Dubbo Regional Airport Noise Modelling

Noise Modelling Final Report

Aviation Safety • Efficiency
Capacity • Environment

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Noise Modelling Final Report

Version 0.1

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5 May 2025	V 0.1	First draft	Jazmin Tweddle-O'Donnell Elvira Marques	Draft release to Dubbo Regional Council of final noise modelling outputs

Related Documents

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Dubbo Regional Airport Noise Modelling Input and Assumptions Document v0.2	Sections 1 and 2 of this document.

Document Review

Date	Version	Name	Title	Organisation
8 May 2025	V 0.1	Adam Webb	Senior Aviation Consultant	To70 Aviation
9 May 2025	V 0.1	Trent Kneebush	Senior Aviation Consultant	

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Name	Title	Organisation	Signature

Terms and Acronyms

Term or Acronym	Definition
AEDT	Aviation Environmental Design Tool
AIP	Aeronautical Information Package
ANEC	Australian Noise Exposure Concept
ANEF	Australian Noise Exposure Forecast
ARP	Aerodrome Reference Point
AWS	Automatic Weather Station
BITRE	Bureau of Infrastructure, Transport, Research Economics
BOM	Bureau of Meteorology
CAGR	Compound Annual Growth Rate
DAH	Designated Airspace Handbook
DEM	Digital Elevation Model
FIFO	Fly-In Fly-Out
HLS	Helicopter Landing Site
HN	Helipad North
HS	Helipad South
LA	Landings
NASF	National Airports Safeguarding Framework
N Contours	Number Above Contours
PA	Practice Approach
RFDS	Royal Flying Doctor Service
RPT	Regular Public Transport
RWY	Runway
SG	Stop and Go
SRTM	Shuttle Radar Topography Mission
TG	Touch and Go
TO	Take-Off
TWY	Taxiway

Contents

List of Figures

List of Tables

1 Introduction

To70 Aviation Australia (To70) was requested by Dubbo Regional Council to develop a 20-year forecast Australian Noise Exposure Concept (ANEC) and number-above contours (N-contours) for the planned extended 2,200-metre runway at Dubbo Regional Airport, and additional N-contours for current operations.

To70 produced the airport noise contours using Aviation Environmental Design Tool (AEDT) version 3e, the current version Airservices Australia (Airservices) uses for Australian Noise Exposure Forecast (ANEF) technical endorsement. AEDT is a computer noise prediction model developed by the U.S. Federal Aviation Administration for airport noise assessments worldwide and is used as standard in Australia.

This report outlines the methodology and key assumptions underpinning the noise modelling process, including the parameters employed in constructing the AEDT model.

1.1 ANEC scenarios

The draft ANEC developed for Dubbo Regional Airport includes the planned extension of runway 05/23 to 2,200 metres at the eastern end, and a 20-year air traffic movement forecast.

1.2 N-contour scenarios

N-contours were calculated based on two scenarios for Dubbo Regional Airport, this included:

- Current (2024) operations model with current runway configuration, and
- A 20-year forecast (2045) model with runway 05/23's 2,200 metre extension.

2 Inputs and Assumptions for ANEF Modelling

This section provides details of the general settings of the AEDT model as well as the inputs and assumptions used for the noise calculations.

Table 1 shows the inputs provided and Table 2 shows the source and approval for each assumption used in developing noise models. Assumptions are further detailed within this document.

Table 1: Provided Inputs

Description	Received from	Date
Avdata 2010-2024.xlsx	Dubbo Regional Council	30/01/2025
Australian Aircraft Activity 2014-2023.xlsx Airport Traffic Data 1985–86 to 2023–24—XLSX	Bureau of Infrastructure and Transport Research Economics	10/02/2025
Avdata 2019-2024.xlsx	Avdata Australia	10/02/2025
Flight Radar tracks	Flight Radar 24	02/04/2025

Table 2: Person responsible for assumptions

Section	Developed By	Data Used	Approved By
Helipad Coordinates	Dubbo Regional Council and To70	Flight Radar tracks and helicopter coordinates provided by Council	Matthew Linsley-Noakes
Aircraft Types	To70	Avdata 2019-2024.xlsx	Matthew Linsley-Noakes
Forecast	To70	Avdata 2010-2024.xlsx Avdata 2019-2024.xlsx Australian Aircraft Activity 2014-2023	Matthew Linsley-Noakes
Runway Usage	To70	Avdata 2019-2024.xlsx BOM Wind Rose data	Matthew Linsley-Noakes
Modelled Tracks	To70	Flight Radar & Airservices Circuit Diagram	Matthew Linsley-Noakes
Day/Night Split	To70	Avdata 2019-2024.xlsx	Matthew Linsley-Noakes

2.1 General Settings

2.1.1 Aerodrome Reference Point (ARP)

The Dubbo ARP was taken from the Airservices Aeronautical Information Package (AIP) and is shown below in Table 3.

Table 3: ARP

Description	Latitude	Longitude	Elevation (ft)
ARP	-32.216667	148.574722	935

2.1.2 Runway and Helipad Coordinates

Runway coordinates were taken from the Airservices Aeronautical Information Package (AIP) Designated Airspace Handbook (DAH). For the extended runway, the estimated coordinates were determined by extending the existing runway 23 by 492 meters to the north-east. The runway end coordinates for current operations are shown in Table 4 and the 20-year forecast in Table 5.

Table 4: Runway end coordinates for current operations

Description	Latitude	Longitude	Length x Width (m)	Elevation (ft)
Runway 05	-32.2228	148.56884	1708 x 45	934
Runway 23	-32.21369	148.58346		901
Runway 11	-32.21436	148.57344	1067 x 18	909
Runway 29	-32.21904	148.58335		925

Table 5: Runway end coordinate for 20-year forecast

Description	Latitude	Longitude	Length x Width (m)	Elevation (ft)
Runway 05	-32.2228	148.56884	2200x 45	934
Runway 23 Extension	-32.2110735702	148.58767520		901
Runway 11	-32.21436	148.57344	1067 x 18	909
Runway 29	-32.21904	148.58335		925

Dubbo Regional Council identified five helicopter landing sites (HLS) around the airport, shown in Figure 1. However, flight tracks sourced from Flight Radar 24 showed a variation of HLS, as shown in Figure 2. To70 and the Council agreed to utilise two primary helipad locations: Helipad North (HN) and Helipad South (HS), shown in Figure 2, where flight track data is concentrated. HN is based on the concentration of flight radar tracks near HLS 1 and accounts for those flights which utilise HLS3 and HLS4. HS is on the northern side of TWY B, where all helicopters pass through to locations HLS 2 and HLS 5. These sites align with helicopter operations as helicopters predominantly utilise the runways for take-off and landings. The helipad coordinates for AEDT are shown below in Table 6.

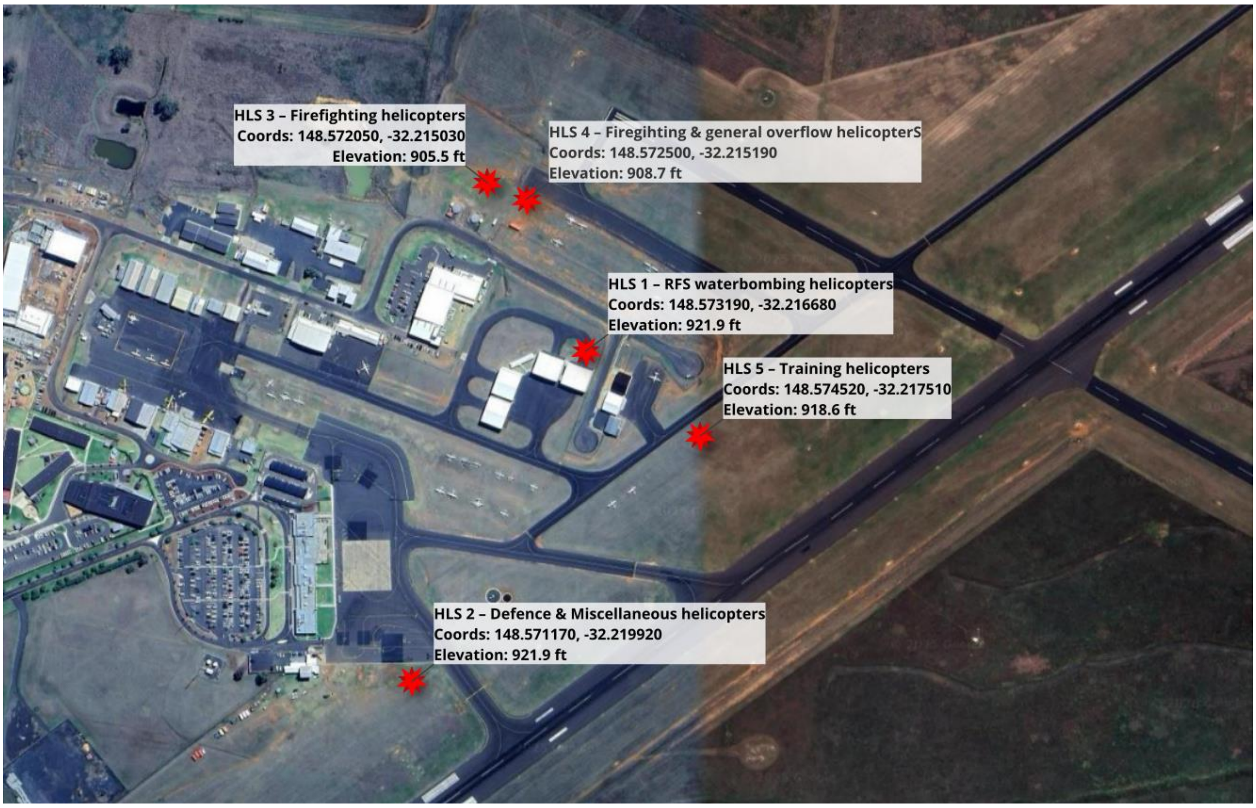


Figure 1: HLS from Dubbo Regional Airport

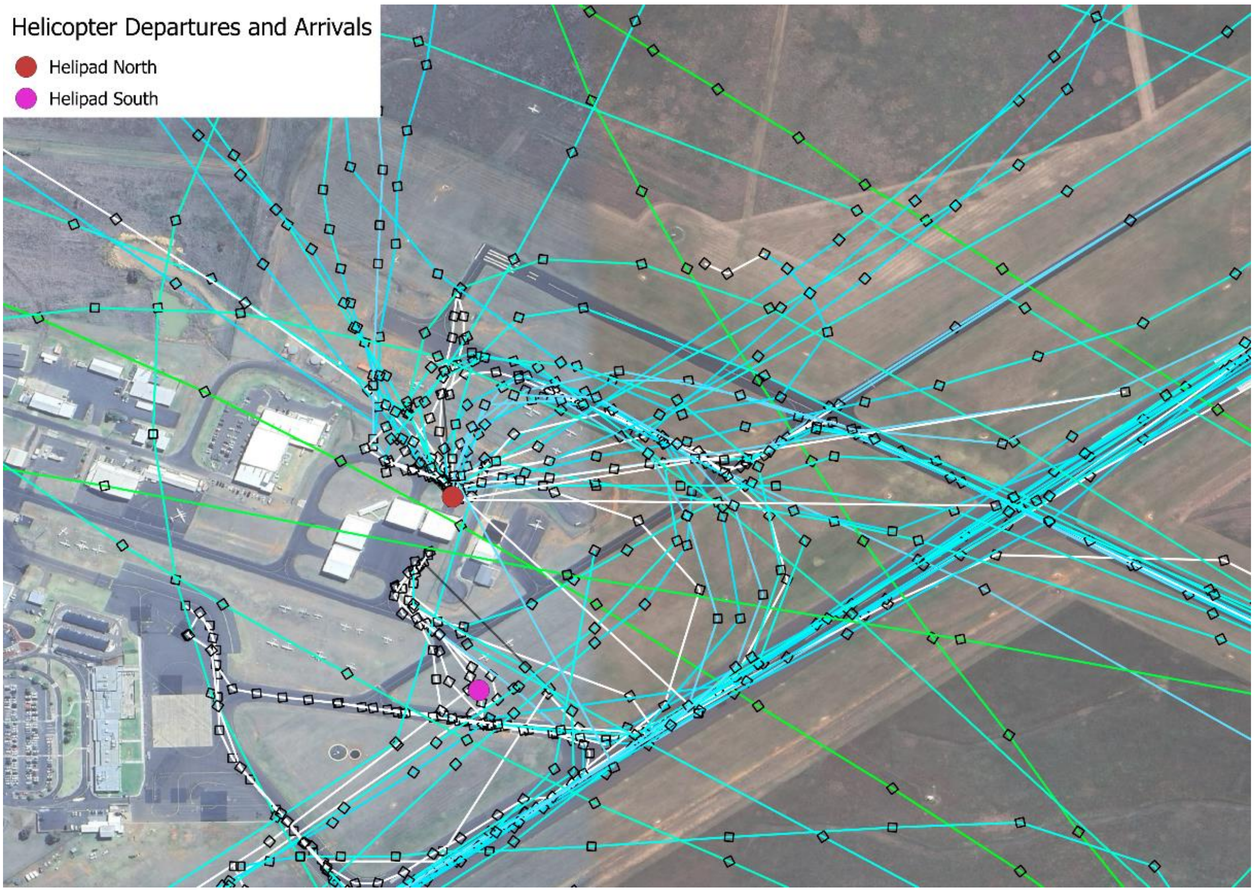


Figure 2: Helicopter departures and arrivals (Source: Flight Radar 24)

Table 6: Modelled helipad coordinates

Description	Latitude	Longitude	Elevation (ft)
HN	-32.21667263	148.57319736	921.9
HS	-32.21849511	148.57344637	921.9

2.1.3 Airport layout

The airport layout of Dubbo Regional Airport is shown below in Figure 3, as taken from the AIP as of 21 March 2025. According to the 2020 Master Plan and Strategic Plan, as shown in Figure 4, the airport plans to extend runway 05/23 to the north-east, reaching a total length of 2,200 metres. Therefore, the airport has requested that the noise modelling account for the scenario where the runway extension is completed.

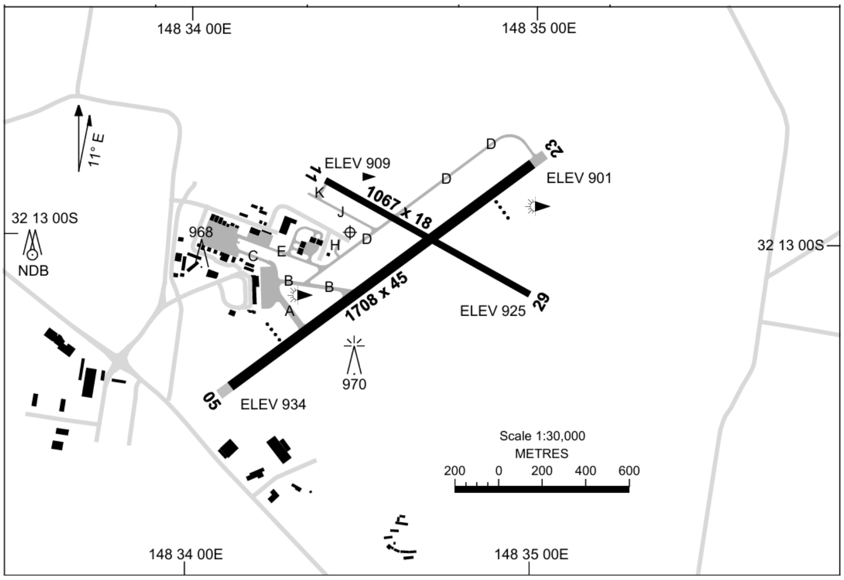


Figure 3: Dubbo Aerodrome Chart (Source: AIP, as of 21 March 2025)

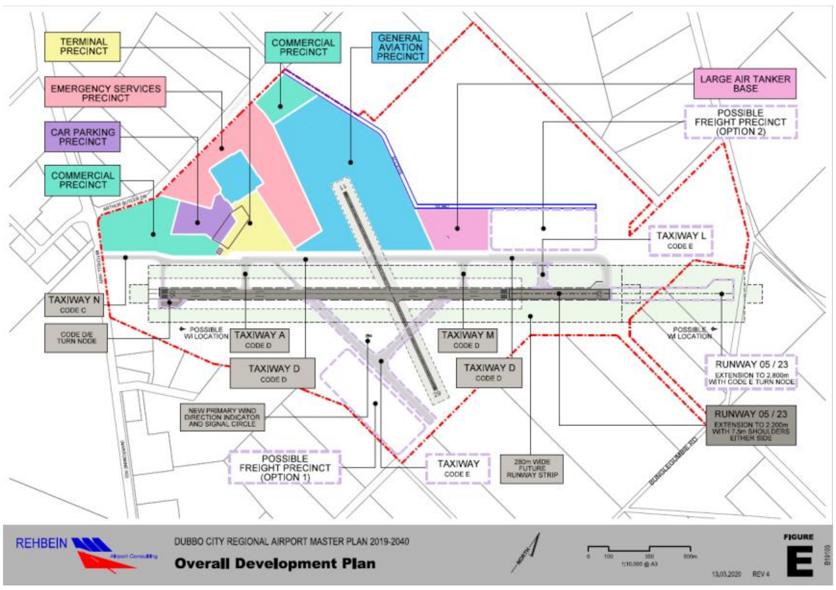


Figure 4: 05/23 runway extension as per 2020 Master Plan

2.1.4 Weather

The weather parameters were sourced from the Bureau of Meteorology (BOM) Dubbo Regional Airport Automated Weather Station (AWS), station 065070. To70 gathered the monthly average 09:00 and 15:00 (local time) weather observations for temperature, pressure, humidity, and wind from March 2024 to February 2025. The weather data collected was averaged over the twelve-month period to determine the weather setting input for AEDT, as is shown in Table 7.

Table 7: AEDT weather settings

Parameter	Value
Temperature	20.63°C
Pressure	1017.92 hPa
Relative Humidity	56.41%
Headwind	16.08 km/h

2.1.5 Terrain

Local terrain data (bare-earth digital elevation model or DEM) has been sourced from NASA's Shuttle Radar Topography Mission (SRTM) and was obtained through Geoscience Australia. The 1-second SRTM DEM-S data is then imported into AEDT as part of the modelling process.

2.1.6 Receptor set

To70 ran the ANEF with a receptor set with a spacing of 25m and a grid size of 10km by 10km.

2.2 Input and Assumptions

2.2.1 Traffic Forecast

Dubbo Regional Council provided To70 with aggregated flight information data for the period 2010-2024 and more detailed flight data for the period 2019-2024, both sourced from Avdata. To70 also utilised Bureau of Infrastructure, Transport, Research Economics (BITRE) Airport Traffic Data 1985–86 to 2023–24. The following analysis formulated the baseline of the forecast:

- The 2024 Avdata data contained 6,620 landings (LA) (excl. regular passenger transport (RPT), which was doubled to account for take-off (TO) to a total of 13,240 operations.
- The 2024 Avdata data showed 2,297 circuit operations for Dubbo Regional Airport.
- BITRE data showed 7,745 RPT operations for FY24.

Based on this data, Dubbo Regional Airport recorded 23,282 operations in 2024. To determine the number of movements, circuit operations were doubled; thus, the total number of movements for Dubbo Regional Airport in 2024 was 25,579. It is important to note that circuit operations include touch and go (TG), stop and go (SG), and practice approach (PA).

To meet the requirement for a 20-year forecast, To70 conducted an analysis approved by Dubbo Regional Council. This analysis utilised BITRE trends to determine compound annual growth rates. Due to differences between BITRE categories and those used for this noise model, Table 8 provides a detailed breakdown of the BITRE categories.

Table 8: BITRE Operation Category

Aviation Sector	Operation Category	Specific Operation Activity
Commercial air transport	Scheduled	International
		Domestic
		Scheduled Freight only
	Non-scheduled	Passenger transport charters
		Air ambulance
		Non-Scheduled Freight only
		Other commercial air transport
General Aviation	Aerial work	Agricultural spreading/spraying
		Agricultural mustering
		Agriculture - other
		Construction - sling loads
		Construction - other
		Photography
		Pipeline or powerline surveying
		Other surveying
		Observation and Patrol
		Search and rescue
		Policing
		Firefighting
		Advertising

		Other aerial work
	Own Use Business	Own business travel
	Instructional flying	Instructional flying - commercial
		Instructional flying - non-commercial
	Sport & pleasure flying	Glider towing
		Parachute dropping
		Aerobatics
		Joy flights/sightseeing charters
		Sport & pleasure flying
		Community service flights
		Other sport and pleasure flying
	Other flying	Test flights
		Ferry flights
		Other flights

The below assumptions were agreed to determine the CAGR shown in Table 9 to generate the 2045 forecast.

- **RPT:** To70 determined a CAGR of 2.5% for Dubbo Regional Airport based on the BITRE Airport traffic data from FY1985–86 to FY2023–24, using total movements from RPT only. To maintain consistency, the BITRE total movements figure for FY2024 was used as the baseline for the RPT forecast instead of Avdata figures.
- **General Aviation and Circuits**: Analysis of the BITRE Australian Aircraft Activity 2014–2023 data for landings in Australia within the General Aviation sector indicated a CAGR of 1.1%.
- **Military**: Due to limited data and the absence of discernible trends from Dubbo Regional Airport's Avdata, the 1.1% CAGR for General Aviation was applied to Military operations.
- **Aerial fire-fighting**: BITRE Australian Aircraft Activity 2014–2023 recorded a CAGR of 1.2% in landings for the Aerial Work category. Data on flying activity by VH-registered aircraft showed a CAGR of 4.3% for hours flown and 5.1% for landings specific to firefighting operations. Given the unpredictable nature of fire operations reflected in Dubbo Regional Airport Avdata, a CAGR of 1.8% was agreed upon to account for variable data.
- **Police:** BITRE Australian Aircraft Activity 2014–2023 recorded a CAGR of 1.2% for landings within the Aerial Work category. Fluctuations in flying activity by VH-registered aircraft and a lack of discernible trends in Dubbo Regional Airport Avdata resulted in applying the same 1.2% growth rate.
- **Medical:** BITRE Australian Aircraft Activity 2014–2023 recorded a CAGR of 1.7% for landings within the Non-Scheduled category. Data on flying activity by VH-registered aircraft indicated a CAGR of 0.9% for hours flown and 1.9% for landings specific to medical activities. A growth rate of 1.7% was agreed upon.

Table 9: Operation Forecast CAGR

Operation Category	CAGR Applied
RPT	2.5%
General Aviation	1.1%
Military	1.1%
Circuits	1.1%

Fire	1.8%
Police	1.2%
Medical	1.7%

Figure 5 shows the total aircraft movement forecast and Table 10 provides the breakdown of the traffic forecast for current operations and 20-year forecast.

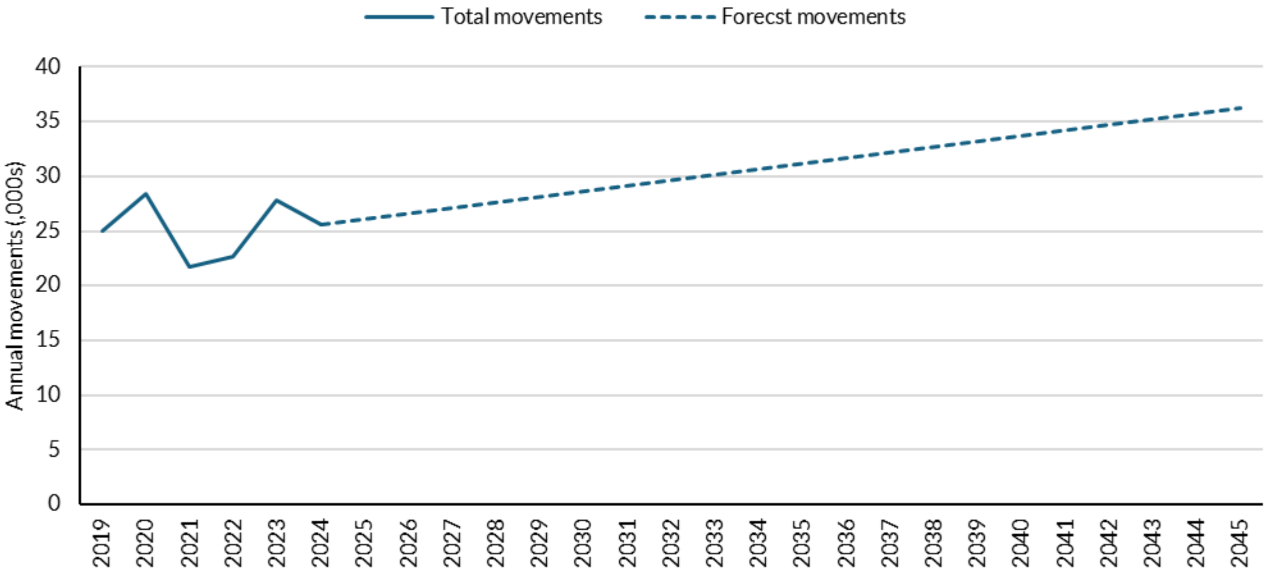


Figure 5: Graphical representation of forecast aircraft movements at Dubbo Regional Airport to 2045

Table 10: Traffic forecast current operations (2024) and 20-year forecast (2045)

Operation Category	2024	2045
RPT	7,745	13,008
General Aviation	7,530	9,476
Military	462	580
Circuits	2,297	2,860
Fire	428	620
Police	90	116
Medical	4,730	6,740
Total Operations	**23,282**	**33,400**
Total Movements	**25,579**	**36,260**

2.2.2 Aircraft selection

To70 analysed the Avdata data and established the aircraft count for Dubbo Regional Airport in 2024, as presented in Table 11. Using this data, To70 identified the most frequently occurring aircraft within each category based on percentage distributions. Adjustments were made to reflect anticipated changes in fleet composition for companies with publicly available plans. In cases with an extensive range of aircraft for a specific category, similar aircraft types have been grouped to simplify the forecasting.

Table 11: Raw 2024 aircraft type and count

Aircraft	2024 Count
SF34	2396
P28A	1447
BE20	1338
DH8D	1247
ULAC	802
PA31	464
B350	446
G115	375
C510	357
C172	353
C182	340
AC50	294
PC21	267
BE58	175
C310	121
SR22	121
E50P	105
C180	98
P28B	97
PC24	96
C82R	91
A139	90
B412	88
C525	74
PA32	73
AT8T	73

Aircraft	2024 Count
COL4	4
RV10	4
BE30	4
P28T	4
C152	4
DH8	4
DHC2	4
JAB4	3
UH1	3
TB20	3
R66	3
C402	3
P28S	3
PA38	3
EC30	3
TBM8	3
P46T	3
PA22	3
SW4	2
AC11	2
C30J	2
RV14	2
M5	2
XL2	2
C404	2
COL3	2

C208	70
BE33	64
S22T	62
PA24	62
BE36	61
P68	57
C150	56
P32R	49
C210	48
C82S	48
PA30	47
DH8C	46
AT5T	45
PC12	44
DA40	43
R44	42
AS50	41
CJ6	38
RJ85	35
HROC	31
SAAB	29
P28R	29
R22	26
T210	26
C337	25
(blank)	24
B06	24
BE55	20
M20P	18
C303	16
C560	15
SS2T	15
RV7	14

C25A	2
C340	2
GLAS	2
RV4	2
BE9L	2
C441	2
GLF6	2
CL60	2
SLG4	2
PA25	2
EC35	2
B214	1
P210	1
LNCE	1
C27J	1
C72R	1
P51	1
K100	1
DHC6	1
C140	1
DV20	1
BE50	1
B190	1
HELI	1
C175	1
JS32	1
EC20	1
LNC2	1
C82T	1
B505	1
A109	1
P180	1
EC45	1

C206	13
RV6	12
B105	12
LNC4	12
AEST	10
TRF1	10
DA42	10
T206	9
AA5	9
PA18	9
AA1	8
FA7X	8
C185	8
BE76	7
SM19	7
RV8	7
PA34	7
SR20	7
B407	6
MUS2	6
C414	6
CT4	6
TBM7	6
PA46	6
CH7B	6
BL8	6
ZZZZ	6
C77R	5
B429	5
E55P	5
H60	5
D6SL	5
BE35	5

DA62	1
F406	1
DH87	1
F7X	1
BE95	1
F900	1
RV9	1
CC11	1
C195	1
CH30	1
SF50	1
G200	1
L39	1
PTS2	1
C205	1
GA6C	1
C421	1
GL7T	1
M7	1
C177	1
MXS	1
GLEX	1
TOUR	1
ROK	1
TWEN	1
B212	1
DG1T	1
RV12	1
YK55	1
GLST	1
A119	1
H25B	1
H47	1

Table 12 and Table 13 show the aircraft and helicopters selected for the AEDT model for each operation category and the associated operation count for the ANEC for current operations and 2045, respectively. There have been some specific assumptions made for aircraft selection and split including:

- Vans RV-7 has been used represent general ultralight aircraft,
- No PC-21 is available in AEDT therefore a PC-12 has been substituted,
- High utilisation of the B200 and B300 has been assumed for medical flights, following fleet planning information shared by the RFDS, and
- The introduction of large firefighting aircraft, including the C130 and 737-300 with the provision of the runway extension.

RPT aircraft were selected based on current and future fleet plans for Qantas, Link Airways, Rex, and fly-in fly-out (FIFO) operations and developed in consultation with the Airport. This includes the following assumptions:

- Qantas retiring all Dash-8 models except the Dash 8- 400 series and the introductions of the Airbus A220,
- Rex Airlines Memorandum of Understanding to cooperate in studying optimised solutions for the replacement and modernisation of its fleet with ATR, and
- The Fokker 70 has been introduced for potential of FIFO operations following the completion of the runway extension.

AEDT has limited helicopters with P-weighted noise data, which is required for the ANEF. Thus, the following substitutions have been made:

- Bell 427 substitute of the Airbus Helicopters Bo 105,
- Bell 430 substitute of the Bell 412, Chinooks, SIKORSKY UH-60 Black Hawk, Bell 412, AW139, and
- Eurocopter EC130 substitute of the AEROSPATIALE AS-350 Ecureuil.

Table 12: Current operations AEDT model aircraft types and operations breakdown

Type of operation	Aircraft	Aircraft share within type of operations	Number of operations
RPT (33.3%)	Bombardier de Havilland Dash 8 Q300	2%	155
	Bombardier de Havilland Dash 8 Q400	30%	2,324
	Saab 340-B-Plus	58%	4,492
	Cessna 310	3%	232
	Piper PA-31 Navajo	7%	542
Fire (1.8%)	Cessna CitationJet CJ/CJ1 (Cessna 525)	16%	68
	British Aerospace Avro RJ85	23%	98
	Air Tractor AT-802F	20%	86
	Rockwell Turbo Commander 690	6%	26
	Raytheon Super King Air 300	1%	4
	Beechcraft Bonanza 36/A36	1%	4
	Bell 427	2%	9
	Bell 430	18%	77
	Eurocopter EC-130	7%	30
	Bell B-206 JetRanger	2%	9

	Bell 407	4%	17
Medical (20.3%)	Raytheon Super King Air 300	23%	1,088
	Raytheon Super King Air 200	55%	2,602
	CESSNA CITATION 510	12%	568
	Pilatus PC-24	2%	94
	Piper PA-31 Navajo	2%	94
	Bell 430	6%	284
Military (2.0%)	Pilatus PC-12	77%	356
	Raytheon Super King Air 200	4%	18
	Raytheon Super King Air 300	2%	9
	Alenia C-27J	6%	28
	Falcon 7X	7%	33
	Lockheed C-130 Hercules	2%	9
	Bell 430	2%	9
Police (0.4%)	Cessna Caravan 208	87%	78
	Bell 429	13%	12
General Aviation (32.3%)	Beechcraft Bonanza 33 (FAS)	4%	300
	Cirrus SR22 Turbo (FAS)	5%	376
	Cessna 182	12%	904
	Cessna 210 Centurion	3%	226
	Cessna 172 Skyhawk	10%	752
	Piper PA-28 Cherokee Series	26%	1,957
	Piper PA-32 Cherokee Six	3%	226
	Rockwell Twin Commander 500	8%	602
	Raytheon Beech Baron 58	5%	376
	Cessna 421 Piston	2%	151
	Vulcanair P.68	2%	151
	Piper PA-31 Navajo	3%	226
	Vans RV-7	3%	226
	Cessna Caravan 208	2%	151
	Pilatus PC-12	2%	151
	ATI AT-502	2%	151
	Embraer Phenom 300 (EMB-505)	2%	151
	Cessna CitationJet CJ/CJ1 (Cessna 525)	2%	151
	Robinson R44 Raven / Lycoming O-540-F1B5	2%	151
	Eurocopter EC-130	2%	151
Circuits (9.9%)	Piper PA-28 Cherokee Series	39%	896
	Cessna 172 Skyhawk	23%	528
	Cessna 182	3%	69
	Beechcraft Bonanza 33 (FAS)	3%	69
	Piper PA-32 Cherokee Six	2%	46
	Vans RV-7	27%	620

	Raytheon Beech Baron 58	3%	69
Total			23,282

Table 13: 2045 AEDT model aircraft types and operations breakdown

Type of operation	Aircraft	Aircraft share within type of operations	Number of operations
RPT (38.9%)	Airbus A220-100	2%	208
	Bombardier de Havilland Dash 8 Q400	28%	3,642
	Saab 340-B-Plus	29%	3,772
	ATR 42-600	29%	3,772
	Cessna 310	3%	390
	Piper PA-31 Navajo	7%	912
	Fokker F70	2%	312
Fire (1.9%)	Lockheed C-130 Hercules	4%	26
	Boeing 737-300 Series Freighter	4%	26
	BAE 146-RJ85	18%	112
	Cessna CitationJet CJ/CJ1 (Cessna 525)	16%	100
	ATI AT-802	20%	124
	Rockwell Twin Commander 690	2%	12
	Raytheon Super King Air 300	3%	18
	Bell 427	2%	12
	Bell 430	18%	111
	Eurocopter EC130	7%	43
	Bell 206B-3	2%	12
	Bell 407	4%	24
Medical (20.2%)	Raytheon Super King Air 300	25%	1,685
	Raytheon Super King Air 200	55%	3,707
	CESSNA CITATION 510	10%	674
	Pilatus PC-24	2%	135
	Piper PA-31 Navajo	2%	135
	Bell 430	6%	404
Military (1.7%)	Pilatus PC-12	77%	446
	Raytheon Super King Air 200	4%	23
	Raytheon Super King Air 300	2%	12
	Alenia C-27J	6%	35
	Falcon 7X	7%	40
	Lockheed C-130 Hercules	2%	12

	Bell 430	2%	12
Police (0.3%)	Cessna Caravan 208	87%	101
	Bell 429	13%	15
General Aviation (28.4%)	Beechcraft Bonanza 33 (FAS)	4%	378
	Cirrus SR22 Turbo (FAS)	5%	474
	Cessna 182	12%	1,136
	Cessna 210 Centurion	3%	284
	Cessna 172 Skyhawk	10%	948
	Piper PA-28 Cherokee Series	26%	2,462
	Piper PA-32 Cherokee Six	3%	284
	Rockwell Twin Commander 500	8%	758
	Raytheon Beech Baron 58	5%	474
	Cessna 421 Piston	2%	190
	Vulcanair P.68	2%	190
	Piper PA-31 Navajo	3%	284
	Vans RV-7	3%	284
	Cessna Caravan 208	2%	190
	Pilatus PC-12	2%	190
	ATI AT-502	2%	190
	Embraer Phenom 300 (EMB-505)	2%	190
	Cessna CitationJet CJ/CJ1 (Cessna 525)	2%	190
	Robinson R44 Raven / Lycoming O-540-F1B5	2%	190
	Eurocopter EC-130	2%	190
Circuits (8.6%)	Piper PA-28 Cherokee Series	39%	1,115
	Cessna 172 Skyhawk	23%	658
	Cessna 182	3%	86
	Beechcraft Bonanza 33 (FAS)	3%	86
	Piper PA-32 Cherokee Six	2%	57
	Vans RV-7	27%	772
	Raytheon Beech Baron 58	3%	86
Total			33,400

Table 14 and Table 15 show the average daily flight operations by aircraft type for current operations and 2045 forecast, respectively. The average daily flight operations are determined by dividing the number of operations by 365 days for each aircraft type.

Table 14: Current operation aircraft daily operations count

Aircraft	Daily Operations
Air Tractor AT-802F	0.23562

Alenia C-27J	0.07671
ATI AT-502	0.41370
Beechcraft Bonanza 33 (FAS)	1.01096
Beechcraft Bonanza 36/A36	0.01096
Bell 407	0.04658
Bell 427	0.02466
Bell 429	0.03288
Bell 430	1.01370
Bell B-206 JetRanger	0.02466
Bombardier de Havilland Dash 8 Q300	0.42466
Bombardier de Havilland Dash 8 Q400	6.36712
British Aerospace Avro RJ85	0.26849
Cessna 172 Skyhawk	3.50685
Cessna 182	2.66575
Cessna 210 Centurion	0.61918
Cessna 310	0.63562
Cessna 421 Piston	0.41370
Cessna Caravan 208	0.62740
CESSNA CITATION 510	1.55616
Cessna CitationJet CJ/CJ1 (Cessna 525)	0.60000
Cirrus SR22 Turbo (FAS)	1.03014
Embraer Phenom 300 (EMB-505)	0.41370
Eurocopter EC-130	0.49589
Falcon 7X	0.09041
Lockheed C-130 Hercules	0.02466
Pilatus PC-12	1.38904
Pilatus PC-24	0.25753
Piper PA-28 Cherokee Series	7.81644

Piper PA-31 Navajo	2.36164
Piper PA-32 Cherokee Six	0.74521
Raytheon Beech Baron 58	1.21918
Raytheon Super King Air 200	7.17808
Raytheon Super King Air 300	3.01644
Robinson R44 Raven / Lycoming O-540-F1B5	0.41370
Rockwell Turbo Commander 690	0.07123
Rockwell Twin Commander 500	1.64932
Saab 340-B-Plus	12.30685
Vans RV-7	2.31781
Vulcanair P.68	0.41370
Total	63.78630

Table 15: 2045 aircraft daily operations count

Aircraft	Daily Operations
Airbus A220-100	0.56986
Alenia C-27J	0.09589
ATI AT-502	0.52055
ATI AT-802	0.33973
ATR 42-600	10.33425
BAE 146-RJ85	0.30685
Beechcraft Bonanza 33 (FAS)	1.27123
Bell 407	0.06575
Bell 427	0.03288
Bell 429	0.04110
Bell 430	1.44384
Bell B-206 JetRanger (B206-3)	0.03288
Boeing 737-300 Series Freighter	0.07123

Bombardier de Havilland Dash 8 Q400	9.97808
Cessna 172 Skyhawk	4.40000
Cessna 182	3.34795
Cessna 210 Centurion	0.77808
Cessna 310	1.06849
Cessna 421 Piston	0.52055
Cessna Caravan 208	0.79726
CESSNA CITATION 510	1.84657
Cessna CitationJet CJ/CJ1 (Cessna 525)	0.79452
Cirrus SR22 Turbo (FAS)	1.29863
Embraer Phenom 300 (EMB-505)	0.52055
Eurocopter EC-130	0.63836
Falcon 7X	0.10959
Fokker F70	0.85479
Lockheed C-130 Hercules	0.10411
Pilatus PC-12	1.74247
Pilatus PC-24	0.36986
Piper PA-28 Cherokee Series	9.80000
Piper PA-31 Navajo	3.64658
Piper PA-32 Cherokee Six	0.93425
Raytheon Beech Baron 58	1.53425
Raytheon Super King Air 200	10.21918
Raytheon Super King Air 300	4.69863
Robinson R44 Raven / Lycoming O-540-F1B5	0.52055
Rockwell Twin Commander 500	2.07671
Rockwell Twin Commander 690	0.03288
Saab 340-B-Plus	10.33425
Vans RV-7	2.89315

Vulcanair P.68	0.52055
Grand Total	91.50685

Not all the specified aircraft types have noise data within AEDT. As a result, AEDT made substitutions for the Aircraft Noise and Performance (ANP) data with a comparable aircraft. The substitutions that were made for each of the types are shown in Table 16.

Table 16: AEDT aircraft ANP profiles (current operations and 2045)

Aircraft	ANP Profile
Airbus A220-100	737700
Alenia C-27J	DHC8
ATI AT-502	GASEPV
ATI AT-802	GASEPV
ATR 42-600	DHC8
BAE 146-RJ85	BAE146
Beechcraft Bonanza 33 (FAS)	GASEPV
Bell 206B-3	B206B3
Bell 407 / Rolls-Royce 250-C47B	B407
Bell 427	B427
Bell 429	B429
Bell 430	B430
Boeing 737-300 Series Freighter	737300
Bombardier de Havilland Dash 8 Q300	DHC830
Bombardier de Havilland Dash 8 Q400	DHC830
Cessna 172 Skyhawk	CNA172
Cessna 182	CNA182
Cessna 210 Centurion	GASEPV
Cessna 310	BEC58P
Cessna 421 Piston	BEC58P
Cessna Caravan 208	CNA208

CESSNA CITATION 510	CNA510
Cessna CitationJet CJ/CJ1 (Cessna 525)	CNA525C
Cirrus SR22 Turbo (FAS)	COMSEP
Embraer Phenom 300 (EMB-505)	CNA55B
Eurocopter EC-130	EC130
Falcon 7X	GIV
Fokker F70	F10062
Lockheed C-130 Hercules	C130AD
Pilatus PC-12	CNA208
Pilatus PC-24	CNA55B
Piper PA-28 Cherokee Series	GASEPF
Piper PA-31 Navajo	BEC58P
Piper PA-32 Cherokee Six	GASEPV
Raytheon Beech Baron 58	BEC58P
Raytheon Super King Air 200	DHC6
Raytheon Super King Air 300	DHC6
Robinson R44 Raven / Lycoming O-540-F1B5	R44
Rockwell Twin Commander 500	BEC58P
Rockwell Twin Commander 690	DHC6
Saab 340-B-Plus	SF340
Vans RV-7	GASEPV
Vulcanair P.68	PA30

2.2.3 Airport Capacity

The forecast total of 33,400 flight operations for 2045 is well within the airport's capacity. The FAA Advisory Circular AC 150/5060-5, updated January 1995, notes in Figure 2-1 that the annual service volume of a cross runways is between 200,000 and 265,000 ops/year, depending on the mix of aircraft. Given the recognised level of available capacity at Dubbo Regional Airport, further refinement of the FAA estimates has not been undertaken.

Dubbo Regional Airport has a shortened parallel taxiway for runway 05/23 and operates 24 hours daily, 365 days per year, with no curfew. There is no control tower as the airport is situated in class G airspace. These considerations would limit the capacity of the airport to some degree when compared to the annual services volumes referred to above, however, further refinement of the FAA estimates regarding the local airport conditions is not considered necessary given the recognised level of available capacity at Dubbo Regional Airport.

2.2.4 Stage Length

In AEDT, the stage length parameter represents the trip distance for departing aircraft. The longer the trip distance, the more fuel required and therefore the heavier the departing aircraft. The departure noise profile for each aircraft varies based on the total weight of the aircraft and the stage length is used as a proxy for this. Table 17 shows the AEDT lookup table with stage numbers and trip distance. Stage Length "M" refers to the maximum range with maximum fuel and no additional cargo other than what is already included in the payload assumption.

Table 17: Departure take-off weights from in AEDT

Stage Length	Trip Distance (NM)	Representative Range (NM)
1	0-500	350
2	500-1,000	850
3	1,000-1,500	1,350
4	1,500-2,500	2,200
5	2,500-3,500	3,200
6	3,500-4,500	4,200
7	4,500-5,500	5,200
8	5,500-6,500	6,200
9	6,500-7,500	7,200
10	7,500-8,500	8,200
11	>8,500	
M	M Maximum range at MTOW	

Table 18 shows the most frequent destinations flown from Dubbo Regional Airport in 2024 from Avdata data and the representative stage lengths considered for the modelling process in AEDT.

Table 18: Flight destinations and associated stage lengths

Airport Code	Airport	Nautical Miles from Dubbo	Stage Length
YBAF	Archerfield Airport	362	1
YBBN	Brisbane Airport	374	1
YBHI	Broken Hill Airport	362	1
YBKE	Bourke Airport	189	1
YCBA	Cobar Airport	148	1
YGLB	Goulburn Airport	166	1
YLRD	Lighting Ridge Airport	168	1
YMML	Melbourne Airport	375	1
YMOR	Moree Airport	175	1
YNBR	Narrabri Airport	131	1
YORG	Orange Airport	75	1
YPKS	Parks Airport	57	1
YSBK	Bankstown Airport	159	1
YSCB	Canberra Airport	188	1
YSRI	Richmond RAAF Base	139	1
YSSY	Sydney Airport	167	1
YSTW	Tamworth Airport	135	1
YWLG	Walgett Airport	133	1
YWWL	West Wyalong Airport	124	1

Although all stage lengths for the destinations at Dubbo Regional Airport are 1 as per Table 17, To70 and the Council adjusted the stage lengths for RPT and Fire aircraft to account for additional fuel supply and load for firefighting operations. Not all aircraft have a stage length greater than 1 in AEDT. Therefore in Table 19 and Table 20, aircraft not included will have 100% of their operations allocated to a stage length of 1. Furthermore, stage lengths are only considered for departures, as aircraft only have a stage length 1 for their arrival profile.

Table 19: Current operations AEDT aircraft stage length selected

Type of operation	Aircraft	1	2	3

RPT (33.3%)	Bombardier de Havilland Dash 8 Q300	25%	50%	25%
	Bombardier de Havilland Dash 8 Q400	25%	50%	25%
Fire (1.8%)	British Aerospace Avro RJ85	25%	25%	50%

Table 20: 2045 AEDT aircraft stage length selected

Type of operation	Aircraft	1	2	3
RPT (38.9%)	Airbus A220-100	25%	50%	25%
	Bombardier de Havilland Dash 8 Q400	25%	50%	25%
	ATR 42-600	50%	25%	25%
	Fokker F70	50%	25%	25%
Fire (1.9%)	Lockheed C-130 Hercules	25%	75%	
	Boeing 737-300 Series Freighter	25%	25%	50%
	BAE 146-RJ85	25%	25%	50%

2.2.5 Day/night operations

The day/night allocation was calculated based on the percentage split of operations from the 2024 Avdata data for each operation category, as represented in Table 21. The night allocation for ANEF represents the number of operations that occur between 19:00 and 07:00 (local time), and the N-Contour Night occurs between 23:00pm and 06:00 (local time).

Table 21: Day / night allocation

Operation Category	Percentage Split
RPT	Day – 85% ANEF Night – 15%
General Aviation	Day – 95% ANEF Night – 5%
Military	Day – 97% ANEF Night – 3%
Circuits	Day – 96% ANEF Night – 4%
Fire	Day – 91% ANEF Night – 9%
Police / Medical	Day – 69% ANEF Night – 17% N-Contour Night – 14%

2.2.6 Runway Usage

The runway allocation percentage is based on the runway selection from the 2024 Avdata data for each operational category. For any aircraft that operationally requires RWY 05/23, the RPT split will be applied. The allocation of runway usage is shown in Table 22.

Table 22: Runway usage

Category	5	11	23	29
RPT Any aircraft that operationally requires RWY05/23	42%	0%	58%	0%
Fire	34%	12%	45%	9%
GA	40%	12%	40%	8%
Medical/Military/Police	43%	1%	53%	3%
Circuits	33%	23%	35%	9%

2.2.7 Helipad Selection

To70 utilised the assumptions the Council provided in Figure 1 regarding the type of operations that occur at the five helicopter landing sites. As To70 condensed into two, the helicopters will be allocated to the closest modelled helipad, as follows:

- HN - Firefighting and general overflow helicopters
- NS - RFS waterbombing, Defence, miscellaneous and training helicopters

Table 23 shows the helipad usage for each operational category.

Table 23: Helipad usage

Category	HN	HS
Fire	66%	34%
GA	40%	60%
Medical/Police	50%	50%
Military	0%	100%

2.2.8 Flight Paths

Flight tracks were created with regard to the published procedures (available in Airservices Australia's AIP documents) and per the typical operations at a regional aerodrome, shown in Figure 6. For the published procedures, flight tracks were created for RNP approaches for runway 05 and runway 23.

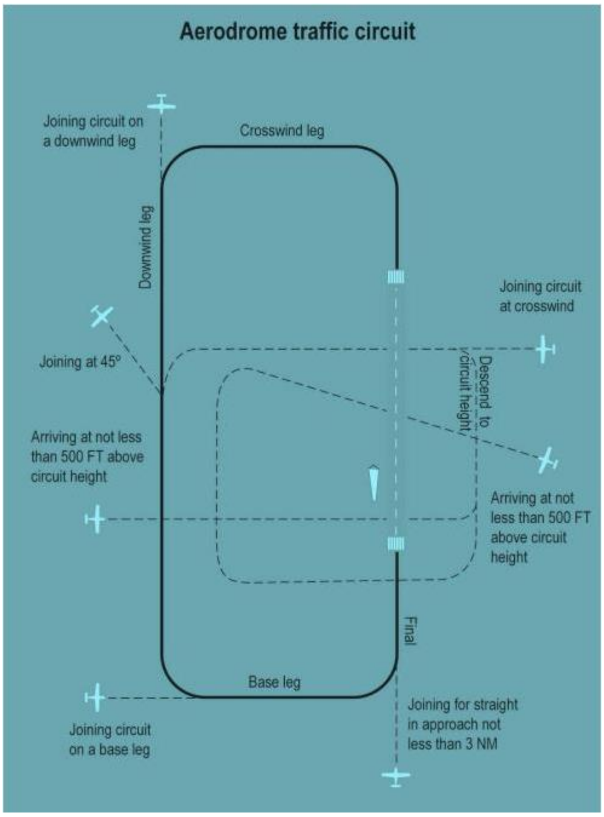


Figure 6: Aerodrome standard traffic circuit, showing arrival and joining procedures (Source: CASA ADVISORY CIRCULAR AC 91-10 v1.3)

Flight Radar 24 data was reviewed and downloaded to confirm actual traffic behaviour to determine the traffic circuit patterns utilised at Dubbo Regional Airport. Avdata data was used to guide the search within Flight Radar 24, helping to identify a range of aircraft movements from the various categories. Cross-referencing with Avdata data allowed for a more targeted and complete extraction of relevant flight data, ensuring a representative sample was captured for the analysis. The number of ADSB tracks obtained for each runway end is provided in Table 24, and the track visualisation is contained in Appendix 1.

The data was imported into QGIS geographic visualisation software to visualise aircraft trajectories, allowing for the identification of common routing patterns and the creation of representative tracks for each runway. Typical flight tracks were derived from the available data for each runway and direction of operation. These tracks represent the observed flight paths during the monitoring period and were used as the basis for noise modelling inputs. The generated flight tracks are presented in Appendix 2.

Table 24: Number of flight tracks downloaded

RWY end	Arrivals	Departures
05	61	59
23	56	80
11*	23	7
29*	30	37

Helipads	32	44
Circuits	59	

*Limited data due to more infrequent use of these runways

2.2.9 Track Allocation

To determine track allocation, To70 analysed approximately 500 historical flight radar tracks to identify typical flight patterns at Dubbo Regional Airport. For runway 05/23, five fixed-wing arrival and departure tracks were identified, along with one touch-and-go circuit. For runway 11, four fixed-wing arrival and departure tracks and one touch-and-go were identified. For runway 29, four arrival tracks, three departure tracks, and one touch-and-go were observed for fixed-wing aircraft. There is an even distribution of arrivals and departures for helicopter operations across all helicopter tracks.

Track allocation percentages for general aviation and helicopter operations are provided in Appendix 3. For RPT operations, track allocation has been modified to reflect the use of RNP approaches. Specifically for runway 05, arrivals are split 50/50 between the Dead Side Join (DSJ) and the Straight-In (SI) RNP approach paths. For runway 23, all RPT arrivals (100%) follow the SI track. These allocations are shown in Table 25 and Table 26.

Table 25: RPT arrival track allocation for RWY 05

RPT Arrival Tracks	RWY 05
05_ARR_DSJ	50%
05_ARR_SI	50%

Table 26: RPT arrival track allocation for RWY 23

RPT Arrival Tracks	RWY 23
23_ARR_SI	100%

To account for the variability in track location, the tracks shown in Appendix 2 will be dispersed laterally by 0.2 NM, resulting in a total track spread width of 0.4 NM. The dispersion of operations helps avoid unrealistic aircraft concentrations along a single narrow flight corridor, thereby correctly showing the extent of the noise impacts. Each track was divided into five sub-tracks, with the weightings for fixed wings and helicopters shown in Table 27 and Table 28, respectively. The dispersed tracks diverge/converge at the departure and arrivals ends of the runway strip to realistically model take-off/landing operations.

Table 27: Dispersed sub-track weighting fixed wing

Sub-track	Weighting
1	6.3%
2	24.4%
Centre track	38.6%
4	24.4%

5	6.3%

Table 28: Dispersed sub-track weighting helicopters

Sub-track	Weighting
1	20%
2	20%
Centre track	20%
4	20%
5	20%

2.2.10 Profile ID

For noise modelling, To70 use AEDT's predefined "STANDARD" aircraft profiles. However, it is important to note that some aircraft do not have standard profiles available. For those specific aircraft, To70 will use the predefined "NOISEMAP" profile, as it is the only option available.

3 Results

This section details the results of the noise modelling and provides a description of the metrics used to generate the noise contours.

To70 has generated the following results for Dubbo Regional Airport:

- Standard 20-year ANEC
- N-contours 2045 forecast for day (N60, N65, N70, N60 Night)
- N-contours 2024 operations for day (N60, N65, N70, N60 Night)

The results are attached in Appendix 4.

3.1 ANEC Results

ANEC contours are used to quantify the noise impact of airport operation or development scenarios. These maps are based on assumptions about the size, shape and demand of aircraft and airport operations, and can relate to the distant future. The ANEC uses the Effective Perceived Noise Level (EPNL) which applies a weighting to account for the fact that the human ear is less sensitive to low audio frequencies.

An ANEC has no official status for land-use planning purposes unless it becomes an ANEF endorsed by Airservices.

3.2 ANEF Process

A subsequent document will be provided, incorporating the 2045 ANEC and addressing the requirements outlined in Airservices' ANEF Checklist. The intent is for the ANEC to become an official ANEF, and as such the results will be submitted to Airservices for review and endorsement. Following Airservices' endorsement, the ANEC becomes an ANEF.

3.3 Number above contours (N-contours)

N-contours are a complementary aircraft noise metric under the National Airports Safeguarding Framework (NASF) Guideline A that show the potential number single event maximum noise level (LAmax) that occur above 60dB(A), 65dB(A), 70dB(A) per day and above 60db(A) for night (11:00pm – 6:00am) . Under guideline A, N-above contours should be considered in planning proposals.

4 Land Use Planning

Land use planning provisions must be considered when planning developments on or near airport sites. This section details some planning provisions relating to ANEF and N-contours.

4.1 Australian Standard AS2021-2015

Recommendations relating to land use within the ANEF contours are contained in Australian Standard AS2021-2015 "Acoustics – Aircraft Noise Intrusion – Building Siting and Construction". These recommendations are summarised in Table 29 below. This is a summary only; the planning authority should consult the Australian Standard for full details of the land use recommendations, and associated notes and conditions.

Table 29: Building Site Acceptability Based on ANEF Zones

Building Type	ANEF Zone of Site		
	Acceptable	**Conditional**	**Unacceptable**
House, home unit, flat, caravan park	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	25 to 30 ANEF	Greater than 30 ANEF
School, university	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF	20 to 30 ANEF	Greater than 30 ANEF
Commercial building	Less than 25 ANEF	25 to 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Other industrial	Acceptable in all ANEF zones		

'Acceptable' means that special measures are usually not required to reduce aircraft noise.

'Conditional' means that special measures (noise attenuation) are required to reduce aircraft noise.

'Unacceptable' means that the development should not normally be considered.

4.2 NASF Guideline A: Measures for Managing Impacts of Aircraft Noise

It is generally recognised that land use planning decisions based solely on ANEF noise contours – that is, without reference to other information – are likely to lead to a suboptimal outcome for both the airport and the community. Additional or supplementary noise-planning tools are therefore recommended to better support an airport's ongoing operation and protect surrounding communities.

Given the recognised limitations of the ANEF system, NASF Guideline A: Measures for Managing Impacts of Aircraft Noise recommends using the 'number-above', or 'N-contour', noise contour metric to supplement ANEF contours for strategic planning and informational purposes.

The NASF Guideline A outlines recommended measures for managing the impacts of aircraft noise on noise-sensitive land uses. In particular, Section I of Guideline A states:

"I. Rezoning of greenfield areas to permit noise sensitive uses

17. It is important that consideration be given to the application of the following approach to land use planning:

I. no new designations or zoning changes that would provide for noise sensitive developments within a 20 ANEF where that land was previously rural or for non urban purposes (in keeping with AS2021).

II. Zoning for noise–sensitive development be avoided where ultimate capacity or long range noise modelling for the airport indicates either:

- *20 or more daily events greater than 70 dB(A);*
- *50 or more daily events of greater than 65 dB(A); or*
- *100 events or more daily events of greater than 60 dB(A).*

III. Zoning for noise–sensitive development should take into account likely night time movements and their impact on residents' sleeping patterns. For example, where there are more than 6 events predicted between the hours of 11pm to 6am which create a 60 dB(A) or greater noise impact, measures for aircraft noise amelioration and restriction on noise sensitive development may be appropriate."

Furthermore, Section III addresses the assessment of new development applications within existing residential areas. The guideline states:

"III. Assessment of new developments applications for noise sensitive uses within existing residential areas

29. Commonwealth, State, Territory, Local Governments and airport operators should support effective disclosure of aircraft noise to prospective residents. This should be considered as broadly as possible but required where ultimate capacity noise modelling for the airport indicates either:

- *the area is within the 20 ANEF;*
- *20 or more daily events greater than 70 dB(A);*
- *50 or more daily events of greater than 65 dB(A);*
- *100 events or more daily events of greater than 60 dB(A); or*
- *6 or more events of greater than 60 dB(A) between the hours of 11pm and 6 am. "*

N contours are not mandated in NSW's Environmental Planning Instruments but are recommended as a strategic planning consideration in NASF Guideline A, in addition to the ANEF.

4.3 Dubbo Local Environmental Plan 2022 (DLEP)

The ANEF is a consideration under Clause 7.8 of the DLEP (Development in areas subject to aircraft noise) which reads as follows:

(1) "The objectives of this clause are as follows—
(a) to prevent certain noise sensitive developments from being located near the Dubbo City Regional Airport or the Wellington/Bodangora Airport and the airport f light paths,
(b) to assist in minimising the impact of aircraft noise from the airports and the flight paths by requiring appropriate noise attenuation measures in noise sensitive buildings,
(c) to ensure land use and development near the airports do not hinder or have other adverse impacts on the ongoing, safe and efficient operation of the airports.

(2) This clause applies to development—
(a) on land—
(i) near the Dubbo City Regional Airport or the Wellington/Bodangora Airport, and
(ii) in an ANEF contour of 20 or greater, and
(b) the consent authority considers is likely to be adversely affected by aircraft noise.

(3) In deciding whether to grant development consent to development to which this clause applies, the consent authority must—

(a) consider whether the development will result in an increase in the number of dwellings or people affected by aircraft noise, and

(b) consider the location of the development in relation to the criteria set out in Table 2.1 (Building Site Acceptability Based on ANEF Zones) in AS 2021:2015, and

(c) be satisfied the development will meet the indoor design sound levels shown in Table 3.3 (Indoor Design Sound Levels for Determination of Aircraft Noise Reduction) in AS 2021:2015.

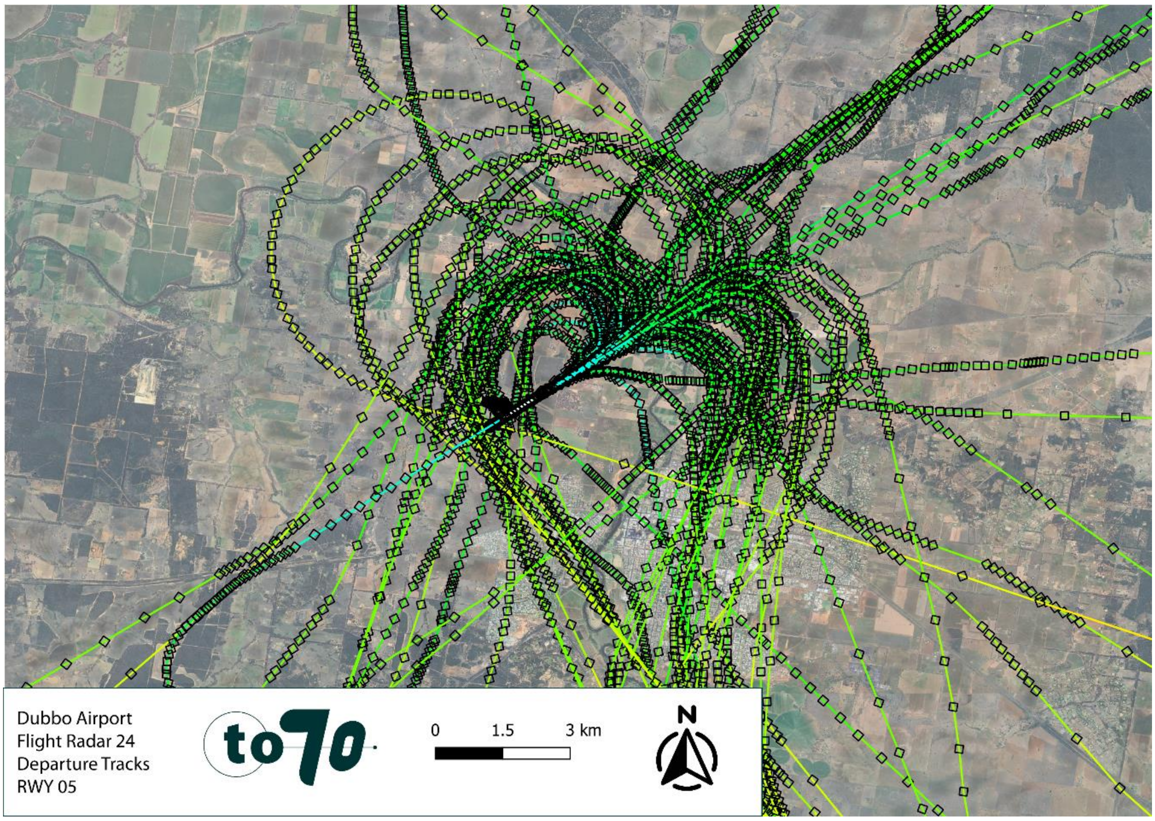
(4) In this clause—

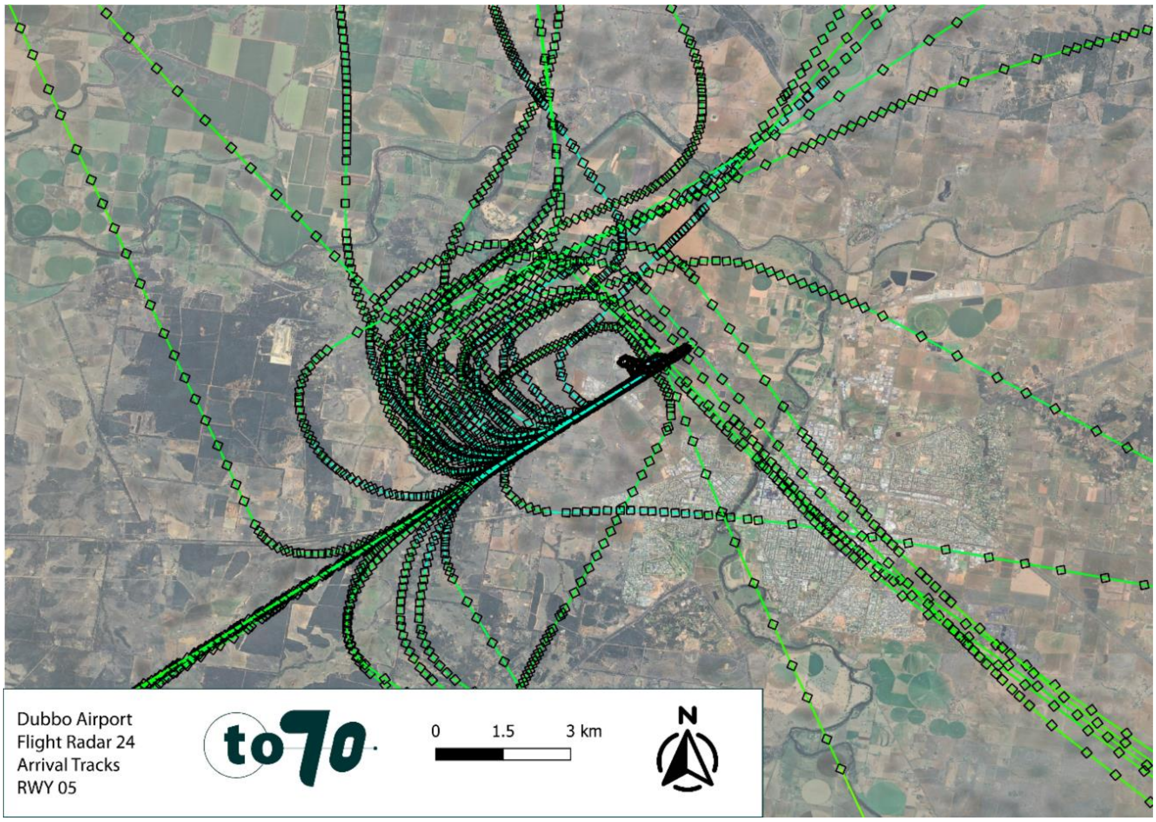
***ANEF contour** means a noise exposure contour shown as an ANEF contour on the Noise Exposure Forecast Contour Map for the Dubbo City Regional Airport prepared by the Commonwealth Department responsible for airports.*

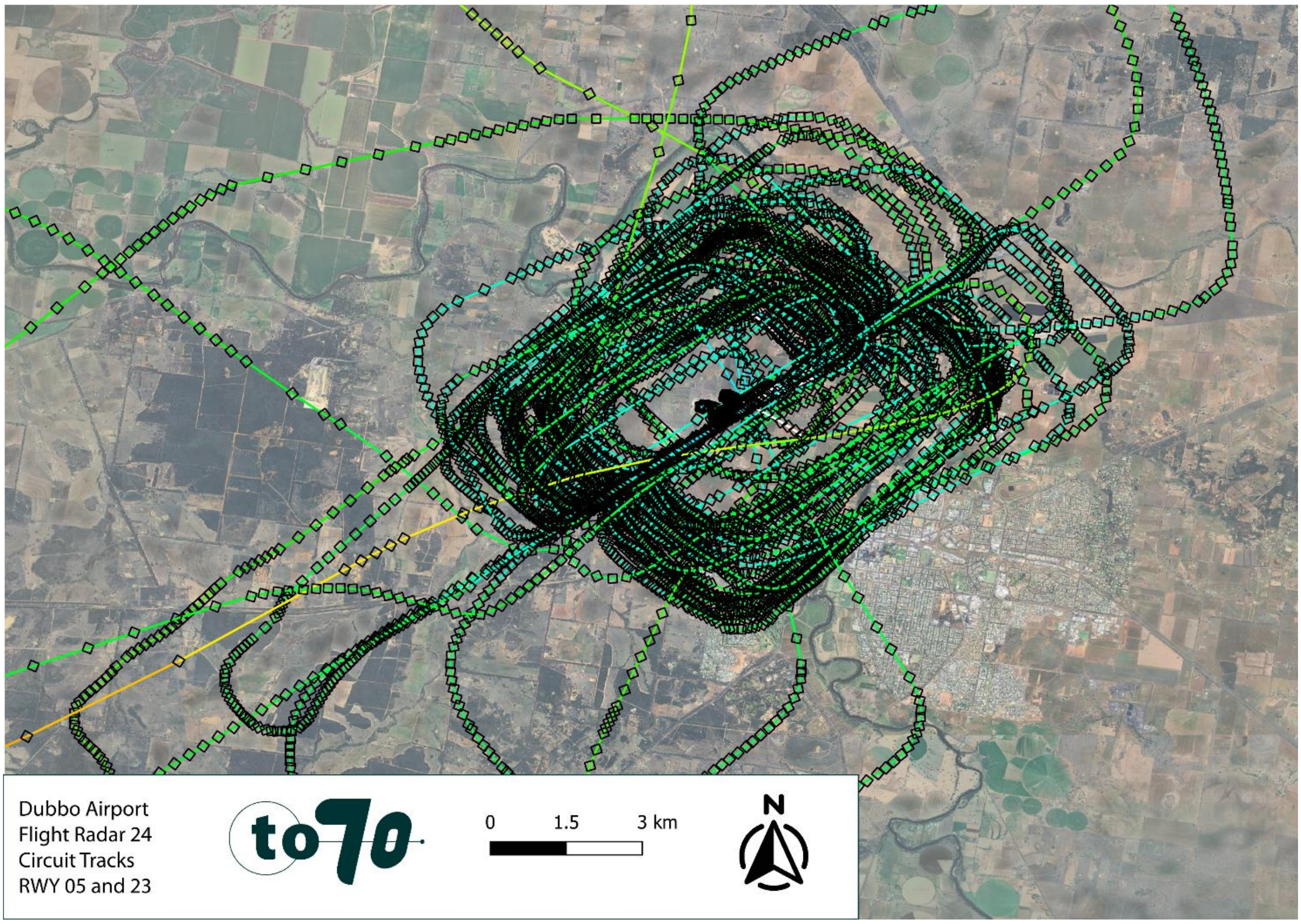
***AS 2021:2015** means AS 2021:2015, Acoustics—Aircraft noise intrusion—Building siting and construction."*

Appendices

A.1 Dubbo Regional Airport Flight Radar 24 Tracks



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Flight Radar 24
Circuit Tracks
RWY 05 and 23
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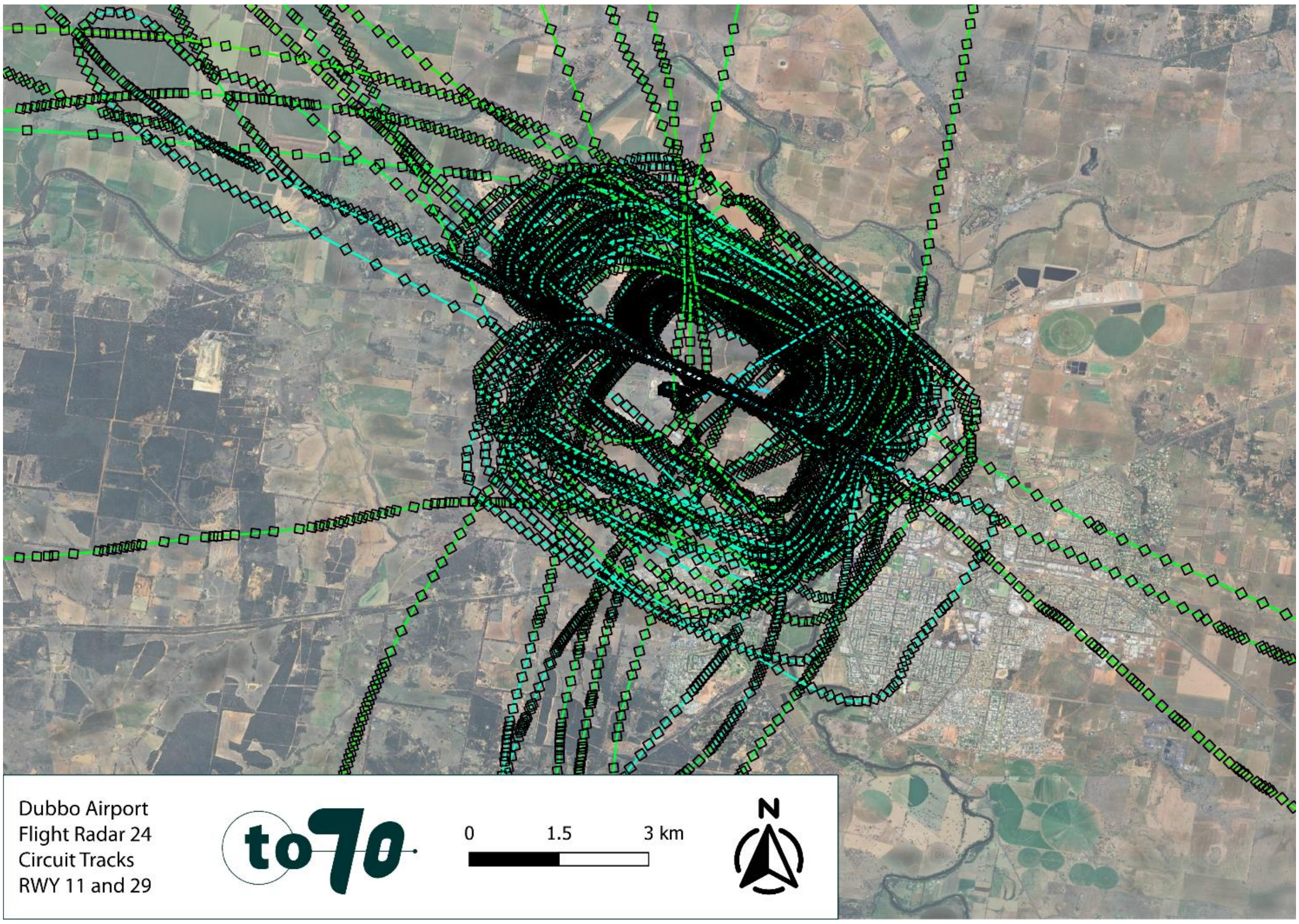
1.5
3 km
N


Dubbo Airport
Flight Radar 24
Circuit Tracks
RWY 11 and 29
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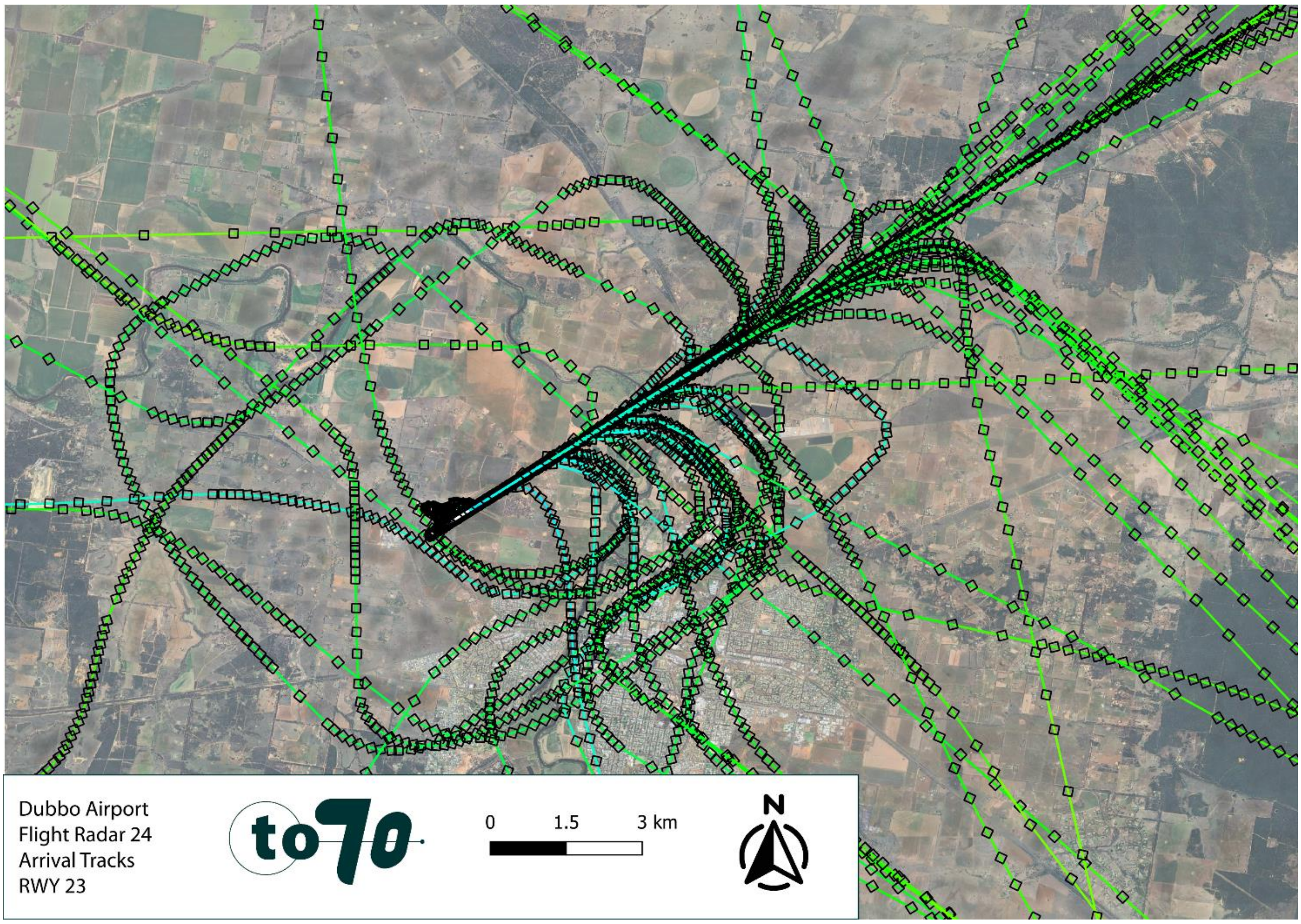
3 km
N


Dubbo Airport
Flight Radar 24
Arrival Tracks
RWY 23
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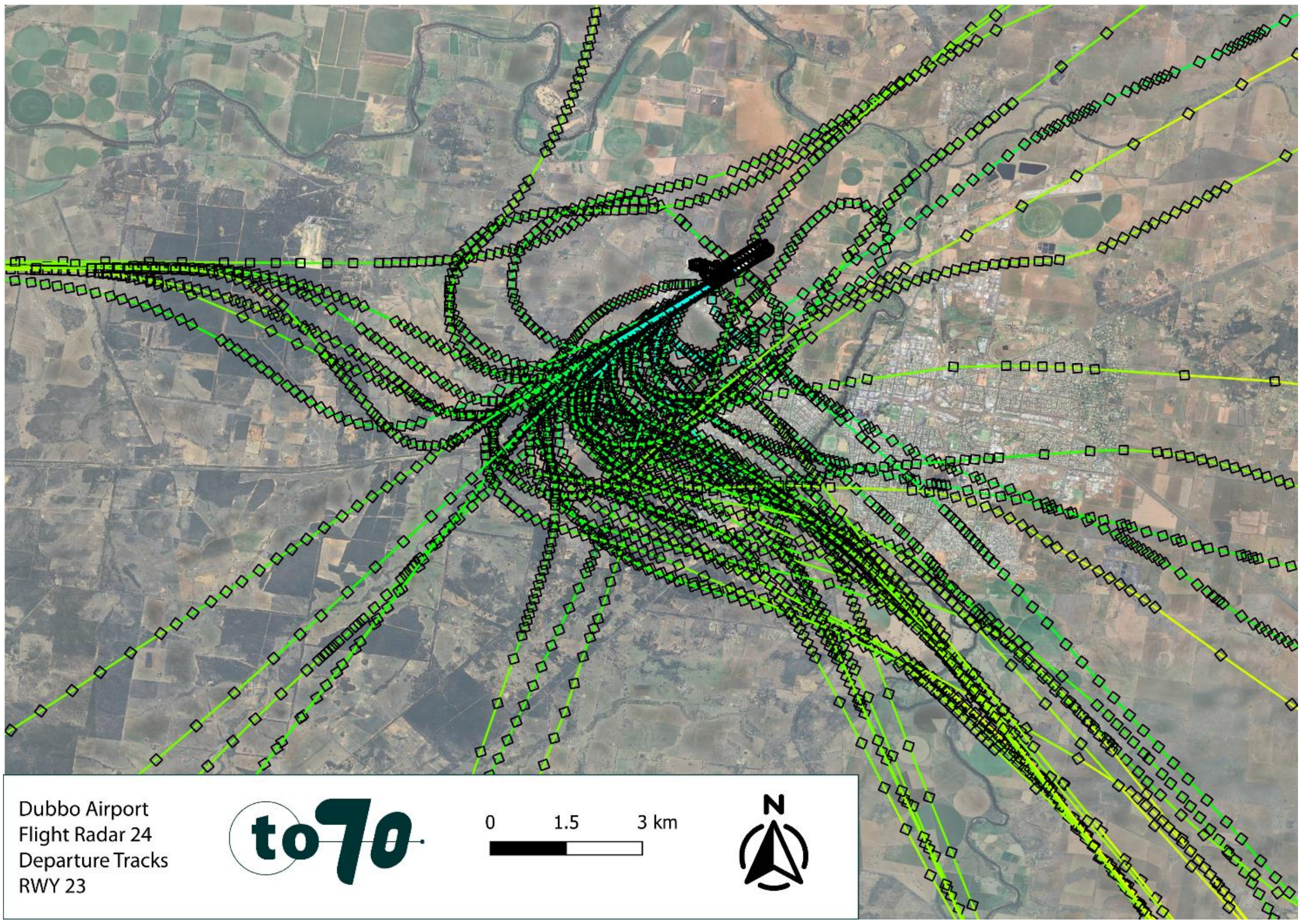
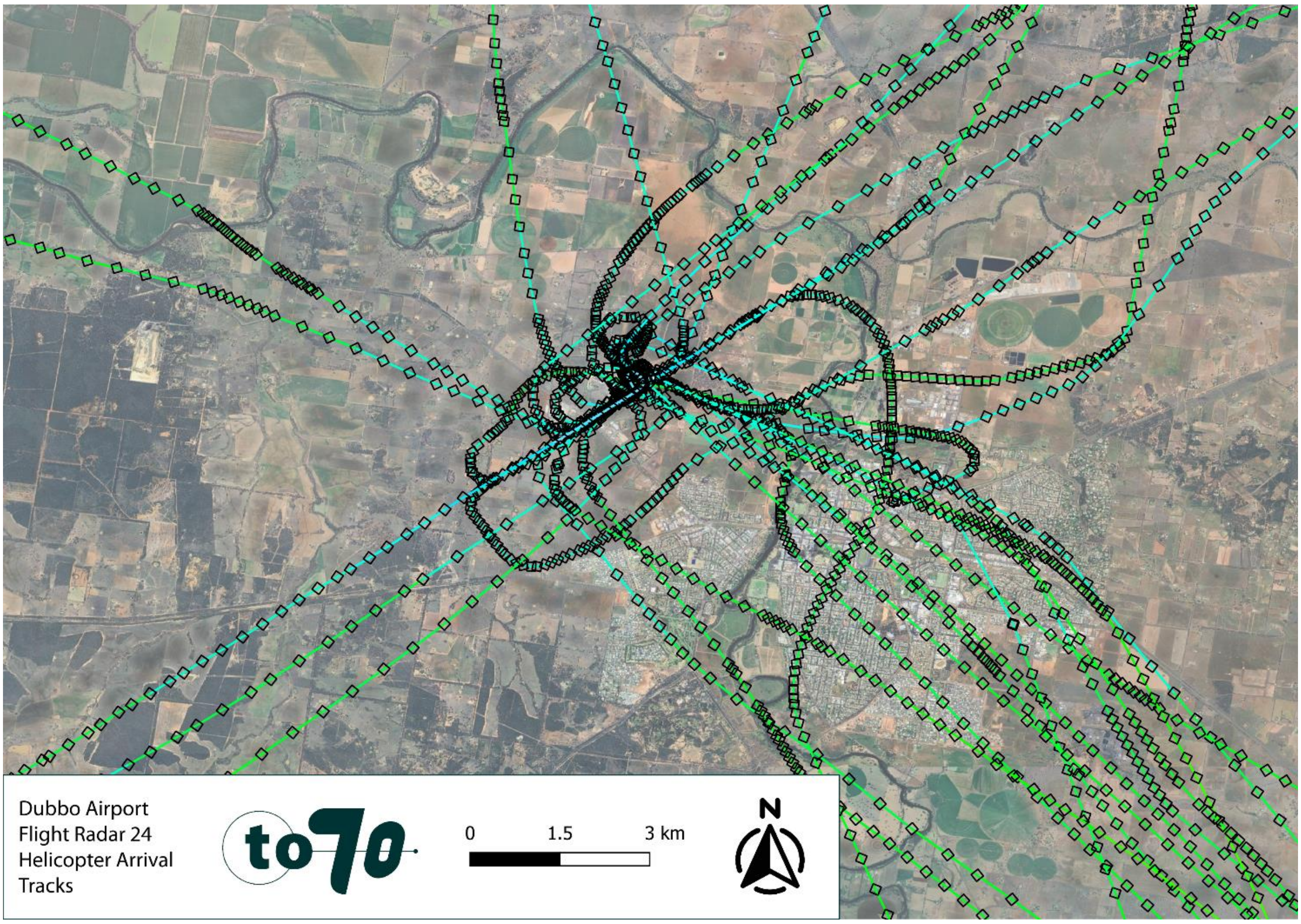
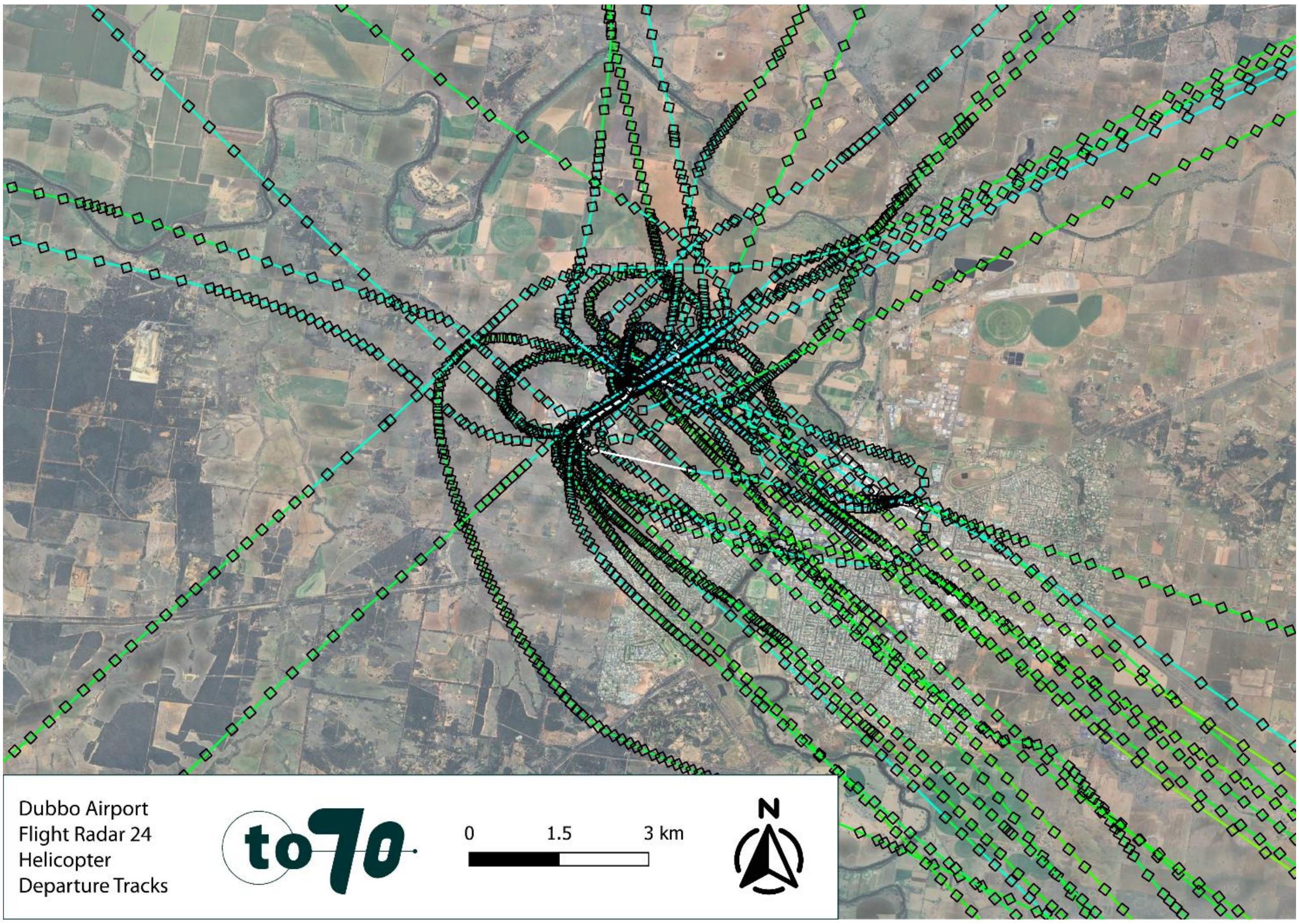
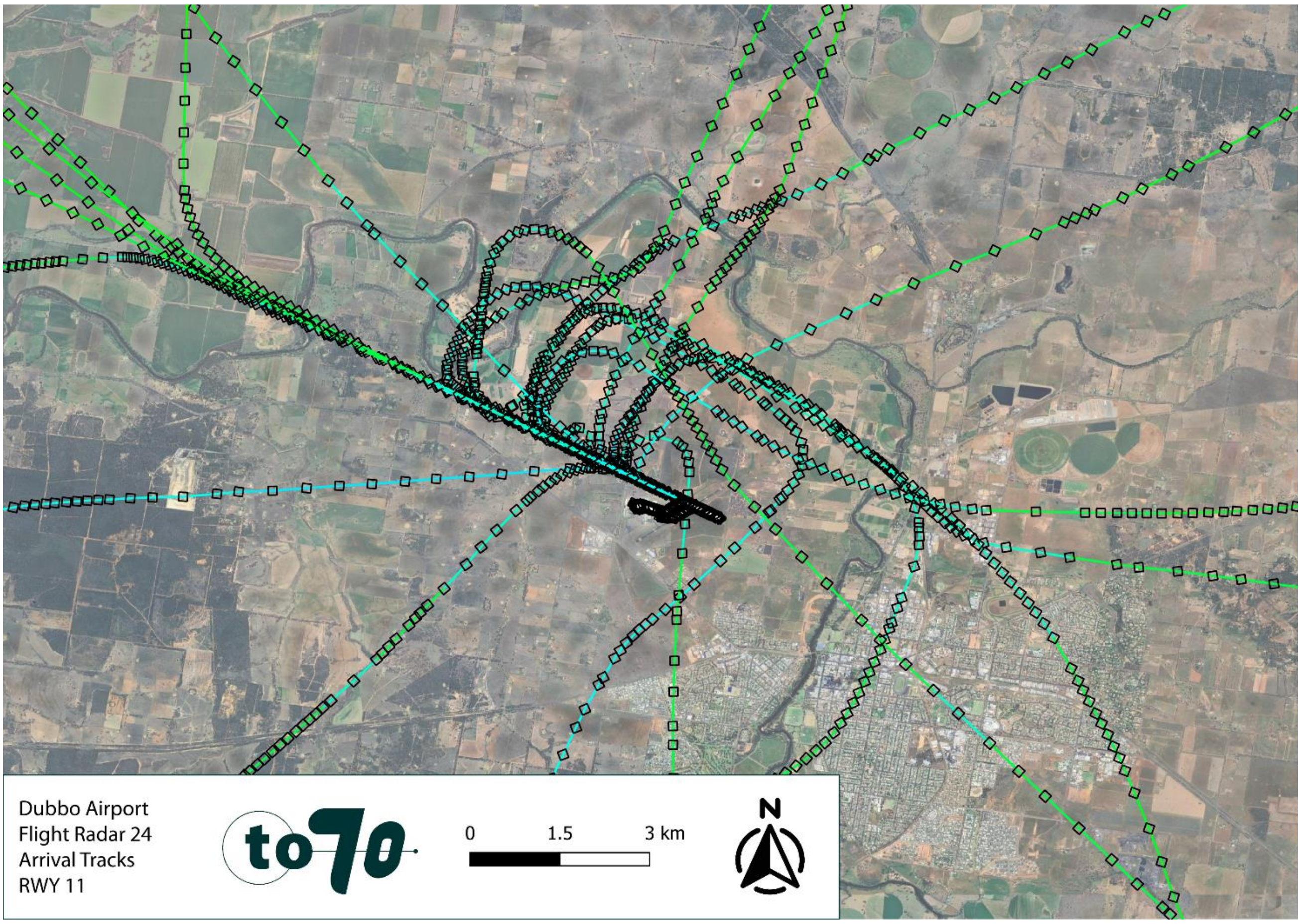
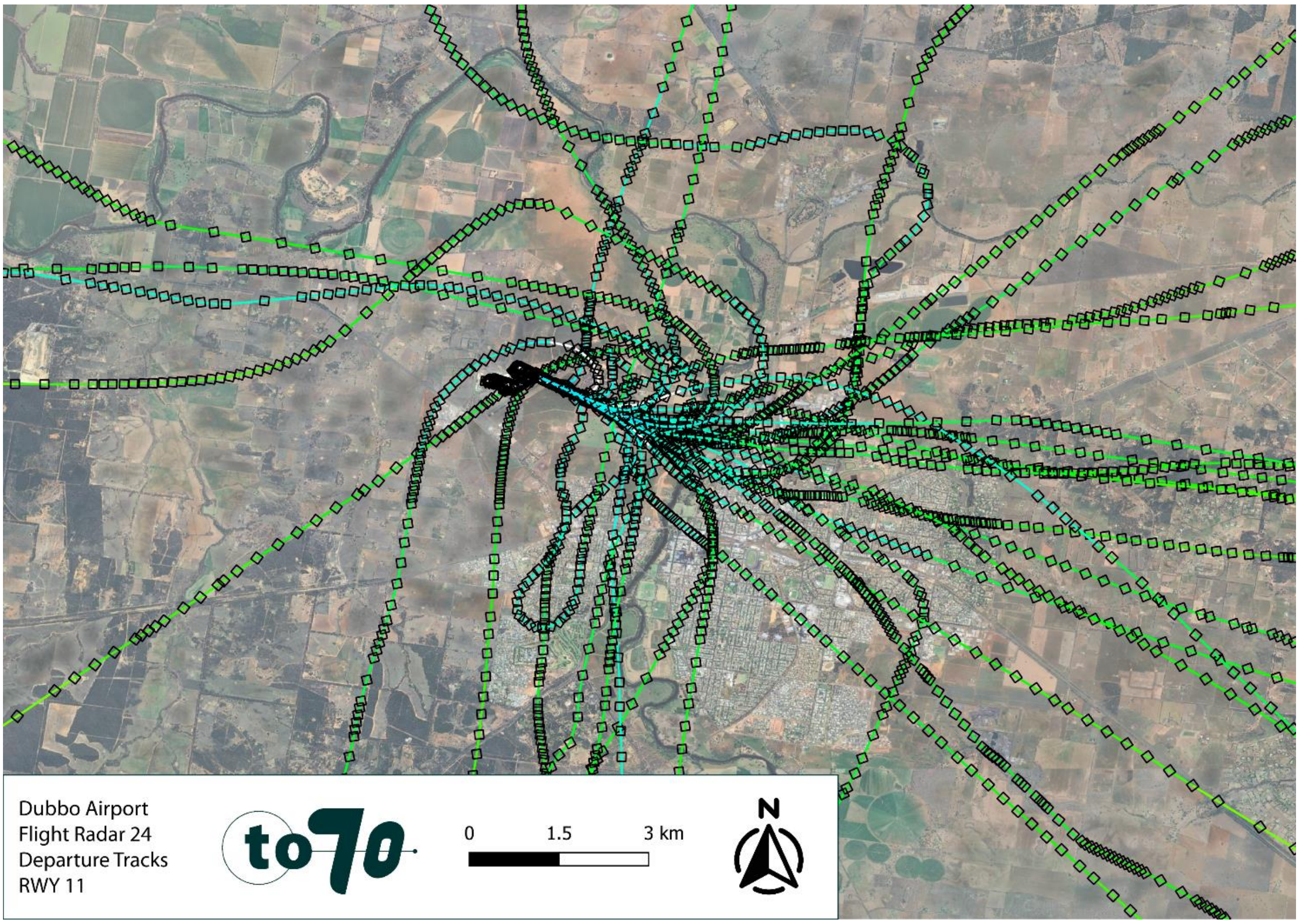
1.5
3 km
N

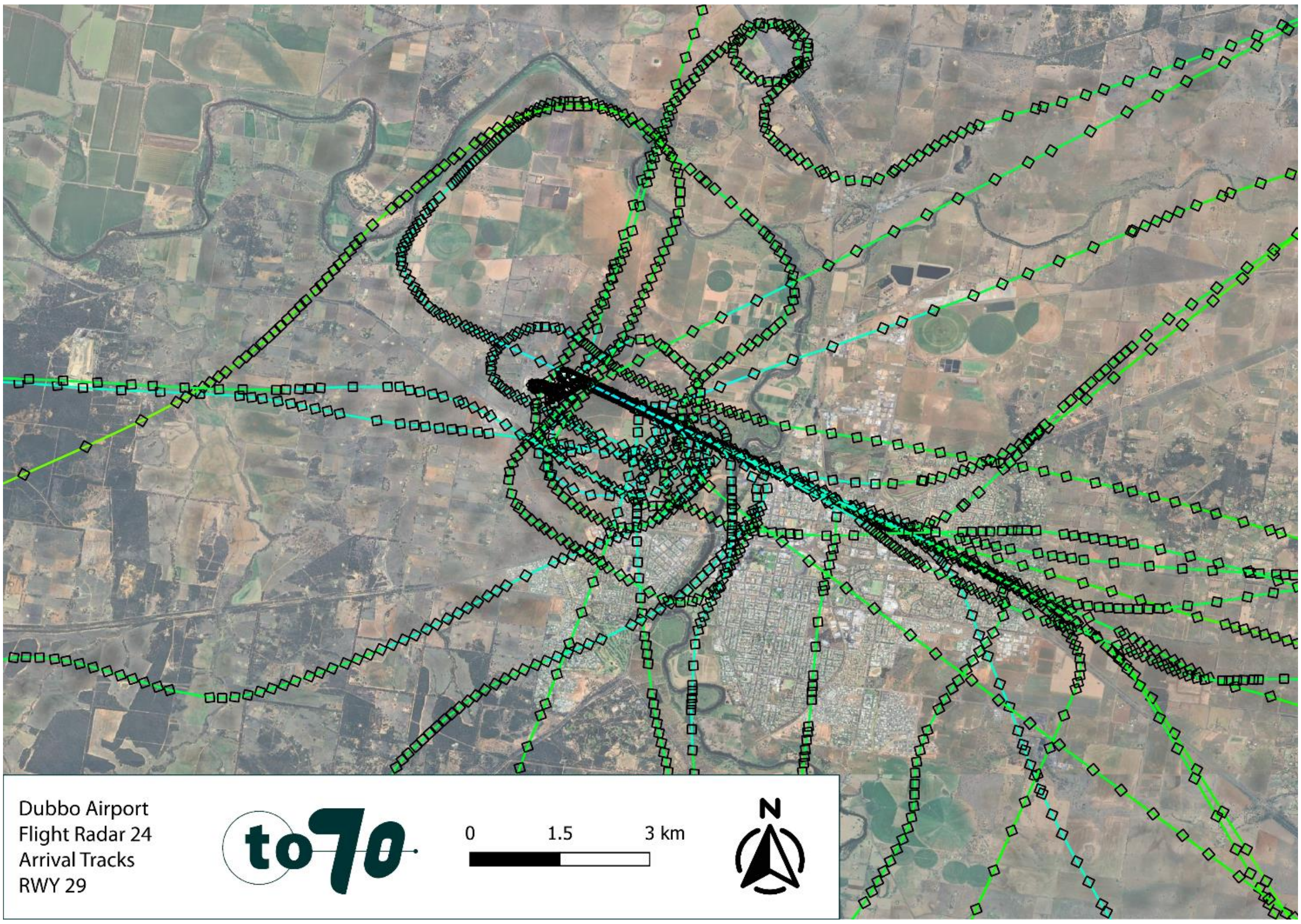

Dubbo Airport
Flight Radar 24
Departure Tracks
RWY 23
0
1.5
3 km
N

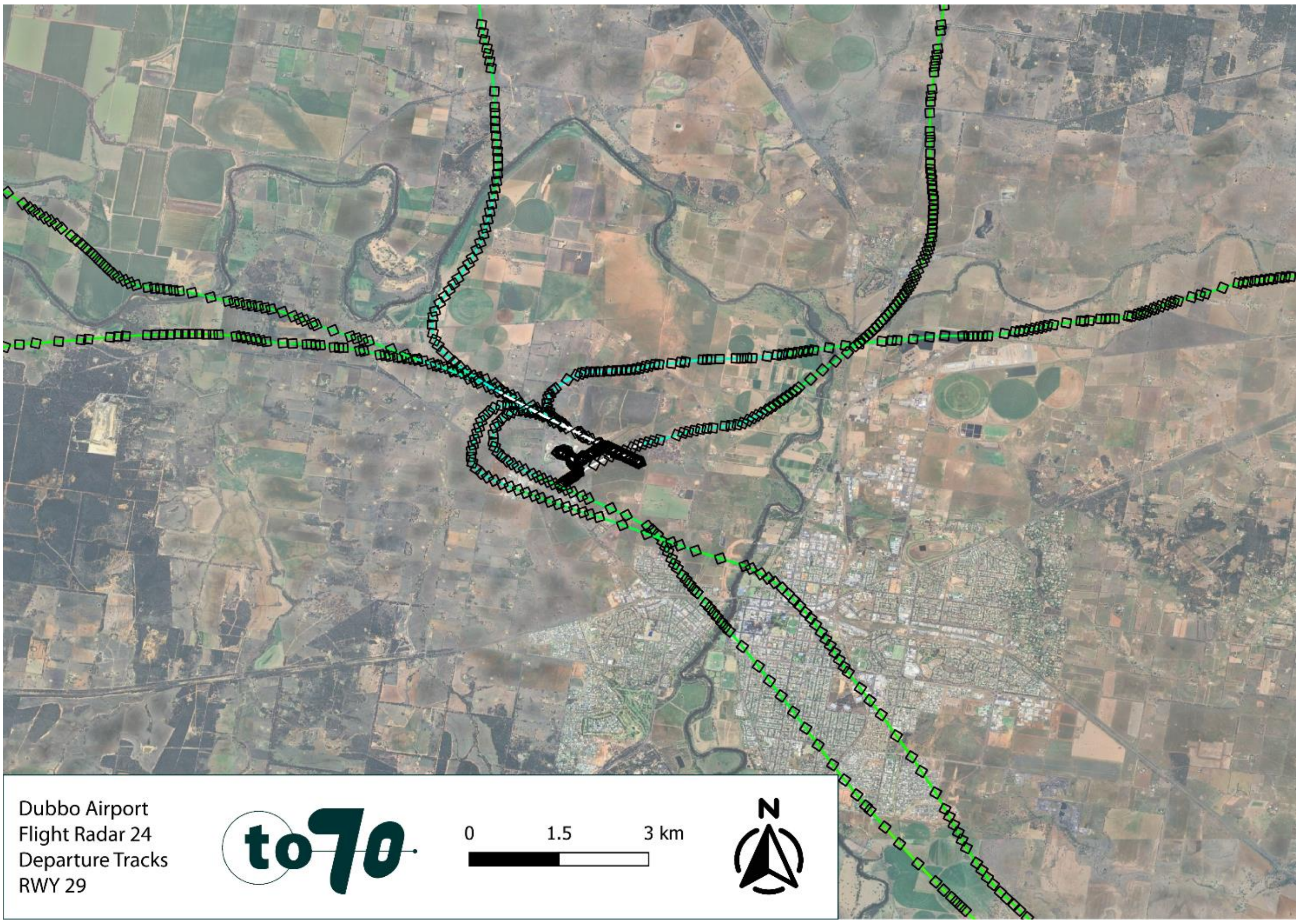

Dubbo Airport
Flight Radar 24
Helicopter Arrival
Tracks
0
1.5
3 km
N


Dubbo Airport
Flight Radar 24
Helicopter
Departure Tracks
0
1.5
3 km
N

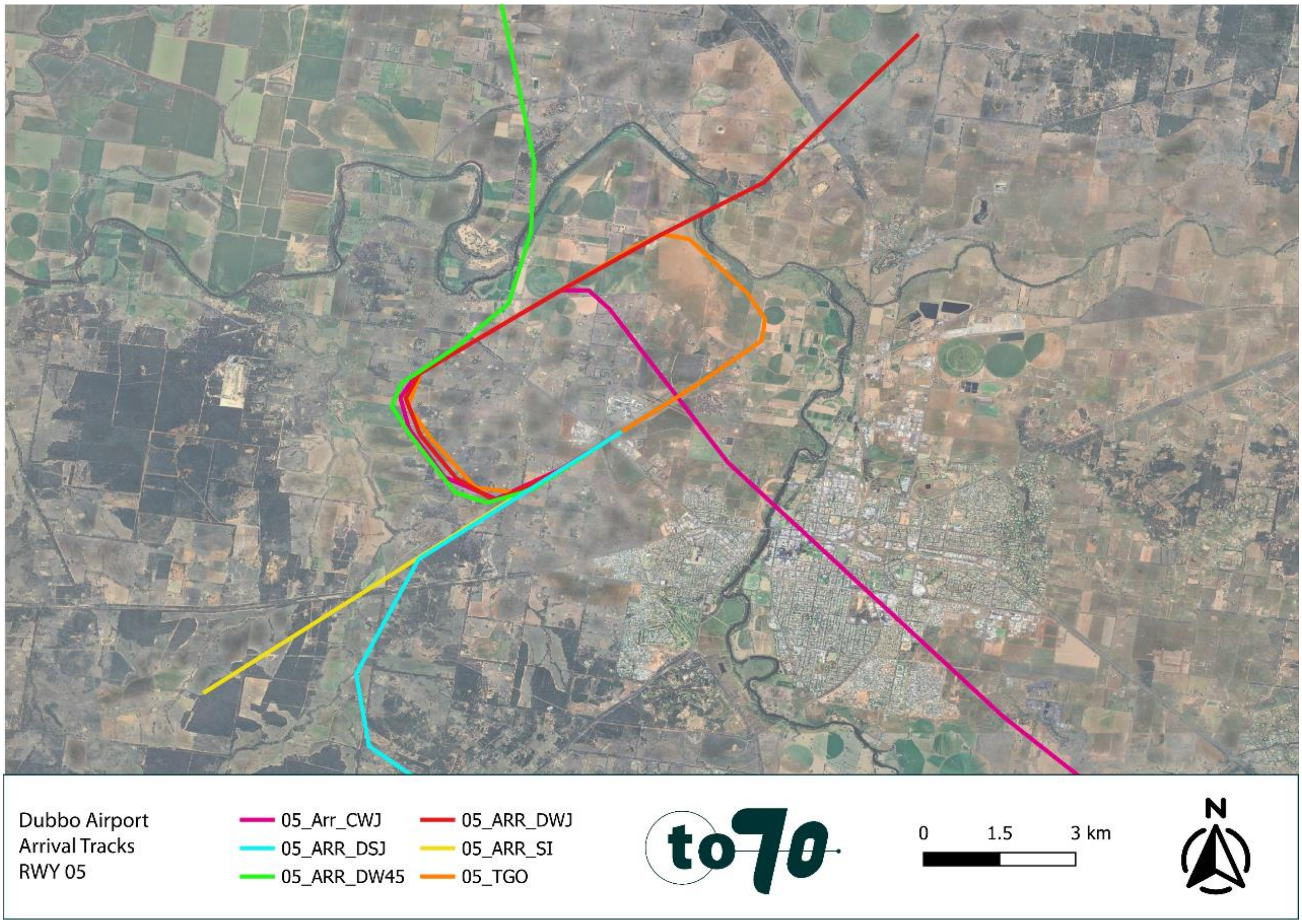

Dubbo Airport
Flight Radar 24
Arrival Tracks
RWY 11
0
1.5
3 km
N

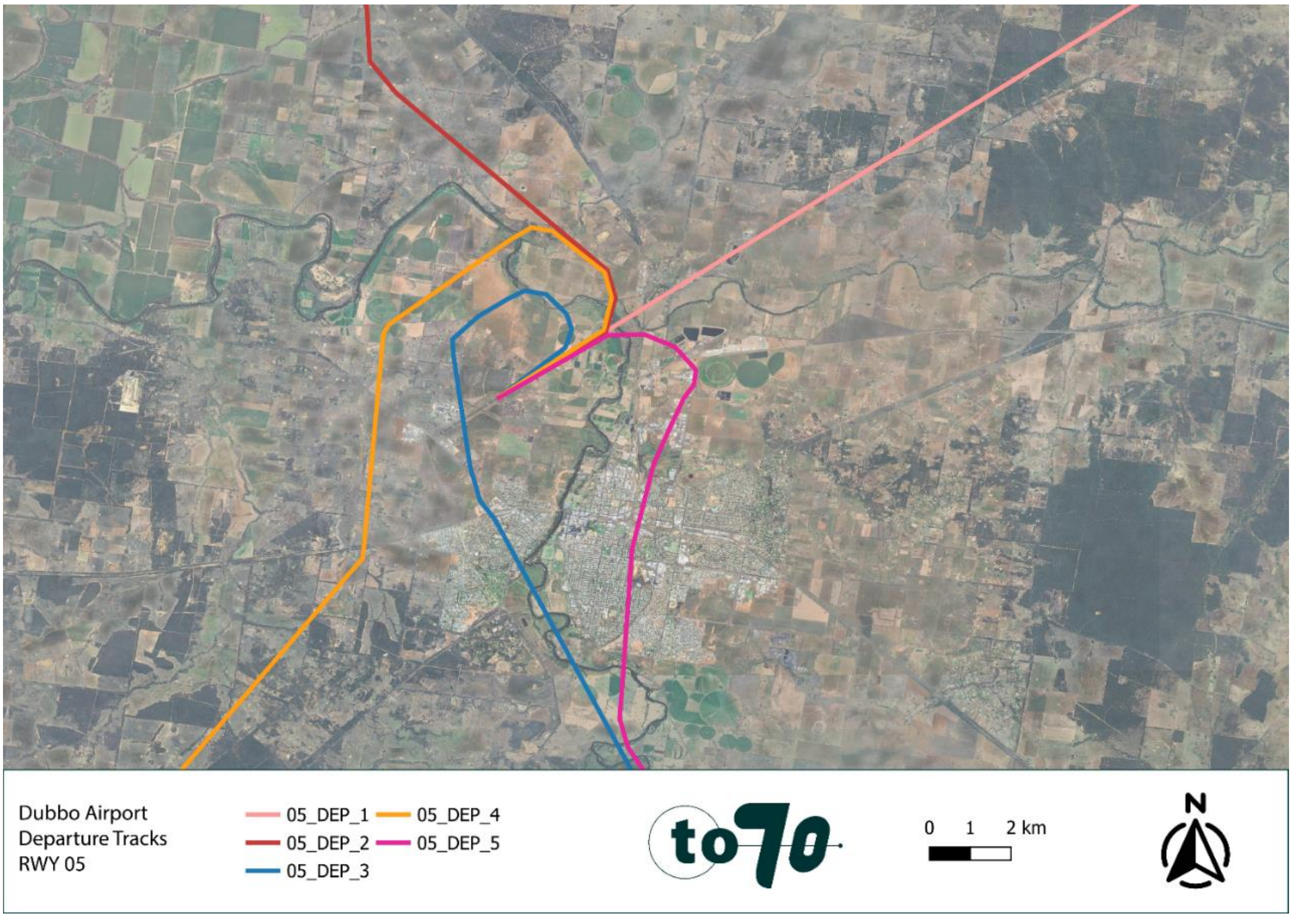

Dubbo Airport
Flight Radar 24
Departure Tracks
RWY 11
0
1.5
3 km
N

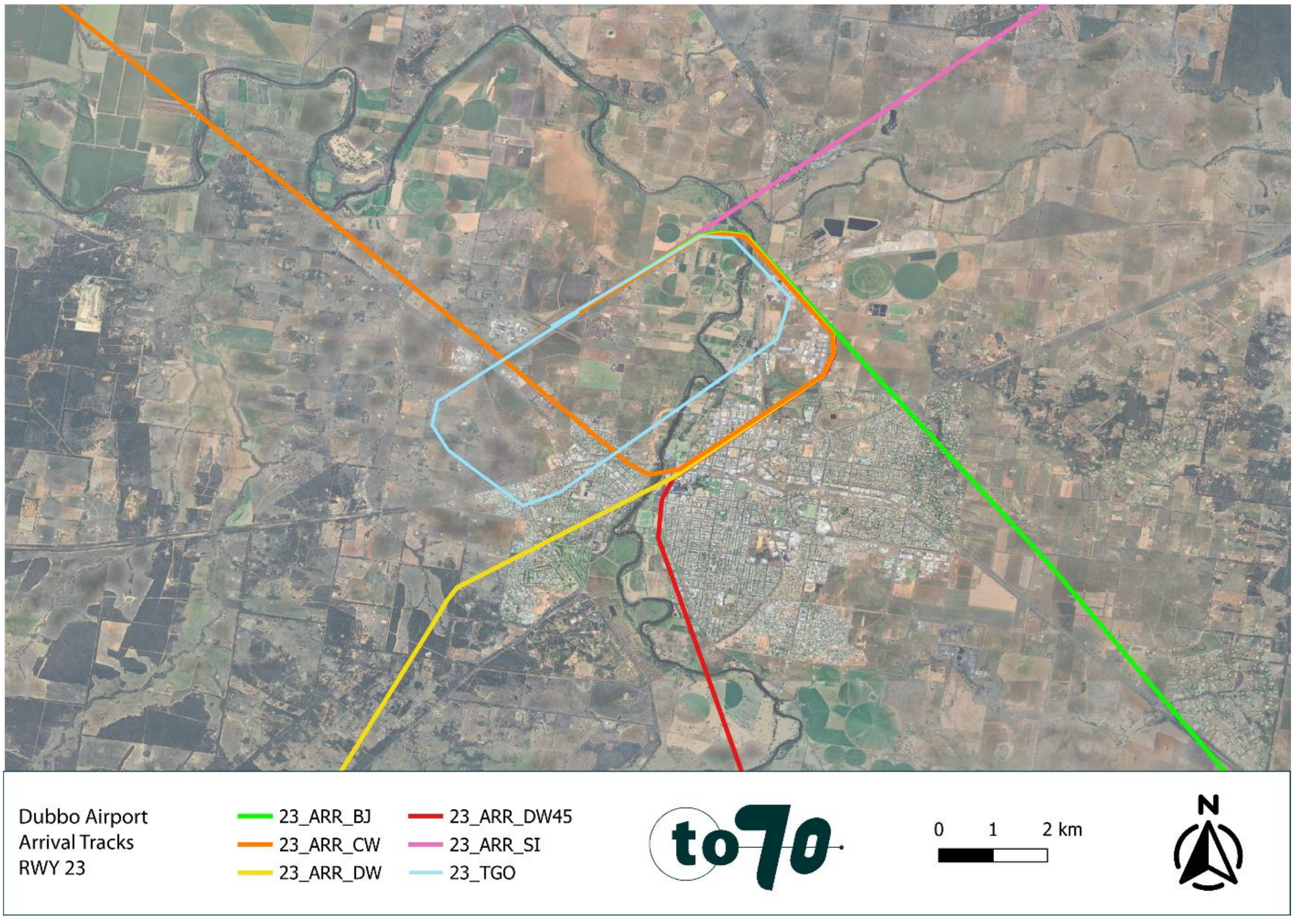

Dubbo Airport
Flight Radar 24
Arrival Tracks
RWY 29
0
1.5
3 km
N

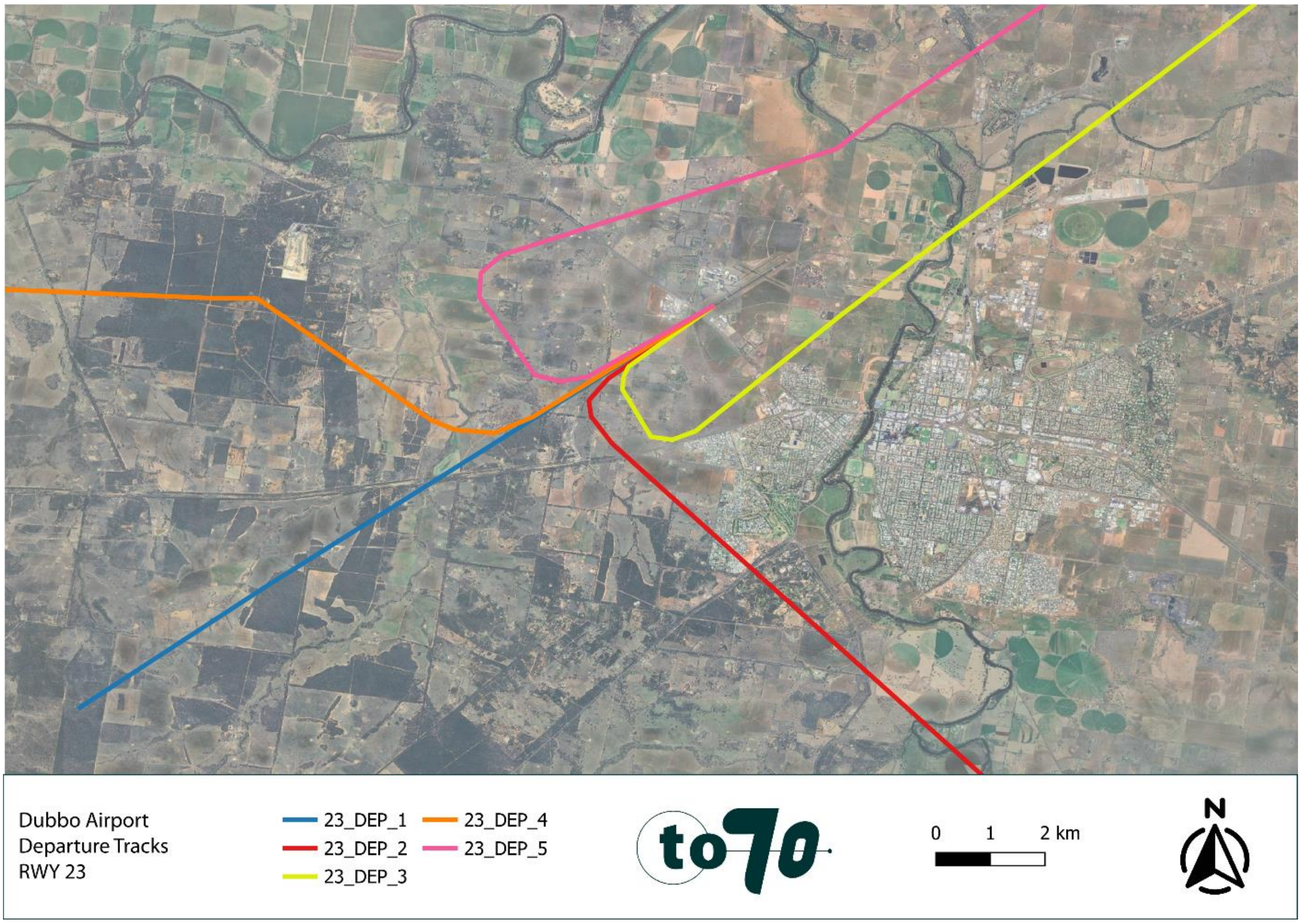

Dubbo Airport
Flight Radar 24
Departure Tracks
RWY 29
0
1.5
3 km
N

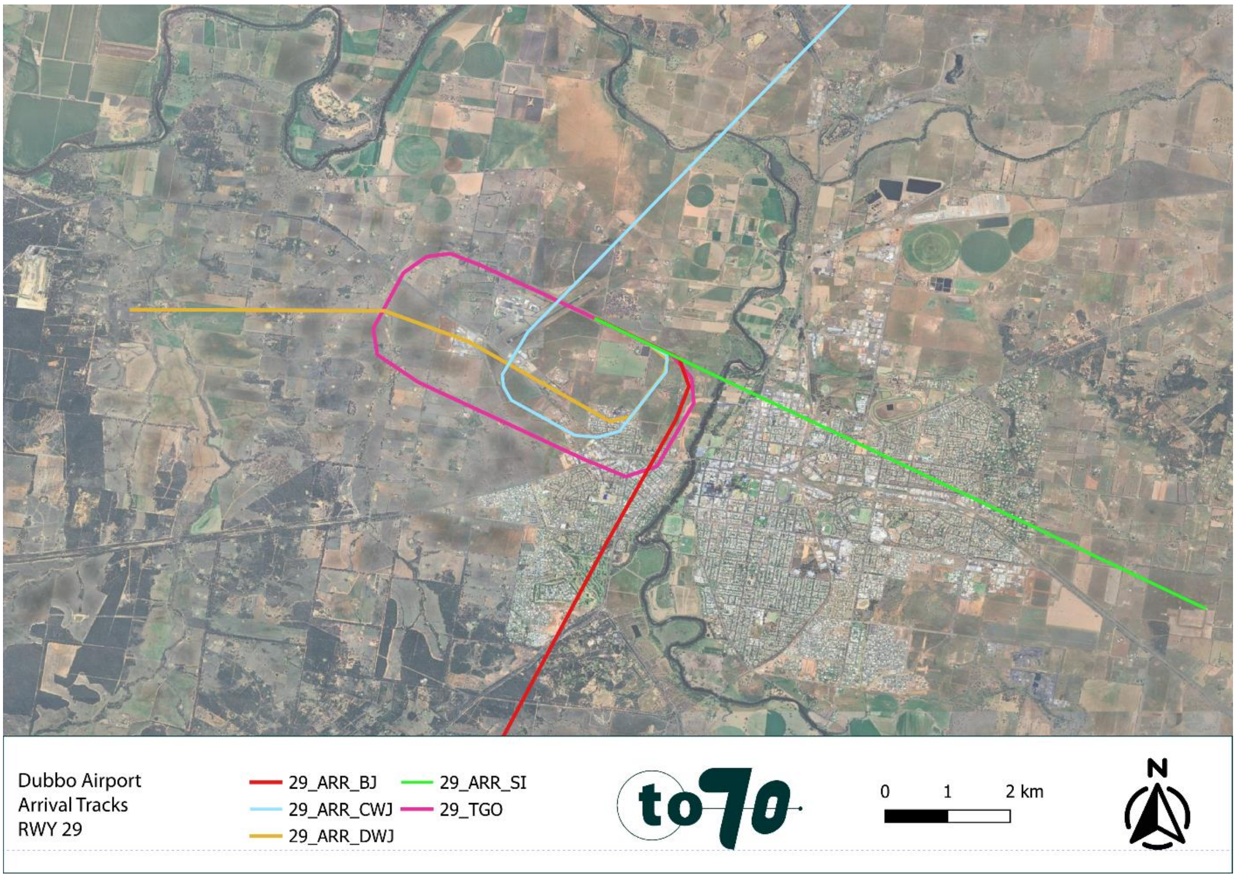
A.2 Modelled Flight Tracks

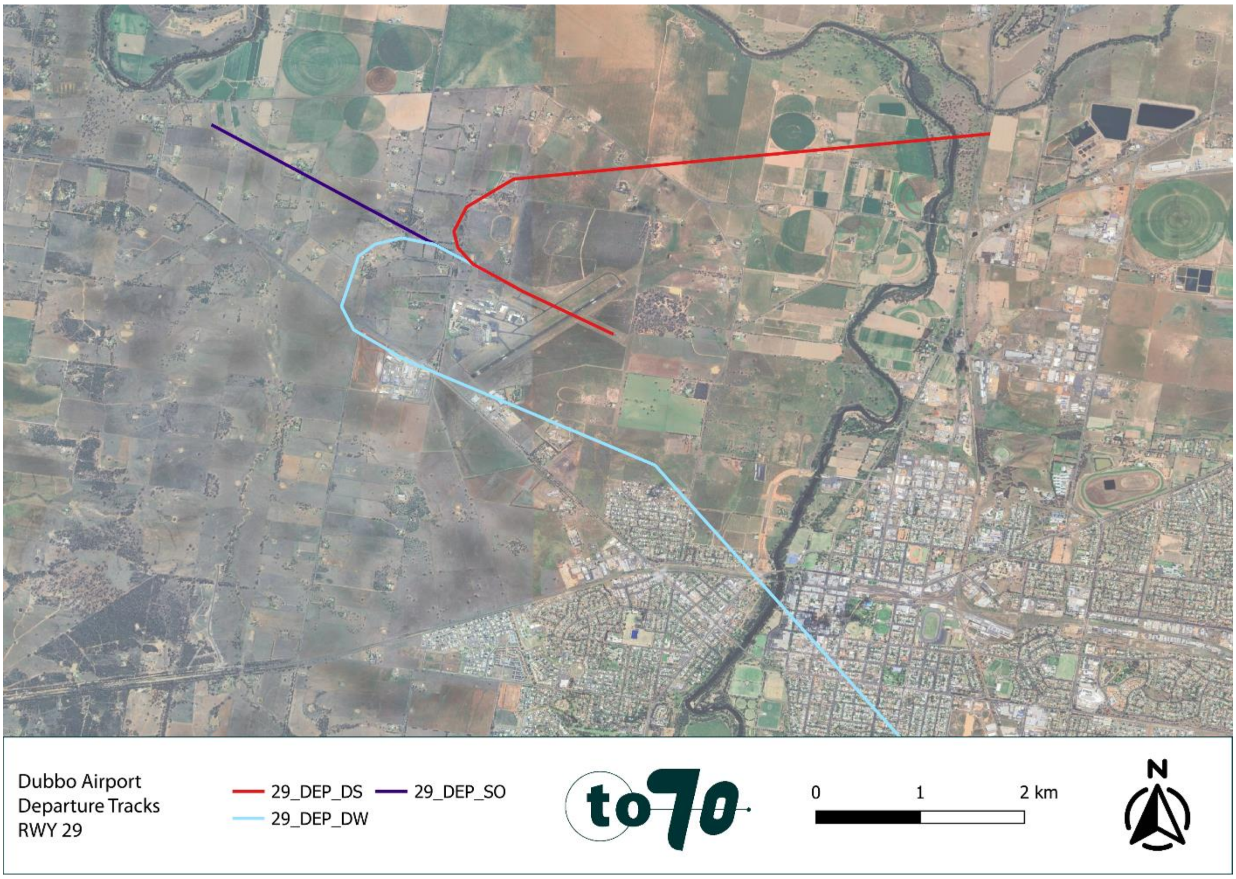


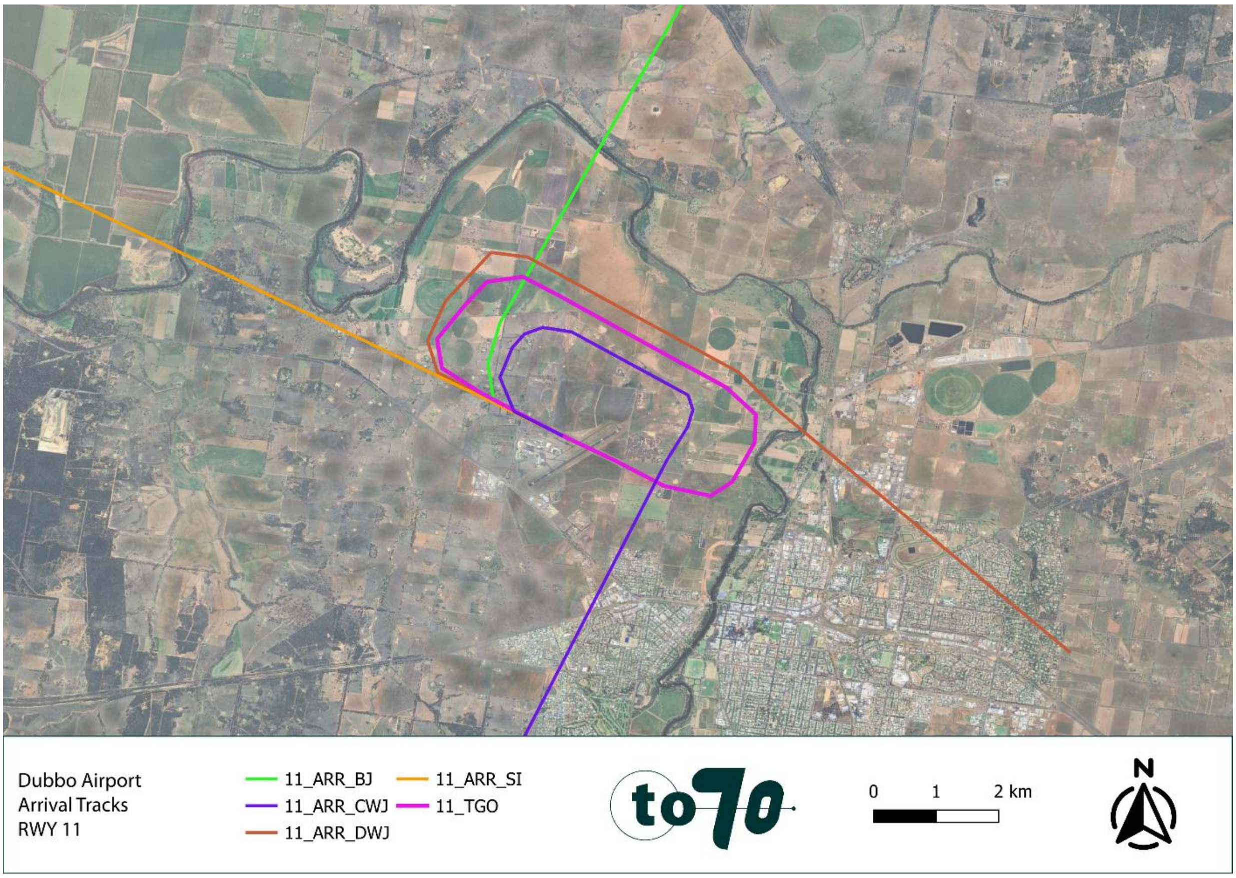

Dubbo Airport
Departure Tracks
RWY 05
05_DEP_1
05_DEP_2
05_DEP_3
05_DEP_4
05_DEP_5
0 1 2 km
N

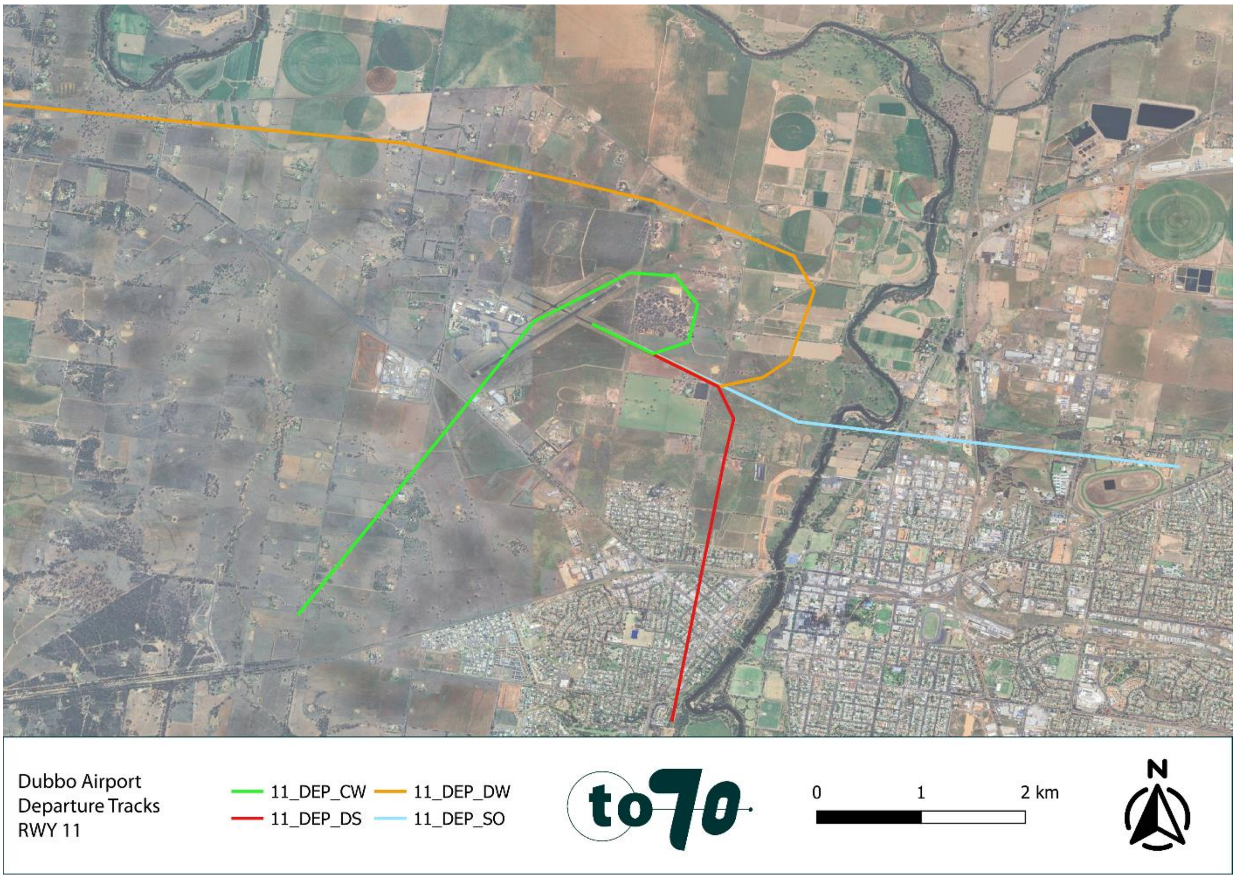

Dubbo Airport
Arrival Tracks
RWY 23
23_ARR_BJ
23_ARR_CW
23_ARR_DW
23_ARR_DW45
23_ARR_SI
23_TGO
0 1 2 km
N

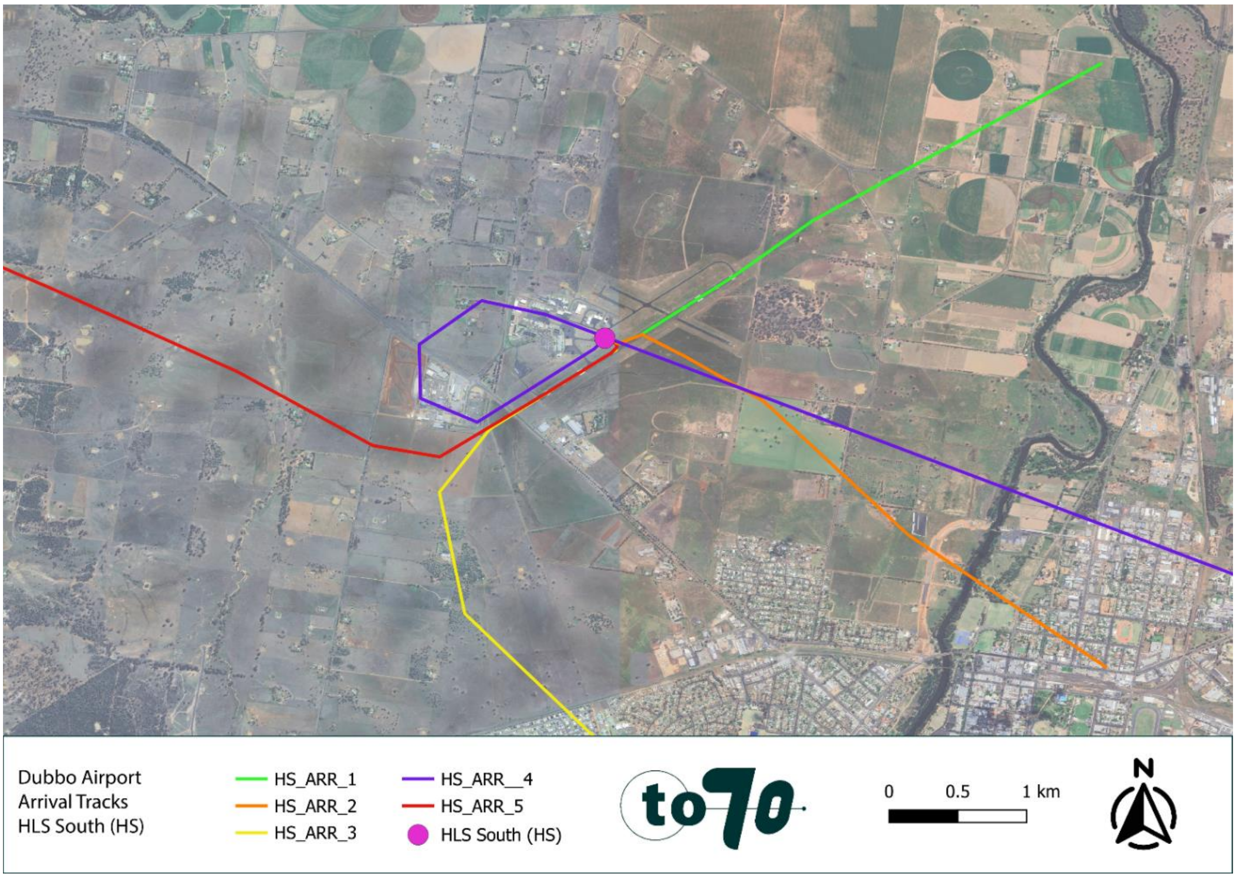

Dubbo Airport
Departure Tracks
RWY 23
23_DEP_1
23_DEP_2
23_DEP_3
23_DEP_4
23_DEP_5
0
1
2 km
N

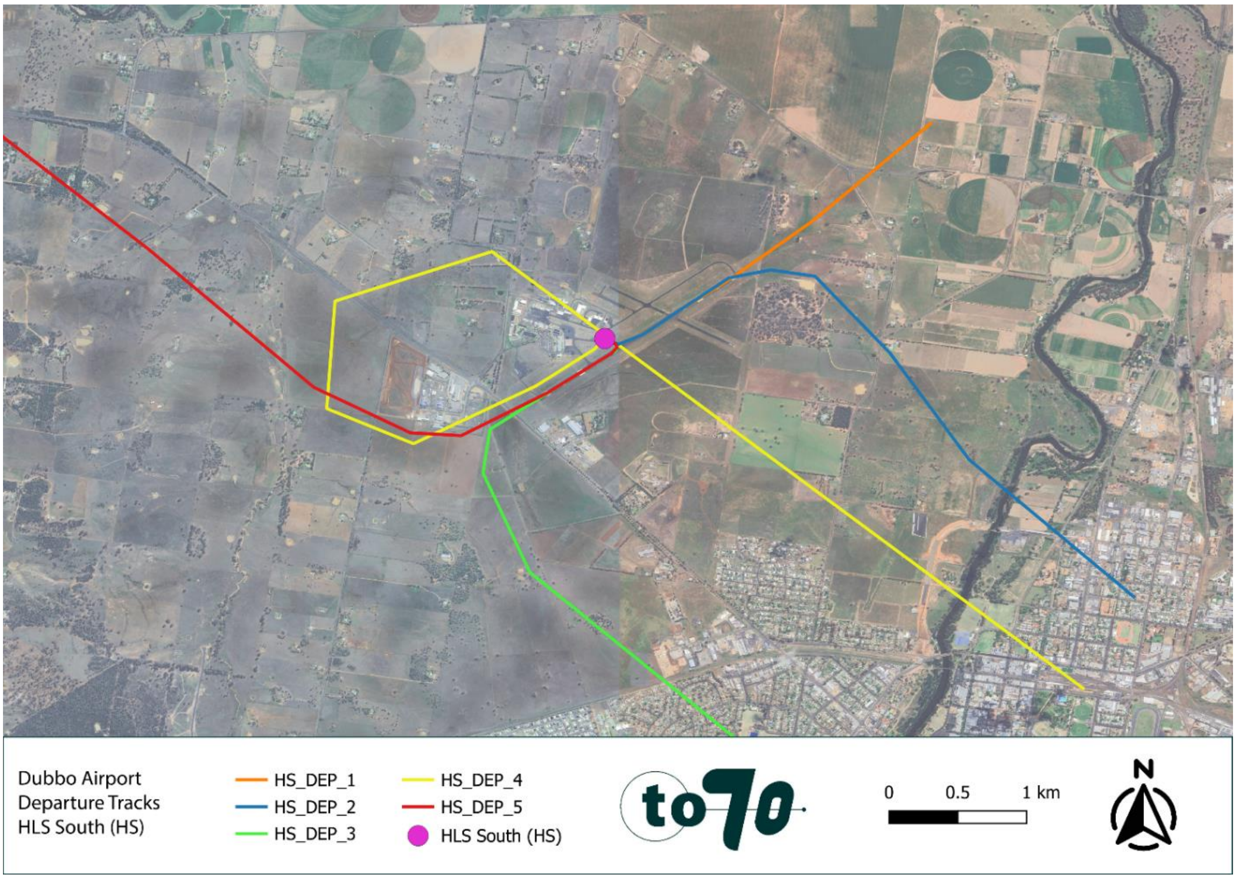

Dubbo Airport
Arrival Tracks
RWY 29
29_ARR_BJ
29_ARR_CWJ
29_ARR_DWJ
29_ARR_SI
29_TGO
0
1
2 km
N

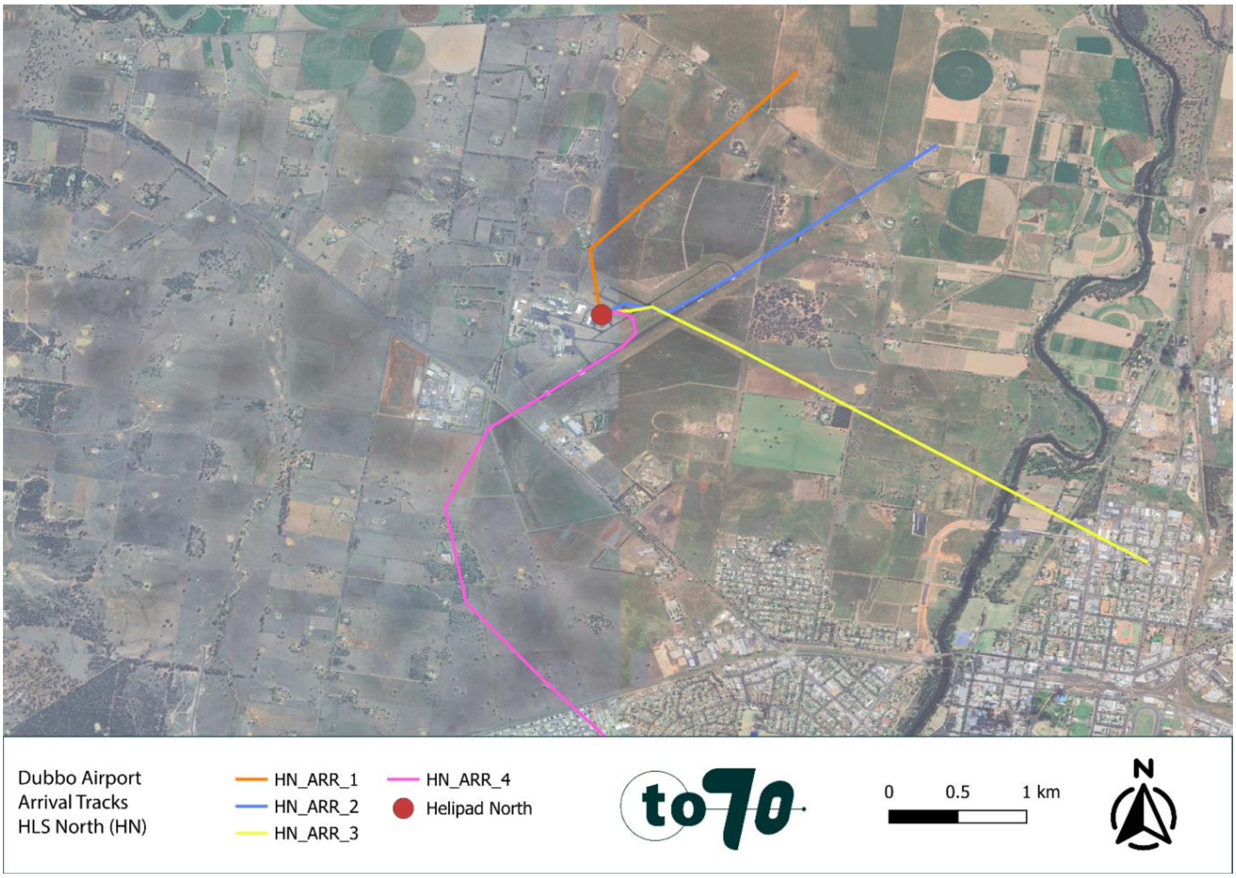

Dubbo Airport
Departure Tracks
RWY 29
29_DEP_DS
29_DEP_DW
29_DEP_SO
0
1
2 km
N

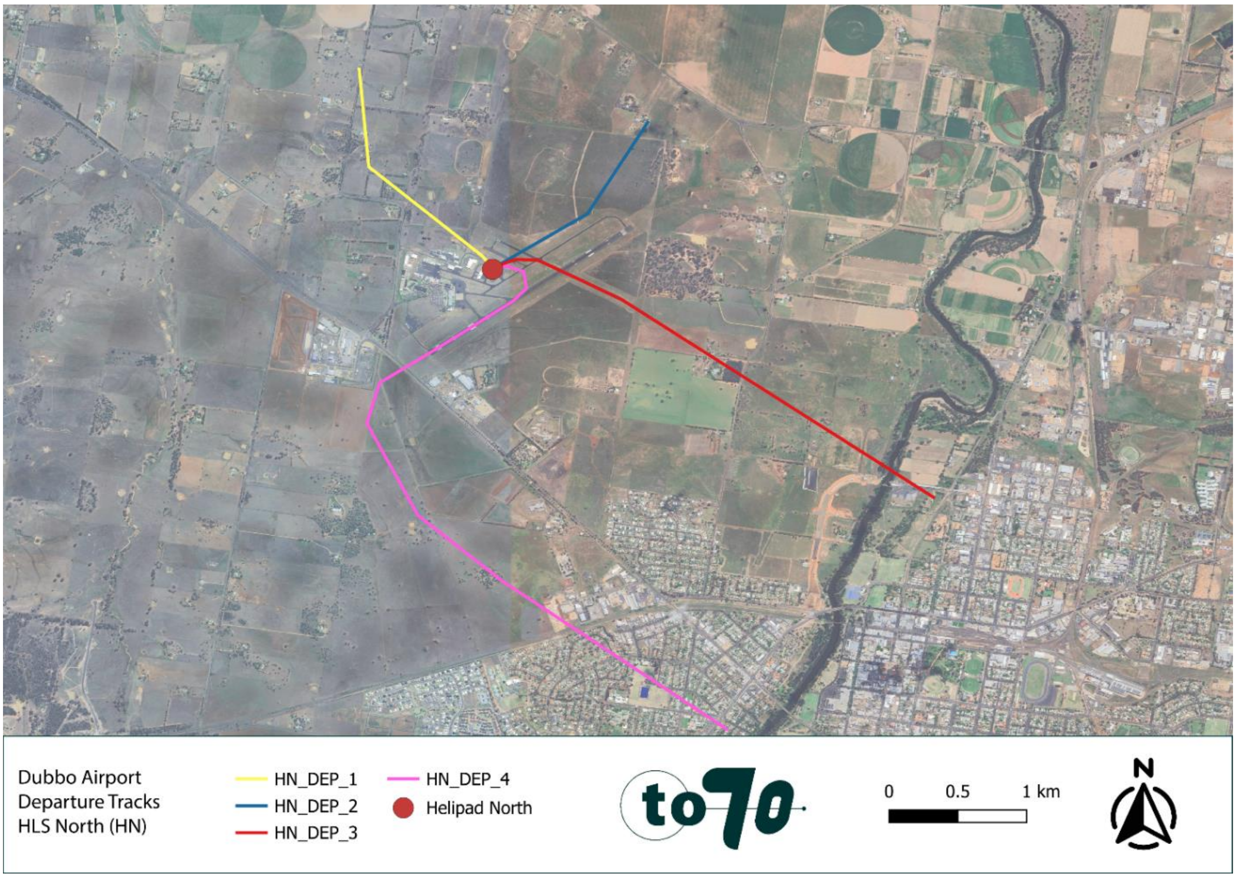

Dubbo Airport
Arrival Tracks
RWY 11
11_ARR_BJ
11_ARR_SI
11_ARR_CWJ
11_TGO
11_ARR_DWJ
0
1
2 km
N


Dubbo Airport
Departure Tracks
RWY 11
11_DEP_CW
11_DEP_DW
11_DEP_DS
11_DEP_SO
0
1
2 km
N


Dubbo Airport
Arrival Tracks
HLS South (HS)
HS_ARR_1
HS_ARR_2
HS_ARR_3
HS_ARR__4
HS_ARR_5
HLS South (HS)
0
0.5
1 km
N


Dubbo Airport
Departure Tracks
HLS South (HS)
HS_DEP_1
HS_DEP_2
HS_DEP_3
HS_DEP_4
HS_DEP_5
HLS South (HS)
0
0.5
1 km
N


Dubbo Airport
Arrival Tracks
HLS North (HN)
HN_ARR_1
HN_ARR_2
HN_ARR_3
HN_ARR_4
Helipad North
0
0.5
1 km
N


Dubbo Airport
Departure Tracks
HLS North (HN)
HN_DEP_1
HN_DEP_2
HN_DEP_3
HN_DEP_4
Helipad North
0
0.5
1 km
N

A.3 Track allocation

Arrival Tracks	RWY 05
05_ARR_DSJ	15%
05_ARR_DW45	10%
05_ARR_DWJ	25%
05_ARR_CWJ	25%
05_ARR_SI	25%

Departure Tracks	RWY 05
05_DEP_5	30%
05_DEP_4	15%
05_DEP_3	25%
05_DEP_2	10%
05_DEP_1	20%

Arrival Tracks	RWY 23
23_ARR_BJ	15%
23_ARR_CW	15%
23_ARR_DW	15%
23_ARR_DW45	15%
23_ARR_SI	40%

Departure Tracks	RWY 23
23_DEP_5	10%
23_DEP_4	15%
23_DEP_3	25%
23_DEP_2	35%
23_DEP_1	15%

Arrival Tracks	RWY 11
11_ARR_BJ	25%
11_ARR_CWJ	25%
11_ARR_DWJ	25%
11_ARR_SI	25%

Departure Tracks	RWY 11
11_DEP_CW	20%
11_DEP_DS	20%
11_DEP_DW	20%
11_DEP_SO	40%
11_DEP_CW	20%

Arrival Tracks	RWY 29
29_ARR_BJ	20%
29_ARR_CWJ	20%
29_ARR_DWJ	20%
29_ARR_SI	40%

Departure Tracks	RWY 29
29_DEP_DS	33%
29_DEP_SO	34%
29_DEP_DW	33%
29_DEP_DS	33%
29_DEP_SO	34%

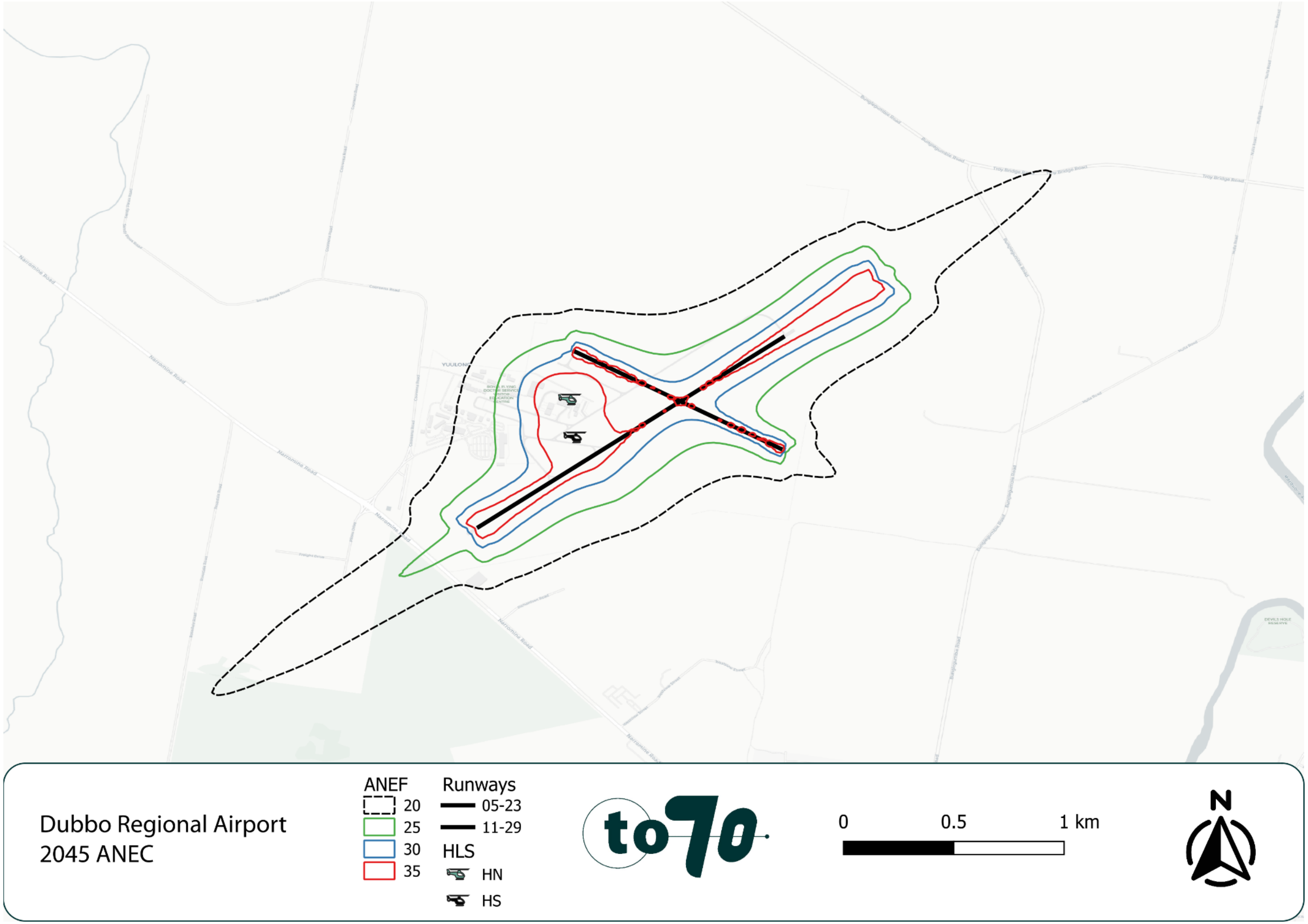
Helipad North Tracks	HN
HN_ARR_1 HN_DEP_1	25%
HN_ARR_2 HN_DEP_2	25%

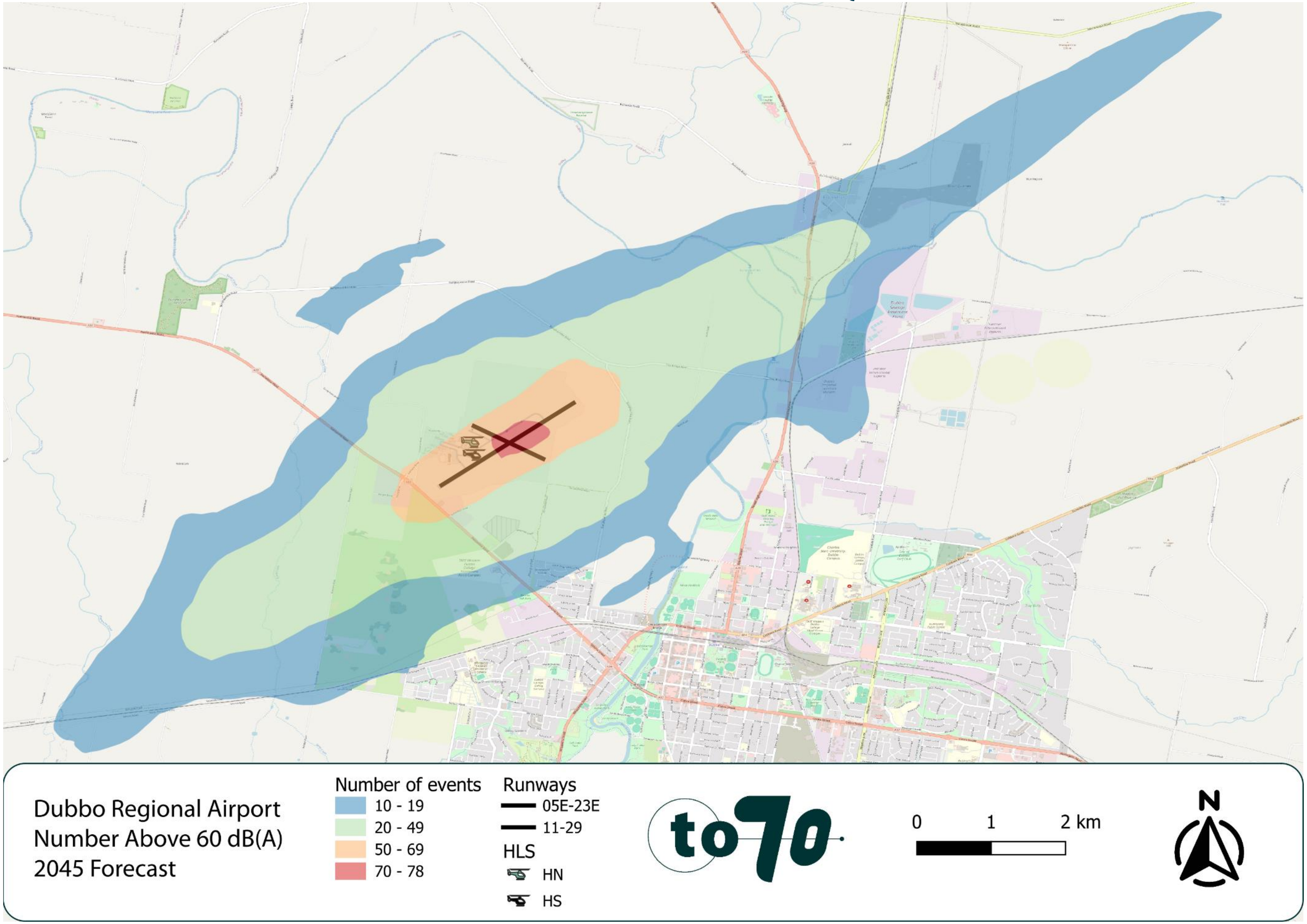
Helipad South Tracks	HS
HS_ARR_1 HS_DEP_1	20%
HS_ARR_2 HS_DEP_2	20%

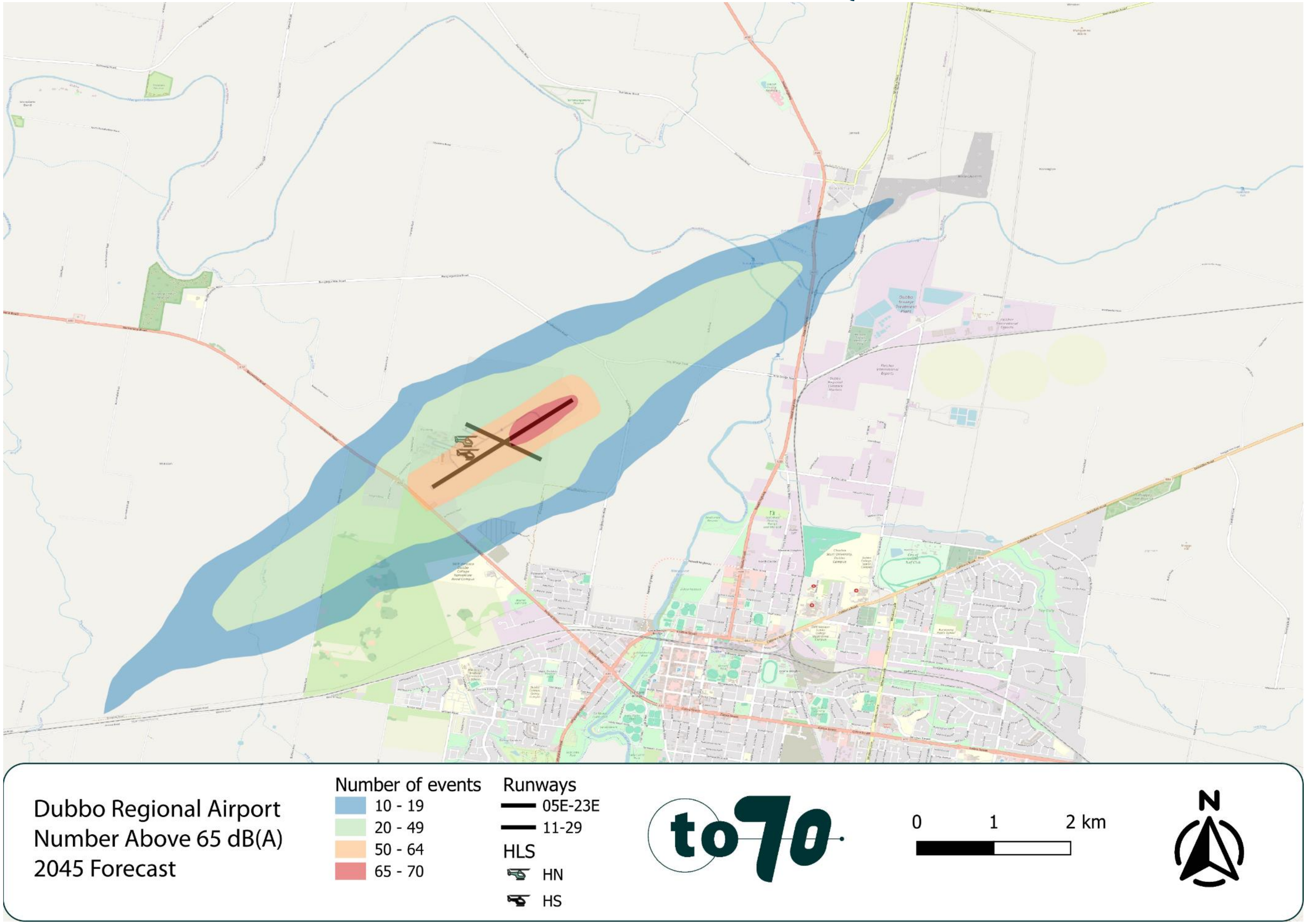
HN_ARR_3 HN_DEP_3	25%
HN_ARR_4 HN_DEP_4	25%

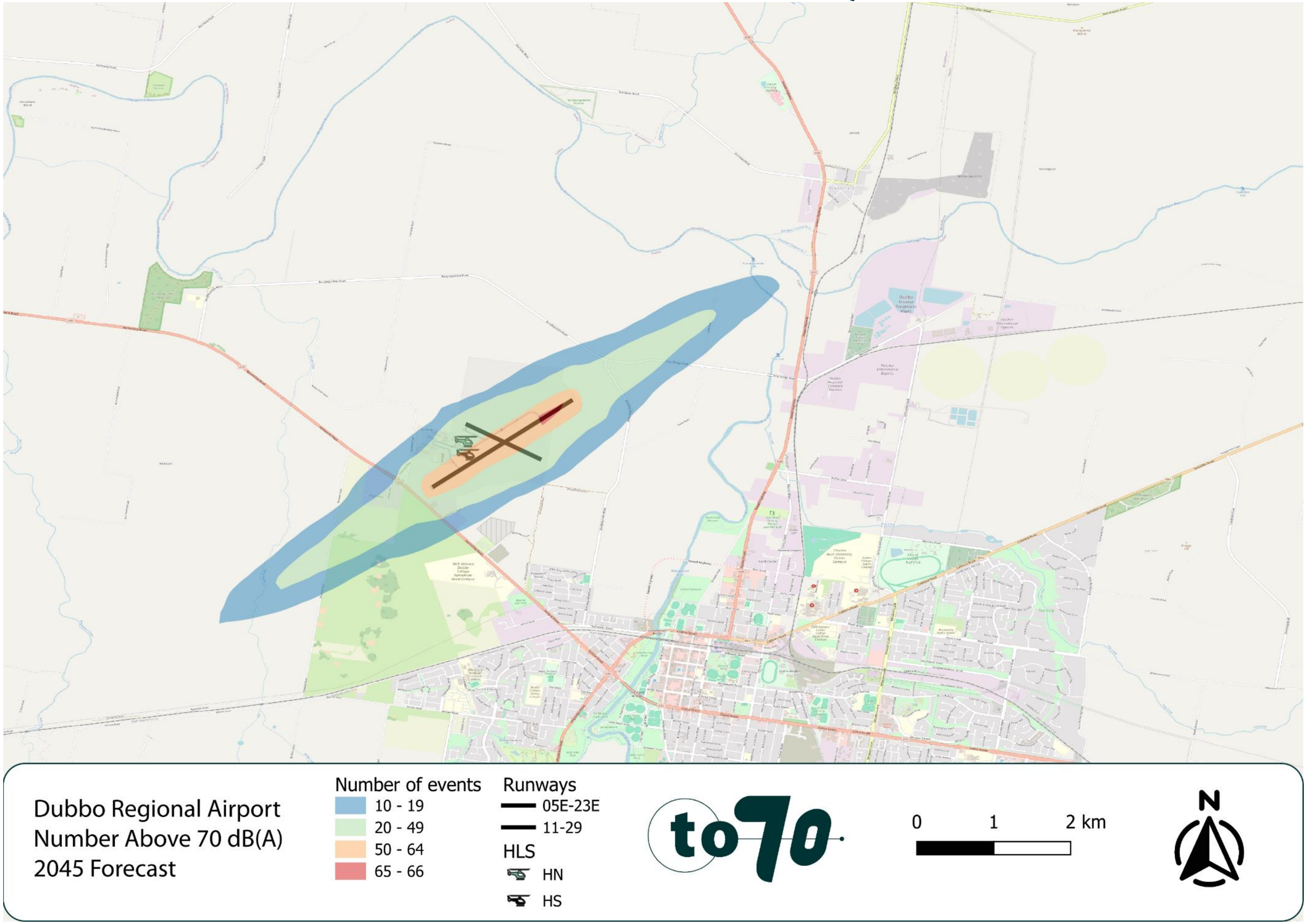
HS_ARR_3 HS_DEP_3	20%
HS_ARR_4 HS_DEP_4	20%
HS_ARR_5 HS_DEP_5	20%

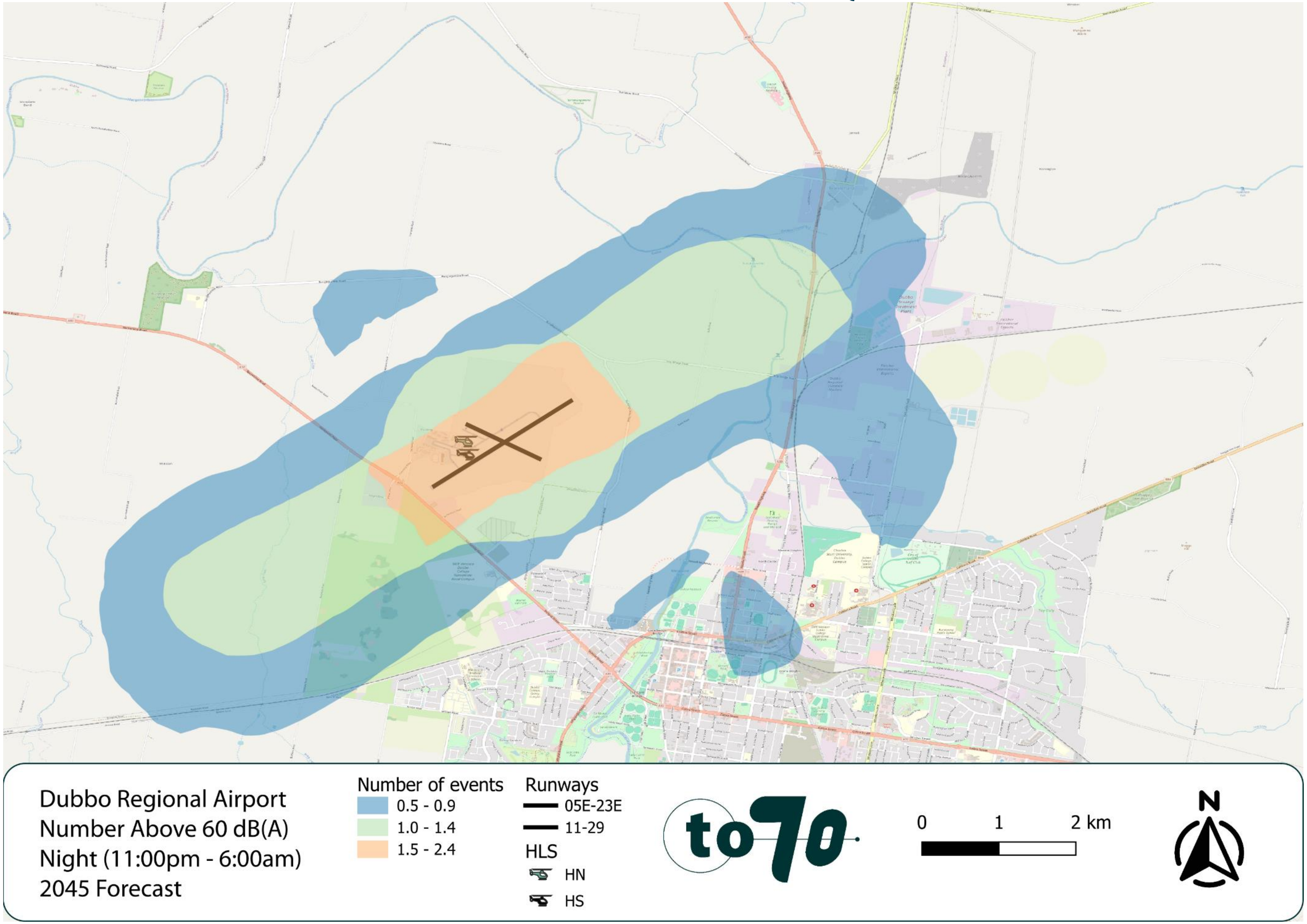
A.4 ANEC and N Contours Result

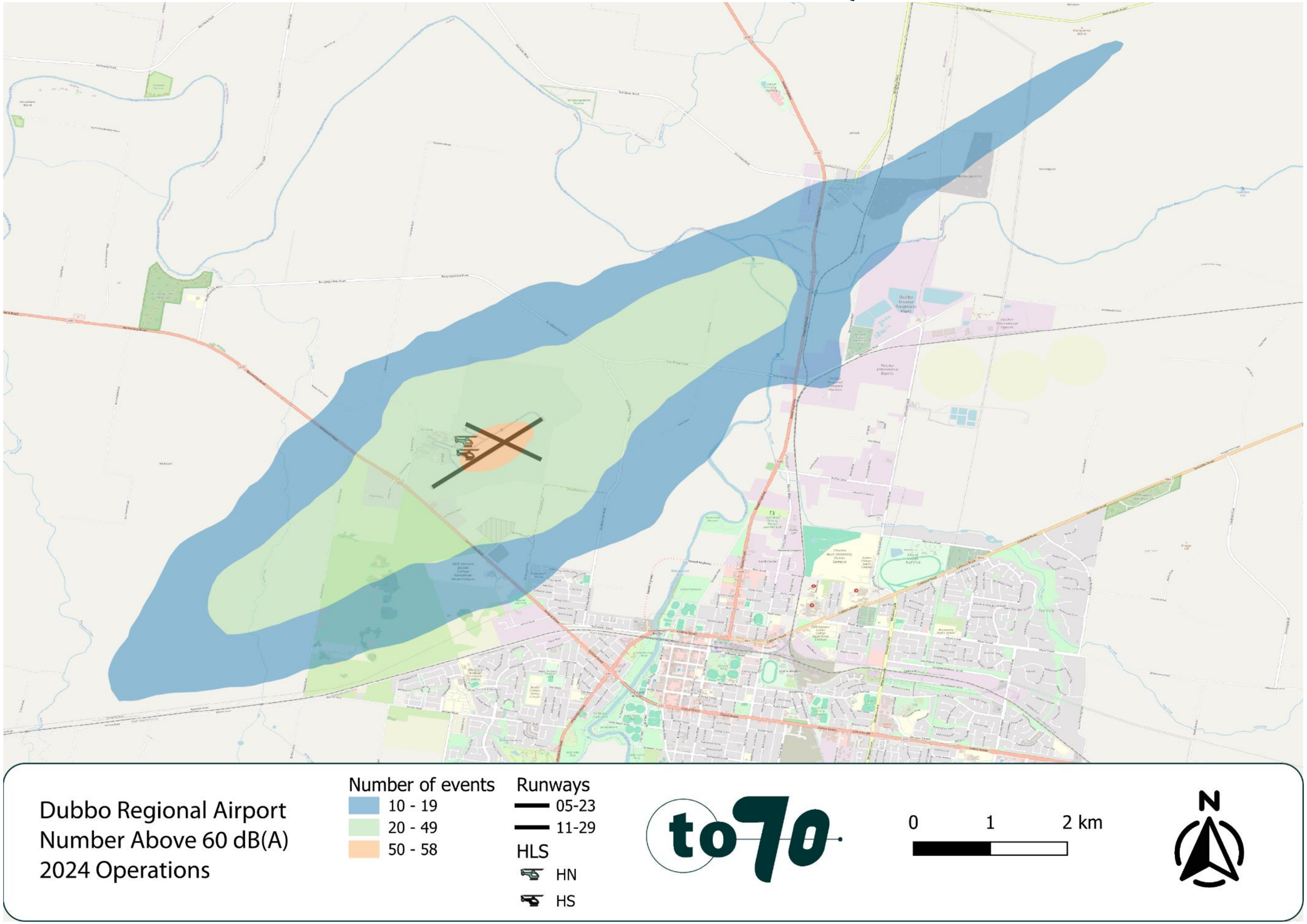


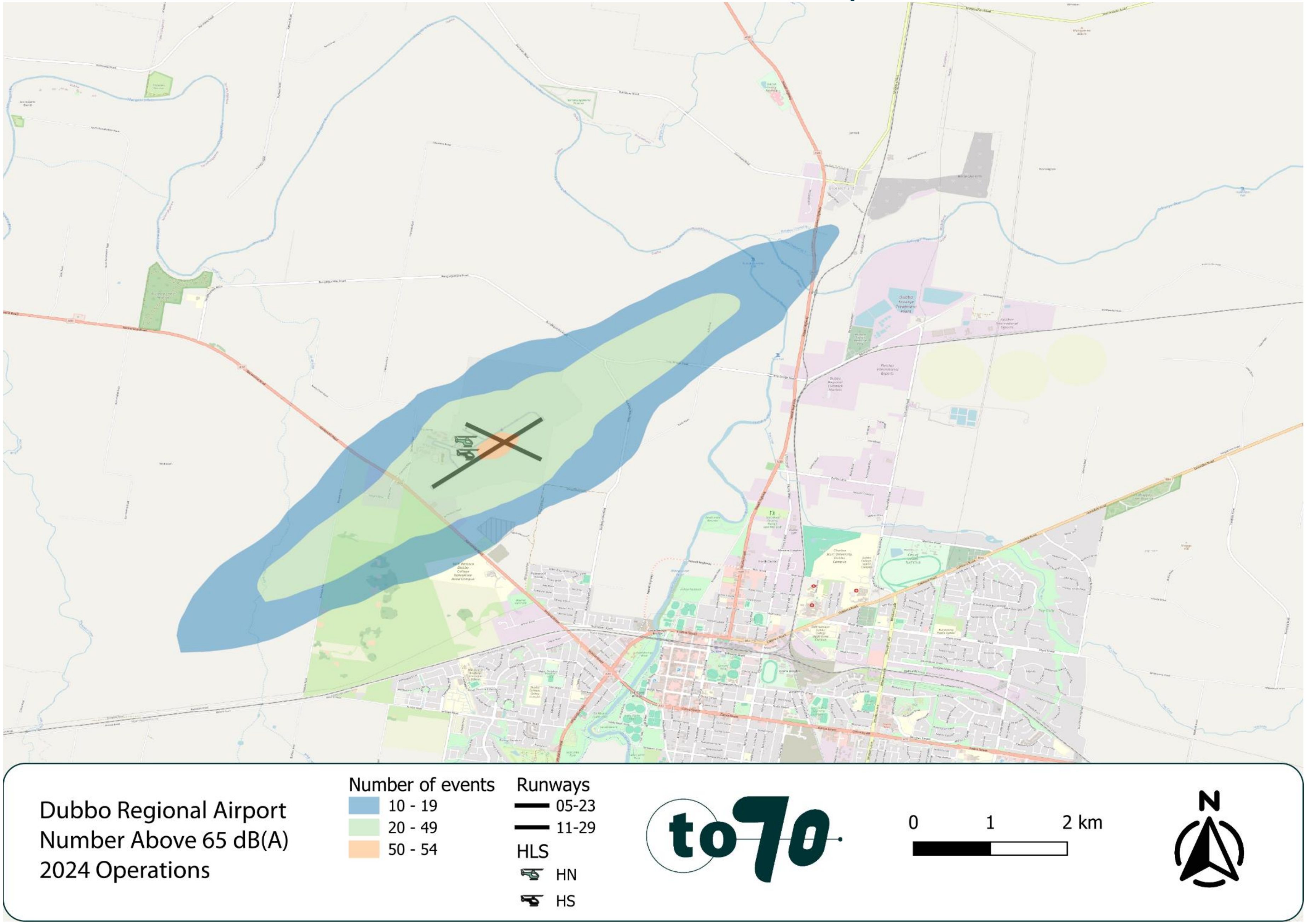

Dubbo Regional Airport
Number Above 60 dB(A)
2045 Forecast
Number of events
10 - 19
20 - 49
50 - 69
70 - 78
Runways
05E-23E
11-29
HLS
HN
HS
0
1
2 km
N

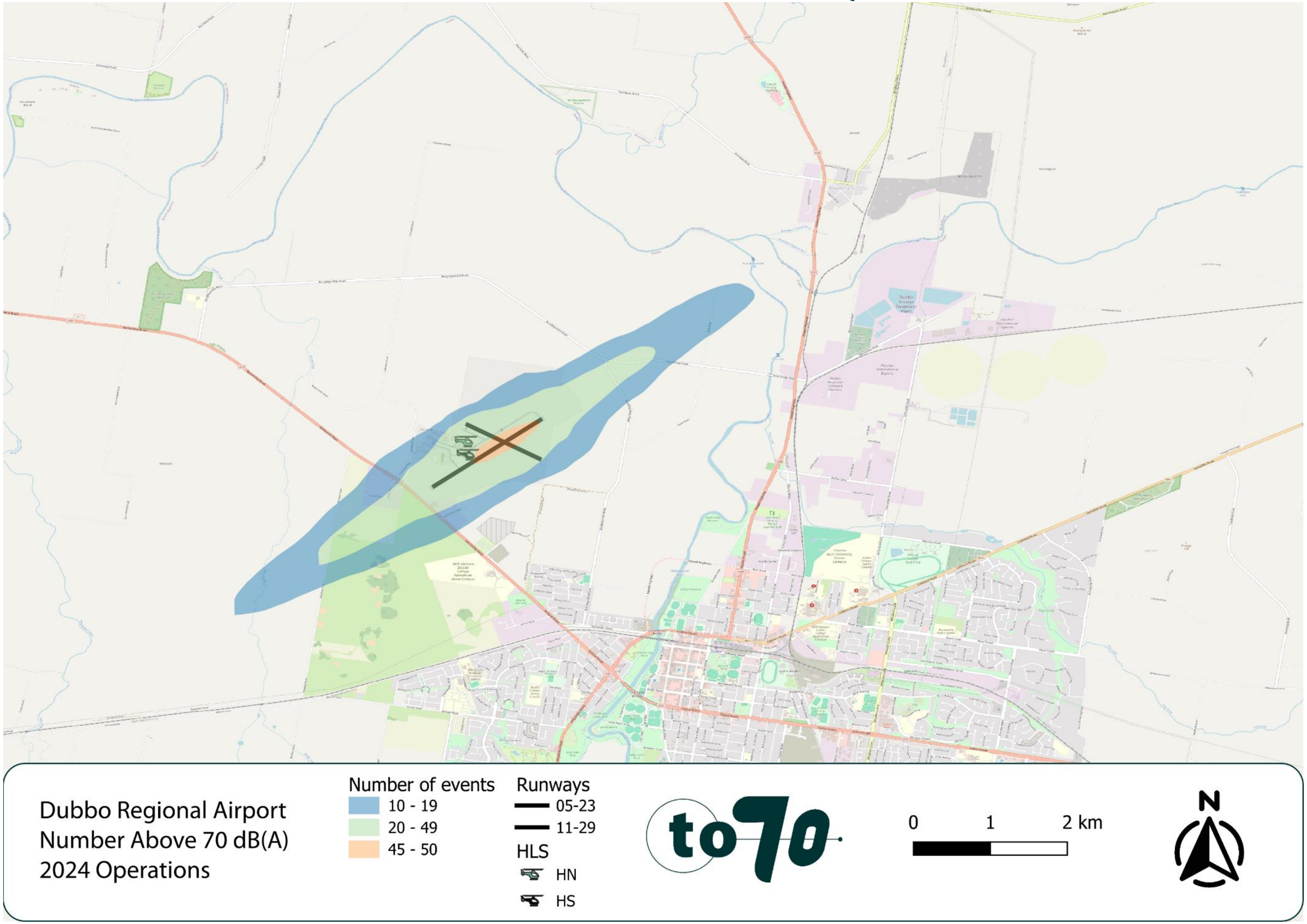

Dubbo Regional Airport
Number Above 65 dB(A)
2045 Forecast
Number of events
10 - 19
20 - 49
50 - 64
65 - 70
Runways
05E-23E
11-29
HLS
HN
HS
0
1
2 km
N

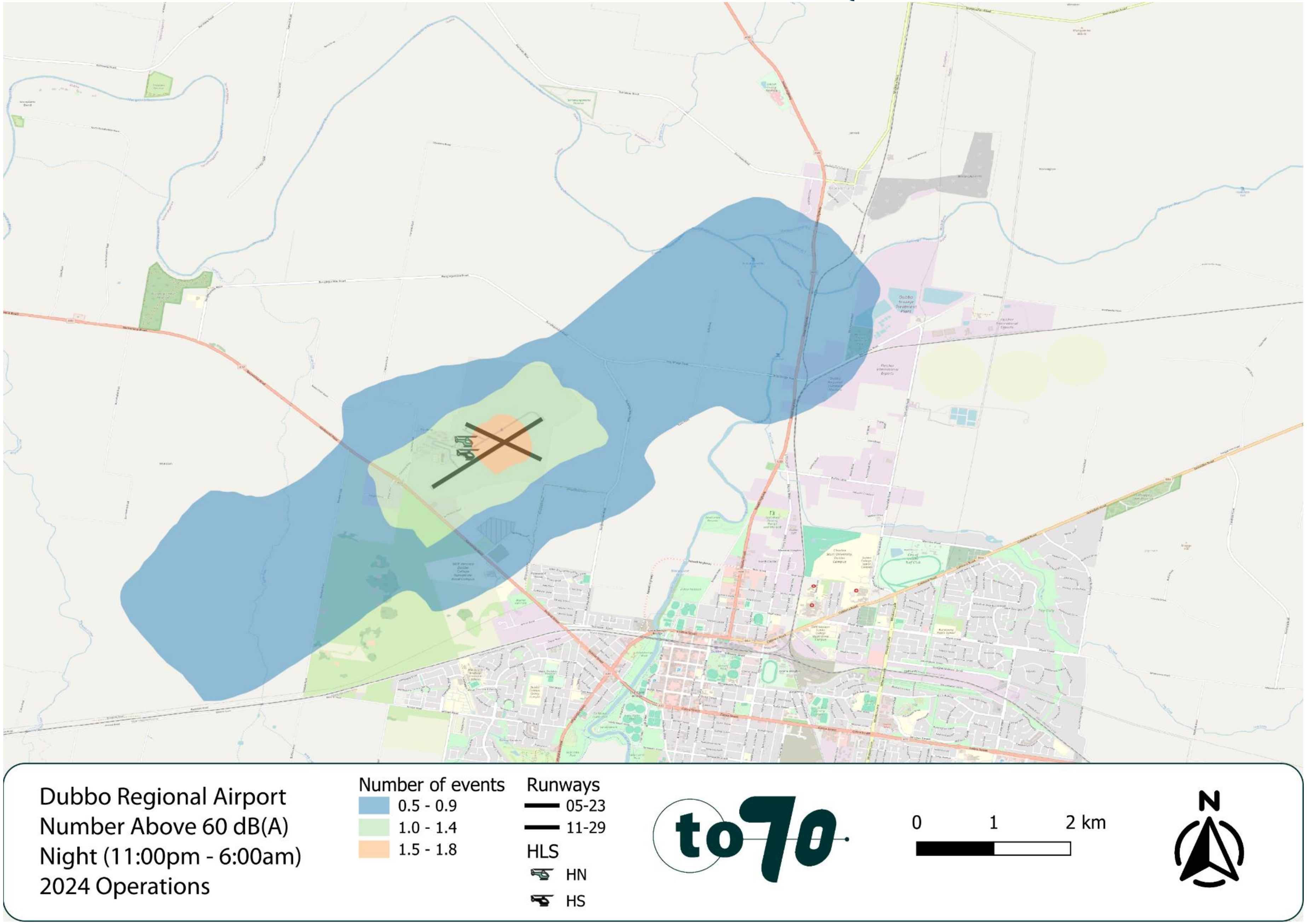

Dubbo Regional Airport
Number Above 70 dB(A)
2045 Forecast
Number of events
10 - 19
20 - 49
50 - 64
65 - 66
Runways
05E-23E
11-29
HLS
HN
HS
0
1
2 km
N


Dubbo Regional Airport
Number Above 60 dB(A)
Night (11:00pm - 6:00am)
2045 Forecast
Number of events
0.5 - 0.9
1.0 - 1.4
1.5 - 2.4
Runways
05E-23E
11-29
HLS
HN
HS
0
1
2 km
N


Dubbo Regional Airport
Number Above 60 dB(A)
2024 Operations
Number of events
10 - 19
20 - 49
50 - 58
Runways
05-23
11-29
HLS
HN
HS
to70
0
1
2 km
N


Dubbo Regional Airport
Number Above 65 dB(A)
2024 Operations
Number of events
10 - 19
20 - 49
50 - 54
Runways
05-23
11-29
HLS
HN
HS
0
1
2 km
N


Dubbo Regional Airport
Number Above 70 dB(A)
2024 Operations
Number of events
10 - 19
20 - 49
45 - 50
Runways
05-23
11-29
HLS
HN
HS
0
1
2 km
N


Dubbo Regional Airport
Number Above 60 dB(A)
Night (11:00pm - 6:00am)
2024 Operations
Number of events
0.5 - 0.9
1.0 - 1.4
1.5 - 1.8
Runways
05-23
11-29
HLS
HN
HS
0
1
2 km
N

Brisbane Melbourne
Bangkok Bengaluru Shanghai Singapore
Brussels Frankfurt Geneva London Milan The Hague
Toronto
Bogota São Paulo