Noise Improvement Trial Summary

At Brisbane Airport Corporation (BAC), we recognise that whilst the benefits of our airport are felt right across our city, state and country, the burdens of it are carried very locally and we are committed to ensuring the best noise outcomes for the community.

Through our extensive community engagement program, we strive to maintain a clear understanding of who our neighbouring communities are, and what matters to them, by generating informed, respectful, honest and on-going conversations, particularly when it comes to our airport operations and how they may be affected. This includes listening to suggestions about ways to reduce aircraft noise and investigating them thoroughly.

This document summarises BAC's response to a community suggestion and the outcomes of the subsequent investigation. A copy of the full report can be found at bne.com.au.

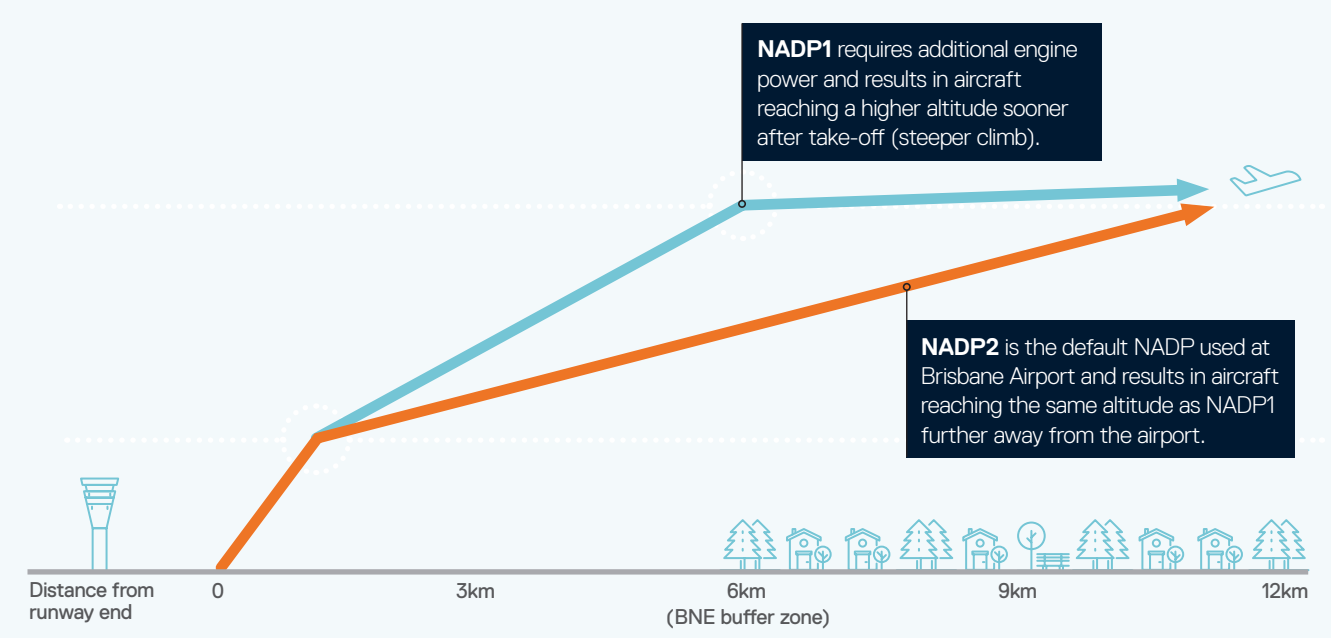
Overview

In 2019, BAC was approached by a group of community members with questions and suggestions about the expected height of aircraft shortly after they take-off from the new runway.

From these suggestions, BAC decided to investigate whether the way in which pilots and air traffic controllers used the flight paths could be adjusted to minimise noise. The primary focus was on whether it would be possible for the aircraft to depart at a steeper gradient to reach a higher altitude sooner, and if this would, in fact, improve the noise impact on residents below.

After extensive modelling of the noise levels, seeking advice from airlines, pilots and noise specialists, it was agreed that BAC and Australia's air traffic control and flight path authority, Airservices Australia (Airservices), would conduct an Australian-first trial of the noise improvement potential of the two Noise Abatement Departure Procedures (NADPs) available in modern jet aircraft, NADP1 and NADP2.

Noise abatement procedures are a series of instructions provided to pilots and air traffic controllers that are designed to reduce the impact of aircraft noise on the community. It is important to note that their use is subject to weather conditions and operational requirements whenever safety needs to be prioritised.



Noise abatement procedures

Over the two-month trial period, data was captured from five separate noise monitors located on the ground, under the two existing flight paths, as aircraft flew the two different noise abatement procedures off the current runway to southern and northern destinations.

While the trial itself did not deliver a noticeable (at least 3dB(A)) noise difference from most aircraft types over residential areas, the information gathered during the trial, as well as from workshops with airlines and Airservices, resulted in the development of some new initiatives to deliver real noise improvements for Brisbane.

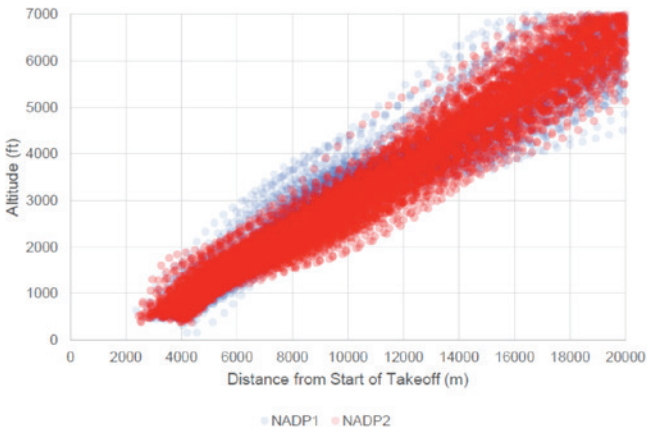
BAC has since commenced work on developing the first combined airport/Airservices Aircraft Performance and Noise Program in Australia. This system will monitor and improve how aircraft perform, to achieve better noise outcomes and provide the community with transparent information about aircraft noise with six new noise monitors installed.

Trial results

The most common aircraft flown during the trial was the B737-800, frequently used on Australia's domestic routes.

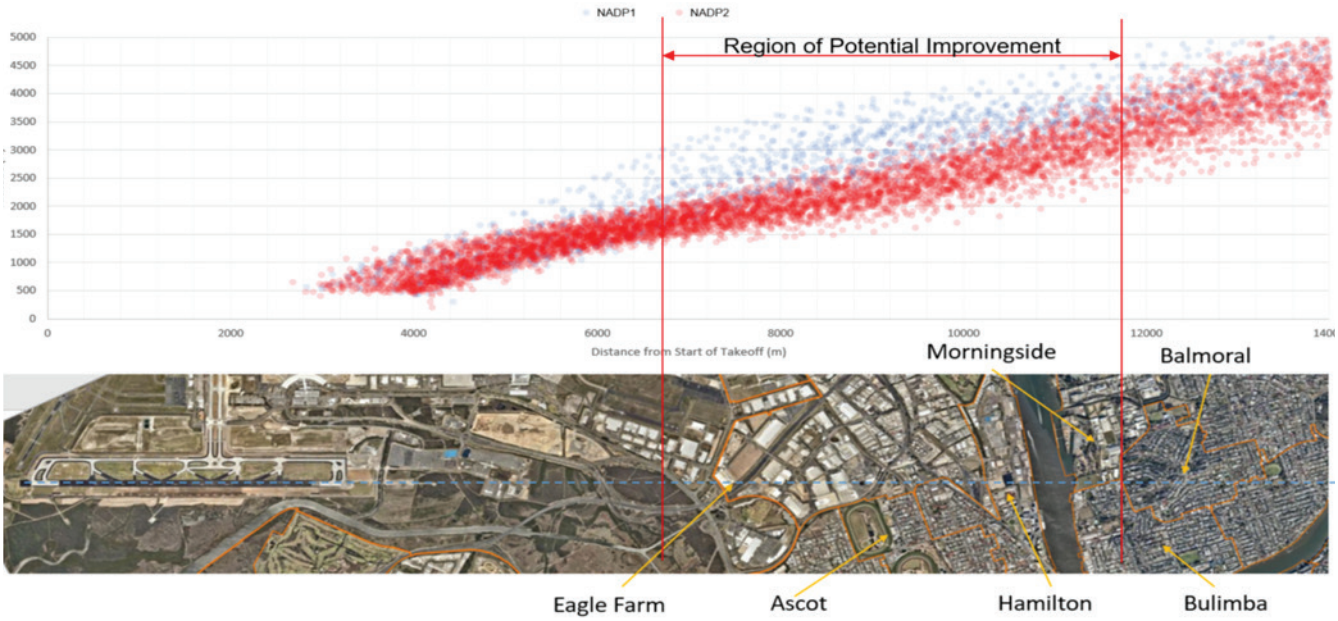
The following diagram shows the variation in altitudes flown by departures to northern destinations before and during the trial using NADP2 (in red), the standard noise abatement departure procedure flown at Brisbane Airport, and NADP1 (in blue), the departure procedure flown during the trial.

Aircraft using NADP1 during the trial are shown as blue dots and NADP2 as red dots



While the trial was conducted off the existing runway, the following diagram transfers the trial aircraft across to the new runway to show aircraft altitudes at distances from the point of take-off over residential areas. It also shows the two noise abatement departure procedures and the area of potential improvement the trial investigated.

B737-800 aircraft using NADP1 during the trial are shown as blue dots and NADP2 as red dots

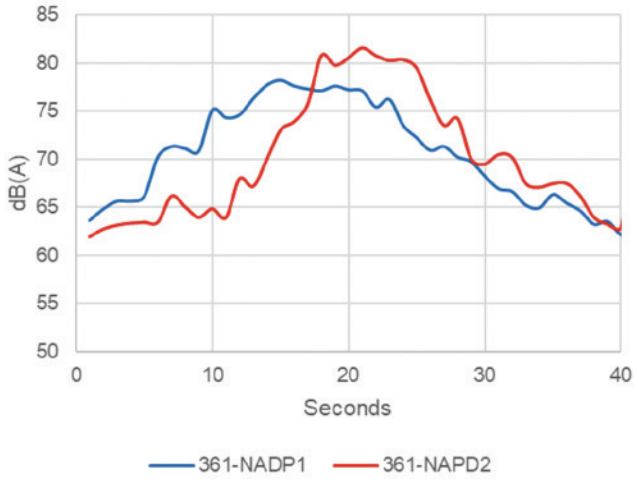


The level of noise versus the length of time

The noise difference captured during the trial included both the level of noise (LAmax), and the combined level and duration of the noise (Sound Exposure Level – SEL).

The below diagram shows NADP1 (blue) results in a lower noise level than NADP2 (red), but the peak of the noise lasts longer.

Noise level and duration comparison between NADP1 and NADP2



Aircraft noise and performance

As a direct result of this trial, BAC is developing the first combined Airport/Airservices Aircraft Performance and Noise Program in Australia.

Recognising the sensitivity of residents to major changes in aircraft noise patterns, this program includes the provision of six extra noise monitoring terminals in addition to the eight permanent noise monitors already in use by Airservices. Four temporary noise monitors will be placed in New Farm, Bardon, Carina, and Hamilton, and two permanent noise monitors south of the two runways.

The system will allow BAC to monitor how aircraft are performing against the noise abatement procedures, explore noise improvements, and report this information to the community. The additional noise monitors will be shown on Airservices' WebTrak (https://www.airservicesaustralia.com/aircraftnoise/webtrak).

Airservices aircraft noise monitors at Brisbane Airport and Salisbury.

Noise improvements and emissions

An important part of the trial measurement was to consider the difference in CO_2 emissions between NADP1 and NADP2. The trial did not show a reduction in noise level and/or duration of greater than 3dB(A) across the aircraft fleet, but modelling using flight information from the trial did indicate substantial increases in fuel use and emissions (CO_2).

Noise and emissions differences by aircraft type departing Brisbane Airport Runway 19L during the NADP1 trial in October-November 2019

	Noise improvement AVE LA max (dB(A))	Noise improvement AVE SEL (dB(A))		*Fuel Increase kg (over 12 months)	*CO_2 increase kg (over 12 months)
B738 Northern destinations	1.0 (dB(A))	0.4 (dB(A))	B738 North and South	560,440 kg	1,797,406 kg
B738 Southern destinations	1.1 (dB(A))	0.5 (dB(A))			
A320 Northern destinations	3.6 (dB(A))	2.0 (dB(A))	A320 North and South	295,694 kg	937,760 kg
A320 Southern destinations	2.0 (dB(A))	1.6 (dB(A))			
A330	2.6 (dB(A))	1.5 (dB(A))	A330	178,800 kg	554,280 kg
B787	3.1 (dB(A))	2.8 (dB(A))	B787	75,600 kg	239,910 kg
B777	1.5 (dB(A))	1.4 (dB(A))	B777	52,800 kg	168,000 kg
A350	3.4 (dB(A))	2.7 (dB(A))	A350	54,180 kg	171,570 kg

A B738 departing to Mackay flying NADP1 uses **an extra 24kg of fuel** and produces **an additional 77kg of CO_2** when compared to NADP2.

By comparison, an average family car would need to travel **422km** (Brisbane to Roma) to produce the same amount of CO_2.

A B777 departing to Los Angeles flying NADP1 uses **an extra 88kg of fuel** and produces **an additional 278kg of CO_2** when compared to NADP2.

An average family car would need to travel **1,530km** (Brisbane to Melbourne) to produce the same amount of CO_2.

Noise improvement outcomes

As a result of the investigation and trial, the below improvements are included in the Brisbane Airport Noise Abatement Procedures which commenced on 21 May 2020:

Clear instructions to always fly a Noise Abatement Departure Procedure.

Speed restrictions on departing aircraft to reduce the number of lower flying aircraft.

If pilots cancel the standard flight path, they will be directed to fly the steeper noise abatement departure (NADP1).

When on the last stage of flight before landing, pilots will use the lowest flap setting when possible to reduce airframe noise.

To find out more about the noise improvement trial and view the full technical report, visit **bne.com.au/flightpaths.**