SUBMISSION BY DR. ERIC ANCICH TO THE DEPARTMENT OF INFRASTRUCTURE, TRANSPORT. REGIONAL DEVELOPMENT, COMMUNICATIONS AND THE ARTS IN RELATION TO THE AVIATION WHITE PAPER 2023

Terms of Reference

On 7 February 2023, the Government released the White Paper Terms of Reference. The White Paper will examine the Government policy and economic reforms necessary to promote efficiency, safety, sustainability and competitiveness of the aviation sector out to 2050. Areas to be considered include:

- aviation's role in economic development, trade and the visitor economy – general, domestic, regional and international aviation;
- how to maximise the aviation sector's contribution to achieving net zero carbon emissions including through sustainable aviation fuel and emerging technologies;
- changing aviation technologies and ways to position our policies, regulations and systems to encourage uptake and manufacturing of new, more efficient, transport technologies;
- airport development planning processes and consultation mechanisms that consider the impact and changing nature of aircraft noise and related expectations on the role of noise sharing and noise mitigation;
- how to support and regenerate Australia's general aviation sector;
- future industry workforce skills and training requirements;
- appropriate consumer protections and access to services;
- maintaining fit-for-purpose aviation safety, air navigation and aviation security systems and service delivery agencies;
- the role of airlines and airports in supporting regional economies; and
- other significant issues raised during the consultation process.

This submission will be confined to "*airport development planning processes and consultation mechanisms that consider the impact and changing nature of aircraft noise and related expectations on the role of noise sharing and noise mitigation*"

Background to this Submission

Prior to the 7 February 2023 release of the Aviation White Paper Terms of Reference, the Department of Infrastructure, Transport, Regional Development, Communications and the Arts issued a Request for Tender (RFT) in relation to the provision of an Environmental Assessment Package for Airspace and Flight Path Design for Western Sydney International (Nancy-Bird Walton) Airport [1].

[1] Request for Tender No. 10019189: For the provision of an Environmental Assessment Package for Airspace and Flight Path Design for Western Sydney International (Nancy-Bird Walton) Airport. Part A5: Scope of Services. (FOI 23-059).

Section 6.8.1 (b) (i) of this document requires review and validation of noise exposure forecasts developed in the Plan for Aviation Airspace Management (PAAM), including description of: noise exposure levels and patterns for relevant air traffic scenarios, based on recognised noise exposure metrics, including (but not limited to) cumulative, peak and movement frequency-based noise measures (e.g. ANEC, N70, N60 and L_{Amax} measures). It is noted that an Australian Noise Exposure Forecast (ANEF) chart (which is a more refined ANEC) has not been specifically mentioned. However, the RFT specifically does not limit the scope of noise metrics. The RFT is potentially deficient in that there is no mandatory requirement for the successful tenderer to report the technical accuracy of their noise modelling.

It should be noted that noise modelling is not "*reality*" but only an approximation of reality. In Senate Estimates on the 6th of April 2021, Queensland Senator Larissa Waters asked a number of questions of Airservices Australia [2]. Written answers were subsequently provided. In relation to questions asked about differences between EIS noise predictions and the measurements in the Ancich Report [3], Airservices advised the Senator that **"**…*There will always be a difference between the theoretical modelling and measured* (i.e. actual) *results*…"

It should also be noted that the Foreword to AS2021:2015 [4] advises:

> "*Exposure prediction* ***below*** (emphasis added) *25 ANEF may be significantly inaccurate, and therefore caution should be exercised in the evaluation of locations outside the 25 ANEF contour. In addition, the extent of noise reduction required for a building may depend in part on the amount of noise from sources other than aircraft. Because of these factors and of the special acoustic requirements of certain types of building, it will sometimes be necessary to undertake supplementary noise measurements so that a sufficiently representative prediction of the noise exposure at the site under evaluation can be obtained. This is also true for aerodromes at which a significant number of training circuits occur. Such measurements should be performed only by personnel appropriately qualified in acoustics*"

This limitation should be made very clear in Airport EIS (and MDP) documentation so that communities surrounding existing or proposed airports have a complete understanding of the likely noise impact.

L_{max}/L_{Amax} Noise Metric

In the past, many analogue Sound Level Meters had a "Maximum" hold function where the meter displayed the single highest value during the measurement period. If more analysis was required, the meter could be connected to a paper chart recorder where all the galvanometer needle excursions would be displayed. This was the only way (at that time) that the then standard environmental noise metrics such a L_{A10} and L_{A90} could be determined until Statistical Analysers were developed.

[2] https://www.aph.gov.au/api/qon/downloadattachment?attachmentId=b6c86e09-8ba2-4cf5-abf1-84c39202a1f7
[3] Ancich E.J. "Assessment Of Measured Aircraft Noise Levels Under The Existing Flight Paths of Sydney Kingsford Smith Airport With Reference To Western Sydney Airport", Report 9173.R1, Submitted to Blacktown City Council, March 2019.
[4] Standards Australia AS 2021-2015, "Acoustics—Aircraft noise intrusion—Building siting and construction", Sydney, 2015.

With the chart recorder method, L_{A10} was taken as the average maxima of the needle swings and L_{A90} as the average minima of the needle swings.

This approach was documented in Draft Australian Standard DR 87187 (Acoustics – Description and Measurement of Environmental Noise) from 15 August 1987. This draft was subsequently issued as revised Australian Standard AS 1055 - 1989.

In Part 1 of DR 87187, $L_{Amax,T}$ is defined (at Section 4.7) as "*…Average maximum A-weighted sound pressure level ($L_{Amax,T}$) – the A-weighted sound pressure level obtained using time-weighting "F" (see AS 1259) and arithmetically averaging the maximum levels measured during the time interval considered…*"

In Part 2 of DR 87187, Section 4.2.4.1 refers to the measurement of noise metrics $L_{A10,T}$ and $L_{A90,T}$. Note 2 of this section advises "*…Commonly the percentile levels of interest $L_{A10,T}$ and $L_{A90,T}$ are taken as approximately equivalent to $L_{Amax,T}$ and $L_{Abg,T}$ respectively…*"

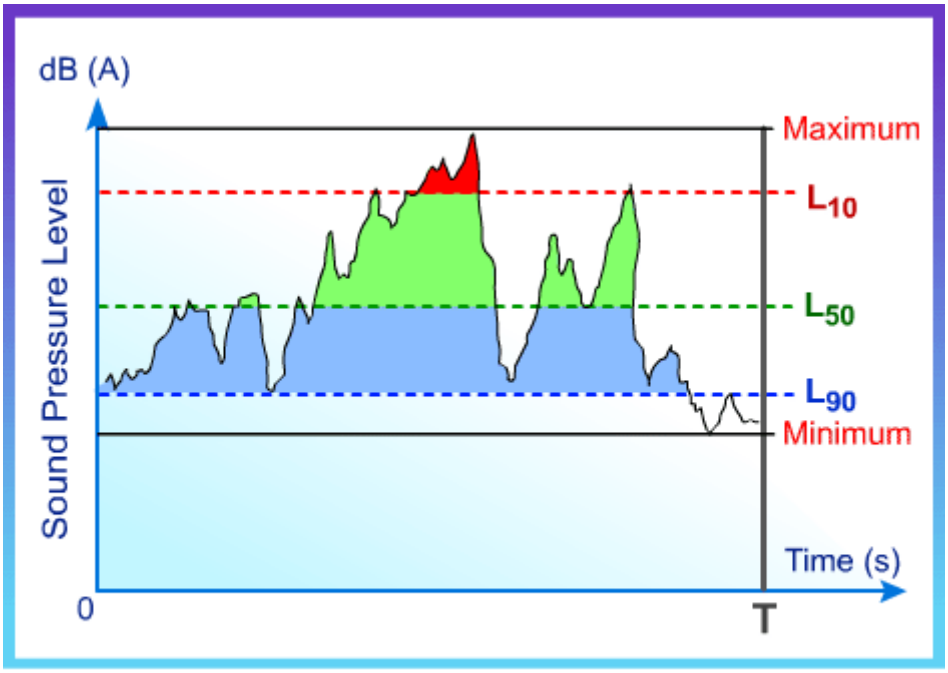

Figure 1. Short Term Noise Event (Over-flight or Vehicle Pass-by)

The relationship between L_{Amax}, $L_{A10,T}$ and $L_{A90,T}$ is shown in the above figure except L_{Amax} is as defined in later paragraphs.

The L_{max}/L_{Amax} Noise Metric is not mentioned in the Glossary or Acronyms and abbreviations sections of the RFT [1].

The lack of a standardised definition of L_{max}/L_{Amax} Noise Metric in either the Glossary or Acronyms and abbreviations sections of the RFT [1] is a potential source of confusion and misinformation.

In relation to the correct definition of L_{Amax}, some assistance in this regard is afforded by the Civil Air Navigation Services Organisation (2013) [5] document entitled "*Considerations for Community Noise Interactions"*.

In Appendix 1, Noise Metrics of that document, L_{Amax} is defined as:

> *The noise level assessed in terms of the* ***instantaneous*** (emphasis added) *maximum sound level that is reached during an over-flight.*

By letter dated 3 July 2020, Airservices Australia advised that the definition of L_{Amax} shown in this Civil Air Navigation Services Organisation document is correct.

A virtually identical definition for L_{Amax} is to be found in the 2009 report of the UK Civil Aviation Authority's Environmental Research & Consultancy Department [6]. Their report ERCD 0904 Metrics for Aircraft Noise defines L_{Amax} as:

> "*The maximum A-weighted sound level (in dBA) measured during* ***an*** (emphasis added) *aircraft fly-by*"

The lack of a standardised definition of the L_{max}/L_{Amax} Noise Metric mentioned above allows a degree of discretion by noise consultants and this degree of discretion is not transparently obvious in EIS and MDP documentation.

The writer attended a Department facilitated meeting at Penrith Panthers Leagues Club on 5 December 2019 with Dr Rob Bullen (previously with Wilkinson Murray Pty Ltd). Dr Bullen started with a PowerPoint presentation that he advised was the presentation he intended showing the FOWSA members on the following day.

In his presentation, Dr Bullen displayed a number of slides that purported to show L_{Amax} single event noise contours for arriving and departing aircraft at WSA. Dr Bullen stated that these were "*average*" values. However, Dr Bullen was unable to indicate how many discrete noise events were used to determine the "*average*". It was pointed out to Dr Bullen that Page 43 (Section 10.5.3) of the 2015-16 WSA EIS [7] stated that "*…Single-event noise contours depict the maximum (L_{Amax}) noise levels resulting from a single operation of a specific aircraft type on all applicable arrival or departure flight paths…*" When this page was shown to Dr Bullen, he agreed with the wording but claimed that it was not what Wilkinson Murray intended to say.

[5] Managing the Impacts of Aviation Noise (A Guide for Airport Operators and Air Navigation Service Providers), Civil Air Navigation Services Organisation, Amsterdam, The Netherlands, 2015.

[6] Jones K. and Cadoux R. "Metrics for Aircraft Noise", ERCD Report 0904, Environmental Research and Consultancy Department, Directorate of Airspace Policy, Civil Aviation Authority, London, UK, 2009.

[7] WSA EIS, Appendix E-1 of Wilkinson Murray Report No. 14168 Version E, "Aircraft Overflight Noise", August, 2016

It was also pointed out that in Appendix E-1 of Report No. 14168 Version E – Acoustic Terminology [7], L_{Amax} was defined as "…*L_{Amax} over a sample period is the maximum A-weighted noise level measured during the period. In the context of aircraft overflight noise, L_{Amax} generally means the maximum A-weighted noise level recorded during a* ***specific*** (emphasis added) *overflight*…"

An identical definition to that shown in [7] is also to be found in the Perth Airport New Runway Project. [8] and the reported data are similarly the result of an undisclosed averaging procedure.

A further undisclosed averaging procedure is to be found for Gold Coast Airport [9]. Appendix A of this document is the Gold Coast Noise Verification Report Dated November 2020 prepared by Envirosuite Ltd.

The Envirosuite report used average L_{Amax} levels for both jets and non-jets but there is no description of the averaging process employed. This is seen as a deficiency and limits the extent of informed commentary as the averaging procedure is not disclosed.

These examples show an arbitary and undisclosed averaging procedure for L_{max}/L_{Amax} being employed by some consultants that is either contrary to the definitions provided in their own documentation or the CANSO [5] definition endorsed by Airservices Australia or the nearly identical definition used by the UK Civil Aviation Authority [6].

N60/N70 Noise Metrics

An approach that combines aircraft over-flight noise information in a single event noise contour with the ability to consolidate this information into a description of high noise 'zones' is available. Information on the number of noise events is termed the 'Number Above' noise metric. In Australia, this is commonly called the N70 (or N65 or N60) where N70 is the number of aircraft noise events louder than 70 dBA. Thus, residents can be informed in a way that is more intuitive. In other words, how many "noisy" events will be experienced within the illustrated zone? Such 70 dBA events have often been used to categorise an event as 'noisy' as these correspond to an approximate 60 dBA noise level indoors, which can disturb conversation or other indoor activities such as watching television.

This system of describing aircraft noise was developed by the Department of Transport and Regional Services (now known as the Department of Infrastructure, Transport, Regional Development, Communications and the Arts) following industry and community consultation and is described by DOTRS [10]. The system is oriented towards providing information in a form that can be understood by interested members of the public, and provides a comprehensive description of the nature of aircraft noise exposure at any point.

[8] Perth Airport New Runway Project Preliminary Draft Major Development Plan Volume C: Airspace Management Plan Sections, 19-26 MAY 2018
[9] Airservices Australia. "Gold Coast Airport Noise Monitoring Review Final Report", December 2021
[10] Department of Transport and Regional Services, "Discussion Paper: Expanding Ways to Describe and Assess Aircraft Noise", Canberra, ACT, March 2000

The information is presented in terms of a number of descriptors, and is intended to provide sufficient detail to allow members of the public to understand for themselves the likely impact of the noise.

The most commonly-used noise descriptor in this system is N70 – the number of aircraft noise events per day exceeding 70 dBA. (A-weighted decibels (dBA) are an expression of the relative loudness of sounds in air as perceived by the human ear.) A noise level of 70 dBA outside a building would generally result in an internal noise level of approximately 60 dBA, if windows are open to a normal extent. This noise level is sufficient to disturb conversation, in that a speaker would generally be forced to raise their voice to be understood.

An internal noise level of approximately 60 dBA (from an aircraft over-flight) is likely to also cause some words to be missed in conversation or from a television or radio program. N70 values indicate the number of times per day when such events would occur.

Whilst this approach has considerable merit, it is potentially flawed as there is currently no national or international standardised approach for determining the number of aircraft noise events per day exceeding 70 dBA (for, say, the N70 metric). There is also no standardised approach for determining the acceptability of particular Nxx levels in assessing adverse community reaction. Historically, different approaches appear to have been used.

In the 2015-16 EIS for Western Sydney Airport [7], a procedure for producing N70 contours was described in Section 2.9. A virtually identical procedure is described in the 2021 Melbourne Airport Major Development Plan (MDP) [11]. The MDP is silent with respect to the accuracy of the N-above contours presented as was the Western Sydney Airport EIS.

In relation to the accuracy of N-above contours, reference is made to the following comment in an Airservices report [12] relating to Sydney Kingsford Smith Airport.

> "*...The N70 aircraft noise map provides information on the total number of aircraft noise events that exceeded 70 dB(A) in a grid area that were likely to have interfered with conversation, sleeping and listening to the radio or television inside a house with the windows open. However, it is important to note the limitations with the N70 aircraft noise maps. The* (Integrated Noise Model) *INM does not provide users with a direct way of computing a 'Number Above' chart, unlike the* (Australian Noise Exposure Index) *ANEI and* (Time Above) *TA contours. It is only possible to derive 'Number Above' values on a rectangular grid, which is then processed for importing into the GIS software package. The accuracy of the N70 contours shown in Attachment F is therefore* ***at best*** (emphasis added) *plus or minus 500 metres, the distance between grid points used by INM in the calculations.*

[11] Melbourne Airport – Third Runway Preliminary Draft Major Development Plan 2022
[12] Airservices Australia, "Sydney Airport, N502 Australian Noise Exposure Index 1 January 2017 to 31 March 2017", 2017.

> *In addition, the superimposed contours may have incurred errors in the transformation from INM coordinates to the map coordinates that were used in the preparation of the N70 chart...*"

The MDP [11] is also silent with respect to the accuracy of the N-above contours shown. The accuracy and reliability of the N-above contours presented in the MDP is seriously questioned as, it appears, the L_{Amax} data used to generate the N-above contours are based on average rather than instantaneous data. And, in a similar manner to the 2015-16 WSA EIS, the method used for averaging the L_{Amax} data is neither defined nor disclosed.

It is considered to be of paramount importance that the L_{Amax} data used to produce all N-above noise contours are instantaneous maxima as defined earlier [5] [6].

It may be argued that the use of the highest instantaneous noise level associated with a single aircraft over-flight is an unreasonable requirement for use in producing N-above contours. If, due to the known limitations of computer modelling of aircraft over-flight noise, some form of averaging is necessary, then an alternative procedure is indicated. As was shown earlier, an undocumented process for averaging noise levels was used in the preparation of the Noise Section of the 2015-16 WSA EIS and recent MDPs. If averaging is to be used, then there should be a high degree of rigour associated with the procedure which should also be independently verifiable. The resulting "*average*" should be associated with a confidence level that is clearly defined before processing the data. Most commonly, a 95% confidence level is used elsewhere and should also be applied to this application. A simple arithmetic average provides no information relating to the range of data used to produce that average.

Community Engagement

Aircraft over-flight noise is a significant environmental noise issue and would appear to be the major environmental noise issue in communities surrounding major airports. In Brisbane, the Brisbane Flight Path Community Alliance was formed after the new parallel runway at Brisbane Airport became operational in 2020. In his submission to the Victorian Government's Melbourne Airport Environs Safeguarding Standing Advisory Committee (MAESSAC) inquiry related to Melbourne Airport, Bullen [13] reported a significant increase in noise complaints at Brisbane Airport. This was demonstrated in his Figures 3 and 4 which show the number of complaints around Brisbane Airport before and after the opening of its new parallel runway in July 2020. He emphasised that it should be remembered that total operations at the airport during this period were significantly reduced due to the COVID pandemic.

In addition to the Brisbane Flight Path Community Alliance, there are active community groups in Sydney, Melbourne, Gold Coast and the Sunshine Coast with significant concern in relation to aircraft over-flight noise. There is also the Community Aviation Alliance Australia **(**CAAA). This is a network of Australian community stakeholder groups, whose aims are to ensure the impact of the aviation industry on Australian communities, including aircraft noise, is given appropriate consideration in flight path, airport, and policy development.

[13] Bullen R. "Melbourne Airport Environs Safeguarding Standing Advisory Committee: Description of Noise Metrics and Impacts", Report No. 20113-1, Prepared for Minter Ellison, December 2020.

On the webpage for the Forum on Western Sydney Airport (FOWSA), their mission statement appears to be:

> *"The Forum on Western Sydney Airport (FOWSA) links the community, the Government and WSA Co during planning and construction of Western Sydney Airport and provides a consultative forum for the exchange of information and ideas. FOWSA members have a responsibility to inform their communities about planning and progress of the airport project and share information on a range of issues relating to the broader airport development. In turn, members will raise community concerns to be discussed at FOWSA meetings."*

There have been 11 FOWSA meetings but only two (2 June 2018 & 7 September 2019) have been open to the public. It is fair to say that FOWSA meetings are shrouded in secrecy. Minutes are eventually published on the website but sometimes months after the meeting.

It does not appear that members have raised any significant community concerns to be discussed at FOWSA meetings even though groups like Residents against Western Sydney Airport (RAWSA) have major concerns.

It is noted that all FOWSA members, including the Chair, are determined by the Minister for Urban Infrastructure (Terms of Reference, Section 3) and this can scarcely be described as "*Community Engagement*" as it clearly lacks any independence. Until 2022, the membership of FOWSA was seriously deficient as the Federal Member for Macquarie had not been offered membership even though the electorate encompassed the Blue Mountains and the Hawkesbury, and included areas that will be directly impacted by Western Sydney Airport. It is understood that the Member for Macquarie is now a member of FOWSA.

This is an aspect requiring a major upgrade in accessibility and transparency. Not just for WSA but for all Australian Airports.

The current Chair of FOWSA (Ms Lee de Winton) gave evidence to the Senate Committee on 29 April 2021. In her evidence, she disclosed that FOWSA was not a decision-making body; but merely a communications piece [14]. Being "*merely a communications piece*" does not satisfy Senate Committee Recommendation 2 following. The ability to make representations to Government is fundamental and this requires a "*decision making*" capability.

A potential lack of independence and objectivity observation was made in the 2010 report of the Senate into Airservices Australia [15]. Recommendation 2 of that Report was as follows"

> *"6.14 The committee recommends that a Community Aviation Advocate position should be funded and established where significant or extensive changes to the management of aircraft noise or airspace are proposed to assist and represent local communities."*

[14] The Senate Finance and Public Administration References Committee "The planning, construction and management of the Western Sydney Airport project", Canberra, ACT, June 2022.

[15] The Senate Rural and Regional Affairs and Transport References Committee, "The effectiveness of Airservices Australia's management of aircraft noise", Canberra, ACT, June 2010.

The Senate Report further recommended (Recommendation 3) that:

> *"6.19 The committee recommends that the Aircraft Noise Ombudsman undertakes a review of the Airservices Australia's Communication and Consultation Protocol to determine the extent to which the protocol:*
>
> *• was developed in consultation with Australian communities and will be subject to regular ongoing review;*
> *• clearly articulates the roles and responsibilities of all stakeholders and the minimum standards of consultation which communities can anticipate, and*
> *• commits Airservices Australia to providing readily available, easily understood and pertinent information (such as environmental noise assessments) to community consultation forums."*

Aircraft Noise Ombudsman (ANO)

Whilst the Commonwealth Ombudsman is appointed by the Governor-General, the Aircraft Noise Ombudsman is effectively an employee of Airservices Australia. Many in the community see the reporting arrangements for the ANO as neither transparent nor independent. The simple inclusion of aircraft noise into the suite of responsibilities of the Commonwealth Ombudsman would solve this perceived lack of transparency and independence.

It is noted that a not dissimilar observation was made in the 2010 report of the Senate into Airservices Australia [15]. Recommendation 5 of that Report was as follows:

> *"6.28 The committee recommends that the Aircraft Noise Ombudsman must be established independently of Airservices Australia and report publicly and directly to the Minister for Infrastructure, Transport, Regional Development and Local Government and to the Australian Parliament."*

Recommendation 5 would, presumably, include appointment by the Governor-General.

Conclusion and Recommendations

The undocumented process used in relation to using averaged L_{Amax} values in the 2015-16 WSA EIS and the Melbourne and Perth New Runway MDPs is inconsistent with the definition of L_{Amax} shown in the Civil Air Navigation Services Organisation (2013) document entitled "*Considerations for Community Noise Interactions"* and endorsed by Airservices Australia and other similar agencies. Clearly, a standardised definition is required and the CANSO [5] definition is strongly recommended.

Where the 2015-16 WSA EIS states a noise level as being L_{Amax}, this is not correct as the EIS used an undocumented process to average noise levels. A similar undisclosed averaging procedure appears to have been used for new runway MDPs for both Melbourne and Perth Airports. This undisclosed averaging procedure may also have been used at other Australian airports.

It is considered to be of paramount importance that the L_{Amax} data used to produce all N-above noise contours are instantaneous maxima as defined by CANSO and the UK CAA [5] [6] but the known limitations in the Integrated Noise Model (INM) and Aviation Environmental Design Tool (AEDT) models may make this difficult.

It may be argued that the use of the highest instantaneous noise level associated with a single aircraft over-flight is an unreasonable requirement for use in producing N-above contours. If, due to the known limitations of computer modelling of aircraft over-flight noise, some form of averaging is necessary, then an alternative procedure is indicated. As was shown earlier, an undocumented process for averaging noise levels was used in the preparation of the Noise Section of the 2015-16 WSA EIS and recent MDPs. If averaging is to be used, then there should be a high degree of rigour associated with the procedure which should also be independently verifiable. The resulting "*average*" should be associated with a confidence level that is clearly defined before processing the data. Most commonly, a 95% confidence level is used elsewhere and should also be applied to this application. A simple arithmetic average provides no information relating to the range of data used to produce that average.

There is currently no national or international standardised approach for determining the number of aircraft noise events per day exceeding 70 dBA (for, say, the N70 metric). There is also no standardised approach for determining the acceptability of particular Nxx levels in assessing adverse community reaction. As was shown earlier, the procedure is largely left to the discretion of the acoustic consultant involved. Also, the accuracy of N-above contours is potentially questionable given the results reported by Airservices Australia [12]. However, for existing airports, predicted N-above contours may be readily validated using measurements. Validation does not appear to have been undertaken for any airport except the proposed WSA. Here measurements at representative locations suggested the modelling results understated the true N70 values by up to 20 dBA [3]. The potential for such a discrepancy has been effectively confirmed by Airservices Australia [2].

Aircraft over-flight noise is a significant environmental noise issue and would appear to be the major environmental noise issue in communities surrounding major airports. It is known that there are active community groups in Brisbane, Sydney, Melbourne, Hobart, Gold Coast and the Sunshine Coast with significant concern in relation to aircraft over-flight noise.

It is further submitted that what purports to be Community Engagement through the auspices of FOWSA is opaque and unrepresentative of real community views. In selecting FOWSA members, the Minister appears to heavily bias the FOWSA membership with pro-airport representatives. This does not facilitate an objective and balanced discussion of important grass-roots community issues.

It is also considered that Recommendations 2 & 3 of the Senate Report into Airservices Australia [15] should be implemented as soon as practicable.

This is an aspect requiring a major upgrade in accessibility and transparency, not just for WSA but for all Australian Airports and reform is strongly recommended.

Whilst the Commonwealth Ombudsman is appointed by the Governor-General, the Aircraft Noise Ombudsman (ANO) is effectively an employee of Airservices Australia. Many in the community see the reporting arrangements for the ANO as neither transparent nor independent. It is recommended that aircraft noise be merged into the existing suite of responsibilities of the Commonwealth Ombudsman as this would solve the perceived lack of transparency and independence. Alternatively, it is considered that the implementation of Recommendation 5 of the Senate Report [15] would be equally effective.

Submitted by:

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