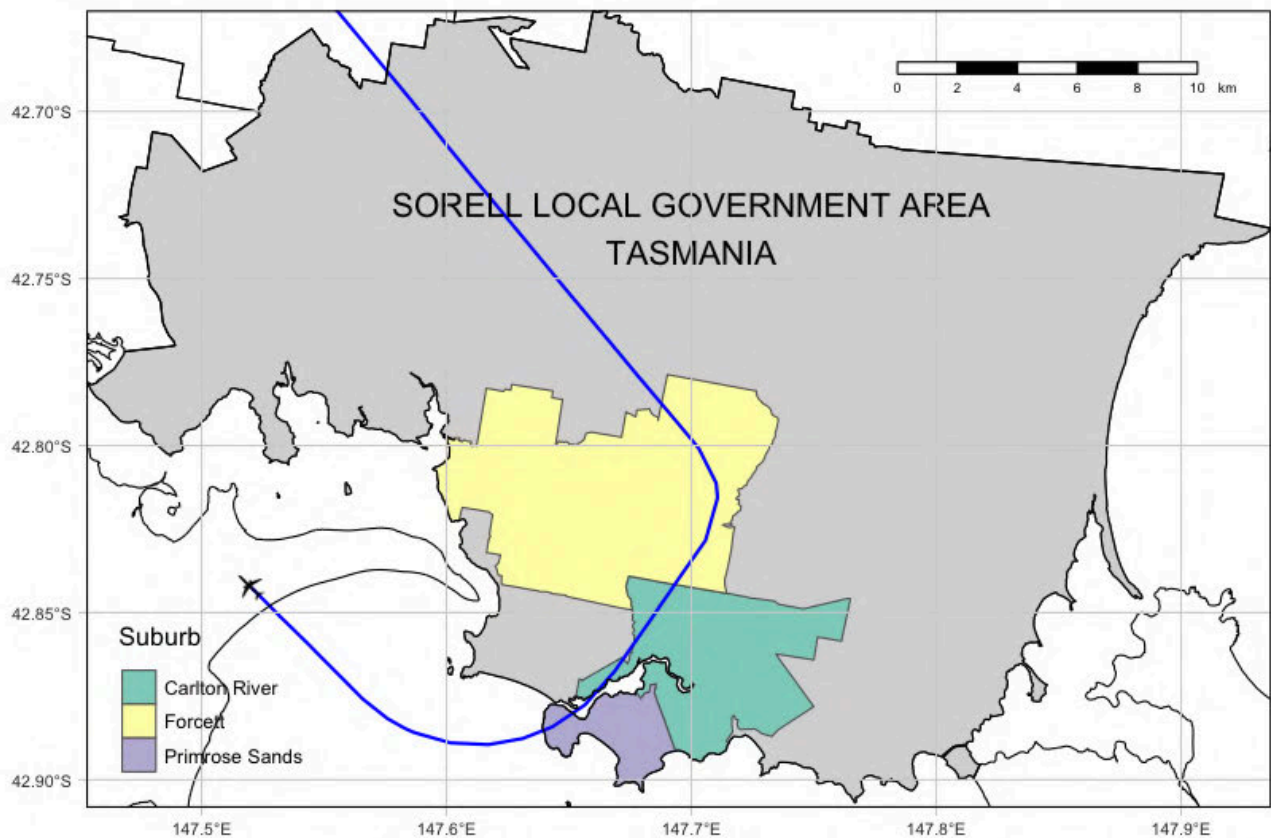


# Submission by the Carlton River, Primrose Sands and Forcett Flight Path Opponents Group to the Senate Inquiry on Aircraft Noise

26 April 2024



## Acronyms

ANO	Aircraft Noise Ombudsman
ASA	Airservices Australia
CAGS	Community Aviation Consultation Groups
CASA	Civil Aviation Safety Authority
COVID-19	Coronavirus Disease 2019
EIA	Environmental Impact Assessment
FOI	Freedom of Information
ICAO	International Civil Aviation Organisation
IRSAD	Index of Relative Socio-economic Advantage and Disadvantage
MNES	Matters of National Environmental Significance
NAP	Noise Abatement Procedure
NCIS	National Complaints and Information Service
PIR	Post Implementation Review
SIDs	Standard Instrument Departures
STARs	Standard Terminal Arrival Routes
RNAV	Area Navigation
RNP-AR	Required Navigation Performance with Authorisation Required

## Introduction

The Rural and Regional Affairs and Transport References Committee initiated an inquiry on 6 February 2024 into the impact of aircraft noise on residents and businesses across capital cities and regional towns. Findings are to be presented by 8 October 2024. The inquiry is open to public submissions on the following key points:

1. The effect of aircraft noise on the amenities, physical and mental well-being, and the everyday lives of residents.
2. The repercussions of aircraft noise on small businesses.
3. Proposals to mitigate and limit aircraft noise, including the potential for flight curfews, adjustments to flight paths, and the exploration of alternatives to air travel.
4. Obstacles hindering the effective mitigation and limitation of aircraft noise.
5. Other relevant issues concerning aircraft noise.

This submission from the Carlton River, Primrose Sands, and Forcett Flight Path Opponents Group, located in the Sorell Local Government Area of Tasmania, details how Airservices Australia (ASA) rerouted the Runway 30 RNP-AR flight path over our homes with minimal consultation. This decision has led to significant distress within the community.

Our submission includes a report documenting the results of an online survey we commissioned to gauge community sentiment around the flight path mentioned above. We received 152 responses, overwhelmingly showing that the community is deeply unhappy with this flight path.

Although we are very upset about the treatment we have received from ASA, our submission presents some ideas/suggestions to ensure that other communities do not have to experience what we are currently experiencing.

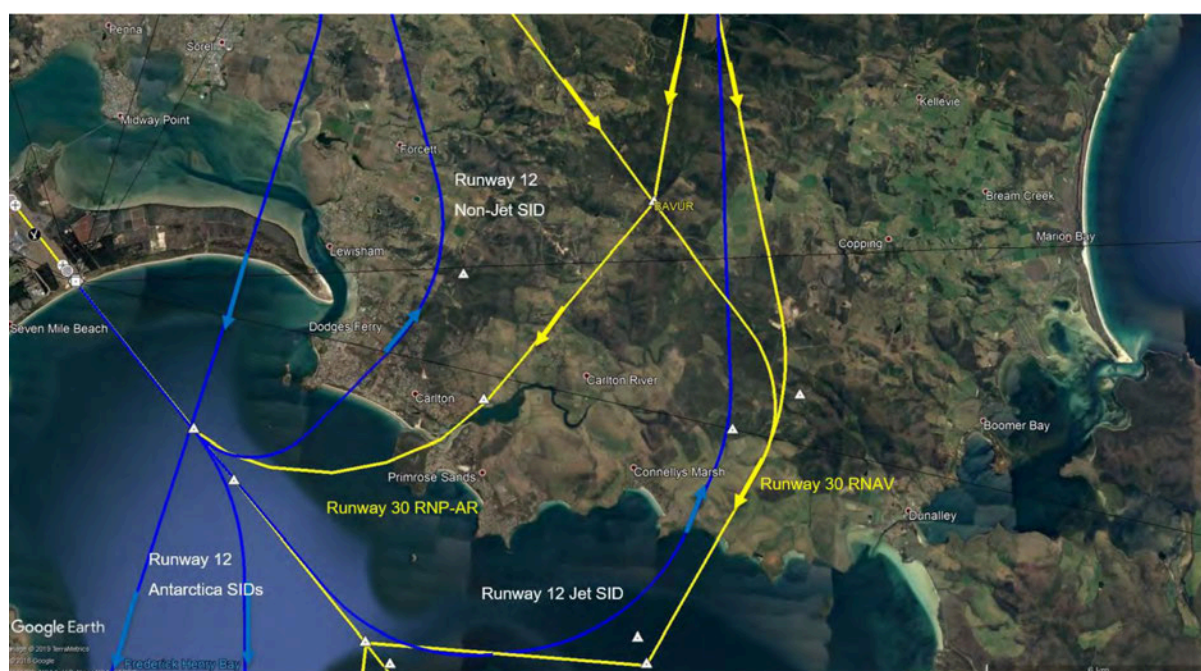


Oblique aerial view of the magnificent Carlton Estuary looking towards the WSW. Carlton Bluff is on the left side of the photograph. Many people settled in the area to enjoy the scenic values and beautiful beaches. Airservices Australia thought placing the noisy Runway 30 RNP-AR approach path in the middle of this previously tranquil area was a good idea. Residents must contend with jets thundering over their homes at under 2500 feet (Source: PropertyPIX).

## Background

Before November 2019, our community experienced few, if any, aircraft passing over our houses. There was some awareness of the controversy surrounding the introduction of the Standard Instrument Arrival (STAR) flight path over Dunalley in September 2017. ASA quickly moved the flight path to the west in March 2018 in response to community backlash. This new flight path crossed over sparsely inhabited, primarily rural terrain between Connellys Marsh and Dunalley.

Then, in a rather perplexing move, ASA rerouted the flight path seven kilometres west to the more densely populated Carlton River, Primrose Sands, and Forcett areas in November 2019. This path positions jets directly over residential areas at or below 2200 feet, purportedly for marginal efficiency gains at the behest of the airline industry<sup>1</sup>. ASA also claims these areas were "previously overflowed", ignoring the significant difference between occasional and constant aircraft noise. Due to prevailing winds in Tasmania, Runway 30 operates 75% of the year. Even when Runway 12 is in operation, residents living under the RNP-AR still experience aircraft noise from departures, albeit at a lower noise level, as aircraft gain altitude quickly and are further away.



Flight path changes that came into effect in November 2019. Runway 30 RNP-AR tracks at lower altitudes across residential areas, compared to Runway 30 RNAV, which tracks across sparsely inhabited rural areas (Source: Airservices Australia).

According to the Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) by the Australian Bureau of Statistics, Primrose Sands ranks as one of Australia's more socially disadvantaged areas<sup>2</sup>. Some residents have questioned whether the low socioeconomic status influenced ASA's decision to reroute the flight path over our community.

Our interactions with ASA have been deeply frustrating, characterised by boilerplate responses designed to obfuscate rather than clarify. ASA cites flight safety as a catch-all defence, a tactic the Aircraft Noise Ombudsman (ANO) critiqued as a pretext for inaction. ASA acknowledged their noise modelling was inaccurate in their Post-Implementation Review<sup>3</sup> (PIR), which seems to be a recurrent nationwide issue, further fueling our frustration.

<sup>1</sup> [Airspace Review of Hobart - December 2019 Civil Aviation Safety Authority](https://www.casa.gov.au/airspace-review-hobart) <https://www.casa.gov.au/airspace-review-hobart>

<sup>2</sup> <https://experience.arcgis.com/experience/32dcbb18c1d24f4aa89caf680413c741/page/IRSAD/>

<sup>3</sup> [Hobart - Post Implementation Review - Final Report.pdf \(28.3 MB\) \(pdf\)](#)



Despite the PIR's suggestion to shift the flight path east by two to three kilometres or trial a Noise Abatement Procedure (NAP), progress has stalled. Community preference strongly favours returning to the less invasive March 2018 flight path and exploring alternative over-water routes. A survey by ASA on NAP time slots appeared arbitrary and gave equal weight to respondents not impacted by aircraft noise to those living under the flight path.

We are concerned about the anticipated increase in aircraft movements and runway upgrades at Hobart Airport. The runway upgrades will allow larger, noisier, wide-bodied aircraft, such as the Airbus A330 or Boeing 787, to fly into Hobart Airport<sup>4</sup>. Moreover, Hobart Airport does not have a curfew. We expect aircraft noise to become much more of a problem going forward.

ASA has made it clear that the air traffic volume is not of concern to them. No regulations limit community exposure to aircraft noise, giving ASA tremendous latitude to do as it pleases.

Table 1 summarises the timeline of events:

Date	Event	Rationale for Changes
Sep 2017	New SIDs and STARs implemented by Airservices Australia at Hobart Airport.	Adopt updated SIDs and STARs to improve the safety and efficiency of aircraft operations during departures and arrivals as per CASA recommendations and ICAO mandates.
Nov 2017	Community backlash and consultation following new flight path implementation.	Airservices acknowledged inadequate consultation and planned an alternative path with improved outcomes for affected communities.
Mar 2018	Implementation of an alternative flight path.	Move the flight path from over Dunalley westward between Dunalley and Connelly's Marsh to minimise the impact of noise on these communities.
Apr 2018	ANO report on the implementation of the new flight paths.	The ANO provided a formal critique and suggested areas for improvement in Airservices' engagement and decision-making processes.
Jan 2018 - Mar 2019	Broader review of Hobart flight paths, including community engagement.	Review of flight paths around Hobart due to community dissatisfaction with the process and outcomes of the initial changes.

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[https://hobartairport.com.au/wp-content/uploads/2023/05/26042023\\_Hobart-Airport-Master-Plan-2022-Final-compressed.pdf](https://hobartairport.com.au/wp-content/uploads/2023/05/26042023_Hobart-Airport-Master-Plan-2022-Final-compressed.pdf)

Date	Event	Rationale for Changes
Nov 2019	Introduction of the new Runway 30 RNP-AR flight path over Primrose Sands and Carlton.	Flight paths are adjusted to accommodate airline industry preferences.
Mar 2020 – Dec 2021	Tasmania restricts non-essential travel in response to the COVID-19 Pandemic.	Protect Tasmanians from COVID-19.
Nov 2020 - Jan 2021	Terms of Reference for the Post-Implementation Review (PIR) developed with community input.	To ensure a comprehensive review of the flight path changes.
Apr 2022	Post Implementation Review (PIR) Final Report. Two options for further assessment were trialling a Noise Abatement Procedure (NAP) and shifting the RNP-AR flight path 2 to 3 km east.	To evaluate the environmental and community impacts of the flight path changes and inform future actions.
Nov 2022 – Dec 2022	Online survey to assess community preferences around noise-sharing time slots.	To ensure community input into the proposed NAP trial – sharing noise between Runway 30 RNAV and Runway 30 RNP-AR flight paths.
Aug 2023	Decision not to proceed with the NAP trial as recommended in the PIR.	ASA decided not to proceed based on community feedback, environmental and noise benefits against emissions outcomes, and prioritising safety.
Sep 2023	Draft report from the Aircraft Noise Ombudsman regarding the decision against the NAP trial.	The ANO recommended reconsidering the NAP trial, criticising the decision-making as partially irrelevant or arbitrary.
Nov 2023	Announcement to review the Runway 30 NAP trial assessment outcome.	The CEO of Airservices requested a further assessment of the NAP trial, including additional community and industry engagement.
Apr 2024	Decision to proceed with a six-month NAP trial, commencing Jun 2024, two years after the finalised PIR report.	Response to the request by the CEO.

## Community survey

Amidst infrastructure upgrades at Hobart Airport and expected growth in air traffic, the Carlton River, Primrose Sands, and Forcett Flight Path Opponents Group conducted a community survey to gather and document community reactions to the

noise increase. The survey was open for four weeks between 20 February and 19 March 2024. Altogether, 152 people responded to the survey. The survey report is at the back of this submission. Responses to open-ended questions make interesting reading.

Key takeaways from the survey were:

- **Significant Noise Impact:** Residents are significantly disturbed by aircraft noise, affecting their daily lives, routines, and overall well-being.
- **Insufficient Consultation and Underestimation of Impact:** The community feels that ASA did not adequately engage with them or accurately assess the noise impact.
- **Community Concern Over Airport Expansion:** There is apprehension regarding future expansions of Hobart Airport, with fears of increased noise due to larger aircraft and more flights.
- **Strong Support for a Curfew:** The overwhelming support for introducing a curfew at Hobart Airport reflects a community desire for regulatory measures to mitigate noise pollution, particularly during nighttime and early morning hours.
- **Diverse Coping Mechanisms:** Residents' various strategies for coping with aircraft noise, ranging from physical modifications to their homes to white noise, background music, or radio, highlight the significant adaptations individuals have to make.
- **Desire for Flight Path Alteration:** The predominant preference among survey respondents is for the flight path to be moved to less populated or uninhabited areas, indicating a strong consensus for a solution that minimises residential noise exposure.
- **Varied Individual Experiences:** Open-ended responses reveal a spectrum of individual experiences with aircraft noise, from significant distress affecting mental and physical health to a minority of residents who do not find the noise bothersome.
- **Call for Comprehensive Solutions:** The community seeks a holistic approach to noise management, including better consultation, more accurate impact assessments, and consideration of environmental and health effects.

## Specific grievances

ASA's design and implementation of the Runway 30 RNP-AR flight path lacks common sense and did not properly consider noise impacts. Below, we outline our main grievances with ASA.

## Substandard community engagement

ASA's community engagement on the Hobart Airspace Design Review was inadequate, with most affected residents unaware of impending flight path changes. ASA misled the few community members they did reach by reporting arrivals would be shared equally between the RNP-AR and the RNAV further east. Currently, the

RNP-AR can experience 35 plus flights per day, potentially increasing to 7 arrivals per hour in the busy periods by 2028. There are 1740 residents currently affected by aircraft noise under the RNP-AR.

Our interactions with ASA have been persistently frustrating. Their communications, often laden with technical jargon, seem designed more to obscure than to clarify the real issues. This approach suggests a lack of genuine empathy and a reluctance to acknowledge their shortcomings. The ANO has criticised the chronic use of 'flight safety' as a universal defence as a pretext for inaction. ASA's approach is high-handed. They operate with a sense of impunity and shirk accountability at every turn.

The flight path over Dunalley, initiated in September 2017 at approximately 6000 feet, was established with scant public consultation. ASA did not communicate their decision to reroute this flight path so that aircraft pass over the denser residential areas of Carlton River and Primrose Sands at 2200 feet very well. An FOI request disclosed that no public comments were received regarding the new design<sup>5</sup>, underscoring the profound deficiency in engaging with the communities directly affected by these changes.

Complaints to ASA's Noise Complaints and Information Service (NCIS) and questions on the Engage Airservices website often go unanswered. Representatives from ASA are coming to Tasmania over the coming weeks to hold face-to-face sessions. ASA advertises these sessions as one-on-one drop-in sessions, but residents have told ASA they prefer ASA to address our community as a group. One-on-one conversations allow ASA to avoid transparency.

ASA's reliance on Community Aviation Consultation Groups (CAGs) and the Engage Airservices platform as the primary modes of community engagement falls short of addressing the diverse needs of noise-impacted communities. This method is particularly inadequate for those with limited digital access or facing socio-economic challenges that hinder their ability to engage. Furthermore, expecting residents to proactively follow developments rather than being directly informed by ASA is ineffective. Our community, where digital and functional literacy vary widely, needs more accessible and inclusive methods of communication to ensure everyone's voice is heard and considered.

The lack of urgency ASA displays in addressing noise issues is particularly frustrating. It has been two years since ASA completed their PIR. Yet, its recommendations have still to be implemented, namely trialling a Noise Abatement Procedure (NAP) and relocating the flight path 2 to 3 kilometres east. Despite community preference for moving the flight path as a top priority to minimise noise impact, ASA chose to trial the NAP first, a decision that disregards the immediate needs and preferences of the affected residents, further highlighting the disconnect between ASA's actions and community interests.

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<sup>5</sup> [https://www.righttoknow.org.au/request/community\\_engagement\\_pertaining#incoming-31182](https://www.righttoknow.org.au/request/community_engagement_pertaining#incoming-31182)



## Previously overflowed areas justification

Homes that once only occasionally heard an aircraft overhead now endure constant air traffic due to precise and concentrated flight paths. Previously, the sporadic aircraft went largely unnoticed, but today's relentless flow above residential areas is far more intrusive and problematic. ASA rationalises establishing these concentrated flight corridors over populated areas with the term "previously overflowed", disregarding the significant noise impacts. ASA appears to be unfazed by the collateral damage caused by its narrow pursuit of operational efficiency, seemingly influenced by the demands of profit-driven airlines.

## Lack of aircraft noise regulations

ASA cites the absence of regulatory limits on aircraft noise impacts on communities as an excuse for not doing much to mitigate aircraft noise. Despite widespread grievances associated with aircraft noise, there is no indication that ASA has proactively sought governmental intervention to establish regulations that would mandate more rigorous noise control measures.

This persistent regulatory gap raises serious questions about the influence of aviation industry lobbyists on government policy, suggesting that their interests are prioritised over the well-being of noise-impacted communities. The reluctance of successive governments to address this issue may reflect the disproportionate sway these industry groups hold, potentially at the expense of public health and property values in noise-impacted areas. It is imperative to examine why there remains a stark absence of legislative action to regulate aircraft noise despite decades of ongoing issues.

## Responses to FOI requests

Unsatisfactory responses to many of our FOI requests suggest ASA is not transparent. For example, ASA claims they consult the airline industry on flight path changes. When asked to provide correspondence between ASA and airline operators, we only received one redacted email from a pilot commenting on the Runway 30 RNP-AR flight path post-implementation<sup>6</sup>. Does ASA consult with the airline industry, or are they reluctant to admit to state capture by this industry? FOI requests tend to take longer than the 30-day mandatory period to fulfil.

## Sloppy environmental impact assessments

ASA significantly underestimated the noise impact from the Runway 30 RNP-AR, partly due to their failure to calibrate their initial noise models using ground-based monitoring equipment. This oversight led to the ill-advised relocation of the flight path over densely populated residential areas. This error indicates broader deficiencies within ASA's environmental impact assessments (EIAs).

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<sup>6</sup> [https://www.righttoknow.org.au/request/extent\\_of\\_industry\\_input\\_into\\_th#outgoing-22725](https://www.righttoknow.org.au/request/extent_of_industry_input_into_th#outgoing-22725)

For instance, during the EIA for the new flight path, ASA neglected to consult with the Tasmania Department of Natural Resources and Environment or the Tasmania Environmental Protection Agency. This oversight is critical as Runway 30 RNP-AR intersects known habitats of the White-Bellied and Wedgetail Eagles—both threatened species<sup>7</sup>. Proper consultation might have identified the need for a flight path reroute to avoid these sensitive areas, as suggested by the recommended 1000m exclusion zones around eagle nests.

ASA relies on the Matters of National Environment Significance (MNES) database for its environmental assessment. The Protected Matters Search Tool on the MNES website has a pop-up banner that clearly states local knowledge is essential for proper environmental assessments<sup>8</sup>.

As the photographs in this submission show, our region is renowned for its rolling hills and pristine beaches, the primary reasons many residents move to the area. However, the EIA completely overlooked the area's scenic value.



Oblique aerial view south towards Carlton Bluff with the Carlton Estuary in the foreground. The Runway 30 RNP-AR flight path tracks down the middle of this photograph over Carlton Bluff before swinging around to the northwest for the final approach into Hobart Airport. Jet aircraft fly over Carlton Bluff at altitudes below 2000 feet above ground level. Noise from passing aircraft frequently reaches 70 to 75 dB in this area (Source: Open2View).

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<sup>7</sup> <https://biocache.ala.org.au/explore/your-area#-42.8404%7C147.6846%7C11%7CBirds>

<sup>8</sup> <https://pmst.awe.gov.au>

Additionally, there's a glaring gap in ASA's assessment of potential rainwater tank contamination from aircraft emissions<sup>9</sup>. Many residents depend on rainwater tanks due to a lack of reticulated water supply and live beneath flight paths where aircraft operate below 3000 feet, a threshold identified by ICAO concerning air quality<sup>10</sup>. Despite this, ASA has sidestepped the contamination issue from ultra-fine particles and soot, which could pose significant health risks.

Research indicates that aircraft noise can have detrimental health effects. Studies have found that individuals chronically exposed to high levels of aircraft noise are more likely to experience stress and hypertension compared to those not exposed<sup>11</sup>. Additionally, aircraft noise can cause psychological harm<sup>12</sup>. Many residents in Primrose Sands suffer from mental health issues, something that ASA overlooked in its EIA. Despite stating that safety is its top priority, ASA does not appear to consider residents' physical and psychological well-being beneath flight paths.

Conducting desktop EIAs without thorough fieldwork or ground-truthing is lazy and results in dubious quality assessments. Had ASA conducted a rigorous, comprehensive EIA, the community might have avoided contending with the current noise problem.

## Safety first or serving the airline's commercial interests?

ASA keeps stressing that flight safety is their number one priority. However, we wonder if they have compromised their safety-first mantra to reduce airline fuel bills. There are better routes than the shortcut over Carlton Bluff.

We have expert advice that the Runway 30 RNP-AR approach is not the safest option. Not only does this approach have potential terrain-induced wind turbulence issues, but the approach joins finals for the runway very late, leaving little time to get landing flaps extended and speeds reduced from the 175 kt maximum over Primrose to the typical B737/A320 final approach speed of about 135 kt. Since the flight can be in the cloud until 370 ft AMSL, pilots must shoot a missed approach if they do not have the airport runway/landing lights visually acquired. The Runway 30 RNAV approach (via waypoint KANRO) is much safer and should be the primary approach path.

Since eagles take advantage of southerly updrafts and soar above Carlton Bluff, there is an enhanced risk of bird strikes with Runway 30 RNP-AR. Had ASA done a proper EIA, they would have known this. Their dogged pursuit of improving airline operators' efficiency has come at the expense of flight safety.

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<sup>9</sup> [https://www.righttoknow.org.au/request/runway\\_30\\_hobart\\_airport\\_home\\_wa#incoming-34058](https://www.righttoknow.org.au/request/runway_30_hobart_airport_home_wa#incoming-34058)

<sup>10</sup> <https://www.icao.int/environmental-protection/Pages/env2016.aspx>

<sup>11</sup> <https://doi.org/10.1016/j.envres.2020.110179>

<sup>12</sup> <https://doi.org/10.3390/ijerph15081642>

## Briefing against communities

ASA's official communications to MPs regarding noise relief often contain claims contradicting their reviews and ANO findings. This discrepancy highlights a gap between ASA's public narrative and the operational realities, suggesting a possible disconnection or overconfidence that undermines transparent and accountable engagement with the public and elected representatives.

It is particularly troubling that ASA briefs elected officials on ways to respond to community concerns about flight paths<sup>13</sup>. MPs often regurgitate the same information ASA tells us, making us feel even more unheard. Elected representatives should advocate for their constituents' interests, not serve as mouthpieces for ASA. Such practices compromise the integrity of community representation and call for immediate scrutiny and reform.

## Impact of aircraft noise on property prices

Prior research indicates a tangible decrease in property values associated with aircraft noise levels exceeding 60 dB, with evidence suggesting that property prices may diminish between 0.5% and 0.9% for every decibel increase beyond this threshold<sup>14</sup>. In our community, particularly beneath the Runway 30 RNP-AR flight path, we often endure noise levels around 75 dB. This noise level suggests a potential decrease in property values ranging from 7.5% to 13.5%. The median house value in Carlton River stands at \$656,000<sup>15</sup>, translating to a devaluation of approximately \$49,200 to \$88,560 per property as a direct consequence of ASA's flight path decisions.

The latitude afforded by the Airservices Act 1995 enables ASA to make operational decisions that significantly affect community members' investments and quality of life without any obligation to address or mitigate these impacts.

## Hobart Airport 2022 Master Plan

A FOI request relating to community feedback regarding the Hobart Airport 2022 Master Plan highlights considerable community unease regarding the airport's expansion and the anticipated increase in flight operations<sup>16</sup>. These developments spell a heavier aircraft noise burden for residents under flight paths, intensifying concerns over their quality of life.

The plan has faced criticism, particularly for its lacklustre response to noise concerns. The community's disappointment is palpable, especially with the plan's failure to consider a curfew as a viable noise mitigation measure. The assertion that

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<sup>13</sup> [https://www.righttoknow.org.au/request/details\\_of\\_hobart\\_airflight\\_path#incoming-31533](https://www.righttoknow.org.au/request/details_of_hobart_airflight_path#incoming-31533)

<sup>14</sup> <https://doi.org/10.1093/qopen/qaab012>

<sup>15</sup> <https://www.propertyvalue.com.au/suburb/carlton%20river-7173-tas>

<sup>16</sup> [https://www.righttoknow.org.au/request/public\\_submissions\\_to\\_the\\_draft#incoming-31753](https://www.righttoknow.org.au/request/public_submissions_to_the_draft#incoming-31753)



the airport holds no responsibility for managing aircraft noise over residential areas has only added fuel to the fire, sparking significant discontent and underlining the need for more community engagement in decision-making processes.

Despite these valid concerns, the Minister for Transport, Infrastructure, Regional Development, and Local Governments' approved the Master Plan, valuing economic benefits over noise-impacted residents' health and well-being.



Oblique aerial view of Primrose Sands looking west. The dwellings on the slopes of Carlton Bluff in the middle of the photograph are located directly beneath the Runway 30 RNP-AR approach path (Source: PropertyPIX).

## Recommendations

The legislation governing ASA must be revised, as they have excessive leeway to act with little accountability. Their community engagement framework appears more protective of their interests than genuinely inclusive of community input. We urgently call for substantial reforms to prioritise communities' well-being over the aviation industry's commercial interests.

### Fix legislation



The existing legislative framework addressing aircraft noise in Australia, including the Civil Aviation Act 1988, Airservices Act 1995, Airports Act 1996, and the Air Navigation (Aircraft Noise) Regulations 2018, needs to be more cohesive. Different government agencies that operate independently manage these laws, leading to a disjointed approach to noise management. This fragmentation highlights the urgent need for comprehensive umbrella legislation coordinating these agencies' efforts to minimise noise impacts effectively.

No specific regulations cap noise exposure for communities, nor does the Airservices Act 1995 require ASA to comprehensively consider the socio-economic and environmental implications of flight path changes. Airport operators often defer noise issues to ASA, claiming they fall outside their jurisdiction. The lack of proactive engagement from the responsible Minister on these issues further exacerbates the problem.

Comprehensive legislative reform is necessary to ensure a cohesive strategy that genuinely addresses the complexities of aircraft noise and its impact on communities.

### Make curfews mandatory

Middle-of-the-night flights should not disturb residents. Our community survey shows overwhelming support for a curfew at Hobart Airport. Petitioning for curfews is a fraught affair with no transparent, well-documented process. There is a need for legislation to enforce a mandatory curfew from 23:00 to 06:00 at all airports. Sydney, Melbourne, Adelaide, Gold Coast and Essendon airports currently have curfew restrictions between 23:00 and 06:00, and they still exist profitably and economically.

We expect the aviation industry to oppose mandatory curfews vehemently. However, their opposition is selfish, prioritising profit over people's health and well-being.

### Strengthening aircraft noise regulations

The Air Navigation (Aircraft Noise) Regulations 2018 focus solely on engine noise for aircraft certification, leaving a significant gap as they do not limit community exposure to aircraft noise. We urge the Federal Government to expand aircraft noise regulations. The regulations must implement the following:

**Establish Noise Caps:** The World Health Organisation (WHO) recommends setting enforceable noise caps at 45 dB during the day and 40 dB at night in residential areas around airports<sup>17</sup>.

**Mandatory Noise Monitoring and Reporting:** ASA must install ground-based systems around all airports to continuously monitor noise levels. The results must be publicly available to ensure transparency and force compliance.

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[https://cdn.who.int/media/docs/default-source/who-compendium-on-health-and-environment/who\\_compendium\\_noise\\_01042022.pdf](https://cdn.who.int/media/docs/default-source/who-compendium-on-health-and-environment/who_compendium_noise_01042022.pdf)

**Adoption of a Balanced Approach Framework:** Formally adopt ICAO's Balanced Approach<sup>18</sup>, which encompasses noise reduction at source, land-use planning, operational noise minimisation procedures, and operational restrictions like curfews.

**Implement Operational Restrictions:** As mentioned above, enforce mandatory curfews and limit flight numbers during sensitive hours to mitigate noise impact.

**Community Compensation:** Create a compensation scheme for residents adversely affected by aircraft noise.

## Reforming ASA

We advocate replacing the Airservices Act 1995 with new legislation that fundamentally transforms ASA's mandate, compelling it to prioritise genuine community engagement and equitable consideration alongside airline and airport operations. The new legislation must enforce the following:

**Proactive and Meaningful Community Engagement:** ASA must engage with affected communities at the earliest indication of flight path changes, incorporating local geography and population considerations to minimise impact. Community well-being should be weighted equally with airline efficiency and safety. ASA must reevaluate decisions favouring minor operational gains at the expense of significant community impact.

**Timely Finalisation of Flight Paths:** The protracted seven-year delay affecting Hobart's community is unacceptable. ASA should adhere to strict timelines for decision-making, with severe penalties for non-compliance.

**Adhere to Global Standards for Noise and Altitude:** ASA must align with WHO noise level standards and ensure aircraft fly at altitudes that mitigate noise impact, addressing the current discrepancies that see aircraft flying over communities at distressingly low altitudes and excessive noise levels.

**Preferential Use of Water-Based Flight Paths:** Where feasible, such as in Brisbane and Hobart, flight paths should be routed over water to spare residential areas from noise pollution.

**Minimise Population Impact:** The design of flight paths must impact the fewest residents, favouring routes over unpopulated or less densely populated areas when water routes are unavailable.

**Eliminate the "Previously Overflowed Areas" Justification:** ASA must cease using the "Previously Overflowed Areas" rationale to implement flight paths indiscriminately.

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[https://www.icao.int/environmental-protection/Documents/Publications/Guidance\\_BalancedApproach\\_Noise.pdf](https://www.icao.int/environmental-protection/Documents/Publications/Guidance_BalancedApproach_Noise.pdf)

This justification is both cynical and disrespectful to communities impacted by noise, ignoring their current experiences and concerns.

**Immediate Action on PIR Outcomes:** Findings from Post-Implementation Reviews highlighting significant community impact must prompt swift action from ASA to address and rectify identified issues.

**Compliance with Environmental and Community Engagement Standards:** ASA must fully comply with standards mandating balanced consideration of environmental, community, and industry needs, ensuring that flight path designs minimise community impact as much as practicable.

**Leadership and Management Overhaul:** To regain public trust and confidence, ASA requires new leadership committed to transparency, community engagement, and equitable decision-making. The current ASA board needs reprimanding for not doing enough to shift the culture at ASA.

**Enhanced Transparency and Accountability:** ASA must commit to transparency in its operations and decision-making processes as a foundational change, laying the groundwork for all other reforms.

By adopting these measures, ASA can more closely align with community expectations, global best practices, and the principles of fairness and transparency, thereby restoring trust and ensuring that airspace design and noise management practices are equitable and considerate of community well-being.

### A new independent aircraft noise agency

Extract the ANO and the NCIS from ASA and consolidate these into a single, robust, independent agency dedicated to overseeing noise regulations.

This new body must be able to investigate complaints, enforce noise standards, and hold aviation service providers accountable. Such powers are becoming crucial as emerging technologies like drones and air taxis become prevalent. Additionally, this agency should have the jurisdiction to award compensation to residents negatively impacted by aircraft noise, ensuring that those affected have a direct and effective recourse.

To design this agency effectively, Australia could look to successful international models demonstrating best practices in noise regulation and community engagement. For instance, the UK Civil Aviation Authority's Noise Regulation Group provides a comprehensive framework for managing civil aviation noise, balancing the aviation industry's and local communities' needs<sup>19</sup>. Similarly, the Federal Aviation Administration in the United States integrates environmental considerations into its operations through the Office of Environment and Energy<sup>20</sup>, which could serve as a blueprint for handling technological advancements like drones. Germany's Federal

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<sup>19</sup> <https://www.gov.uk/government/groups/airspace-and-noise-engagement-group>

<sup>20</sup> [https://www.faa.gov/about/office\\_org/headquarters\\_offices/apl/aee](https://www.faa.gov/about/office_org/headquarters_offices/apl/aee)

Environment Agency<sup>21</sup> and France's Independent Aircraft Noise Authority<sup>22</sup> offer further examples of how robust regulatory frameworks can facilitate effective noise management and community compensation mechanisms. By examining these models, Australia can create an independent noise authority that meets current needs and can handle future challenges in aviation noise management.

## Better planning laws

Current planning laws are inadequate in managing the challenges posed by aircraft noise, highlighting a significant gap that requires targeted reform. The federal and state governments must integrate aircraft noise considerations into local and regional planning processes to protect communities better. Zoning laws must make provision for flight corridors. In addition to updating zoning laws, new building codes must include stringent noise insulation standards for houses beneath flight corridors.

Reforms should mandate that ASA include requests for changes to land zoning as an integral part of its flight path design process. ASA can only implement flight paths after ensuring the community has had adequate time to understand and respond to alterations to land zoning laws. Furthermore, any updates to these zoning laws must incorporate equitable provisions for compensating residents materially affected by noise-related disruptions.

These proposed enhancements aim to create a more robust and enforceable framework for aircraft noise management, emphasising the protection and well-being of communities near airports and under flight paths. By prioritising aircraft noise mitigation, these reforms will safeguard the health and comfort of affected residents, promoting a more sustainable coexistence between the aviation industry and residential areas.

## More innovative aircraft noise management

The independent agency replacing the ANO should respond to noise complaints and proactively lead efforts in aircraft noise management by conducting innovative research and adopting global best practices to minimise noise impacts. Aircraft noise will become a more vexing problem with the emergence of commercial drone services and air taxis. The proposed agency must prioritise research to be more forward-looking. Key initiatives could include:

**National Noise Impact Study:** Evaluate aircraft noise's health and social impacts across communities nationwide. The findings will directly inform the development of targeted noise mitigation policies and regulations.

**International Collaboration:** The agency could leverage global insights and technological advancements to mitigate noise impacts through international research collaborations. This approach would enable the adoption of innovative strategies and technologies that have successfully reduced aircraft noise in other countries.

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<sup>21</sup> <https://www.dfs.de/homepage/en/environment/aircraft-noise/>

<sup>22</sup> <https://www.acnusa.fr/>, <https://anima-project.eu/noise-platform/acnusa>

## Concluding remarks

The Carlton River, Primrose Sands, and Forcett Flight Path Opponents Group acknowledge the crucial role of aviation in Tasmania's economy and the importance of maintaining strong connectivity with the rest of Australia. We recognise the necessity of flight safety and appreciate the aviation industry must reduce carbon emissions. However, these priorities should not come at the cost of community well-being.

There is an urgent need for a comprehensive overhaul of aviation legislation and regulations. When implemented, this reform will ensure (a) rigorous community consultation before implementing flight paths, (b) flight path designs that minimise noise impacts on communities, and (c) there is adequate compensation for households where noise impacts are unavoidable. Additionally, ASA requires significant reforms to improve transparency and accountability. Establishing a well-resourced, independent agency to manage aircraft noise impacts will bring positive changes.

The aviation industry must also adopt a more community-focused approach, refraining from opposing necessary measures such as noise caps and mandatory curfews. With the likelihood of increasing aircraft noise issues over time, we must address these challenges proactively to balance economic benefits with community well-being.

We sincerely thank the Senate Standing Committee for Rural and Regional Affairs and Transport members for convening this necessary inquiry into aircraft noise. We appreciate the opportunity to share our experiences and contribute suggestions to prevent others from enduring similar challenges. Your efforts in addressing this issue are crucial for ensuring that future aviation policies better balance community well-being with industry needs.

Flight Path Opponents Group Action Committee

26 Apr 2024





20 March 2024

**Carlton River, Primrose Sands & Forcett Flight Path  
Opponents Group**

# 1 Introduction

In November 2019, Airservices Australia introduced two new arrival flight paths for Runway 30 at Hobart Airport: “Runway 30 RNP-AR” and “Runway 30 RNAV”. These changes, marking a shift to greater reliance on satellite-based navigation, resulted in more precise and concentrated flight corridors. The “Runway 30 RNP-AR” flight path has jet aircraft passing over houses at altitudes under 3000’, significantly increasing aircraft noise for residents. This noise often exceeds 75 dB, causing considerable distress among the community.

While Airservices Australia highlights the benefits of satellite navigation, such as improved safety, reduced fuel consumption, and lower emissions, it downplays the adverse effects of increased noise on communities under these narrow flight corridors. Despite admitting its shortcomings in community engagement and noise impact predictions, Airservices Australia’s response to community complaints has been lacklustre. The organisation claims it is committed to addressing concerns through its airspace change program, yet the specifics of this program and its effectiveness remain unclear to many. This lack of transparency and what many perceive as the patronising attitude of Airservices Australia has fuelled residents’ frustration.

Amidst infrastructure upgrades at Hobart Airport and expected growth in air traffic, the Carlton River, Primrose Sands, and Forcett Flight Path Opponents Group conducted an online survey to gather and document community reactions to the noise increase. This report collates survey responses with broader flight path and noise abatement discussions, illustrating the community’s plight and exploring potential solutions for more harmonious aviation and residential coexistence. It calls on Airservices Australia to reevaluate its flight path strategies, putting community welfare ahead of operational and commercial priorities.

## 2 Online survey

### 2.1 Survey design

The online survey aimed to capture diverse viewpoints from people living beneath the flight path. While individuals more significantly affected by aircraft noise might be more inclined to participate, the survey was structured to mitigate bias and encourage widespread participation. Fundamental design principles included:

- Brevity: Keeping the survey concise to encourage participation.
- Neutrality: Crafting neutral questions to maintain objectivity.
- Diversity: Balancing with a blend of closed and open-ended questions.

This approach facilitated the collection of a wide range of insights and provided space for respondents to share their experiences in-depth, offering a more nuanced understanding of the community’s stance on aircraft noise. Refer to Appendix A for a list of items in the online survey.

## 2.2 Survey administration and data analysis

The survey was administered using a commercial platform called “Typeform”. Access to the survey was facilitated through a public URL link. While publicly shared links pose a risk of allowing individuals to complete the survey multiple times, potentially skewing the results, the chosen platform incorporates advanced security measures. These measures are designed to detect and prevent any attempts to bias the survey outcomes through repeated participation.

The URL link was shared via word-of-mouth, and flyers were delivered to households directly under the Runway 30 RNP-AR flight path. Flyers were also put up at local stores, and the link was shared through social media platforms, via the local council notice board, and by email. The survey was open for four weeks, from 20 February 2024 to 19 March 2024. The survey attracted more responses from individuals adversely affected by aircraft noise, introducing some response bias.

Survey responses were downloaded as a comma-separated variable file and read into a software package called “R” for data analysis. The analysis involved generating statistical plots and use of generative AI routines to summarise free-text responses. For the sake of transparency, the R code used in the analysis is listed in Appendix B.

## 3 Survey results

Figure 1 breaks down survey completions over time. Most of the survey responses were collected early on. Efforts to manipulate survey outcomes by submitting multiple entries were identified, with only the initial response considered for analysis. Of the 155 responses collected, 152 were deemed valid and included in the final analysis.

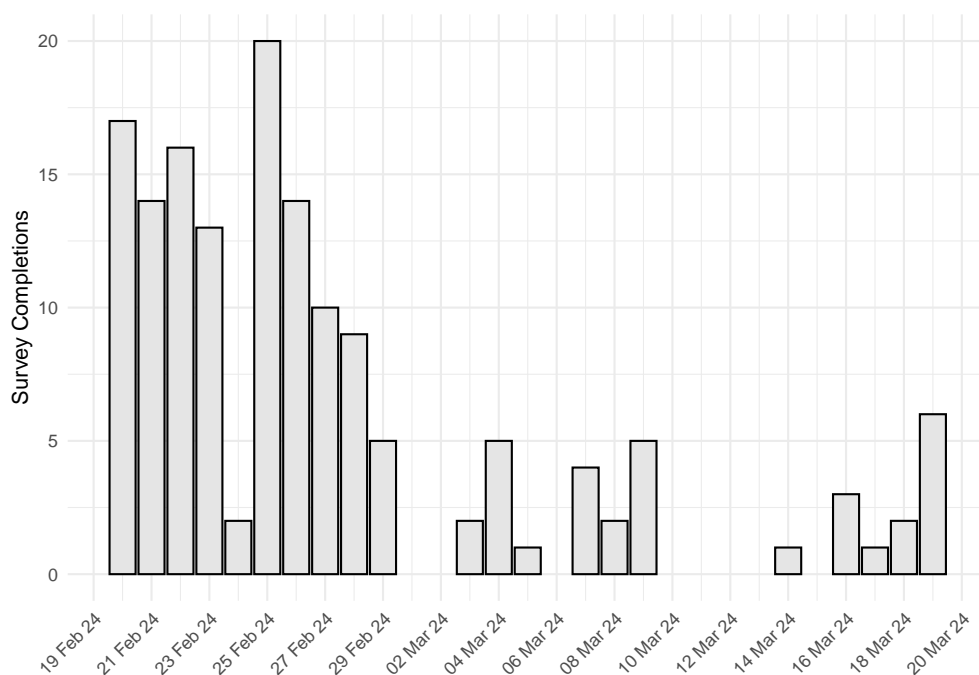


Figure 1: Survey completion rate.

Respondents were given the option to provide their contact details. Of the 152 responses analysed, 96 (63.2%) included contact details, a sign that respondents are keen to remain actively engaged with the aircraft noise issue (Figure 2).

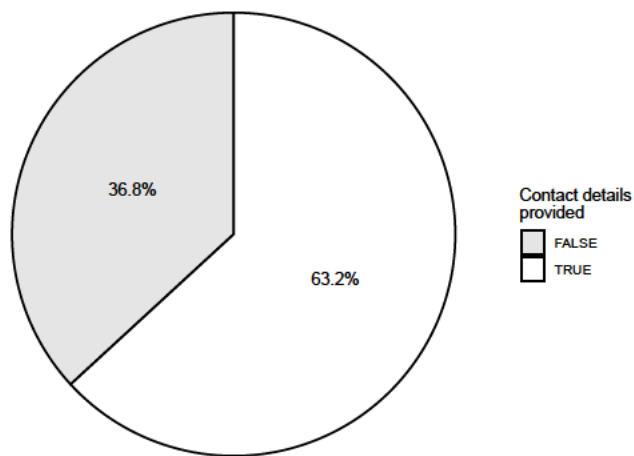


Figure 2: Proportion of respondents providing contact details.

### 3.1 Close-ended survey questions

Closed-ended survey questions limit respondents to predefined answers. However, the survey did allow participants to offer alternative responses in many instances. These additional responses are not represented in the statistical plots but were analysed independently.

#### 3.1.1 Age demographic

Figure 3 shows that most respondents are older than 50. Over a quarter of respondents fall in the 60 to 69 age bracket. Responses to open-ended questions indicate that many of the respondents are retirees.

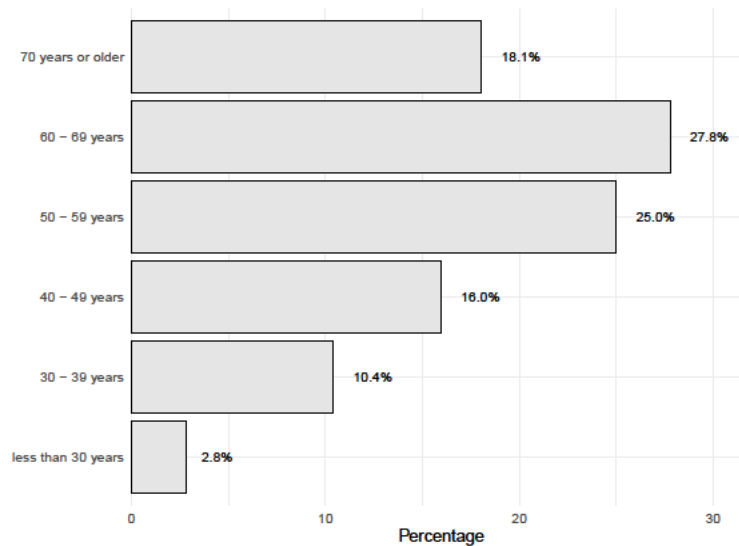


Figure 3: Which age category do you fall within?

### 3.1.2 Already resident before the introduction of new flight paths

Most respondents (76%) bought or moved into their current property before the new flight paths were implemented (Figure 4). From the responses to the open-ended questions, it is clear that many moved to the area to retire peacefully.

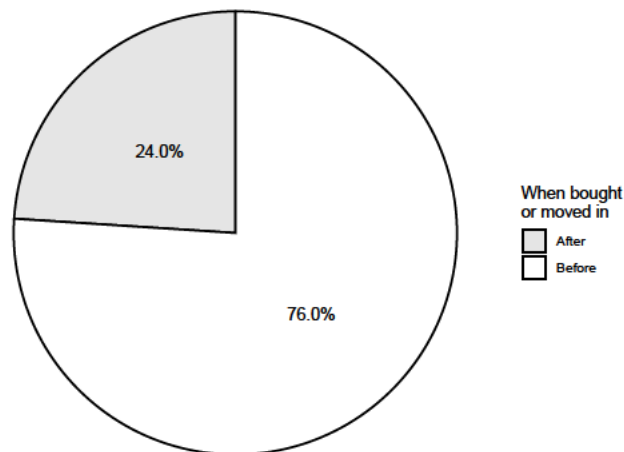


Figure 4: Did you purchase or move into this property before or after introducing the new flight paths in 2019?

### 3.1.3 Noise disturbance

Figure 5 shows that a significant number of respondents are disturbed by aircraft noise, with 45.9% reporting they are extremely disturbed and 23% disturbed. Less than 20% of respondents reported they were not disturbed by aircraft noise at all, suggesting a balanced representation in the survey responses.



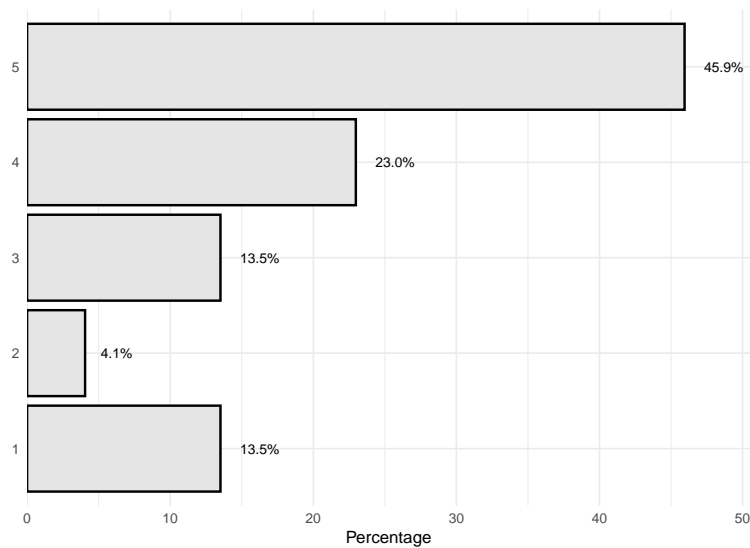


Figure 5: On a scale of 1 to 5, where one is 'Not at all disturbed' and five is 'Extremely disturbed', to what extent are you disturbed by aircraft noise?

### 3.1.4 Awareness of airport expansion plans

Awareness of the planned expansions to Hobart Airport is mixed (Figure 6). While many respondents (~ 50%) are aware of runway upgrades to accommodate wide-bodied aircraft and the anticipated increase in flight movements, a significant number of respondents are not fully aware of these plans (17.6% report they are not at all aware).

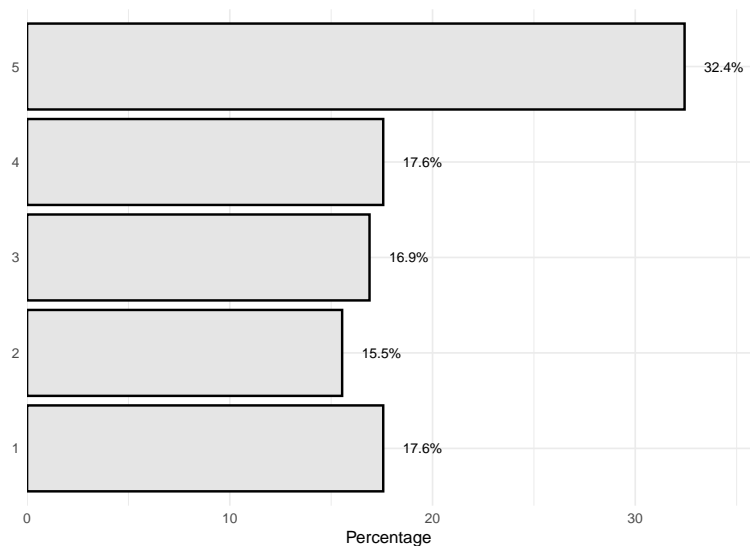


Figure 6: On a scale of 1 to 5, where one is 'Not at all aware' and five is 'Extremely aware', to what extent are you aware of the runway upgrades at Hobart Airport to accommodate larger aircraft such as the Boeing 777 or Airbus A330 and the projected 40% increase in flight arrivals?

### 3.1.5 Support for a curfew

A flight curfew is a regulated period during which commercial airline takeoffs and landings are restricted at an airport. This is usually enforced overnight to minimise noise pollution and

disturbance to residents living near the airport. Hobart Airport does not have any curfew at present.

Figure 7 shows that the majority of respondents strongly support a curfew (76.7%). Only 8.2% are strongly opposed to a curfew. Interestingly, the open-ended responses reveal a few of those opposed to a curfew still favour moving the flight path.

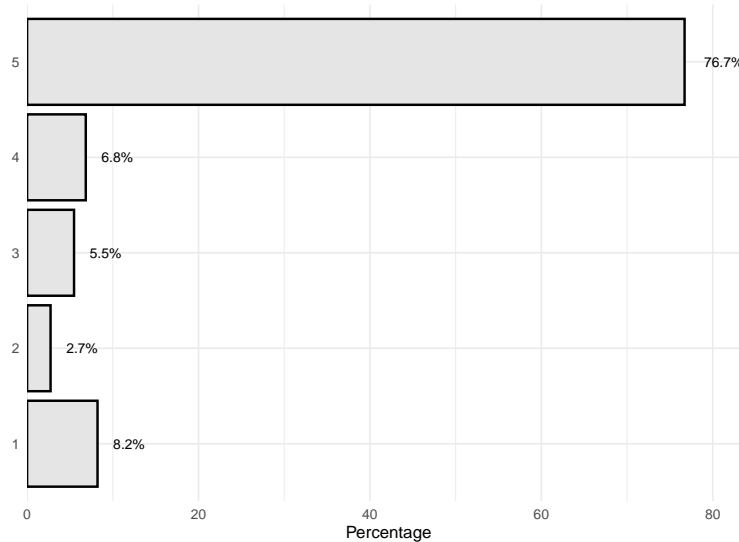


Figure 7: On a scale of 1 to 5, rate how strongly you feel we should have a curfew at Hobart Airport, where one is 'Strongly oppose a curfew' and five is 'Strongly support a curfew'.

### 3.1.6 Ongoing engagement with the aircraft noise issue

There is willingness to remain engaged with the aircraft noise issue. Figure 8 shows 42.9% of respondents are extremely interested and 21.8% fairly interested in attending community information sessions. This interest is reflected in the proportion of respondents who provided contact details (63.2%, see Figure 2).

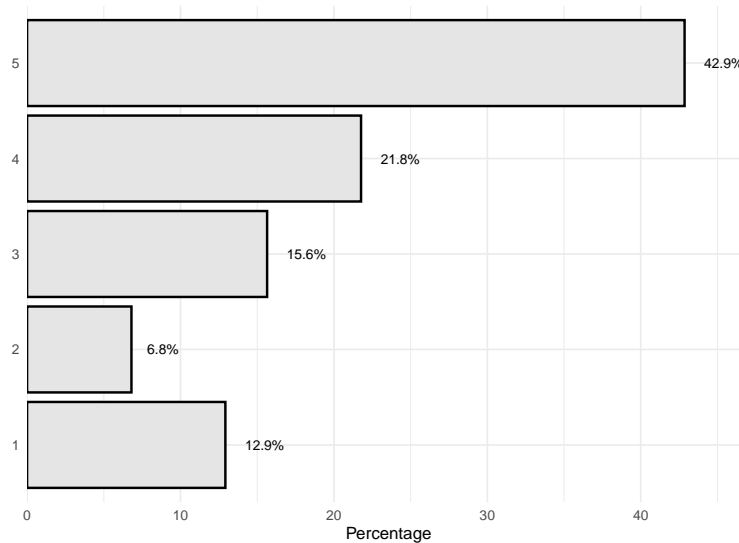


Figure 8: On a scale of 1 to 5, where one is 'Not at all interested' and five is 'Extremely interested', to what extent are you interested in engaging in community information sessions addressing aircraft noise?

### 3.1.7 Coping mechanisms

When asked what respondents do to cope with or mitigate aircraft noise, 24.3% of respondents indicated they keep their doors and windows closed, 15.3% report doing nothing, and 17.3% play music or use their radio or TV to mask aircraft noise (Figure 9). A small percentage (2.7%) seek professional help to cope with aircraft noise.

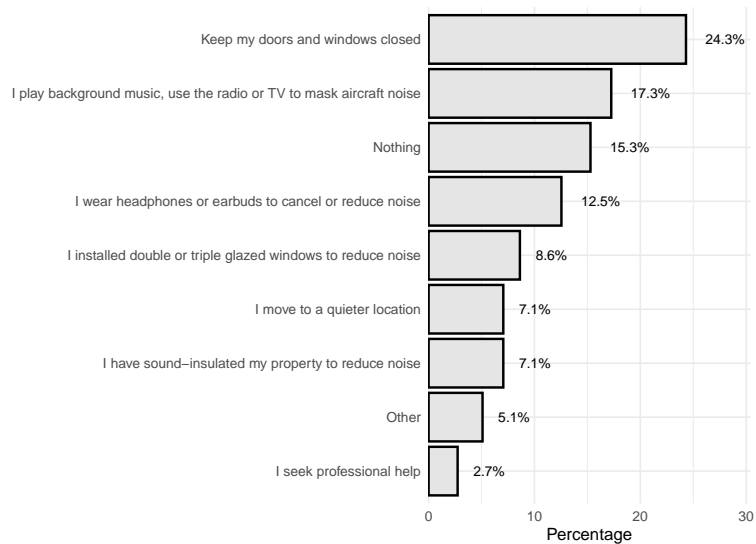


Figure 9: What do you do to cope with aircraft noise?

Figure 10 breaks down the number of coping mechanisms respondents employ to deal with aircraft noise. The majority (51.3%) use only one mechanism, whereas 40.7% or so use two or more strategies to cope with aircraft noise. People particularly sensitive to aircraft noise are more likely to use multiple coping mechanisms.

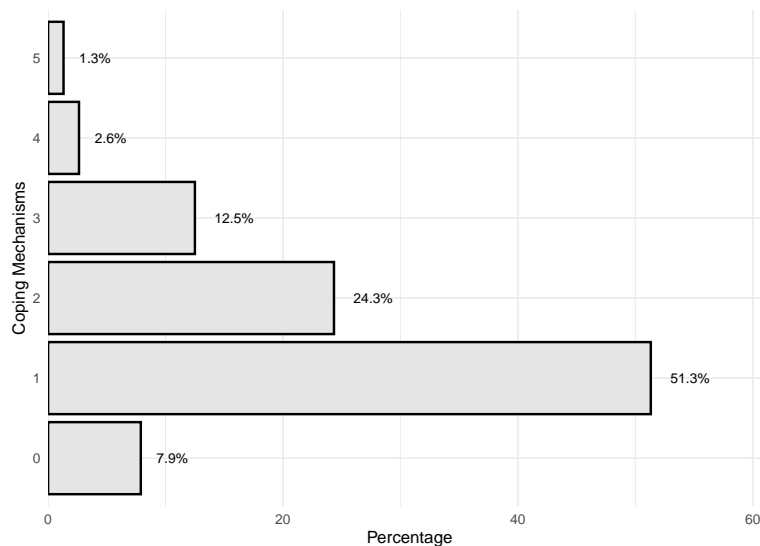


Figure 10: How many mechanisms do respondents use to deal with aircraft noise?

### 3.1.8 Seeking advice or complaining about aircraft noise

Regarding advice or complaints about aircraft noise, Figure 11 shows that respondents tend to get their information from neighbours (30.4%) or through online community groups (23.4%). A much smaller fraction of respondents take this issue further with local, state and federal government bodies.

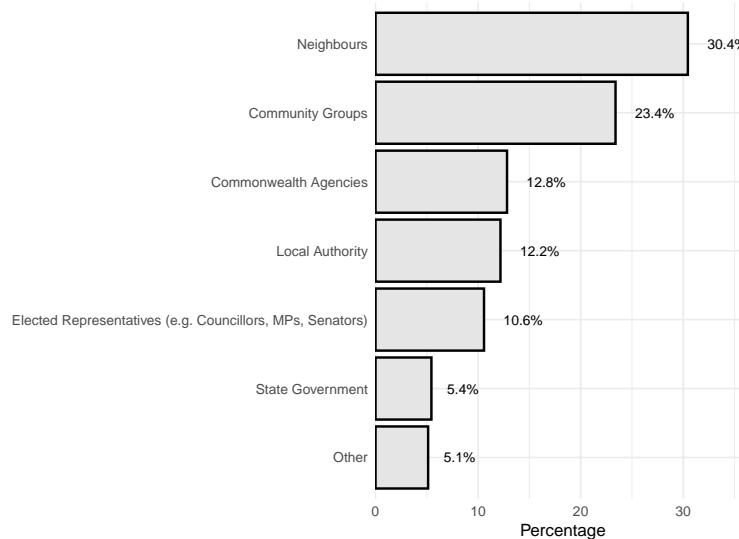


Figure 11: Regarding aircraft noise, who have you contacted to understand the flight path situation or complained about the noise?

A deeper dive into the data shows that 40.8% of respondents only use one channel to discuss aircraft noise (Figure 12). Of the remainder, 12.5% of respondents do not discuss the issue with anyone, while a small percentage of respondents use two or more channels of communication (1.3% use every available channel of communication).

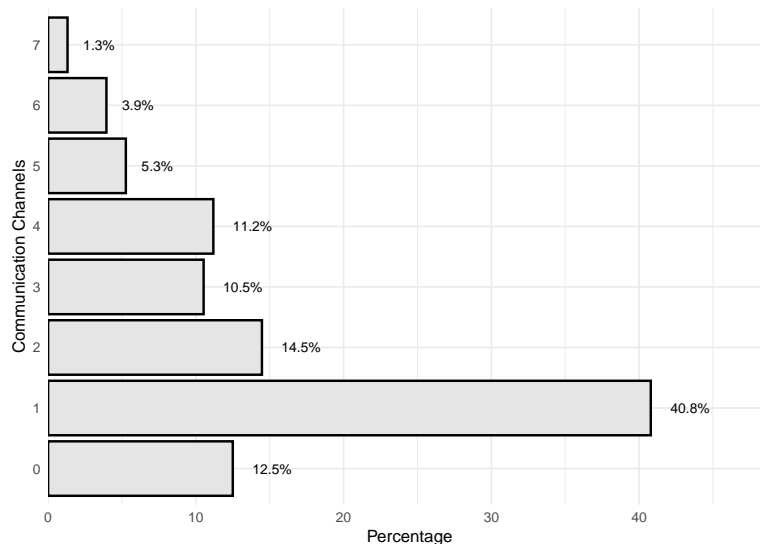


Figure 12: How many channels of communication do people use?

### 3.1.9 Keeping abreast of things

Figure 13 shows respondents prefer to rely on email newsletters (34%) or social media groups (33.2%) for information about community sessions addressing aircraft noise. There is less appetite for letter drops and reliance on community notice boards. A very small number of respondents indicated that they did not want to be bothered by this matter.

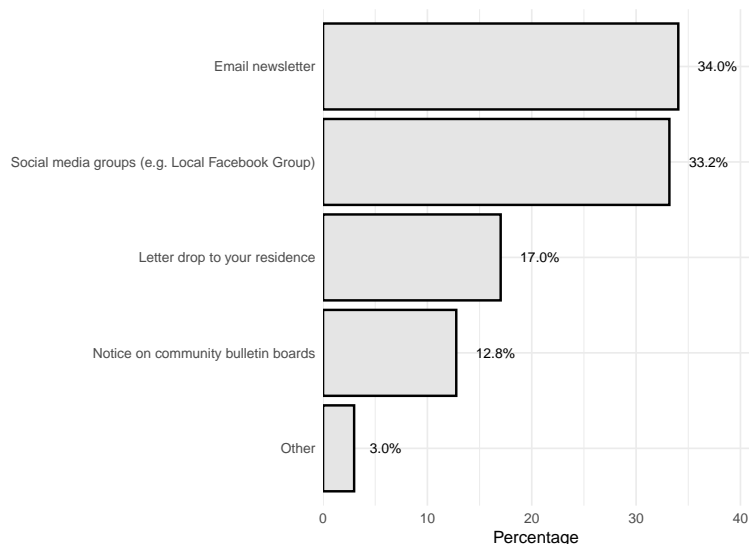


Figure 13: How would you like to stay informed about community sessions addressing aircraft noise?

## 3.2 Open-ended survey questions

Open-ended survey questions empower respondents to express their thoughts freely, providing personalised answers without being restricted to predetermined options.

### 3.2.1 Impacts

Respondents were asked to explain how the noise of aircraft passing over their property impacted their lives, daily routines, lifestyles, and mental or physical health.

Responses indicate aircraft noise significantly impacts the residents' lives, daily routines, lifestyles, and mental and physical health. The noise disrupts sleep patterns, causing sleep deprivation and leading to severe migraines, anxiety, and depression. It also affects residents' ability to work from home, interrupting meetings and calls. The noise is often so loud that it drowns out in-person and phone conversations and disrupts peaceful activities such as gardening or watching TV. Aircraft noise also unsettles pets, causing them distress. The constant noise leaves residents feeling on edge and anxious, with some reporting increased blood pressure. It is particularly disruptive for those with health conditions such as hypersensitivity to noise, post-traumatic stress disorder (PTSD) and attention-deficit hyperactivity disorder (ADHD). Noise pollution has led to some residents needing medication to help them sleep and has caused a decline in mental health. Aircraft noise also impacts the residents' enjoyment of their properties, with many reporting a loss of privacy and tranquillity in their yards. Some residents are concerned about the potential decrease in property value due to the noise. The noise is particularly disruptive



for those who moved to the area for its peace, with some residents considering selling their properties due to the constant noise. Some residents feel that the noise is an invasion of their privacy and are frustrated about the lack of consultation about the flight path changes. In summary, aircraft noise profoundly impacts residents' sleep, work, health, and enjoyment of their properties. Below are some quotes from the free text responses on the perceived impacts of aircraft noise.

"I have lived in the area for over 40 years. I have stayed in the area as I enjoy the peaceful lifestyle. It is now to the point where you can't leave any windows or doors open due to the noise. Planes can still be heard above TVs and radios and inhibits sleep, which has required me to commute on occasions fatigued, which is extremely dangerous to myself and other road users. This has led me to try using white noise to lessen the impact of the noise disturbance from planes but [this] has had little effect. I also find the noise of the planes distracting when working. I work from home for a government call centre and at times, the sound of the planes makes it difficult to hear my client or concentrate on their query, requiring me to ask them to repeat themselves or having to place them on hold until the noise has passed. In summary, my house was not under a flight path when we bought the land and built, if it was, we wouldn't have bought it. There was no consultation regarding the flight path being changed to go over my property, if there had been, I would have strongly objected. The flight path over my property has affected my anxiety levels to the point I am now under doctor supervision".

"We live in Carlton River directly under the flight path. The planes flight paths are so low over Carlton River that we are able to read the text on the belly of JetStar planes. The noise levels are intolerable especially at night when the noise levels intensify that you can't hear the TV, conversations or a person on the phone. I have noticed several flights coming in as late as 1am and have been woken up by such flights causing disruption to my sleep. I have a disability which already causes sleep issues so having late flights coming in so low is not helpful. My concern that as the airport increases its flights that these noise levels will be constant and completely destroy the tranquillity of the area. The flight paths should be moved to over the water not directly over residential areas particularly when the flight paths are so low."

"My property is at the base of Carlton Bluff and aircraft noise seems to be amplified in this area. Any joy that I have gardening has been diminished and whilst having conversations with neighbours and passers-by when aircraft are navigating overhead, voices have to be raised substantially to be heard. Our once peaceful suburb has been shattered by ASA's decision to move the flight path to this populated area."

"We moved here for tranquillity and peacefulness, now we have planes flying directly over our home constantly daily so loudly and low that conversation is not audible when this occurs. That is only one aspect. My partner has PTSD and my children ADHD I work in mental health, the impact of constant noise exacerbates their well-being and mine as a carer."

"I like to have a bit of peace and quite. The planes fly directly over us at low altitude. They start at 6 in the morning and continue all day till late. I counted 37 come over us once. It impacts my lifestyle and the peacefulness. This typical of a large organisation bullying a lower socio-economic community hoping they will just wear it. I refer to Dunalley who complained and campaigned till the flight path was moved. This was mainly due to the big money men in this area. Flight path needs to be shared around."

"I live at the crest of the hill on Sugarloaf Rd. The noise is so loud you stop mid-sentence and kick off again in 30 seconds. I go to work early and get up at 5.30am. There [are] flights

before that time. I go to bed early, 8.30pm, [and] there are flights incoming until past midnight. It's ridiculous."

"The noise limits the use of outside decks, entertainment areas, and just sitting and enjoying the sunshine."

"It doesn't [impact me]. Stop finding shit to whinge about. Put some earplugs in."

### **3.2.2 Livelihood**

Respondents were asked if aircraft noise impacted their livelihood or ability to work.

Responses reveal the noise from aircraft significantly impacts the ability of residents to work, primarily due to sleep deprivation and the subsequent inability to concentrate. Aircraft noise is particularly problematic for those working from home, as it disrupts their focus and productivity. The noise is also disruptive for those who work night shifts and need to sleep during the day. Additionally, the noise is intrusive during work calls, with clients often hearing the noise in the background. The constant noise also causes stress, further impacting work performance. However, some respondents are retired or do not work and, therefore, do not experience a direct impact on their work but still suffer from disrupted sleep and a decreased quality of life. Some quotes from the free text responses on perceived impact on livelihood:

"I am a hospitality business professional. We planned to turn our farm into a wedding and events reception area but this is no longer suitable."

"Absolutely NOT. If this impacts on any-ones livelihood/ability to work, there is something wrong with their mental state."

"Yes, we breed horses and have ongoing issues with horses being spooked by planes. Eagles live on our property and have been displaced by frequent aircraft."

"Yes as stated previously, I work from home for a government call centre, the noise makes it difficult to concentrate on client queries requiring me to ask them to repeat themselves or place them on hold until the noise has passed."

"I work from home and being on [Carlton Bluff] I am directly under the flight path. I have to pause anything I am doing via voice or audio each time a plane flies over. Sundays seem to be the worst. I have to pause the TV often at night to allow for the noise. It is extremely noisy. I did not buy a house on the beach to have a flight path moved directly above my property."

"It certainly adversely affects our lifestyle and ability to exist peacefully, which is exactly why we purchased a property here in Primrose Sands."

"I work from home, everyday, as a contract bookkeeper, it is very hard to concentrate on this type of work with aircraft noise almost directly overhead and only 2,500 feet above. I have to close the windows when a client rings and still get asked by the client 'what's that noise?' Aircraft noise certainly interrupts my concentration!!"

### 3.2.3 Preferred outcomes

Respondents were asked if they could have it any way they wanted about aircraft noise and what outcomes or actions they would like to see happening.

Most survey respondents want the flight paths to be changed so that aircraft noise does not impact any community. They suggest that planes should fly over water or across less populated areas rather than residential properties. If these options are not possible, they propose a curfew at Hobart Airport to provide respite from the noise, particularly during the night. Some respondents also suggest that planes should fly at a higher altitude to reduce noise, and that noise baffles should be included on all planes (noise baffles reduce jet engine noise by disrupting exhaust gas flows and using sound absorbent materials, effectively lowering the engine's overall noise output). A few requested regular published noise testing for affected residents. Some respondents, however, are content with the current flight paths and want to avoid early curfews. Other respondents also suggest financial compensation if the flight path remains in place. Below are some responses to the open-ended question on preferred outcomes:

"I would prefer the flight paths be relocated to a less densely populated area. I am aware these options exist and do not understand why these changes can't be made immediately. If the flight paths stay as they are then at least a curfew should be introduced."

"I would like to see the burden spread around not based on who's got the most impact and money. Everyone knows the planes need to land but the flight path should be spread among all communities not the communities where you think you will have the least resistance."

"Each household impacted should be individually consulted and be part of the rejection/approval process. Aircraft flight paths design is not being directly regulated by the government, this should change. These paths use the space and air above our houses and although they are a transport corridor they are not treated as such during the approval process. They should be lodging DAs (Development Applications) at the councils like everyone else does when building a house or a road and give council planners, planning authorities, and residents an opportunity to comment and approve or reject their proposals."

"The flight paths moved over the water so that they are not over any residential areas especially when the flight paths are so low. If this is not completely possible at least move all night time flights to over the water, and daytime flights share the load to various residential areas so that areas may only be affected a couple of times a day by flights, rather than every two hours with a barrage of 3 planes coming in within a 20 minute period."

"Balance of commercial, safety, and flight paths. The airport has existed for decades, so people should expect aircraft noise. Not so long ago aircraft flew down over Lewisham before a right turn onto final. If we keep pushing the flight path out beyond the expanding housing areas, the flight path will be down around Port Arthur. There is a direct correlation between flight paths and increased airfares!"

"I want the flight path moved so it is not directly over my house. There is a vast amount of vacant farming land between Connollys Marsh and Dunally where there are very few houses. Planes would be at a higher altitude flying over this area therefore the few houses would not be severely impacted by noise. This would require a move of the flight path approximately 3 to 4 km as the crow flies to the east. It is pertinent to note, this is all the community has been

asking for since the first engagement meeting with Airservices Australia, a relocation of the flight path to this vacant farming land, which is not an unreasonable ask.”

“This question is badly worded. I take it to mean what would be the best way to deal with this noise from our point of view. Move the air runway to over the water and farmland as mooted ... 3km east of where it is currently. It really is a no-brainer ... but of course we assume there are a few \$’s to be made by the airlines who save \$’s by coming in on a direct route ... i.e. above suburban homes at low altitudes.”

### **3.2.4 Additional comments/closing remarks**

Respondents were invited to provide additional comments or further questions at the end of the survey.

They expressed a range of concerns and frustrations about the impact of aircraft noise on their lives. Many respondents feel that the issue is not adequately addressed, with some predicting a future increase in noise due to larger planes and a lack of airport curfew. They express dissatisfaction with the lack of transparency and consultation from Airservices Australia and feel there needs to be consideration of alternative flight paths and better regulations to lessen noise impacts on the community. Some respondents regret purchasing properties in the affected area, stating they were unaware of the issue at the time of purchase. There are also concerns about the potential impact on local wildlife, particularly eagles. A few respondents, however, express indifference or enjoyment of the planes, and some suggest that living near an airport should come with the expectation of noise. Concerns about potential air pollution and its impact on rainwater tanks also exist. A significant number of respondents want the flight path shifted over to less populated areas or the ocean. Below are some closing remarks from respondents:

“As I have said, I’m at Carlton Beach and very close to the flight path, and it doesn’t bother me or my family at all.”

“The State govt obsession with tourism is the reason we are now under siege. When did the ‘grand tour’ of the idle rich become this appalling mass movement of people all over the place trying to have an ‘experience’? People moved to TAS over 20 years ago to escape the chaos of the mainland or overseas countries. Now, thanks to our stupid politicians of ALL colours we are subjected to an ongoing assault on our lives, health and what makes Tasmania so special. Take a leaf from Venice.”

“When we had the chance to leave/move away from Primrose Sands we took the chance as Runway 30 was horrible to live under and could not live there long term with this as it was.”

“Please take the community’s well-being seriously. There are alternative flight paths and regulations that can be considered that will have less impact on the community. There are more flights using the runway 30 flight path than was anticipated and consulted on with the community – this reflects a need to reconsider the decision of the number of flights using this path or the flight path altogether. I’d like to note that although I bought my property after 2019 - I bought in 2021 during [the Covid-19 pandemic] where there were fewer flights and the impacts in the area were less obvious. Had I known how many flights would travel overhead during normal conditions on the new flight path, I would have seriously reconsidered my decision to buy in this location – I do not say this lightly, as I love everything else about living in this area.”

“Curfews! A more nuanced approach to managing the impact of aircraft noise! I live very close to the airport. The current flight path has reduced the impact for me but has seriously impacted many friends who live further away from the airport such as interrupting sleep and impacting their health and well-being, significant financial loss due to [selling of] land and having to back out of building plans and purchase elsewhere, reduced property values ...”

“The community consultation I went to was a joke and left me very very angry. The so called survey that you based the decision on to not trial the 3km East option was deeply flawed (or cynically and deliberately aimed at getting the result you wanted). Multiple choice options were limited and slanted toward getting people to agree to one of the options when all of them were unacceptable. There was no option to choose none of the above. It became quite obvious to those who attended the so called consultation that a company (Airservices Australia) who are directly responsible to the airlines should not be charged with ensuring people on the ground under the flight paths were heard considered and enabled to change decisions made by Airservices Australia.”

“We are all on rainwater tanks in the approach area, and I am probably more concerned about the effects of air pollution from the aircraft engines contaminating what I drink and bath in!”

“I worry about our wedge-tailed eagles and sea eagles who fly over the flight path. Most of our sea eagles have relocated, but the wedge-tailed eagles regularly fly high in or over the flight path. Ironically, the aircraft fly directly over Sea Eagle Road and Wedgetail Street.”

“I feel for the residents disturbed by the noise and fearful of more. How do decision makers better consider the impact on communities of business growth and how do we decide when the risk to livability is too high? Or is the mental and physical health of affected residents less important than business growth? What ongoing measures will help define and monitor compliance with optimal routes?”

“Keep the flight paths exactly where they are please, and do not have early curfews. My wife flies weekly and delayed flights due to curfews would mean additional nights and costs away from home.”

“Primrose Sands, Connellys Marsh and parts of Dodges [Ferry], Carlton [are] poor area[s] and treated poorly as a result. No one cares because it's poor [people who are impacted].”

## 4 Key takeaways from the community survey

1. **Significant Noise Impact:** Residents are significantly disturbed by aircraft noise, affecting their daily lives, routines, and overall well-being.
2. **Insufficient Consultation and Underestimation of Impact:** The community feels that Airservices Australia did not adequately engage with them or accurately assess the noise impact.
3. **Community Concern Over Airport Expansion:** There is apprehension regarding future expansions of Hobart Airport, with fears of increased noise due to larger aircraft and more flights.

4. **Strong Support for a Curfew:** The overwhelming support for introducing a curfew at Hobart Airport reflects a community desire for regulatory measures to mitigate noise pollution, particularly during nighttime and early morning hours.
5. **Diverse Coping Mechanisms:** Residents' various strategies for coping with aircraft noise, ranging from physical modifications to their homes to white noise, background music, or radio, highlight the significant adaptations individuals are forced to make.
6. **Desire for Flight Path Alteration:** The predominant preference among survey respondents is for the flight path to be moved to less populated or uninhabited areas, indicating a strong consensus for a solution that minimises residential noise exposure.
7. **Willingness to Engage:** The community is keen to stay informed and engaged on the issue.
8. **Communication Preferences:** There is a preference for email newsletters and social media groups to stay informed on this issue.
9. **Varied Individual Experiences:** Open-ended responses reveal a spectrum of individual experiences with aircraft noise, from significant distress affecting mental and physical health to a minority of residents who do not find the noise bothersome.
10. **Call for Comprehensive Solutions:** The community seeks a holistic approach to noise management, including better consultation, more accurate impact assessments, and consideration of environmental and health effects.

## Appendix A - Survey Questions

Item	Type	Description	Response option
1	Welcome	Please take the survey if you own, rent, or live in a property located in the Sorell Municipality that's under the aircraft flight path or close enough to hear aircraft noise...	Continue
2	Consent	Electronic Consent: By clicking on the "I agree" button below, you are indicating that you voluntarily agree to participate in this survey and that you are at least 18 years of age. You also understand that the data collected will be kept anonymous, that it will be used for research and advocacy purposes, and that we will keep you updated on the results.	I agree / I disagree
3	Question	Please enter the postcode of your property. This will give us some idea how close you are to current flight paths.	Postcode
4	Question	On average, how much time do you spend at this location?	<p>Select one of the following options:</p> <ul style="list-style-type: none"> <li>- 90% of your time (if you have a disability, care for a newborn, are retired, you home-school your children, or work from home)</li> <li>- 80% of your time (if you work part time or study outside home, or are retired)</li> <li>- 70% of your time (if you work full time outside this location and commute to work)</li> <li>- 70% to 30% of your time (if you work more than full time outside of this location or travel often)</li> <li>- Less than 30% of your time (if this location is your place of work and not your home)</li> <li>- I don't live in this location. It is a lot/rental/under construction</li> </ul>
5	Question	Did you purchase or move into this property before or after the introduction of the new flight paths in 2019?	Before / After
6	Question	On a scale of 1 to 5, where one is 'Not at all disturbed' and five is 'Extremely disturbed', to what extent are you disturbed by aircraft noise?	Choose a number between 1 and 5.
7	Question	On a scale of 1 to 5, where one is 'Not at all aware' and five is 'Extremely aware', to what extent are you aware of the runway upgrades at Hobart Airport to accommodate larger aircraft such as the Boeing 777 or Airbus A330 and the projected 40% increase in flight arrivals?	Choose a number between 1 and 5.



Item	Type	Description	Response option
8	Question	A flight curfew refers to a regulated period during which commercial airline take-offs and landings are restricted at an airport. This is usually enforced overnight to minimise noise pollution and disturbance to residents living near the airport. Hobart Airport does not have any curfew at present. On a scale of 1 to 5, rate how strongly you feel we should have a curfew at Hobart Airport, where one is 'Strongly oppose a curfew' and five is 'Strongly support a curfew'.	Choose a number between 1 and 5.
9	Question	Explain how the noise of aircraft passing over your property impacts your life, daily routine, lifestyle, and mental or physical health.	Free text.
10	Question	Regarding aircraft noise, who have you contacted to understand the flight path situation or complained about the noise?	<p>Select one or more of the following options:</p> <ul style="list-style-type: none"> <li>- Neighbours</li> <li>- Community Groups</li> <li>- Local Authority</li> <li>- State Government</li> <li>- Commonwealth Agencies</li> <li>- Elected Representatives (e.g. Councillors, MPs, Senators)</li> </ul>
11	Question	Does aircraft noise impact your livelihood/ability to work?	Free text.
12	Question	What do you do to cope with aircraft noise?	<p>Select one or more of the following options:</p> <ul style="list-style-type: none"> <li>- Nothing</li> <li>- Keep my doors and windows closed</li> <li>- I have sound-insulated my property to reduce noise</li> <li>- I installed double or triple glazed windows to reduce noise</li> <li>- I wear headphones or earbuds to cancel or reduce noise</li> <li>- I play background music, use the radio or TV to mask aircraft noise</li> <li>- I move to a quieter location</li> <li>- I seek professional help</li> </ul>
13	Question	On a scale of 1 to 5, where one is 'Not at all interested' and five is 'Extremely interested', to what extent are you interested in engaging in community information sessions addressing aircraft noise?	Choose a number between 1 and 5.
14	Question	How would you like to stay informed about community sessions addressing aircraft noise?	<p>Select one of the following options:</p> <ul style="list-style-type: none"> <li>- Email newsletter</li> <li>- Letter drop to your residence</li> </ul>

Item	Type	Description	Response option
15	Question	If you could have it any way you wanted about aircraft noise, what outcomes or actions would you like to see happening?	<ul style="list-style-type: none"> <li>- Notice on community bulletin boards</li> <li>- Social media groups (e.g. Local Facebook Group)</li> </ul> Free text.
16	Question	Any additional comments or questions?	Free text.
18	Question	Would you share your contact info for survey updates? Your name, email, or phone number won't be shared.	Optionally fill in the following information: <ul style="list-style-type: none"> <li>- First name</li> <li>- Last name</li> <li>- Phone number</li> <li>- Email address</li> </ul>
19	Closure	Thank you for sharing how aircraft noise affects you. We'll share our findings with you soon. Could you help us by sharing this survey with others in the Sorell area impacted by aircraft noise? We aim to reach 500 people during March - April 2024. Here's the link: URL. Your support is crucial in broadening our understanding and making a difference. Thank you for helping us spread the word!	Closing message for "I agree" to participate (end of survey).
20	Closure	We respect your decision. Please follow developments on social media, community bulletin boards, council notices, or by talking with your neighbours.	Closing message for "I disagree" to participate (early termination).

## Appendix B - R code

```

1 #####
2 #
3 #         Aircraft Noise
4 #         Community Survey
5
6 # load requisite packages
7
8 require(tidyverse)
9 require(readr)
10 require(ggsci)
11 require(egg)
12 require(lubridate)
13
14 # read in survey data
15
16 responses <- read_csv("responses.csv")
17
18 # filter out multiple response attempts
19
20 check <- responses %>%
21   group_by('Network ID') %>%
22   count() %>%
23   ungroup() %>%
24   left_join(responses) %>%
25   arrange(desc(n))
26
27 responses_filtered <- responses %>%
28   mutate(date = as.Date(strptime('Submit Date (UTC)', "%Y-%m-%d %H:%M:%S"))) %>%
29   group_by('Network ID') %>%
30   arrange(date) %>%
31   mutate(attempt = row_number()) %>%
32   ungroup() %>%
33   filter(!('Network ID' == "a858d69af8" & attempt > 1))
34
35 # completion rates
36
37 responses_filtered %>%
38   group_by(date) %>%
39   count() %>%
40   ggplot(aes(x = date, y = n)) +
41   geom_col(fill = "grey90", colour = "black") +
42   scale_x_date(date_breaks = "2 day", date_labels = "%d %b %y") +
43   ylab("Survey Completions") +
44   xlab("") +
45   theme_minimal() +
46   theme(axis.text.x = element_text(angle = 45, hjust = 1))
47
48 ggsave("completions.pdf", width = 7, height = 5, units = "in", dpi = 300)
49
50 # respondent age breakdown
51
52 responses_filtered %>%
53   select(age = 'Which age category do you fall within?') %>%
54   filter(!is.na(age)) %>%
55   mutate(age = factor(age, levels = c("less than 30 years",
56                                       "30 - 39 years",
57                                       "40 - 49 years",
58                                       "50 - 59 years",
59                                       "60 - 69 years",

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60                                     "70 years or older")))) %>%
61 count(age) %>%
62 mutate(percentage = n / sum(n) * 100) %>%
63 ggplot(aes(x = age, y = percentage)) +
64 geom_col(fill = "grey90", colour = "black") +
65 theme_minimal() +
66 ylab("Percentage") +
67 xlab("") +
68 guides(fill = "none") +
69 geom_text(aes(label = sprintf("%.1f%%", percentage)), hjust = -0.5, size = 3) +
70 scale_y_continuous(expand = expansion(mult = c(0,0.15))) +
71 coord_flip()
72
73 ggsave("age_cat.pdf", width = 7, height = 5, units = "in", dpi = 300)
74
75 # buy before or after
76
77 responses_filtered %>%
78   select(when_bought = 'Did you purchase or move into this property before or
79     after the introduction of the new flight paths in 2019?') %>%
80   filter(!is.na(when_bought)) %>%
81   mutate(when_bought = factor(when_bought)) %>%
82   count(when_bought) %>%
83   mutate(percentage = n / sum(n) * 100,
84     label_position = cumsum(percentage) - (0.25 * percentage)) %>%
85   ggplot(aes(x = "", y = percentage, fill = when_bought)) +
86   geom_bar(stat = "identity", width = 1, colour = "black", lwd = 0.75) +
87   coord_polar(theta = "y") +
88   theme_void() +
89   scale_fill_manual(values = c("grey90", "white")) +
90   guides(fill = guide_legend(title = "When bought \nor moved in")) +
91   geom_text(aes(label = sprintf("%.1f%%", percentage)),
92     position = position_stack(vjust = 0.5), size = 4)
93 ggsave("when_bought.pdf", width = 7, height = 5, units = "in", dpi = 300)
94
95 # contact details
96
97 responses_filtered %>%
98   select('Phone number', Email) %>%
99   mutate(across(everything(), ~ ifelse(is.na(.), 0, 1)),
100     contact = ifelse('Phone number' == 1 | Email == 1, TRUE, FALSE)) %>%
101   count(contact) %>%
102   mutate(percentage = n / sum(n) * 100) %>%
103   ggplot(aes(x = "", y = percentage, fill = as.factor(contact))) +
104   geom_bar(stat = "identity", width = 1, colour = "black", lwd = 0.75) +
105   coord_polar(theta = "y") +
106   theme_void() +
107   scale_fill_manual(values = c("grey90", "white")) +
108   guides(fill = guide_legend(title = "Contact details \nprovided")) +
109   geom_text(aes(label = sprintf("%.1f%%", percentage)),
110     position = position_stack(vjust = 0.5), size = 4)
111
112 ggsave("contact_details.pdf", width = 7, height = 5, units = "in", dpi = 300)
113
114 # disturbance to residents
115
116 responses_filtered %>%
117   select(disturbed = 'On a scale of 1 to 5, where one is 'Not at all disturbed'
118     and five is 'Extremely disturbed', to what extent are you disturbed by
119     aircraft noise?') %>%
120   filter(!is.na(disturbed)) %>%

```

```

119 mutate(disturbed = factor(disturbed)) %>%
120 count(disturbed) %>%
121 mutate(percentage = n / sum(n) * 100) %>%
122 ggplot(aes(x = disturbed, y = percentage)) +
123   geom_col(fill = "grey90", colour = "black", lwd = 0.75) +
124   theme_minimal() +
125   ylab("Percentage") +
126   xlab("") +
127   guides(fill = FALSE) +
128   geom_text(aes(label = sprintf("%.1f%%", percentage)), hjust = -0.5, size = 3) +
129   scale_y_continuous(expand = expansion(mult = c(0,0.1))) +
130   coord_flip()
131
132 ggsave("disturbance.pdf", width = 7, height = 5, units = "in", dpi = 300)
133
134 # support for a curfew
135
136 responses_filtered %>%
137   select(curfew = 'A flight curfew refers to a regulated period during which
      commercial airline takeoffs and landings are restricted at an airport. This
      is usually enforced overnight to minimise noise pollution and disturbance
      to residents living near the airport. \n\nHobart Airport does not have any
      curfew at present. On a scale of 1 to 5, rate how strongly you feel we
      should have a curfew at Hobart Airport, where one is 'Strongly oppose a
      curfew' and five is 'Strongly support a curfew'.') %>%
138   filter(!is.na(curfew)) %>%
139   mutate(curfew = factor(curfew)) %>%
140   count(curfew) %>%
141   mutate(percentage = n / sum(n) * 100) %>%
142   ggplot(aes(x = curfew, y = percentage)) +
143     geom_col(fill = "grey90", colour = "black", lwd = 0.75) +
144     theme_minimal() +
145     ylab("Percentage") +
146     xlab("") +
147     guides(fill = FALSE) +
148     geom_text(aes(label = sprintf("%.1f%%", percentage)), hjust = -0.5, size = 3) +
149     scale_y_continuous(expand = expansion(mult = c(0,0.1))) +
150     coord_flip()
151
152 ggsave("curfew.pdf", width = 7, height = 5, units = "in", dpi = 300)
153
154 # appetite for engagement
155
156 responses_filtered %>%
157   select(engagement = 'On a scale of 1 to 5, where one is 'Not at all interested'
      and five is 'Extremely interested', to what extent are you interested in
      engaging in community information sessions addressing aircraft noise?') %>%
158   filter(!is.na(engagement)) %>%
159   mutate(engagement = factor(engagement)) %>%
160   count(engagement) %>%
161   mutate(percentage = n / sum(n) * 100) %>%
162   ggplot(aes(x = engagement, y = percentage)) +
163     geom_col(fill = "grey90", colour = "black", lwd = 0.75) +
164     theme_minimal() +
165     ylab("Percentage") +
166     xlab("") +
167     guides(fill = FALSE) +
168     geom_text(aes(label = sprintf("%.1f%%", percentage)), hjust = -0.5, size = 3) +
169     scale_y_continuous(expand = expansion(mult = c(0,0.1))) +
170     coord_flip()
171
172 ggsave("engagement.pdf", width = 7, height = 5, units = "in", dpi = 300)

```

```

173
174 # prior awareness
175
176 responses_filtered %>%
177   select(awareness = 'On a scale of 1 to 5, where one is 'Not at all aware' and
178         five is 'Extremely aware', to what extent are you aware of the runway
179         upgrades at Hobart Airport to accommodate larger aircraft such as the
180         Boeing 777 or Airbus A330 and the projected 40% increase in flight arrivals
181         ?\n') %>%
182   filter(!is.na(awareness)) %>%
183   mutate(awareness = factor(awareness)) %>%
184   group_by(awareness) %>%
185   summarise(n = n()) %>%
186   mutate(percentage = n / sum(n) * 100) %>%
187   ggplot(aes(x = awareness, y = percentage)) +
188   geom_col(fill = "grey90", colour = "black", lwd = 0.75) +
189   theme_minimal() +
190   ylab("Percentage") +
191   xlab("") +
192   guides(fill = FALSE) +
193   geom_text(aes(label = sprintf("%.1f%%", percentage)), hjust = -0.5, size = 3) +
194   scale_y_continuous(expand = expansion(mult = c(0,0.1))) +
195   coord_flip()
196
197 ggsave("awareness.pdf", width = 7, height = 5, units = "in", dpi = 300)
198
199 # who do you contact
200
201 responses_filtered %>%
202   select(12:18) %>%
203   mutate(across(.cols = everything(), .fns = ~ ifelse(is.na(.), 0, 1))) %>%
204   rename(Other = Other...18) %>%
205   pivot_longer(1:7, names_to = "contact") %>%
206   group_by(contact) %>%
207   summarise(n = sum(value)) %>%
208   mutate(percentage = n / sum(n) * 100) %>%
209   ggplot(aes(x = reorder(contact, percentage), y = percentage)) +
210   geom_col(fill = "grey90", colour = "black", lwd = 0.75) +
211   theme_minimal() +
212   ylab("Percentage") +
213   xlab("") +
214   guides(fill = FALSE) +
215   geom_text(aes(label = sprintf("%.1f%%", percentage)), hjust = -0.5, size = 3) +
216   scale_y_continuous(expand = expansion(mult = c(0,0.2))) +
217   coord_flip()
218
219 ggsave("contact.pdf", width = 7, height = 5, units = "in", dpi = 300)
220
221 # multimodal contact
222
223 responses_filtered %>%
224   select(1, 12:18) %>%
225   mutate(across(.cols = 2:8, .fns = ~ ifelse(is.na(.), 0, 1))) %>%
226   rename(Id = '#', Other = Other...18) %>%
227   pivot_longer(2:8, names_to = "contact") %>%
228   group_by(Id) %>%
229   summarise(modes = sum(value)) %>%
230   ungroup() %>% #
231   count(modes) %>%
232   mutate(percentage = n / sum(n) * 100) %>%
233   ggplot(aes(x = factor(modes), y = percentage)) +
234   geom_col(fill = "grey90", colour = "black", lwd = 0.75) +

```

```

231 theme_minimal() +
232 ylab("Percentage") +
233 xlab("Communication Channels") +
234 geom_text(aes(label = sprintf("%.1f%%", percentage)), position = position_dodge
           (width=0.9), hjust = -0.5, size = 3) +
235 scale_y_continuous(expand = expansion(mult = c(0,0.2))) +
236 guides(fill = FALSE) +
237 coord_flip()
238
239 ggsave("multimode.pdf", width = 7, height = 5, units = "in", dpi = 300)
240
241 # communication preferences
242
243 responses_filtered %>%
244   select(30:34) %>%
245   mutate(across(.cols = everything(), .fns = ~ ifelse(is.na(.), 0, 1))) %>%
246   rename(Other = Other...34) %>%
247   pivot_longer(1:5, names_to = "comms_pref") %>%
248   group_by(comms_pref) %>%
249   summarise(n = sum(value)) %>%
250   mutate(percentage = n / sum(n) * 100) %>%
251   ggplot(aes(x = reorder(comms_pref, percentage), y = percentage)) +
252   geom_col(fill = "grey90", colour = "black", lwd = 0.75) +
253   theme_minimal() +
254   ylab("Percentage") +
255   xlab("") +
256   guides(fill = FALSE) +
257   geom_text(aes(label = sprintf("%.1f%%", percentage)), hjust = -0.5, size = 3) +
258   scale_y_continuous(expand = expansion(mult = c(0,0.2))) +
259   coord_flip()
260
261 ggsave("comms_pref.pdf", width = 7, height = 5, units = "in", dpi = 300)
262
263 # mitigating actions
264
265 responses_filtered %>%
266   select(20:28) %>%
267   mutate(across(.cols = everything(), .fns = ~ ifelse(is.na(.), 0, 1))) %>%
268   rename(Other = Other...28) %>%
269   pivot_longer(1:9, names_to = "mitigation") %>%
270   group_by(mitigation) %>%
271   summarise(n = sum(value)) %>%
272   mutate(percentage = n / sum(n) * 100) %>%
273   ggplot(aes(x = reorder(mitigation, percentage), y = percentage)) +
274   geom_col(fill = "grey90", colour = "black", lwd = 0.75) +
275   theme_minimal() +
276   ylab("Percentage") +
277   xlab("") +
278   guides(fill = FALSE) +
279   geom_text(aes(label = sprintf("%.1f%%", percentage)), hjust = -0.5, size = 3) +
280   scale_y_continuous(expand = expansion(mult = c(0,0.25))) +
281   coord_flip()
282
283 ggsave("mitigation.pdf", width = 7, height = 5, units = "in", dpi = 300)
284
285 # multiple coping mechanisms
286
287 responses_filtered %>%
288   select(1, 20:28) %>%
289   mutate(across(.cols = 2:9, .fns = ~ ifelse(is.na(.), 0, 1))) %>%
290   rename(Id = '#', Other = Other...28) %>%
291   pivot_longer(2:8, names_to = "mechanisms") %>%

```



```

292 group_by(Id) %>%
293 summarise(modes = sum(value)) %>%
294 ungroup() %>% #
295 count(modes) %>%
296 mutate(percentage = n / sum(n) * 100) %>%
297 ggplot(aes(x = factor(modes), y = percentage)) +
298 geom_col(fill = "grey90", colour = "black", lwd = 0.75) +
299 theme_minimal() +
300 ylab("Percentage") +
301 xlab("Coping Mechanisms") +
302 geom_text(aes(label = sprintf("%.1f%%", percentage)), position = position_dodge
303           (width=0.9), hjust = -0.5, size = 3) +
304 scale_y_continuous(expand = expansion(mult = c(0,0.2))) +
305 guides(fill = FALSE) +
306 coord_flip()
307 ggsave("mechanisms.pdf", width = 7, height = 5, units = "in", dpi = 300)
308
309 # generative AI analysis
310
311 require(openai)
312
313 # impact of aircraft noise
314
315 impacts <- paste(responses_filtered$'Explain how the noise of aircraft passing
316                 over your property impacts your life, daily routine, lifestyle, and mental or
317                 physical health.', collapse = "\n")
318
319 prompt_impacts = "Please examine the following text and summarise how the noise
320                 of aircraft passing properties impacts survey respondent's lives, daily
321                 routines, lifestyles, and their mental or physical health:"
322
323 response_impacts <- create_chat_completion(
324   model = "gpt-4",
325   temperature = 0,
326   messages = list(
327     list(
328       "role" = "system",
329       "content" = "You are a social scientist, assessing the impact of aircraft
330                 noise on residents below a flight path"),
331     list(
332       "role" = "user",
333       "content" = paste(prompt_impacts, impacts)
334     )
335   )
336 )["choices"])[["message.content"]]
337
338 # livelihood
339
340 livelihood <- paste(responses_filtered$'Does aircraft noise impact your
341                   livelihood/ability to work?', collapse = "\n")
342
343 prompt_livelihood = "Please examine the following text and summarise how the
344                   noise of aircraft impacts survey respondent's ability to work:"
345
346 response_livelihood <- create_chat_completion(
347   model = "gpt-4",
348   temperature = 0,
349   messages = list(
350     list(
351       "role" = "system",

```

```

345     "content" = "You are a social scientist, assessing the impact of aircraft
346         noise on residents below a flight path"),
347     list(
348         "role" = "user",
349         "content" = paste(prompt_livelihood, livelihood)
350     )
351 )["choices"]]["message.content"]
352
353 # preferred outcomes
354
355 outcomes <- paste(responses_filtered$'If you could have it any way you wanted
    about aircraft noise, what outcomes or actions would you like to see
    happening?', collapse = "\n")
356
357 prompt_outcomes = "Please examine the following text and summarise what outcomes
    or actions survey respondents want regarding aircraft noise:"
358
359 response_outcomes <- create_chat_completion(
360     model = "gpt-4",
361     temperature = 0,
362     messages = list(
363         list(
364             "role" = "system",
365             "content" = "You are a social scientist, assessing the impact of aircraft
                noise on residents below a flight path"),
366         list(
367             "role" = "user",
368             "content" = paste(prompt_outcomes, outcomes)
369         )
370     )
371 )["choices"]]["message.content"]
372
373 # additional comments
374
375 comments <- paste(responses_filtered$'Any additional comments or questions?',
    collapse = "\n")
376
377 prompt_comments = "Please examine the following text and summarise any closing
    comments made by respondents:"
378
379 response_comments <- create_chat_completion(
380     model = "gpt-4",
381     temperature = 0,
382     messages = list(
383         list(
384             "role" = "system",
385             "content" = "You are a social scientist, assessing the impact of aircraft
                noise on residents below a flight path"),
386         list(
387             "role" = "user",
388             "content" = paste(prompt_comments, comments)
389         )
390     )
391 )["choices"]]["message.content"]
392
393 #####
394 #
395 #         End of script

```