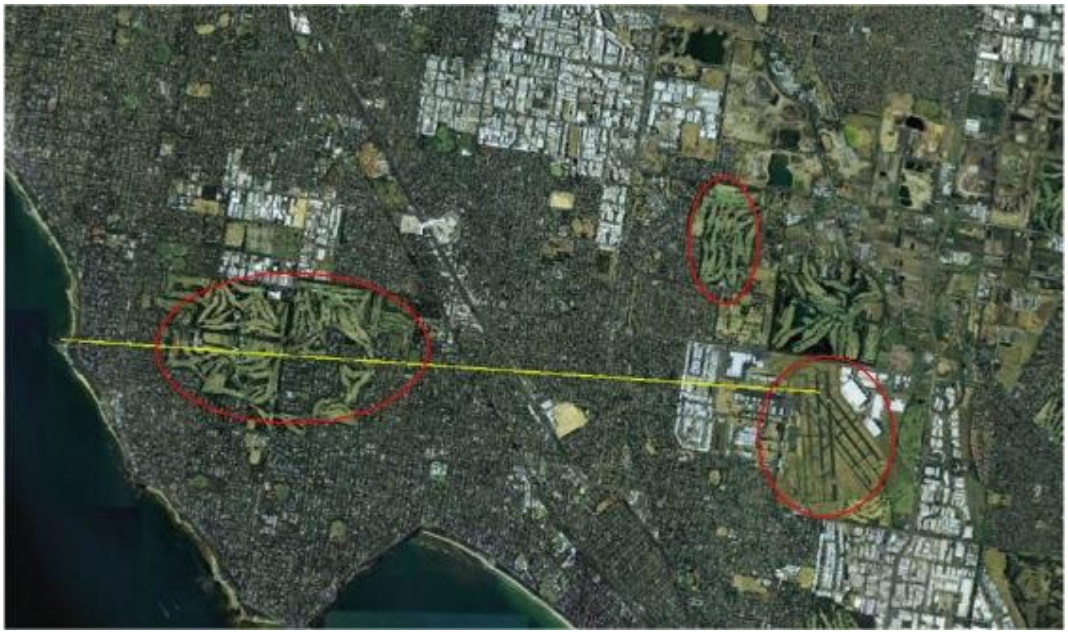


Figure 1. YMMB to Cerberus

A.3.2 Cerberus to Station Pier (9.2 NM)

A.3.2.1 This leg will take approximately 6 minutes. In Figure 2 below, the route is shown by a yellow line and the potential land SFLA is shown by blue or red circles.

A.3.2.2 While there are only a few forced landing open fields, the coastal track offers potential opportunity for a beach landing. Consideration of its suitability would be required for summer months given expected high beach usage.

A.3.2.3 A further consideration for the operator and pilot is the potential use of the coastal area. This area of water is adjacent to land and, assuming the other SFLA requirements in regulation 133.010 of CASR are met, could be used as an SFLA.

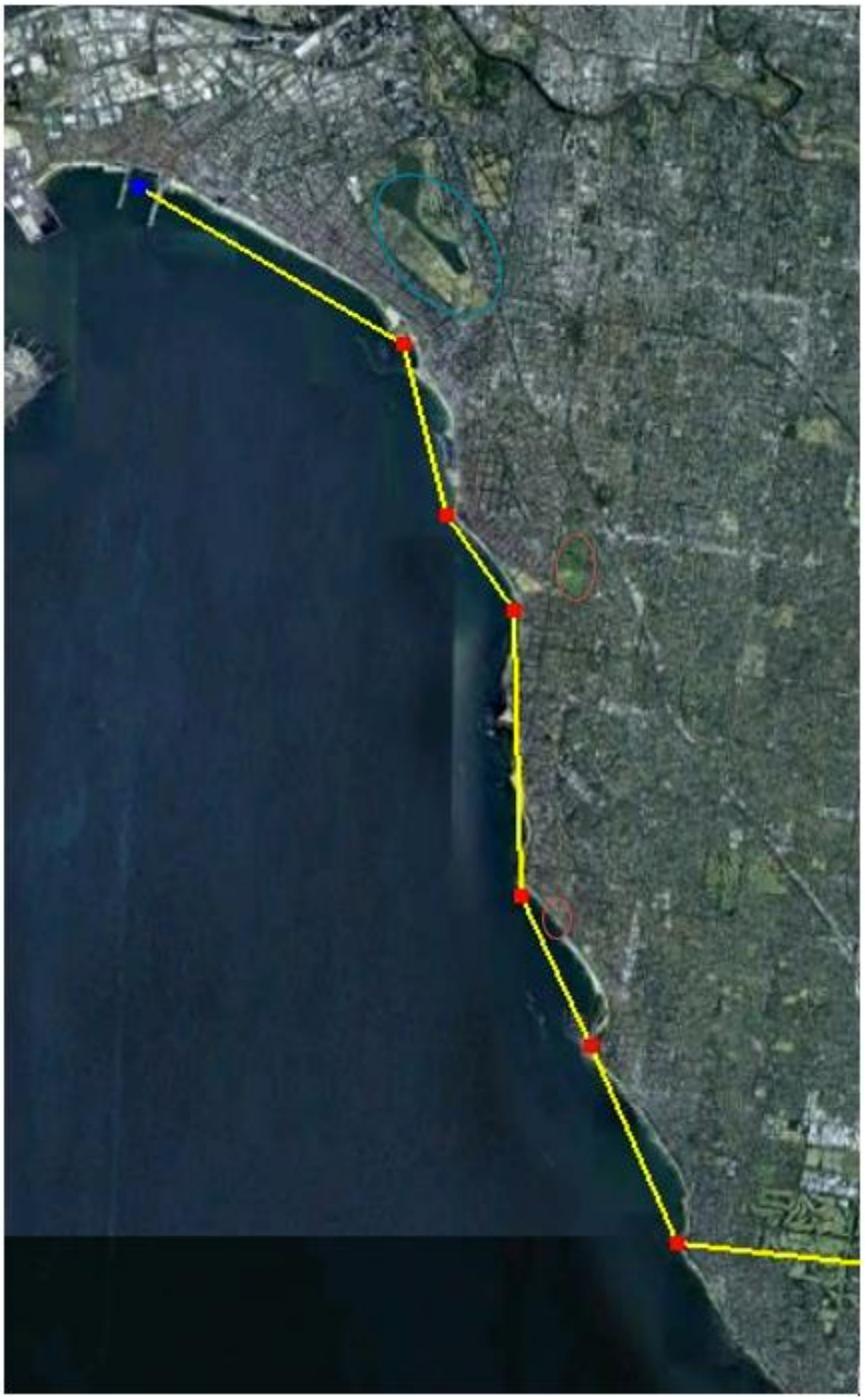


Figure 2. Cerberus to Station Pier

A.3.3 Station Pier to the MCG (5.0 NM)

A.3.3.1 This leg will only consume approximately 3 minutes of the flight; however, the increasing populous area means there are fewer SFLA. In Figure 3 below, the route is shown by a yellow line and the potential land SFLA are shown by red circles.

A.3.3.2 Again, the river may afford some opportunity as an area of water for a SFLA as it is adjacent to land, provided all other requirements of regulation 133.010 of CASR are met.

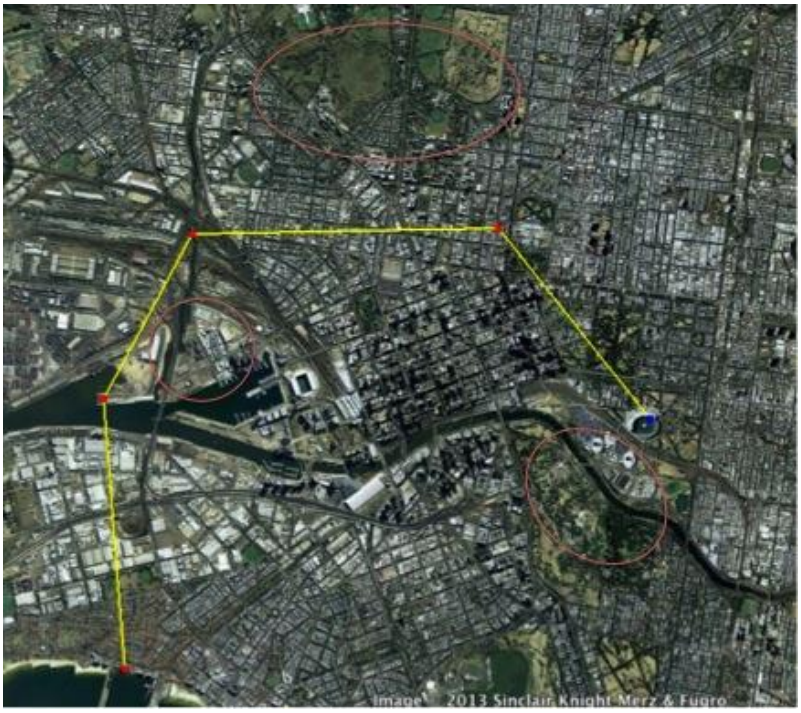


Figure 3. Station Pier to the MCG

A.3.4 MCG to the Academy (ACE) (10.0 NM)

A.3.4.1 This leg will take 6 minutes of flight time but is conducted over a highly populated area. In Figure 4 below, the route is shown by a yellow line and the potential land SFLA are shown by red circles. The possible forced landing areas are limited, and those shown are restricted in size.

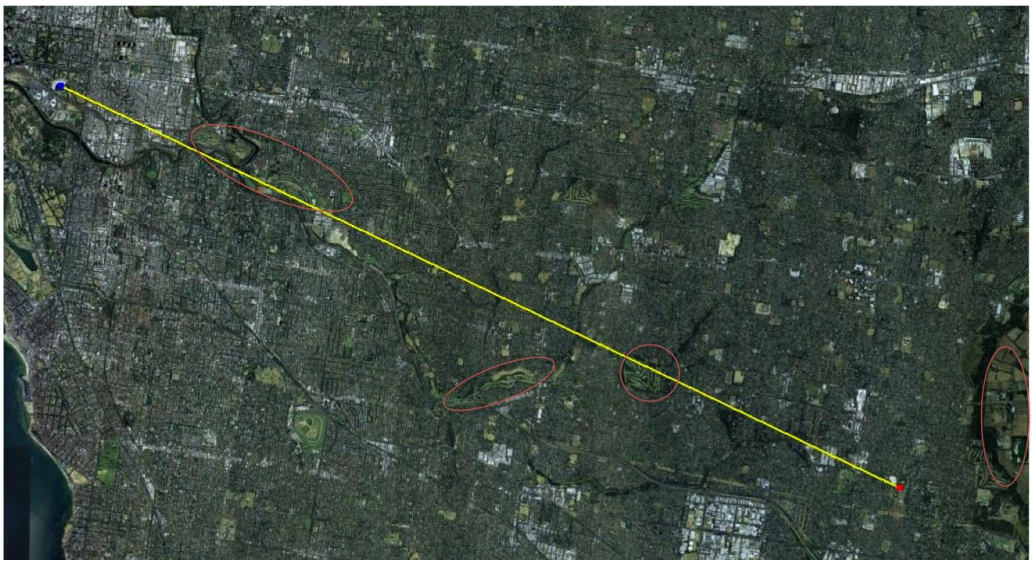


Figure 4. MCG to the ACE

A.3.5 Academy (ACE) to YMMB (6.3 NM)

A.3.5.1 This leg will take approximately 4 minutes and offers limited SFLA as YMMB is approached. Figure 5 below shows the route as a yellow line and the potential land SFLA by red circles.

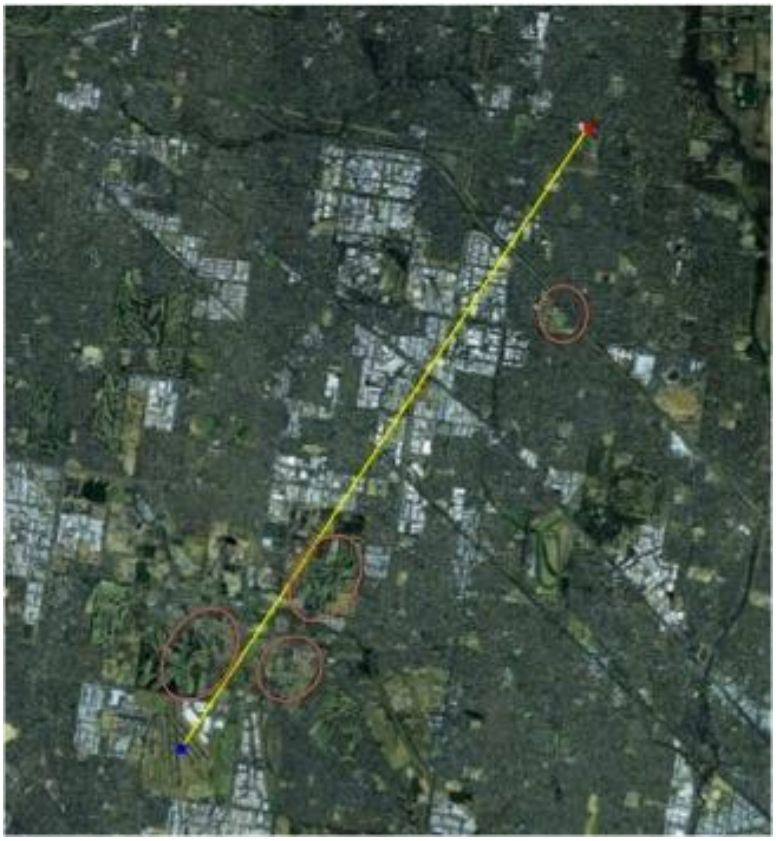


Figure 5. ACE to YMMB

A.4 Analysis

A.4.1 With the flight route surveyed, the operator and PIC have determined that whilst there are some (limited) SFLA available along the selected route, a SFLA will not be available at all times.

A.4.2 As the aircraft will be operated in PC3, and a SFLA is **not** available at all times, the requirements of section 10.26 of the Part 133 MOS must be met.

A.4.3 To meet the requirements of this MOS section, the operator and PIC have reviewed the proposed route to ensure that the time flown along the route with available SFLA is maximised, and no reasonable suitable alternative route options are available.

A.5 Risk assessment and management

A.5.1 Development of the risk assessment and the risk management plan

A.5.1.1 To comply with the requirement, the operator has identified 6 main risk areas as part of the risk assessment process. The risk areas identified are listed immediately below and are further explained in the following sections A.5.2, A.5.3, A.5.4, A.5.5, A.5.6 and A.5.7:

- aircraft emergency leading to a forced or immediate landing on land
- aircraft emergency landing to a ditching scenario
- mid-air collision due to high density traffic area
- previously identified suitable forced landing areas no longer available for use
- aircraft loaded outside of centre of gravity limits leading to an inflight loss of control
- aircraft all up weight being excessive for environmental conditions leading to a loss of control and/or over pitching.

A.5.1.2 With the risk areas identified, the operator and PIC consider the implementation of risk mitigation strategies to reduce, minimise or eliminate the risk.

A.5.1.3 With the process complete, the operator and pilot have identified the following control measures to be implemented.

A.5.2 Aircraft emergency leading to a forced or immediate landing on land

A.5.2.1 Prior to commencement of flight operations all pilots will undergo a route check and be shown the identified suitable forced landing areas.

A.5.2.2 A copy of the route and suitable forced landing area will be displayed in the operations room.

A.5.2.3 Aircraft emergency training (discussed later in this Appendix).

A.5.3 Aircraft emergency leading to a ditching scenario

A.5.3.1 The flight leg from Cerberus to Station Pier offers excellent opportunity for a safe forced landing onto the water in accordance with regulation 133.010 of CASR.

A.5.3.2 As such the operator has elected to take the following actions to ensure they can maximise their use of these areas of water:

- only utilise a rotorcraft with an emergency flotation system
- require the pilot and passengers to wear a life jacket at all times during the flight
- require the pilot to undergo Helicopter Underwater Escape Training (HUET)
- include in the passenger safety briefing the additional actions in the event of a ditching.

Note: The operator will also need to ensure their policies comply with the equipment requirements of Chapter 11 of the Part 133 MOS for operations over water.

A.5.4 Mid-air collision due to high density traffic area

A.5.4.1 Given the risk of a mid-air collision in the YMMB high-density traffic area, the operator has elected to fit an integrated TCAS into the R44. In addition, a training package has been developed on see and avoid procedures.

A.5.4.2 Further, all new pilots will conduct a route check with the Chief Pilot and the 6-monthly checks will incorporate refresher training in operations in high-density traffic areas.

A.5.5 Previously identified suitable forced landing areas no longer available for use

A.5.5.1 The operator has elected to review the designated suitable forced landing areas each 3 months.

A.5.5.2 This will be done as part of the scenic flights and will be conducted by line pilots. The intent will be to ensure the master map is updated and marked with the most recent review date.

Note: If any of the selected sites are designated public use areas, the operator, through the SMS, will monitor possible conflicts with high activity events.

A.5.6 Aircraft load outside of CoG leading to an inflight loss of control

A.5.6.1 The operator has elected to develop standard load sheets for the scenic flights and has determined the maximum load permissible for each seat. These calculations have been included in the flight operations section of the operator's exposition.

A.5.6.2 Further, calibrated scales will be used to weigh each passenger at the beginning of the flight.

A.5.7 Aircraft operating weight excessive for environmental conditions leading to a loss of control and/or overpitching

A.5.7.1 In addition to CoG issues, the operator has identified the risk of the rotorcraft being overloaded for the particular environmental condition. Of note, Melbourne is known to have temperatures in excess of 40 degrees Celsius during the summer periods.

A.5.7.2 As such, in addition to load sheets, the operator has elected to develop load versus temperature quick reference tables to ensure rotorcraft HOGE performance at maximum continuous power. This will ensure that not only is the CoG within limits, but the rotorcraft has sufficient performance for the conditions.

A.5.8 Paragraph 10.29 (4) (b) of the Part 133 MOS

A.5.8.1 The Part 133 MOS (4) (b) requires 'training for pilots in recognising and reacting to inflight emergencies in accordance with the requirements in the rotorcraft's flight manual'.

A.5.8.2 Considering this requirement, the operator has elected to embed an enhanced 6-monthly training program in R44 emergency procedures for all pilots. The Pilot Operators Handbook has been reviewed and the following emergencies selected as a minimum to be covered during the check flight:

- Ditching power off and power on (discussion item).
- Loss of tail rotor thrust in forward flight.
- Engine fire in flight actions.
- Electrical fire in flight (touch drills and discussion item).
- Hydraulic system failure actions.
- Governor failure actions.
- Warning and caution light illumination actions.
- Low RPM Horn and Caution light actions.
- Air restart procedures (touch drills and discussion item).

A.5.9 Subparagraph 10.29 (4) (b) of the Part 133 MOS

A.5.9.1 Subparagraph 10.29 (4) (b) requires 'training for pilots in conducting autorotative descents to locations with limited access to suitable forced landing areas'

A.5.9.2 Considering this requirement, the operator has elected to include the following risk managed autorotative training during the normal 12-monthly checks:

- Power failure between 8 ft and 500' ft (action items discussion and practical training)
- Power failure above 500 ft (discussion and practical training)
- Maximum glide distance configuration in autorotation. (practical)
- Minimum rate of descent configuration in autorotation. (practical)
- Precision autorotation (discussion and practical) training including:
  - Minimal manoeuvring
  - 180 degree.
  - 360 degree.

A.5.10 Risk management plan

A.5.10.1 The plan takes into account all of the identified risks, quantifies an initial risk level, then assesses the residual risk once the control measures are in place.

A.5.10.2 The risk levels are quantified using a standard risk matrix; however, an operator may choose to build a relevant Risk Matrix for their operation.

Risk management action			1 Rare	2 Unlikely	3 Possible	4 Likely	5 Almost certain
EXTREME	Modify the threat, frequency or consequence to reduce the risk class	Likelihood	Event may occur only in exceptional circumstances	Event could occur at some time	Event should occur at some time	Event will probably occur in most circumstances	Event is expected to occur in most circumstance
HIGH	Safety risks – modify the threat, frequency or consequences to reduce the risk class to Moderate or Low. Commercial risks – review the risks and where practicable reduce by additional mitigation measures such as hedging, insurance, etc.						
SIGNIFICANT	Modify the threat, frequency or consequence to ensure the risk class is reduced to Moderate or Low. Where the risk class cannot be reduced to Moderate or Low, action shall be taken to remove threats, reduce frequencies or consequences so as to reduce the risk to As Low As Reasonably Practicable (ALARP).	Examples	May occur only in exceptional circumstances (i.e. will occur once every 20-100 years)	Could occur once every 10 years	Could occur once every 3-10 years	Will probably (>50%) occur one (or more) within 12 months	Will almost certainly occur once or more within 12 months
MODERATE	Management responsibility must be specified – monitor to determine if risk changes and needs to be reassessed.						
LOW	Manage by routine procedures – reassess at next review.						

Figure 6. Risk consequence and likelihood levels

Consequence	Personnel impact	Corporate impact	Financial impact	Environmental impact	Community impact	Likelihood					
							1 Rare	2 Unlikely	3 Possible	4 Likely	5 Almost certain
5 Catastrophe	More than one fatality.	Would threaten the effective operation of the company.	>$5,000,000	Irreversible and irrecoverable changes to soil and/or water quality in the affected area. Loss of ecological or land-use function with little prospect of recovery to pre-incident condition.	Widespread outrage – National / International impact	5 Catastrophe	SIGNIFICANT (6)	HIGH (7)	HIGH (8)	EXTREME (9)	EXTREME (10)
4 Major	Fatality or more than one total permanent disability.	Would threaten the effective operation of the company for a period or have a significant effect on how it will operate in the future.	$500,000 To $5,000,00	Substantial changes to existing soil and/or water quality in the affected area with significant change to biodiversity and/or change of ecological or land-use function.	Major alarm and anger – Statewide impact	4 Major	MODERATE (5)	SIGNIFICANT (6)	HIGH (7)	HIGH (8)	EXTREME (9)
3 Severe	Total permanent disability.	No threat to the effective operation but exposes company to unacceptable consequences.	$50,000 To $500,000	Changes to existing soil and/or water quality in the affected area, with local changes to biodiversity, but no loss of ecological or land-use function.	Widespread complaints and anger	3 Severe	LOW (4)	MODERATE (5)	SIGNIFICANT (6)	HIGH (7)	HIGH (8)
2 Serious	Single permanent partial disability or lost time injury.	No significant impact, dealt with internally.	$10,000 To $50,000	Changes to existing soil and/or water quality in the affected area, but no changes to biodiversity or ecological or land-use function.	Limited complaints with local impact	2 Serious	LOW (3)	LOW (4)	MODERATE (5)	SIGNIFICANT (6)	HIGH (7)
1 Minor	First aid injury.	No significant impact routinely dealt with by operational areas.	<$10,000	Possible incidental impacts to soil, water, flora and fauna in a locally affected area, but without adverse ecological or land-use consequences	No impact	1 Minor	LOW (2)	LOW (3)	LOW (4)	MODERATE (5)	SIGNIFICANT (6)

Figure 7. Risk matrix

Hazard	Risk dimension	Analysis			ALARP	Accept treat	Treatment/control	Secondary analysis		
		Con	Like	Risk				Con	Like	Risk
Task: Conduct scenic flight operations departing YMMB incorporating Melbourne CBD and return										
Title: Scenic flight over a populous area										
Aircraft emergency occurs leading to a forced or immediate landing with no suitable landing area available	Pers. Impact	Cat	Unlike	High (7)	No	Treat	Proposed flight route to be surveyed prior to undertaking revenue flights. Suitable forced landing areas to be identified for each leg. Master map to be compiled including the location of each identified suitable forced landing area. Pilots require route check and shown the nominated safe forced landing areas.	Cat	Rare	Significant (6)
Aircraft emergency occurs leading to a forced or immediate landing with a suitable landing area available however pilot does not have necessary skill set to successfully auto-rotate to the nominated area	Pers. Impact	Cat	Unlike	High (7)	No	Treat	Pilots to be trained in all precision auto-rotations in the R44. Training to include 180 degree and 360 degree autos. Ongoing training to include a six monthly check incorporating precision autos.	Cat	Rare	Significant (6)
Aircraft emergency leading to a ditching scenario	Pers. Impact	Maj	Unlike	significant (6)	No	Treat	Pilots to be trained in ditching procedures. Pilots to conduct Helicopter underwater escape training each 2 years. As part of passenger briefing, actions in the event of ditching to be covered. All passengers and crew to wear a life jacket for the duration of the flight.	Maj	Rare	Moderate (5)
Mid air collision due to high density traffic area	Pers. Impact	Cat	Unlike	High (7)	No	Treat	TCAS to be fitted to all aircraft utilised for scenic flight operations. Training package covering operations in high density traffic areas to be delivered to all operational pilots. Pilots trained in the use of TCAS.	Cat	Rare	significant (6)
Identified suitable forced landing areas no longer available	Pers. Impact	Cat	Rare	significant (6)	No	Treat	Identified suitable forced landing areas to be reviewed 3 monthly to determine ongoing suitability. Master map displaying identified suitable forced landing areas updated on completion of inflight reconnaissance. Identified suitable forced landing areas reviewed annually with Head of Operations to confirm viability of ongoing operations. Safety Manager monitor public events impacting availability of identified suitable forced landing areas.	Cat	Rare	significant (6)
Aircraft load outside of CoG leading to inflight loss of control	Pers. Impact	Cat	Unlike	High (7)	No	Treat	Load data sheets developed for the aircraft to include maximum weights in planned seating configuration.	Cat	Rare	significant (6)
Aircraft weight excessive for environmental conditions leading to a loss of control and/or over pitching	Pers. Impact	Cat	Unlike	High (7)	No	Treat	Passengers weight established prior to flight. Passenger weight entered onto load data sheet prior to flight. Pilots to confirm aircraft within mass and balance prior to each flight.	Cat	Rare	Significant (6)

Figure 8. Risk management plan