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Department of Infrastructure, Transport, Regional Development, Communications and the Arts

Western Sydney International (Nancy-Bird Walton) Airport – Airspace and flight path design

Environmental Impact Statement

Part D: EIS synthesis

October 2024

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This chapter provides an overview of the environmental management framework for the project including an overview of how environmental, social and sustainability issues will be managed for the project. A consolidated summary of the environmental mitigation measures proposed for the project is also provided, summarising the relevant chapters and technical papers informing the EIS.

24.1 Environmental management framework

This Environmental Management Framework (EMF) provides an overview of how environmental, social and sustainability issues will be managed for the project. The EMF outlines the policies, legislation, commitments and activities which will guide improved environmental outcomes associated with implementation and operation of airspace and ground based operations for WSI.

The project's EMF consists of:

- relevant legislation that regulates the Australian airspace
- Condition 16 of the Airport Plan and the future airspace design principles set out in 2.2.5 of the Airport Plan and developed as part of the preliminary design phase
- regulatory oversight by the Commonwealth Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA)
- Airservices Australia's existing Environmental Management System
- the EIS management measures
- existing policies, procedures and plans developed for WSI.

The implementation of environmental management measures during further design development, implementation and operation of the project would minimise any potential adverse impacts arising from the proposed work on the surrounding environment.

The EMF for the project is presented as Figure 24.1.

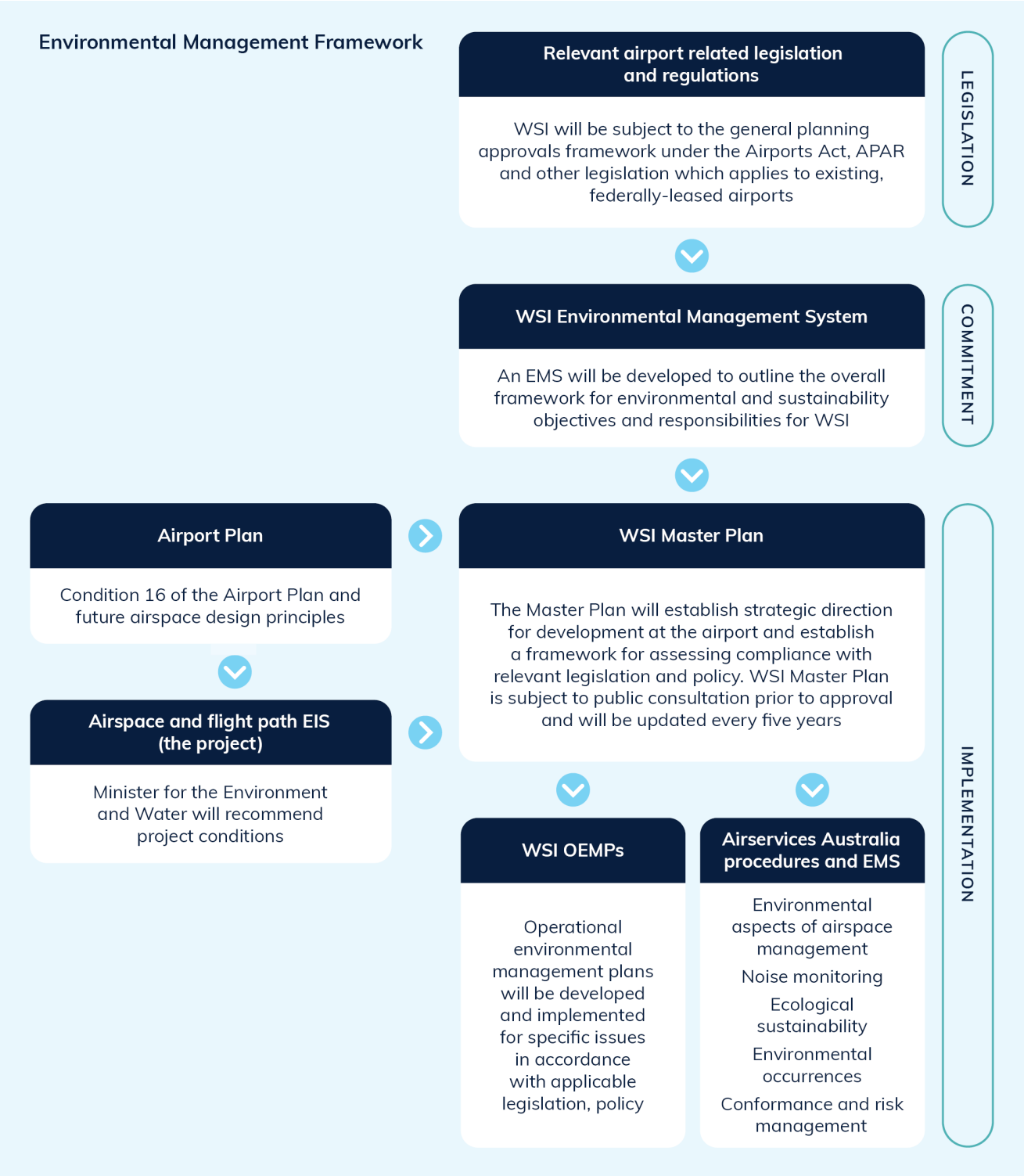

Figure 24.1 Project Environmental Management Framework

24.1.1 Stage 1 Development environmental management framework

The Airport Plan set out the Australian Government's intent for the operation of WSI and provided authorisation for the construction and operation of Stage 1 of the development. Part 3 of the Airport Plan outlines the conditions for the design, construction and operation of the Stage 1 Development, which include environmental standards and implementation of mitigation measures identified in the 2016 EIS. Under these conditions, a suite of construction plans, a Community and Stakeholder Engagement Plan and a Sustainability Plan were developed and approved.

The Airport Plan forms a transitional planning instrument under the Airports Act. WSA Co are required (under the Act) to submit for approval a Master Plan for WSI which is subject to public consultation. The WSI Master Plan will include a 20 year strategic vision for WSI which is renewed every 5 years. The Master Plan includes future land uses, types of permitted development, and noise and environmental impacts. The Master Plan will also include an environment strategy which sets out WSI's strategy to manage environmental issues within a 5 year period and beyond. It is the basis on which environmental performance will be measured.

To date, a range of management plans, policies and procedures have been developed and implemented for the Stage 1 Development.

Future stages of development for WSI (including this project) are subject to the general planning approvals framework under the Airports Act, which applies to existing, federally-leased airports.

24.1.2 Environmental management objectives

The objective of the EMF is to ensure the project minimises impacts to the 'whole of the environment' in a manner consistent with the applicable environmental approvals and regulatory context.

The environmental management objectives for the project are:

- to deliver sound environmental and social outcomes for the Australian community
- to ensure operation of the project is consistent with the future airspace design principles outlined in the Airport Plan
- to identify the regulatory and governance framework for environmental management during operation of the project
- to ensure the project is operated in accordance with the environmental management measures outlined within this EIS and any conditions of approval
- to build on the environmental management objectives and commitments outlined in the Airport Plan
- to provide a robust framework for the development of management plans for the project
- to promote improvement in environmental performance through continuous monitoring, auditing and update of environmental management plans
- to provide a framework for community and stakeholder engagement with the goal of providing a mechanism for managing and responding to complaints within a suitable timeframe
- to ensure that operation of the project is consistent with the principles of ecologically sustainable development.

24.1.3 Relevant legislation and statutory requirements

The Australian airspace is governed by Commonwealth legislation, specifically the *Airspace Act 2007* (the Airspace Act) the *Civil Aviation Act 1988* (the Civil Aviation Act), and their associated regulations, whereas the on-ground development of certain airports and protection of the airspace is primarily governed by the *Airports Act 1996* (the Airports Act) (and its regulations).

Chapter 5 (Statutory context), provides an overview of the relevant planning and legislative framework that applies to the project. It explains the relationship of the legislation that regulates the Australian airspace, the Airport Plan and the environmental assessment process for the project.

24.2 Proposed safeguards and mitigation measures

Table 24.1 provides a compilation of the measures to minimise and mitigate the potential impacts of the project as identified for each environmental aspect assessed in Chapters 11 to 22. The mitigation measures are supported by proposed monitoring/research programs outlined in Table 24.2.

The project does not include any physical infrastructure or construction work, and so the mitigation measures apply to proposed flight paths and a new controlled airspace volume for single runway operations at WSI.

The mitigation measures may be revised in response to submissions raised during public exhibition. A revised list of mitigation measures would be provided in the Final EIS for the project. The mitigation measures and monitoring programs should also be considered in the context of supporting the range of mitigation and management measures described for operation of WSI in the Western Sydney Airport – Environmental Impact Statement (2016 EIS).

24.2.1 Timing and responsibilities

The timing for implementation of mitigation measures outlined in Table 24.1 is referred to as either pre-operation or operation. Pre-operation refers to project phases prior to operation of WSI and flight paths. Operation refers to the implementation of flight paths and the ongoing operation of WSI. The indicative timing of the project's pre-operation and operational phases as well as the project's key delivery agencies is shown on Figure 24.2.

The detailed design phase will include further evaluation and refinement of the proposed selected airspace design for implementation based on feedback received from the community and other technical stakeholders such as airlines and industry bodies on this EIS. Once finalised, the Australian Minister for the Environment and Water will then provide advice to the DITRDCA, Airservices Australia and CASA, including any recommended conditions, before any approval is given for the airspace design. Airservices Australia will be responsible for submitting the Airspace Change Proposal that will be submitted to CASA for approval. This would need to consider the advice provided by the Australian Minister for the Environment and Water.

Key responsibilities within the EMF for the project can be summarised as:

- DITRDCA is leading the design of the WSI airspace arrangements for single runway operations at WSI, as well as having regulatory oversight of the project to ensure compliance with the conditions of the Airport Plan
- Airservices Australia, as the relevant Air Navigation Service Provider (ANSP), will ultimately be responsible for the detailed design, implementation and management of the proposed airspace and flight paths
- CASA, as the regulator responsible for the administration of airspace under the Airspace Act, will be responsible for the approval of the proposed airspace management arrangements through the approval of an Airspace Change Proposal (in its role as the Office of Airspace Regulation)
- WSA Co is responsible for building, operating and managing WSI.

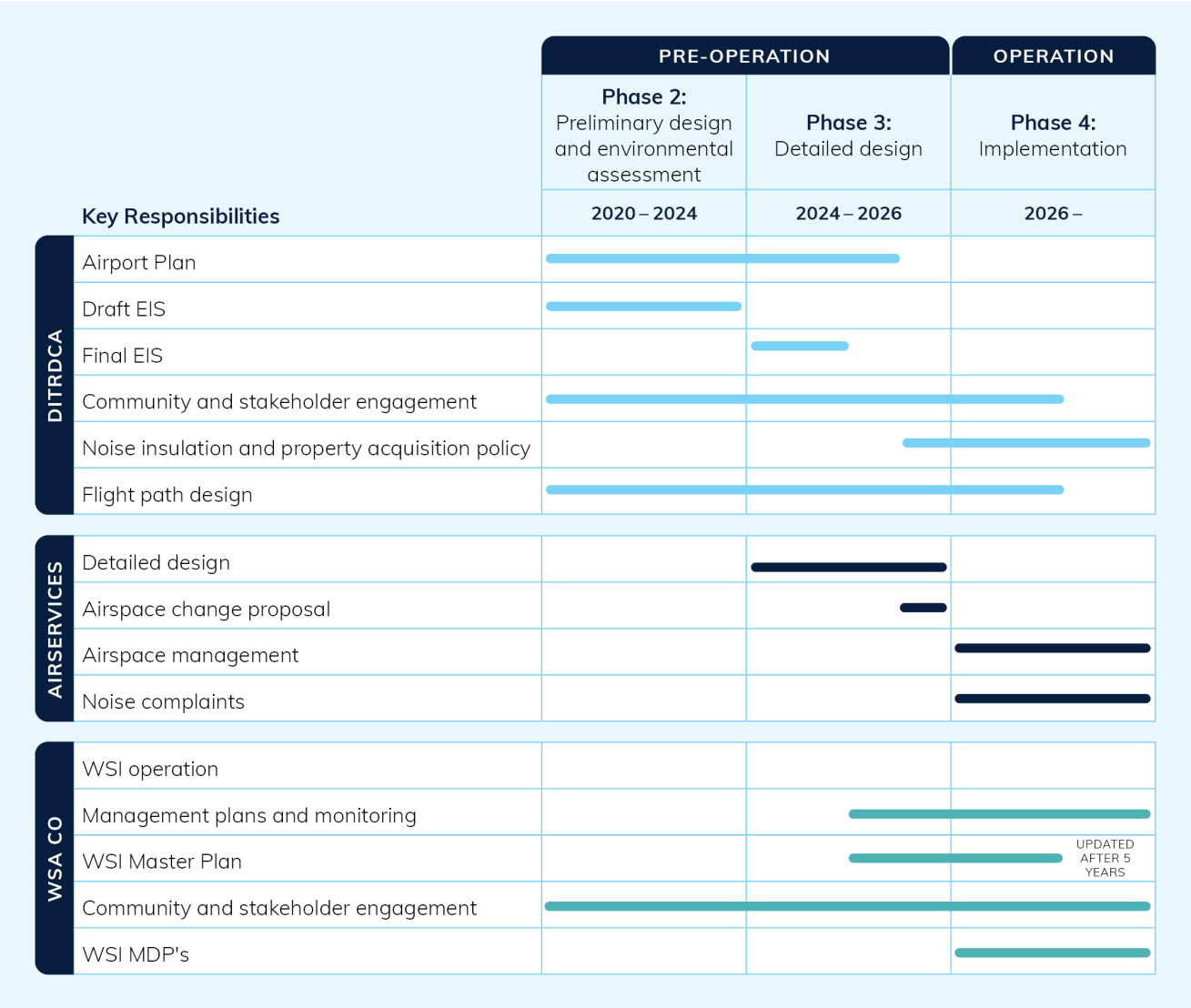

Figure 24.2 Agency responsibilities and indicative timing

24.2.2 Western Sydney International (Nancy-Bird Walton) Airport Stage 1 mitigation measures

In 2016 the then Australian Minister for Urban Infrastructure approved development of WSI under the *Airports Act 1996* (Commonwealth). Following the finalisation of the Western Sydney Airport – Environmental Impact Statement (2016 EIS), the Western Sydney Airport – Airport Plan (Airport Plan) (DITRDC, 2021) was approved. The Airport Plan authorised the construction and operation of the Stage 1 Development of WSI and set the requirements for the further development and assessment of the preliminary airspace design for WSI.

In accordance with subsection 96C(5) of the Act, the Airport Plan sets out the conditions to be complied with in relation to the Airport Stage 1 Development and the Rail Development and contains operational conditions that govern the operational phase of the Stage 1 Development, including the requirement of a series of Operational Environment Management Plans (OEMPs) and a Community and Stakeholder Engagement Plan.

Part 2 of the Airport Plan provides the planning framework for WSI until the first master plan is in place. Within 5 years of the Airport Lease being granted, or such longer period as allowed by the Minister for Infrastructure, Transport, Regional Development and Local Government, the ALC will be required to submit for approval a full master plan, which will replace Part 2. Master plans are subject to community consultation. Many of the project conditions outlined in the Airport Plan ceases to have effect once there is a Master plan for the Airport.

The mitigation measures in this EIS have been developed in consideration of the 2016 EIS and conditions outlined in the Airport Plan, specifically:

- 3.11.2 Construction conditions
  - the Infrastructure Department must consult with relevant Aboriginal stakeholders and relevant government agencies with the aim of establishing, with the support and collaborative action of governments and other stakeholders, an Aboriginal cultural heritage 'keeping place' that would provide secure, above ground storage of artefacts and enable future access for cultural purposes, interpretation, education or research.
- 3.11.4 Operational conditions
  - the preparation of Operational Environmental Management Plans (OEMPs) for noise and air quality management
  - the establishment of community aviation consultation group and preparation of Community and Stakeholder Engagement Plans
  - development of wildlife hazard management plans and programs.
- 3.11.5 General conditions
  - preparation of a Biodiversity Offset Delivery Plan (BODP) in relation to the carrying out of the Airport Stage 1 Development, which takes into account specific species (such as the Southern Myotis (*Myotis macropus*)).

24.2.3 Summary of mitigation measures

Table 24.1 provides a compilation of the measures to minimise and mitigate the potential impacts of the project as identified for each environmental aspect assessed in Chapters 11 to 22. The mitigation measures are supported by proposed monitoring/research programs outlined in Table 24.2.

Table 24.1 Summary of proposed mitigation measures

ID No.	Issue	Mitigation measure	Owner	Timing
Aircraft noise				
N1	Noise insulation and property acquisition	DITRDCA will implement the Noise Insulation and Property Acquisition Policy (NIPA) which will apply to eligible properties that are significantly impacted by aircraft overflight noise from WSI.	DITRDCA	**Pre-operation** (Detailed design, 2024–2026) and **Operation** (Implementation, 2026 – conclusion of program)
N2	Noise abatement	Airservices Australia will develop and review noise abatement procedures in consultation with stakeholders, including aircraft operators, airlines, WSA and FOWSA/WSI Community Aviation Consultation Group (CACG) following a draft proposal developed by the Expert Steering Group in response to feedback on the draft EIS.	Airservices Australia/ DITRDCA	**Pre-operation** (Initial proposal as part of the final EIS, with any further refinements in detailed design, 2024–2026) and **Operation** (Implementation, 2026 – ongoing)

ID No.	Issue	Mitigation measure	Owner	Timing
N3	Communication	WSA Co will establish a CACG to ensure appropriate community engagement on airport planning and operations. This will ensure community and industry have a forum for the groups best positioned to identify, share and test solutions or measures including relevant national or international best practice initiatives.	WSA Co	**Pre-operation** (At the conclusion of detailed design, 2024–2026)
N4	Noise complaints	The Airservices Australia Noise Complaints and Information Service will handle complaints and enquiries about aircraft noise and operations associated with the project to help identify issues of community concern and provide opportunities for improvement.	Airservices Australia	**Operation** (Implementation, 2026 – ongoing)
N5	Aircraft noise	The Aircraft Noise Ombudsman (ANO) provides independent reviews of aircraft noise-related activities to ensure appropriate governance and oversight of operations. The ANO is also available to make targeted reviews on specific issues as they are identified or arise.	Airservices Australia	**Operation** (Implementation, 2026 – ongoing)
N6	Flight path design	Airservices Australia will undertake a post-implementation review (PIR) of the flight path design and implementation.	Airservices Australia	**Operation** (2026 – within 2 years of implementation)
Air quality and greenhouse gas				
No project specific air quality or greenhouse gas emissions mitigations are proposed. As this assessment did not identify any significant change in the approved ground level impacts per the 2016 EIS, no additional monitoring for aircraft emissions is required.				
Aircraft hazard and risk				
HR1	Airspace conflicts	Airservices Australia will continue to address hazard identification and risk mitigation during the remainder of the design process and prioritise on-going safety performance monitoring.	Airservices Australia	**Pre-operation** (Detailed design, 2024–2026)
HR2	Contingency planning	WSA Co will implement contingency planning to respond to the impacts of crash events as per Part 139 Aerodromes Manual of Standards 2019.	WSA Co	**Operation** (Implementation, 2026 – ongoing)
HR3	Aircraft fuel jettisoning	Airservices Australia will apply existing procedures to deal with aircraft fuel jettisoning occurrences as per the Aeronautical Information Publication Australia, Part 2 – En Route (AIP ENR) (Airservices Australia, 2022a)	Airservices Australia	**Operation** (Implementation, 2026 – ongoing)

ID No.	Issue	Mitigation measure	Owner	Timing
HR4	Local meteorological hazards	Automated Thunderstorm Alert Service (ATSAS) will be implemented by the Bureau of Meteorology (BoM) to provide improved thunderstorm forecasting. Implementation of a Doppler LIDAR, if required, will support the identification of turbulence and wind shear (subject to the conclusions of an appropriate cost-benefit study).	WSA Co (in coordination with BoM)	**Operation** (Implementation, 2026 – ongoing)
HR5	Wildlife strike	WSA Co will monitor and control the presence of birds and other wildlife on or in the vicinity of WSI in accordance with Civil Aviation Safety Regulations (CASR) Part 139 MOS requirements and National Airports Safeguarding Framework (NASF) Guideline C (See Table 24.2).	WSA Co	**Operation** (Implementation, 2026 – ongoing)
HR6	Wildlife strike	WSA Co will liaise with planning authorities on matters related to the development of, or modifications to, off-airport land uses that have the potential to attract hazardous numbers or types of wildlife.	WSA Co	**Pre-operation** (Detailed design, 2024–2026) and **Operation** (Implementation, 2026 – ongoing)
HR7	Wildlife strike	WSA Co will establish a WSI Wildlife Hazard Management Committee (WHMC) that will likely comprise Western Sydney local government representatives, NSW Department of Planning and Environment and other relevant aviation stakeholders.	WSA Co	**Operation** (within 6 months of Implementation, 2026 – ongoing)
HR8	Wildlife strike	The WHMC will contribute to the preparation of regional species management programs (including Australian White Ibis) as required. Regional species management plans will build on any existing management programs (e.g. the Canterbury-Bankstown Council Australian White Ibis Management Program). The regional programs will aim to: • reduce species impacts on aviation and the community in general • provide advice to landowners on how they can contribute to species management programs on non-council land • establish measurable targets for species management • maintain the long-term sustainability of the local species populations.	WSA Co	**Operation** (Implementation, 2026 – ongoing)

ID No.	Issue	Mitigation measure	Owner	Timing
Land use				
LUP1	Aircraft noise	DITRDCA and WSA Co will liaise with State and local government agencies to ensure applicable environmental planning instruments have regard to ANEC forecasts produced for the project.	DITRDCA and WSA Co	**Pre-operation** (Detailed design, 2024–2026) and **Operation** (Implementation, 2026 – ongoing)
LUP2	Protected airspace	DITRDCA will coordinate with relevant State and local government agencies to implement appropriate PANS-OPS requirements in applicable planning instruments to ensure future development does not impeded safe aircraft operations in accordance with the National Safeguarding Framework.	DITRDCA	**Pre-operation** (Detailed design, 2024–2026) and **Operation** (Implementation, 2026 – ongoing)
LUP3	Wildlife buffers	WSA Co will liaise with State and local government agencies to establish mechanisms that will identify land uses and prevent the creation of land uses that would cause hazardous wildlife attraction within the wildlife buffers.	WSA Co	**Pre-operation** (Detailed design, 2024–2026) and **Operation** (Implementation, 2026 – ongoing)
LUP4	Wildlife buffers	WSA Co will negotiate with State and local government agencies and land owners if required on agreed action plans for monitoring and, where necessary, reducing wildlife attraction to areas in the vicinity of WSI.	WSA Co	**Operation** (Implementation, 2026 – ongoing)
Landscape and visual amenity				
Based on the nature of the potential impacts, no reasonable or feasible project specific mitigations are considered to be available that would reduce the potential landscape and visual impacts that have been identified as a result of the project.				
Biodiversity				
Project specific mitigation measures related to wildlife strike are presented as HR5 to HR8 and those related to wildlife buffers are presented in LUP3 and LUP4. There are no other project specific mitigations related to biodiversity.				

ID No.	Issue	Mitigation measure	Owner	Timing
Heritage				
H1	Aboriginal heritage	DITRDCA will ensure that the detailed design phase considers Aboriginal cultural places and values, noting that safety is not negotiable and that capacity, environment and efficiency factors must also be considered in the flight path design.	DITRDCA	**Pre-operation** (Detailed design, 2024–2026)
H2	Heritage	A research program will be undertaken to investigate the potential impact of aircraft emissions on historic and Aboriginal heritage sites (including rock art sites), with a particular focus on sites within the Greater Blue Mountains Area. The research program will be designed and implemented in consultation with Heritage NSW and include participation of local First Nations stakeholders.	DITRDCA/ Airservices Australia/ WSA Co	**Pre-operation** (Detailed design, 2024–2026) and **Operation** (Implementation, 2026 – ongoing)
H3	Heritage consultation	WSA Co will establish a CACG for WSI which will facilitate consultation with stakeholders and community on a range of matters including heritage issues.	WSA Co	**Pre-operation** (Detailed design, 2024–2026)
Social				
S1	Social impacts	The WSI CACG will undertake consultation with stakeholders and community, including social organisations, to seek feedback on social issues and to promote social and economic welfare of the community.	WSA Co	**Pre-operation** (Detailed design, 2024–2026)
S2	First Nations employment	WSA Co will implement a program to ensure opportunities for First Nations employment.	WSA Co	**Operation** (Implementation, 2026 – ongoing)
Economic				
E1	Existing airspace users	DITRDCA will continue to consult with aerodrome operators and airspace users at Bankstown and Camden Airports regarding airspace requirements in order to minimise risks and associated economic costs.	DITRDCA	**Pre-operation** (Detailed design, 2024–2026)
E2	Emergency services	DITRDCA and Airservices Australia will continue to consult with emergency services operators regarding priorities of airspace in order to minimise risks and associated economic costs.	DITRDCA and Airservices Australia	**Pre-operation** (Detailed design, 2024–2026) and **Operation** (Implementation, 2026 – ongoing)
Human health				
Mitigation measures related to Aircraft noise are presented as N1 to N7 and mitigations related to aircraft hazard and risk are presented as HR1 to HR8. There are no other project specific mitigations related to human health.				

Table 24.2 Proposed monitoring programs

ID No.	Issue	Monitoring measure	Owner	Timing
M1	Aircraft noise	Airservices Australia will install a system of permanent and temporary noise monitoring terminals at suitable locations and incorporated into the Airservices Australia Noise and Flight Path Monitoring System (NFPMS) network and reporting systems. The interface will allow community and other stakeholders to see where aircraft fly and explore historical trends and patterns. The system will provide accurate noise monitoring data for reporting, validation and noise model calibration. With an established baseline it could give an evidence base for any future flight path modification or noise abatement initiatives. This system will operate 24-hours-a-day, 7-days-a-week, collecting data from every aircraft operating to and from WSI. Noise monitoring will consider the requirements of the WSI Stage 1 Development Noise OEMP.	Airservices Australia	**Operation** (Implementation, 2026 – ongoing)
M2	Wildlife strike	A bird and bat strike monitoring program will be conducted to monitor for the presence of wildlife on the WSI site and in vicinity of WSI. The monitoring program will: • identify wildlife hazards which must be assessed to reduce potential risk to aircraft operations • be conducted in accordance with relevant Commonwealth and State guidelines and standards including any recovery plans for threatened species • carried out under the direction of a suitably qualified person • be carried out in liaison with local government in relation to plans for proposed developments within 13 km of WSI that are likely to increase bird and bat strike • identify locations where reasonable and feasible mitigation measures to manage wildlife strike risk are required • be reviewed annually to determine its effectiveness.	WSA Co	**Operation** (Implementation, 2026 – ongoing)

24.2.4 Effectiveness of mitigation measures

The management of potential impacts associated with the future development of WSI and the operation of flight paths has been incorporated into strategic planning and legislation over the last decade. Land-use planning in particular has also been an effective means to ensure that land use near WSI is compatible with noisy aviation activities, with a primary goal of minimising the population affected by aircraft noise.

Aircraft noise is an unavoidable consequence of an operating major airport in proximity to heavily populated areas. Appropriate noise management controls referencing International and Australian guidelines (such as the National Airport Safeguarding Framework (NASF)) have also been included in applicable planning instruments in advance of WSI's operations.

In addition to land use planning, there is a well-established range of mechanisms supporting the WSI operational framework and these include:

- the Airservices Australia Noise Complaints and Information Service – to handle complaints and enquiries about aircraft noise and operations associated with WSI to help identify issues of community concern and provide opportunities for improvement
- the Aircraft Noise Ombudsman (ANO) (an independent administrative office) – to conduct reviews of Airservices Australia's and Defence's management of aircraft noise-related activities. The ANO would also monitor and report on the effectiveness of the community consultation processes related to aircraft noise for WSI and the presentation and distribution of aircraft noise-related information.

Airservices Australia's Noise and Flight Path Monitoring System (NFPMS) currently collects noise and flight path data from airports across Australia and it is anticipated that WSI will be incorporated into this network. Data collected from NFPMS is used to reduce uncertainty around aviation noise impacts on the community and to determine potential environmental (noise) impacts from existing and proposed new flight paths and noise abatement trials, including post-implementation reviews.

The detailed planning of flight paths, the implementation of air traffic control procedures, noise abatement procedures and airport operating strategies are also effective measures in achieving lower impact over noise sensitive areas without impacting safety and significantly reducing airport capacity.

The adoption of WSI's flight path design principles are the result of national consultation with community, industry and government stakeholders, and are consistent with international global practices. This guidance will assist in minimising the impact of aircraft noise on the surrounding community by directing aircraft away from overflying populated areas where possible.

Airservices Australia will ultimately be responsible for the implementation and management of the proposed airspace and flight paths and are experienced in managing a range of environmental aspects associated with airspace operations. This is partly achieved through a maintained Environmental Management System (EMS) which assures compliance with legal obligations, appropriate risk management of activities and continual improvement. The Airservices Australia EMS aligns with ISO 14001:2015, which provides an internationally recognised framework for effective organisational environmental management and to achieve improved environmental performance.

The range of existing management measures, already built into legislative, environmental and operational framework for WSI are effective in the management and minimising of impacts associated with aircraft noise.

The project specific mitigation measures outlined within Table 24.1 have been developed to add to the range of existing measures discussed above. Where possible, the measures have been developed to consider the "S.M.A.R.T' principle. The effectiveness of the mitigation measures will be reviewed during operation of the project and through ongoing stakeholder consultation and oversight through relevant community forums and community engagement as required by the Australian Government at major airports in Australia.

24.2.5 Cost of environmental management measures

Costing of proposed mitigation measures will be considered by DITRDCA, Airservices Australia, CASA, WSA Co, and the Australian Government as part of the delivery of Western Sydney International Airport.

The costing of mitigation measures will have particular regard to the key mitigations outlined in this EIS including, but not limited to, implementation of the NIPA policy in relation to aircraft overflight noise for buildings outside the Airport Site. The detailed cost associated with the NIPA policy will be provided once finalised.

Chapter 25 Conclusion

This chapter seeks to draw together the residual impacts, benefits and commitments for the project. It summarises the project for which approval is sought and provides the justification for it, considering the compliance with principles of Ecologically Sustainable Development (ESD) and the objects and principles of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

25.1 Introduction

This Environmental Impact Statement (EIS) has been prepared to address the requirements of Condition 16 of the Airport Plan and support the request to the Australian Minister for the Environment and Water for advice in accordance with Section 160 of the EPBC Act. This advice from the Minister is required prior to any approval of the airspace and flight paths.

The project has been developed by an Expert Steering Group led by the Australian Government Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA) and including Defence, ASA, and CASA. It involves:

- the development and implementation of proposed flight paths and a new controlled airspace volume for single runway operations at WSI
- the development of associated air traffic control and noise abatement procedures for eventual use by civil, commercial passenger and freight aircraft
- changes to the Sydney Basin airspace to facilitate the new volume of WSI traffic – specifically to other existing airports' operations (including Sydney (Kingsford Smith) Airport).

The preliminary airspace and flight path design is a further development to the 'proof-of-concept' design presented in the *2016 Western Sydney Airport – Environmental Impact Statement* (refer to Chapter 1 (Introduction)).

The EIS has considered the whole-of-environment EPBC Act requirements as defined in *Actions on, or impacting upon Commonwealth land, and actions by Commonwealth agencies, Significant impact guidelines 1.2* (Significant impact guidelines 1.2) (Commonwealth of Australia, 2013b). It represents a comprehensive assessment of the potential impacts associated with the operation of the project.

This chapter documents the benefits of the project that have been identified throughout the EIS. The adverse impacts assessed as significant have also been summarised and an explanation is provided of why these impacts are considered to be acceptable in the overall context of the project. This chapter also documents where each assessment has considered the interaction with other projects forecast to be in construction or operation at the same time as the project, to consider the cumulative impact of the project. The project will necessitate changes to the Sydney Basin airspace, which in turn has implications for the operations of other airports. These facilitated impacts are also summarised.

25.2 Summary of project benefits and impacts

25.2.1 Project benefits

The project is an integral part of WSI, ensuring that the benefits of WSI are realised. The objectives for WSI are to:

- improve access to aviation services for Western Sydney
- resolve the long-term aviation capacity constraints in the Sydney Basin
- maximise the economic benefit for Australia by maximising the value of WSI as a national asset
- optimise the benefit of WSI for employment and investment in Western Sydney
- deliver sound financial, environmental and social outcomes for the Australian community.

The project will assist in achieving the overall objectives for WSI as it will enable single runway operations to commence at WSI through the introduction of new flight paths and a new controlled airspace volume.

25.2.2 Justification for undertaking project in manner proposed

Condition 16 of the Airport Plan requires the Australian Government to undertake an airspace design process and as such it is considered that a 'take no action' (that is, to consider a no-flight path option) is not a feasible alternative.

The project is justified to be undertaken in the manner proposed as it has been developed as part of an extensive airspace and flight path design development process set out in Condition 16 of the Airport Plan. This process optimises the currently proposed preliminary flight paths for WSI for introduction into the Sydney Basin to ensure they integrate as seamlessly as possible. The development process to date has focused on 4 key elements being safety, environmental, efficiency, and capacity considerations, while minimising changes to existing airspace arrangements in the Sydney Basin. In addition, the preliminary airspace design has been developed to comply with all relevant national and international practices and regulations for safe and efficient air navigation and aircraft operation.

In developing the preliminary flight paths, the design team and Expert Steering Group were guided by a range of constraints which determined what was technically feasible for the flight path design. These included:

- the runway alignment is fixed: there will be no changes to the north-east/south-west runway alignment, which was approved in the 2016 EIS and is currently under construction by Western Sydney Airport Company Limited
- the final approach and initial departure paths are fixed: given the fixed runway alignment and the requirement for aircraft to approach and depart WSI on a relatively straight trajectory, there will be some areas/suburbs directly connecting to the runway ends that would be impacted by aviation operations
- the altitude of aircraft is constrained: the height at which aircraft operate is determined by a number of factors, including the aircraft type, weather conditions, safety requirements and international rules of aviation
- the presence of existing airports in Greater Sydney: major changes cannot be made to the flight paths for Sydney (Kingsford Smith) Airport and considerations need to be made for operations at other airports, such as Camden, Bankstown, RAAF Richmond Base and Holsworthy
- WSI has 24-hour operations: WSI has always been planned to operate 24-hours, and this is fundamental to the viability of its operations.

The need to process aircraft in an orderly sequence when arriving has limited the opportunity to develop multiple alternative approach paths for aircraft arriving at WSI.

In developing this preliminary airspace design, proposed flight paths and runway operating modes have been subject to multiple and iterative reviews with the objective of optimising outcomes (that is, minimising the unavoidable residual impacts of aircraft noise on communities).

Future design phases would continue to ensure a rigorous approach to the finalisation and implementation of the airspace and flight path design. The detailed design phase will include further evaluation and refinement of the proposed selected airspace design to a level appropriate to secure regulatory approvals. This would have consideration of feedback received from the community, technical stakeholders such as airlines and industry bodies, and regulatory authorities. The implementation phase would include the regulatory certification and authorisation of the proposed airspace design and its implementation and post-implementation would involve the ongoing monitoring of the operation of the design by key operational stakeholders.

25.2.3 Summary of impacts

Key environmental issues have been examined throughout the design and development of the project. Consultation has been carried out with relevant stakeholders to identify key potential impacts at an early stage. Where possible, the proposed flight paths have avoided and minimised impacts as part of the project design and development.
The assessment has been carried out to meet the Australian Minister for the Environment and Water's EIS Guideline assessment requirements

The assessment considered the nature and extent of likely short-term (year 2033) and long-term (year 2055) impacts of the Stage 1 Development associated with the project to account for increases in associated service capacity in terms of millions of annual passengers (MAPs) and air traffic movements (ATMs) per year (including freight operations). In relevant cases, for example, the evaluation of aircraft noise for some mitigations, an interim year (2040) was used to assess impacts.

Potential environmental impacts of the project can be appropriately identified at this stage of the design development. Impacts relating to the majority of issues are well understood and any uncertainties are documented where relevant in individual impact assessments of Part C and technical reports attached to this EIS.

25.2.3.1 Aircraft noise

Aircraft noise impacts were assessed to reflect the expected growth of single runway operations in 2033, 2040 and 2055. Three runway modes of operation were modelled.

- In designing the flight paths for WSI, safety of operations is the most important consideration. The preliminary airspace design process also considered, to the extent practical, noise mitigation and environmental impacts associated with single runway operations. However, increased exposure to aircraft noise in areas in the vicinity of WSI and under its proposed arrival and departure flight paths will be an unavoidable consequence of aircraft operations at WSI.

As the single runway approaches capacity in 2055:

- between 7,000 to 12,200 residents may experience 5 or more aircraft noise events above 70 dB(A) over a 24-hour period, which can lead to in an indoor sound level of 60 dB(A) when windows are opened (enough to disturb conversation)
- between 23,500 to 84,500 residents may experience 2 or more aircraft noise events above 60 dB(A) over the night time period (11 pm to 5:30 am). This significant variation is due to the use of Reciprocal Runway Operation (RRO) mode (when available), when flight paths would be minimised over more densely populated areas
- between 114,000 to 155,000 residents may experience 10 or more noise events above 60 dB(A) over a 24-hour period. By 2055, N60 contours extend well beyond the runway ends, north towards Penrith, north-east towards St Marys and north, west and south-west into the Blue Mountains National Park.

The number of residents affected by different levels of aircraft noise depends on the runway operating scenario adopted. Comparison of the 3 primary runway operating scenarios indicates that while there is limited variability of noise exposure levels in close proximity to WSI, the choice of runway operating strategy has a more pronounced effect on communities further away.

With respect to the ANEC, the ANEC extends along the standard instrument arrival and departure routes and would generally remain within the published ANEC contours for WSI. The results show that less than 1,000 people may be living within the 20 ANEC contours by 2055, an increase from approximately 250 people in 2033, regardless of the operational scenario. While there are very few residents within the 25 ANEC contours, mostly in Greendale, the 20 ANEC contours could progressively over time include the community of Twin Creeks and (currently) rural portions of the suburb of Kemps Creek.

The use of an alternative suite of proposed WSI day and night flight paths results in a level of respite and noise being shared to some areas impacted by the proposed higher traffic volumes of WSI day operations and a significant reduction in dwelling and population counts during WSI night operations, particularly when the RRO mode can be applied.

Residential and rural-residential areas to the immediate north-east and south-west of WSI, located on extended runway alignment, and close to the proposed arrival flight paths and initial departure turns would be subjected to a significant and unavoidable level of noise exposure.

The refinements to the preliminary flight path design since the exhibition of the Draft EIS would generally be negligible to minor for most of the refinements. The introduction of the RRO noise abatement procedure (RRO-NAP) and the reallocation of jet aircraft from Runway 23 Departure Northeast Night (RRO) flight path to the Runway 23 Departure Southeast Night (RRO) flight path would result in a noticeable change to the N60 Night contours (as presented in the Draft EIS). However, these changes would have minimal impact to the N60 24-hour and N70 24-hour contours.

Approaches to mitigating aircraft noise generally focus on reducing noise emissions from the aircraft themselves, planning flight paths and airport operating modes in a way that minimises potential noise and environmental impacts, and implementing land use planning or other controls to ensure that future noise-sensitive uses are not located in noise-affected areas.

External to the design, NSW Government planning controls have been in place for several decades and have to the extent practical prevented incompatible noise sensitive developments around WSI. It is expected that future land use planning around WSI would be influenced by final long term ANEF contours, once flight paths and operating modes are finalised and approved.

Subject to relevant considerations such as aircraft safety, all safe and practicable opportunities for mitigating noise impacts will be considered in finalising the flight paths and aircraft operating procedures for the proposed airport.

Various operating strategies for managing aircraft noise will have differing impacts on different populations, particularly at night, when greater airspace flexibility and lower demand permits the use of different runway modes of operation and flight paths. This could be achieved by prioritising, when operationally possible, night-time flights over areas of low density rural land and natural areas to the south-west, west and south of WSI. However, it is noted that these areas could be more noise sensitive than urban areas experiencing similar levels of noise exposure.

DITRDCA will deliver the noise insulation and property acquisition (NIPA) policy which will apply to eligible properties that are significantly impacted by aircraft overflight noise from WSI.

25.2.3.2 Air quality and greenhouse gas

The air quality and greenhouse gas (GHG) assessment adopted the 2033 and 2055 reference years for the project. For each reference year, 7 different flight scenarios were considered of which the No preference, Prefer Runway 05 and Prefer Runway 23 scenarios were identified to represent the worst case for potential air quality impacts.

The local air quality assessment indicates the predicted levels would be below criteria for all the assessed air pollutants in 2033 and 2055, except for $PM_{2.5}$ (particles with a diameter of 2.5 micrometres or less) and NO_2 (Nitrogen Dioxide) during 2055 at several receivers located to the immediate north-west of the runway. However, the elevated $PM_{2.5}$ levels arise due to existing elevated background levels, and the effect of the project would be intangible and insignificant.

Whilst the project would contribute significantly to 1-hour average NO_2 levels at the nearest receivers to the north-west of the runway, the predicted levels of NO_2 are slightly above the more stringent, recently updated Environment Protection Authority (EPA) criteria for only a portion of the hours throughout the year that were assessed. The elevated NO_2 levels would only occur at a few locations immediately adjacent to WSI. As the predicted results are likely to be conservative (overestimating of impacts) and as it is likely there will be improvements in fuel efficiency (for aircraft and motor vehicles) it is reasonable to conclude that no significant impacts would arise. Further, the intensification of

residential receivers in this location would be limited as the land has been zoned for Agribusiness and the area largely corresponds to land within the ANEC 20 contour and above, thus excluding residential development.

The regional air quality assessment identified a similar small scale of NO_2 impacts consistent with the local assessment, with predicted levels above the new EPA criteria in close vicinity to in 2055, representing a small localised potential impact. The predicted impacts for NO_2 are small, infrequent and highly localised. $PM_{2.5}$ impacts arise due to elevated background pollutant levels. An improvement in the predicted maximum ozone impacts relative to the 2016 EIS has been calculated. The project's impact on the concentrations of all other assessed pollutants would be negligible and unlikely to be discernible or measurable within the existing background concentrations.

With respect to potential greenhouse gas emissions, the most emissions-intensive flights are those operating regular passenger transport services to medium and long haul destinations. In 2033 and 2055, these services accounted for only 27 and 23 per cent of projected total air traffic movements but were responsible for more than half of all full-flight emissions of CO_2e (Carbon dioxide equivalent). Emissions of CO_2e from domestic aviation are projected to grow steadily between 2033 and 2055, as activity continues to grow generally in line with population.

Overall, the emissions of CO2e attributed to WSI from main engine use by aircraft operating along WSI's flight paths in either 2033 or in 2055 are not considered to result in significant impacts or inhibit the achievement of net zero economy targets set by the Australian or NSW Government for 2050.

Emissions from aircraft movements are predominantly due to the engine emissions, which are required to meet Australian (and international) performance specifications. Measures to help reduce emissions from aircraft operations generally involve procedures and techniques to optimise the vertical profiles of aircraft climbing or descending to an airport. Beyond those measures, no project specific air quality or greenhouse gas emissions mitigations are proposed.

The refinements to the preliminary flight path design since the exhibition of the Draft EIS would not change the conclusions of the overall air quality assessment or greenhouse gas assessment. Any change to air quality or greenhouse gas emissions would be minimal.

25.2.3.3 Aircraft hazard and risk

A range of potential hazards associated with the operation of WSI's flight paths have been considered, including the risks associated with aircraft crashes to people and critical infrastructure, risks due to fuel jettisoning and objects falling from aircraft, risks to buildings due to wake vortex, and risks to aircraft due to wildlife strike and meteorological conditions.

A hazard analysis process was used as the basis for risk assessment, derived from the NSW Government's Hazardous Industry Planning Advisory Papers (HIPAP), with guidance from aviation-specific risk assessment processes produced by CASA and International Civil Aviation Organization (ICAO).

For individual fatality risk due to an aircraft crash, a risk of 1 in 100,000 per annum is considered to be a low risk that is a generally acceptable level of exposure for members of the public but one that can be considered acceptable, provided that the risk is managed to be as low as reasonably practicable. For most residential properties, the risks would be negligible. This reflects the position of the runway and the design of the flight paths. In 2055, a small number of people (5) are within the 1 in 100,000 per annum risk contour and 108 people are located between the 1 in 100,000 per annum and 1 in 1,000,000 per annum risk contour. As the number of people exposed to risks would increase, these risks are classified as being of moderate effect but are not significant based on the criteria applied.

Societal risk in 2033 and 2055 are within the middle to lower risk part of the 'as low as reasonably practicable' region. These risks are considered acceptable, provided no further practicable means for mitigating these residual risks is available. In this regard, based on the runway location, airspace design requirements and the relative location of developed areas within Sydney, the flight path design has minimised these risks, as far as is practicable.

Critical infrastructure, such as hospitals, transport links, water storage and the Defence Establishment Orchard Hills, are located in the vicinity of the Airport Site. The typical event frequencies and scale of fatalities associated with aircraft crashes are consistent with risks that would be considered acceptable. Operation of flight paths over the Greater Blue Mountains Area (GBMA) presents a very low risk of introducing fire through aircraft accidents.

With respect to other considerations:

- risks due to fuel jettisoning and objects falling from aircraft, or risks to buildings due to wake vortex are concluded to be low or remote events. In particular, fuel jettisoning is a relatively uncommon, non-standard operational requirement that would generally have no ground level impacts if carried out in accordance with appropriate procedures. All fuel jettisoning would be carried out in accordance with Aeronautical Information Publication Australia, Part 2 – En Route (AIP ENR).
- wildlife strike risk mitigation for WSI that would deliver an acceptable level of safety is achievable, provided that a site-specific wildlife management program is implemented
- compared with other airports which operate with an acceptable level of safety, there are no exceptional meteorological conditions at WSI that might lead to significant risks to operational safety. The risks to safety and operational efficiency from meteorological hazards can be mitigated by provision of improved forecasting.

Operations at WSI and the associated airspace in the Sydney Basin are being introduced within a well-established regulatory and management framework that places importance on safety. This is underpinned by key requirements that risks should be 'as low as reasonably practicable' and meet appropriate levels of safety. Assessment of the residual risks associated with WSI operations indicate that those key requirements would be met.

The refinements to the preliminary flight path design since the exhibition of the Draft EIS would not change the conclusions of the overall hazards and risk assessment.

Risk mitigation is provided by a wide variety of general measures adopted across the aviation industry that will apply to operations at WSI. Additionally, project specific mitigations have been developed. These include Airservices Australia continuing to address hazard identification and risk mitigation during the remainder of the design process and prioritise on-going safety performance monitoring. Other project specific mitigations include contingency planning to respond to the impacts of crash events and wildlife strike measures to monitor and control the presence of birds and other wildlife on or in the vicinity of WSI.

25.2.3.4 Land use

There are several International and Australian publications and policies which provide strategic guidance on land use management in proximity to airport operations. The National Airports Safeguarding Framework (NASF) in particular, provides guidance on planning requirements for developments that could potentially affect aviation operations.

Land use planning in the vicinity of WSI has considered and incorporated the operational needs of WSI into land use planning in accordance with guidance provided in the NASF. DITRDCA (formally Department of Infrastructure and Regional Development) liaised with State government agencies and relevant local councils concerning the adoption of the necessary guidelines into the applicable environmental planning instruments. The range of existing planning controls in place in the vicinity of WSI have been an effective means of providing appropriate controls over land use planning and development.

This includes the *State Environmental Planning Policy (Precincts – Western Parkland City) 2021* (NSW) (Western Parkland City SEPP), which outlines that no new noise sensitive development (including residential development) will be permitted within the ANEC 20 and above contours (except in limited circumstances for certain applications for dwelling houses and subdivision that were permissible prior to the SEPP coming into effect). The consent authority for any such development would need to be satisfied that indoor noise levels set in AS 2021:2015 are met. This does not prohibit the enlargement or modification to an existing use.

The predicted composite ANEC presented in the EIS differs in some locations and an additional area of land in the vicinity of WSI is predicted to be within the 20 ANEC contour, when reviewed in comparison to the published ANEC mapping within the Western Parkland City SEPP. This includes areas within Erskine Park, Eastern Creek and to the south of Wallacia, which are currently zoned 'general industrial' (Penrith City Council, 2010) and 'primary production' (Liverpool City Council, 2008) and include a small number of semi-rural residential dwellings and around 5 residential dwellings located within the Twin Creeks Golf and Country Club. The ANEF contour for WSI will be prepared during the detailed airspace design phase. Until an ANEF contour is prepared and approved for WSI, the prescribed WSI ANEC is to be used to inform land use planning. Any changes to relevant planning instruments as a result of adopting an ANEF could see planning conditions imposed on these additional areas.

The refinements to the preliminary flight path design since the exhibition of the Draft EIS would not change the conclusions of the overall land use assessment.

25.2.3.5 Landscape and visual amenity

The landscape and visual amenity study area includes several important environmental, cultural and historic places and routes, which have varying levels of sensitivity. Key receptors that have an elevated landscape character or visual sensitivity include the GBMA itself, many scenic lookouts, campgrounds and day use areas or protected areas, scenic and tourist drives and other heritage places. The assessment has considered the landscape and visual impacts of the project in 2033 and 2055 in areas close to WSI (being within 15 km) and the Blue Mountains.

Based on similar topography, vegetation type and cover, land use and built form (existing and emerging), 12 landscape character zones were considered within Western Sydney. Generally, the landscape character of Western Sydney would be transformed by intended changes facilitated and planned for through a number of strategic planning projects. While there would be some landscape character and visual impacts to the areas within 15 km, these would generally be of a moderate or lower impact level. The level of landscape character impact on the Luddenham village and agricultural landscape character zone would increase from moderate in 2033 to high-moderate in 2055 due to the proximity of the runway and increase in flights arriving and departing the runway.

Eight viewpoints were also considered within Western Sydney. Viewpoints from the public domain that would experience visual impacts ranging from moderate to high-moderate, include those with elevated vantage points with views to recreational areas (George Maunder Lookout at Prospect Reservoir and Warragamba Dam Lookout) and/or locations in close proximity to the Airport Site (Kemps Creek and Luddenham village).

Three landscape character zones within the Blue Mountains landscape were assessed:

- high-moderate landscape character impact in 2033 and 2055 on the Blue Mountains iconic features landscape character zone
- moderate landscape character impact in 2033 on the Blue Mountains forested hills and valleys landscape character zone, increasing to high-moderate in 2055 due to the increase in flight frequency
- moderate-low landscape character impact in 2033 and 2055 on the Blue Mountains township spine landscape character zone.

While the introduction of multiple high altitude and low frequency flights would result in a low magnitude of change to each of the landscape character zones, the variation in landscape sensitivity influences the resulting level of impact.

Of the 8 views assessed in the Blue Mountains, there would be:

- high-moderate visual impact in views from Walls lookout and Echo Point lookout due to the very high sensitivity of these views and the introduction of flights that would be perceptible moving across these views
- moderate visual impact in views from Burragorang Lookout, The Rock Lookout, Wynnes Rocks Lookout and Clearys Memorial Lookout, with the visual impact from Burragorang Lookout increasing to high-moderate in 2055 due to the increase in flight frequency at relatively low altitudes
- moderate-low visual impact in the view from the Hawkesbury Lookout. This view has an urban outlook and a moderate sensitivity, allowing it to absorb the aircraft activity with less of an impact.

From campgrounds and day-use areas within the Blue Mountains there would be a moderate visual impact in 2033 and 2055, as views of aircraft overhead would not be highly visible. If seen overhead, however, they would detract from the amenity of views.

There would be a moderate-low visual impact experienced in the views from scenic routes within the Blue Mountains, including the Great Western Highway and Bells Line of Road, during 2033 and 2055. These impacts would be intermittent and experienced particularly in locations where the flights pass over and across these views.

The project would not directly alter any natural landscape feature on the ground. However, the contribution of the sky to landscape character and its appreciation in views make the sky, in some locations, a landscape feature. This includes locations in the Blue Mountains and also where the naturalness of the sky contributes to landscape character. There is a real chance or possibility that the project would substantially alter the appreciation of the sky in views from the following viewpoints:

- south of Katoomba (represented in this assessment by the view from Echo Point)
- from lookouts along the Grose Valley (represented by the assessment of the view from Walls Lookout).

This alteration would be intermittent, would not be permanent and is reversible.

The refinements to the preliminary flight path design since the exhibition of the Draft EIS would not change the conclusions of the overall landscape and visual amenity assessment.

The design of the preliminary flight paths has aimed to minimise landscape and amenity impacts, to the maximum extent practical while still achieving safe and efficient operations. Based on the nature of the potential impacts, no reasonable or feasible project specific mitigations are considered to be available that would reduce the potential landscape and visual impacts from the project.

25.2.3.6 Biodiversity

There are a wide variety of habitats that support biodiversity values in the biodiversity study area, including the GBMA and other large tracts and isolated pockets of native vegetation (predominantly Dry Sclerophyll Forests), wildlife corridors and wetlands. These provide habitat for EPBC Act listed threatened species including 92 fauna species such as the Regent Honeyeater, Swift Parrot and Grey-headed Flying-fox, and 79 migratory species including migratory shorebirds. Fifty-eight (58) wildlife attractants (such as permanent basins, ponds, non-native ecosystems, waste management facilities, Flying-fox camps and Ibis colonies) were identified within a 30 km buffer of the WSI runway boundary.

The key potential impacts on biodiversity values and measures to address them are:

- direct impacts from wildlife strike leading to mortality. Impacts associated with wildlife strike are likely to be intermittent during WSI's operation but this would not significantly affect the viability of local populations of any species. Flying-foxes are particularly susceptible to wildlife strike. There would be no other direct impacts on biodiversity values
- indirect impacts including potential changes to noise, light, water quality, air quality and ecosystems associated with aircraft overflight:
  - noise can impact behavioural changes and communication interference in wildlife. Most noise related impacts on biodiversity would be concentrated in proximity to WSI (where the highest noise impacts are) and to a lesser degree areas where aircraft are at higher altitudes at distances from WSI. Overall, impacts from noise were assessed as low and unlikely to significantly modify species behaviours or use of habitats that are locally or regionally available
  - light spill and pollution can have adverse impacts on wildlife including behavioural and physiological changes which make them more prone to predation or wildlife strike. The project's operational light would be limited to lights on aircraft as they travel along the flight paths during nocturnal hours. This slight increase in light is unlikely to significantly affect biodiversity
  - emissions from aircraft operating along the flight paths may result in local and regional reductions in air quality. Habitats for wildlife in proximity to WSI are already highly disturbed and likely to be subject to similar emission types associated with urban development and other aircraft. Any alterations to air quality would be temporary, localised and unlikely to impact biodiversity values
  - deposition of aircraft pollutants and subsequent potential impacts on water quality are unlikely and negligible
  - fuel dumping (jettisoning) has the potential to introduce harmful contaminants into the sensitive environments within the study area such as native terrestrial and aquatic ecosystems, if not appropriately managed.
    Fuel dumping can be carried out safely and without any impacts at ground level when appropriate procedures are followed. Fuel jettisoning would only occur in accordance with the AIP ENR (Airservices Australia, 2022a).

In addition, the project:

- is unlikely to have a significant impact on Commonwealth heritage places listed under the EPBC Act
- is unlikely to have a significant impact on threatened or migratory species listed under the EPBC Act or on native plants and animals
- would not breach or raise inconsistences with any of Australia's obligations under the various biodiversity related international agreements to which it is a signatory
- is unlikely to compound impacts on biodiversity associated with the 2019-2020 bushfires.

The refinements to the preliminary flight path design since the exhibition of the Draft EIS would not change the conclusions of the overall biodiversity assessment.

The project is not likely to have significant impacts (residual or otherwise) on biodiversity. As the project is not likely to have significant impacts, the project is not obligated to provide offsets in accordance with the EPBC Act Offsets Policy.

25.2.3.7 Heritage

There are a significant number of items, places and areas within the heritage study area, with around 13,500 Aboriginal heritage sites/places and around 19,000 listed historical sites/areas. For Aboriginal heritage, this is likely to be an underestimate given the lack of systematic survey for sites within protected areas (such as the GBMA). As such, engagement with First Nations knowledge holders and stakeholders has assisted in identifying areas of particular high cultural value. For historic heritage, there are several World Heritage Areas (notably the GBMA), 19 National Heritage items, and numerous State and local heritage items. Of these places, most occur at a distance greater than 10 km from WSI.

The proposed flight paths would fly over a large number of significant sites and places, however in many cases existing flight paths already traverse the airspace above these sites and places. Many types of heritage places are also considered robust in the face of impacts such as air pollution, noise and visual impacts. In most cases aircraft would be at such a distance as to render the impact from these factors as minimal. However, the places closest to WSI are likely to experience higher impacts.

There is general acknowledgement that air pollution is likely to be detrimental to sandstone heritage buildings and Aboriginal rock art, however there has been little direct research on sites within or close to Sydney. It is impossible to evaluate the risk presented by these processes, or indeed to identify and quantify any resulting damage due to a lack of previous research and comparative data, as well as the difficulty in differentiating aircraft emission derived deterioration from other anthropogenic pollution sources via the same processes (such as acidity, nutrients and dust). However, there remains a potential impact that increased emissions to these environments may potentially result in some impact, though the likelihood of this is considered to be generally minimal.

The project would not physically impact or restrict use of an Aboriginal heritage site or place. However, it is acknowledged that noise and visual intrusion are factors that could potentially impact cultural values. In particular, noise does have the potential to disrupt cultural practices at site, which could lead to its use being discontinued. Aircraft on WSI flight paths could potentially result in detrimental indirect impacts to the cultural values of sites connected to the Emu in the Sky constellation at Faulconbridge and Emu Cave Aboriginal Place.

Due to the position of flight paths, frequency of overflight and the predicted noise levels, the project would significantly impact the Aboriginal cultural values of Bents Basin, Linden Ridge sites and the Shaws Creek – Yellomundee Aboriginal Place, which are places of cultural importance with values associated with peace, tranquillity and connection to nature. Impacts to other key sites of cultural significance identified through engagement would have low to moderate impacts due to noise and/or visual intrusion.

Mitigation measures have been developed that require the DITRDCA to ensure that the detailed design of flight paths considers Aboriginal places and sites of high cultural value, where safe and feasible. There is the likelihood that many other Aboriginal sites are located in protected valleys within the GBMA that are overflown by WSI aircraft. Due to the complexity of terrain height and orientation of rock shelters in the rugged sandstone country, it is not possible to predict to what extent this will be an issue for many of the unknown sites.

Other mitigation measures include undertaking a research program to investigate the potential impact of aircraft emissions on Aboriginal heritage sites, and establishment of a Community Aviation Consultation Group (CACG) for WSI which will facilitate consultation with stakeholders and community on a range of matters including heritage matters.

Many historic properties are located in town centres. The flight path design principles seek to avoid population centres and the flight paths design has sought to protect such places from significant impacts, although in some cases aircraft may still be visible in the distance or would be heard. It is inevitable that some properties would suffer some impact from noise given that in many cases to the west and south-west of WSI the properties are located in rural contexts. This includes properties within Mulgoa, Luddenham and Wallacia. Impacts to these items would depend on the aircraft altitude, aircraft noise impacts and the type of heritage values for which the items are listed.

Outside the GBMA, there is no discernible impact on the cultural values of nationally listed places. Of the 89 places on the Commonwealth Heritage list, only 2 are within close proximity to WSI and/or are likely to be adversely impacted by the flight paths; Orchard Hills Cumberland Plain Woodland, and Shale Woodland Llandilo.

At greater distances from WSI, noise and visibility of aircraft begins to diminish, and emissions are likely to disperse and be less concentrated. However, some cultural values remain sensitive to additional aircraft noise, while the frequency of flights can exacerbate this. This applies to the GBMA and those heritage places within it that are valued for their serenity and their ability to connect people to the spirituality of nature.

The refinements to the preliminary flight path design since the exhibition of the Draft EIS would not change the conclusions of the overall heritage assessment, either for Aboriginal or historical heritage.

25.2.3.8 Social

This Social Impact Assessment has been prepared to understand the social changes resulting from the project and has addressed the social impacts of the project in 2033 and 2055. The assessment has been based on the NSW Department of Planning and Environment's (DPE) *Social Impact Assessment Guideline for State Significant Projects 2023* and considers the actual and perceived impacts of the project. The assessment has been informed by community engagement.

The actual or perceived impacts of the project on a broad range of potential social and community issues, including changes to community composition, inequality and vulnerability, way of life, Indigenous and non-Indigenous culture, health and wellbeing, livelihoods and decision-making systems has been assessed.

Operations at WSI and the associated airspace in the Sydney Basin would sit within a well-established regulatory and management framework. Mitigation measures outlined in this EIS, and the existing planning controls (specific to WSI) will reduce the significance of the potential social impacts identified from a High significance rating to Medium or Low.

Following implementation of the flight paths, only one social impact is anticipated to remain with a High significance rating, being a potential increase of inequality for vulnerable groups located in areas within ANEC 20, N60 and N70 contours for both the 2033 and 2055 scenarios.

The refinements to the preliminary flight path design since the exhibition of the Draft EIS would not change the conclusions of the overall social assessment.

To further manage social impacts associated with the project, the WSI Community Aviation Consultative Group (CACG) will undertake consultation with stakeholders and community, including social organisations, to seek feedback on social issues and to promote social and economic welfare of the community.

25.2.3.9 Economic

Demand for aviation services is predicted to continue to increase to service Sydney's ongoing growth in population and business activities. Any shortage in capacity to meet the rising demand will affect future economic growth, productivity, employment, lifestyle and amenity of the Sydney Basin. The project is an integral part of WSI, ensuring that the benefits of WSI are realised. These benefits will grow commensurate with the forecast increase in passenger demand over time.

Overall, WSI (and the associated flight paths that allow for its operation) will be a major catalyst for investment and jobs growth in the Western Sydney region and will deliver benefits to the Australian economy more broadly. WSI will provide direct connections across the world, allowing for opportunities to enhance Western Sydney's connection to other parts of the world economy. The operation of WSI will also allow for improved access to tourism opportunities, providing better accessibility to destinations across Western Sydney and the Greater Blue Mountains. New or upgraded transport infrastructure that would be built to service WSI would also provide benefit to local communities.

It is estimated that WSI itself will generate a significant number of jobs for Western Sydney and contribute significantly to gross regional product. Ernst and Young (2016) concluded as part of the 2016 EIS that airport operations would directly generate around 8,730 jobs in 2031 increasing to 61,500 jobs by 2063. It is noted that these jobs would be generated by WSI itself and not specifically generated by the flight paths, however the project is an essential part of the overall operation of WSI.

The project, in conjunction with the broader development of WSI, has the potential to affect the tourism industry both positively (through increased tourist access) and adversely (if it results in loss of amenity at sensitive land uses). For example, the closer proximity and ready access to an international airport to the Greater Blue Mountains is expected to provide a boost to this industry. However, flight paths have the potential to negatively affect the amenity of tourist experiences in the area, either through the visual location of aircraft or the noise they will generate. The increased access to key tourist destinations, in particular for tourists visiting areas such as the Greater Blue Mountains, is considered to outweigh the potential adverse amenity impact of the flight paths.

WSI and the proposed flight paths would impact the use of the airspace. Currently the area is used by Bankstown and Camden airports for flying training, emergency services and other operations. As a result of the facilitated changes required to accommodate WSI, greater distances would need to be travelled to reach new flying training areas resulting in increased ‘transit’ flight durations, extended training schedules and increased costs including increased flying training times and increased fuel and maintenance costs. The cost of this was estimated at around $15 million in 2026 increasing at a rate of around one per cent per annum.

Operation of the project may result in potential loss in property values for residential properties that may be more adversely impacted by the operation of the flightpaths. Total impact has been estimated at around $53 million loss in total residential values in 2033, increasing to a cumulative value of around $147 million by 2055 (measured in 2022 dollars). While the impact appears high it is important to realise that residential values in Western Sydney have increased considerably over the past 10 years. Dwellings within the N70 contour (and outside the ANEC 20) are expected to have a low level of impact resulting in a loss in residential values of 3 per cent average. In all likelihood this loss would be ‘made good’ by 6 months growth in real capital gain.

The refinements to the preliminary flight path design since the exhibition of the Draft EIS would not change the conclusions of the overall economic assessment.

Project-specific mitigations have been identified, including continuing consultation with aerodrome operators and airspace users during the ongoing airspace design for WSI to consider the impacts to operators at Bankstown and Camden airports. Consultation with emergency services operators regarding priorities of airspace in order to minimise risks and associated economic costs will also continue.

25.2.3.10 Human health

The assessment of human health impacts evaluated the potential health impacts to the existing (and future) communities resulting from the project. In considering the potential impacts, the assessment focused on community health impacts resulting from changes in air quality, noise and other hazards and risks associated with the operation of aircraft from WSI.

With respect to the potential for the project to result in changes to air quality, the assessment did not identify any significant risks. Impacts to community health due to exposure to air emissions from the project in areas close to WSI would be low, and in most cases, considered to be negligible. Of the impacts identified, the potential impact to community health would occur as a result of exposure to increases in nitrogen dioxide within areas in the immediate vicinity of WSI. These potential impacts are however considered to be limited and the potential impact on respiratory health issues for the community is considered to be low. It is noted also that the areas where elevated exposures have been identified are anticipated to be rezoned in the future such that residential use would no longer be relevant.

Additionally, emissions to air derived from the operation of aircraft are expected to have a negligible impact on water quality in Prospect Reservoir or rainwater tanks in the community. Potential impacts on these water supplies would be so low they would not be measured. No risks to community health due to air emissions on a regional level were identified.

Aircraft noise from the project has the potential to result in significant increases in sleep disturbance, noise annoyance and to a lesser degree, cognitive impairment for children (assessed in terms of learning delays). These potentially significant impacts would occur at a number of locations located close to the runway, or below the immediate arrivals and departure flight paths. However, not all the locations identified as being potentially significant are used for residences, schools or childcare centres and have been used as an indicator of where issues may arise. Most of the impacts that are considered to be significant are located within the published ANEC 20 contour or the predicted 2055 ANEC contour for the project. Controls are currently in place to prevent future noise sensitive development within these areas, including new residential developments, schools and childcare centres.

DITRDCA and WSA Co will continue to liaise with State and local government agencies to ensure applicable environmental planning instruments have regard to ANEC forecasts produced for the project, where differences occur to the predicted ANEC presented in this EIS.

By 2055 there would be some additional locations, outside of the modelled ANEC 20 contours where impacts on community health may be of significance. Changes in noise as a result of operations between 2033 and 2055 would be expected to be gradual, and hence the significance of the impacts identified may be influenced by community adjustment to the presence of aircraft noise in the environment. These changes, however, may remain of significance to some members of the community.

For most refinements to the preliminary flight paths, these generally do not occur over populated areas and/or increase the distance to or altitude above populated areas and would not change the conclusions of the overall health assessment. The introduction of the RRO noise abatement procedure (RRO-NAP) and the reallocation of jet aircraft from Runway 23 Departure Northeast Night (RRO) flight path to the Runway 23 Departure Southeast Night (RRO) flight path would however result in a change in some noise impacts at night. This change in night-time noise impacts would result in some sensitive receivers no longer exceeding thresholds for L_{max} or L_{night}, however overall, the changes would be small and would not result in changes to the overall conclusions presented in the Draft EIS in terms of sleep-disturbance.

Existing strategic planning in the vicinity of WSI has considered and incorporated the operational needs of WSI into land use planning. In conjunction with the mitigation measures outlined throughout the EIS the risks to community safety and health are considered low and acceptable.

25.2.3.11 Matters of National Environmental Significance

The EPBC Act provides the national framework for protecting and managing nationally (and internationally) important flora and fauna, ecological communities and heritage places (including World heritage) that are collectively defined under the EPBC Act as ‘matters of national significance’ (MNES). The primary focus of the consideration of MNES was with respect to impacts on the World Heritage and National Heritage values and other values of the GBMA and National Heritage place.

The Greater Blue Mountains was inscribed on the World Heritage List in 2000 for both its fauna and flora values. This listing formally recognises the Outstanding Universal Value of the Greater Blue Mountains under the World Heritage Convention. At its closest point, the GBMA is around 4 nm (7 km) from WSI. The GBMA comprises one of the largest and most intact regions of protected bushland in Australia and is noted for its representation of the evolutionary adaptation and diversification of the eucalypts in post-Gondwana isolation on the Australian continent (UNESCO 2022).

The assessment of the potential impacts of the project on MNES was undertaken via an initial screening of all MNES, followed by assessment of MNES identified as potentially impacted by the project.

Four matters of MNES were identified as relevant to the project, being potential impacts to:

- a World Heritage property
- a National Heritage place
- listed threatened species or communities
- listed migratory species.

Given the nature of the project, the proposed flight paths are expected to result in minimal direct impacts on the World Heritage or National Heritage values of the area, including the criterion which relate to the Outstanding Universal Value of the site and contribute to its World Heritage status.

Direct impacts would primarily be associated with the potential for wildlife strikes to species that utilise habitats within the GBMA and the potential for localised impacts in the unlikely event of an aircraft crash. It is considered that these potential impacts would result in negligible impacts on the attributes within the GBMA relevant to both the evolutionary processes or biological diversity of the property. The project would not contribute to indirect impacts associated with the loss, degradation or damage, notably altered, modified, obscured or diminished World Heritage value.

Given the nature of the project, complete avoidance of potential impacts on the GBMA and MNES would not be possible. The design of the proposed flight paths is such that impacts expected to result from the project would have minimal direct impacts on the World Heritage or National Heritage values of the area, including the Outstanding Universal Value which contribute to its World Heritage status.

25.2.3.12 Facilitated changes

The preliminary airspace design for WSI was specifically required to avoid any impact on the ability of Sydney (Kingsford Smith) Airport to operate all existing runway modes. There would be no impact on the Sydney (Kingsford Smith) Airport curfew between 11 pm and 6 am (local time).

Through the preliminary design process, some changes were identified as being required to maintain the safety assurance of flight operations in the Sydney Basin, while also meeting the requirements of efficiency, capacity and environment. These changes are generally minor in nature, but include changes to some of the existing departures and arrivals in use at Sydney (Kingsford Smith) Airport, as well as changes to Instrument Flight Rules (IFR) and Visual Flight Rules (VFR) operations at Bankstown and Camden Airports, RAAF Base Richmond, and changes to lower level transit flights in the Sydney Basin.

Impacts would vary according to the proposed change. Changes involving more significant lateral changes in flight paths or the narrowing of flight paths for Sydney (Kingsford Smith) Airport for jet aircraft would result in changes in the area or population within N60 or N70 contours. In the case of Runway 25 departures (jets) they are infrequent and only used around 4 per cent of the year.

Changes to IFR procedures for Bankstown Airport would likely be used by around 145 movements per day. These areas are already subject to overflight by Bankstown Airport aircraft, however certain areas would be subject to an increase in the frequency and concentration of overflight, particularly arriving aircraft.

Existing flying training areas would be reduced as a result of the WSI airspace, and new possible training areas have been identified. Flying training activity is highly variable and potential overflight noise impacts from this activity cannot be accurately quantified. VFR flight operations would be constrained by WSI and RAAF Base Richmond, both laterally and vertically. VFR flight operations constitute a low number of aircraft and similar aircraft already fly over these predicted areas. However, aircraft would be flying at lower altitudes which would result in higher noise levels and more visible aircraft.

All other changes to over flights associated with flying training would involve low numbers of aircraft daily and would result in minimal changes from a noise or visual perspective.

The introduction of single runway operations at WSI and the adjustments required to Sydney Basin operations to facilitate flight paths and airspace structures will be introduced in 2026 on a scheduled Aeronautical Information Regulation and Control (AIRAC) date prior to the official opening of WSI in 2026. Introduction at this time will allow pilots and air traffic control to update their systems and become familiar with changes to current procedures before WSI commences operations and will minimise the likelihood of conflicts or incidents in the Sydney Basin airspace. Changes to flying training areas would be subject to a separate change proposal.

25.2.3.13 Cumulative impacts

Cumulative impacts are a result of incremental, sustained and combined effects of human action and natural variations over time and can be both positive and negative. The assessment considered potential impacts associated with the project in conjunction with other known and proposed developments.

The assessment of cumulative impacts was undertaken in accordance with the EIS Guidelines and adopted an approach based on the NSW *Cumulative Impact Assessment Guidelines for State Significant Projects*.

The assessment of cumulative impacts considered each of the environmental aspects requiring assessment in the EIS Guidelines. In many cases, the quantitative assessment of issues was difficult, due to the large study area, the indirect nature of potential impacts and the lack of sufficient baseline data relative to some impacts.

Cumulative impacts from flight path corridors from both WSI and other airports within the Sydney basin would occur at the location where they cross each other.

A range of cumulative impacts have the potential to occur as a result of the project's location, in proximity to current and future large-scale infrastructure projects, strategic growth areas and economic corridors associated with rapid development in Western Sydney. The cumulative effects of noise impacts from WSI in conjunction with other airspace operations would likely manifest as a greater number of noticeable events over a given period of time. Aircraft operating from WSI concurrently with aircraft from other Sydney Basin airports has the potential to increase overall noise exposure to communities being directly overflown and/or in the vicinity to other existing flight paths.

The cumulative impact of aircraft noise at locations where there are intersecting or parallel flight paths is widespread. At these locations, cumulative noise impacts from over flights are likely to be most significant. The application of WSI's flight path design principles along with the necessary separation between flight paths would inherently reduce potential cumulative impacts. Additionally, due to the relatively low number of WSI flight paths relative to existing flight paths, and the existing and proposed complex of flight paths within the Sydney Basin, the cumulative impact of introducing WSI flight path noise is not considered high.

The air quality assessment included consideration of background air quality levels (including emissions from other existing sources in the region) and found all pollutants were below regulatory criteria for 2033, with only minor short term exceedances for nitrogen dioxide in 2055. On a regional level, contributions of ozone as a result of the project make no significant difference to a 'no project' scenario in both 2033 and 2055. The assessment also found that the cumulative greenhouse gas (GHG) impacts associated with the project and related projects and developments are not considered to be significant.

Potential cumulative impacts on biodiversity related to wildlife strikes could result from the project operating in conjunction with other existing airports in the study area. A prediction of the cumulative impact on biodiversity of wildlife strikes was undertaken by comparing strike rates at other airports but does not account for the site-specific variables at each airport, including the quality of wildlife management programs applied at each airport. The cumulative impact on biodiversity as a result of wildlife strikes by aircraft operating in the Sydney region is considered low.

The assessment of cumulative aircraft related hazards and risks identified that WSI would introduce new elevated crash risks into areas that are currently subject to entirely negligible risk from existing operations. However it would introduce a very small additional crash risk into areas that are currently subject to potential risk from existing operations.

Potential cumulative impacts to landscape character and visual amenity would include changes to landscape character and views in the vicinity of WSI resulting from over flights in conjunction with future large-scale infrastructure projects. There would also be the potential for cumulative effects on the landscape character zones across the Blue Mountains, which are subject to increasing air traffic from both WSI and other airports within the Sydney Basin.

Despite the low estimates of the proportional contribution of WSI airspace emissions to the totality of air pollution within the Sydney airshed, there is the potential that increased emission levels could have a negative impact on Aboriginal rock art sites and on some historical buildings over time. However there is currently no comparative data or research to test this possibility. Despite this, it can be expected that additional emissions add to the general impact on heritage items and there is growing evidence that the deterioration will be accelerated by other anthropogenic factors such as climate change.

Positive and negative changes to composition of the community surrounding WSI may occur once the flight paths are operating in conjunction with other developments. Access to transport, social and other infrastructure would have positive cumulative impacts on the social and economic wellbeing of the community. Incremental increases in noise, alterations to air quality and light exposure may result in adverse effects to wellbeing, and changes to the way people enjoy social infrastructure and their own properties.

The refinements to the preliminary flight path design since the exhibition of the Draft EIS would not change the conclusions of the overall cumulative impacts assessment.

The implementation of project specific mitigation measures would avoid, to the greatest extent possible, cumulative impacts with surrounding developments and other airspace users and reduce the potential cumulative impacts to acceptable levels.

25.3 Mitigating and managing impacts

Each assessment chapter identifies the mitigation measures that have been included in design, are in existing policy or legislation and additional project specific measures that would be undertaken to mitigate impact during the project's operation. These are consolidated in Chapter 24 (Mitigation and management). The project's Environmental Management Framework consists of:

- relevant legislation that regulates the Australian airspace
- Condition 16 of the Airport Plan and the future airspace design principles set out in 2.2.5 of the Airport Plan and developed as part of the preliminary design phase
- regulatory oversight by the Commonwealth Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA)
- Airservices Australia's existing Environmental Management System
- the EIS management measures
- existing policies, procedures and plans developed for WSI.

The effectiveness of the proposed mitigation and management measures will be ensured through:

- further evaluation and refinement of the proposed selected airspace design for implementation based on feedback received from the community and other technical stakeholders such as airlines and industry bodies
- environmental management requirements of the Airports Act, including a system to regulate, and assign accountability for, activities at the Airport Site that generate or have the potential to generate pollution or excessive noise
- ongoing stakeholder consultation and oversight through relevant community forums as required by the Australian Government at major airports in Australia.

Under the Western Sydney Airport Plan, the Infrastructure Department is required to develop a NIPA policy in relation to aircraft overflight noise for buildings outside WSI, having regard for the 24-hour nature of operations at WSI. DITRDCA will deliver the NIPA policy which will apply to eligible properties that are significantly impacted by aircraft overflight noise from WSI. Taken together, these mechanisms will ensure that mitigation and management measures proposed are effective and achieve the intended outcomes. The application of comprehensive mitigation and management measures and continuous improvement through review of the performance of environmental controls would be implemented (refer Chapter 24 (Mitigation and management)).

25.4 Object of the EPBC Act

The environmental assessment of the proposed airport development has been conducted having regard to the objectives of the EPBC Act, which provide a policy framework within which the project can be considered. Table 25.1 evaluates the compliance of the project against each of these objects.

Table 25.1 Compliance of the project against objects of EPBC Act

Objects	Evaluation
To provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance.	This EIS assesses the likely impacts of the project and provides mitigation measures for protection of the environment. The EIS specifically assesses potential impacts on, matters of national environmental significance, including listed species and ecological communities and the GBMA, and National Heritage Place (refer Chapter 23 (Matters of National Environmental Significance)). It also considers the impacts on the general environment from the operation of the project (refer to Section 25.2.3). The planning phase of the airspace and flight design process considered environmental and social constraints including the GBMA (refer to Chapter 6 (Project development and alternatives)).
To promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources.	Ecologically sustainable development (ESD) is considered in Section 25.5.
To promote the conservation of biodiversity.	The potential impacts of the project on biodiversity are assessed in detail in Chapter 16 (Biodiversity) and protection measures to avoid, mitigate and offset potential impacts on biodiversity have been developed (see Chapter 24 (Mitigation and management)).
To promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and indigenous peoples.	The airspace and flight path design process has involved consultation with key stakeholders including Forum on Western Sydney Airport, and community and First Nations knowledge holders have been engaged with during the preparation of the EIS. Consultation with key stakeholders and the community following the exhibition of the EIS informed the finalisation of the detailed flight paths (refer Chapter 9 (Community and stakeholder engagement).
To assist in the co-operative implementation of Australia's international environmental responsibilities.	The airspace and flight path design process included consideration of approaches to minimise impacts on areas. The planning phase of the airspace and flight design process considered environmental and social constraints including consideration of the potential impacts to the GBMA and Australia's obligations under the World Heritage Convention to protect this World Heritage Property, its Outstanding Universal Value and its integrity. The preparation of this EIS (and the supporting technical paper addressing potential impacts on the GBMA – Technical paper 14), is considered to be consistent with the guidance on integrating natural World Heritage sites into environmental assessments as outlined in the *Guidance and Toolkit for impact assessments in a World Heritage Context* (UNESCO, 2022a) and the preceding IUCN Advice Note (IUCN, 2013) (which is a requirement of the EIS Guidelines). The project has adopted the ICAO Balanced Approach to Aircraft Noise Management for the safety of international civil aviation. This includes minimising the adverse environmental effects of civil aviation activities, including aircraft noise.

Objects	Evaluation
To recognise the role of indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity.	Extensive consultation with First Nations peoples has occurred in relation to the protection and management of the environment (refer Chapter 9 (Community and stakeholder engagement)).
To promote the use of indigenous peoples' knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.	Extensive consultation with First Nations peoples has occurred in relation to the protection and management of the environment (refer Chapter 9 (Community and stakeholder engagement)).

25.5 Principles of ecologically sustainable development

The promotion of Ecological Sustainable Development (ESD) through the conservation and ecologically sustainable use of natural resources is an object under section 3 of the EPBC Act. Section 3A of the EPBC Act defines the principles of ecologically sustainable development. A discussion on the project's compliance with the principles of ecologically sustainable development against section 3A is provided in the Table 25.2.

Table 25.2 Evaluation of the project against ESD principles

Principle	Evaluation
Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.	The development of the project as part of WSI would be consistent with the objective of effectively integrating both long-term and short-term economic, environmental, social and equitable considerations in decision making. This EIS has considered the environmental impacts and issues of the preliminary airspace and flight path design associated with Stage 1 Development. The proposed airport would provide both short and long-term benefits in terms of job creation and provision of accessibility to aviation services. WSI would also address the long-term aviation capacity requirements of the Sydney region.
If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.	The precautionary principle states that if there are threats of serious environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In applying the principle, decisions should be guided by careful evaluation to avoid, wherever practicable, serious damage to the environment, including an assessment of the risks associated with various options. The planning phase of the airspace and flight design process considered environmental and social constraints including the GBMA (refer to Chapter 6 (Project development and alternatives)) and this EIS implemented a compliance, risk, and/or significance-based approach to impact assessment (refer Chapter 10 (Approach to impact assessment)). The assessments of the potential impacts of the project are consistent with the precautionary principle. The assessments undertaken are consistent with accepted scientific and assessment methodologies and have considered relevant statutory and agency requirements. The assessments have applied a conservative approach with regard to the modelling used. Lack of full scientific certainty has not been used as a reason to postpone or avoid identification and adoption of design or management measures to avoid or minimise environmental degradation. This EIS higher risk aspects are to be managed through avoidance or suitable mitigation strategies as outlined in Section 25.2.3.

Principle	Evaluation
The principle of inter-generational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.	The principle of intergenerational equity states that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. The project would support the operation of proposed airport which would be consistent with the principle of intergenerational equity. Given the project development and alternatives considered (refer to Chapter 6 (Project development and alternatives)) and the proposed management framework (refer Chapter 24 (Mitigation and management)), the implementation of the project as part of WSI, would ensure there would be no significant impact that would diminish the health, diversity or productivity of the environment for future generations. The incremental nature of the long-term development of WSI would provide opportunities for intergenerational equity and decision making that takes full advantage of changing conditions and technologies. The project, as part of WSI, would also provide a broad range of economic benefits which would continue to increase with time.
The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making.	The conservation of biological diversity and ecological integrity should be a fundamental consideration of any development proposal. The project would support the operation of proposed airport which would be consistent with this principle. Where feasible, the project, as part of WSI, has minimised impacts on sensitive ecological areas during design. Mitigation measures include those relating to minimising the risk of wildlife strike.
Improved valuation, pricing and incentive mechanisms should be promoted.	The principle of improved valuation states that environmental factors should be considered in the valuation of assets and services. The principle is implicit in such concepts as 'polluter pays', lifecycle costing, and triple bottom line accounting. The assessment has identified the environmental and other consequences of the project, and identified mitigation measures, where appropriate, to manage potential impacts. If approved, the project would be implemented in accordance with relevant legislation and the proposed management framework. These requirements would result in an economic cost to the proponent. The implementation of mitigation measures would increase both the capital and operating costs of the project; this signifies that environmental resources have been included in the valuation of assets and services in the design and assessment of the proposal. The value of environmental resources is also inherently considered in the development of a design that has avoided and minimised impacts where possible (acknowledging the project must meet civil aviation safety regulatory standards and other international rules and regulations). Costing of proposed mitigation measures will be considered by DITRDCA and the Australian Government as part of its overall funding for WSI, including operation of flight paths and the construction and operation of the WSI Stage 1 Development. The cost of mitigation measures are included in the total estimated project costs. The costing of mitigation measures will have particular regard to the key mitigations outlined in this EIS including, but not limited to, the implementation of the final NIPA policy in relation to aircraft overflight noise for buildings outside the Airport Site. The detailed cost associated with the NIPA policy will be provided when the program guidelines are finalised.

25.6 Concluding statement

This EIS has been prepared to address the requirements of Condition 16 of the Airport Plan and support the request to the Australian Minister for the Environment and Water for advice in accordance with Section 160 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Advice from the Minister is required prior to any approval of the airspace and flight paths.

The project has been developed by an Expert Steering Group led by the Australian Government DITRDCA, including Defence, ASA, and CASA and is an integral part of WSI, ensuring that the benefits of WSI are realised.

The project will achieve the overall objectives for WSI by enabling single runway operations to commence through the introduction of new flight paths and a new controlled airspace volume. The preliminary airspace and flight paths have been designed to minimise community impacts as much as possible through the incorporation of flight path design principles intended to avoid, manage or otherwise minimise the unavoidable residual impacts, including aircraft noise.

WSI would be a major catalyst for investment and jobs growth in the Western Sydney region and would deliver benefits to the Australian economy more broadly.

WSI would provide direct connections to the world, allowing opportunities for residents and the community to enhance Western Sydney's connection to world economies. Tourism is also expected to be boosted, with WSI providing improved accessibility to destinations across Western Sydney and the Blue Mountains. New or upgraded transport infrastructure that would be built to service WSI would also provide benefit to local communities.

Extensive stakeholder and community consultation and engagement has been carried out as part of the EIS, including dedicated engagement to support the release of the online Aircraft Noise Tool as well as exhibition of the Draft EIS. Engagement also included consultation with First Nations representatives and communities within the surrounding Local Government Areas. Feedback received throughout the engagement process and during exhibition of the Draft EIS was used to inform the current project design (including a series of design refinements to the preliminary flight paths) and, where applicable, will inform the ongoing detailed design process.

The EIS found that impacts associated with the operation of the WSI flightpaths would have adverse impacts in relation to aircraft noise. Noise will result in changes in amenity and impacts on Aboriginal Places and sites of high cultural value.

A suite of mitigation measures has been developed to further minimise and mitigate operational impacts, where safe and feasible. There are a range of operational measures that will mitigate the impacts of aircraft noise. Also, there are land use planning controls in place to safeguard the operations of WSI while protecting future communities from aircraft noise. The NIPA policy has been established to ameliorate residual noise impacts where applicable.

While mitigation measures would serve to minimise impacts, residual impacts would remain for communities subject to high levels of aircraft noise and/or the visual presence of aircraft (and the associated amenity impacts) given these are an unavoidable consequence of aircraft operations.

The residual impacts of the project need to be considered within the context of the overall objectives of the project and the significant benefits WSI would provide over the short to longer term and particularly for future generations. The consequences of not proceeding with the ongoing design development would compromise the success of WSI.

The project has been evaluated as consistent with the objects of the EPBC Act and principles of ESD defined under the EPBC Act. DITRDCA, Airservices Australia and WSA Co are committed to managing the potential impacts to the environment through commitments to mitigation measures to further reduce remaining residual impacts. Future design phases would continue to ensure a rigorous approach to the finalisation and implementation of the airspace and flight path design.

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Appendix A

Proponent details and environmental record

Designated Proponent information

Title of the Action:	Western Sydney International airspace and flight path design
EPBC Referral Number:	2022/9143
Designated proponent:	Department of Infrastructure, Transport, Regional Development, Communications and the Arts
ABN:	86 267 354 017
Postal address:	111 Alinga Street, Canberra, Australian Capital Territory (ACT) GPO Box 594, Canberra ACT 2601

Other referring parties

Name	Airservices Australia
ABN:	59 698 720 886
Postal address:	Alan Woods Building, 25 Constitution Avenue, Canberra ACT GPO Box 367, Canberra ACT 2601

Name	Civil Aviation Safety Authority
ABN:	44 808 014 470
Postal address:	Aviation House, 16 Furzer Street, Phillip ACT GPO Box 2005, Canberra ACT 2601

Environmental record of the responsible party

		Yes	No
1	**Does the party taking the action have a satisfactory record of responsible environmental management?** The Australian Government, as represented by the Department of Infrastructure, Transport, Regional Development, Communications and the Arts, has demonstrated commitment to responsible environment management.	X	
2	**Has either (a) the party proposing to take the action, or (b) if a permit has been applied for in relation to the action, the person making the application – ever been subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of the natural resources?** The Australian Government, through its various departments and agencies, has been subject to proceedings various jurisdictions in relation to the protection of the environment and the conservation and sustainable use of natural resources.	X	
3	**If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework?** The Australian Government is not a corporation.		X
4	**Has the party taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?** The Australian Government, through its various departments and agencies, has undertaken numerous activities which have been the subject of referral and approval (as relevant) under the EPBC Act. This includes the referral for the Proposed Western Sydney Airport (2014-7391).	X	

Appendix B

EIS team

Names of persons involved in preparing the EIS

Name	Organisation	Role in the EIS
Project leadership team		
Western Sydney Airport Regulatory Policy Branch	Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA)	Program Management and counter party to all WSP personnel
Bruce Lean	WSP	Senior Program Manager
Louise MacDonald	WSP	Project Manager
Paula Bradshaw	WSP	Program Manager Stream 1 Specialist Manager
Ken Conway	Airbiz	Aviation planning and operations advisor (aircraft noise, airspace and facilitated airspace changes)
Mark Willey	Airbiz	Airspace architecture and capacity specialist
Greg Marks	Airbiz	Aviation expert advisor and peer reviewer (aircraft noise and GHG emissions)
David Cohney	Airbiz	Aviation expert advisor and peer reviewer (aircraft noise and GHG emissions)
Jye Robinson	WSP	Project controls support and field work assistance (wildlife strike)
EIS documentation		
Caitlin Bennett	WSP	EIS Lead
Helen Sloane	WSP	EIS author
Jarryd Barton	WSP	EIS author
Kerrie Atkins	WSP	EIS author/Specialist assistance
Damian Williams	WSP	EIS author/Specialist assistance/EIS Lead (alternate)
Natalia Anderson	WSP	EIS author
Mik Barrow	WSP	EIS author
Kerry Gassner	WSP	Document production
Geospatial and graphics		
Emma Buxton	WSP	GIS
Rebecca Choi	WSP	GIS
Isaac Augey	WSP	GIS

Name	Organisation	Role in the EIS
Lachlan Reinheimer	WSP	Graphic Designer
Nic Drummond	WSP	Graphics
Jessie Milligan	WSP	Graphics
Niall Hargrave	WSP	Graphics
Michael Sparrow	WSP	Visualisation photomontages lead
Raymond Castro	WSP	Visualisation photomontages
Tony Kaihea	WSP	Visualisation photomontages
Lachlan Reinheimer	WSP	Graphic Designer
Nicholas Barnard	WSP	Digital
Community and stakeholder		
Deborah Palmer	Deborah Palmer Consulting	Stream 2 Program Manager
Chris O'Brien	WSP	Engagement Lead
Katie Casson	WSP	Engagement Manager
Calli Brown	WSP	Digital Engagement Lead
Abby Kernaghan	WSP	Engagement Support – Community relations
Lucy Dinn	WSP	Engagement Support
Olivia Dodds	WSP	Engagement Manager
Oscar Langley	WSP	Engagement Support
Steve Nguyen	WSP	Engagement Support
Rebecca Smith	WSP	Engagement
Aircraft noise		
Martin Leprohon	Airbiz	Aircraft Noise
Tristan Noel	Airbiz	Aircraft noise technical assistant (lead AEDT modeller)
Adam Wing	Airbiz	Aircraft noise technical assistant (assistant AEDT modeller) and geospatial support
Hannah Fairbairn	Airbiz	Aircraft noise technical assistant and demand schedule analyst
Blake Gaudry	Airbiz	Geospatial and creative design support
Amina Ziana	Airbiz	Creative design lead
Alex Lampadov	Airbiz	Computer aided design assistant
Daniel Wanasili	Airbiz	Aircraft noise advisor and peer reviewer

Name	Organisation	Role in the EIS
Noise monitoring		
Rebecca Warren	WSP	Noise monitoring lead
Neil Macabenta	WSP	Noise monitoring
Linnea Eriksson		Noise monitoring
Mo Ali		Noise monitoring
Lance Robles	WSP	Noise monitoring
Jennifer Feng	WSP	Noise monitoring
Air quality		
Aleks Todoroski	Todoroski Air Sciences (TAS)	Air quality lead
Daniel Kjellberg	TAS	Air Quality lead technical modeller
Philip Henschke	TAS	Regional air quality lead
Greenhouse gas and climate		
Ken Conway	Airbiz	GHG emissions and climate lead
Tristan Noel	Airbiz	GHG emissions technical assistant (full flight emissions)
Adam Wing	Airbiz	GHG emissions technical assistant (lead AEDT modeller for emissions below 10,000 ft)
Daniel Wanasili	Airbiz	GHG emissions model peer reviewer
Aircraft hazards and risk		
Mark Eddowes	Eddowes Aviation Safety Limited (EASL)	Hazards and risk lead
Kate Grant	EASL	Hazards and risk technical assistant
Land use		
Natalia Anderson	WSP	Planning and land use author
Damian Williams	WSP	Planning and land use lead
Paul Greenhalgh	WSP	Planning and land use technical reviewer
Landscape and visual		
Flora Wehl	IRIS	Landscape and visual assessment specialist author
Suzie Rawlinson	IRIS	Landscape and visual assessment specialist lead
Tania Metcher	IRIS	Landscape and visual assessment specialist author

Name	Organisation	Role in the EIS
Biodiversity		
Toby Lambert	WSP	Biodiversity lead and technical reviewer
Tanya Bangel	WSP	Biodiversity author
Wildlife strike		
Kylie Patrick	Avisure	Wildlife strike assessment lead, author, project manager (Principal Consultant)
Alexandra Stone	Avisure	GIS support and field work (Senior Wildlife Biologist)
Charlotte (Xiang Nin) Kok	Avisure	Administrative support (Wildlife Biologist/Administration)
Jeff McKee	Avisure	Technical contributor (Director of R&D)
Martin Ziviani	Avisure	Field work (Senior Wildlife Biologist)
Phil Shaw	Avisure	Technical contributor (Managing Director)
Will Jamieson	Avisure	Field work, technical review (Principal Biologist)
Chaos Degan-Delauney	WSP	Field work assistance
Greater Blue Mountains World Heritage Area		
Jarryd Barton	WSP	Author
Caitlin Bennett	WSP	Technical reviewer
Bruce Lean	WSP	Technical reviewer
Heritage		
Sue McIntyre-Tamwoy	Navin Officer Heritage Consultants (NOHC)	Heritage lead
Jacob McIntyre	NOHC	Heritage author
Kelvin Officer	NOHC	Heritage author
Meg Walker	NOHC	Heritage author
Nicola Hayes	NOHC	Heritage author

Name	Organisation	Role in the EIS
Indigenous heritage engagement		
Shane Smithers	500 Voices	Darug Culture Specialists. Provided an Indigenous perspective, Indigenous knowledge and input into community engagement
Saskia Reijners	500 Voices	Darug Culture Specialists. Provided an Indigenous perspective, Indigenous knowledge and input into community engagement
Matt Pellow	WSP	Indigenous Specialist Services/ Stakeholder and community engagement
Social		
Carla Martinez	WSP	Social impact assessment lead
Elena Bakhanova	WSP	Social impact assessment author
Jessica Walker	WSP	Social impact assessment author
Sian Hromek	WSP	Social impact assessment author
Felicity Richards	WSP	Social impact assessment technical reviewer
Sophie Le Mauff	WSP	Social impact assessment author
Economic		
Adrian Hack	Hill PDA	Economic impact assessment lead
Aneta Ramos	Hill PDA	Economic impact assessment author
Elizabeth Griffin	Hill PDA	Economic impact assessment author
Henry Zheng	Hill PDA	Economic impact assessment author
Nick Hill	Hill PDA	Economic impact assessment author
Taylor Richardson	Hill PDA	Economic impact assessment author
Human health		
Jackie Wright	Environmental Risk Sciences Pty Ltd (EnRiskS)	Health – Technical lead
Facilitated impacts		
Ken Conway	Airbiz	Facilitated airspace changes lead
Mark Willey	Airbiz	Aviation planning and operations advisor
Greg Marks	Airbiz	Airspace architecture and capacity specialist
Adam Wing	Airbiz	Aircraft noise technical lead
Daniel Wanasili	Airbiz	Aircraft noise and MNES technical advisor and peer reviewer

Appendix C

EIS Guidelines

Guidelines for the content of a draft Environment Impact Statement

Western Sydney International airspace and flight path design

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
1 – General Content	The EIS should be a stand-alone document that contains sufficient information to avoid the need to search out previous or supplementary reports.	EIS – the EIS is a standalone document and contains sufficient information.
	The EIS should take into consideration the EPBC Act Significant Impact Guidelines and other relevant EPBC Act policy statements that can be downloaded from the following web site: https://www.awe.gov.au/environment/epbc/policy-statements.	EIS – the EIS has had due regard to the EPBC Act Significant Impact Guidelines. The EIS represents a comprehensive assessment of the potential impacts associated with the operation of the project Chapter 10 (Approach to impact assessment) – Section 10.2.
	The EIS should enable interested stakeholders and the Minister to understand the environmental consequences of the proposed development. Information provided in the EIS must be objective, clear, succinct and, where appropriate, be supported by maps, plans, diagrams or other descriptive detail. The body of the EIS is to be written in a clear and concise style that is easily understood by the general reader. Technical jargon should be avoided wherever possible. Cross-referencing should be used to avoid unnecessary duplication of text but must be specific (e.g. section 1.1.1).	EIS – the EIS enables interested stakeholders and the Minister to understand the environmental consequences of the proposed development.
	The EIS should be done in consultation in Airservices Australia and have regard to relevant Airservices Australia policies and standards.	EIS – the EIS was done in consultation with Airservices Australia and has regard to relevant Airservices Australia policies and standards Chapter 5 (Statutory context) – Section 5.2 Chapter 9 (Community and stakeholder engagement) – Section 9.2 Appendix D (List of persons and agencies consulted during the preparation of the EIS).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
	In assessing World Heritage, the EIS should take into consideration the *World Heritage Advice Note: Environmental Assessment* that can be downloaded from the following web site: https://www.iucn.org/sites/dev/files/import/downloads/iucn_advice_note_environmental_assessment_18_11_13_iucn_template.pdf	EIS – the EIS takes into consideration the World Heritage Advice note, including Technical paper 9 (Heritage) and Technical paper 14 (Greater Blue Mountains World Heritage Area).
	The level of analysis and detail in the EIS should reflect the level of significance of the expected impacts on the environment and heritage. Any and all unknown variables or assumptions made in the assessment must be clearly stated and discussed. The extent to which the limitations, if any, of available information may influence the conclusions of the environmental assessment should be discussed.	EIS Part C – Environmental impact assessment Technical papers 1 to 14.
	Detailed technical information, studies or investigations necessary to support the main text should be included as appendices to the EIS. It is recommended that any additional supporting documentation and studies, reports or literature not normally available to the public from which information has been extracted be made available at appropriate locations during the period of public display.	Technical papers 1 to 14.
	If it is necessary to make use of material that is considered to be of a confidential nature, the proponent should consult with the department before submitting it to the Minister for approval for publication.	N/A
	The proponent should ensure that the EIS assesses compliance of the action with principles of Ecological Sustainable Development as set out in the EPBC Act, and the objects of the Act at Attachment 1. A copy of Schedule 4 of the EPBC Regulations, *Matters to be addressed by draft public environment report and environmental impact statement* is at Attachment 2.	Chapter 25 (Conclusion) – Section 25.4.

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
2 – Format and Style	The EIS should comprise three elements, namely: • the executive summary; • the main text of the document; and • appendices containing detailed technical information and other information that can be made publicly available.	EIS – the EIS comprises a summary document, Parts A to D, appendices and technical papers.
	The guidelines have been set out in a manner that may be adopted as the format for the EIS. This format need not be followed where the required information can be more effectively presented in an alternative way. However, each of the elements must be addressed to meet the requirements of the EPBC Act and Regulations.	EIS – each element of the guidelines have been addressed as outlined in this checklist.
	The EIS should be written so that any conclusions reached can be independently assessed. To this end, all sources must be appropriately referenced. The reference list should include the address of any Internet web pages used as data sources.	EIS Part C – Environmental impact assessment Chapter 25 (Conclusion) Chapter 26 (References) Technical papers 1 to 14.
	The main text of the EIS should include a list of abbreviations, a glossary of terms and appendices containing: • a copy of these guidelines; • a list of persons and agencies consulted during the EIS; • contact details for the proponent; and • the names of the persons involved in preparing the EIS and work done by each of these persons.	Abbreviations and glossary of terms is provided at the front of the EIS Appendix A (Proponent details and environmental record) Appendix B (EIS team) Appendix C (EIS Guidelines) The organisations, agencies and individuals are detailed in Chapter 9 (Community and stakeholder engagement) – Section 9.2.

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
	Maps, diagrams and other illustrative material should be included in the EIS. The EIS should be produced on A4 size paper capable of being photocopied, with maps and diagrams on A4 or A3 size and in colour where possible. The proponent should consider the format and style of the document appropriate for publication on the Internet. The capacity of the website to store data and display the material may have some bearing on how the document is constructed.	EIS Parts A to D Technical papers 1 to 14.
Specific Content		
3 – Background Information	The EIS must provide the background and context of the action including:	EIS Parts A and B.
	a. the title of the action;	Chapter 1 (Introduction) – Section 1.1.
	b. the location of the action;	Chapter 1 (Introduction) – Section 1.1.
	c. the legislative background and approvals framework for the action;	Chapter 5 (Statutory context) – Sections 5.1 and 5.2.
	d. the current status of the action;	Chapter 1 (Introduction) – Section 1.1.
	e. a clear outline of the objective of the action;	Chapter 1 (Introduction) – Section 1.2.
	f. the consequences of not proceeding with the action;	Chapter 6 (Project development and alternatives) – Section 6.1.
	g. consultation undertaken about the action with stakeholders and identification of key issues and views expressed;	Chapter 9 (Community and stakeholder engagement) – Sections 9.2 and 9.3.
	h. describe how the action relates to any other actions (of which the proponent should reasonably be aware) that have been, are being or are proposed to be taken or that have been approved in the region affected by the action; and	Chapter 5 (Statutory context) – Section 5.4.

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
	i. describe the legislative basis for the referral, as well as the following: – the full name and postal address of all agencies referring the action; – identification of the designated proponent; – identification of the person proposing to take the action; and – outline responsibilities for preparing the EIS.	Chapter 1 (Introduction) – Section 1.3 Chapter 5 (Statutory context) – Sections 5.1 and 5.2 Appendix A (Proponent details and environmental record) Appendix B (EIS team).
4 – Description of the action	This section must describe the proposal in sufficient detail to allow an understanding of all stages and components of the proposal, and to determine potential environmental impacts associated with the proposal.	Chapter 7 (The project).
	The project must be described in the text and illustrated with maps, diagrams, plans (at a suitable scale) and other information as required to provide sufficient context and basis for the identification and assessment of impacts.	Chapter 7 (The project).
	Include the precise location (including coordinates) of all elements of the action that may have impacts on Matters of National Environmental Significance (MNES).	Chapter 10 (Approach to impact assessment) – Section 10.2 Chapter 23 (Matters of National Environmental Significance) – Section 23.3 Appendix E (Project coordinates).
	Detail the process undertaken to develop the flight paths, including any key factors in determining the routes.	Chapter 6 (Project development and alternatives) – Sections 6.2 and 6.3.
	Describe the following: a. operating hours and flexibility of operating arrangements;	Chapter 7 (The project) – Sections 7.1 and 7.4.
	b. runway operating modes for both day and night, noting any seasonal variations	Chapter 7 (The project) – Section 7.4.

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
	c. flight paths and other operational procedures governing aircraft movements, including an estimate of normal variability of movements on defined flight paths, and locational criteria governing flight path selection	Chapter 7 (The project) – Section 7.5 In the EIS, the 'locational' criteria for the selection of flight paths is: • in the development phase (Chapter 6 (Project development and alternatives) – Sections 6.1 and 6.3) – which is informed by SIDs and STARs, noting Chapter 6 also refers to the scope boundaries for the determination of flight paths between the runway and enroute (for example, fixed airfield geometry and infrastructure) • based on air traffic control procedures managed by air traffic control (Chapter 7 (The project) – Section 7.3) • determined by the selection of the runway mode of operation by air traffic control based on weather/night-time operations (Chapter 7 (The project) – Section 7.4).
	d. expected flight frequencies with number and percentage of aircraft movements by type, typical annual and daily movements;	Chapter 7 (The project) – Section 7.2.
	e. expected noise pollution and light levels in relation to flight path selection, aircraft heights and flying patterns;	Chapter 7 (The project) – Section 7.5 Chapter 11 (Aircraft noise).
	f. aircraft operating heights for approaches and departures, variability of aircraft heights for given locations, and describe flight paths of the proposed action; and	Chapter 7 (The project) – Section 7.5.
	g. underlying assumptions and forecast reliability.	Chapter 7 (The project) – Section 7.2.
	Include updated information if any changes have been made to the project since the referral documentation was submitted.	Chapter 7 (The project).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
5 – Feasible Alternatives	Describe any feasible alternatives to the action including: a. the alternative of taking no action (if relevant);	Chapter 6 (Project development and alternatives) – Section 6.1.
	b. alternative flight paths considered; and	Chapter 6 (Project development and alternatives) – Section 6.3.
	c. sufficient detail to make clear why any alternative is preferred to another.	Chapter 6 (Project development and alternatives) – Section 6.3.
	Short, medium and long-term advantages and disadvantages of the options should be discussed.	Chapter 6 (Project development and alternatives) – Section 6.3.
	If there are no feasible alternatives, provide sufficient information as to why this is the case and why there are no alternatives for the airspace design.	Chapter 6 (Project development and alternatives) – Sections 6.1 and 6.3.
6 – Description of the Environment	The EIS must include a description of the environment, land uses and character of the proposal site and the surrounding areas that may be affected by the action. It must include the following: a. The EIS must include a description of the environment, land uses and character of the proposal site and the surrounding areas that may be affected by the action. It must include the following: A general description of the environment on the Airport Site. Include a brief statement on the current status of on-ground construction works, including ground activities and aeronautical infrastructure to manage aircraft operations, and the expected state of the site upon commencement of the proposed action.	Chapter 4 (Project setting) – Sections 4.2 and 4.3.

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
	b. A general description of the environment in surrounding areas that may be affected by the proposed action. This should include details of current and historical land use of the area, and proposed urban, industrial, rural and tourism activities within areas that may be affected by the proposal. Undertake an ambient noise study in surrounding areas that may be affected by the proposed action and describe the findings in the context of land use and sensitive receivers.	Chapter 4 (Project setting) – Section 4.3 EIS Part C – Environmental impact assessment chapters (Existing environment section) Technical papers 1 to 14, including Technical paper 1 (Aircraft noise).
	c. Identify known historical records of fauna and undertake an assessment to identify species and suitable habitat in the area. Identify species relevant to impacts of the action and provide:	Chapter 16 (Biodiversity) – Section 16.5 Technical paper 5 (Wildlife strike risk) – Chapter 6 (Impact assessment) Technical paper 8 (Biodiversity) – Chapter 5 (Existing biodiversity values) and Appendix B.
	– A description of species characteristics, preferred habitat, and any state or commonwealth threatened or migratory listing status;	Chapter 16 (Biodiversity) – Section 16.5 Technical paper 5 (Wildlife strike risk) – Chapter 6 (Impact assessment) Technical paper 8 (Biodiversity) – Chapter 5 (Existing biodiversity values).
	– The location, relative to the action;	Chapter 16 (Biodiversity) – Section 16.5 Technical paper 5 (Wildlife strike risk) – Chapter 1 (Introduction) Technical paper 8 (Biodiversity) – Chapter 4 (Methodology).
	– The amount and quality of habitat, breeding areas, movement corridors or flight paths, threats and the regional context; and	Chapter 16 (Biodiversity) – Section 16.5 Technical paper 5 (Wildlife strike risk) – Chapter 6 (Impact assessment) Technical paper 8 (Biodiversity) – Chapter 5 (Existing biodiversity values).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
	– Detailed mapping and present details on the scope, timing/effort (survey season/s) and methodology for studies and surveys used to provide information on the relevant fauna. This includes details of how best practice survey guidelines have been applied and for commonwealth listed threatened species, how surveys are consistent with (or a justification for divergence from) published Australian Government guidelines and policy statements.	Chapter 16 (Biodiversity) – Section 16.3 Technical paper 5 (Wildlife strike risk) – Chapter 3 (Methodology) Technical paper 8 (Biodiversity) – Chapter 4 (Methodology).
	d. Identify any listed World Heritage properties and National Heritage places that may be impacted by the proposed action. – Provide information about location, physical features, condition, historical context, current uses, and social, economic and cultural aspects of the property; and	Technical paper 9 (Heritage) – Chapter 4 (Existing conditions) Technical paper 14 (Greater Blue Mountains World Heritage Area) – Chapter 3 (Project setting).
	– Provide a description of the World Heritage and National Heritage values of the Greater Blue Mountains Area World Heritage property and National Heritage Place (GBMA), as described in the Statement of Outstanding Universal Value, and the values of any additional World Heritage properties and National Heritage places identified. Include references to the listing criteria, as well as integrity, including Aboriginal cultural connections with the land and any wilderness heritage of the property.	Technical paper 9 (Heritage) – Chapter 4 (Existing conditions) Technical paper 14 (Greater Blue Mountains World Heritage Area) – Chapter 3 (Project setting).
	e. Identify any Commonwealth lands relevant to the impacts of the action. If sites are identified, provide a description of the land, current usage and ownership (if known), along with any listed Commonwealth heritage sites and other relevant components of the environment on Commonwealth land.	Chapter 4 (Project setting) – Sections 4.5 and 4.6.

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
	f. Identify any places with heritage value, as a component of the whole of the environment, in areas relevant to the impacts of the action. Information gathering should be integrated into consultation processes using a method that is accessible to all members of the community for which the site has value. Heritage values include any element of a place's natural and cultural environment, including Aboriginal cultural heritage, that has aesthetic, historic, scientific, social or other significance, for current and future generations – see the Significant Impact Guidelines 1.2 for further detail. Further discussion with the department can determine this scope of work.	Chapter 4 (Project setting) – Sections 4.4 and 4.6 EIS Part C – Environmental impact assessment chapters (Existing environment section) Technical paper 8 (Biodiversity) – Chapter 5 (Existing biodiversity values) Technical paper 9 (Heritage) – Chapter 4 (Existing conditions) Technical paper 10 (Social) – Chapter 4 (Existing environment) Technical paper 14 (Greater Blue Mountains World Heritage Area) – Chapter 3 (Project setting).
	g. A description of the environment in all areas of potential impact, including all components of the environment as defined in Section 528 of the EPBC Act: – ecosystems and their constituent parts, including people and communities; – natural and physical resources; – the qualities and characteristics of locations, places and areas, – heritage values of places; and – the social, economic and cultural aspects of a thing mentioned in paragraph a, b, c or d.	Chapter 4 (Project setting) – Sections 4.3 to 4.6 EIS Part C – Environmental impact assessment chapters (Existing environment section) Technical papers 1 to 14 (Existing environment section).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
	Relevant policy includes the Significant Impact Guidelines 1.2 Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies (2013) which states that in understanding the environmental context of the action, it is helpful to determine whether any components or features of the environment are "rare, endemic, unusual, important or otherwise valuable". See also the EPBC Act Policy Statement – Definition of 'Environment' under section 528 of the EPBC Act.	EIS, including Chapter 10 (Approach to impact assessment) – Section 10.2 Technical papers 1 to 14.
7 – Relevant impacts	Based on the information provided in the referral, including the nature and scale of the proposed action, the department considers that impacts potentially arise in relation to fauna, heritage, people and communities, and air pollution as a result of flight paths used by aircraft to arrive and depart the Airport.	EIS Part C – Environmental impact assessment chapters (Impact assessment section) Technical papers 1 to 14 (Impact assessment section).
	Should any other aspects of the environment be identified by the proponent that may or are likely to be significantly impacted, these need to be described and assessed in an appropriate manner and the department should be informed at the earliest opportunity.	EIS Part C – Environmental impact assessment chapters (Impact assessment section) Technical papers 1 to 14 (Impact assessment section).
	It is the proponent's responsibility to be aware of any changes to the listing status and distribution of listed threatened and migratory species and ecological communities. Information is available in the Species Profile and Threats (SPRAT) Database. The proponent must ensure that a recent Protected Matters Search Tool (PMST) report has been generated and considered before finalising the draft EIS. This PMST should be provided as an attachment to the EIS.	Technical paper 8 (Biodiversity) – Chapter 4 (Methodology) and Appendix A4 (Protected Matters Search Tool results).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
7.1 – Describe and assess relevant impacts	The EIS must include a description of all of the relevant impacts of the action (including direct, indirect, facilitated and cumulative), including the magnitude, duration and frequency of the impacts. Relevant impacts are impacts that the action will have or is likely to have.	EIS Part C – Environmental impact assessment chapters (Impact assessment section) Chapter 21 (Facilitated impacts) – Section 21.5 Chapter 22 (Cumulative impacts) – Section 22.4 Technical papers 1 to 14, including Technical paper 13 (Facilitated changes).
	a. Provide the following information: – a detailed assessment of the nature and extent of the likely short-term and long-term relevant impacts; – a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible; – analysis of the significance of the relevant impacts; and – any technical data and other information used or needed to make a detailed assessment of the relevant impacts, including details of the scope, timing (survey season/s) and methodology for studies or surveys used to provide information.	EIS Part C – Environmental impact assessment chapters (Impact assessment section) Technical papers 1 to 14 (Impact assessment section).
	b. The EIS should identify and address facilitated impacts on operations at Sydney (Kingsford Smith) Airport and other aerodromes and aviation activities in the region as a direct result of arrival and departure paths into and out of the Airport and associated airspace control zone.	Chapter 21 (Facilitated impacts) – Section 21.5 Technical paper 13 (Facilitated changes) and appendices.
	c. The EIS should identify and address cumulative impacts, where potential project impacts are in addition to existing impacts of other activities (including known potential future expansions or developments by the proponent and other proponents in the region and vicinity). This should include changes to noise levels arising from the proposed action in relation to on-ground sources such as road, rail and industry.	Chapter 22 (Cumulative impacts) – Section 22.4 Technical papers 1 to 14 (Cumulative impacts section).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
	d. The EIS should identify areas where ambient man-made noise sources are limited and any increase in aircraft noise would be noticeable.	Chapter 11 (Aircraft noise) – Section 11.6 Technical paper 1 (Aircraft noise) – Chapter 4 (Overview of the study area).
	e. The impact assessment must include details of consultation and cultural heritage surveys undertaken to identify and evaluate impacts to heritage, completed in collaboration with Traditional Owners (or their representative bodies) and the people and communities of Western Sydney and the Greater Blue Mountains.	Chapter 9 (Community and stakeholder engagement) – Section 9.2 Chapter 17 (Heritage) – Section 17.3 Technical paper 9 (Heritage) – Chapter 3 (Methodology).
7.2 – Impacts to fauna	Information required	
7.2.1	Detailed assessment of any likely impact that the proposed action may facilitate (at the local, regional, state and national scale) including but not limited to impacts from noise, lights and risk of bird and bat strike. Include quantification of the habitat area (in hectares) to be impacted as well as quantification of impacted individuals and populations, where feasible. Consider potential compounding impacts of the proposal and the 2019–2020 bushfires, including consideration of impacts of the proposal to potential post-bushfire recovery.	Chapter 16 (Biodiversity) – Sections 16.6 and 16.7 Technical paper 5 (Wildlife strike risk) – entire technical report focuses on the bird and bat strike risk Technical paper 8 (Biodiversity) – Chapter 7 (Impact assessment, including design scenarios), Chapter 8 (Cumulative impacts), Chapter 9 (Significant impact assessments) and Appendix C (Significant impact assessments).
7.2.2	Assessment of the likely duration of impacts and a discussion of whether any impacts are likely to be unknown, unpredictable or irreversible.	Chapter 16 (Biodiversity) – Sections 16.6 and 16.7 Technical paper 5 (Wildlife strike risk) – entire technical report focuses on the bird and bat strike risk Technical paper 8 (Biodiversity) – Chapter 7 (Impact assessment, including design scenarios), Chapter 8 (Cumulative impacts), Chapter 9 (Significant impact assessments) and Appendix C (Significant impact assessments).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
7.2.3	Discussion on whether fauna would still continue to use the Airport and surrounding areas on a long-term basis.	Chapter 16 (Biodiversity) – Sections 16.6 and 16.7 Technical paper 5 (Wildlife strike risk) – entire technical report focuses on the bird and bat strike risk Technical paper 8 (Biodiversity) – Chapter 7 (Impact assessment, including design scenarios), Chapter 8 (Cumulative impacts), Chapter 9 (Significant impact assessments) and Appendix C (Significant impact assessments).
7.2.4	For EPBC listed fauna include a justification, with supporting evidence, how the proposed action will not be inconsistent with: • Australia's obligations under the Biodiversity Convention, the Convention on Conservation of Nature in the South Pacific (Apia Convention), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); and • A recovery plan or threat abatement plan.	Chapter 16 (Biodiversity) – Section 16.6 Technical paper 5 (Wildlife strike risk) – entire technical report focuses on the bird and bat strike risk Technical paper 8 (Biodiversity) – Chapter 7 (Impact assessment, including design scenarios).
7.2.5	For EPBC listed migratory species, justify, with supporting evidence, how the proposed action will not be inconsistent with Australia's obligations under: • The Bonn Convention; • China-Australia Migratory Bird Agreement; • Japan-Australia Migratory Bird Agreement; • International Agreement – Republic of Korea-Australia Migratory Bird Agreement; and • Any international agreement approved under subsection 209(4) of the EPBC Act.	Chapter 16 (Biodiversity) – Section 16.6 Technical paper 5 (Wildlife strike risk) – entire technical report focuses on the bird and bat strike risk Technical paper 8 (Biodiversity) – Chapter 7 (Impact assessment, including design scenarios).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
7.3 – Heritage	Information required	
7.3.1	Detailed assessment of any likely impact that the proposed action may facilitate on the natural, cultural, heritage and socio-economic values of the GBMA, and any other World Heritage properties or National Heritage places identified as relevant to the impacts of the proposed action. Include explicit assessment against the Outstanding Universal Value, including the integrity of the property. This should be based on (but is not limited to) the following: • Noise and light assessments. • Visual assessment of representative viewpoint locations and visual amenity impact on tourist drives. • Impacts to biological attributes of the GBMA. • Assessment of risks to heritage associated with the proposed action (such as contamination risk from fuel jettisoning or increased risk of bushfire).	Impact assessment section of technical papers, including: • Technical paper 1 (Aircraft noise) • Technical paper 4 (Hazard and risk) • Technical paper 7 (Landscape and visual amenity) • Technical paper 8 (Biodiversity) • Technical paper 9 (Heritage) • Technical paper 10 (Social) • Technical paper 11 (Economic) • Technical paper 14 (Greater Blue Mountains World Heritage Area) Corresponding environment impact assessment chapters (in Part C of the EIS).
7.3.2	A description of how the design of the proposed action was selected to avoid and minimise impacts on the GBMA and any other World Heritage properties or National Heritage places.	Chapter 6 (Project development and alternatives) – Section 6.3 Technical paper 14 (Greater Blue Mountains World Heritage Area – Chapter 4 (Project overview and alternatives).
7.3.3	Assessment of impacts to any places in the area surrounding the airport with heritage value as a component of the whole of the environment, with reference to consultation undertaken to identify values and their importance to the community.	Chapter 9 (Community and stakeholder engagement) – Section 9.2 Technical paper 9 (Heritage) – Chapter 5 (Impact assessment) and also Chapter 3 (Methodology) and Chapter 4 (Existing conditions).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
7.3.4	A discussion of impacts on the natural, cultural, heritage and socio-economic values of the GBMA. This discussion must include, but not limited to, the consideration of: • Habitats, species and ecological communities within the GBMA, and the processes that support their connectivity, productivity and function. • The benefit of national parks for people, businesses and the economy. • Living and historic cultural heritage recognising Indigenous beliefs, practices and obligations for country, places of cultural significance and cultural heritage sites. • Non-Indigenous heritage that has aesthetic, historic, scientific or social significance.	Impact assessment section of technical papers, including: • Technical paper 4 (Hazard and risk) • Technical paper 7 (Landscape and visual amenity) • Technical paper 8 (Biodiversity) • Technical paper 9 (Heritage) • Technical paper 10 (Social) • Technical paper 11 (Economic) • Technical paper 14 (Greater Blue Mountains World Heritage Area). Corresponding environmental impact assessment chapters (in part C of the EIS).
7.3.5	For World Heritage, discuss how the proposed action adheres to, and is not inconsistent with: • Australia's obligations under the World Heritage Convention and the provisions in the 2021 Operational Guidelines for the Implementation of the World Heritage Convention. • The Australian World Heritage management principles (Schedule 5 of the EPBC Regulations). • The 2009 Greater Blue Mountains World Heritage Area Strategic Plan and 2016 Addendum and any future iterations in place at time of report preparation. • The 2013 IUCN advice note on environmental assessments.	Technical paper 9 (Heritage) – Chapter 8 (Conclusion) Technical paper 14 (Greater Blue Mountains World Heritage Area) – Chapter 3 (Project setting) Corresponding environmental impact assessment chapters (in part C of the EIS).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
7.3.6	For National Heritage, discuss how the proposed action adheres to, and is not inconsistent with: • The National Heritage management principles (Schedule 5B of the EPBC Regulations). • An agreement to which the Commonwealth is party in relation to the National Heritage place. • The 2009 Greater Blue Mountains World Heritage Area Strategic Plan and 2016 Addendum and any future iterations in place at time of report preparation.	Technical paper 9 (Heritage) – Chapter 8 (Conclusion).
7.4 – People and communities	Information required	
7.4.1	Detailed assessment of impacts that the proposed action may facilitate on people and communities. Including, but not limited to assessment of impacts from noise, change in land use and an assessment of any identified risks to people and communities associated with the proposed action. This should be based on relevant metrics such as the Australian Noise Exposure Concept (ANEC), Australian Noise Exposure Forecast (ANEF) if available, the Number Above 'N' measure, and the maximum noise level (L_{Amax}) single event noise measure.	Impact assessment section of technical papers, including: • Technical paper 1 (Aircraft noise) • Technical paper 4 (Hazard and risk) • Technical paper 6 (Land use and planning) • Technical paper 10 (Social) • Technical paper 11 (Economic) • Technical paper 12 (Human health). Corresponding environmental impact assessment chapters (in part C of the EIS).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
	Identify whether land uses that are noise sensitive could be affected, directly and indirectly, by the proposal including identification and analysis of impacts to: • Health and wellbeing. • Changes to land use and affordability. • Lifestyle and culture. • Social and economic factors.	Impact assessment section of technical papers, including: • Technical paper 1 (Aircraft noise) • Technical paper 4 (Hazard and risk) • Technical paper 6 (Land use and planning) • Technical paper 10 (Social) • Technical paper 11 (Economic) • Technical paper 12 (Human health). Corresponding environmental impact assessment chapters (in part C of the EIS).
	Discuss recent and proposed changes in planning, such as the aerotropolis precinct, and how these changes will alter the likely impacts to people and communities. Where land use is likely to intensify, assess any foreseeable impacts to new residents and visitors to the region.	Impact assessment section of: • Technical paper 6 (Land use and planning) • Technical paper 10 (Social) • Technical paper 11 (Economic). Corresponding environmental impact assessment chapters (in part C of the EIS).
7.4.2	A discussion of social and economic impacts, including both positive and negative impacts for a range of stakeholders and communities. Include a discussion of impacts to existing and proposed urban, industrial, rural and tourism activities within areas that may be affected by the proposal.	Impact assessment section of: • Technical paper 10 (Social) • Technical paper 11 (Economic). Corresponding environmental impact assessment chapters (in part C of the EIS).
7.5 – Air Pollution	Information required	
7.5.1	Analyse and describe the contribution and impacts of the proposed action on air quality at the relevant local, regional and national scales, having regard to relevant weather characteristics including winds, fogs and temperature inversions and any topographic features which may affect the dispersion of air pollutants.	Chapter 12 (Air quality and greenhouse gas) – Sections 12.3 to 12.5 Technical paper 2 (Air quality) – Chapter 3 (Methodology), Chapter 6 (Impact assessment) and Appendices C & D.

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
	Reference must be made to levels of oxides of nitrogen, hydrocarbons, reactive organic compounds, sulphur dioxide, carbon monoxide, odours, air toxics and ultrafine particles.	Chapter 12 (Air quality and greenhouse gas) – Sections 12.3 to 12.5 Technical paper 2 (Air quality) – Chapter 6 (Impact assessment) and Appendices C and D.
	Include specific reference to impacts on rainwater tanks and drinking water catchment areas from dispersion of air pollutants.	Technical paper 2 (Air quality) – Chapter 3 (Methodology).
	Estimate greenhouse gas emissions and include a discussion on design and procedural measures to reduce such emissions. Provide context and comparisons to other sources at local, regional and national levels as appropriate	Chapter 12 (Air quality and greenhouse gas) – Sections 12.4 and 12.5 Technical paper 3 (Greenhouse gas emissions) – Chapters 3 to 10.
7.5.2	Detail emergency fuel dumping procedures, including designated locations for such contingencies, effects of weather conditions on fuel dumping locations, notification to emergency services of fuel dumping occurring, and effects of fuel dumping.	Technical paper 2 (Air quality) – Chapter 3 (Methodology) Technical paper 4 (Hazard and risk) – Chapter 8 (Assessment of other risks) Corresponding environmental impact assessment chapters (in part C of the EIS).
8 – Proposed safeguards and mitigation measures	The EIS must provide information on proposed safeguards and mitigation measures to deal with the relevant impacts of the action including those required by other Commonwealth, State and local government approvals. Use committed language (e.g. 'will') rather than non-committal language (e.g. 'may', 'where possible', 'if required', etc.). The proposed measures must consider the 'S.M.A.R.T' principle: • S – Specific (what and how); • M – Measurable (baseline information, number/value, auditable); • A – Achievable (timeframe, money, personnel); • R – Relevant (address the impacts identified); and • T – Time-bound (specific timeframe to complete).	EIS Part C – Environmental impact assessment chapters (Mitigation and management section) Chapter 24 (Mitigation and management) – Section 24.2 Technical papers 1 to 14 (Mitigation and management section).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
	Specific and detailed descriptions of proposed measures must be provided and substantiated, based on best available practices and must include a consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action. Provide the following: • An assessment of the predicted effectiveness and environmental outcomes of the proposed measures, including details of any baseline data or proposed monitoring required to demonstrate progress towards achieving these outcomes; • Any statutory or policy basis for the mitigation measures; • Any laws or regulations that function to reduce the likelihood or degree of impacts; • Details of ongoing management, including monitoring programs to support an adaptive management approach and determine the effectiveness of the proposed measures, and details of any proposed environmental auditing; • Information on the timing, frequency and duration of the measures to be implemented; • The name of the agency responsible for endorsing or approving a measure or monitoring program; and • The cost of the mitigation measures.	EIS Part C – Environmental impact assessment chapters (Mitigation and management section) Chapter 24 (Mitigation and management) – Section 24.2 Technical papers 1 to 14 (Mitigation and management section).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
9 – Offsets and compensatory measures	a. The EIS must provide details of the likely residual impacts upon a matter protected by a controlling provision after the proposed avoidance and mitigation measures have been taken into account. This includes: – the reasons why avoidance or mitigation of impacts may not be reasonably achieved; and – quantification of the extent and scope of significant residual impacts. b. The EIS must include details of any measures proposed to compensate for residual significant impacts associated with the project, as well as an analysis of how the offset meets the requirements of the department's *Environmental Offsets Policy* October 2012 (EPBC Act Offset Policy).	Chapter 25 (Conclusion) – Section 25.2 No offsets are identified for the project.
10 – Other approvals and conditions	The EIS must include information on any other requirements for authorisation or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action. Please provide: a. An outline of the role of government authorities in identifying and authorising flight paths and managing airspace;	Chapter 1 Introduction – Section 1.3.
	b. Details of any approvals or authorisations that have been obtained or will need to be obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the EPBC Act), including: – A summary of any environmental assessment undertaken for the approval of the proposed action; – Any conditions that apply to the proposed action; – How the instrument provides for the prevention, minimisation and management of any relevant impacts; and – A description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.	Chapter 5 (Statutory context) – Section 5.2 Chapter 10 (Approach to impact assessment).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
	c. The EIS must include information on how the action relates to any other actions (of which the proponent should be reasonably aware) including: – The proposal's interaction with local and regional planning aims and strategic implications for population growth and urban expansion; and – Identifying any potential land use conflicts (such as those that may result from the impact of aircraft noise and any change to the Obstacle Limitation Surface).	Chapter 4 (Project setting) – Sections 4.2 and 4.3 Chapter 5 (Statutory context) – Section 5.4 Chapter 22 (Cumulative impacts) – Section 22.3 Chapter 14 (Land use), including Sections 14.5, 14.6 and 14.7 Technical paper 6 (Land use and planning) – Chapter 2 (Planning framework) and Chapter 3 (Existing environment).
11 – Consultation	The EIS must include discussion of all consultation about the action, including: a. any consultation that has already taken place;	Chapter 9 (Community and stakeholder engagement) – Section 9.2.
	b. proposed consultation about relevant impacts of the action;	Chapter 9 (Community and stakeholder engagement) – Sections 9.4 and 9.6.
	c. if there has been consultation about the proposed action, any documented response to, or result of, the consultation;	Chapter 9 (Community and stakeholder engagement) – Section 9.3.
	d. identification of affected parties, including a statement mentioning any communities that may be affected and describing their views; and	Chapter 9 (Community and stakeholder engagement) – Sections 9.2 and 9.3 Technical paper 9 (Heritage) – Chapter 3 (Methodology) and Chapter 4 (Existing conditions) Technical paper 10 (Social) – Chapter 3 (Methodology), Chapter 4 (Existing environment) and Chapter 5 (Consultation).
	e. a description of how consultation was used in identifying and assessing impacts to heritage.	Chapter 9 (Community and stakeholder engagement) – Sections 9.2 and 9.3 Technical paper 9 (Heritage) – Chapter 3 (Methodology) and Chapter 4 (Existing conditions).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
	The department recommends the following publications are considered in planning and undertaking consultation, particularly with Indigenous communities: • Engage Early – Indigenous engagement guidelines • Working Together: Managing Commonwealth Heritage Places. • Working Together: Managing National Heritage Places • The principles of the Burra Charter for best-practice heritage standards.	Chapter 9 (Community and stakeholder engagement) – Section 9.1 Technical paper 9 (Heritage) – Chapter 2 (Legislation and strategic context).
12 – Environmental record of person(s) proposing to take the action	The information provided must include details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against: a. the person proposing to take the action; and b. for an action for which a person has applied for a permit, the person making the application. If the person proposing to take the action is a corporation, details of the corporation's environmental policy and planning framework must also be included.	Appendix A (Proponent details and environmental record).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
13 – Economic and social matters	The economic and social impacts of the action, both positive and negative, must be analysed. Matters of interest may include:	Impact assessment section of: • Technical paper 10 (Social) • Technical paper 11 (Economic) Corresponding environmental impact assessment chapters (in part C of the EIS).
	a. details of any public consultation activities undertaken and their outcomes;	Chapter 9 (Community and stakeholder engagement) – Sections 9.2 and 9.3 Technical paper 10 (Social) – Chapter 3 (Methodology), Chapter 4 (Existing environment) and Chapter 5 (Consultation) Technical paper 11 (Economic) – Chapter 5 (Economic impact assessment) Corresponding environmental impact assessment chapters (in part C of the EIS).
	b. projected economic costs and benefits of the project, including the basis for their estimation through cost/benefit analysis or similar studies;	Chapter 19 (Economic) – Section 19.5 Technical paper 11 (Economic) – Chapter 5 (Economic impact assessment).
	c. employment opportunities expected to be generated by the project;	Technical paper 10 (Social) – Chapter 6 (Impact assessment) Technical paper 11 (Economic) – Chapter 5 (Economic impact assessment) Corresponding environmental impact assessment chapters (in part C of the EIS).
	d. human health impacts arising from the proposal, with reference to the findings of impact assessments including those relating to noise, air quality, and social/community issues. Give consideration to the demographic characteristics of the sub-region such as the prevalence of existing medical conditions and capacity of health services.	Technical paper 10 (Social) – Chapter 6 (Impact assessment) Technical paper 12 (Human health) – Chapter 4 (Existing conditions), Chapter 5 (Assessment of health impacts: changes in air quality), Chapter 6 (Assessment of health impacts: changes in noise) and Chapter 7 (Assessment of health impacts: changes in hazard and risks) Corresponding environmental impact assessment chapters (in part C of the EIS).
	e. impacts on potential Native Title claimants; and	Technical paper 9 (Heritage) – Chapters 3 (Methodology) Technical paper 10 (Social) – Chapter 4 (Existing environment) and Chapter 6 (Impact assessment).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
	f. impacts on regional and local communities including impacts on demographic characteristics due to redevelopment or changes in land values.	Technical paper 10 (Social) – Chapter 6 (Impact assessment) Technical paper 11 (Economic) – Chapter 5 (Economic impact assessment) Technical paper 12 (Human health) – Impact assessment chapters (5 to 7) Corresponding environmental impact assessment chapters (in part C of the EIS).
	g. Economic and social impacts should be considered at the local, regional and national levels.	Technical paper 10 (Social) – Chapter 6 (Impact assessment) Technical paper 11 (Economic) – Chapter 5 (Economic impact assessment) Corresponding environmental impact assessment chapters (in part C of the EIS).
	h. Details of the relevant cost and benefits of alternative options to the proposed action, as identified in section 5 above, should also be included.	Chapter 6 (Project development and alternatives) – Section 6.3 The costs and benefits have not been quantified. However, the development of the preliminary flight path design considered a range of factors in addition to safety, including capacity to meet demand, efficiency of the airspace and minimising the adverse effects on the environment. This chapter also details the consequences of not proceeding with the project.
14 – Information sources provided in the EIS	For information given in a Draft EIS, the draft must state: a. the source of the information; b. how recent the information is; c. how the reliability of the information was tested; and d. what uncertainties (if any) are in the information.	EIS, including: • Part C – Environmental impact assessment • Chapter 26 (References) • Technical papers 1 to 14 (References, and limitations & assumptions, sections).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
15 – Conclusion	An overall conclusion as to the environmental acceptability of the proposal should be provided, including discussion on compliance with principles of Ecologically Sustainable Development and the objects and principles of the EPBC Act at Attachment 1. Reasons justifying undertaking the proposal in the manner proposed should also be outlined. Measures proposed or required by way of offset for any unavoidable impacts on NES matters, and the relative degree of compensation, should be restated here.	Chapter 25 (Conclusion) – Sections 25.2, 25.3, 25.4 and 25.5.
Attachment 1 – The objects and principles of the EPBC Act 1999 – Sections 3 and 3A		
3 – Objects of the Act	a. to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance; b. to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources; c. to promote the conservation of biodiversity; d. to promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and indigenous peoples; e. to assist in the co-operative implementation of Australia's international environmental responsibilities; f. to recognise the role of indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity; and g. to promote the use of indigenous peoples' knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.	Chapter 25 (Conclusion) – Section 25.3, noting elements extend into relevant considerations such as biodiversity/heritage/other impact areas throughout the EIS.

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
3A – Principles of Ecologically Sustainable Development	The following principles are principles of ecologically sustainable development. a. Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations. b. If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. c. The principle of inter-generational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations. d. The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making. e. Improved valuation, pricing and incentive mechanisms should be promoted.	Chapter 25 (Conclusion) – Section 25.4, noting elements extend into relevant considerations such as biodiversity/heritage/other impact areas throughout the EIS.
Attachment 2 – Matters that must be addressed in a PER and EIS (Schedule 4 of the EPBC Regulations 2000)		
1 - General information	1.01 The background of the action including: a. the title of the action; b. the full name and postal address of the designated Proponent; c. a clear outline of the objective of the action; d. the location of the action; e. the background to the development of the action; f. how the action relates to any other actions (of which the Proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action; g. the current status of the action; and h. the consequences of not proceeding with the action.	EIS Part A – Background and Part B – The project, including: • Chapter 1 (Introduction) – Sections 1.1 and 1.2 • Chapter 5 (Statutory context) – Section 5.4 • Chapter 6 (Project development and alternatives) – Sections 6.1 and 6.3 • Appendix A (Proponent details and environmental record).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
2 - Description	2.01 A description of the action, including: a. all the components of the action; b. the precise location of any works to be undertaken, structures to be built or elements of the action that may have relevant impacts; c. how the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts; d. relevant impacts of the action; e. proposed safeguards and mitigation measures to deal with relevant impacts of the action; f. any other requirements for approval or conditions that apply, or that the Proponent reasonably believes are likely to apply, to the proposed action; g. to the extent reasonably practicable, any feasible alternatives to the action, including: i. if relevant, the alternative of taking no action; ii. a comparative description of the impacts of each alternative on the matters protected by the controlling provisions for the action; and iii. sufficient detail to make clear why any alternative is preferred to another; h. any consultation about the action, including: i. any consultation that has already taken place; ii. proposed consultation about relevant impacts of the action; and iii. if there has been consultation about the proposed action — any documented response to, or result of, the consultation; and iv. identification of affected parties, including a statement mentioning any communities that may be affected and describing their views.	Chapter 6 (Project development and alternatives) – Sections 6.1 and 6.3 Chapter 7 (The project) – all sections Chapter 9 (Community and stakeholder engagement) – Sections 9.2 and 9.3 EIS Part C – Environmental impact assessment chapters (Impact assessment section Chapter 24 (Mitigation and management) – Section 24.2.

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
3 - Relevant impacts	3.01 Information given under paragraph 2.01(d) must include a. a description of the relevant impacts of the action; b. a detailed assessment of the nature and extent of the likely short term and long term relevant impacts; c. a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible; d. analysis of the significance of the relevant impacts; and e. any technical data and other information used or needed to make a detailed assessment of the relevant impacts.	EIS Part C – Environmental impact assessment chapters (Impact assessment section) Technical papers 1 to 14 (Impact assessment section).
4 - Proposed safeguards and mitigation measures	4.01 Information given under paragraph 2.01(e) must include: a. a description, and an assessment of the expected or predicted effectiveness of, the mitigation measures; b. any statutory or policy basis for the mitigation measures; c. the cost of the mitigation measures; d. an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing; e. the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program; and f. a consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action, including mitigation measures proposed to be taken by State governments, local governments or the Proponent.	EIS Part C – Environmental impact assessment chapters (Mitigation and management section) Chapter 24 (Mitigation and management) – Section 24.2 Technical papers 1 to 14 (Mitigation and management section).

Requirement	Paragraph	Where addressed *(note that Technical Papers contain further details on where the EIS Guidelines have been addressed as relevant)*
5 - Other Approvals and Conditions	5.01 Information given under paragraph 2.01(f) must include: a. details of any local or State government planning scheme, or plan or policy under any local or State government planning system that deals with the proposed action, including: i. what environmental assessment of the proposed action has been, or is being carried out under the scheme, plan or policy; and ii. how the scheme provides for the prevention, minimisation and management of any relevant impacts; b. a description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the Act), including any conditions that apply to the action; c. a statement identifying any additional approval that is required; and d. a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.	Chapter 5 (Statutory context) – Section 5.2.
6 - Environmental record of person proposing to take the action	6.01 Details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against: a. the person proposing to take the action; and b. for an action for which a person has applied for a permit, the person making the application.	Appendix A (Proponent details and environmental record).
	6.02 If the person proposing to take the action is a corporation — details of the corporation's environmental policy and planning framework.	The person is not a corporation.
7 - Information sources	7.01 For information given the EIS must state: a. the source of the information; and b. how recent the information is; and c. how the reliability of the information was tested; and d. what uncertainties (if any) are in the information.	Technical papers 1 to 14 (References, and limitations & assumptions, sections).

Appendix D

List of persons and agencies consulted during the preparation of the EIS

List of persons and agencies consulted during the preparation of the EIS

Stakeholder group	Stakeholder
Australian Government agencies and authorities	Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA) WSA Co. Airservices Australia Civil Aviation Safety Authority (CASA) Department of Agriculture, Water and the Environment (DAWE)/Department of Climate Change, Energy, the Environment and Water (DCCEEW) Department of Defence.
NSW Government agencies, authorities and organisations	Transport for NSW Sydney Metro NSW Department of Planning and Environment Western Parkland City Authority Sydney Water Corporation Department of Premier and Cabinet Greater Cities Commission Infrastructure NSW Water NSW Western Sydney Parklands Trust NSW Environment Protection Authority NSW Department of Education NSW Health/NSW Ministry of Health South-Western Sydney Local Health District Western Sydney Local Health District Nepean Blue Mountains Local Health District NSW Aboriginal Affairs NSW Treasury Office of NSW Premier Office of the Deputy Premier Blue Mountains Regional Advisory Committee NSW Communities and Justice NSW Small Business Commission Blue Mountains World Heritage Advisory Committee
State and Federal Ministers of Parliament (MPs)	Individual briefings were held with Federal and State MPs. Refer to Chapter 9 (Community and stakeholder engagement) for further detail

Stakeholder group	Stakeholder
Local government	Blacktown City Council
	Blue Mountains City Council
	Camden Council
	Campbelltown City Council
	Fairfield City Council
	Hawkesbury City Council
	Liverpool City Council
	Penrith City Council
	Wollondilly Shire Council
	Canterbury-Bankstown City Council
	Cumberland City Council
	The Hills Shire Council
	City of Parramatta Council
	Sutherland Shire Council
	Strathfield Council
	Bayside Council
	Inner West Council officers
	Western Sydney Regional Organisations of Councils.
Aviation	General Aviation Advisory Network
	Aeria Management (formerly Sydney Metro Airports (Bankstown and Camden))
	Sydney (Kingsford Smith) Airport
	Regional Aviation Association Australia
	NSW Rural Fire Services
	NSW Fire & Rescue
	NSW Police
	NSW Ambulance
	Australian Federal Police
	Board of Airline Representatives of Australia (covers international airlines)
	Airlines
	Freight companies (DHL, FedEx, Toll etc)
	Flying schools
	Corporate charter organisations
	Recreational flying companies and individuals
	Sport aviation groups.

Stakeholder group	Stakeholder
First Nations	Deerubbin Local Aboriginal Land Council
	Gandangara Local Aboriginal Land Council
	Murru Mittigar
	Dharug strategic management group
	Darug Tribal Aboriginal Corporation
	Darug Custodian Aboriginal Corporation
	Dharug Ngurra Aboriginal Corporation
	Western Sydney Aboriginal Regional Alliance
	Tharawal Local Land Council
	Tharawal Aboriginal Corporation
	Cubbitch Barta
	Gundungurra Tribal Council Aboriginal Corporation
	Gundungurra Aboriginal Heritage Association
	Blue Mountains Aboriginal Culture and Resource Centre
	Metropolitan Local Aboriginal Land Council
	La Perouse Local Aboriginal Land Council
	Dharug Knowledge Holders
	Dharawal Knowledge Holders
	Gundungurra Knowledge Holders.
Peak bodies, think-tanks and advocacy groups	Tourism and Transport Forum
	Committee for Sydney
	Western Sydney Leadership Dialogue
	Infrastructure Partnerships Australia
	Urban Development Institute of Australia
	Urban Taskforce
	Property Council of Australia
	CEDA (Committee for Economic Development of Australia)
	Business Western Sydney
	National Growth Areas Alliance
	Western Sydney Business Connection
	Regional Development Australia
	Aerotropolis Multiversity (the University of Newcastle, UNSW Sydney, the University of Wollongong, Western Sydney University and TAFE NSW)
	Shelter NSW
	Multicultural NSW
	Ethnic Communities' Council of NSW Inc.
	Western Sydney Planning Partnership

Stakeholder group	Stakeholder
Environment, Blue Mountains and other	UNESCO Australian Conservation Foundation The Nature Conservancy Australia NSW National Parks (Blue Mountains Branch) Nature Conservation Council of NSW Blue Mountains Conservation Society Greater Blue Mountains World Heritage Area Advisory Committee (GBMWHAAC) Mulgoa Valley Landcare Group Environmental Defenders Office NSW Environmental Health Australia Friends of the Earth Australia National Parks Association of NSW Give a Dam Greater Sydney Landcare Network The Colong Foundation for Wilderness Blue Mountains Accommodation and Tourism Association Mount Wilson Progress Association Mount Irvine Progress Association Blue Mountains World Heritage Advisory Committee Residents Against Western Sydney Airport (RAWSA) Trustees of the Linden Observatory St Marys Town Centre Marshall Day Acoustics
Tourism	Destination NSW Tourism Australia Tourism and Transport Forum Australian Tourism Export Council Blue Mountains Accommodation and Tourism Association Australian Attractions Business Events Sydney.
Forum of Western Sydney Airport (FOWSA)	FOWSA was established to link the community, government and the Western Sydney Airport Corporation and is made up of members representing: • up to 10 community representatives • up to five local government representatives • one NSW Government representative • one regional airport operator representative • up to two representatives of general aviation users • up to two representatives of the major airlines • up to two persons with connections to relevant representative agencies or organisations • an independent Chair • ex-officio members and other members.

Stakeholder group	Stakeholder
Community representative groups	Western Sydney Aerotropolis, Community Consultative Committee (CCC) and Commissioner
	Luddenham Progress Association
	Ethnic Communities Council of NSW
	Mulgoa Valley Landcare
	Wallacia Progress Association
	Mount Wilson Progress Association
	Mount Irvine Progress Association
	Orchard Hills CCC
	Residents Against Western Sydney Airport (RAWSA)
	Bankstown Community Aviation and Consultation Group
	Camden Community Aviation and Consultation Group
	Sydney Airport Community Forum.
Chambers of Commerce	Wentworth Falls Chamber of Commerce and Community
	Katoomba Chamber of Commerce and Community
	Penrith Valley Chamber of Commerce
	Fairfield City Chamber of Commerce
	Campbelltown Chamber of Commerce
	Camden Chamber of Commerce and Industry
	Liverpool Chamber of Commerce and Industry
	Narellan Chamber of Commerce
	Blue Mountains Business Chamber
	Greater Blacktown Business Chamber
	Blaxland and Districts Chamber of Commerce
	Sydney Hills Chamber of Commerce.
Health and education services	Luddenham Public School
	Holy Family Primary School
	Wallacia Public School
	South Western Sydney Local Health District
	Luddenham Medical Centre
	Bush Babies Pre-School Warrimoo.

Appendix E

Project coordinates

Project coordinates

Given the project does not have a physical boundary, the project coordinates represent the centre of Runway 05/23 at Western Sydney International. Aircraft are expected to operate up to approximately 20,000 ft (6 km) and higher within 45 nautical miles of WSI.

GDA94 MGA56	WGS84
X: 288489	Lat: -33.8833
Y: 624829	Long: 150.7130

Appendix F

Background to the Western Sydney International Airport noise insulation and property acquisition policy

Overview of research to inform the noise insulation and property acquisition policy for Western Sydney International (Nancy-Bird Walton) Airport

F1 Introduction

Under Condition 16(7) of the Western Sydney Airport Plan, DITRDCA is required to develop a noise insulation and property acquisition (NIPA) policy in relation to aircraft overflight noise for buildings outside the Airport Site, having regard for the 24-hour nature of operations at WSI. This condition was included as part of the Government's approval for Stage 1 of WSI for single runway operations and 10 million annual passengers.

Land use planning and development restrictions have been in place for some time in proximity to WSI, including through a range of State Environmental Planning Policies. Outside of these planning restrictions, the primary mechanism to manage aircraft noise within communities is the application *of Australian Standard 2021: Acoustics – Aircraft Noise Intrusion – Building Siting and Construction:2015* (AS2021). The purpose of AS2021 is to inform land use planning of new developments near existing airports (e.g., within ANEF contours) and building requirements associated with noise affected areas. Further information is outlined in Technical paper 6: Land use and planning.

There will still remain residual noise impacts that may not be fully addressed by the flight operations design at existing sensitive buildings and land-uses. DITRDCA recognises this, and the need to preserve living amenity for those most significantly affected residents and communities.

The NIPA policy outlines criteria for those properties that are significantly impacted by aircraft overflight noise who, subject to final government approval, will be eligible for either voluntary acquisition or noise insultation treatment.

In order to inform the development of this policy DITRDCA undertook a review of:

- literature associated with aircraft noise impacts and perceptions of noise
- existing standards and guidelines commonly adopted to reduce aircraft noise impacts
- similar noise insulation and acquisition policies and associated programs that have been implemented in Australia and internationally.

The section below summarises this process and the key findings.

F2 Aircraft noise treatment

Aircraft noise, a by-product of a growing economy, is considered the most significant cause of adverse community reaction to aviation operations. Given the spread of sound, potentially affected parties include all residents and other noise sensitive land-uses in the areas surrounding airports and under flight paths. For those relatively close to these flight paths, aircraft noise can be well above the background noise. Additionally, aircraft noise events can be infrequent and occur at some of the most sensitive times of the day, including night-time hours.

While it is not possible to guarantee any suburb, group, or individual exemption from aircraft noise exposure, aircraft noise management needs to consider the effects of noise on everyday activities.

Noise, being airborne sound, enters a residential dwelling or building in broadly the same ways that air enters – through openings (windows and doors) and cracks and gaps (window frames, open eaves etc.). The pathways and mechanism for aircraft noise to penetrate a building, via the building envelope elements, is provided in Figure F.1. This figure highlights the common weak points where noise intrusion is greatest, which tends to be the elements that have a low density or a large area.

The main building elements that contribute to noise intrusion within an existing dwelling include:

- cracks and gaps in building envelope at joints (e.g., window/door frames, roof-façade junction, etc.)
- open windows or natural ventilation vents
- closed windows or solar tube lights
- entry doors (e.g., glazed sliding doors or solid core entry doors)
- combined roof and ceiling construction (e.g., steel roof or rooftiles)
- air conditioning ducts or kitchen exhaust fans
- solid façade elements (e.g., masonry, weatherboard, etc.).

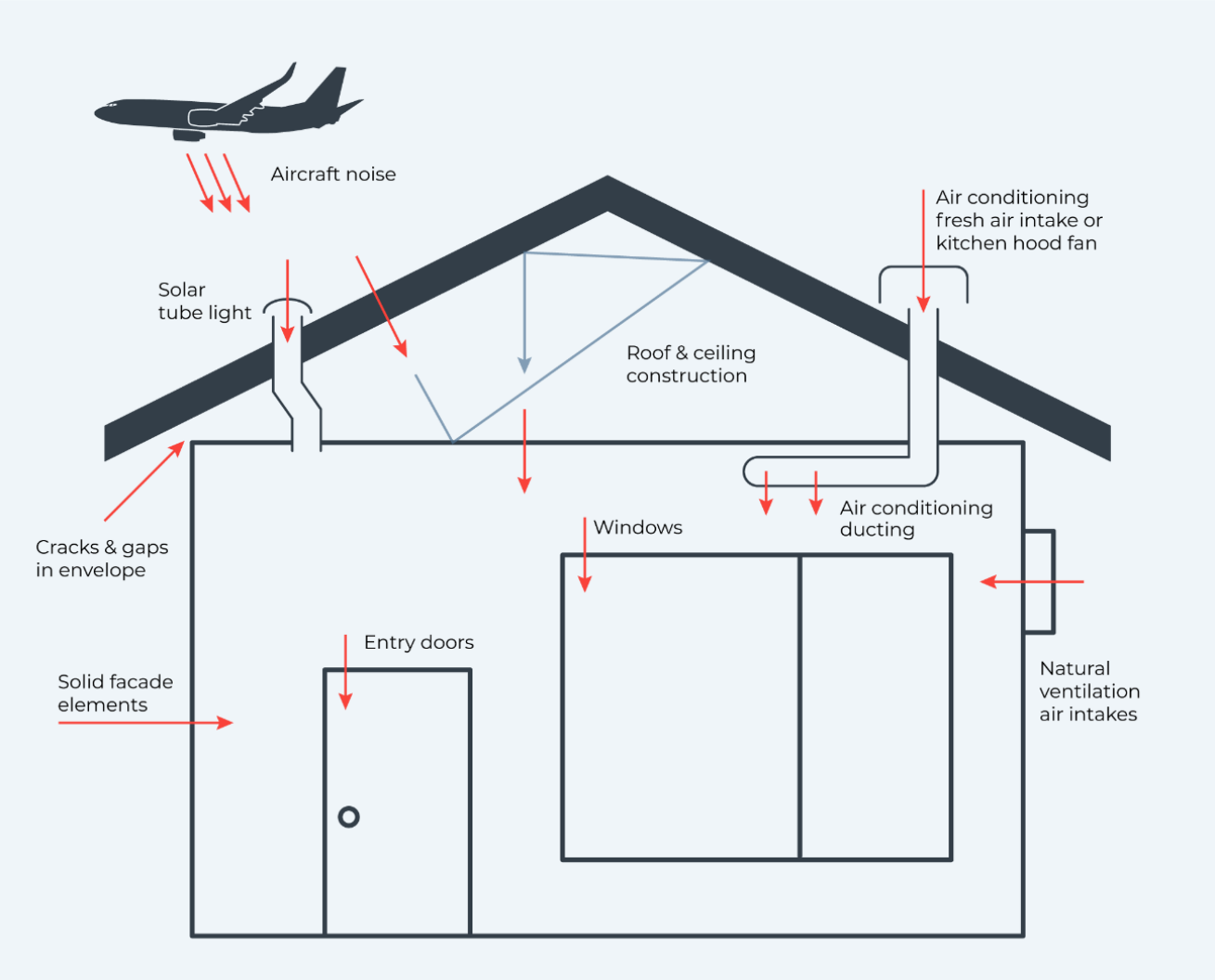

Figure F.1 How sound can permeate into a building

The overall level of external noise entering a dwelling is the combined effect of all the pathways for sound. Measures to restrict and limit the intrusion of noise within a dwelling therefore need to target the primary (dominant) pathways for sound to achieve an overall reduction to the noise intrusion.

As aircraft fly overhead, the roof area is the largest element of a home exposed to aircraft noise. Aircraft noise usually impacts the facades of a dwelling fairly equally, unlike noise from road traffic where one or two facades of a dwelling tend to experience the majority of the noise. Options to help reduce the amount of aircraft noise within a dwelling may have to consider treatments to all major elements of the building, including the roof and ceilings.

An aircraft noise event comprises sounds across a wide range of frequencies. At its source aircraft noise contains high, mid, and low frequency noise. Due to the distances people are located from runways and flight paths, it is often the residual low frequency aircraft noise that can cause annoyance.

Low frequency sound can penetrate buildings, and in some cases induce perceptible vibration of elements such as glazing and light weight walls. The standard sound insulation of a dwelling does not always sufficiently reduce low frequency noise, and to achieve an overall improvement to the internal noise environment the intrusion of the low frequency noise needs to be controlled.

Due to its acoustic characteristics, low frequency noise can be difficult to attenuate. To improve the low frequency sound insulation performance of building elements, the following two principles apply:

- Increasing the weight or density of the element. (e.g., adopting concrete or masonry wall constructions, increasing the glazing thickness of windows, and adding additional layers of plasterboard)
- increasing the width of the cavity between two construction elements. (e.g., implementing timber stud constructions and double glazing). The sound energy dissipates across the air gap introduced by the cavity.

Good acoustic design for properties and buildings should incorporate one or both of these principles. It is good practice to first mitigate noise intrusion via the weakest elements to achieve a suitable reduction in noise and provide a cost-effective solution. For example, upgrading window glazing would result in a more noticeable improvement compared to upgrading a solid masonry wall.

In most cases the effectiveness of noise reduction measures to a home or dwelling requires the external windows and doors to be kept closed. Any open windows or doors can substantially limit the level of aircraft noise reduction that could be achieved. Requirements to close windows and doors are usually accompanied by complementary measures to ensure adequate air flow and ventilation within a dwelling.

Referencing *Reducing Aircraft Noise in Existing Homes* provided by Perth Airport, a summary of the conventional options available to reduce the intrusion of aircraft noise to existing homes is provided in Table F.1.

Table F.1 Practical ways to reduce noise levels in a home[1]

Option	Example treatment	Potential noise reductions
Sealing gaps around doors and windows	• Caulking gaps around window frames with a mastic sealant. • Sealing larges gaps (>15 mm) with expandable foam. • Installing compressible seals to window and door frames. • Installing seals to door thresholds.	• Reductions up to 10 dB (possibly higher) can be achieved.
External doors	• Replace or upgrade hollow doors. • Install perimeter seals to door frames.	• Hollow doors can reduce noise by approximately 18 dB(A). • Solid core doors with acoustic seals can improve noise reduction to up to 30 dB(A).
Closing vents in walls and ceilings	• Grouting up wall vents or covering over with fibre cement sheeting. • Removing vents in walls that are not currently in use and sealing over the openings.	• Reductions up to 10 dB (possibly higher) can be achieved.
Ventilation	• Closing windows. • Install small fans in the roof with acoustic seals and ductwork. • Install an acoustic baffle over ceiling exhaust fans. • Avoid through-wall air conditioning systems.	• Reductions up to 10 dB (possibly higher) can be achieved.

Option	Example treatment	Potential noise reductions
Roofs and ceilings	• Add thermal insulation above the ceiling. • Use surface mounted or drop lights. • Lay plasterboard over joists and add insulation above the plasterboard. • Install loaded vinyl noise blanket over insulation and joists.	• Reductions greater than 10 dB can be achieved.
Windows	• Increasing the thickness of single glazing. • Install double glazing (two panes of glass with an air gap). • Consider awning windows rather than sliding windows.	• Improvements to single glazing can reduce noise by up to 8 dB. • Upgrading to double glazing is more effective and can reduce noise by 10 dB or more.
Other elements	• Remove skylights. • Close open eaves. • Insulate the cavity of weatherboard walls.	• Reductions up to 10 dB (possibly higher) can be achieved.

1. Perth Airport (2016). Reducing Aircraft Noise in Existing Homes

One of the main challenges of a noise insulation program is the range of application, both in terms of volume and breadth of property typologies. Without considering the particularities of WSI's location and surroundings, it is expected that any program would have to deliver noise treatments to suit a broad range of properties and dwellings – such as single-dwellings, high-density residential, retail and commercial properties. In addition to these building typologies, the building elements presented in Table F.2 may impact individual treatments and therefore cost of noise treatments.

Table F.2 Summary of noise insulation cost considerations

Cost consideration	Description
Pre-1980's construction	Dwellings constructed prior to 1980 are highly likely to contain hazardous materials (e.g., asbestos) and will require removal and remediation. In some overseas programs (e.g., Sea-Tac) the airport required residents to remove/treat hazardous materials, at their own cost, before amelioration. Managing a program this way for WSI may reduce cost and risk but may raise issues of equity for local residents.
Heritage listed buildings	Heritage listed buildings are likely to require bespoke amelioration treatment.
Non-code compliant buildings	Non-code compliant structures may require additional work to be made compliant prior to amelioration work (if deemed eligible).
Respite costs	Some properties (both residential and non-residential) may require temporary relocation while amelioration works are underway.
Rectification costs	If the scheme is to include monitoring post completion of the amelioration program, some properties may require rectification works to meet program objectives and/or internal noise targets (if targets are established).
Unique property features	Properties with unique property features such as oversized windows and bifold external doors can significantly increase the cost of amelioration treatment.

The construction industry is currently experiencing unforeseen increases in construction costs due to a range of factors including increased demand, constrained supply chains, devaluation of the Australian currency, high escalation, rising cost of raw materials, and labour shortages. This creates additional uncertainty and risk regarding the delivery of an amelioration program. Other socio-economic issues such as international conflict and the ongoing impact of COVID-19 further exacerbate this risk.

F3 Aircraft noise guidelines and standards

There are two main areas to consider when discussing and evaluating noise and noise impacts from aircraft operations; the level and characteristics of the noise, and how the noise is perceived and experienced. The international aviation industry does not have a consistent approach to address these aspects. There are a range of noise levels and noise metrics applied to assess aircraft noise and provide a benchmark for noise reduction and the amelioration of impacts.

However, the overarching principles are generally the same across industry and regulatory bodies – the management of aircraft noise needs to address both the highest levels of noise and the long-term exposure to noise to understand aspects such as annoyance, sleep disturbance, and the effect of noise on health and well-being.

In Australia, the primary mechanism to manage aircraft noise is the application of Australian Standard 2021: *Acoustics – Aircraft Noise Intrusion – Building Siting and Construction:2015* (AS2021). The primary purpose of AS2021 is to inform land use planning for new developments near existing airports. In lieu of a standard to address aircraft noise impacts for existing properties, AS2021 has been used as a guide and benchmark for airport expansions at Sydney's Kingsford Smith Airport and Adelaide Airport. The standard provides an indoor noise level target for new buildings that can also be used as a benchmark to support recommendations for the treatment of existing buildings.

Other planning policies and guidelines that describe the application of AS2021 for the management of aircraft noise intrusion for new developments near airports include:

- *National Airports Safeguarding Framework* (NASF); Guideline A
- *State Environmental Planning Policy (Western Sydney Aerotropolis) 2021*
- other local council development control plans.

Internationally, a range of regulations and guidelines have also been developed. The most recent example is the *Guidelines for Sound Insulation of Residences Exposed to Aircraft Operations* developed in the United States of America by the FAA and released in June 2022. This guideline provides a phased approach to the development of a noise amelioration program including prescribed eligibility criteria and internal noise targets.

The European Union's (EU) *Environmental Noise Directive* is the main EU instrument to identify noise pollution levels and to trigger the necessary action both at Member State and EU level. However, the directive does not prescribe eligibility criteria or internal noise targets, nor does it prescribe the measures to be included in action plans, thus leaving those issues at the discretion of the competent authorities of each Member State.

Research findings suggests that the appropriate noise threshold ranges for night-time sleep disturbance is between 32 dB and 55 dB, and the noise threshold range for general annoyance is between 42 dB and 50 dB. Guideline levels proposed by WHO establish a high standard for managing noise related health effects yet it may not always be possible to achieve these levels with reasonable and practicable measures for aircraft noise management. A desired internal noise target of 50 dB(A) aligns with recommended indoor noise level under AS 2021 for new properties constructed adjacent to an airport.

F4 Reference years for assessment of aircraft noise exposure

Noise exposure calculations for WSI air traffic are based on projected aircraft movements in the projected demand schedules. For the purpose of the EIS, 3 operating years have been modelled (see also Technical paper 1 – Aircraft noise).

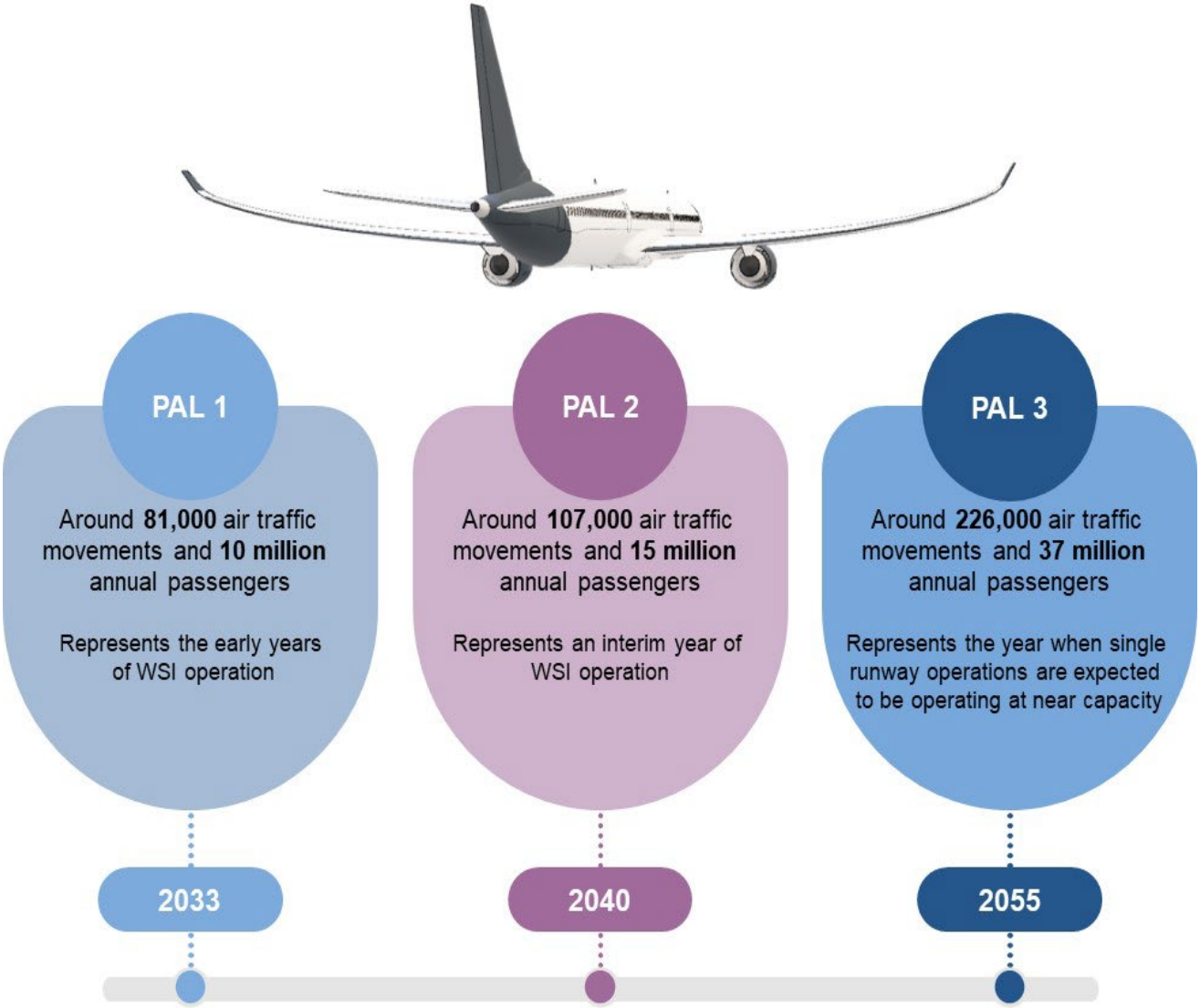

Figure F.2 Reference years for assessment of aircraft noise exposure

F5 Review of existing noise insulation and acquisition programs

In addition to the review of literature associated with aircraft noise and existing standards and guidelines, a review of similar noise insulation and acquisition policies and associated programs that have been implemented in Australia and internationally was undertaken. This review considered the following aspects:

- a review of WSI's operations, layout, geographical context and surrounding developments
- the eligibility criteria, amelioration treatments implemented, and any unique features associated with the program's delivery
- how the program was rolled out including timeframes, governance and delivery mechanisms (e.g., Government owned and delivered, engagement of a managing contractor to act on behalf of the government or one-off payments provided directed to property owners)
- outcomes of the program including effectiveness, community response and costs
- lessons learnt for the development of a similar program for WSI.

Sydney (Kingsford Smith) Airport (KSA) Third Runway and Adelaide Airport (ADL) extension of Runway 05/23 are the most relevant Australian examples for WSI.

The following section summarises the policy and associated program for Sydney (Kingsford Smith) Airport's third runway as well as a summary of lessons learnt from reviewing a number of different Australian and international examples.

F5.1 Sydney (Kingsford Smith) Airport (KSA) Third Runway

The KSA program was facilitated by the Federal Airports Corporation, which at the time was a Commonwealth Government business enterprise. Full privatisation of the airport occurred in 2002, therefore the airport was owned by the Government when the amelioration program commenced. Eligibility for the SYD noise amelioration program was determined using Australian Noise Exposure Forecast (ANEF) contours – which uses a historic record of the previous 12 months of aircraft movements to generate 'current' noise exposure levels and geographical areas affected by airport operating procedures including flight paths, operating schedules, aircraft, and engine types.

Eligibility criteria included:

- voluntary acquisition for residential properties, churches, and child-care centres in the Australian Noise Exposure Forecast (ANEF) 40 contour zone
- insulation for schools and colleges, hospitals and healthcare centres and churches within the ANEF 25 contour zone (some with conditions)
- financial and technical assistance for insulation of residential properties within the ANEF 30 contour zone[1].

The program was developed for existing dwellings, therefore new developments were not eligible for the program.

Eighty-five (85) public buildings were inside the ANEF 25 contour, and the aim was to insulate the noise sensitive areas within the buildings. Given the heritage, design, functional and architectural features of these buildings were quite disparate an acoustic consultant was engaged to assess and recommend a cost effective solution to achieve the noise reduction. Eligibility for the residential insulation program included approximately 4,200 properties and a menu of treatment options was provided for a package approach. This was to provide a cost-effective solution while allowing choice by the homeowner[2]. Approximately 160 properties were eligible for voluntary acquisition.

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1 Department of Transport and Regional Development (1997), *Sydney Airport Noise Amelioration Program*

2 Burgess, M, et. al (2000), *Residential Insulation Scheme Around Sydney Airport*

F5.2 Adelaide Airport (ADL)

The extension of Runway 05/23, completed at the end of 1999, could be seen as the trigger of the ADL noise insulation program. In 2000, the Government introduced a $63.7 million, four-year Noise Insulation Program for ADL3. The program was established in areas of high aircraft noise exposure around ADL.

Under ADL's noise amelioration program residential properties in the Australian Noise Exposure Concept (ANEC) 30 and 35 contour and public buildings (non-residential) in the ANEC 25 contour were eligible for noise amelioration. Public buildings included schools, places of worship, day care centres and hospitals.

Approximately 600 residential dwellings and five public buildings were identified within these contours. Majority of the eligible residential properties were single dwellings built between 1920 and 1970.

Amelioration treatments included, but was not limited to:

- up-rated single glazing or double glazing
- up-rated external doors
- up-rated roof/ceiling insulation.

Based on a property assessment, a noise amelioration package was tailored to the individual property requirements.

By 2010, all eligible residential properties had been ameliorated. Amelioration treatments works on some public buildings continued until 2012 when the Government closed the program.

A comparison of the key eligibility criteria for these two treatment programs is provided in Table F.3.

Table F.3 Key eligibility criteria, KSA and ADL

Eligibility	Sydney Kingsford Smith Airport Third Runway	Adelaide Airport
Acquisition	ANEF 40	–
Amelioration (residential)	ANEF 30	ANEF 30
Amelioration (non-residential)	ANEF 25	ANEF 25

F5.3 Other programs

A review of several Australian and international amelioration programs found that airports tend to approach the amelioration of aircraft noise for impacted properties differently. These differences range from the way eligibility is determined, through to how the programs are delivered. In addition, each jurisdiction around the world uses different noise impact metrics, therefore it is challenging to directly compare eligibility criteria.

Some of the key lessons learnt for consideration for an amelioration program for WSI include:

- In Australia, the ANEF/ANEI contours are the 'standard' approach to identify eligibility based on noise. Over time this has been criticised as not addressing the full range of issues caused by aircraft noise. Airservices Australia has now increased requirements for assessing the impact of noise on populations from flight path changes (in conjunction with *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) requirements). This provides the potential opportunity to supplement eligibility with additional noise levels and metrics.
- Most programs used an annual average or annual average maximum noise metric to determine eligibility. Some airports adopted additional 'peak event' type noise metrics to address properties impacted by night-time noise.
- Most amelioration programs are centrally managed by either private providers, the airport, or government departments. This often includes technical assessment of properties and engaging prequalified contractors to complete treatment works.

- A new policy and associated noise amelioration program will likely need to be a dynamic program to respond to airport operational changes, post commissioning noise impacts compared to modelled impacts, community feedback, and lessons learnt as the program is delivered. The amelioration programs studied have all been altered or amended over time, often in response to community feedback, changing operational conditions, or changes to noise metrics, measures, or standards.
- Programs with rigorous eligibility assessments, pre-treatment requirements, and multistep centrally managed design processes can result in lengthy timeframes between a property owner applying for the program through to implementation of amelioration treatment. However, this level of rigour and more bespoke approach to amelioration may result in greater community acceptance.
- Periodic auditing is a useful tool to assess the success and up take of the program. Most programs reviewed changed over time in response to community feedback and changing airport conditions.
- Careful consideration should be given to how communications and engagement with the community is undertaken for the program. This is especially relevant for newly established airports without an existing background of aircraft noise.

Appendix G

Assessment of the refinements to the project

G1 Description of proposed refinements

G1.1 Overview

A series of refinements to the preliminary flight paths have been identified as part of ongoing development and following submissions received during the public exhibition of the Draft EIS. These refinements provide functional improvements to the preliminary flight path designs and can be safely implemented within the existing and proposed airspace.

The proposed refinements to the preliminary flight path designs as described in this finalised EIS are collectively referred to in this report as the 'revised flight path designs'. The key refinements proposed are:

- minor refinement to preliminary flight path D10 to provide a more westerly alignment north of Linden (refer to Section G1.2)
- removal of Required Navigation Performance – Approval Required approach (A13) south of Linden (refer to Section G1.3)
- minor refinement to preliminary flight path A21 (RRO night approach to Runway 05) to provide a more southerly alignment (refer to Section G1.4)
- refinements to the RRO runway mode of operation (refer to Section G1.5) as follows:
  - the withdrawal of preliminary flight path D28 for jet operations and the reallocation of those aircraft to preliminary flight path D32 (refer to Section G1.5.1)
  - the introduction of a new RRO noise abatement procedure (RRO-NAP) (refer to Section G1.5.2).

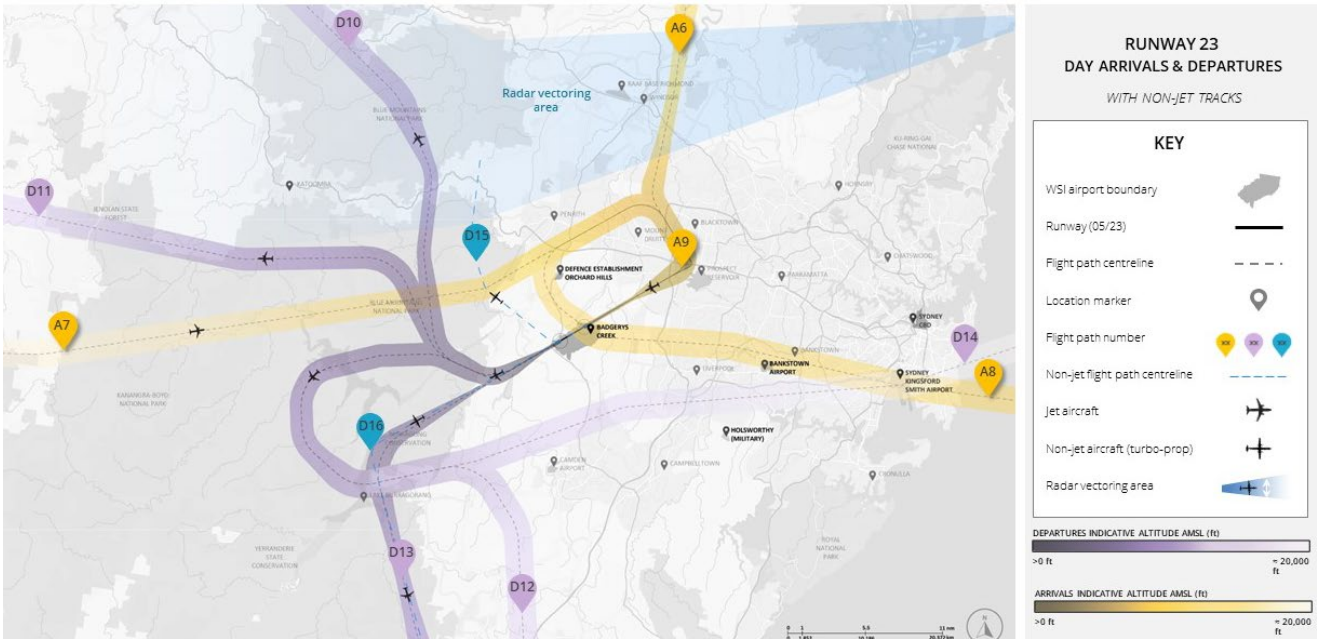
G1.2 Mt Tomah, Mt Wilson and Mt Irvine

The proposed change would realign a section of the daytime northern jet departures preliminary flight path Runway 23 Departure North Day (preliminary flight path D10) further away from the Mt Tomah, Mt Wilson and Mt Irvine areas. The new alignment would be located to the south and west of the preliminary flight path presented in the Draft EIS and, at the widest point of realignment, be up to around one nm (2 km) further west than the preliminary flight path presented in the Draft EIS.

The realignment would commence from a point over one nm (around 2.5 km) north of Linden (where flights would be at an altitude of around 11,000 ft (3.4 km)) and merge back to the preliminary flight path generally to the east of Lidsdale at around 18,000 ft (5.5 km) (refer to Figure G.1 (Draft EIS) and Figure G.2 (refined flight path).

The proposed realignment of the flight path would:

- move the Runway 23 northern jet departures preliminary flight path approximately one nm (2 km) further away from Mt Tomah and 0.9 nm (1.8 km) from Mt Wilson/Mt Irvine residential areas, therefore providing additional lateral distance between the preliminary flight path and these communities
- change the location of the preliminary flight path to provide additional lateral separation between the preliminary flight path and the Emu Cave Aboriginal Place site
- not increase the required fuel burn from aircraft (due to increased flight length) or reduce airport efficiency compared to the preliminary flight path presented in the Draft EIS.



Source: Draft EIS Figure 7.8

Figure G.1 Mt Tomah, Mt Wilson and Mt Irvine preliminary flight path as presented in the 2023 Draft EIS

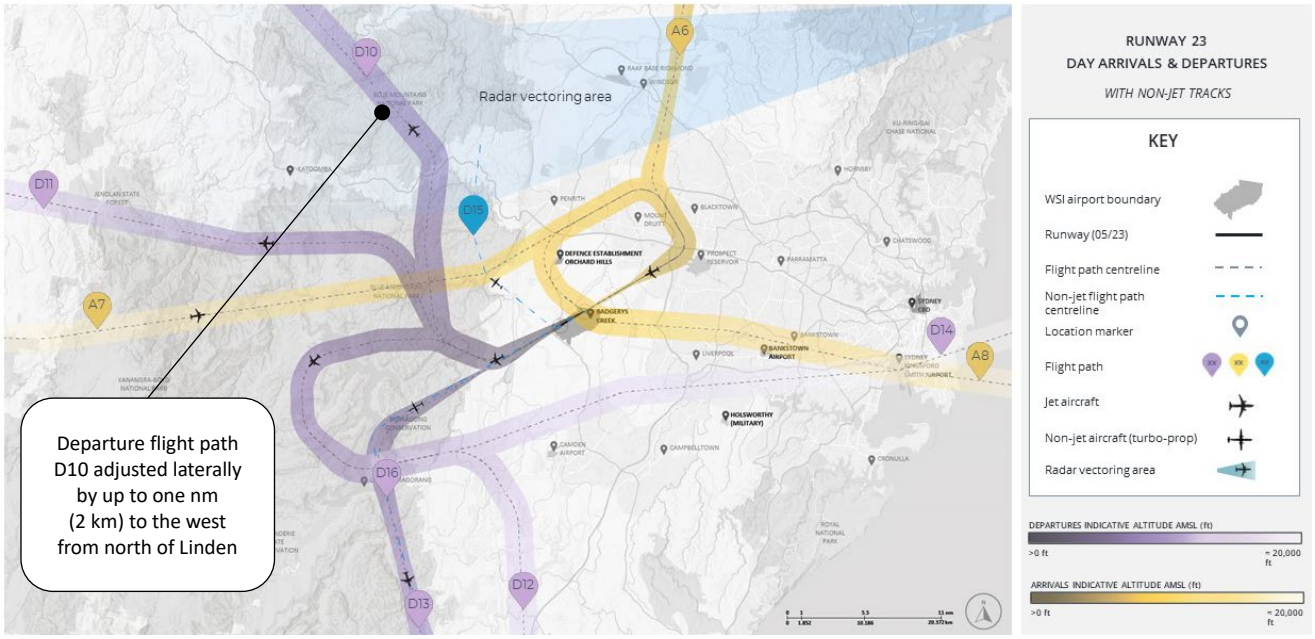
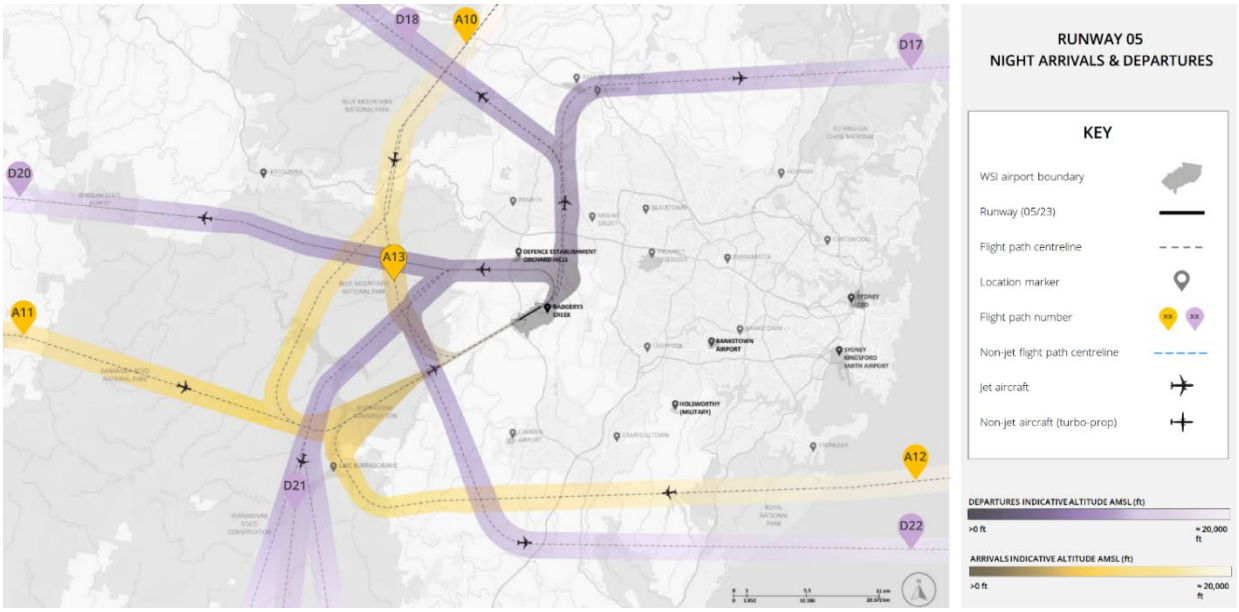


Figure G.2 Mt Tomah, Mt Wilson and Mt Irvine refined preliminary flight path

G1.3 Required Navigation Performance – Approval Required approach

The proposed change would remove the Required Navigation Performance – Approval Required (RNP AR) preliminary flight path (Runway 05 Arrival (RNP) North Night – preliminary flight path A13) identified in the Draft EIS during night time periods (refer to Figure G.3). Flights approaching WSI would instead utilise the alternative preliminary flight path A10 (refer to Figure G.4) as presented in the EIS.

Removal of the RNP AR approach flight path at night would result in an increase in the altitude of aircraft which fly over the residential areas on this approach. In particular, removal of the RNP AR approach flight path and use of the Runway 05 Arrival North Night flight path (preliminary flight path A10) would result in all aircraft on this approach path flying over Linden and Woodford at a height of around 12,000 ft (3.7 km) rather than around 5,000 ft (1.5 km), which would occur on the proposed RNP AR approach flight path as described in the Draft EIS.



Source: Draft EIS Figure 7.9

Figure G.3 Required Navigation Performance – Approval Required as presented in the 2023 Draft EIS

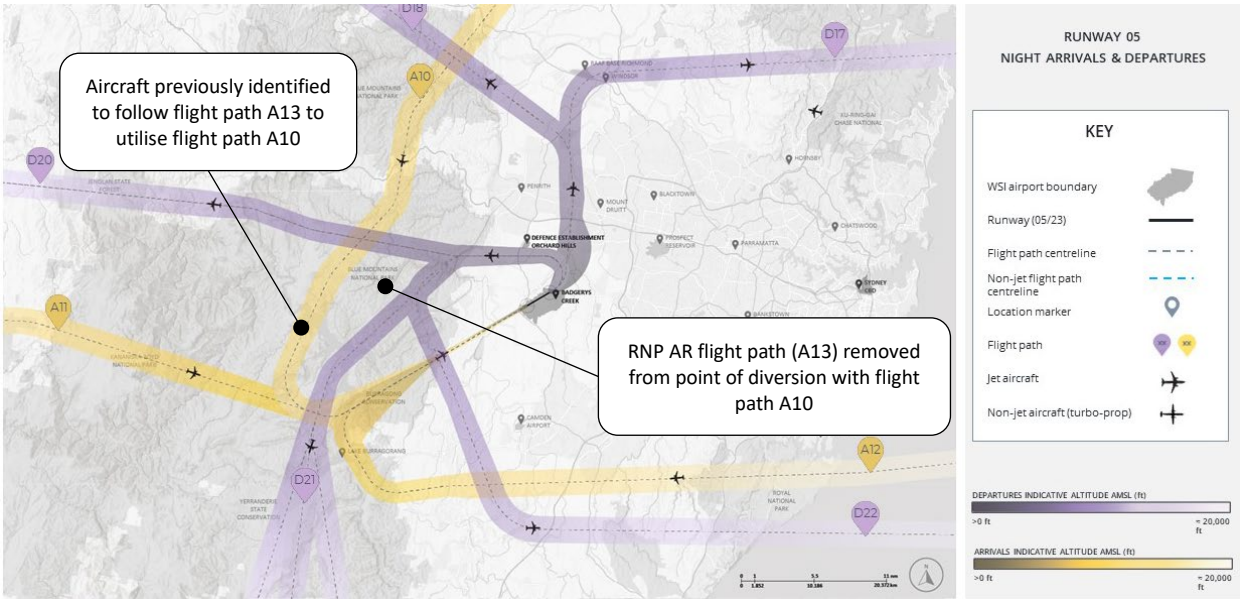


Figure G.4 Required Navigation Performance – Approval Required approach removal

The proposed removal of the RNP AR flight path would:

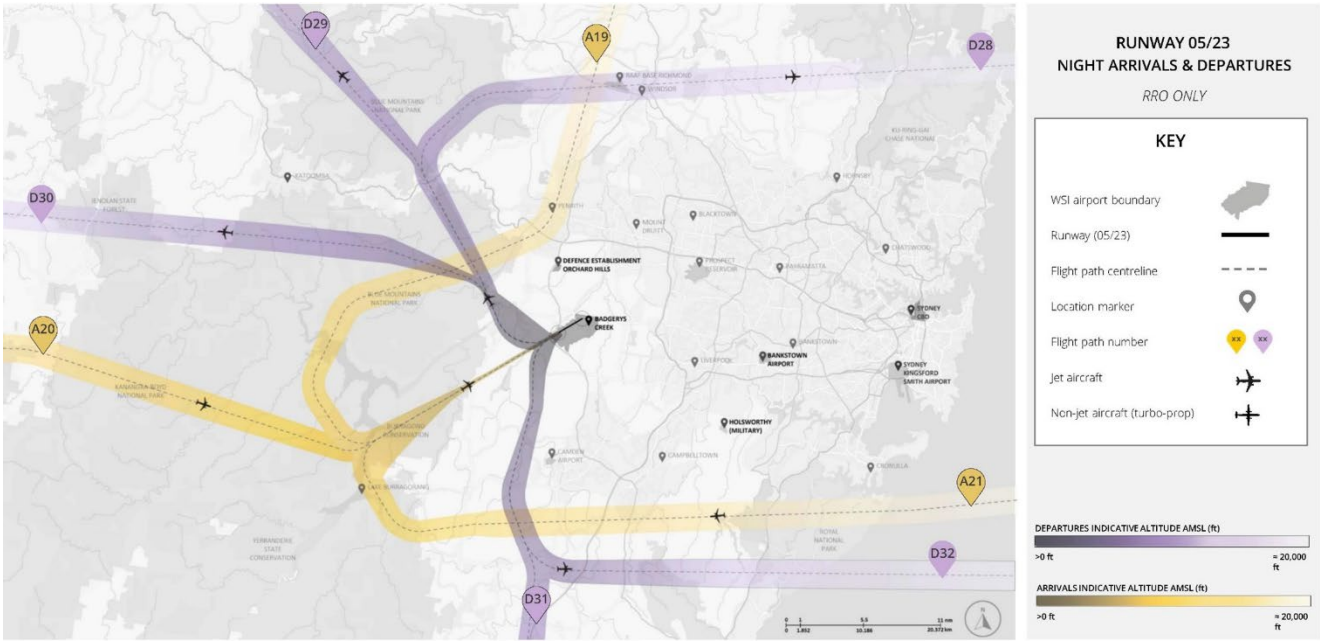
- result in a measurable noise benefit to the communities of Linden and Falconbridge when RNP AR capable aircraft are approaching Runway 05 at night
- allow aircraft passing over the Linden observatory to pass this location at a higher altitude, reducing the extent of visual intrusion to this site
- result in reallocation of aircraft to preliminary flight path A10, resulting in a minor increase in fuel burn for RNP AR capable aircraft at night.

G1.4 RRO night approach to Runway 05 (Arrival East)

The proposed change would move the Runway 05 Arrival East Night flight path (preliminary flight path A21) that approaches WSI from the east around 0.8 nm (1.5 km) further south at the point where it crosses the coastline south of Bundeena. Arriving aircraft at the point south of Bundeena would be at an altitude around 15,000 ft (4.5 km) (refer to Figure G.5 (Draft EIS) and Figure G.6 (refined flight path)).

The revised flight path would continue to provide separation between the arrival (A21) and departure (D22) preliminary flight paths. The realigned preliminary flight path would merge with the preliminary flight path at a point near the suburb of Mount Hunter (at an altitude of around 9,000 ft (2.7 km)). From this point, the revised flight path would continue to WSI along the same flight path alignment as presented in the Draft EIS (A21).

The proposed refinement to the flight path would result in a series of benefits compared to the preliminary flight path presented in the Draft EIS. The proposed refinement would reduce the level of direct community overflight to communities such as Bundeena.



Source: Draft EIS Figure 7.11

Figure G.5 RRO night approach to Runway 05 preliminary flight path as presented in the 2023 Draft EIS

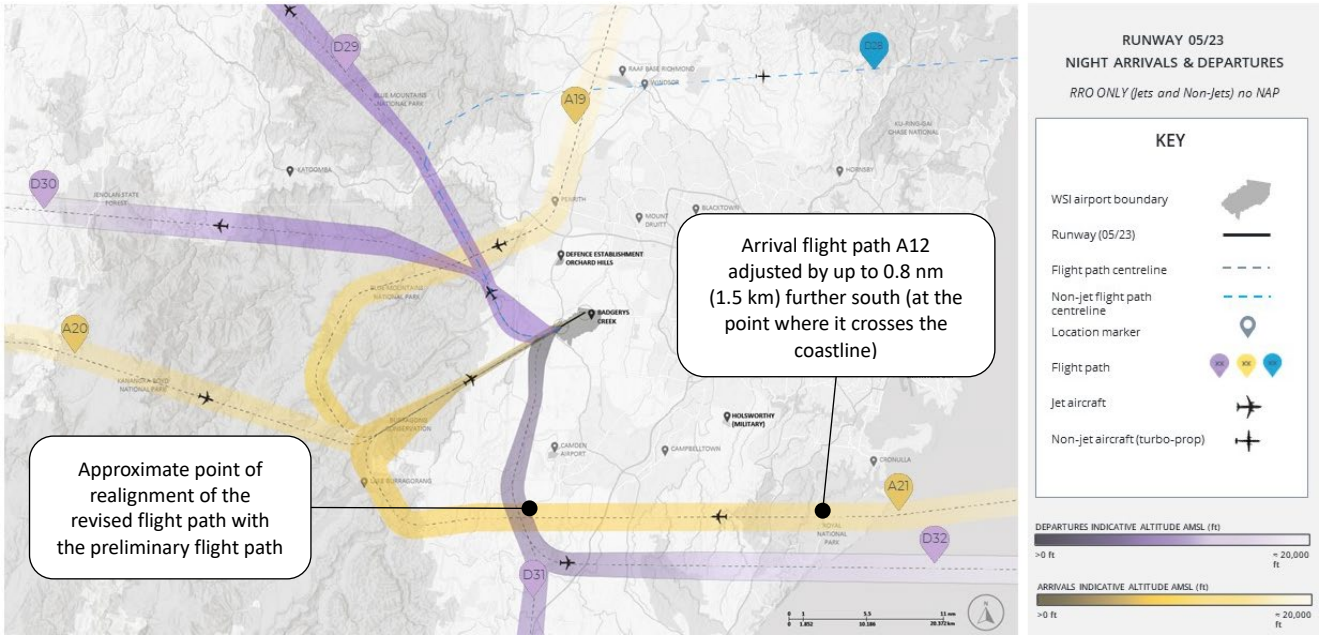


Figure G.6 RRO night approach to Runway 05 refined preliminary flight path

G1.5 Refinements to the RRO mode of operation

Changes have been proposed to the preliminary flight paths that aircraft will follow during RRO. The preliminary RRO flight paths presented in the Draft EIS showed departures from WSI would turn at an altitude as soon as safely possible after take-off to allow for maximum separation with other RRO arriving aircraft (refer to Figure G.7). This would allow air traffic control to maximise the use of the RRO mode of operation. These preliminary flight paths would continue to be used when required. The proposed changes to the RRO procedures and preliminary flight paths have sought to further improve community outcomes and would be implemented when it is safe to do so and when traffic permits.

G1.5.1 East flight paths

This change would discontinue use of the Runway 23 Departure Northeast Night (RRO) flight path (preliminary flight path D28) for jet aircraft. All jet traffic previously assigned jet aircraft along the Runway 23 Departure Northeast Night (RRO) flight path would be redistributed to the Runway 23 Departure Southeast Night (RRO) (preliminary flight path D32). The reassigned traffic includes all eastern departures to destinations in New Zealand, Pacific Island countries and the USA.

The change to the Runway 23 Departure Northeast Night (RRO) preliminary flight path would not affect non-jet aircraft which would continue to use this flight path (refer to Figure G.8).

G1.5.2 North and west flight paths

This change would include the introduction of a new night-time (11 pm to 5:30 am) RRO noise abatement procedure (RRO-NAP). Under the proposed new RRO-NAP, northbound and westbound departure aircraft will maintain the Runway 23 straight ahead runway heading (230 degrees) flight path for approximately 5 nm (9.3 km) rather than immediately turning as soon as safely possible. This would result in avoiding overflights of communities as much as possible, including Wallacia and Mulgoa. However, the RRO-NAP would result in additional overflight of parts of Silverdale and Warragamba.

Once past 5 nm (9.3 km) air traffic control would radar vector aircraft to their outbound tracks along a more southern route than the preliminary flight paths shown in the Draft EIS. Jet aircraft will be processed along a revised flight path south of the Great Western Highway avoiding communities and other noise sensitive areas such as the Greater Blue Mountains Area (GBMA), to the extent practicable (refer to Figure G.8). Non-jet aircraft proceeding west will also follow this path.

Non-jet aircraft proceeding north, after turning right at 5 nm (9.3 km), will be directed to join the preliminary Runway 23 Departure North Night (RRO) flight path (preliminary flight path D29). The expected number of non-jet aircraft operations to/from WSI in the night period (11 pm to 5:30 am) is expected to be extremely low.

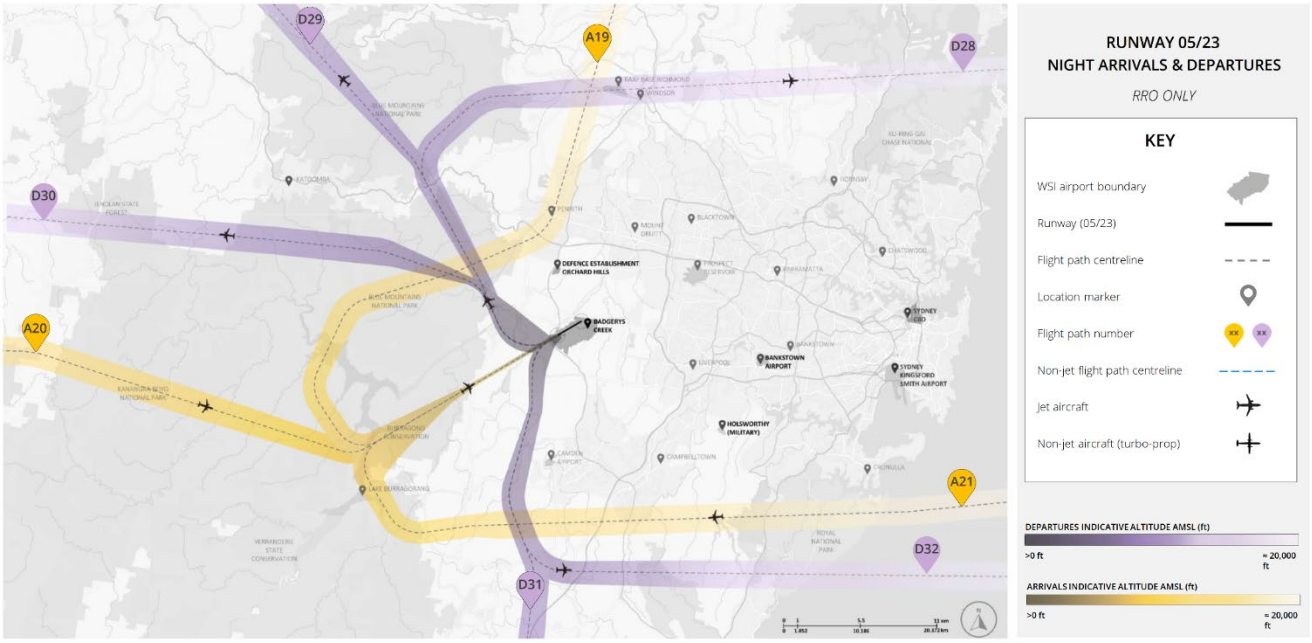
The RRO-NAP would only be able to operate during certain light traffic (low aircraft number) conditions. When night-time traffic demand exceeds around 12 movements per hour, air traffic would revert back to normal RRO departure procedures as presented in the Draft EIS. This procedure is expected to be available where the departure is rolling on its take-off roll, and the inbound aircraft is at or beyond 30 nm (56 km) resulting in a 10-minute separation between any departure and a subsequent arrival movement. Air traffic control may actively manage aircraft sequencing to create this 30 nm (56 km) gap between arrivals. Similar to normal RRO operations this throughput rate may vary when the demand is not balanced and a bias towards either departures or arrivals exists.

As overnight aircraft traffic increases, flight operations will increasingly need to use the published RRO standard instrument departure (SID) flight paths as presented in the Draft EIS, to ensure RRO use is retained (within the existing parameters of the RRO mode).

The proposed change offers alternative departure flight paths to aircraft travelling north and west during the RRO mode. These 2 new tracks are only available when traffic permits, as described above, and are direct alternatives to departure flight path D29 (Runway 23 Departure North Night (RRO)) and departure flight path D30 (Runway Departure West Night (RRO)) (refer to Figure G.7). The proposed RRO-NAP flight paths and procedure changes would only apply to west, north, and north-west departure operations.

The flight paths depicted are indicative. Air traffic control will radar vector aircraft along paths similar to these tracks as indicated by the shaded area in Figure G.8.

With respect to aircraft movements, the RRO-NAP is expected to be able to divert up to around 80 per cent of movements away from the northbound tracks in the RRO runway mode of operation initially (2033). As demand grows, this ratio is expected to decrease to up to around 40 per cent of movements by 2055.



Source: Draft EIS Figure 7.11

Figure G.7 RRO flight paths as presented in the Draft EIS

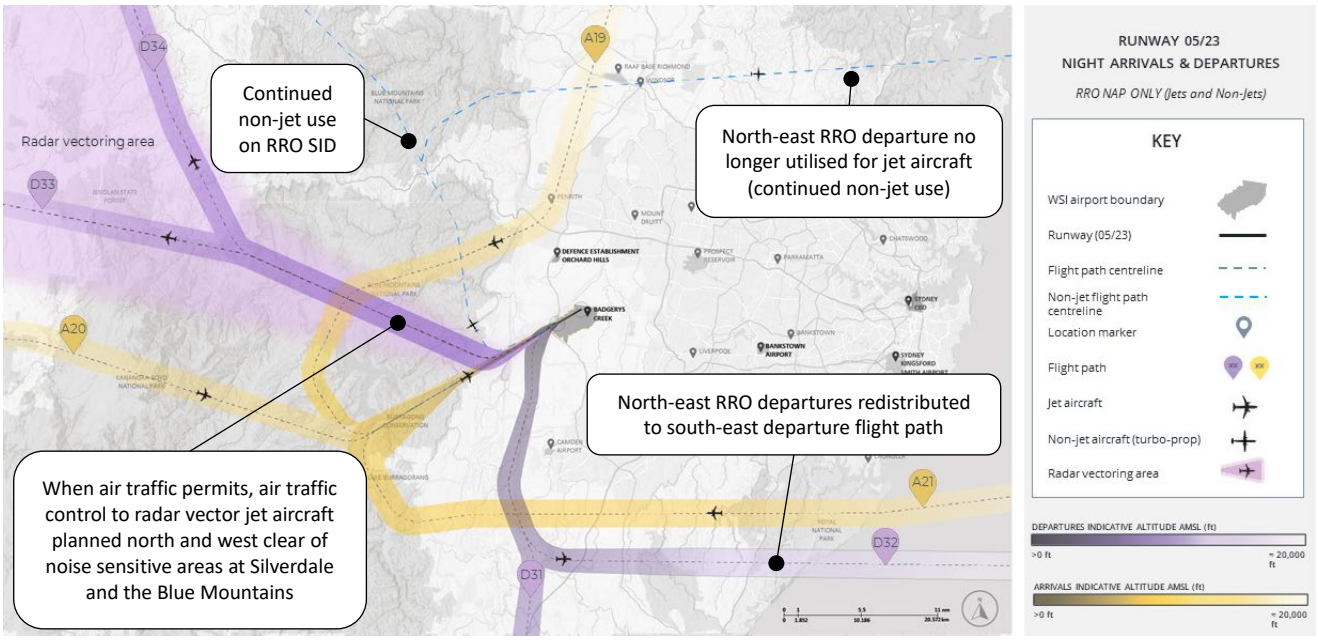


Figure G.8 Refined RRO runway mode of operation flight paths, RRO-NAP and proposed radar vectoring area

Overall, the proposed change to RRO procedures is focussed on reducing to the extent practicable, 'severely impacted' areas identified in the Draft EIS. The proposed refinement is aimed at reducing the number of aircraft overflights of these communities and sensitive sites, reducing noise impacts during night hours (11 pm to 5:30 am).

G2 Assessment of additional impacts

G2.1 Assessment approach

Part C of the Draft EIS presented the impact assessment for the project and identified the range of effects associated with the preliminary flight paths for single runway operations. The assessment considered all potential impacts and risks applicable to the project and addressed the relevant requirements of the Airports Act and the EPBC Act, in accordance with the EIS Guidelines for the project. The assessments were carried out on the preliminary flight paths as described in Chapter 7 of the Draft EIS.

The refined preliminary flight paths, as described in Section G1, were assessed against each of the environmental aspects considered in the Draft EIS. A screening assessment of the potential environmental impacts of each proposed refinement was undertaken as part of the development of the refined preliminary flight paths. Consideration of environmental, social and economic issues, and an assessment of the potential changes to the environmental impacts as compared to those described in the Draft EIS was undertaken. Where no material change in impact was identified, the corresponding environmental aspect was not considered further.

A summary of the environmental aspects potentially affected by each of the proposed preliminary flight path refinements is provided in Table G.1. Where a change in the environmental outcome compared to the Draft EIS is considered to occur, the item is marked with a tick. The changes are described in further detail in the following sections of this appendix. Where there is no change to the impacts assessed in the Draft EIS, the item is marked with a dash.

Table G.1 Summary of environmental aspect considered to be potentially changed in its impact by the refined preliminary flight paths (compared to the Draft EIS)

Refined proposal section	Potential change in environmental aspect outcome													
	Noise	Air quality	Greenhouse gases	Hazard and risk	Land use	Landscape and visual amenity	Biodiversity	Heritage	Social	Economic	Human health	Facilitated impacts	Cumulative impacts	Matters of National Environmental Significance (MNES)
Mt Tomah, Mt Wilson and Mt Irvine (as described in Section G1.2)	✓	–	–	–	–	✓	–	✓	–	–	–	–	–	–
Required Navigation Performance – Approval Required approach (as described in Section G1.3)	✓	–	–	–	–	✓	–	–	–	–	–	–	–	–
RRO night approach to Runway 05 (as described in Section G1.4)	✓	–	–	–	–	✓	–	–	–	–	–	–	–	–
Refinements to the RRO mode of operation and addition of the RRO-NAP (as described in Section G1.5)	✓	✓	–	–	–	✓	–	✓	✓	–	✓	–	–	✓

These assessments have been supported by additional detailed investigation which has been documented in the Addendum to Technical paper 1: Aircraft noise.

The following sections provide a summary of the impact assessment outcomes associated with each of the preliminary flight path refinements.

G2.2 Noise

Mt Tomah, Mt Wilson and Mt Irvine

A majority of the refined preliminary flight path would occur over the Blue Mountains National Park and would not generally affect populated areas. The refined preliminary flight path may have some minor benefit/reduced noise impacts to areas such as Mt Tomah and Mt Wilson/Mt Irvine due to the increased distance from the refined preliminary flight path compared to the preliminary flight path (resulting in an increased separation of around one nm to 0.9 nm (2 km to 1.8 km) from these communities respectively).

The refined flight path would move the preliminary flight path (as presented in the Draft EIS) around 1.7 km closer to the townships of Bell, Dargan and Clarence. However, the refined flight path would still be further from Bell, Dargan and Clarence than it will be from Mt Tomah and Mt Irvine at these locations. In addition, aircraft would be at an altitude of around 18,000 ft.

The N60 contours as depicted in the Draft EIS do not typically extend along this preliminary flight path with the exception of minor impacts (10 to 19 movements per 24-hour period) in 2055. These impacts however would occur over unpopulated areas. Therefore, any minor shift of the N60 to align with the refined preliminary flight path is unlikely to change the assessment that was presented in the Draft EIS. The other assessed scenarios do not generally have N60 noise contours that extend as far as the location of the proposed change.

Required Navigation Performance – Approval Required approach

The removal of the RNP AR would result in an overall increase in the altitude of aircraft above Linden and Faulconbridge using the Runway 05 approach during night time periods by around 6,000 ft to 7,000 ft (1.8 km to 2.1 km) for those aircraft that would have previously been assigned to the A13 flight path. This would result in a measurable noise benefit when RNP AR capable aircraft are arriving to Runway 05 at night.

Overall there would not be an increase in the number of flights using the section of arrival path from where the path turns toward the RNP AR approach to where it meets the longer approach to Runway 05, however with the removal of the A13 flight path, the spread of aircraft arriving across the two flight paths would be changed, with all aircraft now proposed to arrive along the A10 flight path. This aircraft approach however is generally over unpopulated areas and is therefore not expected to result in any change in noise impacts compared to those already discussed in the Draft EIS.

RRO night approach to Runway 05 (Arrival East)

A majority of the refined preliminary flight path occurs over Royal National Park at altitudes at from around 13,300 ft (4 km) (west of Gilead) to over 17,500 ft (5.3 km) (where the preliminary flight path crosses the coastline). The refined preliminary flight path would however result in reduced direct overflight of Rosemeadow, Gilead and Menangle Park, being around 600 m further to the south than the preliminary flight path at an altitude of around 12,000 ft (3.7 km). This refined preliminary flight path would result in negligible reduction in noise impacts to these communities. The change may also have some minor benefit through reduced noise impacts to areas such as Bundeena and Heathcote due to the increased distance of the refined preliminary flight path compared to the preliminary flight path identified in the Draft EIS.

The refined preliminary flight path would be slightly closer to the suburb of Waterfall (up to around 900 m closer in comparison to the preliminary flight path identified in the Draft EIS), but at altitudes of around 12,000 ft (3.7 km), the changes in impacts to those described in the Draft EIS are also expected to be negligible.

Refinements to the RRO mode of operation

These refinements would result in some changes to the noise assessment to that presented in the Draft EIS. A full assessment of the refinements is provided in the Addendum Technical paper 1: Aircraft noise.

Method of assessment

The assessment of aircraft noise impacts was undertaken using the same methodology described in Technical paper 1: Aircraft noise. The assessment focused on night time operations (11 pm to 5.30 am) as the RRO mode of operation would only occur during the night time when conditions permit. Impacts and benefits were identified based on absolute noise level or number of events, and are presented as a comparison against those presented in the baseline assessment presented in Technical paper 1.

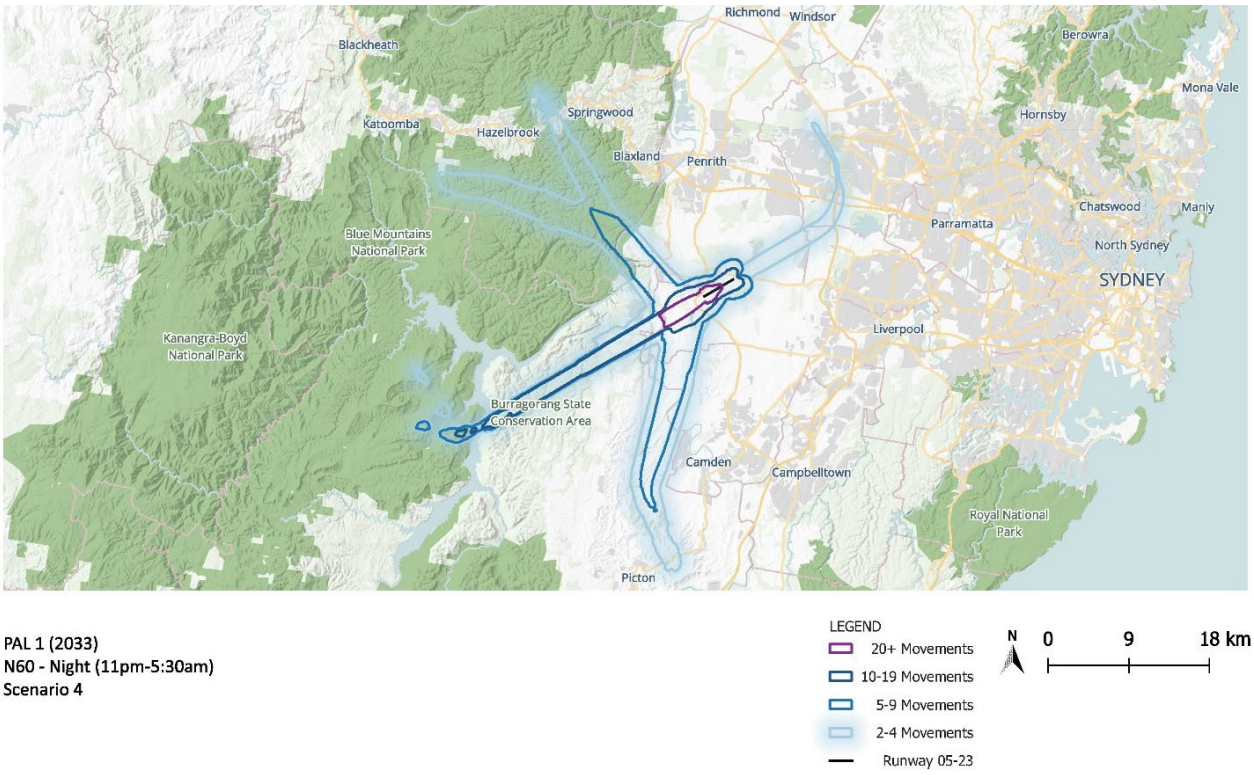
Changes in potential noise impacts

The proposed changes would result in a noticeable change to the N60 Night contours (as presented in the Draft EIS). However, these changes would have minimal impact to the N60 24-hour and N70 24-hour contours. Figure G.9 reproduces Scenario 4 with the assessment year 2033 as presented in the Draft EIS. Figure G.10 displays the same information with both proposed changes to RRO (reallocation of D28 departures and RRO-NAP).

Additional detail on changes to noise impacts is provided in the Addendum to Technical paper 1: Aircraft noise.

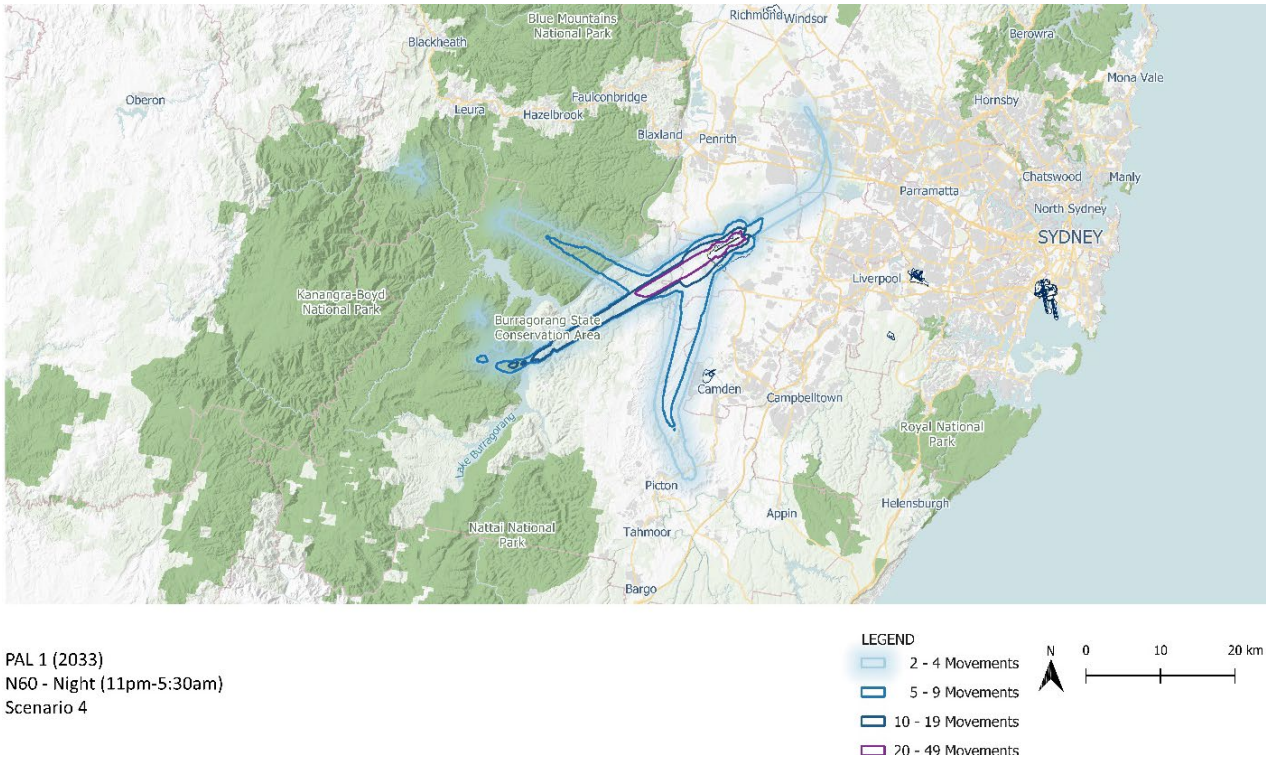
Impacts on the GBMA

Noise impacts to the GBMA are described in further detail in Section G2.15.



Source: Technical paper 1: Noise (Appendix C)

Figure G.9 N60 contour Night (11 pm to 5:30 am) –2033 (Scenario 4) – Draft EIS preliminary flight path



Source: Addendum Technical paper 1: Noise (Appendix C)

Figure G.10 N60 contour Night (11 pm to 5:30 am) –2033 (Scenario 4) – Refinements to the RRO mode of operation and RRO-NAP preliminary flight path

G2.3 Air quality

Mt Tomah, Mt Wilson and Mt Irvine, Required Navigation Performance – Approval Required approach, and RRO night approach to Runway 05 (Arrival East)

The following preliminary flight path refinements are not expected to result in any change to the air quality impact assessment as the same number of aircraft would continue to operate, despite the location of these aircraft changing. Specifically:

- Mt Tomah, Mt Wilson and Mt Irvine: the refined preliminary flight path would not result in any change to the air quality within the Sydney Basin
- Required Navigation Performance – Approval Required approach: the removal of this flight path and reallocation of aircraft to the alternative A10 flight path would not result in any change to the air quality within the Sydney Basin
- RRO night approach to Runway 05: the refined preliminary flight path would not result in any change to the air quality within the overall Sydney Basin.

Refinements to the RRO mode of operation

The implementation of the RRO-NAP would result in a change that would not affect the overall air quality assessment undertaken as part of the Draft EIS as the same number of aircraft would continue to operate, despite the location of these aircraft changing. Overall ozone (O_3) concentration, nitrogen dioxide (NO_2) concentration and other pollutant concentrations are not expected to change compared to those presented in the Draft EIS as a result of the additional runway mode of operation.

The redistribution of aircraft from the Runway 23 Departure Northeast Night (RRO) (preliminary flight path D28) to the Runway 23 Departure Southeast Night (RRO) (preliminary flight path D32) may result in a minimal change to air quality, however it is expected to be negligible due to the small number of affected flights (around 5 per night).

G2.4 Greenhouse gas

Mt Tomah, Mt Wilson and Mt Irvine, Required Navigation Performance – Approval Required approach, and RRO night approach to Runway 05 (Arrival East)

The following preliminary flight path refinements are not expected to result in any change to the greenhouse gas impact assessment as presented in the Draft EIS:

- Mt Tomah, Mt Wilson and Mt Irvine: the refined preliminary flight path would not result in any change to the greenhouse gas generated by the project or the effects on existing greenhouse gas within the Sydney Basin
- Required Navigation Performance – Approval Required approach: the removal of this flight path and reallocation of aircraft to the alternative A10 preliminary flight path would not result in any discernible change to the greenhouse gas generated by the project or the effects on existing greenhouse gas within the Sydney Basin
- RRO night approach to Runway 05: the refined preliminary flight path would not result in any discernible change to the greenhouse gas generated by the project or the effects on existing greenhouse gas within the Sydney Basin.

Refinements to the RRO mode of operation

The implementation of the RRO-NAP would result in a minimal change that would not affect the results of the greenhouse gas assessment undertaken for the Draft EIS as the same number of aircraft would continue to operate, despite the location of these aircraft changing. During the periods when RRO-NAP runway mode of operation is implemented, aircraft would be required to travel up to around 7.2 nm (around 13.6 km) longer than the standard SID RRO flight path, noting that the number of overall flights this would affect is low (up to around 4 movements per night in 2055). The change to the western flight path would also not add substantial travel distance for aircraft compared to the standard SID RRO flight path.

The redistribution of aircraft from the Runway 23 Departure Northeast Night (RRO) (preliminary flight path D28) to the Runway 23 Departure Southeast Night (RRO) (preliminary flight path D32) may result in minimal change to greenhouse gas impacts, however it is expected to be minimal due to the small number of affected flights (around 5 per night). The affected flight paths to North America and Pacific island destinations would have no significant increase in track miles that would result in increased greenhouse gas production.

G2.5 Hazards and risk

Mt Tomah, Mt Wilson and Mt Irvine, Required Navigation Performance – Approval Required approach, and RRO night approach to Runway 05 (Arrival East)

The following preliminary flight path refinements are not expected to result in any change to the overall hazard and risk impact assessment as presented in the Draft EIS:

- Mt Tomah, Mt Wilson and Mt Irvine: the refined preliminary flight path would represent a minor change which would not affect overall hazard or risk assessment undertaken. A majority of the refined preliminary flight path would occur over the Blue Mountains National Park and would not change risk(s) over populated areas
- Required Navigation Performance – Approval Required approach: the removal of this preliminary flight path would reduce the overall hazard and risk to locations that would be traversed as part of the preliminary flight path design, however the noted hazard and risk would be similarly transferred to the A10 flight path
- RRO night approach to Runway 05: the refined preliminary flight path would represent a minor change which would not affect overall hazard or risk assessment undertaken. A majority of the refined preliminary flight path would occur over the Royal National Park and would not change risk(s) over populated areas.

Refinements to the RRO mode of operation

The implementation of the changes to RRO to include the RRO-NAP are expected to result in an overall neutral change in relation to the level of hazard and risk of the north and west flight paths. The implementation of the RRO-NAP would generally redistribute current flights from one urban population to another (i.e. the change would result in additional flights over Warragamba and Silverdale, and generally reduce flights over areas such as Mulgoa, Luddenham and Orchard Hills as well as Lawson, Hazelbrook and Linden).

For the redistribution of the north-east flights to the south east preliminary flight path, aircraft would generally travel over less populated areas and the Royal National Park instead of areas of greater population in northern and western Sydney.

G2.6 Land use

None of the proposed changes to the preliminary flight paths are anticipated to result in a change to the overall land use impacts identified and assessed in the Draft EIS.

G2.7 Landscape and visual amenity

Mt Tomah, Mt Wilson and Mt Irvine, Required Navigation Performance – Approval Required approach, and RRO night approach to Runway 05 (Arrival East)

The following preliminary flight path refinements are not expected to result in any change to the overall landscape and visual amenity impact assessment as presented in the Draft EIS:

- Mt Tomah, Mt Wilson and Mt Irvine: a majority of the refined preliminary flight path would occur over the Blue Mountains National Park and represents a small shift in the overall flight path location. The change may have some minor benefit/reduced visual impact to areas such as Mt Tomah due to the increased distance from this location compared to the preliminary flight path presented in the Draft EIS, meaning aircraft may appear slightly smaller/less visible.

- Required Navigation Performance – Approval Required approach: noting that a majority of the preliminary flight path was located over the Blue Mountains National Park, the removal of this flight path may have benefits through reduced visual impacts to the Linden and Faulconbridge communities as the lower altitude aircraft would now traverse this area at a greater height, meaning aircraft would appear slightly smaller/less visible than would have occurred with the implementation of the RNP AR design. It is also anticipated that the visual impacts to users of the Linden Observatory will also be reduced by the removal of this flight path.
- RRO night approach to Runway 05: a majority of the refined preliminary flight path would occur over the Royal National Park. The change may have some minor benefit through reduced visual impact to areas such as Bundeena and Heathcote due to the increased distance compared to the preliminary flight path as the refined preliminary flight path would be further south, meaning aircraft may appear slightly smaller/less visible than previously assessed in the Draft EIS.

Refinements to the RRO mode of operation

For urban and semi-urban areas including towns along the Great Western Highway, the assessment presented in the Draft EIS noted that there would be a low magnitude of change at night due to the low frequency and high altitude of aircraft. Additionally, due to the low visual sensitivity (and operation of this particular runway mode of operation at night), there would be low visual impact. Flights using the RRO-NAP would further reduce impacts as flights will continue to travel south of the Great Western Highway before turning north west of Katoomba.

The main change in overall visual impacts would be the changed impacts of lighting from the revised night-time flight paths between the suburbs of:

- Wallacia and Mulgoa, which would likely experience slightly reduced impacts due to a reduced number of overflights
- Silverdale and Warragamba, which would likely experience a slightly increased level of impact due to an increased number of overflights.

While there would be a difference in locations (i.e. Wallacia and Mulgoa, and Silverdale and Warragamba) affected by changed aircraft lighting, the impacts would generally be experienced by a similar number of people, therefore continuing to result in a negligible magnitude of change, and consistent with the assessment presented in the Draft EIS. Overall, the RRO-NAP runway mode of operation is expected to result in a minor positive change when the mode is in operation as it would reduce the number of flights over populated areas, therefore reducing the visual impact from these flights (noting that the number of applicable aircraft is low and that the changes would only occur during night time periods).

The redistribution of the Runway 23 Departure Northeast Night (RRO) (preliminary flight path D28) to the Runway 23 Departure Southeast Night (RRO) (preliminary flight path D32) (up to 5 flights redistributed from the north-east flight path to the south-east flight path) would result in aircraft traveling over less populated areas, as well as a portion of the flights being over the Royal National Park instead of larger areas of population in northern and western Sydney. The revised night-time flight paths result in an overall reduced level of visual impact.

G2.8 Biodiversity

Mt Tomah, Mt Wilson and Mt Irvine, Required Navigation Performance – Approval Required approach, and RRO night approach to Runway 05 (Arrival East)

The following preliminary flight path refinements are not expected to result in any change to the overall biodiversity impact assessment as presented in the Draft EIS:

- Mt Tomah, Mt Wilson and Mt Irvine: a majority of the refined preliminary flight path would continue to traverse similar areas of the Blue Mountains National Park and would not result in a change in previously assessed impacts
- Required Navigation Performance – Approval Required approach: the existing flight path would be removed, reducing any potential impacts in this location under the affected runway mode of operation
- RRO night approach to Runway 05: a majority of the refined preliminary flight path would continue to traverse similar areas of the Royal National Park and would not result in a change to previously assessed impacts.

Refinements to the RRO mode of operation

The additional runway mode of operation would not result in any change in overall biodiversity impacts as assessed in the Draft EIS. A majority of the change would continue to traverse similar areas of the Blue Mountains National Park. During implementation of the RRO-NAP, a portion of the Blue Mountains National Park to the north of the Great Western Highway, would not be overflown however different areas of the southern portion of the Blue Mountains would be newly overflown by departing aircraft, resulting in a similar overall level of overflight of the area as a whole.

Additionally, the N60 contours for the additional runway mode of operation would generally be similar to the noise contours assessed as part of the biodiversity assessment in the Draft EIS. As such, the potential impacts of the additional runway mode of operation are expected to be consistent with the biodiversity assessment presented in the Draft EIS.

G2.9 Heritage

Mt Tomah, Mt Wilson and Mt Irvine, Required Navigation Performance – Approval Required approach, and RRO night approach to Runway 05 (Arrival East)

The following preliminary flight path refinements are not expected to result in any change to the overall heritage impact assessment as presented in the Draft EIS:

- Mt Tomah, Mt Wilson and Mt Irvine: the refined preliminary flight path may result in a minor positive heritage impact compared to the impacts assessed in the Draft EIS. The refined preliminary flight path would increase the distance of the preliminary flight path to no longer travel directly over the Emu Cave Aboriginal Place. The revised flight path would be located up to around 0.8 nm (1.5 km) further to the south-west of the preliminary flight path (at an altitude of around 17,000 ft (5.2 km)). The refined preliminary flight path would however also slightly change the orientation of the flight path with respect to Emu Cave which may make the revised flight path somewhat more visible from a distance
- Required Navigation Performance – Approval Required approach: This change would provide some visual and noise amenity improvement (at night) to Aboriginal heritage sites along Linden Ridge and the Emu rock engraving site at Ticehurst Park, as aircraft would be at higher altitudes when passing above or near these sites
- RRO night approach to Runway 05: no identified heritage sites are located within the immediate vicinity of the refined preliminary flight path that would result in changes to the impacts identified in the Draft EIS.

Refinements to the RRO mode of operation

When in operation, the RRO-NAP flight path would provide increased separation between a number of significant heritage items including The Three Sisters, Kings Tableland and Upper Kedumba River Valley Aboriginal Places for flights travelling to the west. The RRO-NAP and/or the removal of jet aircraft from the Runway 23 Departure Northeast Night (RRO) flight path (D28) (when in operation) would also provide some benefit to Aboriginal heritage sites due to reduced overflight of the Linden Ridge sites, the Emu rock engraving site at Ticehurst Park, and/or Emu Cave Aboriginal Place for flights travelling north. The additional runway mode of operation would also not change the previously assessed impacts to the Bents Basin, Euroka Clearing or Red Hand Caves Aboriginal Places. The impacts on these sites would remain consistent with the assessment of heritage impacts as presented in the Draft EIS.

Impacts to the GBMA World Heritage site would also be consistent with the assessment presented in the Draft EIS, as the general height and overall impact on the aesthetic and Aboriginal values of this site would not change as a result of the relocation of the preliminary flight paths associated with the RRO-NAP. The altitude at which the refined preliminary flight paths would operate, and the limited number of aircraft expected to utilise this runway mode of operation, would mean that potential impacts would be consistent with the assessment previously presented. One additional State Heritage Register item (‘Coxs River Arms, Lake Burragorang, Warragamba Dam walking track’) would be located within proximity of the RRO-NAP flight path however this flight is overflown by several other preliminary flight paths (during daytime periods) and was considered as part of the heritage assessment presented in the Draft EIS. Impacts to this item are not expected as a result of the RRO-NAP.

Removal of the Runway 23 Departure Northeast Night (RRO) flight path for jet aircraft (preliminary flight path D28) would also result in a minor benefit to previously identified heritage impacts, reducing the overflight of the Commonwealth Heritage listed North Base Trig station and the RAAF Base Richmond both located at Richmond. It is noted however that the transferred flights from preliminary flight path D28 (for jet aircraft) to preliminary flight path D32 would result in a corresponding increase in flights over the southern portion of the Royal National Park and Garawarra State Conservation Area, and Cubbitch Barta National Estate (associated with the Royal National Park). These aircraft would pass over this area at an altitude of around 18,000 ft and above and is expected to result in negligible impacts to these heritage items.

Overall, it is not expected that the refinements to the RRO mode of operation would result in change to the heritage impacts as presented in the Draft EIS.

G2.10 Social

Mt Tomah, Mt Wilson and Mt Irvine, Required Navigation Performance – Approval Required approach, and RRO night approach to Runway 05 (Arrival East)

The following preliminary flight path refinements are not expected to result in any change to the social impact assessment as presented in the Draft EIS:

- Mt Tomah, Mt Wilson and Mt Irvine: the refined preliminary flight path would generally be over bushland areas associated with the Blue Mountains National Park and would not affect urban or known recreational areas
- Required Navigation Performance – Approval Required approach: the refined preliminary flight path would remove a preliminary flight path providing a general benefit to urban area(s) that were previously below this flight path
- RRO night approach to Runway 05: the refined preliminary flight path would generally be over bushland areas associated with the Royal National Park and would not affect urban areas.

Refinements to the RRO mode of operation

The social impact assessment within the Draft EIS examined a range of potential social impacts that would have the potential to occur as a result of the project. These were derived from a range of categories considered around factors such as community, way of life impacts, cultural impact, accessibility and livelihood impacts, and health and wellbeing impacts. The following sections provide a summary of the potential elements that may result in a change in impact as a result of these refinements.

Changes to community composition and cohesion

An increase in the noise levels experienced by those in the local and regional study area may lead to people deciding to relocate so they can maintain their current lifestyle. This can often result in changes to community composition and cohesion for both those who stay and those who leave. Section 6.1.1 noted that the magnitude of this impact is determined by understanding the proportion of people that will be subject to different levels of aircraft noise, including discussion of the potential number of residents that may be living within the 25 Australian Noise Exposure Concept (ANEC) composite contours and people within 30 ANEC composite contours. The implementation of these refinements would not change the extents of the ANEC, and would therefore not change the assessment of this issue as presented in the Draft EIS.

Increased inequality

The likelihood of aircraft noise-related disturbance on inequality was assessed through understanding existing vulnerability conditions, consulting with affected communities and understanding people's exposure to aircraft noise.

The proposed change would result in a reduction in aircraft flying over communities, including Wallacia and Mulgoa, however would result in additional overflight of parts of Silverdale and Warragamba. The Socio-Economic Indexes for Areas indicators notes that Warragamba has greater levels of disadvantage and Silverdale least disadvantage.

The volume of flight movements expected to occur typically corresponds to the magnitude of the inequality impact expected. Given the low levels of aircraft traffic associated with this runway mode of operation, and restricted timing at which it can occur (i.e. only under certain weather and air traffic conditions), it is not expected that the implementation of the refinements would change the overall magnitude of impact or assessment of potential impacts as presented in the Draft EIS with respect to increased inequality. Consequently, people under vulnerable conditions residing in Silverdale and Warragamba and under the N60 24-hour, N60 night-time and N70 contours, would experience this change as a moderate impact, resulting in a high pre-mitigated impact, consistent with the conclusions within the Draft EIS. A proportionate reduction in impacts to vulnerable community members in Wallacia and Mulgoa is expected to occur as a result of the proposed refinement.

Changes to way of life as a result of loss of residential amenity

Changes to way of life as a result of loss of residential amenity were measured by considering disruptions that may occur due to aircraft noise during the day or night, including impacts on activities such as working from home, and the way people use and enjoy residential indoor and outdoor space (backyards). Given the low levels of aircraft traffic associated with this runway mode of operation, and restricted timing at which it can occur, it is not expected that the implementation of the refinements would change the overall magnitude of impact or assessment of potential impacts as presented in the Draft EIS.

It is noted that some of the potential impacts may shift from one urban population to another (i.e. there would be additional flights over Warragamba and Silverdale, and a reduction in the number of flights over areas such as Mulgoa, Luddenham and Orchard Hills when the RRO (and RRO-NAP) is in operation). All of these areas are considered in the Draft EIS and the overall impact magnitude is considered to be the same.

Changes to the use and enjoyment of social infrastructure

Impacts on social infrastructure such as the use of churches, playgrounds and walking tracks were considered. A majority of these facilities would not likely be utilised during the period of the RRO mode of operation (11 pm-5:30 am). The assessment provided in the Draft EIS would not change as a result of the implementation of these refinements.

Effects to wellbeing as a result of changes to amenity

Changes to health and wellbeing were determined by understanding the existing health and vulnerability conditions of people potentially affected by changes to amenity, including noise, air quality and night light. Noise and air emissions associated with the project were noted as having the potential to affect the physical and mental health and wellbeing of residents. The Draft EIS acknowledged that, among other areas, the suburbs of Luddenham, Greendale, Silverdale, and Wallacia would be likely to experience some level of sleep disturbance and annoyance (refer to Section G2.12 for further detail). The assessment noted that residents in these suburbs are likely to experience moderate changes to their wellbeing as a result of changes to amenity.

The potential impacts on wellbeing may shift from one urban population to another (i.e. the change would result in additional flights over Warragamba and Silverdale, and generally reduce the number of flights over areas such as Mulgoa, Luddenham and Orchard Hills when the RRO-NAP is in operation). While this may shift the location of the potential impacts, such as the percentage of high sleep disturbance and high annoyance within each specific suburb, it is expected that the overall magnitude of the impact would generally remain the same as assessed in the Draft EIS.

Social values associated with the Blue Mountains

Social value impacts associated with the Blue Mountains identified in the Draft EIS related to elements such as cultural values, recreation and tourism values (including various lookouts etc), wilderness values, social and economic, and scenic and aesthetic values. As the RRO mode of operation would only operate during night time periods, the operation of the refinements is expected to result in limited change to the impacts as presented in the Draft EIS. It is noted however that during the operation of the RRO-NAP, there may be some minor to negligible positive impacts to areas of the Blue Mountains that are no longer overflown, which may provide some benefit to users of camping sites or similar recreation areas during this time.

Other assessment considerations

The following impacts that were assessed in the Draft EIS are not expected to change as a result of the additional runway mode of operation:

- effects to Aboriginal culture
- effects to non-Aboriginal culture
- constrained housing availability and affordability
- socio-economic sustainability of Luddenham and accessibility to social services
- wellbeing for First Nations people
- changes to children's behaviour, attentiveness, and cognitive learning in educational settings as a result of aircraft noise
- sense of safety and clean environment due to air quality changes in the local area
- environmental values resulting from concerns about biodiversity being affected by noise and air quality
- impacts on residential property values
- impact to the tourism and livelihoods associated with the Blue Mountains World Heritage Listing
- capacity to participate due to a lack of understanding of preliminary flight paths and potential impacts.

G2.11 Economic

Mt Tomah, Mt Wilson and Mt Irvine, Required Navigation Performance – Approval Required approach, and RRO night approach to Runway 05 (Arrival East)

The following preliminary flight path refinements are not expected to result in any change to the economic impact assessment as presented in the Draft EIS:

- Mt Tomah, Mt Wilson and Mt Irvine: the refined preliminary flight path would generally be over bushland areas associated with the Blue Mountains National Park
- Required Navigation Performance – Approval Required approach: the refined preliminary flight path would generally be over bushland areas and would also result in removal of a flight path where this occurs over urban areas
- RRO night approach to Runway 05: the refined preliminary flight path would generally be over bushland areas associated with the Royal National Park.

Refinements to the RRO mode of operation

It is not expected that the operation of the refinements to the RRO mode of operation would result in changes to the economic impact assessment of the project as presented in the Draft EIS. Based on the identified changes to the N60 and N70 contours, it is not anticipated that the implementation of the refinements would negatively affect previously identified receivers. Specifically, the economic assessment prepared as part of the Draft EIS identified that 106 noise sensitive land uses were inside the 2055 N60 24-hour contour of which 19 are inside the N70 contour, with the impacts on the land uses outside the N70 contour considered to be insignificant. Within the N70 contour the impacts were considered to be moderate. Of the uses identified within the N70 contour, 6 of them were schools and 2 were childcare centres (which would not be active during operation of the RRO) and 2 were aged care homes (both of which are in Kemps Creek and would be unaffected by the refined preliminary flight path).

The implementation of the refinements is not expected to impact other identified potential economic aspects such as tourism (including short-term stay accommodation) or overall property values.

G2.12 Human health

Mt Tomah, Mt Wilson and Mt Irvine

The refined preliminary flight path would predominantly occur over areas of the Blue Mountains National Park and would generally not be directly located above populated areas. The refined preliminary flight path may result in some minor benefit through reduced human health impacts to areas such as Mt Tomah due to the increased distance compared to the preliminary flight path presented in the Draft EIS.

Required Navigation Performance – Approval Required approach

The refined preliminary flight path would predominantly occur over areas of the Blue Mountains National Park as well as the suburbs of Linden and Faulconbridge within the Blue Mountains.

The refined preliminary flight path is expected to result in some minor benefit through reduced human health impacts to the Linden and Faulconbridge communities due to the removal of the A13 preliminary flight path that would traverse this area at a lower altitude compared to the proposed routing of all flights along the A10 preliminary flight path at an increased altitude (therefore reducing noise impacts at this location for aircraft using this particular flight path).

RRO night approach to Runway 05 (Arrival East)

A majority of the refined preliminary flight path would occur over the Royal National Park. The change may have some minor benefit through reduced human health impacts to areas such as Bundeena and Heathcote due to the increased distance compared to the preliminary flight path as presented in the Draft EIS.

Refinements to the RRO mode of operation

The key health impact related to night-time noise is sleep disturbance. The methodology adopted for the assessment of sleep disturbance is detailed in Technical paper 12: Human health. The assessment of sleep disturbance considered both the maximum noise level during the night-time period (L_{max}) as well as the average noise level over the night-time period, or L_{night}. The average as L_{night} enables an assessment of the percentage of the population, or the change in the percentage of the population that is highly sleep disturbed (%HSD).

The revised night-time noise levels modelled at all the sensitive receptor locations considered in the Draft EIS have been used to revise the assessment of sleep disturbance for the community surrounding the WSI. This review has focused on changes relevant to the 2055 operational year (Prefer Runway 05 and Prefer Runway 23). These scenarios have been selected as it reflects the preferred use of the RRO mode of operation.

Revised sleep disturbance assessment

Threshold/maximum noise levels

In relation to aircraft noise, the WHO recommends that noise in the community as L_{night} should not exceed 40 dB(A), and L_{max} should not exceed 52 dB(A) to protect against sleep disturbance issues. It is noted that the L_{night} levels in the existing environment already exceed 40 dB(A), with background levels measured at the noise monitoring locations in the range 41 to 58 dB(A). In addition, the Draft EIS identified a number of exceedances of the L_{night} threshold in relation to aircraft movements. There are no additional receptors that exceed the L_{night} threshold in 2055 as a result of these refinements. However, there are 5 receptor locations (M18, R141, N13, N67 and N158) where L_{night} would drop below the threshold of 40 dB(A) where sleep disturbance has the potential to be of importance for health. The receptors where L_{night} is reduced to be below the threshold of 40 dB(A) are in the following locations (noting that these refinements would only operate during night time periods and would be unlikely to affect these receivers):

- Warragamba (M18: Warragamba noise monitoring location, N13: Warragamba Pre-school, N158: Warragamba Public School)
- Mulgoa (R141: Edmund Rice Retreat and Conference Centre)
- Eastern Creek (N67: Eastern Creek Public School).

The Draft EIS identified a number if receptors where L_{max} levels at night time predicted from aircraft operations exceeded the threshold of 52 dB(A) in 2055. The refinements would not result in any additional receptors exceeding the 52 dB(A) threshold for L_{max}.

Percentage highly sleep disturbed

The %HSD has been calculated for each of the noise sensitive receptors based on the addendum noise assessment outcomes relevant to Prefer Runway 05 and Prefer Runway 23 scenarios. Consistent with the approach adopted in the Draft EIS (Technical paper 12), the potential for the %HSD to be of potential significance is where the calculated %HSD is 3 per cent more than the %HSD relevant to the existing noise environment.

For all the noise sensitive receptors evaluated for 2025, the following is of note in relation to the significance of the %HSD for the addendum noise assessment compared with operations in the Draft EIS:

- the refinements would not result in any additional noise sensitive receptors where the %HSD is of potential significance
- the refinements would result in 2 noise sensitive receptors where the %HSD is no longer of potential significance. These receptors are located in Wallacia (R80: Wallacia Public School and R86: Blaxland Crossing Reserve).

Review of Figure 6.10 from Technical paper 12 indicates that the calculations for these refinements would not change the extent where the %HSD is of potential significance. This is because the 2 receptors where significance is no longer of concern are located in Wallacia where the %HSD remains of potential significance at other close-by receptors.

In relation to the %HSD, Table G.2 shows the calculations for 2055 as presented in the Draft EIS with comparison against outcomes of this revised assessment.

Table G.2 Summary of sleep disturbance impacts from aircraft noise – Draft EIS operations and RRO mode of operation refinements (including the RRO-NAP)

Suburbs and Localities	% population in area highly sleep disturbed (%HSD) as average [minimum – maximum] from all receptors evaluated				
	Existing/ background	2055 – Draft EIS		2055 – Revised	
		Scenario 3	Scenario 4	Scenario 3	Scenario 4
Austral	12#	0	0	0	0
Badgerys Creek	12#	12*	12*	12*	12*
Bringelly	14	3 [0–11]	3 [0–11]	3 [0–11]	3 [0–11]
Cecil Park	12#	0	0	0	0
Cobbitty	12#	19*	19*	19*	19*
Glenmore Park	16	0	0	0	0
Greendale	15–17	21 [11–33]	21 [11–33]	**22 [11–33]**	**22 [11–33]**
Horsley Park	20	0	0	0	0
Kemps Creek	15	4 [0–20]	4 [0–20]	4 [0–20]	4 [0–20]
Luddenham	15–29	19 [10–40]	19 [10–40]	19 [10–41]	19 [10–41]
Mount Vernon	20	0	0	0	0
Mulgoa	12#	9 [0–12]	9 [0–12]	**8 [0–11]**	**8 [0–11]**
Rossmore	12#	1 [0–9]	1 [0–9]	1 [0–9]	0

Suburbs and Localities	% population in area highly sleep disturbed (%HSD) as average [minimum – maximum] from all receptors evaluated				
	Existing/ background	2055 – Draft EIS		2055 – Revised	
		Scenario 3	Scenario 4	Scenario 3	Scenario 4
Silverdale	14	21 [14–27]	21 [14–27]	**22 [15–28]**	**22 [15–28]**
Wallacia	13–15	20 [17–27]	20 [17–27]	**18 [16–28]**	**18 [16–28]**
Warragamba	16	11 [11–12]	11 [11–12]	11 [10–11]	11 [10–11]

** Only one receptor in this Suburb and Locality*

Blue shaded values are 3% or more higher than the %HSD calculated on each area based on existing or background noise (noting that where no background data is available for a Suburb and Locality, the lowest level of background %HSD of 12% has been adopted, as flagged with #)

***22** = Values in **green** text relate to those where the average calculated for RRO-NAP is **higher** than presented in the Draft EIS*

***8** = Values in **blue** text relate to those where the average calculated for RRO-NAP is **lower** than presented in the Draft EIS*

The %HSD calculations presented in Table G.2 indicate that for the revised assessment the %HSD is essentially unchanged from that presented in the Draft EIS. A very small increase in the average %HSD is noted for Greendale and Silverdale, and a very small decrease in the average %HSD is noted for Mulgoa and Wallacia. These changes are small and are not considered to be significant.

In summary, there are some small changes in night-time noise impacts associated with the RRO mode of operation refinements that result in some receptors no longer exceeding thresholds for L_{max} or L_{night}, however overall, the changes associated with these refinements are small and do not result in changes to the conclusions presented in the Draft EIS in terms of sleep-disturbance.

G2.13 Facilitated impacts

Mt Tomah, Mt Wilson and Mt Irvine, Required Navigation Performance – Approval Required approach, and RRO night approach to Runway 05 (Arrival East)

The following preliminary flight path refinements are not expected to result in any change to the facilitated impact assessment as presented in the Draft EIS:

- Mt Tomah, Mt Wilson and Mt Irvine: the refined preliminary flight path would not result in changes to identified facilitated impacts
- Required Navigation Performance – Approval Required approach: the refined preliminary flight path would not result in changes to identified facilitated impacts
- RRO night approach to Runway 05: the refined preliminary flight path would not result in changes to identified facilitated impacts

Refinements to the RRO mode of operation

The reallocation of north-eastern WSI departures to the Runway 23 Southern SID (D32) would not impact any Sydney (Kingsford Smith) Airport aircraft as this departure flight path already exists in the design. The potential facilitated impacts of the RRO-NAP with respect to its interaction with other Sydney Basin operations includes:

- *Sydney (Kingsford Smith) Airport*: Operations and facilitated airspace changes will not be impacted as the proposed WSI RRO departure track changes occur during the Sydney (Kingsford Smith) Airport curfew period between 11.00 pm and 6.00 am local time. Under the Sydney (Kingsford Smith) Airport Curfew Legislation a limited number of aircraft types can operate at Sydney (Kingsford Smith) Airport during the curfew, either as allowed planned operations by mostly propeller driven aircraft or light jets, emergency operations exemptions, or very rarely as a result of a

dispensation against the curfew regulations. Any possible interaction from these allowed Sydney (Kingsford Smith) Airport movements and the RRO-NAP northern and western departure tracks will be managed by air traffic control.

- *RAAF Base Richmond Airport*: The existing WSI RRO Runway 23 northern and western departure tracks are designed to cross above the western RAAF Base Richmond Airport STAR thereby ensuring vertical separation at the point of crossing. The new RRO-NAP northern and western departures would result in slightly more track miles than the preliminary flight paths before crossing the western RAAF Base Richmond Airport STAR and therefore would be able to meet the altitude requirement more readily to safely separate aircraft on these procedures. All other STARs and SIDs at RAAF Base Richmond Airport are clear of the RRO-NAP.
- *Bankstown Airport*: The RRO-NAP would not impact the new Bankstown Airport SIDs. Aircraft would be radar vectored prior to any interaction with the proposed RRO-NAP flight paths. The proposed western STAR into Bankstown Airport would also not be impacted.
- *Camden Airport*: The north-west STAR to Camden Airport is designed to allow WSI departures to readily meet a requirement to climb above it. The new RRO-NAP would continue to allow aircraft to readily climb above the Camden Airport STAR. On the very rare occasion where conflict between aircraft on these procedures is anticipated (e.g., thunderstorm activity) one or both aircraft would be managed by air traffic control to ensure separation is maintained.
- *Western Transit Route*: This Transit Route is designed as a low level (10,000 ft or below) route to allow non-pressurised aircraft to cross the Sydney Basin Airspace well clear of the congested airspace east of the Nepean River. All WSI flight paths, both arrivals and departures, have been designed to ensure vertical separation exists when crossing this low level route. The RRO-NAP would not affect the preliminary flight paths.
- *Sydney Basin Visual Flight Rules (VFR) Operations*: The implementation of the RRO-NAP would have no impact on Sydney Basin VFR operations.

G2.14 Cumulative impacts

None of the proposed changes to the preliminary flight paths are anticipated to result in a change to the overall cumulative impacts identified and assessed in the Draft EIS.

G2.15 Matters of National Environmental Significance (MNES)

Mt Tomah, Mt Wilson and Mt Irvine, Required Navigation Performance – Approval Required approach, and RRO night approach to Runway 05 (Arrival East)

The following preliminary flight path refinements are not expected to result in any change to the impact assessment of MNES as presented in the Draft EIS:

- Mt Tomah, Mt Wilson and Mt Irvine: the proposed change would generally continue to traverse areas of the Blue Mountains National Park consistent with the areas assessed as part of the Draft EIS and would have consistent impacts and would therefore not affect the assessment of MNES
- Required Navigation Performance – Approval Required approach: the proposed change would reduce the overall area of the Blue Mountains National Park traversed by the preliminary flight paths and consolidate 2 flight paths into one. It would also provide some visual and noise amenity improvement (at night) as aircraft would be at higher altitudes when passing above or near to Aboriginal heritage sites along Linden Ridge and the Emu rock engraving site at Ticehurst Park (noting the latter site is adjacent to the GBMA). This change is therefore not anticipated to affect the assessment of MNES previously presented in the Draft EIS
- RRO night approach to Runway 05: the proposed change would not change assessment on any MNES and would not affect flight paths over the GBMA.

The proposed refinements to these preliminary flight path would not result in any additional impacts to MNES (including impacts to the GBMA) compared to those presented in the Draft EIS.

Refinements to the RRO mode of operation

Some areas of the GBMA to the north of Lake Burragorang would be newly overflown as part of RRO operations during implementation of the RRO-NAP. Similarly, some areas of the GBMA to the south of the Great Western Highway and to the north and east of Blackheath would no longer be overflown during this runway mode of operation..

Based on the shift in preliminary flight paths, the implementation of the proposed RRO-NAP would not change the overall assessment on any MNES (including impacts on the GBMA) compared to the assessment presented in the Draft EIS. The additional areas of overflight associated with the RRO-NAP are also already overflown during daytime periods under the preliminary flight paths and would have similar impacts during the implementation of the RRO-NAP. The refinements would provide some visual or noise amenity improvement for Aboriginal heritage sites located in Linden and Faulconbridge, including the emu engraving site at Ticehurst Park (which is adjacent to the GBMA).

Noise impacts

The changes proposed in the RRO flight paths have potential to generate the previously identified noise impacts on the GBMA. The proposed changes redistribute a portion of the traffic further south over a different region of the GBMA. The shift in the aircraft producing at least 60 dB(A) is shown in Figure G.11. As presented in Figure G.11, blue shaded areas are anticipated to result in at least 2 less movement whereas red areas are anticipated to result in at least 2 additional movements of at least 60 dB(A) compared to the assessment presented in the Draft EIS. The selection of 2 movements is based on a likely threshold of noticeability in the number of aircraft overflights.

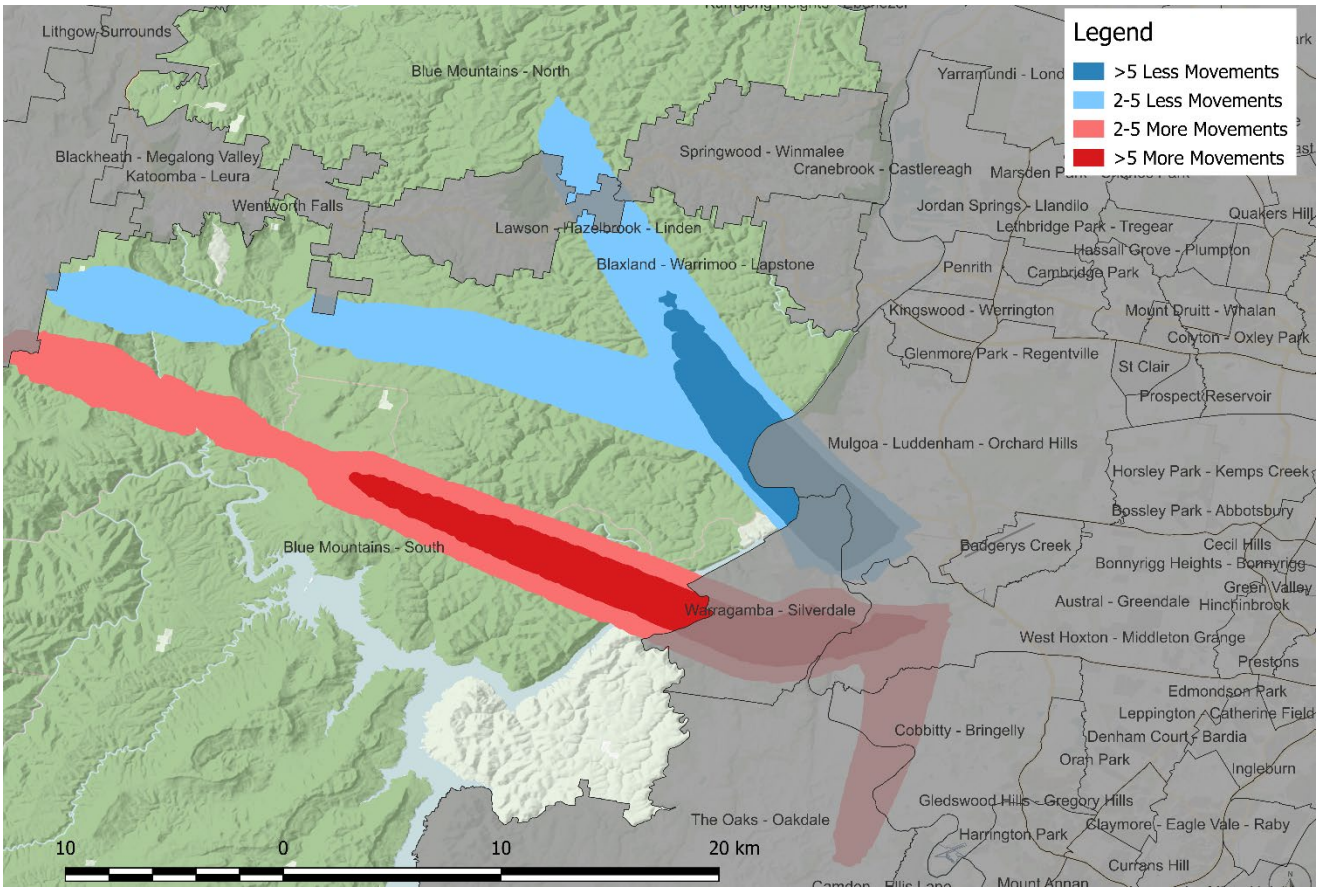


Figure G.11 Differential contours – N60 Night (11 pm to 5.30 am) – 2055

G3 Evaluation of the merits of the refined proposal

The project, including the preliminary flight path refinements that have been identified, has been designed, to the greatest extent practicable to respond to the issues raised by the community and stakeholders and to avoid and minimise potential impacts. As a result of the proposed refinements to the project, the refined preliminary flight paths proposed are considered to, in comparison to the preliminary flight paths identified in the Draft EIS, result in an improved overall outcome.

On balance, the refined preliminary flight paths are considered to result in an improvement to the project as described in the Draft EIS. The remaining impacts are generally consistent with those previously presented in the EIS.

Australian Government

Department of Infrastructure, Transport,
Regional Development, Communications and the Arts