Chapter 21 Facilitated impacts

This chapter presents the impacts of the proposed changes to Sydney Basin airspace required by the preliminary flight paths and airspace design (the project) and described in Chapter 8 (Facilitated changes). The full assessment is provided in Technical paper 13: Facilitated changes (Technical paper 13).

Background and method

The impact assessment approach included a review and categorisation of proposed changes, assessment using qualitative and/or quantitative approaches, and an assessment of the significance of potential impacts.

Potential impacts associated with the facilitated changes were those related to aircraft noise exposure, carbon emissions, visibility of aircraft and impacts on Commonwealth Matters of National Environmental Significance (MNES). Understanding the nature and source of aircraft noise is described in detail in Chapter 11 (Aircraft noise).

Existing environment

As supported by Chapter 4 (Project setting), the Sydney Basin is already congested by a range of aircraft overflight activity including within the study area. In many cases, it could be challenging for an observer to correlate an aircraft overflight's origin or destination to airports within the Sydney Basin.

The current operations associated with each proposed change are described in Chapter 8 (Facilitated changes).

Key findings

Changes to the Runway 25 SIDs (jets) for Sydney (Kingsford Smith) Airport would result in a considerable increase in area (square kilometres), dwellings, and population within the outer Number-above, N60 and N70 contours given the substantial lateral shift in the initial section of the western and north-western departure flight paths, and narrowing of the existing flight path creating an extension to the N60 and N70 contours. However, Runway 25 departures represent only around 4 per cent of annual operations at Sydney (Kingsford Smith) Airport and would be infrequently used. Aircraft would be visible, and would fly over different areas or over existing areas on a narrower path with increased frequency. For northern and eastern departures, the continuation of radar vectoring for northern and eastern departures via SHORE as well as the proposed new Standard Instrument Departure (SID) is expected to see little variation in the visibility of aircraft over these areas.

Changes to Runway 34L (waypoint KADOM) (jet) SIDs for Sydney (Kingsford Smith) Airport would predominately fly over suburbs that are already overflown by this SID. However due to the lateral shift in the departure flight path, and/or narrowing of the existing procedure, there would be an increase in the number of dwellings and population within the outer N60 and N70 contours (depending on the destination of departure). Aircraft would be visible, and would fly over different areas or over existing areas on a narrower path, or at higher frequencies and at marginally higher altitudes.

Changes to Runway 34L RICHMOND SIDs (jet) for Sydney (Kingsford Smith) Airport would result in marginal changes in N60 and N70 extents compared to the current procedure, and the very minor change would be located in areas in the vicinity of the airport. The proposed SID flight path is generally within the flight dispersion of the existing SID flight path but would narrow due to the safety requirements of the procedure. Aircraft would still be visible, but not necessarily in the same location due to the reduction in lateral dispersion.

The proposed SID for Sydney (Kingsford Smith) Airport non-jet departures is expected to be used by around 20 of the 30 non-jet aircraft per day departing for western and north-western destinations in 2030. A number of outer suburbs of the Sydney Basin that would currently experience overflight of non-jet departures would experience a concentration of non-jet flights due to this proposed procedure. However areas subject to 60 dB(A) or more aircraft noise levels would not change. Non-jet aircraft currently fly on a widely dispersed set of radar vectored flight paths to a westerly or north westerly destination. Aircraft would continue to be visible and due to the change from a wide radar vectored dispersion of tracks to a more confined track means some communities would see more aircraft, and some would see less.

Other changes to procedures at Sydney (Kingsford Smith) Airport would result in minimal changes from a noise or visual perspective.

Changes to Bankstown Airport Instrument Flight Rules (IFR) flight procedures would result in an increased frequency and concentration of overflight, particularly for arriving aircraft. Around 145 movements per day are expected to operate under IFR, noting areas overflown by the new procedures are already frequently used by IFR and Visual Flight Rules (VFR) flights. In the case of departures, air traffic control radar vectoring would provide some dispersion. These changes would result in new areas close to Bankstown Airport being subjected to overflight by aircraft undertaking IFR operations and flying at relatively low altitudes. There would be increased frequency of aircraft using the proposed SIDs but would be difficult to distinguish from the current operations from a visual perspective. Aircraft on proposed Standard Instrument Arrivals (STARs) would be visible and in areas not currently overflown by Bankstown Airport IFR aircraft.

New and adjusted STAR procedures for IFR aircraft arriving at Camden Airport are expected to be used by around 10 aircraft movements per day. These changes would have little or no material change to IFR operations at Camden Airport and no changes are proposed where the existing procedure flies over Sydney's urban and rural fringe. Changes would occur further west, over the Greater Blue Mountains Area (GBMA). Aircraft noise would vary according to altitude and the type of aircraft being flown. Aircraft using these procedures may also be subject to radar vectoring which should disperse arrival traffic in a similar fashion to current procedures.

The new SIDs and STARs for RAAF Base Richmond would not change the final approach or initial departures from Runway 10/28, and therefore there would be no changes in noise or local noise preferred procedures. The areas overflown by the new procedures are overflown with similar aircraft, would be used by a low number of aircraft (around 15 flights per day), and have been designed to closely replicate the current radar vectoring. The STARs are well north of the Sydney Basin and/or at high altitudes. The new proposed eastern SID and some continued radar vectoring when appropriate is expected to result in a similar track spread to current operations but at higher altitude. Aircraft would remain visible.

Changes to VFR operations in the Sydney Basin would impact the flying training areas, as well as increases in transit times for aircraft travelling to the future possible training areas. The change of activity cannot be accurately quantified. The most constrained corridor for VFR travel flight operations between WSI and RAAF Base Richmond – limited in lateral extents and with only a 1,500 feet (ft) (460 m) operating limit for some of its extent, is expected to have less than 10 flights daily and with the low growth forecast predictions (approximately one per cent for both Bankstown and Camden Airports) should not constitute a significant impact to overflown areas on its implementation or into the future.

The proposed western low altitude transit route for aircraft transiting north to south, or south to north at altitudes below 10,000 ft (3 km) is assumed to be used by a low number of aircraft per day. Noise levels would vary according to the position along the transit route, aircraft type and altitude being flown.

It is anticipated that the facilitated changes would not significantly impact biodiversity and other MNES values including sites of cultural and heritage value as they will occur within areas already subject to, or close to, routine flight paths by similar aircraft types associated with the existing Sydney Basin (refer to Section 21.4). This is particularly the case where there is a predicted low utilisation of those SIDS and STARs and because there is a low growth forecast of only one per cent or less for these movements.

An exception to this is the changes to Bankstown Airport flight paths which may result in some areas being overflown that have not been previously overflown. Despite this, these flight paths occur in areas which are heavily disturbed in nature and are unlikely to introduce further risk or impacts than that assessed in Chapter 16 (Biodiversity).

21.1 Introduction

This chapter:

- identifies and assesses potential environmental impacts of the proposed facilitated changes
- ensures the ongoing consideration of the proposed changes to flight paths and procedures are informed by environmental impact considerations.

The scope of environmental matters to be assessed for the facilitated changes were guided by Airservices Australia policies relating to airspace change proposals (refer to Chapter 6 (Project development and alternatives)).

As detailed in Chapter 8 (Facilitated changes), the changes proposed to be introduced include:

- new and adjusted IFR procedures
- introduction of new and adjusted airspace volumes
- modified climb and descent gradients
- new and modified procedure waypoints – position and altitude requirements
- changes to Sydney Basin VFR operations.

According to data provided by Airservices Australia from their noise flight path monitoring system (NFPMS), current aircraft movements in the Sydney Basin during night-time hours (11 pm to 5:30 am) are minimal in comparison to operations outside these hours as Sydney (Kingsford Smith) Airport is under curfew from 11 pm to 6 am. Due to the infrequent level of night-time movements (for example, for limited medical operations as explained in Chapter 4 (Project setting)), the potential impacts of these operations have not been considered.

21.2 Legislative and policy context

The relevant legislation, standards and assessment guidelines considered for the facilitated changes assessment include:

- *Airports Act 1996* (Cth) (Airports Act), specifically Condition 16 of the Airport Plan
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act).

21.3 Methodology

21.3.1 Overview

The methodology involved:

- categorising the selected changes into an assessment level and type (refer to Section 21.3.2)
- detailing the current operating conditions of the relevant flight paths in the Sydney Basin and sensitive areas (refer to Chapter 8 (Facilitated changes) and Section 21.4)
- preparing targeted assessments for each of the proposed changes in accordance with the selected approach, using qualitative and quantitative descriptors of potential impact (refer to Section 21.5). This considers noise, visual and carbon emissions impacts (as appropriate) and MNES.

21.3.2 Categorisation of changes

The proposed changes to the current Sydney Basin airspace were categorised into groups based on the availability of data, the significance of the level of change, and consideration of whether to apply either a quantitative or qualitative assessment. The 3 groups are:

- **Group A** – changes to undergo a quantitative assessment as the implications are expected to be noticeable and sufficient data is available to complete a quantitative assessment.
- **Group B** – changes to undergo a 'hybrid' quantitative/qualitative assessment, where changes are maybe noticeable in areas newly overflown at low levels. Qualitative assessments would be completed for the majority of the assessment given the limited data or expected low levels of use.
- **Group C** – changes to undergo a qualitative assessment. These changes are minor in nature, and/or would be used only by a small number of flight operations or time. There is likely to be insufficient data to complete any quantitative assessment, and use of L_{Amax} or Noise-Power-Distance (NPD) charts would be used to understand likely noise impacts.

The categorisation of the facilitated changes are outlined in Table 21.1. These are named along with a reference to where these are presented in Chapter 8 (Facilitated changes), assessed in this chapter and detailed in Technical paper 13.

Table 21.1 Facilitated changes categorisation and reference

Name of change	Description	Impact assessment chapter reference
Group A		
Sydney (Kingsford Smith) Airport Runway 25 (jet) SIDs	Section 8.2.1.1	Section 21.5.1
Sydney (Kingsford Smith) Airport Runway 34L (waypoint KADOM) (jet) SIDs	Section 8.2.1.2	Section 21.5.1.2, Figure 21.11
Sydney (Kingsford Smith) Airport Runway 34L (waypoint RICHMOND) (jet) SIDs	Section 8.2.1.3	Section 21.5.1.3
Sydney (Kingsford Smith) Airport non-jet departures	Section 8.2.1.6	Section 21.5.1.4
Group B		
All IFR changes proposed at Bankstown Airport	Section 8.3.2	Section 21.5.2.1
Group C		
ODALE/AKMIR STAR at Sydney (Kingsford Smith) Airport	Section 8.2.2.1	Section 21.5.3
Camden Airport IFR arrivals (STARs)	Section 8.4.2	Section 21.5.3.2
Departures and arrivals at RAAF Base Richmond	Section 8.5.2	Section 21.5.3.3
Runway 07 SID at Sydney (Kingsford Smith) Airport	Section 8.2.1.4	Section 21.5.3.4
Runway 07 IAF at Sydney (Kingsford Smith) Airport	Section 8.2.1.5	Section 21.5.3.4
RIVETT and BOREE STARs at Sydney (Kingsford Smith) Airport	Section 8.2.2.2	Section 21.5.3.4
Sydney Basin lower-level transit routes	Section 8.6.2	Section 21.5.3.4
VFR operations in the Sydney Basin airspace	Section 8.7.2	Section 21.5.3.5

21.3.3 Approach

The general approach to the assessment is outlined in Figure 21.1. Depending on the magnitude, duration and frequency of proposed change the approach varied according to depending on Figure 21.1, for example noise modelling was only undertaken for Group A and Group B and C involved qualitative analysis.

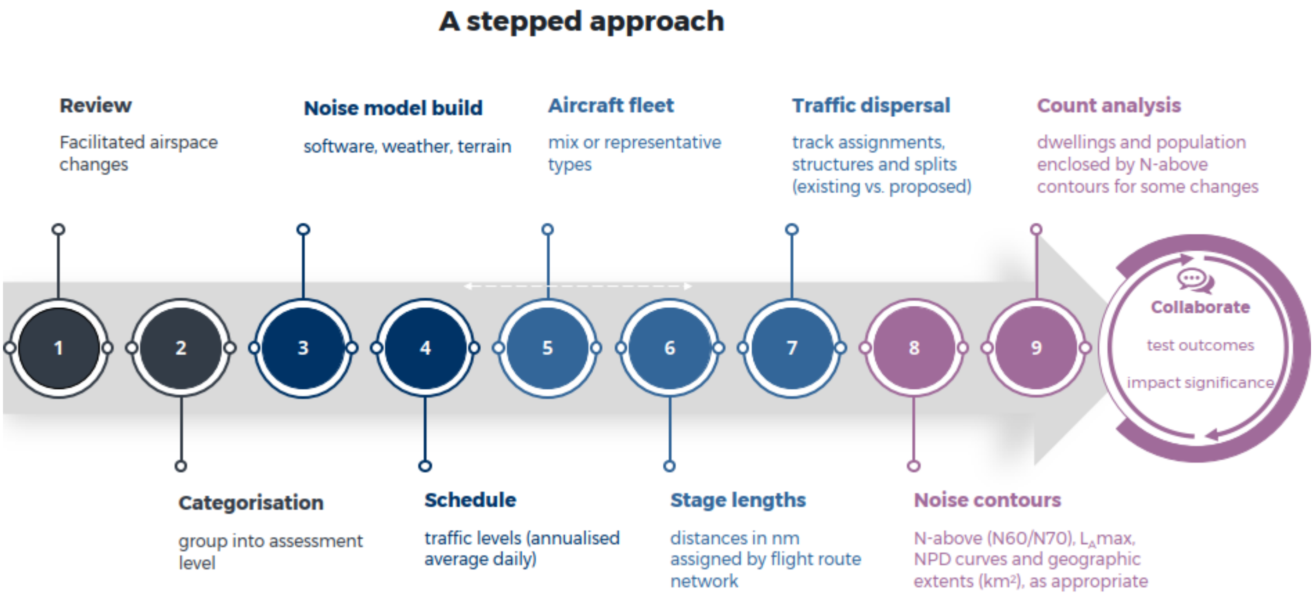


Figure 21.1 Approach to the facilitated changes assessment

The assessment of potential overflight for the facilitated changes describes the potential noise impacts of the proposed individual procedure adjustments and changes only, on a standalone basis. Other existing operations that may overfly the area are not included in the analysis. A robust cumulative impact analysis would involve a complete Sydney Basin airspace review (including comprehensive historical data, future activity forecast levels and other factors influencing airspace structures and management).

21.3.3.1 Traffic growth forecasts

Traffic growth forecasts were extracted from the current master plans available for Sydney Kingsford Smith, Bankstown and Camden Airports (refer to Chapter 4 (Project setting) and forecast to 2030. Further detail on the approach to forecasting specific to each change is provided in Technical paper 13.

21.3.3.2 Group A

The assessment approach taken for each Group A change is depicted in Steps 3 onwards on Figure 21.1.

Steps 3–7 define the assumptions and data inputs required for the Aviation Environmental Design Tool (AEDT) noise model (version 3e) used in the assessment. This model and these data inputs are detailed in Chapter 11 (Aircraft noise). Of note:

- noise modelling was based on the flight movements of the busiest day in October 2019 with the growth rates applied as appropriate. The analysis should therefore be considered a "worst case" scenario compared to an average or typical day of operations. Assumptions specific to each assessment is provided in the individual appendices to Technical paper 13.

A range of metrics, measurements and data were used to define the resulting potential noise impacts. The key outputs were:

- Number above (N-above) metrics – N60 and N70 results presented as standard contours for current and proposed procedures, including:
  - N60 (24-hour) for 10 to 20, 20 to 50, and 50 to 100 events
  - N70 (24-hours) for 5 to 10, 10 to 20, 20 to 50, and 50 to 100 events

  this was to enable a comparison between current and proposed areas in which number of movements or range of noise events with a modelled noise level of 60 or 70 A-weighted decibels (dB(A)) or louder is expected to occur. For context, an outside noise event of 70 dB(A) (such as aircraft flyover) can lead to in an indoor sound level of 60 dB(A) when windows are opened (enough to disturb conversation). N60 and N70 metrics are detailed in Chapter 11 (Aircraft noise)
- L_{Amax} – the highest noise level from an aircraft noise event, measured in dB(A) (refer to Chapter 11 (Aircraft noise). For example, a L_{Amax} single-event contour for a stage length 9 (greater than 6,500 nautical miles (nm) (12,000 kilometres (km)) (Sydney to Johannesburg) long-haul flight operated by a wide-body Boeing B787-9 was generated for Sydney (Kingsford Smith) Airport Runway 34L KADOM (jets) SIDs
- flight path corridor dispersion footprints – current versus where the future flight paths are expected to be due to the changes
- dwelling counts under N-above contours – current versus the number of dwellings that can expected to be exposed to future N60 and N70 noise levels
- nominal backbone track positioning – current versus where the nominal future proposed flight path backbone is located
- suburb boundaries and suburb names overflown – show the current and proposed flight path track dispersion corridors combined with a suburb boundary and suburb name overlay to aid stakeholders in identifying their location of interest associated with the proposed changes.

21.3.3.3 Group B

This approach was predominately qualitative as outlined in Section 21.3.3.4, but noise was assessed using NPD charts generated in AEDT (version 3e) as there was insufficient data available to support N-above contours. Further information on the NPD charts is provided in Section 21.3.3.4.

21.3.3.4 Group C

Each Group C change was subject to assessment using NPD charts generated in AEDT (version 3e). These were developed to provide an indication of what overflight noise from representative aircraft types could be expected on existing flight paths, or on flight paths that have either changed laterally or vertically or both.

NPD charts were used where N-above noise contours (N60 and N70) were not meaningful (for example, at altitudes above 9,000 ft (2.7 km) for jet and non-jet aircraft as the noise levels associated with overflight at these altitudes are well below 60 dB(A) and 70 dB(A) or where N60 and N70 contours did not extend to the point of the change being assessed.

Representative aircraft types included those used for commercial and military operations (for example, Boeing B777-300 and Hercules C130 – Military Aircraft respectively) and light business jets, medium turbo-prop and piston-engine aircraft.

The NPD charts were supplemented with 70 dB(A) and 60 dB(A) lines to aid in interpretation of potential noise exposure outcomes, where appropriate.

The qualitative analysis of the changes proposed to IFR and VFR operations is considered the best available representation of potential impacts. This assessment is heavily qualified due to the variability associated with noise generation from variations of even the same aircraft type, varying pilot technique and variations in meteorological conditions. Overflight noise levels would also vary with respect to the lateral offset positioning of the at-ground receiver to the aircraft operating above.

21.3.3.5 Population and dwellings

An estimate of the number of people and dwellings potentially impacted by aircraft noise was assessed based on N-above contours as described in Section 21.3.3.2. Dwelling counts are presented for the outer contour only – N60 for 10 to 20 overflights, and N70 for 5 to 10 overflights.

Population and dwelling counts were sourced from Australian Bureau of Statistics (ABS) 2021 census data (ABS, 2022). The assessment was undertaken by overlaying the different contours over census data using GIS software.

21.4 Existing environment

Although aircraft differ in operation, type, altitude, noise level and frequency, most areas of the Sydney Basin including the study area are currently overflown. This includes arrivals and departures from Sydney (Kingsford Smith) Airport, Bankstown and Camden Airports, and RAAF Base Richmond for all aircraft. For example, in 2019 there were more than 710,000 air traffic movements in the Sydney Basin airspace (refer to Figure 4.2 in Chapter 4 (Project setting)).

To support this chapter, figures depicting individual groupings of track movements of relevance to the facilitated changes assessment are provided in this section.

Figure 21.2 shows the current IFR flight paths for Sydney (Kingsford Smith) Airport runways in the 16 and 34 directions over a one-week period in March 2019. This supports the assessment of changes relating to Runway 34L from this airport (refer to Section 21.5.1.2 to Section 21.5.1.3). Figure 21.3 provides Runway 25 jet departure tracks from Sydney (Kingsford Smith) Airport for a 1-week period in October 2022. This supports the assessment of changes relating to Runway 25 (refer to Section 21.5.1).

Figure 21.4 shows radar tracks for a one-week period of March 2019 of non-jet operations. This supports the assessment of changes relating to Sydney (Kingsford Smith) Airport non-jet IFR tracks (refer to Section 21.5.1.4).

Figure 21.5 and Figure 21.6 shows the current flight tracks for Bankstown Airport. This supports the assessment for all changes required for Bankstown Airport related procedures (refer to Section 21.5.1.2 and Section 21.5.3.5) and lower level transit route changes (refer to Section 21.5.3.4).

Figure 21.7 shows the current flight tracks for Camden Airports for a one-week period of March 2019. This supports the assessment for all changes required for Camden Airport related procedures, specifically STARs at Camden Airport (refer to Section 21.5.3.2), lower level transit route changes (refer to Section 21.5.3.4) and VFR changes (refer to Section 21.5.3.5).

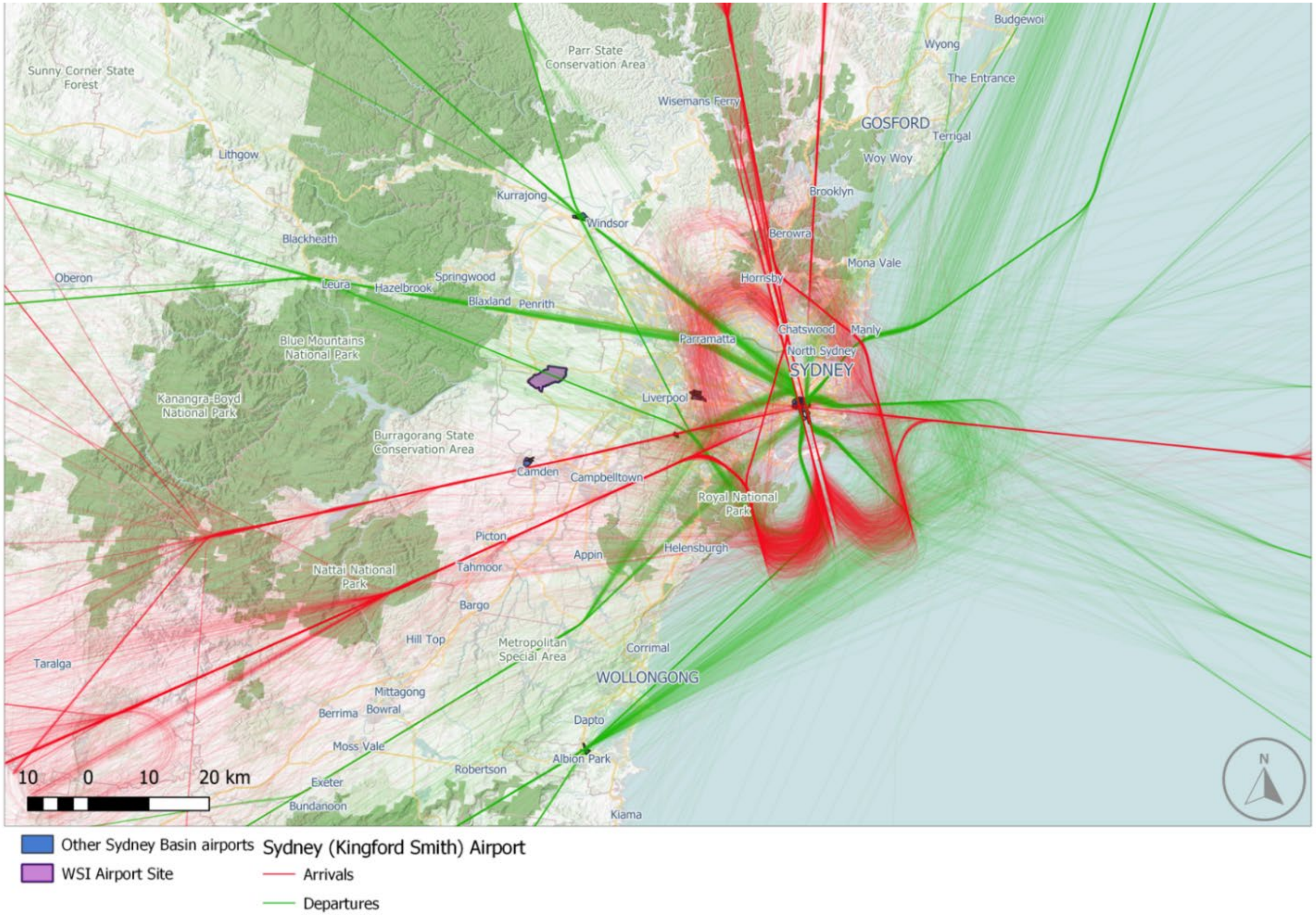


Figure 21.2 Current IFR flight paths for Sydney (Kingsford Smith) Airport runways – one-week period in March 2019

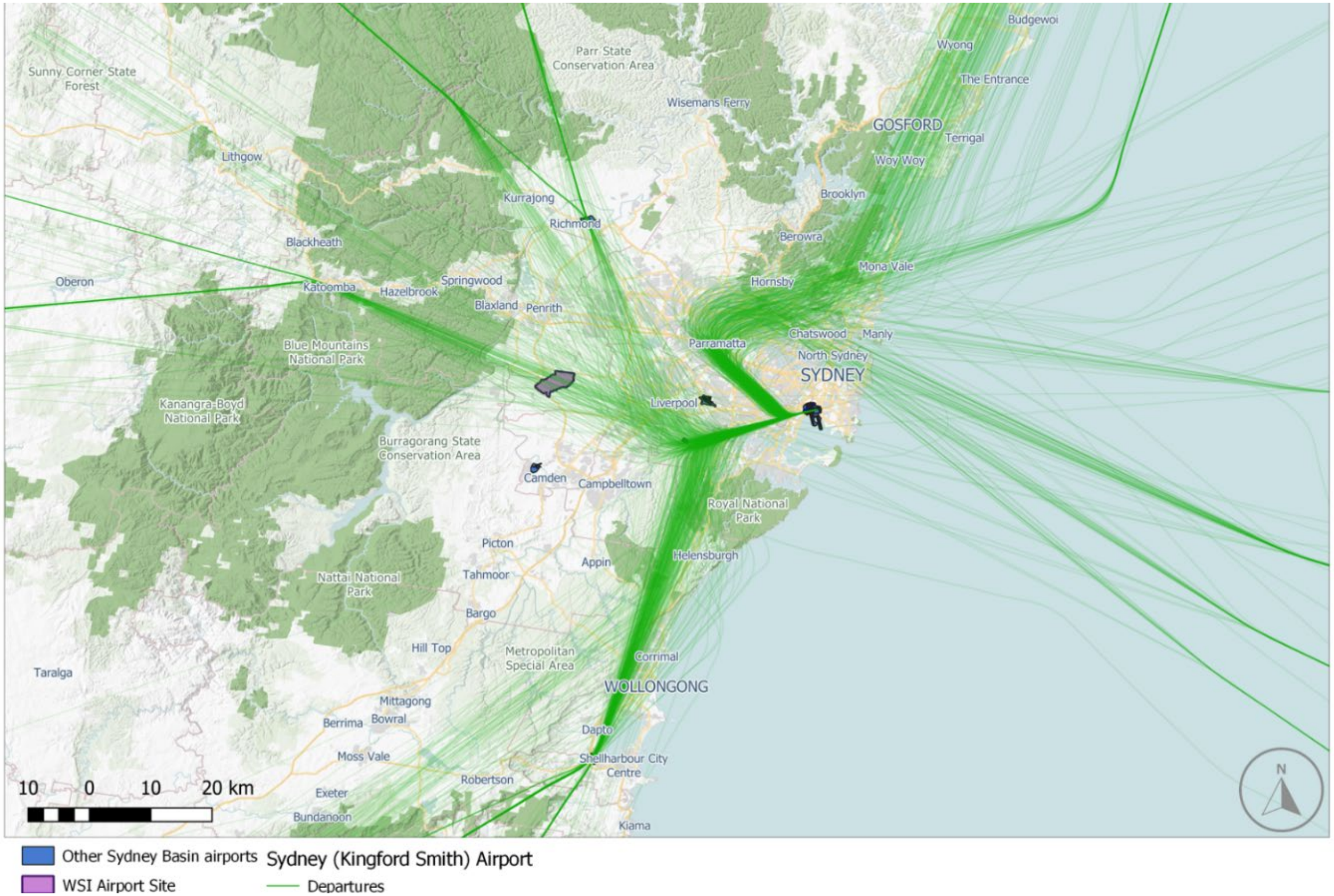


Figure 21.3 Current Sydney (Kingsford Smith) Airport Runway 25 jet departure flight tracks for October in 2022

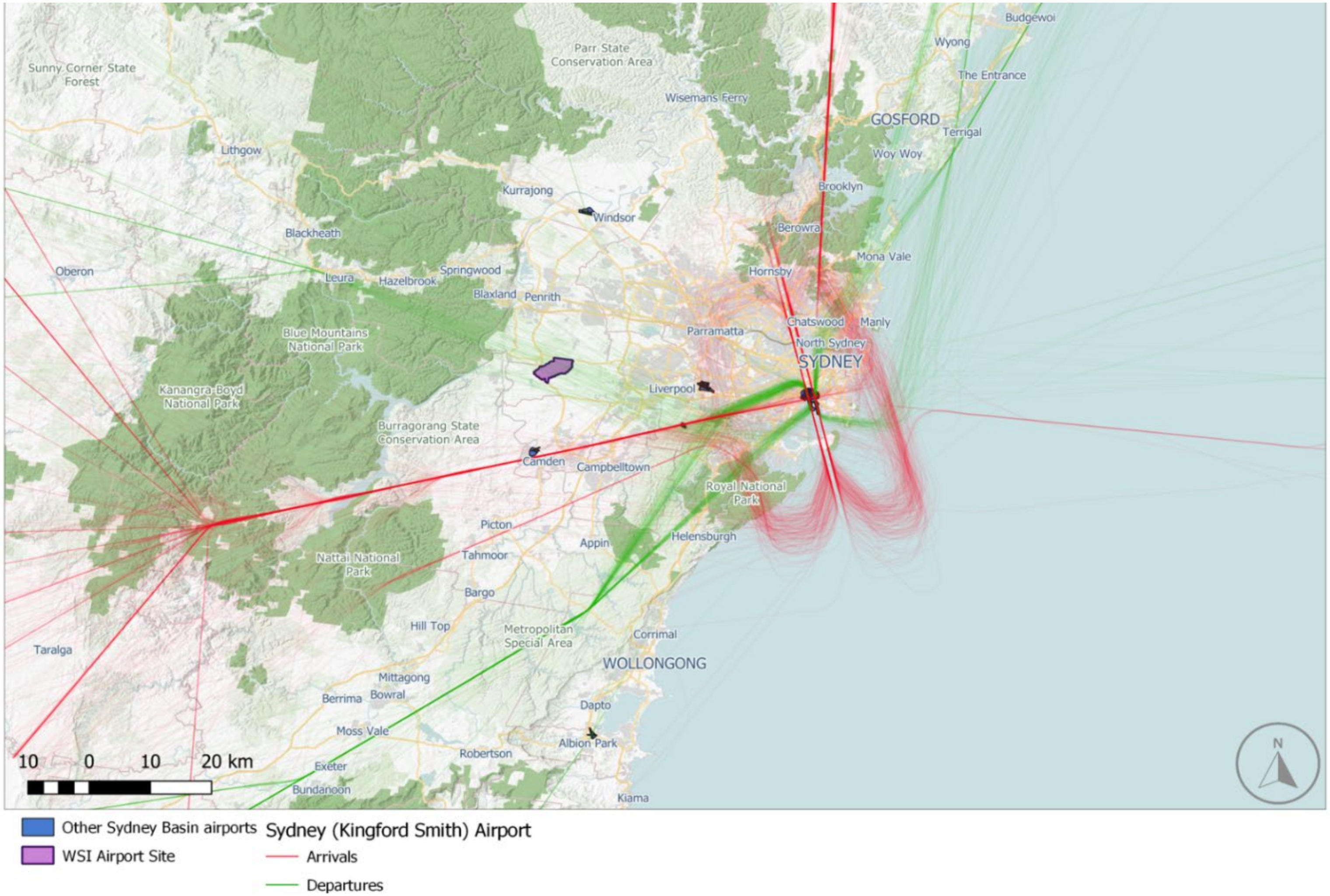


Figure 21.4 Current Sydney (Kingsford Smith) Airport non-jet IFR flight departure tracks (in green) to western and north-western destinations

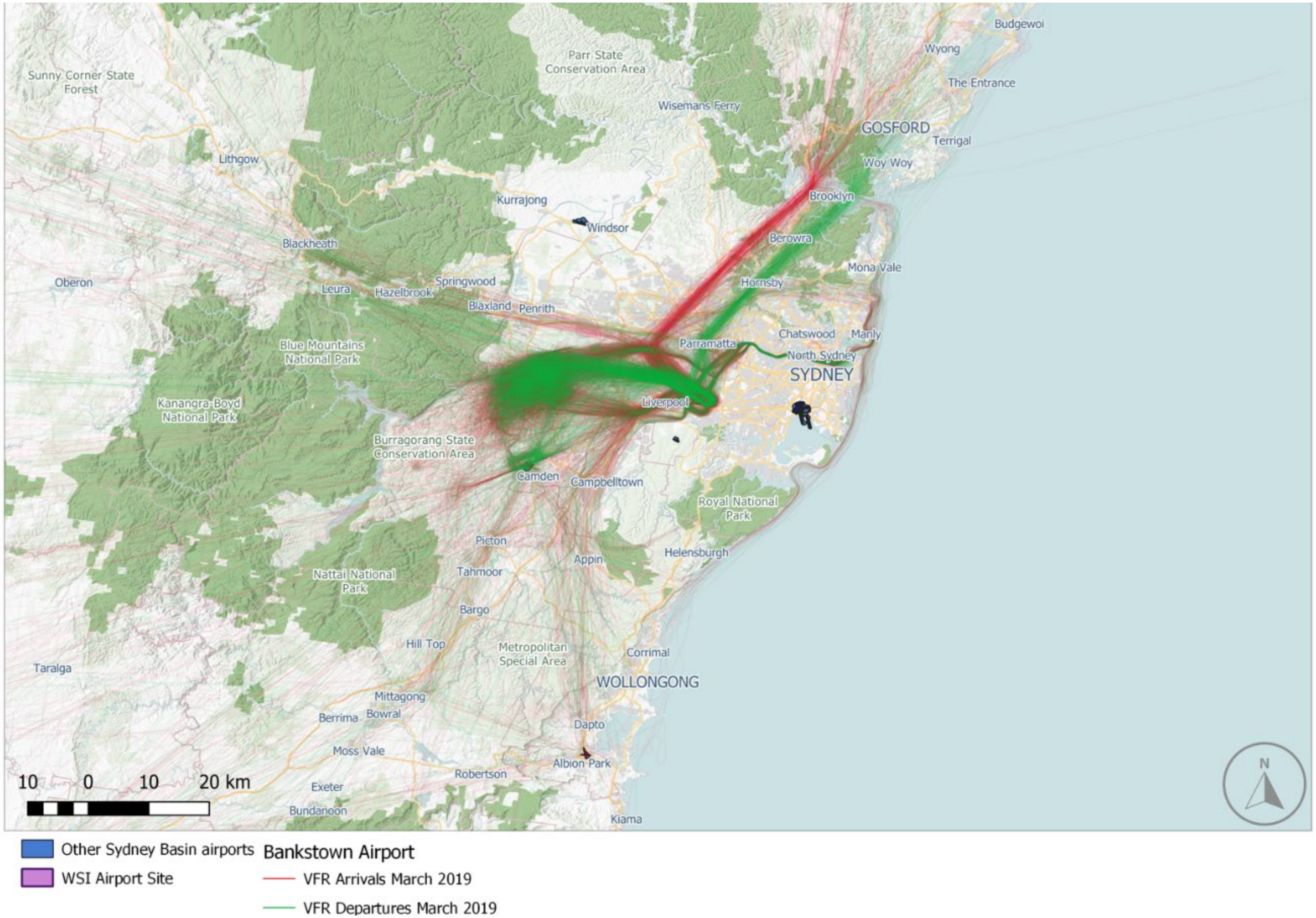


Figure 21.5 Current flight tracks for Bankstown Airport for a one-week period of March 2019

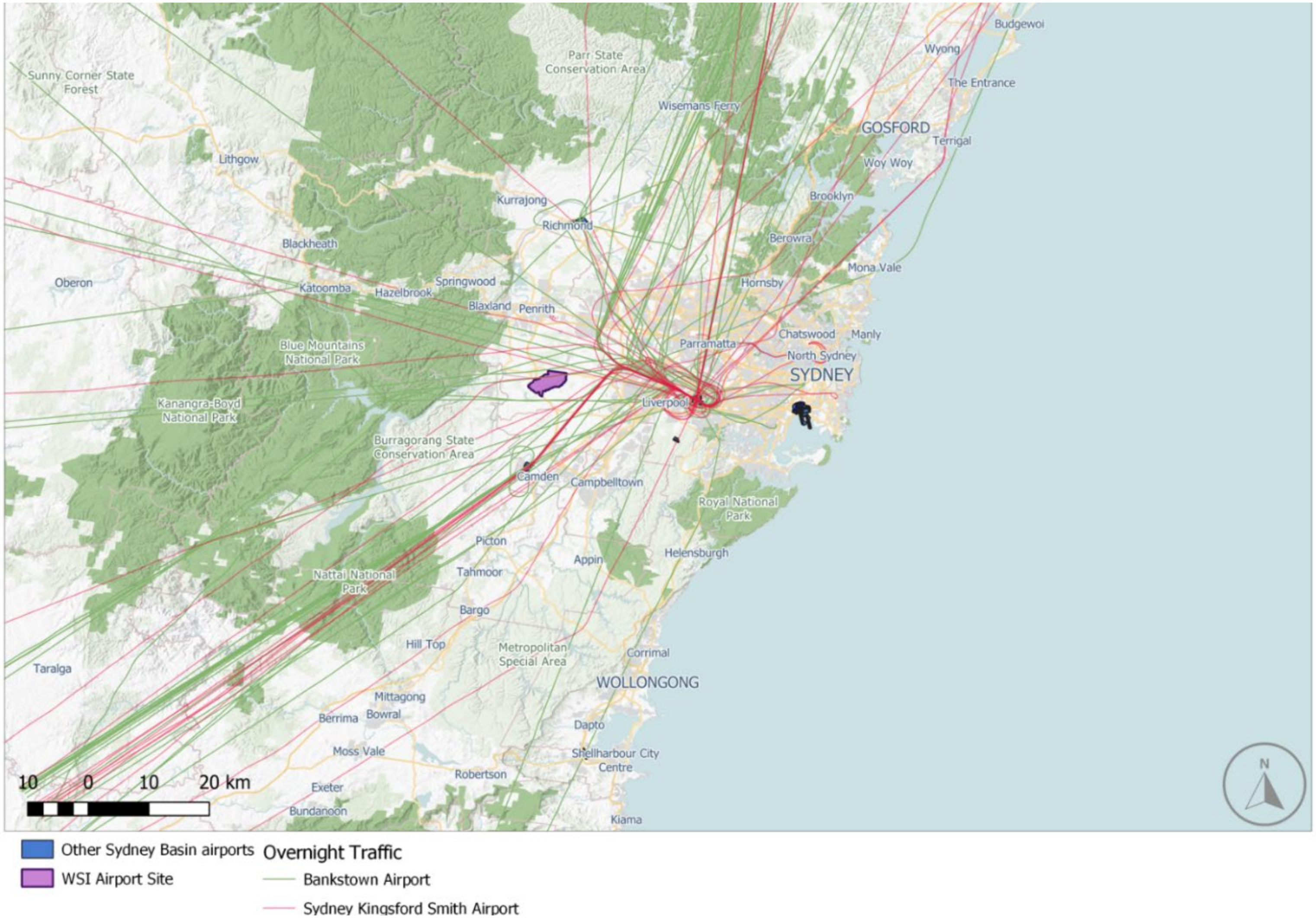


Figure 21.6 Current night flight tracks associated with Bankstown Airport (11 pm to 6 am) (one-week, March 2019)

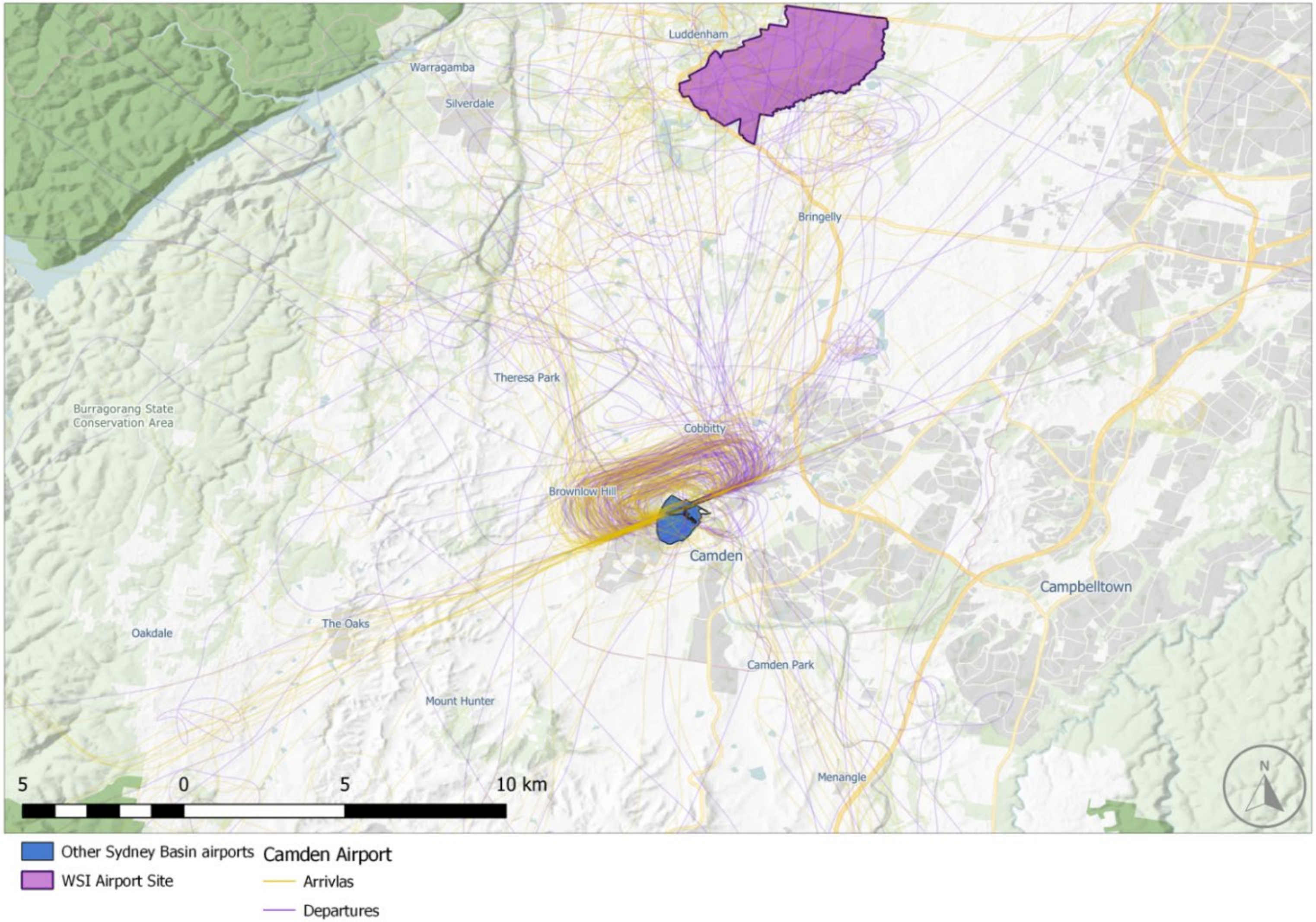


Figure 21.7 Current flight tracks for Camden Airport for a one week period of March 2019

21.5 Assessment of impacts

This section provides the key findings for each change, including changes in usage, changes in aircraft noise, and potential impacts on visual amenity and carbon emissions, as appropriate. Overall facilitated impacts to biodiversity and MNES are also described.

21.5.1 Group A

21.5.1.1 Sydney (Kingsford Smith) Airport Runway 25 (jet) SIDs

This section relates to the proposed Runway 25 SIDs for jet departures to the west, north-west, north and east as presented in Section 8.2.1.1 of Chapter 8 (Facilitated changes). The key assessment findings are depicted by the track dispersion with suburb overlay results in Figure 21.8 to Figure 21.10.

Runway 25 is used around 4 per cent of the year. Flights on the KADOM and RICHMOND SIDs would now have a common segment with the SHORE SID to waypoint NB010. This would mean that suburbs below the segment to waypoint NB010 would experience around 72 additional flights over the busiest day (based on March 2019), or around 168 flights in total if Runway 25 was used for an entire day. In future years, this would only marginally increase due to the low forecast growth rate (around one per cent). The use of Runway 25 for a full day is dependent on strong westerly winds which are infrequent.

The initial track of the proposed SID for northern, eastern and now western and north-western destinations to NB010 are over parts of the inner north-western suburbs that are already overflown by the existing northern and eastern radar vectored departing aircraft (refer to Figure 21.3). Radar vectoring north of waypoint NB010 would result in a similar flight path distribution to current operations once aircraft are north of NB010 (refer to Figure 21.8 and Figure 21.9).

The new SID for aircraft to the north and east via new waypoints NB170 and NB065 to existing waypoint SHORE is anticipated to be used by around 50 per cent of aircraft with northern and eastern destinations. The remaining 50 per cent would continue to be radar vectored contingent on growth in demand within the Sydney Basin and would continue be dispersed over the north-eastern suburbs (refer to Figure 21.10).

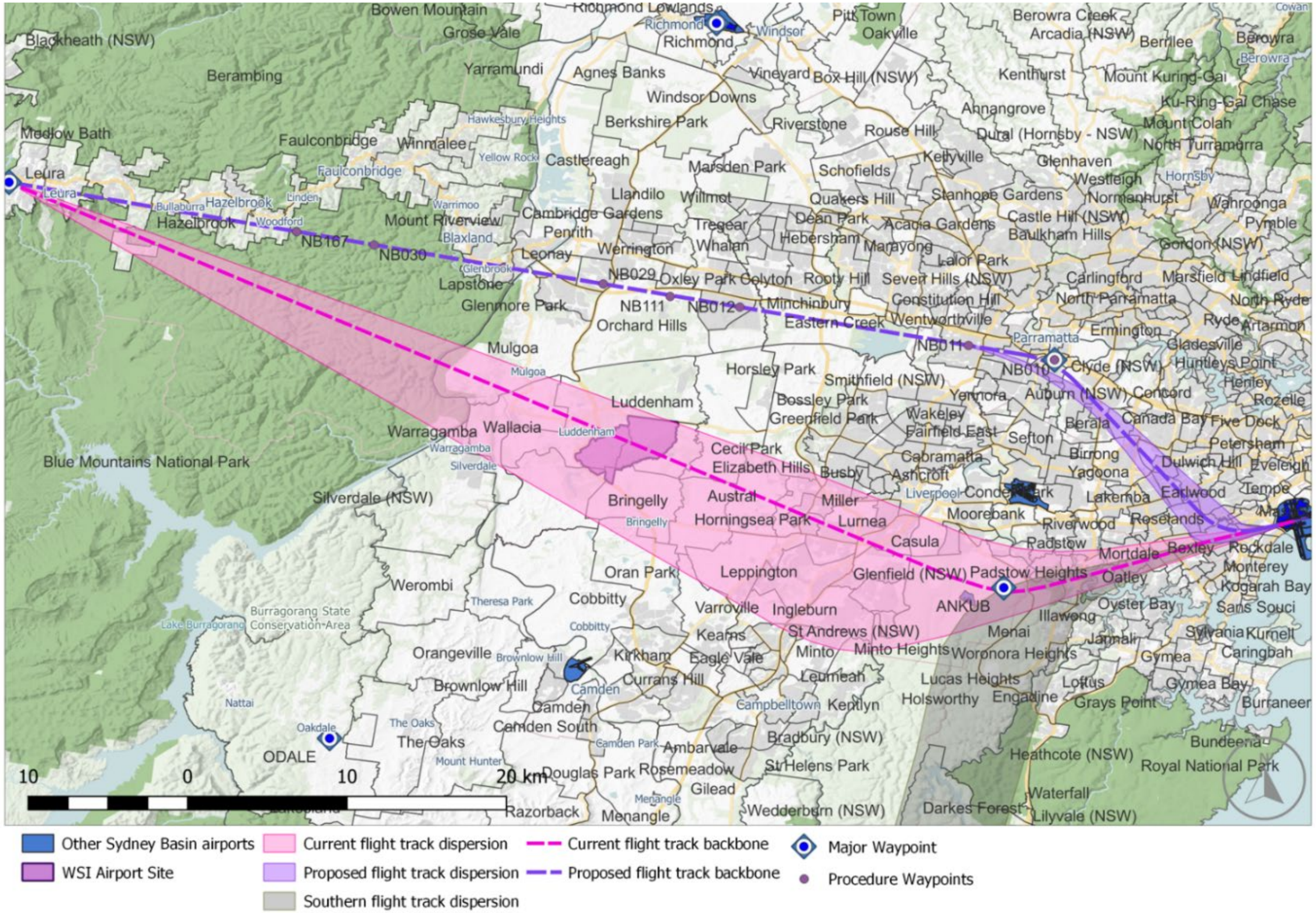


Figure 21.8 Sydney (Kingsford Smith) Airport – current and proposed Runway 25 KADOM SID with suburb overlay

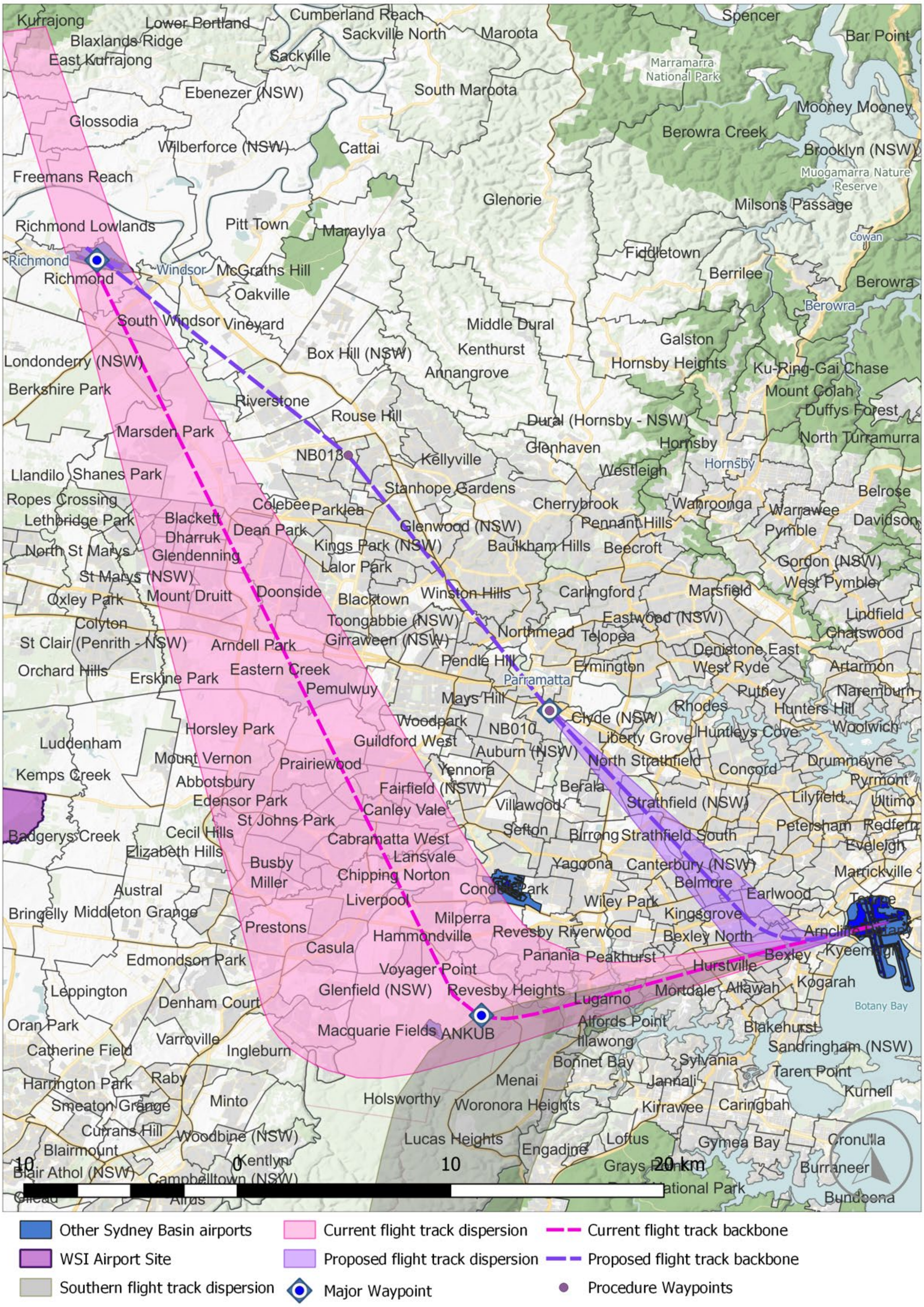


Figure 21.9 Sydney (Kingsford Smith) Airport – current and proposed Runway 25 RICHMOND SID with suburb overlay

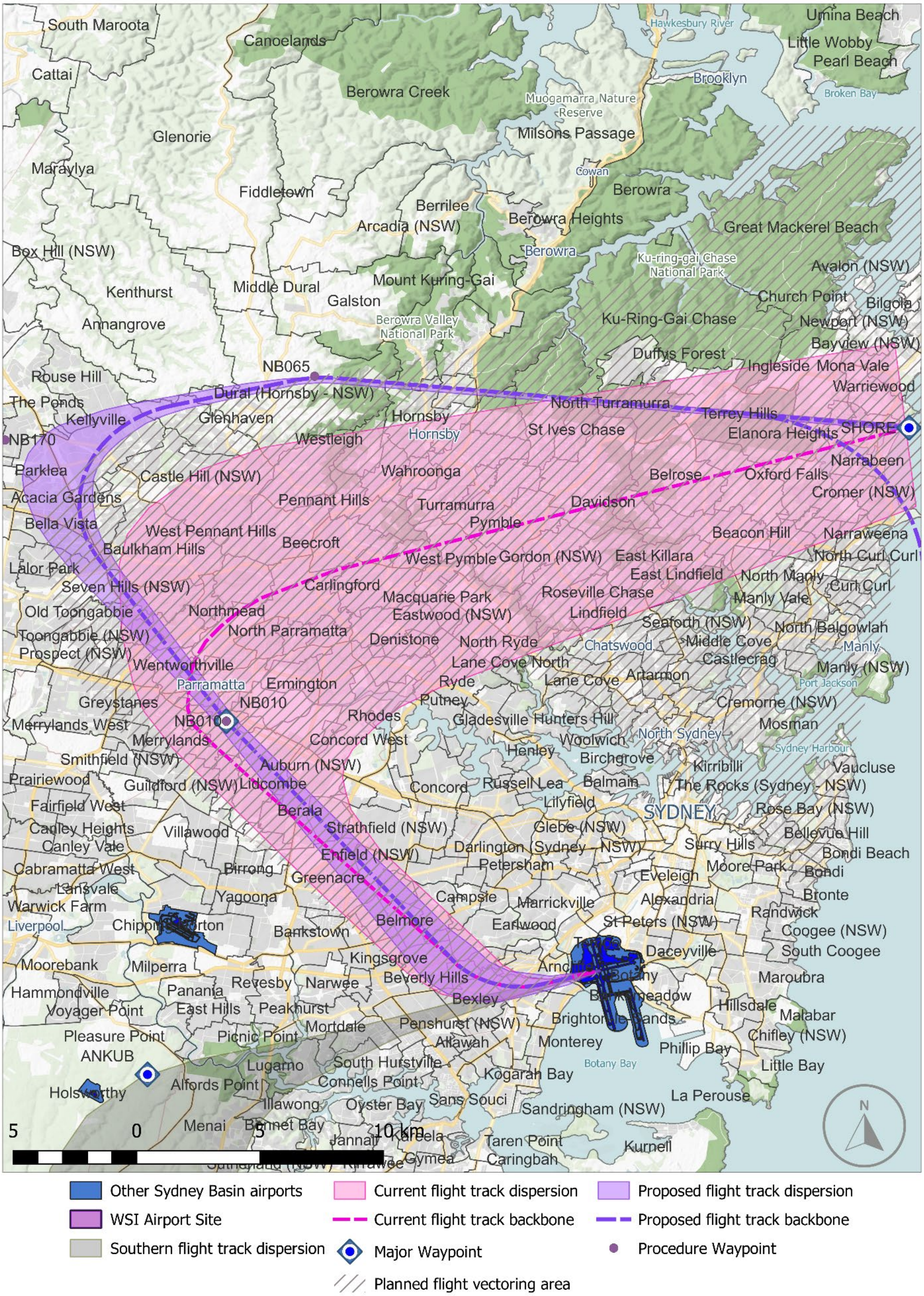


Figure 21.10 Sydney (Kingsford Smith) Airport – current and proposed Runway 25 SHORE SID with suburb overlay

The assessment found that:

- There is a considerable increase in area (square kilometres – km^2), dwellings, and population within the outer N60 and N70 contours as a result of the proposed Runway 25 SID changes (refer to Table 21.2). N60 contours are presented in Figure 21.11 to Figure 21.13, additional figures are presented in Technical paper 13, Appendix A. These increases are attributable to the early initial turn off the Runway 25 alignment (at 1,500 ft), particularly for the KADOM and RICHMOND SID segments. However, Runway 25 departures represent only around 4 per cent of annual operations at Sydney (Kingsford Smith) Airport.
- For the proposed new Runway 25 (waypoint RICHMOND) SID, a short reduction to track distances of around 6 nm (11 km) would result in widebody jet aircraft consuming about 0.1-0.2 per cent less fuel to destinations of 3,500 nm (6,482 km) and 6,500 nm (12,038 km). There would be a similar percentage reduction of carbon emissions per movement.
- In terms of visual amenity, due to the change proposed to Runway 25 SIDs:
  - a substantial area of Western Sydney currently overflown by departing jet aircraft from Runway 25 with western and north-western destinations would no longer be directly under these flight paths
  - areas overflown by aircraft heading to NB010 would experience an increase in frequency of aircraft within a narrower flight path corridor, when the SIDs are in use
  - aircraft tracking to the north-west via Richmond would be visible
  - the continuation of radar vectoring for northern and eastern departures via SHORE is expected to see little variation in the visibility of aircraft over the northern and north-eastern metropolitan area.

Table 21.2 Comparison of existing versus proposed within N60 and N70 contours – Runway 25 SID (only used around 4 per cent of the year)

Noise contour	Segment	Percentage change (%)		
		Area (km^2)	Dwelling count	Population count
N60 (24-hour) 10 movements or more	KADOM	+ 9.4 per cent	+ 67.6%	+73.9%
	RICHMOND	+ 18.1 per cent	+ 70.5%	+ 72.2%
	SHORE	No change	+ 2.4%	+ 0.5%
N70 (24-hour) 5 movements or more	KADOM	+ 22.2%	+ 16.3%	+ 17.1%
	RICHMOND	No change	+ 0.4%	- 0.1%
	SHORE	+ 16.2%	+ 4.6%	+ 4.5%

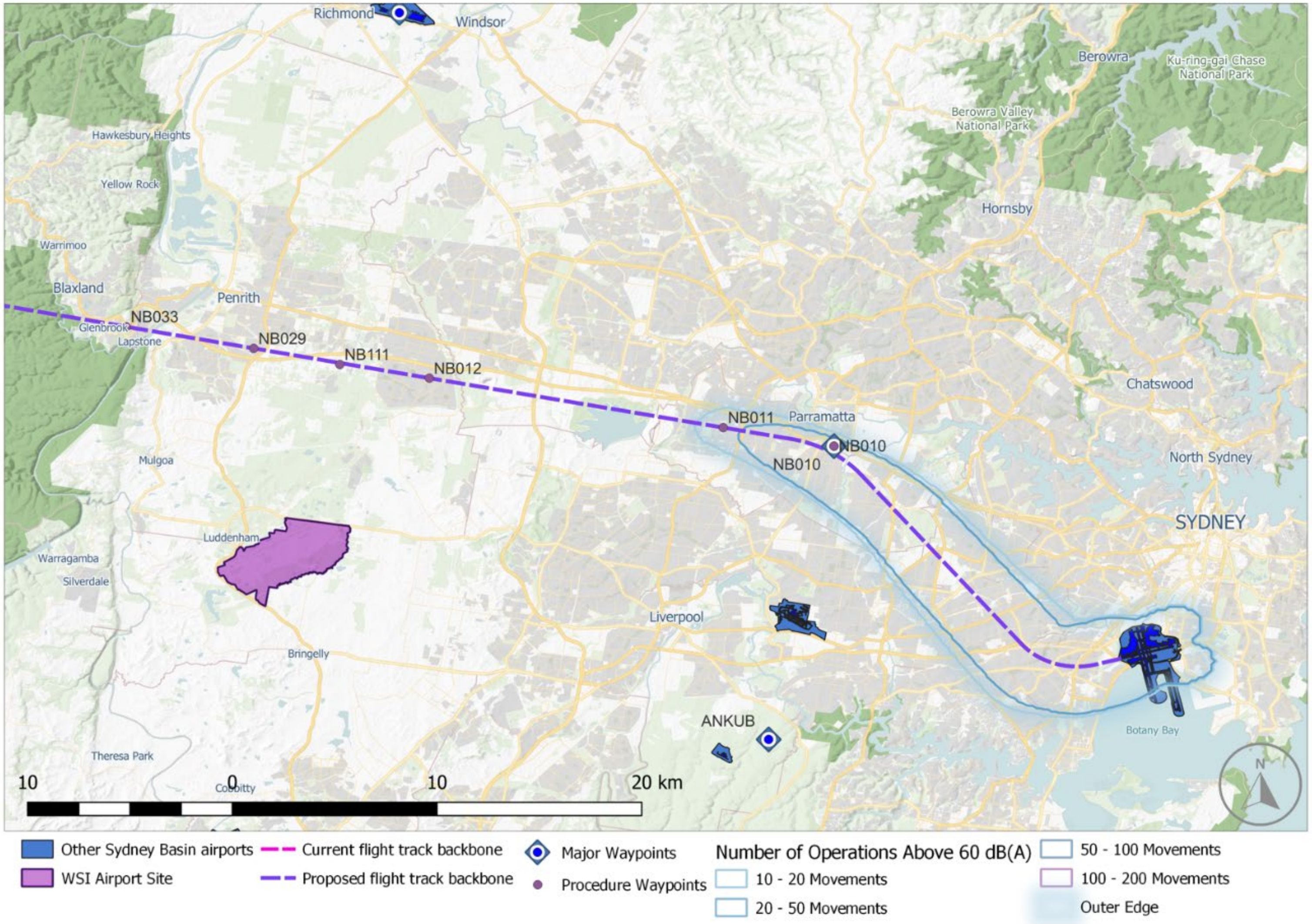


Figure 21.11 Proposed Runway 25 KADOM SID – jet departures - N60 contours

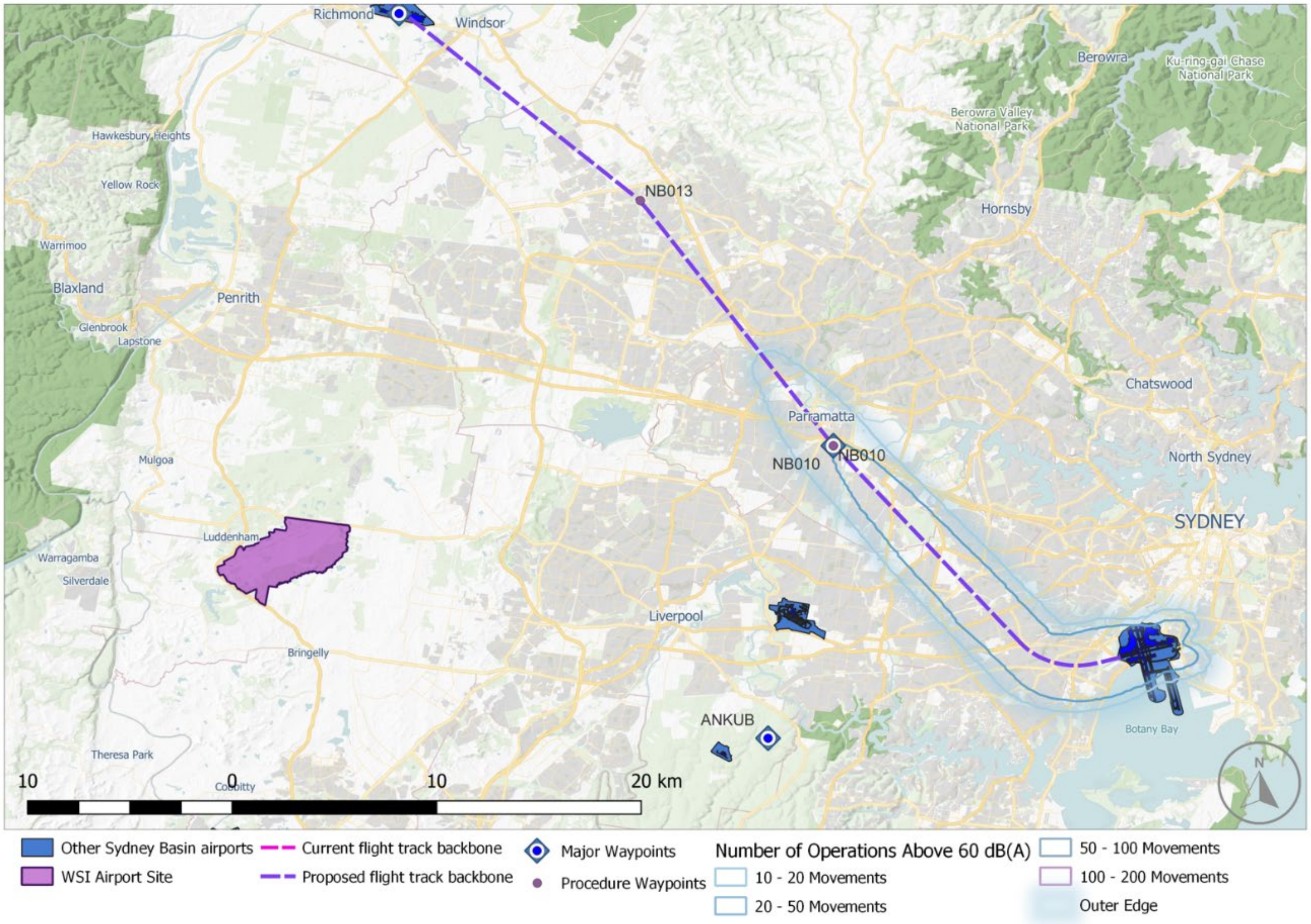


Figure 21.12 Proposed Runway 25 RICHMOND SID – N60 contours

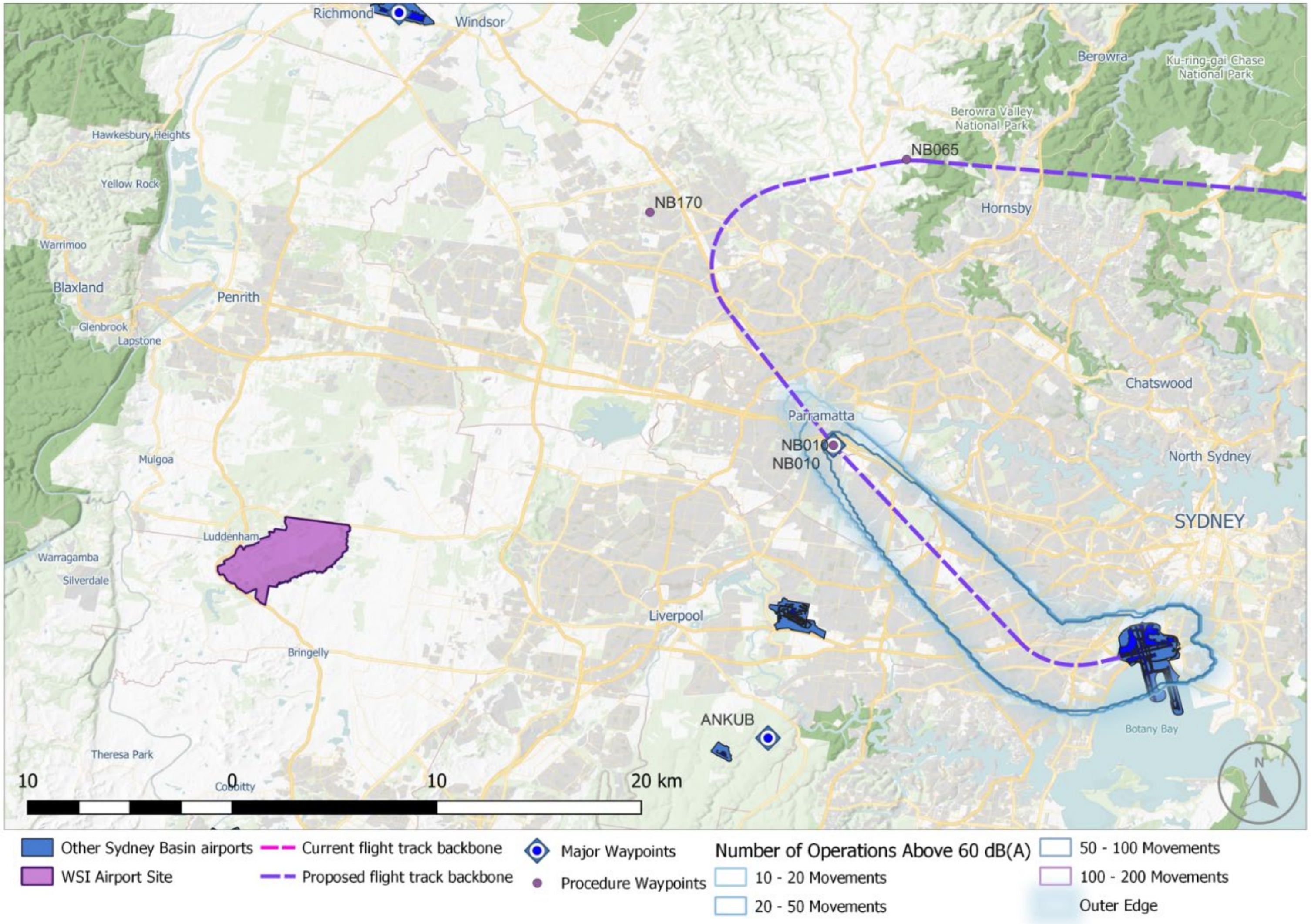


Figure 21.13 Proposed Runway 25 SHORE SID – N60 contours

21.5.1.2 Sydney (Kingsford Smith) Airport Runway 34L (waypoint KADOM) (jet) departures

This section relates to the proposed Runway 34L KADOM SID for jet departures from Runway 34L heading to the west, north-west, north and east as presented in Section 8.2.1.2 of Chapter 8 (Facilitated changes). The key assessment findings are depicted by the track dispersion with suburb overlay results in Figure 21.14 and Figure 21.15.

The flight path for the new Runway 34L KADOM SID as designed is predominantly over parts of the north-western suburbs that are already overflown by the existing SID (refer to Figure 21.2). This results in an additional 80 flights per day along the SID beyond waypoint NB010.

Further:

- the ongoing requirement for aircraft to turn left off Runway 34L runway heading at an altitude of 800 ft would continue to provide the track dispersion over the north-western suburbs
- the dispersion of aircraft created by the 800 ft left turn would narrow where the aircraft fly past new waypoint NB010 at approximately 10 nm (19 km) from Sydney (Kingsford Smith) Airport
- air traffic control radar vectoring is likely on the SHORE transition which replicates current practice
- aircraft heading north-west that would normally be allocated to Runway 34L RICHMOND SID would be reallocated to the KADOM SID when a military parachute training area is activated within the RAAF Base Richmond Restricted Airspace. Radar vectoring would also be used to vector these departures.

The assessment found that:

- In terms of noise:
  - for western departures, there are differences in the geographical extents of the N60 contours. There are differences for N70 contours, with a reduction in the width but an extension in the length of the contours. As a result, there is an associated slight reduction in the area, dwelling and population numbers for the expected noise impacts for departures to the west via the proposed future Runway 34L KADOM SID (Table 21.3). This reflects the expected changes in aircraft dispersion along the SID. N60 contours are presented in Figure 21.16, additional figures are presented in Technical paper 13, Appendix B
  - for northern and eastern departures (using KADOM TO SHORE SID via waypoint NB010), there are discernible differences in the shape of the N60 and N70 contours due to the change in geographic extents of the procedure, with these noise contours extending to the south-west, as well as the displacement of eastern Runway 34L departures off the current RICHMOND SID (which is current radar vectored). As a result, there is an associated change in the area, dwelling and population numbers for the N60 and N70 contours (Table 21.3). However, in practice, not all aircraft would fly on the SID procedure and radar vectoring would disperse aircraft (and aircraft noise). N60 contours are presented in Figure 21.17, additional figures are presented in Technical paper 13, Appendix B.

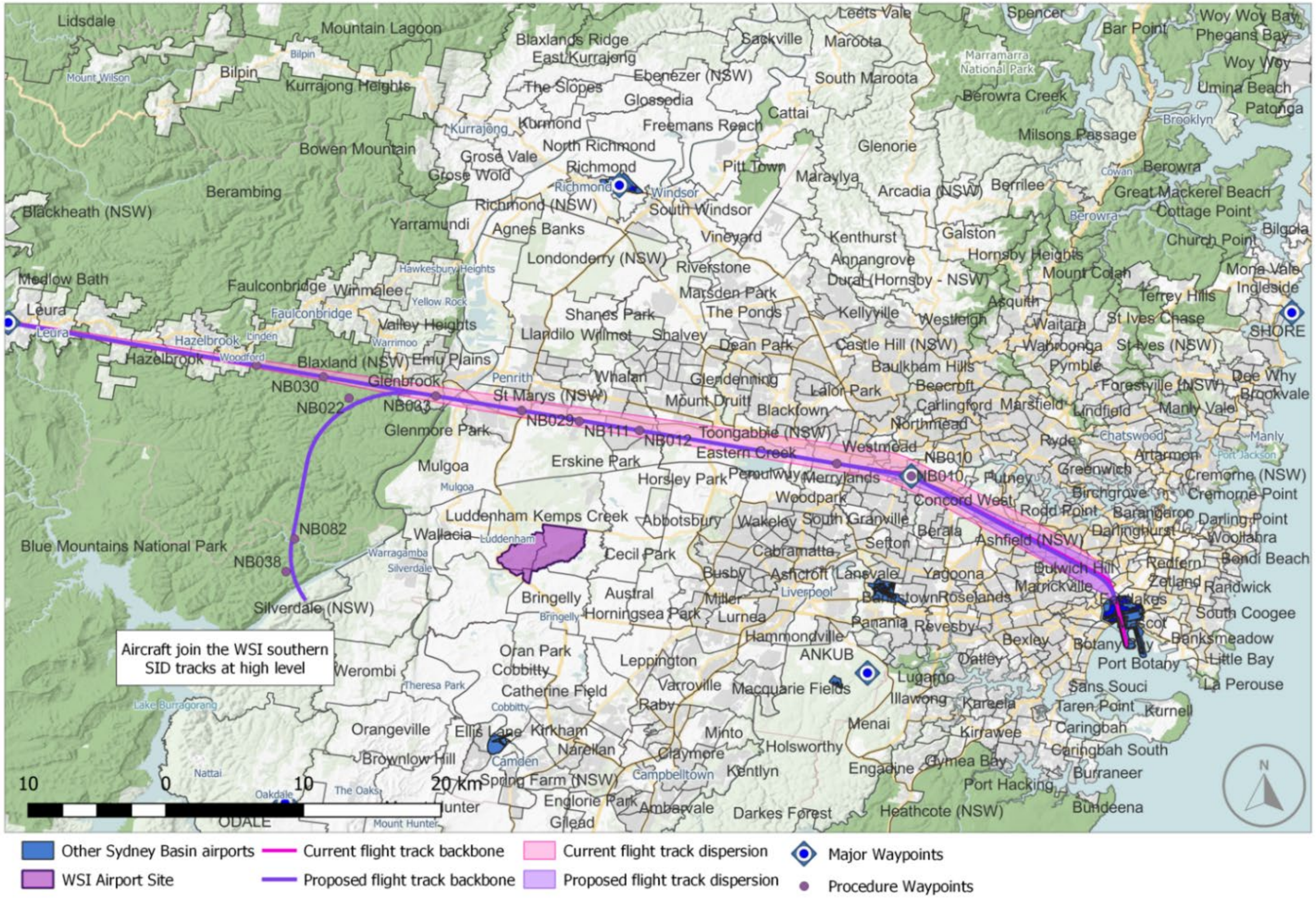


Figure 21.14 Sydney (Kingsford Smith) Airport – current and proposed Runway 34L KADOM SID (jet departures to the north-west) with suburb overlay and flight path dispersion

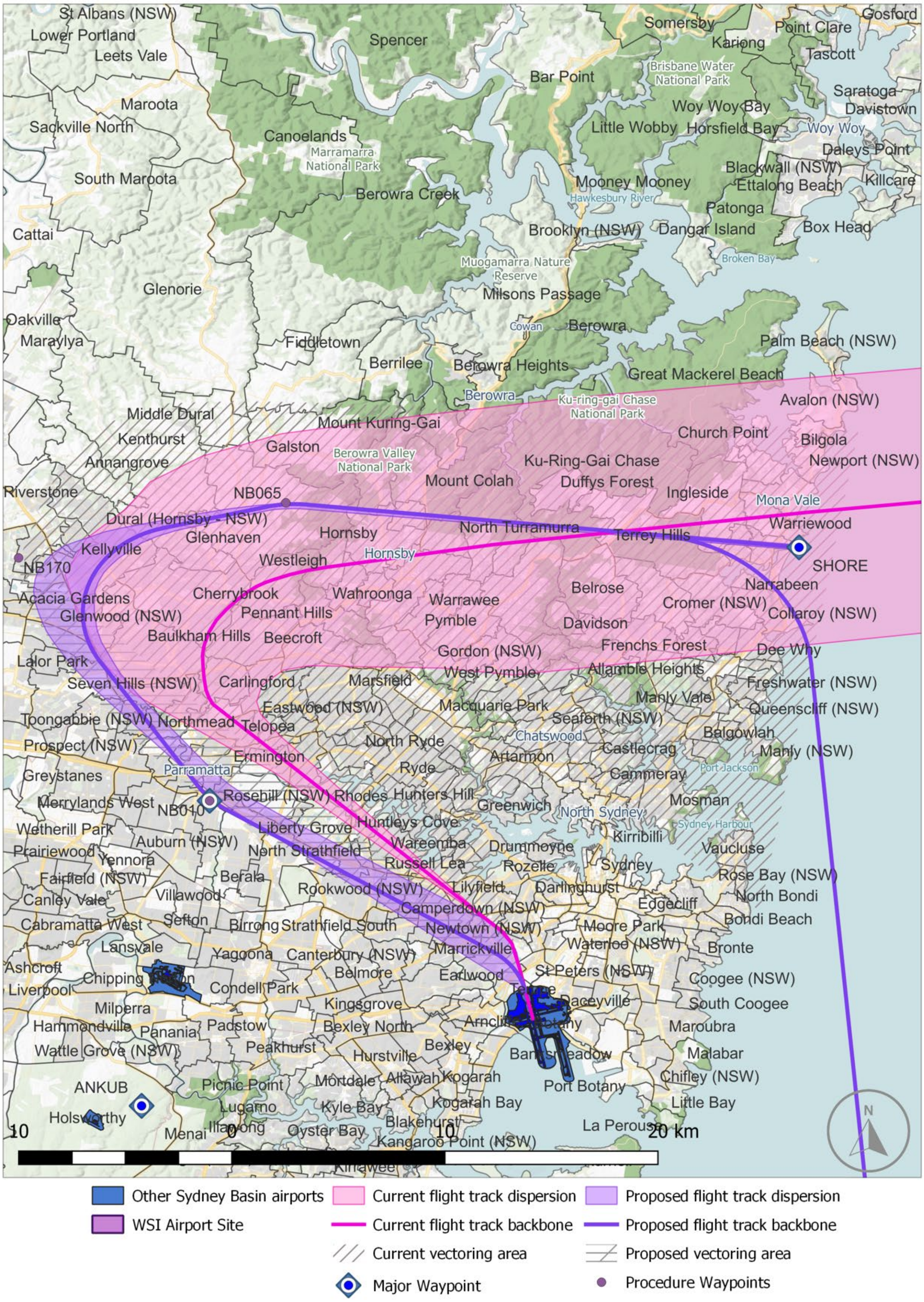


Figure 21.15 Sydney (Kingsford Smith) Airport – current and proposed Runway 34L KADOM SID with SHORE transition (jet departures to the east) with suburb overlay and radar vectoring areas

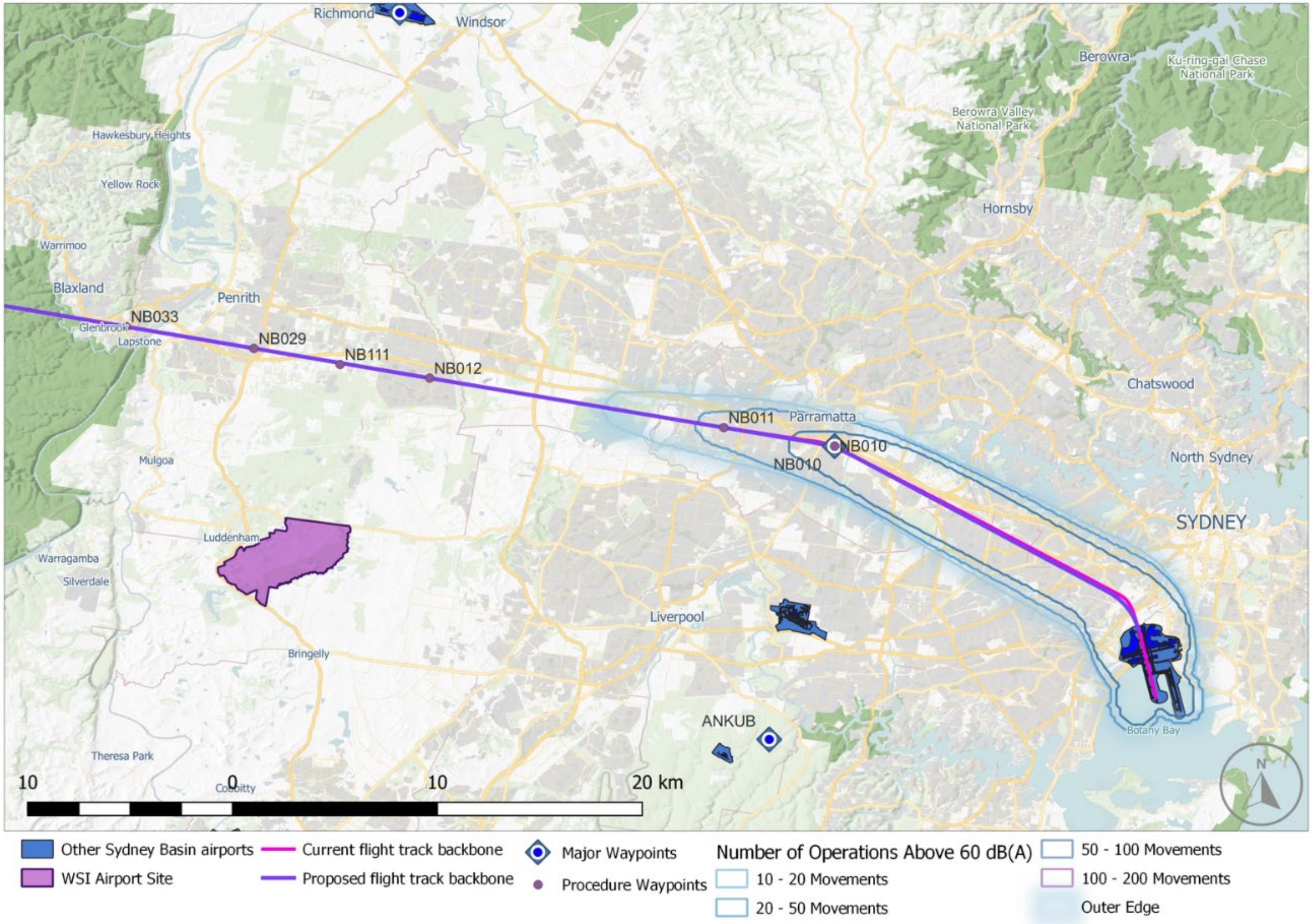


Figure 21.16 Proposed Runway 34L KADOM SID – N60 contours

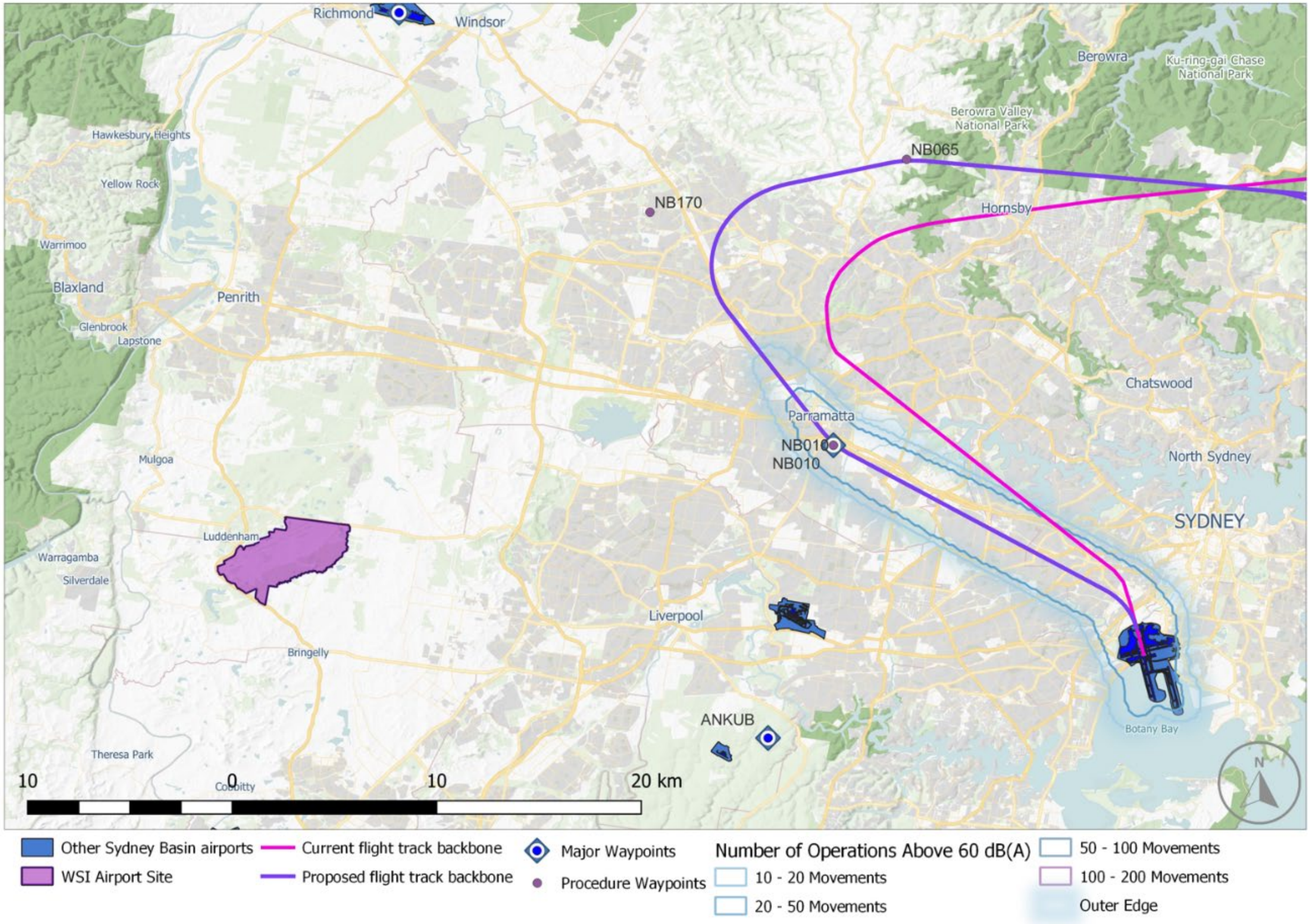


Figure 21.17 Proposed Future Runway 34L KADOM to SHORE SID to eastern/oceanic destinations - N60 contours

- For southern departures via waypoint TONTO, this would be infrequently used as per current practice with around one to 2 aircraft per day. For this change, L_{Amax} was considered which illustrated that the expected noise levels would be less than 50 dB(A) due to the increasing altitude achieved prior to that aircraft reaching the southern transition point at waypoint NB033 (refer to Technical paper 13). Noise levels of 60dB(A) and 70dB(A) for these events would not extend beyond the N60 or N70 contours associated with the KADOM SID for aircraft with western destinations.

Table 21.3 Comparison of existing versus proposed within N60 and N70 contours – Runway 34L SID

Noise contour	SID segment	Current versus proposed future procedure		
		Area (km^2) percentage change	Dwelling count percentage change	Population count percentage change
N60 (24-hour) 10 and above movements	**KADOM**	-6.7 per cent	-6.8 per cent	-6.6 per cent
N60 (24-hour) 10 and above movements	**SHORE**	+6.3 per cent	+8.4 per cent	+12.6 per cent
N70 (24-hour) 5 and above movements	**KADOM**	-10.7 per cent	-6.8 per cent	-7.8 per cent
N70 (24-hour) 5 and above movements	**SHORE**	+7.7 per cent	+29 per cent	+30 per cent

- Due to the minimal change in track distance (less than 0.3 nm or 0.56 km), there is almost no discernible change in the consumption of fuel and emissions of CO_2 from jet aircraft operating between the current and proposed SID all the way through to waypoint KADOM.
- In terms of visual amenity:
  - for aircraft continuing west to waypoint KADOM there would be minimal change in the visual perception of the dispersion of aircraft over the ground when using the proposed SID as compared to the current SID. From waypoint NB010, some aircraft may be slightly higher than the current procedure as the new SID would require aircraft to be 5,000 ft (1.5 km) or above by waypoint NB011. All communities overflown by the adjusted SID are currently overflown by current Runway 34L aircraft operating to western destinations. These aircraft would still be visible, but not necessarily in the same location due to the change in lateral dispersion
  - for aircraft proceeding east and north-east (via waypoint SHORE), the change would result in a maximum lateral shift to the south of approximately 5 km and to the west. Aircraft would be visible. Further, areas overflown by the KADOM procedure segment between Sydney (Kingsford Smith) Airport and waypoint NB010 is already overflown and visible but would be subjected to an increase in frequency of overflights of around 30 flights per day due to the reallocation of those flights off the Runway 34L RICHMOND SID. During the initial years and contingent on growth in demand within the Sydney Basin, dispersion via radar vectoring would also continue as per current practice for around half of the departures
  - for aircraft proceeding south, typically only one or 2 movements per day, they would be at an altitude of 10,000 ft (3 km) or more as they leave the KADOM SID at waypoint NB033. Aircraft would be visible over eastern areas of the GBMA and visible at above 10,000 ft (3 km) on a new low usage, high altitude flight path, between leaving the KADOM SID and joining the en-route network. Currently, these aircraft movements fly above different areas of Sydney at altitudes less than 7,000 ft (2.2 km). These aircraft would no longer be visible in this area of Sydney
  - for aircraft proceeding north-west via the KADOM SID when the military parachute training area is activated, aircraft would be visible leaving the Runway 34L KADOM SID flight path anywhere between waypoint NB033 and KADOM but would be at 10,000 ft or higher.

21.5.1.3 Sydney (Kingsford Smith) Airport Runway 34L RICHMOND SID (jet)

This section relates to the proposed Runway 34L RICHMOND SID for aircraft departures to the west and north-west as presented in Section 8.2.1.3 of Chapter 8 (Facilitated changes). The key assessment findings are depicted by the track dispersion with suburb overlay results in Figure 21.18.

The proposed adjusted Runway 34L RICHMOND SID from Sydney (Kingsford Smith) Airport represents a minimal change from the existing SID. The new SID tracks over parts of the north-western suburbs that are already overflown by the existing SID. The requirement for aircraft to turn left off the Runway 34L runway heading at an altitude of 1,500 ft (460 m) would continue to provide similar track dispersion over the suburbs closer to the airport but would increasingly narrow as the aircraft proceed to waypoint RICHMOND (refer to Figure 21.18).

As the proposed new SID flight path effectively replicates the current SID flight path and is the most direct path to Richmond it can be expected that minimal radar vectoring involving track shortening would take place on this SID. Radar vectors for safety and hazardous weather avoidance would still be possible.

The assessment found that:

- There would be no discernible change to the current track distance and, therefore, no additional fuel burn required by aircraft using the proposed Runway 34L RICHMOND SID or associated CO_2 emissions.
- There would be only very marginal changes in the N60 and N70 extents when compared to the current procedure. This results in a very minor increase in the area, dwelling and population counts. However, further along the SID, noise contours are generally similar (refer to Figure 21.19). N60 contours are presented in Figure 21.19, additional figures are presented in Technical paper 13, Appendix C.
- In terms of visual amenity, the proposed SID flight path is generally within the flight dispersion of the existing SID flight path but would narrow due to the safety requirements of the procedure. Aircraft would still be visible, but not necessarily in the same location due to the change in lateral dispersion.

Table 21.4 Comparison of existing versus proposed within N60 and N70 contours – Runway 34L RICHMOND SID

Noise contour	Segment	Change (%)		
		Area (km^2)	Dwelling count	Population count
N60 (24-hour) 10 movements or more	Richmond	+2%	+3%	+2.8%
N70 (24-hour) 5 movements or more	Richmond	+2.2%	+2.5%	+1.9%

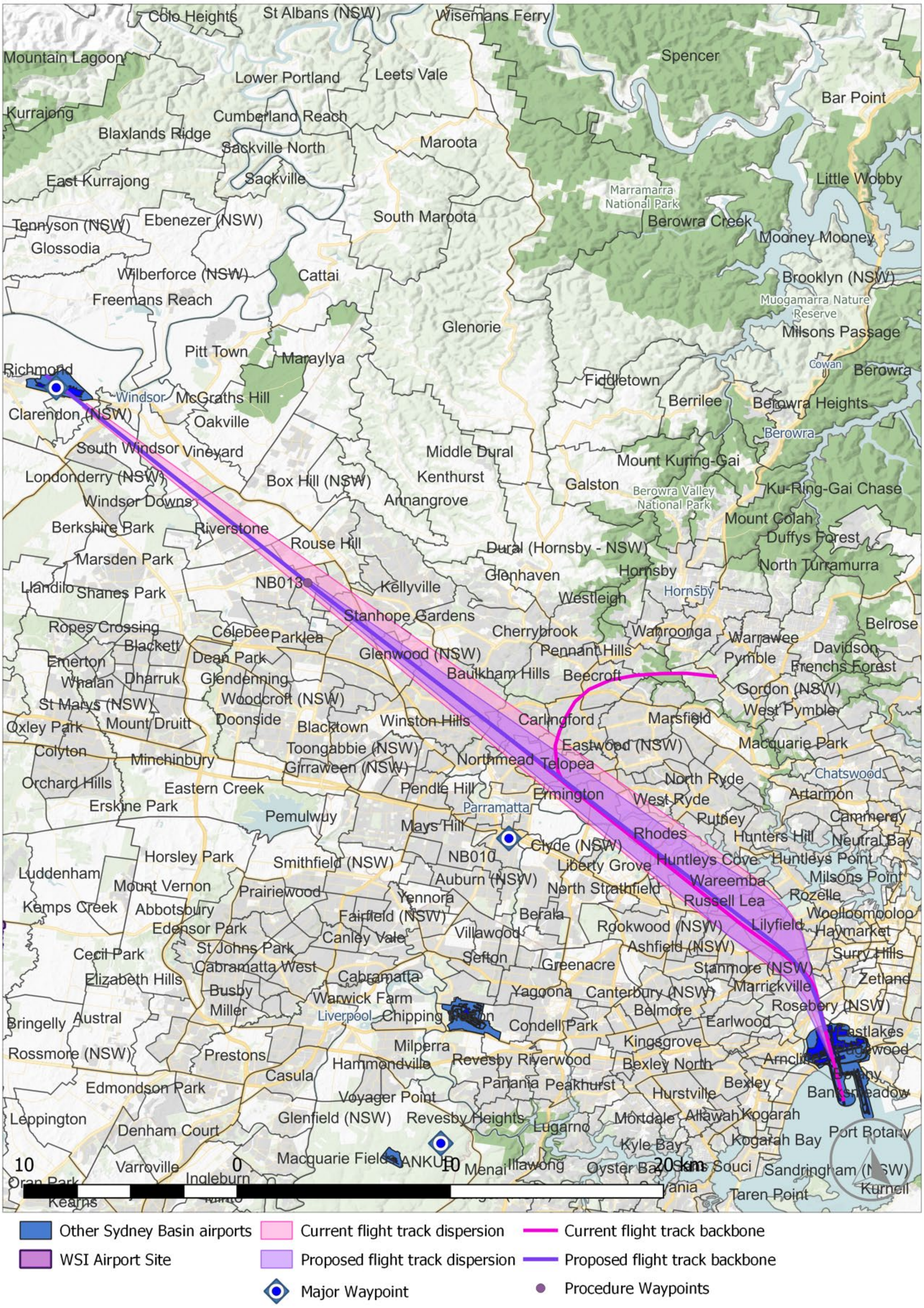


Figure 21.18 Sydney (Kingsford Smith) Airport – current and proposed Runway 34L RICHMOND SID with suburb overlay and flight path dispersion

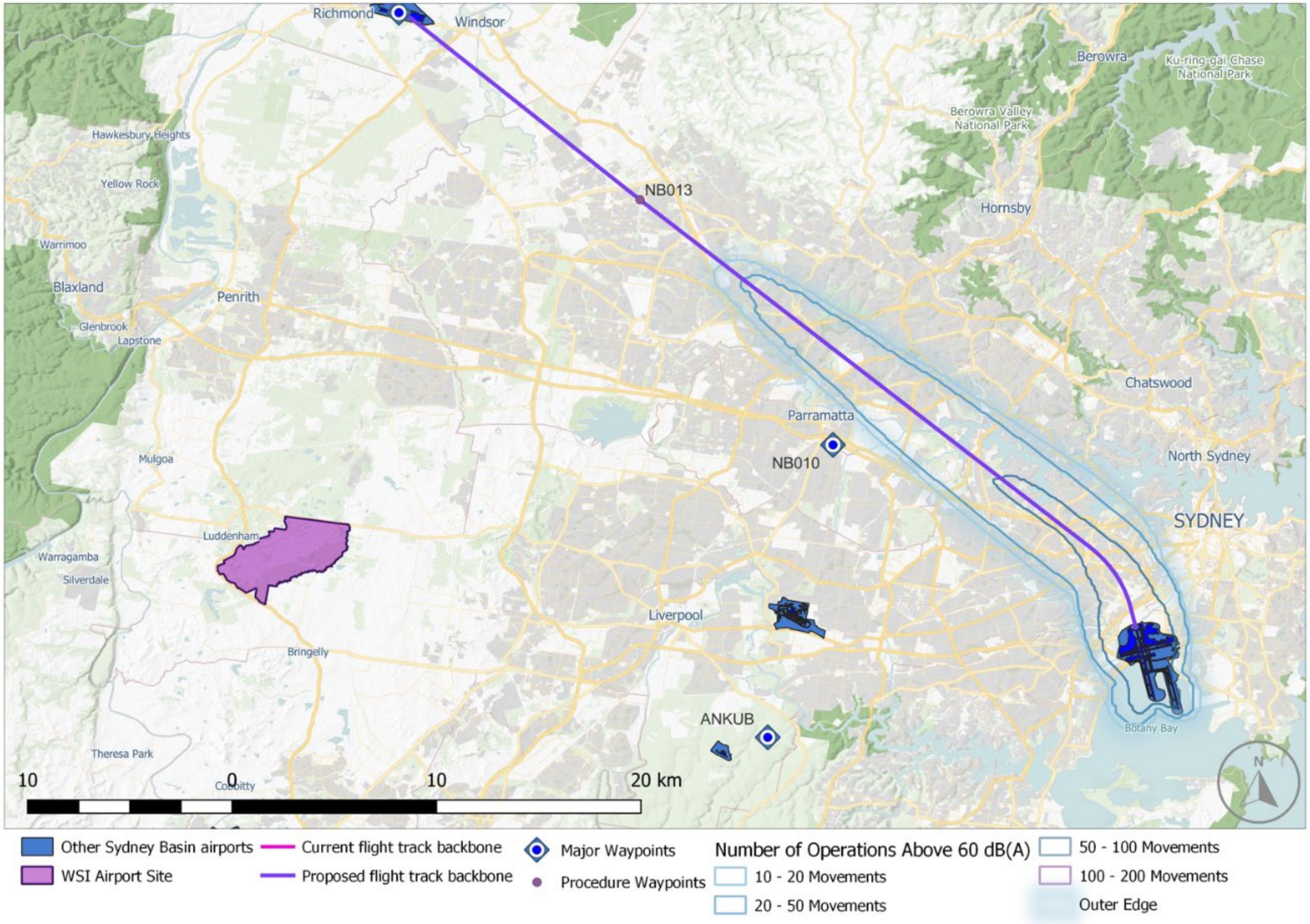


Figure 21.19 Proposed Runway 34L RICHMOND SID – N60 contours

21.5.1.4 Sydney (Kingsford Smith) Airport non-jet departures to the west and north west

This section relates to the proposed non-jet ANKUB SID which would apply to non-jet departures to the west and north-west, as presented in Section 8.2.1.6 of Chapter 8 (Facilitated changes). The key assessment findings are depicted by the flight path dispersion with suburb overlay results in Figure 21.20. A significant number of aircraft already track close to waypoint ANKUB and the new waypoint NB024. From the new waypoint NB024, the proposed new SIDs would vary from the current tracks.

It is expected that there would be around 20 of the 35 non-jet departures per day by 2030 with west and north-west destinations that would use the proposed SID. However, contingent on growth in demand within the Sydney Basin during the first year of implementation, the majority of departing aircraft may fly the new SID but the frequency of its use is expected to increase as operations at WSI increase. A variable proportion of non-jet departures to the west and north-west would continue to be radar vectored towards their first enroute waypoint.

The assessment found that:

- For aircraft that are expected to track along the new SID, there would be a marginal increase in track miles, with an increase of around 5.5 nm (10 km) for aircraft departing to KADOM and 10 nm (19 km) for aircraft departing to BENBU. As result, more CO_2 would be emitted.
- As aircraft would continue to disperse to waypoint ANKUB as per current practice, there are no changes to noise levels or the visibility of aircraft for underlying communities and suburbs between Sydney (Kingsford Smith) Airport and waypoint ANKUB. The 60 dB(A) contour does not extend to waypoint ANKUB. To consider noise beyond ANKUB, the L_{Amax} noise levels have been considered for a representative aircraft (refer to Table 21.5). Noise generated by aircraft can also vary between aircraft, or due to other factors such as pilot technique, different meteorological conditions, and/or lateral distance between the on-ground receiver and the aircraft.
- Different suburbs and communities would now be overflown by aircraft on this SID from waypoint ANKUB, with some benefits to communities currently overflown due to the lateral displacement of up to half the non-jet departure overflights to the south. A number of outer suburbs of the Sydney Basin that would currently experience overflight of non-jet departures would experience a concentration of non-jet flights due to this new procedure. However, this is expected to be around 20 flight per day, during a busy day.
- In relation to visual amenity, non-jet aircraft currently departing Sydney (Kingsford Smith) Airport from any runway fly on a widely dispersed set of radar vectored flight paths to a westerly or north westerly destination. These aircraft are visible to a large part of Western Sydney. Aircraft would continue to be visible and the change from a wide radar vectored dispersion of tracks to a more confined track from waypoint ANKUB for around 50 per cent of the departures means that communities overflown would see more aircraft, while other parts of the metropolitan area would see less overflight.

Table 21.5 Sydney (Kingsford Smith) Airport – predicted average overflight noise levels at waypoints on the proposed SIDs (non-jet departures)

Waypoint	Altitude	Noise level for Saab 340 – Regional twin turbo-prop (L_{Amax})[1]	
		Climb[2]	Cruise
ANKUB	5,000 ft	60 dB(A)	58 dB(A)
NB024	5,000 ft	58 dB(A)	n/a
NB037	9,000 ft	56 dB(A)	n/a
NB038	11,000 ft	54 dB(A)	n/a
NB055	13,000 ft	52 dB(A)	n/a

1. The dB(A) values presented the above table should be considered as a median value of a range of plus or minus 3 dB(A) – i.e., 50 dB(A) would indicate potential overflight noise of between 47 and 53 dB(A).
2. Under the proposed SIDs, aircraft do not climb above 5,000 ft until west of waypoint NB024. It is expected that the majority of aircraft would reach 5,000 ft close to ANKUB due to climb performance and would reduce thrust (noise) while maintaining 5,000 ft until able to climb past waypoint NB024.

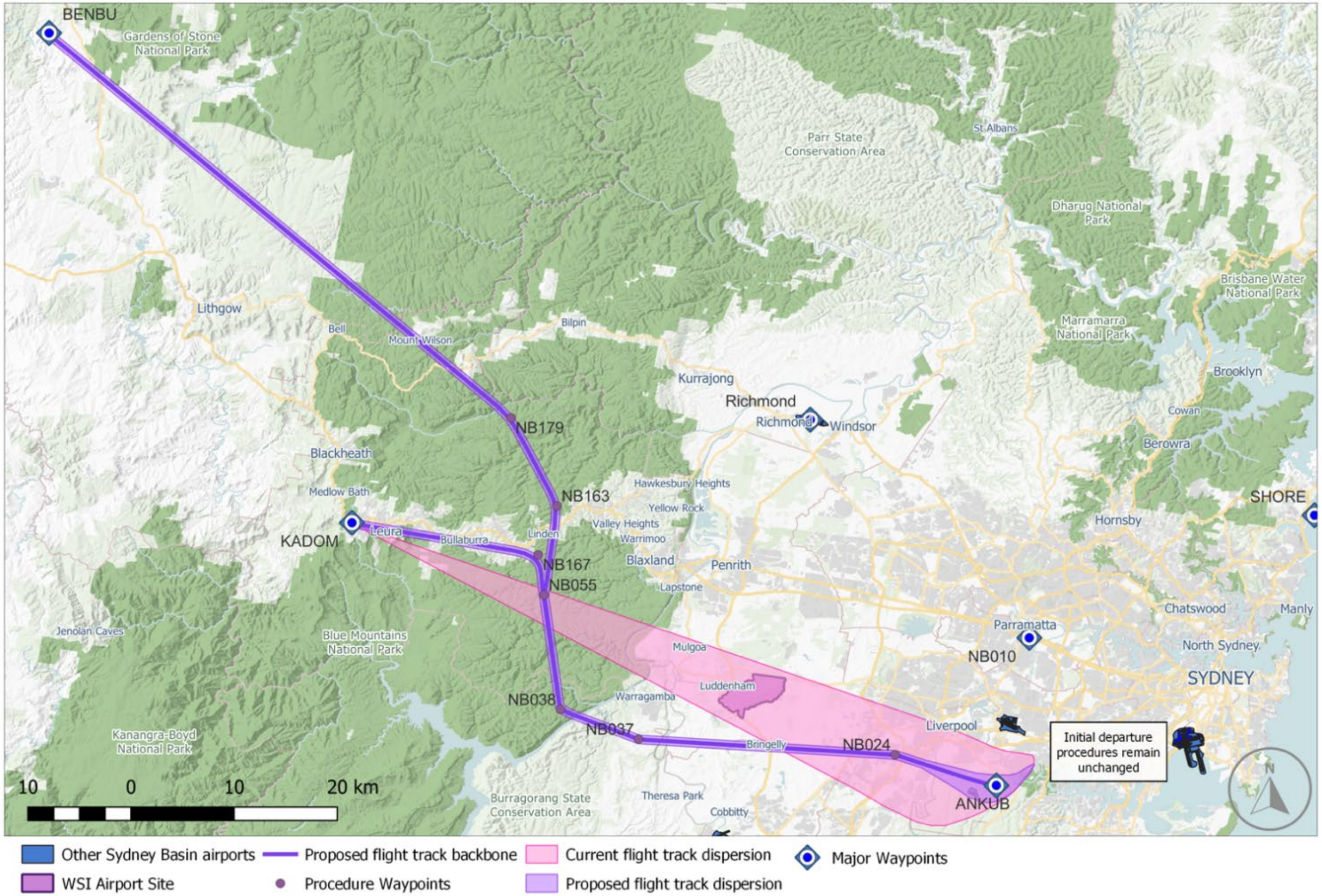


Figure 21.20 Sydney (Kingsford Smith) Airport – current non-jet departures versus proposed new non-jet SID with flight path dispersion

21.5.2 Group B

21.5.2.1 Bankstown Airport IFR changes

This section relates to the proposed IFR changes for aircraft arriving and departing Bankstown Airport, as presented in Section 8.3 of Chapter 8 (Facilitated changes). The key findings are depicted by the track dispersion with suburb overlay results in Figure 21.21 and Figure 21.22. Detailed information on the proposed change and assessment is provided in Appendix G of Technical paper 13.

Bankstown Airport is the most affected of all Sydney Basin airports by the proposed introduction of WSI operations. This is reflected by the need to introduce a suite of new IFR procedures including SIDs, STARs and new instrument approaches (RNP). Bankstown Airport currently handles on average around 700 flight movements per day. Around 145 movements per day are expected to operate under IFR, comprising of:

- turbo-prop and jet aircraft (38 movements), which would consistently operate under IFR
- all twin-engine aircraft movements and only 10 per cent of single-engine aircraft could also operate and train under IFR.

Aircraft movements are expected to grow around one per cent per annum, based on the Bankstown Airport Master Plan.

A set of noise abatement procedures are in place at Bankstown Airport, which detail the preferred runway and circuit directions, and limitations during the day and night time periods. The airport also has a voluntary Fly Neighbourly Procedures Program. This program assists in managing noise-related airport issues for fixed-wing aircraft and helicopters, as well as on-ground noise sources.

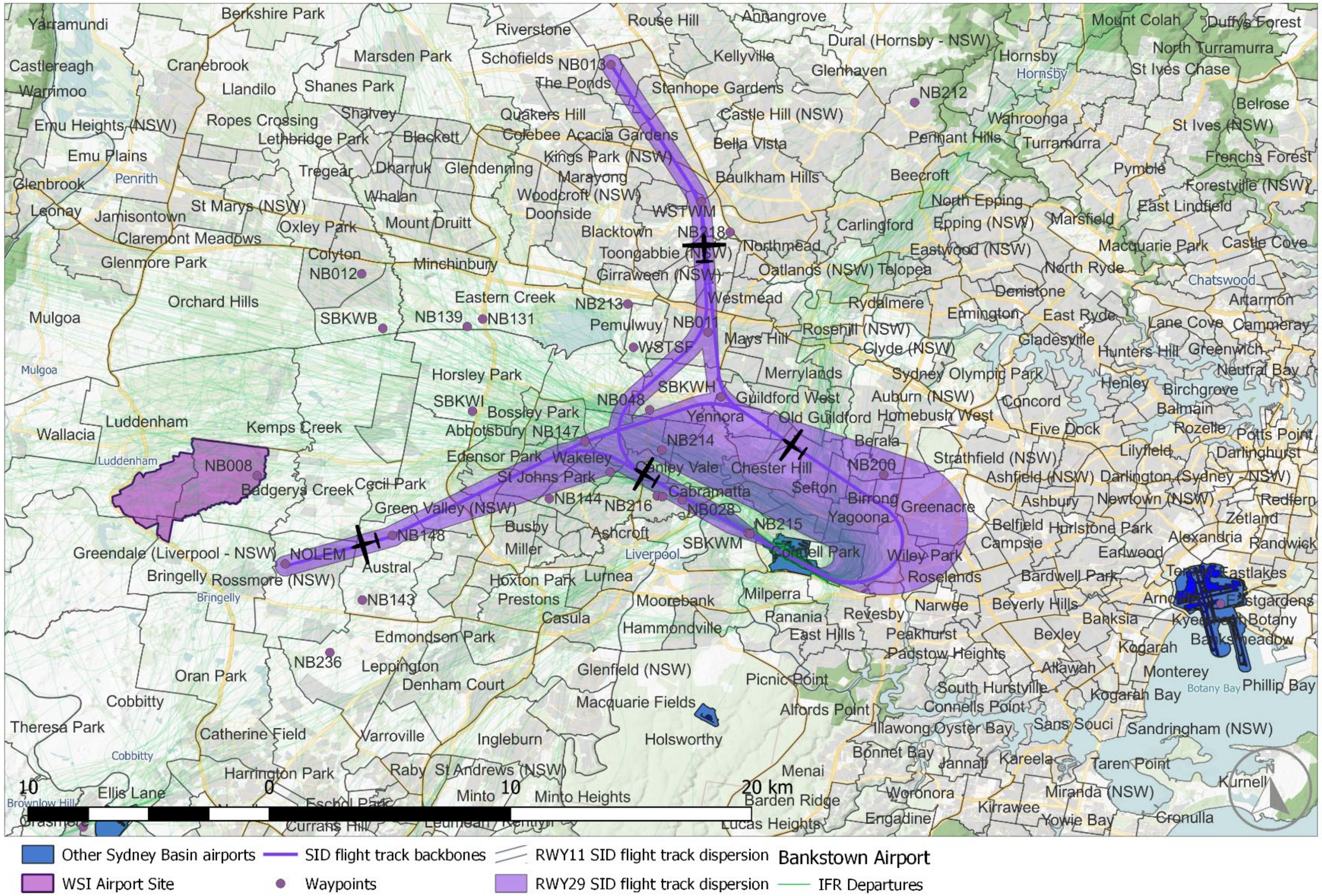


Figure 21.21 Proposed SIDs at Bankstown Airport – current (green) versus future track dispersion with suburb overlay

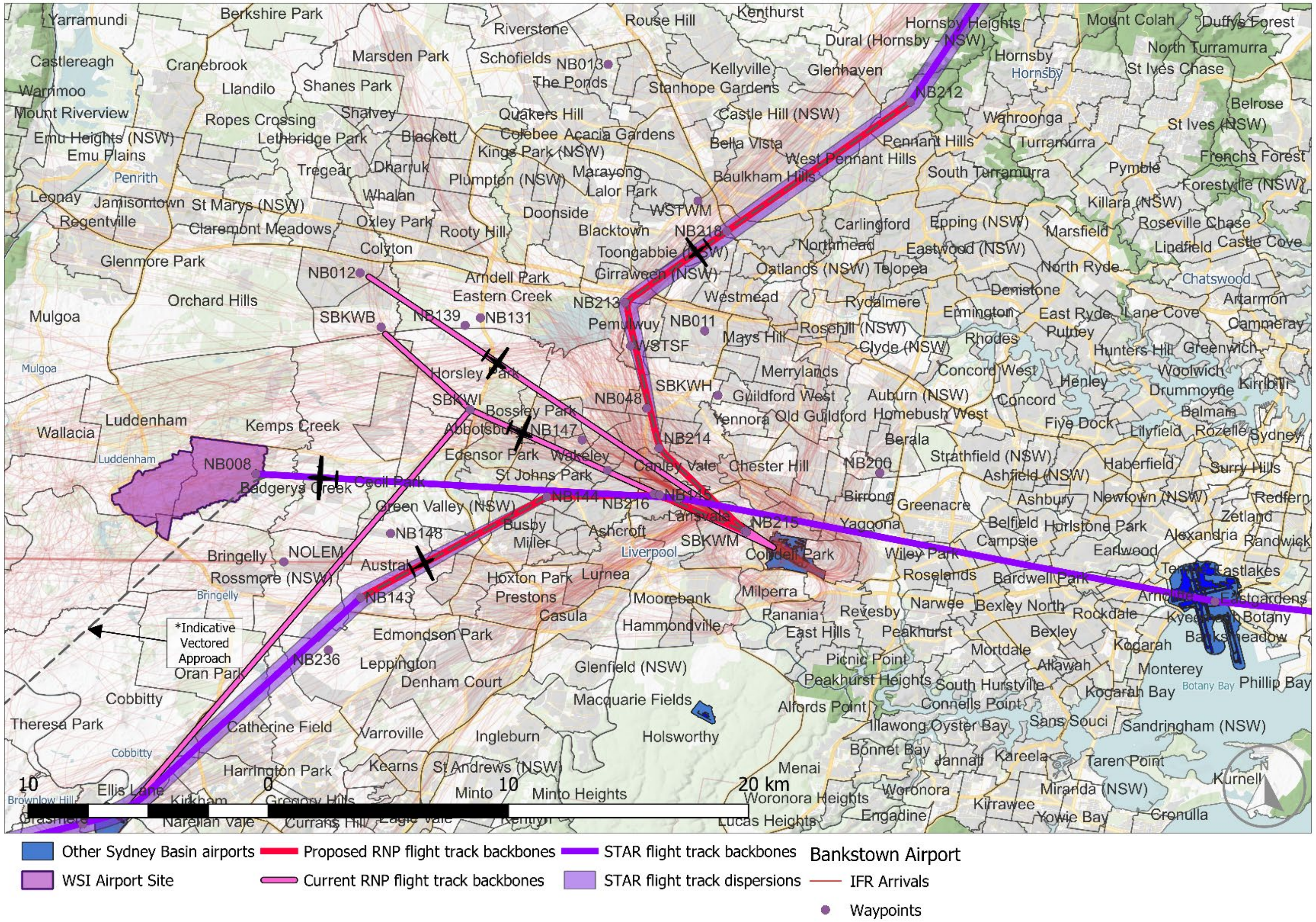


Figure 21.22 Proposed STARs at Bankstown Airport and integrated RNP approaches – Current (red) versus Proposed track dispersion with suburb overlay

The assessment found that:

- The area overflown by the proposed new SIDs and STARs for Bankstown Airport IFR operations is already frequently overflown with similar aircraft undertaking both IFR and VFR flights. Due to the close proximity of WSI, it is expected that IFR aircraft operating to and from Bankstown Airport would more frequently fly the new IFR procedures than is currently the case. This would result in an increased frequency and concentration of overflight, particularly for arriving aircraft. In the case of departures, air traffic control radar vectoring would provide some dispersion around the SID track
- The changes to IFR procedures would result in new areas close to Bankstown Airport being subjected to overflight by aircraft undertaking IFR operations and flying at relatively low altitudes. Noise generated by representative aircraft at various phases of flight are provided in Table 21.6 and Table 21.7. Noise generated by aircraft can also vary between aircraft, or due to other factors such as pilot technique, different meteorological conditions, and/or lateral distance between the on-ground receiver and the aircraft
- Given the variability of the departure points and the subsequent routes flown to connect with the STARs it is not possible to accurately estimate any track mile or emissions savings or increases. The south-western SID almost replicates the current IFR departure track to the south-west and as such no track distance differences are expected. The SID to the north-west will require some aircraft (particularly with destinations to the west) to fly a slightly increased track distance of less than 1 nm (2 km)
- In terms of visual amenity:
  - there will be increased visibility of aircraft on the 2 SID transitions, north-west and south-west. However, the coverage and random nature of the current significant number of flight operations as shown in Figure 21.21, particularly in the vicinity of Bankstown Airport would result in difficulty by observers on the ground to distinguish from a visual perspective, their origin or destination airport. Radar vectoring of IFR departures may take place prior to aircraft reaching the end point of the proposed new SIDs
  - aircraft on the transition from an enroute flight path via the proposed RNPs approaches will be visible on these new STARs. However not all aircraft will fly the relevant STAR and RNP approach. These aircraft, not on a STAR, but radar vectored, would be visible in the areas that are currently overflown by arriving IFR aircraft to Bankstown Airport
  - the minor change in alignment between the existing RNP final approach path and the 2 proposed new RNP final approach paths is sufficiently small that no change in visual amenity is anticipated for IFR operations within the Bankstown control zone.

Table 21.6 Bankstown Airport – predicted average overflight noise levels in dB(A) at SID waypoints

Flight altitude less terrain height	Waypoint	Aircraft	Noise level (L_{Amax})[1]	
			Level flight	Climb flight
1,450 ft	SBKW, WSTWM, NB013, SBKWH, NB147, NB011	Single engine propeller (Cessna Skyhawk)	63 dB(A)	66 dB(A)
		Twin-engine propeller (Beechcraft Baron)	74 dB(A)	77 dB(A)
		Twin turbo-prop (Saab 340)	73 dB(A)	75 dB(A)
		Jet (Cessna Business jet)	76 dB(A)	80 dB(A)
2,450 ft	NB147, NB148	Single engine propeller (Cessna Skyhawk)	56 dB(A)	60 dB(A)
		Twin-engine propeller (Beechcraft Baron)	68 dB(A)	71 dB(A)
		Twin turbo-prop (Saab 340)	67 dB(A)	69 dB(A)
		Jet (Cessna Business jet)	68 dB(A)	dB(A)

1. The dB(A) values represent a median value that has a range of plus or minus 3 dB(A) – i.e. 50 dB(A) would indicate potential overflight noise of between 47 and 53 dB(A).

Table 21.7 Bankstown Airport – predicted average overflight noise levels in dB(A) at STAR waypoints

Flight altitude less terrain height	Waypoint	Aircraft	Noise level (L_{Amax})[1]	
			Level flight	Descent flight
1,250 ft to 1,800 ft [2]	NB145, NB214, NB218, NB213, NB217, BEROW, NB212, NB144, NB143	Single engine propeller (Cessna Skyhawk)	65–60 dB(A)	59–55 dB(A)
		Twin-engine propeller (Beechcraft Baron)	76–72 dB(A)	71–66 dB(A)
		Twin turbo-prop (Saab 340)	75–71 dB(A)	72–68 dB(A)
		Jet (Cessna Business jet)	79–73 dB(A)	71–66 dB(A)
2,250 ft to 2,280 ft	RASKO, NB235 (in ascending order)	Single engine propeller (Cessna Skyhawk)	57 dB(A)	52 dB(A)
		Twin-engine propeller (Beechcraft Baron)	68 dB(A)	64 dB(A)
		Twin turbo-prop (Saab 340)	67 dB(A)	64 dB(A)
		Jet (Cessna Business jet)	69 dB(A)	62 dB(A)
3,000 ft	MEPIL	Single engine propeller (Cessna Skyhawk)	54	49
		Twin-engine propeller (Beechcraft Baron)	66 dB(A)	60 dB(A)
		Twin turbo-prop (Saab 340)	65 dB(A)	60 dB(A)
		Jet (Cessna Business jet)	66 dB(A)	58 dB(A)

1. The dB(A) values represent a median value that has a range of plus or minus 3 dB(A) – i.e. 50 dB(A) would indicate potential overflight noise of between 47 and 53 dB(A).
2. The upper and lower range has been provided. Predicted average noise levels at each waypoint is provided in Technical paper 13, Appendix G.

21.5.3 Group C

21.5.3.1 Sydney (Kingsford Smith) Airport – AKMIR STAR

This section relates to the proposed AKMIR STAR for non-jet arrival operations from the south and west as presented in Section 8.2.2.1 of Chapter 8 (Facilitated changes). The key assessment findings are depicted by the track dispersion with suburb overlay results in Figure 21.23.

The key findings are:

- The AKMIR STAR is predicted to be used up to 60 non-jet and 3 jet flights per day with only slight increases in these flight numbers over the initial 5 years of WSI operations. The limited number of jet aircraft via the AKMIR STAR are expected to be at a similar altitude as non-jet aircraft when overhead the AKMIR waypoint.
- By displacing the AKMIR STAR flight path up to 3.2 nm (5.9 km) south of the existing ODALE STAR a new area would be overflown by non-jet aircraft and the very limited number of jets that utilise the STAR. The new AKMIR STAR flight path re-joins the existing ODALE STAR flight path at waypoint MITSA, from where current procedures would be maintained to land on all the Sydney (Kingsford Smith) Airport runways.
- Noise levels at 60 dB(A) or more do not extend to waypoint MITSA from the airport. Noise levels extracted from the NPD charts for representative aircraft at the waypoints is provided in Table 21.8. Noise generated by aircraft can also vary between aircraft, or due to other factors such as pilot technique, different meteorological conditions, and/or lateral distance between the on-ground receiver and the aircraft.

- The deviation of the proposed AKMIR STAR from the current ODALE STAR represents an increased arrival distance of approximately 1 nm (2 km). This would mean a representative non-jet aircraft type, the Dash-8 400 operating a 250 nm (463 km) regional route, is projected to use an extra 5.5 kilograms (kg) of fuel emitting approximately 17.3 kg of CO_2 per movement. For jet aircraft like the Boeing B737-800, around 22 kg of CO_2 would be emitted per movement.
- As is the case with the current ODALE STAR, all aircraft arriving via the AKMIR STAR would be radar vectored to their final approach. This vectoring normally commences after MITSA.
- In terms of visual amenity:
  - due to the lateral difference between the current ODALE STAR and the proposed AKMIR STAR (refer to Figure 21.23) the aircraft (predominantly turbo-prop aircraft) that are currently visible between waypoints AKMIR and MITSA on the ODALE STAR flight path will no longer be as visible in that piece of airspace. Aircraft operating to and from Bankstown and Camden Airports will still be visible in this area
  - the proposed AKMIR STAR has a flight path corridor between AKMIR and MITSA which at its maximum is around 3.2 nm (5.9 km) south of the current ODALE STAR flight path. Aircraft on descent above 9,000 ft (2.7 km) using this flight path will be newly visible from the ground. But due to a lifting of the altitude requirement on the AKMIR STAR by 2,000 ft (610 m) aircraft will be perceptibly higher than aircraft at a similar distance from Sydney (Kingsford Smith) Airport on the current ODALE STAR.

Table 21.8 Sydney (Kingsford Smith) Airport - predicted average overflight noise levels in dB(A) at AKMIR STAR waypoints

Flight altitude	Waypoint	Aircraft	Noise level (L_{Amax})[2]
19,000 ft – 16,000 ft[1]	AKMIR	B777-300 widebody twin-jet	47 dB(A)
		Boeing 737-800 – Narrowbody twin-jet	43 dB(A)
		Saab 340 – regional twin turbo-prop	39 dB(A)
11,000 ft	NB285	B777-300 widebody twin-jet	53 dB(A)
		Boeing 737-800 – Narrowbody twin-jet	46 dB(A)
		Saab 340 – regional twin turbo-prop	44 dB(A)
9,000 ft	MITSA	B777-300 widebody twin-jet	57 dB(A)
		Boeing 737-800 – Narrowbody twin-jet	49 dB(A)
		Saab 340 – regional twin turbo-prop	47 dB(A)

1. Jets and turbo-props are assumed to be at 19,000 ft in descent, and turbo-props at 16,000 ft in cruise
2. The dB(A) values represent a median value that has a range of plus or minus 3 dB(A) – i.e. 50 dB(A) would indicate potential overflight noise of between 47 and 53 dB(A).

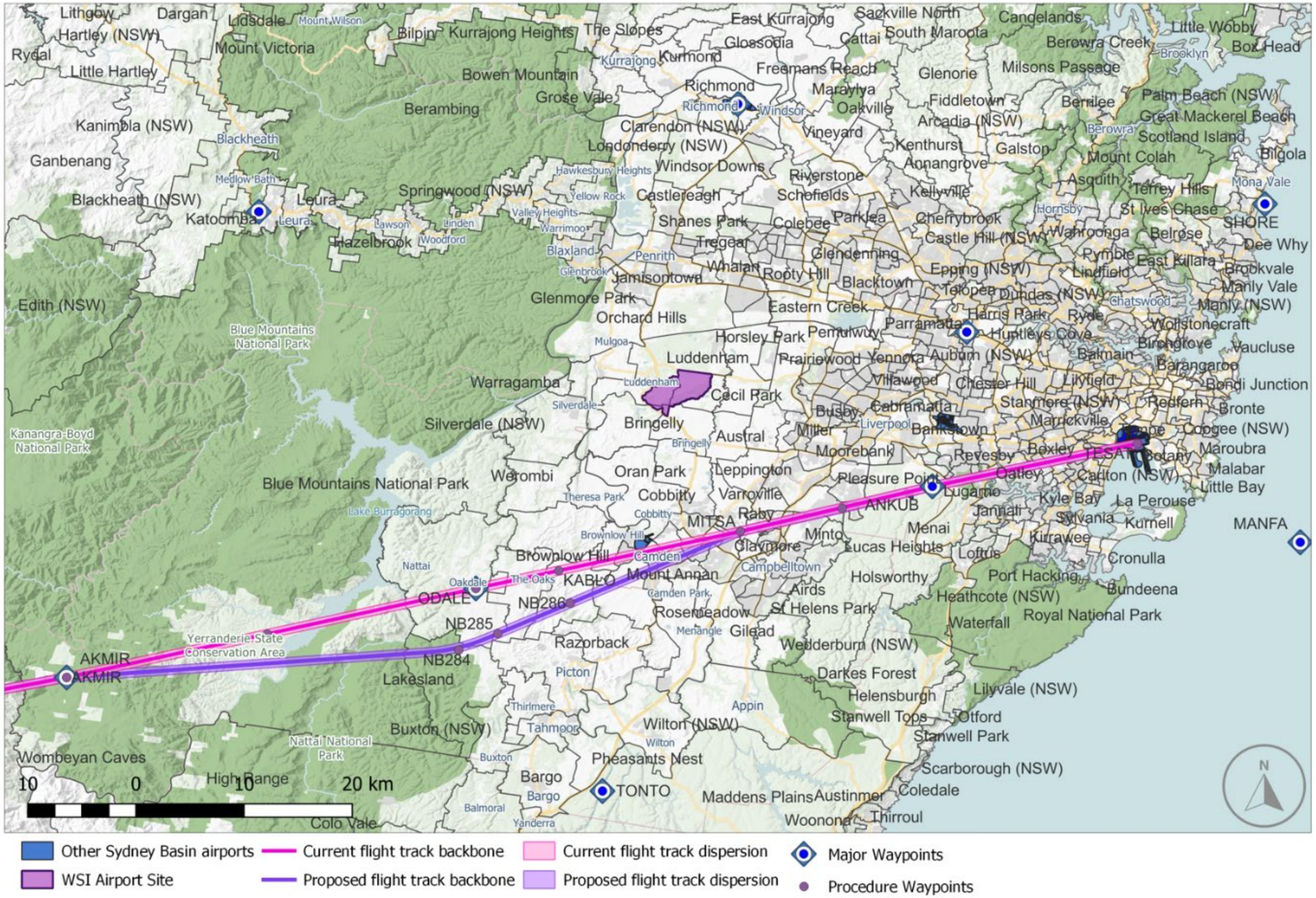


Figure 21.23 Sydney (Kingsford Smith) Airport – current and proposed AKMIR STAR with suburb overlay

21.5.3.2 Camden Airport IFR changes

This section relates to the proposed new STAR procedures for Camden Airport as presented in Section 8.4 of Chapter 8 (Facilitated changes). The key assessment findings are depicted by the suburb overlay results in Figure 21.24. More detailed information is provided in Appendix H of Technical paper 13.

As identified in Section 8.4.1, presently around 10 IFR movements operate to and from Camden Airport per day. Aircraft movements are expected to grow around one per cent per annum or less, based on the Camden Airport Master Plan. As such, IFR movements would remain very low into the future.

There would be little to no material change to current IFR operations at Camden Airport. Specifically:

- once past waypoint SCNWI, the new track to Camden Airport is the same as the current track (and is not subject to assessment). Populated areas are to the east of SCNWI
- the area of change between the waypoint NB234 (at which aircraft must be below 6,000 ft (1.8 km)) and the waypoint NB235 at the commencement of the RNP new approach leg are already overflown at similar altitudes in the current operation. The very small number of aircraft adopting this procedure is not considered to be significant in overflight noise exposure
- noise generated by representative aircraft at various phases of flight at selected waypoints with an assumed vertical profile are provided in Table 21.9 (refer to Appendix H of Technical paper 13 for the full results). Noise generated by aircraft can also vary between aircraft, or due to other factors such as pilot technique, different meteorological conditions, and/or lateral distance between the on-ground receiver and the aircraft
- aircraft using these newly proposed STARs may also be subject to radar vectoring. It is anticipated that this would result in a dispersion of arrival traffic over the ground much the same as today for aircraft from the south and west, and not too dissimilar to today for aircraft from the east, north and north-west
- given the variability of the departure points and the subsequent routes flown to connect with the STARs it is not possible to accurately estimate any track mile or emissions savings or increases
- given that the area under the new STARs is already overflown by a mix of aircraft types (refer to Figure 21.5) and there are low numbers of IFR aircraft expected to use the STARs inside controlled airspace, which are largely west of the metropolitan area, the visual impact to communities in the Sydney Basin area is expected to be negligible.

Table 21.9 Predicted average overflight noise levels in dB(A) at STAR waypoints

Flight altitude less terrain height	Waypoint	Aircraft	Noise level[1]	
			Level flight	Descent flight
2,500 ft	NB059, NB235, SCNWI	Single engine propeller (Cessna Skyhawk)	57 dB(A)	52 dB(A)
		Twin-engine propeller (Beechcraft Baron)	68 dB(A)	62 dB(A)
3,600 ft	NB234	Single engine propeller (Cessna Skyhawk)	50 dB(A)	47 dB(A)
		Twin-engine propeller (Beechcraft Baron)	65 dB(A)	59 dB(A)
7,000 ft	WYATT	Single engine propeller (Cessna Skyhawk)	43 dB(A)	39 dB(A)
		Twin-engine propeller (Beechcraft Baron)	57 dB(A)	52 dB(A)
9,000 ft	NB008	Single engine propeller (Cessna Skyhawk)	53 dB(A)	48 dB(A)
		Twin-engine propeller (Beechcraft Baron)	41 dB(A)	36 B(A)

1. The dB(A) values represent a median value that has a range of plus or minus 3 dB(A) – i.e. 50 dB(A) would indicate potential overflight noise of between 47 and 53 dB(A).

Figure 21.24 Camden Airport – proposed IFR STARs with suburb overlay

21.5.3.3 RAAF Base Richmond departures and arrivals

This section relates to the new SID and STARs for departures and arrivals at RAAF Base Richmond as presented in Section 8.5 of Chapter 8 (Facilitated changes). The key findings are depicted by the track dispersion with suburb overlay results in Figure 21.25.

The assessment found:

- As no changes are proposed for the final approach or initial departure paths to Runway 10/28, there would be no change in noise or the local noise preferred procedures for aircraft operating at this airport. The proposed STARs have been designed to closely replicate the existing radar vectoring that currently occurs. These STARs are well north of the Sydney Basin, and/or at high altitudes. The new proposed eastern SID is expected to result in a similar track spread to current operations but at higher altitude.
- The area overflown by the proposed new SID and STARs is currently frequently overflown with similar aircraft undertaking both IFR and VFR flights (refer to Figure 21.2), and there is a predicted low utilisation of the proposed new SID and STARs by up to 15 flights per day.
- Aircraft with eastern or southern destinations currently fly a more direct route, and the proposed SID would increase track distances by around 51 nm (95 km) for an eastern destination and 55 nm (102 km) for a southern destination. For a Lockheed Super Hercules C130J-30; this would result in around 2.8 to 3 tonnes of CO_2 emissions per flight. However it is likely that air traffic control would radar vector aircraft with southern destinations, when safe to do so. This would reduce track miles and emissions. Given the uncertainty around the frequency of the northern STARs, changes in track miles cannot be estimated.
- In terms of visual amenity, aircraft would still be visible in the same locations on approach as in the current operation. These STARs in broad terms replicate the radar vectoring employed today and are all well north and west of the Sydney Basin. The high-altitude low use STAR from the east and the high-altitude low use SID would be visible to suburbs in proximity to the flight path when in use.

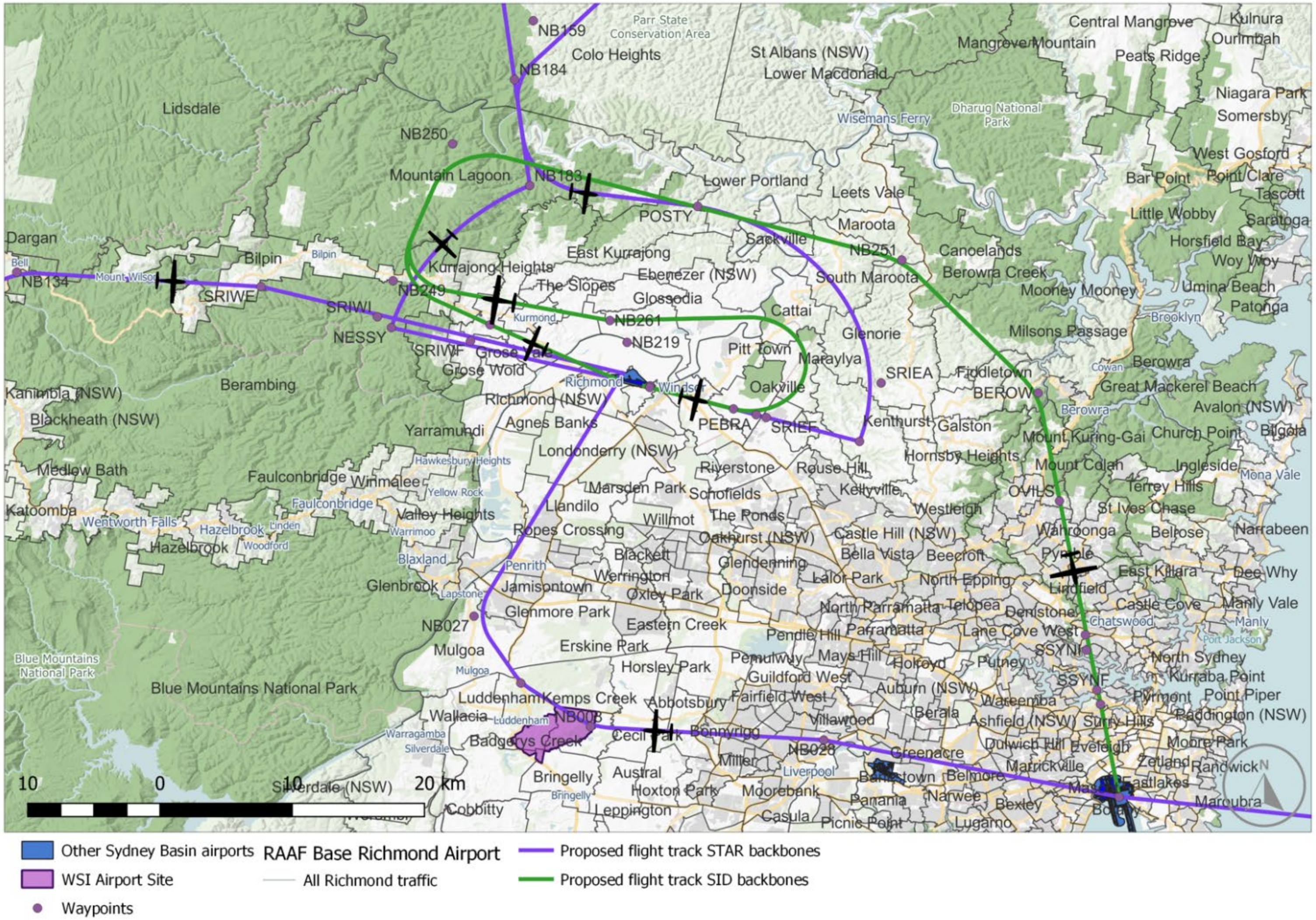


Figure 21.25 RAAF Base Richmond – proposed SID and STARs with suburb overlay

21.5.3.4 Miscellaneous and minor changes in the Sydney Basin

This section relates to the miscellaneous and minor changes at Sydney (Kingsford Smith) Airport (specifically, changes to RIVET and BOREE STARs, Runway 07 SIDs to the west and north-west, Runway 07 IAF) as well as Sydney Basin low altitude transit routes as presented in Section 8.2.2.2, Section 8.2.1.4, Section 8.2.1.5 and Section 8.7 of Chapter 8 (Facilitated changes).

The key findings are:

- The RIVET and BOREE STARs and Runway 07 IAF have no lateral or vertical change from the current procedures so there would be no change to the noise profiles. The proposed Runway 07 SIDs to the west and north-west are the same as the existing SID immediately after take-off from Runway 07, which is infrequently used (less than one per cent of the time). It would position aircraft above 10,000 ft (3 km) where aircraft would still be audible but not at levels considered to result in noise impacts. Aircraft operating on the procedure are expected to be considerably higher than the current radar vectored operation. This should deliver a reduction in overflight noise levels.
- The proposed western low altitude transit route for aircraft transiting north to south, or south to north at altitudes below 10,000 ft (3 km) is expected to be used by around 10 aircraft per day (in the absence of actual data). This transit route would be available 24-hours, 7 days a week, and used mostly by non-pressurised piston-engine aircraft. Indicative average overflight noise levels for aircraft in cruise (flying level at around an 80 per cent power setting) at an altitude of 5,000 ft (1.5 km) above sea level would be around 74 dB(A) at waypoint NB059 and around 63 dB(A) at RUTOS (by a Beechcraft “Baron” twin-engine propeller aircraft) (refer to Appendix J of Technical paper 13 for full results and assumptions). Aircraft could operate up to 10,000 ft (3 km) and would reduce the predicted noise levels.
- The proposed IFR transit route overhead WSI would be used at altitudes of 4,000 ft and above under air traffic control clearance. Depending on the altitude and aircraft, noise levels would vary. For Beechcraft “Baron” twin-engine propeller aircraft, noise could range from 77 dB (A) (at 1,000 ft (300 m)) to 60 dB(A) at 5,000 ft (1.5 km).
- Radar vectoring associated with the proposed adjusted RIVET and BOREE STARs, Runway 07 SIDs and Runway 07 IAF would remain and is consistent with current practice. Radar vectoring could also occur on the lower level transit route.
- There is little or no change expected to the current track distance and emissions when these proposed new minor changes are introduced. The proposed low altitude new western transit route may offer a reduction in track distances for some flights but have an increase for others.
- In general, with the exception of the RIVET and BOREE STARs, the areas overflown by the proposed minor adjustments are expected to have little use and are currently frequently overflown with similar aircraft undertaking both IFR and VFR flights (refer to Figure 21.2). Additionally:
  - there would not be any visual impacts associated with the RIVET and BOREE STARs and Runway 07 IAF, as these new procedures would not change the current procedures in terms of the lateral or vertical position of aircraft
  - the proposed Runway 07 SIDs to the west and north-west would be identical to the existing path over the eastern suburbs. Aircraft crossing the coastline at waypoint SHORE would be visible as aircraft track west at high altitudes, noting this flight path would be infrequently used
  - the proposed western low altitude transit route would have low visual impacts on areas overflown, given the small number of aircraft expected to use this route daily
  - the transit route over WSI would be visible and would mostly cross the WSI flight path at right angles.

21.5.3.5 VFR operations in the Sydney Basin airspace

This section relates to the proposed amendments to VFR operations in the Sydney Basin airspace as presented in Section 8.6 of Chapter 8 (Facilitated changes).

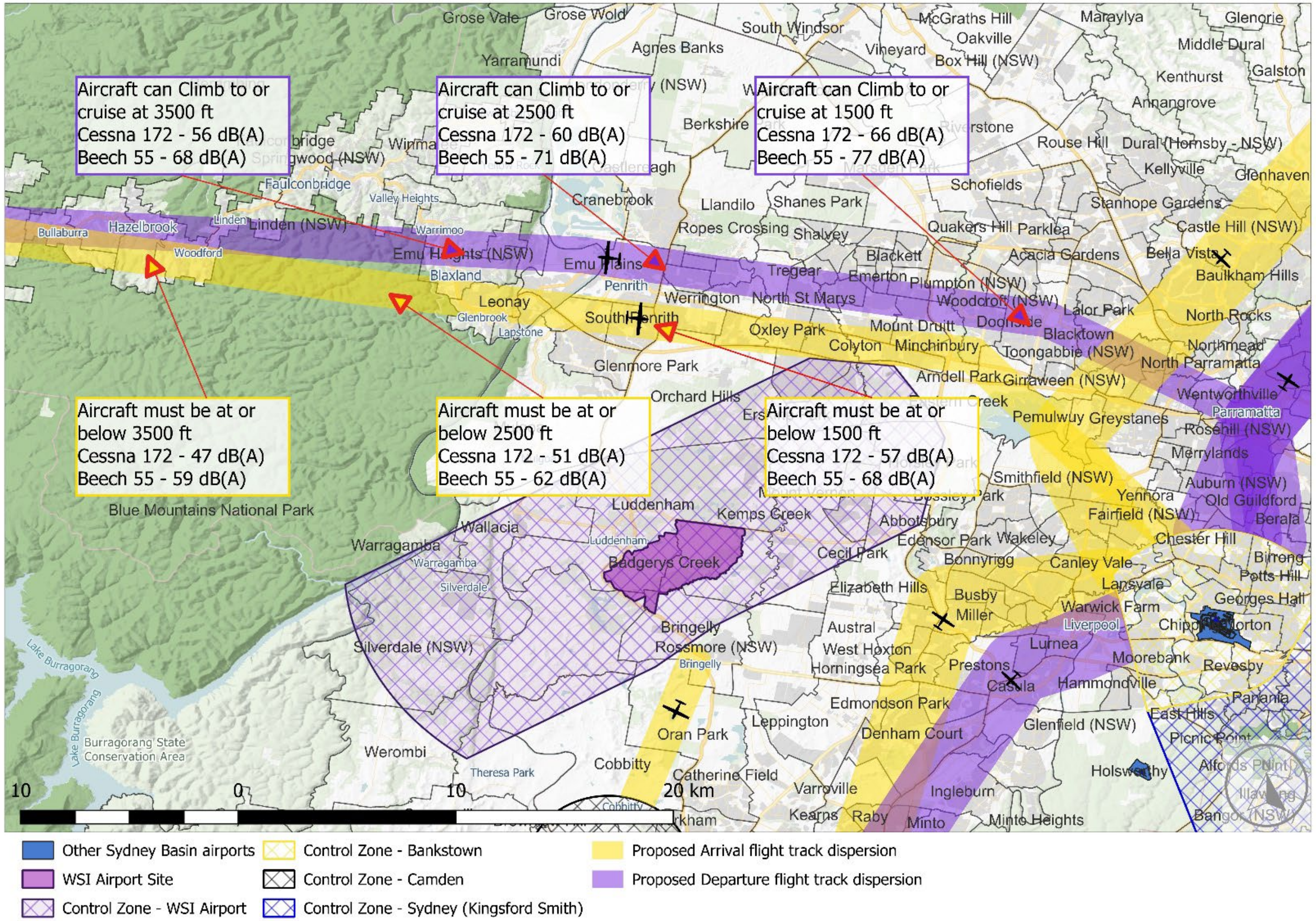
The assessment found that:

- Flying training activity is highly variable and potential overflight noise impacts from this activity cannot be accurately quantified in contrast with the presented potential impacts associated with the more predictable VFR travel flights. This is explained in detail in Appendix I of Technical paper 13.
- A significant component of circuit training activity and its associated impacts at both Bankstown and Camden Airports will not change and operations will continue consistent with current practice.
- The most constrained corridor for VFR travel flight operations between WSI and RAAF Base Richmond – limited in lateral extents and with only a 1,500 ft (460 m) operating limit for some of its extent, is expected to have less than 10 flights daily and with the low growth forecast predictions (approximately one per cent for both Bankstown and Camden Airports) should not constitute a significant impact to overflown areas on its implementation or into the future.
- The possible change in location for future flying training areas means that the pilots will need to be travel further to reach them which would translate to increased transit flight durations, extended training schedules and increased costs including increased flying training times and increased fuel maintenance costs. This is discussed further in Chapter 19 (Economic). As it is not possible to say how these organisations may choose to use the future possible flying training areas, changes to track distances and emissions from these VFR adjustments are difficult to estimate.
- In terms of visual amenity:
  - once WSI is operational the large number of aircraft that use the existing flying training areas over the WSI would have to relocate to other parts of the Sydney Basin. Flying training activity over the future possible flying training areas to the north of Bankstown and to the south of Camden would be visible from the ground
  - while already overflown currently, the compression of the available airspace for travel flights between WSI and Richmond restricted airspace would mean communities in this area would see the same types of aircraft that currently use this airspace but at lower altitudes (refer to Figure 21.26).

21.5.4 Impacts on biodiversity and MNES

It is anticipated that the facilitated changes will not significantly impact biodiversity and other MNES values as they will occur within areas already subject to, or close to, routine flight paths by similar aircraft types associated with the existing Sydney Basin (refer to Section 21.4). This is particularly the case where there is a predicted low utilisation of those SIDS and STARs and because there is a low growth forecast of only one per cent or less for these movements.

An exception to this is the changes to Bankstown Airport flight paths which may result in some areas being overflown that have not been previously overflown. Despite this, these flight paths occur in areas which are heavily disturbed in nature and are unlikely to introduce further risk or impacts than that assessed in Chapter 16 (Biodiversity) and Chapter 23 (Matters of National Environmental Significance).



Note: The dB(A) values presented the above figure should be considered as a median value of a range of plus or minus 3 dB(A) – i.e., 50 dB(A) would indicate potential overflight noise of between 47 and 53 dB(A).

Figure 21.26 Suburb overlay - NPD application example – VFR western arrivals and departures route