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BRISBANE AIRPORT AUSTRALIA

New Parallel Runway Airspace Design

Noise Footprint Comparison to the 2007 Environmental Impact Statement and Major Development Plan



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Abbreviations

ACP	Airspace Change Proposal
AEDT	Aviation Environmental Design Tool
Airservices	Airservices Australia
ATC	Air Traffic Control
ARR	Arrival
BAC	Brisbane Airport Corporation Pty Ltd
CASA	Civil Aviation Safety Authority
CONOPS	Concept of operations
dB	Decibel
DEP	Departure
DODPROPS	Dependent opposite direction parallel runway operations
EIS	Environmental Impact Statement
EIS/MDP	2007 Environmental Impact Statement and Major Development Plan for Brisbane Airport Corporation New Parallel Runway Project
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
FAA	Federal Aviation Administration (USA)
kt	Knot
ICAO	International Civil Aviation Organisation
INM	Integrated Noise Model
ILS	Instrument Landing System
MDP	Major Development Plan
MOS	Manual of Standards
NASF	National Airports Safeguarding Framework
NATS	National Air Traffic Services (United Kingdom)
NPR	New Parallel Runway
PEI	Person Event Index
PROSIG	Parallel Runway Steering and Implementation Group
RDMS	Runway Demand Management Scheme
RNP	Required Navigation Performance
RNP-AR	Required Navigation Performance - Authorisation Required
SID	Standard Instrument Departure
SODPROPS	Simultaneous opposite direction parallel runway operations
STAR	Standard Terminal Arrival Route

BAC is constructing a

3.3km

New Parallel Runway to deliver the infrastructure capacity needed to meet the future demand for domestic and international passengers and associated air services.



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Executive Summary

Background and purpose of this report

Brisbane Airport Corporation (BAC) is constructing a 3300m New Parallel Runway (NPR) to deliver the infrastructure capacity needed to meet the future demand for domestic and international passengers and associated air services into Brisbane. The runway is planned to commence operations in 2020.

BAC is committed to the highest standards of environmental quality in constructing and operating the new runway. The project is subject to a number of Commonwealth environmental regulatory requirements, primarily the Environment Protection and Biodiversity Conservation Act 1999 (the EPBC Act) and the Airports Act 1996 (the Airports Act). Construction of the runway was approved in 2007 by the then Commonwealth ministers responsible for the Environment and Transport respectively, with a range of conditions including requirements for further noise modelling and a community information update program. A copy of the approval conditions are contained in Appendix 1.

Related activities contributing towards the commissioning and operation of the new runway are being conducted by Airservices Australia (Airservices) under the regulatory oversight of the Civil Aviation Safety Authority (CASA). Airservices and CASA's roles are defined by the Air Services Act 1995 and the Civil Aviation Act 1988 respectively.

The project is approaching an important milestone, with Airservices finalising the airspace and flight procedures design which will largely determine the flight paths of aircraft over the Brisbane area following the opening of the new runway. Detailed noise modelling has been undertaken by BAC and based on the latest airspace design which will be used to communicate information about flight paths to Brisbane residents over the next two years leading up to the runway's opening.

The airspace design process has also given rise to a need for an Airspace Change Proposal (ACP) to be submitted to CASA by Airservices. The ACP submission will include environmental assessment of four proposed minor changes to airspace volumes in the Brisbane area. This report will also form part of Airservices ACP submission to CASA.

The purpose of this report is to support three aspects of the environmental assessment process regarding the new runway:

1. *Validate noise modelling from the 2007 EIS/MDP*

   The latest noise modelling summarised in this report, provides an opportunity to review and validate the modelling undertaken for the original Environmental Impact Statement (EIS) and Major Development Plan (MDP) approved in 2007. The EIS/MDP included a comprehensive volume of analysis of the expected aviation noise impacts of future aircraft operations on the community (Volume D). This report therefore takes the approach of comparing forecasts from Volume D of the EIS/MDP to those derived from the latest noise modelling and to provide explanation for any variances. This report also presents those airspace changes that have occurred since the EIS/MDP which have influenced a shift in the comparison baseline from the EIS/MDP.

2. *Support environmental assessment obligations of Airservices*

   The AirServices Act requires that Airservices treats aircraft safety as its primary consideration in exercising its functions. Subject to that requirement, the Act also requires Airservices to protect the environment to the greatest extent possible from the effects of aircraft operations. Furthermore, the EPBC Act requires that Airservices, as a Commonwealth government agency, assess the potential environmental significance of any 'actions' it undertakes, including changes to flight paths, flight procedures and airspace volumes. This report will also support Airservices' own environmental obligations in relation to the environmental assessment of the noise impacts of the new airspace design associated with the runway operations at Brisbane Airport.

3. *Support CASA in its consideration of the environmental aspects of the ACP submission*

   Any proposed changes to the Australian airspace architecture are managed through the airspace change process, administered by the Office of Airspace Regulation within CASA. The ACP related to future parallel runway operations at Brisbane Airport will be submitted by Airservices with a suite of supporting documentation, including this report. The ACP has been developed in close cooperation with BAC. CASA is required to consider the environmental impacts of any proposed airspace architecture changes. This report (and other accompanying environmental assessments related to the four proposed airspace volume changes) will support CASA's consideration of the environmental impacts of the ACP.

Airspace design and noise modelling approach

The first priority of airspace designers will always be safety. 'Safety by design' is a fundamental principle of modern safety systems, particularly in aviation.

In finalising the airspace design process, a 'Closed STAR' design was selected after consultation with airlines and preliminary noise analysis. The Closed STAR design was found to be more efficient, generate less noise overall and better support future technological developments in avionics and navigation systems.

The fundamental design of the airfield and operational modes remain basically unchanged from that envisaged in the 2007 EIS/MDP. That said, it is to be expected that the detailed airspace

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and procedures design undertaken after a further decade of technology development and traffic growth exhibits some minor differences to those of the EIS/MDP. This report identifies any differences, explains the reasons behind them and analyses their impact.

The location of the runway itself remains basically unchanged. The new runway will be 3300 metres long, located two kilometres to the west of existing runway 01/19. While parallel to the existing runway, it is located further north towards Moreton Bay, to allow arriving and departing aircraft to overfly residents to the south of the airport at higher altitude thus reducing noise impact.

The wide spacing of the parallel runways allows for maximum use of simultaneous arrivals and departures over Moreton Bay (known as SODPROPS), particularly at night time. Maximising use of these procedures at night has remained an important guiding principle for BAC and Airservices throughout the airspace finalisation process.

The design also maintains the commitment to avoid jet aircraft landings using the southern approaches over land and southern departures by jet aircraft from the new runway during the night period. When weather conditions dictate that landings cannot approach from the north over water during the night period, they will use the existing runway. The existing cross runway 14/32 will cease operating as envisaged in the 2007 EIS/MDP and reinforced through the 2014 Brisbane Airport Master Plan.

Demand for aviation services generally reflects underlying economic activity. The 2008 Global Financial Crisis, and the lower economic growth over subsequent years, led to a relative decline in the expected number of aircraft movements at Brisbane Airport in the forecast period provided in the EIS/MDP. Broadly, this is expected to manifest as a delay of several years until the forecast activity is reached.

As expected, the trend in the aviation industry over the last decade has been towards adoption of more fuel efficient and quieter aircraft. As examples, the Boeing 747 will largely be phased out of passenger fleets by the early 2020s, replaced by large, wide-bodied aircraft such as the Boeing 787, newer generation Boeing 777 and the larger Airbus 380 and Airbus 350. These aircraft have proved to be quieter than their predecessors, particularly when measured relative to the number of passengers carried. Manufacturers of the primary aircraft used on domestic routes, the Boeing 737 and Airbus A320, have developed new, more fuel efficient and quieter derivatives that over the next decade will further reduce aircraft noise as these aircraft are progressively adopted by major Australian airlines.

It was also envisaged in the EIS/MDP and reflected in Ministerial approval statements that developments in navigation technologies would impact the flight paths and procedures used by aircraft as they approached and departed Brisbane Airport. The updated noise modelling reflects current and emerging practice in aircraft navigation.

Finally, the noise modelling methodology itself and the computer software underpinning it continues to develop. The latest noise modelling also analyses any differences resulting from the changes to the US Federal Aviation Authority (FAA) Integrated Noise Model (INM) over the last decade.

Noise Modelling Results

The EIS/MDP illustrated a range of scenarios to take account of seasonal, time of week, and time of day differences. For this report, comparisons are focussed on the busiest scenario, i.e. summer weekdays. International practice, albeit in a northern hemisphere context, uses summer scenarios to measure community reaction for several reasons. The reasons for this include atmospheric conditions in summer tend to propagate noise more widely; residents are more likely to be outside or have doors and windows open; and summer holiday travel leads to more aircraft movements. In Brisbane, there is an additional sensitivity caused by the relative time difference with southern States in summer due to daylight savings time. This leads to extra demand for services from 5am to 6am as business travellers' depart to southern capitals for business day commitments.

The report uses comparisons of the N70 contours from the day of opening scenarios (now 2020, anticipated to be 2015 at the time of the EIS) and the 2035 scenarios, with illustrations of the EIS contours shown directly against the noise modelling associated with the designs to be included in the ACP. N70 (or 'number above') contours show the geographic extent of a certain number of events (N), above a noise level of 70db(A). The comparisons are shown for summer weekday days (6am to 6pm), evenings (6pm to 10pm) and nights (10pm to 6am) for each time period.

While there are some minor boundary differences, mostly resulting in a small reduction in the noise footprint originally predicted in the EIS/MDP, this report concludes that, there are no material differences between the noise impacts associated with the latest airspace design, compared to the impacts envisaged in the EIS/MDP. The most noticeable change in the contours occurs to the south-east of the airport due to the introduction of new, satellite-based approach procedures by Airservices after the EIS/MDP was approved in 2007. These procedures are already in place for the existing runway 01/19 and are unrelated to the new runway. Assessment of the environmental impact of these changes was conducted by Airservices in 2011 consistent with the requirements of the EPBC Act.

This assessment also found that there has been some localised increases in the footprint of the lower number-above contours, specifically the night time 2-4 and 5-10 event N70 contours immediately surrounding the centreline approach on the existing runway. This reflects current operations and this increased footprint reduces in extent with the opening of the new runway. There is no impact beyond the airport boundary at the more significant 10 or 20 event N70 contours during the night period.

Table 1 on the following page summarises the observable differences between the EIS/MDP noise modelling and the noise modelling completed for the latest detailed airspace design.

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TABLE 1:
SUMMARY OF OBSERVABLE DIFFERENCES BETWEEN THE NOISE MODELLING COMPLETED FOR THE EIS/MDP AND THE LATEST AIRSPACE DESIGN

Issue	Impact	Location	Comment
Reduction in anticipated aircraft movements/delay in reaching anticipated traffic level	Reduction of expected noise impact for specific year	All	2020 day of opening scenario is now being compared with EIS 2015 scenario
Aircraft fleet developments	Reduction in noise due to quieter aircraft	All	Although quieter aircraft were anticipated in 2007, they were not able to be modelled by the FAA INM as the model did not contain those types at the time.
Introduction of smart tracking (RNP arrivals) in 2011 and 2015	Reduction in impact on most northerly approach, increase in smart tracking from the south-east, reduction in aircraft using Instrument Landing System (ILS)	South-east approaches to existing runway 01/19	Not related to new runway project. Already assessed by Airservices consistent with the EPBC Act
Changes established by CASA relating to tailwind limits for runway nomination for over-water operations	Changed circumstances around authorisation of Airservices' ability to nominate a tailwind runway of up to 10 knots in excess of the International Civil Aviation Organisation (ICAO)/ CASA 5 knot criterion. Subsequent need for an increase in movements to the south at night	Southern suburbs	Largely offset by other reductions. Not related to new runway project Airservices still able to offer a tailwind runway up to 10 knots where requested by pilot.
Changes in FAA INM	Very minor expansion of lateral boundaries, small shift from existing runway to new runway	Lateral boundaries of the N70 contours, east and west of the airport	Very minor changes, offset by other reductions

Conclusions and next steps

This assessment has found that the airspace design following the opening of the NPR in 2020 corresponds closely to the noise modelling presented in the EIS/MDP. BAC has carefully considered all aspects of the modelling and believes there is no material difference from the noise impacts developed for the EIS/ MDP. Airservices has reviewed the latest noise modelling inputs and results summarised in this report, and endorses BAC's conclusion. Correspondence to this extent is contained in Appendix 2.

Several, minor variations to the EIS/MDP noise contours have been identified by this assessment due to operational changes invoked by CASA and Airservices independent of the NPR. As anticipated in former Deputy Prime Minister, Mark Vaille's 2007 approval of the MDP, the mechanisms of the EPBC Act were applied to guide the environmental assessment and community consultation around those changes.

This report provides assurance that the anticipated impacts of aircraft noise envisaged in the EIS/MDP approved in 2007 remain largely unchanged. BAC and Airservices have worked closely together to ensure the airspace design for the new runway operations minimises aircraft noise impacts on the community to the maximum extent possible while catering for the future demand for air travel into and out of Brisbane. Noise minimisation has been considered in every phase of the airspace design finalisation process.

BAC and Airservices have continued to engage with the Brisbane community since the approval of the EIS/MDP to effectively communicate the anticipated flight path changes and noise impacts from the NPR.

Approval of the MDP was conditional on a continuing process of community engagement, increasing in focus twelve months before the opening of the runway. BAC is committed to meeting, and indeed exceeding those requirements.

The noise modelling detailed in this report will establish the primary inputs for the comprehensive suite of information to be shared with the Brisbane community from late 2018. That information will not be limited to the diagrams shown in this report. It will include a variety of means to illustrate the impact of aircraft overflights utilising the latest available technology and communications channels.



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1 Introduction

1.1 Background and purpose of this report

Current forecasts indicate that by 2035, passenger traffic into and out of Brisbane Airport will have more than doubled from the current 23 million passengers to nearly 50 million passengers each year. To meet this demand BAC is constructing a new 3300 metre runway parallel to the existing main runway 01/19, including linking taxiways, navigational aids, airfield infrastructure and airfield landscaping.

The project has recently reached an important milestone, with the finalisation by Airservices of the airspace design for the new runway system.

BAC has commissioned extensive noise modelling for the future operations of the parallel runway system. The results of the modelling present an opportunity to compare the noise impacts associated with the latest design, with those presented in the EIS/MDP approved in 2007.

The modelling will also be used to support Airservices' independent assessment of the environmental impacts of aircraft operations using current and future runway systems at Brisbane Airport, consistent with its responsibilities under the Air Services Act 1995 and EPBC Act 1999. In addition, the modelling will support the CASA's consideration of the proposed ACP to be submitted by Airservices, working in close collaboration with BAC.

That proposal will consider airspace volume changes required in the Brisbane area to support the new runway system operations, including any environmental impacts (assessed separately by Airservices). Those airspace architecture changes were identified in the EIS/MDP and underwent consultation with affected stakeholders at that time.

In the first half of 2018, BAC and Airservices have engaged with airports and airfileds in the Brisbane basin area about the required airspace architecture changes.

Preparation of this report is consistent with BAC's commitment to transparency throughout the construction phases of the new runway, both with the Brisbane public, and with aviation and environmental regulators. The report has been prepared in consultation with Airservices, which is working closely with BAC as it designs the new operational airspace. Airservices and BAC are also working closely together to keep the Brisbane community informed of the airspace changes that will result when the NPR commences operations in 2020.

1.2 Environmental assessment and approval process

Planning for the new runway commenced with the overall selection and assessment for the current site of Brisbane Airport in the early 1970s. Environmental assessments were conducted through the 1970s, with a draft EIS issued in 1978 and works on the new site commencing in 1980.

The site plans included provision for widely spaced parallel runways with a central terminal area, which has informed airport master planning for four decades.

With airport privatisation in 1997, planning and development became the responsibility of BAC under the provisions of the Airports Act 1996. Construction of major works such as a new runway must be considered by the relevant Commonwealth Minister following submission of an airport MDP and must be consistent with the airport's Master Plan, also approved by the Minister. Both the master planning process and the MDP process include rigorous environmental assessment and public consultation processes.

Commonwealth environmental legislation has been progressively modernised since the 1970s to reflect community, regulatory and environmental standards. Matters of national environmental significance now fall under the provisions of the EPBC Act. Following agreement by the relevant government agencies, the NPR was assessed under a combined regulatory EIS/MDP process which simultaneously addressed the requirements of both the EPBC and the Airports Acts.

The EIS/MDP investigated all economic, social and environmental aspects of the project, focusing on:

- impacts on the ground at the airport and its surrounds (Volume B)
- impacts on Middle Banks Moreton Bay, which was the proposed source of runway fill and surcharge (Volume C)
- noise impacts as a result of the change in airspace design and the addition of new flight tracks to accommodate parallel runway operations (Volume D).



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The EIS/MDP was approved with conditions by the Australian Government in 2007 following assessment of the technical content and an extensive consultation and comment process. A copy of the project approval letter and associated conditions is included in Appendix 1.

At the time of the EIS/MDP approval, it was anticipated that the new runway would be needed from 2015, however, the 2008 Global Financial Crisis led to a fall in aviation activity that has delayed the need for the runway until 2020. The approval conditions contemplated variable industry demand trends and allowed for this delay.

The construction phase of the project commenced in 2012 with the runway now expected to open in mid-2020. There are three major phases of work involved in the delivery of all infrastructure associated with the new runway shown above.

1.3 Approval conditions

Approval of the new runway at Brisbane Airport was granted in September 2007 by the relevant Commonwealth Ministers following two simultaneous and complementary processes under the requirements of the EPBC Act and the Airports Act 1996. The approvals included a range of conditions.

Broadly, the EPBC Act approval conditions related to management of biodiversity offsets on and around Brisbane Airport while the Airports Act approvals related to a wide range of issues to ensure construction activities were managed appropriately, including

- Environmental management of construction activities;
- Consultation with Airservices;
- Ongoing community update of project progress and aircraft noise issues; and
- Annual regulatory progress reporting.

BAC has complied with all approval conditions to date and reported annually since 2007 on its compliance with those conditions.

A number of the approval conditions related to aircraft noise, recognising that sensitivity to aircraft noise is recognised as a critical community issue and reflecting the focus given to it in the EIS/MDP.

In particular, recognition was given to the importance of Volume D from the EIS/MDP in assessing airspace and aircraft noise issues. The approval conditions include a provision that future public information should reflect the level of detail provided in Volume D as a minimum. While BAC intends to further improve the level of transparency about aircraft noise with the Brisbane community as the runway opening draws nearer, this report takes the opportunity to directly compare the outputs of the latest noise modelling with those presented in Volume D of the EIS/MDP.

The noise modelling assumptions which underpin this report will be used to prepare the necessary material for that community information update.



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1.4 Project governance

Design of airspace to support a modern, busy airport such as Brisbane is a complex task. While aircraft safety is the primary consideration for designers, efficiency, flexibility and environmental impacts are also important considerations.

Airspace design for the new runway system at Brisbane Airport has been undertaken by Airservices as a designer of instrument approach and departure procedures, certified by CASA under Part 173 of the Civil Aviation Safety Regulations 1998. The Regulations are informed by the standards of ICAO, the United Nations agency responsible for civil aviation, of which Australia is a member of the governing Council.

Developing the airspace design is a complex task involving technical assessments, approval processes and a range of stakeholder engagement requirements at each stage of the evaluation process. The design process requires the highest level of coordination, collaboration and information sharing among key industry stakeholders, particularly between BAC and Airservices.

To ensure co-ordination and collaboration between organisations as the airspace finalisation process has progressed, BAC and Airservices established the Parallel Runway Operations Steering & Implementation Group (PROSIG).

PROSIG has focused particularly on:

- monitoring consistency of airspace design with the EIS/MDP design
- considering emerging air traffic control operating methods
- ensuring integration of new technologies in managing airspace
- engagement with appropriate industry and agency stakeholders.

In establishing PROSIG, the initial focus was to develop a framework through which the lead and regulatory stakeholders involved in the development, approval and implementation of the new airspace design would work together in order to achieve a smooth transition to the new flight paths and procedures.

The second element was to outline the proposed stages for the airspace design and associated environmental assessments, at the same time highlighting the protocols that will be followed to ensure each stage is completed in a timely and efficient manner. Thirdly, PROSIG was to establish frameworks through which stakeholders can become constructively engaged and timeframes around which engagement will be initiated based on the design stage.

To consider more detail technical issues, three sub-working groups between both organisations were formed to inform PROSIG on key issues including airspace design (and architecture), community engagement and environment. The Environment and Airspace Design working groups provided technical input into the assumptions which underpin the results of noise modelling presented in this report.

In addition, BAC engaged the United Kingdom's National Air Traffic Services (NATS) to undertake a Peer Review process for the Airspace Design. NATS was selected based on their previous interactions with Airservices and major airports on capacity enhancement initiatives and from their experience in managing a number of complex airspace systems internationally. NATS were engaged during the preliminary airspace design phase of the finalisation process and were able to work collaboratively with Airservices and BAC to ensure solid design outcomes.

NATS addressed their input through participation in design working groups and the delivery of ten separate work packages.

A simplified Community and Government Report prepared by NATS which summarises findings is included at Appendix 4.

Airspace design for the new runway system at Brisbane Airport has been undertaken by Airservices as a designer of instrument approach and departure procedures, certified by CASA under Part 173 of the Civil Aviation Safety Regulations 1998.



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2 Airspace design and noise modelling approach

2.1 Airspace design

The airspace design used in the EIS/MDP reflected a high-level concept of operations which could then be used to develop indicative flight paths and build indicative noise models. It was always envisaged that modelling may change somewhat as preliminary and then final airspace design work was undertaken closer to the commencement of operations.

That said, the concept of operations used for the EIS/MDP has continued to guide the design of the final airspace, recognising that it forms the basis of the environmental approval process and community support for the project.

In May 2016, a review to the design presented in the EIS/MDP was undertaken by PROSIG during which three models were evaluated as the preferred methodology for the selection of flight termination procedures for the Parallel Runway System at Brisbane Airport.

The three models were:

- Point Merge – a new traffic sequencing model which has been adopted in some overseas ports
- Closed STARs – the existing basis of existing operations in Brisbane
- Open STARs – the existing basis of existing operations used in Sydney.

All models were designed to meet operational requirements for independent simultaneous aircraft operations on parallel runways in accordance with existing or emerging ICAO documents and the CASA Manual of Operational Standards (MOS). The CASA MOS guidelines and rules covering parallel runway applications have been used in the development of the flight paths associated with proposed operations at Brisbane Airport.

The conclusion of the evaluation is summarised below:

- Each of the models could be implemented safely
- All models, with minor amendments, could deliver consistency in the N70 footprints included in the EIS/MDP
- The point merge option performed best in terms of throughput and delay, however on average it consumed the most distance, fuel and time. Departing turbo-prop aircraft experienced significant impacts to their preferred operating altitudes
- The Runway 01 open and closed Standard Terminal Arrival Route (STAR) scenarios provided the greatest amount of holding, due to having the shortest average STAR distance, providing less distance and flexibility for speed control and vectoring by air traffic controllers
- Open STAR and Closed STAR have a great deal of commonality in flight path selection, efficiency and capacity performance and a Closed STAR flow can be switched to a vectored or Open STAR arrival conveniently
- The simplest trajectory for training and transition is the Closed STAR model
- Airline stakeholders were presented with the three models and agreed the Closed STAR as the preferred model to underpin the final design
- In general results in aircraft operating at increased altitudes in the Brisbane Extended Manoeuvring Area (areas outside the extents of N60 and N70 contours).

The latest airspace design aims to incorporate international best practices and emerging Performance Based Navigation technologies (satellite based technologies). The use of STARs increases predictability for both airlines and air traffic management. Strategic separation between departures and arrivals means less intervention from air traffic control and reinforces safety outcomes.

The latest design has incorporated the following technical features:

- Closed STARs for modern enabled fleet, and conventional Instrument Landing System approaches retaining legacy high-side/low-side intercept of the localisers for legacy fleet
- Closed STARs based on highly precise RNP-AR approach procedures which aim to eliminate the high/low legacy operational requirement, allowing reduced track miles for aircraft and optimised continuous descent operations where possible as well as avoidance of noise sensitive areas wherever possible
- Open STARs for some legacy fleet operations that when conditions are suitable will enable runway efficiencies and maximise capacity
- A majority of closed Standard Instrument Departures (SIDs) for jet operations that enable an air traffic control solution for crossing departure and arrival tracks thereby reducing interaction and workload for air traffic controllers
- Free climb for the majority of departing aircraft at climb gradients that airlines have confirmed are readily achievable even at maximum weights
- A design that allows equitable access to airspace for Sunshine Coast, Gold Coast, Amberley and Archerfield airports across all modes of operation at Brisbane Airport

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- Application of Safety-By-Design principles to identify known areas of operational risk outside the Brisbane Terminal Control Unit
- Airspace sectorisations that includes Director East and West positions to provide a foundation for maintaining fully independent and safe runway operations as much as possible across a wide range of weather conditions.

The noise modelling results presented in this report is based on the Airservices design version 21.1 (13 November 2017). Appendix 12 contains a summary of all flight tracks included in the latest design. What flight tracks are used depend on a range of operational factors such as weather conditions, time of day, demand or fleet mix.

2.2 Modes of Operation

The following modes of operation were adopted for the EIS/MDP. In summary, the parallel runway system achieves maximum capacity using either modes 3 or 4, respectively southerly or northerly flow. Modes 3a and 4a respectively, can achieve high, but sub-maximum capacity while restricting movements to the south of the new runway. Mode 1 can achieve levels of capacity similar to the current main runway while having most movements occur over Moreton Bay, with the exception of limited non-jet departures. Mode 2 would be reserved for low-capacity (night time) use when weather conditions were not suitable for full simultaneous opposite direction operations.

Figure 1 shows the preference of use and use depends on weather or traffic demand for the runway.

2.3 Noise modelling inputs

Broadly speaking, modelling of aircraft noise needs to consider a number of factors that can impact the noise experienced on the ground by residents including:

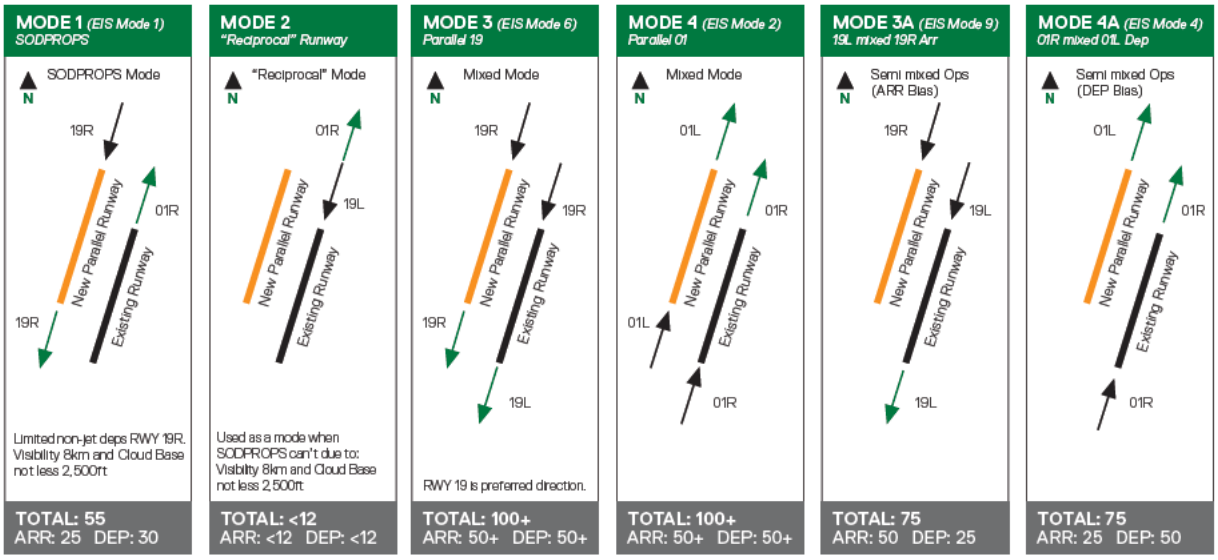
- How many aircraft will use the airport?
- What type of aircraft will use the airport?
- Where will they be flying to/from?
- What runway will they use and in what direction will they approach or leave the runway?
- How will the aircraft be configured?
- What are the meteorological conditions likely to be?
- What time of day will the flights occur?

While it is not possible to predict with certainty many of these inputs, historical data, passenger demand, industry trends and operational constraints enable informed predictions to be made. It can also be useful to examine the likely effects of changes in the inputs to compare their likely effect on community noise exposure. As examples:

- an increase in the number of aircraft movements will result in a direct increase in noise exposure, all other inputs being equal
- an increase in aircraft size may result in fewer aircraft movements being needed for the same passenger demand
- aircraft flying to a more distant location will require more fuel will be heavier, and will therefore require more power to take-off, generating more noise. Conversely, aircraft taking off for closer destinations will tend to be lighter and quieter
- Night time aircraft movements are assumed to be more disruptive to communities than day time movements, and
- a change in an aircraft overflight taking place over Moreton Bay, rather than a residential area, will consequently result in a significant decrease in residential areas affected by aircraft noise.

The approach taken to noise modelling on the latest airspace design has been to adopt the same inputs used in the EIS/MDP where possible and only adopt updated inputs where they reflect changes in operations or conditions since

FIGURE 1:
MODES OF OPERATION FOR PARALLEL RUNWAYS



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2007. Inputs may have changed as a result of policy, technology, updated data availability or industry changes.

Only altering inputs that have changed allows for the closest comparison possible of how the noise impacts of the latest airspace design are or are not materially different to the impacts of the designs set out in the EIS/MDP.

A review of inputs was completed with the following inputs identified as having changed since the EIS/MDP.

- Aircraft movement forecast
- Fleet mix and modernisation
- Origin and destination of flights
- Modes of operation – runways used
- Weather data
- Runway allocation
- Track spreading after take-off or before final approach
- Noise modelling software including updates for next generation aircraft

The following sections examine each of the key modelling inputs, which inputs have changed, and possible reasons for those changes.

Appendix 3 contains a summary of data inputs used to conduct the noise modelling presented in this report.

2.4 Aircraft Movement Forecasts

Generally speaking, when developing forecasts for the future number of aircraft movements, forecasters will adopt a dual approach of analysing 'top-down' economic factors and 'bottom-up' scheduling and network factors.

For example, demand for air travel can be predicted in broad terms by using forecast trends in economic growth, combined with past, experienced links to demand for air travel, known as demand elasticities.

Forecasters can also use broad trends in aircraft size and load factors to convert passenger forecasts to aircraft movement forecasts. Aircraft movement growth is normally lower than passenger growth due to a general increase in aircraft size and improved capacity management by airlines.

As a check, 'bottom-up' analysis of airline scheduling and route analysis ensures forecasts are realistic and reflect real operational airline scenarios. An iterative process ensures the approaches align as well as possible to give the most accurate possible prediction of future activity at the airport.

Generally, air travel is not uniform over a year and the number of daily flights will fluctuate on a monthly and weekly basis to account for when passengers have a strong propensity to travel such as school holidays, Easter and Christmas periods. When considering aircraft noise, the number of aircraft movements at an airport is more relevant that passenger numbers.

Changes in aircraft movement forecasts occur due to a number of influences such as supply of airline services (frequency or aircraft size), tourism promotions or industry demand (e.g. recent resource sector high demand).

Table 2 shows how annual aircraft movement projections have changed in the longer term since the EIS/MDP. Since then forecasts have been impacted by the Global Financial Crisis which saw airlines generally stop or reduce frequency of certain services as well as by the introduction of a Runway Demand Management Scheme (RDMS) at Brisbane Airport in 2013.

While the RDMS was implemented to improve the management of runway capacity on the existing single main runway, BAC will likely adopt the same operating procedures for the new runway system.

Generally, air travel is not uniform over a year and the number of daily flights will fluctuate on a monthly and weekly basis to account for when passengers have a strong propensity to travel such as school holidays, Easter and Christmas periods.

TABLE 2:
ANNUAL AIRCRAFT MOVEMENT FORECASTS

	2007 EIS/MDP pg. A2-51, Table 2.4D	Latest forecasts
2015 (EIS) now 2020	272 000	203 000
2025	324 000	251 000
2030	373 000	292 500
2035	393 000	329 000



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Annual figures are then translated into a typical busy day profile by creating model schedules based on those figures combined with predictions about future operations such as:

- The introduction of new origins and destinations
- Seasonal only services
- Increased or decreased frequency on city pairs
- Timing for introducing new aircraft

Figure 2 compares a busy day profile used in the MDP to the latest busy weekday forecasts.

These profiles translate into a busy day total forecast as follows in Table 3.

TABLE 3:
FORECASTS FOR A TYPICAL BUSY DAY

	2007 EIS/ MDP Fig 2.5f pg. A2-57	Latest forecast daily movements
2020	721	726
2035	1255	1134

In summary, aircraft movement numbers have declined since the EIS/MDP, mostly due to the effect of the 2008 Global Financial Crisis and subsequent modest economic growth. Comparisons between the latest busy day forecasts for 2020 are similar to those for 2015 when the EIS/MDP was carried out.

Forecasts for the 2035 busy day are almost 10 per cent lower.

There has also been a spreading of the expected morning and evening peaks, due partly to the decline of mining construction activity since the EIS/MDP, and the controls imposed by the introduction of Runway Demand Management Scheme in 2013.

2.5 Fleet mix

The type of aircraft included in the noise modelling have been selected because they are representative of aircraft currently operating at Brisbane Airport or closely represent aircraft expected to operate at Brisbane Airport in the future. While BAC does not directly control decisions about airline fleet mix, it works closely with airline customers to understand factors driving fleet planning including forward orders.

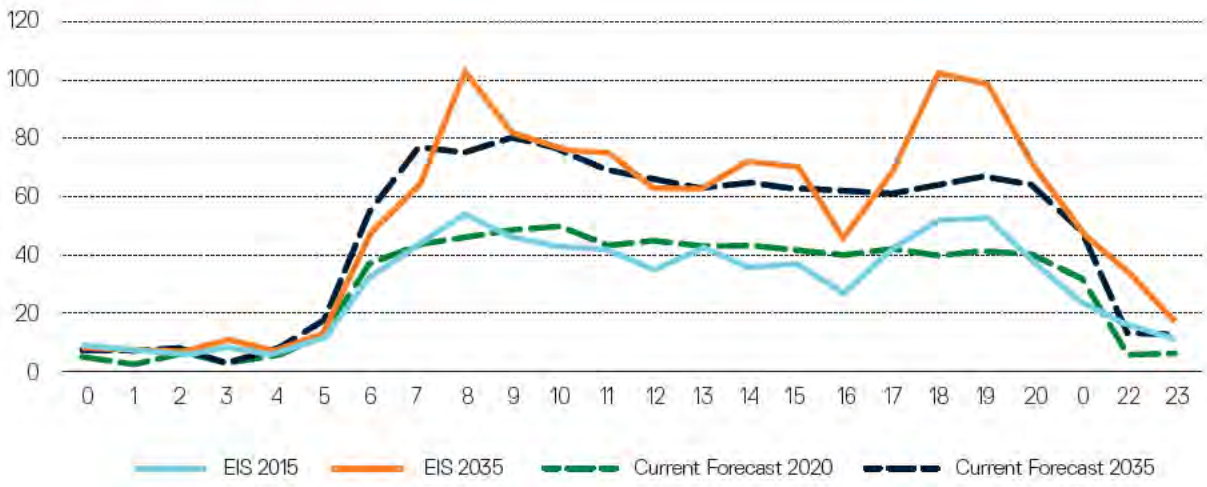
While modern aircraft can be maintained to safely operate for over thirty years, maintenance costs generally tend to increase as aircraft age. Also, aircraft manufacturers strive to improve efficiency, passenger comfort and environmental standards with each new generation of aircraft. Australia's major domestic airlines, Qantas and Virgin Australia, operate fleets with an average age in the range of approximately 7-11 years.

In the time since the EIS/MDP, there have been a number of new, more efficient and quieter aircraft introduced into the fleet operated by airlines at Brisbane Airport. The following table (Table 4) compares the fleet mix which was modelling in the EIS/MDP with the current forecast fleet mix as well as some aircraft which are soon to be introduced by major Australian airlines.

Aircraft introduced into the fleet mix since the EIS/MDP and subsequently modelled for this report using the INM include the:

- A380 (modelled as an A340 in the EIS/MDP)
- 777X (modelled as a 777300 in the EIS/MDP)
- B787800 (not modelled in the EIS/MDP)
- B737 MAX (not modelled in the EIS/MDP)
- A321, A320 NEO and A321 NEO (not modelled in the EIS/MDP)

FIGURE 2:
TYPICAL BUSY DAY PROFILE FORECAST



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TABLE 4:
CHANGES TO FLEET MIX FOR USE IN INM SINCE THE EIS/MDP

		% OF FLEET MIX			
		EIS/MDP FORECASTS (PAGE D4-63 TABLE 4.2a)		LATEST FORECASTS	
AIRCRAFT CLASS	INM TYPE	2015	2035	2020	2035
A380	A340	100	100	0	0
Very Large Wide Body	A380-861	NA	NA	100	100
Large Wide Body	74720B	5	0	0	0
	747400	50	10	0	0
	777300	45	90	100	0
	777X	NA	NA	0	100
Medium Wide Body	777200	50	100	0	0
	A350	NA	NA	15	30
	A330	30	0	57	20
	A340	20	0	0	0
	7878R	NA	NA	28	50
Small Wide Body	767300	15	0	0	0
	777200	85	100	0	0
Large Narrow Body	737400	10	0	0	0
	737800	70	20	72	0
	737MAX	NA	NA	8	80
	A320	20	80	14	0
	A320 NEO	NA	NA	2	11
	A321	NA	NA	3	0
	A321 NEO	NA	NA	1	9
Small Narrow Body	737300	0	-	0	0
	737700	100	-	0	0
Regional Jet	717200	85	95	35	0
	BAE300	0	0	0	0
	F10065	10	0	0	0
	LEAR35	5	5	0	0
	EMB190	NA	NA	65	100
FREIGHT B727	727EM2	-	-	0	0
FREIGHT B737	737300	50	0	17	0
	737400	NA	NA	43	43
	737700	50	100	40	57
FREIGHT BAe146	BAE300	60	0	0	0
	F10065	40	100	100	100
Large Turboprop	DHC830	100	100	100	100
Medium Turboprop	DHC830	100	100	100	100
Small Turboprop	DHC6	100	100	100	100
Small RPT	CNA441	100	0	100	100
General Aviation	CNA441	100	100	100	100

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2.6 Seasonality and Weather

The time of year can influence the number of aircraft operating at any particular airport. Operating seasons are influenced by:

- Airline operating schedules
- Daylight savings changes in Eastern Australia
- Weather changes particularly related to wind direction

There are two distinct seasons for operations at Brisbane Airport. Summer is defined as October to March and winter is from April to September each year. The EIS/MDP adopted the same definitions for each season.

Noise contours associated with summer operations contain more movements and therefore the noise contours are slightly larger. For this reason, summer scenarios have been selected to assess material change as the footprints are larger than winter noise contours. This means the worst-case scenario was used to assess if there are any material differences between the aviation noise impacts forecast in the EIS, and those forecast in this report.

The modelling presented in the EIS/MDP was based on a decade of weather (wind and temperature) data from 1996- 2005. The more recent decade of weather data (2007-2016) was assessed to check if there had been any significant change of weather parameters in the last decade. The assessment showed that there had been no significant change in averages over the latter decade. The latter decade of data has been used in the modelling for this report as it has no effect on the noise modelling outputs.

2.7 Origin and destination of flights

In constructing a model timetable for the airport, assumptions need to be made about the expected origin and destination of aircraft.

In general, aircraft flying to more distant destinations will tend to be larger and carry more passengers, thus requiring more fuel and power to take-off. Because of the fuel requirement, equivalent aircraft will exhibit a higher noise profile in the model if they are travelling to a longer-range destination.

Therefore, changes in economic growth or individual tourism markets might result in some changes to forecast origin and destination flights. For example, a relative shift from European markets to south-east Asian markets might lead to a trend in smaller, shorter-range flights. Similar effects could take place domestically, with a reduction in flights to western Queensland mining sites and other changes to individual interstate markets.

In addition, the concept of operations used in the EIS/MDP envisaged most aircraft departing to or arriving from southerly and easterly airports to use the current runway. Most aircraft departing to or arriving from northerly and westerly airports will use the new runway. The prepared CONOPS developed through the airspace finalisation process adopts this principle.

2.8 Runway Allocation

In constructing a model timetable for the airport, assumptions also need to be made about the expected runway each aircraft will use. This will in turn determine the flight path for the aircraft which is critical for its noise profile.

As outlined above, origin or destination of the aircraft movement is an important factor determining which runway will be used.

Operational matters need to be considered to ensure runway allocation in the model is feasible and realistic. The model, and indeed residents' exposure to aircraft noise will be most sensitive to changes in mode, i.e. whether the airport is operating in a northerly or southerly flow. In general, aircraft departing to arriving from the north will have minimal noise impact as the aircraft will track over Moreton Bay. The noise impact to the south will differ depending on whether the aircraft is arriving or departing.

The ability to maximise over-bay operations at night by allocating aircraft to simultaneous or close to simultaneous northerly departures on the existing runway and southerly arrivals on the new runway is an important element to minimise night time noise over southern suburbs. The EIS/MDP outlined the use of these modes, known respectively as Simultaneous Opposite Direction Parallel Runway Operations (SODPROPS) and Dependent Opposite Direction Parallel Runway Operations (DODPROPS). The use of DODPROPS in the EIS/MDP was proposed for circumstances which allowed for aircraft to operate in a similar way to SODPROPS, but with a tailwind component of up to ten knots when Air Traffic Control (ATC) nominated to do so.

Recent advice from CASA to Airservices (August 2017) has indicated that it is the responsibility of the pilot of the aircraft whether to accept a ten knot tailwind rather than ATC. To reflect this in the noise modelling, DODPROPS has been removed and it is assumed that 40 per cent of the SODPROPS operations at Brisbane Airport will be achieved based on pilots accepting between five and ten knot tailwinds. This assumption reflects current operations since the advice from CASA.

2.9 Track Spreading

The extent to which aircraft flight tracks are concentrated over a narrow line or spread over a wider track can affect the perception of noise on the ground.

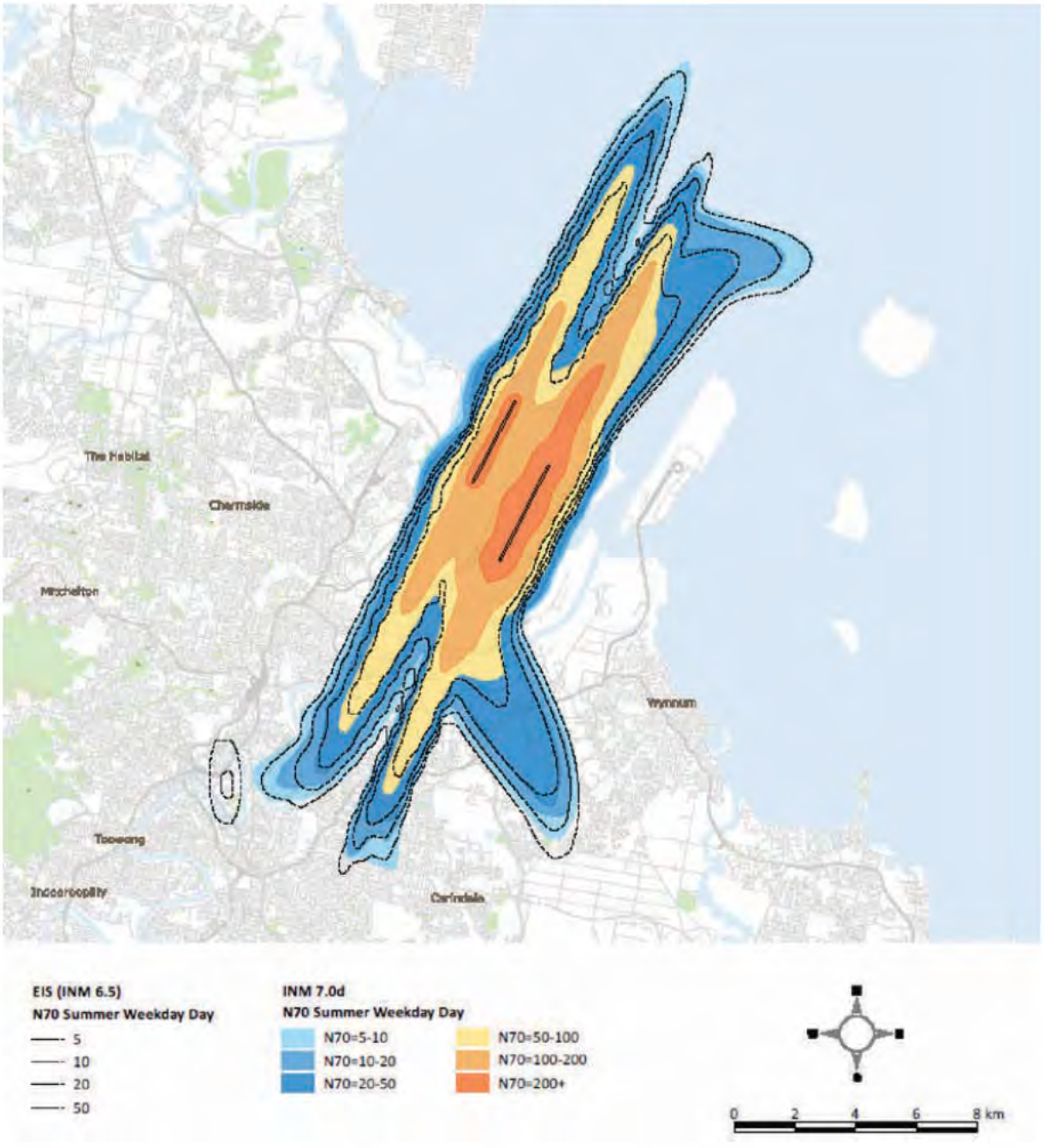
On take-off, an aircraft is typically allocated to a pre-defined waypoint close to the airport, either by ATC, or by the aircraft's flight management system. After this point the aircraft may follow a number of pre-defined tracks towards its ultimate destination.

Similarly, on approach, there are operational differences as to how an aircraft will approach the airport, up to the final approach where aircraft general need to be precisely aligned with the runway. There are a number of factors influencing which approach an aircraft will follow:

- Aircraft need to be safely separated
- Operational safety is generally enhanced by repetition and predictability
- The performance capability of the aircraft for its size, power and manoeuvrability
- Modern aircraft tend to be equipped with precise, satellite-based, navigation systems and pilots trained in their use
- Satellite-based systems allow curved, gradual descent approaches which are safer and relatively quieter than traditional 'straight in' or 'stepped' approaches. However, these approach paths can result in a more concentrated pattern of noise exposure for some residential areas.
- Air traffic controllers may use radar-vectoring of aircraft to control approaching aircraft. This approach is less commonly used than in the past and can be expected to decline further in the future as fleets modernise.

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FIGURE 3:
COMPARISON RESULTS BETWEEN USING INM VERSION 6 AND INM VERSION 7D



In general, it is expected that aircraft flight tracks will exhibit less spreading than modelled in the EIS/MDP.

One particular approach path (an RNP approach) to the existing runway from south-east of the airport was introduced by Airservices in 2011 after conducting an extensive trial and environmental assessment. Appendix 5 contains a summary assessment report prepared by Airservices at the time.

Analysis of the effect of this change shows that flights that previously distributed noise over the suburbs of Cannon Hill and Murarrie were now overflying the suburb of Carina. The impact on the suburb of Carina is comparatively lower than the decrease in impact over Cannon Hill and Murarrie. This is reflected in current operations and essentially resets the baseline for comparison purposes.

Airservices have made other minor changes to airspace management since the EIS/MDP. For completeness, each of those changes have been documented and summarised in Appendix 6.

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TABLE 5:
NEXT GENERATION AIRCRAFT NOISE PROFILES

Next Generation Aircraft	Existing aircraft	Noise correction of existing aircraft on departure (dB)	Noise correction of existing aircraft on arrival (dB)
A320 NEO	A320-211	-3.3	-2.4
A321 NEO	A321-232	-3.5	-1.1
B737 MAX	B737-800	-4.2	-2.3

2.10 Noise Model Software

The INM, developed by the United States FAA, is a computer model that evaluates aircraft noise impacts in the vicinity of airports. The INM is the worldwide industry standard for analysis of aircraft noise and has many uses, including:

- assessing current aircraft noise impacts around airports
- assessing changes in noise impacts resulting from new or extended runways or runway configurations
- assessing changes in noise impacts resulting from new traffic demand and/or fleet mix, and
- evaluating noise impacts from new operational procedures.

Like all computer software, the INM follows a development cycle with new versions released from time to time. INM Version 6 was the current version in 2006 and was used to develop the noise contours presented in the suite of EIS/MDP documentation. Since then, newer versions of the software have been developed to incorporate new aircraft performance data based on actual operations and to include new aircraft types. The latest version of the software is Version 7D.

In order to assess the sensitivity of the noise contours to the different versions of the INM software, the input files from the EIS/MDP were loaded into the latest version, 7D, allowing a comparison of the noise contours based on the latest design with those presented in the EIS/MDP. The comparison is illustrated in Figure 3.

The results suggest that in Version 7D, some slight lateral extension to the contours occurs, principally along the sides of each runway. The extent of the contours at the runway ends is more balanced with some extension on the NPR and retraction of contours on the existing runway. The results of testing the software alone suggest that the version of INM software used would not cause any material change to noise contours. For this reason, INM version 7D was selected to complete the modelling of contours included in this report.

More recently, the FAA has replaced the INM software with the Aviation Environmental Design Tool (AEDT). AEDT is not widely used in Australia, although it is likely to be implemented from 2019 onwards. The key difference between AEDT and INM is that AEDT has incorporated more noise profiles of new and emerging aircraft, some of which are not represented in INM.

INM Version 7D does not include all noise profiles for next generation aircraft including Boeing 737 Max and Airbus 320 and 321 NEOs. Major airlines operating at Brisbane Airport including Qantas and Virgin Australia have placed orders for delivery of these aircraft from late 2019 onwards. To reflect the use of the next generation aircraft in the modelling standard noise profiles of the existing B737-800, A320 and A321 aircraft have been modified to account for the introduction of these aircraft which will be commonly used at Brisbane Airport once the new runway system is operating. These modifications form a series of noise corrections derived from current aircraft noise certification data and have been set out in Table 5.



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3 Results of the noise modelling

THE 2007 EIS/MDP ILLUSTRATED A RANGE OF SCENARIOS TO TAKE ACCOUNT OF SEASONAL, TIME OF WEEK, AND TIME OF DAY DIFFERENCES. N70 CONTOURS WERE PRODUCED FOR SCENARIOS INCLUDING PRE-OPENING, DAY OF OPENING AND 2035:





Season — Summer — Winter

Time of week — WEEKDAY — WEEKEND

Time of day — **Day** (6am to 6pm) — **Evening** (6pm to 10pm) — **Night** (10pm to 6am)

For this report, comparisons between the 2007 EIS/MDP and current modelling are focussed on the scenario with the larger noise footprints, i.e. summer weekdays. International practice, albeit in a northern hemisphere context, has used summer scenarios to measure community reaction. Experience suggests community sensitivity is likely to be heightened for several reasons.

These are: atmospheric conditions in summer tend to propagate noise more widely; residents are more likely to be outside or have doors and windows open; and summer holiday travel leads to more aircraft movements. In Brisbane, there is an additional sensitivity caused by the relative time difference with southern states in summer due to daylight savings. This leads to extra demand for services from 5am to 6am as business travellers' travel to southern capitals for the business day.

The report uses comparisons of the N70 contours from the day of opening scenarios (now 2020, anticipated to be 2015 at the time of the EIS) and the 2035 scenarios, with illustrations of the EIS contours shown directly against the latest noise modelling. The comparisons are shown for summer weekday days (6am to 6pm) (Figure 4), evenings (6pm to 10pm) (Figure 5) and nights (10pm to 6am) (Figure 6) for each time period for the 5-9 70dB(A) event contour and 2-4 70dB(A) event contour for night time. Comparisons for all 70dB(A) event contour levels are contained in Appendix 7.

It was considered relevant to depict just before and just after runway opening scenarios to confirm the delivery of net improvements to those areas subjected to aircraft overflight by operations on the current runway system. These comparisons are included in Appendix 8.

While there are some minor boundary differences, mostly of a small reduction in the noise footprint, there are no material differences between the noise impacts envisaged in the EIS/MDP and the latest design.

The most noticeable change in the contours occurs to the south-east of the airport due to the introduction of new, satellite-based approach procedures by Airservices since the EIS was completed. These procedures are already in place for the existing runway 01/19 and are unrelated to the new runway. Appendix 5 contains a summary assessment report prepared by Airservices relating to this procedure which found that there were no significant noise impacts.

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FIGURE 4:
N70 CONTOUR COMPARISON BETWEEN THE LATEST DESIGN AND THE EIS/MDP – 2020 SUMMER WEEKDAY DAY



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FIGURE 5:
N70 CONTOUR COMPARISON BETWEEN THE LATEST DESIGN AND THE EIS/MDP - 2020 SUMMER WEEKDAY EVENING



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FIGURE 6:
N70 CONTOUR COMPARISON BETWEEN THE LATEST DESIGN AND THE EIS/MDP – 2020 SUMMER WEEKDAY NIGHT



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This assessment has also found that, compared to the noise modelling in the EIS/MDP, there has been some localised increase in the forecast noise footprint of the lower number-above contours, specifically the night time 2-4 and 5-10 event N70 contours immediately surrounding the centreline approach on the existing runway (Appendix 9).

These extensions reflect current operations and demand and improves with the opening of the new runway. There is no impact beyond the airport boundary at the more significant 10 or 20 N70 event contours.

This effect can be explained by the sensitivity to the modelling of the 2-4 event contour on very minor changes to the model inputs. The CASA advice to Airservices regarding runway nomination criteria for tailwind operations to facilitate reciprocal runway operations at night has led to a prediction that, on average, one wide body and three narrow bodied aircraft will land from the south on the current runway between 10pm and 6am on a summer weekend night, compared the EIS /MDP forecast of no wide bodies and two narrow bodies. Because of the low baseline of the EIS forecast, the visual depiction of the difference is very noticeable. However, the actual noise impact of this difference on affected communities is not considered to be materially different to the impacts assessed in the EIS /MDP.

In 2012, the National Airports Safeguarding Advisory Group, comprising of Commonwealth, State and Territory Government planning and transport officials, the Australian Government Department of Defence, CASA, Airservices and the Australian Local Government Association developed the National Airports Safeguarding Framework (NASF).

NASF was established to improve community amenity by minimising aircraft noise-sensitive developments near airports and to improve safety outcomes by ensuring aviation safety requirements are recognised in land use planning decisions through a series of guidelines. One of the guidelines provides advice on the use of a complementary suite of noise metrics including frequency-based noise metrics such as the N60. While this metric was not included in the EIS/MDP at the time meaning no comparisons can made, Appendix 10 contains N60 metrics on the latest design for summer night time operations.

Table 6 summarises the observable differences between the EIS/MDP noise modelling and the latest noise modelling consistent with the detailed airspace design.

TABLE 6:
SUMMARY OF INFLUENCES ON NOISE MODELLING RESULTS

Issue	Impact	Location	Comment
Reduction in anticipated aircraft movements/delay in reaching traffic numbers forecast in the EIS/MDP.	Reduction of expected noise impacts for specific year.	All.	2020 day of opening scenario is now being compared with EIS /MDP 2015 scenario.
Aircraft fleet improvements.	Reduction in noise due to the introduction of quieter aircraft.	All .	Although quieter aircraft were anticipated in the EIS/MDP, they were not able to be modelled by version of the the FAA's INM at the time.
Introduction of RNP in 2011.	Reduction in impact on most northerly approach, increase in smart track from the south-east, reduction using instrument landing system.	South-east approaches to existing runway 01/19.	Not related to new runway project. Already assessed by Airservices consistent with the EPBC Act.
Changes established by CASA relating to tailwind limits for over-water operations.	Changed circumstances around authorisation of tailwind take-offs up to 10 knots (pilot nomination instead of ATC nomination). Subsequent need for an increase in movements to the south at night.	Southern suburbs.	
Changes in FAA INM.	Very minor expansion of lateral boundaries, light shift from existing runway to new runway.	Lateral boundaries of the N70 contours, east and west of the airport.	Very minor changes, offset by other reductions. Not considered to be materially different to the EIS.

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4 Suburb analysis and comparison

THE N70 NOISE CONTOURS PRODUCED FOR THE EIS/MDP WERE ASSESSED ON A SUBURB BY SUBURB BASIS. THE EIS/MDP DETAILED THE PERCENTAGE OF A SUBURB WHICH WAS EXPECTED TO EXPERIENCE AN INCREASE OR DECREASE OF 10 OR 20 FLIGHTS OR MORE. THIS ASSESSMENT HAS BEEN REPLICATED FOR THE LATEST DESIGN.

The change in suburb area cover has been summarised in Table 7.

It shows that the overall area expected to experience 70dB events or more will generally decrease when compared to the EIS/MDP. The most significant percentage changes can be seen with Eagle Farm and Brisbane Airport. This is due to a realignment of suburb boundaries after the EIS. The contours covering these suburbs are over industrial land and therefore no residential areas are impacted in these suburbs.

When compared to the EIS/MDP suburbs expected to see a reduction in the area covered by an increase of 20 flights or more during a summer weekday include Ascot, Balmoral, Bulimba and Hendra. Some suburbs are expected to see a slight increase in area coverage of 20 flights or more including Banyo, Hamilton, Morningside, Nudgee and Nudgee Beach.

Table 7 shows similar reductions compared to the EIS/MDP in contour coverage for evening operations as well as highlighting those suburbs forecast to a higher percentage of area covered by contours. Night time results included in Table 7 show larger variations in suburb cover which is expected due to the low number of movements. Adding one flight to this scenario can change the percentage by 50%.

To allow comparison across affected suburbs, and a total overall comparison between the noise modelling in the EIS/MDP and the modelling which underpins the latest design, a quantitative analysis has been undertaken using The Person Events Index (PEI) developed by the then Commonwealth Department of Transport and Regional Services in the late 1990s. The PEI assessment has been undertaken based on the 2016 Census data and a copy of the report is contained in Appendix 11.

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TABLE 7:
SUBURB ASSESSMENT COMPLETED AS PART OF THE EIS/MDP (REFER EIS/ MDP D5-143)

	Summer Weekday Day						
	2020 Without NPR	2020 With NPR					2020 Without NPR
		% of Suburb (% Suburb area stated in EIS/MDP)					
Suburb	Range of N70 Flights within Suburb	Range of N70 Flights within Suburb	Increase of 20 flights or more	Decrease of 20 flights or more	Increase of 10 flights or more	Decrease of 10 flights or more	Range of N70 Flights within Suburb
Albion	0 - 4	0	0%	0%	0%	0%	0 - 1
Annerley	0	0	0%	0%	0%	0%	0
Ascot	0 - 2	0 - 50	11% (21%)	0%	18% (38%)	0%	0 - 2
Balmoral	0 - 4	1 - 25	36% (40%)	0%	70% (79%)	0%	0
Banyo	0	0 - 30	5% (0%)	0%	12%	0%	0
Belmont	0 - 3	0	0%	0%	0%	0%	0 - 1
Bowen Hills	0 - 3	0	0%	0%	0%	0%	0 - 1
Brisbane Airport	0 - >100	0 - >100	41%	36%	48%	40%	0 - 100
Bulimba	0 - 9	0 - 30	8% (9%)	0%	19% (35%)	0%	0 - 3
Camp Hill	0 - 10	0 - 8	0%	0%	0%	0%	0 - 4
Cannon Hill	3 - 70	1 - 25	0%	13% (13%)	0% (9%)	61%	0 - 20
Carina	0 - 15	0 - 10	0%	0%	0%	4%	0 - 5
Carindale	0 - 10	0 - 8	0%	0%	0%	0%	0 - 3
Chandler	0	0	0%	0%	0%	0%	0
Brisbane City	0	0	0%	0%	0%	0%	0
Coorparoo	0 - 5	0 - 1	0%	0%	0%	0%	0 - 1
Dutton Park	0	0	0%	0%	0%	0%	0
Eagle Farm	0 - >100	2 - 90	36%	40%	43%	44%	0 - 40
East Brisbane	0 - 1	0 - 2	0%	0%	0%	0%	0
Fairfield	0	0	0%	0%	0%	0%	0
Fortitude Valley	0	0	0%	0%	0%	0%	0
Gordon Park	0	0	0%	0%	0%	0%	0
Greenslopes	0	0	0%	0%	0%	0%	0
Gumdale	0	0 - 1	0%	0%	0%	0%	0
Hamilton	0 - 50	0 - 50	27% (24%)	4%	33% (30%)	9%	0 - 15
Hawthorne	0 - 1	2 - 15	0%	0%	34% (56%)	0%	0
Hemmant	0 - 20	0 - 30	0%	0%	0%	0%	0 - 4
Hendra	0	0 - 50	4% (5%)	0%	10% (19%)	0%	0
Herston	0	0	0%	0%	0%	0%	0

1. Green shading indicates suburbs where modelling predicts fewer overflights compared to the EIS/MDP.

2. Orange shading indicates suburbs where modelling predicts an increase in overflights compared to the EIS/MDP.

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Summer Weekday Evening					Summer Weekday Night			
	2020 With NPR				2020 Without NPR	2020 With NPR		
	% of Suburb (% Suburb area stated in EIS/MDP)					% of Suburb (% Suburb area stated in EIS/MDP)		
Range of N70 Flights within Suburb	Increase of 10 flights or more	Decrease of 10 flights or more	Increase of 5 flights or more	Decrease of 5 flights or more	Range of N70 Flights within Suburb	Range of N70 Flights within Suburb	Increase of 2 flights or more	Decrease of 2 flights or more
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0 - 15	8% (17%)	0%	10% (35%)	0%	0	0	0%	0%
0 - 11	15% (13%)	0%	59% (82%)	0%	0	0	0%	0%
0 - 4	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0 - 50	26%	25%	36%	33%	0 - 40	0 - 20	16%	22%
0 - 13	3% (7%)	0%	13% (35%)	0%	0	0	0%	0%
0 - 3	0%	0%	0%	0%	0 - 2	0 - 1	0%	0% (2%)
0 - 9	0%	1% (6%)	0%	18% (64%)	0 - 7	0 - 5	0%	0%
0 - 5	0%	0%	0%	0%	0	0	0%	0%
0 - 3	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0 - 20	31%	30%	35%	41%	0 - 10	0 - 7	0%	6%
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0 - 15	20% (22%)	1% (0%)	27% (31%)	7% (0%)	0 - 5	0 - 4	0%	0%
0 - 6	0%	0%	6% (51%)	0%	0	0	0%	0%
0 - 5	0%	0%	0%	0%	0 - 1	0 - 1	0%	0% (66%)
0 - 15	2% (4%)	0%	3% (16%)	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%

3. Where no EIS/MDP percentage of area has been included on this table, the percentage is the same as the EIS/MDP.

4. The EIS/MDP information referenced in this table is contained in the EIS/MDP Volume D Table 5.4 pages D5-143 and D5-144.

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	Summer Weekday Day						
	2020 Without NPR	2020 With NPR					2020 Without NPR
			% of Suburb (% Suburb area stated in EIS/MDP)				
Suburb	Range of N70 Flights within Suburb	Range of N70 Flights within Suburb	Increase of 20 flights or more	Decrease of 20 flights or more	Increase of 10 flights or more	Decrease of 10 flights or more	Range of N70 Flights within Suburb
Highgate Hill	0	0	0%	0%	0%	0%	0
Holland Park	0	0	0%	0%	0%	0%	0
Kangaroo Point	0	0	0%	0%	0%	0%	0
Lutwyche	0 - 2	0	0%	0%	0%	0%	0
Morningside	0 - 80	0 - 30	3% (0%)	12% (4%)	0% (1%)	26% (44%)	0 - 20
Murarrie	0 - 90	0 - 40	0%	16%	0%	0%	0 - 20
New Farm	0	0 - 5	0%	0%	0%	0%	0
Newstead	0 - 4	0	0%	0%	0%	0%	0 - 1
Norman Park	0 - 15	0 - 10	0%	0%	0%	0%	0 - 4
Northgate	0	0 - 10	0%	0%	22% (0%)	0%	0
Nudgee	0	0 - >100	18% (0%)	0%	4%	0%	0
Nudgee Beach	0	0 - >100	3% (0%)	0%	0%	0%	0
Nundah	0	0	0%	0%	0%	40%	0
Pinkenba	0 - >100	0 - >100	0%	34% (48%)	0%	5% (95%)	0 - 50
Port of Brisbane	0 - 10	0 - 1	0%	0%	0%	0%	0 - 2
Seven Hills	1 - 20	0 - 10	0%	0%	0%	0% (29%)	0 - 7
South Brisbane	0	0	0%	0%	0%	0%	0
Spring Hill	0	0	0%	0%	0%	0%	0
St Lucia	0	0	0%	0%	0%	3% (0%)	0
Tarragindi	0	0	0%	0%	0%	0%	0
Teneriffe	0	0 - 4	0%	0%	0%	0%	0
Tingalpa	0 - 20	0 - 10	0%	0%	0%	0%	0 - 8
Wakerley	0	0 - 1	0%	0%	0%	0%	0
West End	0	0	0%	0%	0%	0%	0
Windsor	0 - 3	0	0%	0%	0%	0%	0 - 1
Wynnum West	0 - 2	0 - 3	0%	0%	0%	0%	0

1. Green shading indicates suburbs where modelling predicts fewer overflights compared to the EIS/MDP.

2. Orange shading indicates suburbs where modelling predicts an increase in overflights compared to the EIS/MDP.

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Summer Weekday Evening					Summer Weekday Night			
	2020 With NPR				2020 Without NPR	2020 With NPR		
	% of Suburb (% Suburb area stated in EIS/MDP)					% of Suburb (% Suburb area stated in EIS/MDP)		
Range of N70 Flights within Suburb	Increase of 10 flights or more	Decrease of 10 flights or more	Increase of 5 flights or more	Decrease of 5 flights or more	Range of N70 Flights within Suburb	Range of N70 Flights within Suburb	Increase of 2 flights or more	Decrease of 2 flights or more
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0 - 13	1% (0%)	1%	0% (1%)	14% (34%)	0 - 7	0 - 5	0%	0% (63%)
0 - 15	0%	5% (0%)	0%	0% (35%)	0 - 8	0 - 6	0%	0% (30%)
0 - 1	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0 - 3	0%	0%	0%	0%	0 - 2	0 - 1	0%	0%
0 - 2	0%	0%	11%	0%	0	0	0%	0%
0 - 20	2% (0%)	0%	2% (0%)	0%	0	0 - 2	1% (0%)	0%
0 - 20	1% (0%)	0%	0%	0%	0	0 - 2	1% (0%)	0%
0	0%	0%	0%	33% (0%)	0	0	0%	0%
0 - 30	0%	16% (4%)	0%	0% (10%)	0 - 20	0 - 20	0% (2%)	13% (90%)
0	0%	0%	0%	0%	0 - 1	0	0%	0%
0 - 4	0%	0%	0%	0%	0 - 3	0 - 3	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	1% (0%)	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0 - 1	0%	0%	0%	0%	0	0	0%	0%
0 - 2	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%
0	0%	0%	0%	0%	0	0	0%	0%

3. Where no EIS/MDP percentage of area has been included on this table, the percentage is the same as the EIS/MDP.

4. The EIS/MDP information referenced in this table is contained in the EIS/MDP Volume D Table 5.4 pages D5-143 and D5-144.

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5 Conclusion and next steps

THE LATEST NOISE MODELLING FOLLOWING THE OPENING OF THE NEW PARALLEL RUNWAY IN 2020 CORRESPONDS CLOSELY TO THE NOISE MODELLING UNDERTAKEN FOR THE EIS/MDP AND DEMONSTRATES NET IMPROVEMENTS.

Several, minor variations of noise contours to the EIS/MDP are due to operational changes invoked by CASA and Airservices independent of the NPR. As anticipated in former Deputy Prime Minister, Mark Vaille's 2007 approval of the MDP, the mechanisms of the EPBC Act have been used to guide the environmental assessment and consultation around these changes.

This report provides assurance to BAC, Airservices and the Commonwealth Government that the anticipated impacts of aircraft noise envisaged in the EIS/MDP remain largely unchanged. BAC and Airservices have worked closely together to ensure the airspace design for the new runway operations minimises aircraft noise impacts on the Brisbane community to the maximum extent possible while catering for the future demand for air travel into and out of Brisbane. Noise minimisation has been considered in every phase of the airspace design process.

BAC has continued to engage with the Brisbane community since the approval of the EIS/MDP to effectively communicate the anticipated flight paths and noise impacts from the NPR. Approval of the MDP was conditional on a continuing process of community engagement, increasing in focus twelve months before the opening. BAC is committed to meeting, and indeed exceeding those requirements.



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The modelling detailed in this report will establish the primary inputs for the comprehensive suite of information to be shared with the Brisbane community from late 2018. That information will not be limited to the diagrams shown in this report. It will include a variety of means to illustrate the impact of aircraft overflights utilising the latest available technology and communications channels.

The community information process will continue through 2019 and 2020 and then post-opening and will include a mobile education unit to conduct face to face public information sessions and extensive online information. BAC is committed to a continuing process of transparency and comprehensive information sharing with the Brisbane public as we work towards the commissioning of this important asset for the people of Queensland.

BAC and Airservices will continue to collaborate closely on all aspects of the new runway system operations, including public awareness activities throughout the process.

The latest noise modelling of the operating environment for Brisbane Airport following the opening of the new parallel runway in 2020 corresponds closely to the noise modelling undertaken for the EIS/MDP and demonstrates net improvements.



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Technical Appendices

Appendix 1: 2007 EIS/MDP Commonwealth Government Approval Conditions and EPBC Referral advice

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The Hon Mark Vaile MP

Deputy Prime Minister
Minister for Transport and Regional Services
Leader of The Nationals

18 SEP 2007

RECEIVED
20 SEP 2004
IN M.D.'S OFFICE

Reference: 03418-2007

Mr Koen Rooijmans
Managing Director and Chief Executive Officer
Brisbane Airport Corporation Limited
PO Box 61
HAMILTON CENTRAL QLD 4007

Dear Mr Rooijmans

I refer to the letter dated 11 April 2007 from Mr Cam Spencer, Project Director, New Parallel Runway Project seeking my approval of the draft major development plan (MDP) for a new parallel runway (NPR) at Brisbane Airport.

The draft MDP was assessed against the requirements of the *Airports Act 1996* (the Act) and it has been determined that the MDP meets these statutory requirements.

I have therefore decided to approve the draft MDP in accordance with my power under subsection 94(2) of the Act. Pursuant to subsection 94(7) of the Act, my approval imposes certain conditions upon the development. These conditions of approval reflect a need to ensure that a number of issues identified in the assessment process are appropriately managed during the development. The conditions are set out in the attachment to this letter.

I would like to congratulate you and the NPR project team (particularly Cam Spencer, Paul Coughlan and Karyn Rains) on providing extensive detail in the draft MDP documentation on the different construction phases and an analysis not only of the impacts directly related to the construction but the likely post-construction operational impacts of the development such as the likely aircraft noise impacts associated with parallel runway operations. I was pleased to receive positive feedback on the comprehensive public engagement program undertaken by Brisbane Airport Corporation (BAC) over the last year that, among other initiatives, included an opportunity for local residents that may be affected by aircraft noise in future to learn more about these impacts and discuss them directly with BAC staff.

I acknowledge the very detailed information on the proposed aircraft operations provided in Volume D (Airspace) of the draft MDP. As you are aware my approval

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relates only to the construction of the new parallel runway. The operational aspects will necessarily require further consideration prior to parallel runway operations commencing when the relevant approvals from the safety regulator and the aeronautical services provider are sought. BAC, in consultation with Airservices Australia (AA) will be required to develop an operational plan for the airport and present for approval of the Civil Aviation Safety Authority (CASA), a comprehensive Safety Case for those operations.

Volume D was critical for setting out the assumptions on which the assessment of environmental (including noise and emission) impacts of the runway are required for the MDP to be fully assessed and to specify how those are expected to be managed. Furthermore Volume D enabled the public to gain a meaningful understanding of the likely impacts of proposed parallel runway operations, and provided them with the opportunity to provide comments on the preliminary draft MDP in an informed manner. I appreciate the effort BAC has made in describing in a comprehensive and transparent manner the noise impacts expected for suburbs under the proposed flight paths for the airport into the future.

I note that the introduction of new technologies that could effect the Safety Case presentation and detail are under consideration, both in the International Civil Aviation Organisation and internally in Australia, and are expected to be implemented in the next few years. The Safety Case will need to assess the overall traffic management plans of all proposed runway modes and I expect it to reflect the latest available technology, traffic density and aeronautical procedures to be used on commissioning of the runway system.

I anticipate, as you do, that the operational plan for the airport will be similar to what you have proposed in Volume D of the draft MDP. Should the actual flight paths be materially different from those contained in Volume D, I am confident that the robust legislative framework triggering consultative mechanisms as set out in the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) will provide sufficient robust processes to ensure the public continue to be engaged in planning decisions and development at Brisbane Airport. In addition, I note that the Master Plan process arising every five years requires the disclosure of transparent noise information relating to aircraft movements and should the airport have a new Australian Noise Exposure Forecast for the airport endorsed, this will trigger a new Master Plan, and therefore, consultation process.

Notwithstanding the above, you will note that as a condition to my approval, I require BAC to continue to keep the community informed of progress with the development. This includes information about flight paths and airport operational changes as a result of the construction as well as a comprehensive public awareness campaign prior to operations commencing on the NPR. I look forward to receiving your strategy on how you propose to fulfill your obligations in this regard.

The Master Plan for Brisbane Airport approved in 2004 by the then Minister for Transport and Regional Services, the Hon John Anderson MP, provided for interim uses for the site of the NPR prior to it becoming a runway. While I acknowledge this was appropriate at the time of the approval of the Master Plan, now that I have approved the construction of the runway I expect construction to commence as soon as all the necessary contractual arrangements have been entered into and the relevant State and Local Government approvals sought. To this end I would appreciate BAC reviewing

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the potential uses of the site with a view to reducing them in the next Master Planning process. My Department will discuss with your staff my specific expectations in this regard.

Brisbane City Council (BCC) has raised concerns about the impact of new and existing flight paths on its ability to provide for a high-rise zone in the central business district of the City. I wrote to BCC on 4 September 2007 providing information about the operation of the airspace protection regime relevant to all federal leased airports. Further to the obligations as set out in the *Civil Aviation Safety Regulations 1998*, I would like BAC to work closely with the BCC to ensure a greater understanding of the approvals process required for proposed infringements of prescribed existing and future airspace around Brisbane Airport. In particular, there is a need BCC and all other local councils affected by the legislation, to be advised as to the obligations of building authorities, as provided for under the *Airports Act 1996* and the *Airports (Protection of Airspace) Regulations 1996.*

I note a number of submissions related to potential traffic impacts associated with the development. I note the cooperative approach BAC has adopted with the local and state government in relation to the road system around and feeding into the airport site, particularly the Gateway upgrade and the northern access road. I encourage you to continue to work closely with BCC and the state government in relation to impacts associated with this development and the overall development on the airport site.

Finally I encourage you to continue to consult with CASA and Airservices Australia, as well as the airlines and other industry players, to ensure the final design of the NPR meets all current technological and safety requirements into the near future. I also encourage you to work collaboratively with State and local authorities as well as with the Airport Environment Officer and Airport Building Controller to obtain all the necessary approvals and authorisations that form part of this project.

I wish you every success with this important infrastructure project for Queensland and Australia.

Yours sincerely

MARK VAILE

Enc

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Draft Major Development Plan

New Parallel Runway, Brisbane Airport

(Brisbane Airport Corporation)

Conditions of Ministerial Approval

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DEFINITIONS

In this document, unless a contrary intention appears, the terms below have the meanings given to them:

ABC means an Airport Building Controller appointed by the Secretary of the Department (or his delegate) under the Act.

Act means the *Airports Act 1996* as amended from time-to-time.

Airport means Brisbane Airport as defined in the *Airports Regulations 1997* as amended from time to time.

AEO means an Airport Environment Officer appointed by the Secretary of the Department of (or his delegate) under the Act.

AEPR means the *Airport (Environment Protection) Regulations 1997* as amended from time to time.

Airservices Australia (Airservices) means the aeronautical services provider for Brisbane Airport

ARFF means the Aviation Rescue and Fire Fighting Services at Brisbane Airport.

BAC means Brisbane Airport Corporation Pty Ltd and includes any future Airport Lessee Company for Brisbane Airport.

Building activity has the meaning given in section 98 of the Act.

Civil Aviation Safety Authority (CASA) means the agency with responsibility for the *Civil Aviation Safety Regulations 1998* as amended from time to time.

CEMP means the Construction Environmental Management Plan for the Development.

the Department means the Department administering the Act from time to time and at the time of Ministerial approval is the Department of Transport and Regional Services.

Development means the New Parallel Runway to be carried out in accordance with the MDP approved by the Minister for Transport and Regional Services.

DEW means the Department administering the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) from time to time and at the time of Ministerial approval means the Department of the Environment and Water Resources.

EIS means an Environment Impact Statement as defined in the EPBC Act as amended from time to time.

Minister means the Minister responsible for the Act.

MDP means the Major Development Plan for the construction of the New Parallel Runway approved by the Minister for Transport and Regional Services on [date].

NPR means the new parallel runway.

N70 data means the noise descriptor which represents the number of aircraft fly-over noise events exceeding 70 decibels and referred to in the Department's discussion paper *Expanding Ways to Describe and Assess Aircraft Noise* published in 2000.

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CONDITIONS

1) BAC must implement and comply with each undertaking or commitment relating to the construction of the New Parallel Runway, made by or on behalf of them, in the draft MDP lodged with the Minister on 11 April 2007 and Supplementary Report provided to the Department on 18 May 2007. In the event of any inconsistency between the undertakings and commitments made by BAC in the MDP and the conditions contained in this document, the conditions in this document shall prevail to the extent of that inconsistency.

Conditions about the environment

2) BAC must prepare and implement a CEMP to be approved by the AEO, prior to commencement of building activity, as defined in s98 of the Act. The CEMP must include, but is not limited to, all of the following:
   a) a Waste Management Plan;
   b) a Sediment and Erosion Management Plan;
   c) an Acid Sulfate Soil Management Plan;
   d) a Contaminated Land Management Plan which incorporates further investigation and assessment of contaminated sites 11, 20, 23, and the car rental tenancy locations. Should the AEO deem that building activity is occurring on or near site 26 then further investigation and assessment of that site will also be required. Such investigation and assessment must be done in accordance with the relevant statutory requirements and industry guidelines. Where investigations identify contamination and the site/s requires remediation, such remediation must also be done in accordance with the relevant statutory requirements and industry guidelines;
   e) a Flora and Fauna Management Plan. The management plan is to be developed in consultation with DEW, the AEO and other relevant state authorities such as the Queensland Department of Primary Industries and Fisheries and the Queensland Environmental Protection Agency, and include such matters as:
      i) measures to ensure that the integrity of conservation areas, outlined in the Airports Environment Strategy, are maintained both during the construction and operational phase of the proposed development;
      ii) plans (i.e. maps/diagrams) showing the terrestrial and aquatic vegetation communities, important flora and fauna habitat areas, locations where threatened species, populations or ecological communities were recorded and areas to be cleared. The plans must also identify vegetation adjoining the proposed works where this contains important habitat areas and/or threatened species, populations or ecological communities;
      iii) actions and methods to manage impacts on flora and fauna species (terrestrial and aquatic) and their habitat which may be directly or indirectly affected by the proposed works. These must include:
         (1) procedures for vegetation clearing, soil management and managing other habitat damage (terrestrial and aquatic) during construction;
         (2) methods to protect vegetation both retained within, and also adjoining, the proposed works from damage during construction;
         (3) details of the compensatory nesting habitat for the listed migratory species, the White-bellied Sea-eagle;

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(4) methods to minimise damage to aquatic habitats; and

(5) performance criteria against which to measure the success of the methods.

iv) rehabilitation details including:

(1) identification of endemic species to be used in rehabilitation and landscaping works, including flora species suitable as a food resource for threatened fauna species;

(2) methods to remediate affected aquatic habitats or fish passages;

(3) methods to re-use topsoil (and where relevant subsoils) and cleared vegetation;

(4) measures for the management and maintenance of all preserved, planted and rehabilitated vegetation (including aquatic vegetation);

(5) measures to ensure areas near Juno Point, which will be cleared of mangroves and saltmarsh, is rehabilitated following completion of the dredge pump-out activity. This is to be undertaken in consultation with the AEO, DEW and relevant state authorities such as the Queensland Department of Primary Industries and Fisheries; and

(6) measures to maintain, rehabilitate and enhance terrestrial and aquatic communities on airport land particularly areas identified within the biodiversity zones. This is to be undertaken in consultation with the AEO, DEW and relevant state authorities. Endemic flora species, which are suitable for foraging by listed threatened and migratory species, are to be used where appropriate.

v) a Weed Management Plan;

vi) a program for reporting on the effectiveness of terrestrial and aquatic flora and fauna management measures, including:

(1) the assessment and monitoring of the ecological health of the remaining Jackson's Creek mangrove system for the duration of the construction period, with particular emphasis on the combined impact of infilling of part of the system and the longshore transport of sediment towards the mouth of Jackson's Creek;

(2) the monitoring of the ecological health of the Serpentine Inlet community for the duration of the construction period; and

(3) post construction, the monitoring of the ecological health of the remaining Jackson's Creek mangrove system and Serpentine Inlet community is to be incorporated into BAC's Biodiversity Management Strategy; and

(4) provision to review management methods where the measures are found to be ineffective.

f) a Water Quality Management Plan must be developed in consultation with the AEO, DEW and Queensland Environmental Protection Agency. The Water Quality Management Plan is to be approved by the AEO and DEW, prior to the commencement of building activity. This Plan must be implemented for a minimum of 5 years after the completion of building activity. The Plan is to include but is not limited to:

i) monitoring of waters flowing onto the airport, flowing off the airport and into the receiving environments. The program must be undertaken before, during and at least five years after building activity is completed. The program must specify the

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parameters to be monitored, response thresholds as outlined in the MDP/EIS and having regard to acceptable limits as defined in the Airport (Environment Protection) Regulations 1997 (AEPR), and the response activities. Monitoring results are to be submitted to the AEO by the last business day of each month;

ii) an outline of how monitoring of post-building activity on airport will be incorporated into the water quality monitoring program conducted under the Brisbane Airport Environment Strategy;

iii) finalisation of the supernatant discharge quality limits, particularly for suspended solids, phosphorous and nitrogen, undertaken in consultation with relevant stakeholders;

iv) the use of the AEPR accepted limit for further investigation and management of suspended solids in the sediment ponds. Continuous on-line turbidity monitoring of the supernatant discharge is to be undertaken at the discharge points of the sediment ponds and monitoring is to also occur within the Serpentine Inlet Drain and Kedron Brook Floodway Drain located upon airport; and

v) the use of silt curtains within the sediment pond/s, including at the inlet to the sediment pond/s, is to be implemented as standard practice;

vi) the AEO will review the program 5 years after the completion of the building activity, including whether it is meeting water quality limits outlined in the AEPR, to determine if the monitoring can cease or whether it would be beneficial to extend the monitoring period for a specified period.

vii) BAC may apply to the Department to discontinue the monitoring program within the 5 year period if monitoring results demonstrate that there is no continuing impact from the building activity.

g) a Groundwater Management Plan, including addressing impacts associated with contaminated sites, dewatering and acid sulfate soils;

h) a Noise and Vibration Management Plan for the building activity program;

i) a Cultural Heritage Management Implementation Plan must be developed incorporating, amongst other matters:

i) commitments outlined in the agreed Queensland Cultural Heritage Management Plan;

ii) requirements as outlined within the AEPR including emergency measures to be adopted in the event of an unexpected find during construction; and

iii) measures to address recording procedures for any sites that may be covered during the reclamation process, or disturbed during building activity or revegetation.

Evidence is to be provided to the AEO that consultation has occurred with all native title claim groups;

j) a Dangerous and Hazardous Goods Management Plan;

k) a Landscape and Visual Management Plan;

l) an Air Quality Management Plan for the building activity program which includes:

i) management measures to mitigate against offsite odour, including the design and operational requirements for the asphalt batching plant; and

ii) mitigation measures to reduce greenhouse gas emissions.

m) a commitment requiring that all employees and contractors of BAC or any other party involved directly in construction works for the New Parallel Runway undergo

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environmental induction training, including of site specific and heritage matters, prior to commencement of construction to enable recognition of any potential environmental impacts and cultural material brought to the surface as a result of the works; and

n) a complaints management system is to be developed and implemented until the operation of the NPR. A report on the detail of all complaints received and any follow up remedial action undertaken it to be provided to the AEO on a monthly basis.

3) BAC must continue to undertake all reasonable and practicable measures, in consultation with the Department, to ensure protection of water quality in the receiving environment. If the Department determines that BAC are not meeting the general duty to avoid polluting, as specified under Regulation 4.01 of the AEPR, then BAC must demonstrate compliance with Regulation 4.02.

4) BAC, in consultation with the AEO and DEW, must ensure that the dredge pump out pipeline route to the reclamation site avoids ecologically important areas for wader birds within and adjacent to Juno Point. Where BAC considers the routing of the pipeline needs to go through ecologically important areas, the route must be agreed to by the AEO and DEW, prior to placement of pipeline, including any mitigation measures to minimise impacts.

5) BAC must ensure that the construction of the mooring facility, pipeline and associated infrastructure is removed following completion of the dredge pump-out activity.

6) BAC must develop, prior to the commencement of building activity, measures for any offsite disposal of soils, including acid sulfate soils, to comply with the legislative requirements of the *National Environment Protection Measures (Implementation) Act 1998* including the disposal of contaminated or acid sulfate soils at an appropriate licensed facility by a licensed transporter.

7) Prior to the completion of building activity for the NPR, BAC must review systems and procedures to ensure spill control systems at the airport are adequately designed and maintained.

8) Within 12 months of the approval of this MDP, BAC must develop and implement a Noise Impact Assessment Policy for the development of sites on the airport, to ensure that best practice planning and design measures will be implemented to provide for the protection of sensitive and commercial receptors from excessive noise.

9) BAC is to consult with Queensland Department of Primary Industries and Fisheries, prior to commencement of mangrove clearing and reclamation work, regarding research to be conducted into the impacts from trimming of mangrove species within the NPR site. Details of issues addressed and outcomes of discussions are to be provided to the AEO.

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10) BAC must submit for the Department's approval a revised version of any plan outlined in the above conditions. If the Department approves such a revised plan, that plan must be implemented in place of the plan as originally approved.

11) BAC is to establish a regular AEO/BAC site inspection regime at a frequency agreed to by the Department. Issues and actions arising from these site inspections are to be documented and timeframes identified for the issues to be addressed. Progression against actions is to be identified within the reporting requirement identified in Condition 12.

12) BAC must provide to the AEO a Building Activity Compliance Report. This report is to be submitted to the AEO on the last business day of each quarter. This report must include information on:

a) status of measures to comply with Condition 2;

b) the implementation and effectiveness of environmental controls. The assessment of effectiveness should be based on a comparison of actual impacts against performance criteria identified in the plans required under Condition 2;

c) environmental monitoring results, presented as a results summary and analysis, with comparison against AEPR scheduled limits;

d) the number and details of any complaints, including a summary of main areas of complaint, action taken, response given and intended strategies to reduce recurring complaints;

e) details of any review and proposed amendments to the plans required under Condition 2, resulting from construction during the reporting period; and

f) any other matter relating to compliance with the conditions of approval or as requested by the AEO and the Department.

13) Prior to 30 June 2008, BAC is to participate in a Departmental review of AEO resourcing at Brisbane Airport to ensure the NPR can be satisfactorily regulated within the meaning of the Act, the AEPR and the lease between the Commonwealth and Brisbane Airport Corporation Limited. BAC is to meet the reasonable cost of any required additional AEO resourcing to regulate this Development.

Conditions about consultation with Airservices

14) BAC will, as soon as practicable, set up a formal arrangement with Airservices to achieve agreed outcomes that, as a minimum, resolve:

a) arrangements for air traffic management and runway operations until the operation of the new parallel runway including in relation to:

i) the impact of single runway operations following the closure of runway 14/32; and

ii) the impact of increased traffic volumes on single runway operations during and following conversion of runway 14/32 into a taxiway;

b) the siting of the new fire station;

c) ARFF access to various parts of the airport;

d) a cost agreement relating to the proposed new fire station;

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e) the temporary accommodation of ARFF vehicles and crew following the closure of the satellite fire station and until a new station is built;

f) the siting of new noise monitoring terminals to address parallel runway operations which are to be in place at least one year prior to operations commencing on the NPR;

g) agreed strategies to manage issues associated with Air Traffic Control Tower response times including measures agreed by CASA to ensure the facility continues to meet the safety objectives of the service to be performed; and

h) measures to ensure the continuity and integrity of communication cables jointly owned by Airservices and BAC.

15) BAC and Airservices are to agree reasonable cost attribution and respective meeting of costs between the parties in relation to all matters referred to in Condition 14.

16) If the parties referred to in Condition 14 are unable to reach agreement with respect to all matters referred to in Condition 15 then they must submit to formal mediation by a qualified mediator agreed to by the parties. The parties will pay the mediator's remuneration in equal shares. Each party will pay its own costs of the mediation.

Conditions about keeping the community informed

17) BAC must, within 28 days of Ministerial approval, provide to the Department a strategy for how it proposes to engage airport users, businesses on the airport and the community as the Development proceeds.

18) The strategy referred to in Condition 17 must, at a minimum:

a) include measures that will ensure the community is kept informed of the Development as it proceeds and the likely amenity impacts associated with the different phases of construction until the commissioning of the NPR;

b) include measures that will ensure the community is kept informed of aircraft noise impacts associated with actual and anticipated aircraft operations. These measures must address the following:

i) Information on aircraft related noise from existing operations that covers the period from when construction commences, to one year after commissioning of the NPR. Such information is to include growth in aircraft movements and how this relates to the forecasts in the draft MDP, changes as a result of the introduction of new generation aircraft, changes to any air traffic control departure and arrival procedures, and any changes due to the closure of the cross runway during the NPR construction; and

ii) A community awareness program, to commence at least one year prior to operations commencing on the NPR, that includes, as a minimum, information on the airport operating plan as approved by CASA, 70 decibel noise contour (N70) data and flight path information all to a similar level of details that in Volume D of the draft MDP.

FOI 27-115 - Document 1

19) The measures referred to in Condition 17 must include information easily accessible by the community on the BAC website. In particular the website must include, but should not be limited to, the information referred to in condition 18(b)(i) and (ii).

20) At least 6 months prior to commencement of operations on the NPR, BAC must advise the Department of a strategy outlining how BAC propose to provide the community with transparent aircraft noise information associated with parallel runway operations on an ongoing basis.

21) BAC must implement the strategy referred to in Conditions 17 and 20.

Conditions relating to the effect of construction on airport operations and air navigation

22) BAC must ensure that the construction does not prejudice the safety of continuing aircraft operations during the construction period including ensuring that it and its contractors do not compromise the integrity of existing navigational aids or aircraft operational systems, including Airservices systems.

Conditions relating to completion of the NPR

23) BAC must complete the Development within 13 years of the date of Ministerial approval.

24) Before the end of the period specified in Condition 23, BAC may apply in writing to the Minister to extend the period specified in Condition 23.

Conditions about providing information to the Minister and the Department

25) BAC will make all reasonable efforts to provide timely information as requested by the AEO, ABC or the Department relating to this Development and compliance with these conditions within the time requested. Unless otherwise requested, information provided by BAC shall be in an electronic format.

26) BAC will provide, on each anniversary of the date of Ministerial approval and within 28 days of the commissioning of the NPR, a status report to the Minister. The report must include:

a) a general overview on progress with the Development including information on milestones achieved against each design element referred to on pages 25-27 of the draft MDP document referred to as the *Summary of Major Findings*. This should include a summary of:

i) contracts entered into;

ii) authorisations sought and received; and

iii) difficulties encountered and how such difficulties were overcome.

b) details of any delays to the Development experienced and reasons for such delays and their impact on the overall Development;

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c) details of any anticipated delays to the Development and reasons for such delays and their potential impact on the overall Development;

d) milestones achieved against the strategy referred to in Condition 17;

e) a written certificate signed by the Chief Executive Officer on the compliance with the above conditions of approval of the draft MDP. Where instances of non-compliance have occurred, the certificate must detail these instances and the measures taken or proposed to ensure compliance.

FOI 27-115 - Document 1

RECEIVED
17 SEP 2007

Minister for the Environment and Water Resources

13 SEP 2007

Mr Cam Spencer
Project Director
New Parallel Runway Project
Brisbane Airport Corporation Pty Ltd
PO Box 61
HAMILTON CENTRAL QLD 4007

Dear Mr Spencer

Decision on approval
Brisbane Airport Corporation - New Parallel Runway (EPBC2005/2095)

I have considered the proposal to construct a new parallel runway at Brisbane Airport Queensland (EPBC 2005/2095), in accordance with Part 9 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and have decided to grant an approval to Brisbane Airport Corporation Pty Ltd. The proposal must be undertaken in accordance with the specified conditions. A copy of the approval and the assessment report is attached for your information.

I would appreciate it if you could inform me who will be the contact person responsible for complying with the conditions. Implementation of the approval conditions may be audited by my Department at a future date. Please note any plans required as conditions of approval will be regarded as public documents unless you provide sufficient justification to warrant commercial-in-confidence status.

It should be noted that, although an approval has been granted under Part 9 of the EPBC Act, this approval does not relieve the person to whom it has been granted from an obligation to comply with any other law of the Commonwealth, State or Territory that is applicable to the action, and to have any right, title or interest that is required to access land or waters and to do the action.

If you require any further information please contact Vicki Middleton on 02 6274 2240 or vicki.middleton@environment.gov.au.

Yours sincerely

Malcolm Turnbull

Enclosure

Parliament House, Canberra ACT 2600 Tel 02 6277 7640 Fax 02 6273 6101

Australian Government
Department of the Environment and Water Resources

COPY

DECISION ON CONTROLLED ACTION – approved subject to conditions

BRISBANE AIRPORT NEW PARALLEL RUNWAY (EPBC 2005/2095)

This decision is made under Sections 133(1) of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Proposed action

proposed action	To develop a new parallel runway and associated works and activities, Brisbane Airport, Queensland

Decision on proposed action: Approved subject to conditions

decision	The proposed action is approved provided it is undertaken in accordance with the conditions set out in this decision
period of approval	This approval has effect until 1 July 2096.
person granted approval	Brisbane Airport Corporation Pty Ltd

Person authorised to make decision

name and position	MALCOLM BLIGH TURNBULL Minister for the Environment and Water Resources
signature	
date of decision	13 September 2007

Controlling provisions

relevant controlling provisions	This approval has effect for the following controlling provisions: • Wetlands of international importance (sections 16 & 17B) • Listed threatened species and communities (sections 18 & 18A) • Listed migratory species (sections 20 & 20A) • Commonwealth land (section 26 & 27A)

DECISION ON CONTROLLED ACTION – approved subject to conditions

BRISBANE AIRPORT NEW PARALLEL RUNWAY (EPBC 2005/2095)

Conditions

The following conditions apply to the approval of the proposed action:

1) The person taking the action must maintain the Biodiversity Zones, as shown in Annexure 1, for conservation for the term of the lease the person has with the Commonwealth for the airport site. Should the person taking the action exercise an option to renew the lease with the Commonwealth, the Biodiversity Zone must continue to be conserved for that further lease period.

2) The person taking the action must prepare and submit to the Department for approval, a Biodiversity Management Strategy, to manage the Biodiversity Zones mentioned in Condition 1. The Strategy must address the following matters:

   a. Identify the biodiversity elements in and adjacent to the zone and outline a management strategy of how these elements are to be maintained or enhanced;

   b. Integrated management of the zone with adjacent Kedron Brook Floodway land owned by the Brisbane City Council;

   c. Research into steps required to maintain and enhance the biodiversity elements of the zone for the matters mentioned under 2. a. above;

   d. Implementation of recommended outcomes from research undertaken in paragraph 2. c. above;

   e. Planting and management of mangroves and other native vegetation within the zone; and

   f. Monitoring of the effectiveness of the environmental management initiatives incorporating monitoring of particular species and the health and extent of particular habitat types.

   Construction cannot commence until the Biodiversity Zones Management Strategy is approved. The approved plan must be implemented.

3) The person taking the action must provide an alternative nest site in the vicinity of the Brisbane Airport consistent with aircraft safety and in accordance with the approved Biodiversity Management Strategy, for the current resident pair of the listed migratory species, the White-bellied Sea Eagle. The new nest site, to be developed in consultation with relevant experts and land owners, is to be prepared prior to the removal of the current nest site as part of the New Parallel Runway development works.

4) The person taking the action will submit a Community Funding Plan to the Department for approval which outlines funding for the development and implementation or extension of a community based volunteer ecological monitoring program. The Community Funding Plan, developed in consultation between the person taking the action and the funded party, will address the following:

   a. monitoring program objectives;

   b. the general program methodology;

   c. data storage and reporting; and

   d. milestone and review processes.

   The community based volunteer ecological monitoring program will involve the following matters:

   a. Seagrass Monitoring Programme - Extension of an existing seagrass monitoring program through the establishment of additional monitoring sites within the vicinity of the dredge footprint and to occur every four months from establishment at Middle Banks, Moreton Bay. The funding for the extension of the Seagrass Monitoring Program will be $20,000 per year for three (3) years; and

   b. Mangrove and Saltmarsh Monitoring Programme – Establishment of monitoring sites for health and species distribution adjacent to Brisbane Airport (particularly Bramble Bay, Kedron Brook and associated waterways, and the Nudgee Beach foreshore) in consultation with relevant research

groups. The funding of the Mangrove/Saltmarsh Monitoring Program will be $60,000 per year for three (3) years.

The Community Funding Plan is to be submitted to the Department not less than 90 days before construction is due to commence.

5) The person taking the action must submit to the Department for approval a Research Monitoring Plan designed to understand the level of impact, if any, the construction of the project is having on the receiving environment and the Moreton Bay Ramsar wetlands adjacent to the Brisbane Airport. The Research Monitoring Plan will include monitoring of ecological health indicators for water quality, sediment makeup and shorebirds and will be based on the water quality and shorebird monitoring outlined in the Environmental Management Framework of the EIS/MDP and Supplementary Report for the project.

   The Research Monitoring Plan will include:

   a. Consultation with relevant experts and the Department; and

   b. The location of at least two (2) monitoring sites from Jackson's Creek to Serpentine Inlet and at least one other site in consultation with the Department.

   The Research Monitoring Plan is to be submitted not less than 90 days before construction is due to commence. Implementation of the Plan must commence not less than 60 days before construction is due to commence and continue for a minimum of two (2) years.

6) Prior to commencing construction, the person taking the action must submit details to the Department of the commitments to increase environmental education through a funding contribution towards the expansion of educational facilities at the Nudgee Beach Environmental Education Centre. The funding is to be $300,000.

7) If the person taking the action wishes to carry out any activity other than in accordance with the plan or strategy required under conditions 2, 4, and 5 the person taking the action must submit for the Department's approval a request for revision of the plan. If the Department approves the revised plan or strategy as submitted, the person taking the action must implement that plan or strategy instead of any plan or strategy previously approved.

8) If the Minister believes that it is necessary or desirable for the better protection of the environment, the Minister may request the person taking the action to make specific revisions to the plan or strategy approved under conditions 2, 4, and 5 for a period of three (3) years. The person undertaking the action must submit the revised plans for the Department's approval. The person taking the action must comply with any such request. If the Department approves a revised plan or strategy pursuant to this condition, the person taking the action must implement that plan or strategy instead of the plan or strategy previously approved.

9) If, at any time after five (5) years from the date of this approval, the Minister notifies the person taking the action in writing that the Minister is not satisfied that there has been commencement of the New Parallel Runway development at Brisbane Airport, the action must not thereafter be commenced without written agreement of the Minister.

DEFINITIONS

In this document, unless a contrary intention appears, the terms below have the meanings given to them:

Construction means all work but does not include survey, acquisitions, fencing, test drilling/test excavations, building/road dilapidation surveys, minor clearing (except where endangered ecological communities or threatened flora or fauna species would be affected), establishing site compounds (in locations meeting the criteria of the Conditions of Approval), or other activities that will have a minimal environmental impact (e.g. minor access roads, minor adjustments to services/utilities etc).

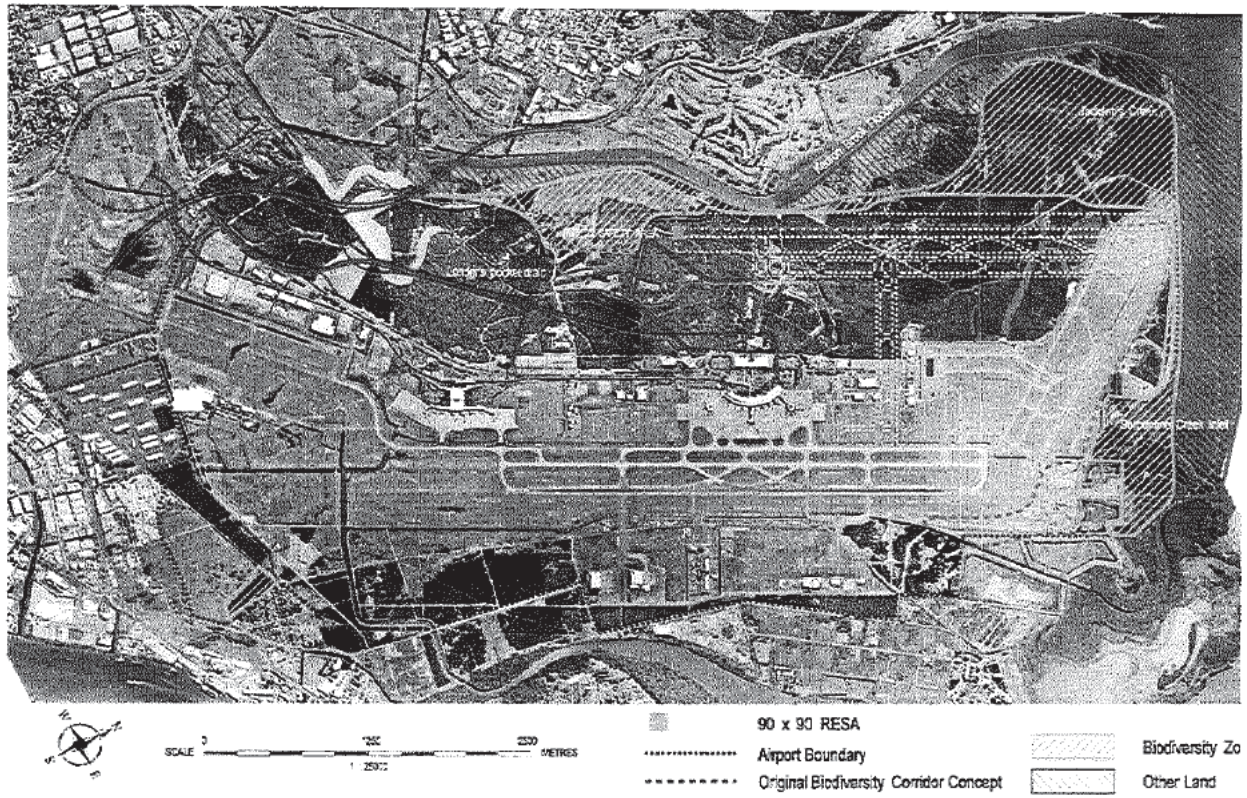
Department - The Australian Government Department currently known as the Department of the Environment and Water Resources, or whatever the Department that administers this approval is thereafter called.

Minister – The Minister of the Department of the Environment and Water Resources, or whatever the Department that administers this approval is thereafter called.

Australian Government

Department of the Environment and Water Resources

ANNEXURE 1 Brisbane Airport Biodiversity Zones (Yellow cross hatch)



Brisbane Airport Corporation New Parallel Runway (EPBC 2005/2095)
4 of 4

Original Sent
from
Minister's Office

Minister for the Environment and Water Resources

13 SEP 2007

The Hon Mark Vaile MP
Minister for Transport and Regional Services
Parliament House
CANBERRA ACT 2600

Dear Minister

Brisbane Airport Corporation Pty Ltd – New Parallel Runway (EPBC 2005/2121)

On 9 June 2005 the above proposal was referred to the Department of the Environment and Water Resources, under Section 160 of the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) for assessment and advice on the environmental impacts associated with the proposal. The action was assessed by joint environmental impact statement / major development plan.

As the Minister for the Environment and Water Resources and in accordance with Section 163 of the *EPBC Act*, I have now completed my consideration of the proposed action. I have determined that there are no unacceptable environmental impacts associated with the proposal provided that Brisbane Airport Corporation implement the proposed mitigation measures outlined in the draft environmental impact statement and it can be approved subject to the following recommended conditions:

1. The integrity of conservation areas, outlined in the airport's Environment Strategy must be maintained both during the construction phase and during operation of the proposed development.

2. BAC is to ensure that the dredge pump out pipeline route to the reclamation site avoids ecologically important areas within and adjacent to Juno Point for wader birds in consultation with the Airport Environment Officer (AEO).

3. BAC is to ensure that the construction of the mooring facility, pipeline and associated infrastructure are removed following completion of the dredge pump-out activity in consultation with the AEO.

4. BAC is to develop a Cultural Heritage Management Plan in consultation with the AEO. The Plan is to address recording procedures for any sites that may be covered during the reclamation process, or disturbed during construction or revegetation. The AEO is to be provided with evidence that consultation with both native title claim groups has occurred.

Parliament House, Canberra ACT 2600 Tel 02 6277 7640 Fax 02 6273 6101

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5. Rehabilitation
   a) BAC is to ensure areas near Juno Point cleared of mangroves and saltmarsh will be rehabilitated in consultation with the AEO and relevant state authorities such as the Queensland Department of Primary Industries and Fisheries following completion of the dredge pump-out activity.

   b) BAC is to maintain, rehabilitate and enhance terrestrial and aquatic communities on airport particularly areas identified within the biodiversity zones in consultation with the AEO and relevant state authorities. It is recommended that locally identified flora species which are suitable for foraging by listed threatened and migratory species, be used where appropriate to aircraft operating requirements.

6. Water Quality Monitoring
   a) A Water Quality Management Plan must be developed in consultation with the Queensland Environmental Protection Agency (EPA) and require endorsement of the AEO prior to the commencement of construction. The Plan is to include:
      i) A water quality monitoring programme must be undertaken prior to, during and at least five years after construction is completed. The program must specify the parameters to be monitored, acceptable levels as defined in the Airport (Environment Protection) Regulations 1997 (AEPR), the response thresholds and the response activities;
      ii) Outline how post-construction monitoring on airport will be incorporated into the water quality monitoring programme conducted under the Brisbane Airport Environment Strategy;
      iii) Finalisation of the supernatant discharge quality limits, particularly for phosphorous and nitrogen, undertaken in consultation with relevant stakeholders;
      iv) The use of the AEPR accepted limit for further investigation and management of suspended solids in the sediment ponds. Continuous on-line turbidity monitoring of the supernatant discharge is to be undertaken at the discharge points of the sediment ponds and monitoring is to also occur within the Serpentine Inlet Drain and Kedron Brook Floodway Drain located on airport land;
      v) This programme may be discontinued after five years if monitoring demonstrates that water quality is meeting project criteria. At this time the AEO will review the program and determine if it can cease or whether it would be beneficial to extend the monitoring period.
   b) A Groundwater Management Plan, which will address impacts associated with any contaminated sites within the project site, dewatering and acid sulfate soils.

6. Mangrove monitoring
   a) Research is to be conducted on the impacts from trimming of mangrove species in consultation with the Queensland Department of Primary Industries and Fisheries and require endorsement of the AEO.
   b) The research is to be conducted on mangroves within the New Parallel Runway site prior to commencement of reclamation work.

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I would further support BAC continuing to work cooperatively with local and state government bodies for any necessary upgrades to the road infrastructure external to, but impacted by, the proposed development.

Yours sincerely

Malcolm Turnbull

Original Sent
from
Minister's Office

Minister for the Environment and Water Resources

13 SEP 2007

Ms Denise Spinks
Manager, Airport Relations
Airservices Australia
GPO Box 367
CANBERRA ACT 2601

Dear Ms Spinks

Brisbane Airport Corporation Pty Ltd – New Parallel Runway (EPBC 2005/2144)

On 27 May 2005 the above proposal was referred to the Department of the Environment and Water Resources, under Section 160 of the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) for assessment and advice on the environmental impacts associated with the proposal. The action was assessed by joint environmental impact statement / major development plan.

As the Minister for the Environment and Water Resources and in accordance with Section 163 of the *EPBC Act*, I have now completed my consideration of the proposed action. The environmental impacts of the New Parallel Runway have been considered under this assessment and it is recommended that the following issues should be considered further by the Commonwealth Government:

- The impact of activities within the Obstacle Limitation Surface is a significant safety issue for the operation of the Airport, and the management of such risks should be reviewed by Airservices Australia prior to operation of the New Parallel Runway.
- Airservices Australia should take account of the options to mitigate noise impacts outlined in the draft Environmental Impact Statement and supplement, and require validation of the uncertainties inherent in the forecasts when conducting the safetycase and environmental assessment of the proposal, prior to operation of the New Parallel Runway.

Yours sincerely

Malcolm Turnbull

Parliament House, Canberra ACT 2600 Tel 02 6277 7640 Fax 02 6273 6101

Technical Appendices

Appendix 2 - Report endorsement correspondence from Airservices Australia

airservices
Air Navigation Services
25 Constitution Avenue
(GPO Box 367)
CANBERRA ACT 2600

t 02 6268 4246
f 02 6268 4141

www.airservicesaustralia.com

ABN 59 698 720 886

Mark Willey
Head of Airport Development
Strategic Planning and Development
Brisbane Airport Corporation (BAC) Pty Limited
PO Box 61, Hamilton Central QLD 4007

Dear Mark

Endorsement of Brisbane Airport Corporation's revised environmental assessment report – *Brisbane New Parallel Runway Airspace Design: Noise Footprint Comparison to the 2007 Environmental Impact Statement (May 2018)*

Airservices has been working closely with Brisbane Airport Corporation (BAC) to finalise the airspace design for this landmark Australian aviation infrastructure project, including reviewing and endorsing BAC's revised environmental assessment report, titled *Brisbane New Parallel Runway Airspace Design : Noise Footprint Comparison to the 2007 Environmental Impact Statement (May 2018)*. This work complements BAC's Environmental Impact Statement and Major Development Plan (EIS/MDP), which were approved by the Commonwealth Minister for the Environment and Water Resources and the Minister for Transport and Regional Services in 2007.

Airservices notes that, as per the MDP approval correspondence from the former Deputy Prime Minister and Minister for Transport and Regional Services, The Hon. Mark Vaile, MP (18 September 2007), BAC and the Minister anticipated that the operational plan for the airport will be similar to what BAC proposed in Volume D of the draft MDP. The Minister went on to state that: "*should the actual flight paths be materially different from those contained in Volume D, I am confident that the robust legislative framework triggering consultative mechanisms as set out in the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) will provide sufficient robust processes to ensure the public continue to be engaged in planning decisions and development at Brisbane Airport*".

Following a comprehensive and detailed review of BAC's revised environmental assessment report above, including endorsement of the noise modelling assumptions listed in Attachment 1, I am pleased to confirm that Airservices noise and environment specialists agree with BAC's conclusions that "*that the airspace design following the opening of the NPR in 2020 corresponds closely to the noise modelling presented in the EIS/MDP*" and that, after careful consideration of all aspect of the modelling, "*there is no material difference from the noise impacts developed for the EIS/MDP*".

I endorse the findings of your report (*Brisbane New Parallel Runway Airspace Design: Noise Footprint Comparison to the 2007 Environmental Impact Statement, May 2018*). In relation to compliance with the EPBC Act, I note that the proposed project was referred by Airservices to the Commonwealth Environment Minister on 27 May 2005. The Minister provided advice back to Airservices on 12 September 2007 in relation to two issues, namely:

- the review of potential safety impacts within the Obstacle Limitation Surface (OLS), and

- taking into account options to mitigate noise impacts outlined in the draft EIS and supplement, and validation of the uncertainties inherent in the forecasts when conducting the safety case and environmental assessment of the proposal, prior to operation of the New Parallel Runway.

I can confirm that the issues above have been duly considered by Airservices in the latest airspace design, the Airspace Change Proposal (ACP) submission to the Civil Aviation Safety Authority (CASA), and in the review of this revised environmental assessment work by BAC.

We look forward to continuing to work closely with your team as we move into the next stages of the project.

Yours sincerely

Stephen Angus
Executive General Manager
7 May 2018

Attachment 1: Airservices review of noise modelling assumptions for BAC's revised environmental assessment report.

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Attachment 1 – Airservices review of noise modelling assumptions for BAC's revised environmental assessment report titled *Brisbane New Parallel Runway Airspace Design: Noise Footprint Comparison to the 2007 Environmental Impact Statement, May 2018*

Airservices review of the noise modelling assumptions for BAC's revised environmental assessment report for Brisbane Airport's New Parallel Runway Project has included the following activities:

Detailed review of INM noise model, similar to ANEF endorsement, including:

- Review of modelled runway end points and intersection departures for correctness.
- Review of modelled tracks. Review of backbone tracks and track spread aligns with NPR Airspace Design and current radar data for before NPR scenarios.
- Review of modelled tracks for arrival vectoring concepts.
- Review of meteorological conditions used in the model for correctness.
- Review of Aircraft Types used in the model including use of agreed corrections applied to next generation aircraft types.
- Review of departure/arrival profiles including user defined profiles for RNP procedures.
- Review of flight operations files to ensure operational numbers agree with forecast numbers in assumptions documents.
- Review of flight operations files to ensure runway and track allocations agree with assumptions documents.
- Full run of INM model to ensure it runs without errors.
- Independent run of INM model and generation of N70 contours for before and after NPR (weekday-winter-day) scenarios for comparison purposes.

Additional review work includes:

- Review of consultant's assumption documentation and development of an Airservices/BAC co-signed modelling assumption document.
- Development of analysis concepts for evaluating populations within noise contours.

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Appendix 3 - Modelling data sources

This document is FOI exempt. FOI Act s27, 45, 47E and 47G applies to this document. This document is provided in confidence to Airservices Australia for the purposes of the Parallel Runway Operations Steering and Implementation Group (PROSIG), and contains business information about Brisbane Airport Corporation and its related entities.

Brisbane Airport New Parallel Runway (NPR) Project - Agreed Noise Modelling Assumptions

Purpose

The purpose of this document is to ensure that Brisbane Airport Corporation (BAC) and Airservices Australia (AsA) agree on the definitions and assumptions used in updated noise modelling for the Brisbane New Parallel Runway (NPR) project, and to provide details of the associated design documentation. Once completed by BAC's consultants (AirBiz), the updated noise modelling will be used to provide noise contour maps for a Revised Environmental Assessment (EA) that will:

- Complement BAC's planning approval conditions for the NPR project, as per the Environmental Impact Statement (EIS) and Major Development Plan (MDP), approved by the Commonwealth Government on 18 September 2007 (http://www.bne.com.au/corporate/bne-major-projects/new-parallel-runway/eismdp);
- Meet AsA's statutory obligations (namely the *Airservices Act 1995* and the *Environment Protection and Biodiversity Conservation Act 1999*); and
- Meet AsA's internal standards and procedures.

The results of the Revised EA will be presented by BAC and AsA to the Commonwealth Department of Infrastructure, Regional Development and Cities, and the Department of Environment and Energy. The Revised EA will also support AsA's Airspace Change Proposal (ACP) submission to the Civil Aviation Safety Authority (CASA), in relation to the proposed airspace changes for the Brisbane Airport NPR project, and will also be used to develop stakeholder engagement plans and community information.

Design Documentation

Noise modelling for the Brisbane Airport NPR project is based on the following documentation:

Document	Owner	Effective Date
Brisbane Airport NPR Modelling Assumptions (PDF - 12280p109q BNE NPR Assumptions)	AirBiz	24th January 2018
Operational Assumptions Document, v0.7	PROSIG (BNE and AsA co-signed document)	Signature date 08 December 2017
Detailed Design Specification, v1.01 (including associated KML files)	AsA (FPD design team)	07 December 2017
Airspace Design, v21 (TAAM Model provided as KML for information only)	AsA **note – provided for info only, modelled tracks to be based on Detailed Design Spec above	13 November 2017
Draft Noise Abatement Procedures	AsA	(Draft) 09 January 2018
SID_STAR usage EIS to CDR Decode.xlsx	AsA	12 January 2018

Base Assumption Definition and Derivation

Assumption	Details	Derived by
Runway Coordinates	Detailed and defined in AirBiz modelling assumptions document.	BNE / AirBiz
Weather Inputs	Seasonal analysis defined in AirBiz modelling assumptions document. Long term averages from BOM have been used.	BNE / AirBiz
Operational Assumptions	Defined by co-signed Operational Assumptions document.	BNE / AsA
Aircraft Forecast and Schedules	Detailed and defined in AirBiz modelling assumptions document. Runway allocation based on co-signed Operational Assumptions document	BNE / AirBiz / AsA
Arrivals Vectoring	Vectoring area and modelling method defined in AirBiz modelling assumptions doc.	AirBiz
Flight Tracks	Developed through TAAM simulation and are operationally suitable. Detailed Design Specification V1.01provides KMLs for average aircraft flight paths for the purposes of noise modelling.	AsA
Flight Track Spread	Detailed in AirBiz modelling assumptions document and derived from existing NFPMS data.	AsA / AirBiz
Flight Altitude Profiles	Detailed and defined in AirBiz modelling assumptions document. Generally INM default profiles used with user profiles for RNP approaches. Sensitivity analysis performed regarding 8,000ft hold down departures.	AirBiz
Aircraft Fleet Mix	Detailed and defined in AirBiz modelling assumptions document. User profiles generated for next generation aircraft types provided by AsA (6/12/2017).	AirBiz
Suburb Assessment	Detailed and defined in AirBiz modelling assumptions document. Percentage coverage of suburb area method used (as per EIS).	BNE / AirBiz
INM7.0d Software used for noise modelling	INM7.0d was considered to be appropriate for the project, as expertise and capability to transition to AEDT was not available at the time the noise model was developed.	AsA
Industry feedback on Airspace Design	Industry feedback on Airspace Design responded to by AsA, with no impact to design.	AsA

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Noise Abatement Procedures (NAPs)	NAPs developed by ASA to a draft state as at 09 January 2018, suitable for noise modelling to commence.	AsA
Non-Jet departure tracks	Additional analysis of existing track spread from NFPMS provided to AirBiz (10 January 2018)	AsA

The assumptions and source documents defined above are considered by the under-signed representatives of BAC and AsA to be acceptable for use in the updated noise modelling for the Brisbane Airport NPR project.

25/1/2018

Mark Latimore
Senior Environment and Noise Specialist
Airservices Australia

Date

29/01/2018

Mark Willey
Head of Airport Development, Strategic Planning and Development
Brisbane Airport Corporation Pty Limited

Date

3

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Technical Appendices

Appendix 4 - Airspace Design Peer Review Community and Government Report (UK NATS 2017)

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1. Introduction

Brisbane Airport Corporation Pty Ltd (BAC) is constructing a New Parallel Runway (NPR) to ensure the airport has the capacity to meet the demand for air transport services to Brisbane Airport. The expected opening date of this new runway is late 2020. To support this new runway, Airservices Australia (ASA) are developing the designs of the airspace and the routes that will facilitate parallel runway operations at the airport, taking account of the relevant national and international standards for safety, efficiency and environmental compliance.

This new design is being co-ordinated through the Brisbane Airport Parallel Runway Operations Steering and Implementation Group (PROSIG) which is a joint initiative by BAC and ASA. As part of this process, BAC have engaged UK NATS as an independent consultant to conduct a peer review and analysis of the initial Airservices Australia airspace designs and provide expert advice to support the PROSIG.

The NATS work took place between February and July 2017 and included visits to Brisbane to understand the current operation, and the drivers, principles and constraints behind the new airspace design. Over the 5 month period, the NATS team agreed the design assumptions for the new operation and then undertook an in depth analysis of the airspace against a set of agreed criteria which included capacity, efficiency, environmental performance and practicality for air traffic control; any safety issues identified were also raised. This work was conducted using a suite of analytical tools, and also took into account operations at other similar airports, and emerging technical developments worldwide.

The final Technical Report containing the highly specialised data and written in the language required for Airspace and Airport Designers, Regulatory and Procedural oversight bodies and Pilot and Air Traffic Control management, was delivered to BAC in July 2017.

This Community and Government Stakeholders report is written in a language that will be readily understood by the aviation lay person. As such it does not contain detailed descriptions of the methodology used in our analysis, technical detail surrounding the complex interaction of departure and arrival tracks (SIDs/STARs) nor the detailed quantum of any findings on efficiency, capacity and environmental aspects both related to emissions and noise.

Rather, this report provides an overview of the NATS review and a summary of the findings with respect to the analysis undertaken by us.

The methodology, benchmarking, analysis both subjective and with the use of fast time computer modelling, was of a world class standard and similar to that used by NATS in evaluating both UK and contracting states' airspace designs.

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1.1. Design considerations

The NATS' review was split into a number of Work Packages. While most of these related to the airspace design, some, such as a future method of Civil and Defence airspace co-ordination are not mentioned in this report as they have no direct impact on the operation of the new runway. Throughout the analysis account was taken of:

- The principal need for the air traffic management system to operate safely and efficiently.
- The importance of the Government approved Environmental Impact Statement (EIS) as a baseline document for the New Parallel Runway.
- The priority placed upon environmental aspects including both emissions and noise.
- The priority given to over water operations during night time hours. The requirements of airline customers regarding fuel consumption, delays and utilisation of modern fleet capabilities.
- International best practice or emerging standards that could be applied to the NPR operation both pre and post opening.



2. Summary of Results

The breadth of the work undertaken has resulted in a series of conclusions and recommendations, the key points of which are summarised below.

Design Analysis

Significant work has been undertaken by the ASA team and as a result, the fundamental airspace design was deemed sound. NATS' analysis did not find any significant issues or "red-flags". In terms of the main criteria of Capacity, Environmental efficiency, Noise, Fuel consumption and Air Traffic Control workload the following conclusions emerged.

- Runway Modes - The compass modes of operation for Runways 01/19, in which aircraft are assigned a runway based on their direction of travel, have the capacity to support both the opening day and 2040 forecast traffic levels without significant delays. Over water modes, designed for night time noise relief, have the capability to meet the capacities as detailed in the EIS.
- Efficiency - This examined the efficiency of the main operating modes by comparing the actual track-distance flown on the departure and arrival routes against the optimum distance. During Compass-modes both Runway 01 and Runway 19 have good overall efficiency for both departures and arrivals. Although being highly beneficial from a noise perspective, SODPROPS (over water night time operations) had lower efficiency because of the need to ensure safe separation between departing and arriving traffic.
- Over Water Operations - Where possible (given the direction of the runway in use), routing aircraft over water is maximised and the climb and descent phases ensure that operations over land are conducted in accordance with the requirements of the EIS.
- Fuel Efficiency - Procedures allow almost all flights to achieve consistent continuous-climbs and continuous descents. This indicates a design that maximises fuel efficiency and minimises low level noise created by level flight below 5000'.

Mode / Category	Over Water (SODPROPS)	Runway 19	Runway 01
Capacity	• Balanced runway demand • Can only operate in specific conditions	• Well balanced runways in grown traffic • Capable of handling 2040 traffic • Sensitive to runway balance	• Capable of handling 2040 traffic • Sensitive to runway balance
Efficiency	• Moderate overall departure/arrival route efficiency • High percentage of Continuous Climb and Continuous Descent Operations	• High overall departure/arrival route efficiency • High percentage of Continuous Climb and Continuous Descent Operations	• High overall departure/arrival route efficiency • High percentage of Continuous Climb and Continuous Descent Operations
Over Water Operations	• All flights besides departing turboprop aircraft (22:00-06:00) are over water	• All Arrivals over water • All Departures over land	• All Arrivals over land • All Departures over water

Comparative Benefit

Comparative Disadvantage

Crossing Tracks

There is an aspiration in the EIS to avoid communities being overflown by both departure and arrival routes using the NPR. However the initial designs had a departure route from Runway 19R and an arrival route to Runway 01L overflying similar areas of the Brisbane community. The NATS work considered a number of options to mitigate this.

- Of the options developed within the current design, one recommendation is to remove one of the three arrival routes to Runway 01 (the 'Visual' arrival') and replace its track with an updated departure route for jet aircraft from Runway 19R). This would provide respite to the communities affected by both arrivals and departures, although it may route over part of the city not currently experiencing aircraft noise.

- An alternative would be to replace the 'Visual' arrival with one in which rules allow adjacent routes to be placed closer (namely a 'RNP-AR Standard Arrival Route'), freeing up airspace for a jet aircraft departure route from Runway 19R.

- Both solutions will require an element of compromise with Air Traffic Control potentially losing the flexibility of a third arrival route, as well as adding to flight distances in some cases.

NATS understands that since these recommendations were made, the airspace design has been revisited to address the issue.

Glideslope Angles

The airspace supporting Brisbane Airport has been designed using the standard aircraft approach gradient (glideslope) of 3° to each runway. NATS reviewed international examples where steeper gradients had been used and reported on the impact from both an aviation and community perception perspective.

- There is evidence that slightly steeper approaches (3.2 degrees) marginally reduce aircraft noise by 1-2 decibels as measured by noise monitoring equipment. However, the human ear is largely unable to perceive a noise reduction below 3 decibels and therefore the measured reductions (1-2 decibels) were not always perceptible by local communities on the ground.

- Elevation of the glideslope beyond 3 degrees renders the runway as not useable in low visibility conditions, including for aircraft with autopilot landing capability (ILS Category 2 & 3).

- Approach glideslope angles in excess of 4.5° trigger special rules and regulatory approvals. These requirements are too prohibitive for many airports to practically consider as they require both aircraft and aircrew certification (including special aircrew training), and for some aircraft types, special procedures and modifications. In addition, there are limitations on the type of approach and stricter weather minima.

- Whilst it is for individual regulatory authorities to specify the limitations, anecdotally larger aircraft are less likely to accommodate steeper glideslope angles due to issues associated with deceleration prior to landing.

- Where glideslope angles greater than 3 degrees are contemplated a robust safety assessment and adequate pilot training are recommended, particularly where such operations are unique to a region.

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- London City Airport is located adjacent to the central business district. Aircraft on approach are specifically affected by the proximity of tall buildings near the airfield which has led to the implementation of a 5.5° approach glideslope. This has led to limitations on the size of aircraft that can operate at this airport. The Airbus A318 is the largest aircraft that is permitted to fly into the airport and the largest commercial aircraft certified by the European Aviation Safety Agency (EASA) to land at steeper-than-usual gradients.

Compass Operations – Air Traffic Control analysis

The NPR and its surrounding airspace has been designed to allocate arriving and departing flights to a specific runway based on their direction of travel via a concept known as Compass Arrivals and Compass Departures.

From the perspective of managing the airspace, the NPR Compass Operations do address the aim of ensuring minimal cross-over of aircraft. Reducing cross-overs assists with enabling continuous climb and descent operations, thus minimising low level noise created by level flight below 5000'. In addition, there is an obvious advantage of the compass method in that it is inherently predictable, with pilots being able to precisely plan their route meeting increased climb gradients and optimising fuel planning.

Within the surrounding airspace, Compass Operations reduce complexity and workload for Air Traffic Control, contributing to the efficiency of the airspace operation when compared to assigning all arrivals to a dedicated landing runway.

Over Water Operations

The EIS provided for several runway modes to be used during night time hours to allow for long periods of respite for communities to the south of the airport. The principal mode for use in these hours is known as SODPROPS (Simultaneous Opposite Direction Parallel Runway Operations). Our analysis shows that the Airservices airspace design for SODPROPS will support its use at the expected traffic levels in the predicted hours within the EIS.

Further analysis showed that safely moving from one of the parallel runway modes (Runways 01L and 01R or Runways 19L and 19R) into or out of the SODPROPS mode would need to be carefully managed with respect to arriving aircraft. Airborne delays and consequent Air Traffic Control workload have the potential to increase significantly in the change period. Such a runway change needs to be planned well in advance and only when it is likely that the SODPROPS mode will be available for an extended period of time. Short term changes in and out of SODPROPS are not an efficient operation and the associated complexity would require a safety and risk assessment. The times for the use of SODPROPS predicated in the EIS take the complexity of such a change into account.

Obstacle Management

Airports worldwide are under pressure to permit the development of tall buildings in the vicinity of aircraft operations. However, these buildings have the potential to disrupt these operations by creating obstacles that change climb and descent gradients, and in some cases could limit the viability of flights operating into and out of the airport. Our analysis looked at how to protect the operational interests of both Brisbane Airport and Airservices but with due regard for building growth in the Brisbane CBD.

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The rules surrounding airspace protection have been created for the purpose of either:

- Regulating aircraft operations where obstacles exist
- Removing obstacles, or
- Preventing the creation of new obstacles.

Ideally 3-dimentional surfaces, extending upwards and outwards from the runway(s) are created that are free from obstacles, but if a surface is infringed, safety measures may be required. These safety or mitigation measures may take a number of forms including increasing weather minima restrictions, an increase in the obstacle clearance altitude leading to higher climb gradients, restrictions to aircraft payload, or under certain conditions the closure of a runway.

- The possible use of increased climb gradients for departing aircraft to achieve increased obstacle clearance, while seemingly allowing for increased building height, comes with a number of negative impacts for the aviation industry. In the weather conditions experienced at Brisbane during summer, it may be necessary for long haul flights, Americas/Middle East to limit their cargo and passenger uplift to meet restrictive climb gradients. Meeting increased climb gradients can impact engine maintenance and "on airframe" life cycles.

- There is a safety impact stemming from increased climb gradients that allow for taller buildings within the critical area required for manoeuvring by heavily laden aircraft in the event of an engine failure immediately after take-off. All airlines develop their own "engine out" procedures for safely avoiding terrain and buildings. These procedures, which include tracking and altitude limitations can vary between airlines, between aircraft types and even between the same type of aircraft depending on weight and ambient weather conditions. The manoeuvres are treated as emergency operations and are at the discretion of the pilot in command; given this and their individualised nature they cannot be known to Air Traffic Control or airspace designers.

- International rules (known as ICAO PANS-OPS) for designing instrument approach procedures, restricts approaches using ILS technology to a maximum 3° gradient. Any increase in approach angles for these runways would therefore preclude the use of such technology, preventing operations during reduced visibility conditions.

- Where such operations are contemplated and are non-standard within a region, a robust safety assessment and adequate pilot training is also recommended.

Ground Operations

The runways and taxiways at Brisbane Airport have been designed to support full independent parallel runway operations. Our analysis showed that the taxiway infrastructure design for the new runway would support operations at the day of opening. Further modelling will need to be undertaken by BAC to correctly time the introduction of future terminal development to minimise future ground delays.

Noise Respite

The EIS places a strong emphasis on minimising the noise impact of airport operations. NATS was asked to provide an overview of a variety of International noise respite trials including results and community reactions.

- There is an extensive catalogue of respite trials upon which to draw case study examples. However, there remains no clear and universally agreed definition of 'respite' and more research is required to understand what constitutes respite in terms of duration and distance for it to be valued by communities.

- Noise is subjective, and a change in measurable noise may not always be perceived as an improvement on the ground. In particular mitigation provided by routes that are offset from one another will depend on both the spacing between the routes and the height of the aircraft. At lower altitudes the degree of lateral separation needs to be significant to create a perceptible change in noise on the ground. It should be noted that laterally separated tracks may impact the ability to provide constant climb and constant descent profiles for jet aircraft. Loss of constant climb and constant decent profiles increases noise levels and aircraft emissions.

- Performance-Based Navigation (PBN) allows better track keeping and introduces opportunity for respite in terms of multiple fanned or offset routes. However, there remain a number of aircraft and Air Traffic Control system issues that need to be resolved before these can be used routinely, as well as methods to mitigate the risk of pilot and Air Traffic Control confusion.

UK airspace design guidance:
noise mitigation considerations when designing PBN departure and arrival procedures

NATS were part of a noise task force led by the UK CAA to consider the issues associated with the impacts of PBN technology. The UK CAA document, CAP 1378[1] details some options available when implementing PBN departure and arrival procedures and describes potential options for respite.

The UK CAA concludes that there is currently no agreed (from the communities' perspective) minimum route separations that would result in an acceptable level of relief. In addition, a major constraint is noted in the document:

"There is a limit on the number of routes and associated points that FMC databases [aircraft flight management systems] can hold. This is not an issue for modern aircraft, however, many aircraft in operation are more than a decade old and FMC capacity cannot be upgraded easily. Many airlines must strictly tailor the available sets of procedures in their databases according to geographic areas they are flying to so that they meet the FMC memory capacity constraints. Potential solutions for noise management which require multiples of routes could be hindered over the next few years due to this lack of storage capacity on some aircraft which airspace designers will need to take into account.

[1] CAP 1378 "Airspace Design Guidance: Noise Mitigation Considerations when Designing PBN Departure and Arrival Procedures" UK CAA, April 2016. *https://publicapps.caa.co.uk/docs/33/CAP%201378%20APR16.pdf*

Emerging Technology

There is a great deal of research on-going into PBN implementation including consideration of respite. Much of it is at the concept stage, including noise assessments. Developments in this area should be monitored by BAC to determine if the outcomes of this research would be beneficial in the future.

USA Investigations around 'fanned' tracks

The US NextGen programme is working towards implementing a PBN-centric air navigation system by 2030. A great deal of research and consideration to date is publicly available in relation to the concept of 'fanned tracks'. These share necessary noise from departing aircraft across a wide area. Much of the work focuses, like the NATS work, on the concept of a family of precision fanned departures which can be used to sequence departures for noise dispersion.

Some of the research goes back a number of years, including a departure feasibility study[2] for John Wayne Airport from 2013. Some of the issues can still be applied to today's potential solutions, including;

- That consensus would need to be found amongst communities on the number of flight paths and where they should be located.
- The solution may not meet international design criteria or electronic navigation data standards.
- Regulatory provisions may need to be created to assure that aircraft have the proper capabilities.
- From an airspace and ATM perspective it would be time-consuming to develop a mechanism for assigning aircraft to tracks.

END OF REPORT

[2] "John Wayne Airport Departure Feasibility Assessment" Naverus, Inc., February 2013. *http://www.newportbeachca.gov/home/showdocument?id=15548*

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Technical Appendices

Appendix 5 - Airservices Australia Summary Report - Proposed Required Navigation Performance RWY01 and RWY 19 Approach Procedures (December 2011)

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airservices

Environmental Assessment

Proposed
Required Navigation Performance (RNP)
Runway 01 and Runway 19 approach procedures

Brisbane Airport

December 2011

Environmental Assessment Endorsement

	Name and Title	Signature	Date
Agreed:	Phil Owen PBN Program Director		15.12.11
Agreed:	Paula McMahon Manager, Environmetnal Services		15·12·2011
Endorsed:	Michelle Bennetts General Manager, Environment		15/12/11

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1 Executive Summary

Environmental Services has undertaken an environmental assessment of the proposal to permanently implement - Required Navigation Performance (RNP) approach procedures at Brisbane Airport.

The procedures replicate those used under the RNP trial that has been in place since 2007 for some Qantas, Jetstar, Virgin, Air New Zealand and Air Vanuatu aircraft.

The assessment compares environmental impacts in the period to 2020 with and without RNP procedures in use. As a substantial portion of environmental impact during that period will be due to expected growth in traffic at Brisbane, the findings relate to the change that could be attributed to the use of RNP procedures from a baseline that includes expected growth.

Procedures are proposed for both ends of Brisbane's main runway - Runway 01 (approaches over land) and Runway 19 (for approaches over Moreton Bay).

There will be no change to departures.

For the RNP approaches to Runway 19, the assessment determined that due to the final segments of all approaches tracking over Moreton Bay there is not likely to be any change that is noticeable by communities. Any segments over residential areas are above 5000ft.

For the RNP approaches to Runway 01, three procedures would be made permanent and are all contained within existing flight path corridors. The environmental assessment has focussed on potential noise impacts caused by any lateral or vertical change in the RNP approaches compared to conventional approaches and possible redistribution of some traffic between the three paths as more aircraft become capable of flying the RNP procedures.

Acceptable navigation tolerance for aircraft conducting an RNP approach will be a maximum of 0.3nm either side of track which corresponds to a flight corridor that is 0.6nm (or approximately 1.1km) wide. Conventional procedures have a navigation tolerance which reflects a corridor that is approximately 2.6km wide.

All the RNP procedures have been designed within these existing 2.6km wide corridors and in most cases, the RNP approach path follows the centre of the existing corridor. Analysis has shown that around 95% of all flights to and from Brisbane today already operate at a level of navigation accuracy which contains them within a narrow corridor. Consequently, communities underneath the centre of existing corridors will experience almost no change in noise from individual overflights as a result of aircraft making an RNP approach, while most of those on the fringes of current corridors will receive slightly less noise over time.

In some specific instances, however, the RNP path is slightly offset from the centre of the current corridor for community or operational benefit (following the Brisbane River, for example). In these cases, the analysis shows a small change in the noise impact for some areas, both favourable and unfavourable. This is discussed in greater detail for each specific approach path below.

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Specific findings for the three approaches onto Runway 01are noted below:

Track 1 - STAKE is the approach path for traffic arriving from the north which follows the current visual approach corridor. The 24-hour total average noise level ($LAeq_{24}$) may decrease by 3 – 4 dB (A) at some locations which may be perceptible. No area is expected to experience an increase in $LAeq_{24}$. Similar decreases are also expected at some locations in the more sensitive night time period. The level of noise from single events (LAmax) is not expected to change for most communities under this path however at a few locations there may be noticeable decreases (up to 6 dB (A) or increases (up to 5 dB (A)).

Track 2 - GLENN is the approach path which mirrors the current ILS approach from the south-east. The assessment has determined there should be no change to the maximum noise exposure of any individual flight (LAmax) to any community as a result of RNP approaches. A few areas under the southern end of this approach may experience increases in the total average noise level over a 24-hour period ($LAeq_{24}$) by up to 5 dB (A) as a result of there being more aircraft on the RNP track. Most areas are expected to experience no change in LAeq due to the implementation of RNP.

Track 3 - LISSA is the approach path for arrivals from the south - about 60% of flights arriving at Brisbane come from that direction.

The final segments of the LISSA approach are also offset slightly from the centre of the current visual approach corridor. The assessment has determined that as a result some areas directly beneath the proposed path may experience more noise events at the maximum noise exposure level (LAmax) while others will experience less than they do now. No perceptible change is expected to the total noise level (LAeq) for either the 24-hour period or the more sensitive night-time period. As these areas are very close to the airport, any change attributed to the slight shift of the RNP corridor is not expected to be differentiated from general growth of traffic.

Growth at Brisbane is expected to continue at around 4% a year according to the Brisbane Airport Corporation Master Plan. The assessment concluded that this growth in traffic, which is unrelated to the introduction of RNP, is expected to create a more noticeable environmental change than any factors associated with RNP. The total population exposed to noise events above 70 dB (A) in an average 24-hour period or 60 dB(A) in an average night period is expected to be less with the implementation of RNP than under currently used procedures.

As the proportion of flights that are able to use RNP will grow gradually from around 20% in 2010 to 85% in 2020, any changes associated with the greater use of RNP will be incremental over that time period.

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2 Methodology

Information about how Air Traffic Control (ATC) plans to manage aircraft using the proposed RNP approach procedures was used in the environmental assessment to determine which of the proposed RNP flight paths would be expected to be used by aircraft tracking from different directions.

The assessment analyses the environmental impact of aircraft types which are (or are expected to be) RNP capable by comparing how they operate now with how they would operate using the proposed RNP procedures. This is done individually for each procedure resulting in a series of noise metrics for each aircraft type.

Comparisons are made between the environmental impact of predicted future traffic using the current pattern of operation and the impact of future traffic where the majority of flights are using the RNP procedure.

The number of aircraft using the RNP procedures is based on information provided by airlines as to their forward plans for RNP – which results in an expectation that 85% of flights will be able to fly the RNP procedures by 2020.

The findings are based on changes in individual aircraft noise levels (LAmax values), total average noise level over a specified time period (LAeq) and a consideration of forecast noise exposure.

The LAmax value relates to the maximum noise level that a person on the ground would hear from a single flight. For the purposes of this analysis, the noise generated by an aircraft conducting an RNP approach is assumed to be the same as that generated for a conventional approach. Findings which relate to a changed LAmax value are therefore solely related to how close a person on the ground is to the approach track.

LAeq measures the total average noise level over a specified time period such as 24 hours ($LAeq_{24}$) or the more sensitive nine hour night time period of 10:00pm to 7:00 am ($LAeq_{9}$). The frequency and intensity of noise events are collated to produce a value for the total average noise level. LAeq levels of 40 dB (A) and below and where there are less than 50 overflights per day are considered not to be significant under Airservices' environmental principles. A small change in LAeq, however, may in some circumstances be very noticeable. A 3dB (A) change in LAeq represents an increase in noise energy equivalent to a doubling the number of over flights or all the same aircraft individually being 3dB (A) louder.

3 Overview

The growth forecast for Brisbane Airport indicates that traffic is expected to increase by 48% over the next 10 years or approximately 4% a year. This growth will result in an $LAeq_{24}$ increase of approximately 2 dB (A) and a greater overall population exposed to noise events above 70 dB (A) in an average 24-hour period, or 60 dB (A) in an average night period. The analysis shows, however, that the total population impacted is expected to be less under implementation of RNP, than under continuation of currently used procedures.

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The RNP procedures are contained within the existing lateral spread of current flight paths. As a result the assessment found that it is likely that locations in the vicinity of the RNP approach procedures already experience LAmax noise levels similar to those that may be experienced from aircraft flying existing procedures. However, the number of these LAmax events in the vicinity of the RNP procedures may increase with the gradual increase in uptake of this technology by aircraft operators.

Runway 01 Arrivals (Over Land)

The three RNP approaches to Runway 01 are all over built-up areas of Brisbane and follow existing flight path corridors. The environmental assessment has assessed the changes that may be experienced as a result of:

- any difference in the profile (both lateral and vertical) that an aircraft making an RNP approach would have compared to an aircraft making the equivalent conventional approach;
- likely changes in traffic patterns, such as any redistribution of flights between the three available approach paths to Runway 01.

The assessment determined that noticeable decreases and increases in LAmax noise levels may result at a number of locations associated with the proposed Runway 01 STAKE (up to 5 dB (A)) and LISSA (up to 7 dB (A)) proposed RNP approaches, due to the difference in median track of the majority of current traffic compared to the median track of the proposed RNP procedures. The changes, however, are in the very late stages of the approach close to the airport.

No increases in LAeq are expected to result from the STAKE procedure. However, some areas will experience decreases up to 4 dB (A) at some locations.

No perceptible change in LAeq is expected from the LISSA procedure.

As the RNP procedure will not change the lateral or vertical flight paths of aircraft using the Runway 01 GLENN approach (which mirrors the current ILS approach), no changes to LAmax noise impacts are expected for communities in this area. A few areas are expected to experience increases in LAeq of up to 5dB (A). However a number of areas are likely to experience no measurable change.

As a result of these findings, the changes caused by the permanent implementation of the Runway 01 LISSA and STAKE RNP approach procedures may be noticeable to the community in some areas.

Summary information about the impact of each of the Runway 01 approach tracks follows:

Track 1 - Runway 01, STAKE

- LAmax noise levels may increase at Bracken Ridge and Hamilton of up to 5 dB (A) with levels above 70 dB (A) in some cases. It is likely that these areas already experience aircraft noise at this level. However, the number of these noise events may increase as a result of the RNP procedures;

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- There may be decreases in LAmax noise at Bulimba of up to 6 dB(A);
- $LAeq_{24}$ changes with current traffic levels compared to RNP procedures range from a decrease of 4 dB(A) at Bulimba and Brendale to no change;
- $LAeq_{9}$ with current traffic levels compared to RNP procedures indicate that decreases can be expected at some locations.
- No substantial change in track miles.

Track 2 - Runway 01, GLENN

- This approach mirrors the current ILS;
- No changes in LAmax are expected to occur;
- Changes in LAeq are expected to occur in some areas. However many are likely to experience no measurable change;
- No substantial change in track miles.

Track 3 - Runway 01, LISSA

- There may be increases in LAmax noise in the Murarrie area of up to 7dB (A) with LAmax values being above 70 dB (A) in some cases. It is likely that these areas already experience aircraft noise at this level, however, the number of these noise events may increase as a result of the RNP procedures;
- There may be noticeable decreases in LAmax noise at Cannon Hill by up to 6 dB (A);
- No perceptible change to $LAeq_{24}$ or $LAeq_{9}$ noise exposure (+ or - 1dB (A));
- No substantial change in track miles.

Runway 19 Arrivals (over Moreton Bay)

As the final segments of all Runway 19 approach procedures are over Moreton Bay, most locations are expected to experience a very low LAeq (below 30 dB(A)) both under current procedures, and under implementation of RNP procedures. Some locations indicate a slight decrease in average noise may be expected due to the implementation of RNP procedures.

Three Runway 19 procedures (POODL, SINNK and GUTTA) are entirely over Moreton Bay until close to the airport and will not result in any changes to noise impacts on communities.

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One approach (GLENN) has the initial segments over land but at high altitude (above 5000 ft). LAmax noise levels at all locations overflown are expected to remain below 50 dB (A).

No net change to population exposed to aircraft noise is expected.

As a result of these findings, the changes caused by the permanent implementation of the Runway 19 RNP approach procedures are not likely to be noticeable.

Track 4 - Runway 19, GLENN

- Overflight of residential areas is above 5,000 ft.
- LAmax noise levels will be below 50dB and LAeq below 30dB. Due to these low levels, changes cannot be accurately quantified.
- The RNP procedure is 4.0 nm longer than current approach, thus an increase of 139kg CO_2 per approach is possible but is likely to be mitigated by the improved efficiency of an RNP procedure;
- No net change to population exposed to aircraft noise.

Track 6 - Runway 19, AMITY

- The proposed RNP track will take aircraft further away from residential areas on North Stradbroke Island;
- LAmax noise levels will be below 50dB (A) and LAeq below 30dB(A). Due to these low levels, changes cannot be accurately quantified.
- The RNP procedure is 1 nm longer than the comparison track thus an increase of 35kg in CO_2 emissions per approach is possible, but it is likely to be mitigated by the improved efficiency of an RNP procedure;
- No change to population exposed to aircraft noise expected.

Tracks 5, 7-8 - Runway 19, POODL, SINNK & GUTTA

- Approaches remain over Moreton Bay until crossing the coast in the final leg close to the end of Runway 19;
- The RNP procedures are either unchanged or <1nm shorter than current procedure, thus an estimated reduction of up to 35kg CO_2 per approach is possible;
- No residential areas affected by aircraft noise from these approaches.

GM-ATC Received
16 DEC 2011
No: [illegible]

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Memo

To: Jason Harfield, General Manager Air Traffic Control

Through: Peter Curran, A/General Manager, Corporate and International Affairs
Michelle Bennetts, General Manager, Environment
Paula McMahon, Manager, Environmental Services

From: Philip Owen, Performance Based Navigation Program Director

CC: Greg Atkins, Manager Operations Support

Date: 12 December 2011

Subject: Go / No Go – Implementation of Terminal Area RNP at Brisbane Airport

PURPOSE

To approve:

- The implementation of new multi-variant design Required Navigation Performance - Authorisation Required (RNP AR) approach procedures at Brisbane.

BACKGROUND

Since 2006, Airservices Australia has been engaged with CASA, Qantas and Naverus Inc as part of a trial for the controlled introduction of RNP-AR procedures within Australian terminal airspace. In order for additional airlines to become involved and to ensure a controlled expansion, Airservices took the lead and engaged Naverus Inc to design multi-variant designs to replace the successful trial procedures. The Implementation of Terminal Area RNP project (ITAR) was created in 2009 to manage this process. The first multi-variant design RNP AR approach procedures are now ready for deployment at Brisbane.

CRITICAL ISSUE 1 - ENVIRONMENTAL CONSIDERATIONS

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires Commonwealth agencies to undertake a 'self-assessment' to decide whether or not an action[1] is likely to have a significant impact on the environment.

A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts[2].

[1] 'Action' is defined broadly in the EPBC Act and includes: a project, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things.
[2] Significant impact guidelines 1.1 *Environment Protection and Biodiversity Conservation Act 1999*

In the case of amendments to flight paths the areas to be considered are the impacts on people and communities and in particular if there is a real chance or possibility that the action will affect the health, safety, welfare or quality of life of the members of a community, through factors such as noise, odours, fumes, smoke, or other pollutants. The main focus of this assessment has been the potential impact of noise on people and communities.

The self-assessment should be as objective as possible and based on sufficient information to make an informed judgement. As such, the following factors have been considered to determine whether the implementation of the new RNP AR approach procedures is likely to have a significant impact on the environment:

- The environmental context,
- Potential impacts, and
- Impact avoidance and mitigation.

Environmetnal context. The new RNP AR approach procedures are contained within the existing and long standing flight path corridors in use at Brisbane Airport. They mimic the trial procedures that have been in use since 2007 during which time more than 32,000 approaches have been flown. There is no evidence to indicate that any community concerns have been raised regarding the operation of aircraft using the trial procedures.

Potential Impacts. When assessing the potential impacts the following criteria were used:

- the scale of the change and its impacts
- the intensity of the change and its impacts, and
- the duration and frequency of the change and its impact

A technical assessment of the potential environmental impacts was undertaken by Environment Group. The assessment was deliberately conservative and compared the potential end state of RNP AR uptake (85% of jet operations in 2020) with current procedures. The assessment also considered the growth in air traffic forecast for Brisbane over the next 10 years. The content of the technical papers has been analysed and the Environmental Report is at Enclosure A. While the technical assessment concluded that in the worst case scenario the change may be perceptible it does not demonstrate that the change is likely to have a significant impact on the quality of life of the community.

Impact avoidance and mitigation. The RNP AR approach procedures have been designed in such a way that they are contained within existing flight path corridors at Brisbane. In addition, where possible, the flight paths have been positioned over areas of low or no population, such as the Brisbane River, within those corridors. The adoption of the new procedures will provide more flexibility in the use of flight paths that may have previously been constrained by weather or darkness potentially allowing for a more equitable sharing of air traffic between them.

As prescribed in the EPBC Act all of the factors discussed above have been taken into account during the conduct of our 'self assessment' of the change and the conclusion is that the proposed implementation of RNP AR procedures at Brisbane is not likely to be significant.

CRITICAL ISSUE 2 - OTHER RELEVANT CONSIDERATIONS

The other relevant considerations that have been addressed are based on the requirements of the Airservices Act sections 8, "AA's functions"; 9, "Manner in which AA must perform its functions" and 10, "AA must consult and cooperate"; they are:

- safety,
- ICAO compliance,
- regularity and efficiency, and
- consultation.

Safety. The procedures have been designed to ensure the safe operation of aircraft. The designers are certified by the CASA and have a proven history of safe implementation of trial RNP AR procedures at 16 Ports around Australia. The specific safety benefits are as follows:

- Vertical and lateral guidance of the aircraft is pre-programmed to minimise the risk of Controlled Flight Into Terrain (CFIT)

- Provision of effective backup in the event of the failure of the ILS
- Reduced complexity of operations through minimising intervention of pilot and controller
- Pre-programmed 'safe routes' in case of engine failure
- On board navigation performance monitoring and alerting

The implementation process will be compliant with Airservices' Safety Management System and a final Safety Assessment Report will be completed prior to the 'go live' date.

ICAO compliance. Performance Based Navigation (PBN) is a central pillar of the ICAO Global ATM Operational Concept and ICAO resolution A36-23 resolved that each state implement PBN. The Australian Strategic ATM Plan accords with the global concept and the Australian PBN Implementation Plan describes how PBN will be deployed, RNP AR procedures are part of this implementation plan.

Regularity and efficiency. Flight regularity is a measure of the successful operation of scheduled flights. RNP AR approaches improve surety of tracking, and in a number of cases surety of arrival. Consequently, RNP AR procedures also improve the likelihood of on time departures. Assuring regularity is an enabler for future growth of the air transportation system and the integration of RNP procedures will support that growth.

PBN facilitates efficient operation of aircraft and the RNP AR procedures have been designed to facilitate Continuous Descent Arrivals and to ensure fewer track miles are flown. As a result fuel burn and associated emissions are expected to be reduced. Having RNP AR procedures in place also reduces the likelihood of missed approaches and diversions in poor weather should the ILS be unavailable.

In addition it is expected that the adoption of PBN will permit more efficient airspace management, smaller separation standards and enhanced airspace capacity.

Consultation. In order to ensure that appropriate community consultation has taken place (in line with the Airservices Communication and Consultation Protocol) a Community Engagement Plan for the project was developed in consultation with the Department of Infrastructure & Transport, Brisbane Airport and Qantas and Virgin airlines. Representatives of potentially impacted communities were consulted and the primary vehicle for consultation has been the Brisbane Airport Community Aviation Consultation Group. A report on the consultation process has been provided by Corporate and International Affairs and is at Enclosure B.

CONCLUSION

The requirements of the EPBC Act have been appropriately considered and the outcome of the 'self assessment' is that the implementation of permanent RNP AR procedures at Brisbane is not likely to be significant.

The other relevant considerations, as determined by the requirements of the Airservices Act, have all been appropriately regarded in forming this recommendation.

RECOMMENDATION

It is recommended that you approve a 'Go' decision on the implementation of new multi-variant design Required Navigation Performance - Authorisation Required (RNP AR) approach procedures at Brisbane Airport.

P D OWEN

Performance Based Navigation Program Director

AGREED / ~~NOT AGREED~~ – Technical accuracy of work within Environment Assessment

Date: 16.12.2011

P McMahon
Manager, Environmental Services

ENDORSED / NOT ENDORSED – Compliance with Airservices Environment Management System

Date: 16/12/2011

Michelle Bennetts, General Manager, Environment

ENDORSED / ~~NOT ENDORSED~~ - Compliance with Airservices Communication & Consultation Protocol

Date: 12/12/11

Peter Curran, A/General Manager, Corporate and International Affairs

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APPROVED / NOT APPROVED – Decision: Not "Likely to be significant" under EPBC Act

Date: 19 December 2011

Jason Harfield, General Manager, Air Traffic Control

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Technical Appendices

Appendix 6 – Airservices Australia airspace change assessment summaries 2007-2016

Summary of airspace changes made between 2005 and 2017 that are not part of the NPR Project or associated ACP

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Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**
Specific Change	**NO 1. EIS (DAYBO – BNPR44 – BNPR45- ILS 01L)**
Modelled Track Reference (INM)	**(Airbiz Ref)**
Effective date	**Date change is to be implemented (2020 TBC)**

Description of the change

	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change	Current STAR is to the future RWY 01R	A/C to fly DAYBO – BNPR44 – BNPR45 – ILS 01L. Depicted as being on the extreme edge of the vectoring area	This track will now be wider than EIS design. Tracking further West and outside the vectoring area to join final approach at 14 miles from the threshold
Describe the Reasoning for the Proposed Change/Justification		EIS 2007 was based on the assumption that aircraft will be vectored onto final to allow simultaneous parallel approaches, however STARs have been designed to comply with proposed amendments allowing aircraft to join final from the relevant STAR.	The ICAO standards that enable aircraft to fly Independent ILS approaches to parallel runways require that A/C on this approach join final approach at or above 4000' at 14 miles from touchdown. The most efficient way of achieving this is to widen the flight path 5.5NM west of DAYBO.
Is the change a New Air Route, Approach or Departure Procedure?			New air route (STAR) connecting to ILS approach
Does the change result in a decrease in altitude?			No, if anything it results in an increase in altitude on the base leg.
Does the change result in an increase in number of movements?			Yes as there are no arriving aircraft on this route at present
Does the change result in a change in aircraft type?			No
Does change result in a change in distance flown?			Yes, an increase of approx.1.8NM

Airspace/Air Routes/Instrument Procedures

Design (DAP Plates) or best available design illustrations		
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**	Had the track as depicted in the EIS from DAYBO been maintained, then the airport would lose the arrival capacity provided by operating independent ILS approaches to parallel runways, as the ICAO standard could not be met. There would be a reduction in capacity of 15 – 20%
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**	To be advised
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**	This route minimises residential overflight, whilst meeting the ICAO standards and allow departures to climb without constraint. Considered the best option to achieve this.
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?	No, unless aircraft are vectored wider for sequencing: ident to AMB required earlier due to closer proximity
	Environmental assessment requirements	For Airservices N70 and N60 impacts outside EIS. This route is different to EIS and existing.

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**
Specific Change	**No 2. EIS (AMBNDB – BNPR45 – ILS01L)**
Modelled Track Reference (INM)	**(Airbiz Ref)**
Effective date	**Date change is to be implemented (2020 TBC)**

Description of the change

	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change	Currently these aircraft approach from west but will be moved on to proposed ACP 2017 flight path through implementation of STAR in Nov 2018	A/C to fly AMBNDB – BNPR45 – 01L ILS.	This track will now join the 01R ILS via new STAR points south of AMB.
Describe the Reasoning for the Proposed Change/Justification			On request from AMB ATC, the arrival route was moved clear of the AMB CTR. This met the aim for the airspace design to facilitate equitable use of airspace. The revised route also results in reduced tracking over residential areas.
Is the change a New Air Route, Approach or Departure Procedure?			New STAR
Does the change result in a decrease in altitude?			Aircraft will join final on descent to A030, vice A040, due to it now terminating to an approach to 01R.
Does the change result in an increase in number of movements?			No
Does the change result in a change in aircraft type?			No

Airspace/Air Routes/Instrument Procedures

Does change result in a change in distance flown?			Yes, approx. 5NM less
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		Had the track as depicted in the EIS from AMBNDB been maintained, then the airport would lose the arrival capacity provided by operating independent ILS approaches to parallel runways, as the ICAO standard could not be met. There would be a reduction in capacity of 15 – 20%
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		To be advised
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**		This STAR is required due to AMB requirements to keep aircraft to south of restricted airspace – results in reduced residential overflight
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?		It reduces the track miles within AMB restricted airspace and avoids AMB CTR all together
	Environmental assessment		This change will be implemented in November 2018 before runway implementation.

2

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**
Specific Change	**No 3. EIS (DAYBO – STAKE – LEFT BASE 01L)**
Modelled Track Reference (INM)	**(Airbiz Ref)**
Effective date	**Date change is to be implemented (2020 TBC)**

Description of the change

	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change	LB01 VSA is facilitated predominately via use of the 'River Track', either as the completion of a closed STAR or via vectors from an open STAR.	DAYBO – STAKE – Left Base 01L was described in the EIS as being the principle arrival track from the north until traffic demand became so heavy that simultaneous arrivals to parallel runways were required. At which time aircraft would continue to use the DAYBO – STAKE track but then be held at a low altitude (2000 – 3000') and radar vectored into the radar vectoring area for a visual approach that met the ICAO standards of simultaneous visual approaches to parallel runways.	Turbo prop aircraft will now be vectored off an open STAR for approx. 4NM final. To ensure the integrity of independent parallel approaches, aircraft will be vectored into a position that will allow a 30 degree intercept at 4NM or greater, whilst maintaining a radar standard with the parallel runway until established on the intercept heading. If tower accept responsibility for separation, aircraft may be vectored for a closer base. An occasional F100 or B717 may also be given this approach.
Describe the Reasoning for the Proposed Change/Justification			As part of the decision to plan only for closed STARS that met the ICAO independent parallel runway standards, PROSIG determined that planning for this track was to be discontinued. Turbo prop operators requested that a 'short' approach still be available, so this option was explored to ensure operational integrity and operator preference.
Is the change a New Air Route, Approach or Departure Procedure?			STAR and visual approach

Airspace/Air Routes/Instrument Procedures			
Does the change result in a decrease in altitude?			No
Does the change result in an increase in number of movements?			Should be within EIS
Does the change result in a change in aircraft type?			Anticipated to be used by non-jet aircraft only with the occasional F100 or B717 (2-4 per day)
Does change result in a change in distance flown?			Yes, aircraft are required to be established on 30 degree intercept heading at 4NM prior to separation breaking down with the adjacent approach.
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		The EIS depicted track did not meet the ICAO standard for independent parallel runway standards. It therefore would need controller intervention to manage altitude and radar headings with subsequent loss of environmental management. Another option is the use of a closed STAR culminating in an RNAV GNSS approach. This would require aircraft to be configured for landing at approx. 9NM, making it inefficient for operators and would increase controller workload due to disparate speeds between aircraft on varying approaches.
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		TBA
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**		Closed STARs or no STARs to either ILS or visual approach. Open STAR to radar vectoring better meets both EIS depiction and airline
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?		No
	Environmental assessment		Within EIS

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**
Specific Change	**NO 4. EIS (Radar Vectoring Area 01L – RNPAR Replacement)**
Modelled Track Reference (INM)	**(Airbiz Ref)**
Effective date	**Date change is to be implemented (2020 TBC)**

Description of the change

	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change	The current RNP-AR from the north follows the 'River Track' for 4NM final.	The EIS depicted what was called a Radar Vectoring Area. It proposed that this area would be used to radar vector arriving aircraft in visual conditions in such a way that they met the ICAO standards for visual approaches in simultaneous parallel runway operations.	An RNP-AR approach is designed to join final approach at four miles from touchdown, which coincides with the inner surface of the radar vectoring area.
Describe the Reasoning for the Proposed Change/Justification			An RNP-AR approach allows suitably equipped aircraft to fly an emissions and noise friendly Constant Descent Approach (CDA) to the threshold in both Visual and Instrument conditions. Flight path predictability for both pilot and controller provide enhanced safety benefits over radar vectoring.
Is the change a New Air Route, Approach or Departure Procedure?			New air route and approach procedure
Does the change result in a decrease in altitude?			No
Does the change result in an increase in number of movements?			Yes, 50-60% of jet aircraft will use this approach
Does the change result in a change in aircraft type?			Yes, RNP-AR certified aircraft only.

Airspace/Air Routes/Instrument Procedures

Does change result in a change in distance flown?			Depending on the amount of vectoring that may have been required, the distance could be greater or less. It provides a known distance to fly, ensuring maximum efficiency for certified operators.
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		The alternative is to maintain the reduced predictability of operations including poorer emissions and noise outcomes by retaining radar vectored approaches.
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		TBA
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**		RNP-AR approaches result in greater predictability for airlines. It will be a constant descent ensuring maximum fuel efficiency and minimum engine thrust (idle to around 1500ft)
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?		No
	Environmental assessment		Within EIS noise contours – use will need to be explained to the community as there will be concentration with 50-60% of jet aircraft from the north using this approach

2

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**
Specific Change	**NO 5. EIS (Radar Vectoring Area 01L – Closed Visual STAR Replacement)** **Note that this change will no longer be included in the airspace design**
Modelled Track Reference (INM)	**(Airbiz Ref)**
Effective date	**This track is to be removed from the airspace design as it is replaced by open STAR with radar vectoring**

Description of the change

	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change		The EIS depicted what was called a Radar Vectoring Area. It proposed that this area would be used to radar vector arriving aircraft in visual conditions in such a way that they met the ICAO standards for visual approaches in simultaneous parallel runway operations.	No longer included in the design
Describe the Reasoning for the Proposed Change/Justification			Closed Visual STAR approach has been removed from the design on request from IFP.
Is the change a New Air Route, Approach or Departure Procedure?			
Does the change result in a decrease in altitude?			
Does the change result in an increase in number of movements?			
Does the change result in a change in aircraft type?			
Does change result in a change in distance flown?			

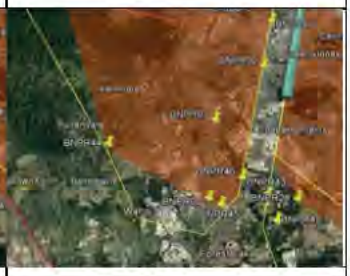
Airspace/Air Routes/Instrument Procedures			
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		The EIS depicted track did not meet the ICAO standard for independent parallel runway standards. It therefore would need controller intervention to manage altitude and radar headings with subsequent loss of environmental management. No consistent Constant Descent Arrival (CDA) is possible using this track.
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?** **Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?** **Environmental assessment**		Not required

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs		
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**		
Specific Change	**NO 6. EIS (Radar Vectoring Area 01L – ILS Replacement)** **No longer required and will not be included in airspace design – replaced by closed STARS**		
Modelled Track Reference (INM)	**(Airbiz Ref)**		
Effective date	**Change will not be implemented – replaced by closed STARs**		
Description of the change			
	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change	Aircraft currently join final to the future 01R at approx. 12NM.	The EIS depicted what was called a Radar Vectoring Area. The southern extremity of this area was shown as encompassing the STAR that joined the ILS approach for 01L.	Due to the design now being closed STARs to the ILS, radar vectoring for ILS final will not be the normal operating model. Vectoring may still be required for late sequencing requirements, weather or other operational requirements.
Describe the Reasoning for the Proposed Change/Justification			Due to the requirements of simultaneous independent parallel approaches, some vectoring outside the EIS vectoring area may be required dependent on the situation at the time.
Is the change a New Air Route, Approach or Departure Procedure?			No
Does the change result in a decrease in altitude?			No
Does the change result in an increase in number of movements?			No
Does the change result in a change in aircraft type?			No

Airspace/Air Routes/Instrument Procedures

Does change result in a change in distance flown?			Dependent on the extent of vectoring required in individual circumstances.
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		Assessment of airspace options determined closed STAR provided best outcomes overall
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**		Assessment of safety, efficiency, capacity and environmental impact determined best option closed STAR
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?		No, unless aircraft are vectored wider for sequencing. Ident to AMB required earlier due to closer proximity
	Environment assessment		Not required

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**
Specific Change	**NO 7. EIS (DUNNI - BNPR48 – LISSA – 01R)**
Modelled Track Reference (INM)	**(Airbiz Ref)**
Effective date	**Date change is to be implemented (2020 TBC)**

Description of the change

	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change	Aircraft fly DUNNI – KASBA – SORVA - RNAV-P 01, which is the same track as the EIS path, but waypoint names have changed.	A/C to fly DUNNI – BNPR48 – LISSA – Right Base to land 01R. This replicates an existing pre NPR arrival track.	This track will now initially be slightly further south over Stradbroke Is and Victoria Point, then join an existing and EIS predicted track at COTON, then via SORVA – Right Base 01R as per present RNAV-P 01.
Describe the Reasoning for the Proposed Change/Justification			Widening this track is required to sterilize the parallel runway break out procedure required in the ICAO standards. It also provides more maneuvering room for 01R departures over the bay helping to facilitate continuous climb departures.
Is the change a New Air Route, Approach or Departure Procedure?			Amended approach procedure
Does the change result in a decrease in altitude?			No, aircraft may be higher crossing the coast
Does the change result in an increase in number of movements?			This may allow an increase in departure traffic.

Airspace/Air Routes/Instrument Procedures			
Does the change result in a change in aircraft type?			No
Does change result in a change in distance flown?			Yes, increase of 12NM
Design (DAP Plates) or best available design illustrations	As per EIS 2007 path		
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		Alternative is to maintain the EIS design but this design does not protect the parallel runway breakout ICAO standard requirement and thus removes the ability to operate independent parallel runway arrivals with a consequent 15 – 20% reduction in arrival capacity
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		Unknown
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?** **Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?**		Unknown Yes, it allows spacing for the breakout procedure, and allows for more space to process departures

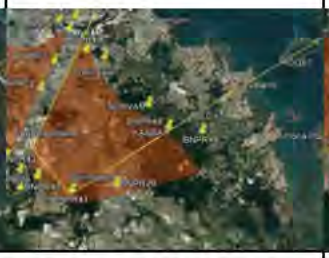
Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**
Specific Change	**NO 8. EIS (DUNNI – BNPR48 – BNPR41 – TO ILS 01R)**
Modelled Track Reference (INM)	**(Airbiz Ref)**
Effective date	**Date change is to be implemented (2020 TBC)**

Description of the change

	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change	Acft track DUNNI – LOGAN – GLENN to intercept ILS 01R	A/C to track via DUNNI – BNPR48 – BNPR41 – Right Turn to intercept ILS 01R.	This track will now initially be slightly further south over Stradbroke Is and track to COTON. From COTON the track will remain further south east than the EIS depiction continue further south and make a right turn to intercept ILS approach 01R at 14 miles. A/C will also be required to maintain 3000' altitude for 8 miles prior to commencing the ILS approach.
Describe the Reasoning for the Proposed Change/Justification			Widening this track is required to sterilize the parallel runway break out procedure required in the ICAO standards. It also provides more maneuvering room for 01R departures over the bay helping to facilitate continuous climb departures. After passing COTON it still needs to track further SE than the EIS depiction to allow the right turn to intercept the ILS 01R to meet the geometric design required by the ICAO standards for independent parallel approaches. Further, a level segment at 3000'is also required by these standards.

Airspace/Air Routes/Instrument Procedures			
Is the change a New Air Route, Approach or Departure Procedure?		Amended	New air route and approach procedure
Does the change result in a decrease in altitude?		No	Initially aircraft may cross the coast slightly higher, but then will be required to maintain 3000 to ensure the viability of independent parallel approaches
Does the change result in an increase in number of movements?		Yes, but not as significant as ACP 2017 route.	Dependent on how many aircraft are vectored over this area currently
Does the change result in a change in aircraft type?		No	No
Does change result in a change in distance flown?		3NM more than present route	4NM more than EIS route
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		Alternative is to maintain the EIS design but this design does not protect the parallel runway breakout or independent join of final approach ICAO standards requirements and thus removes the ability to operate independent parallel runway arrivals with a consequent 15 – 20% reduction in arrival capacity.
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		TBA
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**		Must meet regulatory standards for independent runway operations and allow sufficient room for departures. Considered best design from safety, efficiency and environmental outcomes.
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?		It allows for departure routes to be better designed than otherwise may have been

Airspace/Air Routes/Instrument Procedures		
	Environmental Assessment	Outside EIS but aircraft currently vectored in this area. 33% of aircraft on this STAR expected to use ILS.

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**
Specific Change	**NO 9. EIS (BERTI – 01R ILS)**
Modelled Track Reference (INM)	**(Airbiz Ref)**
Effective date	**Date change is to be implemented (2020 TBC)**

Description of the change

	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change	Acft track BERTI – GEROO – GLENN to intercept ILS 01	A/C to track from BERTI to a Right Base to join 01R ILS.	This track will leave BERTI on a more westerly heading to a point further south of the airport and then make a right turn to intercept the 01R ILS at 14 miles from touchdown. There will be an 8 mile level segment at 3000'.
Describe the Reasoning for the Proposed Change/Justification			Widening this track to the SW is required to meet the geometry required of the ICAO standards for independent parallel runway approaches in ILS conditions. The 3000' level segment is also a requirement of the ICAO standards.
Is the change a New Air Route, Approach or Departure Procedure?		Amended route	New air route
Does the change result in a decrease in altitude?		No	Aircraft will have to maintain 3000 earlier than present due to independent parallel runway requirements
Does the change result in an increase in number of movements?		Not significantly as dependent parallel approaches would be required.	Yes as it facilitates independent parallel runway operations
Does the change result in a change in aircraft type?		No	No

Airspace/Air Routes/Instrument Procedures

Does change result in a change in distance flown?		1NM further than current STAR	Same track miles at EIS 2007
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		Alternative is to maintain the EIS design but this design does not provide for independent parallel runway ICAO standards requirements and thus removes the ability to operate independent parallel runway arrivals with a consequent 15 – 20% reduction in arrival capacity.
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		TBA
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**		Best option to meet regulatory independent parallel runway standards and existing flight paths as closely as possible
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?		No
	Environmental assessment		ILS used for 33% of jets using this STAR. Outside EIS but within existing vectoring.

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs		
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**		
Specific Change	**NO 10. (EIS Radar Vectoring Area 01R – Closed Visual STAR Replacement)** **No longer required as replaced by radar vectoring**		
Modelled Track Reference (INM)	**(Airbiz Ref)**		
Effective date	**Removed from airspace design**		
Description of the change			
	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change		The EIS depicted what was called a Radar Vectoring Area. It proposed that this area would be used to radar vector arriving aircraft in visual conditions in such a way that they met the ICAO standards for visual approaches in simultaneous parallel runway operations.	Closed visual STARs have been removed
Describe the Reasoning for the Proposed Change/Justification			Closed Visual STAR approach has been removed from the design on request from IFP.
Is the change a New Air Route, Approach or Departure Procedure?			
Does the change result in a decrease in altitude?			
Does the change result in an increase in number of movements?			
Does the change result in a change in aircraft type?			
Does change result in a change in distance flown?			

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Airspace/Air Routes/Instrument Procedures			
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		Closed STARs developed but independent parallel runway standards and airline requirements resulted in replacement with open STAR and radar vectoring within the EIS
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		TBA
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?** **Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?**		As above
	Environmental Assessment		Not required

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs		
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**		
Specific Change	**NO 11. EIS (Radar Vectoring Area 01R – ILS Replacement) No longer required as replaced by Closed STARs**		
Modelled Track Reference (INM)	**(Airbiz Ref)**		
Effective date	**No longer included in airspace design**		
Description of the change			
	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change		The EIS depicted what was called a Radar Vectoring Area. The southern extremity of this area was shown as encompassing the STAR that joined the ILS approach for 01R.	Due to the design now being closed STARs to the ILS, radar vectoring for ILS final will not be the normal operating model. Vectoring may still be required for late sequencing requirements, weather or other operational requirements.
Describe the Reasoning for the Proposed Change/Justification			Due to the requirements of simultaneous independent parallel approaches, some vectoring outside the EIS vectoring area may be required dependent on the situation at the time.
Is the change a New Air Route, Approach or Departure Procedure?			No
Does the change result in a decrease in altitude?			No
Does the change result in an increase in number of movements?			No
Does the change result in a change in aircraft type?			No

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Airspace/Air Routes/Instrument Procedures			
Does change result in a change in distance flown?			Dependent on the extent of vectoring required in individual circumstances.
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		No, unless aircraft are vectored wider for sequencing. Ident to AMB required earlier due to closer proximity
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?** **Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?** **Environmental assessment**		Evaluation of the options determined closed STARs provided best outcomes Not required

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**
Specific Change	**NO 12. EIS (19R SID to AMBLE)**
Modelled Track Reference (INM)	**(Airbiz Ref)**
Effective date	**Date change is to be implemented (2020 TBC)**

Description of the change

	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change	Current SID departs 19 and climbs to CITEE – NOGRA – AMBLE	SID designed to depart 19R and at approx. 6 miles turn right and track to AMBLE	This SID will initially track as per the EIS but the right turn and the track will be wider than the EIS design.
Describe the Reasoning for the Proposed Change/Justification			The EIS design did not allow sufficient room to meet the bank angle requirements for jet aircraft. Also by widening the turn a more noise friendly flight path can be designed.
Is the change a New Air Route, Approach or Departure Procedure?			New route and departure procedure
Does the change result in a decrease in altitude?		No	No
Does the change result in an increase in number of movements?		Yes due to parallel operations	No
Does the change result in a change in aircraft type?		No	No
Does change result in a change in distance flown?	24 TO AMBLE	Approx. 1NM further than present	Approx. 4NM further to AMBLE or abeam AMBLE as not all SIDs go via AMBLE now.

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Airspace/Air Routes/Instrument Procedures

Design (DAP Plates) or best available design illustrations		
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**	There are no alternatives.
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**	TBA
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**	This design meets PANSOPS requirements for the turn and improves environmental outcomes as more contained within EIS
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?	There will be an adjustment in the track to the former positions of CORAL and TRIKI that will effect BUR.
	Environmental assessment	Within EIS

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**
Specific Change	**NO 13. EIS (19R SID TO BNPR09 and BNPR10)**
Modelled Track Reference (INM)	**(Airbiz Ref)**
Effective date	**Date change is to be implemented (2020 TBC)**

Description of the change

	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change	Current SID climbs to overhead CITEE, then turns right to WACKO	SID designed to depart 19R track on runway heading to approx. 6 miles and turn right then split to either BNPR09 or BNPR10	This SID will turn right at 6NM upwind, track west, then turn right to track direct to WACKO.
Describe the Reasoning for the Proposed Change/Justification			The SID in the EIS replicated the then existing enroute structure, which had inbound and outbound traffic on the same routes. For enroute safety issues a one way route structure has been introduced and now only one outbound SID via WACKO is used. The PD represents this one way route structure. This route allows the aircraft to take a wider turn, remains within the EIS vectoring area for 8 extra track miles, and establishes over less-densely populated areas quicker.
Is the change a New Air Route, Approach or Departure Procedure?		Departure procedure amendment	Departure procedure amendment
Does the change result in a decrease in altitude?		No	No
Does the change result in an increase in number of movements?		No	No

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Airspace/Air Routes/Instrument Procedures

Does the change result in a change in aircraft type?		No	No
Does change result in a change in distance flown?		No	Approx. 4NM more.
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		An alternative would be to return to the less safe enroute structure.
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		TBA
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**		Best option to meet the safer current enroute structure (changed since EIS) and reduces residential overflight within the EIS
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?		No
	Environmental Assessment		Within EIS and more closely matches current tracks than EIS track

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Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**
Specific Change	**NO 14. EIS (19L SID to SCOTT)**
Modelled Track Reference (INM)	**(Airbiz Ref)**
Effective date	**Date change is to be implemented (2020 TBC)**

Description of the change

	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change	SID tracks upwind to CITEE, then right turn to climb overhead arrivals.	EIS provided for a left turn to SCOTT	A 19L SID to SCOTT is in the PD
Describe the Reasoning for the Proposed Change/Justification			Present SCOTT SID tracking (utilising 19R) would not be feasible off 19L. SCOTT SID follows the path of the existing HUUGO SID, then deviates left to SCOTT south of YBBN.
Is the change a New Air Route, Approach or Departure Procedure?			New departure procedure
Does the change result in a decrease in altitude?			Yes, the aircraft may be held lower (A080) for a short period reference arriving aircraft above
Does the change result in an increase in number of movements?			No
Does the change result in a change in aircraft type?			No

Airspace/Air Routes/Instrument Procedures

Does change result in a change in distance flown?			Yes, reduction of approx. 30NM
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		To use a SID to SCOTT off 19R, which would increase track miles, taxi distances and complexity due to other traffic to the north of YBBN and transiting aircraft to the east.
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		Tested in the simulator.
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**		Track distances, taxi distances, complexity
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?		Requires aircraft to potentially level out, arrivals require a level restriction
	Environmental assessment		Follows existing until springwood then turns to east as presented in EIS.

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs		
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**		
Specific Change	**NO 15. EIS (19L SID to AMB)**		
Modelled Track Reference (INM)	**(Airbiz Ref)**		
Effective date	**Removing from airspace design**		
Description of the change			
	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change		SID designed to depart 19L and track to AMB	This SID is not in the PD as it no longer meets Amberley requirements
Describe the Reasoning for the Proposed Change/Justification			This airspace is now used for inbound traffic via GORDY.
Is the change a New Air Route, Approach or Departure Procedure?			
Does the change result in a decrease in altitude?			
Does the change result in an increase in number of movements?			
Does the change result in a change in aircraft type?			
Does change result in a change in distance flown?			
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		

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Airspace/Air Routes/Instrument Procedures		
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**	
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**	
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?	
	Environment assessment	Not required

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Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs		
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**		
Specific Change	**NO 16. EIS (HUUG0 SID 19L)**		
Modelled Track Reference (INM)	**(Airbiz Ref)**		
Effective date	**Date change is to be implemented (2020 TBC)**		
Description of the change			
	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change		No change to present day	No change to present day
Describe the Reasoning for the Proposed Change/Justification			
Is the change a New Air Route, Approach or Departure Procedure?			
Does the change result in a decrease in altitude?			
Does the change result in an increase in number of movements?			
Does the change result in a change in aircraft type?			

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Airspace/Air Routes/Instrument Procedures

Does change result in a change in distance flown?			
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		This change was to meet ICAO requirements which have now changed (2018) to allow existing flight path to remain.
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?** **Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?** **Environment assessment**		Not required – same as existing

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs		
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**		
Specific Change	**NO 17. EIS (01R SID to AMB)**		
Modelled Track Reference (INM)	**(Airbiz Ref)**		
Effective date	**No longer required in airspace design due to Amberley requirements**		
Description of the change			
	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change		SID designed to depart 01R, right turn and track to AMB	This SID is not in the PD.
Describe the Reasoning for the Proposed Change/Justification			This airspace is now used for inbound traffic via GORDY
Is the change a New Air Route, Approach or Departure Procedure?			
Does the change result in a decrease in altitude?			
Does the change result in an increase in number of movements?			
Does the change result in a change in aircraft type?			
Does change result in a change in distance flown?			
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		

Airspace/Air Routes/Instrument Procedures		
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**	
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?	
	Environment assessment	Not required

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Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs		
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**		
Specific Change	**NO 18. PD (AMB – KEVIE 19R)**		
Modelled Track Reference (INM)	**(Airbiz Ref)**		
Effective date	**Date change is to be implemented (2020 TBC)**		
Description of the change			
	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change	WOODY-KEVIE-DRAIN to join the future 19L	This STAR is not in the EIS	STAR is now WOODY-DAYBO to join other 19R ILS STARs
Describe the Reasoning for the Proposed Change/Justification			Inbound route for non-jet aircraft from the west that is used in present day operations wasn't catered for in the EIS.
Is the change a New Air Route, Approach or Departure Procedure?			New air route
Does the change result in a decrease in altitude?			No, aircraft will be higher over built up areas.
Does the change result in an increase in number of movements?			No
Does the change result in a change in aircraft type?			No
Does change result in a change in distance flown?			Yes, 4NM further than present STAR to 19L

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Airspace/Air Routes/Instrument Procedures

Design (DAP Plates) or best available design illustrations		
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**	The options for non-jet arrivals from the west would result in: 1. large increases in track miles to join the non-jet STAR from the north, and/or 2.tracking south to join the jet STAR through the southern portion of AMB airspace
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**	TBC
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**	Best option for turbo props to ensure strategic separation with jets and follow existing flight paths
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?	Yes, the STAR now vacates AMB airspace at a different point to the current STAR
	Environmental assessment	Not articulated in EIS but follows existing flight paths

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Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**
Specific Change	**NO 19. EIS (19L, 19R Radar Vectoring Area)**
Modelled Track Reference (INM)	**(Airbiz Ref)**
Effective date	**Change no longer required in airspace design**

Description of the change

	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change		The EIS depicted what was called a Radar Vectoring Area. It proposed that this area would be used to radar vector arriving aircraft in visual conditions in such a way that they met the ICAO standards for visual approaches in simultaneous parallel runway operations.	No longer included in the design
Describe the Reasoning for the Proposed Change/Justification			The EIS depicted track did not meet the ICAO standard for independent parallel runway standards. It therefore would need controller intervention to manage altitude and radar headings with subsequent loss of environmental management. No consistent Constant Descent Arrival (CDA) is possible using this track.
Is the change a New Air Route, Approach or Departure Procedure?			
Does the change result in a decrease in altitude?			
Does the change result in an increase in number of movements?			
Does the change result in a change in aircraft type?			

Airspace/Air Routes/Instrument Procedures

Does change result in a change in distance flown?			
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		TBA
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**		Closed STARs considered best outcome from option assessment.
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?		
	Environmental Assessment		Not required

Airspace/Air Routes/Instrument Procedures

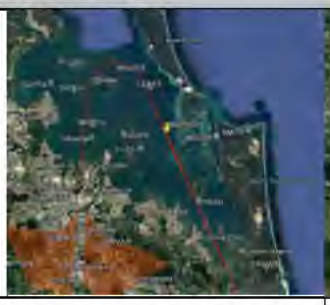
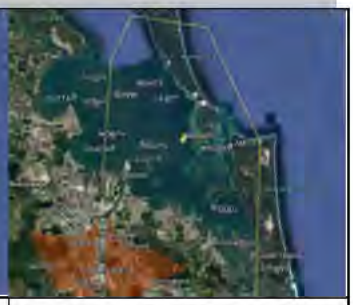
EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**
Specific Change	**NO 20. EIS (SODPROPS 19R Arrivals from South)**
Modelled Track Reference (INM)	**(Airbiz Ref)**
Effective date	**Date change is to be implemented (2020 TBC)**

Description of the change

	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change		Southern STARS designed to remain inside of Moreton Bay	STARS now to track East of Stradbroke Is.
Describe the Reasoning for the Proposed Change/Justification			This facilitates departing aircraft to south, north and west to have continuous climb while maneuvering over Moreton Bay. It provides less ATC complexity and enhanced safety. It also provides for reliable capacity on the airports No 1 preferred noise mode.
Is the change a New Air Route, Approach or Departure Procedure?			New air route
Does the change result in a decrease in altitude?			No
Does the change result in an increase in number of movements?			Yes, as it frees up space for departures from 01R
Does the change result in a change in aircraft type?			No
Does change result in a change in distance flown?			Yes, approx.. 17NM

Airspace/Air Routes/Instrument Procedures

Design (DAP Plates) or best available design illustrations		
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**	Revert to previous designs, both EIS and PD. Both have noise and capacity limitations.
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**	This has been tested utilising the ATS Simulator
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**	Increased distance was a consideration, but the efficiency and lower complexity provided by continuous climb for departures was deemed to be of greater importance than reducing track miles for arrivals.
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?	It allows departure routes to be designed for increased efficiency and lower complexity.
	Environment assessment	Moves further east over non populated areas and then joins EIS.

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs		
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**		
Specific Change	**NO 21. EIS (SODPROPS Dep North)**		
Modelled Track Reference (INM)	**(Airbiz Ref)**		
Effective date	**Date change is to be implemented (2020 TBC)**		
Description of the change			
	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change		EIS SID to North designed to maintain a low altitude and pass under southern arrivals then climb once east of Stradbroke Is.	PD SID designed to turn right over the bay, climb continuously, turn left inside the bay and climb over the arrivals and continue north.
Describe the Reasoning for the Proposed Change/Justification			The EIS design has been deconflicted in the PD design. Allowing for continuous climb, less track miles and better noise outcomes.
Is the change a New Air Route, Approach or Departure Procedure?			New departure procedure
Does the change result in a decrease in altitude?			No
Does the change result in an increase in number of movements?			Potentially due to less complexity
Does the change result in a change in aircraft type?			No
Does change result in a change in distance flown?			No

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Airspace/Air Routes/Instrument Procedures

Design (DAP Plates) or best available design illustrations		
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**	Reintroduce EIS design with capacity, confliction and track mile implications.
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**	ATS simulator
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**	Efficiency for departing aircraft, complexity
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?	Requires arrival routes from south and east to be pushed wider and height requirements added.
	Environmental Assessment	Not required as over water

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**
Specific Change	**NO 22. EIS (SODPROPS Dep West)**
Modelled Track Reference (INM)	**(Airbiz Ref)**
Effective date	**Date change is to be implemented (2020 TBC)**

Description of the change

	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change		EIS SID to West designed to maintain a low altitude and pass under southern arrivals then climb once east of Stradbroke Is and be radar vectored north then west to join track.	PD SID designed to turn right over the bay, climb continuously, turn further right inside the bay, track overhead the airport in excess of 6000' and track to WACKO. This is an existing SID in current and PD 01 parallel operations.
Describe the Reasoning for the Proposed Change/Justification			The EIS design has been deconflicted in the PD design. Allowing for continuous climb, significantly less track miles and better noise and capacity outcomes.
Is the change a New Air Route, Approach or Departure Procedure?			No
Does the change result in a decrease in altitude?			No
Does the change result in an increase in number of movements?			Potentially due to decreased complexity
Does the change result in a change in aircraft type?			No

Airspace/Air Routes/Instrument Procedures

Does change result in a change in distance flown?			Potentially. The benefit is the track miles are known, as opposed to be situation dependent as per the EIS solution.
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		1. Reintroduce EIS design with capacity, confliction and track mile implications. 2. Continue SID as per the northern departures, then turn west to climb over the arrival tracks. This created issues with sectorisation when tested in the simulator.
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		ATS simulator.
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**		Airspace issues, efficiency, track miles.
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?		No
	Environmental Assessment		Should be close to existing tracks and only used for SODPROPS

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**
Specific Change	**NO 23. EIS (Mixed modes RWY01R North arrivals)**
Modelled Track Reference (INM)	**(Airbiz Ref)**
Effective date	**Date change is to be implemented (2020 TBC)**

Description of the change

	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change		EIS does not cater for arrivals from the north to 01R.	STARs divert from 01L STAR paths and track over sparsely populated areas until established within the EIS vectoring area. They then intercept the 01R localiser at GLENN.
Describe the Reasoning for the Proposed Change/Justification			This would be required when operating in mode 4, when weather conditions don't allow for SODPROPS at night and 01 is the duty runway.
Is the change a New Air Route, Approach or Departure Procedure?			New air route
Does the change result in a decrease in altitude?			No
Does the change result in an increase in number of movements?			No
Does the change result in a change in aircraft type?			No
Does change result in a change in distance flown?			No

Airspace/Air Routes/Instrument Procedures

Design (DAP Plates) or best available design illustrations		
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**	
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**	Not tested
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**	Required according to EIS modes when not using SODPROPS. Tracking as much as possible over sparsely populated areas as its predominant use would be at night.
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?	No
	Environmental assessment	Within EIS and over non populated areas where possible

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs		
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**		
Specific Change	**NO 24. EIS (Mixed modes RWY19L dep North)**		
Modelled Track Reference (INM)	**(Airbiz Ref)**		
Effective date	**Date change is to be implemented (2020 TBC)**		
Description of the change			
	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change	SID tracks upwind to CITEE, then right turn to NOGRA/NAIDO and then north and north-east.	EIS provided for a right turn as per the current SID.	SID tracks upwind approx. 4NM then turns right in a wider turn than the present SID
Describe the Reasoning for the Proposed Change/Justification			The EIS design did not allow sufficient room to meet the bank angle requirements for jet aircraft. Also by widening the turn a more noise friendly flight path can be designed. This would be required when operating in mode 9, when weather conditions don't allow for SODPROPS at night and 01 is the duty runway.
Is the change a New Air Route, Approach or Departure Procedure?			New departure procedure
Does the change result in a decrease in altitude?			No
Does the change result in an increase in number of movements?			No
Does the change result in a change in aircraft type?			No

Airspace/Air Routes/Instrument Procedures

Does change result in a change in distance flown?			Yes, increase of approx. 4NM
Design (DAP Plates) or best available design illustrations			
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**		Best option as uses existing flight path as much as possible. If speed restriction was removed may allow aircraft to clean up quicker with incremental noise benefits
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**		TBA
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**		A number of options considered with this one providing best noise outcomes
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?		No
	Environmental Assessment		Within EIS and follows existing as much as possible

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Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs		
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**		
Specific Change	**NO 25. PD (AMB – KEVIE 01L)**		
Modelled Track Reference (INM)	**(Airbiz Ref)**		
Effective date	**Date change is to be implemented (2020 TBC)**		
Description of the change			
	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change	WOODY-KEVIE-GLENN to join the future 01R	This STAR is not in the EIS	STAR joins SMOKA STAR west of YBBN.
Describe the Reasoning for the Proposed Change/Justification			Inbound route for non-jet aircraft from the west that is used in present day operations wasn't catered for in the EIS.
Is the change a New Air Route, Approach or Departure Procedure?			New air route
Does the change result in a decrease in altitude?			No
Does the change result in an increase in number of movements?			No
Does the change result in a change in aircraft type?			No
Does change result in a change in distance flown?			Negligible change from present STAR

1

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Airspace/Air Routes/Instrument Procedures

Design (DAP Plates) or best available design illustrations		
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**	The options for non-jet arrivals from the west would result in: 1. large increases in track miles to join the non-jet STAR from the north, and/or 2.tracking south to join the jet STAR through the southern portion of AMB airspace
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**	TBA
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?**	This option allows turbo props to 01L ILS and follows existing as much as possible.
	Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?	Yes, the STAR now vacates AMB airspace at a different point to the current STAR
	Environment Assessment	STAR wasn't shown on EIS. Follows existing flight paths as much as possible.

Airspace/Air Routes/Instrument Procedures

EIS v Current Change Template

Intent	This template is used to describe the proposed change to: • airspace • air routes, including fixed routes, UPRs, flex tracks and direct route segments, ERSA flight planning requirements • instrument procedures within controlled airspace, including SIDs and STARs		
Subject	**Title of the Proposed Change** **BAC NPR ACP 2017**		
Specific Change	**NO 26. EIS (CG/BLAKA - ILS 19L)**		
Modelled Track Reference (INM)	**(Airbiz Ref)**		
Effective date	**Date change is to be implemented (2020 TBC)**		
Description of the change			
	Current (Existing Airport, 2 runway ops)	**Approved EIS 2007**	**ACP 2017**
Describe the proposed change	Current STAR remains over water between the mainland and Moreton Is.	No change to current	This track will now be wider than EIS design.
Describe the Reasoning for the Proposed Change/Justification			During simulator testing it was determined that the STAR needed to be wider than originally designed. This was due to aircraft on opposite base legs pointing at one another, creating an unsafe situation.
Is the change a New Air Route, Approach or Departure Procedure?			New air route (STAR) connecting to ILS approach
Does the change result in a decrease in altitude?			No, if anything it results in an increase in altitude on the base leg.
Does the change result in an increase in number of movements?			Potentially due to the decreased risk of nose to nose tracking of aircraft.
Does the change result in a change in aircraft type?			No
Does change result in a change in distance flown?			Yes, an increase of approx. 4NM

1

Airspace/Air Routes/Instrument Procedures

Design (DAP Plates) or best available design illustrations		
Alternatives	**What alternatives or other options were considered, and why were they unacceptable?**	Had the track as depicted in the EIS been maintained, then the airport would lose the arrival capacity provided by operating independent ILS approaches to parallel runways, as the ICAO standard could not be met. There would be a reduction in capacity of 15 – 20%
Test and evaluation	**How was this proposed amendment and other options tested, and what were the results (e.g. ATS Simulator, traffic analysis tool TAAAM, workshop etc)?**	ATS simulator
Other considerations	**What other considerations were examined (e.g. efficiency, capacity, track distances, fuel consumption etc)?** **Does this proposal impact other airspace, air routes, ATC sector etc and if so, how?** **Environmental assessment requirements**	This route minimises residential overflight, but does overfly Moreton Is and is within close proximity to Tangalooma Resort. On profile aircraft will be above A050 overhead Moreton Is. For Airservices N70 and N60 impacts outside EIS. This route is different to EIS and existing.

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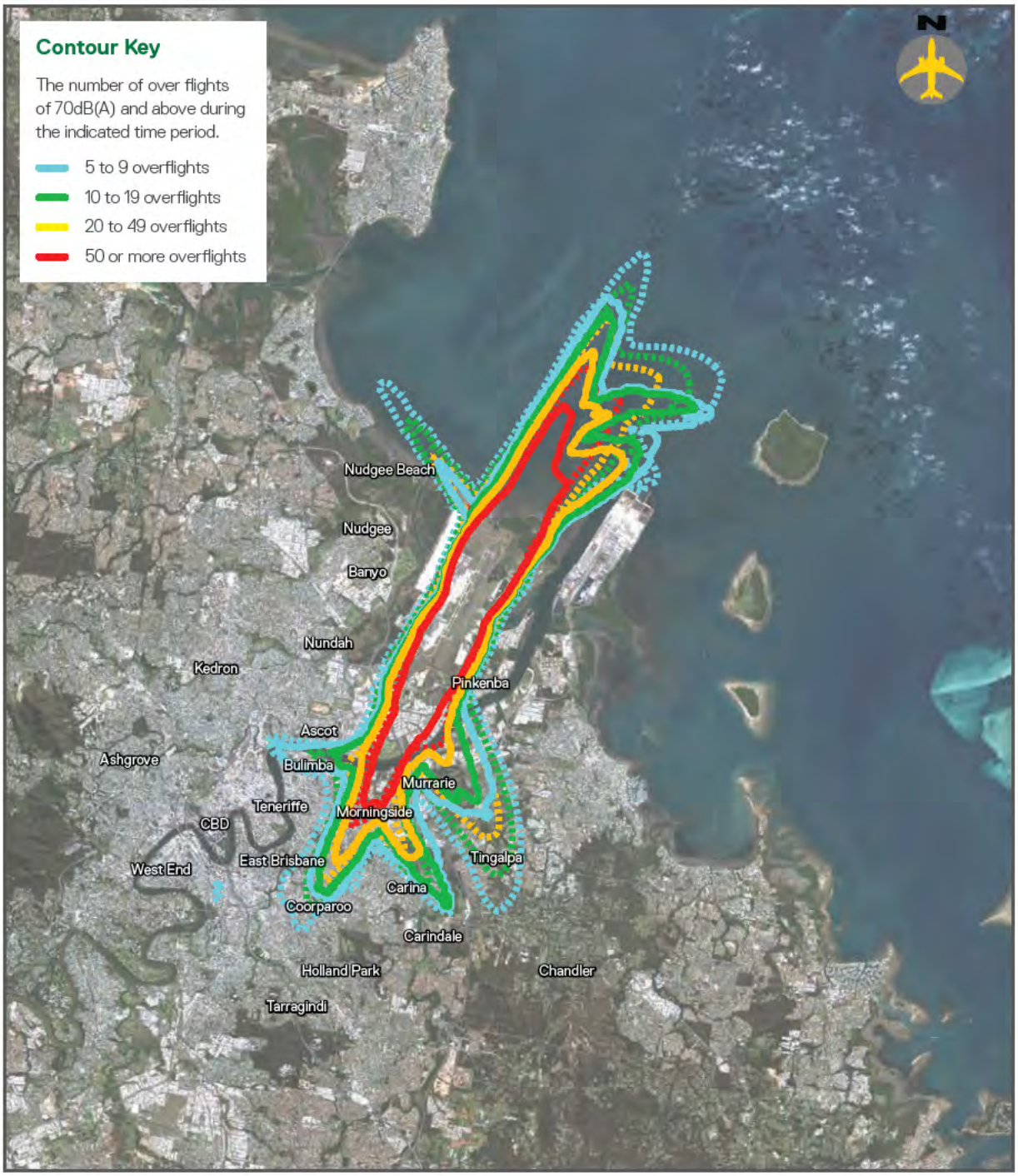
Appendix 7 – N70 Comparisons to the EIS/MDP

The following scenarios are included in this Appendix

1. Summer Weekday Day 2020, just before runway opening
2. Summer Weekday Evening 2020, just before runway opening
3. Summer Weekday Night 2020, just before runway opening
4. Summer Weekday Day 2020, just after runway opening
5. Summer Weekday Evening 2020, just after runway opening
6. Summer Weekday Night 2020, just after runway opening
7. Summer Weekday Day 2035
8. Summer Weekday Evening 2035
9. Summer Weekday Night 2035

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SUMMER WEEKDAY DAY 2020
JUST BEFORE RUNWAY OPENING

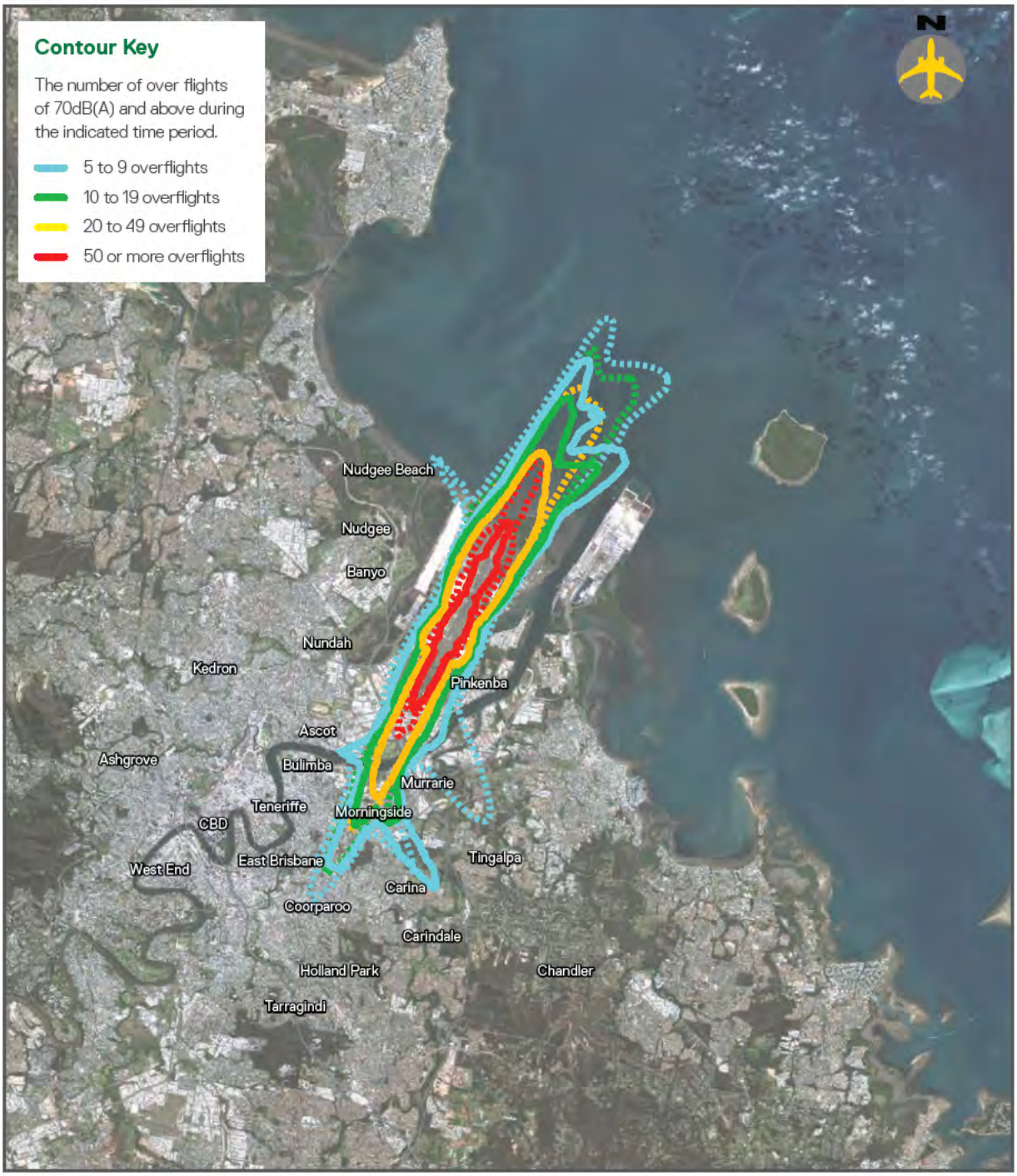


Dotted line represents contours presented in the EIS/MDP

2000 0 2000 4000 6000 8000

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SUMMER WEEKDAY EVENING 2020
JUST BEFORE RUNWAY OPENING

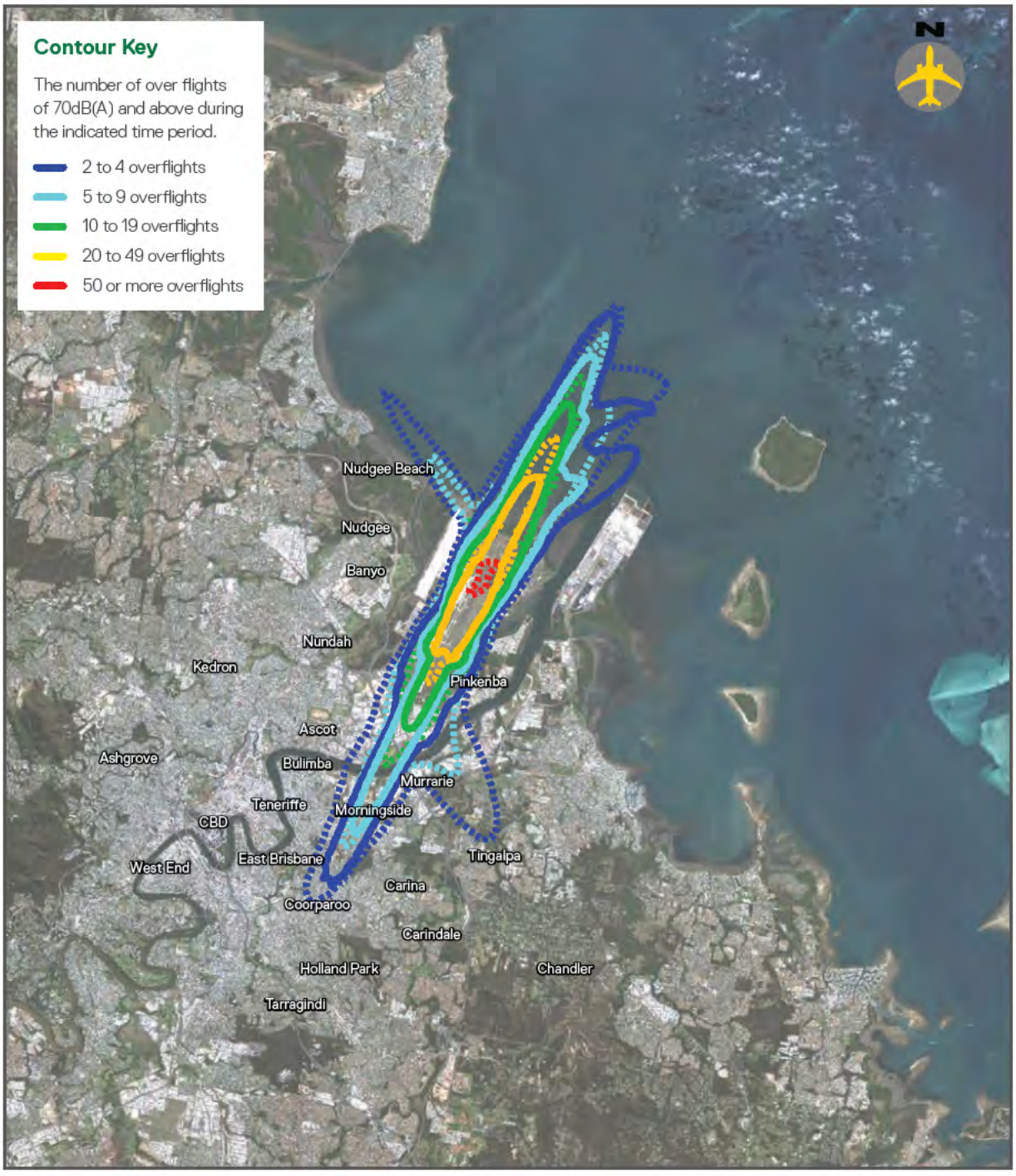


Dotted line represents contours presented in the EIS/MDP

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SUMMER WEEKDAY NIGHT 2020
JUST BEFORE RUNWAY OPENING

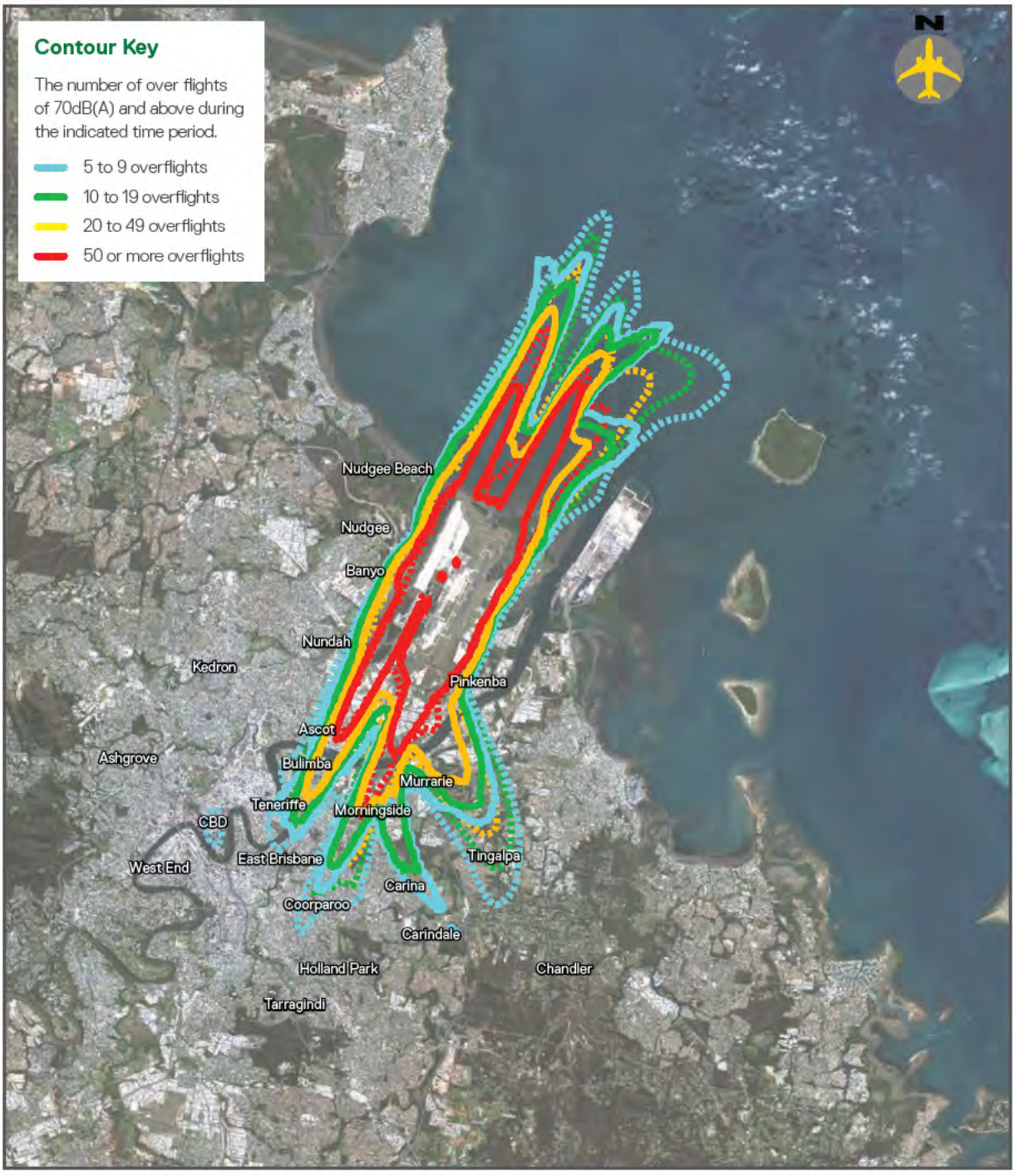


Dotted line represents contours presented in the EIS/MDP

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SUMMER WEEKDAY DAY 2020
JUST AFTER RUNWAY OPENING

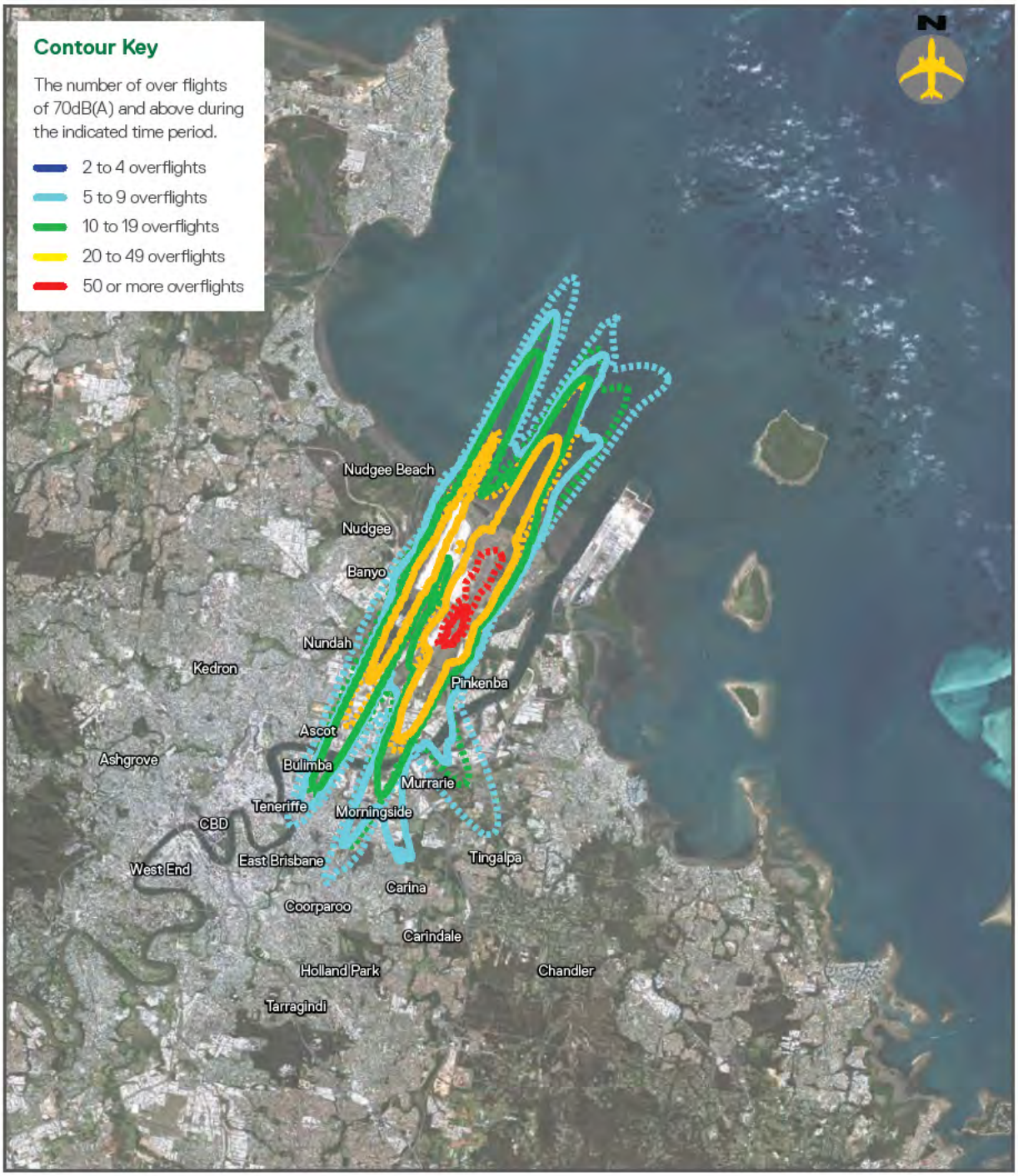


Dotted line represents contours presented in the EIS/MDP

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SUMMER WEEKDAY EVENING 2020
JUST AFTER RUNWAY OPENING

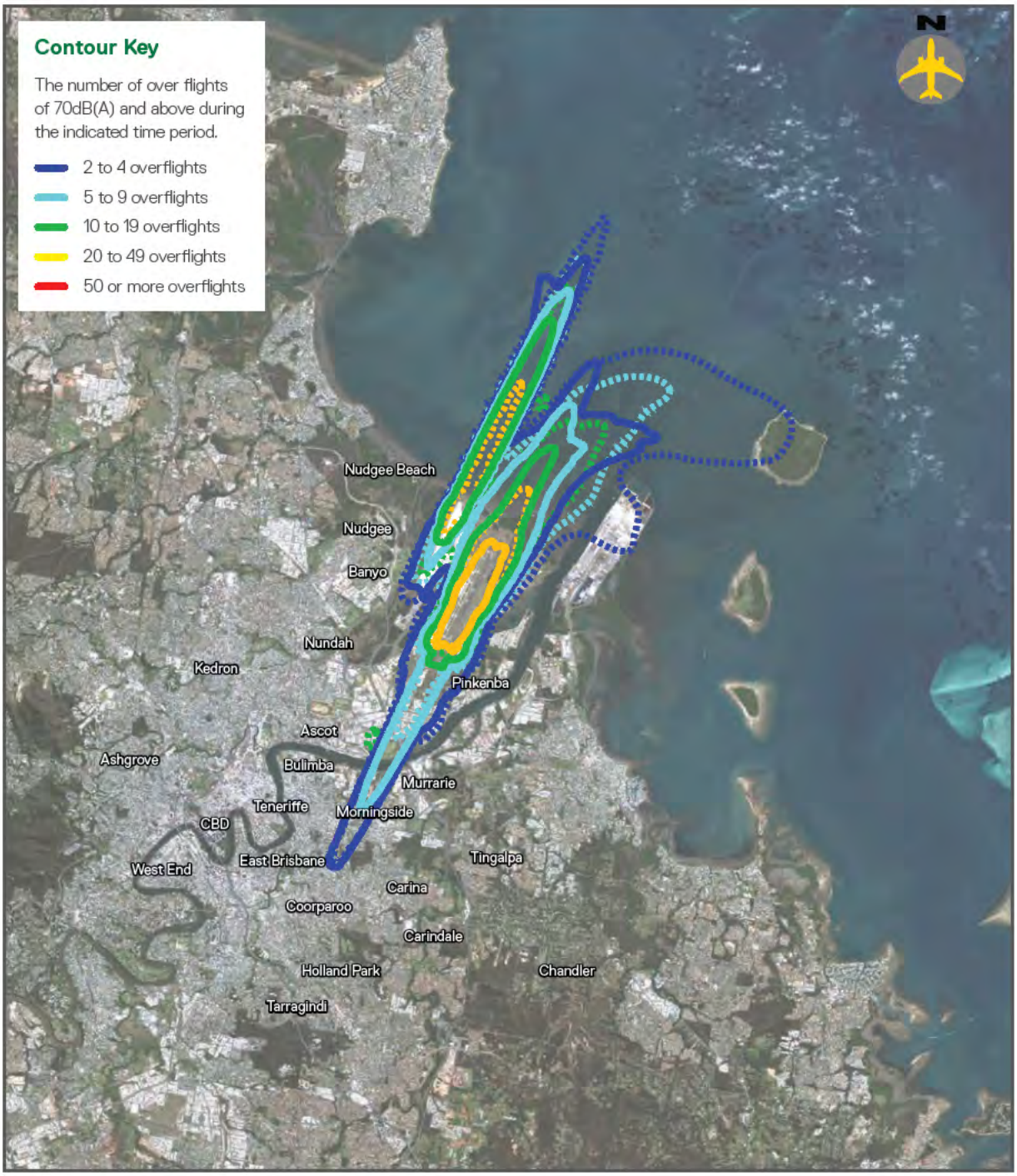


Dotted line represents contours presented in the EIS/MDP

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SUMMER WEEKDAY NIGHT 2020
JUST AFTER RUNWAY OPENING

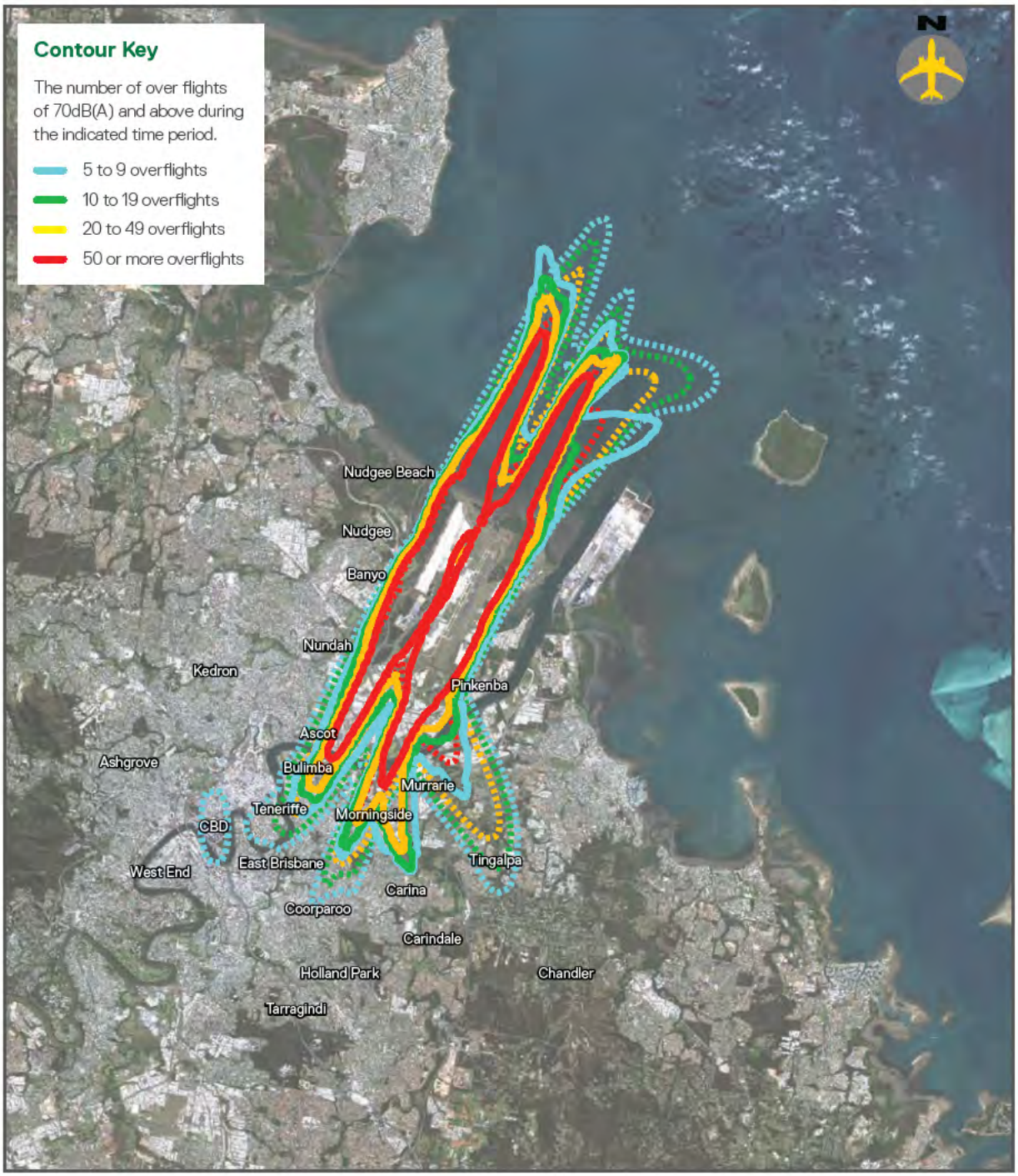


Dotted line represents contours presented in the EIS/MDP

2000 0 2000 4000 6000 8000

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SUMMER WEEKDAY DAY 2035

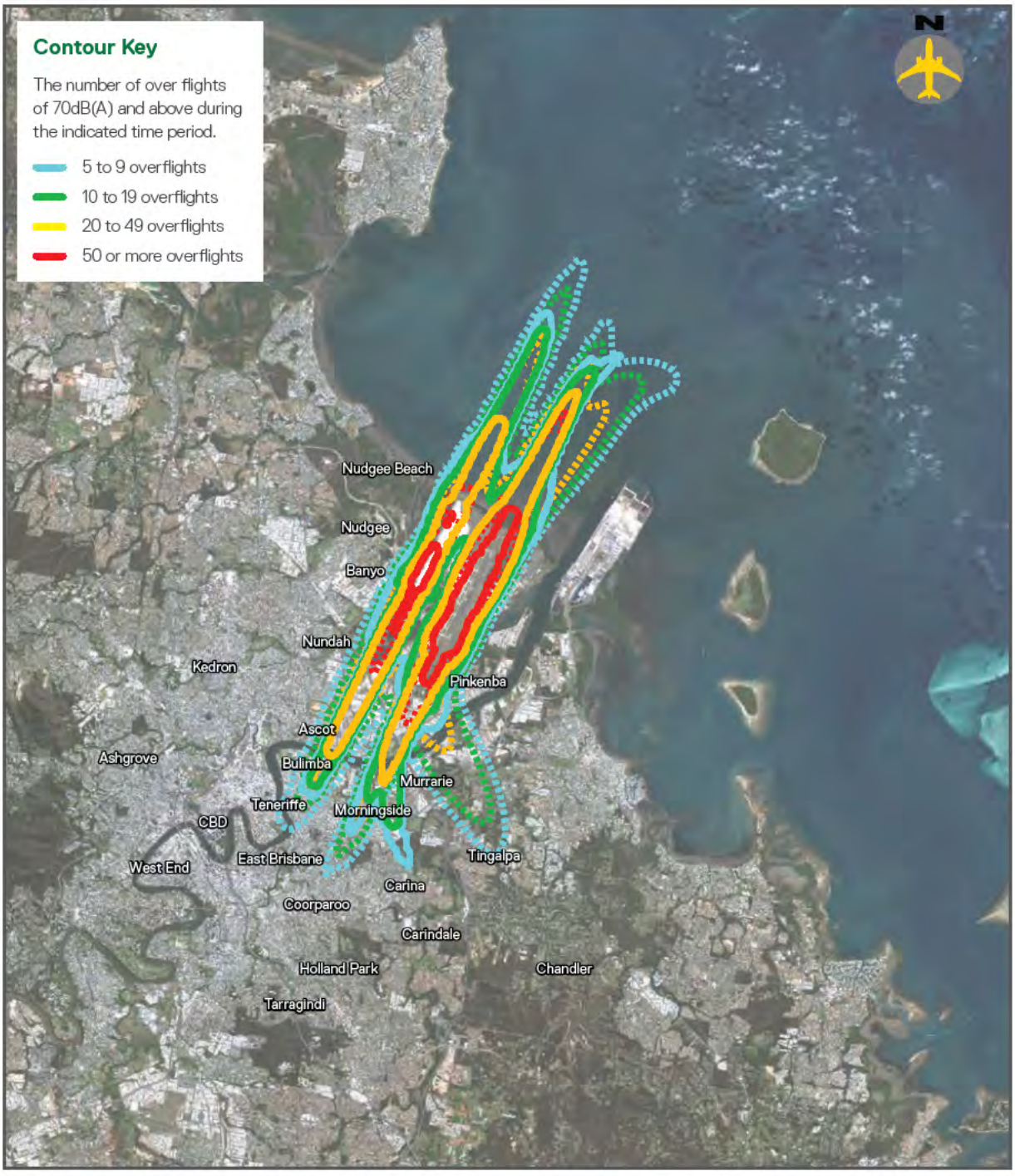


Dotted line represents contours presented in the EIS/MDP

2000 0 2000 4000 6000 8000

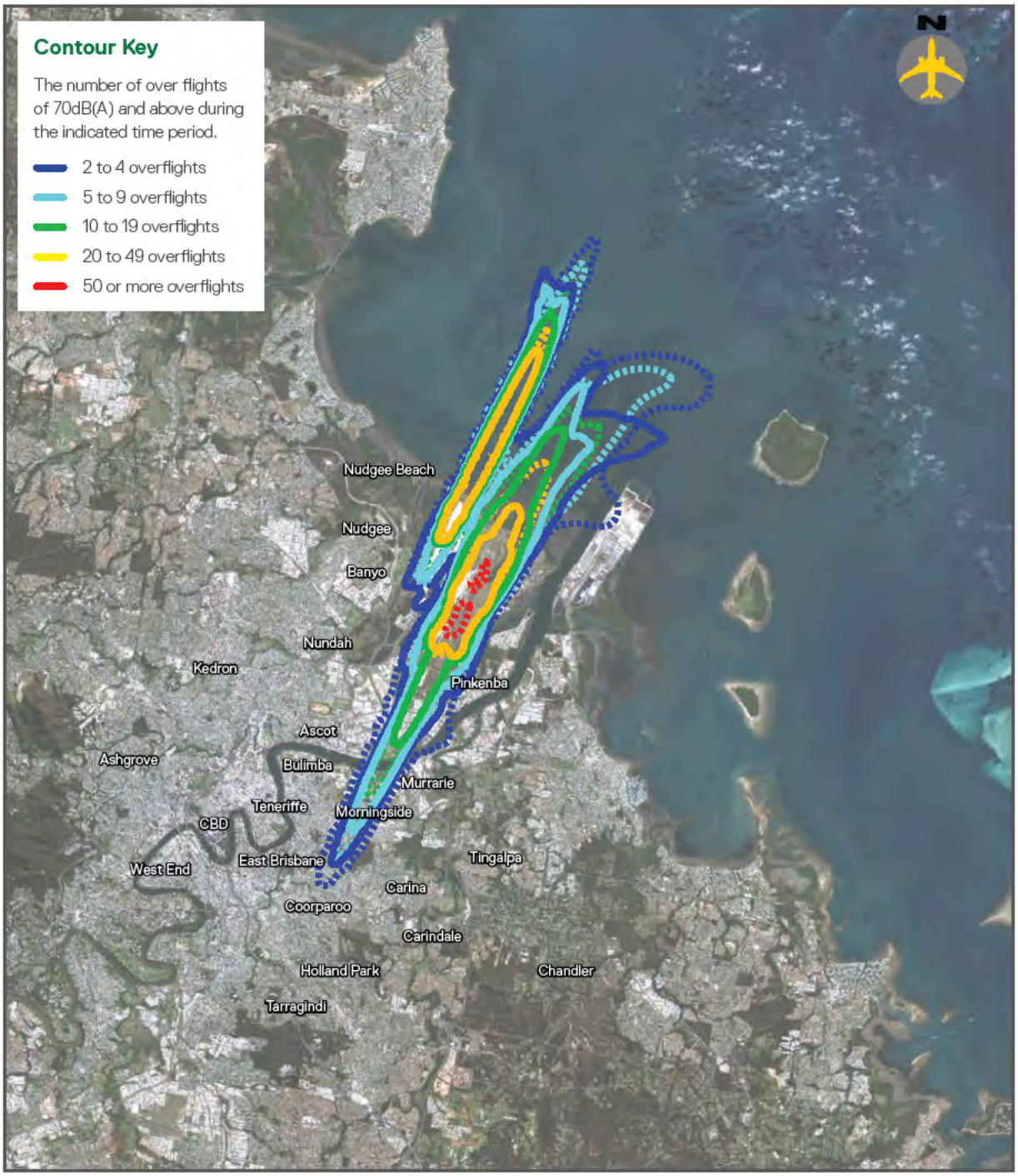
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SUMMER WEEKDAY EVENING 2035



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SUMMER WEEKDAY NIGHT 2035



Dotted line represents contours presented in the EIS/MDP

2000 0 2000 4000 6000 8000

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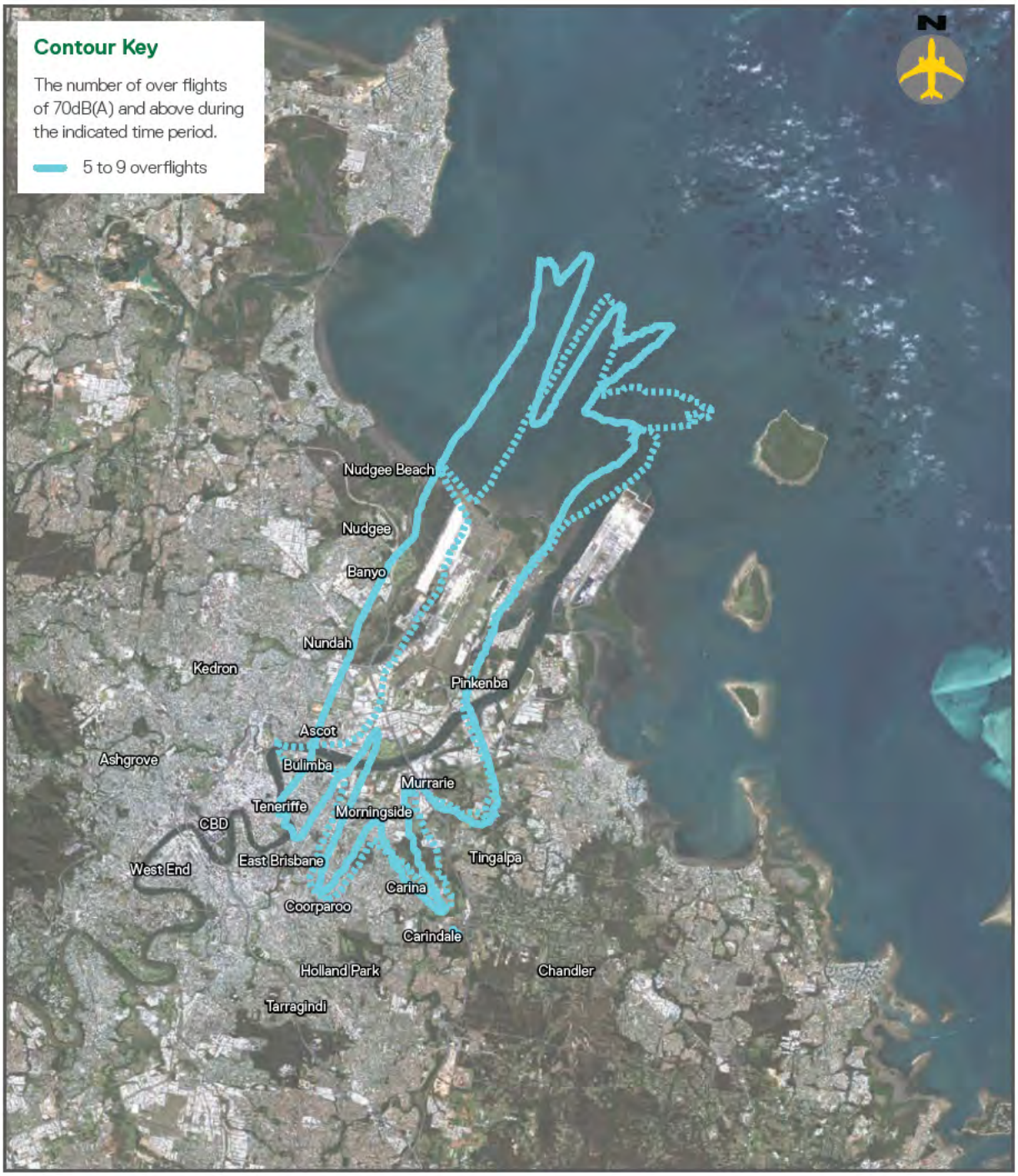
Appendix 8 – N70 comparison diagrams - 2020 Before and After Runway opening

IT WAS CONSIDERED RELEVANT TO DEPICT JUST BEFORE AND JUST AFTER RUNWAY OPENING SCENARIOS TO CONFIRM THE DELIVERY OF NET IMPROVEMENTS TO THOSE AREAS SUBJECTED TO AIRCRAFT OVERFLIGHT BY OPERATIONS ON THE CURRENT RUNWAY SYSTEM.

1. Summer Weekday Day 2020 before and after opening
2. Summer Weekday Evening 2020 before and after opening
3. Summer Weekday Night 2020 before and after opening

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SUMMER WEEKDAY DAY 2020
BEFORE AND AFTER OPENING (5-9 CONTOUR LEVEL)



Dotted line represents contours day before runway opening

2000 0 2000 4000 6000 8000

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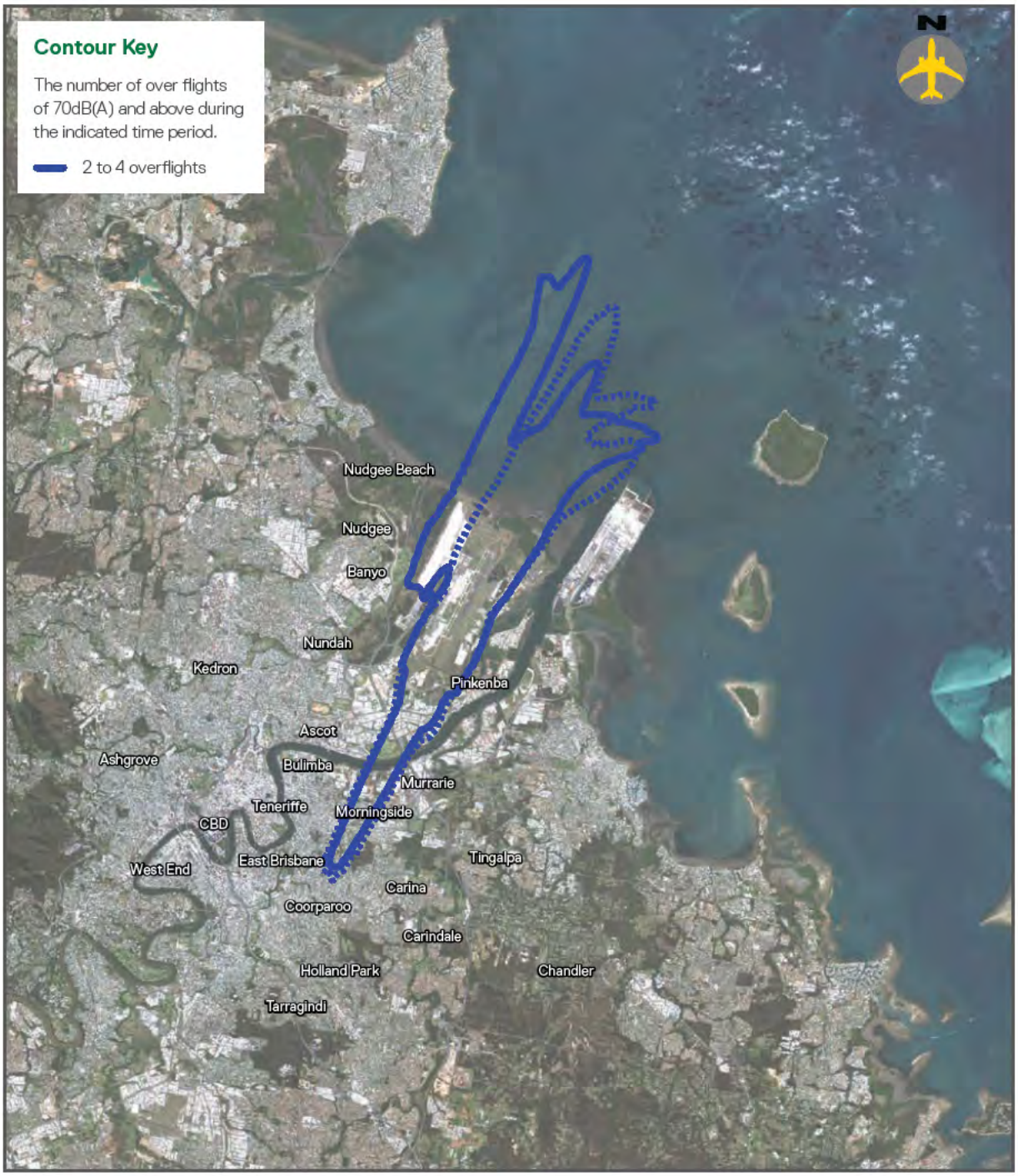
SUMMER WEEKDAY EVENING 2020
BEFORE AND AFTER OPENING (5-9 CONTOUR LEVEL)



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SUMMER WEEKDAY NIGHT 2020

BEFORE AND AFTER OPENING (2.-4 CONTOUR LEVEL)



Dotted line represents contours day before runway opening

2000 0 2000 4000 6000 8000

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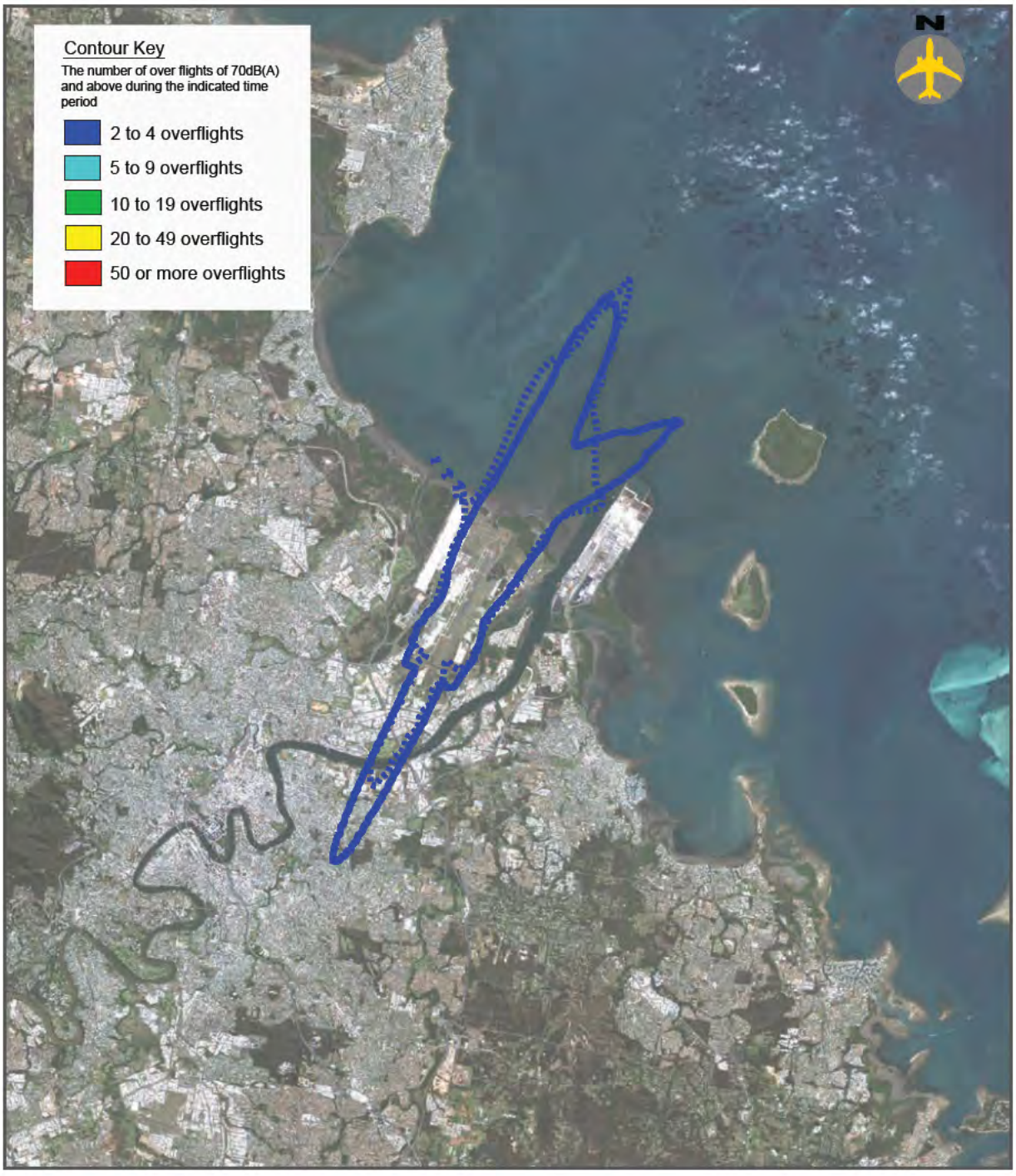
Technical Appendices

Appendix 9 – Localised noise footprint increase assessments

1. Summer Weekend night, just before opening, contour 2-4
2. Summer Weekend night, just before opening, contour 5-9
3. Summer Weekday evening 2020 just before opening, contour 5-9
4. 4. Summer Weekend night 2020, just after opening, contour 2-4
5. Summer Weekday night 2020, just after opening, contour 5-9
6. Winter Weekend night 2020, just after opening, contour 2-4

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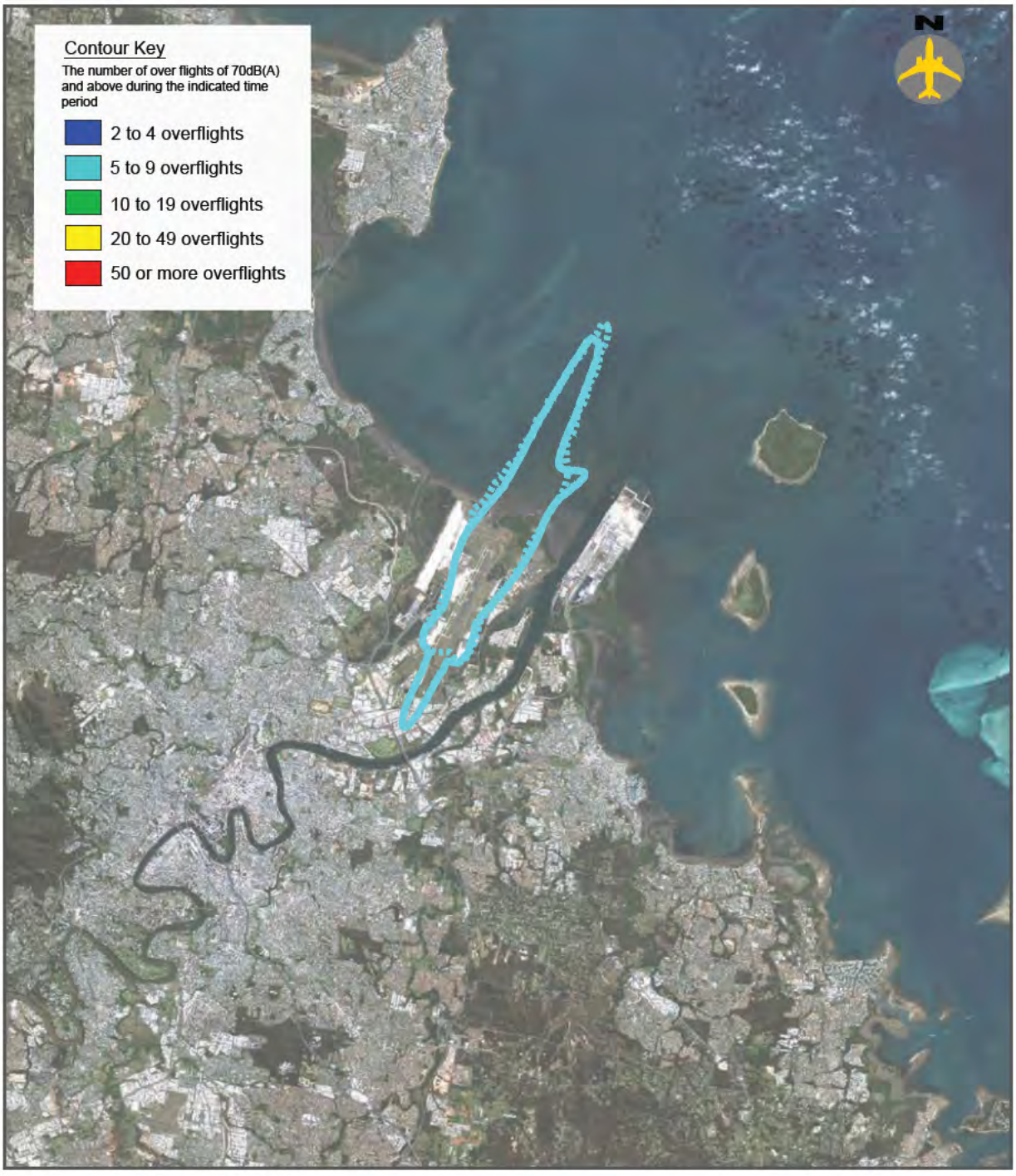
SUMMER WEEKEND NIGHT
JUST BEFORE OPENING (CONTOUR 2-4)



The key reasons for the extension in the contour when compared to the EIS/MDP are the loss of ten knots tailwind for reciprocal operations. In effect, the solid blue line represents current operations prior to runway opening.

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SUMMER WEEKEND NIGHT 2020
JUST BEFORE OPENING (CONTOUR 5-9)



The key reasons for the extension in the contour when compared to the EIS are the loss of DODPROPS and a change in the fleet mix predictions as follows:

For 01R Arrivals

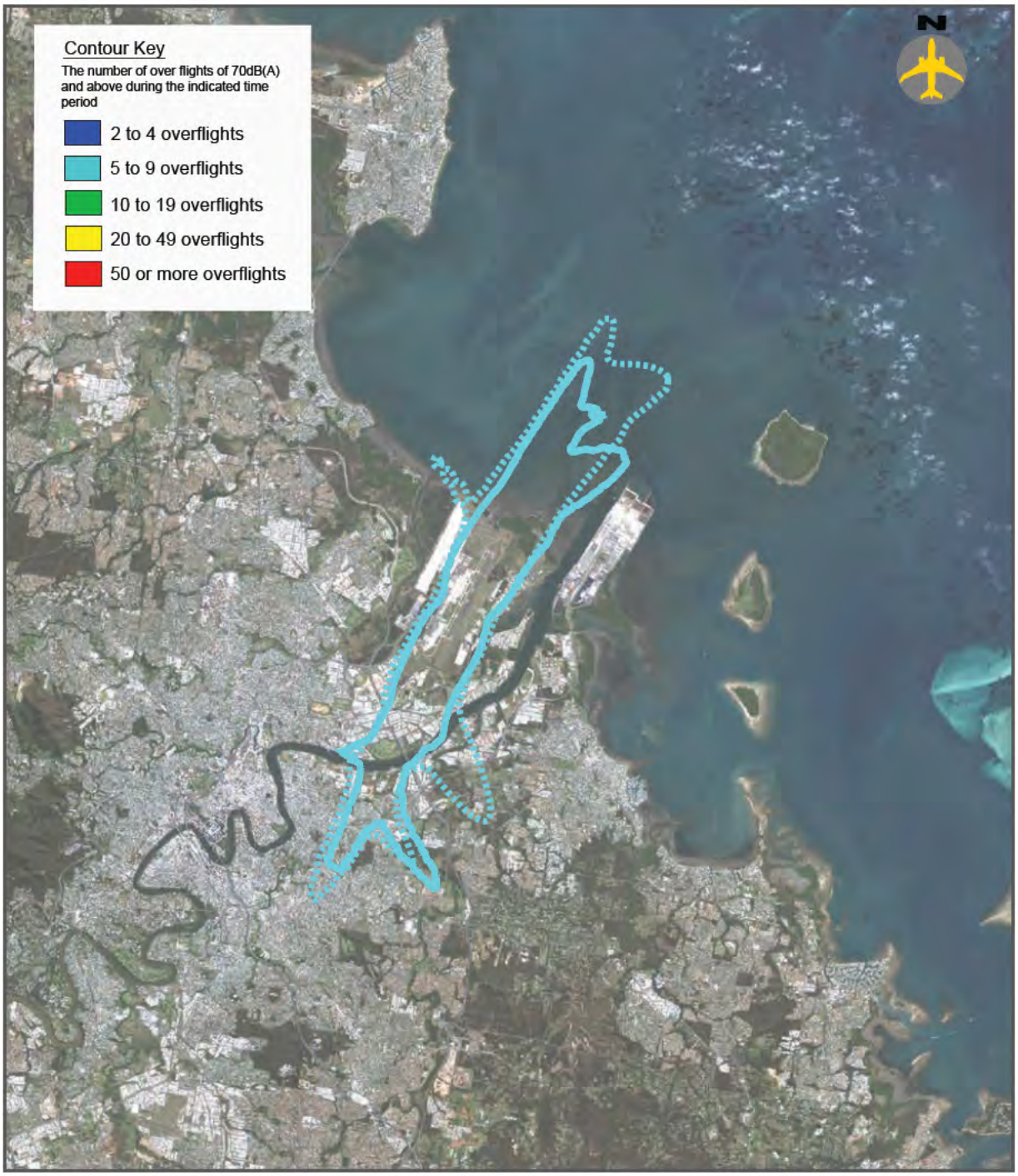
Aircraft Category	EIS	Latest Design	Variation
Widebody	>0	1	+1
Narrowbody	2	3	+1
Turboprop	1	>0	+1
Total	3	4	+1

For 19L Departures

Aircraft Category	EIS	Latest Design	Variation
Widebody	>0	1	+1
Narrowbody	1	1	-
Turboprop	1	>0	-1
Total	2	2	-

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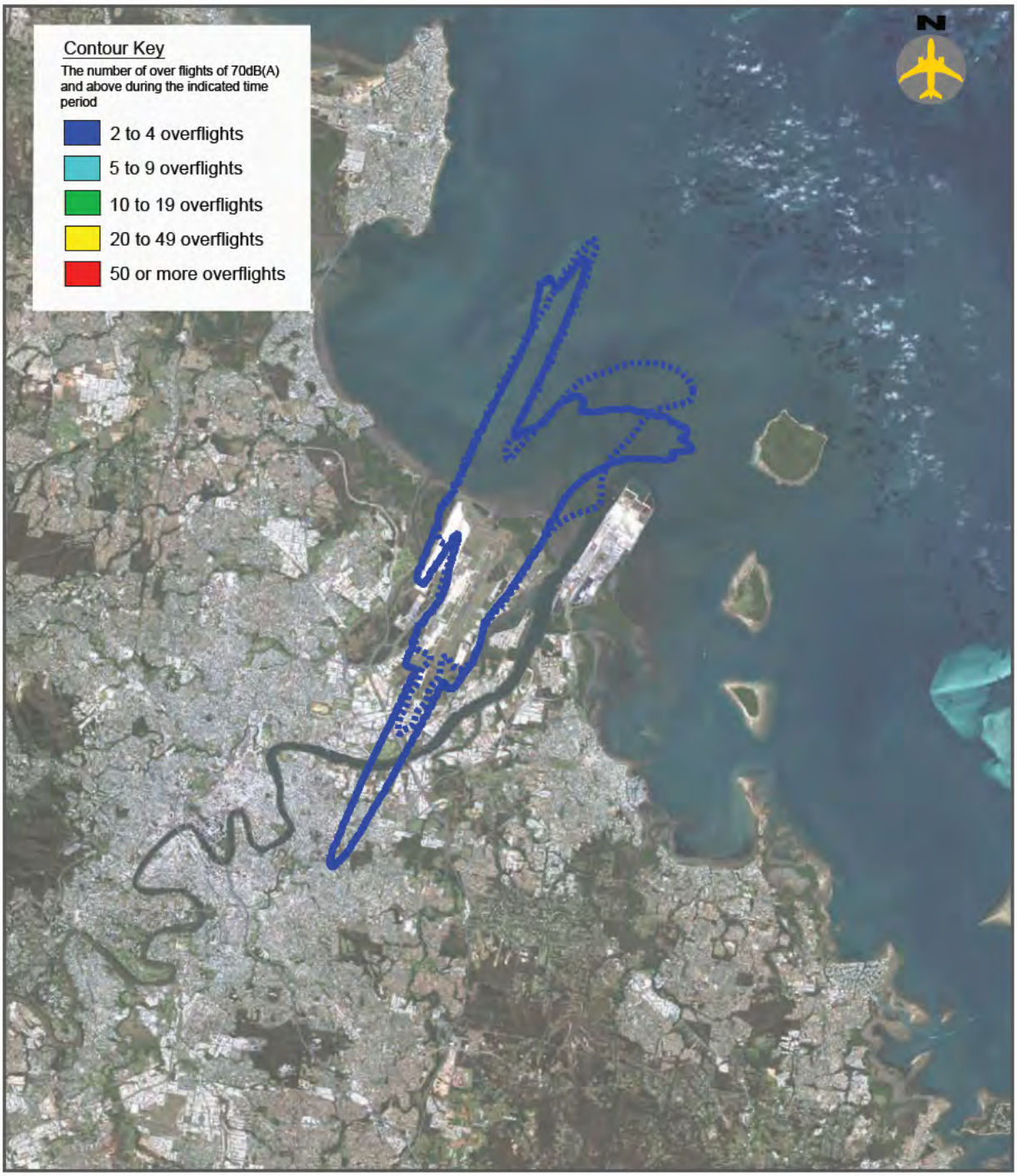
SUMMER WEEKDAY EVENING 2020
JUST BEFORE OPENING (CONTOUR 5-9)



There is a slight extension of the contour due to increased use of the river track arrival path over the Bulimba and Hamilton area.

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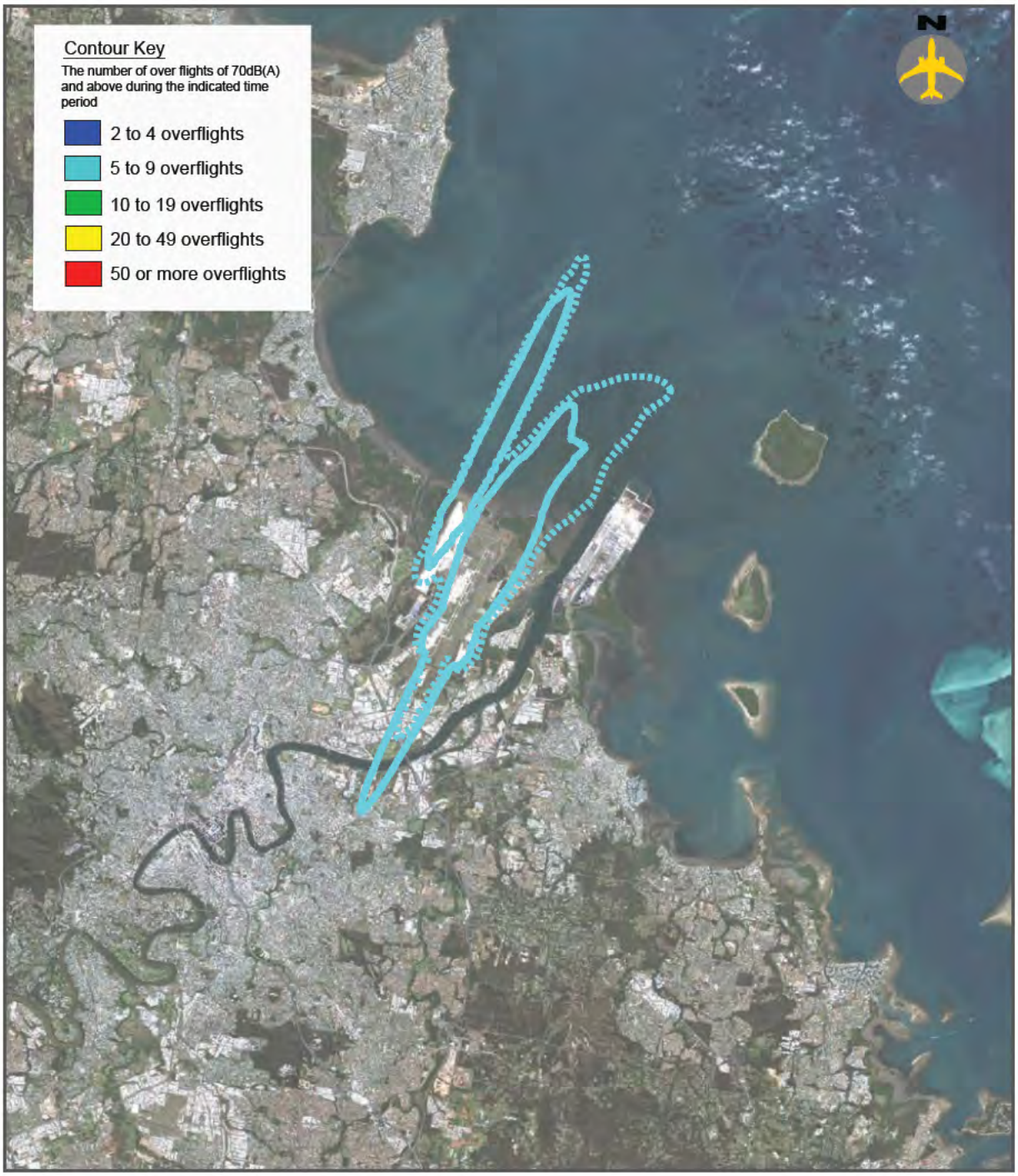
SUMMER WEEKEND NIGHT
JUST AFTER OPENING (CONTOUR 2-4)



The key reasons for the extension in the contour of the latest design when compared to the EIS are the loss of ten knots tailwind for the DODPROPS mode modelled in the EIS/MDP which is no longer available. When compared to the before runway opening scenario, the solid line over southern suburbs does not extend any further than the before opening scenario.

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SUMMER WEEKDAY NIGHT 2020
JUST AFTER OPENING (CONTOUR 5-9)



The key reasons for the extension in the contour when compared to the EIS are the loss of DODPROPS and a change in the fleet mix predictions as follows:

For 01R Arrivals

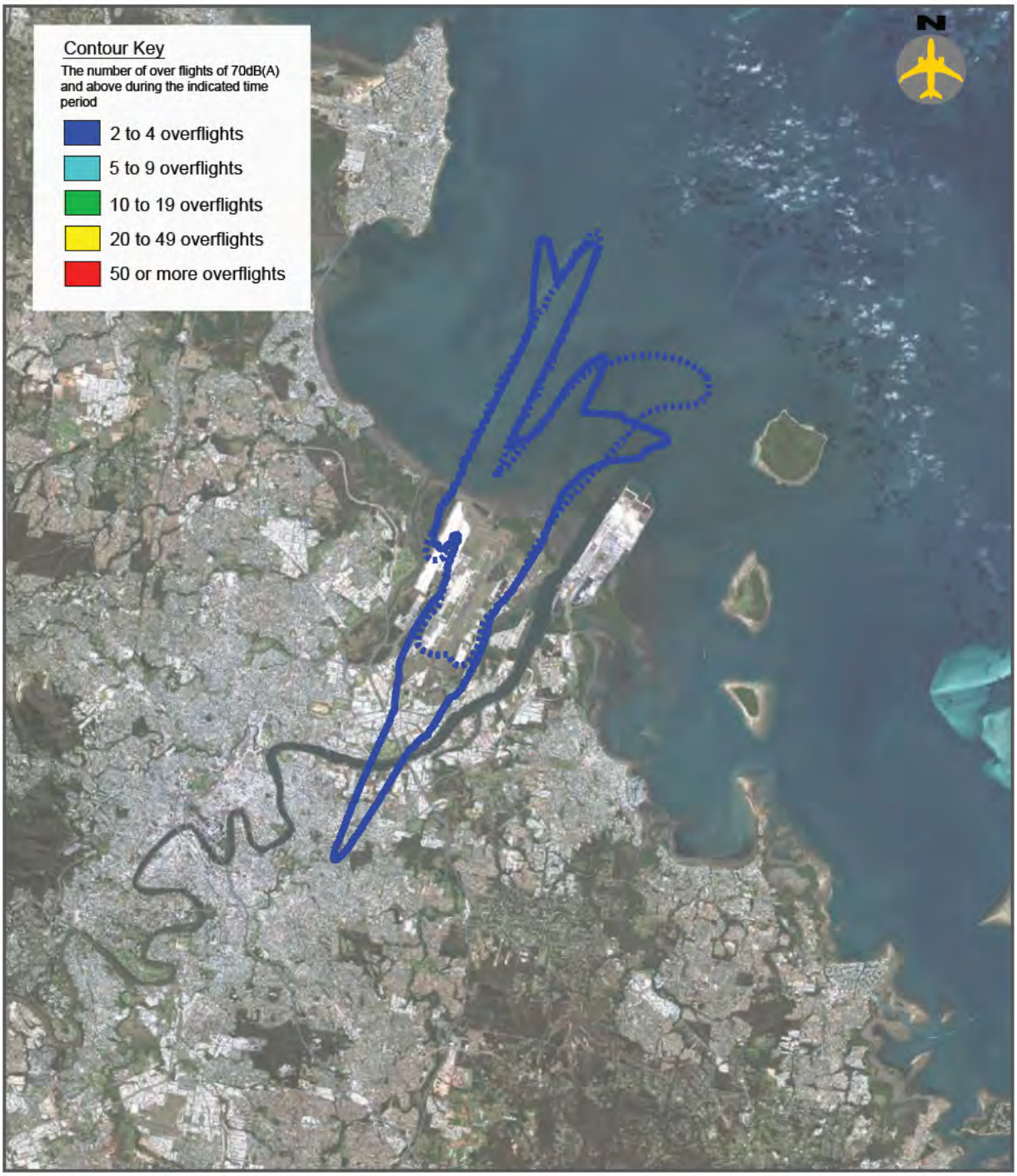
Aircraft Category	EIS	Latest Design	Variation
Widebody	>0	1	+1
Narrowbody	2	4	+2
Turboprop	2	1	-1
Total	4	6	+2

For 19L Departures

Aircraft Category	EIS	Latest Design	Variation
Widebody	1	1	-
Narrowbody	2	3	+1
Turboprop	3	3	-
Total	6	7	+1

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WINTER WEEKEND NIGHT 2020
JUST AFTER OPENING (CONTOUR 2-4)



The key reasons for the extension in the contour when compared to the EIS are the loss of DODPROPS and a change in the fleet mix predictions as follows:

For 01R Arrivals

Aircraft Category	EIS	Latest Design	Variation
Widebody	>0	>0	-
Narrowbody	>0	1	+1
Turboprop	>0	>0	-
Total	>0	1	+1

For 19L Departures

Aircraft Category	EIS	Latest Design	Variation
Widebody	>0	2	+2
Narrowbody	>0	2	+2
Turboprop	1	>0	-1
Total	1	4	+1

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Appendix 10 – N60 Night time results for the latest design

1. Summer Weekday Night 2020, just before runway opening
2. Summer Weekday Night 2020, just after runway opening
3. Summer Weekday Night 2035

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SUMMER WEEKDAY NIGHT 2020
JUST BEFORE RUNWAY OPENING



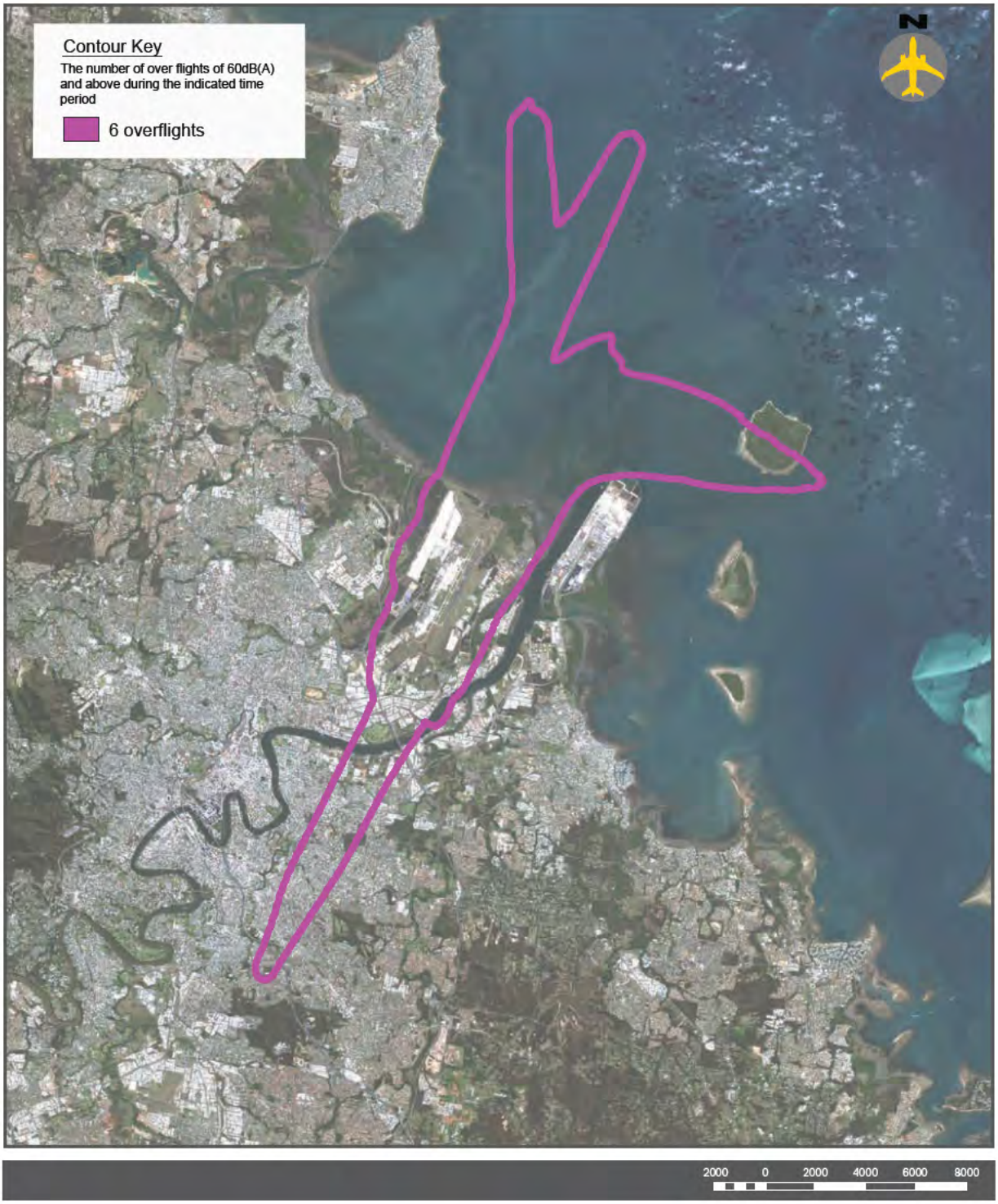
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SUMMER WEEKDAY NIGHT 2020
JUST AFTER RUNWAY OPENING



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SUMMER WEEKDAY NIGHT 2035



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Technical Appendices

Appendix 11 – Person Event Index Report based on 2016 Census data

BRISBANE AIRPORT AUSTRALIA

New Parallel Runway Airspace Design

Person Event Index (PEI)
Report based on 2016 Census data



Analysis and comparison using the Person Event Index

To allow comparison across affected suburbs, and a total overall comparison between the noise modelling used in the 2007 EIS/MDP and the noise modelling of the latest airspace design, a quantitative analysis has been undertaken using the Person-Events Index (PEI) developed by the then Commonwealth Department of Transport and Regional Services in the late 1990s.

What is the PEI

In 2000, the then Commonwealth Department of Transport and Regional Services published a ground-breaking paper, *Expanding Ways to Describe and Assess Aircraft Noise*[1], which sought to detail the important developments in aircraft noise descriptors since the controversy surrounding the opening of the third runway at Sydney Airport in 1994. The development of these metrics was consistent with findings of the 1995 Senate Select Committee on Aircraft Noise in Sydney: *Falling on deaf ears?* which was particularly critical of the way in which the noise impacts had been portrayed in the project's Environmental Impact Statement.

The widespread adoption worldwide of the N70 metric was strongly influenced by the publication of the Expanding Ways paper. The N70 metric refers to the number of events of 70 decibels or louder overflying a particular location. The metric can then be used to generate illustrative contours, such as the 20 event N70 contour, within which it can be expected that at least 20 overflights of 70 decibels or more will be experienced on an average day.

Furthermore, the *Expanding Ways* paper described a means of quantitively comparing different operational scenarios on a population basis to investigate the comparative noise impacts. This was of particular interest in Sydney where the overall noise burden of parallel runways operations versus noise-sharing modes was of interest.

The PEI allows the total noise load generated by an airport to be computed by summing, over the exposed population, the total number of instances where an individual is exposed to an aircraft noise event above a specified noise level over a given time period.

For example, a 70-decibel single event contour for a particular aircraft operation will describe the area under which residents will be exposed to at least 70 decibels of noise. By mapping this area to an estimate of the population, a PEI (70) can be derived for that area. By comparing the effects of the same operation over a different geographical area, an indicator for direct community impact can be derived using the comparative PEI. Overflight of non-populated areas, such as bodies of water, will not add to the PEI while overflight of heavily populated areas will have a greater impact.

This metric can be used for Brisbane Airport operations to test the total of the expected community impacts predicted by the latest (2018) noise modelling using the 2016 Census as a population base. These results can then be compared with the impacts predicted by the operations modelled in the 2007 EIS/MDP using the same population base.

As a secondary analysis, the PEI can also be used to assess the expected impacts on the overall Brisbane population, and on individual suburbs, between pre-opening single runway operations and post-opening of the new runway.

What does the noise modelling show?

Table 1 summarises the comparisons between the day, evening and night scenarios resulting from the EIS/MDP noise modelling and the 2018 noise modelling using the PEI (70), the number of person-events at the 70 decibel or above level. A positive difference indicates the predicted PEI (70) is lower for that particular suburb than the level predicted by the 2006 EIS/MDP modelling parameters. A negative difference indicates a larger value for the 2018 modelling.

The highlights of the results can be summarised as follows:

- Analysis of the N70 contours and the 2016 Census data shows that almost 135,000 Brisbane residents could experience at least two N70 events per day on average. This illustrates the order of magnitude of the PEI. For example, each of these residents experiencing a single extra 70 decibel overflight would add 135,000 to the PEI (70); each resident experiencing 2 flights would add 270,000 to the PEI (70) etc.
- The 2018 noise modelling shows a total reduction of over 846,300 in the PEI (70) for an average summer weekday across all Brisbane suburbs, compared with the modelling of the EIS/MDP.
- This comprises a reduction of 647,800 during the daytime (6am to 6pm), a reduction of 202,400 during the evening period (6pm to 10pm) and a comparatively small increase of 3,900 in the night time period (10pm to 6am). An increase of 13,500 is also predicted for the weekend night time period.
- The modelling indicates there are two suburbs which will experience greater noise impacts than those predicted in the EIS/MDP. These are Carina and Carindale, which together indicate an increase of almost 35,000 in the PEI (70) on a typical summer weekday (6am to 6pm). The explanation for this increase is the introduction since the EIS/MDP by Airservices Australia of the smart tracking route approaching the existing main runway from the south-east. Balancing this, there are reductions in the predicted impacts in the neighbouring suburbs of Cannon Hill (13,500), Camp Hill (70,900), Coorparoo (40,900), Hemmant (30,300), Morningside (116,300), Norman Park (23,100) Seven Hills (39,600) and Tingalpa (95,900).

1 *Expanding Ways to Describe and Assess Aircraft Noise, Department of Transport and Regional Services, March 2000*

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TABLE 1:
PEI (70) DIFFERENCES BETWEEN 2006 EIS/MDP AND 2018 MODELLING (POSITIVE NUMBER INDICATES REDUCED NOISE IMPACT)

Suburb	PEI (70) Difference EIS vs 2018 modelling				
	Summer Weekday Day	Summer Weekday Evening	Summer Weekday Night	Summer Weekend Night	Total Summer Weekday
Albion	0	0	0	0	0
Ascot	17,230	15,061	0	0	32,291
Balmoral	13,930	8,618	0	0	22,548
Banyo	-3,110	3,332	0	0	222
Belmont	6,746	27	0	0	6,773
Bowen Hills	0	0	0	0	0
Brisbane Airport	0	0	0	0	0
Brisbane City	32,501	9,094	0	0	41,595
Bulimba	42,614	19,702	0	0	62,316
Camp Hill	62,179	8,770	0	0	70,949
Cannon Hill	11,622	2,990	-1,078	-3,913	13,534
Carina	-23,200	-6,773	0	0	-29,973
Carina Heights	253	0	0	0	253
Carindale	-3,792	-1,172	0	0	-4,964
Chandler	3	0	0	0	3
Coorparoo	38,056	2,860	0	0	40,916
Eagle Farm	0	0	0	0	0



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Suburb	PEI (70) Difference EIS vs 2018 modelling				
	Summer Weekday Day	Summer Weekday Evening	Summer Weekday Night	Summer Weekend Night	Total Summer Weekday
East Brisbane	15,329	0	0	0	15,329
Fortitude Valley	2,971	0	0	0	2,971
Greenslopes	4,383	0	0	0	4,383
Gumdale	2,257	104	0	0	2,361
Hamilton	26,705	17,576	93	-54	44,374
Hawthorne	12,877	12,007	0	0	24,884
Hemmant	26,882	10,403	0	0	37,285
Hendra	14,369	9,119	0	0	23,488
Herston	697	0	0	0	697
Highgate Hill	91	0	0	0	91
Holland Park	2,182	0	0	0	2,182
Holland Park West	886	0	0	0	886
Kangaroo Point	15,359	0	0	0	15,359
Lutwyche	0	0	0	0	0
Lytton	0	0	0	0	0
Manly West	838	0	0	0	838
Moreton Bay	0	0	0	0	0



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Suburb	PEI (70) Difference EIS vs 2018 modelling				
	Summer Weekday Day	Summer Weekday Evening	Summer Weekday Night	Summer Weekend Night	Total Summer Weekday
Morningside	89,456	29,414	-2,571	-7,256	116,299
Murarrie	17,125	5,893	-753	-911	22,265
New Farm	33,736	16,073	0	0	49,809
Newstead	652	0	0	0	652
Norman Park	18,739	4,337	0	0	23,076
Northgate	1,037	414	0	0	1,451
Nudgee	-5,472	4,558	268	0	-646
Nudgee Beach	9	111	11	0	131
Nundah	63	0	0	0	63
Pinkenba	2,244	1,012	940	-143	4,196
Port Of Brisbane	0	0	0	0	0
Seven Hills	33,195	7,141	-783	-1,213	39,553
South Brisbane	7,792	0	0	0	7792
Spring Hill	16,022	1,791	0	0	17,813
Teneriffe	8,725	1,983	0	0	10,708
Tingalpa	79,952	15,945	0	0	95,897
Wakerley	13,508	1,104	0	0	14,612
Windsor	0	0	0	0	0
Woolloongabba	1,977	0	0	0	1,977
Wynnum West	8,178	901	0	0	9,079
Total Differences	**647,794**	**202,395**	**-3,874**	**-13,490**	**846,315**

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What will be the night time impacts immediately upon opening of the new runway?

Table 2 summarises the weekday and weekend night scenarios resulting from the latest noise modelling using the PEI (70) comparing the day before opening (single runway) and day after opening (parallel runways).

A positive difference indicates the predicted PEI (70) is lower for that particular suburb after the new runway opens than before. A negative difference would indicate a larger value post-opening.

Of particular interest is an analysis of the change in the circumstances under which simultaneous operations can be used over Moreton Bay. The change was determined by the Civil Aviation Safety Authority in 2016 and resulted in a decrease in operations over Moreton Bay and a subsequent increase to the number of night time flights over the southern suburbs.

This table allows an analysis of the six suburbs (Cannon Hill, Hamilton, Morningside, Murarrie, Pinkenba and Seven Hills) which have a predicted higher night time PEI (70) derived from the 2018 noise modelling than that predicted in the EIS/MDP.

The analysis confirms that the increased predictions result from growth that has occurred under current operational conditions and will be improved significantly by the commissioning of the new runway.

TABLE 2:
PEI (70) DIFFERENCES BETWEEN DAY BEFORE AND DAY AFTER NEW RUNWAY OPENING (POSITIVE NUMBER INDICATES REDUCED NOISE IMPACT)

	PEI (70) Day Before vs Day After Opening	
Suburb	**Summer Weekday Night**	**Summer Weekend Night**
Cannon Hill	3,263	521
Hamilton	104	26
Morningside	3,833	584
Murarrie	699	189
Pinkenba	438	227
Seven Hills	1,175	-296
Total	**10,622**	**1,251**



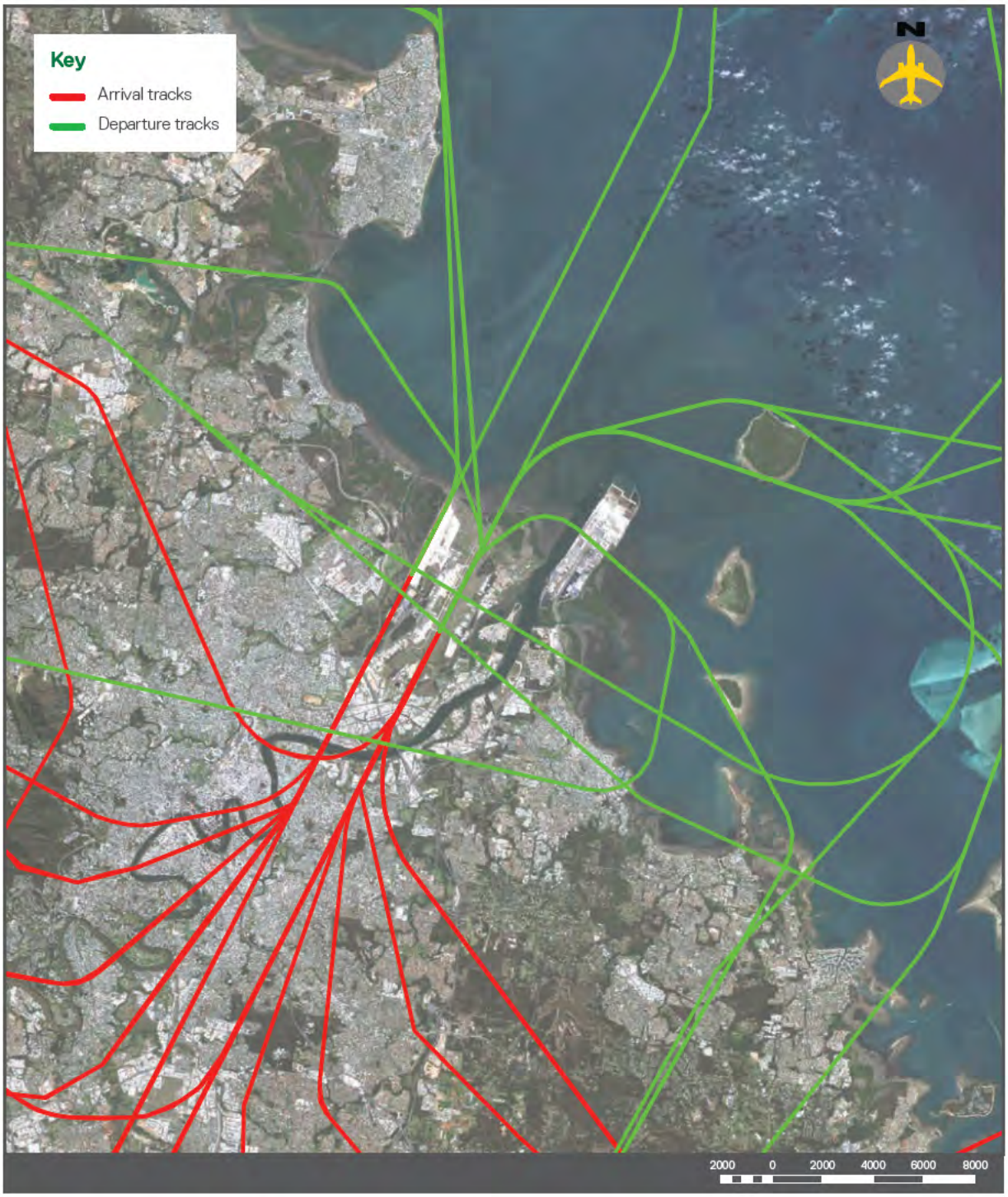
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Technical Appendices

Appendix 12 – Summary of flight tracks included in the latest design

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SUMMARY OF ARRIVAL AND DEPARTURE TRACKS
SOUTHERLY ARRIVALS/NORTHERLY DEPARTURES



The use of flight tracks are dependent on the runway operating mode ATC are using at the time.

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SUMMARY OF ARRIVAL AND DEPARTURE TRACKS
NORTHERLY ARRIVALS/SOUTHERLY DEPARTURES



The use of flight tracks are dependent on the runway operating mode ATC are using at the time.

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