Darwin International Airport

2023 **Master Plan**

Preliminary Draft

September 2023

Darwin
International Airport

We welcome your feedback on the Darwin International Airport Preliminary Draft 2023 Master Plan.

The Preliminary Draft 2023 Master Plan is available for public comment for a period of 60 business days.

Written public comment submissions can be emailed to **masterplan@adgnt.com.au** or sent to Darwin International Airport at the address below. Submissions must be made prior to close of business on 18 December 2023.

2023 Master Plan
Darwin International Airport
PO Box 40996
Casuarina NT 0811


airnorth
VH-ANO

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Welcome

It is with great pleasure I present the Darwin International Airport 2023 Master Plan.

Darwin International Airport provides vital infrastructure for industry and the community, playing an integral role in the growth of the Northern Territory economy and linking Darwin to Australia and the rest of the world.

The 2023 Master Plan is a blueprint for the development and management of the airport for the next 20 years, supporting the growth of key industries including tourism, agriculture, mining and fishing.

Darwin International Airport's parent company, Airport Development Group (ADG), has been a major contributor to northern Australia for 25 years, since acquiring the leases for Darwin International Airport, Alice Springs Airport and Tennant Creek Airport during the Australian Government's airport privatisation program in the late 1990s.

Darwin is one of only two joint-user airports in Australia, being co-located with RAAF Base Darwin. A unique agreement between the Department of Defence and ADG sets out the relationship and responsibilities of both parties as well as civil aircraft access rights to the Defence-owned runways and taxiways.

With the Territory forecasting robust growth over the next 20 years, the Master Plan identifies the infrastructure and investment required across the airport precinct to accommodate and support this growth.

Major projects detailed in the Master Plan include the redevelopment of adjacent hotels to create a world class resort, realignment of roads to improve safety and access, terminal enhancements to improve the experience of our customers, and long-term plans for the 80 hectares of commercial land across the airport site.

ADG has enormous confidence in the continued growth of the Northern Territory, and the investment, innovation, and strategic planning outlined in the 2023 Master Plan will ensure Darwin International Airport continues to play a major role in leading economic growth and sustainability in the Top End.

TONY EDMONDSTONE
Chief Executive Officer
Darwin International Airport

Executive summary

Darwin International Airport Pty Ltd holds a 50-year lease (plus a 49-year option) over the Darwin International Airport site from the Australian Government under the *Airports Act 1996*.

Darwin International Airport is also a joint-user airport under the Airports Act, being co-located with the Royal Australian Air Force (RAAF) Base Darwin. A Joint User Deed with the Department of Defence governs all aspects of the military–civil use of the runway and taxiway system, known as the Jointly Used Area (see Figure ES-1). The deed also defines each party's aviation responsibilities in the separate civil and military areas.

The Airports Act and its regulations set out the requirements for the airport's management and operation. Under the Act, Darwin International Airport must prepare a 20-year master plan, including an airport environment strategy, to guide the development of existing and proposed airport land uses and facilities. Until recently, we were required to renew the master plan every 5 years; however, recent amendments to the Airports Act have extended this to every 8 years.

As a result of the COVID-19 pandemic and the uncertainty in the aviation industry, Darwin International Airport sought - and was granted - a 12-month extension from the federal minister to deliver this master plan. During preparation of the 2023 master plan, the airport sought an additional 6-month extension due to Defence considerations, which too was granted. So the previous 2017 master plan for Darwin International Airport remains valid until 6 March 2024.

Key features of the 2023 master plan

The 2023 master plan is an important document for Darwin International Airport's progressive and orderly development. It is both a regulatory requirement and a strategic planning tool that outlines our vision for growth and development over the next 20 years.

The new master plan retains the fundamental concepts of previous master plans. It provides long-term development concepts for the airport out to 2043 with an optimal mix of aeronautical and non-aeronautical uses. The 2023 master plan also includes the Airport Environment Strategy.

While the 2023 master plan provides a framework for future development until 2043, it is also flexible to meet changing conditions.

The current Darwin International Airport layout is shown in Figure ES-1. The 2043 development concept, shown in Figure ES-2, is based on comprehensive technical studies, wide consultation and confidence in the future of the airport business.

The 2023 master plan demonstrates that Darwin International Airport can accommodate forecast growth in aircraft movements and passenger activity, aviation support facilities and commercial developments.

Planning context (see Section 2)
While the 2023 master plan provides a framework for future development of the airport to 2043, we are conscious that the master plan must also be flexible to meet changing conditions.

Darwin International Airport has established the following objectives to guide our planning and development of aeronautical and non-aeronautical facilities and services:

- Ensure that planning supports long-term development as an airport with an optimal mix of aeronautical uses.
- Provide a safe, secure, reliable, efficient and sustainable airport operating environment.
- Enhance the airport's contribution to Northern Territory economic growth through developing the airport's aviation and property business and by facilitating the success of our business partners.
- Integrate environmental considerations into the development of facilities and services and seek to minimise their impact on the natural environment.
- Engage with key community, business and government stakeholders on airport-related economic, social and environmental issues, and be mindful of surrounding community interests.
- Provide airport infrastructure and facilities that are timely, cost-effective and flexible in use and provide a good customer experience.
- Undertake developments that enhance value to our shareholders and the broader economic community.

Northern Territory planning laws do not apply to Darwin International Airport because it is located on Commonwealth land. Where possible, the master plan as been developed to promote consistency with the NT Planning Scheme, particularly in relation to non-aviation development in the landside part of the airport site.

We are committed to effective and genuine consultation with airport stakeholders. Our clearly articulated approach to planning will ensure accurate information is shared and feedback about the airport's development is encouraged.

Sustainability (see Section 3)
Darwin International Airport views corporate sustainability as conducting our business to create value for our present stakeholders while protecting the rights of future stakeholders. Sustainability is important for the health of the environment and the prosperity of communities, and it also represents good business.

Central to our Sustainability Strategy is our commitment to action, measure and demonstrate improvement against key sustainability indicators.

In 2018–19, Darwin International Airport's parent company, Airport Development Group (ADG), developed an emissions reduction target in line with the Paris Agreement. The Paris Agreement aims to strengthen the global response to the threat of climate change by holding the increase in the global average temperature to well below 2°C above pre-industrial levels, and pursuing efforts to limit temperature increase to 1.5°C.

ADG's reduction target has been developed utilising a science-based target where emissions reductions fall well within the Australian emissions reduction target under the Paris Agreement and United Nations Convention on Climate Change. We are on track to have zero net emissions (scope 1 and scope 2) by 2030 with continued growth of our solar energy investment.

Social, economic and regional significance (see Section 4)
Aviation is critical to the economic and social development of the Northern Territory. The remoteness of many communities, weather, road conditions and distance from major population centres makes NT residents more reliant on aviation services than those of any other jurisdiction.

Darwin International Airport is a crucial commercial, personal travel, essential services and military transport facility for northern Australia. It makes a substantial contribution to the Darwin and NT economies.

It is estimated that business activities at Darwin International Airport directly employ some 1,500 people from 72 businesses. A further 1,200 people are indirectly employed, bringing the airport's overall employment contribution to some 2,700 people.

The airport's contribution to the NT economy is significant, with direct and indirect contributions to gross state product (GSP) in 2021–22 estimated at $544 million. In 2021–22, the total GSP of the NT was $26.1 billion, suggesting that Darwin International Airport contributes around 2% of GSP.

It is estimated that activities arising from Darwin International Airport (both aviation related and non-aviation related) could contribute to the overall employment of some 7,400 workers by 2043.

The total economic contribution of Darwin International Airport to NT GSP is forecast to grow over the next 20 years and could reach an estimated $1.8 billion in 2043 (in current dollar values).

Aviation activity forecasts (see Section 5)
Improving air access across the Northern Territory is one of the objectives of Darwin International Airport's route development strategy. Darwin International Airport is a curfew-free gateway to northern Australia, providing domestic, international and general aviation services.

Darwin International Airport is an important gateway in a growing tourism, trade and travel market between Asia and Australia. Darwin is within narrowbody aircraft range of all of South-East Asian hubs and Australia's main population centres, which are all less than 5 hours away.

Since the last master plan, the Australian aviation industry has gone through unprecedented volatility – the COVID-19 pandemic, extreme weather events like bushfires and floods, the Russia–Ukraine conflict, constrained aviation sector resources, high jet fuel prices and a high inflationary environment.

Before the pandemic, Darwin International Airport welcomed 2 million passengers through the airport in 2019. There is still uncertainty around how the aviation industry will continue to recover from the COVID-19 pandemic, particularly in the short- to medium term.

By 2031 (the 8-year lifespan of this master plan), total annual passenger numbers at Darwin International Airport are predicted to reach between 2.5 and 3.3 million passengers. In the longer-term, total annual passenger movements (including transit and transferring passengers) may grow to between 3.7 million and 5.5 million by 2043.

Airlines servicing Darwin International Airport continue to trend away from widebody code E aircraft, instead focussing their operations more on narrowbody code C aircraft. Total annual airline aircraft movements at Darwin International Airport are projected to reach around 27,000 movements by 2031, potentially growing to 39,000 movements by 2043. Of this figure, domestic airlines are anticipated to make up the majority, some 85% of movements.

General aviation growth is expected to be limited over the planning period of the master plan, with a small potential increase to around 55,000 movements per year by 2043.

In future, we expect domestic freight will continue to be carried largely in the cargo hold of passenger services and dedicated air freight services. As domestic airline movements increase, so will extra capacity for domestic freight. Darwin International Airport will continue to pursue our strategy to attract air freight service offerings to Darwin.

Airport Land Use Plan (see Section 6)

Darwin International Airport incorporates 311 hectares.

Land use planning is fundamental to an airport master plan, to guide the progressive and orderly development of Darwin International Airport.

Land use planning in the Darwin International Airport 2023 Master Plan:

- ensures there is adequate land for expansion of aviation activity
- clearly separates aeronautical and nonaeronautical uses
- has been developed using terminology and definitions consistent with that used in the NT Planning Scheme where possible, with any variations highlighted
- reflects the significant long-term development potential of the airport
- provides a considerable amount of land for conservation reserves.

The Land Use Plan for Darwin International Airport remains largely unchanged from the previous master plan.

The boundaries of the Tourist Commercial Zone, Terminal and Facilities Zone, and Commercial Zone along Henry Wrigley Drive have been adjusted to mirror the recent realignment of the road.

The Tourist Commercial Zone has been expanded to the south (into the Terminal & Facilities Zone) and to the east (into the Aviation Reservation Zone) to accommodate potential future redevelopment and growth of the hotel/resort precinct. The adjacent Conservation Zone of Rapid Creek Reserve remains as is.

Airfield Development Plan (see Section 7)
The airfield at Darwin International Airport consists of runways, taxiways and aircraft parking areas. The master plan provides for further development of the airfield to ensure it can efficiently handle the forecast aircraft traffic.

Under the Joint User Deed, the Department of Defence is responsible for operating and maintaining the runway and taxiway system within the Jointly Used Area.

The existing runway system has sufficient capacity to cater for future projected civil traffic movements over the 20-year planning period and beyond.

The master plan proposes a number of taxiway enhancements over the 20-year planning period to support the forecast increase in aircraft traffic.

Staged expansion of the air transport apron is anticipated, to address aircraft parking capacity constraints and provide greater operational flexibility.

General aviation facilities will developed on a commercial basis over the planning period of the master plan.

Terminal Development Plan (see Section 8)
The terminal at Darwin International Airport is a 2-storey building of 27,000 square metres that facilitates both domestic and international passenger movements.

As with the airport's previous master plans, it is envisaged that the airport will continue to operate a single terminal that handles both domestic and international passengers.

In 2015, Darwin International Airport's passenger terminal was significantly expanded – doubling its size. Our forecasting indicates we're unlikely to need to further expand the building's overall footprint in the short- to medium term. Some minor infills and internal reconfiguration may occur to better use the existing floor space and make the most of available capacity.

Any future growth of the terminal building will be accommodated by expanding the existing terminal within the Terminal and Facilities Zone and in line with peak-hour demand. In the longer-term, we envisage future terminal expansion will mainly be to the west, with the building footprint wrapping around to the northwest (see figures 7-3 and 10-4). There is scope for extra expansion to the east, as needed.

The experience of customers visiting the airport is paramount to Darwin International Airport. We are committed to improving the customer experience both in the terminal and across the broader airport precinct.

Darwin International Airport aims to provide facilities and services that are accessible for all members of the community. Future improvement to upgrade the airport terminal and facilities over time will seek to achieve access and mobility compliance with the relevant Australian Standards.

Commercial Development Plan (see Section 9)
While Darwin International Airport's first priority is aviation, a key part of the master plan is allowing for income diversification with clear strategic direction for growth while maintaining the flexibility to respond to market directions and demand. The COVID-19 pandemic proved the importance of our commercial development plans and diversified portfolio.

Of the 311 hectares in the airport lease area, some 80 hectares (just over 25%) is available for commercial development.

Darwin Airport Central is Darwin International Airport's business, retail and entertainment precinct. Comprising 60 hectares of Service Commercial zoning, it is located along the northern boundary of the airport site.

Significant commercial developments since the last master plan include the emergency medical retrieval precinct, the freight and cold storage facility, and the refurbishment of the existing airport hotels into a world-class resort.

Possible developments over the 20-year planning period include commercial offices, showrooms, warehousing, large-format and speciality retail, entertainment / leisure, hotel and other short-stay accommodation, cafés and restaurants.

Ground Transport Plan (see Section 10)
Ground transport planning is important for Darwin International Airport to operate efficiently. It relates to the journey of passengers and staff to and from the airport, as well as within the airport precinct. The Ground Transport Plan considers the airport's internal and external road network, car parking, pick-up and drop-off facilities, taxis, rideshare, shuttle bus, car rental, public transport and active transport (such as cycling and walking).

In 2022, Darwin International Airport completed significant road improvements to Henry Wrigley Drive (within the airport's lease boundary), including constructing 2 new roundabouts and realigning Sir Norman Brearley Drive.

Both existing external and internal road systems at the airport may need enhancing during the 20-year planning period of the master plan.

Daily vehicle trips to and from the airport could grow from around 20,000 currently to some 66,000 in 2043 as a result of projected aviation growth and commercial development.

As with the previous master plan, the major external road access development concept envisioned during the 20-year planning period of the master plan is a new signalised intersection on McMillans Road between Sabine Road and Rapid Creek Road.

We anticipate that during the planning period of the master plan the forecourt area immediately in front of the terminal building may be pedestrianised and landscaped to enhance passengers' and visitors' customer experience and enhance safety and aviation security. This would require relocating the existing taxi and commercial vehicle drop-off and pick-up lanes to the north towards the short stay car park. Suitable access for those with disabilities will be incorporated into any such improvements.

Utilities infrastructure (see Section 11)
To ensure Darwin International Airport operates effectively into the future, our infrastructure and utility services must be able to meet future demands.

An early adopter of solar, Darwin International Airport installed 2 large scale solar arrays in 2016 and 2017, generating up to 5-megawatts (AC) of power in total. In 2020, as part of climate change mitigation efforts, Darwin International Airport started constructing a 4-megawatt solar rooftop array across several businesses operating at the airport.

Darwin International Airport's parent company, Airport Development Group, intends to continue making significant renewable energy investments. Darwin International Airport is investigating further opportunities to develop renewable energy, including using more available roof space on buildings across the airport's lease area.

Safeguarding the airport (see Section 12)
Airports are important national infrastructure assets. They are essential transport hubs and contribute significantly to the national economy and the economies of the cities, regions, states and territories they operate in.

Building and activities near Darwin International Airport have the potential to create air safety hazards and seriously limit aircraft operations in and out of the airport. The 2023 master plan considers the National Airports Safeguarding Framework (NASF) guidelines, which were developed to enhance the safety, viability and growth of aviation operations at Australian airports.

Figure ES-1: Darwin International Airport 2023 current layout

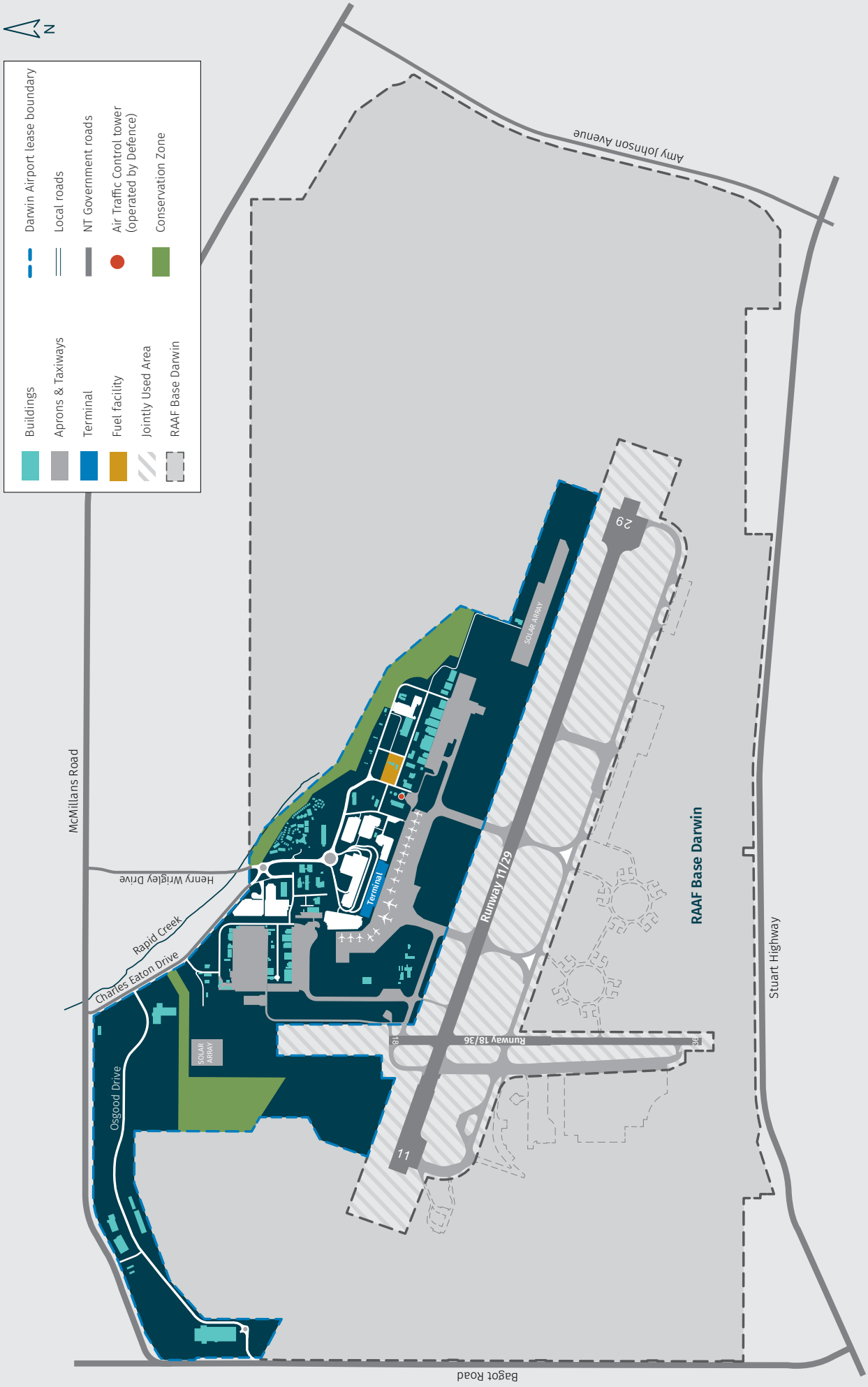
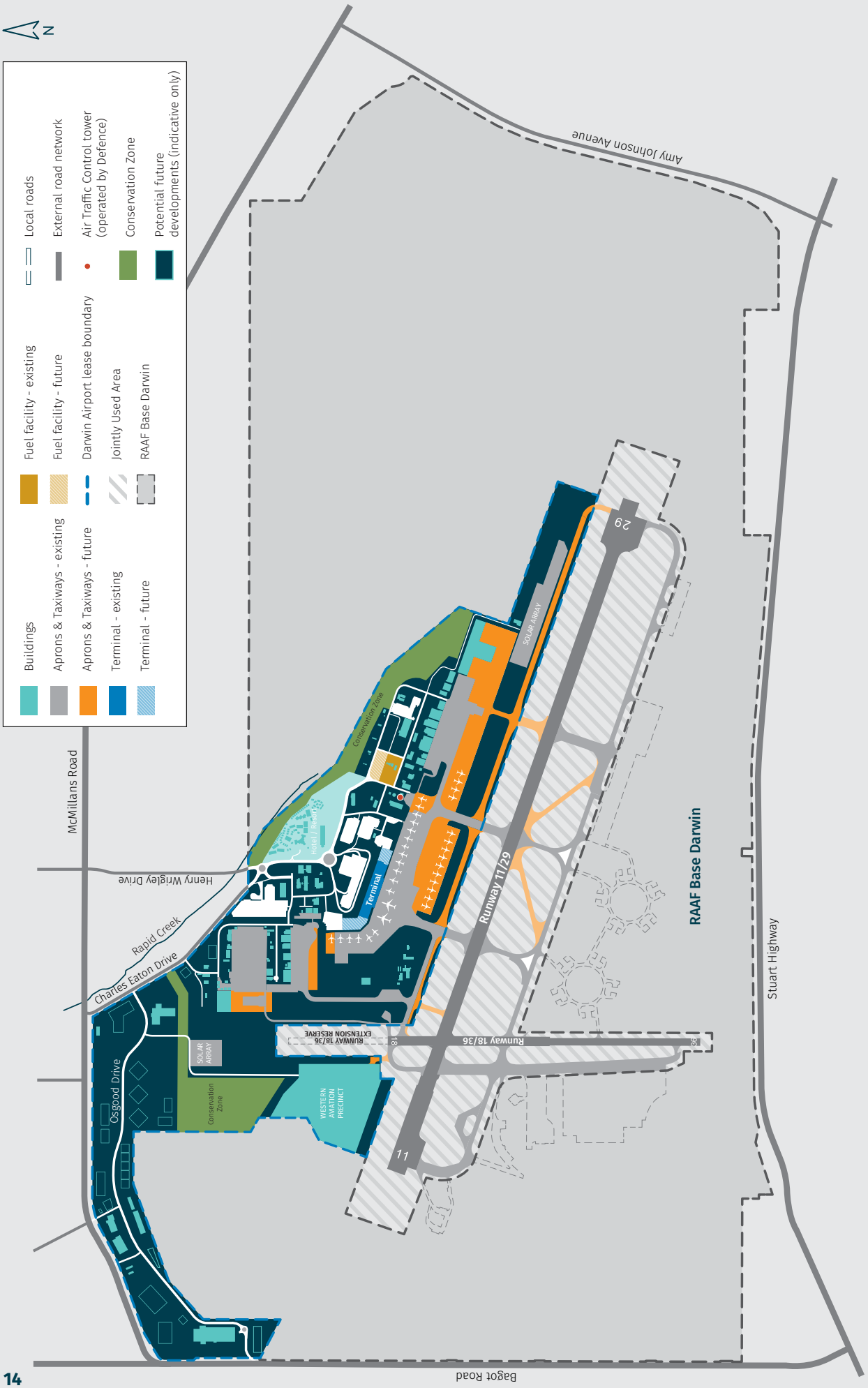


Figure ES-2: Darwin International Airport 2043 development concept



Aircraft noise management (see Section 13)
People living across the Darwin region may experience varying levels of aircraft noise relating to civil or military aircraft operations at Darwin International Airport and RAAF Base Darwin. Aircraft noise is an unavoidable impact of aircraft operations, from aircraft departing and arriving as well as ground-based aircraft operations on the airfield.

As the civil airport operator, Darwin International Airport has little direct control over noise produced by aircraft operations other than the ground running of civil aircraft engines.

The Australian Noise Exposure Forecast (ANEF) system has been in place for over 30 years and is the primary measure of aircraft noise exposure in the vicinity of Australian airports. The ANEF is a set of contours showing future forecasted levels of exposure to aircraft noise around an airport, to inform strategic land use planning.

The ANEF is an important noise metric because it is the only noise metric that has status under the:

- NT Planning Scheme for land use planning and development consent off-airport
- Airports Act for land use planning and development consent on-airport.

The ANEF is used in accordance with Australian Standard AS2021 Acoustics – Aircraft noise intrusion – Building siting and construction (AS2021) to guide land use planning and development consent decisions by the relevant authority.

As Darwin International Airport is a joint-user airport, the Airports Act requires that the master plan has a joint military–civil ANEF. The 2023 master plan incorporates a standard 20-year ANEF to the year 2043. ANEF inputs include military and civil aircraft movement forecasts, runway and flight path usage, time of day, aircraft fleet mix, local topography and climate conditions. The overall extent of the ANEF contours for RAAF Base Darwin and Darwin International Airport is primarily driven by military aircraft, particularly military fast jets.

The ANEF contours are not necessarily an indicator of the full spread of noise impacts. As such, Darwin International Airport has also prepared N-contour diagrams, a complementary method of describing aircraft noise that shows the potential number of aircraft noise events above a certain decibel on an average day.

Environment Strategy (see Section 14)
The 8-year Environment Strategy is the framework for Darwin International Airport's commitment to environmental management. It has actions to be implemented over the next 8 years to ensure continual improvement in all aspects of environmental management across the airport site.

Our commitment to environmental management and sustainability looks to not only comply with regulatory requirements but also to build on these to move towards best practice in developing future environmental initiatives.

The Environment Strategy ensures relevant legislation, regulations and environmental standards are incorporated into all operations on-airport, including both aviation and non-aviation related activities carried out by airport staff, tenants and contractors.

SECTION 1:
Introduction

SECTION 1: **Introduction**

1.1 Purpose of the master plan

The master plan is a blueprint for Darwin International Airport's development. It is both a regulatory requirement and an important strategic planning tool that outlines our vision for projected growth and development over the next 20 years.

1.2 Background

Darwin International Airport is the major gateway to the Northern Territory, making it a vital link for transport, military and recreational travel to the north.

Darwin is also the closest Australian capital city to Asia, located around halfway between major Australian cities and South-East Asian capitals.

Figure 1-1: Location of Darwin

Darwin International Airport Pty Ltd holds a 50-year lease (plus a 49-year option) over the Darwin International Airport site from the Australian Government under the *Airports Act 1996*.

With the airport lease in place until 2097, Darwin International Airport will continue to be the only major airport in the Darwin region until at least the turn of the next century.

Darwin International Airport is also a joint-user airport under the Airports Act. A Joint User Deed with the Department of Defence governs the co-located operation of Darwin International Airport and the Royal Australian Air Force (RAAF) Base Darwin.

1.3 Airport ownership

Darwin International Airport's parent company is Airport Development Group (ADG). ADG has been part of the Northern Territory community for more than 2 decades and is one of northern Australia's largest companies.

ADG owns 100% of Northern Territory Airports Pty Ltd (NTAPL). NTAPL owns all of Darwin International Airport Pty Ltd and Alice Springs Airport Pty Ltd, which hold the leases over Darwin International Airport and Alice Springs Airport, respectively. ADG also owns Tennant Creek Airport Pty Ltd. See Figure 1-2.

Figure 1-2: Airport Development Group corporate structure

Figure 1-3: Darwin International Airport location

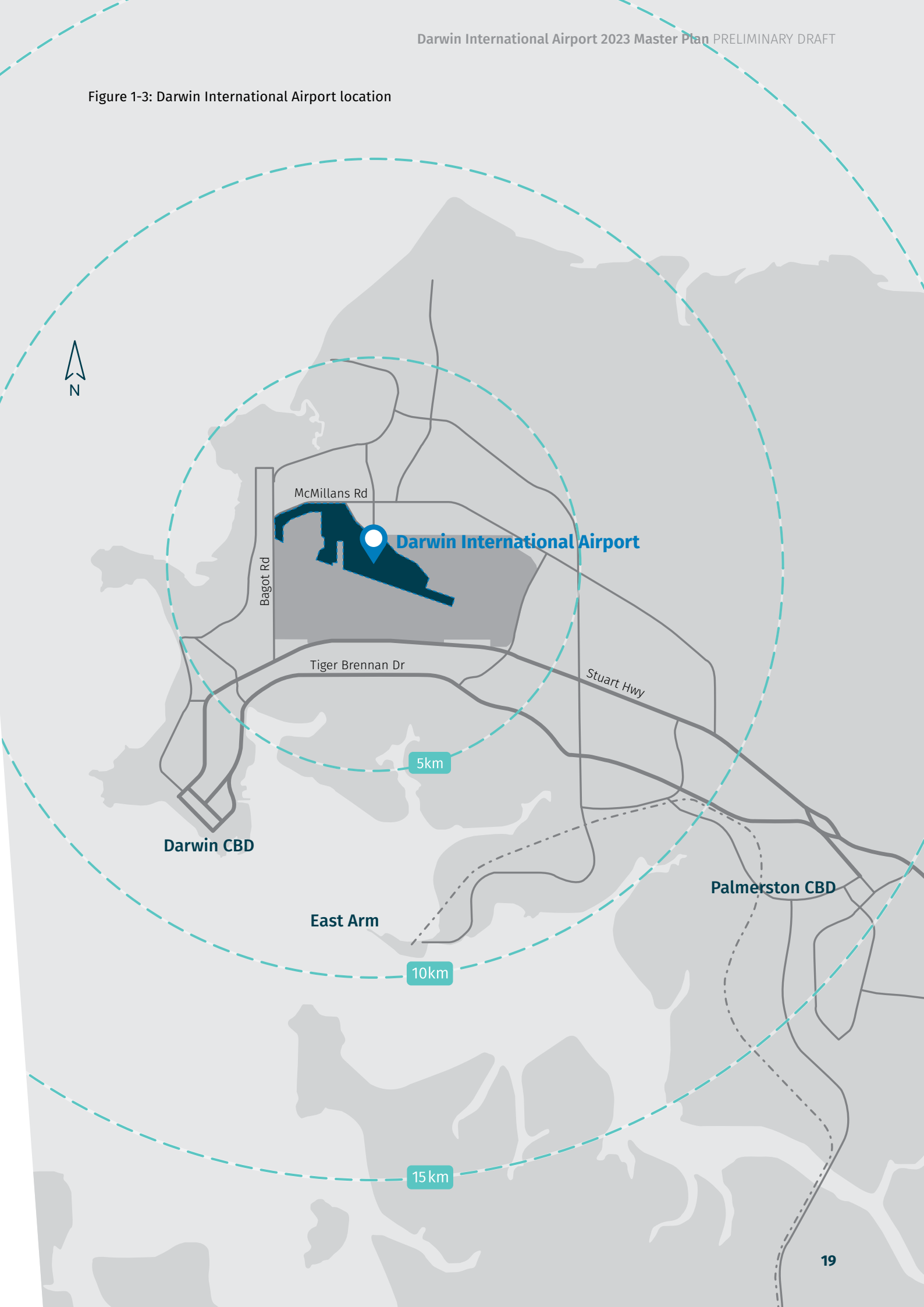
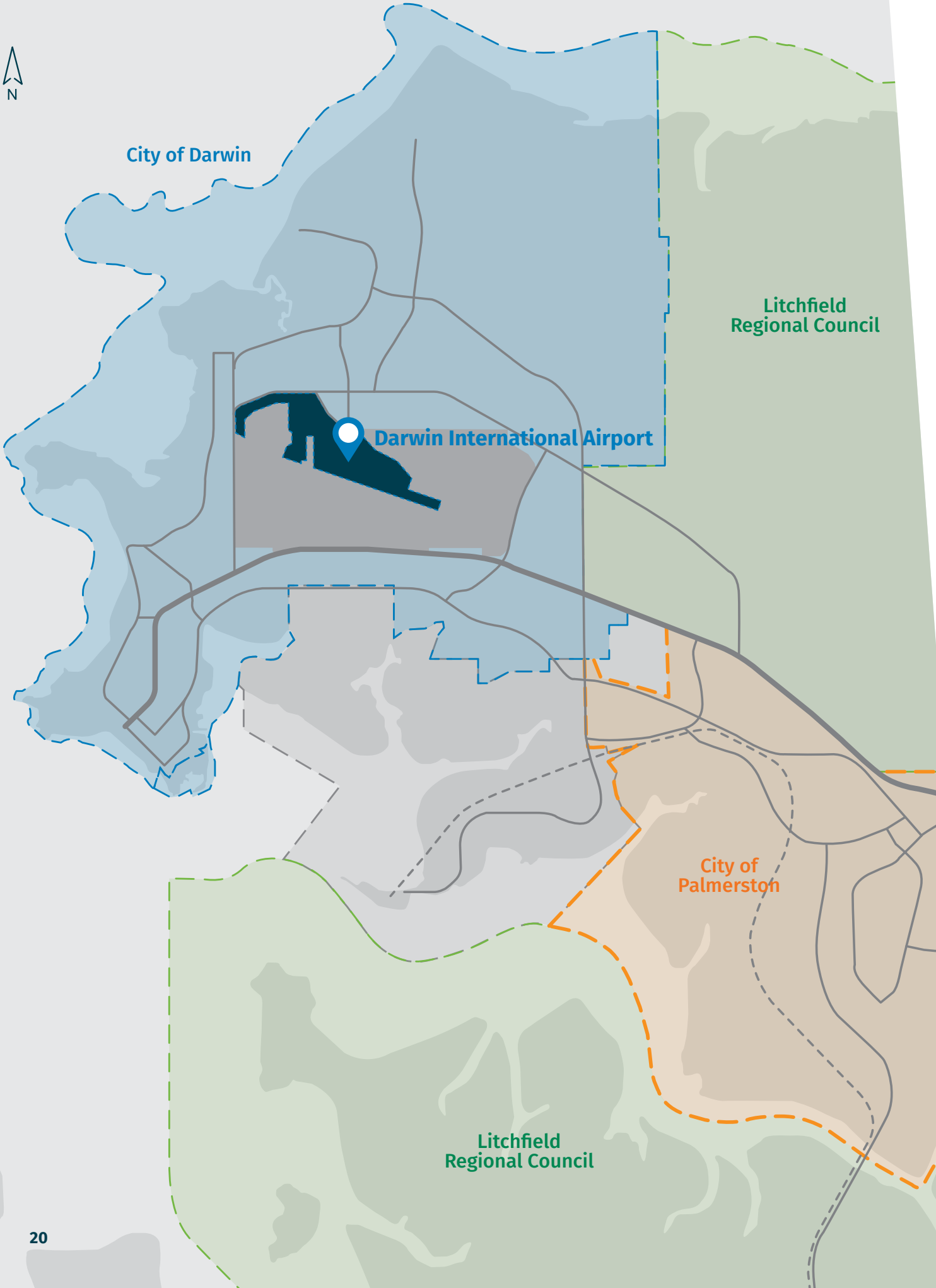


Figure 1-4: Local government areas surrounding Darwin International Airport



ADG owns and operates these airports; has significant investments across hotels, property and utilities; and will continue to invest in major infrastructure projects across the Top End that will improve the lives of all Territorians.

ADG is 100% Australian owned via our investment fund shareholders IFM Investors (77.4%) and Palisade Investment Partners Limited (22.6%). Through these shareholders, ADG directly contributes to the retirement savings of some 70,000 Territorians via their superannuation funds.

About IFM Investors

IFM Investors is an investor-owned global fund manager with A$199.0 billion (at 30 June 2022) under management. With investment teams across Australia, North America, Europe, and Asia, IFM Investors manages a range of institutional investment strategies across infrastructure, debt investments, listed equities and private equity. IFM Investors is owned by a collective of 19 aligned, profit-to-member Australian industry superannuation funds and aims to maximise net returns in a responsible, patient and strategic manner. Through its like-minded institutional investors, IFM Investors invests on behalf of more than 9 million Australians.

About Palisade Investment Partners

An independent, specialist investment manager, Palisade Investment Partners invests the retirement savings of 2.5 million Australians and has approximately $3 billion in funds under management. Palisade focusses solely on investment acquisition and management, and long-term sustainable returns in Australia. Palisade's assets include airports, ports, rail and renewables.

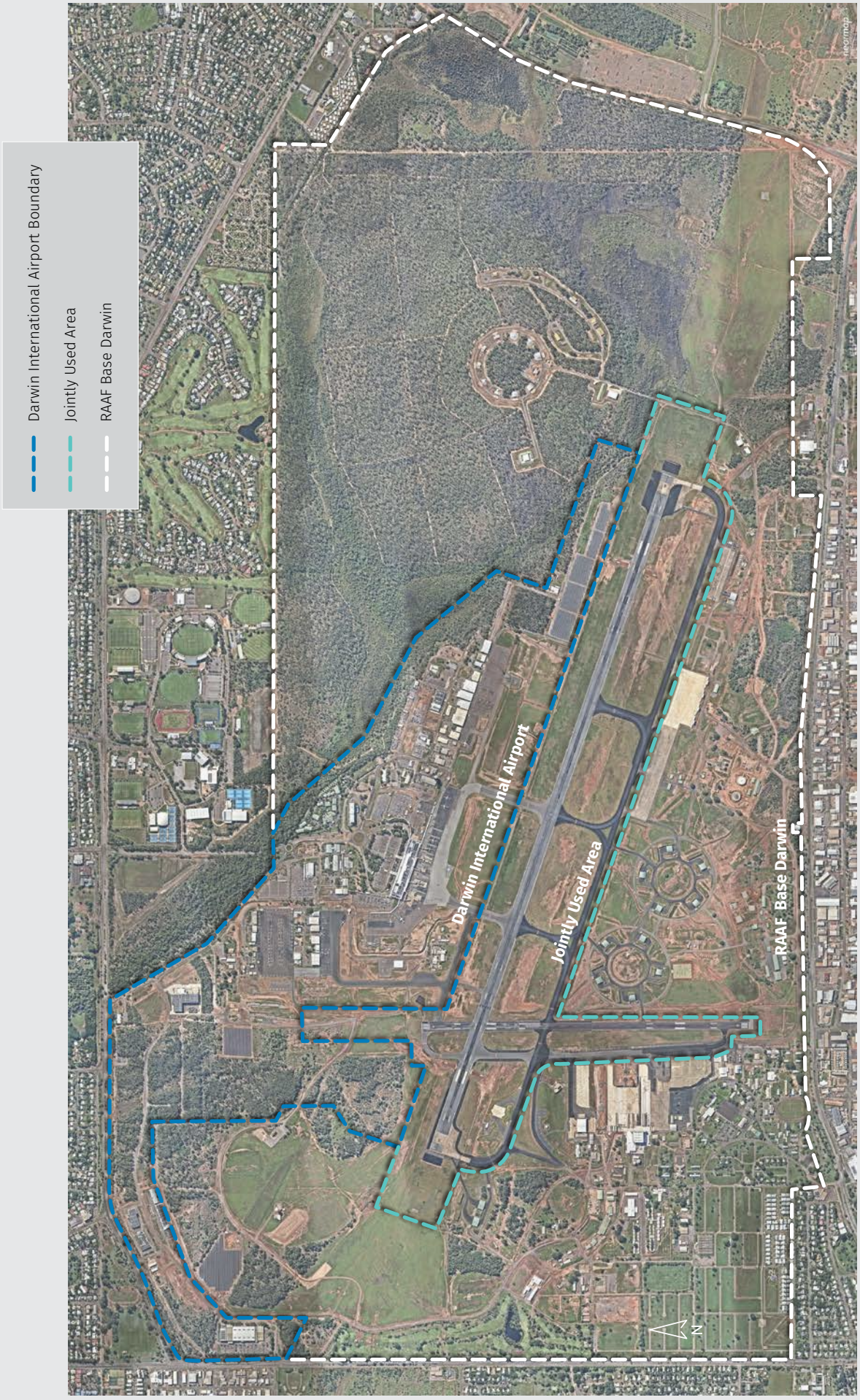
1.4 Airport site

Darwin International Airport is located 13 kilometres by road north-east of the Darwin central business district and 18 kilometres by road north-west of the Palmerston central business district (see Figure 1-3).

Darwin International Airport is on Commonwealth land in the City of Darwin local government area (see Figure 1-4).

The airport site covers 311 hectares plus the 215 hectare Jointly Used Area (civil plus military use). The Darwin International Airport lease boundary is shown in Figure 1-5.

Figure 1-5: Darwin International Airport lease boundary



1.5 Airport history

Darwin's first aerodrome was located at Parap Police Paddock, which was selected in 1919 as the Australian point of entry for the England to Australia air race. Keith and Ross Smith arrived on 10 December 1919 as the first international flight. Two days later, the first flight across the continent arrived from Melbourne. This aerodrome continued to be developed along the alignment of the current Ross Smith Avenue.

The current Darwin International Airport site was commissioned in July 1940 by the Royal Australian Air Force (RAAF) and continued in its sole use until the end of World War II in 1945. During World War II it came under attack many times by Japanese aircraft, evidence of which remains in the form of bullet holes in some buildings. The Australian Government made the military airfield available for civil use under the terms of a joint user policy, which included requirements for a civil building area to be set aside as a self-contained entity. At the time, all existing civil building development was in the south west part of the aerodrome, in what is now the Department of Defence area. It was agreed that the civil facilities could be placed there while civil traffic levels were low. Starting small – in part of a hangar – the civil terminal expanded, as did the apron, roads and car park serving it, creating considerable congestion over time.

This congestion was recognised as early as the 1950s, and plans were prepared for a civil move north of the main runway 11/29. However, the high cost of this option led to civil facilities being planned to move to the east of runway 18/36. Runway upgrades continued throughout this time, with the high-strength main runway completed in 1962 and the crosswind runway reconstructed in 1964.

Darwin Airport terminal, 1979 (Source: Library & Archives NT)

Around the same time, the eastern development started with a new combined fire station and control tower, traffic operations centre and other technical facilities placed there. A general aviation hangar area was also set out.

This situation continued until 1980 when it was concluded that civil operations should again transfer to the north side. Following various studies, the Australian Government confirmed this strategy in 1982, with construction of a civil terminal starting in 1984. However, construction was halted the next year due to concerns over the total cost.

Changing ownership: 1980s to today

The Federal Airports Corporation (FAC) assumed responsibility for civil facilities in Darwin on 1 April 1989 and immediately started developing civil facilities on the north side of the airport, largely along the lines of the Department of Aviation's 1983 Master Plan. Under a $55 million contract, construction commenced on a domestic/international terminal, aircraft apron, taxiways, roads and car parks in January 1990. Separate helicopter and general aviation aprons and support infrastructure were also developed.

Civil air services first started operations from the current terminal on 15 December 1991. Military air traffic control facilities and a separate fire station, were constructed on the north side in 1998 by the Department of Defence.

Privatisation

Between 1997 and 2003, the Australian Government sold long-term leases over the FAC-operated airports to the private sector. In 1998, ADG acquired the 3 Northern Territory airports of Darwin, Alice Springs and Tennant Creek.

1.6 Recent achievements

In line with previous master plans and environment strategies, many developments and initiatives have been or are being implemented at Darwin International Airport, including:

- construction of a new hangar for RFDS operations (2017)
- construction of a new hangar for CareFlight operations (2018)
- car parking equipment upgrades, including online booking engine (2018)
- forecourt safety improvements to the entry to the terminal (2018)
- $8 million purpose-built facility for the National Critical Care and Trauma Response Centre (2019)
- Darwin International Airport incorporated in ADG's first sustainability report (2019)
- major security screening upgrades to advanced computed tomography CT x-ray screening equipment and body scanners (2019)
- construction of a new air traffic control tower and a significant upgrade of the existing airfield systems complex by Defence as part of the OneSKY Program (2020)
- implementation of an integrated vegetation management (IVM) program to reduce the presence of wildlife near the main runway (2020)
- $15 million development of a multipurpose freight, training and cold storage facility (2020)
- community partnership commenced with the Larrakia Rangers to maintain the health of the Rapid Creek reserve in the airport lease area (2020)
- acquisition of the hotel and resort on-airport (2021), and extensive redevelopment program to create a world-class tropical resort (underway)
- high voltage (HV) electrical upgrades across the airport precinct (2021)
- $6 million upgrade of Henry Wrigley Drive and realignment of Sir Norman Brearley Drive (2021)
- creation of a dedicated 'swing' departure lounge to increase flexibility in facilitating domestic and international passengers (2022)
- installation of new self service check-in technology (2023)
- $5 million investment in solar PV (photovoltaic) arrays installed on the rooftops of buildings throughout the airport precinct (underway)
- $10 million aerobridge replacement program (underway)

NAIF loan

In September 2018, ADG welcomed the announcement of a $150 million loan from the Northern Australia Infrastructure Facility (NAIF) to contribute to significant infrastructure projects across all 3 airports in Darwin, Alice Springs and Tennant Creek.

The then Minister for Resources and Northern Australia commented that 'these investments will increase the operational capacity of each airport, and that will increase economic opportunities for each community.'

The loan is one of NAIF's largest investments to date and makes up half of ADG's overall $300 million investment in infrastructure projects across its 3 airports.

In Darwin, the NAIF loan has supported the development of the freight and cold storage facility and further investment in solar energy to support ADG's target of net zero emissions by 2030.

Artist's impression of hotel/resort redevelopment


Hotel/resort redevelopment underway

SECTION 2:

Planning context

SECTION 2: **Planning context**

2.1 Introduction

Darwin International Airport is on Commonwealth land and is subject to the planning framework in the *Airports Act 1996*.

2.2 Commonwealth framework

Airports Act 1996

The Airports Act was passed by federal parliament in 1996 to govern the development and operations of federal airports leased to the private sector.

The federal Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA) is responsible for the design and implementation of the Australian Government's infrastructure, transport and regional development policies and programs. DITRDCA manages the administration of the government's interests in privatised airports under the Airports Act.

Part 5 of the Act requires Darwin International Airport to prepare a 20-year master plan that incorporates an environment strategy. The previous 4 master plans for Darwin International Airport (1999, 2004, 2010 and 2017) were prepared every 5 years, in keeping with the Act's requirements of the time. Amendments to the Airports Act in 2018 increased this to 8 years for Darwin International Airport. After approval of the Darwin International Airport 2023 Master Plan by the federal minister, all future master plans will be prepared every 8 years.

As a result of the COVID-19 pandemic and the uncertainty in the aviation industry, Darwin International Airport sought - and was granted - a 12-month extension from the federal minister to deliver this master plan. During preparation of the 2023 master plan, the airport sought an additional 6-month extension due to Defence considerations, which too was granted. So the previous 2017 master plan for Darwin International Airport remains valid until 6 March 2024.

Section 70 of the Airports Act says the purposes of an airport's final master plan are:

- to establish the strategic direction for efficient and economic development at the airport over the planning period of the plan
- to provide for the development of additional uses of the airport site
- to indicate to the public the intended uses of the airport site
- to reduce potential conflicts between uses of the airport site, and to ensure that uses of the airport site are compatible with the areas surrounding the airport
- to ensure that all operations at the airport are undertaken in accordance with relevant environmental legislation and standards
- to establish a framework for assessing compliance at the airport with relevant environmental legislation and standards
- to promote the continual improvement of environmental management at the airport.

The Airports Act specifies that a joint-user airport master plan must set out:

- development objectives for the civil use of the airport
- an assessment of the future needs of civil aviation users, and other users of the airport, for services and facilities relating to the airport
- intentions for land use and related development of the airport site, where the uses and developments embrace airside, landside, surface access and land planning/ zoning aspects
- an Australian Noise Exposure Forecast (ANEF) for the areas surrounding the airport
- flight paths at the airport
- plans for managing aircraft noise within the area
- an assessment of environmental issues associated with the implementation of the plan
- plans for dealing with the environmental issues
- in relation to the first 8 years of the master plan – a plan for a ground transport system on the landside of the airport
- in relation to the first 8 years of the master plan – detailed information on the proposed developments that are to be used for commercial, community, office or retail purposes, or for any other purpose that is not related to airport services

- in relation to the first 8 years of the master plan – the likely effect of the proposed developments on employment levels at the airport, and the local and regional economy and community
- in relation to the first 8 years of the master plan – an environment strategy.

Other regulatory frameworks

In addition to the Airports Act, there is a range of legislation and regulations relevant to the planning of leased federal airports including:

- Airports Regulations 1997
- Airports (Building Control) Regulations 1996
- Airports (Control of On-Airport Activities) Regulations 1997
- Airports (Environment Protection) Regulations 1997
- Airports (Ownership Interests in Shares) Regulations 1996
- Airports (Protection of Airspace) Regulations 1996
- Civil Aviation Safety Regulations 139
- CASA Part 139 (Aerodromes) Manual of Standards 2019
- *Environment Protection and Biodiversity Conservation Act 1999*.

National Airports Safeguarding Framework

The Australian Government recognises that responsibility for land use planning rests primarily with state, territory and local governments but that a national approach can assist in improving planning outcomes on and near airports and under flight paths.

The National Airports Safeguarding Framework (NASF) has been developed by the National Airports Safeguarding Advisory Group to provide guidance on planning requirements for development that affects aviation operations. The framework was first released in 2012 and provides a national regime for land use planning around airports in Australia. The purpose of the framework is to enhance the current and future safety, viability and growth of aviation operations at Australian airports.

Section 12 outlines how Darwin International Airport seeks to implement NASF guidance in its planning.

2.3 Joint User Deed

Darwin International Airport is co-located with RAAF Base Darwin and has been a joint-user airport with shared military–civil facilities since 1946. RAAF Base Darwin, located on the southern side of the main runway, is a permanent Main Airbase that concurrently supports the role of a Forward Operating Base capable of significant surge to support and enable Defence operations and exercises. The Department of Defence provides air traffic control facilities and systems that are staffed by Defence personnel.

Responsibilities between the Department of Defence and Darwin International Airport are set out in a Joint User Deed that governs all aspects of the military–civil use of the runway and taxiway system, known as the Jointly Used Area.

The Jointly Used Area is owned and controlled by the Department of Defence, with the Joint User Deed giving military and civil shared access to the Jointly Used Area. The Joint User Deed also defines the respective aviation responsibilities in the separate military and civil areas.

There is a cost-sharing agreement for the use of the aircraft manoeuvring areas (runways and taxiways) by civil aircraft. Both parties (Darwin International Airport and Defence) are responsible for providing and maintaining their own facilities and services, whether they are located in their own areas or elsewhere.

Under the Joint User Deed, the Department of Defence is also responsible for the control of environmental impacts, including the preparation of Australian Noise Exposure Forecast (ANEF) charts.

2.4 Northern Territory planning context

Northern Territory planning laws do not apply to Darwin International Airport because it is located on Commonwealth land. The Airports Act and associated regulations require that the master plan describe proposals for land use and related planning, zoning or development in an amount of detail equivalent to that required in the state or territory in which the airport is located.

Planning Act 1999

The Northern Territory Planning Framework is set out in planning laws including the *Planning Act 1999* and the Planning Regulations 2000. These laws provide for appropriate and orderly planning and control of the use and development of land. The planning laws are the responsibility of the Minister for Infrastructure, Planning and Logistics.

On 31 July 2020, planning laws changed in the Northern Territory. Amendments were made to the Planning Act 1999, Planning Regulations 2000 and the Northern Territory Planning Scheme. The purpose of these amendments was to deliver a modern planning system that aligns with best practice in Australia. Its purpose is to increase transparency and accountability within the planning system and to deliver better development outcomes, with an eye to the needs of future generations.

These amendments resulted in the previous Northern Territory Planning Scheme 2007 being replaced by the new Northern Territory Planning Scheme 2020.

Northern Territory Planning Scheme

Unlike other jurisdictions, planning in the Northern Territory is the responsibility of the Northern Territory Government, not local government. The Northern Territory (NT) Planning Scheme is the 'rule book' for land use and development in the Northern Territory. The NT Planning Scheme:

- describes how land use may change to meet future needs
- identifies factors and risks that could affect land use (e.g. flooding)
- sets controls that allow, prohibit or put conditions on land use

- provides guidance to help consent authorities make decisions
- states the level of flexibility allowed for decisions about development applications, maps, plans, designs and diagrams.

The NT Planning Scheme has four main parts:

- strategic framework made up of strategic policies and plans that guide changes to land use
- overlays that identify and give special rules for factors that could affect land use
- zones that control the types of use and development allowed in an area
- development and subdivision requirements that provide direction on how a use or development should look or operate.

Strategic framework

The strategic framework that forms part of the NT Planning Scheme is made up of plans and policies describing how the government expects land to develop now and in the future. These plans and policies cover different areas of the NT and are arranged in the following order:

- Territory-wide policy
- regional land use plans
- sub regional land use plans
- area plans.

Several plans within the strategic framework of the NT Planning Scheme acknowledge Darwin International Airport and RAAF Base Darwin and specify planning requirements for development surrounding the aerodrome so that it doesn't affect current and future aviation operations. These plans are described briefly below.

Darwin Regional Land Use Plan

The Darwin Regional Land Use Plan (2015) identifies the essential characteristics and needs that will shape future development in the Darwin region and establishes an overarching framework for that development.

The plan recognises Darwin International Airport as the principal airport in the region, and its operation as a joint-user airport with RAAF Base Darwin. Planning considerations relating to the airport are acknowledged, including aircraft noise contours (ANEF) and the protection of airspace. The plan also highlights the Defence (Aviation Areas) Regulations – previously called the Defence (Areas Control) Regulations – that regulate the construction of buildings or the height of buildings in areas close to RAAF Base Darwin.

Area plans

Area plans are land use and development policies within the NT Planning Scheme that guide the future use and development of land and provide a detailed framework for land use change. These plans contain planning principles and objectives to give the community, industry and decision-makers confidence and understanding about potential land uses.

The following area plans include planning principles and considerations to safeguard the ongoing operations of Darwin International Airport and RAAF Base Darwin:

- Central Darwin Area Plan (2019)
- Darwin Inner Suburbs Area Plan (2016)
- Darwin Mid Suburbs Area Plan (2016)
- Berrimah Farm Planning Principles and Area Plan (2014)
- Berrimah North Planning Principles and Area Plan (2014)
- Central Palmerston Area Plan (2021)

The objectives of these planning principles include:

- minimising the detrimental effects of aircraft noise on people who reside or work in the vicinity of an airport
- preventing any new use or intensification of development on land that would prejudice the safety or efficiency of an airport.

The Darwin Mid Suburbs Area Plan identifies the airport's Service Commercial Zone as Commonwealth land designated for business and industry use, and references the airport's 2010 master plan that was current at the time the area plan was prepared.

Overlays

The NT Planning Scheme has a 'land in proximity to airports' overlay. The purpose of this overlay is to identify areas that may be subject to additional amenity impacts and/or restrictions due to its proximity to an airport. Similar to the planning principles discussed on the previous page, the overlay ensures that development in these areas:

- minimises the detrimental effects of aircraft noise on people who reside or work in the vicinity of an airport
- does not result in any new use or intensification of development on land that would prejudice the safety or efficiency of an airport
- does not result in any new use or intensification of development that would jeopardise the curfew free operation of the NT's airports (where applicable)
- retains the non-urban character of the land.

2.5 Planning and development approach

While the 2023 master plan for Darwin International Airport provides a framework for future development to 2043, we are conscious that the master plan must also be flexible to meet changing conditions.

Development objectives

Darwin International Airport has established the following development objectives to guide our planning and development of aeronautical and non-aeronautical facilities and services:

1. Ensure that planning supports long-term development as an airport with an optimal mix of aeronautical uses.
2. Provide a safe, secure, reliable and sustainable airport operating environment.
3. Enhance the airport's contribution to Northern Territory economic growth through developing the airport's aviation and property business and by facilitating the success of our business partners.
4. Integrate environmental considerations into the development of facilities and services, and seek to minimise their impact on the natural environment.
5. Engage with key community, business and government stakeholders on airport-related economic, social and environmental issues, and be mindful of surrounding community interests.
6. Provide airport infrastructure and facilities that are timely, cost-effective and flexible in use and provide a good customer experience.
7. Undertake developments that enhance value to our shareholders and the broader economic community.

Consistency with the NT Planning Scheme

Part 5.02(2) of the Airports Regulations 1997 states: '*An airport master plan must, in relation to the landside part of the airport, where possible, describe proposals for land use and related planning, zoning or development in an amount of detail equivalent to that required by, and using terminology (including definitions) consistent with that applying in, land use planning, zoning and development legislation in force in the state or territory in which the airport is located.*'

Where possible, the master plan has been developed to promote consistency with the NT Planning Scheme, particularly in relation to non-aviation development in the landside part of the airport site.

Landside means the area of the airport and buildings that the general public normally has free access.

Airside means the aircraft movement area of the airport, and adjacent land and buildings, that are access controlled.

The Land Use Plan for Darwin International Airport (see Section 6) comprises both non-aviation related zones and aviation related zones:

- The non-aviation related zones (Service Commercial, Tourist Commercial, Commercial, Conservation) are entirely located in the landside area of the airport. These zones have been developed, where possible, in an amount of detail and using terminology and definitions consistent with that of the NT Planning Scheme.
- The aviation related zones (Aviation Activities, Terminal and Facilities, Aviation Reservation) are located across both the airside and landside areas of the airport. As there are no aviation-specific zones within the NT Planning Framework, these have been prepared in an amount of detail equivalent to the NT Planning Scheme.

Figure 2-1: Darwin International Airport surrounding land use plan

As Darwin International Airport is subject to Commonwealth legislative control, the planning and development of the airport is not under control of the Northern Territory Government. The airport's landside commercial zones are not currently recognised in the NT Planning Scheme as an activity centre or commercial area. However, the Northern Territory Government acknowledges that commercial development at the airport has continued to establish a place in the wider hierarchy of centres in the Darwin region, and that there is therefore benefit in referencing the master plan within the NT Planning Scheme as a means of providing confidence and allow future planning for the region (and other commercial/retail centres) to be undertaken, taking account of the envisaged scale of commercial development at the airport.

Alignment with surrounding land uses

The master plan seeks to integrate airport land uses, particularly non-aviation related landside uses, with land uses surrounding Darwin International Airport. Developments within these non-aviation related zones will seek to complement development adjacent to the airport site.

The southern and eastern perimeter of the Darwin International Airport lease boundary abut RAAF Base Darwin which is Commonwealth land. This includes the Jointly Used Area. Only the northern and western perimeter of the airport's lease area border land that is governed by the NT Planning Scheme framework, as can be seen in Figure 2-1. It is this north-west corner of the site where the airport's Service Commercial Zone is located, bounded by Bagot Road to the west, McMillans Road to the north, and Charles Eaton Drive to the north-east.

The airport's Service Commercial Zone is consistent with most land use zones surrounding it, including Light Industry in the suburb of Coconut Grove directly to the west, and Commercial, Organised Recreation and Public Space zoning in the suburb of Millner directly to the north. A section of the Service Commercial Zone is adjacent to Low Density Residential, also within Millner. The land use zone table for the airport's Service Commercial Zone (see Section 6 of the master plan) recognises that developments are to be designed in such a way to protect the amenity of these nearby residences.

The airport's Commercial Zone is located to the south-east of the Service Commercial Zone bound by Charles Eaton Drive. Directly surrounding this area to the north is an area zoned Conservation associated with Rapid Creek.

More broadly, the following land uses surround the wider aerodrome (comprising Darwin International Airport and RAAF Base Darwin):

- To the north is the Marrara sporting complex, a golf club, conservation zoning related to Rapid Creek, and the northern residential suburbs of Millner, Jingili, Moil, Anula, Malak and Karama.
- To the east is a mix of land uses including the Berrimah Business Park, Defence Establishment Berrimah, residential areas of varying density in the vicinity of Boulter Road, and community purposes including schools, community centres and places of worship. There is a portion of land zoned Restricted Development that aligns with the centreline of the main runway, for airport safeguarding purposes.
- To the south is the suburb of Winnellie comprising industrial and service commercial land uses, as well as organised recreation, a caravan park and community purposes including the Darwin Aviation Museum. The Narrows residential area abuts the south-west corner of the aerodrome.
- To the west is a special purpose lease to an indigenous organisation, and the residential area of Ludmilla. There is a Restricted Development Zone immediately to the west of the main runway centreline, for airport safeguarding purposes.

Darwin International Airport monitors development surrounding the airport and provides comment to the Northern Territory Government's Development Assessment Services relating to proposed development applications that could impact on the airport's operations now and in the future. Aspects that the airport considers include aircraft noise, height and scale of development, extraneous lighting, and wildlife hazard. Further information on airport safeguarding is provided in Section 12.

2.6 Consultation and engagement

Master plan preparation and consultation

Preparing the Darwin International Airport 2023 Master Plan involves a number of steps and consultation elements, which are highlighted in the diagram below.

Figure 2-2: Master plan process

Exposure draft 2023 master plan

During development of the master plan (including environment strategy), Darwin International Airport shared an early draft of the master plan – called the exposure draft – with key airport stakeholders, including:

- Darwin International Airport Community Aviation Consultation Group
- Airport Development Group Planning Coordination Forum
- Australian Government agencies
- Northern Territory Government agencies
- Local governments surrounding the airport
- airlines, general aviation operators and other users of the airport
- airport businesses
- Aboriginal representatives
- environmental groups.

Feedback we received during consultation on the exposure draft was considered in preparing the preliminary draft master plan for public comment.

Preliminary draft 2023 master plan for public comment

In line with Section 79 of the Airports Act, the preliminary draft master plan is released for public comment for 60 business days. Darwin International Airport has made the preliminary draft master plan available through:

- a newspaper notice advising of the preliminary draft master plan's release and inviting written comment
- publishing the preliminary draft master plan on the Darwin International Airport website
- printed copies to view and purchase from the Darwin International Airport management centre.

To meet the Airports Act requirements, before the public comment period commenced, Darwin International Airport sent written advice about our intention to release the preliminary draft master plan for public comment to:

- the Northern Territory Minister for Infrastructure, Planning and Logistics
- the Northern Territory Department of Infrastructure, Planning and Logistics
- City of Darwin.

Submission of the draft 2023 master plan for approval

When the public comment period closes, Darwin International Airport submits the draft master plan to the Minister for Infrastructure, Transport, Regional Development and Local Government. Included is a copy of any written comments we received during the public comment period and a summary of those comments. This summary contains:

- the names of people/organisations that made comments
- a summary of the comments
- a statement declaring that Darwin International Airport has taken due regard of the comments
- any other information relating to the comments that may be required by the regulations.

The minister has 50 business days to decide whether to approve or refuse to approve the draft master plan. In making their decision, the minister must consider:

- the extent to which the plan achieves the purpose of a final master plan
- the extent to which the plan meets the needs of the airport users
- the effect on the use of land, including within the airport site and the areas surrounding the airport
- consultation undertaken in preparing the master plan
- the views of the Civil Aviation Safety Authority (CASA) and Airservices Australia in respect to safety and operational aspects
- any other matters considered relevant.

Final 2023 master plan

In line with Section 86 of the Airports Act, following the minister's approval of the draft master plan, Darwin International Airport will:

- publish a notice in the newspaper advising that the master plan had been approved
- make printed copies of the final master plan available to view and purchase from Darwin International Airport management centre
- publish the final master plan on the Darwin International Airport website.

2.7 Stakeholder and community engagement

We are committed to effective and genuine consultation with airport stakeholders. Our clearly articulated approach to planning will ensure accurate information is shared and feedback about the airport's development is encouraged.

Building positive, strong and long-term relationships with those involved in or affected by our airport's operation and development is a priority and vital to our success.

Stakeholder engagement occurs at many levels: from developing our airport master plan through to our daily operational activities.

Community Aviation Consultation Group

The Darwin International Airport Community Aviation Consultation Group was established in 2011 and meets three times a year. The group's main role is to discuss community issues arising from airport operations and developments. This allows information to flow from the airport and its tenants to the community and vice versa. It also allows the community to make comments and suggestions about the airport's operation and development.

The group's work includes reviewing:

- existing and proposed airport development and operations
- steps being taken to implement or develop the airport's master plan
- noise (including aircraft noise) and environmental issues
- ground transport and access issues
- improvements or changes to airport facilities
- activities from Airservices Australia and the Civil Aviation Safety Authority that may change or affect airport operations and be of community interest
- the contribution of the airport to the local, regional and national economy.

Planning Coordination Forum

As well as the Community Aviation Consultation Group, Airport Development Group runs a Planning Coordination Forum 3 times a year. This forum sees high-level strategic discussions between the airport and Australian, Northern Territory and local government representatives to improve the coordination of planning for the airport site and surrounding areas.

As most planning resources of both the Northern Territory Government and Airport Development Group are located in Darwin, it is sensible for one Planning Coordination Forum to cover both Alice Springs Airport and Darwin International Airport.

The Planning Coordination Forum's work includes the areas of:

- planning and development issues, including local planning integration
- development and implementation of airport master plans
- road access issues, including ground transport and public transport services
- environmental impacts from airport operations
- the role of the airports as a major consumer and employment centre in the urban and regional planning context, as well as the wider economic role of the airports as transport centres
- measures to address the impacts of airport operations, including aircraft noise
- land use planning issues in the vicinity of the airport, including planning measures to safeguard airport operations, amenity of neighbouring properties, and future development on- and off-airport
- government regulatory and policy issues.

SECTION 3:

Sustainability

SECTION 3: **Sustainability**

3.1 Introduction

Darwin International Airport views corporate sustainability as conducting our business to create value for our present stakeholders while protecting the rights of future stakeholders. Sustainability is important for the health of the environment and the prosperity of communities, and it also represents good business.

3.2 Sustainability Strategy

Sustainability is incorporated across our business operations, our staff, our community and our environment. Adopting corporate sustainability across Darwin International Airport operations delivers value to our business through:

- maintaining our social licence to operate
- growing investor confidence
- driving efficiency improvements in the use of natural resources
- minimising waste
- providing safe work environments
- supporting employee learning and development
- driving innovation within our projects
- managing risk.

Central to our Sustainability Strategy is our commitment to action, measure and demonstrate improvement against key sustainability indicators.

Darwin International Airport has published annual sustainability reports since 2018–19. The sustainability reporting demonstrates our performance in these areas:

- approach to sustainability reporting
- stakeholder engagement processes
- workforce profile
- work health and safety systems
- resource use, emissions and waste.

ADG 2030 emissions reduction target

In 2018–19, Airport Development Group (ADG) developed an emissions reduction target in line with the Paris Agreement. The Paris Agreement aims to strengthen the global response to the threat of climate change by holding the increase in the global average temperature to well below 2°C above pre-industrial levels, and pursuing efforts to limit temperature increase to 1.5°C.

ADG's reduction target has been developed utilising a science-based target where emissions reductions fall well within the Australian emissions reduction target under the Paris Agreement and United Nations Convention on Climate Change. We are on track to have zero net emissions (scope 1 and scope 2) by 2030 with continued growth of our solar energy investment.

The focus areas for reducing emissions across our operations include:

- continued investment in renewable energy generation
- energy efficiency projects
- electrification of operational plant and equipment (from fossil fuel) using generated renewable energy
- implementing sustainable building design principles.

A future initiative is to collaborate with key partners to identify and investigate opportunities to support the uptake of renewable energy sources and other activities that reduce scope 3 greenhouse gas emissions across our value chain. This is discussed in Section 14: Environment Strategy.

SECTION 4:

Social, economic and regional significance

SECTION 4: **Social, economic and regional significance**

4.1 Introduction

Airport Development Group aims to enhance the lives of all Territorians.

Aviation is critical to the Northern Territory's economic and social development. The remoteness of many communities, weather, road conditions and distance from major population centres means NT residents are more reliant on aviation services than those in any other jurisdiction.

A strong community focus is our continuing priority. Our sponsorship of local arts and cultural groups, and our corporate giving and workplace donation systems help us stay connected to the people living in the surrounding region.

4.2 Social and community benefit of Darwin International Airport

Darwin is the capital city of the Northern Territory. Close to 150,000 people call the greater Darwin region home, which is 60% of the NT population.

Connecting communities

There are 6 airports in the Northern Territory and more than 70 regional and remote aerodromes. Darwin International Airport provides direct or indirect links to all of these.

Darwin International Airport plays a vital role in sustaining remote communities across northern Australia through our large general aviation capability. A wide range of essential services connect remote communities to Darwin via the air, such as those in law enforcement, education, health, utilities maintenance, housing and conducting elections.

In 2015, Airnorth launched the 'Centre Run' service between Darwin and Alice Springs via Katherine and Tennant Creek. This service not only provides improved air connections for residents in these regional areas but supports the delivery of health, education and other essential services to these regional towns.

COVID-19 repatriation flights

In August 2021, Darwin International Airport began processing the Australian Government's COVID-19 repatriation flights, supporting the international repatriation program for Australians stranded overseas during the pandemic. Our assistance helped an extra 1,500 Australians per fortnight to come home during the pandemic. Before Australia's international borders reopened in early 2022, 141 repatriation flights arrived safely at Darwin International Airport.

We completed significant building and capital works in the terminal to ensure safe physical and atmospheric separation of repatriation passengers.

Emergency medical retrieval precinct

Darwin International Airport plays a crucial role in giving people in remote areas fast access to emergency medical care by transporting critically ill people to Royal Darwin Hospital (RDH) and other medical centres in Australia. RDH is the base for most of the NT's medical services and is the referral centre for the Top End of the NT and parts of Western Australia.

Since the last master plan, a world-class emergency medical retrieval precinct has been established at Darwin International Airport. It provides a vital link for medical services overseas and across rural and remote regions of northern Australia that didn't exist before. The precinct has tripled the NT's emergency medical infrastructure and greatly improved the health security and confidence for tourists and residents in remote areas of the NT, ensuring health care is no longer a restriction to a sustainable rural workforce.

The precinct is home to the National Critical Care and Trauma Response Centre (NCCTRC), Australia's only deployable field hospital, as well as CareFlight and the Royal Flying Doctor Service (RFDS), providing 24-hour emergency medical retrieval services for Australia and overseas.

National Critical Care and Trauma Response Centre

The National Critical Care and Trauma Response Centre (NCCTRC) is a key component of the Australian Government's disaster and emergency medical preparedness and response capability to incidents of local, national and international significance.

The location of the NCCTRC in Darwin ensures Australia is ready to respond to major onshore and offshore incidents in Australia and South-East Asia. Its Australian Medical Assistance Teams (AUSMAT) are multi-disciplinary health teams with doctors, nurses, paramedics, fire fighters and allied health workers such as environmental health staff, radiographers and pharmacists. AUSMAT has 2 tiers: state responses (intra or interstate) and national responses, with a large and varied supply of medical equipment stored and pre-packed in the NT, ready for multiple health disaster scenarios.

The NCCTRC has strong links with the NT Department of Health, Queensland Health, Charles Darwin University and Flinders University in Adelaide, ensuring significant advantages to community and research and economic benefits for the Top End. The NCCTRC also works closely with NT emergency management stakeholders to support a Territory-wide health emergency response.

CareFlight

CareFlight operates the Top End Medical Retrieval Service (TEMRS) for the Northern Territory Government. CareFlight uses 5 Beechcraft B200 King Air turbo-prop aircraft, and an AW139 long-range medical rescue helicopter to service towns, communities, mine sites, energy and resource sector operations, and pastoral stations across an area of around 600,000 square kilometres. TEMRS supports a population of more than 50,000 people, 40 remote health clinics and 3 hospitals across the NT. More than 90% of patients are Indigenous.

CareFlight is also the dedicated inter-hospital aeromedical evacuation jet provider for the Northern Territory Government. A long-range Gulfstream G150 jet services this contract, which is capable of transporting critically ill patients across Australia and from South-East Asia. CareFlight also has a CareFlight International base in Darwin that undertakes medical retrievals from South-East Asia.

Royal Flying Doctor Service (RFDS)

The RFDS aeromedical base at Darwin International Airport is part of RFDS Central Operations. It facilitates emergency evacuations and inter-hospital transfers as well as charter services for the NT Department of Health for health professionals to deliver remote fly-in clinics throughout the Top End. In 2021–22, RFDS facilitated more than 1,000 clinics from the Darwin base.

RFDS Central Operations (comprising SA and NT) operates a total of 20 aircraft for health service delivery and passenger transport/medical freight operations: 18 Pilatus PC-12s and 2 Pilatus PC-24 Medi-Jets 24s. Three aircraft were based in Darwin during 2021–22, flying more than 500,000 kilometres.

Emergency medical retrieval precinct

Community engagement and sponsorship

Darwin International Airport has been an enthusiastic supporter of the Darwin community for more than 20 years. We take our social performance in the community we operate in seriously. That includes respect for the traditional owners of the land, the Larrakia people, as well as the cultural and social values of the Darwin community.

Stakeholder relations and consultation are integral to our social performance, including our Community Aviation Consultation Group and Planning Coordination Forum. We publish an annual Stakeholder Engagement Report on our website, which summarises the group's meetings for the year and our stakeholder engagement with the community, industry and business, the environment, corporate giving, education and the arts.

Our social performance includes sponsorships; our commitment to conservation, art and culture; and creating a workplace where staff are proud to come to work. For over a decade, our Workplace Giving program has seen staff voluntarily contribute to NT charities through payroll deductions, which the company matches dollar for dollar.

Darwin International Airport is also a proud supporter of local community, tourism and sporting events. Our significant sponsorship program has supported many events in recent years, including the Darwin Festival, Darwin Symphony Orchestra, NT Cricket's 'Cricket 365 Program', V8 Supercars Darwin Indigenous Round, and the Million Dollar Fish campaign.

Education and training

ADG Indigenous Training Academy

In 2022, Airport Development Group launched an Indigenous Training Academy, which delivers nationally recognised qualifications in the hospitality and tourism sectors. When they finish their traineeship, graduates can gain full-time employment with ADG and our partners, including contractors, tenants and organisations in the airport precinct.

Aviation training academy

After an industry-led feasibility study, Darwin International Airport became home to the Territory Aviation Skills Centre in 2021. The aviation academy delivers training for apprentices in mechanical avionics, specialised training for cabin crew, and supports the VET In Schools program delivery of line maintenance and electronic training. Thanks to the academy, up to 100 students no longer have to travel interstate for their aviation training and to sit their exams.

The academy is the result of a combined effort from the Northern Territory Government, Chamber of Commerce NT, Industry Skills Advisory Council NT, CareFlight, Aviation Australia, and ADG.

4.3 Economic contribution of Darwin International Airport

Darwin International Airport is a key commercial, personal travel, essential services and military transport facility for northern Australia. It makes a substantial contribution to the Darwin and NT economies. This economic analysis looks at the transport infrastructure, airline, general aviation and non-aviation commercial business contribution of Darwin International Airport to the NT economy.

We use input–output analysis to estimate the airport's economic contribution using data from a survey of airport businesses and airport financial information. Input–output analysis is a way to estimate the total economic contribution that arises after some initial stimulus to an economy. Total contributions include the initial (or direct) effect of the stimulus and the multiplier (or indirect) effects that arise from the linkages between industries in an economy.

'Economic value added' is a measure of the final value of the output generated by an economy over a period of time, calculated as the value of production less the costs of goods and services used to generate that production. This economic value is known as the contribution to gross product. At a Northern Territory level, it is referred to as gross state product, and at a national level it is referred to as gross domestic product.

Darwin International Airport and its tenants:

- **Directly contribute** to the economic value added of the economy through the gross operating surplus (gross profits) earned, spending on goods and services, and the payment of direct wages to their workforces.
- **Indirectly contribute** through the economic activity stimulated by their spending on goods, services and community investments, and through paying wages to their employees, which are spent in the economy.

Economic contribution of Darwin International Airport in 2022

It is estimated that business activities at Darwin International Airport directly employ some 1,500 people from 72 businesses. A further 1,200 people are indirectly employed, bringing the airport's overall employment contribution to some 2,700 people, or around 1.9% of the NT labour force.

Darwin International Airport's economic contribution to the NT economy is significant, with direct and indirect contributions to gross state product (GSP) in 2021–22 estimated at $544 million (see Table 4-1). In 2021-22, the total GSP of the NT was $26.1 billion, suggesting that Darwin International Airport contributes around 2% of GSP.

	Aviation business contribution		Non-aviation business contribution		Total business contribution	
	Employment (full time equivalent)	Value-added GSP ($M)	Employment (FTE)	Value-added GSP ($M)	Employment (FTE)	Value-added GSP ($M)
Direct contribution	1,174	254.9	338	39.7	1,512	294.6
Indirect contribution	1,075	219.8	146	29.4	1,221	249.3
Total	**2,249**	**474.8**	**484**	**69.1**	**2,733**	**543.9**

Table 4-1: Estimated annual economic contribution of Darwin International Airport in 2021–22 (Source: ACIL Allen)

As well as economic activities at the airport, Darwin International Airport makes a significant contribution to the wider NT economy by facilitating the air travel of domestic and international visitors. An airport is critical in a city like Darwin with its remote location, distance from other population centres in Australia and proximity to South-East Asia.

The airport's contribution to the NT's economy as an enabler of tourism spending is considerable. Darwin International Airport enabled (directly and indirectly) an estimated $985 million in tourism activity in 2021–22 and some 7,300 tourism jobs.

Economic contribution of Darwin International Airport in 2031

A requirement of the master plan is to forecast the economic contribution of the airport in the first 8 years of the master plan. It is estimated that business activities at Darwin International Airport will continue to grow over the coming years and by 2031 could support (directly and indirectly) some 5,340 jobs and contribute $1.5 billion to the NT economy (in current dollar values). See Table 4-2.

The airport's expected economic contribution to the NT's GSP as a result of tourism spending enabled by the airport is considerable. The potential increase in visitors has been estimated from passenger forecasts through Darwin International Airport (as described in section 5), while visitor spending is based on current average spend per visitor as reported by Tourism NT.

By 2031, it is estimated that Darwin International Airport may enable an estimated $2.6 billion to the NT's GSP from (direct and indirect) visitor spending. This increase in visitation over time will result in a growth in job creation. It is forecast that the tourism market enabled by the airport could create some 19,600 jobs in the NT by 2031, with most of these a result of spending by domestic visitors.

Economic contribution of Darwin International Airport in 2043

The combined contribution from the operations of Darwin International Airport, capital expenditure by the airport, and the activities of the aviation and non-aviation tenants of the airport are significant. It is estimated that activities arising from Darwin International Airport (both aviation related and non-aviation related) could contribute to the overall employment of some 7,400 workers by 2043.

	Aviation business contribution		Non-aviation business contribution		Total business contribution	
	Employment (FTE)	Value-added GSP ($M)	Employment (FTE)	Value-added GSP ($M)	Employment (FTE)	Value-added GSP ($M)
Direct contribution	2,037	483.1	740	77.3	2,777	780.7
Indirect contribution	2,259	470.2	303	65.3	2,563	746.9
Total	**4,296**	**953.2**	**1,044**	**139.5**	**5,340**	**1,527.6**

Table 4-2: Estimated annual economic contribution of Darwin International Airport in 2031 (Source: ACIL Allen)

	Aviation business contribution		Non-aviation business contribution		Total business contribution	
	Employment (FTE)	Value-added GSP ($M)	Employment (FTE)	Value-added GSP ($M)	Employment (FTE)	Value-added GSP ($M)
Direct contribution	2,771	667.1	1,093	113.6	3,865	551.1
Indirect contribution	3,089	654.0	452	92.9	3,541	1,241.9
Total	**5,860**	**1,321.1**	**1,545**	**206.5**	**7,406**	**1,793.0**

Table 4-3: Estimated annual economic contribution of Darwin International Airport in 2043 (Source: ACIL Allen)

The total economic contribution of Darwin International Airport to NT GSP is forecast to grow over the next 20 years and could reach an estimated $1.8 billion in 2043 (in current dollar values). See Table 4-3.

Over the next 20 years, it is anticipated that the airport's contribution to the NT's economy as an enabler of tourism spending will continue to grow. Darwin International Airport could facilitate an estimated $4.2 billion annually in tourism activity by 2043 (in current dollar values) and more than 34,000 tourism jobs.

4.4 Other related activities

RAAF Base Darwin

RAAF Base Darwin, co-located with Darwin International Airport, is a strategically important and enduring Main Airbase and Forward Operating Base. RAAF Base Darwin provides the Australian Government with capabilities for border protection operations, to assist humanitarian relief efforts, to respond to natural disasters, and enables Defence to maintain international engagement with regional allies, specifically hosting extended rotations of the United States Marine Corps Rotational Force – Darwin and United States Air Force Enhanced Air Cooperation. RAAF Base Darwin and associated airbase capabilities must continue supporting current activities, the Joint Forces, Air Combat and Air Mobility operations. The airbase can accommodate a significant surge in personnel to support and enable operations and exercises by Defence and in partnership with allied forces and Indo-Pacific nations and leverages proximity to training grounds in the NT.

Under the 2014 Australia–United States Force Posture Agreement, there are annual deployments of United States Marine Corp aviation elements as well as visiting United States Air Force aircraft.

The Australian Government's Defence Strategic Review was released in April 2023, setting the agenda for reform to Defence's posture and structure. A key priority area identified in response to the review is to improve the ability of the Australian Defence Force to operate from Australia's northern bases.

Supporting freight

In 2020, a $15 million multipurpose freight, training and cold storage facility was opened at Darwin International Airport. National export specialist Pakfresh Handling joined forces with local companies Wyuna Coldstores and G&R Wills as the first tenants of the facility.

The 6250 square metre facility is the largest of its kind in the NT. It includes a vapour heat treatment plant and enables up to 18 tonnes of fresh produce to be exported by plane daily to markets across Asia. The new facility is a 'game changer' for NT exporters, farmers and agribusinesses, with major flow-on benefits allowing local businesses to take advantage of the overseas demand for fresh Australian produce and seafood.

The development of the facility was supported by a Northern Australia Infrastructure Facility loan and a $4 million contribution by the Australian Government's Building Better Regions fund.

Policing

The Northern Territory Police Force Airwing provides aviation services to support police operations. It has 3 Pilatus PC-12 aircraft based at Darwin International Airport.

Border protection

Darwin International Airport is a major base for border protection aircraft, with 24-hour northern Australia surveillance undertaken by Bombardier Dash 8 aircraft.

Freight and cold storage facility

SECTION 5:

Aviation activity forecasts

SECTION 5: **Aviation activity forecasts**

5.1 Introduction

Improving air access across the Northern Territory is one of the objectives of Darwin International Airport's route development strategy. Improved air access creates options not only for passenger markets (such as holiday makers, business travellers, visiting friends and family, and employment), but it improves capacity and capability for air cargo – a key enabler of growth for the NT's agribusiness sector.

Darwin International Airport is a curfew-free gateway to northern Australia, providing domestic, international and general aviation services. The airport is currently served by 7 airlines flying to 12 domestic cities, 3 international destinations, 5 regional ports and 3 major fly-in, fly-out operations (see Figure 5-1). Other regional and remote destinations are served by general aviation operations.

24-hour operations benefit both travellers and airlines. Night flying schedules improve access to Darwin because night flights offer a full day of connections at the other airport. 24-hour operations also mean airlines can fit Darwin flights into airports that are closed by curfews. About 40% of Darwin's seats are flown during night hours.

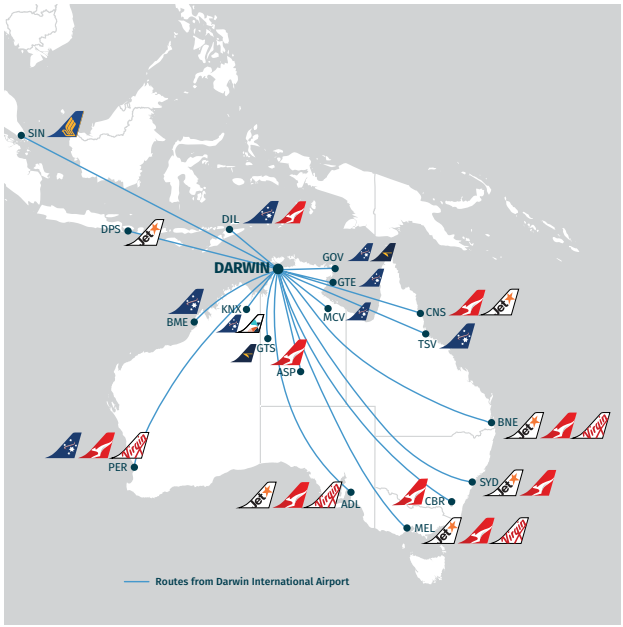


Figure 5-1: Darwin air routes

Darwin International Airport is an important gateway in a growing tourism, trade and travel market between Asia and Australia. Darwin is within narrowbody aircraft range of all of South-East Asian hubs and Australia's main population centres, which are all less than 5 hours away.

5.2 Recent performance

The historical passenger and aircraft movement numbers used in this master plan are sourced from Darwin International Airport's data, unless specified otherwise. These figures may differ marginally from other aviation data sources, such as the Bureau of Infrastructure and Transport Research Economics (BITRE) and Airservices Australia, which may use slightly different criteria for collecting similar information.

Due to Darwin International Airport's relatively small passenger base, adding new air services or suspending existing services has a major impact on growth.

Since the last master plan, the Australian aviation industry has gone through unprecedented volatility – the COVID-19 pandemic, extreme weather events like bushfires and floods, the Russia–Ukraine conflict, constrained aviation sector resources, high jet fuel prices and a high inflationary environment.

Before the pandemic, Darwin International Airport's total annual passenger numbers had been declining, from 2.2 million passengers in 2017 to 2 million in 2019. This was influenced at the time by a slowing resources industry, the winddown of the INPEX Ichthys LNG construction project in Darwin as it reached completion, and the low penetration of domestic and international tourists to the NT.

Of the total passengers passing through Darwin International Airport prior to the pandemic, domestic passengers typically made up 85% and international passengers the remaining 15%.

In 2019, around 73,500 civil aircraft movements arrived and departed from Darwin International Airport. About a third of these were civil passenger aircraft flights operated by airlines equating to just over 22,000 movements. The rest were mainly general aviation flights and a small number of helicopter and freight movements.

Domestic

Of the 2 million travellers that passed through the airport in 2019, some 1.75 million were domestic passengers. It is estimated that 40% of domestic passengers were travelling for business purposes, 30% were travelling for leisure, and 30% to visit friends and relatives.

Darwin's top 5 domestic routes at the time were Brisbane, Sydney, Melbourne, Perth and Adelaide, accounting for over two-thirds of all domestic passengers. Qantas Group (Qantas and Jetstar) accounted for about 60% of all domestic passengers, and Virgin Australia had about 25%.

New domestic routes from Darwin introduced since the last master plan:

- direct flights to Uluru, Canberra and Broome operated by Qantas
- Virgin Australia launched direct flights to Alice Springs, but this finished in early 2020
- Airnorth operated flights to the Gold Coast (via Townsville).

In early 2020, low-cost carrier Tiger Airways ceased operating the Darwin–Brisbane route.

In 2019 there were approximately 19,000 domestic airline movements that arrived and departed from Darwin International Airport. Of these, almost 70% were narrowbody code C aircraft, some 20% were regional jets, and the remainder were turbo prop aircraft. No widebody code E aircraft were used on domestic routes to and from Darwin in 2019.

International

Improvements in aircraft technology have increased the distances aircraft can travel, so the need for some airlines to stop over in Darwin has diminished. This has resulted in the loss of some international carriers, like Philippine Airlines, that used Darwin as a transit between South-East Asia and other Australian ports.

Since the last master plan, international airlines AirAsia Indonesia and Malaysia Airlines have also ceased operating services to Darwin.

In 2018, Donghai Airlines launched a direct service between Darwin and Shenzhen, China. This route between Darwin and mainland China also opened new air freight opportunities. Virgin Australia completed a very successful but short-lived seasonal trial of Darwin to Denpasar, Indonesia, services in 2019 that stimulated the market by more than 50% during the operating period.

By 2019, Jetstar and Jetstar Asia provided almost half of the international seat capacity available at Darwin International Airport (flying to Denpasar and Singapore). SilkAir (now Singapore Airlines) provided 23%, Airnorth 14% and the remainder was made up by Virgin Australia, Donghai Airlines and military charter flights.

Some 275,000 international passengers passed through Darwin International Airport in 2019. It is estimated that 60% of international passengers were travelling for holiday, 20% to visit friends and relatives, and 14% for business.

Of the 3,000 international airline movements arriving and departing Darwin International Airport in 2019, 65% were narrowbody code C aircraft, almost 30% were regional jets, and the remainder were widebody code E aircraft.

Aircraft at Darwin International Airport

5.3 COVID-19 impact

The COVID-19 pandemic has presented a hugely challenging environment for the aviation industry.

In March 2020, the Australian Government responded to the emerging COVID-19 pandemic by closing its international borders inbound for foreign travellers and outbound by Australian citizens and permanent residents. Domestically, state and territory border restrictions (at times combined with local lockdowns of varying lengths) were a key part of the Australian response to managing the crisis through reducing virus transmission.

The NT was vigorous in protecting the health of its vulnerable communities, and Darwin International Airport responded to these state and territory border controls to assist in this protection.

The impact of these border restrictions resulted in passenger volumes falling to extraordinarily low levels, with Darwin International Airport experiencing just 10% of passenger volumes in June 2020 compared to the same month in 2019. The pandemic also had a significant impact on the aviation sector workforce, with the loss of staff and talent across the industry.

Through Australian Government aviation support in the form of the Regional Aviation Network Support (RANS) and Domestic Aviation Network Support (DANS) programs, minimum connections and schedules between Darwin and other domestic ports were able to be maintained. As a result, Darwin International Airport passenger volumes performed relatively well in 2020 and 2021.

Darwin's geographic location and airport infrastructure played a critical role in the Australian Government's efforts to repatriate Australians stranded overseas during the pandemic. Darwin International Airport assisted the Centre for National Resilience with 140 repatriation flights from every inhabited continent. These 2 attributes also made it possible for Qantas to operate direct international services to London and Delhi for a period of time.

5.4 COVID-19 recovery

The COVID-19 pandemic has proven the importance of the airport's diversified portfolio of investment to soften the constant shocks from the aviation sector.

The NT reopened its domestic border in December 2021, and the Australian Government reopened the international border in February 2022. The Australian aviation industry then entered the 'COVID recovery' phase, characterised by an environment free from sudden border closures and fostering steady passenger growth.

Connectivity, capacity and passenger volumes at Darwin International Airport subsequently grew rapidly throughout 2022, with domestic passenger numbers recovering to pre-COVID levels by mid-year.

During this COVID recovery phase at Darwin International Airport, new airline services have been created, some existing services have been suspended and some previous services have not yet returned.

Qantas announced it would base at least 4 Embraer E190 aircraft in Darwin as it set up a new base to service QantasLink routes across Australia: Canberra, Cairns, Townsville and a new international passenger service from Darwin to Dili. The services are part of a 3-year deal with Alliance Airlines, ramping up domestic flights and increased connections and schedules between smaller capital cities and regional centres.

In mid-2023, Nexus Airlines commenced daily flights between Darwin and Kununurra (with connections on to Broome).

International recovery has lagged behind domestic recovery, in line with capacity and the varied response to the pandemic by foreign governments. In early 2022, Jetstar Asia recommenced flights to Denpasar and Singapore, and Singapore Airlines (previously SilkAir) recommenced services to Singapore. Jetstar Asia later exited the Singapore route in August 2022.

5.5 Industry outlook

In the Northern Territory Government's Tourism Industry Strategy 2030, tourism is one of 5 core growth sectors identified in the Economic Development Framework to propel the NT's economy in the long term.

Capacity levels and connections are likely to vary from pre-COVID networks as the aviation industry settles into the 'new normal' influenced by regional population migration, demand for point-to-point travel, work from home, advancement in virtual meeting technologies, the rise in online shopping, and volatility in domestic and global economies.

Furthermore, foreign airlines that have been able to emerge from the pandemic have taken the opportunity to reassess their strategies and operations, which is likely to influence network decisions.

Closer to home, the Australian aviation sector has emerged from COVID-19 with a new independent ultra-low-cost carrier – Bonza – and REX entering the domestic routes now operating commercial jet aircraft.

With the development of the new Western Sydney International (Nancy-Bird Walton) Airport, Brisbane's recently opened third runway, and the proposed development of additional runways at other Australian airports such as Melbourne and Perth, there will be significantly more runway capacity coming online in the years to come and potentially more flights across Australia.

5.6 Aviation forecasts

Forecast approach

The Australian Government recognises that the forecasting of future demand for air transport and commercial growth opportunities is critical to the long-term stability and efficient operation of airports.

The airport master planning process takes 18 months to 2 years. Passenger and aircraft forecasts are developed early in the process so they can be used to develop the master plan. The forecasts for this Darwin International Airport 2023 master plan were prepared in mid-2022.

As with any projection or forecast, forward-looking statements can be uncertain or change.

Forecast methodology

Developing passenger and aircraft movement forecasts for Darwin International Airport involves a number of steps:

- review traffic history to establish the main drivers
- assess relationships between the main drivers and aviation traffic
- develop assumptions for the future of the main drivers
- develop forecasts.

In Darwin, the main drivers are Australian and NT economic and population growth, movements in domestic travel costs and airline capacity developments.

Once the passenger forecasts have been developed, assumptions for average passenger seat factors and aircraft types are used to generate aircraft movement forecasts.

Passenger movements

There is still uncertainty around how the aviation industry will continue to recover from the COVID-19 pandemic, particularly in the short- to medium term. As such, in this master plan, we have taken the approach to refer to future passenger movement forecasts as a range rather than a single figure. We expect there will be more certainty in future forecasts by the time the next master plan is developed (due in 2031).

The 2017 master plan was optimistic in its passenger forecasting, which reflected the buoyant economic conditions in Darwin at the time. As we emerge from the pandemic, Darwin International Airport has taken a more conservative approach to its longer-term growth passenger projections in this 2023 master plan.

Darwin International Airport anticipates total annual passenger volumes are likely to recover to pre-COVID levels between 2023 and 2025. However, international passenger recovery is expected to continue to lag behind domestic recovery.

By 2031 (the 8-year lifespan of this master plan), total annual passenger numbers at Darwin International Airport are predicted to reach between 2.5 and 3.3 million passengers.

In the longer-term, total annual passenger movements (including transit and transferring passengers) may grow to between 3.7 million and 5.5 million passengers by 2043.

This forecasting continues the trend of passenger movements being comprised of approximately 85% domestic passengers and 15% international passengers.

Aircraft movements

For this master plan, a mid-point has been derived from the passenger forecast range to prepare aircraft movement forecasts.

Airlines servicing Darwin International Airport continue to trend away from widebody code E aircraft, instead focussing their operations more on narrowbody code C aircraft. It is expected this trend will continue through the 20-year planning period of the master plan, with any increase in domestic airline demand resulting in more frequent flights by these smaller aircraft rather than up-gauging to larger aircraft.

New generation narrowbody aircraft like the Airbus A321 and Boeing 737 MAX will come into operation in the short-term. These aircraft have a longer range than their predecessors, offering point-to-point opportunities to destinations previously unreachable with narrowbody aircraft.

Total annual airline aircraft movements at Darwin International Airport are projected to reach around 27,000 movements by 2031, potentially growing to 39,000 movements by 2043. Of this figure, domestic airlines are anticipated to make up the majority, some 85% of movements.

General aviation

As identified in previous master plans, the general aviation sector at Darwin International Airport continues to experience entry and exit of industry participants. Since the last master plan, general aviation movements have continued to fluctuate.

In 2019, before the pandemic, some 50,000 general aviation aircraft movements arrived and departed from Darwin International Airport. Total general aviation movements have fluctuated between 43,000 and 53,000 annual movements in the years since the pandemic emerged.

In recent times, general aviation activities have been variable, with growth differing among the categories of general aviation flying (such as flight training, sport and pleasure flying, and aerial work). In the wider NT, total annual flying hours for general aviation activities have fluctuated over the past 10 years, with data from the Bureau of Infrastructure, Transport and Regional Economics (BITRE) indicating some 87,800 hours flown


STOP

in 2019, before the pandemic. The number of general aviation aircraft actively operating in the NT has also fluctuated, with 428 aircraft in 2019.

In comparison, the total general aviation hours flown in the NT decreased by a third the following year due to COVID-19, with 55,700 hours flown in 2020. The number of general aviation aircraft actively operating in the NT also reduced by more than 50 aircraft in 2020. General aviation activity in the NT improved in 2021, with the total flying hours increasing to 63,200 and 407 aircraft operating.

General aviation growth at Darwin International Airport is expected to be limited over the planning period of the master plan, with a small potential increase to around 55,000 movements per year by 2043.

Helicopters

There is a small amount of helicopter activity at Darwin International Airport with the number of movements typically fluctuating each year. For example, in 2019 there were approximately 700 helicopter movements, the equivalent of about 2 flights a day. In comparison, there were 1,300 helicopter flights in 2022.

By 2043 it is anticipated that helicopter movements may increase slightly to 1,500 movements a year, the equivalent of 4 movements a day. These are forecast to be large helicopters servicing resource sector projects (like oil rigs and mining sites) in northern Australia.

Freight

Darwin International Airport is well equipped to support air cargo operations by both narrowbody and widebody aircraft. Our goal is to create a sustainable air freight service offering that:

- improves usable air cargo capacity to target export markets
- supports passenger route development and the growth of the NT economy
- offers a strong commercial proposition for key supply chain stakeholders
- provides value for money for consumers.

In 2019 there were approximately 550 freight aircraft movements at Darwin International Airport.

Limited data is available on total freight carried by air to and from Darwin, particularly on domestic routes. Bureau of Infrastructure, Transport and Regional Economics data shows that before the pandemic, a total of 418 tonnes of freight was carried on international services to and from Darwin in 2019, the equivalent of 6.5 tonnes per week spread evenly across the year. The highest international freight volumes went to Singapore, China, France, the United Kingdom, Indonesia, the Philippines, Timor-Leste and the USA.

Before the pandemic, Airport Development Group (ADG) invested in a purpose-built freight and cold storage facility with direct airside access (see sections 4 and 7). The facility opened in 2020 and houses the only vapour heat treatment plant in the NT, opening new opportunities in export markets.

The pandemic brought unique opportunities to Darwin for dedicated freight activity. As a result of severely restricted air cargo capacity due to passenger aircraft bring grounded (which carry most air freight in the cargo hold) and strict quarantine requirements in other countries, Darwin saw dedicated freight services to Singapore and Hong Kong with Tasman Cargo Airlines and Qantas Freight. For the year ending 30 June 2022, annual freight aircraft movements at Darwin International Airport peaked at almost 2,000 movements. These freight services carried a total of 318 tonnes of international air freight and 12 tonnes of international air mail (data source: BITRE).

In late 2022, Cathay Pacific Cargo started a Boeing 777 seasonal weekly service out of Darwin for 5 weeks called the 'Mango Express'. Each service carried more than 50 tonnes of mangoes to international markets such as Hong Kong, South Korea and Dubai. The mangoes were processed in the vapour heat treatment system at the airport's freight and cold storage facility before export, meeting the strict import protocols of countries such as South Korea.

There is currently one dedicated domestic air freight service to Darwin operated by Toll Group using a containerised 737 narrowbody aircraft. However, a large amount of air freight is typically carried in the cargo hold of passenger aircraft services.

In the short-term it is believed that dedicated freight movements will return to pre-pandemic levels, and will remain fairly constant over the 20-year planning period of the master plan with approximately 550 freight movements a year. It is predicted there will be an equal split between narrowbody and widebody freighter aircraft.

Many freight aircraft are between 30-40 years old and are being replaced by more modern aircraft that are larger. This trend means that the new larger freight aircraft will be able to handle any potential growth in freight demand before extra flights need to be added.

In future, we expect domestic freight will continue to be carried largely in the cargo hold of passenger services and dedicated air freight services. As domestic airline movements increase, so will extra capacity for domestic freight. Darwin International Airport will continue to pursue our strategy to attract air freight service offerings to Darwin.

SECTION 6:

Airport Land Use Plan

SECTION 6: **Airport Land Use Plan**

6.1 Introduction

Darwin International Airport incorporates 311 hectares.

A requirement of the master plan is to specify Darwin International Airport's intentions for its land use and related development of the airport site. The Airport Land Use Plan and land use zones have been developed observing this.

6.2 Land use planning

The airport's lease area is high-value, centrally located land in Darwin. Darwin International Airport is first and foremost an airport for airlines and general aviation operations. Airport land use planning focusses first on preserving adequate land for current and future aviation operations and second on land with commercial potential.

Land use planning is fundamental to an airport master plan, to guide the progressive and orderly development of Darwin International Airport.

Land use planning in the Darwin International Airport 2023 Master Plan:

- ensures there is adequate land for expansion of aviation activity
- clearly separates aeronautical and nonaeronautical uses
- has been developed using terminology and definitions consistent with that used in the NT Planning Scheme where possible, with any variations highlighted
- reflects the significant long-term development potential of the airport
- provides a considerable amount of land for conservation reserves.

6.3 Land use zones

Land use zones for airport land apply to areas on the land use plan shown in Figure 6-1. These are based on known airport land use needs and current market trends. The zoning regime aims to assist and encourage progressive and orderly development of the airport land.

There are 7 land use zones described in this land use plan, categorised into aviation and aviation-related uses, interim uses, and non-aviation uses (see Table 6-1 below).

Category	Land use zone
Aviation and aviation-related uses	Aviation Activities Zone
	Terminal & Facilities Zone
Interim uses	Aviation Reservation Zone
Non-aviation uses	Commercial Zone
	Service Commercial Zone
	Tourist Commercial Zone
	Conservation Zone

Table 6-1: Darwin International Airport land use zones

These 7 land use zone types are consistent with the previous 2017 master plan. The accompanying land use zone tables detailed below have been updated to take a broadly similar format to the NT Planning Scheme 2020 that came into force on 31 July 2020. Each land use zone table is defined by:

- **zone purpose:** describes the intent of the zone
- **desired zone outcomes:** provides guidance on the type and form of development that will contribute to achieving the zone purpose
- **potential land uses:** lists potential uses within the zone
- **development considerations:** identify aspects that may have additional requirements for the potential land use and development of the zone, and provide direction on how a potential land use or development should look or operate.

Non-aviation related land use zones are complementary to the airport's operations and are generally consistent with those land uses in the NT Planning Scheme, with additional uses included that are specific to Darwin International Airport, for example, aviation activity and aviation support facilities.

Potential land uses can proceed through the normal environmental and building control (and major development plan if necessary) processes, except where a specific potential use is denoted as a sensitive development, in which case the process at Section 89A of the Airports Act applies.

Darwin International Airport will apply the potential land uses and interpret all definitions as required for the operation and development of the airport. Any potential land uses that are not specified in a particular land use zone will be assessed on a case-by-case basis, following consideration by Darwin International Airport as to whether the proposed use is consistent with the general theme of the zone and is in keeping with the types of activity listed in the potential land uses of that zone.

Noise-sensitive developments

The land use plan at Figure 6-1 includes the contours of the endorsed joint military–civil 2043 Australian Noise Exposure Forecast (ANEF). The ANEF is a land use planning tool to manage noise-sensitive land uses around the airport. The ANEF is discussed in more detail in Section 13: Aircraft noise management.

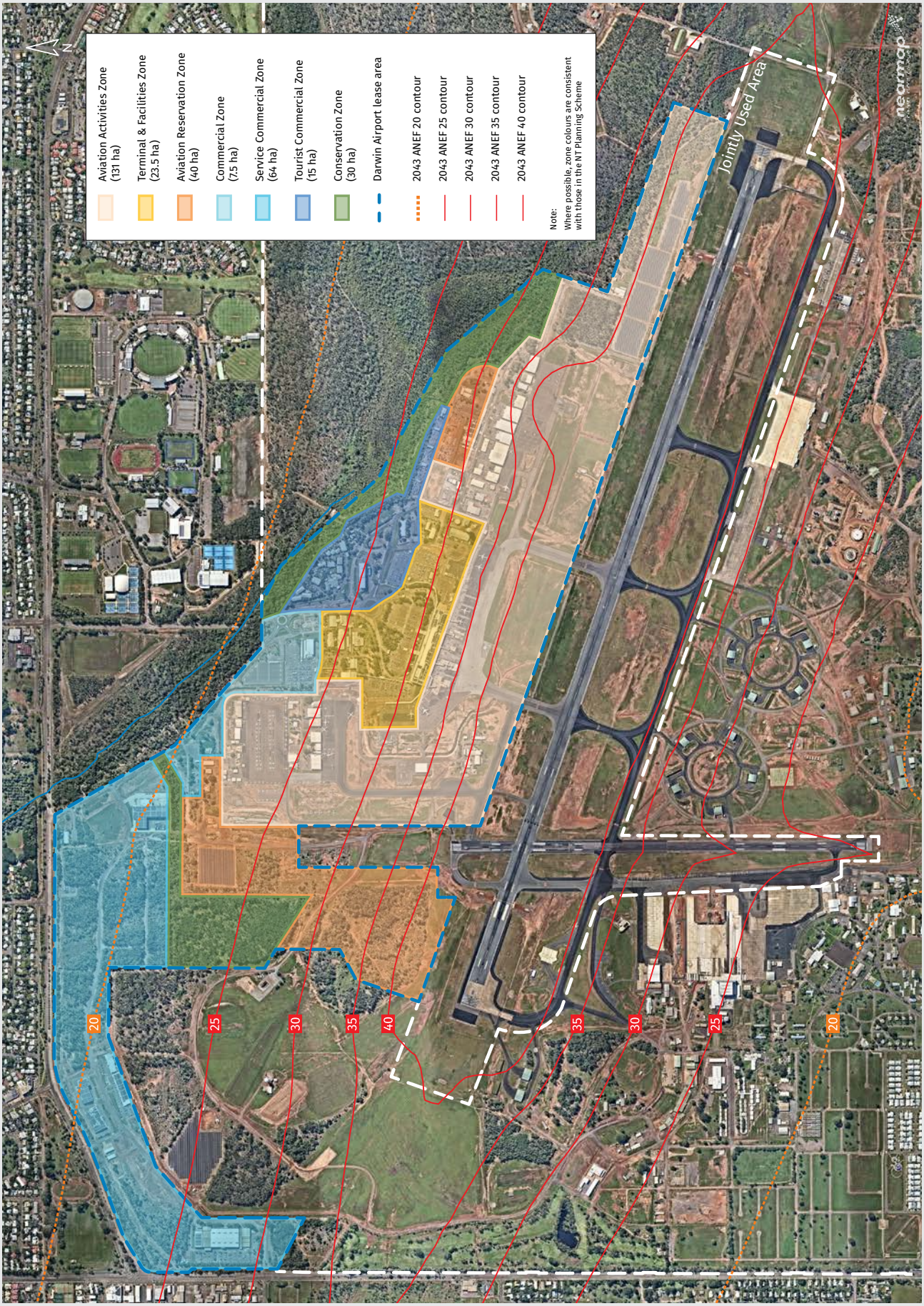
Australian Standard AS2021 Acoustics – Aircraft noise intrusions – building siting and construction (AS2021) provides guidance on the acceptability of new types of development based on the ANEF zone it lies within, deeming it acceptable, conditional or unacceptable (see Table 13-1: Building site acceptability based on ANEF zones). 'Acceptable' means that there is usually no need for any noise control features to be incorporated into the construction. 'Conditional' means that approval may be given if appropriate noise attenuation features can be incorporated in the construction.

For some of the land use zones at Darwin International Airport, more than one ANEF contour applies. For example, the northern half of the Tourist Commercial Zone lies within the 20-25 ANEF zone and the southern half lies within the 25-30 ANEF zone. As a result, the potential land uses listed in the following land use zone tables are intentionally quite broad and must be considered against AS2021 for acceptability.

The location of any potential noise-sensitive developments on-airport (such as childcare centres) will be addressed in line with the ANEF contours and AS2021. Should such a development be considered 'conditional', any noise attenuation issues will be addressed in line with AS2021. Noise-sensitive developments as defined by Guideline A of the National Airports Safeguarding Framework include residential, education establishments, offices, hospitals, aged care, churches, religious activities, theatres, cinemas, recording studios, court houses, libraries and galleries.

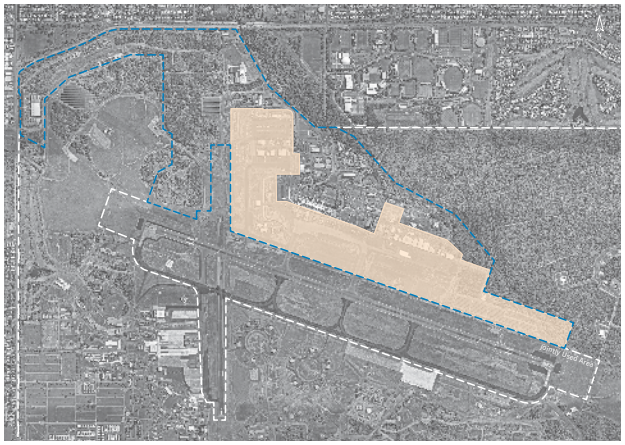
Any development application to the Airport Building Controller must comply with the relevant noise standards.

Figure 6-1: Darwin International Airport Land Use Plan



Aviation and aviation-related uses

Aviation Activities Zone



Zone purpose

Provide for safe, secure and efficient aviation operations of the airport.

Desired zone outcomes

- Provide areas that are essential for aircraft operations and requirements.
- Promote the safe and orderly operation of aircraft and airport facilities in general.
- Facilitate compatible and ancillary uses withing the zone that do not conflict with aviation activities or facilities.
- Accommodate facilities that support safe and efficient aviation operations such as emergency response services and aircraft navigational aids.
- Accommodate aviation support functions such as maintenance, servicing and refuelling.
- Development does not prejudice the safety of efficiency of the airport.

Potential land uses

- animal boarding
- aviation activity
- aviation support facility
- business sign
- car park
- fuel depot
- general aviation and support facilities
- helipad
- heliport
- industry – light (supporting aviation development and operations)
- medical clinic
- navigational aids
- office
- passenger terminal
- place of worship (within passenger terminal)
- promotion sign
- shop
- transport terminal
- utilities and infrastructure

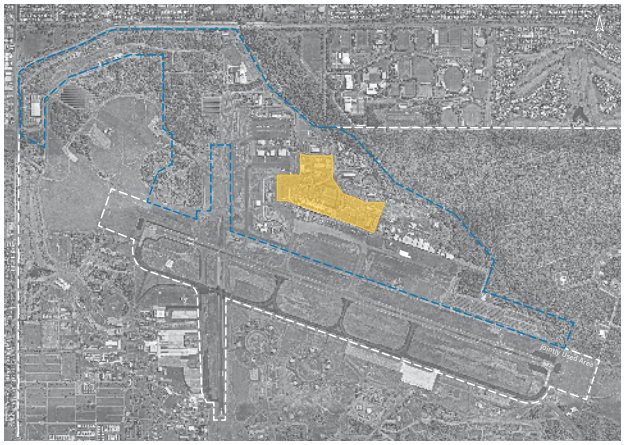
Development considerations

- Development is compliant with aviation standards and relevant regulations.
- Have regard to AS2021 and the endorsed joint military–civil 2043 ANEF.
- Have regard to the National Airports Safeguarding Framework.
- Have regard to the requirements of the *Disability Discrimination Act 1992* (Cth) and *Anti-Discrimination Act 1992* (NT).

Table 6-2: Aviation Activities Zone

Aviation and aviation-related uses

Terminal & Facilities Zone



Zone purpose

Provide for the airport terminal and associated facilities to support the evolving needs of passengers, tourists, airport visitors, the airport workforce and airline partners.

Desired zone outcomes

- Development is to be of a high standard that enhances the amenity of the airport environment, acknowledging the significance of the area as the gateway for arriving and departing passengers.
- Development does not prejudice the safety or efficiency of the airport.
- Buildings provide variety and interest at street level and allow passive surveillance of public spaces, with a scale and character appropriate to the function of the locality.
- Development respects the amenity of the adjacent and nearby uses.
- Ensure that adequate car parking is provided and ground transport facilities and services accommodated for access to and from the airport and terminal.
- Ensure access to the front of the airport terminal building for emergency response vehicles.
- Ensure the connectivity of passengers and visitors between the airport terminal and the hotel/resort (located in the adjacent Tourist Commercial Zone).
- Support compatible and complementary commercial land uses that benefit from proximity to the terminal and aeronautical operations.
- Development is designed to provide clear connections within the airport precinct and to external transport networks and infrastructure to promote accessibility and use.
- Development incorporates appropriate urban and landscape design that creates attractive and functional buildings, streets and places.
- Provide for corridors to accommodate existing and future infrastructure, pedestrian and cycle links, signs, lighting and landscaping.

Potential land uses

- animal boarding
- aviation activity
- aviation support facility
- bar – public
- bar – small
- business sign
- car park
- childcare centre
- food premises – café / takeaway
- food premises – fast food outlet
- food premises – restaurant
- fuel depot
- general aviation and support facilities
- helipad
- heliport
- hotel / motel
- leisure and recreation
- medical clinic
- navigational aids
- office
- passenger terminal
- place of worship (within passenger terminal)
- promotion sign
- service station
- shop
- shopping centre
- transport terminal
- utilities and infrastructure
- vehicle sales and hire

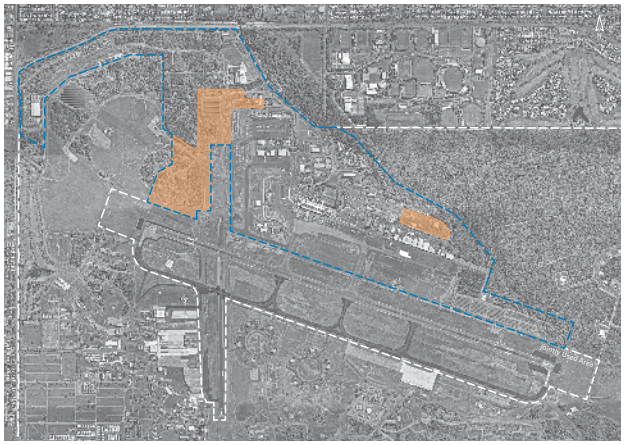
Development considerations

- Development is compliant with aviation standards and relevant regulations.
- Have regard to AS2021 and the endorsed joint military–civil 2043 ANEF.
- Have regard to the National Airports Safeguarding Framework.
- Ensure that sufficient off-street car parking, constructed to a standard and conveniently located, are provided to service the proposed use of a site.
- Provide for the loading and unloading of vehicles associated with the use of land.
- Ensure appropriate landscaping, in accordance with the Darwin International Airport Landscape Master Plan, that is attractive, water efficient and contributes to a safe environment, is provided to all developments to enhance the streetscape and overall amenity to the locality.
- Ensure that new commercial buildings provide sufficient safe, quality and convenient end of trip facilities to enable active travel choices by workers, visitors and customers for the proposed use of the site.
- Have regard to the requirements of the *Disability Discrimination Act 1992* (Cth) and *Anti-Discrimination Act 1992* (NT).

Table 6-3: Terminal and Facilities Zone

Interim uses

Aviation Reservation Zone



Zone purpose

Provide for the potential future expansion of aviation and aviation-related uses, with interim uses accommodated that do not conflict with future aviation and aviation-related uses.

Desired zone outcomes

- Facilitate compatible and ancillary uses that do not conflict with aviation and aviation-related uses or render the land unfit for aviation and aviation-related uses when it is required in future.
- Development does not prejudice the safety or efficiency of the airport.
- Promote community safety in building design, having regard to adjacent and nearby uses.
- Development is designed to provide clear connections within the airport precinct and to external transport networks and infrastructure to promote accessibility and use.
- Provide for corridors to accommodate existing and future infrastructure, pedestrian and cycle links, signs, lighting and landscaping.

Potential land uses

- animal boarding
- aviation activity
- aviation support facility
- bar – public
- bar – small
- business sign
- car park
- car wash
- club
- community centre
- education establishment ('sensitive development' as defined by Section 71A of the Airport Act)
- food premises – café / take away
- food premises – fast food outlet
- food premises – restaurant
- fuel depot
- general aviation and support facilities
- helipad
- warehouse
- heliport
- hotel / motel
- industry – light
- leisure and recreation
- medical clinic
- motor body works
- motor repair station
- navigational aids
- office
- passenger terminal
- place of worship
- plant nursery
- promotion sign
- rooming accommodation
- service station
- shop
- short-stay accommodation
- showroom sales
- transport terminal
- utilities and infrastructure
- vehicle sales and hire
- veterinary clinic

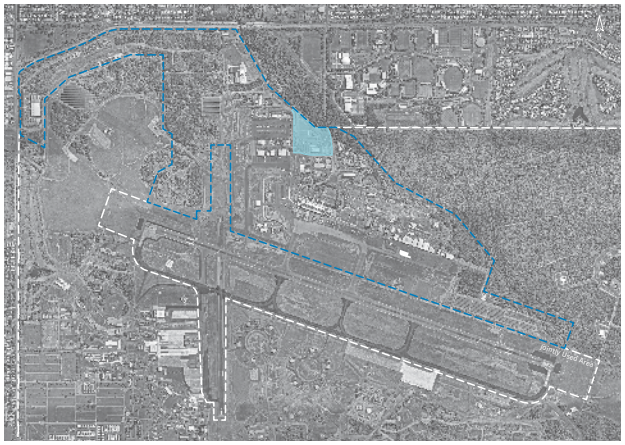
Development considerations

- Development is compliant with aviation standards and relevant regulations.
- Have regard to AS2021 and the endorsed joint military–civil 2043 ANEF.
- Have regard to the National Airports Safeguarding Framework.
- Ensure that sufficient off-street car parking, constructed to a standard and conveniently located, are provided to service the proposed use of a site.
- Provide for the loading and unloading of vehicles associated with the use of land.
- Where appropriate, ensure landscaping, in accordance with the Darwin International Airport Landscape Master Plan, that is attractive, water efficient and contributes to a safe environment, is provided to all developments to enhance the streetscape and overall amenity to the locality.
- Ensure that new commercial buildings provide sufficient safe, quality and convenient end of trip facilities to enable active travel choices by workers, visitors and customers for the proposed use of the site.
- Have regard to the requirements of the *Disability Discrimination Act 1992* (Cth) and *Anti-Discrimination Act 1992* (NT).

Table 6-4: Aviation Reservation Zone

Non-aviation uses

Commercial Zone



Zone purpose

Provide for a range of business, office and retail activities as well as community uses.

Desired zone outcomes

- Encourage a diversity of commercial activities that would benefit from a gateway location in close proximity to the airport and its terminal area.
- Development does not prejudice the safety or efficiency of the airport.
- Development respects the amenity of the adjacent and nearby uses.
- Buildings provide variety and interest at street level and allow passive surveillance of public spaces, with a scale and character appropriate to the commercial function of the locality.
- Development is designed to provide clear connections within the airport precinct and to external transport networks and infrastructure to promote accessibility and use.
- Development incorporates appropriate urban and landscape design that creates safe and functional buildings, streets and places.
- Developments are operated in a manner to ensure that there is no unreasonable loss of amenity for surrounding premises, having regard to the mixed nature of the zone.
- Provide for corridors to accommodate existing and future infrastructure, pedestrian and cycle links, signs, lighting and landscaping.
- Development avoids or minimises adverse impacts on ecologically important areas such as Rapid Creek through location, design, operation and management.

Potential land uses

- bar – public
- bar – small
- business sign
- car park
- car wash
- childcare centre
- club
- community centre
- exhibition centre
- food premises – café / take away
- food premises – fast food outlet
- food premises – restaurant
- hotel / motel
- leisure and recreation
- market
- medical clinic
- motor repair station
- navigational aids
- office
- passenger terminal
- place of assembly
- place of worship
- plant nursery
- promotion sign
- rooming accommodation
- service station
- shop
- shopping centre
- showroom sales
- utilities and infrastructure
- vehicle sales and hire
- veterinary clinic

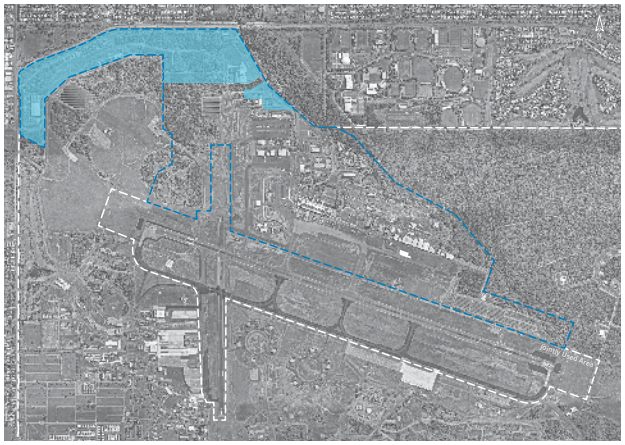
Development considerations

- Development is compliant with aviation standards and relevant regulations.
- Have regard to AS2021 and the endorsed joint military–civil 2043 ANEF.
- Have regard to the National Airports Safeguarding Framework.
- Ensure that sufficient off-street car parking, constructed to a standard and conveniently located, are provided to service the proposed use of a site.
- Provide for the loading and unloading of vehicles associated with the use of land.
- Ensure appropriate landscaping, in accordance with the Darwin International Airport Landscape Master Plan, that is attractive, water efficient and contributes to a safe environment, is provided to all developments to enhance the streetscape and overall amenity to the locality.
- Ensure that new commercial buildings provide sufficient safe, quality and convenient end of trip facilities to enable active travel choices by workers, visitors and customers for the proposed use of the site.
- Have regard to the requirements of the *Disability Discrimination Act 1992* (Cth) and *Anti-Discrimination Act 1992* (NT).

Table 6-5: Commercial Zone

Non-aviation uses

Service Commercial Zone



Zone purpose

Facilitate destination retailing, commercial and other activities that individually require a large floor area for the handling, display and storage of bulky goods, or activities.

Desired zone outcomes

- Encourage a diversity of service commercial activities that consist predominantly of retail business activities.
- Support a mix of complementary activities thar are compatible with and are of such a kind that will not adversely affect the amenity of the service commercial function of the area.
- Development does not prejudice the safety or efficiency of the airport.
- Buildings provide variety and interest at street level and allow passive surveillance of public spaces, with a scale and character appropriate to the function of the locality.
- Development respects the amenity of the adjacent and nearby uses.
- Development should be designed in such a way to protect the amenity of the adjoining or nearby residences on McMillans Road.
- Development is designed to provide clear connections within the airport precinct and to external transport networks and infrastructure to promote accessibility and use.
- Development incorporates appropriate urban and landscape design that creates safe and functional buildings, streets and places.
- Developments are operated in a manner to ensure that there is no unreasonable loss of amenity for surrounding premises, having regard to the mixed nature of the zone.
- Provide for corridors to accommodate existing and future infrastructure, pedestrian and cycle links, signs, lighting and landscaping.

Potential land uses

- animal boarding
- bar – public
- bar – small
- business sign
- car park
- car wash
- childcare centre
- club
- community centre
- education establishment ('sensitive development' as defined by Section 71A of the Airport Act)
- food premises – café / take away
- food premises – fast food outlet
- food premises – restaurant
- hotel / motel
- industry – light
- leisure and recreation
- medical clinic
- motor body works
- motor repair station
- navigational aids
- office
- passenger terminal
- place of worship
- plant nursery
- promotion sign
- rooming accommodation
- service station
- shop
- shopping centre
- short-stay accommodation
- showroom sales
- transport terminal
- utilities and infrastructure
- vehicle sales and hire
- veterinary clinic
- warehouse

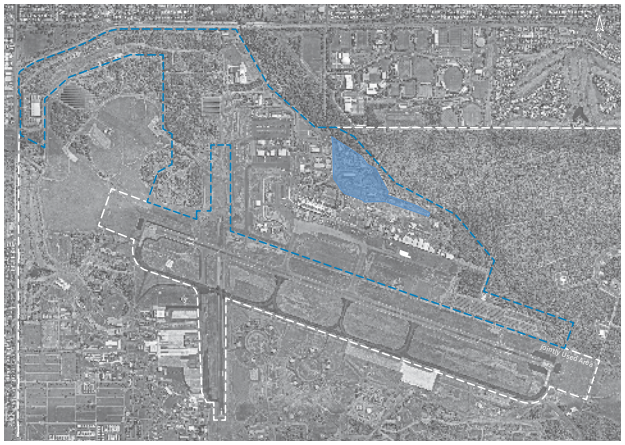
Development considerations

- Development is compliant with aviation standards and relevant regulations.
- Have regard to AS2021 and the endorsed joint military–civil 2043 ANEF.
- Have regard to the National Airports Safeguarding Framework.
- Have regard to a landscaping corridor abutting Bagot and McMillans roads and extending from Osgood Drive to Charles Eaton Drive.
- Ensure that sufficient off-street car parking, constructed to a standard and conveniently located, are provided to service the proposed use of a site.
- Provide for the loading and unloading of vehicles associated with the use of land.
- Ensure appropriate landscaping, in accordance with the Darwin International Airport Landscape Master Plan, that is attractive, water efficient and contributes to a safe environment, is provided to all developments to enhance the streetscape and overall amenity to the locality.
- Ensure that new commercial buildings provide sufficient safe, quality and convenient end of trip facilities to enable active travel choices by workers, visitors and customers for the proposed use of the site.
- Have regard to the requirements of the *Disability Discrimination Act 1992* (Cth) and *Anti-Discrimination Act 1992* (NT).

Table 6-6: Service Commercial Zone

Non-aviation related uses

Tourist Commercial Zone



Zone purpose

Facilitate commercial development that caters for the needs of visitors, supports tourism activities and is of a scale and character compatible with the surrounding environment.

Desired zone outcomes

- Encourage a mix of uses focused on providing services to tourism that would benefit from a location in close proximity to the airport and its terminal area.
- Allow for complementary commercial and community uses where the nature of the activity does not compromise the primary use of the locality for tourist commercial activities.
- Development does not prejudice the safety or efficiency of the airport.
- Buildings provide variety and interest at street level and allow passive surveillance of public spaces, with a scale and character appropriate to the function of the locality.
- Development respects the amenity of the adjacent and nearby uses.
- Development is designed to provide clear connections within the airport precinct and to external transport networks and infrastructure to promote accessibility and use.
- Development incorporates appropriate urban and landscape design that creates safe and functional buildings, streets and places.
- Ensure that development avoids or minimises adverse impacts on ecologically important areas such as Rapid Creek through location, design, operation and management.
- Ensure the connectivity of passengers and visitors between the hotel/resort and the airport terminal (located in the adjacent Terminal and Facilities Zone).
- Provide for corridors to accommodate existing and future infrastructure, pedestrian and cycle links, signs, lighting and landscaping.

Potential land uses

- bar – public
- bar – small
- business sign
- car park
- car wash
- caravan park
- childcare centre
- club
- community centre
- exhibition centre
- food premises – café / take away
- food premises – fast food outlet
- food premises – restaurant
- hotel / motel
- leisure and recreation
- medical clinic
- navigational aids
- office
- passenger terminal
- place of assembly
- place of worship
- plant nursery
- promotion sign
- rooming accommodation
- service station
- shop
- short-stay accommodation
- utilities and infrastructure
- vehicle sales and hire

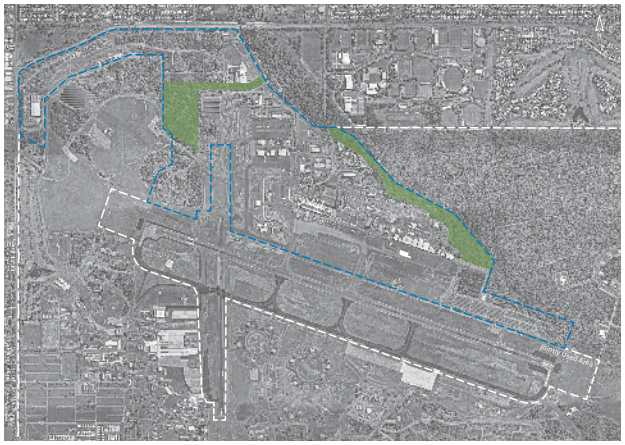
Development considerations

- Development is compliant with aviation standards and relevant regulations.
- Have regard to AS2021 and the endorsed joint military–civil 2043 ANEF.
- Have regard to the National Airports Safeguarding Framework.
- Ensure that sufficient off-street car parking, constructed to a standard and conveniently located, are provided to service the proposed use of a site.
- Provide for the loading and unloading of vehicles associated with the use of land.
- Ensure appropriate landscaping, in accordance with the Darwin International Airport Landscape Master Plan, that is attractive, water efficient and contributes to a safe environment, is provided to all developments to enhance the streetscape and overall amenity to the locality.
- Ensure that new commercial buildings provide sufficient safe, quality and convenient end of trip facilities to enable active travel choices by workers, visitors and customers for the proposed use of the site.
- Have regard to the requirements of the *Disability Discrimination Act 1992* (Cth) and *Anti-Discrimination Act 1992* (NT).

Table 6-7: Tourist Commercial Zone

Non-aviation related uses

Conservation Zone



Zone purpose

Conserve and protect the flora, fauna and character of natural areas within the airport land.

Desired zone outcomes

- Conservation space responds to and conserves the recognised environmental values of the land.
- Development, including access for informal recreation, is sensitive to the natural features and habitats of the land, and located and operated to have minimal impact on the environment.
- Development that is complementary to and supports the conservation values of natural areas may be established if of a scale and intensity that does not adversely impact on the amenity or environment.
- Development is located, designed and managed to:
  - conserve ecologically important areas and other natural features of the land and the setting
  - maintain the scenic value and visual quality of the area
  - be sympathetic and respectful to places of cultural significance
  - minimise excavation and filling and other changes to landform
  - minimise soil erosion and adverse impacts on water quality
  - wherever possible, use existing cleared and degraded areas for the placement of buildings and related works.
- Development provides for a limited range of infrastructure and services that are commensurate with the protection of the conservation values of the land and incorporates a high quality of built form and landscape design.
- Development does not prejudice the safety or efficiency of the airport.

Potential land uses

- business sign
- food premises – café / take away
- food premises – restaurant
- navigational aids
- shop
- utilities and infrastructure

Development considerations

- Development is compliant with aviation standards and relevant regulations.
- Have regard to AS2021 and the endorsed joint military–civil 2043 ANEF.
- Have regard to the National Airports Safeguarding Framework.
- Have regard to the biodiversity and conservation objectives, management measures and initiatives outlined in the airport's environment strategy (see Section 14.6).
- Ensure that the clearing of native vegetation does not unreasonably contribute to environmental degradation of the locality.
- Avoids impacts on environmentally significant or sensitive vegetation.
- Have regard to the 'Land Subject to Flooding' overlay in the NT Planning Scheme.
- Have regard to the requirements of the *Disability Discrimination Act 1992* (Cth) and *Anti-Discrimination Act 1992* (NT).

Table 6-8: Conservation Zone

6.4 Changes from 2017 Master Plan

The Land Use Plan for Darwin International Airport remains largely unchanged from the previous master plan. Adjustments have been made primarily to the Tourist Commercial Zone and as such to some of the zones immediately adjacent to it (see Figure 6-2).

The boundaries of the Tourist Commercial Zone, Terminal & Facilities Zone, and Commercial Zone along Henry Wrigley Drive have been adjusted to mirror the recent realignment of the road.

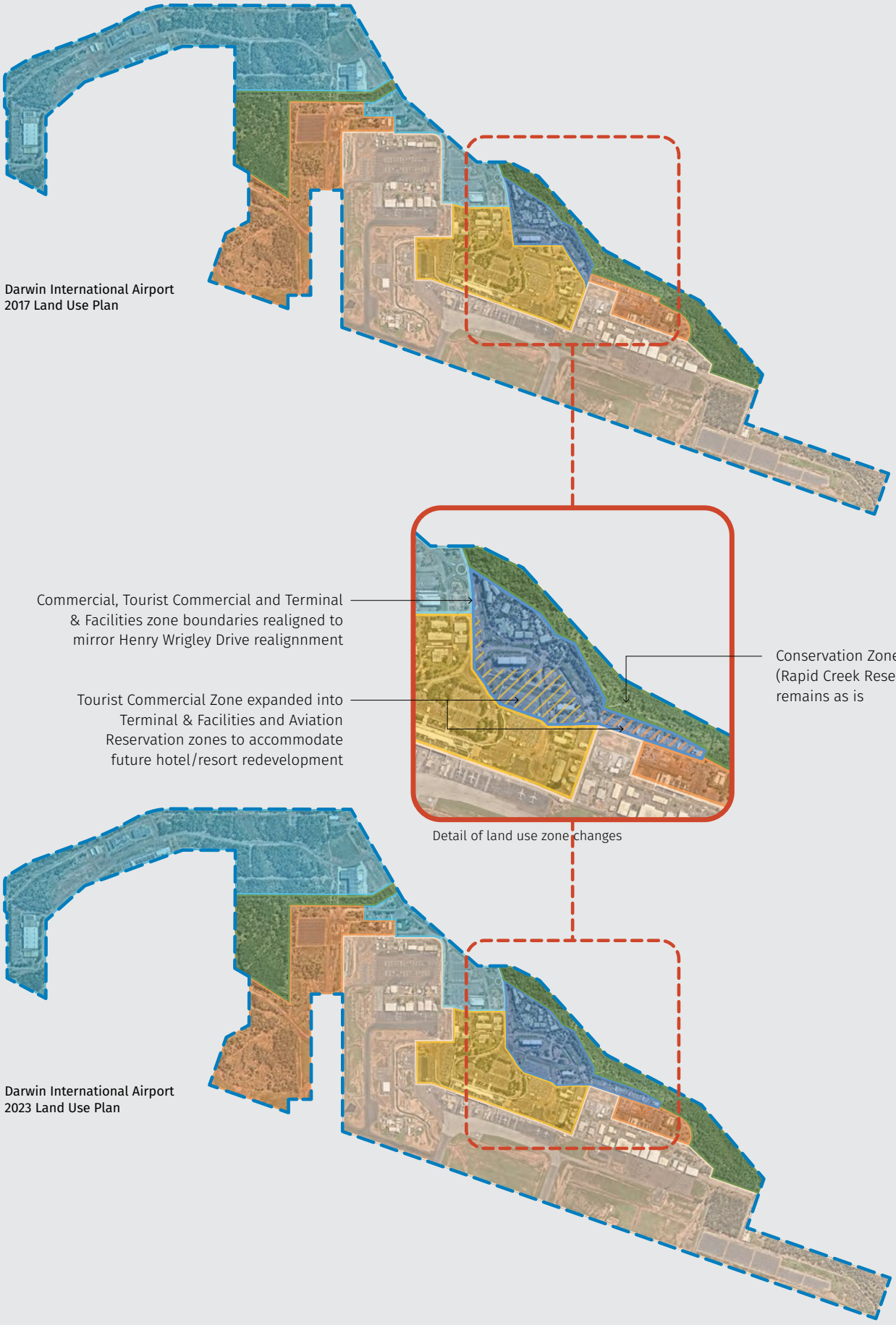
The Tourist Commercial Zone has been expanded to the south (into the Terminal & Facilities Zone) and to the east (into the Aviation Reservation Zone) to accommodate potential future redevelopment and growth of the hotel/resort precinct. The adjacent Conservation Zone of Rapid Creek Reserve remains as is.

A summary of the changes in area to the land use zones is shown in Table 6-9 below.

Category	Land use zone	Area in 2017 master plan		Area in 2023 master plan	
		Area (hectares)	Total area of airport	Area (hectares)	Total area of airport
Aviation and aviation-related uses	Aviation Activities Zone	131 ha	42%	131 ha	42%
	Terminal & Facilities Zone	28 ha	9%	23.5 ha	8%
Interim uses	Aviation Reservation Zone	42 ha	14%	40 ha	13%
Non-aviation uses	Commercial Zone	8 ha	2.5%	7.5 ha	2%
	Service Commercial Zone	64 ha	20%	64 ha	20%
	Tourist Commercial Zone	8 ha	2.5%	15 ha	5%
	Conservation Zone	30 ha	10%	30 ha	10%

Table 6-9: Land use zone area comparison

Figure 6-2: Comparison between 2023 Land Use Plan and 2017 Land Use Plan



6.5 Sensitive developments

Several of the land use zones have potential land uses that are considered sensitive developments under the Airports Act.

The Airports Act defines a sensitive development as the development of, or a redevelopment that increases the capacity of, any of the following:

- a residential dwelling
- a community care facility
- a pre-school
- a primary, secondary, tertiary or other educational institution
- a hospital.

A sensitive development does not include:

- an aviation educational facility
- accommodation for students studying at an aviation educational facility at the airport
- a facility with the primary purpose of providing emergency medical treatment and that does not have in-patient facilities
- a facility with the primary purpose of providing inhouse training to staff of an organisation conducting operations at the airport.

Sensitive developments cannot proceed without exceptional circumstances being demonstrated and the major development plan process followed (where the land use was to occur on the airport lease).

Section 71A of the Airports Act requires that the master plan identify any potential sensitive developments. Within the Aviation Reservation and Service Commercial zones, 'education establishment' is included as a potential land use.

There are no specific proposals identified in this master plan for the future development of any sensitive developments at Darwin International Airport.

6.6 Building and development approvals

Building activity at Darwin International Airport is subject to statutory controls under the Airports Act and the Airports (Building Control) Regulations 1996. The federal Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA) oversees land use planning and building activity at the airport.

The Airport Building Controller is appointed under Commonwealth law to administer the airport building control regime to ensure activities at Darwin International Airport meet the appropriate building and engineering standards. All construction and building activities must be notified to the Airport Building Controller.

Darwin International Airport's consent (as the airport lessee company) is needed before the Airport Building Controller can approve any of these activities. Darwin International Airport reviews building activity applications to:

- ensure the proposal is consistent with the airport master plan
- ensure the development is consistent with its planning objectives
- assess the proposal's impact on airport infrastructure and the operations.

Darwin International Airport can also impose appropriate conditions on building activities. The approval of the 2023 master plan does not automatically confer approval on subsequent major developments. The Airports Act requires that certain developments must undergo a major development plan process, which is subject to ministerial approval.

SECTION 7:

Airfield Development Plan

SECTION 7: **Airfield Development Plan**

7.1 Introduction

The airfield at Darwin International Airport consists of runways, taxiways and aircraft parking areas. The master plan provides for further development of the airfield to ensure it can efficiently handle the forecast aircraft traffic.

Under the Joint User Deed, the Department of Defence is responsible for operating and maintaining the runway and taxiway system within the Jointly Used Area.

Darwin International Airport is a counter-terrorist first response airport, and therefore, stringent security requirements must be met by both the airport operator and businesses that work at the airport. All activities at the airport are subject to the security controls detailed in the *Aviation Transport Security Act 2004* and Regulations along with Darwin International Airport's Transport Security Program.

Planning standards

Civil aerodrome planning for Darwin International Airport adheres to Civil Aviation Safety Regulations 139 (CASR 139) and CASA Part 139 (Aerodromes) Manual of Standards 2019 (called MOS 139). MOS 139 is prepared by CASA and is the Australian document that sets out the regulatory requirements for aerodromes.

MOS 139 follows accepted International Civil Aviation Organisation (ICAO) methodology of using a code system known as the Aerodrome Reference Code to specify the standards for aerodrome facilities that are suitable for use by aeroplanes within a range of performances and sizes. The code is based on the characteristics of an aircraft (not the airport) and is composed of 3 elements:

- a **code number** indicates the runway type and is related to the length of the runway (see Table 7-1)
- a **code letter** relates to the aeroplane wingspan and outer main gear wheel span. The planning of aprons and taxiways is largely based on this element (see Table 7-2)
- the **outer main gear wheel span**, applicable to both runways and taxiways (see Table 7-3).

Design aircraft

In the master plan, we use the concept of 'design aircraft' to guide the planning and development of our aerodrome facilities, like runways and taxiways. The 'design aircraft' is the main type of aircraft likely to use the airport in the future.

In the master plan, we use a different 'design aircraft' for each runway:

- Runway 11/29: this is the airport's main runway, and its design aircraft is a Code 4E aircraft. This allows for large long-haul wide body aircraft like KC30, B52, B777 and A330 aircraft types that can carry more than 300 people.
- Runway 18/36: the design aircraft for the airport's secondary runway is a Code 2C aircraft. This allows for E120, Q300, SF340 aircraft and general aviation aircraft types.

Code number	1	2	3	4
Aeroplane reference field length	Less than 800m	Not less than 800m	Not less than 1200m	Not less than 1800m

Table 7-1: Code element 1 – code number

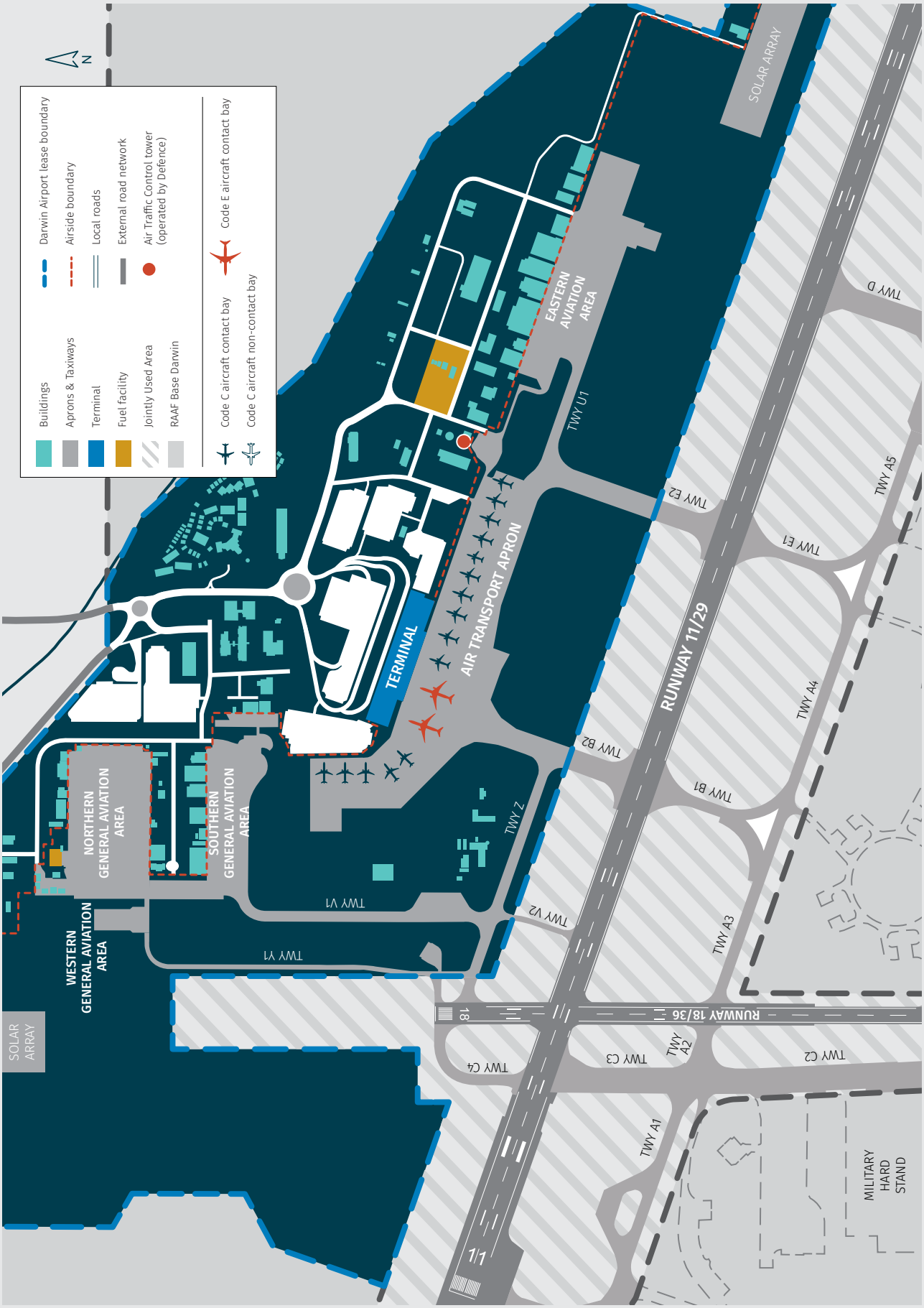
Code letter	A	B	C	D	E	F
Wingspan	Up to but not including 15m	15m up to but not including 24m	24m up to but not including 36m	36m up to but not including 52m	52m up to but not including 65m	65m up to but not including 80m

Table 7-2: Code element 2 – code letter

	OMGWS			
Outer main gear wheel span (OMGWS)	OMGWS up to but not including 4.5m	OMGWS 4.5m up to but not including 6m	OMGWS 6m up to but not including 9m	OMGWS 9m up to but not including 15m

Table 7-3: Code element 3 – outer main gear wheel span

Figure 7-1: Darwin International Airport 2023 current airfield layout



Darwin International Airport is capable of accepting the largest Code F aircraft (e.g. Airbus A380) typically as cargo operations or airline diversions in the case of passenger illness or engineering problems during flight. Although it is not expected that Code F aircraft will operate regularly into Darwin, there continue to be Code F diversions and cargo operations.

7.2 Existing airfield configuration

Darwin International Airport's existing airfield layout is shown in Figure 7-1.

Runways

The runway system at the airport consists of 2 intersecting runways, owned by the Australian Government Department of Defence. The dimensions and distances of these runways are given in Table 7-4 below.

Runways are named using a numbering system between 01 and 36, which reflects the orientation of the runways relative to the degrees on a compass. For example, runway 11 points to the south east (110°) and runway 29 points to the north west (290°).

A runway can be used in both directions and has a different name for each end, with the 2 numbers always differing by 18 (180°). The entire runway is named with both numbers: e.g. runway 11/29.

The speed and direction of the wind is a main factor in determining which runways are used at any given time. Aircraft typically take-off and land into the wind. Based on the wind direction, air traffic control will decide which runway is to be used.

Main runway (11/29)

The main runway, with an orientation of 11/29, is 3,354 metres long and 60 metres wide and is contained within a 300-metre-wide runway strip. Work is scheduled to commence in 2023 to resurface the main runway. The Department of Defence will lead these necessary and planned works. As part of this project, the runway width is to be reduced from 60 metres to 45 metres.

Amendments to MOS 139 in 2019 reduced the required runway strip width of Code 4 runways from 300 metres to 280 metres; however, Darwin International Airport has chosen to 'grandfather' the existing 300-metre runway strip width.

The runway is a flexible construction, and the central 45 metre portion is grooved.

The runway is an 'instrument' runway, with a Category 1 instrument landing system (ILS) installed on runway 29. An ILS is a highly accurate radio signal navigation aid consisting of 2 antennas that transmit signals to receivers in the aircraft cockpit – a glide path next to the runway at the eastern end and a localiser at the western end. These antennas give the pilot vertical and horizontal guidance when landing in low visibility. An ILS is not used by departing aircraft. The ILS at Darwin International Airport increases the use of runway 29 because it is used as the primary runway in poor weather conditions or when wind direction allows.

Runway 29 is equipped with a high intensity approach lighting (HIAL) system–CAT I. This helps pilots using a precision instrument approach (for example, the ILS) to smoothly change from flying the aircraft with instruments to visually.

Runway direction	Length (M)	Width (M)	Take-off run available (M)	Take-off distance available (M)	Accelerated stop distance available (M)	Landing distance available (M)
11	3,354	60*	3,354	3,444	3,354	3,354
29	3,354	60*	3,354	3,444	3,354	3,354
18	1,524	30	1,524	1,584	1,524	1,524
36	1,524	30	1,524	1,584	1,524	1,524

* The width of runway 11/29 will be reduced from 60 metres to 45 metres as part of the resurfacing works scheduled to commence in 2023.

Table 7-4: Runway data

The main runway is also fitted with a 6-stage high intensity runway edge and threshold lighting system, which gives pilots visual guidance for aircraft approaching and departing. A precision approach path indicator (PAPI) also services both ends of the runway.

Land and hold short operations (LAHSO) are available on runway 29 to allow continuous use of runway 18/36. LAHSO is a procedure where dependent operations are conducted on 2 intersecting runways - aircraft land and depart on one runway while aircraft landing on the other runway hold short of the intersection. LAHSO occurs predominantly on runway 29 and is rarely used on runway 36.

The runway is equipped with a retractable cable arrestor system at both ends, designed for specific military aircraft and is not used by civil aircraft.

In August 2023, Defence commenced essential works to resurface the main runway. Runway resurfacing is a standard aviation infrastructure maintenance requirement. The resurfacing has been scheduled in a staged manner to minimise disruption to airline schedules and the community. It is anticipated to be completed by late 2024.

Cross runway (18/36)

The cross runway has an orientation of 18/36 and is 1524 metres long and 30 metres wide. It is contained within a 90-metre-wide runway strip and is supported by a non-precision RNAV-Z (GNSS) approach to runway 36.

Amendments to MOS Part 139 in 2019 increased the required runway strip width of Code 2 non-precision instrument runways from 90m metres to 140m metres; however, Darwin International Airport has chosen to 'grandfather' the existing 90-metre runway strip width.

Civil use of this runway is mostly general aviation movements. Runway 18/36 is mostly used for take-offs on runway 18 and landings on runway 36.

Runway 18/36 is used by aircraft up to Dash 8-400 (Code 3, subject to outer main gear wheel span limitations) and other Code 2 aircraft, as well as some Code 3 turbo-prop aircraft such as Dash 8-300, E120 and Saab 340.

The main benefit provided by the cross runway is for lower performance general aviation aircraft when there is a strong crosswind on runway 11/29, and for emergency landings when the main runway is unavailable.

General aviation aircraft on runway 11

Helicopters

A heliport is located at the east end of taxiway U.

Taxiways

Airport runways are supported by a system of 'taxiways': routes aircraft can 'taxi' along as they move to or from a runway. These taxiways help the aircraft move efficiently between the runways and aircraft parking areas.

Planning for taxiways and aprons is largely based on the code letter of the Aerodrome Reference Code. Each code letter represents aircraft grouped in accordance with their wingspan and outer main gear wheel. Table 7-5 details the taxiways at Darwin International Airport.

Aircraft parking

'Aprons' are areas aircraft park in, and the parking position is known as an aircraft stand (or bay). These apron areas are also used for aircraft servicing activities such as baggage, freight, refuelling and flight catering. A variety of ground support equipment (GSE) operated by third parties is used on the apron to service aircraft between flights, such as baggage carts, mobile stairs and belt loaders to load baggage onto aircraft.

There are 5 aprons at Darwin International Airport that accommodate a full range of aircraft types and operations: the air transport apron and 4 general aviation aprons.

Users of the airport (such as aircraft operators) are subject to the airport's Condition of Use document.

Taxiway	Width / aircraft code	Pavement classification number (PCN) / restrictions	Responsibility / leased areas
A1-6	23m + 3m shoulder	PCN 81. Parts of taxiway unavailable for use by civil aircraft when Bomber Replenishment Apron (BRA) or Fighter Replenishment Apron (FRA) are occupied by armed aircraft. This may require backtracking on Runway 11/29.	Jointly Used Area
B1	23m + 3m shoulder	PCN 81	Jointly Used Area
B2	23m + 10.5m shoulders	PCN 81	Darwin International Airport
C1	Varies 15m to 23m	PCN 81, refer Note 1	Jointly Used Area
C2	23m + 13m shoulder eastern side	PCN 81, refer Note 1	Jointly Used Area
C3	23m + 14m shoulders	PCN 81, refer Note 1	Jointly Used Area
C4	23m	PCN 81, refer Note 1	Jointly Used Area
D	23m + shoulders varying between 3m and 12m	PCN 81	Jointly Used Area
E1	23m + 3m shoulder	PCN 81	Jointly Used Area
E2	23.0m + 10.5m shoulders	PCN 81	Darwin International Airport
U1	15.0m	MTOW 60,000kg refer Note 2	Darwin International Airport
U2	15.0m	MTOW 60,000kg	Darwin International Airport
V1	15.0m + 3.0m shoulders	MTOW 22,000kg	Darwin International Airport
V2	11.0m	MAX wingspan 24m	Darwin International Airport
Y1	9.0m	MTOW 5,700kg, MAX wingspan 15m	Darwin International Airport
Z	15m + 3.5m shoulders	MTOW 22,000kg, MAX wingspan 35.8m	Darwin International Airport

Notes

1. Taxiway C is west of and runs parallel to runway 18/36 and also provides access for heavy aircraft to the military apron areas.; Taxiway C4 is on the northern side of runway 11/29, providing access to runway 18/36 and is not marked with taxiway edge lines.
2. Taxiway U1 east of taxiway U2 is restricted to helicopter only (fixed-wing operations allowed with Darwin International Airport approval).

Table 7-5: Taxiway data

Air transport apron

The air transport apron is located in front of the airport terminal and is used for scheduled airline traffic. It can accommodate up to 17 large aircraft in various combinations. All parking bays on the air transport apron are 'common user', which means any airline can use them.

All of the aircraft parking bays on the air transport apron are 'contact' bays. This means the aircraft parking bays are connected to the terminal by either an aerobridge or a walkway:

- bays 1 to 5 are connected by aerobridges to the terminal
- bays 7 to 12 and bays 21 to 25 are connected by covered external walkways to the terminal

Bays 1 and 2 can accommodate code E aircraft, and bay 3 can accommodate code D aircraft. The remaining bays can accommodate code C aircraft. Code C aircraft can also be parked on bays 1, 2 and 3.

Bays 1, 2 and 5 have 'apron drive' aerobridges, while bays 3 and 4 are equipped with 'fixed T head' aerobridges. Darwin International Airport is undertaking a replacement program for the aerobridges on bays 2, 3 and 4, as well as replacing the link between the aerobridge and the terminal on bay 1. The new aerobridges will include pre-conditioned air units that use the airport's generated solar energy to pump cool air into parked aircraft, such as when passengers are boarding and disembarking.

Bays 1 to 8 and bays 21 to 25 are equipped with fuel hydrants.

General aviation

General aviation refers to all parts of the aviation industry that engage in activities other than scheduled commercial airline activity. It includes charter operations, aeromedical operations, agricultural aviation businesses, aviation-based fire-fighting services, and training and aerial work like aerial photography and surveying. It also includes private, business, recreational and sports aviation activity and supporting businesses, such as maintenance providers.

General aviation areas at Darwin International Airport comprise around 89,000 square metres of hangar space and 74,000 square metres of aircraft parking space. Around 30 businesses and a number of individuals operate from these facilities.

General aviation operations at Darwin International Airport are clustered into 4 distinct areas:

- an area to the north of Slade Court bounded by Murphy Road – known locally as the **northern general aviation area**
- an area directly to the west of the northern general aviation area – known locally as the **western general aviation area**
- an area to the south of Slade Court and to the east of land reserve by the Department of Defence for a possible extension of runway 18/36 – known locally as the **southern general aviation area**
- an area to the east of the passenger terminal, bounded by Lancaster Road and beyond that by the Rapid Creek Reserve – known locally as the eastern aviation area.

Northern general aviation area

The northern general aviation area apron is a sealed pavement with parking for around 80 aircraft, whose wingspan must be less than 17.5m (code A aircraft). There is a general aviation waiting room in the south-east corner of the northern general aviation apron.

All the parking bays in the northern general aviation area apron are leased to aircraft operators. There are 2 passenger set-down and loading positions adjacent to the general aviation waiting room.

Operations from the northern general aviation area include charter, light freight transportation and freight forwarding, aerial work, flight training, private flying, business flying, sport aviation and fuel supply AVGAS and Jet A1.

Western general aviation area
The western general aviation area provides overflow and itinerant parking for 12 aircraft with a wingspan of less than 15m (code A aircraft). The parking positions are available on an opportunity basis.

Southern general aviation area
The southern general aviation area apron is flexible (asphalt) pavement and provides parking for a combination of code B and code C aircraft. The southeast corner of the apron provides parking for code C aircraft up to 22,000kg with a pavement concession for up to 42,000kg.

Operations from the southern general aviation area include charter, aerial work, aircraft maintenance, hangarage, coastal surveillance, search and rescue, and aero medical services.

Eastern aviation area
The eastern aviation area accommodates a range of aviation operations, including maintenance for regional jet and turboprop aircraft, charter, heavy freight transportation and freight forwarding using domestic and regional airline services and dedicated freight aircraft (these aircraft utilise the air transport apron), hangarage, fuel supply, light and heavy aircraft maintenance, and airline catering. Helicopter activities are located at the eastern end of this area.

A private apron area of 8,000 square metres is currently used for regional airline maintenance and a fixed base operator. This apron caters for some code C aircraft (with a maximum take-off weight up to 60,000kg).

Freight consolidation is completed in the eastern aviation area before being transported to the air transport apron for loading into the hold of passenger aircraft.

At the eastern end of the eastern aviation area is a heavy helicopter zone with a final approach and take-off (FATO) point and a sealed parking area for 4 S-92 Sikorsky helicopters as well as 3 smaller helicopter bays (up to Bell JetRanger in size). A non-sealed (grass) area is also available for helicopter operations. Typically, small helicopters use the FATO point, and heavy helicopters take-off and land on runway 11/29.

From the eastern aviation area, CareFlight operates fixed-wing aircraft and helicopters for emergency patient transportation, while the Royal Flying Doctor Service (RFDS) operates fixed-wing aircraft only.

7.3 2043 Airfield Development Plan

The 2043 Airfield Development Plan is shown in Figure 7-3.

The planning and delivery of future airfield developments will be undertaken in close consultation with government agencies and airport stakeholders.

Runways
The capacity of the runway system at Darwin International Airport and RAAF Base Darwin is in excess of 250,000 movements per year. Due to the complex nature of joint-user airports, the capacity of the runway system takes into consideration both military and civil movements.

Aircraft movement forecasts prepared for the 2023 master plan estimate there could be a total of around 96,000 civil aircraft movements by 2043 (excluding military traffic), which is well below capacity. The existing runway system has sufficient capacity to cater for future projected civil traffic movements over the 20-year planning period and beyond.

Previous airport master plans have acknowledged the potential for Defence to extend runway 11/29 to a total length of 4,000m, should it be required for military purposes. It is understood such an extension would occur to the east, outside of the Darwin International Airport lease boundary.

A runway extension reserve exists in the Jointly Used Area to the north of runway 18/36. Although not required for civil operations within or beyond the 20-year planning period of the master plan, the 2043 Airfield Development Plan acknowledges Defence's requirement that the runway extension reserve must be maintained to preserve the option to extend runway 18/36 in the future, with the potential to utilise it as a primary and/or emergency runway for a greater range of military aircraft thereby increasing resilience of the RAAF Base Darwin runway system.

Figure 7-2: Darwin International Airport 2031 Airfield Development Plan

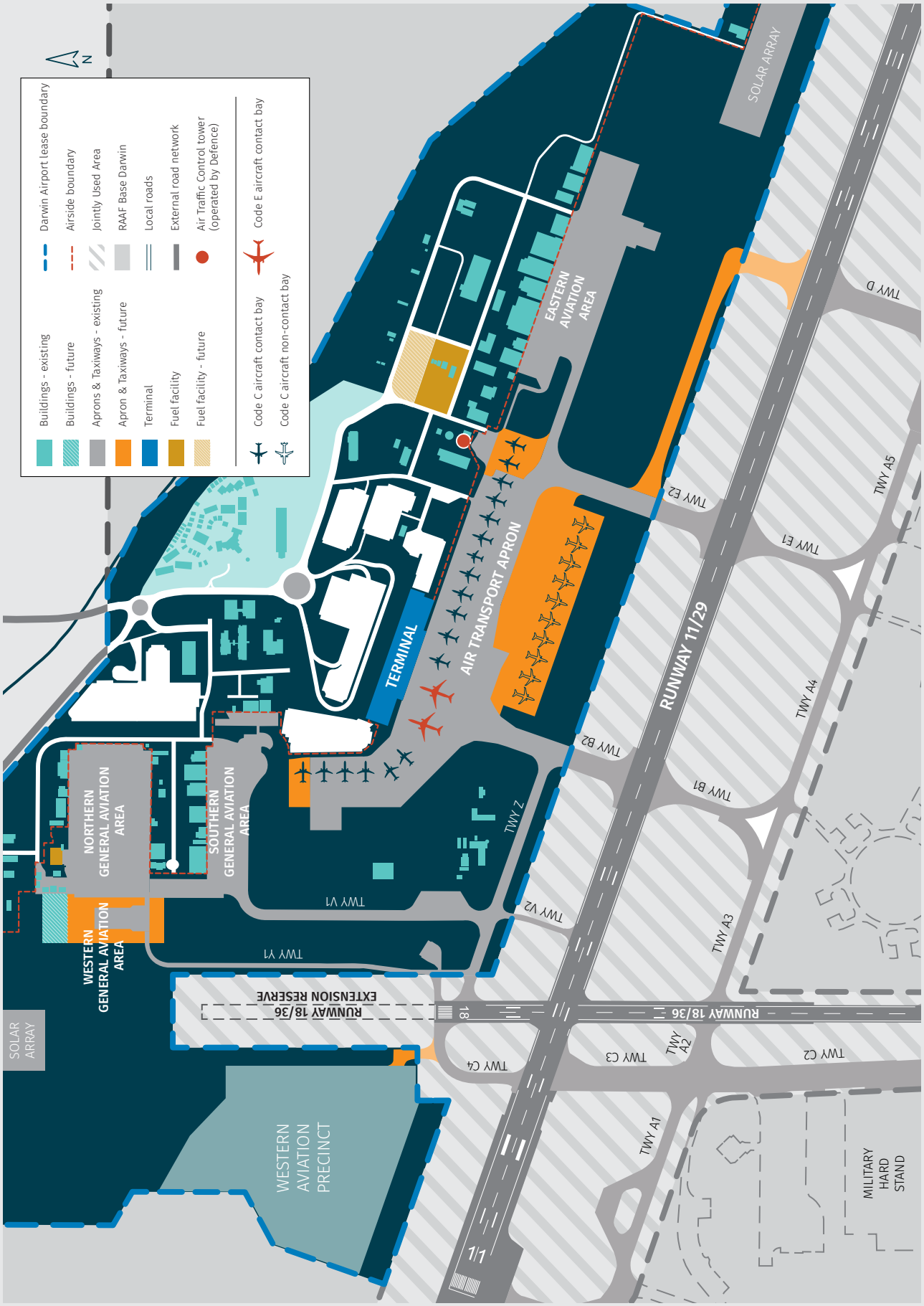
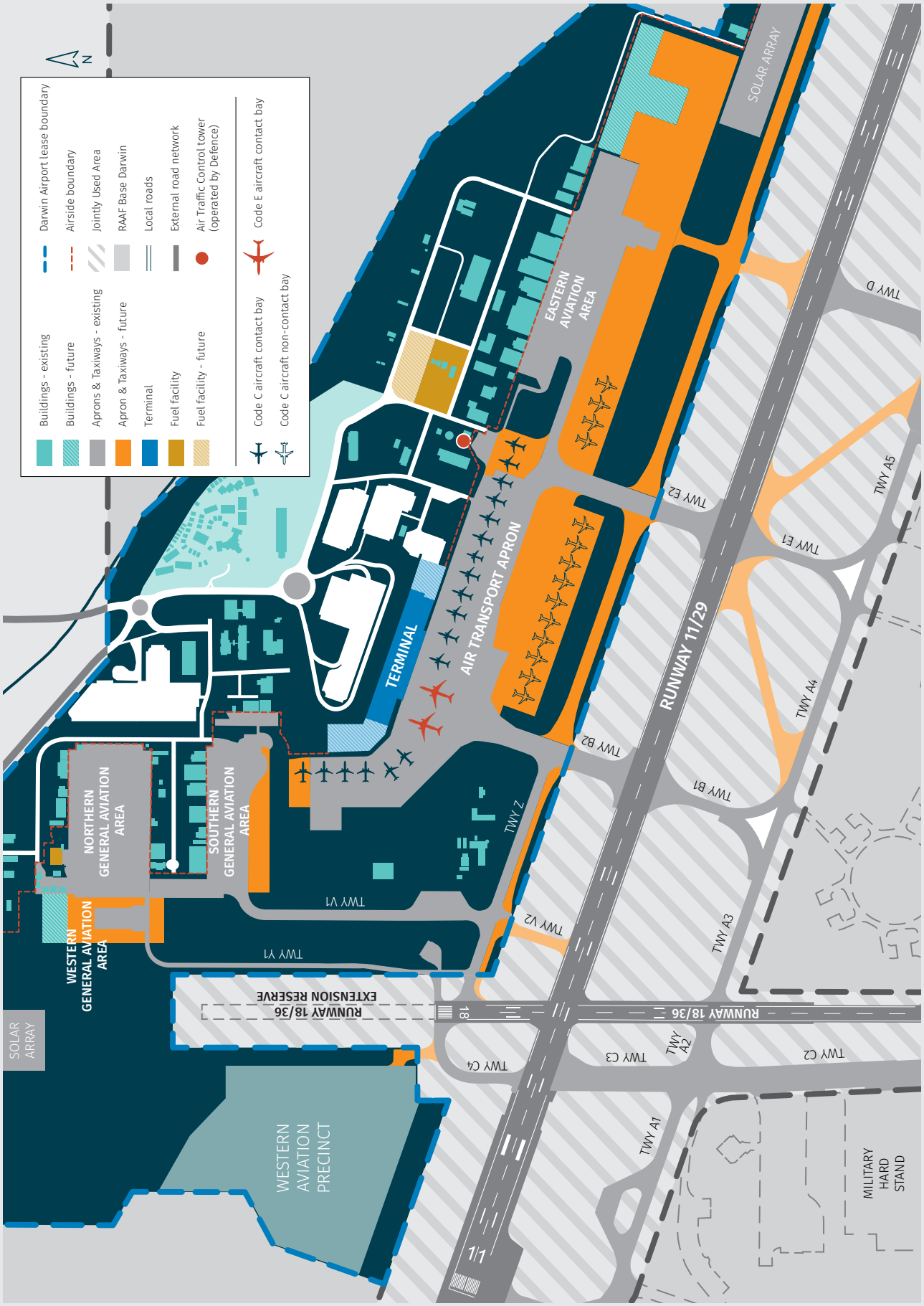


Figure 7-3: Darwin International Airport 2043 Airfield Development Plan



The RAAF Base Darwin 2008 Master Plan suggests runway 18/36 could be extended to a total length of 2,010m. Defence has indicated that if runway 18/36 is extended there may also be a need to extend taxiway C (on the western side of runway 18/36) to service the extended runway.

Darwin International Airport notes that significant civil works would be required to extend runway 18/36 to the north, to create a level runway. Similarly, the alignment and connection of adjacent taxiways would need careful consideration, to maintain access into the existing northern general aviation and southern general aviation apron areas. Any future extension of runway 18/36 to the north would also need to consider potential aircraft noise implications for residents of Darwin's northern suburbs.

Taxiways

The master plan proposes a number of taxiway enhancements over the 20-year planning period of the master plan to support the forecast increase in aircraft traffic and support expanded apron areas. This may include:

- staged extension and realignment of taxiway Z to provide a full-length code E taxiway parallel to the north of runway 11/29
- upgrade of taxiway V2 to accommodate code C aircraft
- potential provision of suitable rapid exit taxiways (RETs) for civil use from runway 11/29 to taxiway Z
- development of general aviation taxiways to service general aviation apron areas.

Restrictions are imposed on the runways and taxiways when explosive ordnance operations are undertaken at RAAF Base Darwin. These restrictions can create delays, affecting civil operations and airline schedules. The future provision of a parallel code E taxiway (taxiway Z) on the northern side of runway 11/29 within the airport's lease area will enable civil aircraft to access the main runway without the need to backtrack when the taxiways on the southern side of the runway are not available due to military explosive ordnance safeguarding measures.

It is anticipated that the extension of taxiway Z to a full parallel taxiway will occur progressively over the 20-year planning period of the master plan (see figures 7-2 and 7-3). It is expected that in the first instance, priority will be given to constructing the new taxiway D2 and that part of taxiway Z between taxiways D2 and E2, as shown in Figure 7-2. This would enable code C aircraft to operate intersection departures in either direction on runway 11/29.

The airport's existing solar farm located to the north of the runway 29 threshold will ultimately need to be repositioned to accommodate the full extension of taxiway Z.

Air transport apron

Airlines servicing Darwin International Airport are trending away from widebody code E aircraft and instead focussing their operations on narrowbody code C aircraft. It is expected this trend will continue through the planning period of the master plan, with more frequent flights by these smaller aircraft. The aircraft movement forecasts detailed in Section 5 of this master plan anticipate that some code E aircraft will continue to service the airport, so the existing code E aircraft parking bays are intended to be retained to accommodate these larger aircraft.

In line with the 2017 master plan, staged expansion of the air transport apron is anticipated over the 20-year planning period to address aircraft parking capacity constraints and provide greater operational flexibility (see figures 7-2 and 7-3).

Aircraft parking on the air transport apron has become increasingly constrained due to an increase in the frequency of smaller code C aircraft needing terminal-facing parking positions, an increase in the demand for overnight aircraft parking, and an increase in locally based aircraft fleets. A recent aircraft parking demand analysis has identified that Darwin International Airport is a slots constrained airport due to the air transport apron's capacity. The analysis of the air transport apron has concluded that it is effectively operating at capacity during the 'busy hour' of the busiest time of the year (being the dry season).

It is predicted there will be steady growth of code C aircraft operations at Darwin International Airport over the first eight years of the master plan to 2031. This growth will require additional aircraft parking above the current 17 parking bays. It is forecast that the air transport apron will need to accommodate 30 parking bays for code C aircraft by 2031 (i.e. in the first 8 years of the master plan), increasing to 34 code C aircraft parking bays by 2043 (see Table 7-6). This parking will comprise:

- **contact bays** that are aircraft parking bays connected to the terminal by either an aerobridge or pedestrian walkway
- **non-contact bays** that are remote aircraft parking bays not connected to the terminal.

To achieve this, it is anticipated that by 2031 enhancements to the air transport apron may include (see Figure 7-2):

- a staged expansion to the south between taxiways B2 and E2, providing non-contact parking bays for up to 10 code C aircraft (or the equivalent of 5 code E aircraft). This expansion would allow remote parking of aircraft that don't need contact with the passenger terminal (such as freighters or aircraft that need somewhere to park overnight or for longer durations) and free up contact bays connected to the terminal for other aircraft. This expansion would also include upgrading the existing air transport apron taxilane to code E provisions to provide greater flexibility for aircraft accessing the air transport apron from the Jointly Used Area.
- Extending the air transport apron to the north-west to create an additional code C aircraft contact parking bay.
- Extending the air transport apron to the east to create 2 additional code C aircraft contact parking bays.

Further growth to the air transport apron in the longer-term to 2043 may include expanding the provision of remote parking to the east, to create an additional 4 code C aircraft non-contact parking bays.

The previous 2017 master plan considered a pier terminal development in the longer-term to meet future demand. It is not anticipated that such a development will be recognised during the 20-year planning period of the 2023 master plan.

The provision of additional aerobridges to connect the terminal to contact aircraft parking bays will be considered as both the airfield and terminal building continue to develop and grow, and will be assessed on an as-needs basis.

Freight

As the number of freight aircraft movements is forecast to remain constant across the 20-year planning period of the master plan, it is not envisaged that a dedicated freight apron will be required. Freight on passenger aircraft or freight services will continue to use the air transport apron.

The 6,250-square-metre purpose-built freight and cold storage facility has some 3,000 square metres of cold storage available with varied temperature zones and a 3,000-square-metre dry storage area. The facility has 5 loading docks, a logistics training facility, x-ray and screening capacity. A dedicated airside access road provides streamlined access to the air transport apron for freight forwarders to ensure timely delivery of goods.

There is also 2–3 tonnes of cold freight storage capacity available through the Qantas Freight facility in the eastern aviation area.

	Contact bays					Non-contact bays				Total bays	
	Code C	Code D	Code E	Total	Code C equivalent	Code C	Code E	Total	Code C equivalent	Total	Total Code C equivalent
2023	14	1	2	17	**17**	0	0	**0**	**0**	**17**	**17**
2031	17	1	2	20	**20**	10	0	**10**	**10**	**30**	**30**
2043	17	1	2	20	**20**	14	0	**14**	**14**	**34**	**34**

Table 7-6: Air transport apron aircraft parking bay analysis

There is further land available in the Aviation Activities and Facilities Zone and the Aviation Reservation Zone to accommodate any future growth of freight activities.

General aviation

General aviation facilities will be developed on a commercial basis over the planning period of the master plan.

The existing northern general aviation area is currently constrained in capacity. Future enhancements anticipated in the first eight years of the master plan may include (see Figure 7-2):

- redesigning the taxilanes and parking areas of the apron for maximum efficiency to an 18-metre maximum wingspan and current design standards
- expanding the apron towards the west, in line with the design principles of the 2017 master plan.

Further growth of the northern general aviation area will need to consider aspects such as obstacle limitation surfaces (OLS) associated with an extended runway 18/36, windshear, aircraft noise and surface drainage.

An expansion to the southern general aviation area may be required in the longer-term if existing operators based in this precinct need to expand in future years. Should the need arise, the existing apron could be expanded to the south to accommodate non-airline code C aircraft.

The 2017 master plan indicated a potential extension of Slade Court to accommodate additional general aviation hangars and aprons. However, the 2023 master plan has removed this feature as this would likely reduce aircraft access to the northern general aviation apron down to a single point of entry, resulting in significantly diminished operational efficiency of this precinct.

Darwin International Airport has identified approximately 20 hectares of land within the Aviation Reservation Zone to become a new Western Aviation Precinct. This provides a significant area for expansion of the general aviation facilities both within and beyond the planning period (see Western Aviation Precinct section for more detail).

Any future helicopter growth will be accommodated in the eastern aviation area.

Western Aviation Precinct

Darwin International Airport envisages the new Western Aviation Precinct could become home to general aviation operators, aviation manufacturing and aviation support industries.

The precinct lies to the west of the runway 18/36 extension land reserve and will be designed to have both landside and airside access. It is intended that enhancements will be made to the existing taxiway system to provide aircraft connectivity to the precinct. These enhancements will be determined and agreed in collaboration with Defence and other airport stakeholders.

Darwin International Airport anticipates development of the Western Aviation Precinct may commence during the initial period (first 8 years) of the master plan. Development is dependent on Defence completing per- and polyfluoroalkyl substances (PFAS) soil remediation works in the area.

Defence has indicated that if runway 18/36 was to be extended there may also be a need to extend taxiway C (located to the west of runway 18/36) to parallel the runway extension. Should this occur it could provide better access for aircraft into the Western Aviation Precinct, however it may constrain the extent of developable area available.

7.4 Emerging aviation technologies

Advanced air mobility (AAM) refers to emerging aviation technologies such as electric vertical take-off and landing vehicles (eVTOL) and other crewed or uncrewed aircraft to move people and cargo.

This sector is rapidly evolving, with CASA anticipating that AAM aircraft may commence operations in Australia by 2026. While there is a long-term vision for the safety regulation of this type of transport, there remains significant uncertainty about the long-term needs of this sector. In 2022, CASA published a regulatory roadmap for AAM and drones to provide a plan for the long-term vision for these sectors supported by acceptable levels of safety.

Darwin International Airport will work collaboratively with government, regulators and local communities to help facilitate this type of transport in future, with the aim of integrating AAM into our future operations.

Northern and southern general aviation areas

7.5 RAAF Darwin Estate Base Plan

Darwin International Airport is aware that the Department of Defence is currently preparing an updated Estate Base Plan for RAAF Base Darwin. It is understood the updated Estate Base Plan will replace the existing RAAF Base Darwin Master Plan published in 2008.

The key recommendations of the 2008 Defence Master Plan with respect to the airfield at RAAF Base Darwin / Darwin International Airport were as follows:

- safeguarding the extension of runway 18/36 to the north, resulting in an overall length of 2,010 metres
- extension of taxiway Z to the runway 29 threshold to resolve potential civil aircraft taxiing conflicts with explosive ordnance safety zones and navigational equipment
- extension of taxiway D across runway 11/29 to join the extended taxiway Z
- provision of a new taxiway crossing runway 11/29, joining taxiway A6 to taxiway Z between taxiway D and the runway threshold
- provision of 2 rapid exit taxiways between runway 11/29 and taxiway A, in the approximate location of taxiway E1
- extension of the existing air traffic control facilities area.

In addition to this, the airport is aware that Department of Defence is investigating an additional apron for military helicopter parking to be located within the Jointly Used Area.

7.6 Aviation support facilities

A range of aviation support facilities at Darwin International Airport support the core aviation business of transporting passengers and freight.

Department of Defence

Air traffic control
Air traffic control (ATC) services at Darwin International Airport are provided by the Department of Defence. The tower is located to the east of the passenger terminal within the civil airport boundary.

ATC's main role is processing and separating air traffic in both the initial and final stages of flight. ATC also controls the movement of aircraft and vehicles on the runways and taxiways of the airport.

Construction of a new air traffic control tower was completed by Defence in 2020 as part of the joint Defence and Airservices Australia 'OneSKY Australia' program. The project also included significant upgrade of the existing airfield systems complex.

OneSKY will replace the current independent civil and Defence air traffic management systems with an advanced integrated system known as the Civil Military Air Traffic Management System (CMATS). The OneSKY program will enhance the safety, efficiency and capacity of the Australian air traffic network.

It is expected that the original ATC control tower will be demolished in due course once the OneSKY program has been delivered.

Navigational aids
Department of Defence is responsible for the provision and maintenance of the TACtical Air Navigation (TACAN) and the Radar.

Airservices Australia

Navigational aids
Airservices Australia provides and maintains numerous radio navigation aids and systems on or near the airport, including:

- distance measuring equipment (DME)
- Very High Frequency Omnidirectional Range (VOR)
- instrument landing system (ILS) (glide path and localiser)
- radar at Knuckey Lagoon, which provides a backup to the RAAF primary radar.

Aviation rescue fire fighting (ARFF)
Fire and rescue services are provided by Airservices Australia from a facility located to the southwest of the air transport apron within the airport's lease boundary. The aviation rescue fire fighting (ARFF) service currently provides up to ICAO Category 8 standard on a 24-hour notice basis. Under agreement with the Department of Defence, ARFF is provided to all aircraft, both civil and military. A fire training area is located to the west of the passenger terminal on Department of Defence land.

Aviation fuel

The safe and continuous supply of fuel is critical to on-time performance of all aircraft operators at the airport. Any disruptions to the supply of fuel will affect aircraft movements and passengers.

Since the last master plan, Darwin International Airport has acquired an ownership in the Joint User Hydrant Installation (JUHI) storage facility at the airport, with an agreed timeframe in place to purchase 100% of the facility. The facility continues to be operated by the current joint venture partners.

The purchase was the first time an Australian capital city airport had acquired an interest in existing JUHI infrastructure necessary to support the core aviation business of the airport and its airline partners. Through the purchase, the airport established an open access regime allowing fuel suppliers to market aviation fuel to airlines, introducing more competition in jet fuel pricing for our airline customers.

There is currently no fuel pipeline delivery to Darwin International Airport. Jet A-1 fuel is supplied into Darwin by ship and is received into the Darwin Vopak industry terminal in the East Arm port precinct. The fuel is then supplied to the airport by road tanker to a storage facility consisting of 5 semi-buried fuel tanks, totalling 1 million litres. At maximum capacity, this can serve the airport needs for one to 2 days, depending on aircraft movements. On average, 400,000 litres of Jet A-1 fuel is delivered each day by double road trains to Joint Aviation Fuel Services (JAFS) located on Lancaster Road. The Jet A1 fuel is dispensed via an in-ground hydrant system currently servicing 13 aircraft parking positions on the air transport apron. Fuel tankers service aircraft parked on the remaining bays without the in-ground hydrant system.

General aviation aircraft are serviced from a fuel facility located in the northern general aviation area. Fuel (avgas) is stored in 2 underground storage tanks, totalling 145,000 litres. Airport fuel tankers carrying up to 16,000 litres deliver this fuel to aircraft in all parts of the airport.

The forecast increase in aircraft movements will result in increased fuel consumption over time. This will necessitate expanded fuel facilities. Adjacent land has been reserved in the Aviation Activities Zone for this purpose as indicated in Figure 7-3.

The existing hydrant system to the air transport apron will be extended as required.

Fuel storage facility at East Arm (off-airport)

Airport Development Group (ADG) is preparing to develop a new mixed fuel product storage facility off-airport at East Arm, located to the south of the airport site. The circa 80 megalitre (subject to market requirements) facility is intended to store fuel products like diesel and Jet A-1 fuel. The site is well connected with direct shipping and truck access.

The proposed $60 million facility is to be jointly funded by ADG and the Australian Government. The project received $30 million in funding under the Australian Government's Boosting Australia's Diesel Storage Program, contributing to the government's long-term fuel security goal to increase Australia's domestic fuel storage to meet the country's needs during an emergency and into the future.

Construction is scheduled to commence in 2024, and the new facility will provide local industry with competitively priced and secure access to this critical resource. The development of key industries such as tourism, defence and mining relies on the consistent supply of fuel, and the new facility will provide this.

With environmental considerations a key focus for ADG, building a facility that offers flexibility in fuel storage, including the potential use of biofuels, could see the life of the facility extended and support ADG to meet its net zero emissions by 2030 target. It would also help airlines and industry meeting their own emissions reduction targets.

Potential fuel pipeline

In conjunction with the new fuel storage facility off-airport, ADG is also advancing a 10-15 kilometre underground pipeline to connect the fuel storage facility to Darwin International Airport. This pipeline would convey Jet A-1 fuel directly to the airport resulting in improvements in aircraft refuelling practices, for both civil and military aircraft. A pipeline would also reduce the number of fuel delivery heavy vehicle movements on roads surrounding the airport.

ADG is working with the Northern Territory Government and the Department of Defence in progressing the fuel pipeline.

Aircraft maintenance

There are 3 main types of aircraft maintenance activities:

- Line maintenance is generally minor maintenance and routine inspections that occur during transit and turnaround and can be performed at the aircraft parking position.
- Base maintenance requires ground-time in a hangar or at a parking position away from the terminal. Ground time periods can range between 20 and 36 hours.
- Heavy maintenance requires significant ground-time in a hangar. Ground-time periods can range between 6 and 50 days, depending on the type of heavy maintenance being done.

Airlines conduct line maintenance on the air transport apron. Airnorth conducts base and heavy maintenance activity in its facilities. Any future expansion to airline maintenance facilities could be potentially accommodated within the Aviation Activities and Facilities Zone and the Aviation Reservation Zone.

There is extensive general aviation maintenance activity covering line, base and heavy maintenance throughout the general aviation areas. General aviation aircraft maintenance capacity will expand in line with general aviation activity.

Engine run-up bay

An engine run-up bay is an area used for the ground running of an aircraft. This is when an aircraft engine is tested at the airport while the aircraft is stationary on the tarmac. Taxiway C4 is used for ground running of aircraft up to Dash 8 in size, and the aircraft run-up bay on taxiway Y is used for smaller aircraft up to Cessna 402 in size.

Ground service equipment

Ground service equipment (GSE) is the vehicles and equipment used to service aircraft between flights.

GSE is used for a variety of functions, including starting aircraft, aircraft maintenance, aircraft refuelling, transporting freight to and from the aircraft, loading freight, transporting passengers to and from the aircraft, baggage handling, aircraft waste disposal services and food services. Adequate areas adjacent to the apron to store GSE is necessary for efficient operations.

The existing GSE storage areas lie to the east and west of the existing terminal area, and comprise an area of approximately 10,500 square metres. There are additional GSE parking areas on the air transport apron bays.

The area required for GSE storage depends on peak demand, aircraft configuration, number of ground-handling agents and types of equipment. GSE areas will expand in line with demand.

Darwin International Airport is investigating replacing the existing GSE with an electric GSE fleet to be powered by renewable energy generated onsite by the airport's solar arrays, further minimising the airport's carbon footprint.

Flight catering

Flight catering for airlines is prepared onsite at the airport. There is currently one flight catering facility at the airport.

Unlike many aviation-related activities, there is no specific need for flight catering facilities to be located onsite at the airport. The master plan provides for flight catering to continue to be located onsite at the airport if required.

SECTION 8:

Terminal Development Plan

SECTION 8: **Terminal Development Plan**

8.1 Introduction

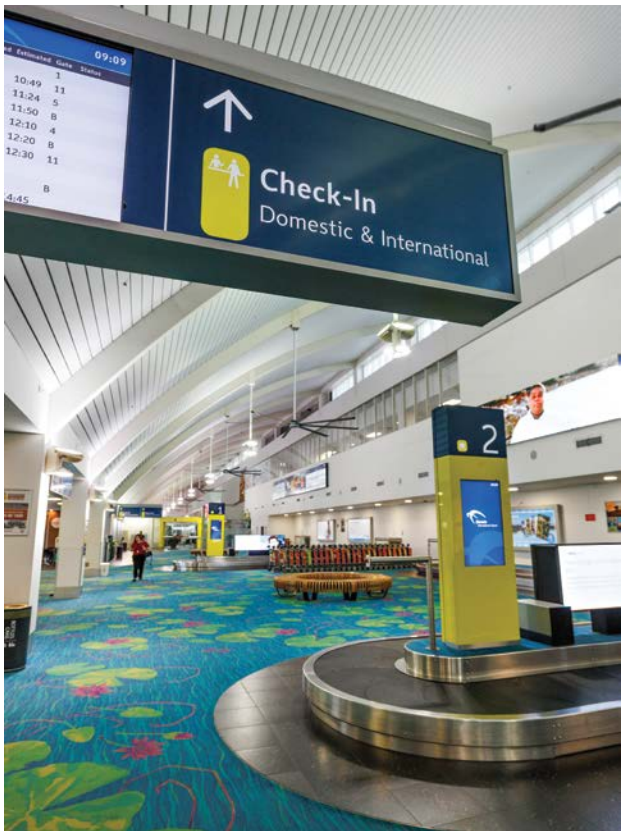
An airport's passenger terminal is the face of the airport business, and connects passengers, airlines and operators. It is the public interface between the airport's 'landside' and 'airside' activities.

The terminal is also the transition point for passengers moving between air and ground transport modes. For the terminal to run efficiently and meet the needs of airlines and passengers, planning for things like road access and car parking is essential.

8.2 Current terminal facilities

The terminal at Darwin International Airport is a 2-storey building of 27,000 square metres that facilitates both domestic and international passenger movements.

There are 4 daily peak periods of operations at the airport around midday, midnight, early morning and late afternoon. Due to Darwin's geographic location and average sector lengths (4 hours) from international and domestic cities, these peak times of operation are unlikely to change. These peaks influence the design of the terminal.



COVID-19 terminal enhancements

The COVID-19 pandemic presented a hugely challenging environment for the aviation industry and tested Darwin International Airport's ability to respond to a rapidly changing operational environment. The closure of domestic and international borders significantly affected airline flight schedules and passenger numbers.

The airport's agreement between the Australian Government and Northern Territory Government to process all arriving international repatriation passengers through Darwin International Airport drove activities to ensure repatriated passengers were processed safely away from domestic travellers and airport users. The Northern Territory was vigorous in its protection of its vulnerable communities, and Darwin International Airport took this very seriously, resisting international arrivals through the terminal until gold standard infrastructure was complete.

This consisted of 2 main projects: creating air conditioning zones to ensure COVID-19 couldn't be transmitted to other parts of the terminal, and building physical barriers as solid walls to separate international and domestic passengers. These upgrades ensured a secure and separate controlled area for processing internationally repatriated Australians before their transfer to the Centre for National Resilience at Howard Springs to undertake mandatory quarantine.

The introduction of border checkpoints and health screening measures for arriving passengers by government agencies required substantial reconfiguration of the airport's terminal environment to accommodate these new functions. Although these functions are no longer required now domestic and international borders have reopened, the flexibility of the terminal environment is paramount to adapt and accommodate any future disruptors.

Similarly, in mid-2022, Darwin International Airport worked with the Australian Government Department of Agriculture, Fisheries and Forestry to set up a bio-security response zone to manage the threat of the highly infectious foot-and-mouth disease reaching Australia after an outbreak in Indonesia.

Recent terminal improvements

Since the last master plan, the airport terminal has been enhanced with:

- **Security screening technology:** in line with new Australian Government aviation security requirements, major security screening upgrades were undertaken in 2019, making Darwin International Airport one of the first Australian airports with advanced computed tomography (CT) x-ray screening equipment. It scans both checked and carry-on baggage, which means fewer physical bag searches and a faster passage through the airport for passengers. The new body scanners have improved the customer experience for passengers who previously had to undergo secondary screening due to implants such as pacemakers or hip replacements.
- **Aerobridge replacement:** 2 of 3 aerobridges due for replacement have been completed, with the new aerobridges including pre-conditioned air units that use solar energy to pump cool air into parked aircraft, such as when passengers are disembarking. The replacement program is due to be completed in 2023.
- **Forecourt safety improvements:** the entry to the terminal was redeveloped in 2018 to enhance customer safety. The forecourt was aligned and bollards added to mitigate the risk of vehicle impact with the terminal.
- **Rooftop solar:** as part of Darwin International Airport's target to reach net zero emissions by 2030, solar PV (photovoltaic) arrays have been installed on the terminal roof as part of a broader project to install solar to the rooftops of buildings throughout the airport precinct.
- **Departure lounge flexibility:** a true departure 'swing' lounge was created for the existing boarding gates 10 to 13 so that they can be allocated as either domestic gates or international gates depending on demand. During recent peak periods, these gates have been opened to the domestic departure lounge to accommodate increased domestic passengers travelling through the airport.
- **Self service check-in technology**: 30 new self service check-in kiosks and 23 automatic bag drop facilities were installed in 2023, providing convenience and reducing wait time in queues. Dedicated airline staff continue to remain available to assist customers.
- **Retail enhancements:** Construction is currently underway (2023) to infill the domestic departure lounge between gates 8 and 10 to accommodate new retail and food & beverage offerings as well as provide improved circulation and access. These renovation and expansion works are expected to be completed by late 2024.

8.3 Planning principles

The International Air Transport Association (IATA) publishes the Airport Development Reference Manual, a guideline for planning new airports or extending existing airport infrastructure. The manual covers a 'level of service' framework for airport terminal facilities. IATA recommends an 'optimum' level of service that balances sufficient space and comfort with acceptable processing times, at a reasonable cost.

Digital twin

Darwin International Airport is developing a 'digital twin' of the airport's terminal. A digital twin is a digital representation of a real-world system, powered by data analytics and enhanced cloud computing power. This simulation tool will allow the airport to run 'what if' scenarios to inform our business decisions. It will be used to optimise terminal operations, inform terminal master planning, analyse customer behaviour, and support a timely response to any changes in our annual passenger forecasts and busy hour forecasts.

8.4 2043 Terminal Development Plan

Future demand

By 2043, the projected passenger demand for the terminal is anticipated to be between 3.7 million and 5.5 million passengers per year. Annual passenger forecasts do not give a true representation of the impact on terminal capacity – for example, they don't capture 'meeters and greeters' who come to the airport but are not travelling – so 'busy hour' forecasts are used to plan future development needs.

Future development

The aviation industry is a dynamic business, and airports evolve over time to meet the changing needs of aviation operations and passenger expectations. In recent years, there has been a strong focus in the aviation industry on the customer experience of passengers travelling through the airport.

In line with Darwin International Airport's development objectives outlined in Section 2, future developments to the terminal will seek to improve operational efficiency and enhance the customer experience of our passengers.

As with the airport's previous master plans, it is envisaged that Darwin International Airport will continue to operate a single terminal that handles both domestic and international passenger movements.

In 2015, Darwin International Airport's passenger terminal was significantly expanded – doubling its size. Our forecasting indicates we're unlikely to need to further expand the building's overall footprint in the short- to medium term. Some minor infills and internal reconfiguration may occur to better use the existing floor space and make the most of available capacity.

Any future growth of the terminal building will be accommodated by expanding the existing terminal within the Terminal and Facilities Zone and in line with peak-hour demand. In the longer-term, we envisage future terminal expansion will mainly be to the west, with the building footprint wrapping around to the northwest (see figures 7-3 and 10-4). There is scope for extra expansion to the east, as needed.

Previous master plans have indicated a potential terminal pier development to the west or south of the existing terminal, should demand require it. It is not expected that a pier will be required during the 20-year planning period of this master plan. However, if this were to be realised, it would be developed in consideration of the air transport apron and aircraft parking requirements.

The provision of additional aerobridges to connect the terminal to contact) aircraft bays will be considered as both the airfield and terminal building continue to develop and grow, and will be assessed on an as-needs basis.

Key areas that will likely drive the future expansion of the terminal will be baggage make-up, baggage claim and, to some extent, the domestic departure lounge and retail requirements.

Possible enhancements to the terminal and its immediate surrounds during the 20-year planning period of the master plan may include:

- creating a landscaped pedestrian welcome plaza directly in front of the terminal, including enhancements to the road network in the immediate vicinity of the terminal
- enhancements to the customer experience through new and upgraded retail offerings and departure lounge refurbishments
- consolidating security screening operations to improve the efficiency and agility of the security workforce
- relocating the car rental desks outside the terminal to a purpose-built facility closer to the car rental car park
- constructing shade structures in some of the car parks
- improved connectivity between the terminal and the hotel/resort precinct through landscaping and transport options.

The planning and delivery of any future terminal developments will be done in close consultation with airport stakeholders.

8.5 Customer experience

The experience of customers visiting the airport is paramount to Darwin International Airport. We are committed to improving the customer experience both in the terminal and across the broader airport precinct.

In 2019, Darwin International Airport introduced the innovative 'HappyOrNot' instant customer feedback platform, positioning these stations around the airport terminal. The system allows customers to give instant feedback – both positive and negative – about their experience at the airport, including the bathroom facilities and security. The data is collected and reported to the airport's management team. The real-time alerts allow the team to react to issues immediately, providing additional control and fast reaction time to improve service quality.

8.6 Accessibility

Darwin International Airport aims to provide facilities and services that are accessible for all members of the community.

Darwin International Airport take a best practice approach to accessibility, having regard to legislation and standards such as the *Disability Discrimination Act 1992*, the Disability (Access to Premises – Buildings) Standards 2010 and the Disability Standards for Accessible Public Transport 2002.

Future improvements to upgrade the airport facilities over time will seek to achieve compliance with Australian Standard AS1428 Design for access and mobility: Part 1 (General requirements for access – New building work) and Part 2 (Enhanced and additional requirements – Building and facilities).

Darwin International Airport publishes a Disability Access Facilitation Plan, which is available on our website. The plan covers availability and access of services at Darwin International Airport for our passengers with a disability. We intend to update this plan to reflect any future terminal or operational improvements.

Darwin International Airport recognises that not all disabilities are visible and is currently investigating a hidden disabilities program in place at a number of other Australian airports.

Domestic departure lounge

SECTION 9:

Commercial Development Plan

SECTION 9: **Commercial Development Plan**

9.1 Introduction

While Darwin International Airport's first priority is aviation, a key aspect of the master plan is allowing for income diversification and providing clear and transparent strategic directions for growth, while maintaining the flexibility to respond to market directions and demand. The COVID-19 pandemic proved the importance of our commercial development plans and diversified portfolio.

The commercial land holding at Darwin International Airport is strategic in 4 respects:

- a central location in the Darwin urban area
- proximity to the aviation activities located at the airport
- provides large parcels of land for development
- proximity to the arterial road network.

In considering commercial development opportunities on airport land, we have 3 main considerations:

- contributing to Northern Territory economic growth through developing the property business and by facilitating both the success of our business partners and the objectives of the Northern Territory Government
- enhancing value to our shareholders
- underpinning infrastructure for further aeronautical development.

Commercial development vision

Darwin International Airport promotes contemporary and high-quality building form that is sensitive to the natural environment and the Darwin climate.

Sustainable building design principles are encouraged and support Airport Development Group's emissions reduction strategy (as outlined in Section 3: Sustainability). The emphasis of sustainable design principles applied to new buildings at Darwin International Airport include:

- undertaking rooftop solar feasibility studies and installing rooftop solar panels, where roof design permits, across the maximum roof area available
- adopting passive design features, including building orientation, to mitigate climate impacts
- undertaking embedded energy analysis of construction materials and products.

Commercial development opportunities

Darwin International Airport has identified the following aeronautical and non-aeronautical commercial property opportunities:

- office accommodation
- retail, big box retail and warehousing companies that would benefit from a central Darwin location with exposure and access
- family entertainment centres
- meeting centres, accommodation facilities, and other social support / health facilities
- high-technology industry that values timely manufacturing and supply
- industries that rely on good logistical support (e.g. Defence, mining, energy)
- industries that process and produce time-sensitive products
- air, road and other transport base industries
- administration of service industries.

Darwin Airport Central

Darwin Airport Central is Darwin International Airport's business, retail and entertainment precinct. Comprising 60 hectares of Service Commercial zoning, it is located along the northern boundary of the airport site (see Figure 9-1). The precinct is bordered by 2 major external roads – Bagot Road and McMillans Road – and is well positioned in a highly visible traffic zone with close, easy connections to the CBD, northern suburbs and beyond. Running through Darwin Airport Central is Osgood Drive, the main arterial road through the precinct.

A centrepiece of the precinct is Osgood South Commercial, a 3200-square-metre architecturally designed commercial centre located at the intersection of Neale Street and Osgood Drive.

Following the Darwin Airport Central's first development of Bunnings on the corner of Osgood Drive and Bagot Road, significant development activity of Darwin Airport Central has occurred predominantly in the vicinity of Neale Street. Commercial developments in this area include family entertainment, retail, showrooms, fitness, childcare, car rental, warehousing and a service station.

9.2 Recent commercial developments

Significant commercial developments since the last master plan include the emergency medical retrieval precinct (in the Aviation Reservation Zone), the freight and cold storage facility (in the Service Commercial Zone), and the refurbishment of the existing airport hotels into a world-class resort (in the Tourist Commercial Zone).

World-class destination resort

In early 2021, ADG acquired the 2 on-airport hotels – the Mercure Darwin Airport Resort and Darwin Airport Novotel Hotel – and embarked on an ambitious redevelopment program to transform these into a single world-class tropical resort.

The acquisition was seen by the Territory Economic Reconstruction Commission as a 'fabulous multiplier for the Darwin economy' and exactly the type of investment needed in the NT. As the hotels are adjacent to the airport, they provide opportunities to integrate the airport into the tourism fabric.

The first stage of accommodation refurbishments was completed in late 2021, with bespoke villas and luxury family accommodation.

Stage 2 started in 2022 and will include a lagoon pool and children's play area, bars, restaurants and conference facilities. A recreation vehicle (RV) park is also included.

Freight and cold storage facility

The freight and cold storage facility is located near the intersection of Charles Eaton Drive and Osgood Drive. The facility (see Section 4) is part of a broader strategy for Darwin International Airport on several levels: its location in the Darwin Airport Central precinct, its airside interface handling facilities, its 15-minute drive to the Darwin Port, its central Darwin location and its nearby developmental land, is designed to grow and develop more export capacity and with it, logistics and warehousing. Its location is also a catalyst for other larger developments at the precinct in other fields. Interest has already been garnered from a number of local companies, as well as multinational corporates looking to expand to the business park and/or enter the NT market for the first time.

Freight and cold storage facility

9.3 2043 Commercial Development Plan

Of the 311 hectares in the airport lease area, some 80 hectares (just over 25%) is available for commercial development.

This 80 hectares in the Service Commercial, Commercial, and Tourist Commercial zones will be developed as commercial opportunities arise. A demand study for the greater Darwin region has estimated that some 153,000 square metres of development could occur in the airport's Service Commercial and Commercial zones over the 20-year planning period of the master plan. Possible developments include commercial offices, showrooms, warehousing, large format and speciality retail, entertainment / leisure, hotel and other short-stay accommodation, cafés and restaurants.

A whole-of-airport 2043 road traffic study, based on both aviation forecasts and the projected 153,000 square metres of commercial development, was undertaken to ascertain future road system requirements (see Section 10).

Land in the Aviation Reservation Zone, while being planned for ultimate aviation use, can be utilised for a variety of commercial purposes in the short- to medium-term.

Figure 9-1 illustrates Darwin Airport Central and the current development of the precinct and a possible outline of future commercial development to 2043. It is anticipated that further retail and entertainment developments may evolve in Darwin Airport Central in the vicinity of the established entertainment precinct at Neale Street and may also extend west towards the existing Bunnings site. Further logistics developments are anticipated to develop around the freight and cold storage facility at the eastern end of Osgood Drive. Potential office, warehousing and showroom developments may develop along Osgood Drive between the freight and cold storage facility and Osgood South Commercial.

9.4 Commercial developments in the first 8 years of the master plan

A requirement of the Airports Act is to outline potential commercial developments in the first 8 years of the master plan, including those that relate to commercial, community, office or retail purposes.

It is difficult to predict the timeline for commercial development opportunities at Darwin International Airport, even for the first 8 years of the master plan. Developments that occur will be in response to demand. Darwin, and the NT in general, is still a developing economy (and not a mature economy like south-eastern Australia), so it's difficult to predict the commercial development that will occur.

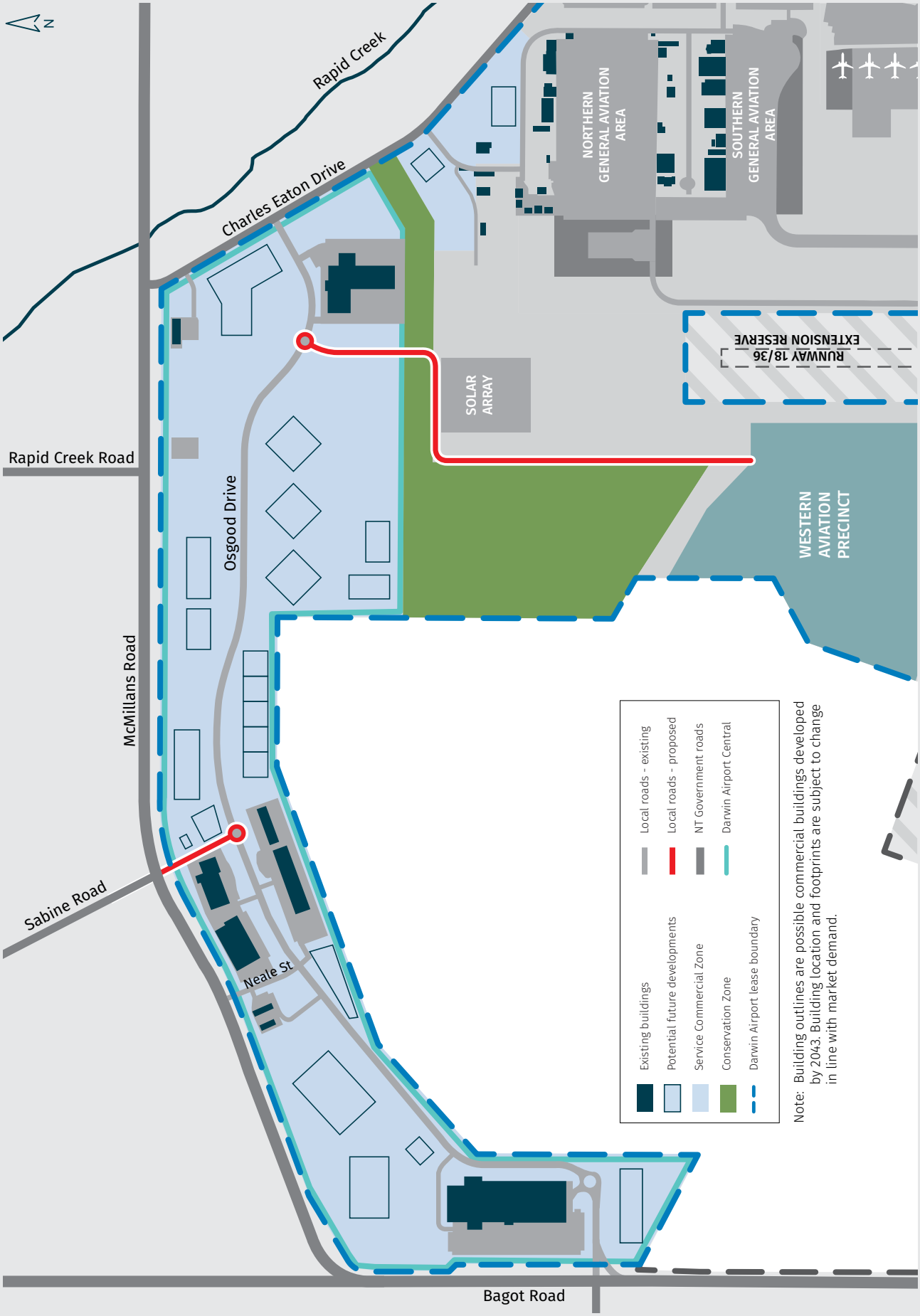
It is anticipated that in the first 8 years of the master plan, Stage 3 of the Osgood South Commercial development may be undertaken, should demand be realised. Called 'West Village', it could provide an additional 2000 square metres of commercial space. Further expansion of the nearby entertainment precinct in the vicinity of Neale St could also occur, subject to demand.

Following the success of the freight and cold storage facility, there is potential for other logistics-related businesses to leverage off this and be developed in the vicinity of the site.

Further redevelopment of the hotel/resort could take place in its evolution to a world-class tropical resort.

Osgood South Commercial

Figure 9-1: Darwin International Airport 2043 Commercial Development Concept



SECTION 10:

Ground Transport Plan

SECTION 10: **Ground Transport Plan**

10.1 Introduction

Ground transport planning is important for the airport to operate efficiently. It relates to the journey of passengers and staff to and from Darwin International Airport, as well as travel within the airport precinct. The Ground Transport Plan considers the airport's internal and external road network, car parking, pick-up and drop-off facilities, taxis, rideshare, shuttle bus, car rental, public transport and active transport (such as cycling and walking).

Darwin International Airport works with the Northern Territory Department of Infrastructure, Planning and Logistics on the interactions with the external road network and public transport system. The department's Transport Infrastructure Planning division is a member of the airport's Planning Coordination Forum.

The Northern Territory Government recently updated its Greater Darwin Regional Transport Study. The purpose of this study is to inform government strategies and priorities on the existing and future travel demand across greater Darwin. It enables effective planning for the ongoing development of roads and public transport networks in the region. Darwin International Airport was consulted as a stakeholder in this update.

The Northern Territory Government provided this new planning information to Darwin International Airport for inclusion in the airport's own traffic modelling study to inform the 2023 master plan. The airport's study involved the detailed development, calibration and testing of microsimulation models for the internal and external road network and provides a sound basis for the airport's future land transport proposals.

10.2 Existing ground transport system

The existing ground transport system at Darwin International Airport is illustrated in figures 10-1 and 10-2.

External road access and internal road network

Darwin International Airport currently has access to the external road network through:

- the signalised intersection of Henry Wrigley Drive and McMillans Road
- the signalised intersection of Osgood Drive and Bagot Road
- the intersection of Charles Eaton Drive and McMillans Road
- the intersection of Neale Street and McMillans Road.

McMillans Road and Bagot Road are managed by the Northern Territory Government, as are the sections of Charles Eaton Drive and Henry Wrigley Drive to the north of the airport's lease boundary (see Figure 10-3). Darwin International Airport manages those sections of Charles Eaton Drive and Henry Wrigley Drive within the airport's lease boundary.

The internal road system has developed over time in response to aviation and commercial development and specific traffic requirements. In 2022, the airport completed significant road improvements to Henry Wrigley Drive (within the airport's lease boundary) including construction of 2 new roundabouts and the realignment of Sir Norman Brearley Drive.

Modes of travel

The 4 daily traffic peaks at the airport are consistent with the peaks during the previous master plan period. The daily peaks are 11 pm to 3 am, 4 am to 8 am, 11 am to 3 pm and 4 pm to 7 pm.

A passenger drop-off area is located close to the terminal, along with a passenger pick-up area in the short stay car park. There is also a dedicated rideshare pick-up point in the short stay car park. A charter bus parking area is east of the terminal building.

There is a minimal public bus service to Darwin International Airport, with a bus stop situated on Pederson Road. The service primarily caters for people working on or near the airport rather than travellers. One aspect that makes it difficult to effectively service the airport with public transport is the large number of flights occurring between 11 pm and 7 am.

Figure 10-1: Darwin International Airport 2023 current ground transport system

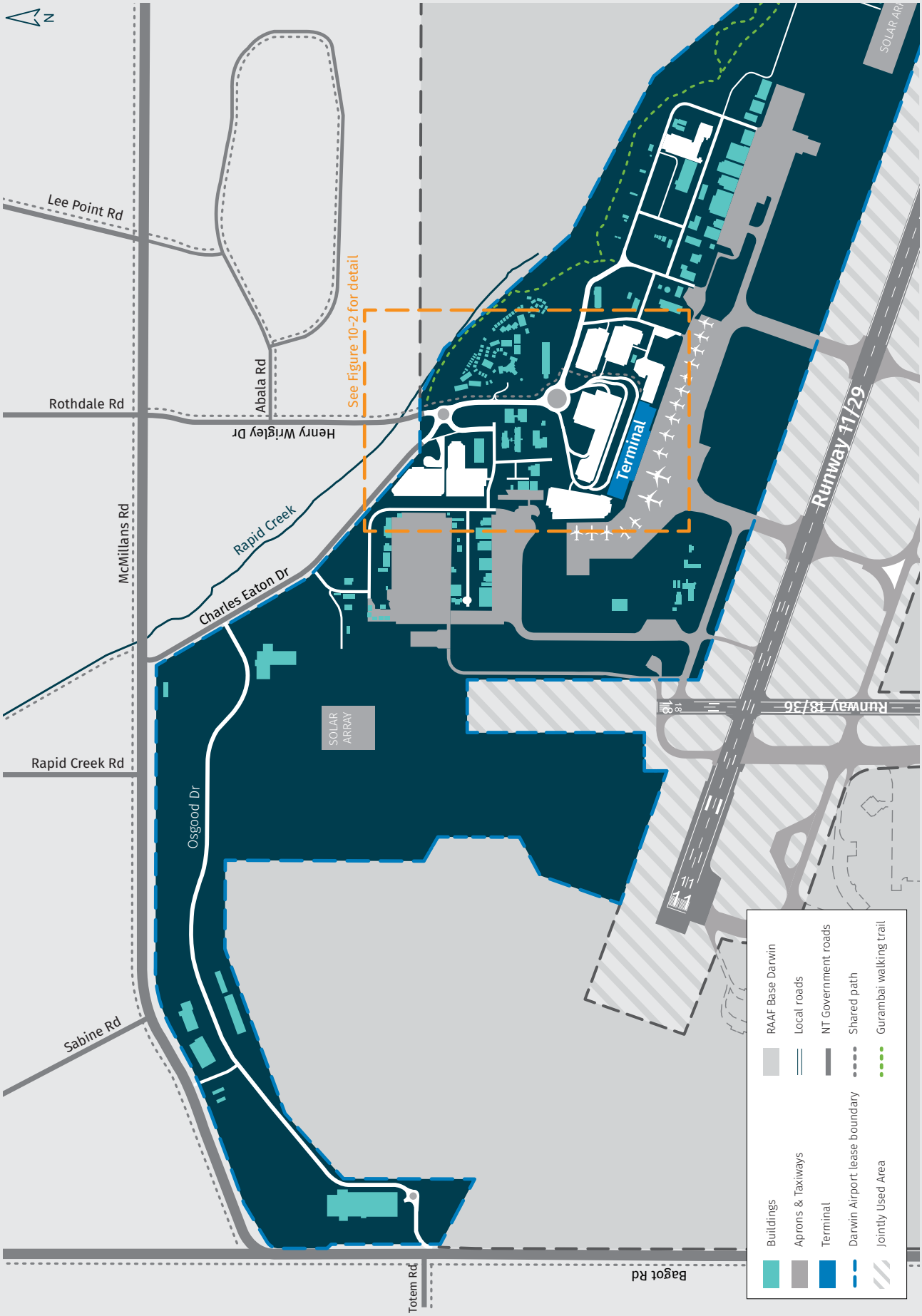
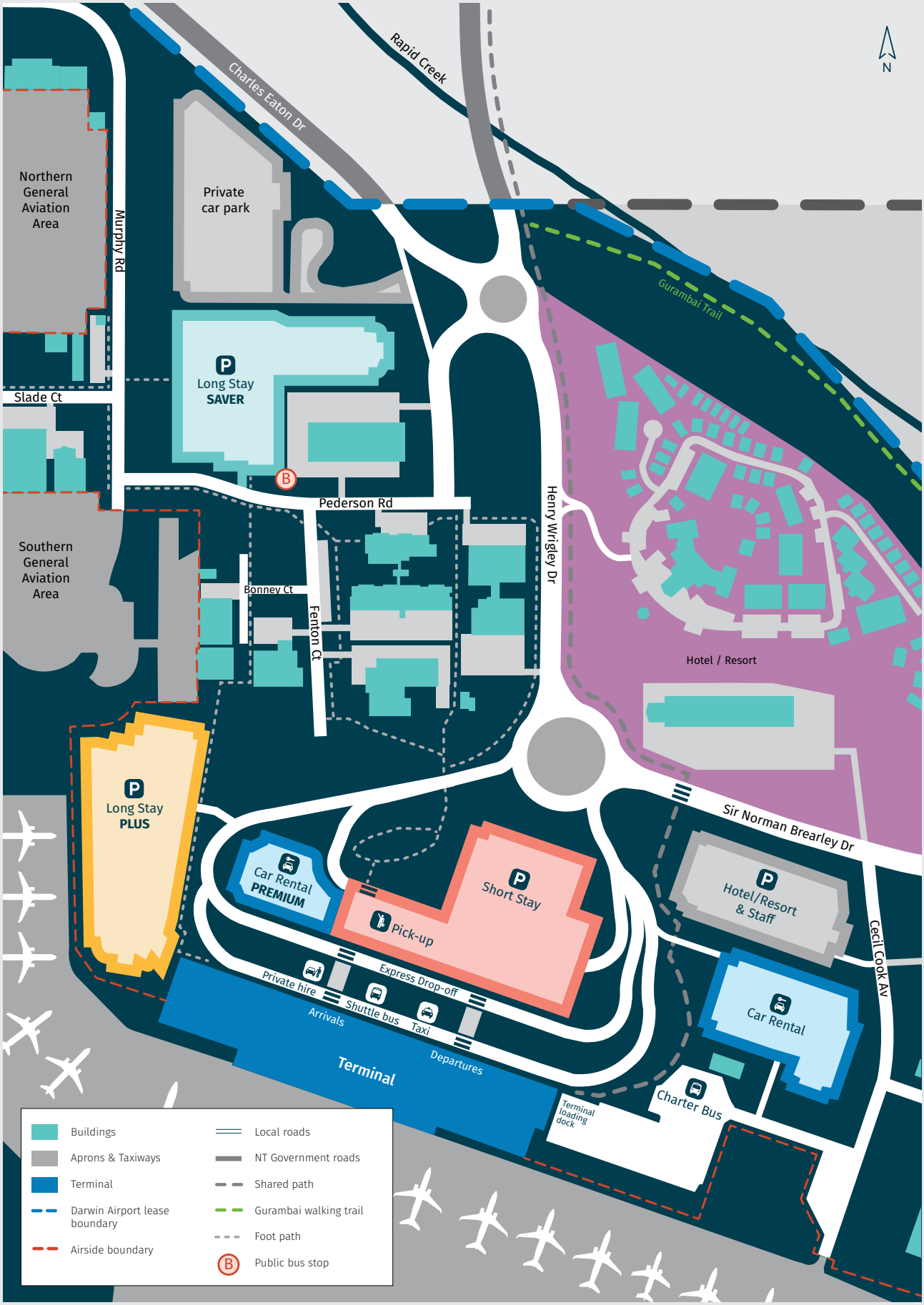


Figure 10-2: Darwin International Airport 2023 current ground transport system – terminal precinct



Car parking

There are about 1,500 public car park spaces at Darwin International Airport across a number of car parks (see Figure 10-2):

- The **short stay** car park (around 485 spaces) is located directly in front of the terminal.
- The **long stay** plus car park (around 525 spaces) is located immediately to the west of the terminal.
- The **long stay saver** car park (around 490 spaces) is located on Pederson Road and is a 6-minute undercover walk from the terminal. The long stay saver car park also offers parking for caravans, boats and trailers.

All public car parks at Darwin International Airport have been constructed at grade (ground level) and include disabled car parking bays.

There are 2 car parks for car rental vehicles – a premium car park immediately in front of the terminal building with around 100 spaces and a secondary car park with 230 spaces to the east of the terminal.

There are 2 private car parks that were originally built for park-and-ride purposes for the INPEX project. One is on Charles Eaton Drive adjacent to the long stay saver car park, with 400 spaces. The other is on Lancaster Road and has 135 spaces. These 2 car parks are currently not in operation as car parks.

Other formal and informal car parks are located throughout the airport precinct, including some 425 car park spaces for airport staff and hotel/resort guests.

Online booking system

Darwin International Airport introduced an online booking system in 2018 for the airport's public car parks. It uses number plate recognition technology, making parking at the airport convenient and easy for customers.

Active transport

A network of pedestrian footpaths connects the passenger terminal with hotels, car parks and office buildings.

A shared path (cyclist and pedestrian use) runs along Henry Wrigley Drive between McMillans Road and the terminal building. Some bicycle parking is located close to the terminal near the short stay car park.

While there is no formal bicycle path network across Darwin International Airport, there are sealed shoulders on some roads. The airport is in consultation with the Northern Territory Government about opportunities to improve the bicycle path network in and around the airport.

The Northern Territory Government is investigating ways cycling safety can be improved on Bagot Road, which runs along the airport's western boundary. A planning study has commenced to identify potential options for improved cycling infrastructure on Bagot Road and plan for a cycling route between the northern suburbs and the Stuart Highway.

The airport's Gurambai walking trail is about 2 kilometres long and offers a unique opportunity for locals and visitors to appreciate the Rapid Creek reserve. Gurambai is the Larrakia name for Rapid Creek and means 'elbow', referring to the shape of the creek at its mouth. The trail follows Rapid Creek and its wetlands from Henry Wrigley Drive, behind the airport's hotel/resort, and then upstream past wetland areas before forming a loop through woodland at the far end of Larkin Avenue.

10.3 2043 Ground Transport Development Plan

It is anticipated that both the existing external and internal road systems at the airport may need enhancing during the 20-year planning period of the master plan.

The information and development concepts in this master plan are derived from data collection and detailed traffic modelling studies commissioned by Darwin International Airport. These studies have involved the development, calibration and testing of microsimulation models for the internal and external road network and provide a sound basis for the ground transport proposals.

There are 2 main demand areas for the ground transport system to 2043:

- Demand created by growth in aviation-related activities
- demand created by growth of commercial (non-aviation) activity.

External road access

A whole-of-airport traffic study was undertaken, based on projected aviation growth and commercial development over the next 20 years to 2043. The study incorporated the airport's internal road network as well as the relevant surrounding external road network.

Daily vehicle trips to and from the airport could grow from around 20,000 currently to some 66,000 in 2043 as a result of projected aviation growth and commercial development (see Table 10-1). One feature of the overall trip generation will be future commercial development focused along Osgood Drive.

In keeping with the previous master plan, the major external road access development concept envisioned during the 20-year planning period of the master plan is a new signalised intersection on McMillans Road that will include a connection through to Osgood Drive (discussed in detail below).

Development	Daily trip generation 2023[1]	Daily trip generation 2043[1]	Daily increase in trip generation
Terminal and short-term parking, including car rental[2]	6,030	18,350	12,290
Staff car park and long-term parking	1,310	3,380	2,070
Eastern aviation area	2,890	7,300	4,410
Northern and southern general aviation areas (access Charles Eaton Drive)	2,090	2,700	610
Western Aviation Precinct	0	920	920
Aviation subtotal	**12,350**	**32,650**	**20,300**
Hotel/resort precinct[3]	1,230	2,280	1,050
Darwin Airport Central – between Bunnings and Neale St[4]	1,100	13,800	12,700
Darwin Airport Central – from Neale St to Charles Eaton Dr	1,790	9,470	7,680
Darwin Airport Central – Bunnings and Bagot Rd commercial	4,370	8,300	3,930
Non-aviation subtotal	**8,490**	**33,850**	**25,360**
TOTAL	**20,840**	**66,500**	**45,660**

1. Daily trip generations estimated from 12 hour totals using indicative factor of 1/0.90. Actual night time trip generation will vary by land use type.
2. Includes potential future commercial site south of Henry Wrigley Drive / Sir Norman Brearley Drive roundabout.
3. Includes valet parking
4. Includes existing service station on western side of Neale Street.

Table 10-1: Estimated total trips 2043


NO SMOKING
Taxis
TAXI
CUSTOMER NOTICE

It is not considered important to strongly connect commercial with aviation-based areas. The external road access philosophy is therefore that:

- access to the terminal precinct and eastern aviation area should be retained via Henry Wrigley Drive, although it is anticipated that Osgood Drive will continue to be attractive for traffic departing this area towards Bagot Road, reducing the need for longer term upgrades of McMillans Road (westbound)
- access to the northern general aviation area and southern general aviation area are provided via Henry Wrigley Drive, Charles Eaton Drive and the new signalised intersection
- access to the airport's Service Commercial Zone – Darwin Airport Central – is provided by Osgood Drive, Charles Eaton Drive and the new signalised intersection.

The external road access developments envisioned over the 20-year planning period of the master plan are:

- new signalised intersection on McMillans Road and downgrading of the existing intersection of McMillans Road and Charles Eaton Drive – see further detail below
- increased capacity of Henry Wrigley Drive north of Abala Road, and increased capacity on all approaches at the intersection of McMillans Road, Rothdale Road and Henry Wrigley Drive
- possible improvements to the signalised intersection of Bagot Road, Osgood Drive and Totem Road are also under consideration to provide greater connectivity into the airport site.

These proposed improvements are anticipated to occur in a staged manner.

The traffic study also suggests capacity improvements of the external road network over the 20-year planning period that are outside the remit of this master plan.

New signalised intersection

As discussed in previous master plans, in 2009 the Northern Territory Government approved in principle a new signalised intersection on McMillans Road, to be positioned between Sabine Road and Rapid Creek Road. It will be an 'all movements' signalised intersection (including signalised pedestrian crossings) with a connector road through to Osgood Drive in the airport's Service Commercial Zone.

Such a development would be accompanied by the downgrading of the existing intersection of McMillans Road and Charles Eaton Drive to provide left-in and left-out traffic movements only.

Darwin International Airport has continued to pursue this opportunity with the Northern Territory Government and City of Darwin, to provide greater connectivity between the airport and the external road network. All three parties collectively agree that the most suitable location for this signalised intersection would be at Sabine Road (see Figure 10-5).

Darwin International Airport looks forward to continuing to work with the Northern Territory Government and City of Darwin to progress this opportunity.

Internal road network

Key internal roads within Darwin International Airport are Sir Norman Brearley Drive, Osgood Drive, Charles Eaton Drive and Henry Wrigley Drive. Future traffic modelling indicates that access to and from the external road system is adequate with the nominated improvements. The internal road network will develop over time in response to demand.

The approach to development of the internal road network will be to:

- maximise the use of existing road capacity
- segregation of passenger and non-passenger (e.g. maintenance, commercial developments) traffic as far as practicable
- progressive enhancement of road system capacity in line with demand
- facilitate aviation and commercial developments.

The modelling suggests that improvements to the internal road network by the end of the 20-year planning period of the master plan may include (see Figure 10-4):

- enhancements to the roundabout at the intersection of Henry Wrigley Drive and Charles Eaton Drive to increase capacity
- a new access road from Fenton Court to the long stay plus car park may be developed, reducing the number of vehicle movements across the front of the terminal
- the southbound lane of Fenton Court may be extended to meet Henry Wrigley Drive
- a new access road from Osgood Drive to the proposed Western Aviation Precinct (see Figure 10-5).

Figure 10-3: Road ownership around Darwin International Airport

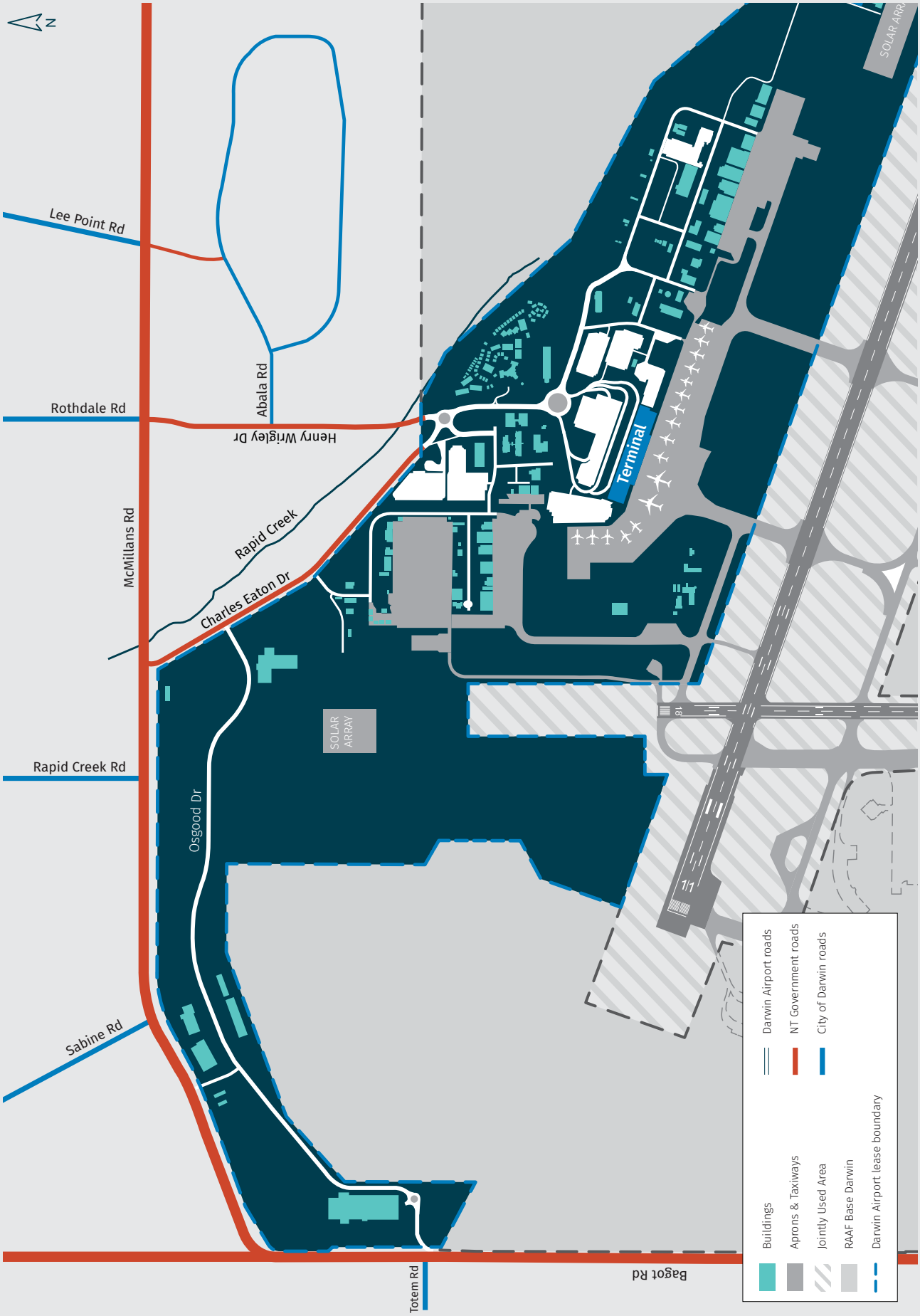
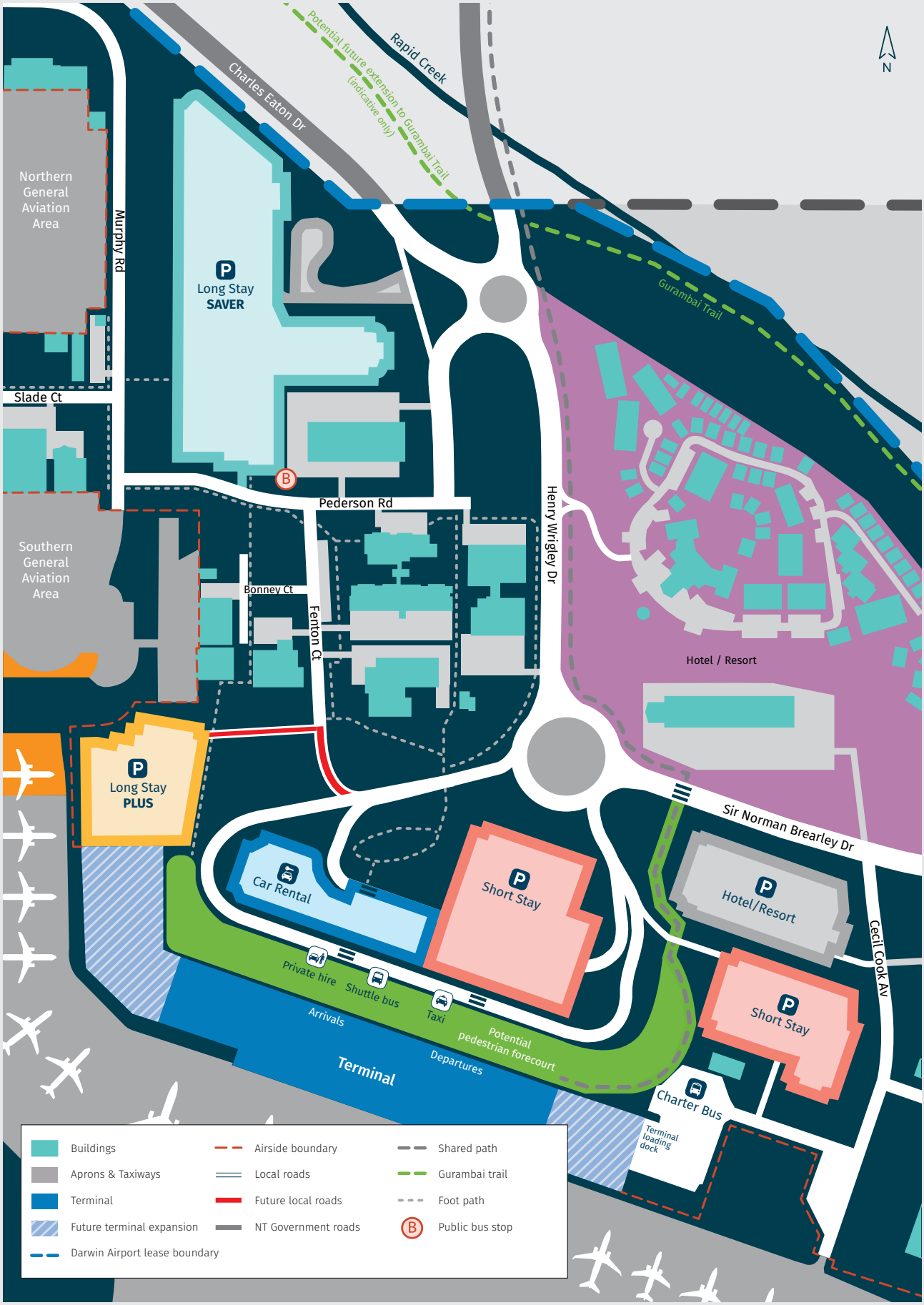


Figure 10-4: Darwin International Airport 2043 Ground Transport Development Plan Concept



The alignment of Osgood Drive may be varied to accommodate future developments during the 20-year planning period of the master plan. This is not expected to impact on the external road access or traffic movements.

Extensions to the internal road system (including shared paths for active transport) over the 20-year planning period will be subject to the normal design considerations and the views of relevant airport customers and other stakeholders.

Car parking

The existing capacity of public and private car parks at the airport are expected to meet parking demand in the short term, with the functions of some car parks to be reallocated as required. Darwin International Airport will continue to review its car parking equipment strategy as advancements in technology evolve.

The traffic modelling for the airport indicates that additional car parking capacity for the terminal may be required in the medium- to long-term, which may take the form of a multi-level car park. This would also be true should a future terminal expansion to the west be realised (see Section 8: Terminal Development Plan), as it would encroach on the existing long stay plus car park, potentially halving its capacity (as shown in Figure 10-4). The location of one or more multi-level car parks during the 20-year planning period will be subject to detailed planning and design at the time.

More formalised car parking for general aviation will be developed when commercially viable.

Darwin International Airport is investigating constructing awnings in some car parks to provide shade to vehicles.

The Northern Territory Government's Electric Vehicle Strategy and Implementation Plan 2021–2026 says the number of electric vehicles in the Northern Territory is expected to increase, potentially rapidly. Darwin International Airport will continue to review the provision of electric vehicle charging points at the airport in line with demand.

Ground transport

As most terminal passengers and general aviation customers arrive at the airport by car or private shuttle bus, ground transport planning needs to focus on transport to and from the airport by private vehicle, taxi, ride share, private hire car, rental cars and private shuttle bus services.
The terminal forecourt area is the threshold to the terminal building and provides an important interface for ground transport functions at the airport. Ground transport arrangements will be refined over time in line with any passenger terminal forecourt changes.

It is anticipated that during the 20-year planning period of the master plan the forecourt area immediately in front of the terminal building may be pedestrianised and landscaped to enhance the customer experience of passengers and visitors to the terminal, as well as promoting safety and aviation security outcomes (see Figure 10-4). This concept would require relocating the existing taxi and commercial vehicle drop-off and pick-up lanes to the north towards the short stay car park. Disability and mobility access assessments will be undertaken to inform the design and development of such a project.

Active transport

Darwin International Airport will continue to investigate opportunities to extend the current shared path network within the airport to support active transport. We will work with the Northern Territory Government to improve shared path capacity where possible in the surrounding areas. Providing charging points for e-bikes and e-scooters may also be explored, in line with demand.

Darwin International Airport is keen to explore opportunities with City of Darwin and the Northern Territory Government to extend the Gurambai walking trail to continue following Rapid Creek beyond the airport's boundary, ultimately connecting it to the pedestrian network on McMillans Road.

10.4 Ground transport developments in the first 8 years of the master plan

A requirement of the Airports Act is to outline potential ground transport developments in the first 8 years of the master plan.

Darwin International Airport is optimistic that an agreement will be reached with the Northern Territory Government in the short-term regarding construction of the signalised intersection on McMillans Road.

We anticipate that refinements may be made to some of the existing ground transport arrangements close to the terminal, such as:

- The terminal forecourt area may be pedestrianised, with some ground transport functions relocated further north towards the short stay car park. Such a development would need to ensure access to the front of the airport terminal building is maintained for emergency response vehicles.
- Road improvements to Fenton Court, as detailed above, including extension of the southbound lane to meet Henry Wrigley Drive.
- Connectivity may be enhanced between the terminal and the hotel/resort, including widened paths, shade structures and landscaping.

In the first 8 years of the master plan, some of the car parks may be reallocated to address market demand, including:

- The long stay saver car park may be expanded into the adjacent private car park to create more capacity. New pedestrian access may be constructed near Murphy Road to provide better access for general aviation customers.
- As part of the hotel/resort development, the existing staff car park may be repurposed for hotel guest parking, with staff car parking relocated to other car parks across the terminal precinct.

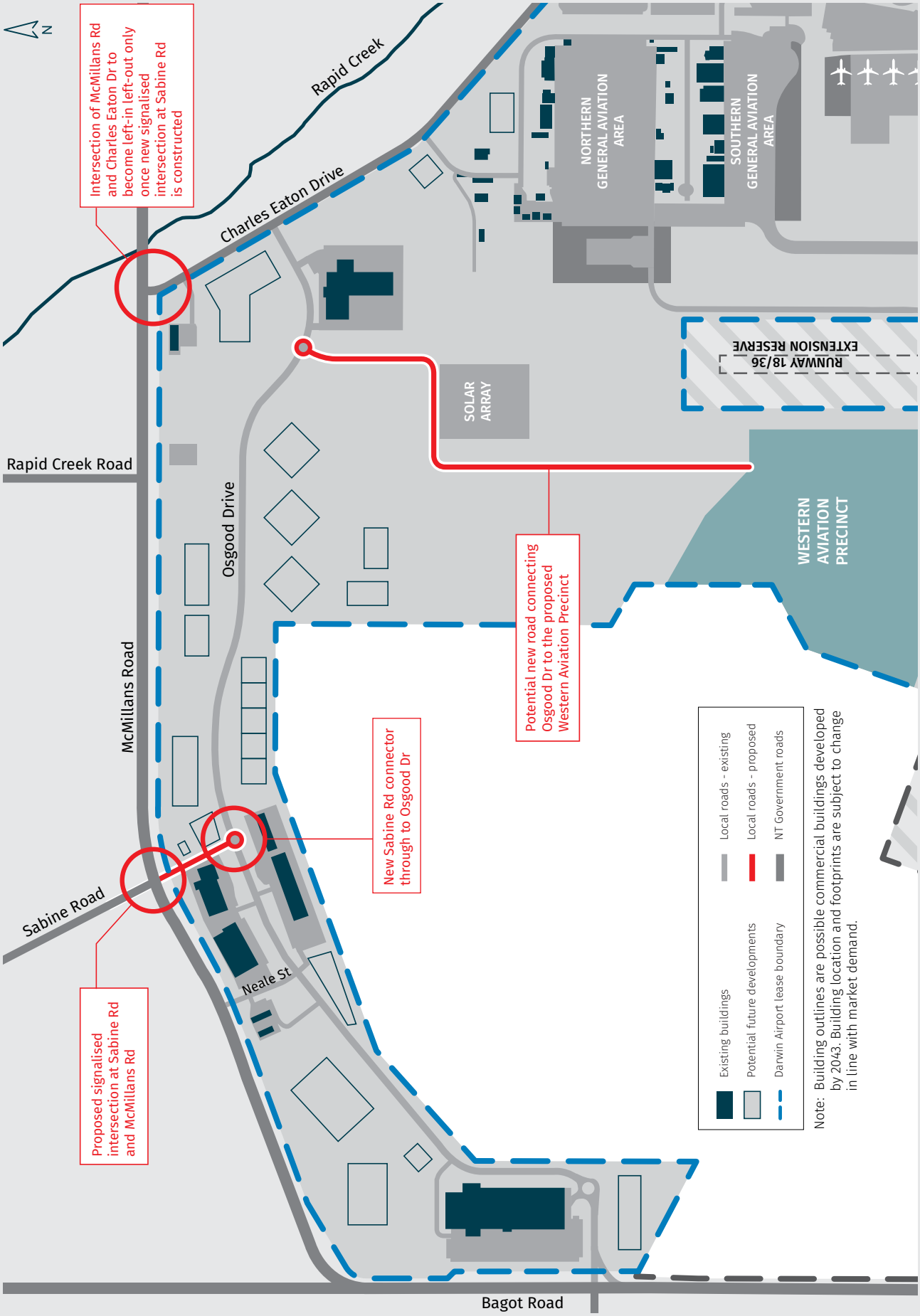
It is anticipated that development of the Western Aviation Precinct will commence in the first 8 years of the master plan. Should this be realised, the new access road to the precinct will need to be developed.

To support the forecast growth of non-airport traffic on the external road network surrounding the airport, as well as increased activity in the airport site, it is anticipated that improvements to some of the surrounding external intersections may also be needed during the first 8 years of the master plan. The traffic modelling suggests this could be undertaken in a staged manner, with initial stages of longer-term upgrades being undertaken to improve capacity at:

- the intersection of Osgood Drive, Bagot Road and Totem Road
- the intersection of Henry Wrigley Drive, McMillans Road and Rothdale Road.

These potential first stage intersection improvements have been identified to inform future discussions with the Northern Territory Government and City of Darwin.

Figure 10-5: Future New External Access



SECTION 11:

Utilities infrastructure

SECTION 11: **Utilities infrastructure**

To ensure Darwin International Airport operates effectively into the future, our infrastructure and utility services must be able to meet future demands. Darwin International Airport is responsible for internal electricity, water, sewage and stormwater infrastructure.

11.1 Leadership in renewable energy generation

Darwin International Airport's parent company, Airport Development Group, is committed to its renewable energy target of net zero scope 1 and 2 greenhouse gas emissions by 2030.

An early adopter of solar, Darwin International Airport installed 2 large scale solar arrays in 2016 and 2017, generating up to 5-megawatts of power in total (AC, alternating current). At the time, the project was the largest airside photovoltaic system in the Southern Hemisphere, with 15,000 solar panels over 8 hectares of airport land that was not required for aviation purposes. (The previous 2017 master plan quoted this solar power generation in DC (direct current) figures which equated to 5.5-megawatts).

In 2020, as part of climate change mitigation efforts, Darwin International Airport started constructing an additional 4-megawatt (AC) solar rooftop array across several businesses operating at the airport. The project signalled ADG's ongoing sector leadership in renewable energy generation in the Northern Territory, and the continued tracking towards the airport's emissions reduction target. The $5 million investment included funding from the North Australia Infrastructure Fund. Our aim is that the solar arrays at Darwin International Airport will provide the airport with all the energy it requires to operate.

Darwin International Airport continues to invest in sustainability, developing grid smarts like generator synchronisation and managing cloud cover to be part of the grid for Power and Water Corporation.

Part of reducing emissions means adjustments across each part of the business. For example, in 2020, an energy-saving project replaced 7,400 square metres of roof and insulation on the Bunnings building, as well as installing 10 new energy-efficient air conditioners.

Future extensions

ADG intends to continue making significant renewable energy investments. Darwin International Airport is investigating further opportunities to develop renewable energy, including using more available roof space on buildings across the airport's lease area.

The airport's electrical network can be extended to duplicate current solar capacity.

Energy battery storage systems may be installed to support the growth of renewable energy and displace purchased fossil fuel.

Rooftop solar array on terminal building

11.2 Electricity supply

Existing services

Darwin International Airport manages an embedded electrical network that provides electricity to all airport users and tenants. The energy sources used by the airport are:

- solar PV arrays
- electricity purchased from the grid
- standby diesel generation sets
- unleaded petrol or diesel for vehicles and machinery.

The airport is currently served by 3 feeds from Power and Water Corporation, any 2 of which are sufficient to supply the airport.

The aeronautical facilities on airport are serviced by one complete ring main, and a spur main services surrounding commercial buildings.

Back-up generators are supplied for most aviation-related and some commercial facilities. High voltage back-up generators are connected to the airport's HV ring main. Local emergency generator sets (low voltage) are provided for the terminal building to provide power for essential systems for an additional level of redundancy.

Darwin International Airport has applied for a generation licence under the NT electricity grid. The airport is awaiting the results from the Northern Territory Utilities Commission on the public consultation of this application.

Future extensions and upgrades

The airport's 11kV HV network will be extended and augmented as required to cater for future developments. The system will need a number of additional HV/LV substations for new developments as well as HV cable additions and replacements to ensure network integrity is maintained.

Continual liaison with Power and Water Corporation (PWC) will be essential to ensure the PWC import capacity threshold is not exceeded, as this could trigger the requirement for additional HV feeders to the airport. However, Darwin International Airport does not anticipate this occurring due to improved efficiency of plant and equipment as well as solar power generation on site.

11.3 Water supply

Existing services

Water is supplied to Darwin International Airport by Power and Water Corporation, sourced from surface water catchments in the Darwin region.

A significant amount of water is used across the airport for passengers, daily operations, construction activities and airport gardens. Water is also distributed to airport tenants under sub-metering arrangements. There is currently no recycled water used across the airport's regular operation.

Potable water for the airport is taken from 2 external mains connections: one adjacent to McMillans Road (south of the intersection with Charles Eaton Drive) and the other at Bagot Road near Bunnings.

The terminal precinct water is transferred into a holding tank which then feeds a pressure pump set. Both domestic water and fire hydrant water share the same ring main system. The pressure pump set is sized to provide sufficient firefighting water without external intervention. The remainder of the airport's lease area is supplied at PWC mains pressure.

Future extensions and upgrades

The water systems will be augmented as required for future developments.

A master plan has been prepared for the water main infrastructure to align with potential future developments at Darwin International Airport. This master plan includes a new central storage tank at a new location to be appropriately sized to cater for potable and fire-fighting demand, new booster pumps and Power and Water Corporation main bypass facilities.

11.4 Sewerage

Existing services

The current built area has a reticulated gravity system which feeds the various pumping stations that discharge to the main sewerage pumping station to the north of the northern general aviation area. This then pumps via a rising main to Power and Water Corporation's Marrara Trunk Sewer on the north-east side of Rapid Creek.

The receiving capacity of Power and Water Corporation's infrastructure is at its limit.

Future extensions and upgrades

Until Power and Water Corporation's sewage receival capacity is increased, Darwin International Airport will augment its internal sewage holding capacity to smooth the discharge rate to the Power and Water Corporation system.

A master plan has been prepared for the sewer infrastructure. The master plan has identified possible constraints in the existing sewer network and foresees the need to upgrade existing sewer mains pipes, increase the duty of sewer pump stations, and install a combination of new gravity and pumped sewer pipework and new pump stations to service future developments at the airport.

11.5 Stormwater drainage

Existing services

Stormwater drainage uses both open drains and stormwater pipes that lead into Rapid Creek and Ludmilla Creek. Darwin International Airport has established extensive monitoring and implemented a variety of controls to minimise the impact of airport stormwater.

Under the Joint User Deed, Defence is responsible for managing stormwater drainage in the Jointly Used Area.

In 2007, a large retention basin was established in the north-western corner of the airport site in conjunction with the Department of Defence to retard water flows from airside land into the Ludmilla Creek catchment and drainage systems.

Off-airport, the Northern Territory Government constructed the Marrara detention basin in 2019 for stormwater detention and flood mitigation, with the main objective of reducing flood events along Rapid Creek, particularly in the suburb of Millner. The basin is located north of the airport site on the corner of McMillans Road and Henry Wrigley Drive. The detention basin has been successful in managing the impact of peak flows, however it does not futureproof the catchment for increased stormwater flows as a result of land development, rather it mitigates the impacts from historical increases in catchment flows to Rapid Creek.

Updated flood mapping for Rapid Creek published in 2020 by the Northern Territory Government now includes this stormwater detention basin and has resulted in a reduced impact of flooding on more than 100 downstream properties. This includes 45 properties that are no longer on the Rapid Creek flood map.

Flood mitigation and stormwater flows within the Rapid Creek catchment remain a high priority community issue. The Rapid Creek Management Plan released by the Rapid Creek Water Advisory Committee in 2021 has a focus on hydrology, highlighting increased inflows from urban developments as a threat to the health of Rapid Creek.

Future extensions and upgrades

Darwin International Airport intends to update previous stormwater modelling and review the existing and future stormwater management across the airport site (see Section 14: Environment Strategy). This is particularly important for new development areas, to ensure there is sufficient site drainage infrastructure and to ensure that any stormwater flow increases from newly developed non-permeable areas do not negatively impact Ludmilla Creek, Rapid Creek or downstream communities within a catchment that is at full capacity during major rain events.

11.6 Communications

Existing services

As with all other major Australian airports, a range of communications are available to airport tenants. Radio, mobile phone, land line and internet communications are largely the responsibility of other authorities. Darwin International Airport provides free Wi-Fi to customers in the airport terminal.

The airport's infrastructure data network is separate and additional to telecommunications and public/corporate network and internet access. This infrastructure network provides communications for machine-to-machine and machine-to-control systems applications.

This network follows the airport's high voltage distribution cable paths, allowing the airport to monitor all our electrical energy distribution, usage and general inputs. By following our electrical distribution, this network extends physically, via single mode fibre optic cable, to cover the whole airport precinct.

Future extensions and upgrades

The airport's infrastructure data network will be augmented as required for future developments.

Communications equipment mounted to water tower.

11.7 Easements

Part 5.02(3)(b) of the Airport Regulations 1997 requires that any obligations or interests at Darwin International Airport are addressed. Existing registered easements are listed below:

- 2 electricity supply easements to Power and Water Corporation
- 2 electronic communications easements to Telstra Corporation Limited
- electricity supply easement granted to the Department of Defence – RAAF Base Darwin
- water supply easement granted to the Department of Defence – RAAF Base Darwin
- access easement granted to the Department of Defence – RAAF Base Darwin.

SECTION 12:

Safeguarding the airport

SECTION 12: **Safeguarding the airport**

12.1 Introduction

Airports are important national infrastructure assets. They are essential transport hubs and contribute significantly to the national economy as well as the economies of the cities, regions, states and territories they are located in.

Buildings and activities in the vicinity of Darwin International Airport have the potential to create air safety hazards and to seriously limit the current and future viability of aircraft operations in and out of the airport.

12.2 National Airports Safeguarding Framework

The Australian Government recognises that responsibility for land use planning rests primarily with state, territory and local governments but that a national approach can assist in improving planning outcomes on and near airports and under flight paths.

The National Airports Safeguarding Framework (NASF) has been developed by the National Airports Safeguarding Advisory Group to provide guidance on planning requirements for development that affects aviation operations. The group comprises representatives from Commonwealth Infrastructure and Defence departments and aviation agencies, state and territory planning and transport departments, and the Australian Local Government Association. The Northern Territory Government Department of Infrastructure, Planning and Logistics is a member of the group.

The framework was first released in 2012 and provides a national regime for land use planning around airports in Australia. The purpose of the framework is to enhance the current and future safety, viability and growth of aviation operations at Australian airports by supporting and enabling:

- the implementation of best practice in relation to land use assessment and decision making in the vicinity of airports
- assurance of community safety and amenity near airports
- better understanding and recognition of aviation safety requirements and aircraft noise impacts in land use and related planning decisions
- the provision of greater certainty and clarity for developers and landowners
- improvements to regulatory certainty and efficiency
- the publication and dissemination of information on best practice in land use and related planning that supports the safe and efficient operation of airports.

NASF guidelines

There are 9 guidelines under the framework:

- **Guideline A:** Measures for Managing Impacts of Aircraft Noise
- **Guideline B:** Managing the Risk of Building Generated Windshear and Turbulence at Airports
- **Guideline C:** Managing the Risk of Wildlife Strikes in the Vicinity of Airports
- **Guideline D:** Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation
- **Guideline E:** Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports
- **Guideline F:** Managing the Risk of Intrusions into the Protected Airspace of Airports
- **Guideline G:** Protecting Aviation Facilities – Communications, Navigation and Surveillance (CNS)
- **Guideline H:** Protecting Strategically Important Helicopter Landing Sites
- **Guideline I:** Managing the Risk in Public Safety Areas at the ends of Runways.

Darwin International Airport is committed to continuing considering the NASF guidelines in our airport planning and development.

The Northern Territory Government first introduced airport safeguarding measures for off-airport developments in 2016 through the ‘Land in Proximity to Airports’ provision of the NT Planning Scheme. As part of recent planning reforms, the ‘Land in Proximity to Airports’ provision has now become an overlay that is also captured in the NT Atlas and Spatial Data Directory online mapping tool.

12.3 Aircraft noise

Over the long term, inappropriate development around airports can result in unnecessary constraints on airport operations and negative impacts on community amenity due to the effects of aircraft noise.

Guideline A provides advice on the use of a supplementary suite of noise metrics, including the Australian Noise Exposure Forecast system and frequency-based noise metrics, to inform strategic planning and provide communities with comprehensive and understandable information about aircraft noise. Source: NASF factsheet

The main noise metric for Darwin International Airport is the Australian Noise Exposure Forecast (ANEF). The ANEF is a contour map that forecasts expected future aircraft noise levels for land use planning purposes. The ANEF is subject to technical review and endorsement by Airservices Australia and the Department of Defence.

Section 13 of the master plan details the joint military-civil aircraft noise forecasts for RAAF Base Darwin and Darwin International Airport.

The ANEF is an important noise metric because it is the only noise metric that has status under the:

- NT Planning Scheme for land use planning and development consent off-airport
- Airports Act for land use planning and development consent on-airport.

Being a land use planning tool, the ANEF does not appropriately describe the impact or exposure of aircraft noise to the surrounding community. For this reason, Darwin International Airport has incorporated the NASF Guideline A recommendation of additional complementary methods of describing aircraft noise, such as N-Contour drawings (see Section 13).

Darwin International Airport considers all potential on-airport developments against the ANEF and N-Contour drawings. Darwin International Airport provides comment on proposed developments off-airport that are exhibited through the Northern Territory Government's Development Assessment Services. The airport's feedback includes reference to the siting of proposed developments surrounding the airport in relation to the ANEF contours.

Off-airport, the Northern Territory Government has embedded Guideline A within the NT Planning Scheme and relevant regional land use and area plans. The ANEF contours are incorporated within the Northern Territory Government's online mapping tool (NT Atlas and Spatial Data Directory), and a new 'Land in Proximity to Airports' overlay has been introduced with further detail of the overlay's provisions in Part 3.5 of the NT Planning Scheme. The AS2021 acoustics table for siting of buildings against aircraft noise intrusion is referenced in Schedule 5 of the planning scheme.

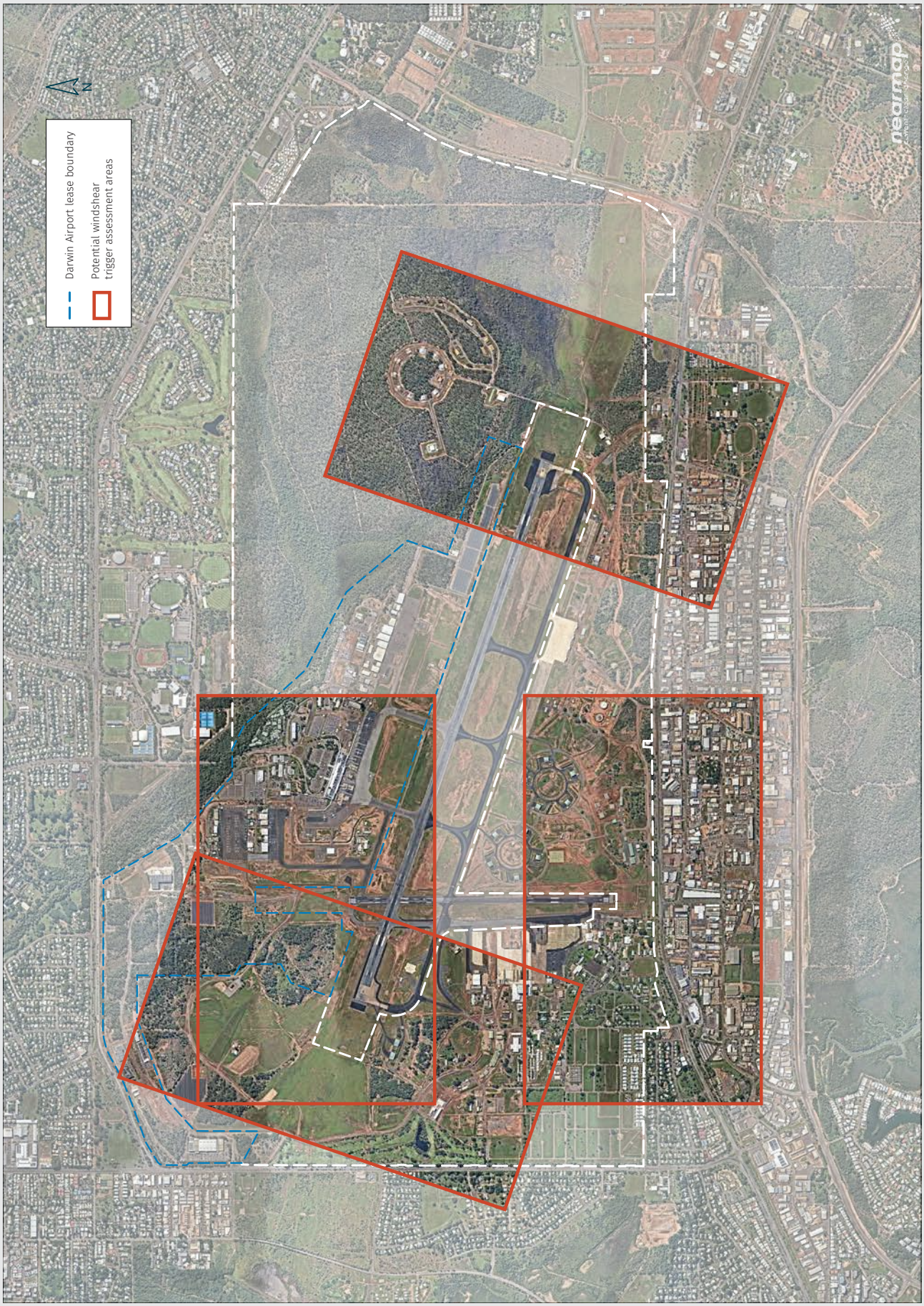
12.4 Building-generated windshear and turbulence

Building-induced windshear and turbulence can be a problem for aviation operations in cases where structures are situated close to airport runways. When a significant obstacle is located in the path of a crosswind to an operational runway, the wind flow will be diverted around and over the building and can cause then crosswind speed to vary along the runway.

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

At airports, a combination of strong winds and large buildings near runways can create runway wind effects that could affect aviation safety.

Figure 11-1: Darwin International Airport potential building generated wind effect assessment areas



Windshear and turbulence pose the greatest risk on approach, landing and take-off when an aircraft's speed is low and the pilot's ability to respond may be limited. It has been identified that the most critical zone for building positioning in relation to building generated windshear is in close proximity to the touch-down zones of the runways. Building generated turbulence is a more likely phenomenon than windshear when large structures are located in the vicinity of runways.

Guideline B sets out an assessment methodology for windshear and turbulence, including potential assessment trigger envelopes for the airport. In considering the risk of building-generated windshear and turbulence as a result of any future developments on-airport, Darwin International Airport will refer to NASF Guideline B recommendations. The potential assessment trigger envelopes for Darwin International Airport are at Figure 11-1.

Off-airport, risk from windshear and turbulence generated by buildings is primarily managed through height controls of the NT Planning Scheme and through the existing referral and consultation process. Any concerns are addressed by the consent authority as part of the development assessment process or via conditions of approval.

12.5 Wildlife hazard management

Wildlife strikes and/or avoidance can cause major damage to aircraft and/or compromise aircraft safety. Whilst the Civil Aviation Safety Authority has well-established safety requirements for wildlife management plans on-airport, wildlife hazards also occur outside the airport fence.

Guideline C provides advice to help protect against wildlife hazards originating off-airport. Many existing airports are surrounded by areas that are attractive to wildlife, especially birds, but appropriate land use planning decisions and the way in which existing land use is managed in the vicinity of airports can significantly reduce the risk of wildlife hazards. Source: NASF factsheet

Surrounding land use can have the potential to attract problem wildlife species to the airport, increasing the risk of strike incidences. Darwin International Airport is required to monitor and control the presence of wildlife on or in the vicinity of the airport in accordance with CASA regulations.

The airport maintains a vigilant Wildlife Hazard Management System to remove and reduce potential high-risk bird and animal species. Wildlife hazard management considerations are taken into account when planning and assessing potential developments at the airport and its surrounds.

Off-airport, the Northern Territory Government has incorporated recommendations of Guideline C within the Land in Proximity to Airports overlay in Part 3.5 of the NT Planning Scheme. Guideline C is also reflected in relevant regional land use and area plans, containing land use policy with respect to land near airports.

12.6 Wind turbines

Wind turbines can constitute a risk to low-flying aviation operations such as agricultural pilots. Additionally, temporary and permanent wind monitoring towers can be erected in anticipation of, or in association with, wind farms and can also be hazardous to aviation, particularly given their low visibility.

These structures can also affect the performance of communications, navigation and surveillance equipment operated by Airservices Australia and the Department of Defence. Guideline D provides advice on the location and safety management of these and other similar structures. Source: NASF factsheet

There are currently no large-scale wind turbines in the vicinity of Darwin International Airport. The Airports (Protection of Airspace) Regulations protect Darwin International Airport from tall structures like wind turbines being constructed in the vicinity of the airport. When wind turbines over 150 metres above ground level are to be built within 30 kilometres of a certified or registered aerodrome, the proponent should notify the CASA and Airservices Australia.

The Northern Territory Government's Roadmap to Renewables strategy identified that relatively low average wind speeds are experienced in the NT. As a result, they are less effective at generating energy and so less commercially viable than in other parts of Australia. Wind power is likely to be of marginal value in comparison to other renewable energy technologies, like solar power, which is well suited to the climate conditions of Darwin.

12.7 Lighting in the vicinity of the airport

Pilots are reliant on the specific patterns of aeronautical ground lights during inclement weather and outside daylight hours. These aeronautical ground lights, such as runway lights and approach lights, play a vital role in enabling pilots to align their aircraft with the runway in use. They also enable the pilot to land the aircraft at the appropriate part of the runway.

It is therefore important that lighting in the vicinity of airports is not configured or is of such a pattern that pilots could either be distracted or mistake such lighting as being ground lighting from the airport. Guideline E provides advice on the risks of lighting distractions and how these can be minimised or avoided.
Source: NASF factsheet

CASA has the power under the Civil Aviation Regulations 1988 (CAR 94 – Dangerous Lights) to control ground lights where they have the potential to cause confusion or distraction from glare to pilots in the air. To assist lighting designers and installation contractors in the vicinity of the airport, CASA has established guidelines on the location and permitted intensities of ground lights within a 6-kilometre radius of airports. External advertising, sport field floodlighting and street lighting are some of the more likely lighting sources requiring consideration.

NASF Guideline E provides further guidance to assist development proponents and planning authorities to ensure lighting in the vicinity of airports does not compromise aviation safety. A maximum permissible lighting intensity map for Darwin International Airport is at Figure 11-2.

Off-airport, the Northern Territory Government has incorporated recommendations of Guideline E within the Part 5.3 overlay 'Land in Proximity to Airports' in the NT Planning Scheme 2020. This precludes the use or development of lighting on land within flight approach paths so as not to prejudice the safe operation of the airport. Guideline E is also reflected in relevant regional land use and area plans, containing land use policy with respect to land near airports.

12.8 Airspace protection

The operational airspace of airports is the volume of airspace above a set of imaginary surfaces, the design of which is determined by criteria established by the International Civil Aviation Organisation. These surfaces are established with the aim of protecting aircraft from obstacles or activities that could be a threat to safety – in particular, high-rise buildings.

Guideline F provides advice for planners and decision makers about working within and around protected airspace, including OLS and PANS-OPS intrusions, and how these can be better integrated into local planning processes. Source: NASF factsheet

Part 12 of the Airports Act and the Airport (Protection of Airspace) Regulations declare prescribed airspace and give statutory protection from intrusion into this airspace. For the immediate and long-term operation of Darwin International Airport, new structures should be designed, or other activities controlled, to ensure they do not intrude into the present or future protected airspace.

Figure 11-2: Darwin International Airport maximum permissible lighting intensity

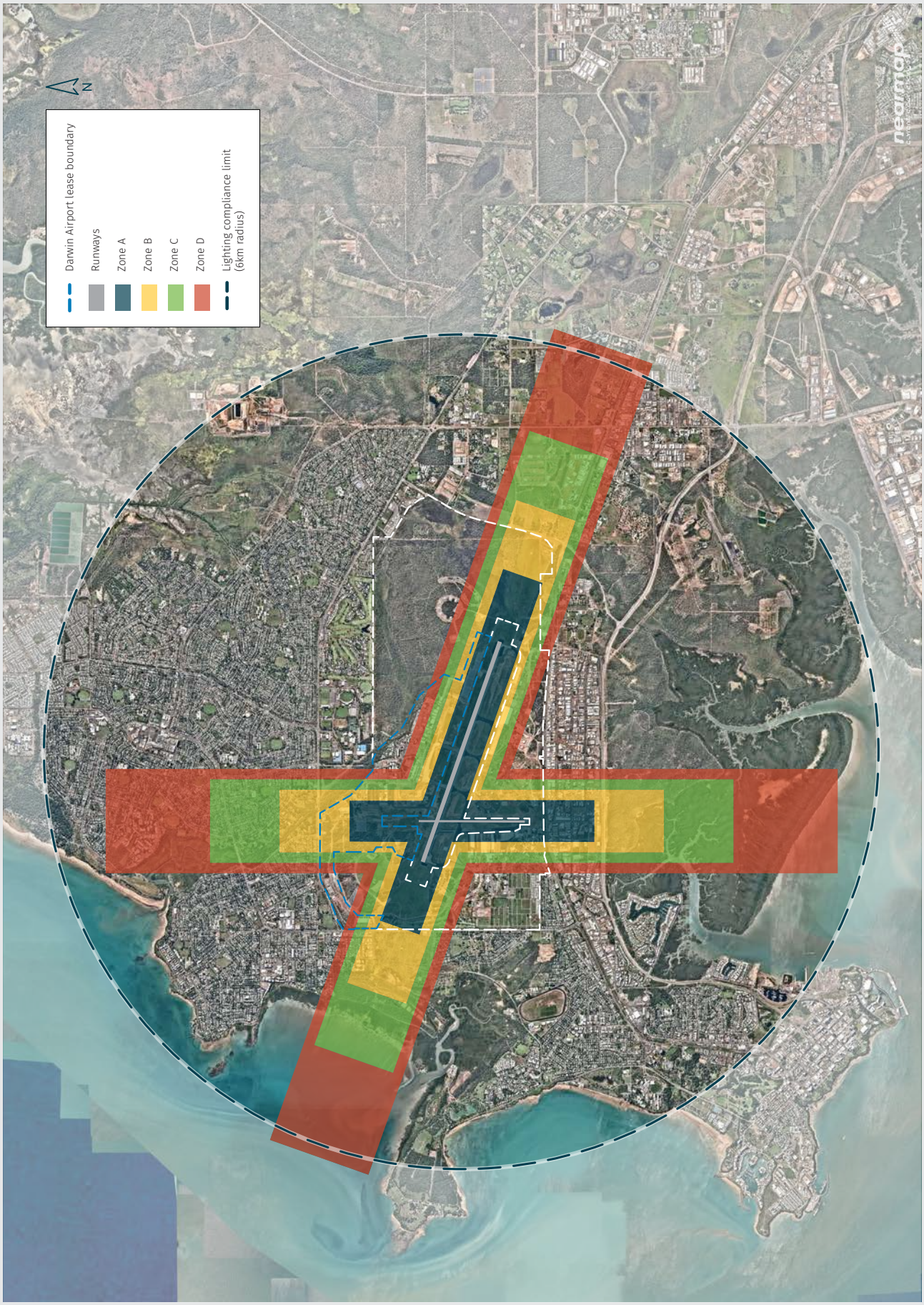
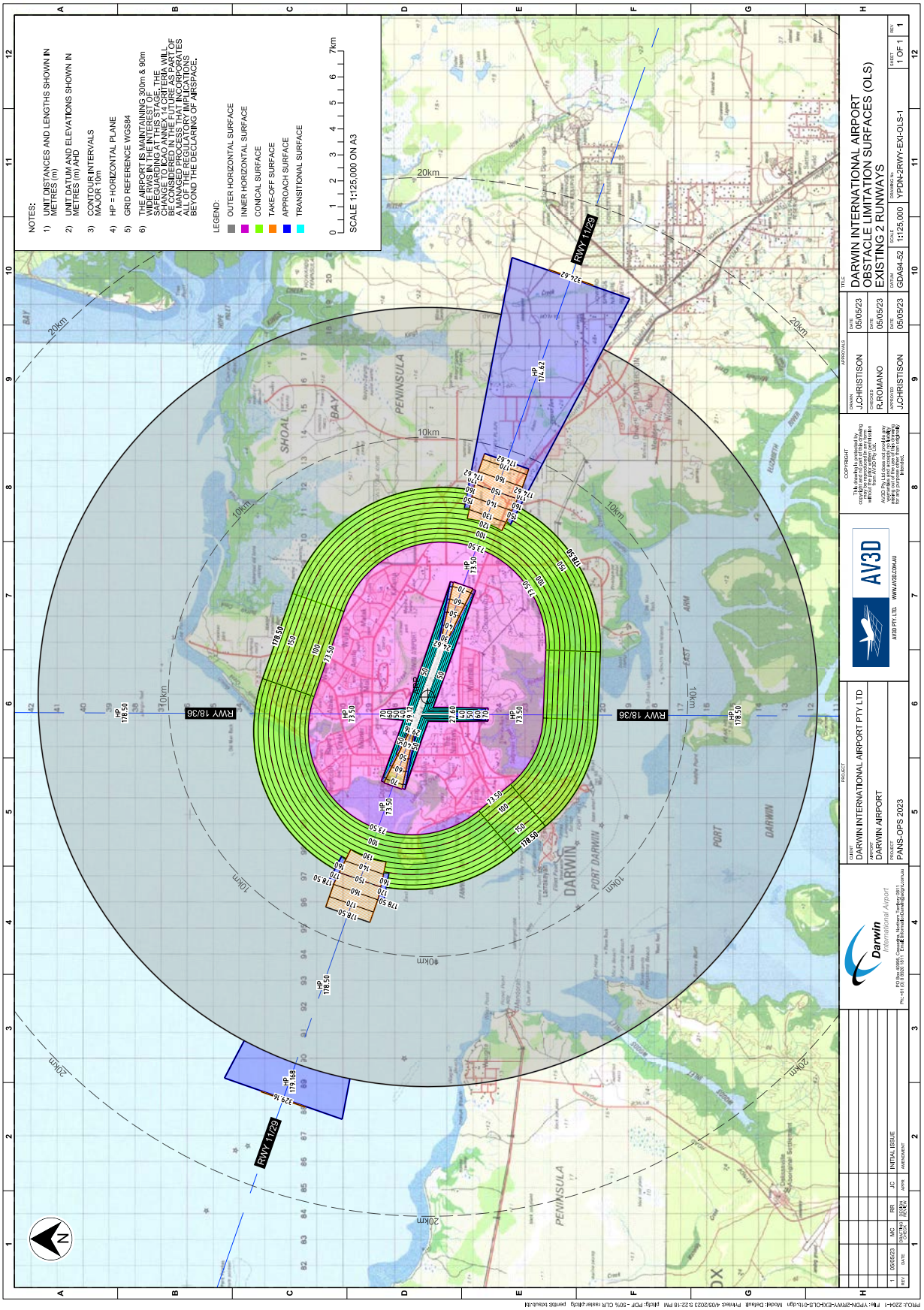


Figure 11-3: Darwin International Airport obstacle limitation surfaces (OLS)



There are Australian standards for airport design, including Civil Aviation Safety Regulations (CASR 1998) and Manual of Standards Part 139 – Aerodromes (MOS Part 139). Under these standards, airspace is prescribed for protection in 2 categories:

- obstacle limitation surfaces (OLS)
- procedures for air navigation services – aircraft operations (PANS-OPS).

NASF Guideline F highlights the importance of these surfaces in protecting the operational efficiency of the airport. In line with these guidelines, Darwin International Airport has prepared OLS and PANS-OPS charts that define the airport's prescribed airspace. These charts are integral in assessing proposed developments in and around the airport that may intrude on the protected airspace.

The Northern Territory Government manages the risk of intrusion into protected airspace through the height controls of the NT Planning Scheme and the consultation and referral processes. Buildings or structures proposed in the vicinity of Darwin International Airport that are over 8.5m in height are referred to the airport, Department of Defence and CASA for comment, particularly where these proposed developments are located within the declared RAAF Base Darwin Defence Aviation Area Plan. Civil and Defence airspace protection regulations are also referenced in Part 5 (Development Requirements) of the NT Planning Scheme.

The Northern Territory Government has worked collaboratively with Darwin International Airport and Department of Defence to increase the understanding of airspace protection for planning professionals and development applicants. A helpful summary of civil and Defence building height planning considerations surrounding Darwin International Airport / RAAF Base Darwin is published on the Department of Infrastructure, Planning and Logistics website.

Darwin International Airport would welcome the opportunity for the airport's OLS and PANS-OPS charts to be included as additional overlays in the Northern Territory Government's online mapping tool (NT Atlas and Spatial Data Directory).

Obstacle limitation surfaces

The obstacle limitation surfaces (OLS) are a series of surfaces in the airspace surrounding an airport and referenced to each runway. The OLS for Darwin International Airport is at Figure 11-3.

The broad purpose of the OLS is to define the volume of airspace that should ideally be kept free from obstacles in order to minimise the danger to aircraft flying into or out of the airport when the pilot is flying by sight, or during the visual segment of an instrument approach procedure. Infringements of these surfaces may be approved subject to a safety analysis and assessments by stakeholders and subject to any conditions imposed.

Procedures for air navigation services – aircraft operations (PANS-OPS) surfaces

A PANS-OPS surface for an airport is a surface ascertained in accordance with the procedures in ICAO Procedures for Air Navigation Services – Aircraft Operations (Doc 8168, PANS-OPS). The PANS-OPS for Darwin International Airport is at Figure 11-4.

The PANS-OPS surfaces are generally higher than the OLS and are intended to safeguard an aircraft from collision with obstacles when the pilot is flying with navigation instruments. The designer of an instrument procedure determines the lateral extent of areas needed for an aircraft to execute a particular manoeuvre. The designer then applies minimum obstacle clearances to structures, terrain or other natural features within that area to determine the limiting altitude at which the manoeuvre can be safely executed. As a result, PANS-OPS surfaces cannot be infringed in any circumstances.

Airspace protection planning control

Any activity (on- or off-airport) that infringes an airport's protected airspace is called a 'controlled activity' and requires approval before it can be carried out. Controlled activities include:

- permanent structures, such as buildings, intruding into the protected airspace
- temporary structures, such as cranes, intruding into the protected airspace
- any activities causing intrusion into the protected airspace through glare from artificial light or reflected sunlight, air turbulence from stacks or vents, smoke, dust, steam or other gases or particulate matter.

The Airports (Protection of Airspace) Regulations stipulate that controlled activities need specific approval from DITRDCA. The regulations require that proponents of controlled activities must provide Darwin International Airport with the details of the proposal, which are then assessed against the OLS and PANS-OPS by the airport and government safety agencies before Darwin International Airport provides all information to DITRDCA for consideration. Where it will affect the safety, efficiency or regularity of air transport at the airport, Darwin International Airport will indicate to DITRDCA its opposition to the proposal.

Defence Aviation Area

Part 11A of the Defence Regulation 2016 provides a legal framework for controlling activities that may be dangerous to aviation and aviation facilities around Defence airfields. A declared Defence Aviation Area (DAA) exists within a 15 kilometre radius of RAAF Base Darwin / Darwin International Airport. This means that certain activities, structures and objects need to be referred to Defence for approval if they exceed a certain height, including:

- the construction of buildings and other permanent structures like communications towers
- temporary structures such as cranes
- vegetation, such as trees and plants used for landscaping
- gas plumes coming from an exhaust stack.

Objects located within the DAA that are hazardous to the safety of aircraft operations or aviation-related communications, navigation or surveillance facilities (such as radars) also require Defence approval under the regulations, regardless of the DAA height restrictions.

12.9 Communication, navigation and surveillance facilities

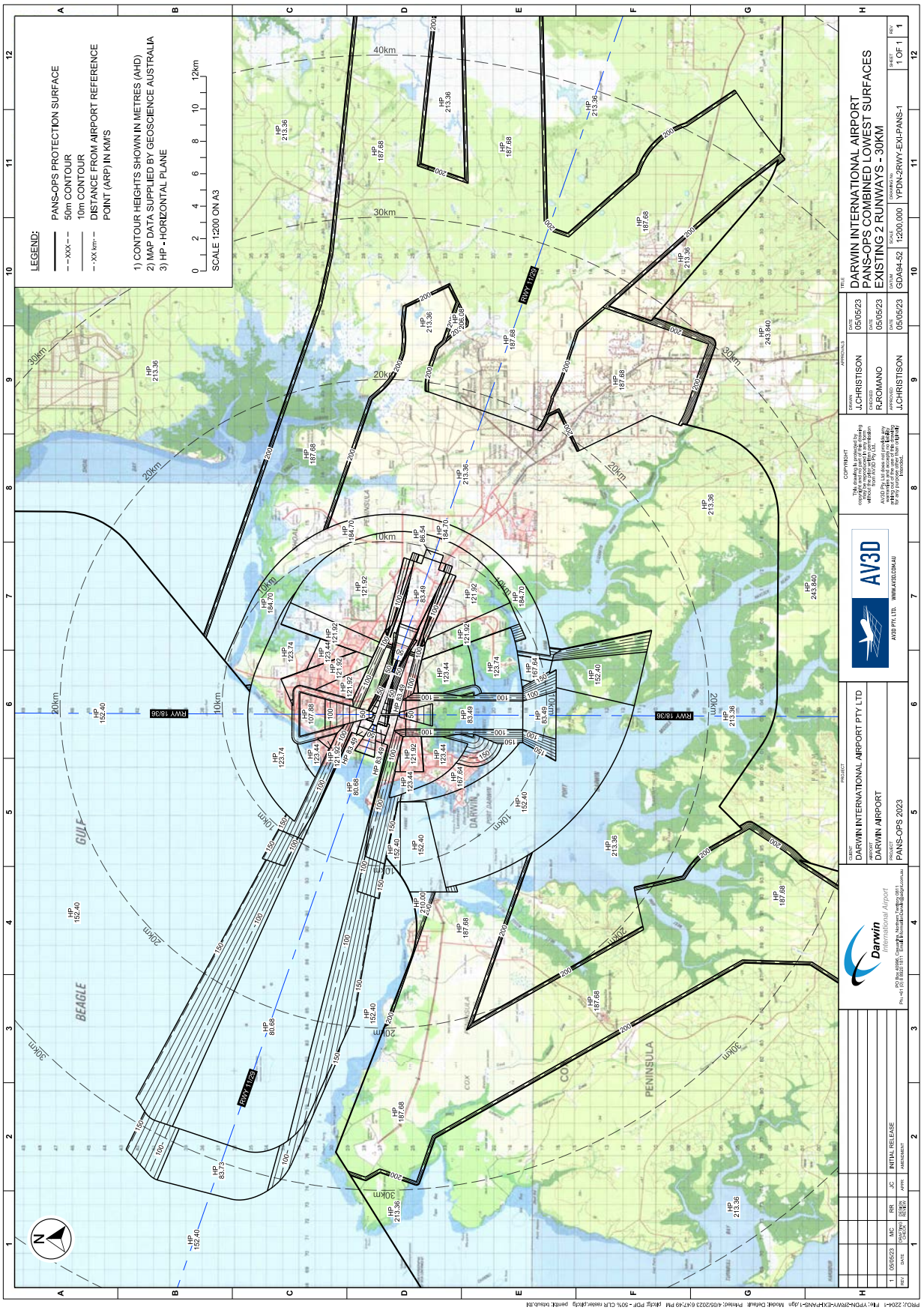
Communications, navigation and surveillance (CNS) facilities are crucial to the safe and efficient operation of aircraft. They enable pilots to navigate while between airports, conduct instrument approaches and to communicate and confirm their position with air traffic control. While such facilities are generally associated with airports, some are offsite and at significant distances from airports. Inappropriate development in the vicinity of these facilities can compromise their effectiveness.

Guideline G is intended to assist land-use planners in their consideration of these facilities when assessing development proposals and rezoning requests and when developing strategic land use plans. It will also guide their interactions with Airservices Australia and the Department of Defence on when to consult on development proposals and in gaining up-to-date geographical locations for these facilities.
Source: NASF factsheet

At Darwin International Airport, there are a number of radio navigation aids, communication installations and radar systems that provide precision and other guidance to aircraft, including distance measuring equipment (DME), very high frequency omnidirectional range (VOR), instrument landing system (ILS), tactical air navigation system (TACAN) and radar. These are operated by Airservices Australia and the Department of Defence.

These systems rely on the transmission of radio waves that must be protected from any structures or obstacles that could cause signal refraction or interference. Consequently, areas surrounding these facilities may have development restrictions. NASF Guideline G provides detailed guidance on the requirements for the building restriction areas around these facilities.

Figure 11-4: Darwin International Airport procedures for air navigation services – aircraft operations (PANS-OPS) surfaces



Aircraft use airport-based navigational aids for en-route navigation or to make an instrument approach to the airport. Unplanned interruptions to, or degradation of, the ground signal are to be avoided in the interests of safety. Therefore, it is necessary to ensure there will be no interference caused to the operation of navigational aids by the erection of structures or work activities within the vicinity of a navigational aid or its associated cables.

To meet the necessary performance requirements, airspace restrictions are established for each item of equipment and procedures. It may be possible under some circumstances to permit infringements of the protective surfaces without degradation in system performance. Protection of the navigation aids and radar-restricted surfaces is managed cooperatively between Darwin International Airport, Airservices Australia and the Department of Defence.

The Northern Territory Government has incorporated provisions of Guideline G in relevant regional land use and area plans, which refer to height restrictions for land near Darwin International Airport.

12.10 Helicopter landing sites

The protection of strategically important helicopter landing sites (HLS) (such as those associated with hospitals) from the adverse impacts of development has become a critical issue in recent years. There have been times where hospital emergency helipads have been closed due to safety concerns arising from the nearby operation of construction cranes.

Guideline H seeks to provide a consistent national approach for land use planning in the vicinity of these facilities. State and territory governments are responsible for identifying HLS that are considered to be of strategic importance, or those that are to be protected in the interest of public safety.
Source: NASF factsheet

Guideline H specifically relates to protecting strategically important helicopter landing sites located off-airport. The Northern Territory Government introduced helicopter landing sites into the NT Planning Scheme in 2019. There are currently 3 strategically important helicopter landing sites designated in the NT: Alice Springs Hospital, Katherine Hospital and Royal Darwin Hospital.

12.11 Public safety areas

Public safety areas (PSAs) are designated areas of land at the end of airport runways within which certain planning restrictions may apply. While air crashes are rare events, the majority occur in the vicinity of airports during take-off and landing. The PSA Guideline was developed to mitigate the risk of on-ground fatalities from an aircraft incident by informing a consistent approach to land use at the end of Australian airport runways.
Source: NASF factsheet

Guideline I: Managing the Risk in Public Safety Areas at the Ends of Runways is the most recent guideline to have been introduced into the National Airports Safeguarding Framework, in late 2018.

Public safety areas seek to limit land uses at the end of an airport runway that increase the number of people living, working or congregating in the area, as well as the storage of hazardous materials in the area.

On-airport, public safety areas are considered by Darwin International Airport in the approval process when assessing a proposed development.

Off-airport, the implementation of public safety areas falls within the jurisdiction of the Northern Territory Government. Public safety within proximity of the runway ends at Darwin International Airport / RAAF Base Darwin has long been recognised in the NT Planning Scheme as an important objective in the regulation of land use in the vicinity of airports.

The NT Planning Scheme has applied Restricted Development zones to land directly to the east and west of Darwin International Airport. These Restricted Development zones have been in place for over a decade, prior to the introduction of Guideline I, and already prohibit most types of development at the end of the runways.

The Berrimah North Area Plan, adopted in the NT Planning Scheme in 2014, includes a public safety area on land east of the airport. It includes principles on land use constraints associated with Darwin International Airport and RAAF Base Darwin.

The Department of Defence has indicated it will soon prepare a new public safety area model for RAAF Base Darwin. It will take a similar form to that recently completed at RAAF Base Amberley.

12.12 Remotely piloted aircraft systems (RPAS) and advanced air mobility (AAM)

Commonly referred to as drones, remotely piloted aircraft systems (RPAS) are different from other aircraft because they have no pilot or crew on board. Advanced air mobility (AAM) describes a range of aircraft types (both crewed and uncrewed) that will transport passengers and larger freight.

Drones are an emerging technology that are growing in popularity. It is important that drone users inform themselves on how and where they may operate a drone, whether they need to be licensed, and the dangers of flying drones near airports.

CASA is responsible for the regulation of aviation safety in Australia and has developed rules for the use of drones around airports, available on its website. CASA has verified several drone safety apps that use location-based maps to show where you can and can't fly drones according to aviation legislation.

Drones offer significant opportunities, such as the potential to deliver time-critical medical items to remote communities (currently being investigated by the Northern Territory Government).

However, drones also present security and safety risks. In 2021, the Australian Government released the National Emerging Aviation Technology Policy Statement to set the framework for managing these technologies, including:

- a Drone Rule Management System developed in partnership with state and territory governments to enable a consistent framework for drone operating restrictions to be submitted, assessed and implemented
- a National Drone Detection Network to detect drone activity around airports, flight paths and other sensitive areas. It will be a coordinated system of scalable and modular infrastructure and will provide relevant data to a wide range of users.

Air traffic control towers at Darwin International Airport

SECTION 13:

Aircraft noise management

SECTION 13: **Aircraft noise management**

13.1 Introduction

Darwin International Airport operates 24 hours a day, 7 days a week, providing essential civil air transport access for Territorians. It is co-located with RAAF Base Darwin, a strategically important and enduring main airbase and forward operating base for the Australian Defence Force.

People living across the Darwin region may experience varying levels of aircraft noise relating to civil or military aircraft operations at Darwin International Airport and RAAF Base Darwin. Aircraft noise is an unavoidable impact of aircraft operations, from aircraft departing and arriving as well as ground-based aircraft operations on the airfield.

Aircraft noise, like all types of noise, is subjective. What might be of no concern and acceptable for one person may cause annoyance and be unacceptable to another.

Understanding aircraft noise

Airservices Australia explains in its 'Understanding Aircraft Noise' webpage that the characteristics of sound from aircraft can vary depending on a range of factors, including the type of engine (e.g. propeller or jet) and the height of the aircraft. Although there are many sources of noise from an aircraft (e.g. engine, airframe, landing flaps and landing gear), for most of the flight, it is the engines that are the dominant source. Jet aircraft noise is generated by a combination of the mixing of high-velocity exhaust gases with ambient air, combustion of fuel and compressor fans. Noise from propeller-driven fixed-wing and helicopter aircraft result from the rotating propeller cutting through the air.

13.2 Roles and responsibilities

The International Civil Aviation Organisation (ICAO) has developed standards and guidelines that address civil aircraft noise, referred to as Annex 16. Australian Government aircraft noise legislation reflects the standards developed by ICAO and the obligations placed on Australia as a member of ICAO.

The management of aircraft noise at Darwin International Airport and RAAF Base Darwin involves a number of organisations, summarised in Table 13-1. As the civil airport operator, Darwin International Airport has little direct control over noise produced by aircraft operations other than the ground running of civil aircraft engines.

13.3 Australian Noise Exposure Forecast (ANEF)

The Australian Noise Exposure Forecast (ANEF) system has been in place for over 30 years and is the primary measure of aircraft noise exposure in the vicinity of Australian airports. The ANEF is a set of contours showing future forecasted levels of exposure to aircraft noise around an airport, to inform strategic land use planning.

The ANEF is an important noise metric because it is the only noise metric that has status under the:

- NT Planning Scheme for land use planning and development consent off-airport
- Airports Act for land use planning and development consent on-airport.

The ANEF is used in accordance with Australian Standard AS2021:2015 Acoustics – Aircraft noise intrusion – Building siting and construction (AS2021) to guide land use planning and development consent decisions by the relevant authority. Building approvals external to the airport are the responsibility of the Northern Territory Government. On-airport development is under the final approval of the Airport Building Controller under the Airports Act.

ANEF in land use planning and development consent

AS2021 is primarily concerned with land use planning and building treatments for new development sites in the vicinity of an airport. It provides guidance on the acceptability of new construction in relation to ANEF contours (see Table 13-2).

'Acceptable' means that there is usually no need for any noise control features to be incorporated into the construction. 'Conditional' means that approval may be given if appropriate noise control features can be incorporated in the construction.

The 20 ANEF contour is the lowest value referred to in the table of building site acceptability. AS2021 states that the actual location of the 20 ANEF contour is difficult to accurately define due to variations in aircraft flight paths, pilot operating techniques, meteorological conditions and topography. For these reasons, the 20 ANEF contour is shown as a dashed line on ANEF diagrams.

Organisation	Responsibility
Aircraft operators	• Decide what type of aircraft they operate and which airports they fly to. They are required to maintain aircraft to meet ICAO standards. • Are responsible for adhering to the noise abatement procedures for RAAF Base Darwin and Darwin International Airport.
Department of Infrastructure, Transport, Regional Development, Communications and the Arts	• Advises the Australian Government on the policy and regulatory framework for Australian airports and the aviation industry, manages the administration of the Government's interests in privatised airports under the Airports Act, and provides policy advice to the Minister on the efficient management of Australian airspace and on aircraft noise and emissions. • Attends the Darwin International Airport Community Aviation Consultation Group and Planning Coordination Forum.
Civil Aviation Safety Authority (CASA)	• Regulates the safety of civil aviation operations in Australia and of Australian registered aircraft operating overseas. • Through the Office of Airspace Regulation, has responsibility for the administration and regulation of Australian-administered airspace.
Airservices Australia	• Is responsible for Australia's airspace management, aeronautical information, aviation communications, navigation aids and technology, flight path changes, and Aviation Rescue Fire Fighting services. • Publishes the noise abatement procedures for Darwin International Airport and RAAF Base Darwin. • Manages aircraft noise complaints and enquiries for Darwin International Airport through its Noise Complaints and Information Service (NCIS), the Australian aviation industry's main interface on aircraft noise and related issues for the community. • Works with the Department of Defence to resolve any military aircraft related noise complaints and enquiries received through NCIS. • Is a member of the Darwin International Airport Community Aviation Consultation Group, providing regular reports on any aircraft noise complaints received across the greater Darwin region.
Darwin International Airport	• Manages civil operations at the airport, including developing and maintaining infrastructure to support aircraft operations. • Is responsible for managing ground-based civil aircraft noise at the airport. • Is required under the Airports Act to include a new joint military–civil ANEF for each master plan. • Darwin International Airport's Community Aviation Consultation Group meets three times a year to discuss community issues arising from airport operations and developments, including aircraft noise. • Darwin International Airport's Planning Coordination Forum sees high-level strategic discussions between the airport and Australian, Northern Territory and local government representatives to improve the coordination of planning for the airport site and surrounding areas, including aircraft noise.
Department of Defence	• Manages the air traffic control of both military and civil aircraft at RAAF Base Darwin and Darwin International Airport. • Under the Joint User Deed, Defence is responsible for preparing the joint military–civil ANEF for RAAF Base Darwin and Darwin International Airport. • Is a member of the Darwin International Airport Community Aviation Consultation Group and Planning Coordination Forum. • Manages the Defence Aircraft Noise website and will investigate any queries or complaints made by the community about military aircraft. • Has prepared a series of aircraft noise documents that relate to RAAF Base Darwin and Darwin International Airport, including: • Air Force Aircraft Noise Management 2018-2023 • RAAF Base Darwin Aircraft Noise Management Plan • Air Force Fly Neighbourly Policy
Aircraft Noise Ombudsman	• Conducts independent reviews of Airservices Australia's and Defence's management of aircraft noise-related activities.
Northern Territory Government	• Is responsible for preparing and implementing the NT Planning Scheme, the 'rule book' for land use and development in the NT. This includes strategic land use planning frameworks to prevent inappropriate (noise-sensitive) developments in the vicinity of the airport. • Is a member of the Darwin International Airport Community Aviation Consultation Group and Planning Coordination Forum.

Table 13-1: Aircraft noise management responsibilities

AS2021 also recognises that the 20 ANEF and 25 ANEF zones do not capture all high-noise-affected areas around an airport, and the ANEF contours are not necessarily an indicator of the full spread of noise impacts. Aircraft noise doesn't simply stop at the 20 ANEF contour. As such, Darwin International Airport has incorporated the NASF Guideline A recommendation of additional complementary methods of describing aircraft noise, in particular the frequency-based measure of the N-contour system (discussed further in this section).

Darwin as a joint-user airport

The Airports Act requires that a new standard 20-year ANEF be prepared for each master plan. That is, a 2043 ANEF for this master plan.

Darwin International Airport has been a joint-user airport with shared facilities with RAAF Base Darwin since 1946. Responsibilities between the Department of Defence and Darwin International Airport are set out in the Joint User Deed.

Being a joint-user airport, the Airports Act requires that the ANEF for Darwin International Airport be a joint military–civil ANEF. Under the Joint User Deed, the Department of Defence is responsible for producing the joint military–civil 2043 ANEF (the 2043 ANEF).

13.4 ANEF methodology

The 2043 ANEF contours were prepared in accordance with the Airservices Australia document 'Guidelines for the Production of Noise Contours for Australian Airports' and comply with the 'Manner of Endorsement' approved by the former Minister for Infrastructure and Transport in April 2017.

The 2043 ANEF was developed using Aviation Environmental Design Tool (AEDT) software. Airservices Australia only accepts ANEFs for technical endorsement that have been produced using AEDT.

ANEF inputs

ANEF inputs include military and civil aircraft movement forecasts, runway and flight path usage, time of day, aircraft fleet mix, local topography and climate conditions. The ANEF process ensures forecast traffic is within the aircraft movement capacity of the airport (in this case both civil and military movement forecasts). The 2043 ANEF for RAAF Base Darwin and Darwin International Airport assumes that there are to be no major changes to the airfield layout, any runway extensions or changes to the current flight patterns within the 20-year planning period. The current procedures for aircraft arriving and departing the airport were defined in close consultation with local air traffic control operated by the Department of Defence.

Building type	Acceptable	Conditional	Unacceptable
House, home, unit, flat, caravan park	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	25 to 30 ANEF	Greater than 30 ANEF
School, university	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF	20 to 30 ANEF	Greater than 30 ANEF
Commercial building	Less than 25 ANEF	25 to 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Other industrial	Acceptable in all ANEF zones		

Table 13-2: Building site acceptability based on ANEF zones (Source: Standards Australia)

Military inputs

RAAF Base Darwin is a main operating base for Australian Defence Force (ADF) aircraft and a key ADF operational mounting airbase for the Asia-Pacific region. It has one of the busiest operational tempos of any base, typically hosting over 35 ADF exercises annually, including the multi-nation Talisman Sabre and Pitch Black exercises. The primary users of RAAF Base Darwin are Air Force flying squadrons, however the base experiences high numbers of visiting/transiting international fixed and rotary wing aircraft.

In developing the 2043 ANEF, Defence gave consideration to the appropriate scenario for military operations at RAAF Base Darwin. The military traffic scenario selected reflects both ongoing and future traffic scenarios as the basis for the 2043 ANEF and its associated noise metrics. It incorporates a representation of military aircraft types and movements related to the short-term military training exercises held throughout the year, such as the biennial Exercise Pitch Black. These movements are averaged out over the typical year of operations in accordance with the procedures for developing an ANEF.

The 2043 ANEF includes the same quantity and configuration of military fast jet activity as the 2042 ANEF.

In keeping with the previous 2042 ANEF, Defence has included military aircraft operations at nearby Robertson Barracks in the 2043 ANEF. This maintains Defence's compliance obligation with the EPBC Act approval for the operation of the armed reconnaissance helicopter (Tiger) at Robertson Barracks.

Civil inputs

Although military traffic varies, civil traffic remains relatively stable throughout the year. In developing the civil traffic component of the 2043 ANEF, the following inputs, methodology and assumptions were used:

- The aircraft movement forecasts detailed in Section 5 (Aviation activity forecasts) of this master plan were used as the basis for the civil component of the 2043 ANEF.
- As the ANEF looks at a 20-year horizon, it is expected that some of the civil aircraft flown by airlines servicing Darwin today will be replaced with new aircraft models by 2043. Where possible, aircraft that are known to be on order by these airlines have been incorporated into the 2043 ANEF. For example, Qantas announced in 2021 that it intends to replace its ageing B737-800 aircraft fleet with the A320neo and A220 families of aircraft.
- While some widebody aircraft had previously been forecast on domestic routes in the 2042 ANEF, the aircraft fleet announcements mentioned in the point above indicate that any increase in domestic airline demand will result in more frequent flights by these smaller narrowbody aircraft rather than up-gauging to larger aircraft. As such narrowbody jet movements are expected to make up most domestic traffic.
- Similarly, international airline movements are projected to consist primarily of narrowbody jets, with limited widebody aircraft utilised.
- The day/night split of domestic and international airline flights follows the split observed today on specific routes. Day-time movements are flights that are scheduled between 7am to 7pm, and night-time movements are scheduled between 7pm to 7am.
- General aviation growth is expected to be limited.
- The current small amount of civil helicopter activity at the airport may increase marginally by 2043, forecast to be large helicopters servicing resource sector projects (oil rigs and mining sites) in northern Australia.
- Dedicated freight movements are expected to remain similar to current operations. It is anticipated there will be an equal split between narrowbody and widebody freighter aircraft.

Off-airport, there is a small helipad to the south of the airfield (adjacent to the Darwin Aviation Museum) that accommodates smaller helicopters typically taking scenic flights around Darwin. As this small helipad is not part of Darwin International Airport or RAAF Base Darwin, these flights are not captured in the ANEF modelling.

13.5 Noise comparisons over time

The 2043 ANEF for RAAF Base Darwin and Darwin International Airport incorporates the military and civil inputs discussed above.

It is important to note that ANEF noise contours can change over time between master plans, as inputs to the modelling process such as aircraft movement forecasts, fleet mix, runways, flight paths and time of day are updated to reflect new information. It is anticipated that future iterations of the joint military–civil ANEF for RAAF Base Darwin and Darwin International Airport will vary from the one before it. The extent to which the ANEF contours differ will depend on the relevant information available at the time of production.

The previous ANEF prepared for the airport's 2017 master plan was a 'long range' 25-year ANEF to the year 2042 (called the 2042 ANEF). This was chosen in anticipation that it may not need to be updated for the airport's next master plan. However, legislative changes to the Airports Act in 2018 now require that a new ANEF must be prepared for each master plan. The ANEF prepared for the 2023 Master Plan is a 'standard range' 20-year ANEF, to the year 2043. As a result, there is only a one-year difference between the 2043 ANEF and the previous 2042 ANEF.

Figure 13-3 compares the ANEF from the 2017 master plan (the 2042 ANEF) with the endorsed ANEF for the 2023 master plan (the 2043 ANEF). In comparison to the 2042 ANEF, the 2043 ANEF contours have expanded to the east and west of the aerodrome, and contracted to the north and south.

The overall extent of the ANEF contours for RAAF Base Darwin and Darwin International Airport is primarily driven by military aircraft, particularly military fast jets. When the previous 2042 ANEF was developed, Defence incorporated a theoretical flying model of the proposed F-35A military fast jet. This model has since been found to be inadequate to represent the current and future use of the F-35A. As such, the 2043 ANEF is representative of the renewed F-35A flight profiles, which has resulted in an increase in the extent of the contours when compared with the previous 2042 ANEF.

Consistent with the previous 2042 ANEF, a small set of aircraft noise contours lie over Robertson Barracks, associated with the operation of the armed reconnaissance helicopter (Tiger) at Robertson Barracks.

13.6 Draft 2043 ANEF engagement

In February 2023, Defence released the draft joint military–civil 2043 ANEF for public consultation and hosted a number of public drop-in information sessions in Darwin. The public consultation period ran for one month.

During the ANEF public consultation period, Defence and Darwin International Airport presented the draft 2043 ANEF to:

- Northern Territory Government Department of Infrastructure, Planning and Logistics
- City of Darwin
- City of Palmerston
- Litchfield Council
- Darwin International Airport's Community Consultation Group and Planning Coordination Forum.

Residential land use considerations

Feedback on the draft 2043 ANEF primarily related to where the contours had expanded beyond the extent of the 2042 ANEF contours to the east of the airfield, into areas identified within the strategic land use planning framework of the NT Planning Scheme for future infill development.

In finalising development of the 2043 ANEF, Defence undertook a revision of its operating scenarios, and continues to work collaboratively with the Northern Territory Government to achieve balance between Australian Defence Force capability and encouraging the economic growth of the Darwin region for future decades.

As discussed in Section 12 (Airport safeguarding), inappropriate development around an airport can result in unnecessary constraints on airport operations and negative impacts on community amenity due to the effects of aircraft noise. It is important that land use planning authorities and landholders consider the impact of aircraft noise when planning for future residential development.

AS2021 relates to land use planning and the acceptability of new noise sensitive development or changes to an existing land use (e.g. subdivision of residential land or extension to an existing residential structure). AS2021 is not a test of acceptability for existing uses of residential

sites. AS2021 states that the only exception is where there is evidence that the particular aircraft type and movement which produce the highest noise level do not constitute a typical operation.

As shown in Table 13-2, AS2021 recommends that new residential land use development – including houses, units, flats and caravan parks – be limited to areas outside the 20 ANEF contour. In areas within the 20 to 25 ANEF contour, new residential land use proposals are 'conditionally acceptable' subject to the inclusion of appropriate sound insulation to protect the interior of the dwellings.

13.7 Endorsement process

As the 2043 ANEF incorporates both military and civil inputs, it is required to be endorsed for technical accuracy by Defence (for the military component) and Airservices Australia (for the civil component).

As part of the process to achieving Defence and Airservices Australia's endorsement of the ANEF, comment on the draft 2043 ANEF was sought from the state/territory agency responsible for planning, and relevant local government authorities:

- Northern Territory Government Department of Infrastructure, Planning and Logistics
- City of Darwin
- City of Palmerston
- Litchfield Council.

Comments on the civil component were provided to Airservices Australia for consideration in its endorsement process of the civil component of the 2043 ANEF. Likewise, comments on the military component were provided to Defence for consideration in its endorsement process of the military component of the 2043 ANEF.

Once all comments had been considered by Defence and Airservices Australia and they were satisfied that all criteria in preparing the ANEF had been met, they endorsed their respective component of the joint military–civil 2043 ANEF. This completed the ANEF endorsement process and the 2043 ANEF became legally valid for land planning decisions.

Endorsed joint military–civil ANEF

The joint military–civil 2043 ANEF endorsed by Department of Defence and Airservices Australia is at Figure 13-2. It replaces the existing 2042 ANEF that was prepared for the previous 2017 master plan.

Darwin International Airport will have regard to the 2043 ANEF contours in relation to on-airport planning and development decisions.

The Northern Territory Government remains the authority over the application of the new 2043 ANEF contours for land use planning and development consent decisions off-airport.

13.8 Describing aircraft noise

Sound is due to pressure variations travelling through the air from the source (for example an aircraft) to the receiver (for example a human ear). The pressure variations are caused by air molecules vibrating back and forth which cause a sound wave to travel through the air in the direction of the vibration.

Sound is measured on a logarithmic scale using decibels (dB). When sound is measured by acoustic equipment a correction factor is applied to reflect the sensitivity of the human ear. This factor is referred to as being A-weight corrected and is indicated by the letter 'A' next to the unit measure 'dB'. Therefore noise levels are usually shown in dB(A) units.

Source: Airservices Australia 'Understanding aircraft noise' webpage

The N-contour system is a complementary aircraft noise metric that shows the potential number of aircraft noise events above a certain decibel on an average day. It is more explanatory than the ANEF system because it shows noise in a way that a person perceives it – as a number of single aircraft movement events per day above a certain noise level. This information is portrayed as a series of 'number above' contours.

2043 N70 civil contours

The civil N70 contours for 2043 are in Figure 13-12. This shows the forecast number of civil aircraft noise events greater than 70 dB(A) that may occur in an average day in 2043. The 70-decibel (N70) measure has been the most commonly used frequency-based aircraft noise measure to date because a 70 decibel outside noise will generally be experienced as a 60-decibel event inside a residence with the windows open. Sixty decibels is the sound level that will disturb a normal conversation or activities, such as watching television (see Figure 13-1).

2043 N70 joint military–civil contours

The joint military–civil N70 contours for 2043 are in Figure 13-13.

2043 N60 night-time civil contours

A 60-decibel noise outside a residence will be experienced as a 50-decibel noise level inside and is likely to be more disturbing during sleeping hours.

AS2021 nominates the acceptable standard of noise for sleeping areas at 50 decibels, which is the level of noise that does not disturb the sleep of most people. However, this depends on the individual. The civil N60 night-time contour shows the number of civil aircraft noise events at 60 dB(A) or greater that are forecast to occur on an average night in 2043 between the hours of 11 pm and 6 am (see Figure 13-14).

13.9 Flight paths

Flight paths illustrate the broad spread of flight paths that an aircraft may fly when arriving at or departing from an airport. The approved civil flight paths for all runways are in figures 13-4 to 13-7. The approved military flight paths are at figures 13-8 to 13-11.

While aircraft follow flight paths, these are not as precise as a train on a railway line or a car on the highway, with aircraft approaching or departing the runway within a flight path 'envelope' (or 'corridor'). The envelopes may vary with aircraft configuration and weather.

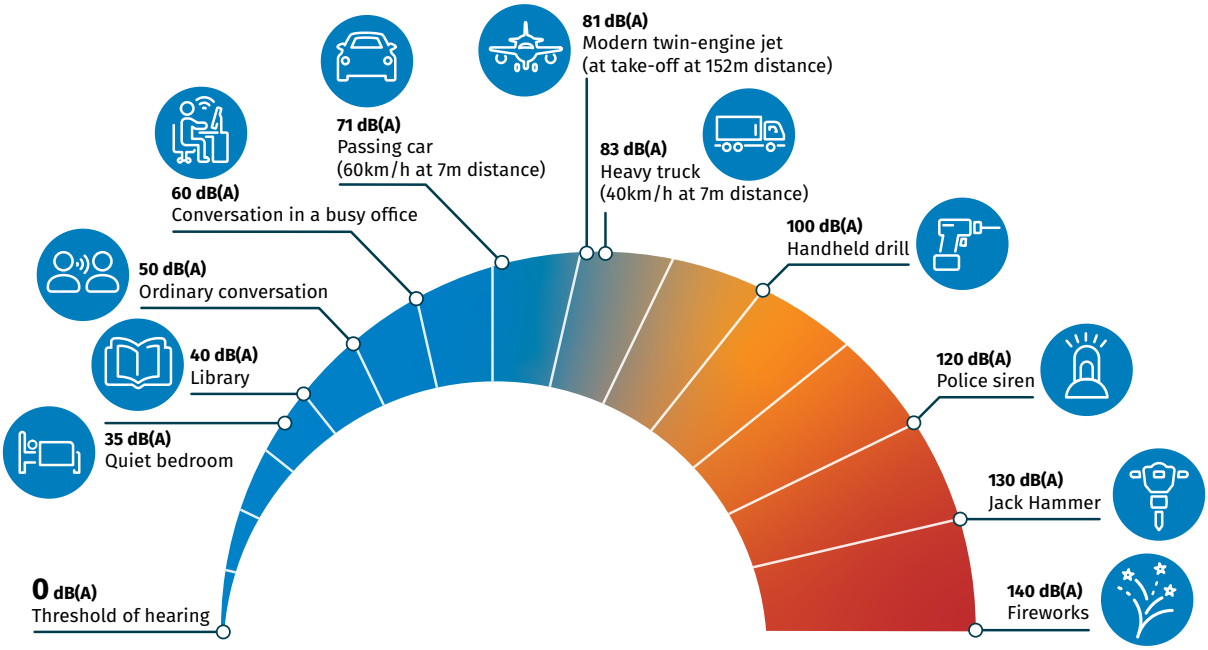


Figure 13-1: Decibel levels (adapted from Airservices Australia and NASF Guideline A)

13.10 Managing noise intrusion

The Airports Act requires that the master plan include details of the airport's plans for managing aircraft noise intrusion, should the new ANEF identify aircraft noise intrusion in areas forecast to be subject to exposure above the significant ANEF levels (30 ANEF).

Military aircraft operations – rather than civil aircraft operations – are the main contributor to the extent of the joint military–civil 2043 ANEF contours (including the 30 ANEF contour).

The RAAF Base Darwin Base Aircraft Noise Management Plan published in 2021 recognises that "aircraft noise is an unavoidable consequence of Air Force operations and training. The impact of aircraft noise affects communities in different ways. Air Force has an obligation to reduce the effects of aircraft noise on local communities to the maximum extent possible, whilst achieving operational and training outcomes for Government." The plan informs and aims to improve public understanding of aircraft noise management strategies in the vicinity of RAAF Base Darwin, and includes Air Force's fly neighbourly policy.

Darwin International Airport's role

Australian airports have little influence in the amount of aircraft noise generated or land use decisions around the airport and under flight paths. However, Darwin International Airport takes a proactive approach to ensure aircraft noise is minimised, and will continue to work where it sensibly can to minimise noise impacts on the Darwin community.

Noise abatement procedures

All major airports in Australia, including Darwin International Airport, have noise abatement procedures that are designed to reduce the impact of aircraft noise on the community.

Noise abatement procedures for Darwin International Airport are published in Airservices Australia's Departure and Approach Procedures. These procedures have been designed for civil and military operations. These nominate runway 11/29 as the preferred runway and note that only jet-propelled aircraft that are noise certificated to ICAO Annex 16 can operate from runway 18/36.

Noise monitoring

While aircraft noise complaints are the responsibility of Airservices Australia and Department of Defence, Darwin International Airport works with these agencies to manage aircraft noise impacts on the local community.

Both Airservices Australia and Defence regularly share information at the airport's Community Consultation Group meetings (see Section 2: Planning context) about any civil or military aircraft noise complaints received and how they have been addressed.

Airservices Australia

Aircraft noise complaints received by Darwin International Airport relating to aircraft flying overhead are referred to Airservices Australia, the agency responsible for managing and monitoring the impact of civilian aircraft noise. Airservices Australia is responsible for managing complaints and enquiries about aircraft noise and operations through its dedicated Noise Complaints and Information Service (NCIS).

Since October 2012, Airservices Australia has published quarterly noise information reports for major urban areas. These include information and analysis on aircraft movements, noise monitoring and complaint issues.

Department of Defence

The Department of Defence manages the Defence Aircraft Noise website and will investigate any queries or complaints made by the community about military aircraft.

In November 2021, Defence began operating a temporary Noise and Flight Path Monitoring System (NFPMS) at RAAF Base Darwin / Darwin International Airport, with a noise monitoring terminal positioned at either end of the main runway. These types of systems are used at airports around Australia to give communities noise and flight track data recorded by automated terminals. Interactive and accessible monthly reports are published on the Defence Aircraft Noise website.

Aircraft ground running

Ground running of aircraft engines is a significant part of aircraft maintenance. Ground running is when an aircraft engine is tested at the airport while the aircraft is stationary on the tarmac. Most aircraft maintenance at Darwin International Airport is conducted by general aviation operators. Darwin International Airport has established stringent operating procedures for the ground running of civil aircraft, detailed in the airport's Engine Ground Running Management Plan.

Figure 13-2: Endorsed joint military–civil 2043 ANEF

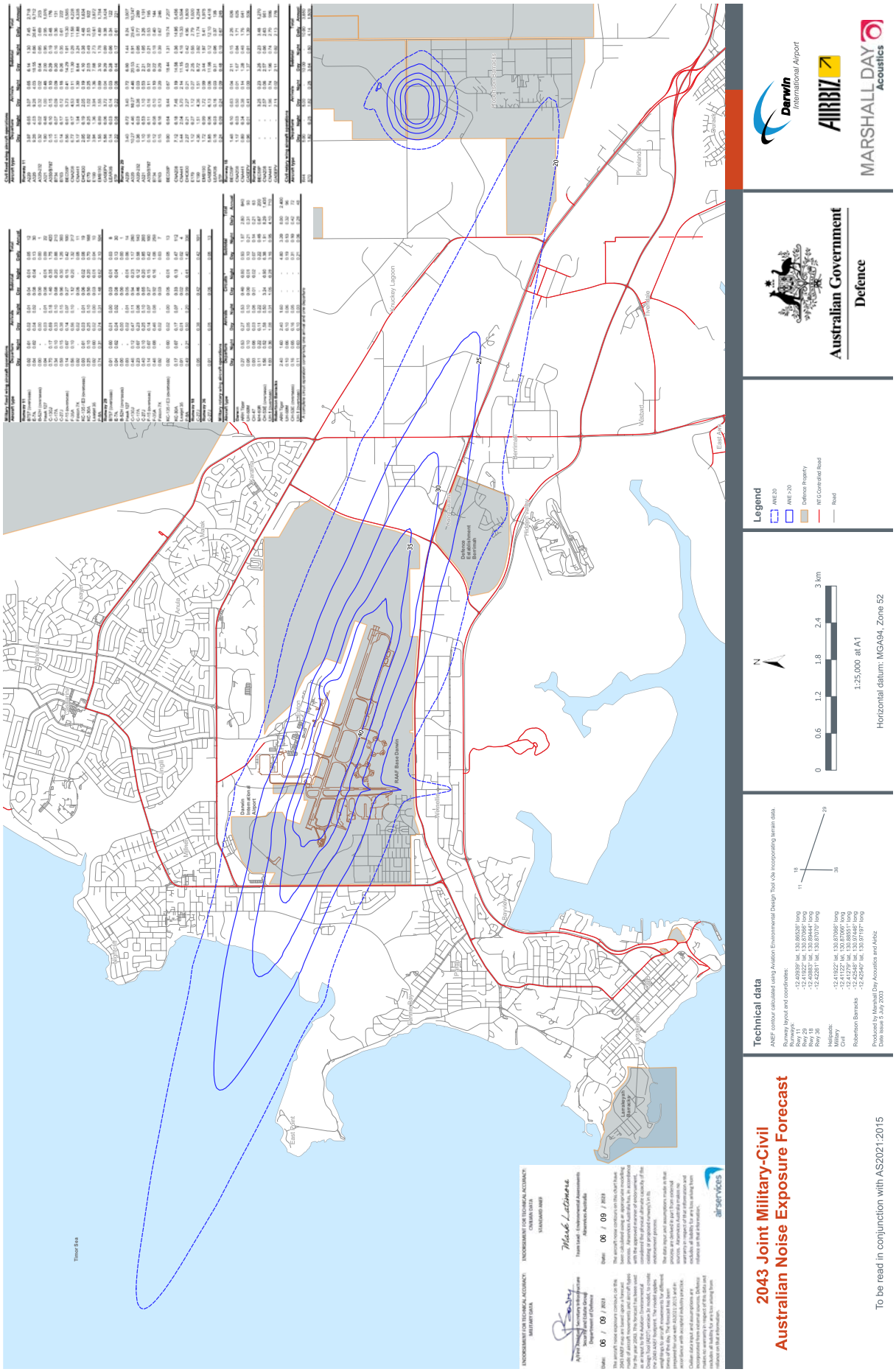


Figure 13-3: 2043 ANEF and 2042 ANEF comparison

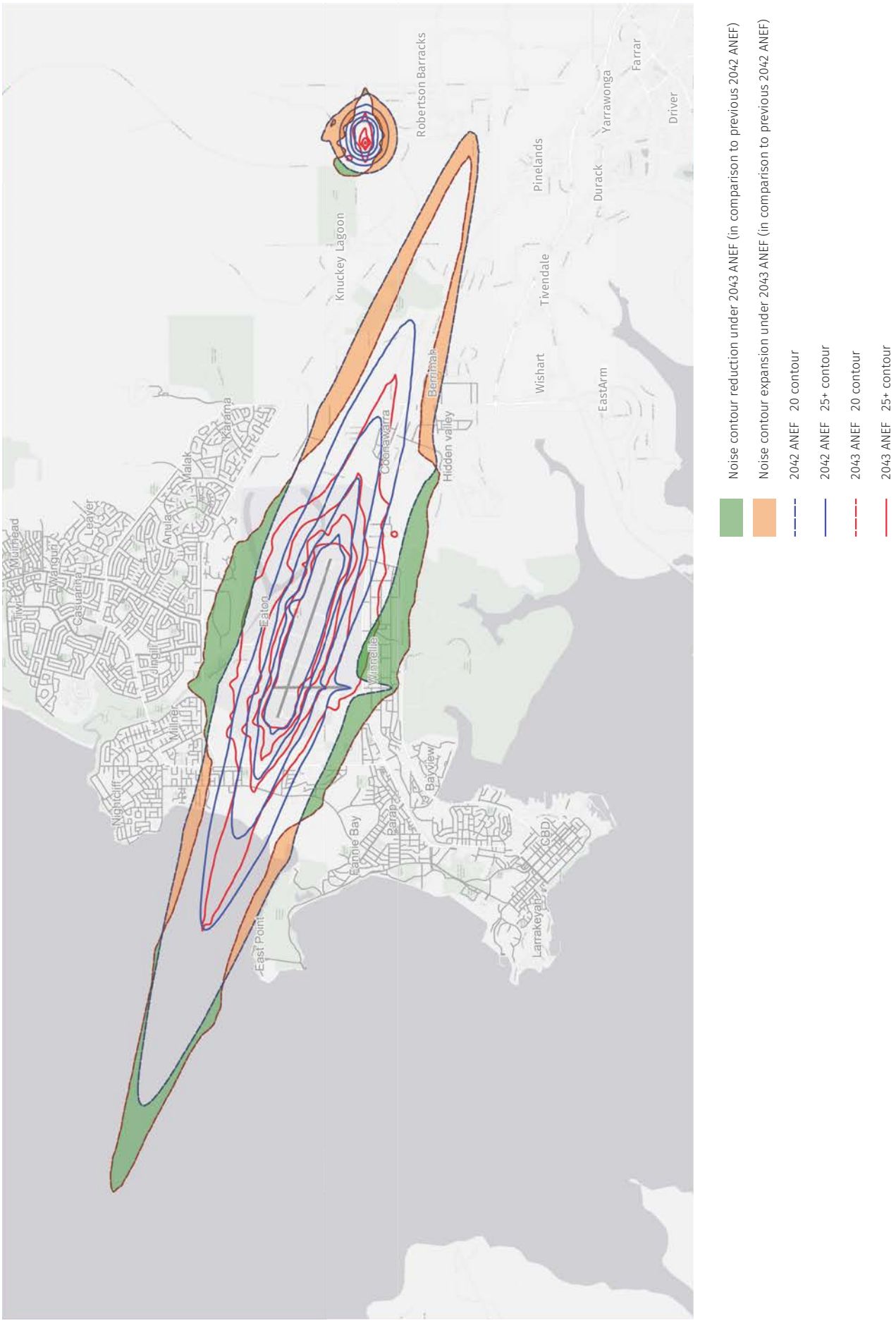


Figure 13-4: 2043 civil flight paths – arrivals

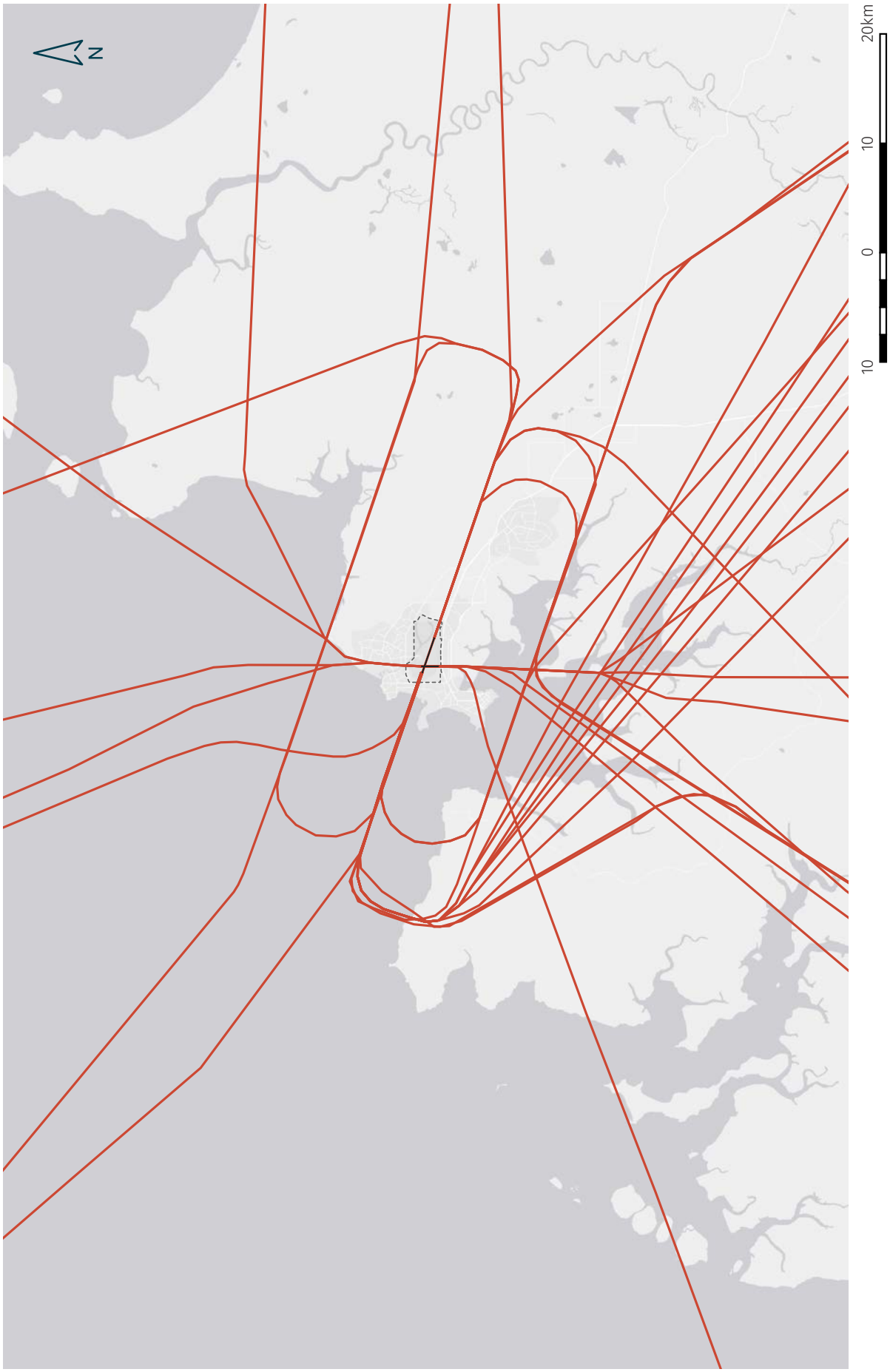


Figure 13-5: 2043 civil flight paths – departures

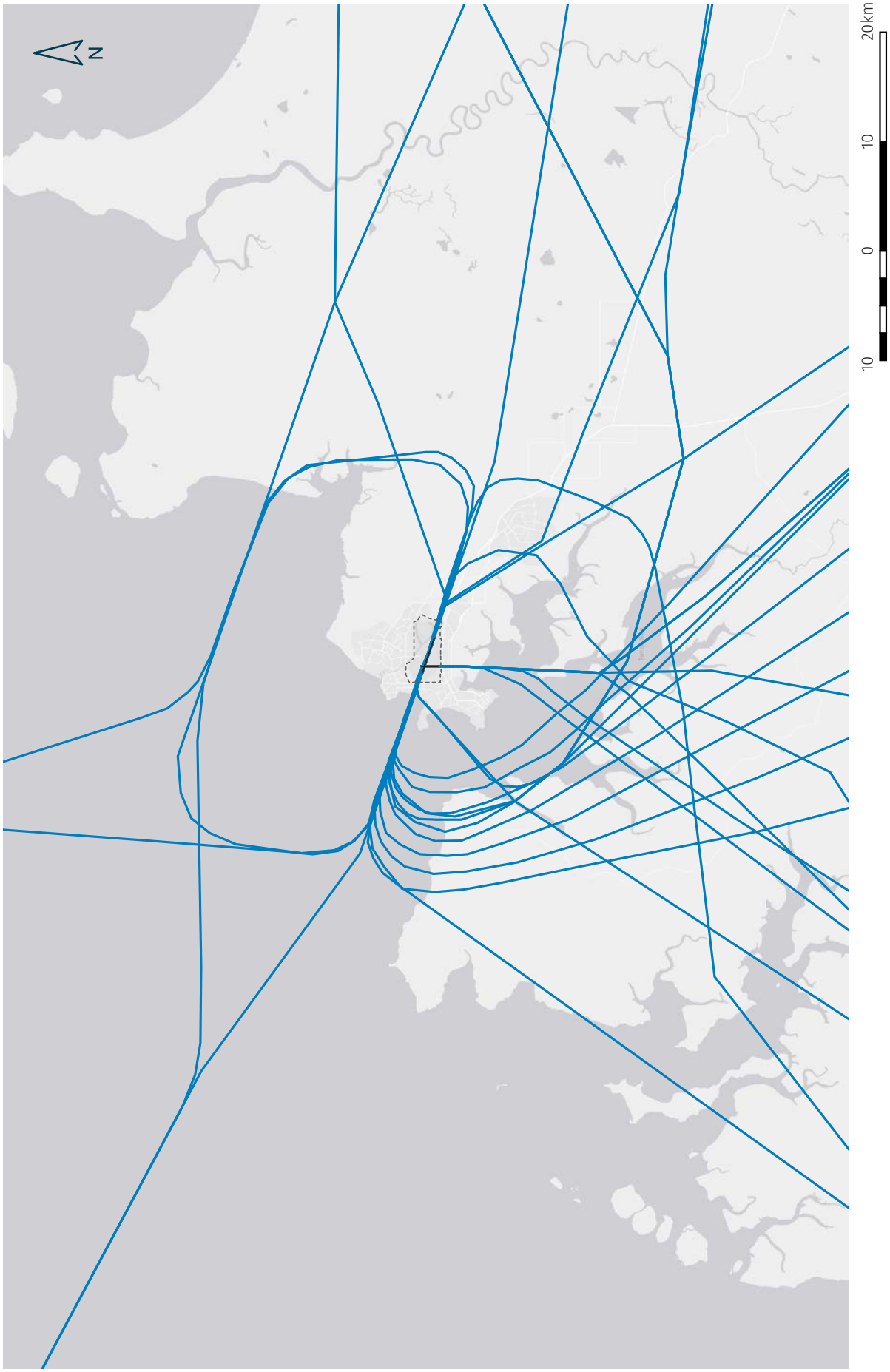


Figure 13-6: 2043 civil flight paths – training circuits

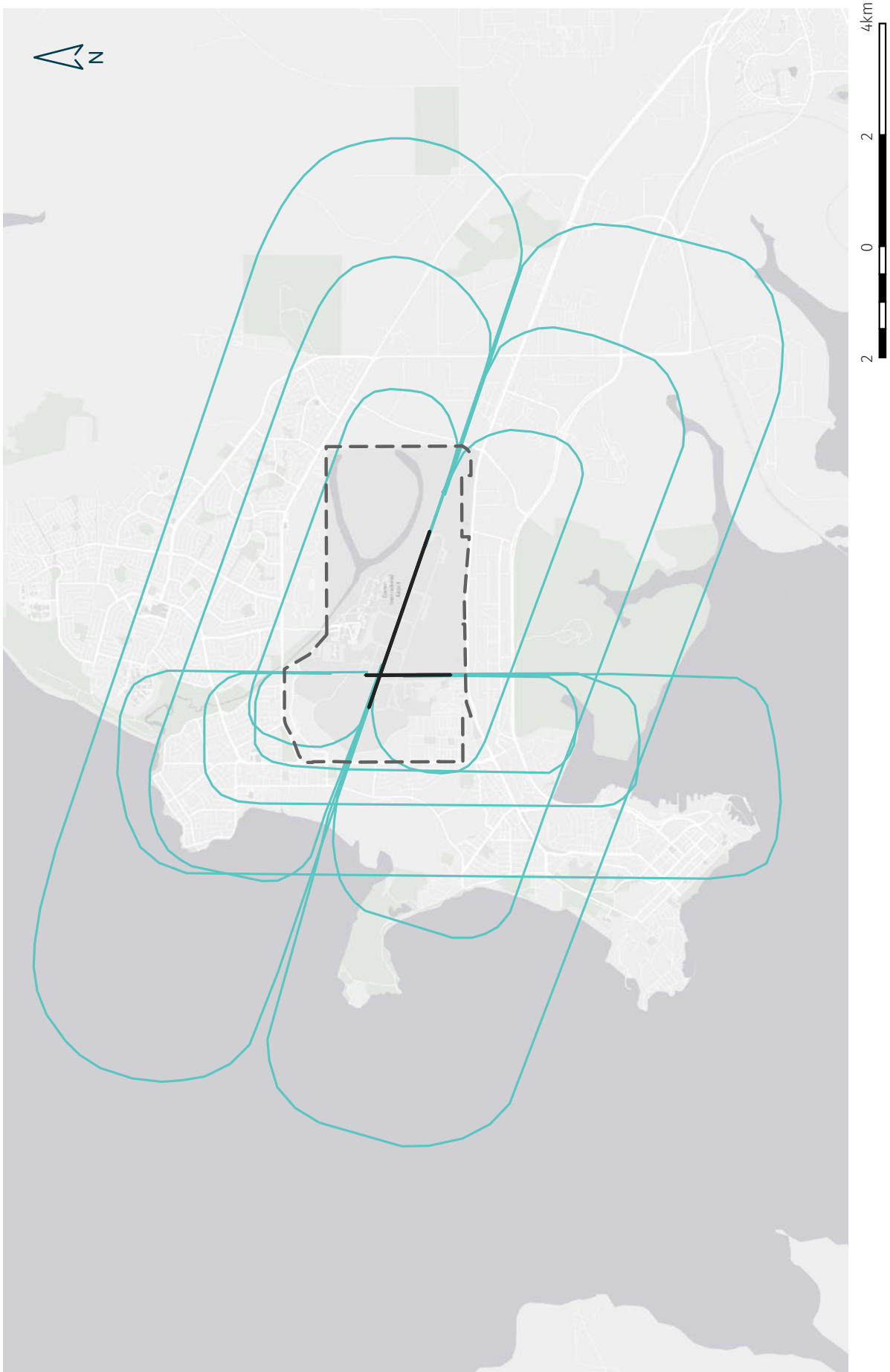


Figure 13-7: 2043 civil flight paths – helicopters

Figure 13-8: 2043 military flight paths – arrivals

Figure 13-9: 2043 military flight paths – departures

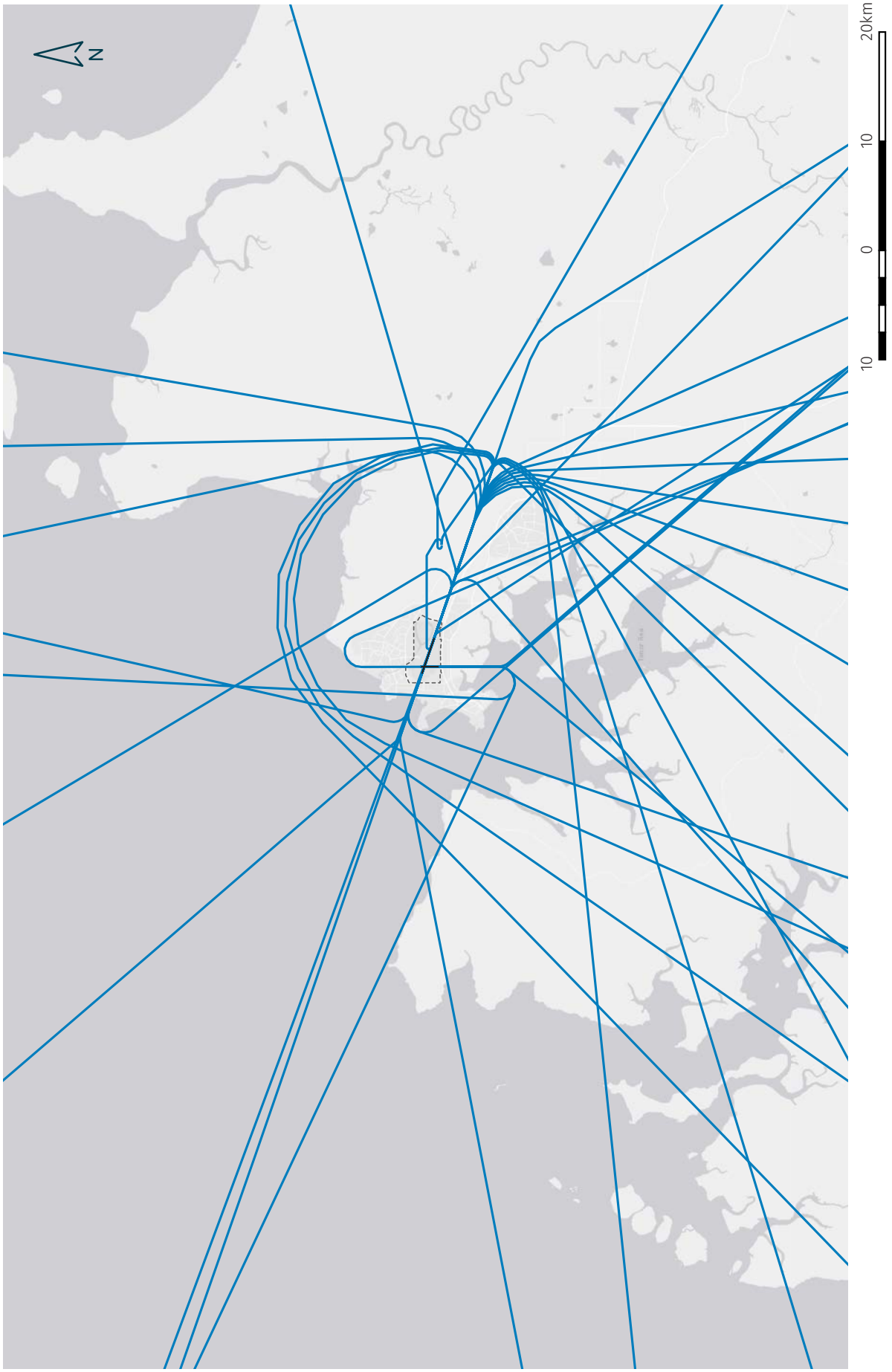


Figure 13-10: 2043 military flight paths – training circuits

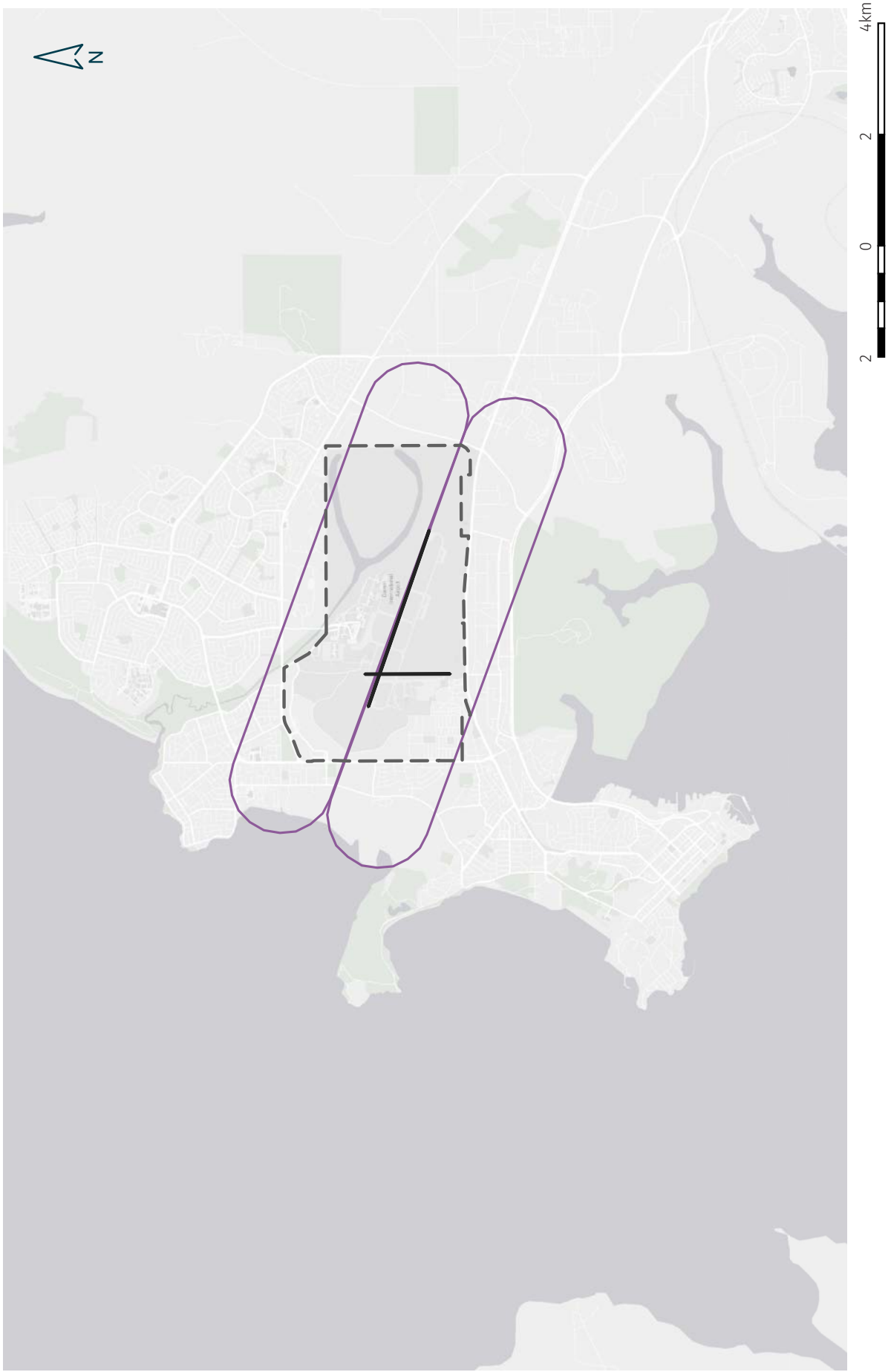


Figure 13-11: 2043 military flight paths – helicopters

Figure 13-12: 2043 civil N70

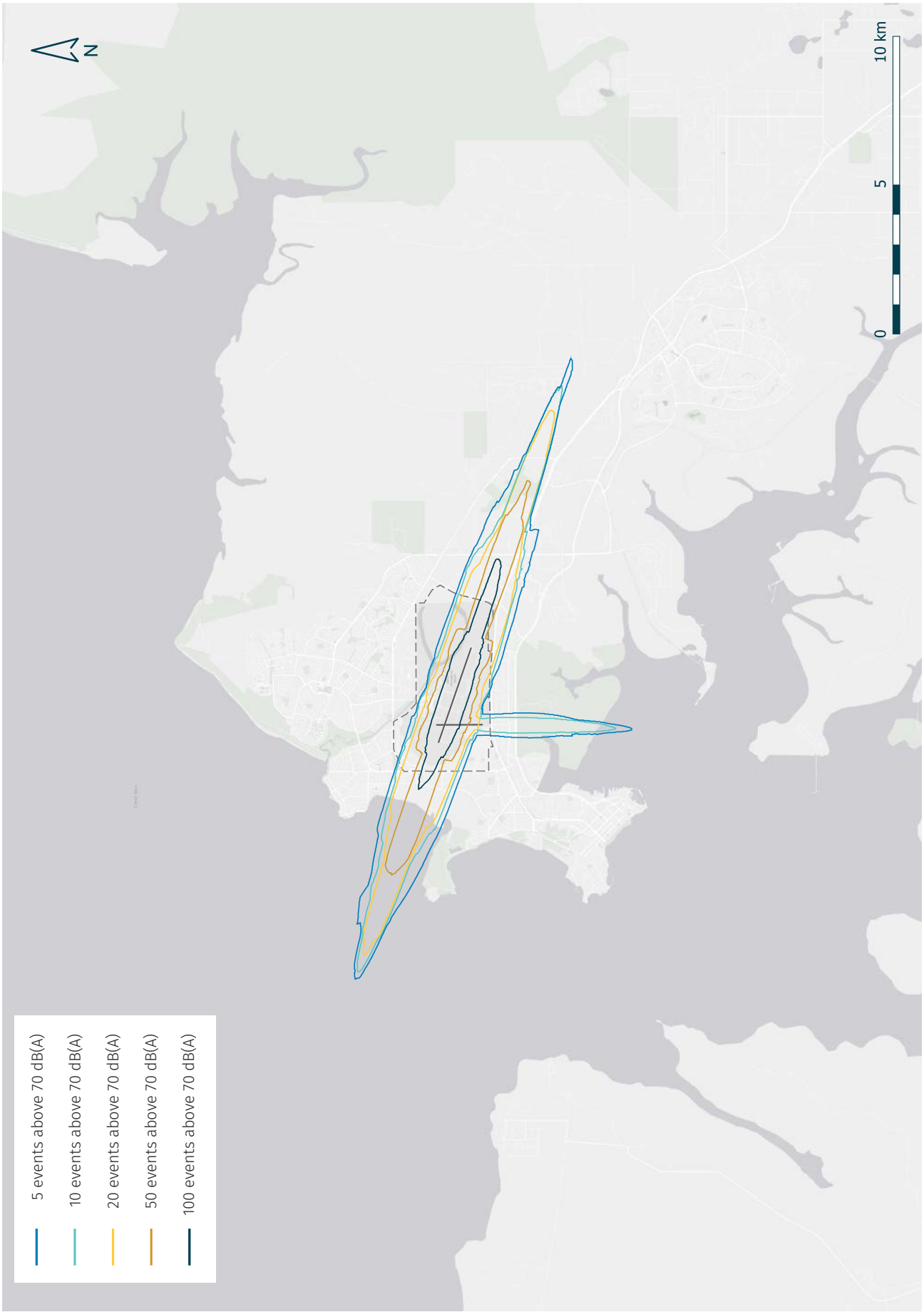


Figure 13-13: 2043 joint military–civil N70

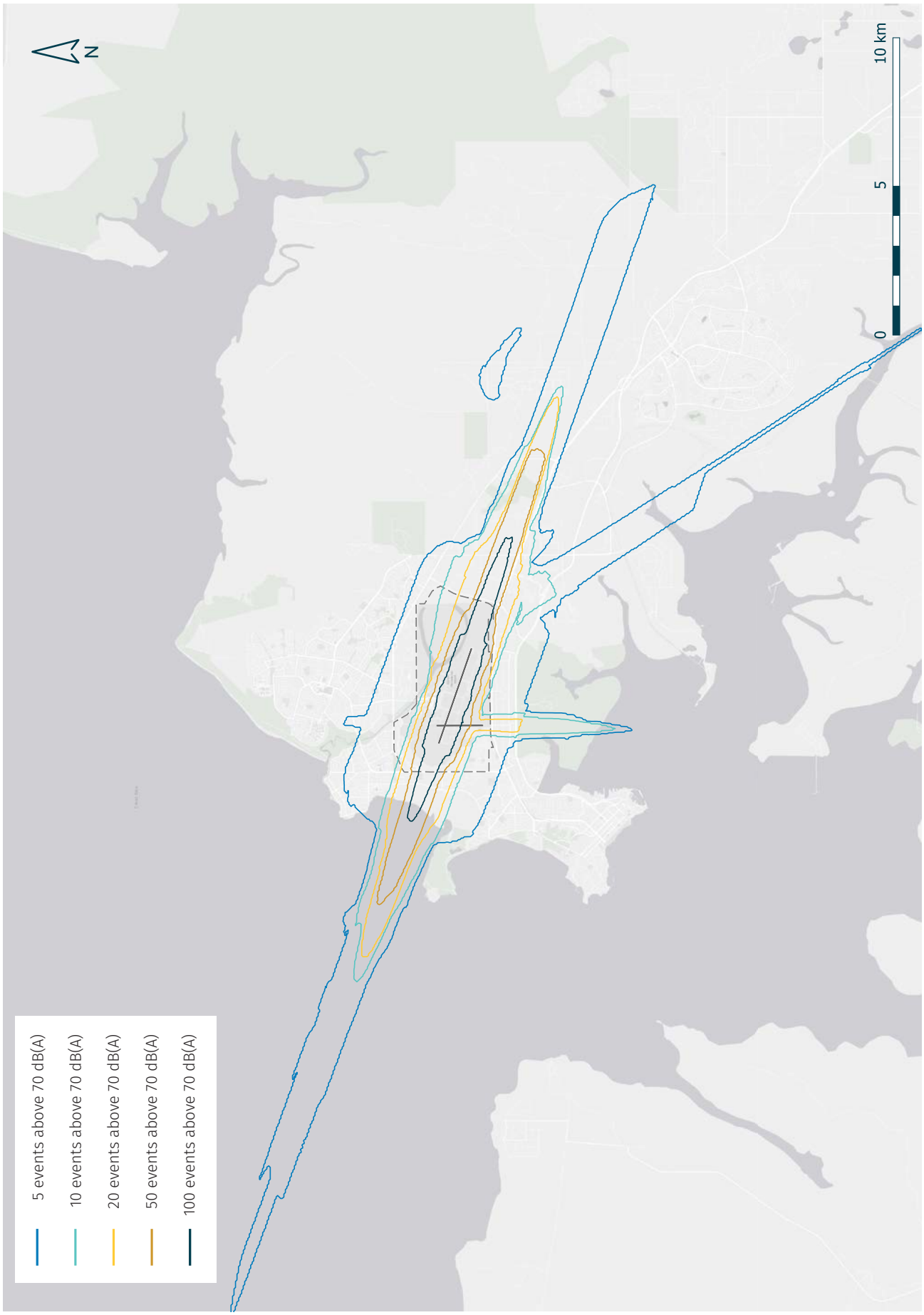
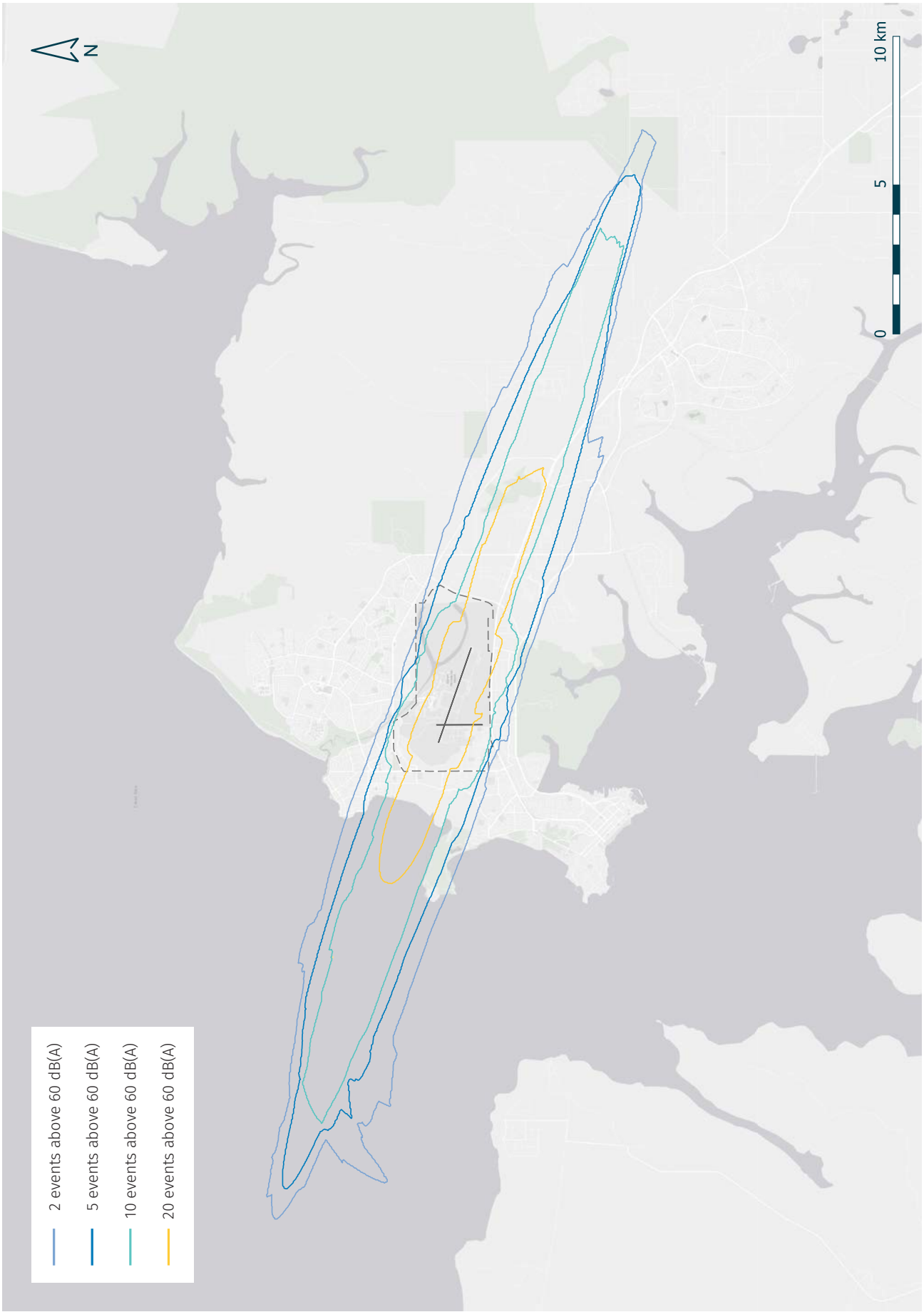


Figure 13-14: 2043 civil night N60



SECTION 14:

Environment Strategy

SECTION 14: **Environment Strategy**

14.1 Introduction

Overview

The Environment Strategy has been developed as part of the Darwin International Airport 2023 Master Plan in consultation with government agencies, airport tenants, the Darwin community and other stakeholders.

The Environment Strategy is an 8-year plan that outlines Darwin International Airport's environmental aspects and the strategic actions and initiatives that underpin our commitment to continuous improvement across these aspects.

Darwin International Airport is committed to ensuring we effectively manage our legislative and regulatory obligations in protecting the environment, and we seek to continuously improve our management of all areas of the environment.

We work closely with Australian Government, Northern Territory Government and local government agencies and participate in working groups and inter-agency committees. We also work closely with local communities and interest groups.

The Environment Strategy is relevant to all operations on-airport, including both aviation- and non-aviation-related activities carried out by Darwin International Airport staff, tenants, contractors and local community organisations.

Darwin International Airport has made a number of major environmental achievements since the 2017 Environment Strategy, including:

2018

- implemented the Environmental Assurance Program for continued environmental compliance monitoring of tenants and operators
- developed a science-based emissions reduction target in line with the United Nations Framework Convention on Climate Change, with a target of 100% reduction scope 1 and scope 2 gas emissions by 2030

2019

- implemented the Community Partnership Project with the Larrakia Rangers, where a core team of indigenous rangers are now the primary vegetation contractors responsible for the detailed management of Rapid Creek Reserve

2021

- utilised 7,000 tonnes of reused gravel for the Henry Wrigley Drive improvement project and 3,800 tonnes of reused gravel for apron and aerobridge upgrade projects
- conducted extensive ecological surveys both landside and airside to identify significant species, with 5 new species added to the Darwin International Airport Flora and Fauna Register
- achieved compliance in airport operations and environmental management against the PFAS National Environment Management Plan 2.0

2022

- awarded the Australian Aviation Wildlife Hazard Group industry award for reducing the risk of wildlife strike through the integrated vegetation management program
- awarded the Airports Council International (Asia Pacific) Green Airports Recognition 2022 silver award for carbon management strategies including renewable energy generation, emissions reductions targets and apron efficiency upgrades
- increased the airport's total solar generation capacity to 7.75-megawatts (AC) through further investment in solar arrays installed across the airport site.

Airport legislation and regulation

The Airports Act and Regulations provide a regulatory framework for the operation and development of federal airports in Australia that are leased to non-government enterprises (see Section 2: Planning Context for more detail). The Act establishes the system airport operators and other users must abide by. Part 5 of the Act directs the airport lessee company to develop an airport environment strategy as part of the airport's master plan.

The Airports (Environment Protection) Regulations 1997 outline standards and requirements for managing environmental impacts and their monitoring, reporting and remedial action.

The Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA) manages the Australian Government's interests in privatised airports under the Airports Act. DITRDCA appoints the Airport Environment Officer and the Airport Building Controller to administer elements of the Airports Act and relevant regulations at the airport.

The Airport Environment Officer oversees how the airport adheres to the approved Airport Environment Strategy and administers the Regulations. The Airport Building Controller administers the Airports (Building Control) Regulations 1996.

Under the Regulations, Darwin International Airport submits an annual environment report to DITRDCA that covers:

- the results of environmental monitoring undertaken
- environmental incidents and, if deemed necessary, subsequent investigations and remediation plans
- Darwin International Airport's progress in achieving the objectives and actions outlined in the Airport Environment Strategy.

The *Environment Protection and Biodiversity Conservation Act 1999* covers the management and protection of Australian and internationally significant species of flora, fauna, ecological communities and heritage places.

Where Commonwealth legislation does not address an environmental issue or standard, Northern Territory legislation is applicable. Territory legislation addresses areas such as pests and pathogens, stormwater and groundwater once it leaves the airport precinct, and native wildlife.

Pollution or noise generated by aircraft during flight, landing, taking off or taxiing is regulated under the Air Navigation (Aircraft Engine Emissions) Regulations 1998 and the Air Navigation (Aircraft Noise) Regulations 1984. This is not the responsibility of Darwin International Airport as the airport lessee company.

14.2 Environmental management and sustainability

Environmental management objectives

Darwin International Airport has established key objectives to guide environmental management at the airport:

1. **Environmental Management System Excellence:** Maintain and continuously enhance the environmental management system, aligning it with ISO14001 standards, to ensure effective environmental governance and performance.
2. **Regulatory Compliance and Adaptation:** Monitor and communicate all environmental legislative and regulatory changes, ensuring that Darwin International Airport remains in full compliance and adapts proactively to emerging requirements.
3. **Environmental Risk Mitigation:** Identify and assess environmental aspects and associated risks, with a commitment to managing these risks to as low as reasonably practicable levels.
4. **Stakeholder Awareness and Training:** Conduct comprehensive training programs for staff and contractors to promote awareness and understanding of the Environmental Management System's objectives and requirements.
5. **Environmental Assurance and Audit:** Implement environmental assurance audit programs to guarantee ongoing compliance and effectiveness of the Environmental Management System.
6. **Sustainable Development Integration:** Incorporate environmental considerations, particularly regarding energy, greenhouse gas emissions, water, waste, and contractor management, into the design, construction, and operation of new infrastructure and facilities to achieve sustainable development.
7. **Climate Change Resilience:** Develop and execute climate change mitigation and adaptation strategies, addressing risks and opportunities associated with changing climate patterns and ensuring the resilience of airport operations.

Environment Policy

Airport Development Group's (ADG) Environment Policy is the foundation of Darwin International Airport's Environmental Management System. The Environment Strategy guides the implementation of both.

The Environment Policy is reviewed every 3 years through internal consultation with key stakeholders. New team members are made aware of the policy during the induction process. A copy of the policy is available to all team members on the internal SharePoint site.

Environmental Management System

The Environmental Management System (EMS) describes how Darwin International Airport plans, implements, monitors, reports and reviews all environmental management aspects across the airport. The EMS aligns with relevant Australian standards and ISO14001 (the international standard for environmental management systems).

The main components of the EMS are:

- the ADG Environment Policy
- planning – environmental aspect and risk identification and assessment, development of standards, procedures and guidelines
- implementation and operation – environmental responsibilities, training and awareness, communication, document and operational control, and emergency preparedness and response
- checking – monitoring, assessment and auditing
- management review – a health check of the system itself and areas to improve.
- The EMS covers all environmental aspects the airport can control and considers all relevant legislation, codes of practice and standards. An external audit of the EMS is conducted every 3 years, and an internal audit of the system is carried out annually.

Environmental aspects and risks

Darwin International Airport has implemented a risk management framework to identify and evaluate the main environmental risks with our airport operations.

In assessing environmental risks, we regularly review our activities, products and services. From these reviews, potential environmental impacts are determined and actions are put in place to minimise impacts and improve environmental performance. These initiatives also become part of the 8-year action plan for each environmental aspect, as outlined in this strategy.

Environmental management training

Darwin International Airport conducts environmental management training and awareness to ensure our staff, tenants and contractors are aware of their environmental obligations and responsibilities at the airport. Educating people about environmental awareness is vital to achieving our environmental management objectives.

Training covers:

- the Environment Policy, Environment Strategy, Environmental Management System, and environmental legislative and regulatory requirements and how they relate to stakeholder roles and work areas
- the environmental aspects and potential risks associated with each person's work area and the controls in place to manage these risks to as low as reasonably practicable
- sites of environmental significance, and cultural heritage and management requirements
- environmental standards, procedures, guidelines, forms and other tools
- the environmental, social and economic benefits of improved performance.

Training and awareness is provided to staff, tenants and contractors using a number of tools, including online modules, face-to-face and through written materials.

Environmentally significant areas

Comprehensive flora and fauna surveys by local ecologists and a number of environmental assessments in conjunction with ongoing project works have identified that there are no environmentally significant areas protected under legislation within the Darwin International Airport lease boundary. Details of the flora and fauna assessments are outlined in Section 14.6 – Biodiversity and conservation management.

Following consultation with traditional owners, the Larrakia people, and officers from the Northern Territory Government, the Aboriginal Areas Protection Authority issued an authority certificate to Darwin International Airport in 2004 over the total airport lease area for the staged development of commercial and aeronautical activities on airport land. When the authority certificate

Environmental management aspect	Monitoring type	Frequency
Water	Water use	Monthly
Groundwater and surface water	Surface water quality	Quarterly
	Groundwater quality	Annually
Waste	Landfill and recycling disposal quantities	Monthly
	Bin inspections	Regular and ongoing
	Trade waste quality	Per trade waste agreement requirements
Soil	Soil quality testing (pre-development, incident investigation, stockpile management and excavation risk management)	Event based
Biodiversity and conservation	Weed management	Annually
	Fuel load assessment	Annually
	Prescribed burns	As required
	Maintenance of firebreaks	Annually
	Flora and fauna monitoring	Every 5 years
	Airside wildlife monitoring	Daily
	Mosquito vector monitoring	Wet season focus as required
Energy and carbon	Electricity use	Monthly
	Fuel use	Monthly
	Gas use	Monthly
	GHG emissions assessment	Annually
Ground-based noise	Ground-based noise	As required
Contamination, hazardous substances and materials	Inspections of chemical storage areas	Regular and ongoing as part of our safety, environment, security observation inspections and tenant assurance audits
	Underground storage tank integrity testing	As required
Air quality	Air quality monitoring	Event based
Tenants and contractors	Review of tenant risk ratings	Annually
	Environmental assurance audits	Every 1–3 years based on tenant risk ratings
	Environmental site inspections against construction environmental management plans (for new developments)	As required
Environmental management	Internal Environmental Management System conformance audit	Annually
	External Environmental Management System conformance audit	Every 3 years
	Landside precinct environmental inspections	Fortnightly in wet season, monthly in dry season

Table 14-1: Darwin International Airport environmental monitoring program

was granted in 2004 there were no 'registered' or 'recorded' Aboriginal sacred sites within the airport's lease area. In 2021 the AAPA advised that a 'recorded' Aboriginal sacred site had been identified (see Section 14.7: Cultural heritage).

There are no known European heritage sites within the Darwin International Airport lease boundary.

Environmental monitoring

As part of meeting our regulatory obligations, Darwin International Airport conducts a range of monitoring activities across the environmental aspects to ensure airport operations do not lead to pollution or disturbances of local flora, fauna and habitat.

Our monitoring and measurement processes also provide information to guide the environmental management of airport activities. These processes inform:

- environmental objectives
- operations and activities that can have significant environmental impact
- compliance with applicable environmental legislation and regulations
- environmental management measures required by airport operators and tenants.

Monitoring frequencies, procedures and parameters are reviewed annually and updated where required to reflect changes to local conditions.

Environmental monitoring is managed by the ADG Environment team with support from other team members as required. Groundwater, surface water quality and flora and fauna assessments are carried out by qualified external consultants. Laboratory analysis of surface and groundwater quality is carried out by a National Association of Testing Authorities (NATA) accredited facility.

The type and frequency of our environmental monitoring is outlined in Table 14-1 on the previous page.

Environmental management – tenants and contractors

A range of businesses operate in the Darwin International Airport lease area, both aviation related and non-aviation related. Their leases contain environmental clauses to ensure all parties understand their obligations while operating on airport land.

Tenants are assessed on the level of environmental risk associated with their business's activities. They may be asked to develop and implement an environment management plan to address their activities, the potential environmental aspects and impacts, and controls in place to minimise impacts.

Our tenant environmental assurance audit program monitors tenants' compliance with relevant regulations and the EMS. Audit frequency is based on each tenant's risk level (see tables 14-2 and 14-3).

Category	Description
Class A	**High-risk tenants** – carry out high-risk activities (i.e. storage/handling/management of significant volumes of hazardous substances) or have legacy site contamination that has the potential to cause significant harm to the environment.
Class B	**Medium-risk tenants** – carry out activities that have the potential to cause moderate environmental harm. These activities may include, but not be limited to, ground service equipment maintenance, aircraft repair and maintenance workshops, and large warehousing facilities.
Class C	**Low-risk tenants** – carry out activities that pose a low risk to the environment. These activities may include, but are not limited to, commercial retail, office/administrative and childcare facilities.

Table 14-2: Tenant environmental risk categories

Type of auditing	Class A	Class B	Class C
Darwin International Airport-conducted assurance	Annual	Every 2 years	Every 3 years

Table 14-3: Tenant auditing frequency

As well as the environmental assurance audit program, Darwin International Airport runs environmental management awareness training for tenants and contractors as necessary to help them understand their obligations under the legislation and the Environment Strategy.

Darwin International Airport employs a range of contractors who provide construction and engineering, maintenance and landscape management works. Contractors must complete an environmental induction before starting work. All contractors are made aware of any significant environmental risks in their activities through the construction environment management plan. Contractors must implement these plans for their projects and make them available to everyone on the project site. We inspect project sites to check these plans are in place and to monitor the effectiveness of environmental controls.

Sustainable development

Darwin International Airport recognises the need for development, expansion, and facility upgrades to accommodate the growing demands of travellers, the aviation sector, and the surrounding Darwin region. We are acutely aware of the necessity to strike a delicate balance between development and the preservation and enhancement of our natural environment.

In anticipation of future growth, we are dedicated to proactively managing environmental impacts by seamlessly integrating environmental considerations into every aspect of our projects, from initial design through construction to ongoing operations. Our commitment to sustainable development places a primary focus on critical environmental facets, namely energy, greenhouse gas emissions, water management, waste reduction, and efficient contractor oversight.

Our steadfast dedication to sustainability extends throughout the entire life cycle of airport infrastructure projects. This comprehensive approach commences with meticulous scoping and feasibility assessments, continues through design and procurement, and steadfastly incorporates these principles into the vigilant maintenance of our facilities.

By weaving sustainability into the fabric of each project, we reap numerous advantages for our business:

1. Ensuring full compliance with organisational standards and regulatory requirements.
2. Enhancing and preserving the overall environmental quality.
3. Strategically managing risks associated with our operations.
4. Promoting efficient utilisation of natural resources, resulting in cost savings.
5. Reducing project delivery time, ongoing maintenance expenses, and utility costs.
6. Minimising waste generation and maximising resource efficiency.
7. Demonstrating our unwavering commitment to environmental and sustainability goals.
8. Fostering an environment of innovation within our projects.
9. Preparing for and adapting to the evolving challenges posed by climate change.

To uphold this commitment, Darwin International Airport will systematically integrate sustainability requirements and objectives into our procurement protocols, project management standards, and environmental assessment procedures, ensuring that every facet of our operations aligns with our vision of a sustainable and environmentally responsible future.

Climate change management

Based on climate predictions by the CSIRO and the Bureau of Meteorology, ADG has developed a Climate Change Mitigation and Adaption Plan that identifies risks and opportunities for the business under a changing climate. The plan also outlines mitigation and adaption measures to minimise future climate impacts to staff, customers and operations.

Due to forecast increases in drought frequency and stresses on mains water supply, Darwin International Airport has also included water efficiency and recycling elements in the water management aspect for this strategy. Ongoing monitoring of vegetation, flora and fauna composition will assess potential climate change impacts and may trigger the need for responsive management strategies. Maintaining low fuel loads and ongoing reviews of our bushfire plans will be important in managing the potential increase of fire risk associated with climate change.

Climate change impacts at Darwin International Airport could include:

- a decline in annual rainfall, resulting in higher dust levels
- higher temperatures decreasing aircraft performance, causing heat damage to airport surfaces and increasing the airport's cooling requirements
- changes in wind patterns affecting flight paths and en-route turbulence
- extreme weather events – storms, droughts, floods and lightning strikes – disrupting operations, ground transport access and supply of utilities.

Achievements

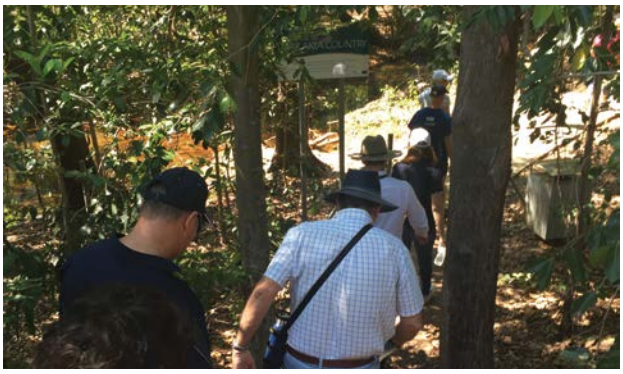
During the 2017–2022 Environment Strategy, our achievements included:

- established the Environmental Assurance Audit Program for continued environmental compliance monitoring of tenants and operators
- developed and implemented an online environment induction for new starters in addition to face-to-face training sessions
- updated the spill kit management procedure and spill response procedure and distributed to relevant operators, with training provided.

Environment and sustainability management initiatives

Outlined below are the environment and sustainability management initiatives that Darwin International Airport will undertake from 2023 to 2031.

1. **Environmental Documentation and Training Program:** Review and update all environmental documentation for development and construction activities, emphasising sustainability, resource efficiency, and environmental stewardship best practices. Develop and implement a comprehensive awareness and training program for staff, contractors, and tenants, covering compliance and sustainability principles.
2. **Comprehensive EMS Audits:** Annually conduct an internal audit of the airport's Environmental Management System (EMS) to identify opportunities for enhancing sustainability, reducing environmental impact, and streamlining processes. Additionally, triennially engage an independent third-party for an external audit of the EMS to ensure transparency and accountability, aligning practices with global environmental standards. Use audit findings as a basis for continuous improvement.
3. **Dedicated EMS Enhancement Team:** Establish a dedicated team responsible for continually enhancing and maintaining the airport's EMS. This proactive team will seek out innovative solutions and technologies to minimise the environmental footprint and promote sustainability.
4. **Ongoing Environmental Awareness and Management Training:** Launch and maintain an ongoing comprehensive environmental awareness and management training program for all stakeholders, including staff, contractors, and tenants. Ensure that everyone associated with the airport is well-versed in sustainability practices and their role in preserving the environment.
5. **Integrated Sustainability Framework:** Develop and implement a robust sustainability framework covering energy efficiency, waste reduction, water conservation, and renewable energy integration. Explore renewable energy sources, optimise water usage, and implement waste reduction strategies to reduce the airport's carbon footprint and enhance resource management.
6. **Biodiversity and Habitat Restoration Program:** Collaborate with Indigenous communities to establish a biodiversity and habitat restoration program, prioritising Indigenous ecological knowledge and practices. Ensure that restoration efforts align with Indigenous cultural and environmental values.
7. **Sustainable Transportation Plan:** Implement a sustainable transportation plan that encourages the use of eco-friendly modes of transport to and from the airport, such as electric shuttles, bike-sharing programs, and incentives for carpooling.
8. **Community Engagement:** Regularly engage with the local community through open forums, workshops, and information sessions to gather feedback and involve residents in sustainability efforts. Strengthen ties with the community and demonstrate a commitment to addressing their concerns.



Rapid Creek community awareness session

14.3 Environmental aspects

Overview

Darwin International Airport has identified the following environmental aspects as being potentially affected by airport development and operations:

- 14.4 groundwater and surface water
- 14.5 soil
- 14.6 biodiversity and conservation
- 14.7 cultural heritage
- 14.8 energy and carbon
- 14.9 water
- 14.10 air quality
- 14.11 ground-based noise
- 14.12 contamination, hazardous substances and materials
- 14.13 waste.

This strategy addresses each of these aspects and outlines:

- key objectives to be achieved during the 8-year environment strategy period
- background information on each of the aspects
- potential sources of environmental impact
- current management practices and achievements
- high-level management initiatives for each aspect that will be implemented over the 8-year environment strategy period to support the overarching objectives.

14.4 Groundwater and surface water

Objectives

1. **Water Quality Management:** Enhance monitoring, prevent pollution, and adopt recycling to protect groundwater and surface water quality.
2. **Collaboration and Engagement:** Foster sustainable partnerships, outreach, and biodiversity efforts to support water conservation and community involvement.
3. **Operational and Development Sustainability:** Implement eco-friendly practices in operational and development activities to reduce environmental impact.

Overview

Darwin International Airport is in the wet–dry tropics of the Northern Territory. Average annual rainfall at the airport is 1727mm, with most rain in the wet season (November–April) and very little in the dry season (May–October).

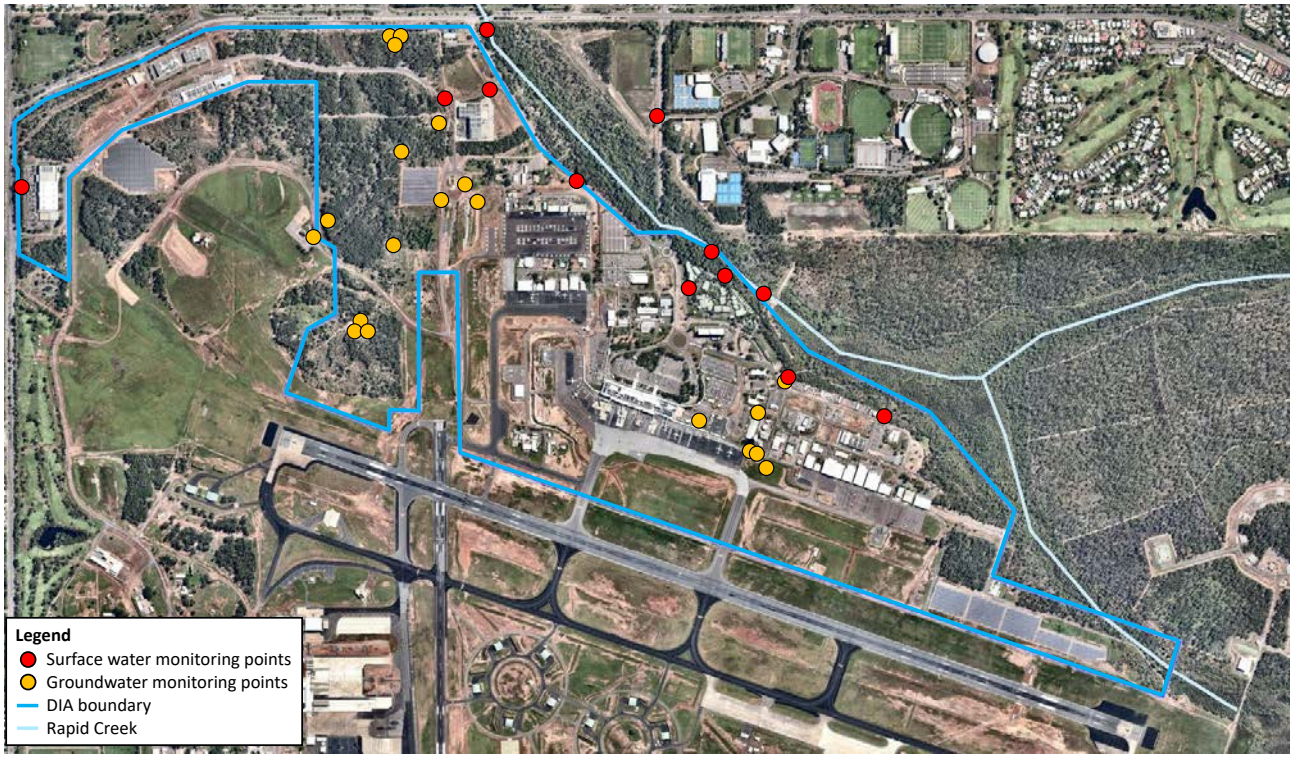
Groundwater is generally at its highest point – and surface water flows at their greatest – during January, February and March, when monthly rainfall averages 430mm, 369mm and 311mm, respectively. The distinct seasonality can highly influence the rate and trajectory of contaminant migration in surface water and groundwater at different times of the year. For example, in the mid-wet season, groundwater can be within one metre of the surface and intersect surface water flows; whereas, in the dry season, groundwater levels can drop to over 10 metres below ground level.

Groundwater and surface water flows generally follow the topography of the site, with the majority draining north-northeast into Rapid Creek. Around 294 hectares of the Darwin International Airport site is in the Rapid Creek catchment (Figure 14-1), with a small area in the northwest (approximately 16 hectares) sitting within the Ludmilla Creek catchment.

Rapid Creek and Ludmilla Creek drain into Darwin Harbour. Rapid Creek is of particular importance because its freshwater and downstream estuarine reaches support relatively healthy aquatic ecosystems. In addition, Rapid Creek is also highly valued by the community for recreation and has scenic and cultural values.

Figure 14-1: Rapid Creek catchment and Darwin International Airport lease boundary

Figure 14-2: Darwin International Airport groundwater and surface water monitoring points



In addition to the airport, the Rapid Creek catchment includes the Marrara sporting complex, Marrara golf course, residential suburbs, Defence land, and part of the industrial area of Winnellie.

There are two sources of freshwater flows to Rapid Creek: stormwater runoff and groundwater. During the dry season (May–October), base flows in Rapid Creek are sustained by groundwater seepage, predominantly fed by 2 springs in the Marrara Swamp, which sits upstream on the neighbouring Defence estate. These base flows are essential in sustaining the aquatic ecosystems of Rapid Creek throughout the dry season.

Potential sources of environmental impact

Potential sources of impact on groundwater and surface water quality at Darwin International Airport include:

- re-fuelling facilities and fuel storage tanks
- fuel, chemical or sewerage spills
- aircraft and vehicle wash-down areas
- waste, litter and sediment
- increases in post-development stormwater flows to Rapid Creek and Ludmilla Creek
- legacy contaminated sites
- faults in pollution-control devices.

Environmental management

The airport carries out regular surface water and groundwater monitoring, analysis and reporting. See Table 14-1, Darwin International Airport – Environmental Monitoring Program.

Surface water sampling includes stormwater drains and sites along Rapid Creek that represent different discharge points throughout the airport catchment, as well as a reference site upstream of the Darwin International Airport catchment.

A series of groundwater monitoring sites are located across the Darwin International Airport site, including historic landfills, generator and airside refuelling facilities and reference bores. Samples are analysed for potential environmental contaminants such as dissolved metals, nutrients, hydrocarbons, per- and polyfluoroalkyl substances (PFAS) and microbiological parameters.

Figure 14-2 shows surface water and groundwater monitoring locations across Darwin International Airport.

Management practices in place to minimise impacts on surface or groundwater and receiving waters include:

- ‘Report All Spills’ policy and spill response training
- spill response procedure
- pollution control devices to intercept and treat stormwater runoff
- designated wash-down bays for vehicles, equipment, activities
- tenant environmental audits
- project erosion and sediment controls
- project construction environmental management plan inspections
- monitoring of fuel storage tanks
- frequent litter collection throughout Rapid Creek Reserve.

Achievements

During the 2017–2022 Environment Strategy, our groundwater and surface water management achievements included:

- carried out extensive groundwater and surface water monitoring and assessments
- audited pollution-control devices across the airport precinct, resulting in repairs to 2 poorly functioning HumeCeptors and identifying further maintenance requirements. (The HumeCeptor system is an underground, precast concrete stormwater treatment solution that utilises hydrodynamic and gravitational separation to remove hydrocarbons and suspended solids from stormwater runoff).
- developed new spill management procedures for airside operators and staff
- delivered community awareness sessions on water quality in Rapid Creek
- Rapid Creek Water Advisory Committee participation
- contributed to the Rapid Creek Management Plan 2021 (prepared for the Rapid Creek Water Advisory Committee)
- provided feedback to the Northern Territory Government Department of Infrastructure, Planning and Logistics on development proposals that may affect the health of Rapid Creek
- supported the construction of Marrara detention basin to manage environmental flows of Rapid Creek and mitigate flooding of Darwin’s northern suburbs.

Groundwater and surface water management initiatives

Darwin International Airport is committed to responsible and sustainable groundwater and surface water management. As we look ahead to the period from 2023 to 2031, we have outlined a comprehensive set of initiatives that will guide our efforts in preserving and protecting these vital natural resources. These initiatives reflect our dedication to not only meet but exceed environmental standards while fostering collaboration with various stakeholders. Our commitment is driven by a profound respect for the environment and the communities we serve.

1. Enhance the Water Quality Monitoring Program: Continuously implement and refine our water quality monitoring program to ensure the highest standards of water quality are maintained and to swiftly respond to any deviations. This will employ cutting-edge technology and scientific expertise to safeguard our water resources.
2. Stormwater Modelling and Management: Collaborate closely with internal and external stakeholders to comprehensively assess the potential for stormwater modelling across the airport precinct. Engage specialised consultants to carry out this crucial project, enabling us to better understand, predict, and manage stormwater flow and its impacts on groundwater and surface water.
3. Advanced Pollution Prevention Measures: Undertake a rigorous examination of potential sources of pollution and implement proactive measures to safeguard groundwater and surface water quality. These measures will include sustainable practices, innovative technologies, and regular assessments to prevent contamination.
4. Catchment Engagement: Maintain and strengthen our engagement with state and local governments, Indigenous communities, and other key stakeholders concerning catchment matters. This collaborative approach will ensure alignment with regional water management policies, promote knowledge sharing, and enhance our collective ability to address water-related challenges.
5. Biodiversity and Habitat Enhancement: Collaborate with Indigenous organisations and environmental experts to develop and implement a comprehensive biodiversity and habitat enhancement program. This will focus on protecting and rehabilitating critical aquatic ecosystems and wetlands in the airport's vicinity.
6. Community Education and Outreach: Launch an extensive community education and outreach program to raise awareness about the importance of groundwater and surface water conservation. This will engage with schools, local organisations, and the general public to foster a sense of shared responsibility for our precious water resources.
7. Innovative Water Recycling and Reuse: Investigate and implement cutting-edge water recycling and reuse systems across airport facilities, significantly reducing our overall water consumption and environmental footprint.
8. Emergency Response Plan: Develop and regularly update a comprehensive emergency response plan specifically tailored to address potential groundwater and surface water-related incidents. This will ensure rapid and effective responses to unforeseen events, minimizing environmental impact.
9. Research and Development Collaboration: Collaborate with research institutions and universities to initiate research projects focused on sustainable groundwater and surface water management, with an emphasis on innovative technologies and best practices.

These initiatives embody our unwavering commitment to responsible water management, ensuring that Darwin International Airport continues to thrive as a model of environmental stewardship and community engagement.

14.5 Soil

Objectives

1. **Prevent Soil Contamination and Erosion:** Prevent soil contamination and minimise erosion across the airport site, preserving soil integrity and reducing environmental impact.
2. **Effective Soil Management Plans:** Develop and implement soil management plans to protect soil quality and minimise environmental impacts.

Overview

Soil management at Darwin International Airport aims to prevent/minimise soil erosion, sedimentation, contamination and airborne dust. Management activities vary by season; for example, wet season rainfall increases the risk of erosion and sedimentation, and the dry season may present airborne dust issues.

Soil management at Darwin International Airport refers to the ground surface and soils, and landform features. Land systems and land units at the airport are described in the Northern Territory Government's 'Land Systems of the Darwin Region' survey.

Most of the airport land can be described as flat to gently undulating upland terrain with red massive soils, often deep and gravelly yellow massive earths, and naturally vegetated (if uncleared) by Eucalyptus tall, open forest. Closer to Rapid Creek, the terrain is gentle lower slopes and broad drainage floors and creek margins subject to slow drainage, wet season water logging and/or inundation, and vegetated by tall shrubland to low open woodland. The upper Rapid Creek is swampland, and most of this area is off the airport site lease.

Areas of PFAS contamination are present at Darwin International Airport due to the historic use and storage of PFAS-containing foams used for firefighting emergency response, in training and testing on the fire training grounds and the fire stations. Further information on PFAS is in Section 14.12: Contamination, hazardous substances and materials.

Potential sources of environmental impact

Potential sources of impact to land at Darwin International Airport include:

- poor implementation of sediment and erosion controls
- fire (natural and prescribed regimes) creating bare soil more susceptible to erosion
- contamination through accidental spills or leaks, use of unapproved fill, and legacy issues
- incorrect storage and disposal of waste materials
- land-clearing activities for development, weed control or landscaping.

Environmental management

Darwin International Airport has implemented a range of measures to manage and minimise soil erosion and prevent contamination, including:

- natural regeneration of native vegetation is encouraged in undeveloped areas of the airport site
- implementation of erosion and sediment-control measures for projects, building construction and land-clearing activities
- erosion and sediment control plans to be developed and implemented for major or high-risk projects, required to form part of a construction environment management plan
- monitoring of erosion in stormwater drains to inform required remedial works
- capital works to improve the condition of any unlined drains
- spill-management procedures
- excavation and stockpile movements require approval
- soil quality testing pre-development and for incident investigation, stockpile management and excavation risk management
- retention and capture of stormwater.

Achievements

During the 2017–2022 Environment Strategy, our soil management achievements included:

- minimised sediment movement and erosion across development projects by ensuring effective control measures were implemented
- carried out site investigations for new developments
- all excavations and stockpile movements required approval under an application procedure
- monitored and managed the historic airside stockpile area in line with the National Environmental Management Plan for PFAS
- required construction environmental management plans for all new developments
- tenant inspection audits reviewing spill avoidance and spill management practices.

Soil management initiatives

The soil management initiatives to be implemented by Darwin International Airport between 2023 and 2031 are outlined below.

1. Bare Ground Management Plan: Develop and implement a comprehensive plan for managing bare ground areas, mitigating erosion and contamination risks, and enhancing soil health.
2. Stockpile Management Plan: Develop and execute a systematic plan for managing stockpiles, ensuring proper containment, monitoring, and environmental compliance.

14.6 Biodiversity and conservation

Objectives

1. Biodiversity and Natural Habitat Preservation: Preserve and protect the biodiversity and natural habitats within Darwin International Airport with a focus on conservation zoned areas.
2. Community Engagement and Stakeholder Collaboration: Engage the airport community and collaborate with key stakeholders to promote biodiversity conservation, sustainability, and environmental protection.

Overview

The Darwin International Airport site encompasses many near intact native vegetation communities that have relatively good habitat condition. Most vegetation communities are regrowth aged less than 25-35 years old. Historical vegetation clearance, fire and weed infestations have affected the integrity of these communities; however, the nature of the wet–dry tropics enables many vegetation communities to regenerate naturally.

Around three-quarters of the total airport site is cleared grassland to accommodate buildings and airfield systems. The rest of the airport site is remnants of eucalypt woodland and part of the Rapid Creek riverine corridor.

Darwin International Airport has 2 conservation zones comprising almost 30 hectares of land. The first is Rapid Creek Reserve and the second is a parcel of land located airside that abuts the Service Commercial Zone of Darwin Airport Central (see Figure 6-1).

Rapid Creek is a freshwater stream that runs along the northern boundary of the airport site, flowing almost 10km through Darwin's northern suburbs and into the sea at the southern end of Casuarina Beach. Rapid Creek is bounded by a number of landholders: Darwin International Airport, the Department of Defence, the Northern Territory Government and City of Darwin. As Darwin's largest freshwater stream, Rapid Creek is of considerable cultural, historical, social and ecological importance. It supports several plant communities, from paperbark forests in the Marrara Swamp, to monsoon forest along the stream's middle reaches and mangrove forests near the sea. Along its length, the creek provides extensive habitat for flora and fauna.

Originating in Marrara Swamp, the Rapid Creek catchment measures 28 square kilometres and covers 13 Darwin suburbs. While a large proportion of the catchment has been cleared for residential, sporting, commercial and semi-rural use, and much of the catchment is highly urbanised, parts of the stream's upper reaches and the stream corridor itself remain relatively intact. Rapid Creek reserve's main body of vegetation remains protected 'airside' (behind the security fence and not publicly accessible) and extends 'landside' (open to public) via a 50-metre-wide corridor to the riparian zone of Rapid Creek along Charles Eaton Drive. The reserve provides a biological link between the upper catchment area of Rapid Creek and the creek corridor.

Darwin International Airport also maintains a 75m wide environment reserve as a buffer from the creek's centre line and from our boundary in the Marrara wetland. We constructed the 'Gurambai' walking trail and interpretative signage in this area, which is home to a diverse range of native species and habitat types.

There are 12 distinct vegetation communities on the airport site (see Figure 14-3). Seven are native vegetation, and the rest are modified areas resulted from clearing, slashing and replanting. In general, the distribution of native vegetation across the site depends on landform and soil moisture content. The site is mostly eucalypt woodland, which is in good condition and includes a small wet season drainage line running west-east, which supports some riparian and wetland species. A seasonally inundated area of approximately one hectare on the site supports a Melaleuca/Lophostemon wetland with open areas of native sedges and herbs.

Darwin International Airport undertakes a variety of biological surveys across the airport site, with many relating to site-specific projects. The airport's flora and fauna registers indicate there is a relatively consistent diversity of species between surveys. To date, 308 flora species and 214 fauna species have been identified within airport grounds. Five new species were added during the 2021 landside and airside surveys: the pale-vented bush-hen (*Amaurornis moluccana*), northern cave bat (*Vespadelus caurinus*), northern yellow-faced turtle (*Emydura tanybaraga*), short-beaked echidna (*Tachyglossus aculeatus*), and a newly described flora species (*Utricularia gaagudju*).

Eight threatened species have been recorded at Darwin International Airport (see Table 14-4). Three of these – the Darwin cycad, the northern brushtail possum and the black-footed tree-rat – were recorded during the 2021 flora and fauna survey.

Forty-two introduced flora species are known to occur on the Darwin International Airport site, of which 12 are declared weeds under the *Weeds Management Act 2001 (NT)*. Of the weed species, introduced grasses such

	Common name	Scientific name	Status (EPBC Act)	Status (TPWC Act)
Flora	Darwin cycad	*Cycas armstrongii*	Not listed	VU
Fauna	Northern quoll *	*Dasyurus hallucatus*	CR	EN
	Floodplain monitor	*Varanus panoptes*	Not listed	VU
	Mitchell's water monitor	*Varanus mitchelli*	Not listed	VU
	Black-footed tree-rat	*Mesembriomys gouldii*	EN	EN
	Northern brushtail possum	*Trichosurus vulpecula arnhemensis*	VU	Not listed
	Pale field rat	*Rattus tunneyi*	Not listed	VU
	Curlew sandpiper *	*Calidris ferruginea*	CR	CR

Status key: *EPBC Act – Environment Protection and Biodiversity Conservation Act 1999* (Cth)
TPWC Act – Territory Parks and Wildlife Conservation Act 1976 (NT)
VU – Vulnerable
EN – Endangered
CR – Critically Endangered;
**Not recorded during Darwin International Airport surveys but appears on NT Fauna Atlas records: Northern Quoll recorded most recently in 1996; Curlew Sandpiper recorded most recently in 1995.*

Table 14-4: Threatened species recorded at Darwin International Airport

as gamba grass, mission grass and thatch grass are of highest concern because they have a significantly higher biomass than native species and cure later in the dry season, causing hotter and more intense fires.

Three introduced fauna species have been recorded during surveys at Darwin International Airport: the cane toad (*Rhinella marina*), Asian house gecko (*Hemidactylus frenatus*) and black rat (*Rattus rattus*).

Potential sources of environmental impact

Airport activities that may affect flora and fauna include:

- clearing of vegetation for development and to comply with obstacle limitation surface restrictions and air traffic control line of sight
- fire, including wildfire and prescribed burns
- fuel or chemical spills
- weed-control activities (including patch burning and herbicide use)
- aircraft noise and accidents.

Environmental management

Vegetation management measures for development proposals or land clearing activities implemented at Darwin International Airport include:

- complying with relevant legislation in all land clearing/development proposals
- requirement of construction environment management plans for major development proposals
- implementing Darwin International Airport's Landscape Master Plan, which requires preferential use of native species for revegetation and landscaping works
- landscape management forms approved by the airport's Environment and Sustainability Manager for any vegetation removal
- establishing vegetation reserves and regeneration programs across the airport site.

Conservation Zone management

Darwin International Airport's management measures for the remnant vegetation habitat in the two conservation zones include:

- inclusion in the airport's Weed Management Plan that comprises of targeted treatment of high priority species
- annual weed monitoring survey to assess the progress of the Weed Management Plan objectives
- annual fuel load assessment to monitor and manage areas of high fuel load
- protection from public access by the airside fence (Airside Conservation Zone)
- weekly site visits by the Larrakia Rangers to undertake weed management, fuel load management, litter collection and track maintenance (Rapid Creek Reserve)
- surface water and groundwater monitoring to identify any potential contaminants entering the creek system (Rapid Creek Reserve)
- revegetation activities as required
- controlled burns as required
- 5-yearly flora and fauna surveys to monitor for threatened or vulnerable species.

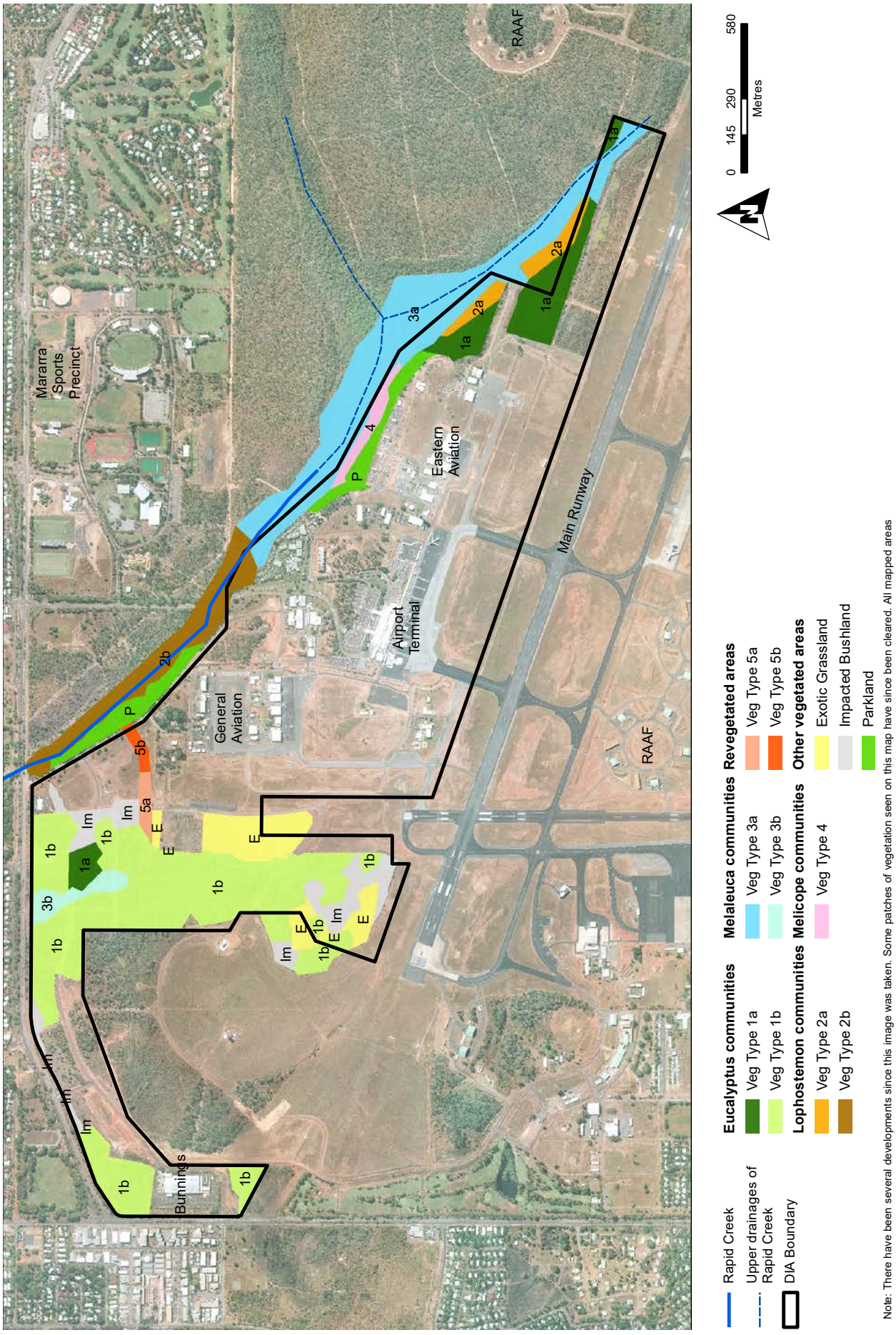
Fire management

Several vegetation types on the airport site are prone to fire. Our Bushfire Management Plan informs management practices to mitigate bushfire risk. Bushfire management strategies at Darwin International Airport include:

- controlling public access
- fuel load monitoring
- weed monitoring
- fire break maintenance
- controlled burns to reduce fuel load
- staff and tenant training and awareness.

Every year, fuel loads across the airport site are evaluated to inform fire management activities and priorities. This assessment is also used to update the airport's Bushfire Management Plan.

Figure 14-3: Map of vegetation communities at Darwin International Airport



Note: There have been several developments since this image was taken. Some patches of vegetation seen on this map have since been cleared. All mapped areas currently exist.

Pest animal, plant and pathogen management
We implement a range of measures to control pest animals and plants at Darwin International Airport:

- Mosquitoes: potential breeding sites are mapped, removed if possible and monitored when necessary in line with climatic conditions. Stormwater drains are maintained to minimise ponding, and vegetation known to harbour mosquitoes is not used for landscaping. The Northern Territory Government Department of Health provides assistance with trapping and monitoring where necessary.
- We implement weed management and monitoring programs across the site in conjunction with our other environmental programs such as fire management and regeneration works.

Wildlife Hazard Management Plan
The risk of wildlife strike with aircraft at the airport is managed through our Wildlife Hazard Management Plan. The main objective of this plan is to reduce bird and animal strike incidences, using both active and passive management to discourage the presence of birds and animals from airside areas.

Darwin International Airport recognises that wildlife hazard management requires a systematic approach rather than focussing individually on wildlife species. Wildlife presence is influenced by available habitat, predators, water, food sources, inter/intra-species behaviour and human interaction.

Our ongoing wildlife management activities at the airport are:

- recording bird observations and strike incidents
- training airport operations officers in bird and habitat identification and dispersal activities
- dispersal activities such as pyrotechnic bird fright, sirens and gunshot
- habitat modification, including maintaining optimal grass height adjacent to runways
- our Integrated Vegetation Management program, reducing insect populations and broad leaf weeds to make runway areas less attractive to birds
- ongoing reporting and stakeholder meetings to review the implementation of the program
- program auditing.

Integrated Vegetation Management program
Darwin International Airport has sought an unconventional and innovative approach to reduce wildlife strikes at the airport through our Integrated Vegetation Management program. Vegetation at the airport currently provides several different food sources (mostly insects and seeds) that attract a wide variety of wildlife. Using selective insect and weed control strategies integrated alongside the airport's mowing and harassment activities, the main objective of the Integrated Vegetation Management program is to reduce the presence of wildlife in the high-risk areas near the main runway.

During 2019, a small-scale trial was undertaken adjacent the runway, resulting in a promising reduction in broadleaf weed, bird and insect numbers, as well as a reduction in mowing and slashing activities required in the trial area.

After the success of the trial, a site-specific Integrated Vegetation Management program was developed for the climatic conditions and species at Darwin International Airport. It has 2 applications each year – one in the early wet season and one in the late wet season.

The second full year of the program was implemented in 2021–22. The treatment area covers some 90 hectares of the Jointly Used Area around the runway, and requires significant coordination with Darwin International Airport airside operators, Integrated Vegetation Management contractors and Defence over the 2-week treatment period.

Integrated Vegetation Management program

Following the promising results of the first two years of integration, the Integrated Vegetation Management treatment will continue in 2022–23 and likely beyond as a biannual activity as we strive for a significant reduction in wildlife strikes through actively managing vegetation composition and insect numbers around the main runway.

Monitoring programs

A variety of monitoring programs are undertaken at Darwin International Airport to assess biodiversity and manage any threatening processes, including weeds and fire. These programs are outlined in Table 14-1.

Achievements

During the 2017–2022 Environment Strategy, our biodiversity and conservation management achievements included:

- continued implementation of the Weed Management Plan and Bushfire Management Plan to reduce the presence of exotic grasses across the airport estate
- undertook a prescribed burn in Rapid Creek Reserve with the Larrakia Rangers
- reduced bird strike rates from the successful trials and implementation of the Integrated Vegetation Management program
- mapped Department of Agriculture (Biosecurity) mosquito monitoring locations at the airport and continued to implement monitoring and management measures
- updated Wildlife Hazard Management Plan for Darwin International Airport and RAAF Base Darwin
- continued to undertake off-airport bird surveys to identify potential bird attractors off-airport
- developed the Darwin International Airport Precinct Landscape Master Plan
- conducted the 5-yearly flora and fauna survey in conservation areas (finalised in 2021)
- sponsored Landcare groups for developing brochures and other community resources.

Biodiversity and conservation management initiatives

The biodiversity and conservation management initiatives to be implemented by Darwin International Airport between 2023 and 2031 are outlined below.

1. **Enhance Biodiversity Management:** Implement and continually enhance comprehensive biodiversity surveys, management plans, and programs. Covering areas like weed, pest, erosion, sediment, vegetation, fire, wildlife hazard, and flora/fauna management.
2. **Landscape Master Plan Enhancement:** Improve and implement the Landscape Master Plan for the airport site, emphasizing sustainable landscaping and biodiversity enhancement.
3. **Biodiversity Offset Program:** Establish and execute a biodiversity offset program to support conservation efforts.
4. **Rapid Creek Reserve Strategy:** Develop and implement a conservation and stewardship strategy, plan, and program for Rapid Creek Reserve, collaborating with key stakeholders.
5. **Community Engagement:** Promote the protection and biodiversity within the airport community with a focus on conservation zoned areas.
6. **Stakeholder Collaboration:** Continue engaging, consulting, and collaborating with key stakeholders, including state government agencies and community groups, to address land and biodiversity aspects effectively.

14.7 Cultural heritage

Objectives

1. **Indigenous Cultural Heritage Preservation and Engagement:** To identify, understand, preserve, and manage sites of indigenous heritage value in consultation with indigenous communities, fostering cultural awareness, and upskilling while adhering to legislative requirements.
2. **Indigenous Cultural Heritage Awareness and Promotion:** To promote indigenous cultural heritage awareness, understanding, and engagement, including the support of indigenous cultural initiatives and guided tours.

Overview

Darwin International Airport has been advised by the Aboriginal Areas Protection Authority that a 'recorded' Aboriginal sacred site has been identified in the subject land. A site listed as 'recorded' is one that is known to the Aboriginal Areas Protection Authority but has not been evaluated or placed in the Register of Sacred Sites in accordance with the *Northern Territory Aboriginal Sacred Sites Act 1999*. The location or extent of a 'recorded' site is not yet determined, but there is information indicating that it is nonetheless significant according to Aboriginal tradition.

The land the airport is located on was bombed during the Second World War, and most infrastructure was devastated during Cyclone Tracy in December 1974. Most of the older buildings relating to the historical use of the airport are located in the RAAF lease area. No listed European heritage sites have been identified in the Darwin International Airport lease area.

Potential sources of environmental impact

Potential impact to sacred sites, heritage sites and artefacts may occur as a result of:

- failure to identify sites
- accidental or malicious disturbance of sites
- disturbance of sites during development, landscaping or fire activities
- environmental impacts, including fire, termites, wind, flooding and high temperatures.

Environmental management

Activities that could potentially affect heritage values, such as construction or development on airport land, go through an assessment process to minimise this risk. Construction environment management plans are used where heritage values may exist for all projects, and all contractors are required to be aware of this document and their obligations while working on site.
If items of heritage value are uncovered onsite, the find is to be immediately reported to the airport's Environment and Sustainability Manager and appropriate management measures implemented.

Darwin International Airport strives to foster good working relationships with the Larrakia people and has undertaken joint projects on the cultural protection of Rapid Creek.

Achievements

During the 2017–2022 Environment Strategy, our cultural heritage management achievements included:

- ensured all contractors and tenants understood their heritage obligations under the site rules in construction environment management plans and/or via the Darwin International Airport Environment Management – An Information Handbook for Operators at the Airport
- continued to work with the Larrakia people in the management of Rapid Creek and other airport projects
- education through interpretative signage along the Gurambai walking trail
- strengthened relationships with the Larrakia Rangers, who are now the primary vegetation contractor for the management of Rapid Creek Reserve.

Cultural heritage management initiatives

The cultural heritage management initiatives to be implemented by Darwin International Airport between 2023 and 2031 are outlined below.

1. **Community Engagement:** Foster strong relationships through consultations, cultural events, and upskilling programs with indigenous communities.
2. **Heritage Protection:** Establish a heritage database, train staff and contractors, and create a rapid response protocol for heritage discoveries.
3. **Cultural Tours Support:** Actively sponsor the Gurambai Cultural Experience guided tours.
4. **Cultural Awareness Promotion:** Develop educational materials, art installations, and cultural engagement programs for visitors and the community.

14.8 Energy and carbon

Objectives

1. **Energy and Carbon Efficiency:** Minimise energy consumption and increase the share of renewable energy in the airport's energy mix.
2. **Renewable Energy Expansion:** Expand renewable electricity systems and explore storage options.
3. **Greenhouse Gas Reduction Collaboration:** Collaborate for emission reductions across the value chain.

Overview

Darwin International Airport, as with all large airports, requires significant amounts of energy for providing the operations and services required for an airport of its size.

The airport uses 3 main sources of electricity – electricity from external generation facilities (grid), solar electricity generated by onsite rooftop and ground-mounted solar systems and electricity provided via diesel generators, which is only used during a mains power outage.

Other energy sources the airport uses are liquid petroleum gas and liquid fuels.

Energy use activities at Darwin International Airport include:

- general airport operations, including all activities in airside and landside buildings
- vehicle and ground-based aircraft activities, including operation of plant and equipment
- lighting – runway lighting, area lighting, street lighting and internal building lighting
- air-conditioning, power use and conveyor belts in the terminal and other buildings occupied by staff, tenants and contractors
- grounds maintenance and landscaping
- construction projects and related works.

Carbon emissions

Measurement, monitoring and reporting of Darwin International Airport's carbon emissions is carried out every year through a greenhouse gas emissions assessment. The assessment format is based on the National Greenhouse and Energy Reporting (NGER), which is administered federally by the Department of Industry, Science, Energy and Resources. The assessment is focussed primarily on the Scope 1 and 2 emissions generated by the airport. Figure 14-4 shows the key sources and contributors to these Scope 1 and 2 emissions across the airport.

From 2024, Darwin International Airport intends to move from the NGER assessment format to the Airport Carbon Accreditation program governed by Airports Council International (ACI).

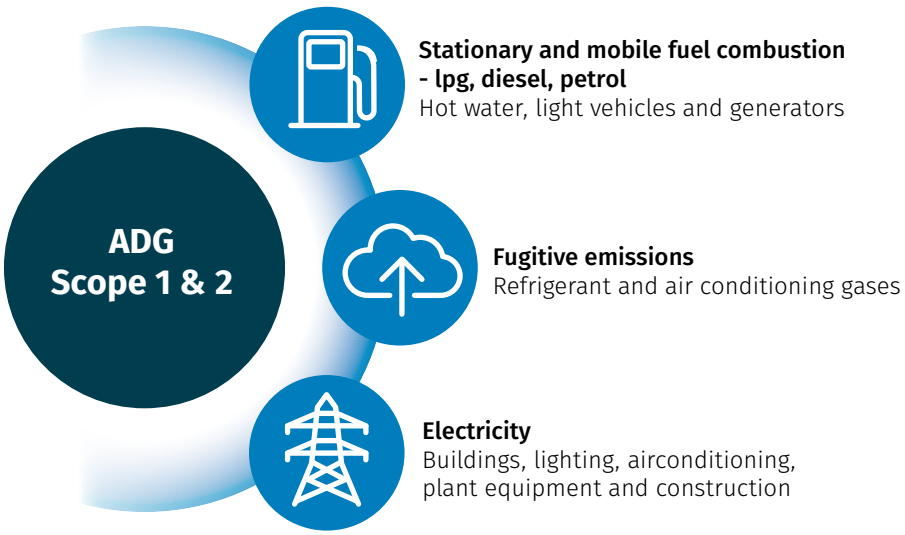
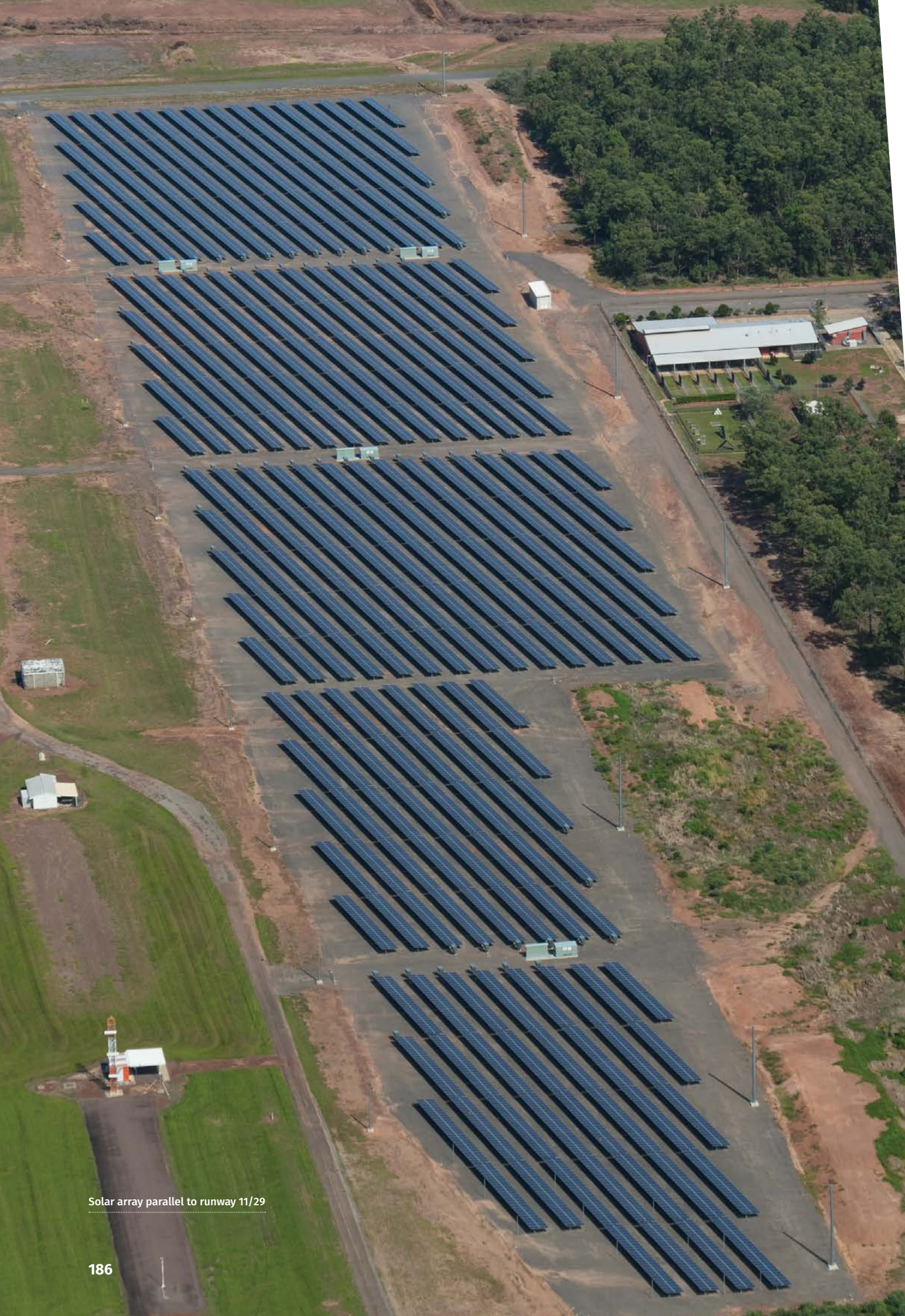


Figure 14-4: Darwin International Airport key sources and contributors to Scope 1 and 2 greenhouse gas emissions



Solar array parallel to runway 11/29

Renewable energy transition

Darwin International Airport is committed to reducing our carbon emissions. This commitment has seen the business invest over $20 million in installing renewable energy systems across the airport precinct (see Section 11: Utilities Infrastructure). In 2023, the airport's current total solar capacity is 7.75-megawatts (AC).

As part of our net zero emissions target, we will look to further increase our total renewable energy generation capacity and may install renewable energy storage systems in the form of batteries.

Environmental management

The focus areas for energy efficiency and reducing emissions across Darwin International Airport's operations include:

- continued investment in renewable energy generation
- energy efficiency projects
- electrification of operational plant and equipment (from fossil fuel) using generated renewable energy
- implementation of sustainable building design principles that maximise energy efficiency.

Achievements

During the 2017–2022 Environment Strategy, our energy and carbon management achievements included:

- continued voluntary annual National Greenhouse and Energy Reporting
- constructed several rooftop solar arrays across the airport precinct, increasing the total solar generation capacity to 7.75-megawatts (AC)
- replaced street and terminal lighting with energy efficient LED lighting
- installed pre-conditioned air and electric ground support equipment for aircraft
- awarded the silver award in 2022 from the Airports Council International (ACI – Asia Pacific) for carbon management strategies including renewable energy generation, emissions reductions targets and apron efficiency upgrades.

Energy and carbon management initiatives

The energy and carbon management initiatives to be implemented by Darwin International Airport between 2023 and 2031 are outlined below.

1. **Energy Efficiency and Planning:** Create an Energy Master Plan detailing energy-saving strategies, renewable energy integration, and efficiency measures.
2. **Sustainable Energy Design and Communication:** Communicate Sustainable Design and Delivery Guidelines, specifying energy-efficient criteria for all projects.
3. **Renewable Energy Expansion and Storage:** Investigate and expand renewable electricity systems and explore energy storage opportunities.
4. **Greenhouse Gas Reduction Collaboration:** Partner with stakeholders to discover and support renewable energy adoption and emissions reduction activities.
5. **Energy Conservation Promotion:** Raise awareness and encourage energy-saving measures within the airport community.
6. **Airport Carbon Accreditation:** Begin reporting emissions in line with the ACI program and pursue certification.

Smart irrigation installed to landscaped median strips during road network upgrades

14.9 Water

Objectives

1. **Water Efficiency:** Conserve and minimise water consumption through efficiency and reuse initiatives.
2. **Water Stewardship:** Continuously improve water stewardship practices and enhance awareness among stakeholders.

Overview

Darwin International Airport, including its tenants and other users on the precinct, relies on mains water supplied by the Northern Territory Government-owned corporation, Power and Water. The water supplied by Power and Water, which is delivered to homes and businesses in Darwin and surrounding areas, currently comes from 2 sources – the Darwin River Dam and groundwater from McMinns and Howard East bore fields.

The water supply in Darwin is dependent of rainfall, which can vary from year to year and is expected to continue to fluctuate with the impact of climate change and the high evaporation from the main catchment. So it's important for all users across Darwin International Airport to be water smart.

Water use areas and activities across the airport include terminal and hotel facilities, retail and commercial facilities, garden maintenance, aircraft and vehicle washdown, and fire training.

Potential sources of environmental impact

Potential sources of impact on water at Darwin International Airport include:

- inefficient water use – garden irrigation equipment and management, inefficient appliances and fixtures
- water leaks
- new developments increasing consumption
- excessive use of water to carry out activities
- design, monitoring and maintenance of mains water infrastructure
- indoor and outdoor water usage activities.

Environmental management

Sustainable design and delivery guidelines are being developed that will guide water efficiency measures to be implemented for new developments. Water efficiency improvements that are considered and installed when repairing or upgrading infrastructure include sensor taps, dual flush toilets, low-flow shower heads and water-efficient appliances. For project landscaping, native water-wise plants are prioritised to limit the amount of irrigation required.

As part of the Henry Wrigley Drive road improvements undertaken in 2022, the first smart irrigation controller at Darwin International Airport was installed on a landscaped median strip. The controller is Wi-Fi-enabled and connects to local weather stations, adjusting the watering rate depending on local conditions. All other irrigation across the airport precinct operates overnight to minimise water lost to evaporation.

Achievements

During the 2017–2022 Environment Strategy, our water management achievements included:

- installed smart irrigation on a landscaped median strip as part of road network upgrades that adjusts watering rates depending on local weather conditions
- developed the Landscape Master Plan that prioritises native water-wise plants for landscaping to limit irrigation requirements.

Water management initiatives

The water management initiatives to be implemented by Darwin International Airport between 2023 and 2031 are outlined below.

1. **Strategic Water Management:** Establish and execute a comprehensive water management strategy aligning with sustainability goals.
2. **Enhanced Water Consumption Monitoring:** Strengthen water consumption monitoring mechanisms to enhance efficiency and identify areas for improvement.
3. **Sustainable Design Guidelines:** Finalise and implement sustainable design guidelines to delineate water-efficient requirements for construction, new developments, and upgrades.
4. **Water Efficiency and Recycling Exploration:** Investigate opportunities for water recycling and implement site-wide water efficiency measures.
5. **Community Water Conservation Promotion:** Actively engage and educate the airport community on water conservation practices.

14.10 Air quality

Objectives

1. **Air Quality Compliance:** Ensure strict adherence to Commonwealth and Northern Territory regulations governing air quality standards.
2. **Continuous Air Quality Monitoring:** Implement ongoing air quality monitoring measures to promptly address and mitigate any potential issues.
3. **Emission Reporting Alignment:** Align greenhouse gas emission reporting with the ACI's Airport Carbon Accreditation program to strengthen environmental accountability.
4. **Stakeholder Collaboration for Clean Air:** Collaborate with stakeholders to maintain ambient air quality and minimise pollution risks in the airport vicinity.
5. **Proactive Pollution Management:** Implement proactive pollution management strategies to control emissions from ground-based sources, construction, and operational activities.

Overview

Air quality includes gaseous emissions, fumes, dust, odours and particulates. The airport experiences few issues with air quality or air pollution. Complaints relating to air pollution from airport operations are rare and are typically associated with one-off events such as bushfires, prescribed burns or aviation rescue firefighting training exercises. The principal source of emissions at the airport is carbon dioxide related to energy use in buildings, transport and fixed plant.

Darwin International Airport has engaged consultants and produced reports aligning with the reporting tool under the *National Greenhouse and Energy Reporting Act 2007*. To date, total air emissions produced have not exceeded the National Pollution Inventory trigger levels for any individual operation on airport, nor for the airport as a whole. From 2024, Darwin International Airport intends to move its reporting of greenhouse gas emissions to be in line with ACI's Airport Carbon Accreditation program.

Ambient air quality for the greater Darwin region is monitored by the NT Environment Protection Authority (EPA) and is assessed against the National Environment Protection (Ambient Air Quality) Measure. The NT EPA operates a monitoring station in the suburb of Winnellie, 2.5 km south of the airport terminal. Generally, exceedances of accepted limits are rare and are mostly associated with particulates in smoke from bushfire activity. Real-time and historic air quality data is publicly available on the NT EPA website.

Potential sources of environmental impact

Air pollution may be from stationary or other ground-based sources, including:

- exhaust emissions generated by auxiliary and ground power units
- fuel-burning equipment
- construction activities
- ground-based operations generating dust or smoke (including smoke emissions from fire training exercises)
- painting and paint stripping operations
- prescribed burns
- odours from stored chemicals or waste.

Environmental management

Air quality monitoring at Darwin International Airport is event-based and is conducted by qualified consultants as required.

Air quality issues from dust generation are managed through control measures implemented as part of construction environmental management plans, which are a requirement for development projects.

Smoke from fires, whether prescribed, unplanned or as a result of arson, can negatively affect air quality, affecting airport operations and the surrounding community. Fire management at the airport includes weed management and fuel load reduction to limit combustible material, and prescribed burns are only undertaken during favourable conditions.

Smoke emissions can also result from training exercises undertaken by Airservices Australia for aviation rescue firefighting. Hot fire training is no longer undertaken at Darwin International Airport, and has instead been replaced by cold-smoke exercises using a smoke machine. The impact is further managed by limiting training exercises to outside the hours of major aircraft activity and informing the Darwin International Airport Operations team, the Environment and Sustainability Manager and Air Traffic Control prior to exercises commencing.

Odours are managed using best practice guidelines for chemical storage, handling and disposal, and bins are kept undercover where possible and with lids closed to limit rainwater infiltration and smell.

Achievements

During the 2017–2022 Environment Strategy, our air quality management achievements included:

- voluntary annual National Greenhouse and Energy Reporting scheme monitoring
- developed an emissions reduction target, including a science-based tool to keep emission reductions in alignment with the United Nations Framework Convention on Climate Change
- managed airport land to mitigate the risk of bushfires on-airport
- continued to undertake air quality monitoring and reporting as required
- awarded Airports Council International (ACI – Asia Pacific) Green Airports Recognition 2022 Silver Award for Carbon Management strategies including renewable energy generation, emissions reductions targets and apron efficiency upgrades.

Air quality initiatives

The air quality initiatives to be implemented by Darwin International Airport between 2023 and 2031 are outlined below.

1. **Air Quality Compliance Assurance:** Develop and implement an air quality compliance assurance program to ensure adherence to Commonwealth and Northern Territory regulations.
2. **Continuous Air Quality Monitoring Enhancement:** Develop and implement continuous air quality monitoring systems to proactively detect and address any deviations from established standards.
3. **Emission Reporting Alignment:** Begin aligning greenhouse gas emission reporting with ACI's Airport Carbon Accreditation program, aiming for certification within the specified timeframe.
4. **Collaborative Pollution Prevention:** Foster collaboration with stakeholders to develop and implement pollution prevention strategies, with a focus on emissions from ground-based sources, construction activities, and operations.
5. **Comprehensive Air Pollution Control:** Develop and implement a comprehensive air pollution control plan, including measures to minimise bare ground across the airport site, ensuring the maintenance of high air quality standards.

14.11 Ground-based noise

Objectives

1. **Noise and Vibration Management:** Implement comprehensive noise and vibration management strategies to minimise the impact of ground-based activities while ensuring compliance with regulatory requirements.
2. **Mitigation of Construction-Related Noise:** Implement effective noise mitigation measures within construction environmental management plans to minimise noise pollution during development activities on the airport grounds.

Overview

Airports are typically high-noise environments due to ground-based and aeronautical activities. Darwin International Airport has not had any serious noise-related incidents since the last master plan. Under the Joint User Deed, the Department of Defence is responsible for producing the joint military–civil Australian Noise Exposure Forecast (ANEF) included in the 2023 master plan.

The ANEF is a set of contours showing future forecasted levels of exposure to noise for building control purposes. It is used in accordance with AS2021 to guide land use planning and development consent decisions by the relevant authority.

ANEF inputs include aircraft movement forecasts, runway and flight path usage, time of day and fleet mix. The ANEF is discussed in Section 13 of the master plan.

The Airports (Environment Protection) Regulations 1997 address noise generated from ground-based activities. The *Airservices Act 1995* addresses noise generated by aircraft in flight, landing, taking off or taxiing. The airport's Environment Strategy does not address these stages of operation.

Vibration arising from ground-based activities such as construction and demolition can also negatively affect both sensitive and commercial receptors. All reasonable and practical measures are taken to prevent or minimise vibration where possible.

Potential sources of environmental impact

Ground-based aviation noise and vibration sources include:

- aircraft ground running
- aircraft maintenance and testing
- aircraft auxiliary power units
- aircraft refuelling and operation activities
- pavement maintenance.

Ground based non-aviation noise sources include:

- tenant activities
- road traffic
- construction and demolition activities.

Environmental management

Darwin International Airport will investigate noise complaints relating to ground-based operations by responding to the complainant. Responses will include explaining the event (once identified) and seeking opportunities for where improvements can be made. For non-ground-based noise complaints, Darwin International Airport will refer complainants to Airservices Australia.

In the event of major changes to airport operations or unprecedented increases in air traffic volume, noise monitoring will be undertaken to ensure noise levels remain at non-nuisance levels. We also evaluate the potential for noise generated by airport operators to affect new developments, particularly residential developments. In the absence of noise complaints, we continue to conduct qualitative noise monitoring on an ongoing basis.

The Darwin International Airport Engine Ground Running Plan is used as a guide for the positioning of aircraft to reduce the impact of aircraft noise on the surrounding areas.

Construction environmental management plans address potential noise pollution issues associated with construction activities and are a control measure for noise and vibration exposure during development on-airport.

Achievements

During the 2017–2022 Environment Strategy, our ground-based noise management achievements included:

- continued noise monitoring program as required
- liaised with Airservices Australia through meetings on noise complaints and reporting
- timely investigation and response reporting on any complaints as required
- updated Darwin International Airport Engine Ground Running Plan.

Ground-based noise management initiatives

The ground-based noise management initiatives to be implemented by Darwin International Airport between 2023 and 2031 are outlined below.

1. Enhance Ground Running Plan: Review and enhance the Darwin International Airport Engine Ground Running Plan to optimise aircraft positioning and minimise ground-based noise for neighbouring communities.
2. Advanced Noise Impact Assessment: Conduct a comprehensive noise impact assessment of Defence exercises to assess their effects on passengers walking on the air transport apron, and implement measures to mitigate noise impacts.

14.12 Contamination, hazardous substances and materials

Objectives

1. Effective Hazardous Substance Control: Implement rigorous environmental controls and spill prevention measures to ensure the safe storage, handling, and disposal of hazardous substances and materials across airport operations.
2. Collaborative Remediation Efforts: Partner with relevant stakeholders, including Defence and Airservices Australia, to assess, monitor, and remediate legacy contamination sites, such as those affected by PFAS, to protect environmental and human health.
3. Comprehensive PFAS Management: Develop and implement a comprehensive plan for the assessment, monitoring, and management of per- and polyfluoroalkyl substances (PFAS) across the airport precinct, ensuring compliance with regulatory requirements and safeguarding environmental quality.

Overview

Darwin International Airport operations require the storage, handling and use of various hazardous substances. The most significant hazardous substances stored on site are liquid and gas fuels. There are 2 main aviation fuel depots, one public fuel station for motor vehicles, an airside fuelling station, fuel storage facilities and 2 liquid gas storage tanks.

Other activities involving the storage and use of hazardous substances include:

- maintenance facilities operated by airport tenants and Darwin International Airport
- materials used for firefighting
- construction and development projects
- the storage and use of fuels and oils (for non-commercial supply), solvents, paints, pesticides and herbicides.

Asbestos has been identified in the airport precinct, and asbestos records are maintained to manage the risk associated with exposure and to guide remedial activities.

Several small areas in the airport lease area were used as landfill sites for waste from the clean up after Cyclone Tracy, as well as waste from airport development works conducted around 1991. Records of these sites and other potentially contaminated sites, such as areas where fuels or chemicals have been used or spilled/leaked as the result of an environmental incident, are maintained by the airport.

Per- and polyfluoroalkyl substances (PFAS)

The detection of per- and polyfluoroalkyl substances (PFAS) residue in groundwater and soil is an issue at airports around Australia, including Darwin International Airport. PFAS are a group of man-made chemicals used in a variety of industrial and commercial products. They have been historically used as an active ingredient in fire-fighting foam used by the Department of Defence and Airservices Australia for firefighting emergency response, in training and testing on the fire training grounds and the fire stations.

In 2019, Defence finalised its PFAS Management Area Plan for the RAAF Base Darwin and commenced additional environmental monitoring for PFAS. Airservices also updated its environmental management plans, undertook operational upgrades across its sites, developed treatment options for managing PFAS-contaminated sites and removed all PFAS-containing firefighting foam from its operations.

Darwin International Airport is committed to engaging with and supporting Defence and Airservices Australia and other stakeholders to ensure appropriate PFAS assessment, management and remediation is implemented across the airport precinct.

Potential sources of environmental impact

The potential sources of environmental impacts relating to hazardous substances occur when there are uncontrolled releases to the environment. Spills, if not prevented or managed properly, have the potential to cause impacts to the environment. These impacts can be in the form of contamination of soil, water or air. The impacts may also adversely affect flora, fauna and human health.

Environmental management

There are a range of management practices in place for contamination, hazardous substances and materials, which are outlined below.

The following controls are required to be implemented across Darwin International Airport's owned and managed operations, tenants and contractors for the use, storage or disposal of hazardous substances and materials:

- appropriate storage containers/tanks, bunding and refuelling/refilling areas
- spill kits
- appropriate waste management by licensed waste management providers
- safety data sheets must be available for all chemicals used on-site
- tenant environmental assurance audits
- preparation of operational environmental management plans for high risk tenants.

Asbestos records are maintained for Darwin International Airport buildings and other infrastructure objects that has been found to contain asbestos. Inspections are conducted at these buildings in accordance with the National Code of Practice.

Incidents involving the spill or leakage of hazardous substances or materials are required to be reported in accordance with Darwin International Airport's Environmental Incident Response Procedures. Fuel storage tanks and hydrant systems are regularly inspected for leaks to ensure compliance with relevant legislation and standards. The majority of underground storage tanks at Darwin International Airport have integrity monitoring systems installed to immediately detect leaks.

Achievements

During the 2017–2022 Environment Strategy, our contamination, hazardous substances and material management achievements included:

- updated spills procedures and provided spills training to airside operators
- online reporting system used for reporting and recording of airside spills
- tenant environmental assurance audits included hazardous substance storage, pollution control devices, spill response capabilities and procedures.

Contamination, hazardous substances and materials initiatives

The contamination, hazardous substances and material management initiatives to be implemented by Darwin International Airport between 2023 and 2031 are outlined below.

1. **Environmental Assurance Audit Program:** Establish an environmental assurance audit program that includes hazardous substances and dangerous goods (HSDG) storage and use as a key focus area. Regularly conduct these audits to ensure compliance and identify areas for improvement.
2. **Review and Update Hazardous Substance Register:** Review and update the Darwin International Airport Hazardous Substance and Dangerous Goods (HSDG) register to maintain an accurate and comprehensive record of all hazardous substances on-site. This register should be accessible and regularly reviewed for currency.
3. **Spill Prevention Training:** Provide mandatory and ongoing spill prevention training for all airport personnel, tenants, and contractors involved in the storage, handling, or disposal of hazardous substances. This training will include proper use of spill kits, emergency response procedures, and safe handling practices.
4. **Regular Compliance Audits:** Conduct regular audits and inspections of hazardous substance storage areas, ensuring that all containers, tanks, bunding, and refilling areas comply with safety standards. Non-compliance issues should be promptly addressed and corrected.
5. **Joint Remediation Plans:** Collaborate with Defence and Airservices Australia to develop comprehensive remediation plans for legacy contamination sites, such as PFAS-affected areas. These plans should outline assessment, monitoring, and remediation strategies, timelines, and responsibilities.
6. **Review and Update Contaminated Site Records:** Review and update the current Contaminated Site Records and Register to ensure they reflect the latest information about contamination sites across the airport precinct.
7. **Community Engagement:** Engage with the local community and relevant environmental agencies to provide transparent information about ongoing remediation efforts. Regularly update stakeholders on progress, findings, and any potential impacts to maintain public trust.

14.13 Waste

Objectives

1. **Waste Minimisation and Recycling:** Continually improve our practices to minimise waste generation, increase recycling, and repurpose materials.
2. **Pollution Prevention through Proper Disposal:** Enhance waste management to prevent pollution through proper disposal and handling of solid, liquid, recyclable, regulated, and hazardous waste.
3. **Promoting Responsible Waste Disposal:** Promote responsible waste disposal practices among airport operators, tenants, users, and the general public.

Overview

Waste at Darwin International Airport is handled by local waste contractors, and general wastes are disposed of at the City of Darwin Shoal Bay waste disposal site.

Waste is generated from multiple activities across Darwin International Airport: passengers, tenants and airside operators, construction, development, demolition, refurbishment, offices, hotels and maintenance sheds.

The types of waste generated at Darwin International Airport can be classified as either solid, liquid, recyclable, regulated or hazardous waste:

- Solid waste includes office waste, food and packaging, green waste, and construction and demolition waste.
- Liquid waste includes sewage and trade waste.
- Recyclable materials include paper, cardboard, glass, plastic, bottles and cans and electronic waste.
- Regulated waste includes oil, fuel, batteries and tyres.
- Hazardous waste, which is also regulated, includes quarantine waste, sanitary waste, asbestos, chemical storage containers, used chemicals, waste sludge and contaminated wastewater.

Sewage and trade waste generated by the airport is sent to Power and Water's sewage system. This waste is managed, monitored and reported in accordance with the requirements of the Trade Waste Agreement that is in place between Darwin International Airport and Power and Water Corporation.

Potential sources of environmental impact

Environmental impacts attributable to waste at Darwin International Airport include:

- incorrect disposal of waste by airport operators, contractors, tenants and users
- inappropriate storage of waste oils, chemicals and other hazardous waste materials
- wastewater runoff from airport operations such as paint stripping, fire training exercises, and aircraft and vehicle wash down
- spills of HSDG
- illegal dumping of waste on airport land
- inadequate pre-treatment of waste discharges to sewer
- litter generated from tenant activities, airport operations and the general public.

Environmental management

Waste management at Darwin International Airport is handled through a number of separate processes and services.

Waste audits are undertaken periodically to assess bin and waste collection requirements and to investigate and implement continued improvements in recycling.

Historically, the illegal dumping of waste on the airport site has been an issue. In particular, garden waste has been dumped along roads adjacent to the airport and litter along the length of Rapid Creek. The erection of signs and bins in areas of high public usage has resulted in a decrease in illegal dumping.

Darwin International Airport participates in community events such as Clean Up Australia Day and the Great Northern Clean Up to promote our proactive approach to waste management initiatives. Generally, the focus areas for the clean-ups are on the high public usage areas along the Rapid Creek riparian zone and on airport land. Bins are provided in car parks and along paths across the airport precinct. Regular litter collection is undertaken throughout the airport and in Rapid Creek Reserve.

Recycling is also implemented at the airport in accordance with the capabilities of local recycling facilities. We have launched recycling initiatives including colour-coded bins and information posters across our offices and operational areas to improve recycling rates.

Construction environmental management plans include sections stipulating waste reduction and recycling where practicable on project sites.

Waste management is also a focus during tenant audits, and recommendations are made where necessary to reduce waste generation and improve waste storage, separation, handling and recycling.

Achievements

During the 2017–2022 Environment Strategy, our waste management achievements included:

- coordinated container deposit recycling in the terminal
- implemented 4 streams of recycling across the administrative offices of both the airport and the on-airport hotel/resort
- ongoing monitoring, clean up and investigation of illegal dumping
- participation and awareness of Clean Up Australia Day and Great Northern Clean Up
- improved training to tenants and contractors to streamline waste separation processes and improve recycling rates
- recycling of gravel and fill materials as part of construction projects, including the aerobridge upgrades and Henry Wrigley Drive road improvements
- collected disused furniture from the hotel/resort redevelopment for reuse
- improved recycling practices in the operational areas of the on-airport hotel/resort
- maintained register of tenants' trade waste agreements.

Waste management initiatives

The waste management initiatives to be implemented by Darwin International Airport between 2023 and 2031 are outlined below.

1. **Comprehensive Waste Management Strategy:** Develop and implement a comprehensive waste management strategy that outlines clear waste reduction goals, recycling targets, and waste diversion initiatives. Ensure alignment with sustainable practices and continuous improvement in waste management.
2. **Waste Stream Optimisation:** Investigate opportunities and implement initiatives to reduce waste streams and improve management practices for waste-generating activities across the airport. Focus on source reduction, waste separation, and responsible waste handling.
3. **Enhanced Recycling Collaboration:** Collaborate with waste management partners to continue developing waste diversion solutions and expanding recycling opportunities. This includes exploring partnerships with local recycling facilities and waste management experts to optimise recycling practices.
4. **Sustainable Design and Delivery Guidelines:** Finalise and implement sustainable design and delivery guidelines that outline our sustainable waste requirements for new developments, capital works, and upgrade projects. Ensure that these guidelines include waste reduction, recycling, and responsible disposal measures.
5. **Community Engagement for Responsible Waste Disposal:** Promote litter prevention, waste reduction, and recycling across the airport community. Launch educational campaigns targeting passengers, tenants, and airport staff to encourage responsible waste disposal practices and raise awareness of the importance of recycling and waste reduction.

14.14 8-year environment strategy

This plan brings together the initiatives for each of the environmental aspects outlined in this section with timeframes for completion.

These initiatives will be implemented along with the current management practices including the monitoring program (see Table 14-1) that is outlined for each aspect to support the delivery of Darwin International Airport's environmental objectives.

Table 14-5: Summary of 8-year environment strategy initiatives

Environmental aspect	Initiative	Initiative description	Completion timeframe
Environment and sustainability management	Environmental Documentation and Training Program	Review and update all environmental documentation for development and construction activities, emphasising sustainability, resource efficiency, and environmental stewardship best practices. Develop and implement a comprehensive awareness and training program for staff, contractors, and tenants, covering compliance and sustainability principles.	2024 onwards
	Comprehensive EMS Audits	Annually conduct an internal audit of the airport's Environmental Management System (EMS) to identify opportunities for enhancing sustainability, reducing environmental impact, and streamlining processes. Additionally, triennially engage an independent third-party for an external audit of the EMS to ensure transparency and accountability, aligning practices with global environmental standards. Use audit findings as a basis for continuous improvement.	Ongoing – Annually and Triennially
	Dedicated EMS Enhancement Team	Establish a dedicated team responsible for continually enhancing and maintaining the airport's EMS. This proactive team will seek out innovative solutions and technologies to minimise the environmental footprint and promote sustainability.	2025
	Ongoing Environmental Awareness and Management Training	Launch and maintain an ongoing comprehensive environmental awareness and management training program for all stakeholders, including staff, contractors, and tenants. Ensure that everyone associated with the airport is well-versed in sustainability practices and their role in preserving the environment.	2024
	Integrated Sustainability Framework	Develop and implement a robust sustainability framework covering energy efficiency, waste reduction, water conservation, and renewable energy integration. Explore renewable energy sources, optimise water usage, and implement waste reduction strategies to reduce the airport's carbon footprint and enhance resource management.	2027
	Biodiversity and Habitat Restoration Program	Collaborate with Indigenous communities to establish a biodiversity and habitat restoration program, prioritising Indigenous ecological knowledge and practices. Ensure that restoration efforts align with Indigenous cultural and environmental values.	2026
	Sustainable Transportation Plan	Implement a sustainable transportation plan that encourages the use of eco-friendly modes of transport to and from the airport, such as electric shuttles, bike-sharing programs, and incentives for carpooling.	2028
	Community Engagement	Regularly engage with the local community through open forums, workshops, and information sessions to gather feedback and involve residents in sustainability efforts. Strengthen ties with the community and demonstrate a commitment to addressing their concerns.	Ongoing

Environmental aspect	Initiative	Initiative description	Completion timeframe
Groundwater and surface water	Enhance the Water Quality Monitoring Program	Continuously implement and refine our water quality monitoring program to ensure the highest standards of water quality are maintained and to swiftly respond to any deviations. This will employ cutting-edge technology and scientific expertise to safeguard our water resources.	2024
	Stormwater Modelling and Management	Collaborate closely with internal and external stakeholders to comprehensively assess the potential for stormwater modelling across the airport precinct. Engage specialised consultants to carry out this crucial project, enabling us to better understand, predict, and manage stormwater flow and its impacts on groundwater and surface water.	2024
	Advanced Pollution Prevention Measures	Undertake a rigorous examination of potential sources of pollution and implement proactive measures to safeguard groundwater and surface water quality. These measures will include sustainable practices, innovative technologies, and regular assessments to prevent contamination.	2025
	Catchment Engagement	Maintain and strengthen our engagement with state and local governments, Indigenous communities, and other key stakeholders concerning catchment matters. This collaborative approach will ensure alignment with regional water management policies, promote knowledge sharing, and enhance our collective ability to address water-related challenges.	Ongoing
	Biodiversity and Habitat Enhancement	Collaborate with Indigenous organisations and environmental experts to develop and implement a comprehensive biodiversity and habitat enhancement program. This will focus on protecting and rehabilitating critical aquatic ecosystems and wetlands in the airport's vicinity.	2025
	Community Education and Outreach	Launch an extensive community education and outreach program to raise awareness about the importance of groundwater and surface water conservation. This will engage with schools, local organisations, and the general public to foster a sense of shared responsibility for our precious water resources.	2027
	Innovative Water Recycling and Reuse	Investigate and implement cutting-edge water recycling and reuse systems across airport facilities, significantly reducing our overall water consumption and environmental footprint.	2029
	Emergency Response Plan	Develop and regularly update a comprehensive emergency response plan specifically tailored to address potential groundwater and surface water-related incidents. This will ensure rapid and effective responses to unforeseen events, minimising environmental impact.	2027
	Research and Development Collaboration	Collaborate with research institutions and universities to initiate research projects focused on sustainable groundwater and surface water management, with an emphasis on innovative technologies and best practices.	Ongoing
Soil	Bare Ground Management Plan	Develop and implement a comprehensive plan for managing bare ground areas, mitigating erosion and contamination risks, and enhancing soil health.	2029
	Stockpile Management Plan	Develop and execute a systematic plan for managing stockpiles, ensuring proper containment, monitoring, and environmental compliance.	2029

Environmental aspect	Initiative	Initiative description	Completion timeframe
Biodiversity and conservation	Enhance Biodiversity Management	Implement and continually enhance comprehensive biodiversity surveys, management plans, and programs. Covering areas like weed, pest, erosion, sediment, vegetation, fire, wildlife hazard, and flora/fauna management.	2026
	Landscape Master Plan Enhancement	Improve and implement the Landscape Master Plan for the airport site, emphasising sustainable landscaping and biodiversity enhancement.	2025
	Biodiversity Offset Program	Establish and execute a biodiversity offset program to support conservation efforts.	2028
	Rapid Creek Reserve Strategy	Develop and implement a conservation and stewardship strategy, plan, and program for Rapid Creek Reserve, collaborating with key stakeholders.	2030
	Community Engagement	Promote the protection and biodiversity within the airport community with a focus on conservation zoned areas	Ongoing
	Stakeholder Collaboration	Continue engaging, consulting, and collaborating with key stakeholders, including state government agencies and community groups, to address land and biodiversity aspects effectively.	Ongoing
Cultural heritage	Community Engagement	Foster strong relationships through consultations, cultural events, and upskilling programs with indigenous communities.	Ongoing
	Heritage Protection	Establish a heritage database, train staff and contractors, and create a rapid response protocol for heritage discoveries.	2026
	Cultural Tours Support	Actively sponsor the Gurambai Cultural Experience guided tours.	2024
	Cultural Awareness Promotion	Develop educational materials, art installations, and cultural engagement programs for visitors and the community.	Ongoing
Energy and carbon	Energy Efficiency and Planning	Create an Energy Master Plan detailing energy-saving strategies, renewable energy integration, and efficiency measures.	2030
	Sustainable Energy Design and Communication	Communicate Sustainable Design and Delivery Guidelines, specifying energy-efficient criteria for all projects.	2025
	Renewable Energy Expansion and Storage	Investigate and expand renewable electricity systems and explore energy storage opportunities.	2027
	Greenhouse Gas Reduction Collaboration	Partner with stakeholders to discover and support renewable energy adoption and emissions reduction activities.	2028
	Energy Conservation Promotion	Raise awareness and encourage energy-saving measures within the airport community.	2024
	Airport Carbon Accreditation	Begin reporting emissions in line with the ACI program and pursue certification.	2024

Environmental aspect	Initiative	Initiative description	Completion timeframe
Water	Strategic Water Management	Establish and execute a comprehensive water management strategy aligning with sustainability goals.	2029
	Enhanced Water Consumption Monitoring	Strengthen water consumption monitoring mechanisms to enhance efficiency and identify areas for improvement.	2025
	Sustainable Design Guidelines	Finalise and implement sustainable design guidelines to delineate water-efficient requirements for construction, new developments, and upgrades.	2028
	Water Efficiency and Recycling Exploration	Investigate opportunities for water recycling and implement site-wide water efficiency measures.	2026
	Community Water Conservation Promotion	Actively engage and educate the airport community on water conservation practices.	Ongoing
Air quality	Air Quality Compliance Assurance	Develop and implement an air quality compliance assurance program to ensure adherence to Commonwealth and Northern Territory regulations.	2029
	Continuous Air Quality Monitoring Enhancement	Develop and implement continuous air quality monitoring systems to proactively detect and address any deviations from established standards.	2027
	Emission Reporting Alignment	Begin aligning greenhouse gas emission reporting with ACI's Airport Carbon Accreditation program, aiming for certification within the specified timeframe.	2030
	Collaborative Pollution Prevention	Foster collaboration with stakeholders to develop and implement pollution prevention strategies, with a focus on emissions from ground-based sources, construction activities, and operations.	Ongoing
	Comprehensive Air Pollution Control	Develop and implement a comprehensive air pollution control plan, including measures to minimise bare ground across the airport site, ensuring the maintenance of high air quality standards.	2028
Ground-based noise	Enhance Ground Running Plan	Review and enhance the Darwin International Airport Engine Ground Running Plan to optimise aircraft positioning and minimise ground-based noise for neighbouring communities.	2025
	Advanced Noise Impact Assessment	Conduct a comprehensive noise impact assessment of Defence exercises to assess their effects on passengers walking on the air transport apron, and implement measures to mitigate noise impacts.	2026

Environmental aspect	Initiative	Initiative description	Completion timeframe
Contamination, hazardous substances and materials	Environmental Assurance Audit Program	Establish an environmental assurance audit program that includes hazardous substances and dangerous goods (HSDG) storage and use as a key focus area. Regularly conduct these audits to ensure compliance and identify areas for improvement.	2024
	Review and Update Hazardous Substance Register	Review and update the Darwin International Airport Hazardous Substance and Dangerous Goods (HSDG) register to maintain an accurate and comprehensive record of all hazardous substances on-site. This register should be accessible and regularly reviewed for currency.	2024
	Spill Prevention Training	Provide mandatory and ongoing spill prevention training for all airport personnel, tenants, and contractors involved in the storage, handling, or disposal of hazardous substances. This training will include proper use of spill kits, emergency response procedures, and safe handling practices.	Ongoing
	Regular Compliance Audits	Conduct regular audits and inspections of hazardous substance storage areas, ensuring that all containers, tanks, bunding, and refilling areas comply with safety standards. Non-compliance issues should be promptly addressed and corrected.	Ongoing
	Joint Remediation Plans	Collaborate with Defence and Airservices Australia to develop comprehensive remediation plans for legacy contamination sites, such as PFAS-affected areas. These plans should outline assessment, monitoring, and remediation strategies, timelines, and responsibilities.	2025
	Review and Update Contaminated Site Records	Review and update the current Contaminated Site Records and Register to ensure they reflect the latest information about contamination sites across the airport precinct.	2024
	Community Engagement	Engage with the local community and relevant environmental agencies to provide transparent information about ongoing remediation efforts. Regularly update stakeholders on progress, findings, and any potential impacts to maintain public trust.	Ongoing
Waste	Comprehensive Waste Management Strategy	Develop and implement a comprehensive waste management strategy that outlines clear waste reduction goals, recycling targets, and waste diversion initiatives. Ensure alignment with sustainable practices and continuous improvement in waste management.	2024
	Waste Stream Optimisation	Investigate opportunities and implement initiatives to reduce waste streams and improve management practices for waste-generating activities across the airport. Focus on source reduction, waste separation, and responsible waste handling.	2026
	Enhanced Recycling Collaboration	Collaborate with waste management partners to continue developing waste diversion solutions and expanding recycling opportunities. This includes exploring partnerships with local recycling facilities and waste management experts to optimise recycling practices.	2026
	Sustainable Design and Delivery Guidelines	Finalise and implement sustainable design and delivery guidelines that outline our sustainable waste requirements for new developments, capital works, and upgrade projects. Ensure that these guidelines include waste reduction, recycling, and responsible disposal measures.	2028
	Community Engagement for Responsible Waste Disposal	Promote litter prevention, waste reduction, and recycling across the airport community. Launch educational campaigns targeting passengers, tenants, and airport staff to encourage responsible waste disposal practices and raise awareness of the importance of recycling and waste reduction.	Ongoing

SECTION 15:

Implementation

SECTION 15: **Implementation**

15.1 Implementation framework

The final Darwin International Airport 2023 Master Plan represents current views of developments expected to be realised at Darwin International Airport in a staged manner, largely as a result of increased aircraft movements, passenger demand and commercial development.

Planning, by its nature, is a dynamic activity requiring continuous monitoring of changing conditions, standards and practices, and technology. Therefore, implementation of the final 2023 master plan will require flexibility that takes into account fluctuations in economic activity and factors that affect air travel and commercial demand.

The approval of the final 2023 master plan does not automatically confer approval on subsequent major developments. The Airports Act requires that certain developments at Darwin International Airport must undergo a major development plan process that is subject to ministerial approval. Before ministerial approval, proposals are subject to further detailed assessment, including community consultation, environmental studies, traffic effects and aviation impact.

All building activities on-airport are subjected to Darwin International Airport's internal development review process. Building activity at Darwin International Airport is subject to statutory controls under the Airports Act and the Airports (Building Control) Regulations 1996. The Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA) has oversight of land use planning and building activity at the airport.

An Airport Building Controller is appointed under Commonwealth law to administer the airport building control regime to ensure activities at Darwin International Airport meet the appropriate building and engineering standards. All construction and building activities must be notified to the Airport Building Controller.

The consent of Darwin International Airport (as the airport lessee company) is required before any approval can be given by the Airport Building Controller. Darwin International Airport will review all applications to ensure the proposal is consistent with the airport master plan, to ensure the development is consistent with its planning objectives, and to assess the impact of the proposal on infrastructure and the operations of the airport. Darwin International Airport also has the power to impose appropriate conditions on building activities.

An Airport Environment Officer is similarly appointed under Commonwealth law and is responsible for overseeing the airport's compliance with its environmental legislative responsibilities. The Airport Environment Officer oversees adherence to the approved Airport Environment Strategy and administers the Airports (Environmental Protection) Regulations 1997.

Review process

The Airports Act provides for a final master plan to remain in force for 8 years. The Act includes additional provisions for minor amendments to a master plan and for the minister to direct another master plan to be prepared.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APPENDIX 1:

Consistency with the Airports Act

APPENDIX 1: **Consistency with the Airports Act**

Legislation	Final details in section of the master plan
AIRPORTS ACT 1996	
70 Final master plans	
(1) For each airport, there is to be a final master plan.	Section 2
(2) The purposes of a final master plan for an airport are:	
(a) to establish the strategic direction for efficient and economic development at the airport over the planning period of the plan; and	Section 2, 6, 7, 8, 9, 10, 11
(b) to provide for the development of additional uses of the airport site; and	Section 6, 7, 9, 10, 11
(c) to indicate to the public the intended uses of the airport site; and	Section 6, 7, 8, 9, 10, 11
(d) to reduce potential conflicts between uses of the airport site, and to ensure that uses of the airport site are compatible with the areas surrounding the airport; and	Section 2, 6, 12, 13
(e) to ensure that all operations at the airport are undertaken in accordance with relevant environmental legislation and standards; and	Section 14
(f) to establish a framework for assessing compliance at the airport with relevant environmental legislation and standards; and	Section 14
(g) to promote the continual improvement of environmental management at the airport.	Section 14
71 Contents of draft or final master plan	
(3) In the case of a joint-user airport, a draft or final master plan must specify:	
(a) the airport-lessee company's development objectives for civil use of the airport; and	Section 2
(b) the airport-lessee company's assessment of the future needs of civil aviation users of the airport, and other civil users of the airport, for services and facilities relating to the area of the airport site leased to the company; and	Section 4, 5, 6, 7, 8, 9, 10, 11
(c) the airport-lessee company's intentions for land use and related development of the airport site leased to the company, where the uses and developments embrace:	
(i) in all cases – landside, surface access and land planning/zoning aspects; and	Section 2, 6, 8, 9, 10, 11
(ii) if the leased area includes one or more runways or taxiways – airside aspects; and	Section 2, 6, 7
(d) an Australian Noise Exposure Forecast (in accordance with regulations, if any, made for the purpose of this paragraph) for the areas surrounding the airport; and	Section 12, 13
(da) flight paths (in accordance with regulations, if any, made for the purpose of this paragraph) at the airport; and	Section 13
(e) the airport-lessee company's plans, developed following consultations with the airlines that use the airport, local government bodies in the vicinity of the airport and the Defence Department, for managing aircraft noise intrusion in areas forecast to be subject to exposure above the significant ANEF levels; and	Section 13
(f) the airport-lessee company's assessment of environmental issues that might reasonably be expected to be associated with the implementation of the plan; and	Section 14
(g) the airport-lessee company's plans for dealing with the environmental issues mentioned in paragraph (f) (including plans for ameliorating or preventing environmental impacts); and	Section 14

Legislation	Final details in section of the master plan
(ga) in relation to the initial period (see subsection (3A)) of the master plan – a plan for a ground transport system on the landside of the airport that details:	
(i) a road network plan; and	Section 10
(ii) the facilities for moving people (employees, passengers and other airport users) and freight at the airport; and	Section 10
(iii) the linkages between those facilities, the road network and public transport system at the airport and the road network and public transport system outside the airport; and	Section 10
(iv) the arrangements for working with the State or local authorities or other bodies responsible for the road network and the public transport system; and	Section 10
(v) the capacity of the ground transport system at the airport to support operations and other activities at the airport; and	Section 10
(vi) the likely effect of the proposed developments in the master plan on the ground transport system and traffic flows at, and surrounding, the airport; and	Section 10
(gb) in relation to the initial period (see subsection (3A)) of the master plan – detailed information on the proposed developments in the master plan that are to be used for:	
(i) commercial, community, office or retail purposes; or	Section 9
(ii) for any other purpose that is not related to airport services; and	Section 6, 9, 10
(gc) in relation to the initial period (see subsection (3A)) of the master plan – the likely effect of the proposed developments in the master plan on:	
(i) employment levels at the airport; and	Section 4
(ii) the local and regional economy and community, including an analysis of how the proposed developments fit within the planning schemes for commercial and retail development in the area that is adjacent to the airport; and	Section 2, 4, 6, 9
(h) in relation to the initial period (see subsection (3A)) of the master plan – an environment strategy that details:	
(i) the airport-lessee company's objectives for the environmental management of the airport; and	Section 14
(ii) the areas (if any) within the airport site which the airport-lessee company, in consultation with State and Federal conservation bodies, identifies as environmentally significant; and	Section 14
(iii) the sources of environmental impact associated with civil aviation operations at the airport; and	Section 14
(iv) the studies, reviews and monitoring to be carried out by the airport-lessee company in connection with the environmental impact associated with civil aviation operations at the airport; and	Section 14
(v) the time frames for completion of those studies and reviews and for reporting on that monitoring; and	Section 14
(vi) the specific measures to be carried out by the airport-lessee company for the purposes of preventing, controlling or reducing the environmental impact associated with civil aviation operations at the airport; and	Section 14
(vii) the time frames for completion of those specific measures; and	Section 14

Legislation	Final details in section of the master plan
(viii) details of the consultations undertaken in preparing the strategy (including the outcome of the consultations); and	Section 2
(ix) any other matters that are prescribed in the regulations; and	Section 14
(j) such other matters (if any) as are specified in the regulations.	See below
Paragraphs (a) to (h) do not, by implication, limit paragraph (j).	
Matters provided by regulations	
(6) In specifying a particular objective or proposal covered by paragraph (2)(a), (c), (ga), (gb) or (gc) or (3)(a), (c), (ga), (gb) or (gc), a draft or final master plan must address:	
(a) the extent (if any) of consistency with planning schemes in force under a law of the State in which the airport is located; and	Section 2, 6, Appendix 2
(b) if the draft or final master plan is not consistent with those planning schemes – the justification for the inconsistencies.	Section 2, 6, Appendix 2
Company to have regard to Australian Standard	
(8) In developing plans referred to in paragraph (2)(e) and (3)(e), an airport-lessee company must have regard to Australian Standard AS2021–2000 ("Acoustics–Aircraft noise intrusion–Building siting and construction") as in force or existing at that time.	Section 13
(9) Subsection (8) does not, by implication, limit the matters to which regard may be had.	
(10) In this section: *airport service* means a service provided at an airport, if the service is necessary for the purposes of operating or maintaining civil aviation services at the airport, and includes the use of facilities at the airport for those purposes.	
71A Draft or final master plan must identify proposed sensitive developments	
(1) A draft or final master plan must identify any proposed sensitive development in the plan.	Section 6
AIRPORTS REGULATIONS 1997 – REG 5.02	
5.02 Contents of draft or final master plan – general	
(1) For paragraphs 71(2)(j) and (3)(j) of the Act, the following matters are specified:	
(a) any changes to the OLS or PANS-OPS surfaces for the airport concerned that is likely to result if development proceeds in accordance with the master plan;	Section 12
(b) for an area of an airport where a change of use of a kind described in subregulation 6.07(2) of the Airports (Environment Protection) Regulations 1997 is proposed:	No such changes of use proposed.
(i) the contents of the report of any examination of the area carried out under regulation 6.09 of those Regulations; and	As above
(ii) the airport-lessee company's plans for dealing with any soil pollution referred to in the report.	As above
(2) For section 71 of the Act, an airport master plan must, in relation to the landside part of the airport, where possible, describe proposals for land use and related planning, zoning or development in an amount of detail equivalent to that required by, and using terminology (including definitions) consistent with that applying in, land use planning, zoning and development legislation in force in the State or Territory in which the airport is located.	Section 6, Appendix 2

Legislation	Final details in section of the master plan
(3) For subsection 71(5) of the Act, a draft or final master plan must:	
(a) address any obligation that has passed to the relevant airport-lessee company under subsection 22(2) of the Act or subsection 26(2) of the Transitional Act; and	Section 11
(b) address any interest to which the relevant airport lease is subject under subsection 22(3) of the Act, or subsection 26(3) of the Transitional Act.	Section 11
(4) In subregulation (1): *OLS* and *PANS-OPS* surface have the same meanings as in the Airports (Protection of Airspace) Regulations.	
5.02A Contents of draft or final master plan – matters to be specified in environment strategy	
(1) For subparagraphs 71(2)(h)(ix) and (3)(h)(ix) of the Act, the matters in this regulation must be specified in an environment strategy.	Section 14
(2) The environment strategy must specify any areas within the airport site to which the strategy applies that the airport-lessee company for the airport has identified as being a site of indigenous significance, following consultation with:	
(a) any relevant indigenous communities and organisations; and	Section 14
(b) any relevant Commonwealth or State body.	Section 14
(3) The environment strategy must specify the airport-lessee company's strategy for environmental management of areas of the airport site that are, or could be, used for a purpose that is not connected with airport operations.	Section 14
(4) The environment strategy must specify:	
(a) the training necessary for appropriate environment management by persons, or classes of persons, employed on the airport site by the airport-lessee company or by other major employers; and	Section 14
(b) the training programs, of which the airport-lessee company is aware, that it considers would meet the training needs of a person mentioned in paragraph (a).	Section 14
5.02B Contents of draft or final master plan – things to be addressed in environment strategy	
(1) For subsection 71(5) of the Act, a draft or final master plan must address the things in this regulation.	Throughout document
(2) In specifying its objectives for the airport under subparagraph 71(2)(h)(i) or (3)(h)(i) of the Act, an airport-lessee company must address its policies and targets for:	
(a) continuous improvement in the environmental consequences of activities at the airport; and	Section 14
(b) progressive reduction in extant pollution at the airport; and	Section 14
(c) development and adoption of a comprehensive environmental management system for the airport that maintains consistency with relevant Australian and international standards; and	Section 14
(d) identification, and conservation, by the airport-lessee company and other operators of undertakings at the airport, of objects and matters at the airport that have natural, indigenous or heritage value; and	Section 14
(e) involvement of the local community and airport users in development of any future strategy; and	Section 2
(f) dissemination of the strategy to sub-lessees, licensees, other airport users and the local community.	Section 2, 14

Legislation	Final details in section of the master plan
(3) In specifying under subparagraph 71(2)(h)(ii) or (3)(h)(ii) of the Act, the areas within the airport site it identifies as environmentally significant, an airport-lessee company must address:	
(a) any relevant recommendation of the Australian Heritage Council; and	Noted
(b) any relevant recommendation of the Department of Environment	Noted
(c) any relevant recommendation of a body established in the State in which the airport is located, having responsibilities in relation to conservation of biota, habitat, heritage or similar matters.	Noted – Section 14
(4) In specifying the sources of environmental impact under subparagraph 71(2)(h)(iii) or (3)(h)(iii) of the Act, an airport-lessee company must address:	
(a) the quality of air at the airport site, and in so much of the regional airshed as is reasonably likely to be affected by airport activities; and	Section 14
(b) water quality, including potentially affected groundwater, estuarine waters and marine waters; and	Section 14
(c) soil quality, including that of land known to be already contaminated; and	Section 14
(d) release, into the air, of substances that deplete stratospheric ozone; and	Section 14
(e) generation and handling of hazardous waste and any other kind or waste; and	Section 14
(f) usage of natural resources (whether renewable or non-renewable); and	Section 14
(g) usage of energy the production of which generates emissions of gases known as 'greenhouse gases'; and	Section 14
(h) generation of noise.	Section 14
(5) In specifying under subparagraph 71(2)(h)(iv) or (3)(h)(iv) of the Act the studies, reviews and monitoring that it plans to carry out, an airport-lessee company must address:	
(a) the matters mentioned in subregulation 5.02A(2) and subregulations 5.02B(3) and (4); and	Section 14
(b) the scope, identified by the airport-lessee company, for conservation of objects and matters at the airport that have natural, indigenous or heritage value; and	Section 14
(c) the approaches and measures identified by the airport-lessee company as its preferred conservation approaches and measures; and	Section 14
(d) the professional qualifications that must be held by a person carrying out the monitoring; and	Section 14
(e) the proposed systems of testing, measuring and sampling to be carried out for possible, or suspected, pollution or excessive noise; and	Section 14
(f) the proposed frequency of routine reporting of monitoring results to the airport environment officer (if any) for the airport, or to the Secretary.	Section 14
(6) In specifying under subparagraph 71(2)(h)(vi) or (3)(h)(vi) of the Act, the measures that it plans to carry out for the purposes of preventing, controlling or reducing environmental impact, an airport-lessee company must address:	
(a) the matters mentioned in subregulations (2) to (4); and	Throughout document, especially Section 14
(b) the means by which it proposes to achieve the cooperation of other operators of undertakings at the airport in carrying out those plans.	Section 14

Legislation	Final details in section of the master plan
(7) An airport-lessee company, in specifying the company's strategy for environmental management under subregulation 5.02A(3), must address the matters in subregulations (2) to (6).	Section 14
(8) In this regulation: *Department of Environment* means the Department administered by the Minister responsible for administering the *Environment Protection and Biodiversity Conservation Act 1999*.	

Note 1
Subregulation 6.07 (2) – Airport (Environment Protection) Regulations 1997
A change of use to which paragraph (1)(d) applies is a change that necessitates greater environmental protection measures because the use will result in the land being used in a way, or for a purpose, that will, or is reasonable likely to, cause greater harm:
(a) to an aspect of the environment; or
(b) to the health, safety or, in any respect, the welfare of, human beings.

APPENDIX 2:

Definitions of land uses

Notes:

- **Black** denotes those zones and land uses identical to those in the NT Planning Scheme 2020
- Red denotes those zones and land uses that have been amended from those in the NT Planning Scheme 2020 to appropriately reflect on-site aviation and non-aviation land uses and activities
- Blue denotes independent definitions for aviation zones and land uses

Potential land use	Definition	Aviation and aviation related uses		Interim uses	Non-aviation related uses			
		Aviation Activities	Terminal and Facilities	Aviation Reservation	Commercial	Service Commercial	Tourist Commercial	Conservation
animal boarding	means premises used as a commercial enterprise for the accommodation of domestic animals and may include where ***ancillary*** an **office**, but does not include **intensive animal husbandry** or **stables**.	•	•	•		•		
aviation activity	means any activity for the arrival, departure, movement or operation of aircraft and includes aircraft aprons, helipads, heliports, runways, taxiways, areas set aside for the parking and or storage of aircraft either short or long term, and the like.	•	•	•				
aviation support facility	means any aircraft maintenance or manufacturing facility, engine-run area, ground support equipment, transport depot and associated ground base activities necessary for the orderly and efficient operation of aviation activity.	•	•	•				
bar – public	means premises primarily used to sell alcoholic beverages to the public for consumption on the premises, where the maximum capacity is more than 100 persons at any one time. The use may include ***ancillary*** sale of food for consumption on the premises and entertainment activities, but does not include a **bar – small, club, hotel/motel, nightclub entertainment facility**, or **food premises – restaurant**.		•	•	•	•	•	
bar – small	means premises primarily used to sell alcoholic beverages to the public for consumption on the premises, where the maximum capacity does not exceed 100 persons at any one time. The use may include ***ancillary*** sale of food for consumption on the premises and entertainment activities, but does not include a **bar – public, club, hotel/motel, nightclub entertainment venue** or **food premises – restaurant.**		•	•		•	•	

Potential land use	Definition	Aviation and aviation related uses		Interim uses	Non-aviation related uses			
		Aviation Activities	Terminal and Facilities	Aviation Reservation	Commercial	Service Commercial	Tourist Commercial	Conservation
business sign	means a device using words, letters or images exhibited for the purpose of advertising, announcement or display restricted to the name of the business carried on and the nature of the services or goods available, on the land on which the sign is erected, and includes, where a number of persons are carrying on different businesses on that land, a sign identifying the place.	•	•	•	•	•	•	•
caravan park	means land used for the parking of **caravans** or the erection or placement and use of tents or cabins for the purpose of providing accommodation. The use may include, where ***ancillary***, a manager's residence and **office, bar – small, food premises – café / take away, food premises – restaurant, shop**, amenity buildings, and the provision of recreation facilities for the use of occupants of the **caravan park** and their visitors.						•	
car park	means the parking of motor vehicles, including buses and trucks, otherwise than as an ***ancillary*** use of land, and does not include **vehicle sales and hire.**	•	•	•	•	•	•	
car wash	means a premises primarily used for the commercial cleaning of motor vehicles by mechanical or manual processes.			•	•	•	•	
childcare centre	means premises used for the minding, education and care of children and may include where ***ancillary*** an **office**, but does not include an **education establishment** or family day care as a **home-based business.**		•		•	•	•	
club	means premises used by persons associated for social, political, sporting, athletic or other similar purposes for social interaction or entertainment. The use may include the sale of alcoholic beverages and food to members and their guests.			•	•	•	•	
community centre	means a building or part of a building used for providing artistic, social or cultural facilities and community support services to the public and may include where ***ancillary*** an **office** or the preparation and provision of food and drink.			•	•	•	•	

Potential land use	Definition	Aviation and aviation related uses		Interim uses	Non-aviation related uses			
		Aviation Activities	Terminal and Facilities	Aviation Reservation	Commercial	Service Commercial	Tourist Commercial	Conservation
education establishment	means premises used for the purposes of providing education including an academy, college, lecture hall, vocational training college or university, but does not include **a place of worship** or **community centre**. The use can include where ***ancillary***, f**ood premises – café / take away, office, rooming accommodation** or **shop** that directly service the needs of students and staff.			•		•		
exhibition centre	means premises used for the display, or display and sale, of materials of an artistic, cultural or historical nature including a museum. The use can also include where ancillary **food premises – café / take away** and **office.**				•		•	
food premises – café / take away	means small-scale premises (other than a **bar – small**) used for the preparation and sale of food and drinks that may be either taken away or consumed at seating on the premises.		•	•	•	•	•	•
food premises – fast food outlet	means premises used for the preparation and sale of food and drinks primarily packaged to be taken away for consumption off premises that incorporate a drive-through service, and may include the provision of seating for the consumption of food on the premises.		•	•	•	•	•	
food premises – restaurant *previously 'restaurant'*	means premises (other than a **bar – public, bar – small, shop**, or part of a **hotel/motel**), used for the preparation, sale and service of food and drinks for consumption primarily on the premises where seating is provided, and may include the ***ancillary*** provision of take-away food.		•	•	•	•	•	•
fuel depot	means a depot for the storage or sale of solid, liquid or gaseous fuel, but does not include a **service station**.	•	•	•				
general aviation and support facilities	means any aviation and aviation-related use of the land. General aviation commonly refers to that part of the aviation industry that engages in activity other than scheduled commercial airline activity. This may include charter operations, aeromedical operations, agricultural aviation businesses, aviation-based firefighting services, training and aerial work such as aerial photography and surveying. It also includes private, business, recreational and sports aviation activity and supporting businesses such as maintenance providers.	•	•	•				

Potential land use	Definition	Aviation and aviation related uses		Interim uses	Non-aviation related uses			
		Aviation Activities	Terminal and Facilities	Aviation Reservation	Commercial	Service Commercial	Tourist Commercial	Conservation
helipad	means a place not open to the public, used for take-off and landing of helicopters.	•	•	•				
heliport	means a place not open to the public, used for the take-off and landing of helicopters whether or not it includes: (a) a terminal building (b) facilities for parking, storage or repair of helicopters.	•	•	•				
hotel/motel *previously separate definitions for 'hotel' and 'motel'*	means premises primarily used for the short-term accommodation of travellers. The use can include where ***ancillary***, meeting and function rooms, **food premises – restaurant**, a **bar – small**, and recreation facilities but does not include a **bar – public, club**, or **nightclub entertainment venue.**		•	•	•	•	•	
industry – light *previously 'light industry'*	means an ***industry*** in which the process carried on, the machinery used and the goods and commodities carried to and from the premises on which the ***industry*** is sited are not of such a kind as are likely to adversely affect the ***amenity*** of the surrounding locality by reason of the emission of noise, vibration, smell, fumes, smoke, vapour, steam, soot, ash, dust, waste water, waste products, grit, oil or otherwise. The use may include where ***ancillary*** food **premises – café / take away, office** and **shop**.	•		•		•		
leisure and recreation	means the provision indoors or outdoors of recreation, leisure or sporting activities and includes cinemas, theatres, sporting facilities, gymnasiums and the like as a commercial enterprise but does not include a **club** or **community centre.** The use can include where ***ancillary*** a **bar – small, food premises – café / take away, food premises – restaurant** and **shop.**		•	•	•	•	•	
market	means premises or land managed and used for the sale of goods, food and drink to the public on a regular basis, where the items are primarily sold from a number of vehicles, trailers or temporary structures such as stalls, booths or trestle tables. The use may include entertainment provided for the enjoyment of customers.				•			

Potential land use	Definition	Aviation and aviation related uses		Interim uses		Non-aviation related uses		
		Aviation Activities	Terminal and Facilities	Aviation Reservation	Commercial	Service Commercial	Tourist Commercial	Conservation
medical clinic	means a building or place used by one or more medical practitioners, physiotherapists, dentists or persons ordinarily associated with health care, or their employees, and may include where ***ancillary*** an **office**, but does not include a **hospital.**	•	•	•	•	•	•	
motor body works	means premises for repairing the body work of motor vehicles and includes body building, panel beating or spray painting of motor vehicles, and may include where ***ancillary*** an **office.**			•		•		
motor repair station	means premises used for carrying out repairs to motor vehicles and may include where ***ancillary*** an office, but does not include a **motor body works** or a **transport terminal.**			•	•	•		
navigational aids	means any aircraft surveillance equipment, control towers, radars, visual and non-visual navigation aids and the like.	•	•	•	•	•	•	•
office	means a building or part of a building used for the conduct of administrative, secretarial or management services or the practice of a profession, where no goods or materials are made, repaired, sold or hired but does not include a **home-based business.**	•	•	•	•	•	•	
passenger terminal	means premises used as a railway or bus station, shipping passenger terminal, airline passenger terminal, hover port or heliport.	•	•	•	•	•	•	
place of assembly	means the use of premises for the gathering of people to attend functions whether or not for commercial purposes including convention facilities, or auditoriums. The use can include ***ancillary*** bar – **small, café / take away, office** and **shop.**				•		•	
place of worship	means premises used as a church, chapel, mosque, temple, synagogue or place of religious instruction or worship or for the purpose of religious training. The use can include where ***ancillary*** an **office** and **shop.**	•	•	•	•	•	•	

Potential land use	Definition	Aviation and aviation related uses		Interim uses		Non-aviation related uses		
		Aviation Activities	Terminal and Facilities	Aviation Reservation	Commercial	Service Commercial	Tourist Commercial	Conservation
plant nursery	means premises principally used for the growing and sale to the public of plants, whether or not seeds, equipment, landscape materials or other associated products are displayed or sold, and may include where ***ancillary*** an **office**, but does not include the use of land for **agriculture, horticulture** or **industry–primary.**			•	•	•	•	
promotion sign	means a device using words, letters or images exhibited for the purpose of advertising, announcement or display that contains information relating to: (a) goods, services or products not provided, produced or sold (b) events or activities that are not carried out on the land or in the building on which the sign is constructed or erected.	•	•	•	•	•	•	
rooming accommodation *previously 'hostel'*	means premises such as hostels, guest houses, student and worker accommodation used for the accommodation of unrelated persons that may include: (a) the provision of food or other services and facilities, and/or (b) on-site management or staff and associated accommodation, and where each guest/resident: (c) has a right to occupy on or more rooms; and (d) does not have a right to occupy the whole of the premises in which the rooms are situated; and (e) may have separate facilities for private use or share communal facilities or communal space with other residents The use can include where ***ancillary***, **bar-small, food premises-café / take away, office** and **shop.**			•	•	•	•	
service station	means premises used for the sale by retail of fuels, oils and other products for use in connection with the operation of motor vehicles, whether or not it includes convenience shopping, but does not include a **fuel depot, motor repair station, motor body works**, or **shopping centre**. The use can include, where ***ancillary***, a **food premises – café / take away** and **shop.**		•	•	•	•	•	

Potential land use	Definition	Aviation and aviation related uses		Interim uses		Non-aviation related uses		
		Aviation Activities	Terminal and Facilities	Aviation Reservation	Commercial	Service Commercial	Tourist Commercial	Conservation
shop	means premises used for the display and sale by retail or for hire of goods or to provide services but may include where ***ancillary*** an **office**, but does not include a **food premises – café / take away, food premises – fast food outlet, food premises – restaurant, retail agricultural stall, service station, shopping centre, showroom sales** or **vehicle sales and hire.**	•	•	•	•	•	•	•
shopping centre	means an integrated complex of 3 or more individual tenancies that is comprised primarily of **shops.**		•		•	•		
short-stay accommodation	means hotel and/or motel style accommodation that has been specifically designed for short-stay business or tourist accommodation and that is not subject to a residential lease.			•		•	•	
showroom sales	means premises used for the sale or hire of bulky goods that require a large area for handling, display or storage including: (a) furniture, floor coverings, furnishings, household appliances or camping gear; or (b) materials, tools, equipment or machinery for use in ***industry***, commerce, the trades, primary production, medical purposes or party hire; and may include where ***ancillary*** an **office.**			•	•	•		
transport terminal	means premises used for the: (a) loading, discharge or storage of goods in the course of the transport of those goods by air, road, rail or ship; (b) garaging and basic maintenance of fleet vehicles; or (c) servicing, repair and garaging of buses; and may include where ***ancillary*** an **office.**	•	•	•		•		
utilities and infrastructure	means a road, traffic lights, stormwater drains, disposal of sewage and waste water, facilities for the reticulation of services, telecommunications facilities, electricity substations and electricity transmission facilities, including sustainable generation systems, and the like.	•	•	•	•	•	•	•

Potential land use	Definition	Aviation and aviation related uses		Interim uses		Non-aviation related uses		
		Aviation Activities	Terminal and Facilities	Aviation Reservation	Commercial	Service Commercial	Tourist Commercial	Conservation
vehicle sales and hire	means premises used wholly or principally for the display for sale by retail or for rental of motor vehicles, **caravans**, trailers, farm machinery or boats. The use may include where ***ancillary*** an **office** or repair or servicing activities and sale or fitting of accessories.		•	•	•	•	•	
veterinary clinic	means premises used for the medical treatment of animals, whether or not the animals are boarded there as part of the treatment, and may include where ***ancillary*** an **office.**			•	•	•		
warehouse	means premises used for the bulk storage of goods, or the display and sale of goods by wholesale, and may include where ***ancillary*** an **office.**			•		•		

General definitions

amenity	in relation to a locality or building, means any quality, condition or factor that makes or contributes to making the locality or building harmonious, pleasant or enjoyable.
ancillary	means associated with, but auxiliary and subordinate to the primary land use.
dwelling	means a building, or part of a building, designed, constructed or adapted as a self-contained residence.
industry	means the use of land for processes involving manufacturing, assembling, packaging, altering, repairing, renovating, finishing, cleaning, treating of waste materials, testing or analysis or dismantling of an article, goods, or material including the storage or transportation associated with any such activity.
site	means an area of land, whether consisting of one lot or more, that is a subject of an application to the consent authority

Supplementary land use definitions

agriculture	means, as a commercial enterprise: (a) the growing of crops, pasture, timber trees and the like, but does not include a plant nursery or horticulture; and (b) the keeping and breeding of livestock. The use may include where ancillary an office, but does not include animal boarding, intensive animal husbandry or stables;
caravan	includes a vehicle registered or eligible for registration within the meaning of the Motor Vehicles Act 1949 which is designed or adapted for human habitation.
home-based business	means use of a dwelling or the site of a dwelling by a person who resides in the dwelling for a business activity which is subordinate to the primary residential use including: (a) family day care for no more than 7 children; (b) storage of materials and vehicles; (c) carrying out of an occupation or profession; and (d) provision of temporary accommodation on a commercial basis within the dwelling.
horticulture	means the commercial cultivation of fruit, vegetables, and flowers, including the wholesale growing of plants, and may include where ancillary an office.
hospital	means a building used to provide health services including preventative care, diagnosis, medical and surgical treatment and counselling to persons admitted as in-patients. The use can include where ancillary, food premises-café / take away, medical clinic, office, rooming accommodation and shop that directly service the needs of staff, patients and visitors.
industry – primary	means an industry which involves the storage, treatment, processing or packing of primary products transported to the site where the process carried on and the goods and commodities carried to and from the premises on which the industry is sited are not of such a kind as are likely to adversely affect the amenity of the surrounding locality.
intensive animal husbandry	means: (a) the breeding, keeping and feeding of animals, including poultry and pigs, in sheds, stalls, ponds, compounds or stockyards, or; (b) aquaculture; as a commercial enterprise.
nightclub entertainment venue	means a premises used to provide entertainment, dancing and music. The use generally includes the sale of alcoholic beverages and food for consumption on the premises.
retail agricultural stall	means a building used for the display and retail sale of agricultural, market garden or horticultural produce grown on the land on which the building is erected.
stables	means premises used for the keeping, exercising or training of horses or other animals of burden as a commercial enterprise, and may include where ancillary an office.


Departures
09:08
QF8656 Kununurra → Perth
QF841 Sydney
TL404 Groote Eylandt
AA7299 Brisbane
QF351 Dili
EY6340 Brisbane
TL210 Milingimbi → Maningrida
QF1960 Alice Springs
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APPENDIX 3:

Supporting information

APPENDIX 3: **Supporting information**

Acronyms

AAM	Advanced air mobility
ADF	Australian Defence Force
ADG	Airport Development Group
AEDT	Aviation Environment Design Tool
ANEF	Australian Noise Exposure Forecast
ARFF	Aviation rescue and fire fighting
ATC	Air traffic control
AUSMAT	Australian Medical Assistance Teams
BITRE	Bureau of Infrastructure, Transport and Regional Economics
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations
CMATS	Civil Military Air Traffic Management System
DAA	Defence Aviation Area
DITRDCA	Department of Infrastructure, Transport, Regional Development, Communications and the Arts
DME	Distance measuring equipment
EMS	Environmental management system
eVTOL	Electric vertical take-off and landing vehicles
FAA	Federal Aviation Administration (USA)
FAC	Federal Airports Corporation
FATO	Final approach and take-off
FTE	Full-time equivalent
GA	General aviation
GRI	Global Reporting Initiative
GSP	Gross state product
GSE	Ground service equipment
HIAL	High intensity approach lighting
HV	High voltage
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
ILS	Instrument landing system
INM	Integrated Noise Model
IVM	Integrated Vegetation Management
JUHI	Joint User Hydrant Installation
LAHSO	Land and hold short operations
LV	Low voltage
MOS	Manual of Standards 2019
MV	Megawatt
N70	Noise events louder than 70dB(A)
N60	Noise events louder than 60dB(A)
NAIF	Northern Australia Infrastructure Facility
NASF	National Airports Safeguarding Framework
NCCTRC	National Critical Care and Trauma Response Centre
NCIS	Noise Complaints and Information System (Airservices Australia)
NFPMS	Noise and Flight Path Monitoring System
NT	Northern Territory
NTAPL	Northern Territory Airports Pty Ltd
OLS	Obstacle limitation surfaces
PANS-OPS	Procedures for air navigation services – aircraft operations
PAPI	Precision approach path indicator
PCN	Pavement classification number
PFAS	Per- and polyfluoroalkyl substances
PV	Photovoltaic
PWC	Power and Water Corporation
RAAF	Royal Australian Air Force
RDH	Royal Darwin Hospital
RET	Rapid exit taxiway
RFDS	Royal Flying Doctor Service
RPAS	Remotely piloted aircraft systems
TACAN	Tactical air navigation system
TEMRS	Top End Medical Retrieval Service
TWY	Taxiway
VOR	Very high frequency omnidirectional range

Glossary and aviation terminology

Aircraft noise terms

Australian Noise Exposure Forecast (ANEF)
A set of contours showing future forecasted levels of exposure to noise. The ANEF is the only type of noise map intended to be used to assist land-use planning decisions. ANEF maps are subject to technical review and endorsement by Airservices Australia.

Flight path
These maps provide an indication of where aircraft fly and how many overflights there are over a particular period.

N-contours (N70, N60)
The N-contour system is a complementary aircraft noise metric that shows the potential number of aircraft noise events above a certain decibel on an average day.

The N70 chart provides a guide to aircraft noise which is more explanatory than an ANEF. N70 refers to the number of noise events louder than 70 dB(A) over a particular period. The level of 70 dB(A) has been chosen because it is equivalent to the single event level of 60dB(A) specified in the Australian Standards AS2021 as the indoor design sound level for normal domestic areas in dwellings.

Similar to the N70 chart, the N60 night-time chart refers to the number of noise events at 60dB(A) or greater between the hours of 11 pm and 6 am. A 60-decibel noise outside a residence will be experienced as a 50-decibel noise level within a residence. This is the level of noise that does not disturb the sleep of most people; however, it depends on the individual.

Airfield terms

Aerodrome/airport
A defined area of land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

Aircraft operator
A person, organisation or enterprise engaged in, or offering to engage, in aircraft operation.

Airport operator
Any owner, licensee, authority or corporation, or any other body that has legal responsibility for a particular aerodrome (e.g. Darwin International Airport Pty Ltd).

Airside
The movement area of an airport, adjacent terrain and buildings or portions thereof, access to which is controlled.

Aprons
A defined area for aircraft parking. An apron area enables passengers to board or disembark from an aircraft, the loading of freight onto or unloading freight from an aircraft, the refuelling, parking or carrying out of maintenance on aircraft in between flights.

Code A aircraft
An aircraft with a wingspan up to but not including15 metres.

Code B aircraft
An aircraft with a wingspan between 15 metres and up to but not including 24 metres.

Code C aircraft
An aircraft with a wingspan of between 24 metres and up to but not including 36 metres, e.g. A320 and B737.

Code D aircraft
An aircraft with a wingspan of between 36 metres and up to but not including 52 metres, e.g. B767.

Code E aircraft
An aircraft with a wingspan of between 52 metres and up to but not including 65 metres, e.g. A330, B777.

Code F aircraft
An aircraft with a wingspan of between 65 metres and up to but not including 80 metres, e.g. A380.

Contact bay
Aircraft parking bay connected to the terminal by either an aerobridge or pedestrian walkway.

Explosive ordnance
Equipment carried in a military aircraft designed to detonate with explosive force.

General aviation
Commonly refers to that part of the aviation industry that engages in activity other than scheduled commercial airline activity. This may include charter operations, aero medical operations, agricultural aviation businesses, aviation-based fire-fighting services, training and aerial work such as aerial photography and surveying. It also includes private, business, recreational and sports aviation activity and supporting businesses such as maintenance providers.

Landside
Those parts of an aerodrome not considered airside; that is, areas normally accessible to the general public.

Manoeuvring areas
Those parts of an aerodrome used for the take-off, landing and taxiing of aircraft, excluding aprons.

Movement areas
Those parts of an aerodrome used for the take-off, landing, taxiing and parking of aircraft (i.e. the manoeuvring area plus the aprons).

Non-contact bay
Aircraft parking bay that is not connected to the terminal.

Obstacle limitation surfaces (OLS)
A series of surfaces in the airspace surrounding an airport and referenced to each runway.

The broad purpose of the OLS is to define the volume of airspace that should ideally be kept free from obstacles in order to minimise the danger to aircraft flying into or out of the airport when the pilot is flying by sight, or during the visual segment of an instrument approach procedure.

Procedures for air navigation services - aircraft operations (PANS-OPS) surfaces
The PANS-OPS surfaces are generally higher than the OLS and are intended to safeguard an aircraft from collision with obstacles when the pilot is flying with navigation instruments.

Runways
Defined area provided for the landing and take-off of aircraft. Darwin International Airport has 2 runways, which are identified by international convention by a 2-part designator derived from the direction in which the aircraft is flying:

- Runway 11/29 is the main east-west runway
- Runway 18/36 is the secondary north-south runway.

Runway strips
Defined area surrounding a runway, provided to reduce the risk of damage to aircraft running off runways and also to provide obstacle-free airspace for aircraft flying over the area during take-off and landing operations.

Taxiways
Defined paths providing safe, efficient surface movement of aircraft between the runway and aprons.

Thresholds
The points on the runway for which the landing distance available to an aircraft is measured. A threshold is determined with reference to obstacle-free approach gradient required for the particular category of runway. Where there is no obstacle infringement, the threshold and runway end normally coincide. Where obstacles infringe the approach surface it is necessary to displace the threshold to achieve the required obstacle free gradient.

References

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