CLONCURRY AIRPORT MASTER PLAN
Strategic Assessment Review

16 March 2023

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1. EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

BACKGROUND AND PROCESS

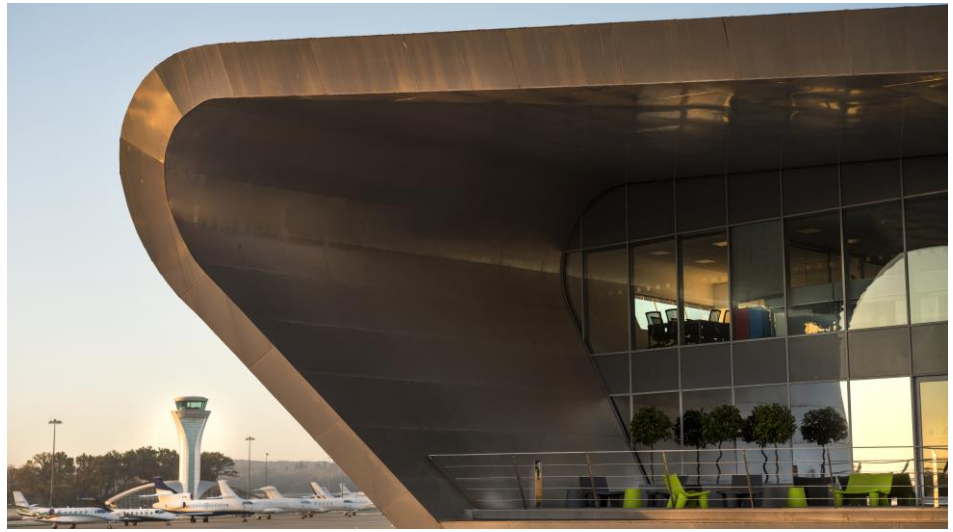
Cloncurry Shire Council has received financing from the "Preparing Australian Communities Program" for preparation of a Master Plan and Concept Design for Cloncurry Airport.

The airport is currently facing a number of infrastructure issues (pavements, flooding, electrical system) but has a lot of opportunities (growth in chartered flights, UAV Sector, freight, GA) .

Ramboll has been engaged as Consultant to assist in:

- Preparation of Master Plan
- Concept Design for key infrastructure items:
    - Aircraft Pavements
    - Airside and Landside Drainage Infrastructure
    - Aircraft Visual and Navigational Aids
    - Airfield Pavement Paint-Marking
    - Airfield Apron Lighting

This report includes Stage 1 and Stage 2 of the Master Plan. Stage 1 outlines the **three different Airport Master Plan Layout scenarios**. In Stage 2 these scenarios have been evaluated against each other based on different evaluation criteria, such as financials, operations, environment etc. After this, a Concept Design will be prepared for the selected Master Plan Layout scenario.



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EXECUTIVE SUMMARY

MASTER PLAN LAYOUT SCENARIOS AND GUIDING PRINCIPLES

Based on significant stakeholder engagement in Cloncurry (encompassing airlines, airport management, Council, fuel operators, private aircraft owners, airport tenants, mining companies, Defence, Royal Flying Doctor Service etc.), site inspections and the development of a bottom-up air traffic forecast, which shows limited growth, three different Master Plan Layout scenarios have been developed.

The main difference in the scenarios is centered around the future use of the secondary runway 06/24, and are named as follows:

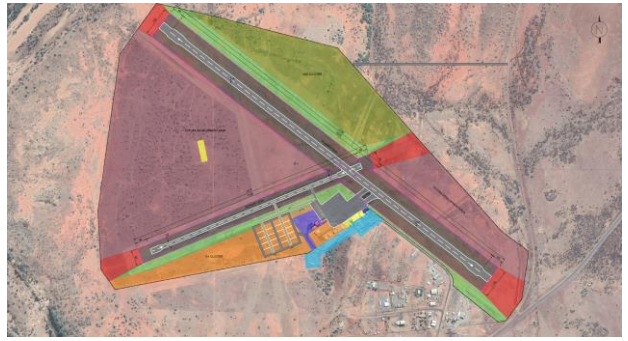
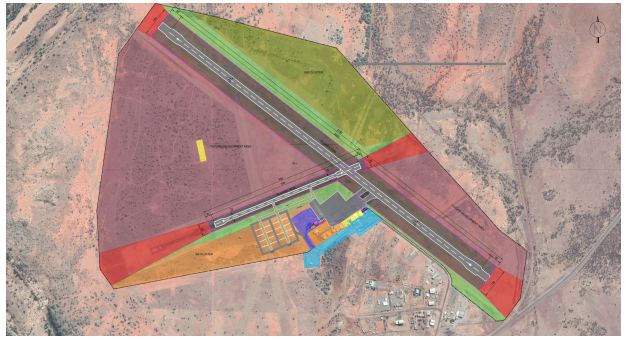
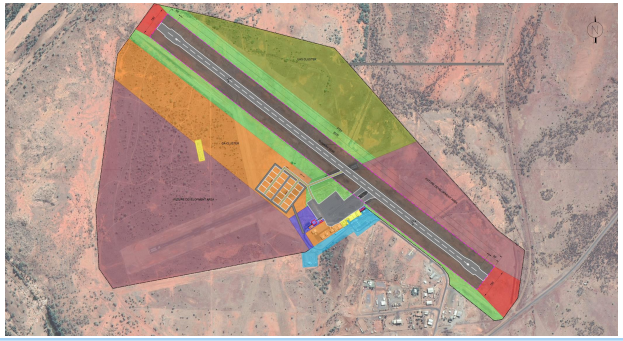
- **Scenario 1: Full Length Runway 06/24**
- **Scenario 2: Reduced Length Runway 06/24**
- **Scenario 3: Close Down Runway 06/24**

The three scenarios are shown in the following page.

The guiding principles for the development of each of the three layout scenarios have been:

- Creating a **synergy between similar businesses** by dedicating an area of infrastructure development for their activities (**clustering**)
- Ensuring an **easy access to runway** from the dedicated new infrastructure development areas
- Preservation of existing infrastructure by **retaining or repurposing to the extent possible**
- Establishing new infrastructure in **proximity of existing services/utilities**, to reduce cost

EXECUTIVE SUMMARY
MASTER PLAN LAYOUT SCENARIOS

Scenario	Layout
Scenario 1 Full Length Runway 06/24	
Scenario 2 Reduced Length Runway 06/24	
Scenario 3 Close Down Runway 06/24	

2. INTRODUCTION

INTRODUCTION

Cloncurry Shire Council successfully received Federal funding through the ”Preparing Australian Communities Program” for the development of the Cloncurry Airport Masterplan and Concept Design.

The airport is currently facing a number of infrastructure issues (pavements, flooding, electrical system) but has a lot of opportunities (growth in chartered flights, UAV Sector, freight, GA)

This has prompted the Council to initiate this Master Plan and Concept Design work, which, in line with the RFP for the project, is focused on the following:

- Aircraft Pavements
- Airside and Landside Drainage Infrastructure
- Aircraft Visual and Navigational Aids
- Airfield Pavement Paint-Marking
- Airfield Apron Lighting

While these are the focus points, and have been given the majority of attention in this project, other aspects are also touched upon in the Master Plan and Concept Design work.

To create the best basis for assessing the current state of the above mentioned focus areas, a visual inspection has been undertaken (Condition and Compliance Assessment), and this has been supplemented by stakeholder consultation to obtain anecdotal information. Furthermore, the following on-site investigations have been undertaken:

- Topographical Survey (December 2022)
- Pavement Investigation (February 2023)
- Geotechnical Investigation (commencing 6th March 2023)

In combination this creates the basis for the project work that follows in this report.

3. EXISTING SITUATION

EXISTING SITUATION

Cloncurry Airport is situated in Cloncurry, Queensland, Australia. The airport caters to a variety of traffic, including local residents, mustering helicopters, UAS and flights related to bringing in and out staff from the different mining companies that operate in the region.

The airport has two runways, whereof runway 12/30 is the one mainly used by airlines, as the other runway 06/24 is much shorter and in poor condition.

The airport furthermore has a terminal building, which is considered by the users (mainly mining workers) to be too small. This however, is due to the fact that mining companies prefer to move all workers in and out of Cloncurry at the same time, meaning that the peak stress on the terminal is very high compared to the weekly, monthly and annual activity levels in the airport.

Cloncurry Mustering Company, Qinetiq and other GA/ recreational users are tenants in the airport, having hangar facilities on airport land. They operate helicopters, UAS and GA/ recreational aircraft respectively.

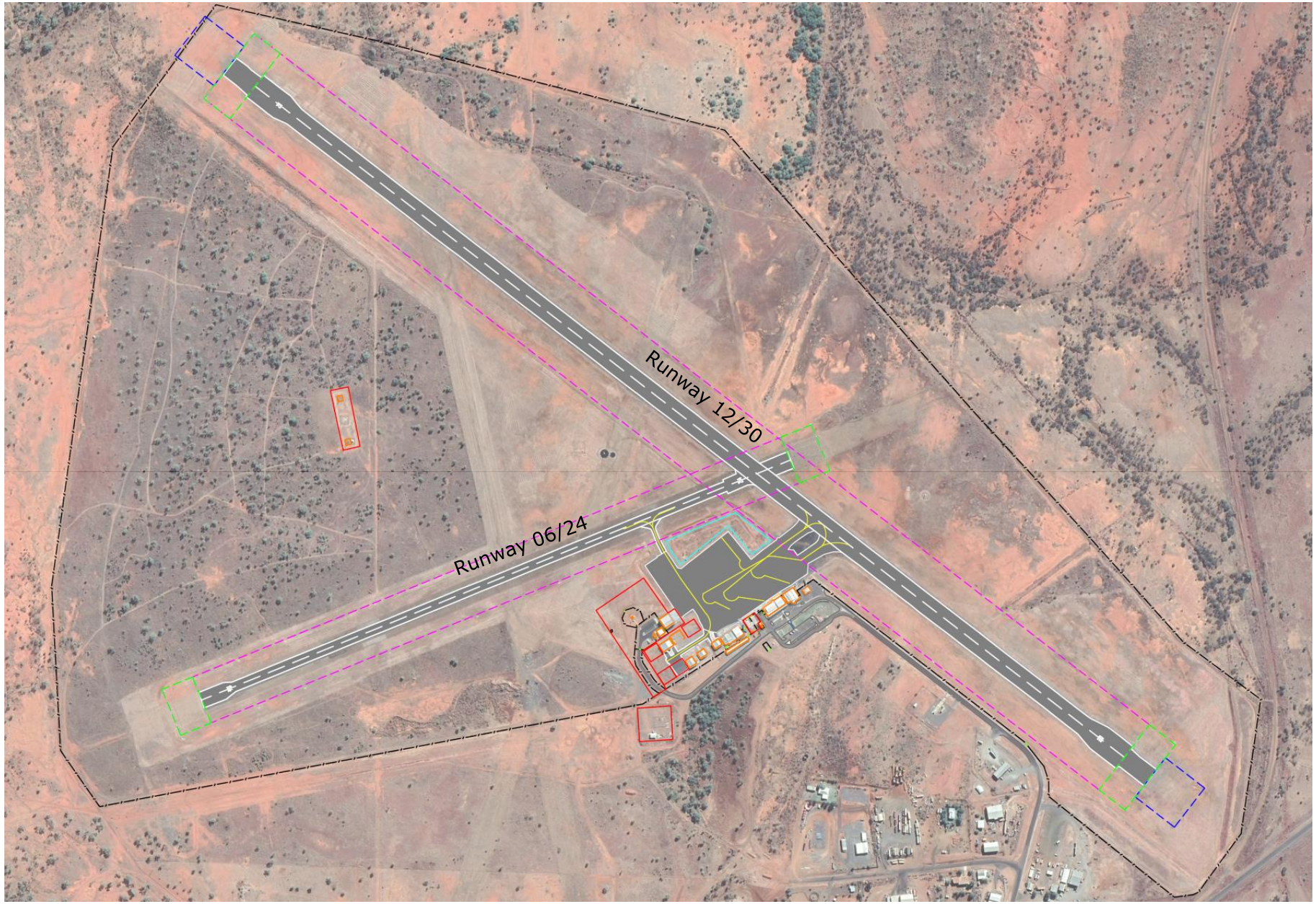
At the moment, the airport is facing certain issues, which are mainly centered around the condition of the airside assets (pavements, drainage, visual aids, lighting systems etc.) and the serviceability of the airport during natural disasters. During flood events the roads leading in and out of the town of Cloncurry are cut off, and the only means of bringing people and goods in and out of the town is by air. As the airport is a lifeline to the town during a natural disaster – this underlines the importance of ensuring the future serviceability of the airport, and of giving special attention to drainage issues in this Master Plan and Concept Design project.

Stakeholder engagement and condition assessment undertaken in the airport have further revealed that large areas inside the airport boundary are flooded during heavy downpour, and even the inside of the terminal building is at times flooded. Moreover, the electrical system for the airfield ground lighting is unreliable and a previous survey has not been able to identify the exact cause of this.

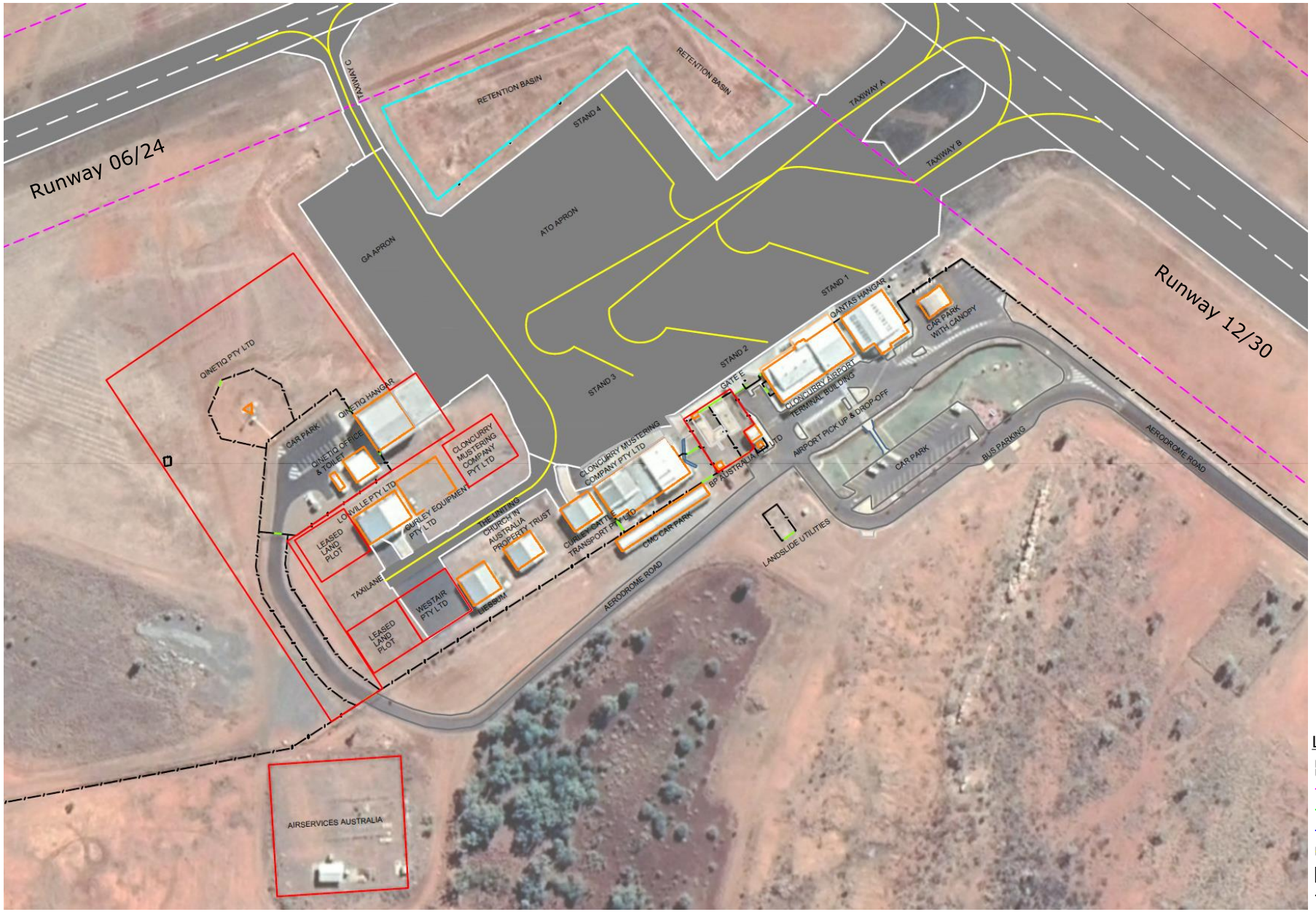
The condition of the airport infrastructure is described in much more detail in the Condition Assessment Report delivered as part of this project.

In the following pages, the airport is shown in its existing layout, with mark up of the different facilities.

EXISTING SITUATION



EXISTING SITUATION



4. STAKEHOLDER ENGAGEMENT

STAKEHOLDER ENGAGEMENT

Stakeholders Engaged

The project has included extensive stakeholder engagement, done via physical meetings in Cloncurry, as well as online meetings. The following stakeholders have been consulted in relation to the project:

- **Mayor** – Greg Campbell
- **Councillors**
- **Airport Manager** – Joanne Earl
- **Airport staff** – Blaine Parise and Shaun Booth
- **Senior town planner** – Larinda Turrell
- **Alliance and BP operators** – Susan and John Swalling
- **IOR operator** – Kellie Athorn
- **Cloncurry Mustering Company** – Dick Tully
- **Manager Planning and Environment** – Megan Anderson (online)
- **Eloise Mining** – Ben McInerney
- **MMG** – Simon Fitzpatrick
- **Evolution Mining** – Ernest Henry – Shane Morrissey
- **MT Cuthbert** – Shane Ryan
- **Copper Mountain Mining** – Eva Copper Mine – Akua Afriyie Ahenkorah
- **Qinetiq** – Mark R. Roots (online)
- **Defence** – Richard Ward (online)
- **Council Project Team** – Rithy Poch, Simon Humphreys, Philip Keirle
- **Local resident with 2 aircraft at the airport** - Ronald Bird (online)
- **Royal Flying Doctor Service** – Anthony Hooper (online)
- **Airside Logistics** – Alan Mathieson
- **REX Airline** – Steve Jones
- **Horizon Airways (Flight School)** – Matthew Munns

Pending consultations include:

- Qantas
- Dronamics

MoMs from the stakeholders interviews conducted in December 2022 have been delivered, with the remaining MoMs to be delivered by end of March 2023.

5. MARKET ANALYSIS & TRAFFIC FORECAST

MARKET ANALYSIS AND TRAFFIC FORECAST

EXISTING SITUATION AND BASELINE

The **purpose** of the market analysis and traffic forecast is to assist in defining future infrastructure needed in Cloncurry Airport. The **current market situation** in Cloncurry Airport is characterized by traffic generated by the business environment in the town and surrounding areas.

The passenger volume in Cloncurry Airport is generated by Alliance and Qantas. Alliance is mainly operating on behalf of the **mining industry** in and around Cloncurry. This market segment could grow due to increased global demand for natural resources.

Inbound and outbound **leisure traffic** potential is expected to be limited due to the relative proximity of Mount Isa and Mount Isa Airport.

General Aviation (GA) traffic can be expected to grow, as demand from this market segment is growing, among others due to the recent opening of the Horizon Airways Flight School.

Traffic generated by the **mustering industry** is expected to remain stable in the years to come.

Other traffic segments are of limited importance due to the size of the town.

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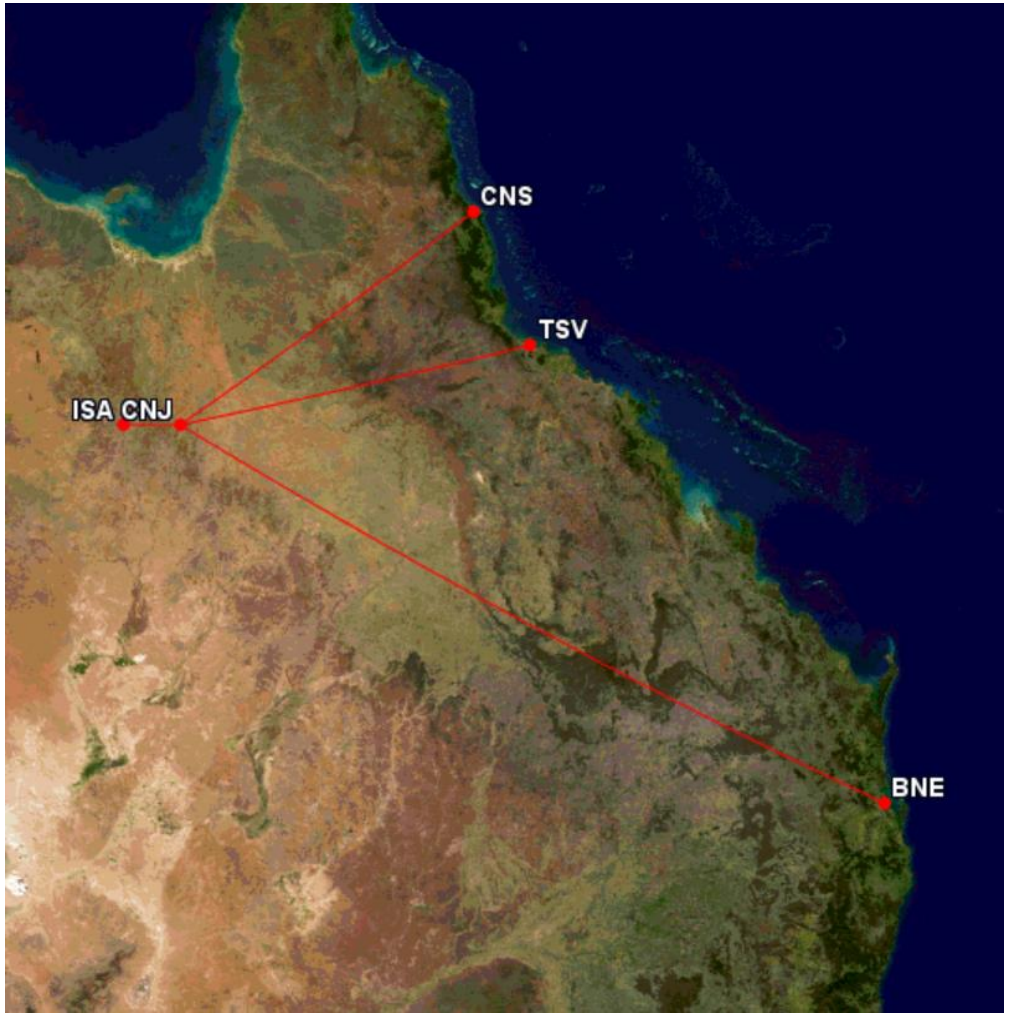
MARKET ANALYSIS AND TRAFFIC FORECAST

SUBSTITUTES

For most traffic segments, the Mount Isa Airport remains a viable substitute for Cloncurry Airport.

Mount Isa Airport is less than two hours by car from Cloncurry Airport. Combined with the fact that Mount Isa Airport is already served by scheduled airlines like Qantas, Virgin Australia, and Rex, and is less expensive for airlines to use, Mount Isa Airport is a very relevant substitute for Cloncurry Airport. Hence, it would be very challenging to grow the scheduled airline segment at Cloncurry Airport, as Mount Isa is eight times the population of Cloncurry with correspondingly higher demand for leisure traffic.

Two market segments, namely traffic for the mining and mustering industry, do not have good alternatives to using Cloncurry Airport.



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MARKET ANALYSIS AND TRAFFIC FORECAST

MARKET SEGMENTS

Based on the market analysis, the aviation market in Cloncurry Airport can be split into three segments:

- **Passenger Traffic** (including traffic for the mining industry)
- **General Aviation (GA)** (including recreational flying)
- **Traffic for Mustering Industry**

Each traffic segment is assessed independently in the following pages.

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MARKET ANALYSIS AND TRAFFIC FORECAST

PASSENGER TRAFFIC

The **passenger traffic** in Cloncurry Airport is mainly traffic supporting the Mining Industry. Further, it is expected that there is limited potential to grow leisure and other passenger traffic because of the attractive substitute offered at Mount Isa Airport.

Throughout the year, the passenger traffic in Cloncurry Airport is relatively stable with low seasonal fluctuations, as shown in the monthly figure to the right.

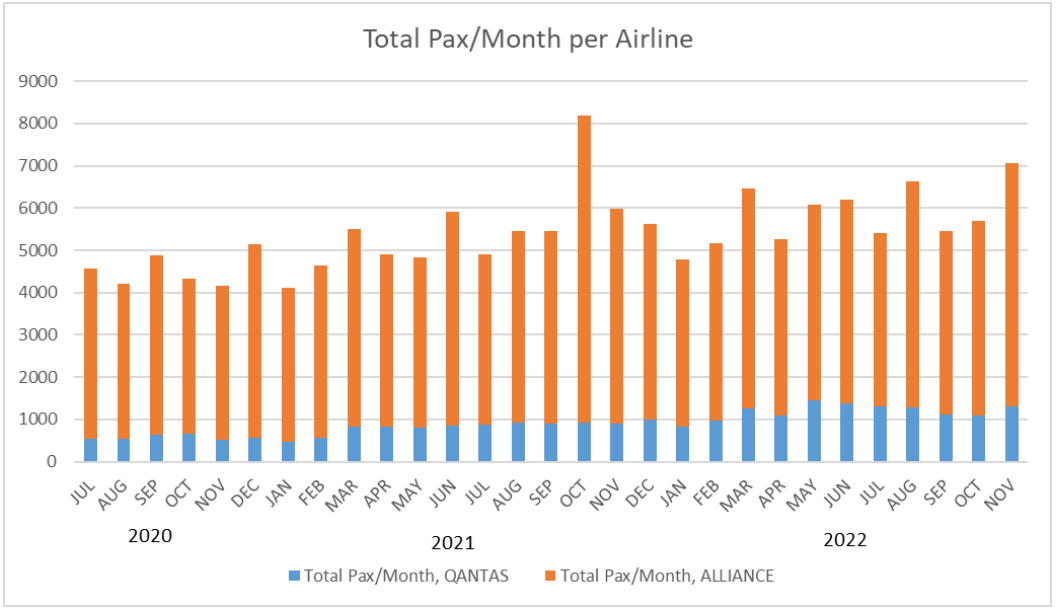
Potential future growth drivers for passenger traffic are:

- New mining opportunities like Little Eva Project
- Increased global demand for natural resources from mines

Potential future growth diminishers for passenger traffic are:

- Technological development in the mining industry leading to more automation, which will lead to less need for passengers flying to/from Cloncurry

Based on the above and Ramboll's experience from similar projects as well as the general worldwide aviation trend, we expect a **base case** of 2% annual passenger traffic growth if one new mining company enters Cloncurry. This could increase to 4% annual passengers if two mining companies expand into the area (**high case**). If no new companies enter, we expect a **low case** of no growth. This is illustrated on the following two pages.



Source: Airport Power BI database

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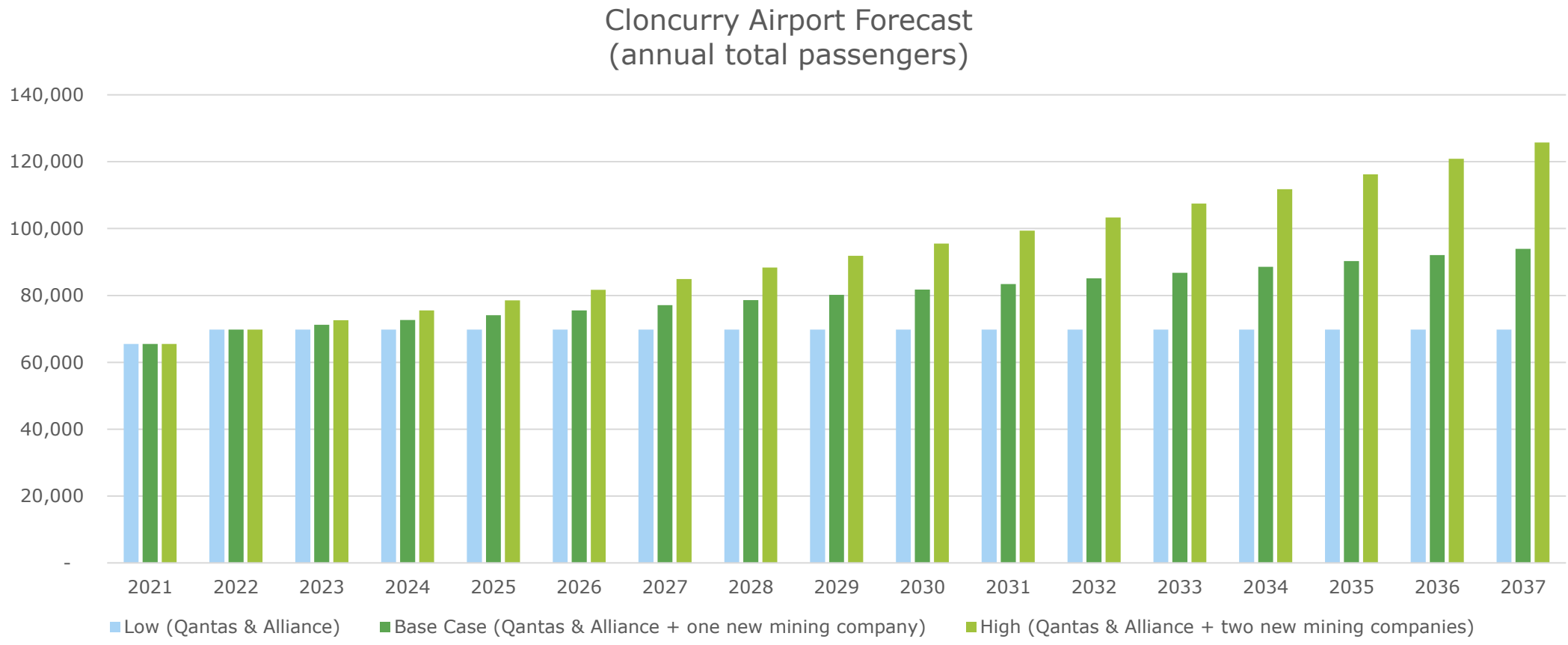
MARKET ANALYSIS AND TRAFFIC FORECAST

PASSENGER TRAFFIC

Below illustrates the assessed low, base and high case scenarios for the expected future passenger traffic development in Cloncurry Airport:



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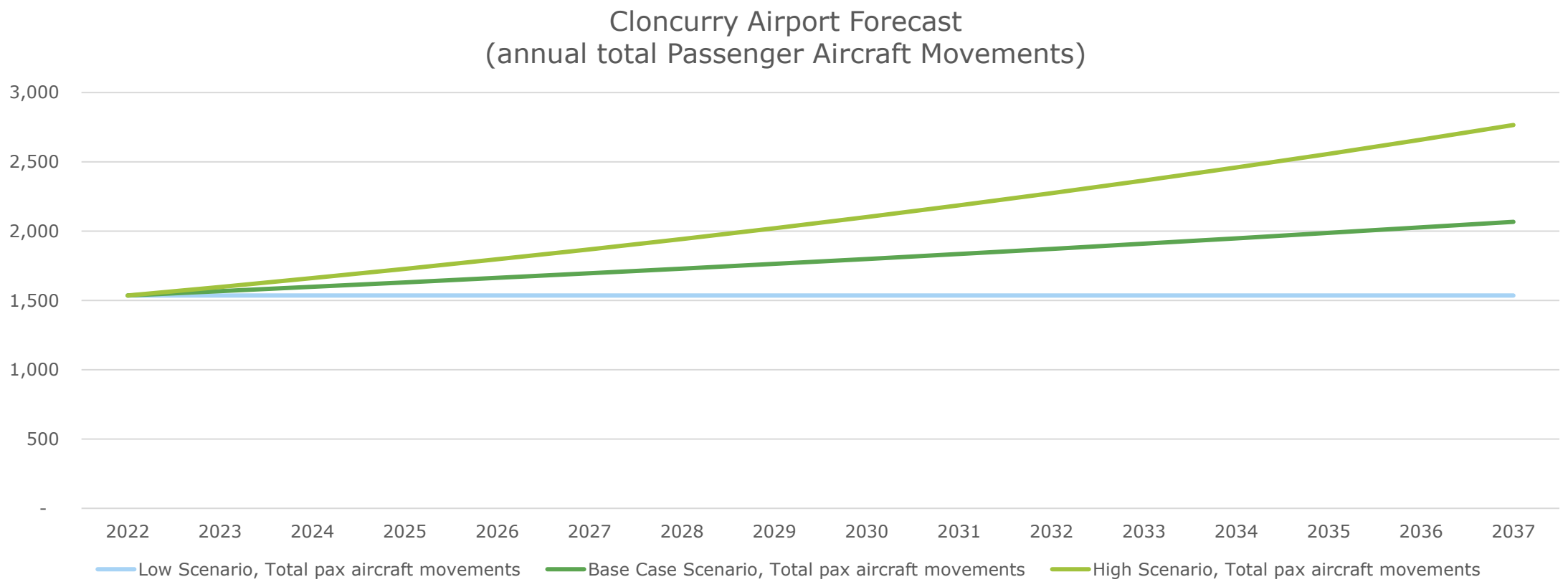
MARKET ANALYSIS AND TRAFFIC FORECAST

PASSENGER TRAFFIC

Below illustrates the assessed low, base and high case scenarios for the expected future passenger traffic movements in Cloncurry Airport:



MARKET ANALYSIS AND TRAFFIC FORECAST

GENERAL AVIATION (GA)

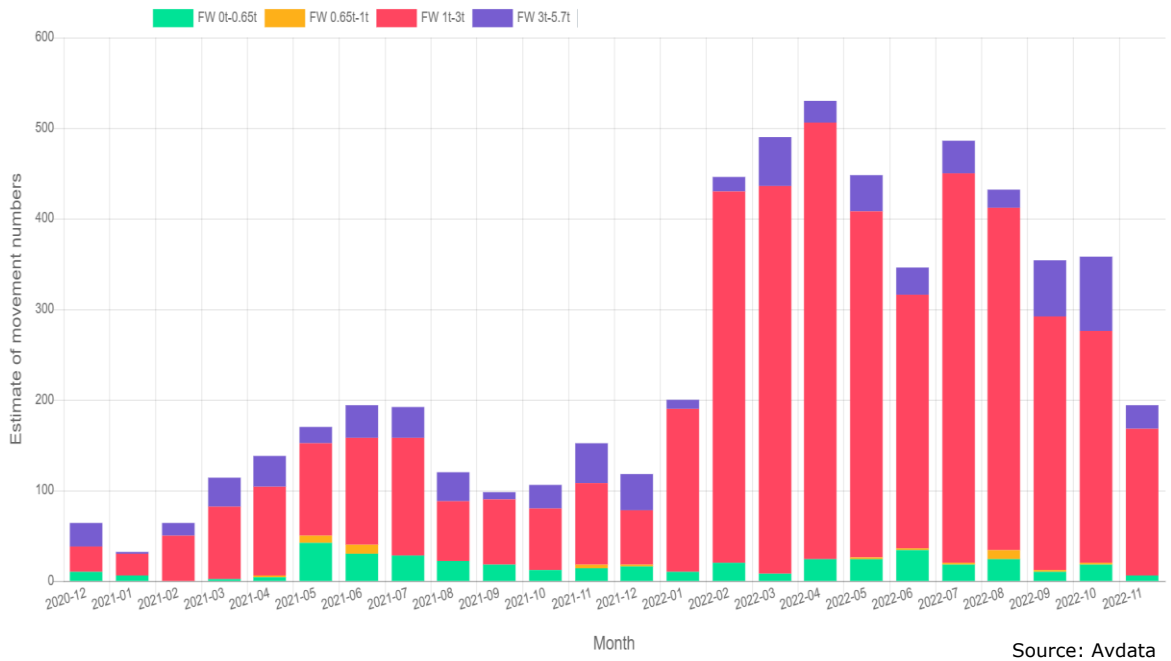
The **GA segment** of the market in Cloncurry Airport is mainly driven by small aircraft used for recreational purposes, training, medical services etc.

During the last couple of years, the number of movements in this segment has grown (as shown in figure to the right).

In the years to come, further expansion can be expected in this market segment, which is driven by more expressed demand and request for more hangar capacity to be erected in Cloncurry Airport.

Cloncurry Airport has eight GA Hangar lots at the moment, and Ramboll has been informed by Council that they see a need for 20 new hangar lots in the airport for the future. This corresponds to a growth in hangar lots of 350%. Not all of these will be leased out from the outset but rather be developed over time. Assuming that traffic growth corresponds to growth in the number of hangar lots, and that these are developed over e.g. a 30-year period, the annual growth is approx. 4%. This growth rate has been used as the **base case**. A **low case** of 2% annual growth and a **high case** of 5% annual growth has been established.

Estimated GA movements in Cloncurry Airport



Source: Avdata

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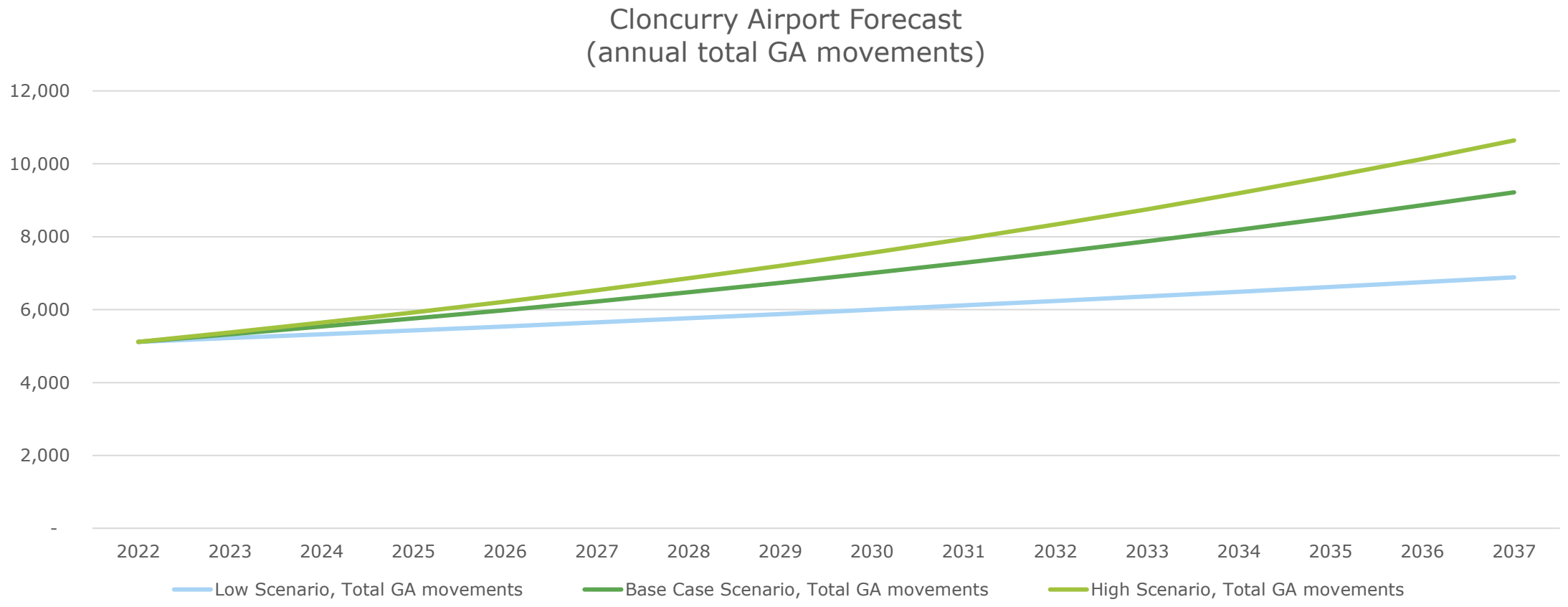
MARKET ANALYSIS AND TRAFFIC FORECAST

GENERAL AVIATION (GA)

Below illustrates the assessed low, base and high case scenarios for the expected GA traffic movements development in Cloncurry Airport:



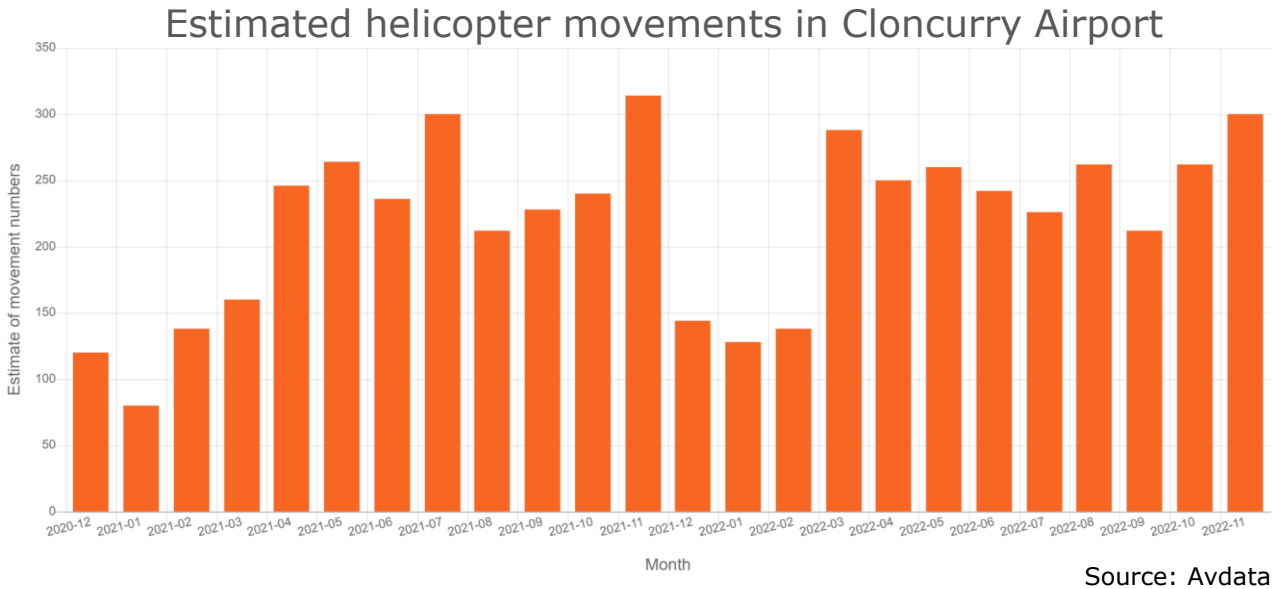
MARKET ANALYSIS AND TRAFFIC FORECAST

TRAFFIC FOR MUSTERING INDUSTRY

Helicopters are used by the mustering industry in and around Cloncurry.

The growth in this traffic is estimated to be limited in the years to come, and is therefore not anticipated to generate demand for additional infrastructure at Cloncurry Airport in the foreseeable future.

Despite constituting limited volumes, we know that CMC is currently in the process of expanding with an additional hangar lot (growing from 3 hangars to 4), and therefore we do forecast with a **base case** scenario of 2% growth annually in this traffic segment, a **high case** scenario of 4% growth and a **low case** scenario of zero growth.

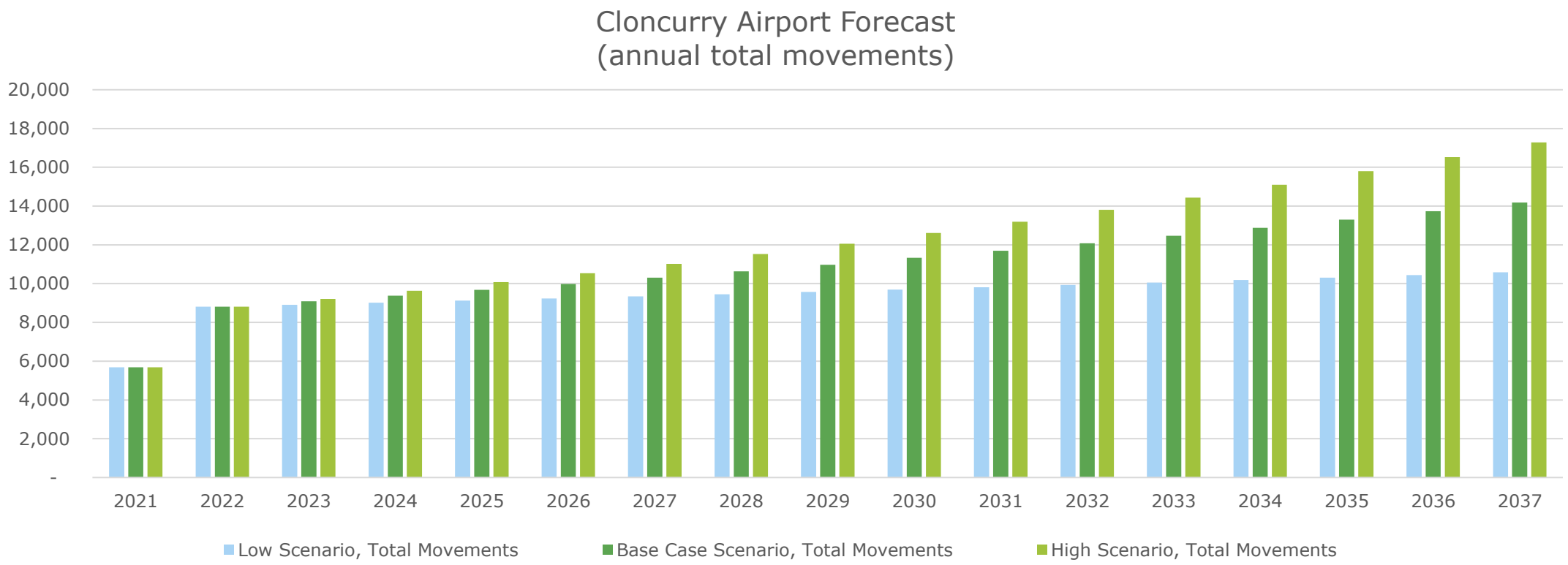


Source: Avdata

MARKET ANALYSIS AND TRAFFIC FORECAST

SUMMARY: MARKET ANALYSIS AND TRAFFIC FORECAST

Below illustrates the assessed low, base and high case scenarios for all the expected future traffic movements in Cloncurry Airport:



MARKET ANALYSIS AND TRAFFIC FORECAST

SUMMARY: MARKET ANALYSIS AND TRAFFIC FORECAST

Below table summarizes the market analysis and traffic forecast:

Traffic Segment	Growth Potential	Comments
Passenger Traffic (including traffic for the mining industry)		Both outbound and inbound leisure traffic segment is limited and have good existing alternatives in Mount Isa. Traffic for the mining industry can grow but it is considered most likely that this growth will be limited.
General Aviation (GA) (including recreational flying)		Higher demand has been identified in the GA segment, where demand exist for further GA hangar capacity in Cloncurry Airport.
Traffic for Mustering Industry		Helicopter traffic generated by the mustering industry is expected to stay almost flat (with limited growth).

In addition to the above, it is understood that there is some interest in UAS facilities in the airport (e.g. Dronamics and Airbus), but this is not quantifiable at the moment in terms of traffic. In the Master Plan described in the following pages, an area is allocated for a future UAS Cluster which will be able to cater to this type of activity.

6. MASTER PLAN

MASTER PLAN
NEEDS STATEMENT / ISSUES DEFINITION

As described, the basis for the Master Plan work is the following:

- Condition and Compliance Assessment (Visual Inspection)
- Extensive Stakeholder Engagement
- On-Site Investigations
- Market Analysis & Traffic Forecast (previous chapter)

Based on the outcome of the above, a Needs Statement has been developed, which describes the main issues/wishes that the Master Plan and subsequent Concept Design should address, such that the airport going forward will be compliant, in operational condition, and provide the necessary capacity and infrastructure to cater to forecasted demand.

In the following page the needs ("issues" and "wishes") are presented in a grouped and distilled manner based on the nature of the issue/wish and the way to address them. The full list of issues and wishes is presented in Appendix 1 which has been the basis of the following slides. In Appendix 1, the issues and wishes have been prioritized/ranked in terms of criticality in accordance with Ramboll's experience and discussion with Cloncurry Shire Council, and this prioritization has been part of the basis for what is presented in the grouped Needs Statement on the next page.

Based on the Needs Statement and discussion with Cloncurry Shire Council, a set of solutions have been developed. These have, in an iterative process, guided the later development of the three different Master Plan layout scenarios, which are shown later in this document.

MASTER PLAN
NEEDS STATEMENT / ISSUES DEFINITION

1 **Airside**
- Deteriorating pavement condition on parts of the airside
- Poor drainage system condition (Flooding of large parts of airside during heavy downpour)
- Poor electrical system condition (unreliable)
- Insufficient GA apron capacity
- No area allocation for expansion of GA Hangars and UAS related activities
- Issues surrounding stands 2 & 3 (limitation for parking aircraft, for access to the fuel station and for access to/from the airport gate)
- Non-compliant apron lighting
- Council wish to use Qantas hangar for other purposes, which will entail a need for new office space, GSE parking space (already a lack of GSE parking space as it is) and toilets
- Noise from APUs when aircraft parked on apron

It is clear from condition assessment and anecdotal information obtained through stakeholder interaction that especially some pavements, drainage and the electrical system is in poor condition and needs maintenance and/or upgrade. Especially runway 06/24 is in poor condition and some pilots refuse to land here. Moreover, Taxiway C and the apron is bumpy and with loose stones. During rainfall events large areas on airside are flooded due to insufficient drainage system including an insufficient retention basin adjacent to the runway and apron. During normal operations the electrical system is unreliable, and root causes cannot be identified (as per previous electrical study made in the airport by other Consultant).

During stakeholder interviews it has become clear that there is a great interest in leasing space in the airport for GA users and potentially for UAS operators. 3 lots prepared for GA hangars have already been leased out, and Council has indicated a need for up to 20 more GA hangars.

Existing apron lighting is non-compliant as light fixtures are placed horizontally, thereby potentially blinding pilots. Moreover, the masts on which the lights are fixed are penetrating the Obstacle Limitation Surfaces of runway 06/24.

Due to lack of other options (e.g. Ground Power Unit), aircraft parked on the ATO Apron use the APU (Auxilliary Power Unit) to power their aircraft while parked. This is noisy and not energy efficient. The noise is especially an issue for CMC, as they are located next to the apron.

2 **Terminal**
- Perceived lack of passenger capacity
- Flooding of terminal during heavy downpour

During the times when mining companies are changing personnel, there is a lack of capacity in the terminal building. This is due to the mines' wish to change all personnel at the same time, which puts a large strain on the existing terminal infrastructure. Moreover, the terminal roof is leaking, certain equipment is unreliable and during flooding events even the terminal floor is flooded due to undersized drainage on the landside.

3 **Landside**
- Perceived lack of bus drop-off capacity
- Poor drainage system condition

As for the terminal, during the times when mining companies are changing personnel, there is insufficient capacity on the landside. This is due to the mines' wish to change all personnel at the same time, which puts a large strain on the existing infrastructure.

4 **Ancillary / Other**
- Lack of fuel in the airport during natural disasters
- Poor fence condition (animals go through or under)
- Toilet facilities unavailable for GA users

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MASTER PLAN
SOLUTIONS LIST

	Needs Statement / Issues Definition	Solutions List
1	**Airside** • Deteriorating pavement condition on parts of the airside • Poor drainage system condition (Flooding of large parts of airside during heavy downpour) • Poor electrical system condition (unreliable) • Insufficient GA apron capacity • No area allocation for expansion of GA Hangars and UAS related activities • Issues surrounding stands 2 & 3 (limitation for parking aircraft, for access to the fuel station and for access to/from the airport gate) • Non-compliant apron lighting • Council wish to use Qantas hangar for other purposes, which will entail a need for new office space, GSE parking space (already a lack of GSE parking space as it is) and toilets • Noise from APUs when aircraft parked on apron	**Airside** • Full or part closure of runway 06/24 (dependent on scenario), or rehabilitation of same • Rehabilitation of certain pavements • Rehabilitation and upgrade of drainage system • Rearrangement of stands on ATO Apron • Allocation of area for expansion of GA Hangars and GA Apron • Allocation of area for UAS cluster • Provision of indoor GSE garage with adjoining office space for airport management and for operational center during natural disasters (for use by defence when and if necessary) • Provision of mobile GPU (to address APU noise issue)
2	**Terminal** • Perceived lack of passenger capacity • Flooding of terminal during heavy downpour	**Terminal** • Reorganization of flights (slot management) by continuous dialogue with airlines/mining companies to ensure that peaks are evened out (meaning no need to increase physical infrastructure) • Slight reorganization of existing terminal space • Identify and repair damages to terminal, and replace or repair unreliable equipment • Rehabilitation and upgrade of drainage system
3	**Landside** • Perceived lack of bus drop-off capacity • Poor drainage system condition	**Landside** • Reorganization of flights (slot management) and thereby also busses, by continuous dialogue with airlines/mining companies to ensure that peaks are evened out (meaning no need to increase physical infrastructure) • Rehabilitation and upgrade of drainage system
4	**Ancillary / Other** • Lack of fuel in the airport during natural disasters • Poor fence condition (animals go through or under) • Toilet facilities unavailable for GA users	**Ancillary / Other** • Initiate dialogue with existing operators IOR and BP, whether they will be interested in expanding the fuel reserves on-site • Replacement of existing fence with new animal-proof fencing • Provision of toilet facilities for GA users

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OPPORTUNITIES

UAS

Cloncurry Airport is today host to the Queensland Flight Test Range, which provides for flying of all weight classes of UAVs/UASs for routine operations, tests, demonstrations etc. Historically the airport's remoteness and thereby security has proven to be advantageous, as for instance military usage would be at a safe distance from other powers. As UASs are highly usable in a military context, this advantage may still be leveraged to attract business opportunities to the airport.

Recently several UAS-related companies have shown interest in Cloncurry Airport, as a place for operations, testing, evaluation and demonstration of their specific UAS types. These companies include **Dronamics**, who are specialised in cargo UASs and **Airbus**, who intend to further develop their Zephyr-programme in Australia. The Zephyr is a high-altitude platform station, which can fly continuously for several months (shown in below figure).

With the above in mind, it is seen as a great opportunity to include UAS Cluster development as a focus point in the future airport development.

Solar Power Generation

Due to the airport's large areas of undeveloped land and its geographical location, there is an opportunity to implement a large solar photo voltaic farm for the production of green energy.

This energy can be used on site, as the existing airport facilities such as hangars, terminal, offices etc. need power. Moreover, it can be a great selling point in attracting other businesses (for instance UAS-related ones) to the airport, as these businesses will gain goodwill in the public when basing themselves in a "green airport". The power can also be used outside of the airport site, as it can be sold through the grid to residential and commercial users in the town of Cloncurry.

Implementation of solar panels is in line with the future trends as seen in other airports. Furthermore it contributes to the UN's 17 Sustainable Development Goals and thereby the sustainable development and achievement of carbon neutrality of Cloncurry and Queensland.

Before implementation of this however, careful studies should be undertaken, to ensure that any installed solar panels are oriented such that a balance is struck between maximum possible power output and minimum glare for pilots approaching the airport.

INFRASTRUCTURE DESIGN BASIS AND FUTURE NEEDS
AIRSIDE

Primary Runway 12/30

At present, the primary runway 12/30 at Cloncurry Airport is 2,000m long and 30m wide. The larger aircraft types operating on this runway are:

- Dash-8 Q400
- Embraer 190
- Fokker 70
- Fokker 100

In the future, based on the traffic/ market analysis the potential airlines to expand their business to Cloncurry Airport are Jetstar and Virgin Australia. The aircraft types which are part of their fleets and most likely to operate at Cloncurry are:

- Airbus 320
- Boeing 737-800 (with winglets)

The required dimensions of the main runway have been evaluated as part of this master plan design to cater to the current and future operating aircraft types at the airport. The design basis of this assessment are the following:

- Civil Aviation Safty Authority (CASA) Part 139 (Aerodromes) Manual of Standards 2019
- ICAO Doc 9157 Aerodrome Design Manual Part I – Runways 2020
- Airport Planning Manual Airbus A320
- Airport Planning Manual Boeing 737

<u>Runway Length:</u>

For a Boeing 737-800:
Tabulated below is the runway length required at Cloncurry Airport (with corrections for elevation, temperature & slope) for the corresponding take-off weight for the aircraft.

Aircraft Take-Off Weight (TOW)	Runway Length Required
~78,240kg (maximum)	~2,450m
~70,000kg	~2,000m

Furthermore, the assessment of the flight range and corresponding Operating Empty Weight (OEW) of the aircraft with payload, that could be carried by the aircraft from Cloncurry when the take-off weight and runway length are limited to 70,000kg and 2,000m respectively, is tabulated below.

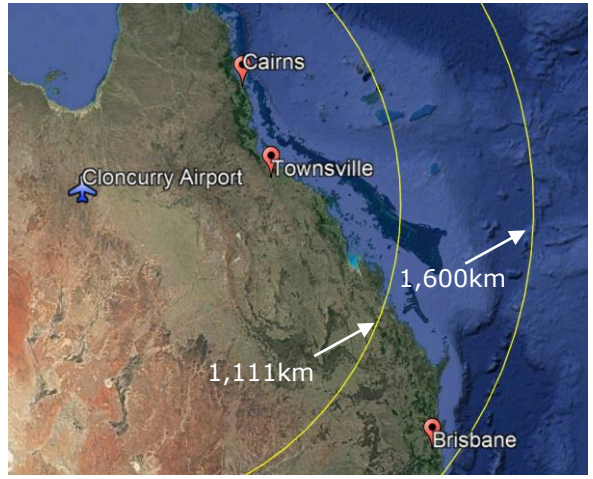
OEW + Payload*	Flight Range*
~62,900 kg (100% payload)	~600nm/1,111km
~61,500kg (93.45% payload)	~870nm/1,600km

* OEW+Payload vs. Flight Range based on B737-800 non-winglet performance. Winglet aircraft will have slighty greater range.

Based on the above calculations a B737-800 can take-off on the existing 2,000m long runway at Cloncurry Airport with:

- Full payload to Cairns and Townsville
- Slighty reduced payload to Brisbane

Please see the image to the right with the flight range marked in yellow on the map.



INFRASTRUCTURE DESIGN BASIS AND FUTURE NEEDS
AIRSIDE

For an Airbus 320:
Tabulated below is the runway length required at Cloncurry Airport (with corrections for elevation, temperature & slope) for the corresponding take-off weight for the aircraft.

Aircraft Take-Off Weight (TOW)	Runway Length Required
~77,240kg (maximum)	~2,513m
~70,000kg	~2,000m

As the limit to the aircraft take-off weight for a runway length of 2,000m is the same as that for a Boeing 737-800 at Cloncurry, it can be assumed that the Airbus 320 could operate from Cloncurry to Cairns, Townsville and/ or Brisbane with similar payload and flight range.

Therefore, a 2,000m long runway is deemed sufficient for take-off and landing operations by a A320 or B737-800 at Cloncurry Airport.

Runway Width:

The minimum runway width required at Cloncurry based on the Outer Main Gear Wheel Span (OMGWS) of the current and future operating aircraft types (except Dash-8 Q400), should be 30m.

For the Dash-8, the minimum runway width ought to be 45m as per its OMGWS. However, in November 2010 (after the rules regarding minimum runway width were reformed) CASA published an industry wide exemption which allows the Q400 to continue operations on a 30m wide runway.

Therefore, a 30m wide runway if sufficient at Cloncurry Airport.

Please note that the Airport Management/ Shire Council must consult airlines and their respective chief pilot for specific operating procedure including runway length and width requirements.

INFRASTRUCTURE DESIGN BASIS AND FUTURE NEEDS
AIRSIDE

Existing Taxiways

There are four existing taxiways in the airport:
- Taxiway A (code C)
- Taxiway B (code D)
- Taxiway C (code A) (Taxiway from Runway 06/24 to the beginning of GA Hangar Taxiway)
- GA Hangar Taxiway (Taxiway from the ATO apron to the end of the existing GA Hangar Area)

Due to insufficient separation distance between Taxiways A and B, the latter should not be used for code D operations simultaneously with a code C operation on Taxiway A. Therefore it is recommended that Taxiway B be declared as a code C Taxiway (instead of the current declaration as a code D Taxiway). Additionally, as the airport does cater to Code D aircraft, now or in the future, this will not influence today's or expected future operations.

The pavement of Taxiway C shall be rehabilitated due to poor pavement condition, as it is intended to remain functional in all three Master Plan layout scenarios, as later shown in this report. It is recommended to also expand the width and ensure clearance of Taxiway C for select code B aircraft, which will imply re-marking of the existing GA apron edge to provide sufficient wingtip clearance for taxiing aircraft.

The GA Hangar Taxiway is currently a code A taxiway, and shall remain so.

New Taxiways and potential upgrade

In **Master Plan layout scenarios 1 and 2**, four new taxiways/taxilanes have been introduced:
- Taxiway D connects Runway 06/24 with the new parallel taxiway (Taxiway E)
- Taxiway E is placed parallel to Runway 06/24 and makes taxiing possible between the New GA Hangar Area and the existing fuel station as well as the old and New GA Aprons.
- Taxilane 1 connects the first group of 10 GA Hangar lots with Taxiway E
- Taxilane 2 connects the second group of 10 GA Hangar lots with Taxiway E

All four new taxiways/taxilanes are planned as code B taxiways, providing enough clearance distance to the hangars in the New GA Hangar Area and the New GA Apron.

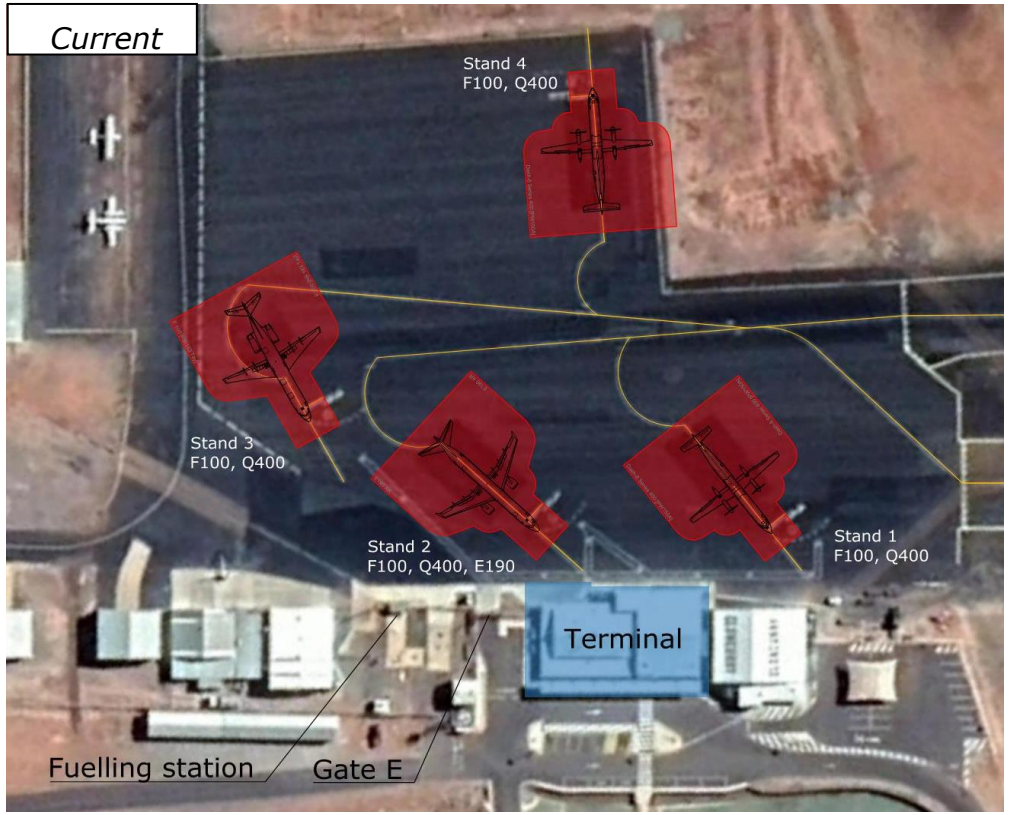
In **Master Plan layout scenario 3** four new taxiways/taxilanes are similarly introduced:

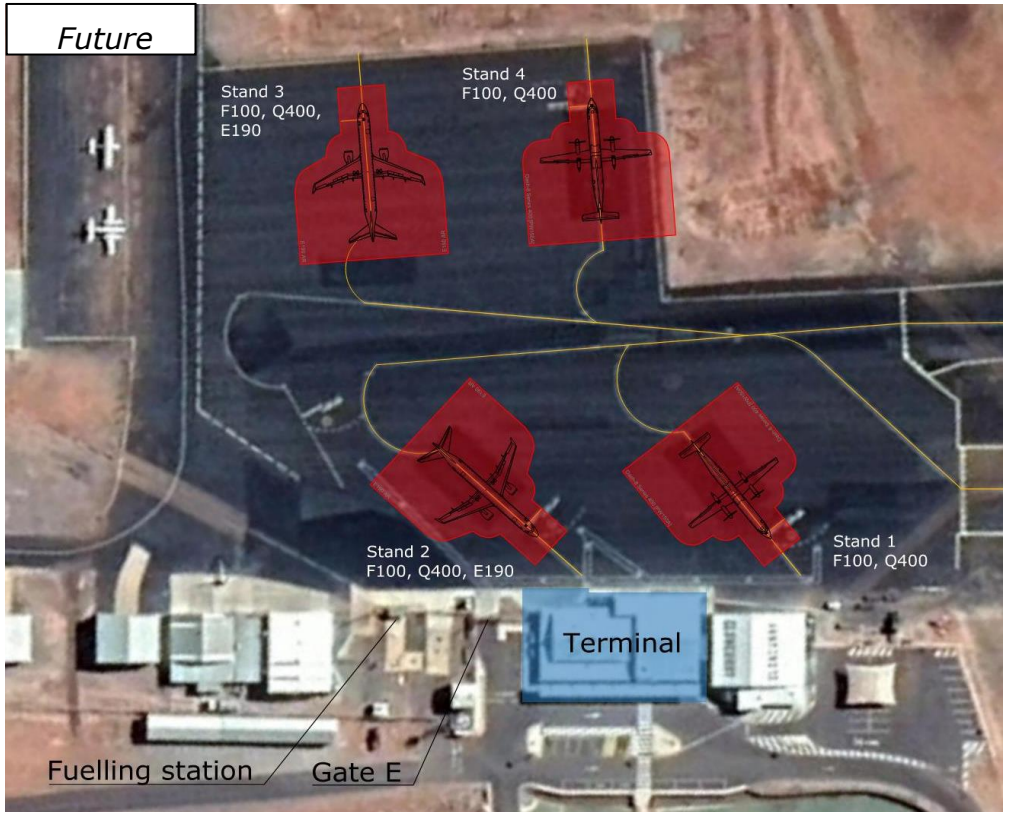
- Taxiway D (repurposed east-most part of existing Runway 06/24) connects Runway 12/30 with the new parallel taxiway (Taxiway E)
- Taxiway E is placed parallel to Runway 12/30 and makes taxiing possible between the New GA Hangar Area and the existing fuel station as well as the old and New GA Aprons.
- Taxilane 1 connects the first group of 10 GA Hangar lots with Taxiway E
- Taxilane 2 connects the second group of 10 GA Hangar lots with Taxiway E

INFRASTRUCTURE DESIGN BASIS AND FUTURE NEEDS
AIRSIDE

ATO Apron

Currently four apron stands are marked on the ATO apron, however they are not utilized equally. Stand 3 is almost never used due to pilots' impression of limited clearance. Moreover, Stand 3 is making it harder for GA aircraft to access the fuel station. Stand 2 is complicating access to the airport gate E for fuel trucks arriving to or leaving from the airside. Therefore, relocation of Stand 3 to the northern side of the ATO apron is recommended, as there is sufficient space for introducing a stand parallel to the existing Stand 4. It will be suitable even for Embraer 190, which has the widest wingspan and longest fuselage of all aircraft currently operating at the airport.



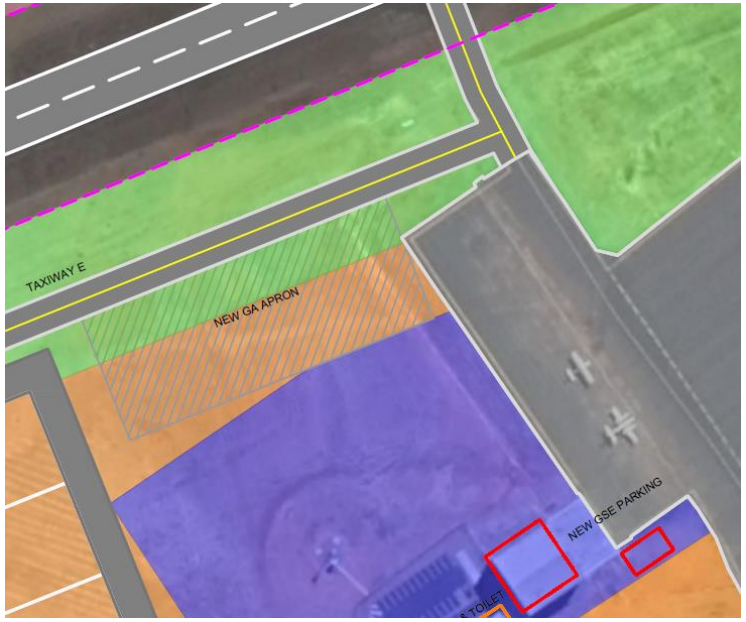


INFRASTRUCTURE DESIGN BASIS AND FUTURE NEEDS
AIRSIDE

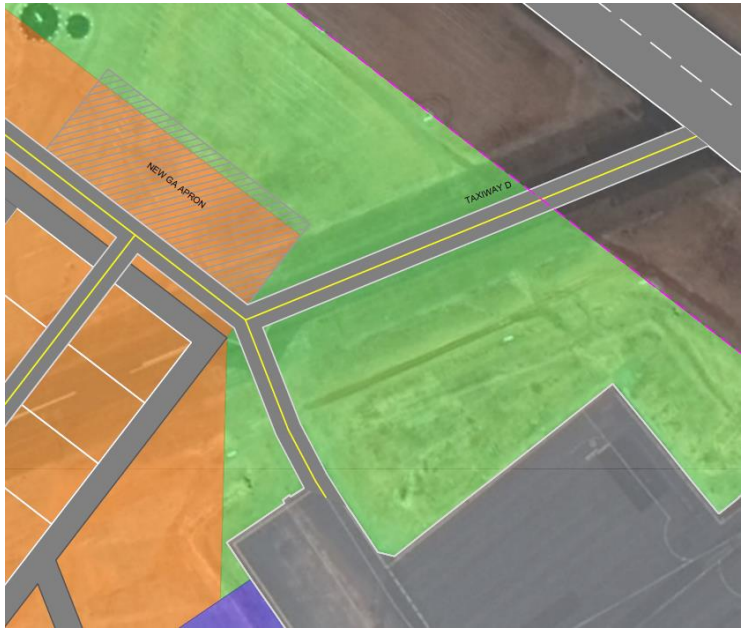
GA Apron

Based on the user and airport personnel experience, the existing GA Apron has reached its capacity limits. Often the GA Apron space is occupied by GA aircraft for long term stay, tied by ropes to the apron's surface. GA aircraft visiting Cloncurry Airport for a short time have no place to park and occupy space in front of the fuelling station, which is not ideal. It has also been reported that the jet blast of the bigger aircraft parked on the ATO apron affects the smaller GA aircraft. Therefore a New GA Apron for aircraft parking has been introduced in the Master Plan. This has space for 6-8 aircraft stands, depending on the aircraft type and how the aircraft are parked.

In scenario 1 and 2, the New GA Apron is located parallel to Runway 06/24, perpendicular to the existing GA Apron. In scenario 3, the New GA Apron is located parallel to Runway 12/30 and to the north of Taxiway D. In all three scenarios the two GA Aprons (existing and new) will provide sufficient space for GA traffic demand and give flexibility for the airport operations.



Scenario 1 & 2



Scenario 3

RAMBOLL

INFRASTRUCTURE DESIGN BASIS AND FUTURE NEEDS
AIRSIDE

Hangars

Cloncurry Shire Council is leasing several areas for hangars to various GA tenants. Lots B, C, D, E, F, G, I and J have hangars or sheds already constructed and in use. Lot H is leased and paved, however no hangar is found there. Lot P is leased to Qinnetiq, who operates the UAS Flight Testing Range. At the moment lots K, Q and R are leased and new hangars are expected to be constructed soon. The current hangar space at the airport has thus reached its capacity, as the access road to the Qinnetiq hangar limits further development of hangar lots to the west of lots Q and R. However, in the future when Qinetiq move their business to the UAS Cluster, their access road could be repurposed and used to access future infrastructure. Moreover, it was reported that the Council expects demand for 20 more hangars for GA tenants, that the in the future.

Each of the Master Plan scenarios includes a New GA Hangar Area, with space for 20 hangar lots to meet the expected future demands. Furthermore, it will be possible to expand even beyond 20 new hangar lots, should this ever be required in the future. Each of the planned hangar lots will be 38mx30m, making them able to accommodate a hangar building which can house small to medium sized Code B aircraft.

Each of the hangar lots will be accessible by a code B taxiway from the airside, and by a regular access road from the landside gate. It is recommended to prepare the hangar lots with enabling works, so that utility connection points are established for electricity, water and sewage.

RAMBOLL

INFRASTRUCTURE DESIGN BASIS AND FUTURE NEEDS
AIRSIDE

Hangars

The New GA Hangar and Apron Area would be part of a development area called the GA Cluster. This new and dedicated area for GA Traffic would be placed adjacent to the exisitng GA infrastructure as a continual development, thereby creating a synergy between the businesses (clustering). Additionally, this cluster would be placed alongside the runway catering to the GA traffic.

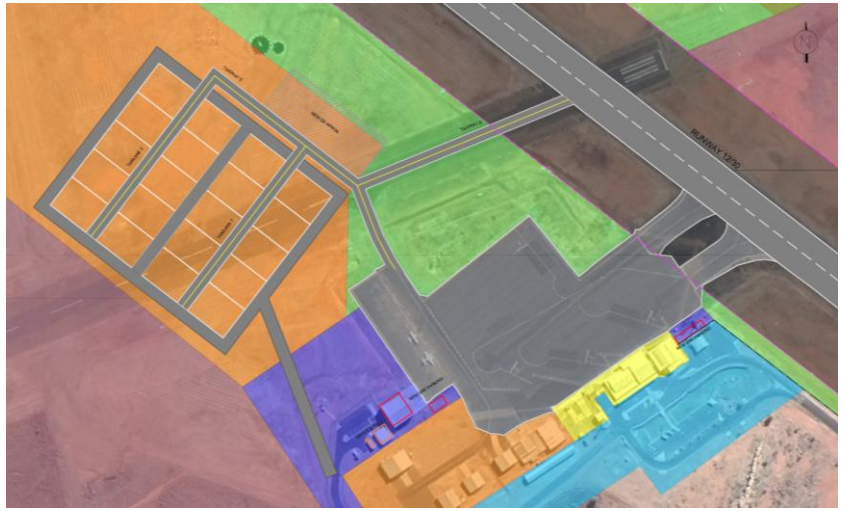
In Scenario 1 & 2, the GA Cluster has been placed to the west of the existing GA hangars, beyond the access road to Qinnetiq which would be repurposed as an access road to the New GA Hangar Area. Also, the new hangars and apron would be placed alongside Runway 06/24 (which would be dedicated to GA traffic) to minimise taxiing distance for the GA aircraft.

In Scenario 3, the GA Cluster has been placed to the north-west of the repurposed cross runway and the existing apron area. The access road from the landside to the existing infrastructure would be a partial repurposing and partial extension of the current Qinetiq access road. The new hangars and aprons would be placed alongside Runway 12/30, which would now be used by GA aircraft, to minimise taxiing distance to the runway.

In all three scenarios, the placement of the GA Cluster provides ample opportunity for further development of additional hangar lots, beyond the 20 that Council expects in the future. The no. of hangar lots that could be accomodated further in each scenario are:

- Scenario 1 – 40-45 lots
- Scenario 2 – 45-50 lots
- Scenario 3 – 90-100 lots

Scenario 1 & 2



Scenario 3

INFRASTRUCTURE DESIGN BASIS AND FUTURE NEEDS
AIRSIDE

UAS Cluster

Cloncurry Shire Council has expressed a wish to reserve an area for the development of a UAS Cluster. The airport already has related activities today, as Qinetiq operate the Flight Testing Range in the airport. In the future the airport could be used for further testing of different UAS types, training, eVTOL facilities, air-cargo UASs, etc. The needs are not precisly known at the moment, but there are several parties that are already interested in this Cluster, including Dronamics, Airbus and Queensland State Government.

In the Master Plan scenarios a total area of approximately 248,000 m2 is reserved for the development of this UAS Cluster. The location has been chosen after studies of all possible quadrants of the airport available area: NE, SE, SW and NW (see also Appendix 2). Each of the quadrants have pros and cons, however, after discussion with the Council, the NE area appears to be the preferred option.

At present there exists a drainage issue towards the south of this dedicated area (marked in yellow on the aerial photo). If infrastruture is to be built over the existing open drain channel, additional infrastructure costs would be incurred to provide a system of pipes and manholes. Avoiding the drain channel and the area around it, would be less costly but would reduce the total area from 248,000 m2 to 175,000 m2 for UAS infrastructure development.

More detailed planning of the reserved drone cluster will be required when the Council will start negotiation with potential tenants, who will have their own requirements and wishes for the area and the infrastructure provided. As of today, Qinnetiq leases an area of approximately 14,500 m2 and Airbus has indicated that they will potentially require an area of 20,000 m2. Considering the extent of the area dedicated to the UAS Cluster and the area required by some of the interested parties, there is ample land available for the development of the beforementioned businesses and more. Provision of enabling works, utilities as well as a landside access road will be required.

INFRASTRUCTURE DESIGN BASIS AND FUTURE NEEDS
AIRSIDE

GSE areas and Airport personnel facilities

The Qantas hangar is currently used for airport personnel office and GSE storage. It is located on the east side of the existing terminal building. Due to lack of space many GSE vehicles are parked outside, where they are affected by the weather/sun. Moreover, the Qantas hangar is of historical importance and the Council has a wish to keep it clear of everyday usage and preserve it for important celebration and Qantas needs (potentially repurpose it to be a museum).

On the other side of the ATO Apron, Qinnetiq occupies a hangar, office and toilet building built by Queensland State Government on the leased lot 'P'. The lease expires in 2024. In the Master Plan scenarios, Qinnetiq as well as Queensland State Government facilities should be part of the 'UAS Cluster', which will be located in the NE quadrant of the airport. Relocation of Qinnetiq to the UAS Cluster would free up the facilities in lot 'P'. It is suggested to use the lot 'P' facilities in the future for GSE storage and airport office. The toilet building can be used by both airport personnel and GA users. This should also provide enough space for briefing/operational center for defence during any natural disaster event.

Additionally two new outdoor GSE parking areas (A and B) are planned on the airside. Both of them should be equipped with roof protecting the GSE from the sun. The purpose of GSE parking A is to provide space for inspection cars, tractors and mowing machine used by the airport personnel daily. GSE parking B is dedicated to equipment used for handling the aircraft and passengers like stairs, baggage handling vehicles and trolleys, as well as the future mobile GPU. Purchase of a mobile GPU will decrease noise issue, and will improve flexibility for airlines, as they will no longer be restricted by type of aircraft they can send to Cloncurry due to lack of GPU.

Area	Equipment type / Purpose	Amount	Dimensions (min)
Qinnetiq hangar	GSE storage	1	412sqm
Office + toilet	Airport personell facility	1	168sqm
GSE parking A (outdoor)	Tractor	1	3.8mx1.9m
	Inspection cars - Toyota Hillux	3	5.5mx1.8m
	Mowing machine (new)	1	3.8mx8m
Qantas hangar	Museum	1	506sqm
GSE parking B (outdoor)	Stairs	2	5mx2m
	Baggage carts	6	4mx1.5m
	Baggage tractors	2	2.75mx1.5m
	Conveyor belt	1	5mx1.64m
	GPU mobile (new)	1	4.5mx2m

INFRASTRUCTURE DESIGN BASIS AND FUTURE NEEDS

TERMINAL

Terminal

The existing terminal was build in 2015 and it is generally well maintained, except for roof leaks and some unreliable equipment. It is sometimes flooded during rainfall due to insufficient drainage system on the landside and poor design of drop-off/pick-up zone surface. It is estimated that the departure hall can contain up to 120 people at the same time and the whole terminal 240 people in total. Currently the terminal is crowded due to tightly scheduled flights and uncontrolled passenger flow through the terminal. The passenger volume is not expected to grow significantly in the future, therefore expansion of the terminal building isn't recommended.

Instead of expansion of facilities, more active slot management/flight scheduling is recommended. This will require well coordinated discussions and agreement between key stakeholders like mining companies who are using the airport to transfer their workers, the airport management and airlines providing the service. An optimized flight schedule will reduce congestion and will allow efficient utilization of the apron stands by the aircraft and of the bus lane on the landside.

The following is considered the maximum occupation of various areas:

- Arrival Hall: <120 passengers
- Departure Hall: <120 passengers
- Stands for short-term parking: <2 aircraft
- Stands for long-term parking: <2 aircraft
- Bus lanes: <2 busses

On the right, an example of flight schedule management is shown for current traffic on Wednesdays. The suggested future schedule eliminates the capacity issues as seen in the 'Summary' parts of the figures.

Current

Flight	Occupation type	07:00	07:30	08:00	08:30	09:00	09:30	10:00	10:30	11:00	11:30	12:00	12:30	13:00	13:30	14:00	14:30	15:00	15:30	16:00	16:30	17:00	17:30
Alliance Fl00 TSV (100 seats)	Stand			1	1	1	1	1	1														
	Bus			2				2	2														
	Departure passengers							100	100														
	Arriving passengers			100																			
Alliance E190 TSV (110 seats)	Stand				1	1	1	1															
	Bus				2		2	2															
	Departure passengers						110	110															
	Arriving passengers				110																		
Alliance F70 BNE (80 seats)	Stand					1																	
	Bus				2	2																	
	Departure passengers				80	80																	
	Arriving passengers					80																	
Alliance Fl00 BNE (100 seats)	Stand								1	1	1	1	1	1	1	1							
	Bus								2						2	2							
	Departure passengers														100	100							
	Arriving passengers								100														
Alliance Fl00 CNS (100 seats)	Stand											1	1	1	1	1	1	1					
	Bus											2					2	2					
	Departure passengers																100	100					
	Arriving passengers											100											
QantasLink D8 ISA (78 seats)	Stand																				1		
	Bus																			1	1		
	Departure passengers																			78	78		
	Arriving passengers																				78		
Summary	**Stand**			1	2	3	2	2	2	1	1	2	2	2	2	2	1	1			1		
	Bus			2	4	2	2	4	4			2			2	2	2	2		1	1		
	Departure passengers				80	80	110	210	100						100	100	100	100		78	78		
	Arriving passengers			100	110	80			100			100									78		
	Passengers (total)			100	190	160	110	210	200			100			100	100	100	100		78	156		

Future

Flight	Occupation type	07:00	07:30	08:00	08:30	09:00	09:30	10:00	10:30	11:00	11:30	12:00	12:30	13:00	13:30	14:00	14:30	15:00	15:30	16:00	16:30	17:00	17:30
Alliance Fl00 TSV (100 seats)	Stand			1	1																		
	Bus			2	2																		
	Departure passengers				100																		
	Arriving passengers			100																			
Alliance E190 TSV (110 seats)	Stand					1	1																
	Bus					2	2																
	Departure passengers					110	110																
	Arriving passengers					110																	
Alliance F70 BNE (80 seats)	Stand									1													
	Bus								2	2													
	Departure passengers								80	80													
	Arriving passengers									80													
Alliance Fl00 BNE (100 seats)	Stand											1	1	1	1	1							
	Bus											2			2	2							
	Departure passengers														100	100							
	Arriving passengers											100											
Alliance Fl00 CNS (100 seats)	Stand													1	1	1	1	1					
	Bus													2			2	2					
	Departure passengers																100	100					
	Arriving passengers													100									
QantasLink D8 ISA (78 seats)	Stand																				1		
	Bus																			1	1		
	Departure passengers																			78	78		
	Arriving passengers																				78		
Summary	**Stand**			1	1	1	1			1		1	1	2	2	2	1	1			1		
	Bus			2	2	2	2		2	2		2		2	2	2	2	2		1	1		
	Departure passengers				100	110	110		80	80					100	100	100	100		78	78		
	Arriving passengers			100		110				80		100		100							78		
	Passengers (total)			100	100	220	110		80	160		100		100	100	100	100	100		78	156		

INFRASTRUCTURE DESIGN BASIS AND FUTURE NEEDS

TERMINAL

Existing Layout

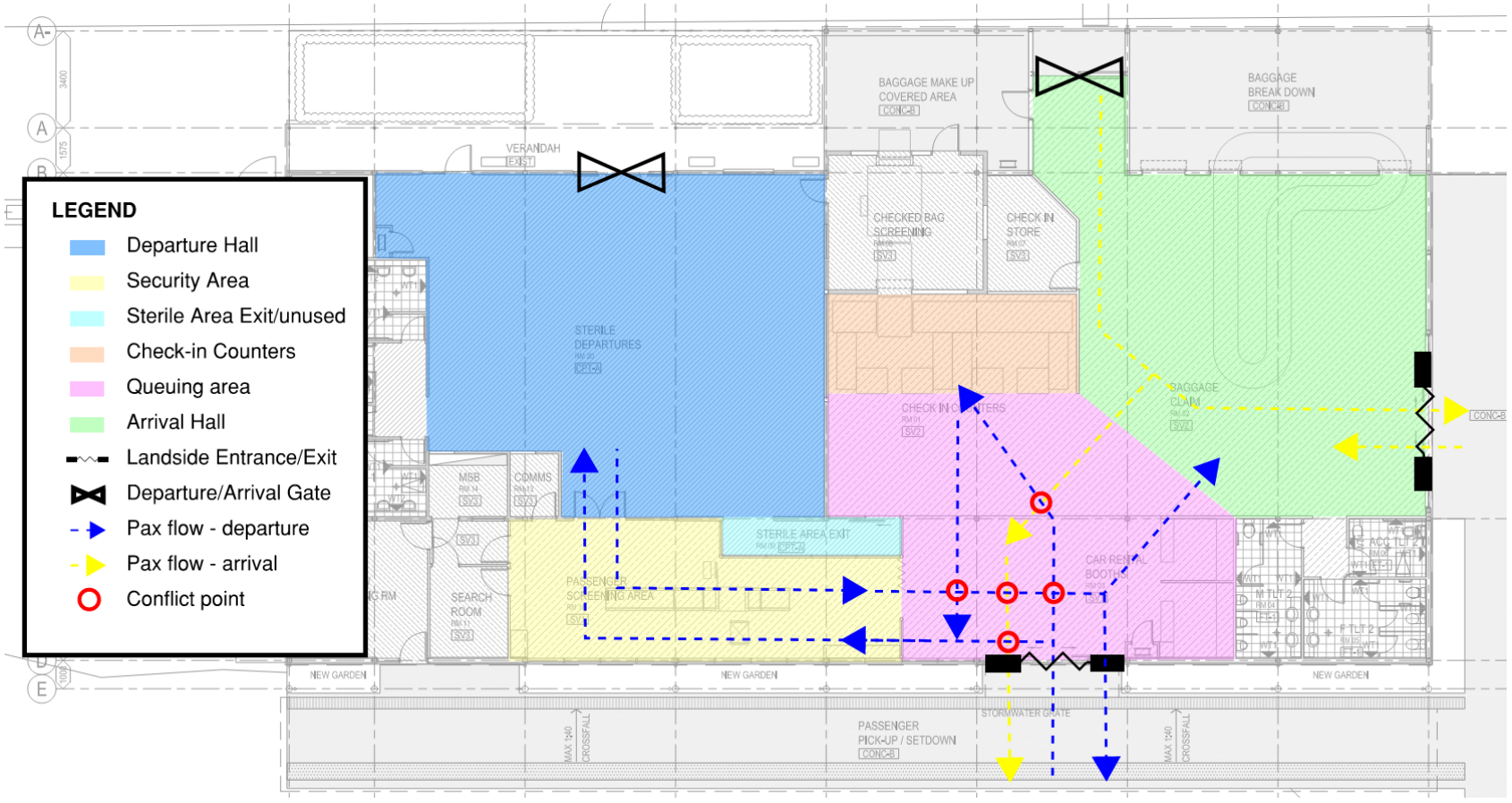
Currently the terminal building is congested and seems to reach its capacity limits on busy days.

It has been noticed that the departing passengers move freely around the whole building after checking in their luggage, and mix with the arriving passengers. Moreover arriving passengers use both existing exit doors which creates additional conflict points with departure passengers. Passengers standing in the **'Queuing Area'** and waiting to check-in add to the congestion in this limited space.

On the other hand the **'Sterile Area Exit'** is not used at all.

The so-called **'Security Area'** has previously been used for security screening, but is now just a corridor for passengers walking in both directions

Several conflicts between passenger flows shown on the figure on the right could be avoided with a few adjustments and improved utilization of available spaces.



RAMBOLL

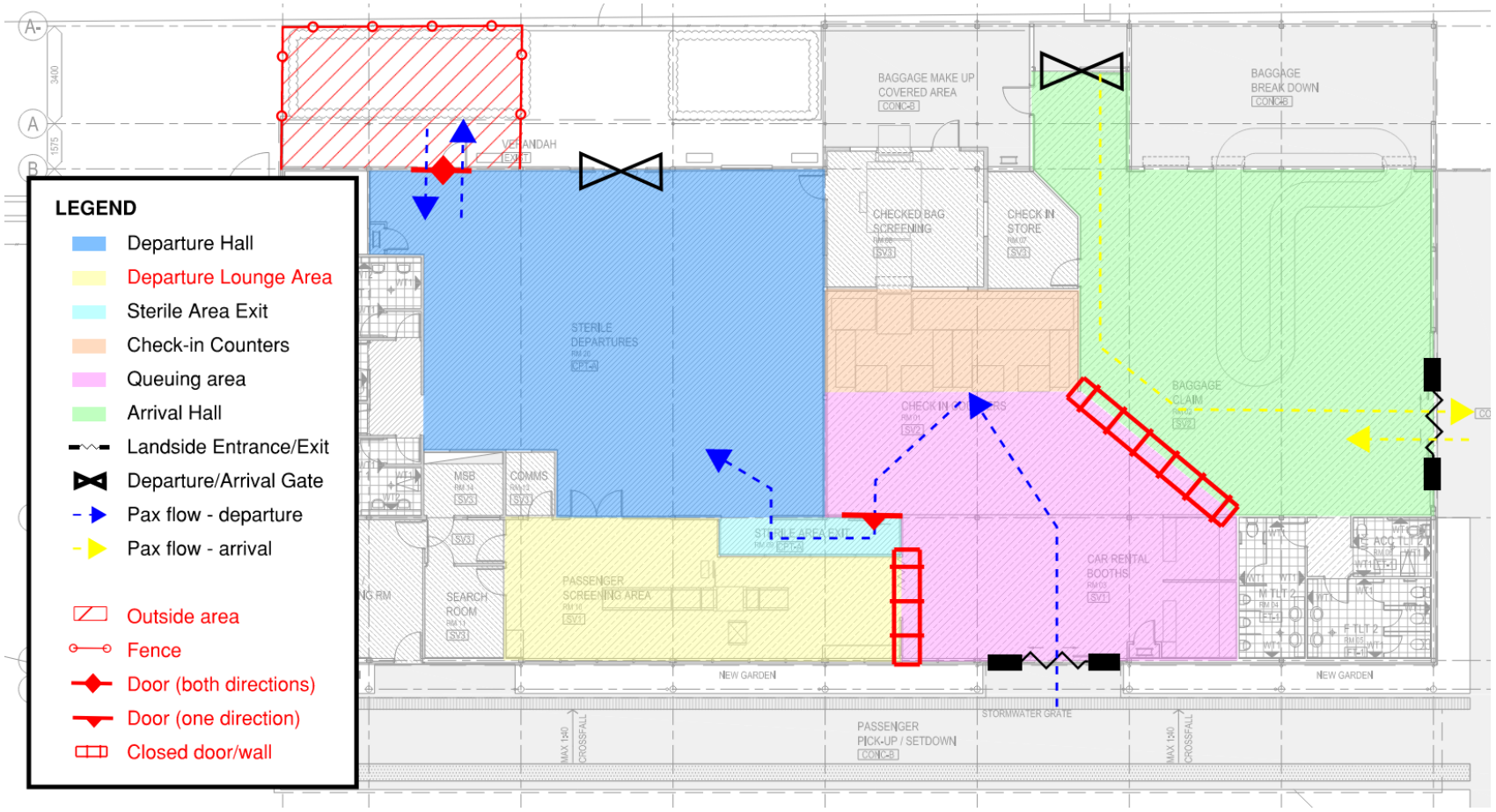
INFRASTRUCTURE DESIGN BASIS AND FUTURE NEEDS

TERMINAL

Proposed Layout

The goal of the proposed terminal layout is to separate departing and arriving passenger flows inside the terminal. The following adjustments are suggested:

- **Closed door** between 'Queuing Area' and existing 'Security Area'. The 'Security Area' will be turned into 'Departure Lounge Area' which will increase the waiting space for departing passengers.
- **One-direction door** for departure passengers going through the 'Sterile Area Exit' after checking in.
- **'Outside Area'** for departure passengers, which will be covered, secured, fenced and equipped with outdoor benches.
- **'Departure Lounge Area'** with coffee machine, sandwich machine, beverage machine, cozy spaces, etc.
- **'Separation wall'** between 'Queuing Area' and 'Arrival Hall' with a door accessible only by airport/airline personnel.



INFRASTRUCTURE DESIGN BASIS AND FUTURE NEEDS
LANDSIDE

Access Road

An asphalted, 2-lane local road is provided as an access road to the existing airport. It is suitable for cars and buses.

An additional access road to the new UAS Cluster in the north-east part of the airport area has been introduced in the Master Plan scenarios. The new access road should be asphalted. Access to the public road network will be provided by a connection to 'Common Road' with a simple T-intersection and dedicated information signage. The width of the road should consist of two lanes, one in each direction. The road shown in Master Plan Layouts is indicative, and the precise alignment of this should be determined at a later stage.

Car parking

The airport currently has sufficient car parking spaces for short and long term stay near the terminal. Introduction of an additional roof protecting parked cars from the sunlight effects is recommended. Due to inadequate design of the drop-off/pick-up zone surface in front of the terminal, rainfall water runs off towards the terminal building, which at times creates flooding inside the terminal. This issue will be addressed in the concept design phase, where a holistic drainage solution will be developed.

Once the Council goes into negotation with potential tenants in the UAS Cluster, it can be further defined what type of requirements they will have for parking areas, and if this should be a shared facility among tenants, or if each tenant will need individual parking areas.

Bus parking

Current area for bus parking is sufficient for 2-3 busses parked at the same time in front of the terminal building. It is recommended to maintain the size of the bus parking and improve management of the bus arrival to and departure from the airport, to avoid overcrowded drop-off/pick-up hours, as also described in the Terminal chapter of this report.

INFRASTRUCTURE DESIGN BASIS AND FUTURE NEEDS
ANCILLARY

Fuel storage

The airport has two fuel providers: BP and IOR. BP fuel storage is located close to the airside. Additionally BP provides a fuelling station for GA aircraft to the west of the terminal building. IOR storage is located approximately 2.5 km from the airport along the local road network.

Both fuel storages are sufficient for the normal, daily operation of the airport, however there was a significant shortage of fuel during the flood in 2019. It is recommended that the Council initiates a dialogue with existing operators IOR and BP, whether they would potentially be interested in expanding the fuel reserves on-site, so as to avoid future shortages during floods or similar events.

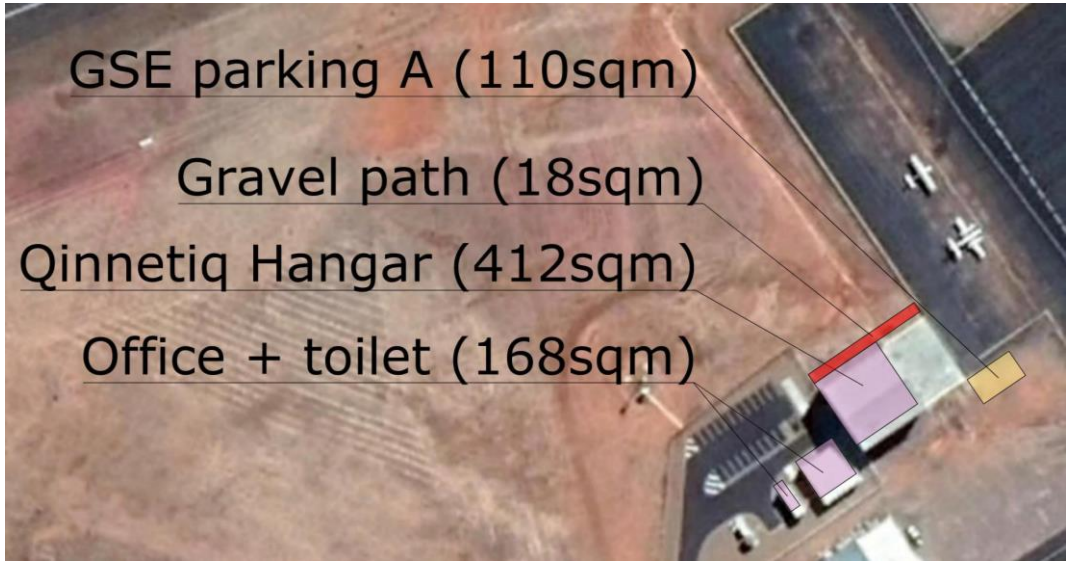
In the Master Plan scenarios the current fuel station for GA aircraft is retained in its existing location and size. The aforementioned relocation of Stand 3 on the ATO apron will provide easier access to the fuelling station. In the future it will be possible to relocate the fuel station to the New GA Hangar Area, to shorten the taxiing distance for GA aircraft to and from the fuel station.

Perimeter fencing

The fence around the airside is in poor condition due to deformations, holes and shallow footing. It requires a complete replacement with stronger material and burying of the fence footing so that animals will not be able to go through or under the fence. It should also be resilient to floods and occasionally standing water. It is recommended to establish a gravel perimeter road along the fence on the airside to enable easier daily inspection by the airport personnel.

Toilet

A landside toilet is provided with entrance from the parking lot. However, it is not easily accessible for GA users from the airside, which means that GA users usually go to CMC and ask to use their toilets. This is of course a nuisance to CMC, and as such it is planned that GA users should have access to the airport personnel toilet after relocation of airport offices to plot 'P' and relocation of Qinnetiq to the UAS Cluster. An additional pathway between the GA Apron and the toilet building should be considered for easy access (marked as "Gravel path" in below figure).



MASTER PLAN
LAYOUT SCENARIOS

Guiding Principles of Layout Scenarios

The following has been the basis of the development of new infrastructure at the airport across all three scenarios:

- Creating a synergy between similar businesses by dedicating an area of infrastructure development for their activities (clustering)
- Ensuring an easy access to runway from the dedicated new infrastructure development areas
- Preservation of existing infrastructure by retaining or repurposing to the extent possible
- Establishing new infrastructure in the proximity of existing utilities, to reduce costs associated to laying down entirely new utility networks

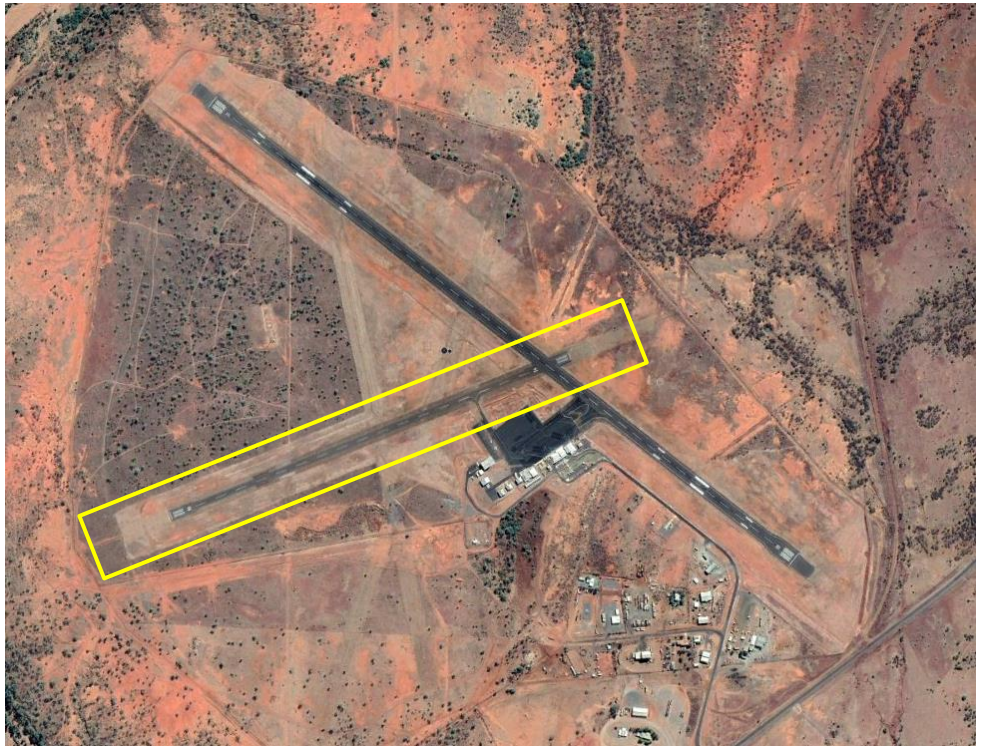
Definition of Layout of Scenarios

As part of the Project Assessment Framework, the three Master Plan Scenarios have been defined by the extent of development of the secondary cross runway 06/24 (marked in yellow on the aerial photo). They are as follows:

- Scenario 1: Full Length Runway 06/24
    - where the runway and associated elements are repaired and maintained for the exisitng length of 1,157m.

* This scenario corresponds to a do-nothing option, if development of no new infrastructure is taken in account and where the existing infrastructure is repaired and maintained.

- Scenario 2: Reduced Length Runway 06/24
    - where the runway and associated elements are repaired and maintained for a reduced length of 799m.
- Scenario 3: Close Down Runway 06/24
    - where the runway and associated elements are decommissioned, with the section of the runway connecting Taxiway C to Runway 12/30 repurposed as a Code B Taxiway.



MASTER PLAN
LAYOUT SCENARIOS

Tabulated below is a comparison of the different characteristics of Runway 06/24 between the three scenarios.

Runway 06/24	Scenario 1	Scenario 2	Scenario 3
Length	1,157m	799m	NA
Width	18m	18m	NA
Code Number	Code 1	Code 1	NA
Strip Length	1,277m	859m	NA
Strip Width	80m	60m	NA

The difference within the various characteristics of the runway in each scenario would impact:

- Aircraft operations
  - The length of the runway would impact the aircraft types that could operate on the runway, at present and in the future. This would in turn impact the number of aircraft traffic movement(s) on each runway.
  - Provision of a cross-runway gives flexibility to pilots to choose the runway they would operate on in unfavourable wind conditions.

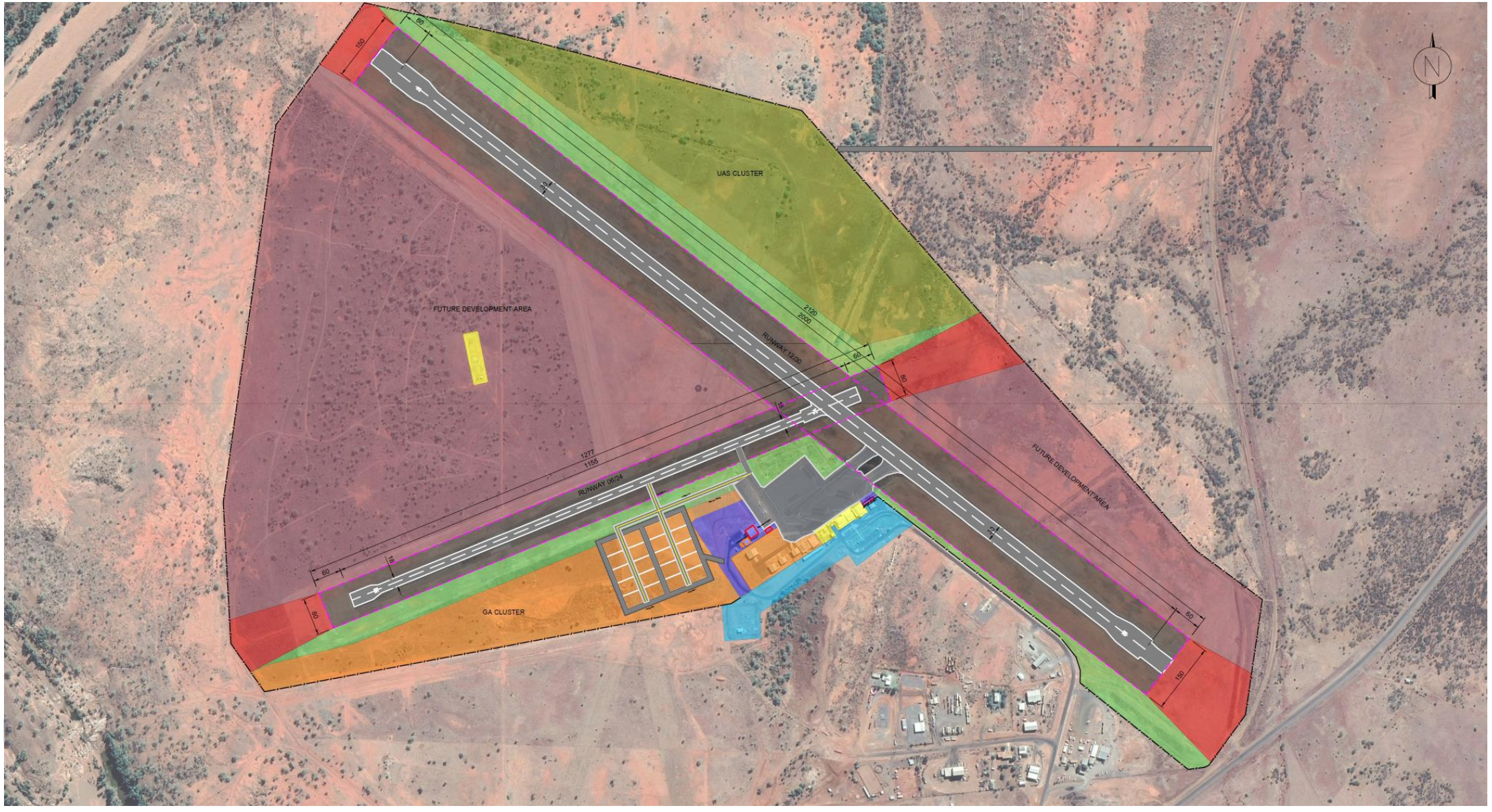
- Expanse of the limitation to infrastructure development
  - This would be in terms of minimum clearance distance from the runway centreline, objects on runway strip, height of buildings in the proximity, etc. For example, the figures on the right show the show the expanse of the runway strip which would limit infrastructure development.

Scenario 1

Scenario 2

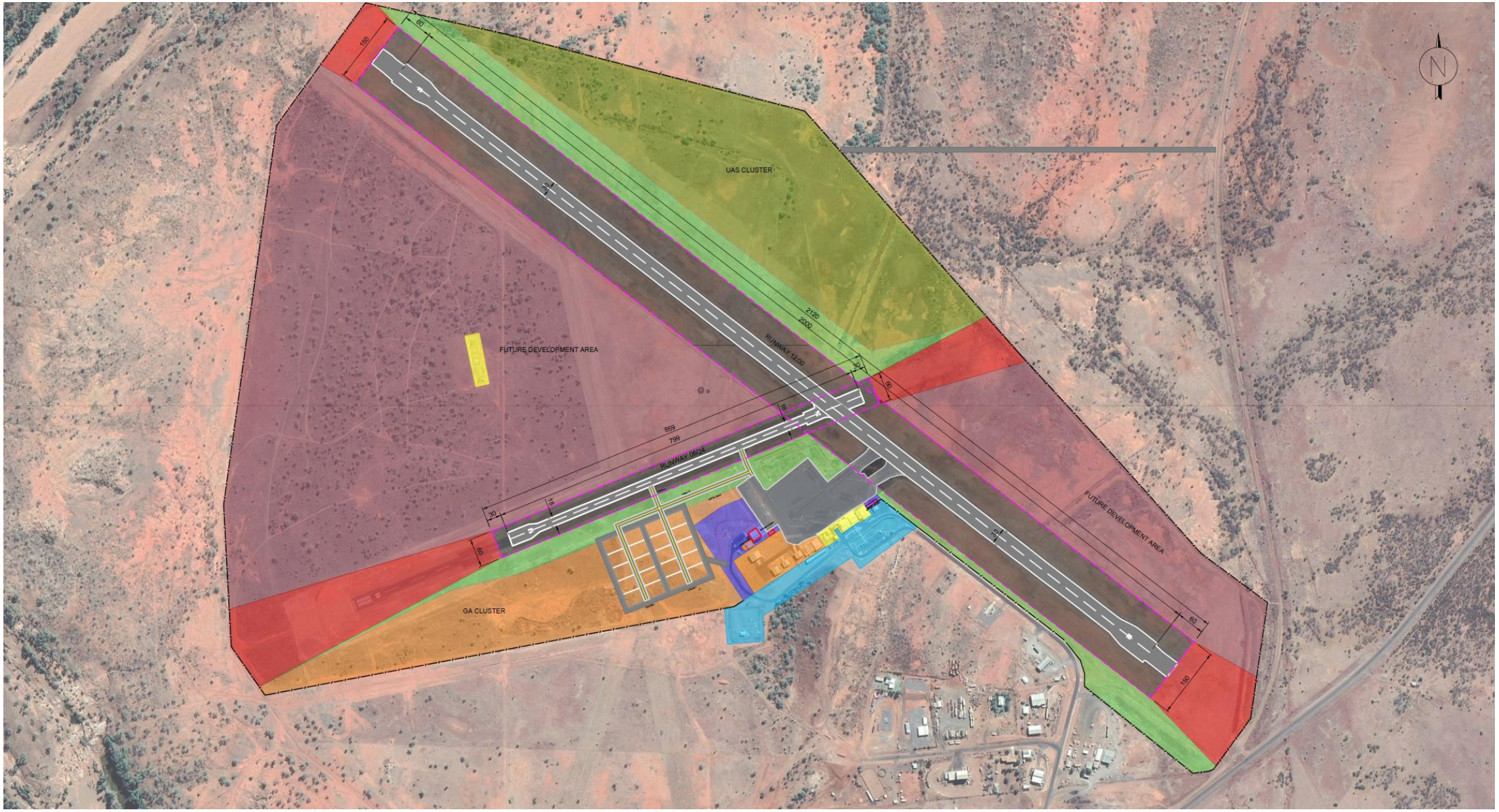
MASTER PLAN

SCENARIO 1: FULL LENGTH RUNWAY 06/24



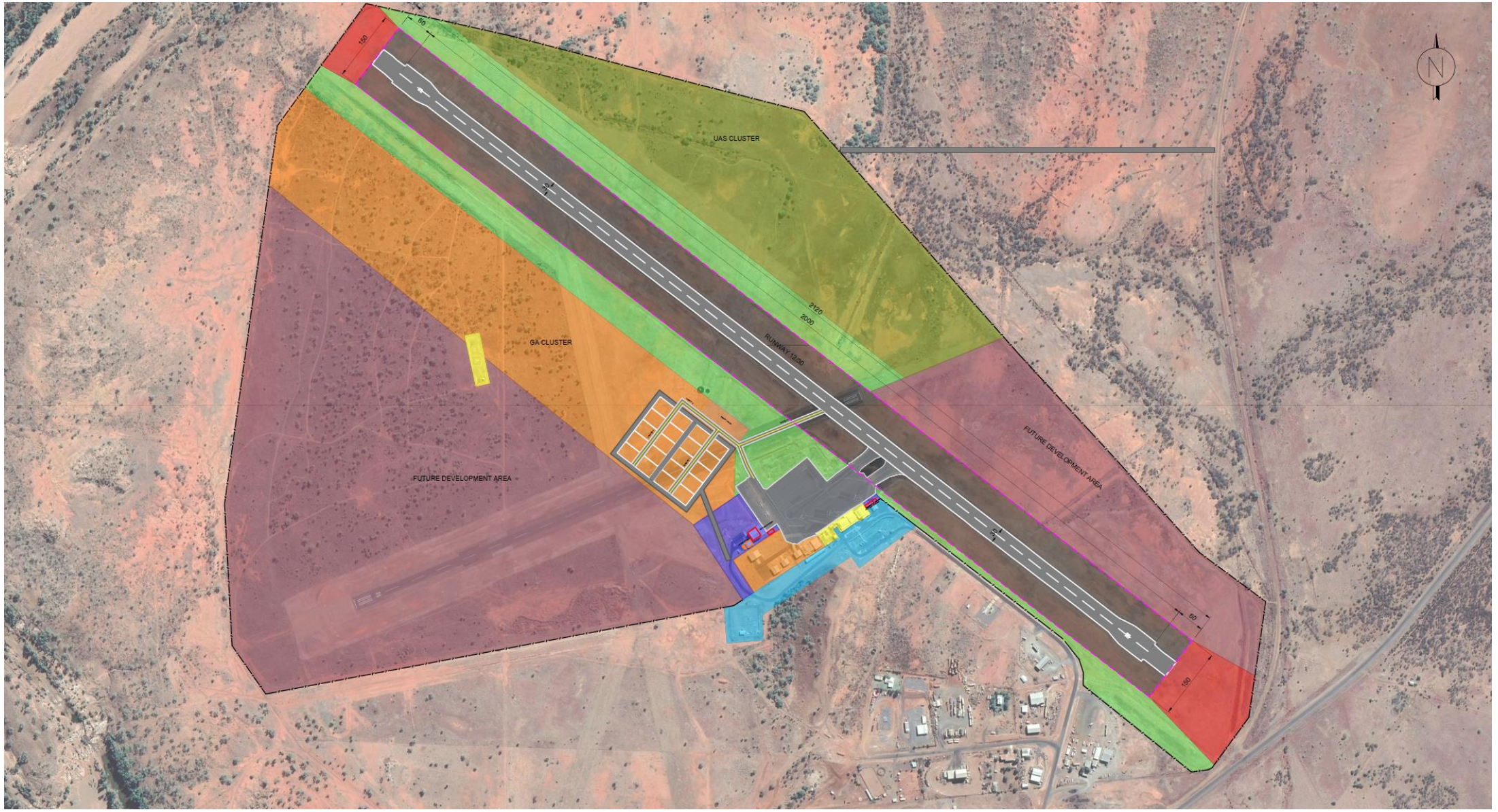
MASTER PLAN

SCENARIO 2: REDUCED LENGTH RUNWAY 06/24



MASTER PLAN

SCENARIO 3: CLOSE DOWN RUNWAY 06/24



MASTER PLAN
SCENARIO COMPARISON

Listed below are the pros and cons of each scenario in comparison to the other scenarios from a **high level qualitative perspective only**.

	PROS	CONS

SCENARIO 1	• Two fully functional runways
	  • RWY 12/30 – 2,000mx30m
	  • RWY 06/24 – 1,157mx18m
	• Runway 06/24 dedicated to GA Traffic
	• With a longer runway length, it is possible to have aircraft such as King Air 350 (used by RFDS) land on the cross runway as they require long runways with minimum 18m width
	• Potential to upgrade the cross runway to Code 2, if it is supplemented with an expansion in width to 23m from 18m
	• Shorter access to the GA Cluster from the landside
	• New infrastructure within the GA Cluster closer to the existing utilities network
	• New infrastructure design allows for a future upgrade to Code 2 runway
		• Additional costs associated to the repair and maintenance of:
		  • Runway pavement
		  • Runway strip
		  • Electrical systems
		  • Lights
		  • Drainage
		• Runway 06/24 divides the airport into four quadrants, thereby limiting the extent of infrastructure development
		• More restrictive airspace around the airport site due to the Obstacle Limitation Surfaces (OLS) associated to two runways
		• In case of a future upgrade to Code 2 runway, the OLS would penetrate with one of the three existing apron flood lights by 0.18m.

SCENARIO 2	• Two fully functional runways
	  • RWY 12/30 – 2,000mx30m
	  • RWY 06/24 – 799mx18m
	• Runway 06/24 dedicated to GA Traffic
	• Shorter access to the GA Cluster from the landside
	• New infrastructure within the GA Cluster closer to the existing utilities network
		• Additional costs associated to the repair and maintenance of (less in comparison to scenario 1):
		  • Runway pavement
		  • Runway strip
		  • Electrical systems
		  • Lights
		  • Drainage
		• Runway 06/24 divides the airport into four quadrants thereby, limiting the extent of infrastructure development
		• More restrictive airspace around the airport site due to the Obstacle Limitation Surfaces (OLS) associated to two runways

SCENARIO 3	• No additional costs associated to the repair and maintenance of:
	  • Runway pavement
	  • Runway strip
	  • Electrical systems
	  • Lights
	• Larger area available for future infrastructure development
	• Less restrictive airspace around the airport site due to the Obstacle Limitation Surfaces (OLS) associated to a single runway
	• Section of runway 06/24 which is to be repurposed as Code B taxiway, provides access from the new GA hangar and apron infrastructure to runway 12/30
		• Only one fully functional runway
		  • RWY 12/30 – 2,000mx30m
		• No runway dedicated to GA Traffic. All the GA Traffic would be directed to Runway 12/30, making it a busier runway.
		• Longer access to the GA Cluster from the landside
		• New infrastructure within the GA Cluster further away to the existing utilities network

7. EVALUATION OF MASTER PLAN LAYOUT SCENARIOS

EVALUATION OF MASTER PLAN LAYOUT SCENARIOS

INTRODUCTION

As part of Stage 2 of the Project Assessment Framework, an options analysis of the three Master Plan Scenarios has been carried out where they have been evaluated against each other. First, the different evaluation criteria have been defined based on experience, stakeholder consultations and relevance to Cloncurry Airport. This has been followed by a grading assessment of the scenarios against each criterion supported by argumentation where each criterion has been weighted as per its significance to the airport development. Finally, the evaluation results in a quantitative score for each scenario, where the highest scoring option has been recommended to proceed into Concept Design.

Assumptions

The following works will not be included in the evaluation matrix as they are to be carried out regardless of each scenario to tackle the existing issues at Cloncurry Airport:

- Pavement rehabilitation
- Drainage system rehabilitation
- Airfield Ground Lighting (AGL) rehabilitation for compliance
- Pavement markings for compliance

Evaluation Criteria

Based on consultations with the Council, it has been agreed to evaluate the three scenarios on the following criteria:

Operational	*Runway*
	Obstacle Limitation Surface (OLS)
	Stakeholder Operation
Land Use	*Proximity to existing infrastructure*
	Repurposing existing infrastructure
	Future development area within clusters
	Future development outside the clusters
Environmental	*Biodiversity*
	Aboriginal heritage
	Hydrology and flooding
	Bushfire risk
	Noise and vibration
	Contamination
Social and Economic	*Tenant satisfaction*
	Social and employment
	Facilitate future trends
Sustainability	*Embedded carbon footprint*
Financial	*CAPEX*
	Financial feasibility

Regulatory has not been included as an evaluation criterion as the same set of regulations/ permits are applicable to the airport site, irrespective of the Scenarios. Appendix 3 includes an overview of the relevant regulations.

Grading Assessment

A scoring system has been used for the evaluation of each scenario against a criterion, where the significance of each score to the design development has been described below:

Score	Significance
2	A superior advantage
1	An advantage
-1	Not an advantage

EVALUATION OF MASTER PLAN LAYOUT SCENARIOS
OPERATIONAL (1)

This evaluation criterion focuses on the qualitative advantages and disadvantages to the airport operations based on the infrastructure development of the scenarios. This includes the following sub-criteria:

- Runway – Serviceability of the runway system in terms of:
  - Quantity – the number of fully functional runway(s)
  - Use – dedicated use of the cross runway by the GA traffic segment
  - Capacity – type of aircraft that could operate to/from the cross runway
  - Resilience – flexibility in use of the runway(s) in bad weather conditions such as heavy cross-winds, natural calamities, etc.

Evaluation criteria	Scenario 1 Score	Scenario 2 Score	Scenario 3 Score	Argumentation
Quantity	*1*	*1*	*-1*	• Scenario 1 & 2 have two fully functional runways – RWY 12/30 and RWY 06/24. • Scenario 3 has one fully functional runway – RWY 12/30.
Use	*1*	*1*	*-1*	• In Scenario 1 & 2, the cross runway can be dedicated to GA traffic use. • In Scenario 3, with a single available runway the GA traffic would be directed to RWY 12/30, making it a busier runway.
Capacity	*2*	*1*	*-1*	• With a longer cross runway in Scenario 1, it opens the possibility to operate bigger aircraft types such as the BEECH 200 or King Air 360 from this runway in the future. • With a shorter cross runway in Scenario 2, the GA aircraft types present at the airport today could operate from this runway. • With the absence of a cross runway in Scenario 3, there is no such upgrade/ consistency.
Resilience	*2*	*1*	*-1*	• In the event of critical weather conditions, Scenario 1 & 2 with the cross runway provides flexibility to the pilot to choose the runway they would operate from. A greater flexibility is provided in Scenario 1 with a longer runway, for example allowing selected RFDS aircraft types to use the cross runway if required. • Scenario 3 would not provide this flexibility.
Runway	2	1	-1	• Overall, the serviceability of the runway system seems to be the best in Scenario 1, followed by Scenario 2. • Scenario 3 is the least serviceable of the three.

EVALUATION OF MASTER PLAN LAYOUT SCENARIOS
OPERATIONAL (2)

- OLS – The number and the type of the runway influences the extent of the Obstacle Limitation Surfaces, thereby impacting the expanse of infrastructure development as well as compliance in terms of objects such as the apron flood lights penetrating the surfaces.

Evaluation criteria	Scenario 1 Score	Scenario 2 Score	Scenario 3 Score	Argumentation
Extent	*-1*	*-1*	*1*	• In Scenario 1 & 2, with two runways there are two sets of OLS present at the airport, thereby the airport having a more restrictive airspace and a limitation to the extent of infrastructure development on ground. • In Scenario 3, with a single runway there is only one set of OLS at the airport.
Compliance	*2*	*2*	*2*	• For both Scenario 1 & 2, the dimensioning of the cross runway strip from 90m to 60m as per CASA Part 139 requirements for a Code 1 non-instrument runway would resolve the issue of the apron flood lights penetrating the OLS. However, in Scenario 1 if the runway is ever upgraded to a Code 2 runway, the OLS would penetrate with one of the three existing apron flood lights by 0.18m. This is a minor penetration and can be solved by new apron lighting. • For Scenario 3, the highest point of the apron flood lights is well below the OLS.
OLS	1	1	2	• Based on the extent of the OLS in the three scenarios, Scenario 3 is graded better than Scenario 1 & 2.

- Stakeholder operations – Impact of the infrastructure change, for instance on the extent of development of the cross runway on stakeholder operations.

Evaluation criteria	Scenario 1 Score	Scenario 2 Score	Scenario 3 Score	Argumentation
Stakeholder Operations	1	1	-1	• The presence of a cross-runway dedicated to GA traffic in Scenario 1 & 2 would give more independence to GA users on runway usage (from one end), making this option attractive to the stakeholders and thereby promote growth in GA operations. • Without a dedicated cross runway and dependence on other traffic operations on the sole runway and their runway occupancy time, would make Scenario 3 less appealing to GA users. Furthermore, this would result in longer taxiing times for existing GA users to the runway.

EVALUATION OF MASTER PLAN LAYOUT SCENARIOS
LAND USE (1)

Under this criterion, consideration is given to the existing infrastructure and allocation of land for future use across the airport site. Specifically, this parameter delves deeper into the following:

- Proximity to existing infrastructure – proximity of the proposed new infrastructure for GA traffic to existing airside infrastructure such as runway, fuel tanks, utilities and access road to airside. Proximity to the previously stated infrastructure would ensure ease of constructing hangars, aircraft operations and airside access to the GA users.

Evaluation criteria	Scenario 1 Score	Scenario 2 Score	Scenario 3 Score	Argumentation
Runway	*1*	*1*	*1*	• In all three Scenarios, the new infrastructure for the GA has been placed such as to provide quick and easy access to the runway intended for use by GA traffic.
Fuel Tanks	*1*	*1*	*2*	• The taxing distance from the new GA Apron to the fuel tanks is similar in all three scenarios • The taxing distance from the new GA Hangar lots to the fuel tanks is larger in Scenario 1 & 2, in comparison to Scenario 3.
Existing Utilities	*2*	*2*	*1*	• For Scenario 1 & 2, the new GA infrastructure is placed closer to existing utilities. • For Scenario 3, the new GA infrastructure is places further away from the existing utilities when compared to the other Scenarios.
Access Road	*2*	*2*	*1*	• Scenario 1 & 2 would provide users a quicker access to the new GA infrastructure from the landside with a shorter extension to Qinetiq's present day access road. • Scenario 3 would require a longer extension to Qinetiq's current access road.
Proximity to existing infrastructure	2	2	1	• Overall, the proximity of the new GA infrastructure to the existing airside infrastructure is best in Scenario 1 & 2. • Although the new infrastructure in Scenario 3 is close to the existing infrastructure, is less so than the other scenarios.

EVALUATION OF MASTER PLAN LAYOUT SCENARIOS
LAND USE (2)

- Repurposing existing infrastructure – this is primarily with respect to Qinetiq's existing infrastructure and how this is to be reused as airside and ancillary infrastructure after Qinetiq move their business activities to the UAS cluster. This would include a repurposed access road to airside, airport staff offices, toilet facilities for staff and tenants as well as GSE parking facility. It also includes the repurposing of the Qantas Hangar.

Evaluation criteria	Scenario 1 Score	Scenario 2 Score	Scenario 3 Score	Argumentation
Repurposing existing infrastructure	1	1	1	• In all three scenarios, Qinetiq's existing infrastructure and the Qantas hangar are to be repurposed.

- Future development area within clusters – a high level quantitative assessment of the number of the GA Hangar lots that could be accommodated for small-medium sized Code B aircraft in the future within the land area allocated to the GA Cluster.

Evaluation criteria	Scenario 1 Score	Scenario 2 Score	Scenario 3 Score	Argumentation
Future development area within clusters	1	1	2	• The allocation of land to the GA Cluster provides ample opportunity for further development of additional hangar lots, beyond the 20 that have been laid out. The additional no. of hangar lots that could be accommodated in each scenario are: • Scenario 1 – 40 to 45 lots • Scenario 2 – 45 to 50 lots • Scenario 3 – 90 to100 lots

- Future development outside the clusters – aside from the greenfield area allocated to the GA Cluster and the UAS Cluster in each scenario, this is the area available for any infrastructure development in the future.

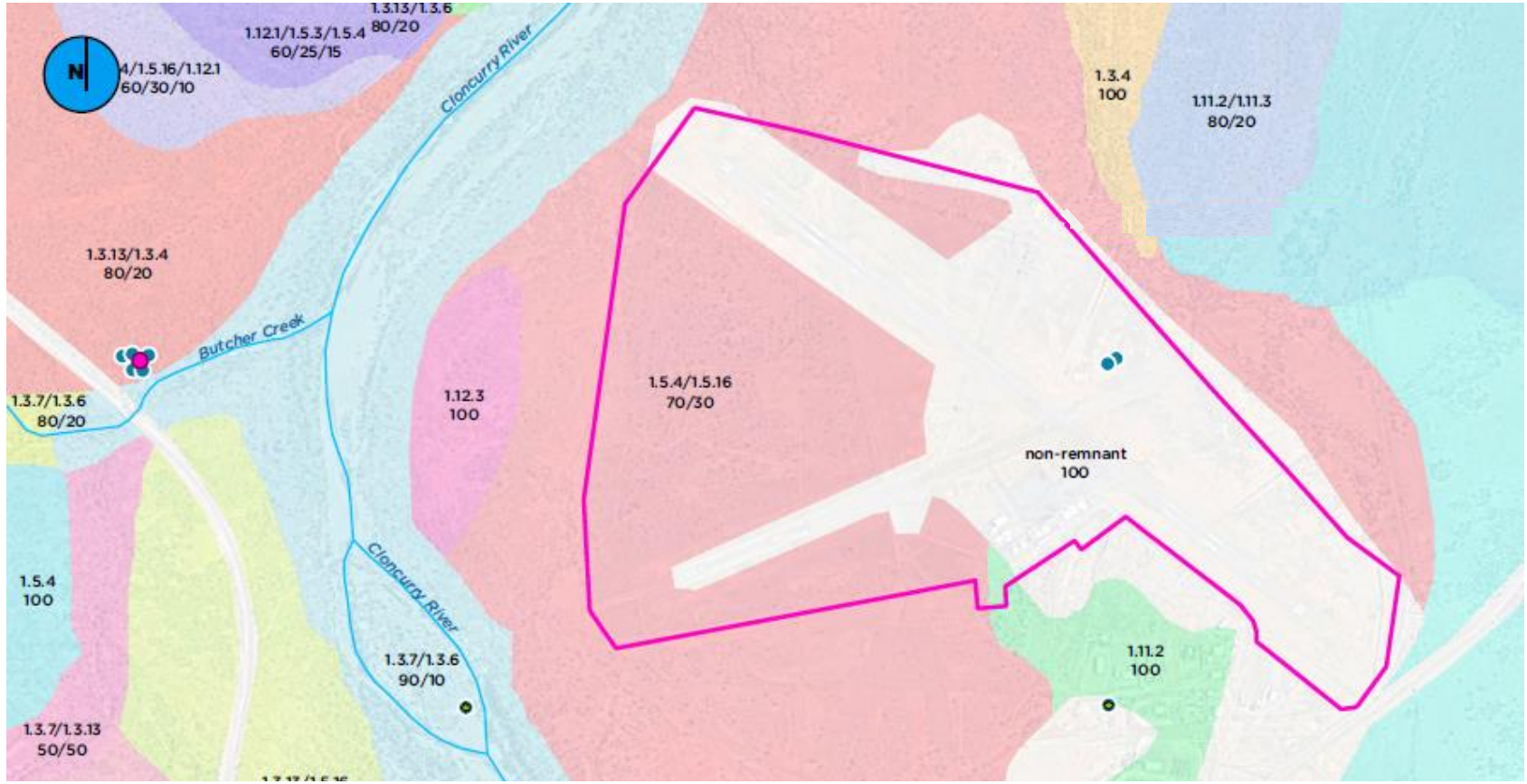
Evaluation criteria	Scenario 1 Score	Scenario 2 Score	Scenario 3 Score	Argumentation
Future development outside the clusters	2	2	1	• The area available for future development in each scenario are: • Scenario 1 – ~ 876,450 sqm • Scenario 2 – ~ 876,200 sqm • Scenario 3 – ~ 816,300 sqm

EVALUATION OF MASTER PLAN LAYOUT SCENARIOS

ENVIRONMENTAL (1)

Evaluation criteria	Scenario 1 Score	Scenario 2 Score	Scenario 3 Score	Argumentation
Biodiversity	1	1	1	A review of the Queensland Globe remnant regional ecosystems and WildNet databases was undertaken. The airport site contains Category B regulated vegetation that is predominantly *Eucalyptus leucophylia and/or Coryumbia terminalis low open woodland on red earths* or *Acacia camabei low woodland on red earths* (both least concern vegetation management class). There is two record of a bird species (Australian pratincole) within the airport site. It is listed as a marine species under the Commonweatlh *Environment Protection and Biodiversity Conservation Act 1999*. It is a migratory species. It is not expected that the potential impacts to biodiversity will be substantially different between the three options. While their layouts differ the planned development footprints (excluding the future development areas) would impact a similar area of land. It is not expected that changes to the operation of the airport would lead to a significant impact on any migratory or other bird species that inhabit or utilize these wetlands.
Aboriginal heritage	1	1	1	A review of the Aboriginal and Torres Strait Islander Cultural Heritage Database and Register was undertaken. It found Aboriginal cultural relics and places close to, but not within, the airport site. It is not expected that the potential impacts to Aboriginal heritage (including previously unidentified Aboriginal cultural relics) will be substantially different between the three options. While their layouts differ the planned development footprints (excluding the future development areas) would impact a similar area of land.
Hydrology and flooding	1	1	1	A review of the Cloncurry Shire Planning Scheme identified that the majority of the airport is covered by the Flood hazard overlay (Annual Exceedence Probability (AEP) 0.2%) and small section in the northwest is below the AEP 1% level. A review of flood modelling mapping also showed that the majority of the airport is at risk of flooding.

BIODIVERSITY MAPPING



Legend

Site boundary

Fauna and flora status

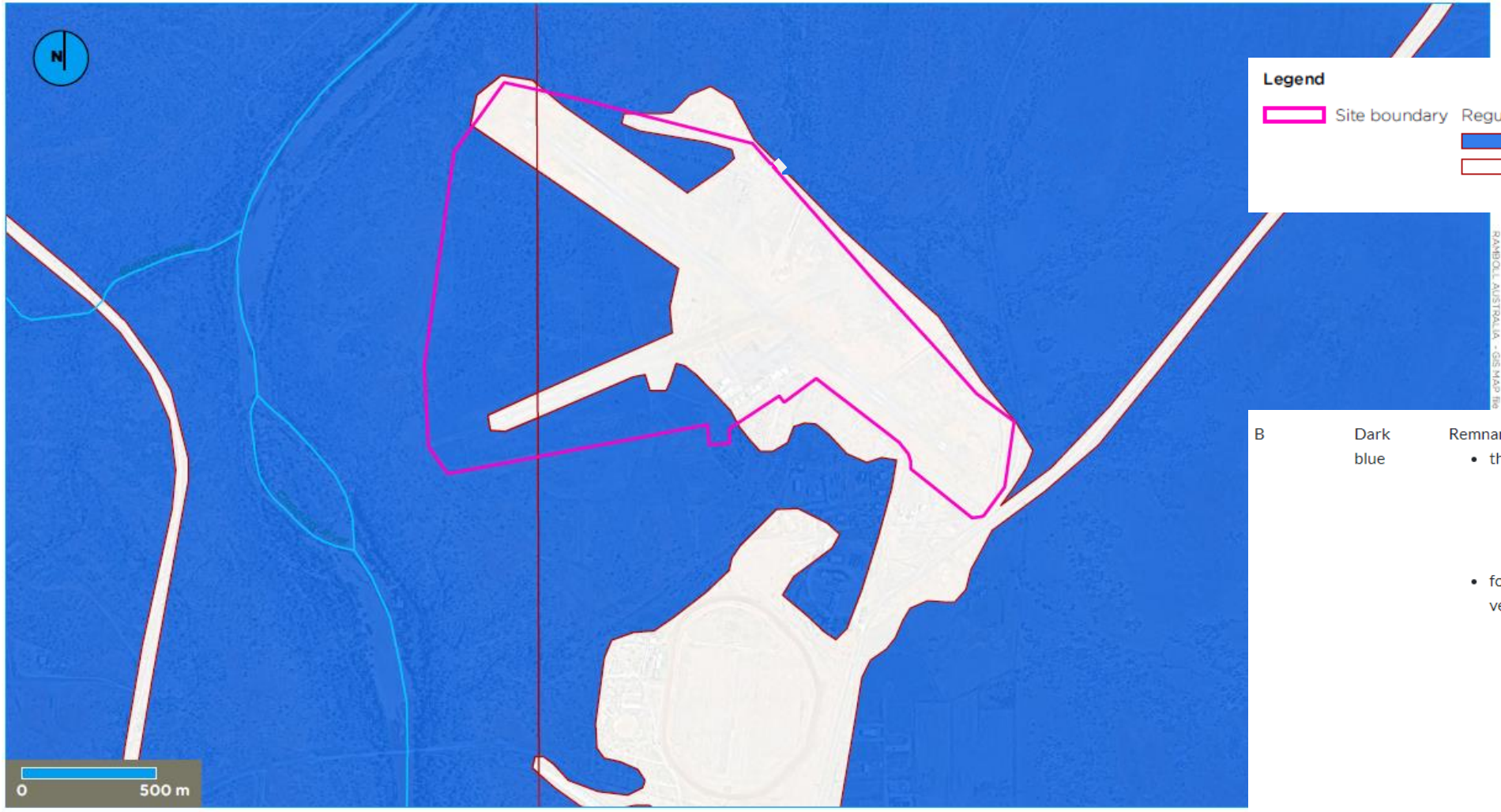
- Least concern wildlife (NCA)
- Vulnerable wildlife (NCA and EPBC)
- Least concern flora (NCA)

Regional ecosystem

- 1.11.2,100
- 1.11.2/1.11.3,80/20
- 1.11.3/1.5.16/1.11.8,65/25/10
- 1.12.1,100
- 1.12.1/1.5.3/1.5.4,60/25/15
- 1.12.3,100
- 1.3.13/1.3.4,80/20
- 1.3.13/1.3.6,80/20
- 1.3.13/1.5.16,95/5
- 1.3.4,100
- 1.3.7/1.3.13,50/50
- 1.3.7/1.3.6,80/20
- 1.3.7/1.3.6,90/10
- 1.5.4,100
- 1.5.4/1.11.3/1.5.16,85/10/5
- 1.5.4/1.5.16,70/30
- 1.5.4/1.5.16,90/10
- 1.5.4/1.5.16/1.12.1,60/30/10
- 2.4.2,100
- 2.4.2/2.4.3,70/30
- 2.4.2/2.4.3,80/20
- non-remnant,100

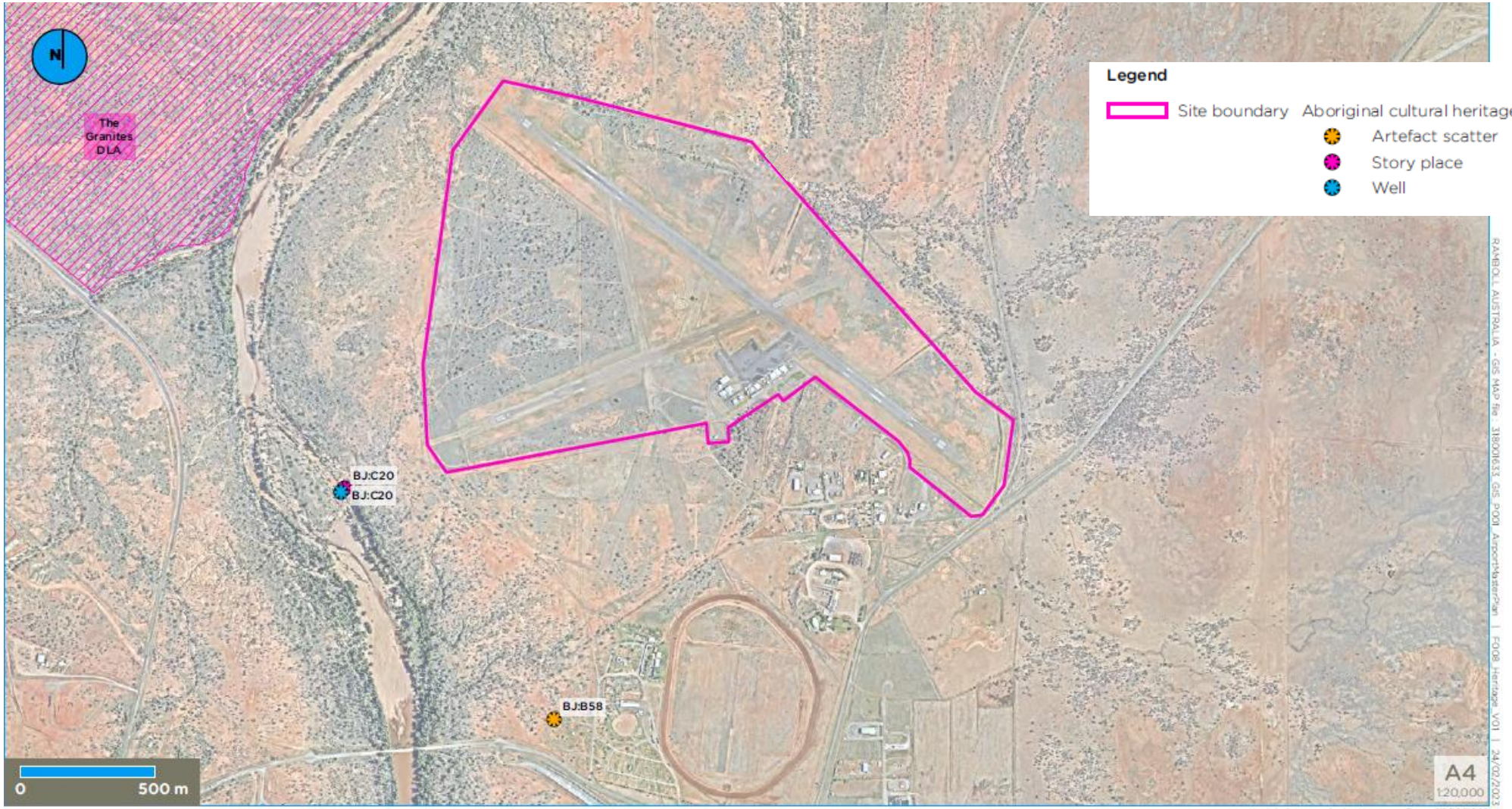
RAMBOLL

REGULATED VEGETATION MAPPING



B	Dark blue	Remnant vegetation areas. This is vegetation: • that is: ◦ an endangered regional ecosystem ◦ an of concern regional ecosystem or ◦ a least concern regional ecosystem. • forming the predominant canopy of the vegetation: ◦ covering more than 50% of the undisturbed predominant canopy ◦ averaging more than 70% of the vegetation's undisturbed height and ◦ composed of species characteristics of the vegetation's undisturbed predominant canopy

ABORIGINAL HERITAGE



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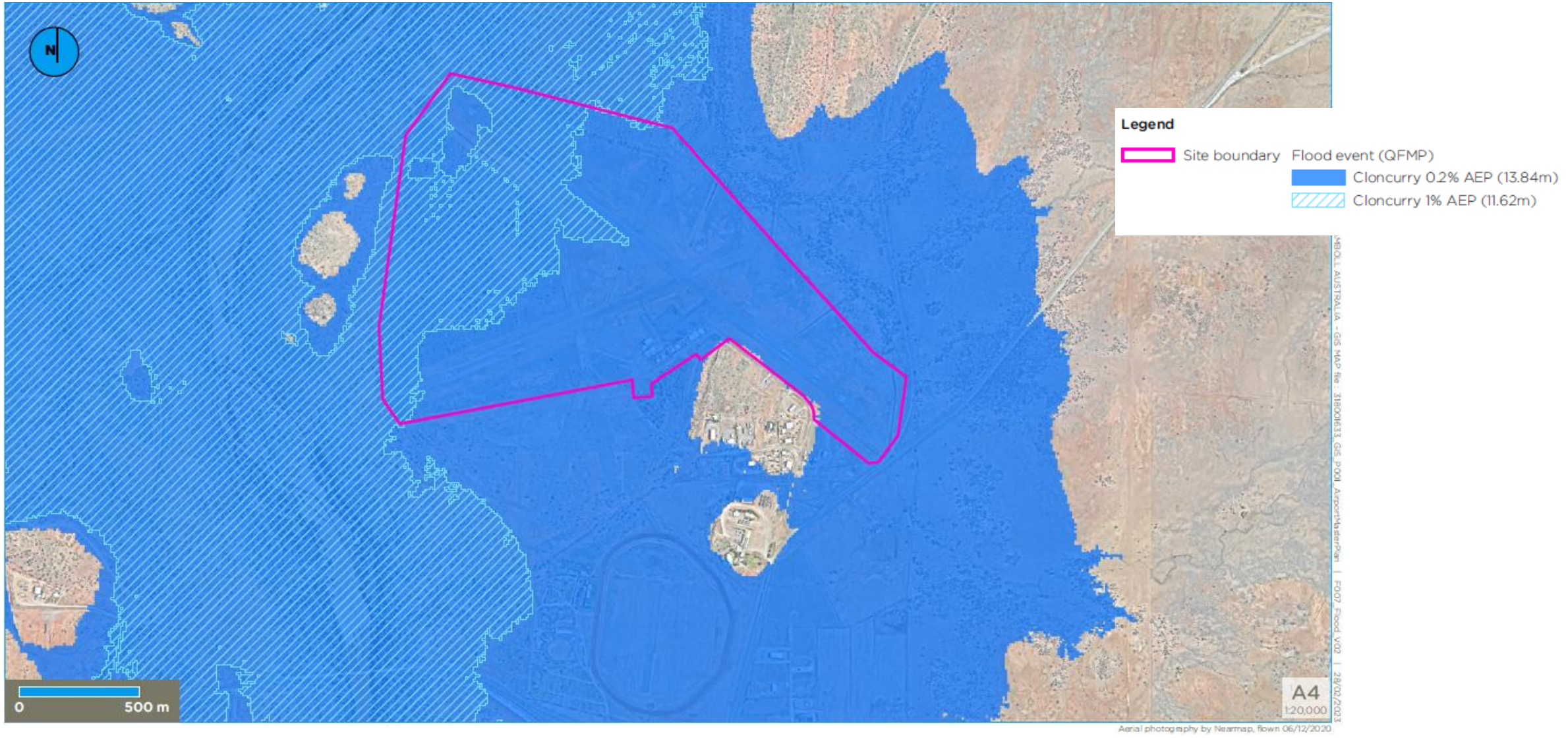
FLOOD RISK MAPPING (FLOODCHECK QUEENSLAND)



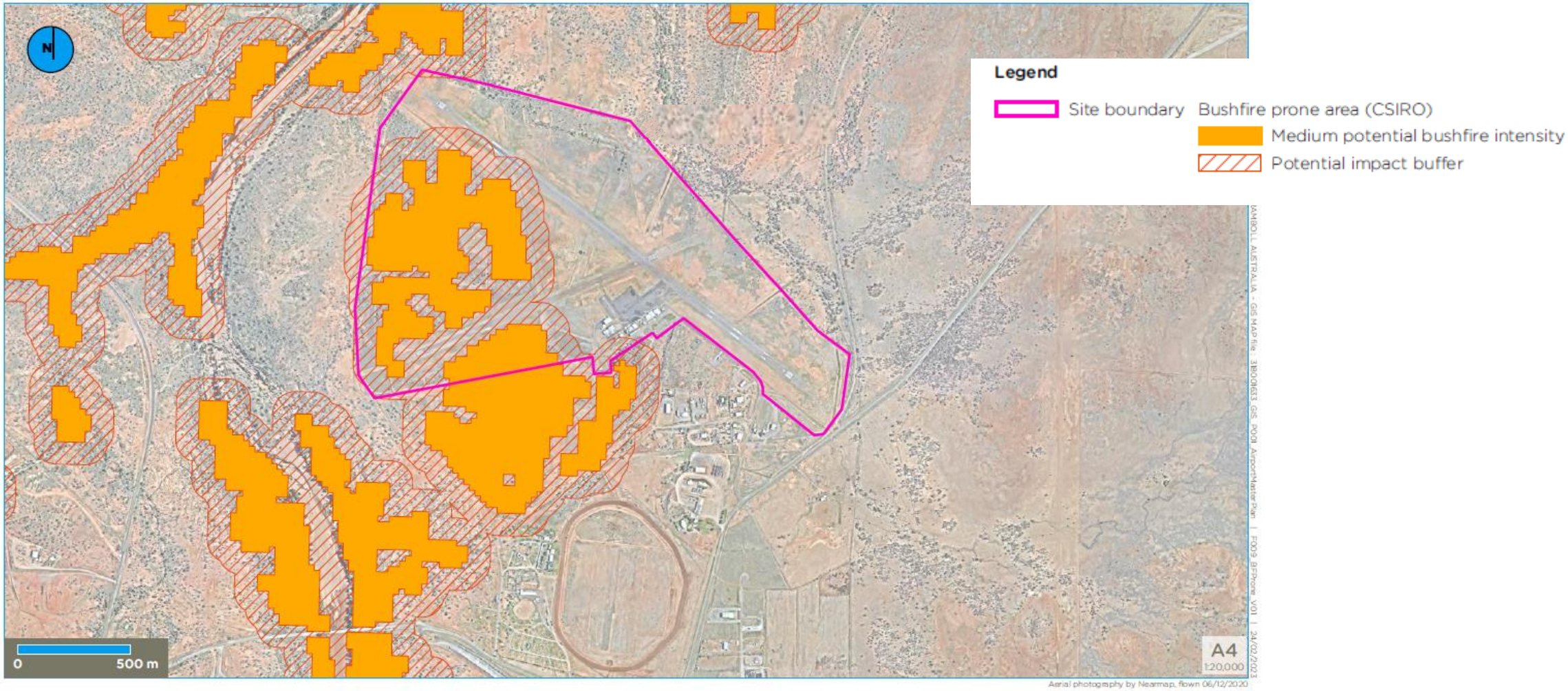
RAMBOLL

EVALUATION OF MASTER PLAN LAYOUT SCENARIOS

ENVIRONMENTAL (2)

Evaluation criteria	Scenario 1 Score	Scenario 2 Score	Scenario 3 Score	Argumentation
Bushfire risk	1	1	1	A review of the bushfire risk overlay maps identified land in the west and south west of the airport, and adjoining land to the west and north, were identified as bushfire prone land This presents a potential additional risk to the proposed GA Cluster alignments and the south west future development land in all three scenarios. The potential bushfire risk, and the actions required to be taken to alleviate these risks, are not expected to be substantially different between the three scenarios.
Noise and vibration	1	1	1	Scenario 3 would result in the closure of Runway 06/24, and Scenario 2 would lead to a change in the type and number of aircraft using Runway 06/24. These scenarios would result in an increase in the use of aircraft using Runway 12/30. While Scenario 3 would lead to an increase in aircraft flights to and from the northwest and southeast such flights would not pass over the township or other populated areas. It would also lead to a reduction in aircraft noise to the southwest and northeast, but these areas also have a low population density. As such changes to the noise environment are not expected to be substantially different between the three scenarios.
Contamination	1	1	1	The airport has a long history, and as such there is the potential for historical activities and land practices to have resulted in soil and/ or groundwater contamination. This may include: • Leaks from underground or above ground fuel storage • Poor waste management practices (such as landfilling) • Fire fighting or fire fighting training that involved the use of PFAS-containing AFFF. Any of the scenarios that require changes to the layout of buildings and facilities, and/or disturbance of soils within the existing airport precinct could impact on contaminated soils. Investigations should be undertaken to confirm the absence or presence, and if present the nature and extent, of any contamination, and what would be required to remediate.

BUSHFIRE PRONE LAND



RAMBOLL

EVALUATION OF MASTER PLAN LAYOUT SCENARIOS

SOCIAL AND ECONOMIC

Evaluation criteria	Scenario 1 Score	Scenario 2 Score	Scenario 3 Score	Argumentation
Tenant satisfaction	2	2	1	• All scenarios will provide the benefit of shared user toilet facilities which will be considered beneficial to all airport users. • Operators of small aircraft are expected to be concerned about the Scenario 3 and the closure of the cross runway as it provides them better options/ safety in windy conditions.
Social and employment	1	1	1	• Long term: there is unlikely to be a substantial difference between the three scenarios. • Construction phase: rehabilitation of Runway 06/24 in Scenario 1 and Scenario will provide jobs during construction. However overall development of Scenario 3 will provide additional jobs. • Scenario 1 and Scenario 2 will require additional labour for ongoing maintenance. Overall there is unlikely to be a substantial difference in the employment and economic activity generation between the three scenarios.
Facilitate future trends	1	1	1	• The retention of Runway 06/24 in Scenario 1 and Scenario 2 would allow for the facilitation in any changes in demand or use of the airport due to increased air traffic. Scenario 3 would see the loss of Runway 06/24 and place significant restrictions on the development of an alternative east – west runway if demand warranted it. • Scenario 3 does, however, provide for significant more land for the GA Cluster and therefore allow for significantly more hangars with direct runway access in the future. • The development of renewable energy, such as solar, would be dependent on the suitability of the technology and its location to not impede aviation activities (such as glint and glare from solar panels). A glint and glare assessment would be required for the introduction of solar, however the southwest future development area may be suitably located to allow for such development that does not impede aviation activities.

EVALUATION OF MASTER PLAN LAYOUT SCENARIOS
SUSTAINABILITY

Qualitative sustainability assessment which will utilise relevant sustainability criteria from the Infrastructure Sustainability Council of Australia's (ISCA's) sustainability assessment tool.

Evaluation criteria	Scenario 1 Score	Scenario 2 Score	Scenario 3 Score	Argumentation

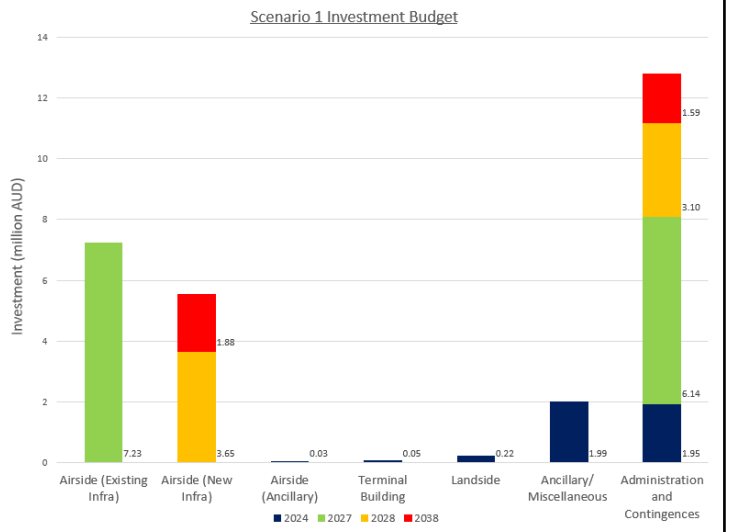
Embedded carbon footprint	1	1	1	• **Scenario 1**
				  • Rehabilitated pavement = 135,215 sqm
				  • New pavement = 20,504 sqm
				• **Scenario 2**
				  • Rehabilitated pavement = 127,931 sqm
				  • Decommissioned pavement = 7,284 sqm
				  • New pavement = 20,237 sqm
				• **Scenario 3**
				  • Rehabilitated pavement = 115,142 sqm
				  • Decommissioned pavement = 20,073 sqm
				  • New pavement = 19,819 sqm
				
				All three scenarios will require a very similar area of new pavement. While there are differences in the area of pavement to be rehabilitated, the carbon footprint associated with the rehabilitation works would be partially offset by the retention and rehabilitation of the existing pavement.
				The carbon footprint for Scenarios 2 and 3 will depend on how the decommissioned pavement is managed: left in situ or removed for disposal (generating carbon emissions) or reuse (generating reduced carbon emissions).
				It is not expected that the embedded carbon footprint of the three scenarios will be substantially different.

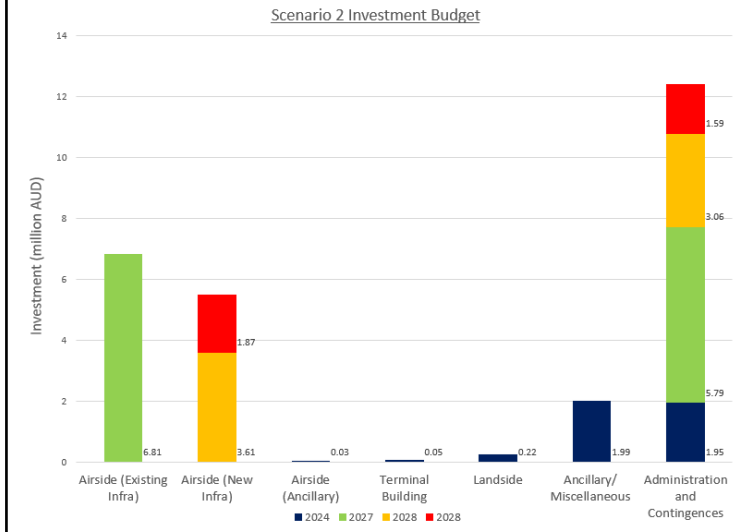
EVALUATION OF MASTER PLAN LAYOUT SCENARIOS
FINANCIAL (1)

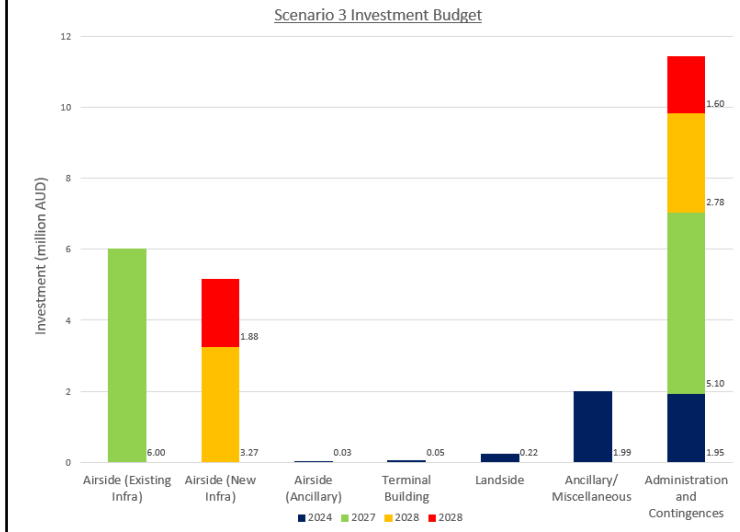
Financial figures based on investment estimates and an extrapolation of the existing airport financial data is used to assess the effect of infrastructure development in each scenario on the finances of the Airport/ Council in terms of:

- Capital expenditure (CAPEX)

Evaluation criteria	Scenario 1 Score	Scenario 2 Score	Scenario 3 Score	Argumentation
Capital Expenditure	1	1	2	• The total capital investment estimate in each scenario are*: • Scenario 1 – ~ 27,835,408 AUD • Scenario 2 – ~ 26,970,122 AUD • Scenario 3 – ~ 24,870,873 AUD







*The numbers quoted in the financial evaluation have been based on thorough calculation and analysis of each Scenario.

EVALUATION OF MASTER PLAN LAYOUT SCENARIOS
FINANCIAL (2)

- Financial feasibility – The financial feasibility of the scenarios is based on the CAPEX, OPEX and revenue generated over a 20-year time period.

Evaluation criteria	Scenario 1 Score	Scenario 2 Score	Scenario 3 Score	Argumentation
Financial Feasibility	1	1	2	• The NPV budget over the 20-year period in each scenario is*: • Scenario 1 – ~ 38,243,861 AUD • Scenario 2 – ~ 39,044,122 AUD • Scenario 3 – ~ 40,924,009 AUD

*The numbers quoted in the financial evaluation have been based on thorough calculation and analysis of each Scenario.

RAMBOLL

EVALUATION OF MASTER PLAN LAYOUT SCENARIOS

COMPLETE EVALUTION SCORING

Tabulated below are the final evaluation results with a quantitative score for each scenario.

Evaluation Criteria		Criterion Weighting	Scenario 1 Score	Scenario 1 Result	Scenario 2 Score	Scenario 2 Result	Scenario 3 Score	Scenario 3 Result
Operational	Runway	3	2	6	1	3	-1	-3
	OLS	2	1	2	1	2	2	4
	Stakeholder Operation	2	1	2	1	2	-1	-2
Land Use	Proximity to existing infrastructure	2	2	4	2	4	1	2
	Repurposing existing infrastructure	1	1	1	1	1	1	1
	Future development area within clusters	1	1	1	1	1	2	2
	Future development outside the clusters	1	2	2	2	2	1	1
Environmental	Biodiversity	1	1	1	1	1	1	1
	Aboriginal heritage	1	1	1	1	1	1	1
	Hydrology and flooding	1	1	1	1	1	1	1
	Bushfire risk	1	1	1	1	1	1	1
	Noise and vibration	1	1	1	1	1	1	1
	Contamination	1	1	1	1	1	1	1
Social and Economic	Tenant satisfaction	2	2	4	2	4	1	2
	Social and employment	1	1	1	1	1	1	1
	Facilitate future trends	1	1	1	1	1	1	1
Sustainability	Embedded carbon footprint	1	1	1	1	1	1	1
Financial	CAPEX	3	1	3	1	3	2	6
	Financial feasibility	3	1	3	1	3	2	6
		Total Score		**37**		**34**		**28**

EVALUATION OF MASTER PLAN LAYOUT SCENARIOS

CONCLUSION

An overview and conclusion of the grading assessment as well as the evaluation results of selected criteria have been tabulated below. Please note that the results showcased below are for the criteria that have a greater influence on the evaluation score due to the differences amongst the three scenario as well as their relevance to Cloncurry Airport and is only a part of the entire options analysis tabulated in the previous section.

Evaluation Criteria		Criterion Weighting	Scenario 1 Score	Scenario 1 Result	Scenario 2 Score	Scenario 2 Result	Scenario 3 Score	Scenario 3 Result
Operational	Runway	3	2	6	1	3	-1	-3
	OLS	2	1	2	1	2	2	4
	Stakeholder Operation	2	1	2	1	2	-1	-2
Land Use	Proximity to existing infrastructure	2	2	4	2	4	1	2
Environmental	Hydrology and flooding	1	1	1	1	1	1	1
	Bushfire risk	1	1	1	1	1	1	1
Social and Economic	Tenant satisfaction	2	2	4	2	4	1	2
Sustainability	Embedded carbon footprint	1	1	1	1	1	1	1
Financial	CAPEX	3	1	3	1	3	2	6
	Financial feasibility	3	1	3	1	3	2	6
		Total Score		**27**		**24**		**18**

As per the above quantitative evaluation, **Scenario 1 scores the highest and would be the preferred Scenario.**

Scenario 1 is closely followed by Scenario 2 in terms of the scoring, where the better capacity and resilience offered by a longer cross-runway is what sets Scenario 1 above Scenario 2.

Although Scenario 3 scores better in terms of the financial criteria, it falls short in the operational, land use as well as social and economic categories.

APPENDICES

APPENDIX 1: ISSUES / WISHES

APPENDIX 2: LOCATION ANALYSIS FOR DRONE CLUSTER

APPENDIX 3: REGULATIONS

APPENDIX 1: ISSUES / WISHES

Importance	Categories	Issues
high	Infrastructure	Stand no. 3 seems too close to the stand no. 2 and is therefore hardly used by pilots
high	Infrastructure	Not enough apron space for GA
high	Infrastructure	Drain in front of CMC hangar (difficult to get helicopters out and in)
high	Management	Terminal passenger capacity insufficient on Wednesdays
high	Maintenance	Broken mowing machine
high	Maintenance	Holes in the fence due to animals (lizards, kangaroos, etc. go through or under the fence)
high	Pavement	Poor pavement condition on RWY 06-24 (bad condition, pilots refuse to land there), TWY C, apron (bumpy, loos stones), RWY 12-30 (just cracks)
high	Drainage	Flooding of the airport (airside) after half a day rain fall and standing water
high	Drainage	Flooding of the buildings (water coming straight into the terminal building and hangars)
high	Electrical	Electrical system is not reliable, not documented, difficult to say where the faults are
mid	Infrastructure	Difficult access for GA to fuelling facility when stand 2 and 3 are occupied
mid	Infrastructure	Not enough space for the fuel truck to leave airside through gate E if stand no. 2 is occupied
mid	Traffic	Non-compliance: Taxiway B declared as taxiway code D
mid	Management	No traffic control by airport (airport manager finds out the last about changes in flight schedule)
mid	Electrical	Poor apron lighting
mid	Marking	RWY 30 Aiming point to be relocated
mid	Marking	Turnpad centerline marking missing on all turnpads
mid	Marking	Part of TWY C edge marking missing
low	Infrastructure	Steep ramp to the QinetiQ hangar
low	Management	Staff changing constantly (big rotation every few months)
low	Management	Noise from the jets parked at the apron, this is difficult to handle for CMC personnel
low	Management	Lack of security screening
low	Maintenance	Poor internet connection (for CMC and QinnetiQ)
low	Maintenance	Too strong AC in the departure hall
low	Maintenance	Terminal roof leaking
low	Maintenance	Conveyor belt at the check-in desk stops sometimes
low	Maintenance	Not enough fuel during the flood disaster

APPENDIX 1: ISSUES / WISHES

Importance	Category	Wishes
high	Infrastructure	More storage for GSE
high	Infrastructure	Bigger GA parking
high	Infrastructure	More hangar lots for leasing (20 more)
high	Infrastructure	Bigger jets (150 seaters) like Boeing 737, but preferably with the current length of RWY 12/30.
high	Infrastructure	Maximize drone facility
high	Infrastructure	Resilience and better facilities during flood disaster (no operational center, not enough fuel)
high	Management	More commercial flights especially on Friday and Monday/Sunday for managers and engineers who work 5 days a week and fly home for the weekend. More flexibility. Direct flight connection to Cairns, Townsville, Brisbane
high	Management	Charter flights with mining workers arriving at the same time
high	Maintenance	GPU unit for the planes (mobile one)
high	Electrical	Possibility to land at night
high	Electrical	Provide emergency generator
mid	Infrastructure	Water supply for GA
mid	Infrastructure	GA stands further from the jets
mid	Infrastructure	Attract army to use the airport (that requires operational center, briefing facility and equipment storage)
mid	Management	Lower fees per passenger
mid	Electrical	Power supply for the hangars (except CMC)
low	Infrastructure	Operational facility (office, storage, briefing room) for defence to use during the natural disaster
low	Infrastructure	Easier access to the toilets on the airside for GA users
low	Infrastructure	More space for busses on the landside
low	Infrastructure	Tank at the airside and underground system
low	Management	More check-in counters, if a new airline comes (REX is expected to come)
low	Extra	Coffee and sandwich purchase possibility at the terminal for passengers
low	Extra	Car rental possibility at the airport
low	Extra	Roof for car parking on landside
low	Extra	Pleasent visual outlook of the hangars

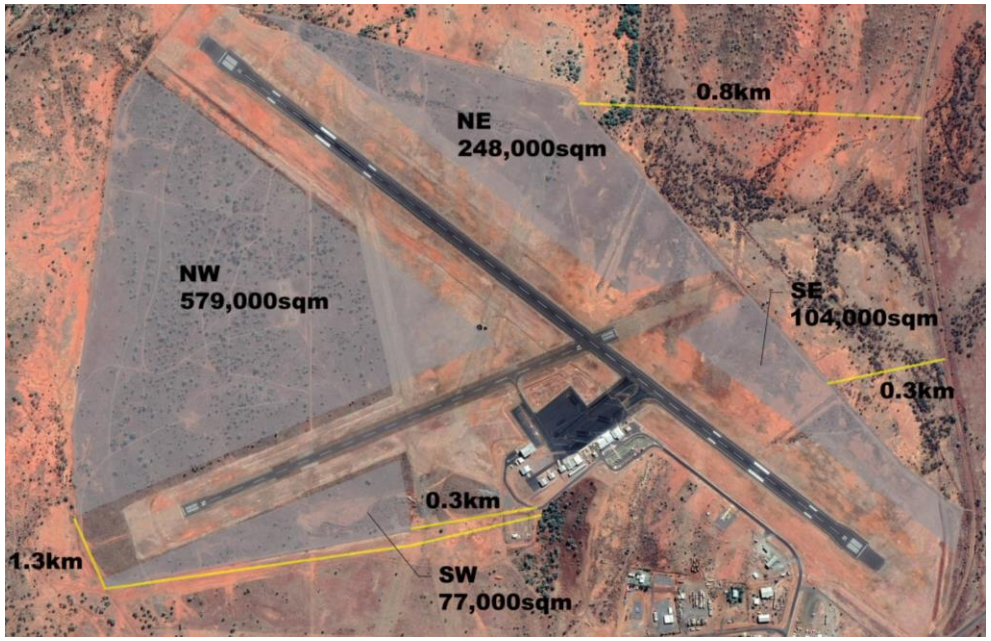
APPENDIX 2: LOCATION ANALYSIS FOR DRONE CLUSTER

Location NW (579,000 m2)	
Pros	**Cons**
Very large area for development	Far from existing utilities
Full privacy	Longer access road needed
Easy access to main runway and secondary runway (in Sc 1 and 2)	In Sc 3 potentially clashing with GA development
Unrestricted future development of GA Cluster	Necessary to clear parts of land of trees (environmental/publicity downside)
	Potentially necessary to relocate existing towers that count the traffic

Location NE (248,000 m2)	
Pros	**Cons**
Large area for development	Far from existing utilities
Full privacy	Have to cross main runway and secondary runway to get to existing airport facilities
Easy access to main runway	(If drainage channels need to remain open, the area will be reduced to approx. 175,000 m2)
Limited need for new access road	
Unrestricted future development of GA Cluster	

Location SW (77,000 m2)	
Pros	**Cons**
Close to existing utility connections	Limited space for development
Consolidated infrastructure (Potential benefits from being close to GA/other airport facilities)	Will restrict further development of GA Cluster
Limited need for new access road	Little privacy
Easy access to secondary runway *(in Sc 1 and 2)*	Difficult access to the main runway (in Sc 3)

Location SE (104,000 m2)	
Pros	**Cons**
Limited need for new access road	Limited space for development
More privacy than Location SW	Have to cross main runway to get to existing airport facilities
Easy access to main runway	Less privacy than Locations NW / NE
Unrestricted future development of GA Cluster	(If drainage channels need to remain open, the area will be cut in half and will be unsuitable)



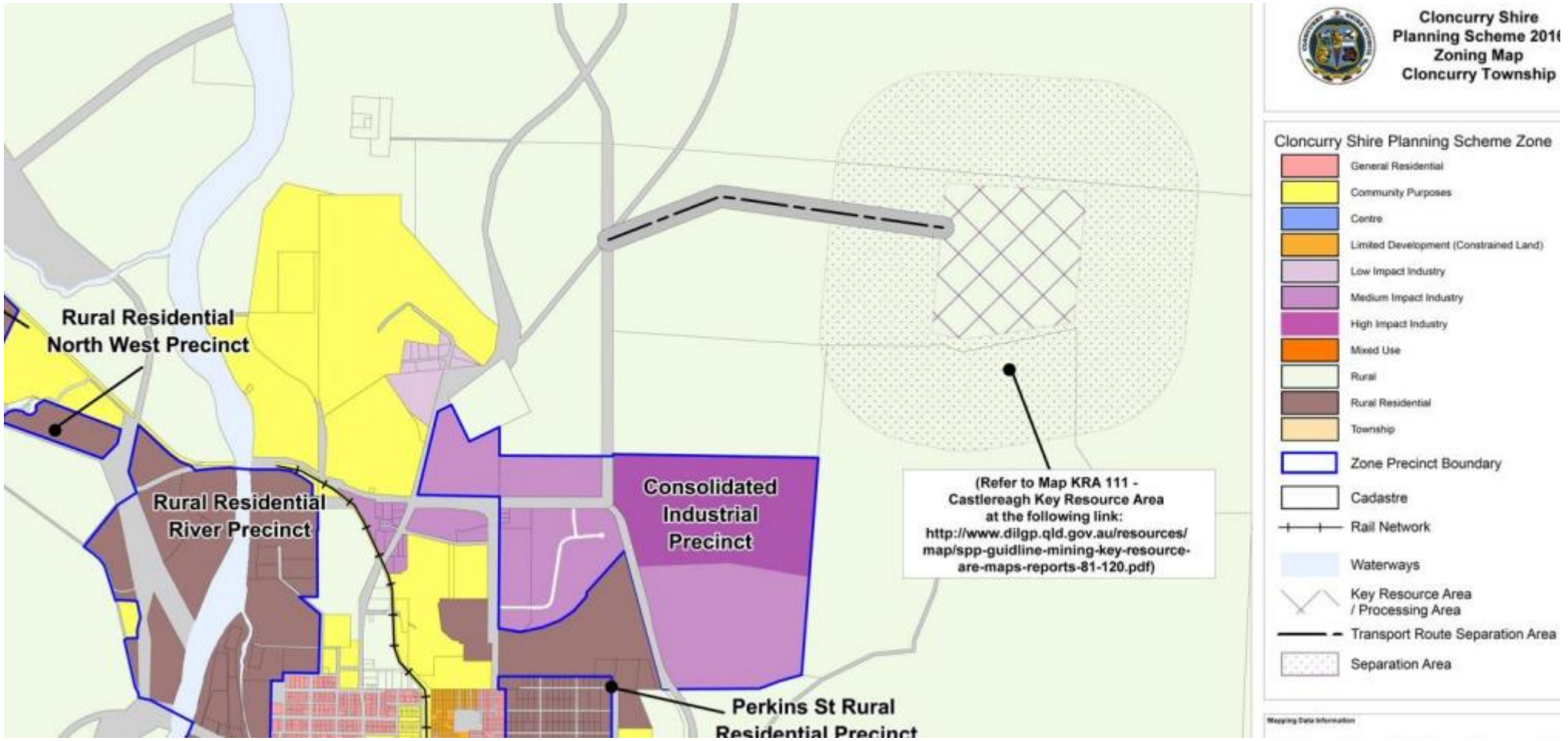
APPENDIX 3: REGULATIONS

Listed below are the regulations relevant to Cloncurry Airport irrespective of the choice of Scenario:

- The land to be developed is subject to Cloncurry Shire Planning Scheme 2016 (the Planning Scheme). The land is categorized as:
  - Community purpose zone (the airport site)
  - Rural zone (primarily for a potential road connecting the UAS Cluster to Common Road)
- The airport and immediate surrounds are identified as "Airfield Environs" overlay under the Planning Scheme. The primary purpose of the overlay (and associated code) is to facilitate operation of the airport and protect it from incompatible land uses.
- Parts of the airport are also subject to the following overlays under the Planning Scheme:
  - Flood hazard
  - Bushfire prone area
- The proposed development/ redevelopments included in the three scenarios would be permitted under the Scheme, with Council as the assessor with potential referrals to other government agencies and stakeholders.
- Depending on their nature, changes to the aviation activities at the airport would require the approval of Air Services Australia and/ or CASA
- Depending on the scenario, the nature of the activity and the potential impacts, approvals may be required under, or consideration needs to be given to, the following acts:
  - Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (*for impacts on matters of national environmental significance)
  - *Aboriginal Cultural Heritage Act 2003* (impacts on cultural heritage)
  - *Nature Conservation Act 1992* (clearance of native plants)
  - *Native Title Act 1993* (consideration of the existence of Native Title in development area)
  - *Queensland Heritage Act 1992* (impacts on non-indigenous heritage)
  - *Vegetation Management Act 1999* (clearing of native vegetation)

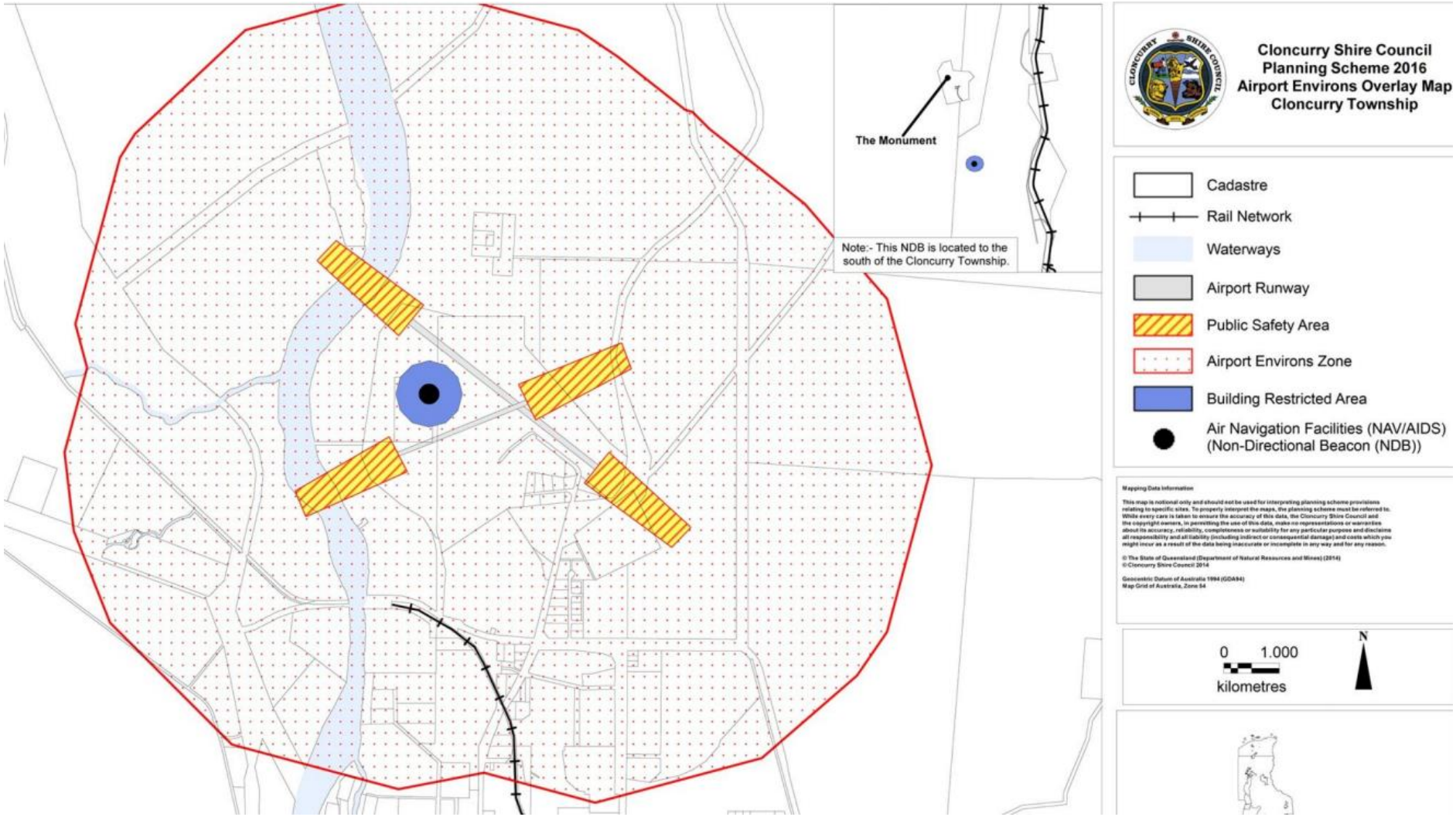
APPENDIX 3: REGULATIONS

CLONCURRY SHIRE PLANNING SCHEME ZONING MAP



APPENDIX 3: REGULATIONS

AIRPORT ENVIRONS OVERLAY MAP



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