Aircraft Noise Community Consultative Group - Glossary of Terms

(Version 2 - as at 30.05.2022)

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Introduction

The following glossary was prepared in response to a suggestion at an Aircraft Noise Community Consultative Group (ANCCG) meeting in 2019. The Quarterly and Annual Noise reports presented to the ANCCG include glossaries but the scope is limited with the focus primarily on noise. The wider aviation, resource management and other terms that arise in ANCCG discussions are not covered.

Non-industry members of the ANCCG are typically not technical experts in these areas. That results in "information asymmetry" i.e. industry members have more or better information/knowledge than the other party. As a consequence, the ability of non-industry members to effectively pursue the purpose and activities of the ANCCG can be constrained due to insufficient understanding. To help overcome that asymmetry industry ANCCG members (Auckland Airport, Airways, BARNZ) and supporting organisations, that attend the meetings from time to time, put considerable effort into explaining terms and providing educational and briefing information. That is very much a credit to them and is appreciated.

To further assist in overcoming the information divide, this glossary was drafted on a voluntary basis drawing on my experience as a non-industry, lay member of the Aircraft Noise Community Consultative Group (ANCCG). However, it does have limitations, as set out in the disclaimer below. This is the second iteration of the glossary which can be refined and improved over time to better assist non-industry ANCCG members, while at the same time not offending the professional, technical expertise of industry members.

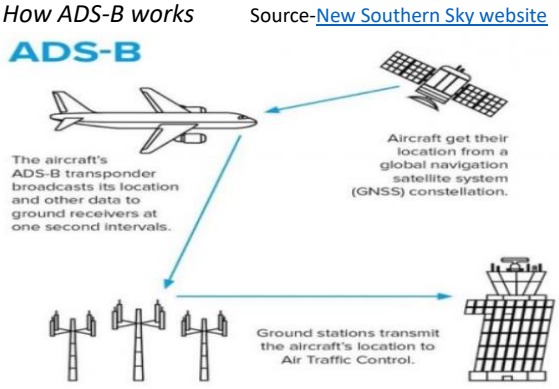
Limitation Disclaimer

The glossary that follows has been prepared by with the aim of providing high level, overview explanations of terms and industry matters sufficient for non-experts i.e. lay people. It is focused on terms that arise in the Aircraft Noise Community Consultative Group (ANCCG) which is established under Designation 1100 of the Auckland Unitary Plan. That means terms are defined in a manner that is relevant for the Auckland environment, not necessarily for other parts of New Zealand or elsewhere.

The glossary draws on and is adapted from documents and information provided to the ANCCG over the years and on numerous websites with free, publicly available information. It does not purport in any way to give full, detailed technical definitions. **While in most cases it is likely to be very accurate and useful, for any number of editorial or other reasons, it might not be. <u>There may be errors</u>.** Please use your good judgement when using this resource and do not rely on it in any way for legal or other such purposes.

Catherine Harland
Independent Chair ANCCG
30 May 2022

A	
AACT	Auckland Airport Community Trust provides financial assistance to help with the installation of a noise mitigation package to some homes that fall within the Annual Aircraft Noise Contours moderate aircraft noise area. The Trust is also passionate about helping the community thrive and grow and provides community grants to support that. AACT was established in 2003 by AIAL as a condition of the Environment Court following approval for the company to build a second runway at Auckland Airport. The court decision (A143/2001) specified that $250,000 per annum (adjusted by the consumer price index each year) should be contributed by the company to the Trust, and be distributed as a 'noise mitigation' fund. The AUP (Designation 1100) updates that figure and requires AIAL to contribute $340,670 (in 2017 NZD terms) per annum plus GST (if any), adjusted annually by the CPI (All Groups) from October 2017. Since 2003 the Trust has distributed over $5.2 million grants to over 200 organisations. These grants are awarded to support the communities living within current and projected noise-affected areas in the vicinity of Auckland Airport with a focus on uplifting education outcomes in the Manukau area. Two Trustees are appointed by AIAL, two Trustees are appointed from the community by the Council, and one Trustee is appointed by the ANCCG. See AACT website, See Designation 1100 Aircraft Noise Mitigation Fund, conditions 11, 12, 12A

AANC	Annual Aircraft Noise Contour – means an L_{dn} contour published by AIAL annually as a prediction of noise from Aircraft Operations for the following 12 months / financial year (excluding noise excepted from the limit in conditions 5 and 6, or by virtue of condition 8 of Designation 1100). The AANC is used to identify the homes that are located within the predicted HANA and MANA where the Airport is required to offer a sound insulation subsidy to property owners (see Noise Mitigation Package).
ACI	Airports Council International.
ADS-B	Automatic Dependent Surveillance - Broadcast. A cooperative surveillance technology. An aircraft accurately identifies its position via satellite navigation and periodically broadcasts that information (up to twice a second) via a transponder, enabling it to be tracked. The data on its identification, position, altitude, speed and intention can be received by air traffic control services to maintain aircraft separation as a replacement for secondary radar. It can also be received by other aircraft to provide situational awareness and allow self separation. MoT Technical terms and acronyms (23/05/2018), CAA & Avsec NSS ADS-B in New Zealand 31.07.2018 V0.3
How ADS-B works	Source-New Southern Sky website 

ADS-B continued	The Minister of Transport amended CAA Rule Part 91 allowing all controlled airspace within NZ's domestic airspace to be designated as ADS-B mandatory from 1 December 2021. If an aircraft cannot practicably or reasonably be equipped with an ADS-B system due to the characteristics of the aircraft type it may be permitted to operate within a prescribed airspace if it has obtained specific authorisation from the ATC unit having jurisdiction over the relevant airspace as part of the ATC clearance to enter that airspace. There are two components of ADS-B. ADS-B OUT is primarily used for surveillance purposes and transmits information from equipped aircraft to ground ADS-B receivers to be used for air traffic control. ADS-B IN improves situational awareness for aircraft and air traffic control, and uses on-board receivers to collect information from other aircraft. There are no plans to make ADS-B IN mandatory in New Zealand. See 5 Feb 2020 Released Cabinet Paper "Moving to ADS-B, New Zealand's new, safer aviation surveillance system"; Final Rule CAR Part 91 Amendment 34, effective 1 Dec 2021
Aerodrome	(a) means any defined area of land or water intended or designed to be used either wholly or partly for the landing, departure, and surface movement of aircraft; and (b) includes any buildings, installations, and equipment on or adjacent to any such area used in connection with the aerodrome or its administration. See- Civil Aviation Act 1990 s2; and CAR Part 1 CAA Consolidation, Definitions and Abbreviations, 01 Dec 2021, p24
Aeropath	Aeropath is an aeronautical information management (AIM) and navigation services provider with experience across 22 countries. It offers procedure and airspace design, performance based navigation (PBN), training and aeronautical data services that support customers in the evolution from AIS (aeronautical information services) to AIM, high quality, on time aeronautical information. Aeropath is responsible for the production and distribution of Aeronautical Information Publications (AIP), for NZ and a number of Pacific States. It is an independent company wholly owned by Airways NZ. See Aeropath website
AIAL	Auckland International Airport Limited. (Under the AUP Designation 1100, AIAL has two representatives on the ANCCG).
AIC	Aeronautical information circular.
AIP	Aeronautical Information Publication is a set of documents that provide all the operational information required for safe national and international air navigation within NZ airspace. It is produced by Aeropath under contract to CAA. It follows a standard format specified by ICAO and used around the world for publishing information about each nation's aviation system, including national regulations and requirements, meteorological systems, en-route information, air traffic control, ATS routes, aerodrome information and various charts such as aeronautical charts, visual charts and aerodrome obstacles. Each aerodrome has a separate section in the AIP. There are set deadlines for when changes (termed supplements) to the AIP must be submitted to Aeropath. Access via CAA website, AIP New Zealand website or AIP Shop website

Airport	For ANCCG purposes, this means Auckland International Airport.
Airport Precinct	The land owned by AIAL which covers an area of approximately 1,500 hectares. Chapter I of the AUP sets out details of the Auckland Airport Precinct including amongst other matters the policies, objectives, activities, standards and assessment criteria. See AUP Chapter I402, operative in part 15 Nov 2016
Airside	The movement area of an aerodrome and its adjacent terrain and buildings or portions, to which access is controlled.
Airways	Airways Corporation of New Zealand Limited (Under the AUP Designation 1100, it has one ANCCG representative). Airways is NZ's air navigation service provider. The company manages NZ's FIR (30 million square kilometres of airspace) providing air traffic control, surveillance, communication, flight inspection, mapping and airspace design services. Its staff deliver services throughout NZ and in over 65 countries. Airways was established in 1987, is a State Owned Enterprise and operates under rules set down by the CAA, which are developed using the ICAO's guidelines. See Airways website About Airways and The Treasury website
Ambient noise	Total noise level in a specified environment. NZS 6805: 1992 definition - The totally encompassing sound in a given situation at a given time, from all sources near and far including the specific sound.

ANB	Air Noise Boundary – Term set out in the NZS 6805: 1992. For Auckland Airport that equates to the boundary of the HANA where noise levels must not exceed 65 dB L_{dn}.
ANC	Actual Noise Contours – Represents the actual aircraft activity that occurred in a financial year and uses the measured noise levels at three permanent noise monitoring locations associated with the existing AIAL runway (Puhunui School, Prices Road, Velodrome).
ANCCG	Aircraft Noise Community Consultative Group.
ANCCG Local Board Represen-tatives	Under the AUP Designation 1100, members are appointed by the following 12 Local Boards: Māngere- Ōtāhuhu, Ōtara- Papatoetoe, Manurewa, Howick, Franklin, Maungakiekie-Tāmaki, Albert-Eden, Puketāpapa, Whau, Ōrākei, Waitākere Ranges, Papakura. When appointing its representative Local Boards have often chosen to appoint an alternate member to attend when the primary appointee is unavailable.
ANMR	Annual Noise Management Report - Each year under Condition 9(b) of Designation 1100, AIAL is required to prepare an ANMR which summarises the measurements and modelling required by Condition 5(d) and identifies past and future initiatives for noise reduction.
ANNA	Aircraft Noise Notification Area - an area that is outside the HANA and MANA and that will have future noise levels between 55 and 60dB L_{dn}. This is an AUP term specific to managing noise at Auckland Airport.

Apron (APN)	Is a defined area on a land aerodrome intended to accommodate aircraft for the purpose of loading or unloading passengers or cargo, refuelling, parking or maintenance. See CAR Part 1 CAA Consolidation, Definitions and Abbreviations, 1 Dec 2021, p34
ASAN	Activities Sensitive to Aircraft Noise. Means any dwellings, boarding houses, tertiary education facilities, marae, integrated residential development, papakāinga, retirement village, supported residential care, educational facilities, care centres, hospitals and healthcare facilities with an overnight stay facility. See Designation 1100, Conditions (1) p2
ATC	Air Traffic Control.
ATM	Air Traffic Management.
ATS	Air Traffic Services – A set of services including air traffic control, flight information service, aerodrome flight information service (AFIS), alerting service, and any other service considered by the Director of Civil Aviation to be necessary or desirable for the safe and efficient operation of the civil aviation system. See AIP NZ Definitions GEN2.2-33
Auckland Council Represen-tative	Under the AUP Designation 1100, one ANCCG representative is appointed by Auckland Council.
AUP	Auckland Unitary Plan. The key provisions relating to Auckland Airport are Designation 1100, 1101 and 1102 which among other things create the ANCCG and its Terms of Reference, set the noise contours (HANA, MANA and ANNA), specify the activities which can be undertaken within the noise contours, require a FANC to be specified each year, set noise monitoring requirements, create the obligation to offer noise mitigation packages and set the specifications of the offers, require an Annual Noise Management Report and create a Noise Mitigation Fund administered by trustees of the AACT with annual specified contributions by Auckland Airport. See Designation Schedule - AIAL
Aviation Industry Association of New Zealand Inc. (AIA)	Is a membership organisation established in 1950 to champion safety, represent member interests and help them be more effective in business. See Aviation NZ website
Avsec *Kaiwhakamaru Rererangi*	Aviation Security Service - Avsec is an operational unit within CAA. It provides services that include: • Screening and searching passengers, crew, airport workers, baggage, aircraft, cargo, etc • Undertaking security patrols and escorts • Managing the airport identity card system • Collaborating with other domestic and international security and border agencies. See website "Our role in aviation security"
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear. The human ear responds more to frequencies between 500 hertz (Hz) and 8 kHz and is less sensitive to very low and very high frequency sounds. The response also varies with sound level. To mimic the sensitivity of the human ear, sound level meters are equipped with filters, or settings, that apply frequency weightings.

	The most commonly used filter is the "A-weighting" which reduces the sensitivity of the sound measuring instrument to both low and very high frequency sounds. "A-weighting" is widely adopted and approved for measuring environmental or outdoor community noise, including aircraft noise.
B	
BARNZ	Board of Airline Representatives of New Zealand. A not-for-profit incorporated society, BARNZ is the voice of NZ's airline industry. It works with Government, regulators, businesses and local communities to provide cost savings and service improvements for its 28 airline and 5 non-airline members; and to create an environment that fosters continued, sustainable growth for them in NZ. Under the AUP Designation 1100, BARNZ has two representatives on the ANCCG. See BARNZ website
C	
CAA *Te Mana Rererangi Tūmatanui o Aotearoa*	Civil Aviation Authority of New Zealand - The CAA is a Crown Entity responsible to the Minister of Transport. It regulates civil aviation in NZ, establishing civil aviation safety and security standards, and monitoring adherence to those standards. It also enforces the ICAO's standards and regulations in NZ. See CAA website
CAA CAR	CAA Civil Aviation Rules – these are the NZ aviation rules that have been signed into law by the Minister of Transport.
CAR 91	Civil Aviation Rule Part 91 – Outlines the general operating and flight rules, visual flight rules (VFRs), instrument flight rules (IFRs) and other requirements to operate aircraft in New Zealand airspace. See consolidation documents issued via CAA website latest date 1 December 2021
CAR 93	Civil Aviation Rule Part 93 - Stipulates the special operating traffic rules and noise abatement procedures around certain aerodromes in New Zealand including for AIAL. These rules are in addition to the rules for aerodrome traffic prescribed in Part 91. It includes details of the Auckland noise abatement area (93.63), Departure (93.59) and Approach (93.61) noise abatement procedures and procedures that apply when using the existing AIAL runway between the hours of 2300 and 0600 by pilots of turbo-jet or turbo-fan powered aeroplanes (93.65). See latest consolidation document, 24 Sep 2015, via CAA website
CASPER	Is a Dutch company that specialises in easy-to-use aviation noise and operations monitoring solutions for airports worldwide. It provides AIAL with some noise monitoring equipment and an online flight monitoring system so members of the public are able to view the aircraft using Auckland Airport, and make a complaint/ enquiry about aircraft noise. The CASPER tracking system combines information from air traffic control radar and the airport's noise and operations monitoring system to give an accurate picture of air traffic movements. Information first becomes available 25 minutes after flight movements have occurred, to maintain aviation security and ensure accurate information has been processed.

	The information remains online for public use for 30 days. Noise concerns or enquiries are submitted via Casper located at https://flighttracking.casper.aero/akl/
Community Represen-tatives	Under the AUP Designation 1100, two members are appointed to the ANCCG by the Chair, Council Representative and one AIAL Representative. One community representative must live within the Aircraft Noise Areas.
Control Tower	An elevated facility for air traffic control in the vicinity of an airport, so controllers can view the extremities of the airfield.
D	
Daytime	7.00am to 10.00pm as established in NZS 6805: 1992.
dB	Decibel - The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of Pr=20 µPa i.e. dB = 20 x log(P/Pr). Decibels are widely used to measure how loud a sound is as the information is vital to safeguard against ear damage and prevent noise pollution.
dBA	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
Designation 1100, 1101 and 1102	Is the AUP designation frameworks applicable to AIAL. Among other things, Designation 1100 sets out noise performance criteria and noise management obligations for the Airport to comply with. The ANCCG Terms of Reference are included as Attachment A to Designation 1100. Condition 5(d) of Designation 1100 requires AIAL to undertake the following: • Monitor noise from aircraft operations at a minimum of three locations associated with the existing runway which are as near as practicable to the boundary of the HANA to demonstrate that the Day/Night level of 65 dB L_{dn} is not exceeded outside the HANA • Use recognised aircraft noise modelling software and noise monitoring data to calculate whether the noise from aircraft operations exceeds 60 dB L_{dn} anywhere outside the HANA and the MANA • Calculate noise levels to ensure compliance with Condition 10 of the Designation relating to the Noise Mitigation Programme. Condition 13(b) requires the airport to monitor, calculate and report on the noise levels from engine testing activities and Condition 9(c) requires the airport to report on the noise complaints it receives. AUP Designation 1101 relates to activities in the Renton Road area and Designation 1102 relates to Obstacle Limitation Surfaces (OLS), Runway End Protection Areas (REPA) and Non-Aeronautical Ground Light Restriction Areas. See Designation Schedule - AIAL
E	
Engine testing noise	Is measured and managed separately to aircraft operations (arrivals/departures) as it has a different character. The noise limit for in situ engine testing operations is 55 dB $L_{dn(7\ day\ rolling\ average)}$ with a 75 dB L_{Amax} applicable from 10.00pm to 7.00am. Engine testing noise at AIAL must comply with the noise limit within the identifed area shown in Figure 1 attached to Designation 1100.

F	
FANC	Future Aircraft Noise Contours – means each of the long term predicted noise contours shown on the Future Aircraft Noise overlay maps in Appendix 19 of the AUP. Note this is an AUP term specific to managing noise at Auckland Airport.
FIR	Flight Information Region – Airways controls all domestic and international air traffic travelling within NZ's FIR, which totals 30 million square kilometres - one of the largest areas of airspace in the world. The **NZ domestic FIR** covers the entire country and surrounding coastline with both 'controlled' and 'uncontrolled' airspace. The **Auckland Oceanic FIR** covers 26 million square kilometres of the Pacific and Tasman Oceans, extending from the South Pole to 5 degrees south of the equator. Airways is responsible for aircraft flying between 24,500 feet and 46,000 feet in this sector. Within the FIRs, there are also areas of uncontrolled airspace, where (light) aircraft are not separated by a controller but receive information and advice to ensure they can conduct their flights safely. See Airways website "The airspace we control"
FMC	Flight Management Computer.
FMS	Flight Management System.
G	
GA	General Aviation.
GANP	Global Air Navigation Plan [ICAO] - is the strategy to achieve a global interoperable air navigation system offering safe, secure and efficient air transport for people and goods worldwide, while limiting the impact of aviation on the environment. The GANP serves as a worldwide reference to transform the air navigation system in an evolutionary and inclusive manner so that no State or Stakeholder is left behind. The Plan is reviewed every 3 years. The 6th edition was adopted at the 40th Session of the ICAO Assembly held in Montréal, Canada during 24 Sep-4 Oct 2019. See GANP web portal
GNSS	Global Navigation Satellite System - A satellite navigation system with global coverage. Examples include the United States Global Positioning System (GPS) and the Russian GLONASS. The European Union Agency for the Space Programme (EUSPA) has developed Galileo an independent civilian system, while China's BeiDou system became fully operational in 2020. Satellite systems such as GPS can provide navigation information to aircraft systems to allow navigation without ground based systems.
GPS	Global Positioning System. GPS is the only GNSS used for aviation in New Zealand. GPS is owned by the U.S. government and is operated and maintained by the U.S. Air Force.

H	
HANA	High Aircraft Noise Area - the area that will have future noise levels greater than L_{dn} 65 dB. Note this is an AUP term specific to managing noise at Auckland Airport. The AUP policy framework for the HANA discourages establishment of new dwellings and new activities sensitive to aircraft noise (ASAN) e.g. New ASAN (excluding tertiary education facilities) are classified as Prohibited Activities (A29). New tertiary education facilities and additions or alterations to existing ASAN other than existing dwellings are Non-Complying Activities (A30). Additions or alterations to an existing dwelling are Restricted Discretionary Activities (A31). There is also a requirement for new ASAN to install acoustic insulation and related ventilation and/or air conditioning systems to achieve an internal noise limit of 40 dB L_{dn}. See AUP D24. Aircraft Noise Overlay
I	
IATA	International Air Transport Association was founded in 1945 and is the trade association for the world's airlines, representing 290 airlines from 120 nations or 83% of total air traffic. It supports many areas of aviation activity and helps formulate industry policy on critical aviation issues. See IATA website
ICAO	International Civil Aviation Organization - a specialised agency of the United Nations responsible for the safe and orderly development of the world's aviation industry. It was established in 1944 to manage the administration and governance of the Convention on International Civil Aviation (Chicago Convention). ICAO works with the Convention's 193 Member States and industry groups to reach consensus on international civil aviation Standards and Recommended Practices (SARPs) and policies in support of a safe, efficient, secure, economically sustainable and environmentally responsible civil aviation sector. ICAO is not an international aviation regulator, its standards never supersede the primacy of local and national regulatory requirements which are enforced by sovereign states and must be legally adhered to by air operators. See ICAO website
IFR	Instrument Flight Rules. IFRs are established for aircraft that fly and navigate by reference to instruments in the cockpit. IFR-classified aircraft can operate in all flyable weather conditions day or night and within clouds. IFR-classified aircraft can also fly using visual references outside the cockpit (horizon, buildings, flora etc.) this may be done when they are close to an airport and positioning to land. Flights using a SMART Approach flight path operate under IFRs using cockpit instruments. See 4.1 Operating Procedures, footnote 8, in 2015-2016 Yellow U23 SMART Approach Flight Path Trial, Final Report 2018, p.18
ILS	Instrument Landing System - an antenna array based at the airport that provides pilots with accurate vertical and horizontal guidance during an approach to land.

Industry Associations	The aviation industry has many associations including: • Aviation Industry Association of New Zealand Inc. (AIA) • Board of Airline Representatives of New Zealand (BARNZ) • New Zealand Airports Assocation (NZAA) • New Zealand Airline Pilots' Association (NZALPA) • New Zealand Aviation Federation Inc. (NZAF)
Industry Represen-tative	Under the AUP Designation 1100, one ANCCG member is appointed to provide representation from industry/business that use the facilities of the airport e.g. freight forwarder or manufacturer etc.
INM	Integrated Noise Model ("INM") was referenced in a legacy (pre-November 2019) version of Designation 1100. Aircraft noise modelling software is frequently updated and refined, so referencing a specific model was identified as inappropriate and deleted. INM was a computer model developed by the US Federal Aviation Authority (FAA) to evaluate aircraft noise impacts in the vicinity of airports. In May 2015 the FAA replaced it with the Aviation Environmental Design Tool (AEDT) software system.
ISO 20906: 2009	International Organization for Standardization (ISO) standard for undertaking unattended monitoring of aircraft sound in the vicinity of airports. See ISO website for latest version

J	
Jet aircraft	An aircraft powered by an engine that develops thrust by a turbofan that bypasses air around the core of the engine, ejecting a jet of gaseous combustion products. Jets rely on encased turbine engines to move the aircraft forward and do not have propellers. Passenger jets that use AIAL include for example, the Airbus A380, A320/321neo, A350, Boeing 777-200/300ER, Boeing 787-9 Dreamliner, Boeing 737.
K	
kt	Knot/s. Is the standard unit of speed in aviation since its 20th century beginning when a lot of terms and measures were borrowed from the marine sector. One knot (1kt) is equal to one nautical mile per hour (1Nm/h) and it has been defined to be equal to 1.852km/h in terms of SI units (International System of Units). There are three distinct types of airspeeds (Indicated, Calibrated and True) and they are all measured in 'knots'. Airspeed is fundamentally different to ground speed which is the sum of airspeed and wind speed.
L	
$L_{Aeq\ (t)}$	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10.00pm and 7.00am.

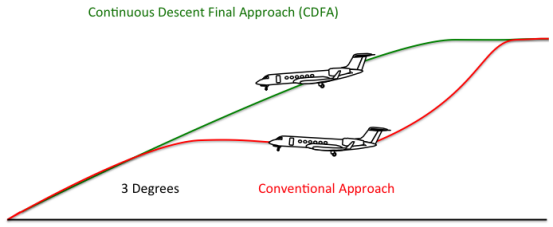
L_{Amax} or L_{max}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
L_{dn}	The day night noise level which is calculated from the 24 hour L_{Aeq} with a 10 dB penalty applied to the night-time (2200-0700 hours) L_{Aeq}. Note L_{dn} is the noise measurement adopted in the AUP in relation to measuring aircraft noise relating to Auckland Airport.
LOSGA	 Is a navigational waypoint, like an intersection, in the sky. It sits 5 nautical miles from the Airport and is above Mt Albert and Dominion Roads. It is a joining point for aircraft arriving from the north and west.
M	
MANA	Moderate Aircraft Noise Area - the area that will have future noise levels between L_{dn} 60 dB and 65 dB. Note this is an AUP term specific to managing noise at Auckland Airport. The AUP provisions for the MANA deem new dwellings in a residential zone as Permitted where the average density does not exceed one dwelling per 400m2 or the maximum density controls within the Flat Bush Precinct (A37). Where those densities are exceeded, the activities become Restricted Discretionary (A38). There is also a requirement for new ASAN to install acoustic insulation and related ventilation and/or air conditioning systems to achieve an internal noise limit of 40 dB L_{dn}. See AUP D24. Aircraft Noise Overlay
Mana whenua Represen-tative	Under the AUP Designation 1100, two ANCCG members are appointed by mana whenua.
MLAT	Multilateration - is a more recent ground-based surveillance technique that is used in the airspace around Queenstown Airport, as radar is impracticable in the terrain. A number of ground stations interrogate and receive replies from aircraft SSR (Secondary Surveillance Radar) transponders. The system calculates the position of the aircraft using the time difference between the arrival of a reply at four or more ground stations and presents a display of the traffic on monitors in an Air Traffic Control Tower. Multilateration targets are typically updated once per second, compared with five-second intervals for radar targets. MLAT systems that cover broader areas are known as Wide Area Multilateration (WAM) and covers most of Otago and Southland. See Surveillance on NSS website and MoT National Airspace and Air Navigation Plan 2014, pp25-29
N	
National Airspace Policy (2012)	Is the Government's response to the GANP which ICAO issued in 2007. It recognised the step-change from land-based navigational aids to performance-based navigation (PBN) technology used in the SMART Approach flight paths.

New Southern Sky (NSS) - National Airspace and Air Navigation Plan (2014)	Is the programme to implement the National Airspace and Air Navigation Plan and modernise NZ's airspace and air navigation system. It sets out the practical steps required to make an effective transition to the use of next generation technologies, manage airspace as demand increases, and to enhance aviation safety over ten years. It is a multi-agency programme led by the CAA. Members of the NSS Working Group such as Airways, the Ministry of Transport, MetService, Aeropath and airlines lead various work streams. See NSS website
Night time	10.00pm to 7.00am as established in NZS 6805: 1992. 11.00pm to 6.00am (traffic density timing, see Night time restriction explanation for Auckland).
Night time restriction - Auckland	There is no night time restriction on flights using the existing Auckland Airport runway. It is able to operate 24/7. However there are noise abatement procedures provided for under CAR Part 93 between 11.00pm and 6.00am. Once constructed and operational, under Condition 4 of the AUP Designation 1100, the Northern Runway will have night time restrictions in place. Non-Jet and Jet aircraft between the hours of 10.00pm and 7.00am, will not be permitted to depart to or arrive from the east except in limited circumstances. That means Northern Runway flights during those hours must arrive and depart over the Manukau harbour i.e. no night flights / noise effects over Papatoetoe, Ōtara or Ormiston.
Night STARs	In mid-2018 Airways, BARNZ and AIAL proposed new night time Standard Terminal Arrival Routes. Rather than tracking over the city, a new northern approach would cross over Whangaparaoa and then track down the Gulf off the North Shore. Likewise a new southern approach would cross over Franklin before turning left. The new approaches would overfly 65% fewer people than existing routes and the Person Event Index (PEI) would reduce by 50%. Consultation with Local Boards occurred and flying commenced 1 September 2018 with reduced night overflights of the central suburbs/Takapuna areas and higher altitude overflying for Stillwater/Pukekohe areas. See Runway 23L Night Arrival Procedures a presentation to ANCCG, 5 Jun 2018
NM	Nautical Miles. Are used to measure distance travelled through the water. A nautical mile is slightly longer than a mile on land. Using latitude and longitude coordinates is more practical for long-distance travel, where the curvature of the Earth becomes a factor in accurate measurement. Air and space travel also use latitude and longitude for navigation and nautical miles to measure distance.
NMP	Noise Management Plan – as described in Condition 9 of the AUP Designation 1100.
Noise	A sound that is unwanted by, or distracting to, the receiver.

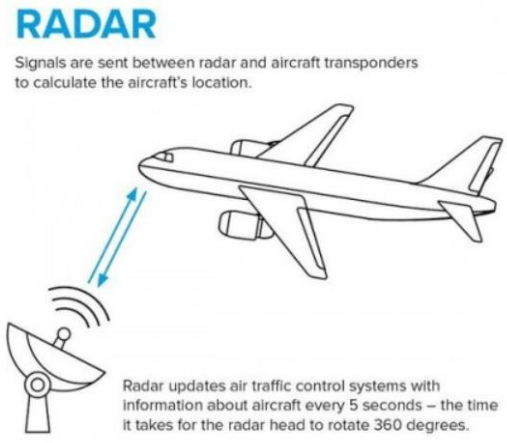
Noise abatement procedures	CAA Noise Rules (CAR Part 93) do provide for noise abatement procedures at Auckland Airport. Between 11.00pm and 6.00am when there is a tailwind less than 5 knots and air traffic conditions allow, flights can takeoff (depart) to the west and can land (arrive) from the west i.e. over the Manukau Harbour. This is subject to ATC operational requirements. [93.65] Pilots of a turbo-jet or turbo-fan powered aeroplane shall not operate over the Auckland noise abatement areas at an altitude of less than 5000 feet QNH (height above mean sea level) except during take-off climb or during during visual approach to Runway 23 [93.63].
Noise Complaint Procedure	The process for making a complaint about aircraft noise at Auckland Airport can be found on AIAL's website, see: https://corporate.aucklandairport.co.nz/corporate-responsibility/managing-aircraft-noise A person can make a complaint using the on-line Casper flight tracking system at https://flighttracking.casper.aero/akl/ (hit 'submit complaint' on left hand menu) or by calling 09 256 8133 or freephone 0800 466473 (0800 4 NOISE) anytime.

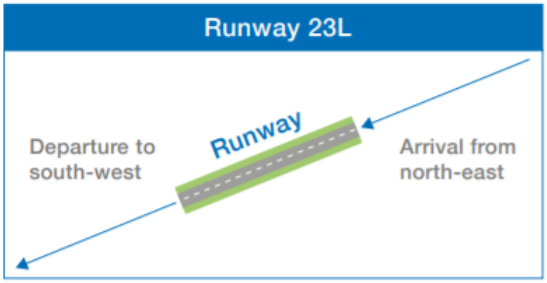
Noise Mitigation Package	Under the AUP, the airport is required to offer a noise mitigation package to property owners in the HANA and MANA, whose properties fall within the Annual Aircraft Noise Contours (AANC). The subsidy offered by the airport depends on the location of the house within the AANC, and applies to existing buildings used for an ASAN that existed at 10 December 2001, and 18 November 2019 (for those properties within the area shown on the plans in Attachment C to Designation 1100). Any buildings commencing use as an ASAN after these dates do not qualify for a noise mitigation package as this is required to be installed at the time of construction. The subsidies and criteria for an offer are: 100% subsidy – for properties in the HANA with the airport paying the full cost of installing the noise mitigation package 75% subsidy – for properties in the MANA with the airport paying 75% of the cost of installing the noise mitigation package. Home owners within the MANA can apply for financial assistance from the AACT to cover the 25% contribution they need to have a noise mitigation package installed. Noise mitigation installed in homes includes: ventilation system, thermal grade ceiling insulation to all habitable rooms (HANA only), mechanical kitchen extractor fan, heat pump in the principal living room. Double glazing is not provided. The sound insulation must be designed to ensure an internal noise level of 40 dB L_{dn} or less will be achieved in habitable rooms and sleeping areas and rooms for convalescing and learning. Windows must be closed and ventilation provided to ensure compliance with the internal noise limit and Building Code.

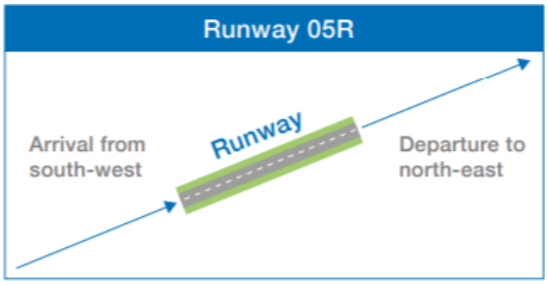
Noise mitigation programme monitoring	AIAL is required to monitor implementation of the Noise Mitigation Programme as set out in Condition 10 of Designation 1100 and provide a written report to Auckland Council setting out its findings in detail at six monthly intervals each year.
Non-jet aircraft	Means any aircraft that is not a turbo-jet or a turbo-fan powered aircraft. For the avoidance of doubt turbo-prop aircraft are non-jet aircraft. See Designation 1100, Conditions (1) p3
Northern Runway (RWY 05L/23R)	The future runway that will be located to the north of the Airport's existing terminal facilities with an operational length of 2,983 metres once constructed.
NoR	Notice of Requirement – As a Requiring Authority under the Resource Management Act (RMA) 1991, the AIAL proposed alterations to the AUP Designations 1100 and 1102 to provide for a longer and realigned Northern Runway at Auckland Airport. That NoR was confirmed on 18 November 2019, with the altered designations becoming operative in the AUP.
NZ Airports Association Inc.	Is the industry association for NZ's airports and related businesses. It is a not-for-profit organisation with members that operate across 42 airports. See nzairports website
NZALPA	New Zealand Airline Pilots' Association - is an industrial union of workers and professional association representing over 2,600 pilots and air traffic controllers and flight service operators employed in NZ. See NZALPA website
New Zealand Aviation Federation Inc. (NZAF)	Brings together member associations across all the sectors of General Aviation to exchange ideas and issues that can be collectively debated and then presented to the relevant regulating authority. It collectively forms the largest single Aviation lobby organisation in NZ. NZAF is represented on all the sector reference groups and advisory panels within the Civil Aviation Authority. See aviation federation website
NZS 6805: 1992	NZ Standard 6805 "*Airport Noise Management and Land Use Planning"* was developed for use by territorial or regional authorities to control airport noise. It is used to ensure people living close to an airport or aerodrome are properly protected from the effects of aircraft noise, while also recognising the need to be able to operate an airport efficiently. The Standard uses a system in which a limit is set for the average daily amount of aircraft noise exposure that is permitted in the vicinity of an airport.
O	
OCB	Outer Control Boundary – Term set out in the NZS 6805: 1992. For Auckland Airport that equates to the boundary of the ANNA where noise levels must not exceed 55 dB L_{dn}.
Operational length	Is the length of Runway available and suitable for the ground run of an aircraft taking off, in accordance with the Civil Aviation Advisory Circular 139-6 Revision 5 dated 9 August 2016 called the "Take-Off Run Available" or "TORA". See Designation 1100, Conditions (1) p3

P	
PBN	Performance-based Navigation – uses GPS technology so aircraft can follow flight paths to a far greater degree of accuracy. PBN procedures allow curved approach paths to runways and the ability for aircraft to be established on the extended runway centreline much closer to the runway than is possible using a ground-based ILS. These shorter approach paths result in fuel and carbon emission savings and potentially fewer residents being over flown if they can be designed to overfly commercial or open space areas. PBN also allows constant descent when aircraft are on final approach to a runway, allowing aircraft to remain at higher altitudes for longer and engines to run at lower power settings. PBN technology almost eliminates the traditional step-down approach, where aircraft descend in steps separated by intervals of level flight and higher engine thrust (see Figure below).
	
	PBN was first used at Auckland Airport in 2012. A small number of PBN approach paths were implemented in Auckland in 2015 following a trial known as the 'SMART Trial' with a further PBN approach going live in 2019 after trials in 2016/17. Ongoing trials of new PBN approach paths occur from time to time.

PEI	The "Person-Events Index" was developed by the Australian Department of Transport and Regional Services, as a means of assessing an airport's noise impact on a population. The PEI allows the total noise load generated by an airport to be computed by summing, over the exposed population, the total number of instances where an individual is exposed to an aircraft noise event above a specified noise level over a given time period. The index has deliberately been expressed in a form which gives non-experts (eg decision-makers & community representatives) some feel for the magnitude of the noise load. The PEI and the related Average Individual Exposure (AIE) metric are useful for considering how noise is shared around or concentrated within a local population. See DOTARS (2000, Mar) Discussion Paper: Expanding Ways to Describe and Assess Aircraft Noise, pp40-44
Q	

R	
Radar	A radio detection device which provides information on range, azimuth and/or elevation of objects. Current technologies include: • Primary surveillance radar (PSR) transmits a radio signal that is reflected back to the radar by aircraft. The range and bearing of each aircraft detected is presented to the air traffic controller. PSR cannot identify aircraft, and does not rely on aircraft systems. • Secondary surveillance radar (SSR) not only detects and measures the range and bearing of aircraft, but also requests additional information from the aircraft itself, such as its identity and altitude. It relies on aircraft being equipped with a mode A/C transponder. Transponders are mandatory in New Zealand controlled airspace. See NSS website, Current Technologies
How Radar works	Source-New Southern Sky website 
RCL	Runway Centre Line – shows the physical centre of the runway to help guide aircraft during takeoff and landings. The centreline consists of a line of uniformly spaced stripes and gaps.
REPA	Runway End Protection Areas – are areas in which, statistically, there is a risk of aircraft landing or takeoff incidents. It is desirable that the risk from such a hazard be reduced by limiting the range of activities permitted in the REPAs and the number of persons that can be exposed. AUP Designation 1102 sets out requirements intended to restrict development within the REPA in order to control the number of people on the ground at any one location and time.
Residual sound	Ambient noise remaining when specific noise (such as aircraft noise) is suppressed. NZS 6805: 1992 definition - The total sound remaining at a given position in a given situation when the specific sounds under consideration are supressed or are an insignificant part of the total (ambient) sound.
RNAV *(pronounced "AR-NAV")*	Area Navigation is a method of navigation that allows an aircraft to choose any course within a network of ground-based navigation beacons, or GNSS aids, or a combination, rather than navigating directly to and from the beacons. This can reduce flight distances, reduce congestion, and allow flights into airports without ground-based navigation beacons.
RNP	Required Navigation Performance - is a type of PBN that allows an aircraft to fly a specific path between two 3-dimensionally defined points in space. RNP requires on-board performance monitoring and alerting so that the pilot is notified early of any reduced satellite coverage, and is therefore a more robust system.

RWY	Runway. Means a defined rectangular area on a land aerodrome prepared for the landing and takeoff of aircraft. The existing AIAL runway located to the south of the Airport's terminal facilities has an operational length of 3,635 metres. See Designation 1100, Conditions (1) p.3 The runway is orientated north-east to south-west. Aircraft must take off and land into the wind. See 4.1 Operating procedures, in 2015-2016 Yellow U23 SMART Approach Flight Path Trial, Final Report 2018, p.18
RWY 23L	The existing AIAL runway's mode of operation is called either "Runway 23L" or "Runway 05R", representing the abbreviated magnetic compass direction of the runway. In Auckland, the prevailing wind is from the south west and under these conditions aircraft use Runway 23L, where departing aircraft take off towards the west over the Manukau Harbour, and arriving aircraft land on the eastern end of the runway, overflying Papatoetoe.
Mode of operation in Westerly Wind Conditions – flights arrive from North East and depart to South West  See 4.1 Operating procedures, in 2015-2016 Yellow U23 SMART Approach Flight Path Trial, Final Report 2018, p.18	

RWY 05R	Existing AIAL runway. When the wind direction switches to easterly, the runway direction changes and aircraft use Runway 05R, where arriving aircraft land on the western end of the runway overflying the Manukau Harbour, and departing aircraft take off to the east overflying Papatoetoe.
Mode of operation in Easterly Wind Conditions – flights arrive from South West and depart to North East  See 4.1 Operating procedures, in 2015-2016 Yellow U23 SMART Approach Flight Path Trial, Final Report 2018, p.19	
Runway naming	All runways are numbered based on the magnetic azimuth (compass bearing) in which a runway is oriented. There are 360 degrees on a compass rose. Runway numbers are determined by rounding the compass bearing of one runway end to the nearest 10 degrees and truncating the last digit, meaning runways are numbered from 1 to 36. A runway can normally be used in both directions, and is named for each direction separately: e.g., "Runway 05" in one direction is "Runway 23" when used in the other. The two numbers differ by 18 (= 180°). The "L" and "R" designate the relative position (left or right) of each runway respectively when approaching/facing its direction.

S	
SAF	Sustainable Aviation Fuel - derived from renewable biomass sources e.g. animal waste, fats/oils, forest/wood residues, rubbish, other organic materials.
SAR	Search and Rescue.
SARPS	Standards and Recommended Practices [ICAO].
SEL or L_{AE}	Sound Exposure Level - The sound level of one second duration which has the same amount of energy as the actual noise event measured. Usually used to measure the sound energy of a particular event, such as a train pass-by or an aircraft flyover.
SIDs and STARs	Routes that guide aircraft from and to runways are known as Standard Instrument Departures (SIDs) and Standard Terminal Arrival Routes (STARs). SIDs and STARs have specified procedures, including directional and height limits which pilots are required to observe when flying out of and into a destination (Auckland), unless instructed otherwise by Airways. While flight paths are often thought of and shown as a single lines on a map, it is usually not possible for all aircraft following a traditional flight path to fly precisely along the same line. In practice individual flight paths tend to occur within flight corridors that can be a number of kilometres wide. The exception to this is when performance-based navigation (PBN) paths (see SMART Approach Flight Paths) are used. There is considerable variation in the flight paths aircraft fly day-to-day, for reasons including weather, airspace congestion and activity at other aerodromes (e.g. Ardmore and Whenuapai). See 4.2 Traditional flight paths, in 2015-2016 Yellow U23 SMART Approach Flight Path Trial, Final Report 2018, p.19 See "Auckland flight paths" on AIAL website including the explanatory video- Feb 2016

SMART Approach Flight Paths	Smart Approach flight paths are technically known as Required Navigation Performance, which is a type of PBN. SMART Approaches use satellite-based navigation and enable aircraft to burn less fuel, emit less carbon dioxide and fly more quietly. They contribute to international aviation carbon dioxide-emission reduction proposals and are aligned with the New Zealand Government's National Airspace and Air Navigation Plan. Six SMART Approach flight paths currently operate at Auckland Airport, three from the north (Green X23A, Blue X05A, Yellow U23A) and three from the south (Red Y23, Black Y05, Orange S23). Blue X05A and Green X23A flight paths can only be used 7.00am to 10.00pm with a maximum of 10 flights per day on each of these paths. Yellow U23A can only be used 7.00am to 10.00pm with a maximum of six flights per day, which may be increased to a maximum of 10 subject to certain conditions, including consultation on the proposal with the ANCCG. Black Y05 is available 24 hours per day uncapped. Orange S23 and Red Y23 can both only be used 7.00am to 10.00pm with no cap on volumes. See 9.1 Yellow U23A SMART Approach Decision, in 2015-2016 Yellow U23 SMART Approach Flight Path Trial, Final Report 2018, p.58 See "Flying Smarter" on AIAL website including the explanatory video-Feb 2016 See Orange 23 Smart Trial Results and Memo to 13 Dec 2021 ANCCG meeting, Orange Trail Track Final Report, 29 Nov 2021

Surveillance	Surveillance involves monitoring the relative position of aircraft in flight so Air Traffic Control can ensure the right amount of separation to prevent collisions. The transition to satellite-based surveillance involves the use of ADS-B technology. Other current technologies include Radar (PSR and SSR) and Multilateration (MLAT). See Surveillance on NSS website
T	
TAIC *Te Kōmihana Tirotiro Aituā Waka*	Transport Accident Investiation Commission is an independent Crown Entity responsible to the Minister of Transport. TAIC's principal purpose is to determine the circumstances and causes of [selected aviation, marine, and rail] accidents and incidents with a view to avoiding similar occurrences in the future, rather than to ascribe blame to any person. See TAIC website and TAIC Act 1990, s4
Taxiway	A defined path on an aerodrome for the taxiing of aircraft, intended to provide a link between one part of the aerodrome and another.
TORA	Take-off run available – see Operational length.
Turboprop aircraft	An aircraft powered by thrust from a propeller that is turned by a gas turbine engine. Turboprop aircraft are commonly used for regional domestic services in NZ and include aircraft such as the ATR-72 500/600, Dash 8-Q300/400 and smaller aircraft such as Beech 1900D, Cessna Caravan, Britten Norman Islander.
U	

V	
VFR	Visual Flight Rules. VFRs are established for aircraft that fly and navigate by visual references outside the cockpit. VFR aircraft usually fly in clear skies during the day, not within clouds or in adverse weather, and not normally at night. Specific details for each airport's flight rules are published in New Zealand's Aeronautical Information Publication (AIP). See 4.1 Operating Procedures, footnote 8, in 2015-2016 Yellow U23 SMART Approach Flight Path Trial, Final Report 2018, p.18

W	
WPT - Waypoint	A waypoint is an intermediate point or place on a route or line of travel, a stopping point or point at which course is changed. In aviation a waypoint is a specified geographical location (latitude/ longitude coordinates, altitude ignored) used to define an area navigation route or the flight path of an aircraft employing RNAV (area navigation). GPS-based waypoints are given an identifier that typically consists of five characters - letters, digits, or a combination of both e.g. LOSGA, ARADI, DOMRI, VIBAG, EMRAG. Auckland Airport has a number of standard routes (STARs and SIDs), managed by Air Traffic Control, which aircraft can take when arriving and departing. Each standard route has waypoints, much like intersections in the sky, through which aircraft may pass. See "Auckland flight paths" on AIAL website
X	
Y	
Z	