D2

AIRSPACE AND AIRCRAFT RELATED NOISE

AIRSPACE ARCHITECTURE AND MODES OF OPERATION

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2.1 INTRODUCTION

This chapter explains the factors that affect airspace operations at the Sunshine Coast Airport (SCA) and examines the airport runway operations, flight paths and airspace changes required to support the proposed runway. This information is provided to assist the reader in understanding the impact of aircraft flight operations, and therefore the potential noise impact associated with the proposed new runway.

The existing SCA operations and airspace procedures were reviewed. Based on demand forecasting, future traffic volumes and aircraft operating types were identified. In consultation with Sunshine Coast Airport (SCA) and Airservices Australia (Airservices), flight path and airspace options for the proposed new runway were developed, assessed and reviewed with a view to maximising the efficiency of the airspace network and minimising the number of flight paths and impact on local population centres.

A detailed technical report titled 'Airspace Design Concepts Report' was prepared and reviewed by Airservices and the Civil Aviation Safety Authority (CASA) and forms the basis for the information provided in this chapter.

Agreement in principle has been provided by both Airservices and CASA, confirming that the proposed new flight paths and airspace changes meet their planning requirements. It should be noted that before any flight path changes are implemented, Airservices would be required to complete an additional full and detailed Safety Case and Environmental Assessment, which must be approved by Federal Government process. This will not take place until just prior to opening of the proposed runway in 2020.

The changes proposed in this chapter represent the flight paths and airspace currently envisaged by SCA to be adopted for operations on the proposed runway. However, these concepts are preliminary and future developments in aircraft technology and navigation systems, as well as development of the Brisbane basin air traffic management network could result in changes to the proposed airspace.

2.2 WEATHER

Weather conditions have a major impact on airport operations, determining the direction of runway use and the types of approach and departure procedures used.

These factors determine which flight paths will be flown by aircraft as they arrive and depart from the airport.

2.2.1 Wind direction and speed

Wind direction and speed are critical factors used by pilots and air traffic control to determine which runway direction will be used for aircraft landing and taking off.

For safety and efficiency, aircraft will generally land and take-off into the wind, known as a headwind, as this allows the slowest speed over the ground and reduces the distances required for accelerating and stopping. This makes the aircraft easier to control during these critical phases of flight.

Aircraft can only land or take-off with the wind coming from behind, known as a tailwind, in very limited circumstances where the wind speed is very low, typically no more than five knots, and the runway surface is completely dry. Under tailwind conditions aircraft are more difficult to control and require higher speeds and longer runway distances to safely complete the landing or take-off operation.

Aircraft also have operating limitations when the wind is from the side, known as crosswind, and under such conditions the safe operation of aircraft when landing and taking off from the runway can require that a different runway direction be used.

For all of these reasons the direction of the runway must be carefully considered, to ensure the runway aligns with the prevailing wind conditions typically occurring at the airport.

At SCA both the Bureau of Meteorology (BOM) and Airservices collect meteorological information. Consequently, wind speed and direction is well understood.

The wind patterns at SCA are characterised by distinct seasonal patterns and influenced by proximity to the ocean, with onshore winds prevailing for the majority of the time.

The wind rose shown in **Figure 2.2a** represents the annual average for winds at SCA over a 16-year period to 2010, and clearly shows the bias toward south-easterly winds for most of the year. For a limited time during the early summer period (September to December) the prevailing winds typically swing to a more northerly direction but are reduced in speed.

The proposed new Runway 13/31 has been designed with a north-west/south-east alignment to best suit the prevailing winds at SCA. This will reduce the number of times aircraft are unable to operate at the airport due to unfavourable winds, which has regularly been a problem with the alignment of the existing north-south Runway 18/36.

2.2.2 Rain and visibility

Rain and reduced visibility caused by low cloud or fog conditions also affect the way that aircraft arrive and depart from the airport.

Rain causes runway surfaces to have reduced levels of friction and longer take-off and landing runs are required.

Rain, low cloud or fog conditions can all reduce visibility to the point that pilots of aircraft approaching the airport are unable to see the runway well enough to use visual cues when landing. In these situations instrument approach procedures are used to guide the aircraft safely to a point from which the pilot can see the touch down point on the runway.

Whereas in visual flight conditions Air Traffic Control (ATC) can flexibly alter flight paths to suit operating efficiencies, in instrument flight conditions aircraft must follow strictly defined flight paths and altitudes to ensure safety.

Figure 2.2a: Wind direction vs wind speed in km/h (6 July 1994 to 30 September 2010)

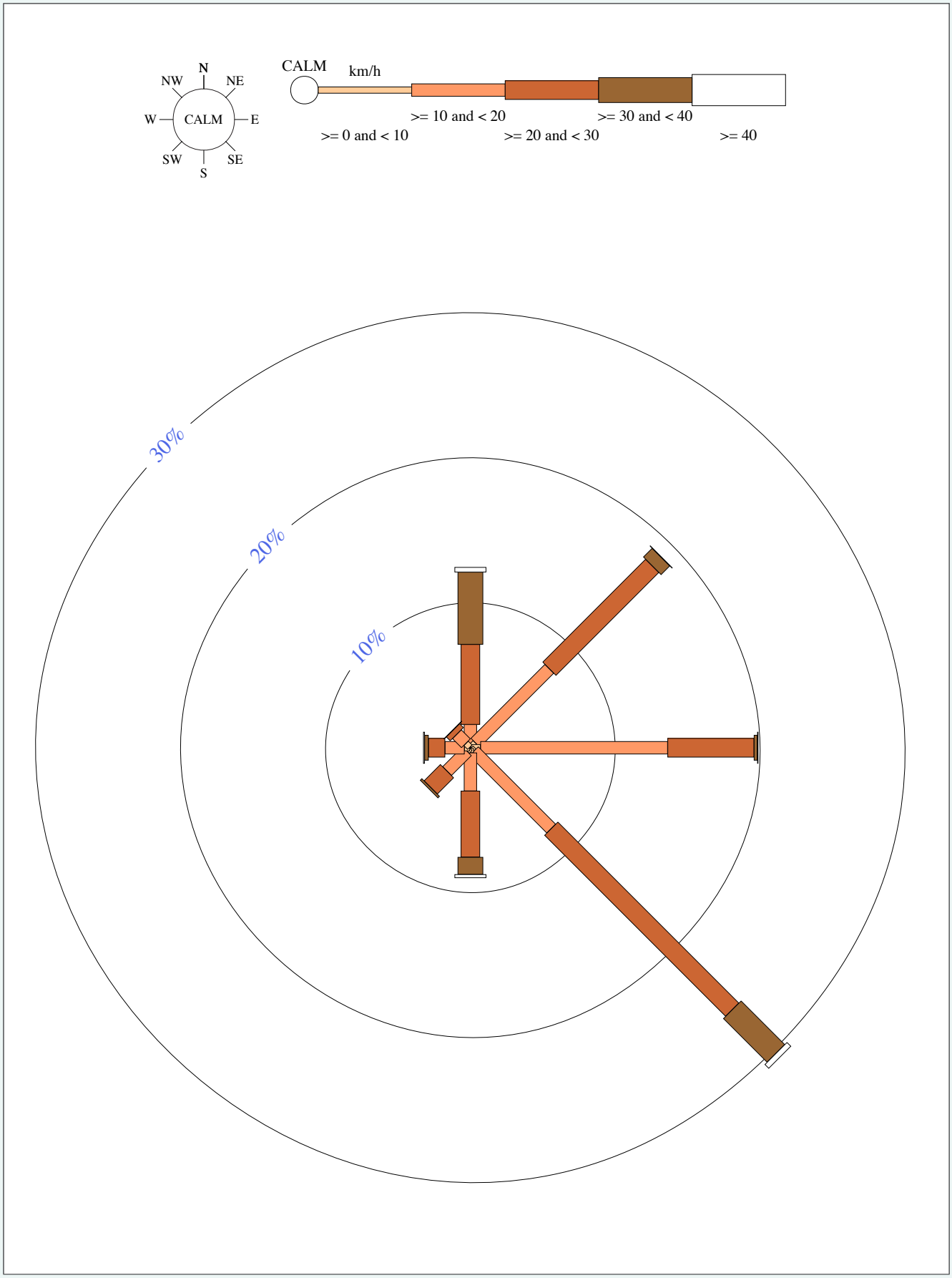


Figure 2.3a: Existing jet arrival flight paths (Note 1 – solid green lines represent instrument approach paths)

2.3 EXISTING FLIGHT PATHS

The existing flight paths, which aircraft follow to arrive at and depart from SCA, are based on the alignment of the existing main Runway 18/36. This runway is aligned in a north-south direction.

Operating procedures and flight paths at the airport are designed to minimise the impact of aircraft noise on the community as much as possible. These noise abatement procedures dictate that, where possible, the preferred direction of operation for jet aircraft is to land from the south, landing on Runway 36, and depart to the south, taking off from Runway 18.

These procedures are designed to avoid low-level overflight of the Marcoola area immediately to the north of the airport as much as possible.

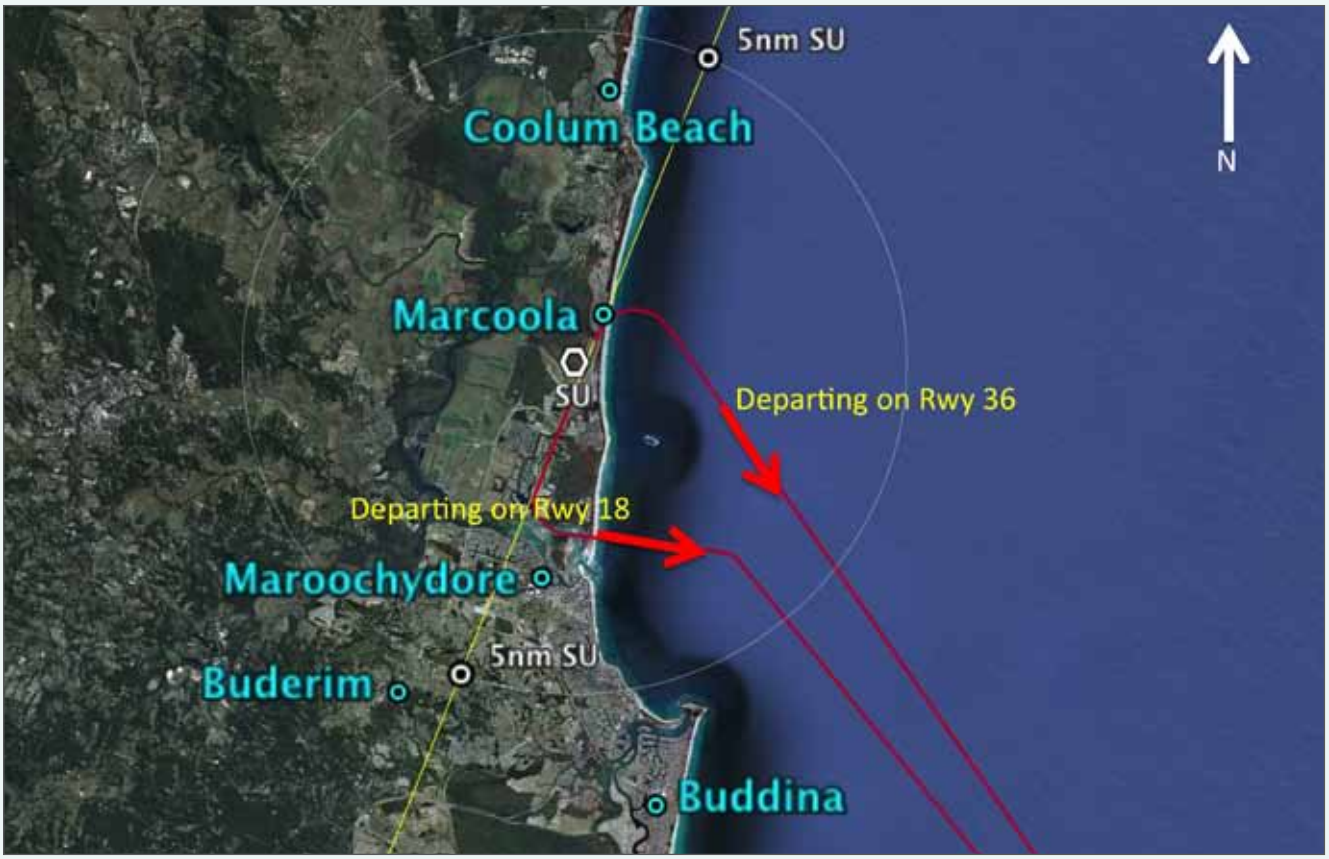
In addition jet aircraft operating south of the airport approach from the east remaining overwater for as long as possible, and turn to the east on departure as soon as possible to minimise the amount of overflight of high population areas in Maroochydore and southern areas of the Sunshine Coast.

However, as previously explained, in certain wind and weather conditions procedures designed to minimise noise impact cannot always be followed. Sometimes arrivals and departures of jet aircraft to the north of the airport (arriving on Runway 18 and departing on Runway 36) are unavoidable.

Under visual flight conditions arriving jet aircraft will approach from the east overwater and visually position themselves to turn on to the final approach path at approximately five nautical miles (nine km) from the runway in use. Under instrument conditions pilots follow published instrument approach procedures and follow strict flight paths that lead them to turn on to final approach paths eight nm (15 km) to 10 nm (18 km) from the runway in use. These general flight paths are shown in **Figure 2.3a** and **Figure 2.3b**. Full details of the instrument approach procedures are published in the Airservices, Aeronautical Information Package (AIP) Departure and Approach Procedures (DAP East) available on the Airservices website.

Due to the north-south runway alignment, the existing flight paths necessarily concentrate most of the commercial jet traffic operations over populated areas to the south of the airport, such as Maroochydore, Buderim, Mooloolaba and Buddina. As commercial traffic levels grow the noise impact from these flights will continue to increase.

Figure 2.3b: Existing jet departure flight paths



This problem will be alleviated with the proposed new runway alignment, which will allow aircraft approaching from and departing to the south to remain over water and keep away from the main population areas south of the airport.

Satellite based approaches into runway 18/36 called Required Navigation Procedures (RNP) or Standard Tracks exist. These approaches can be flown by aircraft equipped with suitable reviews and used by trained crew.

This system allows the aircraft to track along on instrument like approach and achieve significant benefits from reduced track miles and minimum decision heights in poor weather.

At SCA the RNP approaches paths for Runways 18 and 36.

2.4 AIRPORT OPERATING HOURS

SCA operates 24 hours a day, 7 days a week. The airport supports a number of Regular Public Transport (RPT) services and a variety of General Aviation (GA) activities. These activities are in keeping with the increasing demands of tourism, passenger traffic, general aviation and commercial development opportunities, which are essential for the commercial viability of the airport, as well the sustained economic growth of the Sunshine Coast.

2.5 VOLUME OF AIRCRAFT TRAFFIC

2.5.1 Existing aircraft traffic

An aircraft movement is defined as a single landing or take-off event. In the year ending June 2012 there were a total of 91,029 aircraft movements at SCA. These movements are broken down in **Table 2.5a**.

Table 2.5a: Aircraft movements 2012

Type of Aircraft Operations	2012 Movements
Commercial RPT aircraft	5,559
General Aviation fixed wing (including charter)	25,168
Helicopters	60,302

General aviation fixed wing (including charter flights) and helicopter operations currently account for approximately 94% of all aircraft movements while the remaining 6% are commercial RPT flights.

Commercial flights currently include domestic jet services to Sydney and Melbourne as well as seasonal trans-Tasman jet services to New Zealand.

Turboprop aircraft servicing mining industry destinations in North Queensland also carry out daily charter flights.

2.5.2 Future aircraft traffic

Long-term traffic forecasts indicate that, with the construction of the proposed new runway, SCA can expect to experience significant growth in commercial RPT flights with a baseline compound average annual growth rate of 4% in the period 2012 to 2050. By 2050 commercial traffic (RPT), will represent nearly 20% of all aircraft movements.

General aviation fixed wing (including charter flights) and helicopter traffic is expected to remain at similar to current levels with a baseline compound average growth rate of less than 1% during the same 2012 to 2050 period.

The forecast traffic movements for the years 2020, 2030 and 2040 are shown in **Table 2.5b**.

Table 2.5b: Forecast aircraft movements 2020 – 2040

Type of Aircraft Operations	2020	2030	2040
Commercial aircraft (RPT)	8,900	13,660	18,210
General Aviation fixed wing (including charter)	29,370	35,630	35,630
Helicopters	70,390	85,390	85,390

Steady growth of commercial traffic is expected in the following area:

- Growth in narrowbody jet services to the existing Sydney and Melbourne markets
- Expansion of narrowbody jet services to other domestic capital city markets
- Growth in narrowbody jet services, and the introduction of widebody jet services, to trans-Tasman markets
- Introduction of widebody jet services to Asian markets
- Growth of commercial turboprop charter services, and the introduction of commercial RPT turboprop services, to northern resource sector markets and tourism.

Due to its limited length, the existing Runway 18/36 can only accommodate narrowbody Airbus A320 and Boeing 737 jet aircraft suitable for short domestic and limited trans-Tasman services, and due to its limited 30 m width these aircraft can only operate under a CASA exemption.

Traffic forecasting has confirmed the need for a longer, 45 m wide, runway to enable operations by narrowbody jet aircraft without CASA dispensation and by widebody aircraft types that would be required for services to key international hub destinations.

The proposed new Runway 13/31 will meet these requirements and provide adequate runway capacity for the forecast future traffic growth.

2.6 EXISTING AIR TRAFFIC CONTROL PROCEDURES FOR THE SUNSHINE COAST AIRPORT

The existing runway operations are managed by ATC at the airport using a variety of procedures to ensure safe and efficient operations of arriving and departing air traffic.

ATC will determine the correct runway to be used, known as the Runway Mode of Operation, based on wind and weather conditions, the type of aircraft and the direction of the flight as well as noise and traffic efficiency considerations.

ATC will also select the correct approach or departure procedures and flight paths based on traffic demand and the aircraft capability.

2.6.1 Weather criteria for visual and instrument landings

Aircraft operating under Visual Flight Rules (VFR) are only able to fly when visibility levels exceed specified Visual Meteorological Conditions allowing the aircraft to remain clear of cloud and in sight of the ground.

Once cloud levels increase and/or visibility deteriorates below a certain point aircraft are only allowed to fly if they comply with Instrument Flight Rules (IFR). IFR aircraft are able to fly in Instrument Meteorological Conditions without visual reference to the ground except in the final phases of landing, and during take-off. To comply with IFR aircraft must be fitted with special instrument navigation systems and pilots must be qualified to operate those systems.

Instrument landings can only be carried out by aircraft operating under IFR. Instrument landing procedures are designed to guide an IFR aircraft down a fixed approach path to a minimum safe altitude, at which point the pilot must be able to see the runway in order to complete the final approach and landing.

In some circumstances when weather conditions are suitable, aircraft operating under IFR may choose to carry out visual approaches without the need to complete an approved instrument approach procedure. In most cases aircraft conducting visual approaches will fly a much shorter route directly to a close in final approach point to complete a landing.

2.6.2 Fly Neighbourly policy

Due to the large number of general aviation fixed wing aircraft and helicopters operating at SCA, the airport management and operators have agreed on a 'Fly Neighbourly Policy' to minimise the noise impact caused by these flights.

To comply with the Fly Neighbourly Policy fixed wing general aviation aircraft adhere to the following principles:

- Ensuring that where practicable all IFR aircraft depart via the appropriate standard instrument departure (SID)
- Compliance with noise abatement procedures included in the En Route Supplement Australia (ERSA) which applies irrespective of tower operation
- All pilots to plan all flights to minimise flight over built up areas e.g. over water or rural areas
- Wherever practicable runway departure to use full length in order to maximise height over populated areas
- Consider using satellite strips for aircraft circuit operations
- Avoid flying low over populated areas
- Minimise engine failure training over populated areas
- No training to occur between the hours of 10pm and 7am
- No engine ground running for the purpose of engine testing to occur between the hours of 2200 and 0700 (unless approved by the Airport Manager for extenuating circumstances)
- Ensuring that all non pre-flight engine runs are undertaken in the designated run-up area
- Ensuring that environmental awareness and noise issues are included in pilot training
- Responding to community enquiries about noise in a cooperative manner.

To comply with the Fly Neighbourly Policy helicopters adhere to the following principles:

- All pilots to plan all flights to minimise flights over built up areas (e.g. over water or rural areas)
- Wherever possible, use satellite strips for helicopter circuit operations
- Avoid flying low over populated areas
- Avoid tight manoeuvres and turns while operating helicopters over populated areas
- The volume of touch and go and auto rotation training on the main Runway 18/36 to be kept to a minimum
- No training to occur east of the main Runway 18/36 – all operations to be kept west of the flight strip wherever possible
- No training to occur between the hours of 10pm and 7am
- Ensure that environmental and noise issues are included in pilot training
- Respond to community enquiries about noise in a co-operative manner.

To minimise the impact of noise caused by commercial aircraft operations at SCA, Noise Abatement Procedures (NAP) are published in the Airservices En Route Supplement Australia (ERSA) and are followed by all aircraft.

Published NAP at SCA include instructions for jet aircraft to use Runway 36 for landing and Runway 18 for take-off whenever possible and for jet aircraft departing to the south to turn towards the water as soon as possible to avoid overflying populated areas.

2.6.3 Existing runway modes of operation

At SCA there are three main runway modes of operation, which are shown in **Figure 2.6a**.

1. **Runways 18 Mode –** In this mode jet and turboprop aircraft arrive from the north over Marcoola and depart to the south over Maroochydore on Runway 18. General aviation aircraft and helicopters normally land on the crossing Runway 12 but will use Runway 18 if the crosswind strength on Runway 12 is too high.
2. **Runways 36 Mode –** In this mode jet and turboprop aircraft arrive from the south over Maroochydore and depart to the north over Marcoola on Runway 36. General aviation aircraft and helicopters normally land on Runway 30 but will use Runway 36 if the crosswind strength on Runway 30 is too high.
3. **Reciprocal Runway Mode –** In this mode all jet and turboprop aircraft will arrive from the south over Maroochydore on Runway 36, but depart to the south over Maroochydore on Runway 18. This mode can only be used in periods of light wind conditions and low traffic demand.

2.6.4 Existing General Aviation operations

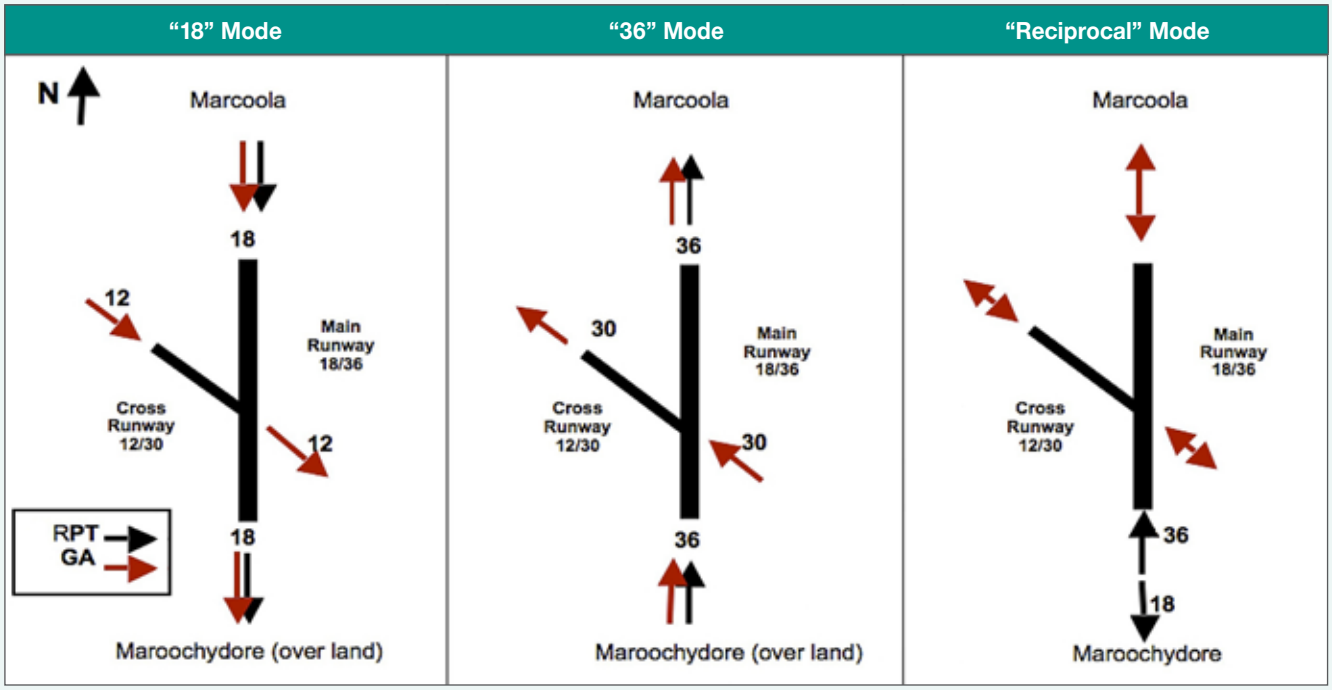
A large number of general aviation and helicopter flights operate at SCA.

ATC impose local traffic regulations published in the Aeronautical Information Package (AIP) Australia to control traffic operating in the vicinity of the airport and minimise disruption to local residents. These regulations include:

- Instrument approaches conducted for training purposes are restricted
- Circuit training is restricted to the hours of 7am till 10pm
- Local helicopter training flights operate west of Runway 18/36 not above 500 feet in an area referred to as the Helicopter Training Area
- NAP are applied.

Light aircraft operating under VFR are provided with published VFR traffic lanes to minimise overflight of populous areas. VFR traffic lanes are established west of the Bruce Highway from the Ettamogah Pub to Eumundi, and east of the coastline from Noosa Heads to Kings Beach.

Figure 2.6a: Existing runway modes of operation



2.7 METHOD OF DETERMINING REQUIRED CHANGES TO AIRSPACE

2.7.1 Flight path development process

Air traffic arriving and departing from SCA must be routed in directions that do not conflict with the broader en-route traffic flows established to service the greater Brisbane basin region.

A complex system of air routes currently exists which has evolved over time to suit the volume and type of air traffic, the available ground based navigation aids, the available surveillance coverage, the needs of military and other airspace users and general air traffic management procedures.

With the increased reliance on satellite based navigation and continual improvements in aircraft navigation technology and accuracy, greater flexibility in the design of air routes can be employed to improve efficiency for both operators and air navigation service providers. Airservices, is responsible for national air traffic management, they are currently reviewing the broader Brisbane basin air route structure with a view to reducing complexity and improving traffic flow efficiency in the future. The flight path requirements for the major regional airports at the Gold Coast and Sunshine Coast will be subject to optimisation of the main traffic flows at Brisbane Airport.

Until Airservices completes the Brisbane Basin airspace review, the full extent of en-route upper airspace changes cannot be fully anticipated. This review is programmed to be completed when the airspace changes for Brisbane's new parallel runway (NPR) are integrated, which involves staged airspace development up until 2020 when the NPR is commissioned. It is likely that there will be many changes to waypoints and track alignments, some of which may change the outer routes flown by aircraft operating in and out of the Sunshine Coast region. However, the basic entry and exit points where local flight paths will join the upper airspace can be generally predicted based on established traffic flows.

Working with Airservices, SCA has identified the general entry and exit points to the terminal airspace to ensure flight paths in the outer approach and departure segments do not conflict fundamentally with broader en-route traffic flows.

The final approach and initial departure segments of instrument flight procedures for the proposed new Runway 13/31 can be established accurately given the fixed nature of the runway alignment and local terrain. From these flight procedure paths, the local flight paths that join the proposed new runway to the upper airspace system have been developed. Airservices has provided in-principle agreement to the proposed new local flight paths.

The proposed new flight paths required to operate the proposed new runway also requires redefined volumes of airspace to properly contain arriving and departing aircraft and safely separate them from other aircraft operating in less controlled areas.

As the proposed flight paths are expected to accommodate an increase in air traffic and cater to flights from an expanded range of destinations, the new airspace structure needs to be more extensive and in some cases more restrictive than the current arrangement in order to maintain safety and adequate level of air traffic management efficiency.

SCA, in consultation with CASA, who is responsible for airspace classification in Australia, has developed a proposed airspace structural concept for the proposed flight paths. Unlike the flight paths themselves, the final design of the proposed airspace volumes will only be determined:

- Just prior to operation of the proposed new runway (currently scheduled for 2020)
- When Airservices completes the Brisbane basin airspace review and upper level airspace changes (scheduled to be completed prior to the commissioning of Brisbane Airport's NPR in 2020).

The proposed airspace concepts that have been developed are nevertheless useful for identifying the likely impact on various airspace users and CASA has provided in-principle agreement that the proposed airspace concepts meet general planning guidelines.

Proposed new flight paths and airspace changes have been developed to minimise noise impacts on population centres while meeting strict regulatory criteria. This process has been governed by three overriding principles:

- Safety is paramount in the development of all procedures
- Procedures must be based on sound air traffic management requirements
- Noise, other environmental and social impacts must be minimised to the extent possible.

Criteria for safe flight path development are drawn from International Civil Aviation Organization (ICAO) Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) as well as other supporting ICAO, Airservices and CASA documents, which detail technical data and requirements for the development of Standard Instrument Departures (SIDs) and Standard Arrival Routes (STARs), as well as Precision and Non-precision Instrument Approaches.

Air traffic management requirements are based on ICAO Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM), ICAO 'Annex 11 Air Traffic Services' and other supporting Airservices and CASA documents, as well as direct consultation with Airservices Brisbane Centre Operations management and technical staff.

Airspace changes are based on criteria provided by CASA guidelines for controlled airspace design, as well as direct consultation with CASA operations staff.

Noise, as well as other environmental and social impact considerations, are based on the principles outlined in Airservices Environmental Branch guidance material 'Environmental Principles and Procedures for Minimising the Impact of Aircraft Noise', as well as consultation with SCC and SCA.

2.7.2 Principles for development of flight paths and modes of operation

The proposed new runway alignment of 13/31 was selected taking into account the available development land, operational safety requirements resulting from wind and other weather conditions, minimising of terrain restrictions for approach and departure procedures and minimising of noise and environmental impacts on the Sunshine Coast region.

The proposed new runway direction will change the flight paths required to be flown by aircraft arriving and departing from the airport, which will result in changes to noise patterns and impacts on airspace users.

Planned development of population centres on the Sunshine Coast is focused on the southern area of coast with the largest residential expansion in the Caloundra South area. To the extent possible, flight paths corridors to support approach and departure procedures associated with the proposed runway have been identified to avoid over flight of existing and developing population areas.

In identifying airspace changes and new flight path corridors which will be needed to operate the proposed new Runway 13/31 at SCA, the fundamental principle was to contain flight paths to the primary runway alignment, with a circular traffic flow east of the coast overwater and crossing the coastal strip only in low population areas. This basic concept is illustrated in **Figure 2.7a**.

From this foundation concept, flight path corridors and airspace changes have been developed taking into account the operational requirements of the various aircraft types expected to fly in and out of SCA in the future.

The traffic forecast destinations, the supporting en-route structure and broader Brisbane basin traffic flows, the various types of approach and departure procedures likely to be employed in the future and the accommodation of general aviation traffic and other airspace users have all been considered.

2.8 PROPOSED MODES OF OPERATION

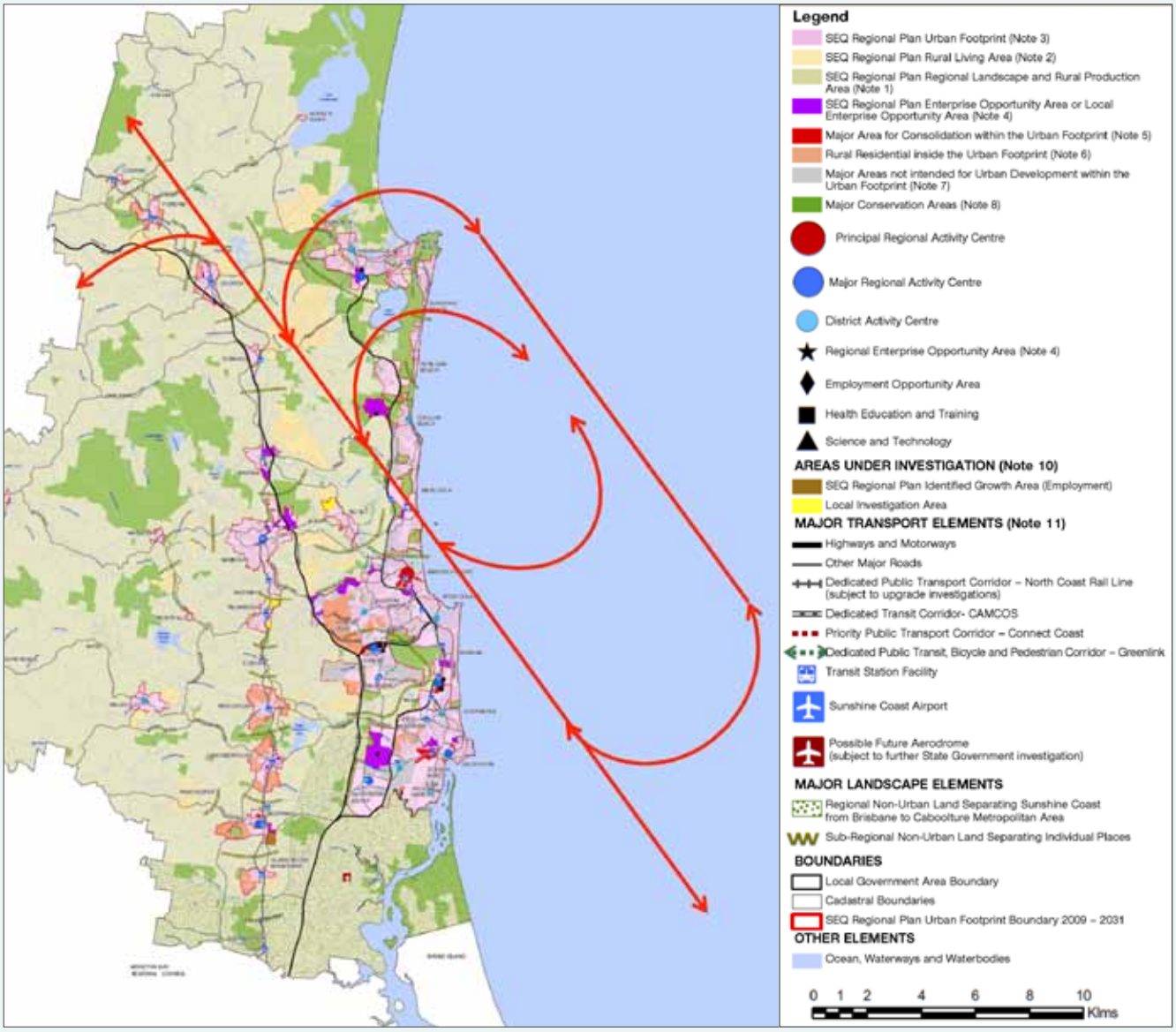
The proposed new runway at SCA will provide many operational benefits. Being longer and wider than the existing runway, the proposed new runway will provide improved safety margins for aircraft in critical flight phases of landing and take-off.

The proposed new runway will allow the operation of larger aircraft types that provide operating efficiencies to airlines and a wider choice of domestic and international destinations that can be directly serviced. It will also provide improved all weather capability through the use of more advanced instrument landing systems resulting in less flight diversions.

In addition, the proposed runway alignment will allow the use of flight paths that will avoid commercial jet aircraft having to overfly heavily populated areas of the Sunshine Coast, particularly those areas south of the airport.

The proposed new runway at SCA will change the runway modes of operation and procedures employed by ATC. ATC will continue to ensure safe and efficient operations of arriving and departing air traffic at the airport.

Figure 2.7a: Foundation concept for preferred flight paths to avoid Sunshine Coast population areas



2.8.1 New runway modes of operation

In 2020 it is proposed that traffic operating at SCA will have the use of two runways. The proposed new Runway 13/31 will become the primary runway for all traffic. The existing Runway 18/36 will remain in service but will no longer be used by commercial jet traffic. The existing Runway 18/36 will become the alternate runway for general aviation traffic.

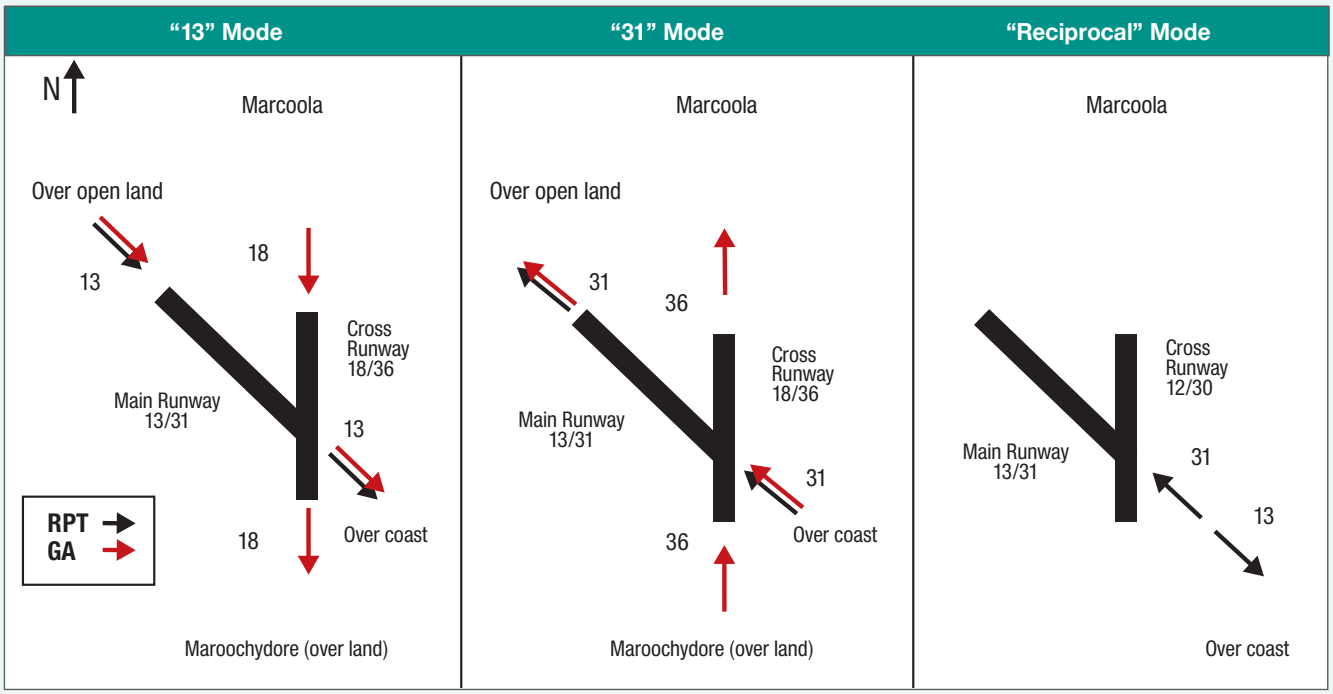
Jet aircraft will operate exclusively on the proposed new Runway 13/31. The CASA exemption, which allows narrowbody aircraft such as the Boeing 737 and Airbus A320 aircraft to currently operate on Runway 18/36, is expected to be withdrawn when the new runway becomes operational.

Turboprop aircraft will also operate primarily on the proposed new Runway 13/31. General aviation aircraft and helicopters will operate primarily on the proposed new Runway 13/31, however, in some cases light aircraft may not be able to operate on Runway 13/31 due to crosswinds and will use Runway 18/36 instead.

Three basic modes of operation for the proposed main Runway 13/13 and the cross-Runway 18/36 have been identified and are shown in **Figure 2.8a**.

1. Runway 13 Mode – In this mode jet and turboprop aircraft arrive overland and depart overwater on Runway 13. General aviation light aircraft arrive over Marcoola and depart over Maroochydore on Runway 18 when Runway 13 is not suitable for operations.
2. Runway 31 Mode – In this mode jet and turboprop aircraft arrive overwater and depart overland on Runway 31. General aviation light aircraft arrive over Maroochydore and depart over Marcoola on Runway 36 when Runway 31 is not suitable for operations.
3. Reciprocal Mode – In this mode all aircraft arrive overwater on runway 31 and depart overwater on Runway 13. This mode can only be used in periods of light wind conditions and low traffic demand.

Figure 2.8a: Runway operating modes at SCA with the proposed runway 13/31



2.8.2 Fly Neighbourly policy

The significant level of general aviation fixed wing aircraft and helicopter operations, which currently take place at SCA, is expected to continue.

The proposed Runway 13/31 will become the preferred runway for use by these aircraft and operations on the existing Runway 18/36 will be reduced significantly, only taking place when operational conditions on the new main runway are unfavourable, such as when there are strong crosswinds.

The existing Fly Neighbourly Policy, previously described in **Section 2.6.2** will still apply, ensuring that noise impacts from general aviation fixed wing aircraft and helicopters will continue continues to be minimised.

Due to the proposed new runway alignment, aircraft arriving and departing on the new runway will fly predominantly over water and low population rural areas. As a result, noise impacts on populated areas will be lower and there will be greater flexibility for ATC to select the runway most suitable for weather and wind conditions. The proposed new runway alignment, and proposed new flight paths will generally allow ATC more flexibility to accommodate procedures for noise abatement and noise sharing than currently exist.

2.9 PROPOSED FLIGHT PATHS FOR SCA

2.9.1 Proposed flight paths

The Environmental Impact Statement (EIS) assessment is concerned with flight paths within 40 km of SCA. Proposed new flight paths within 40 km of SCA can be separated into three principal groups.

1. **Outer Joining Routes** – these are the high-level sections of flight paths where arriving and departing aircraft join the upper airspace system. While some of these flight paths are within 40 km, aircraft altitudes at these points are generally very high. In most cases aircraft operating in these areas will be very hard to see and in most cases will not be able to be heard at all. The broader Brisbane basin traffic flow determines the location of the outer joining routes.
2. **Primary Approach and Departure Corridor** – This is the main flight path aligned with the proposed new runway. Large commercial jet aircraft need to line up with the runway at some distance from touchdown in order to prepare for landing and avoid last minute turns. This distance depends on the type of aircraft and the type of approach procedure being followed.

   For instrument flight procedures where an aircraft is following an instrument landing system or certain types of Global Positioning System (GPS) based navigation procedures this distance is typically around 10 nautical miles (nm) or approximately 20 km.

   Similarly, aircraft departing will typically fly straight ahead until reaching a safe altitude and turning to join a route to their destination. The primary approach and departure corridor extends up to 15nm or approximately 30 km in each direction along the runway.

   The location of the primary corridor is fixed by the runway alignment.
3. **Secondary Approach and Departure Corridor** – This is a secondary corridor that has been established to provide an efficient second flight path for aircraft arriving from, and departing to southern destinations such as Sydney and Melbourne.

This corridor provides a shorter flight path for arriving aircraft able to carry out some types of advanced GPS based instrument approach procedures which can accommodate turns, as well as providing a suitable flight path for aircraft making visual approaches.

Aircraft arriving from the south to Runway 13 will use the secondary corridor to save the extra flying distance and time which would otherwise be required if they were to arrive via an outer joining route to the primary approach corridor in the north. In some instances ATC will also split air traffic between the primary and secondary corridors to avoid traffic conflicts.

Similarly, aircraft departing to southern destinations will be able to use the secondary corridor to begin heading in the right direction when required to depart initially to the north from Runway 31.

The location of the secondary corridor has been carefully chosen as the best available option that minimises the noise impact to population areas while still providing an operationally safe flight path for aircraft.

A diagram locating these three flight path groups is shown below in **Figure 2.9a**.

2.9.2 Aircraft altitudes

Significant noise impact is generally only considered to be an issue where jet aircraft overfly residential areas below 5,000 feet Above Ground Level (AGL) or non-jet aircraft overfly residential areas below 3,000 feet AGL.

The focus area for the EIS is overland flight paths within 40 km (20 nm) of SCA where aircraft are operating at altitudes below approximately 5,000 feet AGL. This area is shown in **Figure 2.9b**. Green lines represent flight paths flown by arriving aircraft and red lines represent flight paths flown by departing aircraft.

In **Figures 2.9c** to **2.9h** population centres potentially affected by the new flight paths can be assessed.

Typical descent altitudes based on known approach procedure descent profiles for the arrivals tracks in the identified corridors are shown.

Unlike arrival altitudes which are generally fixed by approach procedures, climb altitudes vary widely between aircraft depending on type, load and operating conditions. Representative climb altitudes for a typical jet aircraft climb profile for the departure tracks in the identified corridors are shown.

Figure 2.9a: New flight paths for Sunshine Coast Airport Runway 13/31

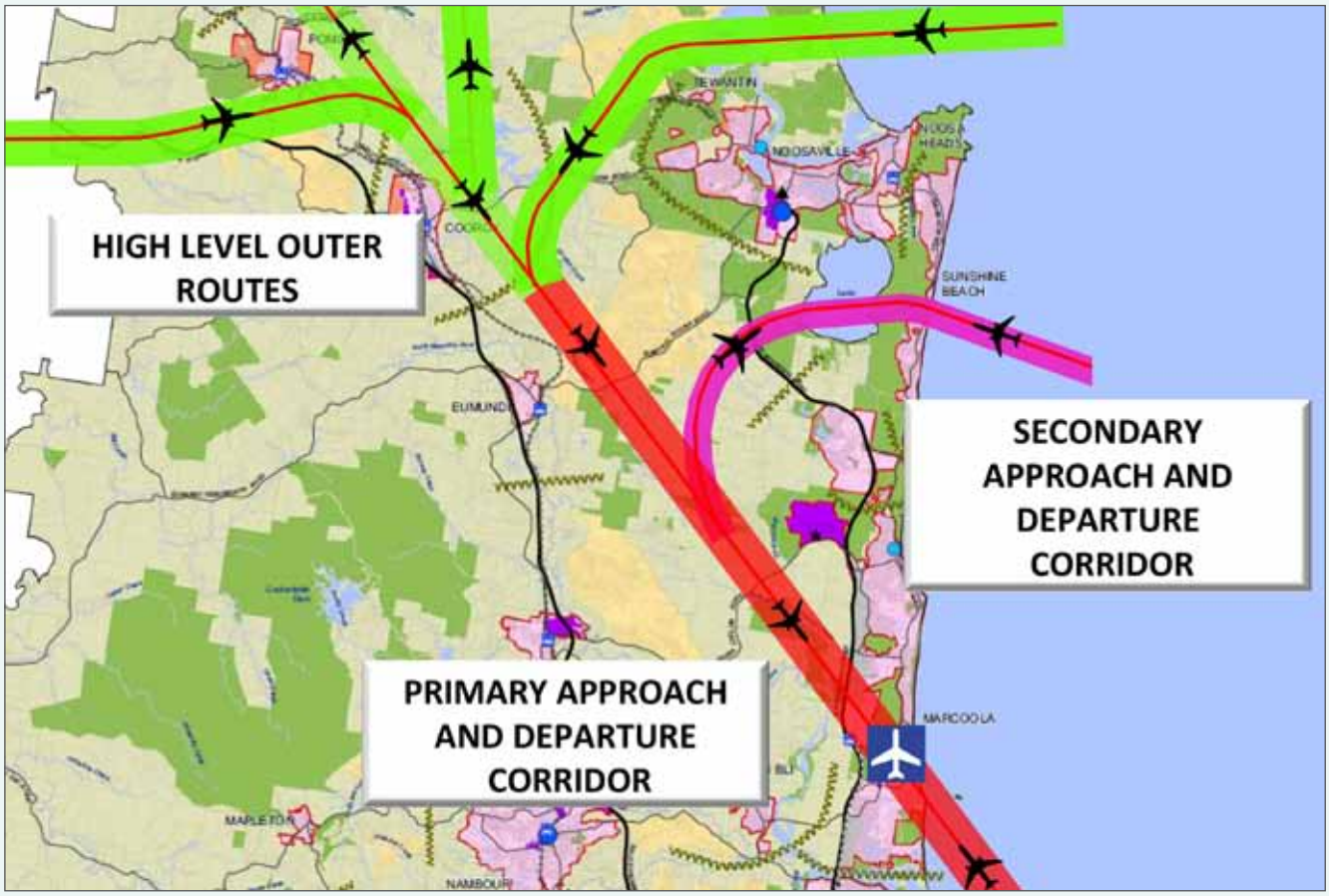


Figure 2.9b: Focus area for EIS assessment – overland flight paths below 5,000 ft. AGL within 40 km (20 nm) of SCA

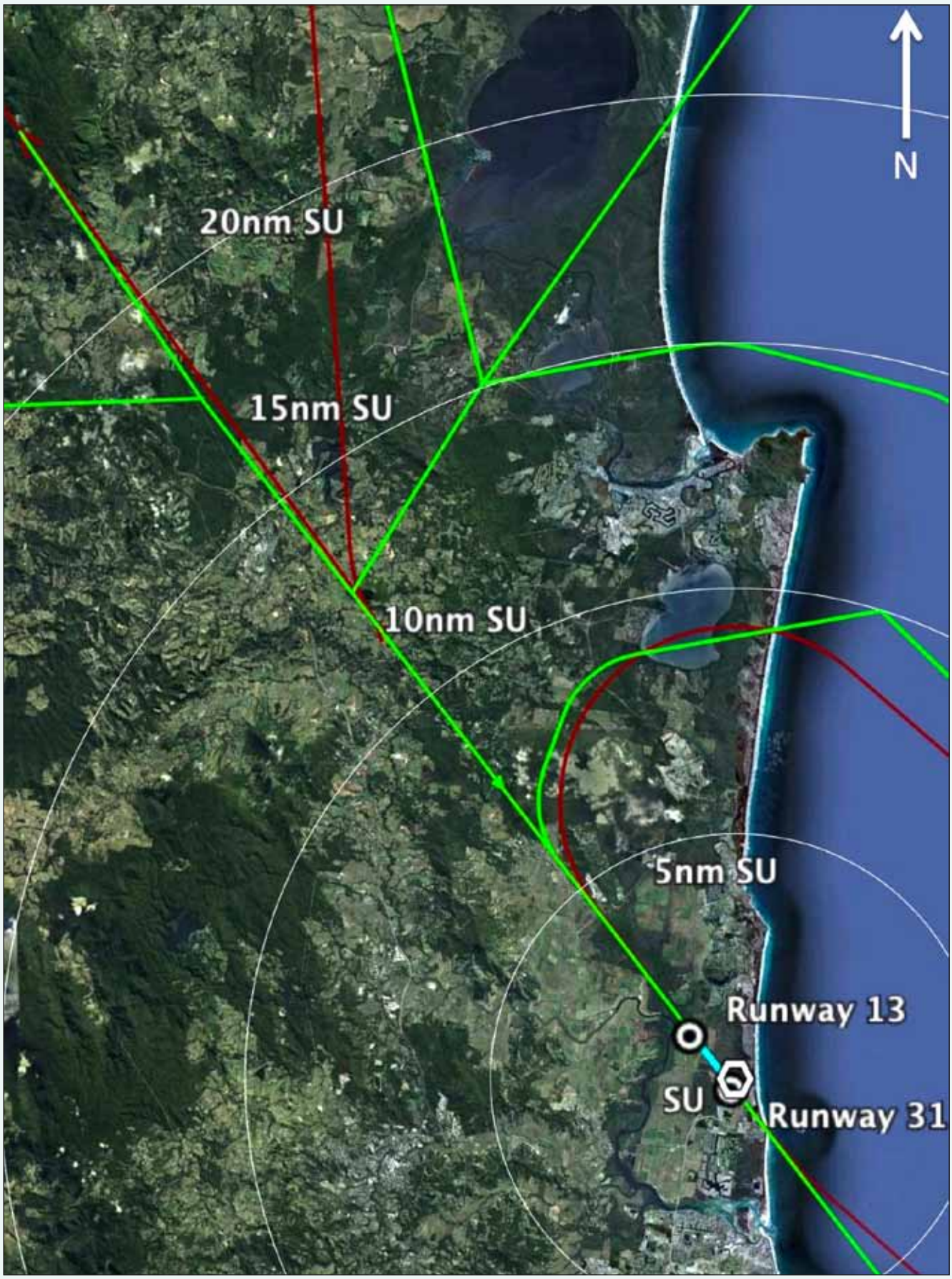


Figure 2.9c: Population centres affected by arrivals within 5 nm of SCA

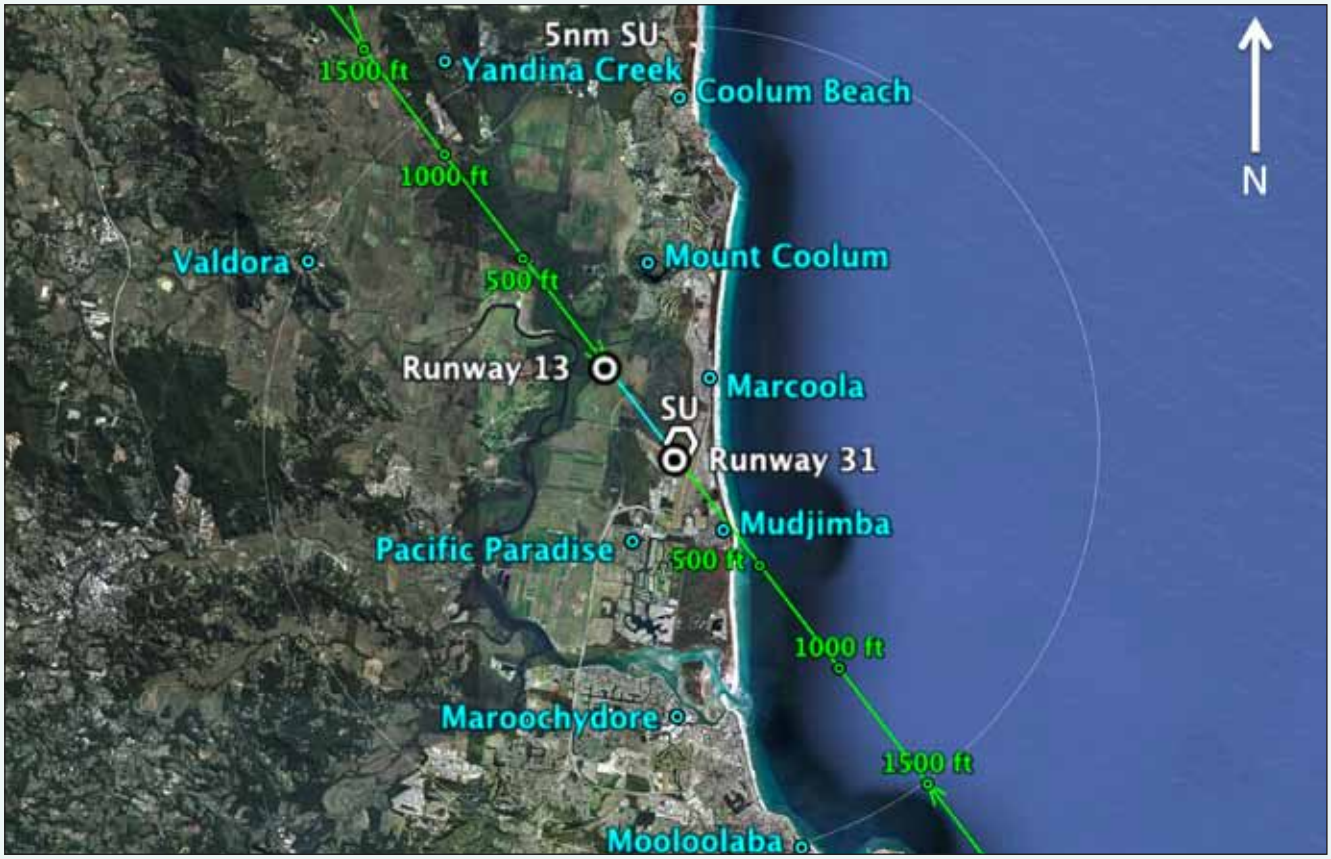


Figure 2.9d: Population centres affected by departures within 5 nm of SCA

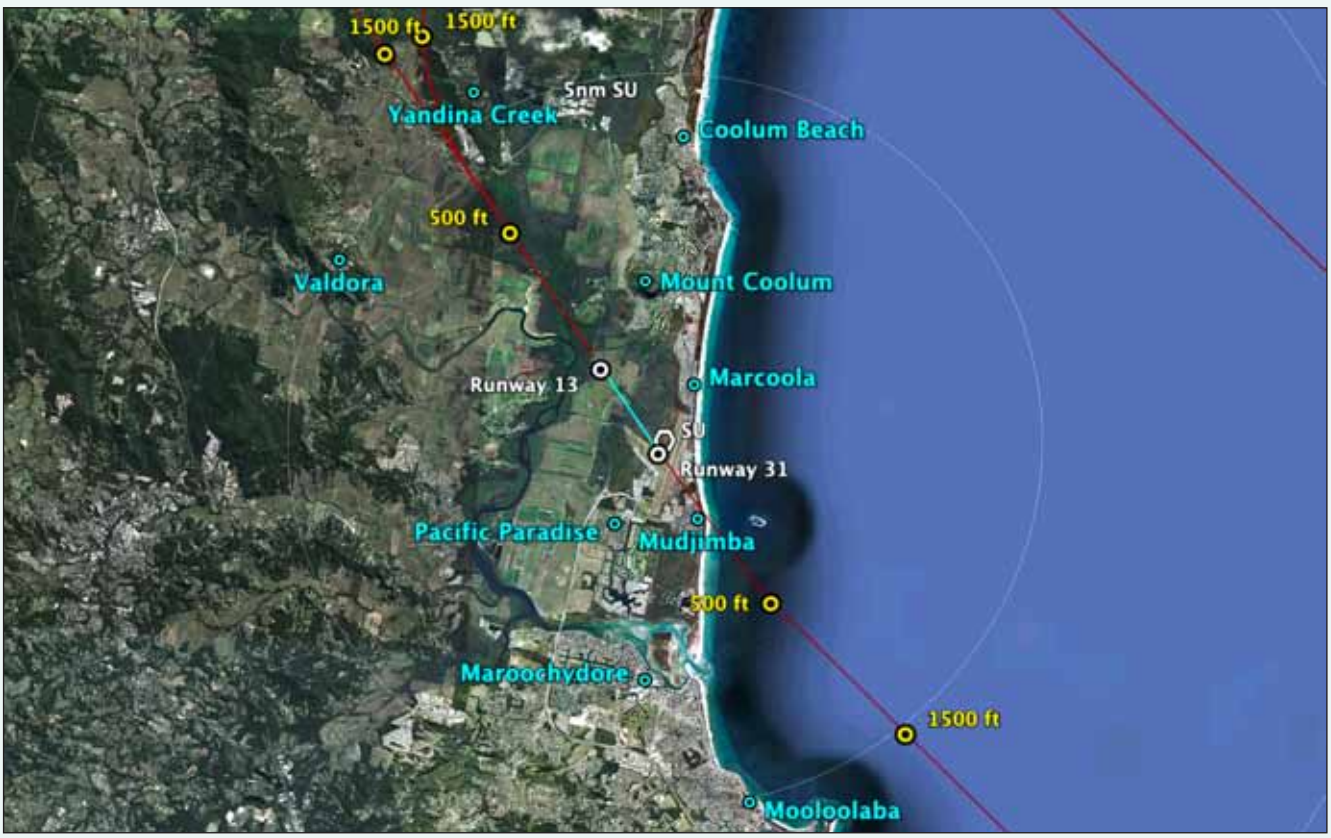


Figure 2.9e: Population centres affected by arrivals between 5 nm and 10 nm from SCA

Figure 2.9f: Population centres affected by departures between 5 nm and 10 nm from SCA

Figure 2.9g: Population centres affected by arrivals between 10 nm and 20 nm from SCA

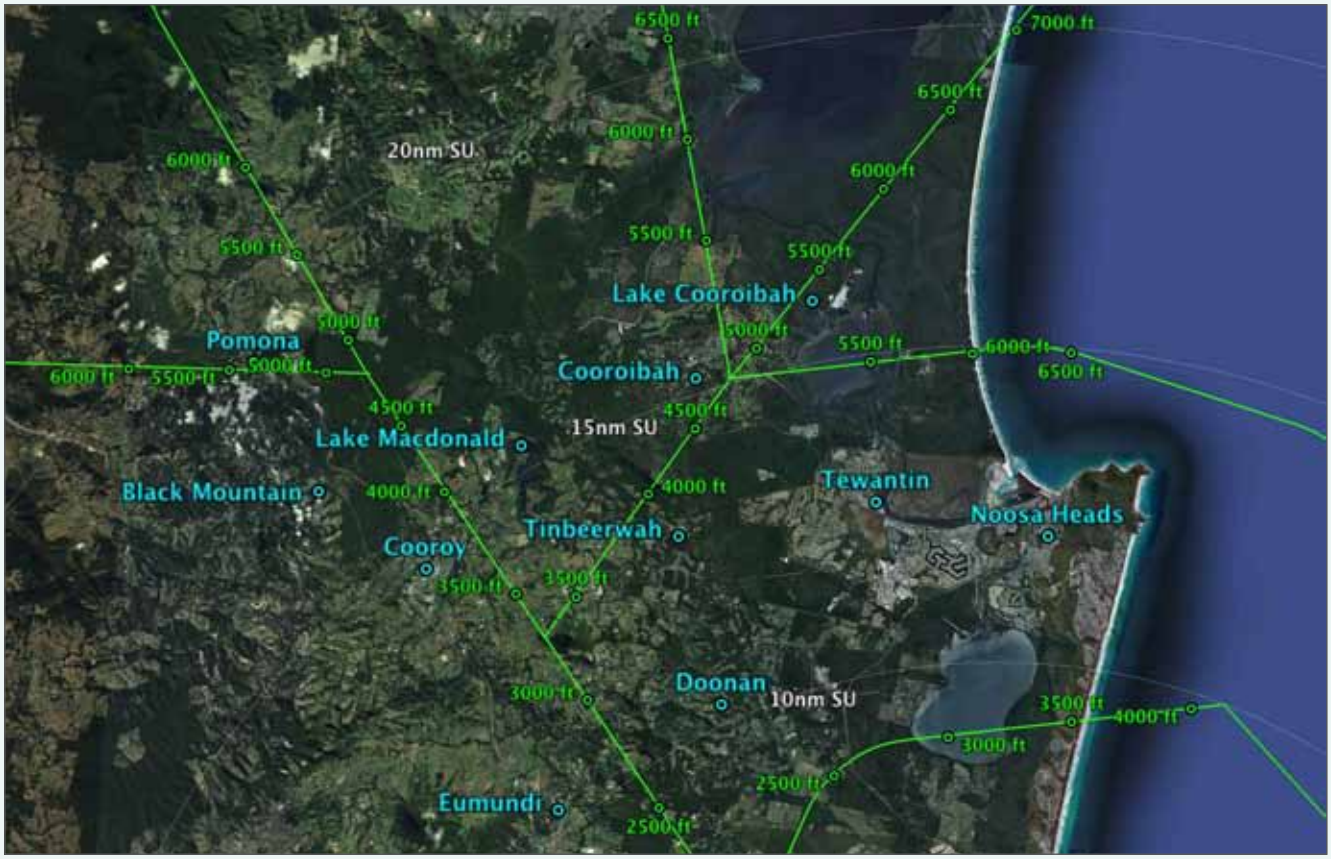
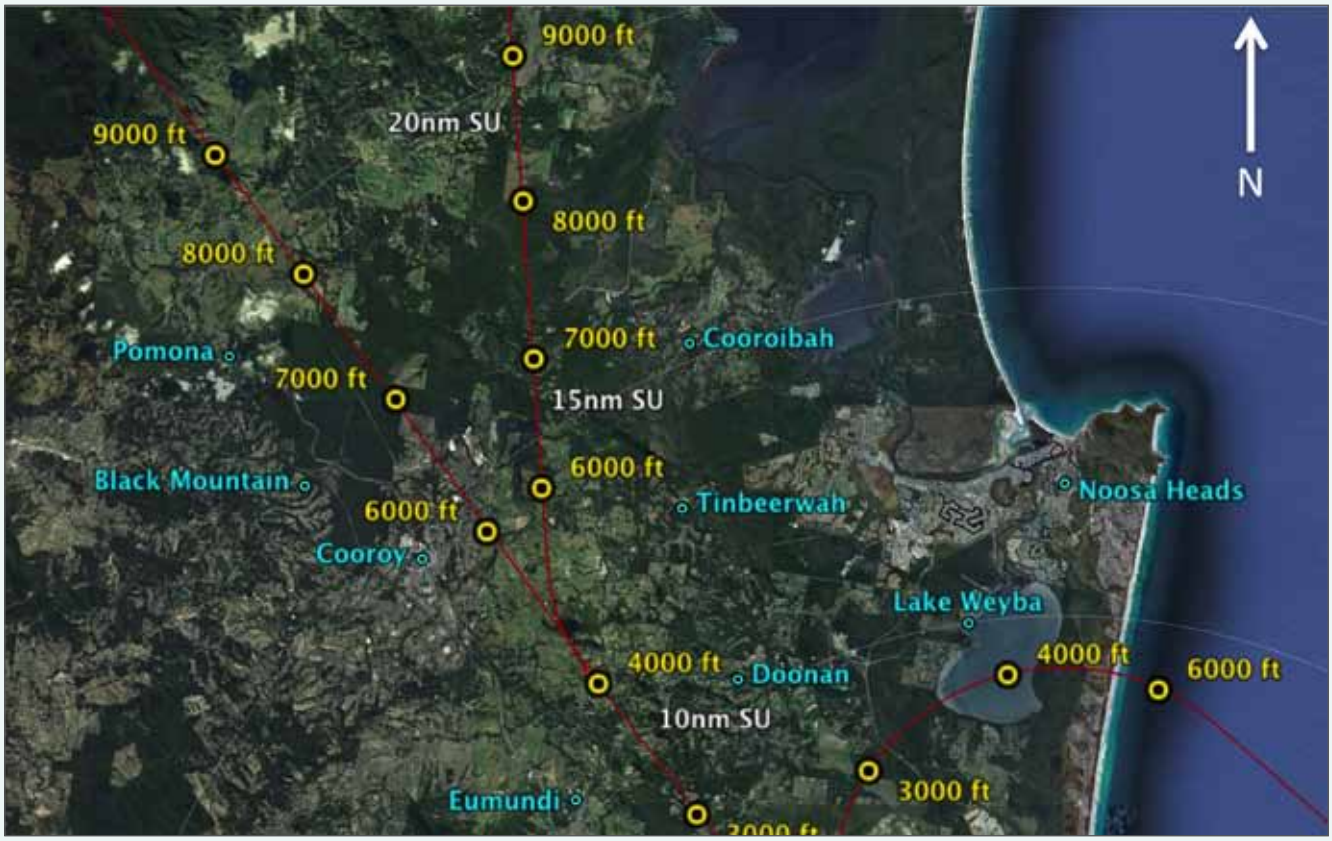


Figure 2.9h: Population centres affected by departures between 10 nm and 20 nm from SCA



2.10 PROPOSED AIRSPACE CHANGES

2.10.1 Description of proposed changes to controlled airspace

Airspace containing flight paths is divided into different types of volumes for the purpose of defining the type of aviation activity that can take place within that volume, and the level of operating restrictions and control services that apply within that volume.

A Control Zone (CTZ) is a volume of airspace surrounding an airport down to ground level within which all aircraft movements are subject to a defined level of control.

Similarly a Control Area (CTA) is a volume of airspace in any location, with defined upper and lower altitude bands, within which aircraft movements are subject to a defined level of control.

The levels of control are defined as classes of airspace. For example, Class G airspace covers much of low-level airspace in Australia away from airports and within Class G airspace aircraft move freely about with few operating restrictions and are generally not subject to direct instruction from ATC. At the other end of the scale, Class A airspace is typically defined at high altitudes where commercial jet traffic is required to follow strict operational procedures and flight paths and all aircraft are subject to direct instructions from ATC. There are several other classes of airspace between these two extremes, each with different levels of control.

SCA currently operates with a Class D CTR and Class C and D CTA steps, which provide a level of control appropriate for the type and volume of air traffic currently operating at airport. This airspace also provides containment for the flight paths of arriving and departing aircraft and safely separates them from other aircraft operating in less controlled areas.

This existing airspace structure is shown in **Figure 2.10a**. Airspace classes are indicated and each airspace volume is defined by a lower height limit (LL) in feet.

The new airspace structure is shown **Figure 2.10b**. Primary changes include an upgrading of the CTR and CTA steps to Class C airspace. This is consistent with Airservices' plans to introduce more controlled surveillance services at SCA in the next few years to cater for the growing level of commercial air traffic. A more expansive CTA step structure is also required to contain the network of joining flight paths in the north and north-west that will service new commercial domestic and international jet routes.

2.10.3 Impacts on other users of the airspace

An expanded and more controlled airspace architecture will necessarily impact on different airspace users in different ways. The main impacts have been identified as follows:

- General aviation aircraft operating Outside of Control Area (OCTA) in areas surrounding the airport's CTR may experience increased restrictions in tracking due to expanded and lowered CTA Steps. However, a dedicated western VFR corridor will be retained allowing north to south transit by VFR aircraft to continue with minimum restriction
- GA aircraft conducting training and recreational flying in the Noosa north shore area will experience some restriction in operating altitudes due to expanded and lowered CTA steps. However, the Teewah and Noosa airstrips will remain accessible to GA aircraft operating OCTA, and transiting through the CTR and CTA will still be available subject to ATC clearances
- Gliding and hang gliding activities on the Blackall Range between Gympie and Cooroy will be limited to periods when CTA steps to the north-west can be deactivated to accommodate these operations
- Encroachment of CTA steps to the north and east of Caloundra Aerodrome will reduce the available airspace for OCTA operations. However airspace to the south and west, which contains the majority of traffic movements, will remain unchanged
- Recreational activities such as skydiving within the CTR and VFR aircraft transiting the CTR along the coast will experience greater restrictions and procedural controls as a result of a busier traffic environment and introduction of Class C airspace procedures.

2.10.4 Process of airspace change prior to runway opening

Prior to the opening of the proposed runway the following airspace change process will be completed:

- The air navigation services provider (currently Airservices) will conduct a full airspace design assessment and, based on the airspace architecture that exists at the time, will finalise designs for all en-route flight paths, SIDs and STARs and instrument approach procedure designs
- The air navigation services provider will complete a detailed safety case and environmental assessment, which will require approval of the relevant Australian Government Minister (currently the Minister for Infrastructure and Regional Services)
- An Airspace Change Proposal will be submitted to CASA for review and approval
- Once approved, airspace users will be notified of the changes and effective dates through publication in the Australian AIP in accordance with the normal Aeronautical Information Regulation and Control (AIRAC) cycle.

Figure 2.10a: Existing SCA airspace

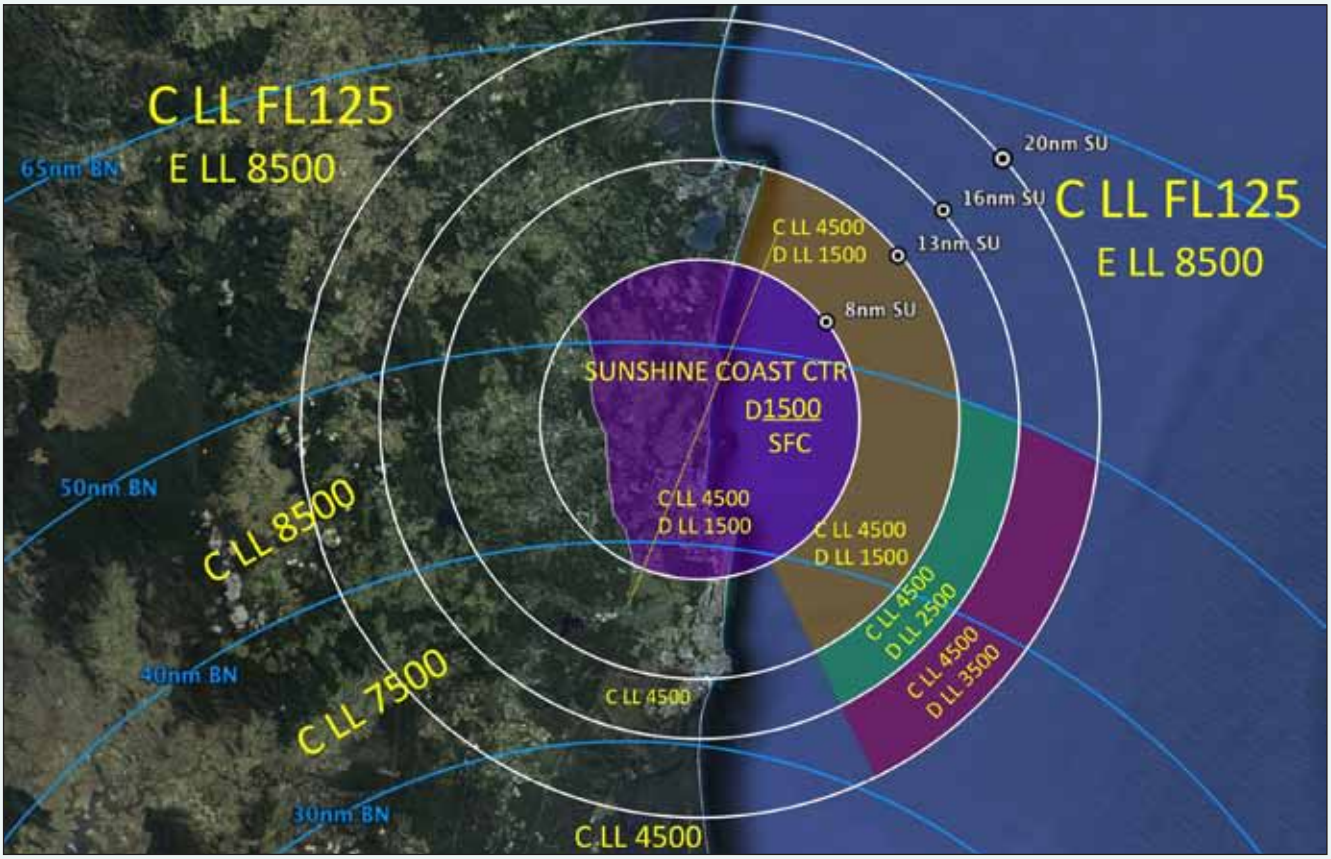
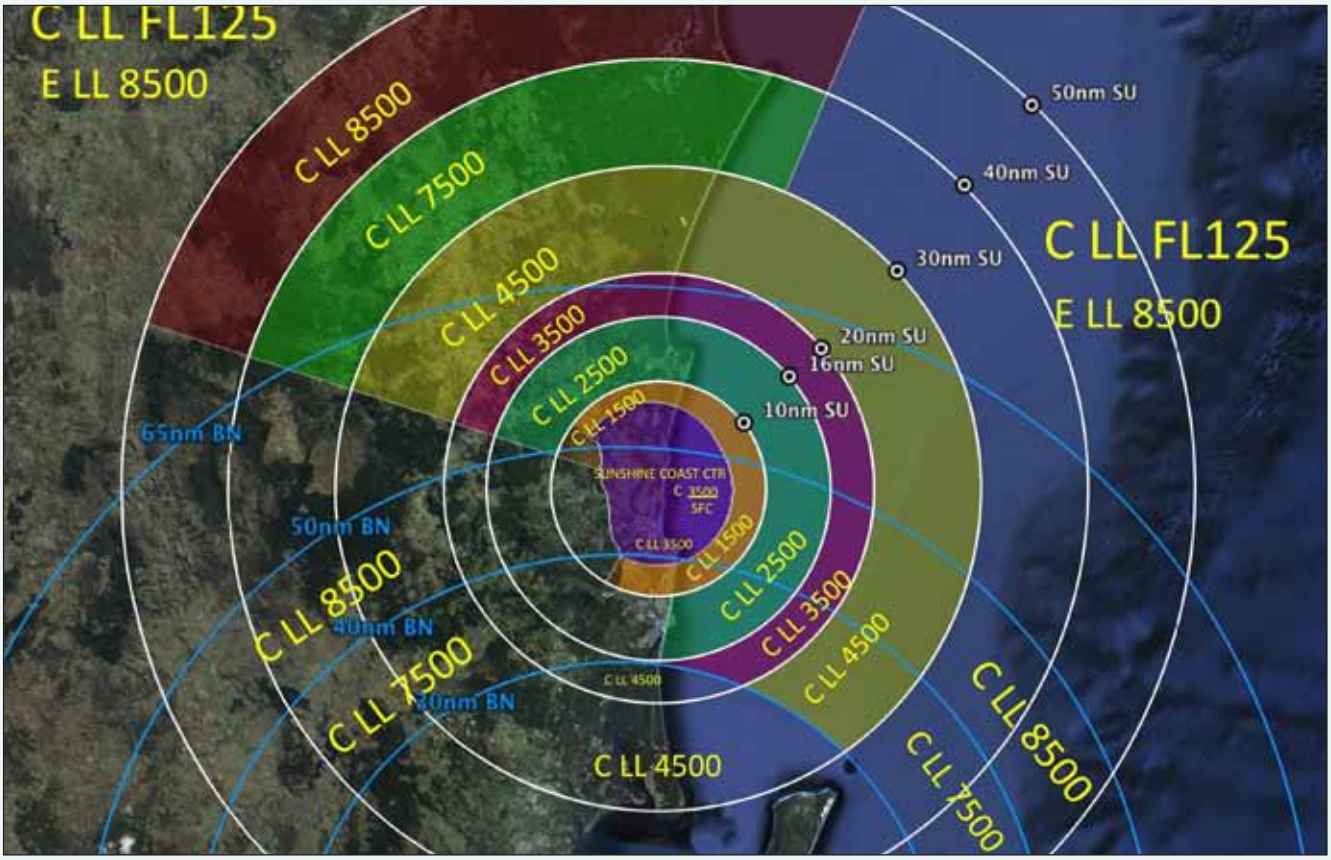


Figure 2.10b: New SCA airspace



2.11 DRAFT OPERATING PLAN

2.16.1 Combined runway modes

The different modes of runway operation for the existing Runway 18/36 were outlined in **Section 2.6.3**.

The different modes of runway operation for the proposed new Runway 13/31 were outlined in **Section 2.8.1**.

Three modes of combined runway operations will be possible for SCA. These are shown in **Table 2.11a**.

2.11.2 Nominating duty runways and modes

The Duty Runway refers to the operating direction of the runway. ATC will nominate the duty runway and associated mode of operation based on weather and traffic conditions.

Combined Runway Mode 1 – South-East Direction Operations, will be used when the wind is predominantly from the east to south-east, a coastal meteorological condition which exists for most of the year at SCA as explained in **Section 2.2.1**.

Combined Runway Mode 2 – North-West Direction Operations, will be used when the wind is predominantly from the north to north-west, a meteorological condition which tends to occur for a limited period during the early summer months September to December as explained in **Section 2.2.1**. These wind directions may also occur at night at any time of the year, but with reduced wind speeds due to typical coastal weather conditions where cooling of the oceans causes a shift from steady daytime onshore breezes to light night time offshore breezes.

Combined Runway Mode 3 – Reciprocal Overwater Operations, will be used only in periods of very low traffic levels and calm winds to keep arriving and departing aircraft over the water as much as possible to avoid overflight of population centres on the land. These conditions will generally exist only at night time.

The proposed draft operating plan for operations with the proposed new runway are provided in **Table 2.11b**.

Table 2.11a: Combined modes of runway operations

Combined Runway Mode 1 – South-East Direction Operations	Primary Runway 13: For arrival and departures of all traffic Secondary Runway 18: For limited GA light aircraft use when Runway 13 is not operationally suitable
Combined Runway Mode 2 – North-West Direction Operations	Primary Runway 31: For arrival and departures of all traffic Secondary Runway 36: For limited GA light aircraft use when Runway 31 is not operationally suitable
Combined Runway Mode 3 – Reciprocal Overwater Operations	Primary Arrival Runway 31: For arrival of all traffic Primary Departure Runway 13: For departure of all traffic Secondary Arrival Runway 36: For limited GA light aircraft arrivals when Runway 31 is not operationally suitable Secondary Departure Runway 18 For limited GA light aircraft departures when Runway 31 is not operationally suitable

Table 2.11b: Draft operating plan

Daily Operations – Monday to Sunday	
Day Mode	1. Combined Runway Mode 1 – South-East Direction 2. Combined Runway Mode 2 – North-West Direction
Night Mode	1. Combined Runway Mode 1 – South-East Direction 2. Combined Runway Mode 2 – North-West Direction 3. Combined Runway Mode 3 – Reciprocal Overwater

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