

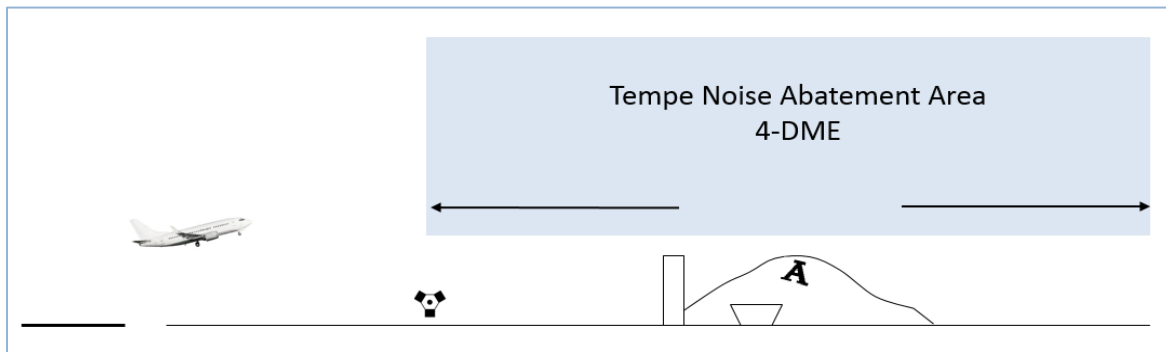
PHX EAST COMPLAINT REPORT

First Quarter 2019

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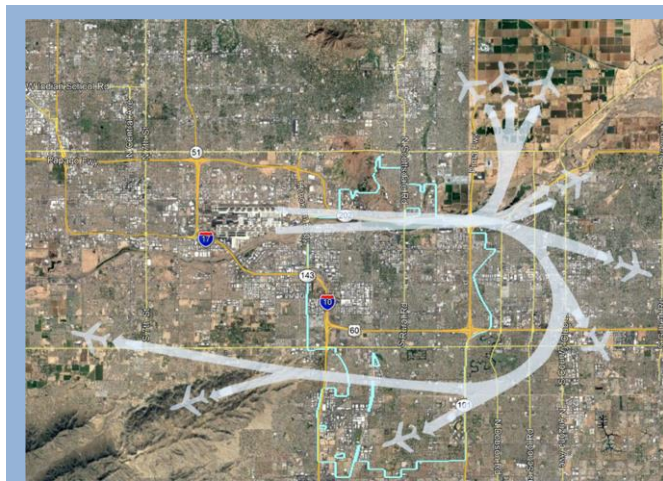
A. Airline Compliance Measuring



In September 1994 the cities of Tempe and Phoenix entered an Intergovernmental Agreement (IGA) to memorialize noise mitigation flight procedures that for decades had the purpose of keeping Phoenix Sky Harbor International Airport (PHX) aircraft operations over the dry riverbed of the Salt River in north Tempe and away from populated areas on both sides of the riverbed.

The agreement contains three measures to reduce noise from aircraft taking off and landing; (1) the requirement for jet and large turboprop aircraft departures to keep on headings off the runways to a single point at 4NM (Distance Measuring Equipment) before diverging; (2) equalize east and west of the airport the flow of jet and large turboprop aircraft departures night and day; (3) implement a side-step approach procedure to the third/south from the east.

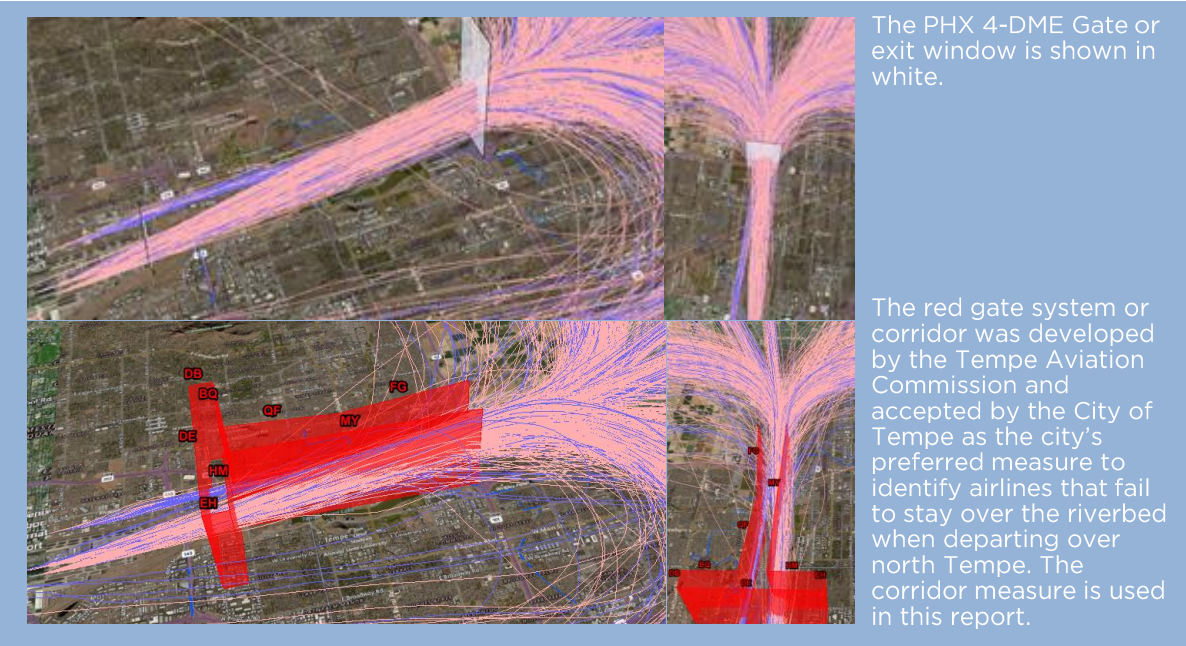
A voluntary side-step procedure was tested in 2001 after the opening of the third runway but it was cancelled in March 2002 because of flight safety concerns raised by air traffic controllers and airline pilots.



Standard Instrument Departure (SID) routes for PHX towards the east follow paths directly east over the City of Tempe before turns are made towards the route destinations. In September 2014 the FAA expanded the number of departure routes where airlines use satellite-based Area Navigation (RNAV) SID procedures from seven to nine. A fly-over waypoint at 4 NM DME was included in the east flow RNAV SIDs.

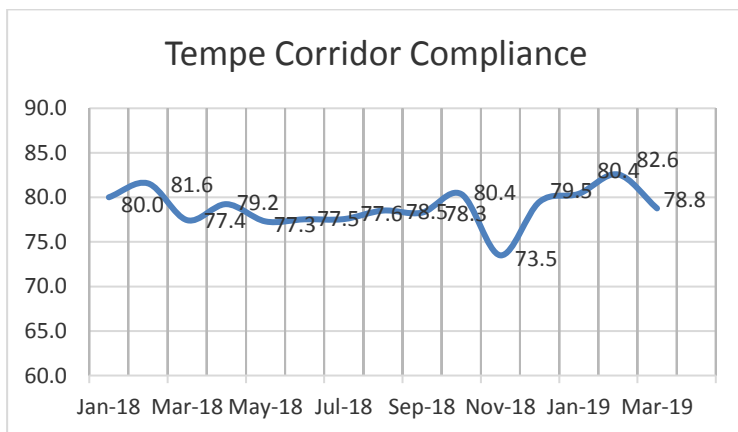
With the 1994 IGA the City of Phoenix agreed to install a Noise and Flight Track Monitoring System for PHX also known as Airport Noise and Operations Management System (ANOMS). After the system was installed and became operational in 1997, the City of Tempe proposed how the ANOMS could be set up to identify departures that failed stay over the riverbed in Tempe or reasonably comply with the 4-DME SID procedure considering drift due to prevailing winds. The City of Phoenix did not find that the proposal was implementable and developed an imaginary “4-DME Gate” in the ANOMS stretching 5,500 feet north to south in the airspace over where the SR-202

and SR-101 Red Mountain exchange is located east departing jet aircraft needed to pass through to stay in compliance with the 4-DME SID procedure. The City of Phoenix has final say in how to implement tools in the ANOMS to detect non-compliance with the agreed upon noise mitigation flight procedures. The City of Phoenix uses the measure to identify deviating east flow jet departures that are not impacted by wind or weather. Flagged deviations are notified to respective airline operators.



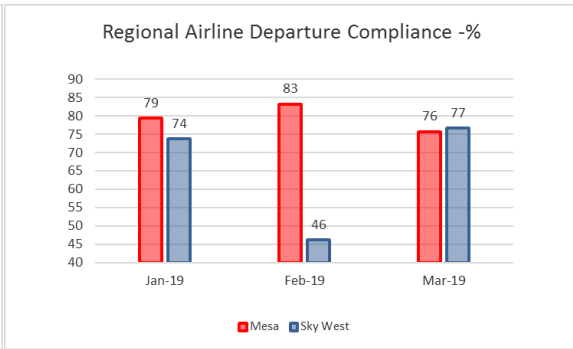
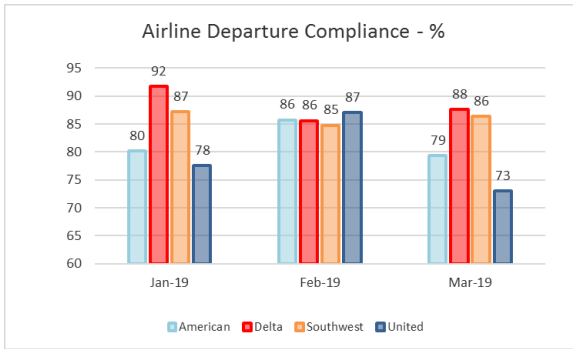
The quarter had eleven days when weather resulted in east departure deviations were excluded from the tally of non-compliant east flow jet departures.

B. Airline Corridor Compliance:

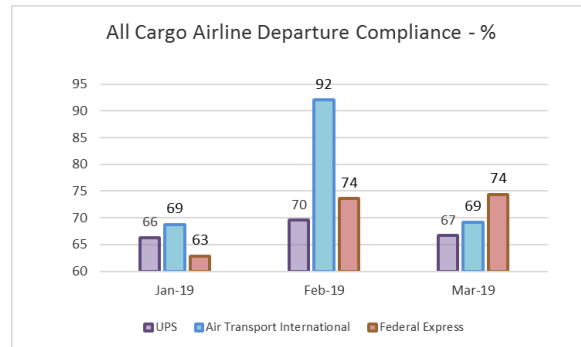


The overall compliance rate with the Tempe corridor was 80.6% for the quarter and 80.1% with the large turboprop aircraft departures included.

Large turboprop aircraft are routinely departing on diagonal headings to the northeast and southeast directly after take-off.

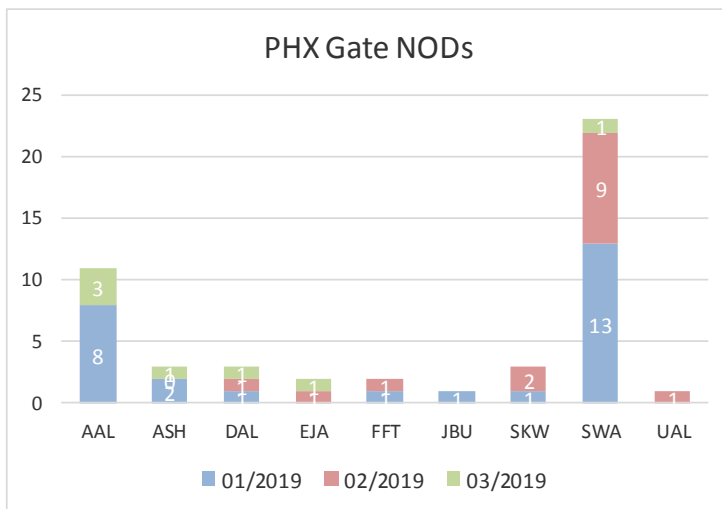


The graphs show corridor compliance rates for some of the larger airlines at PHX.



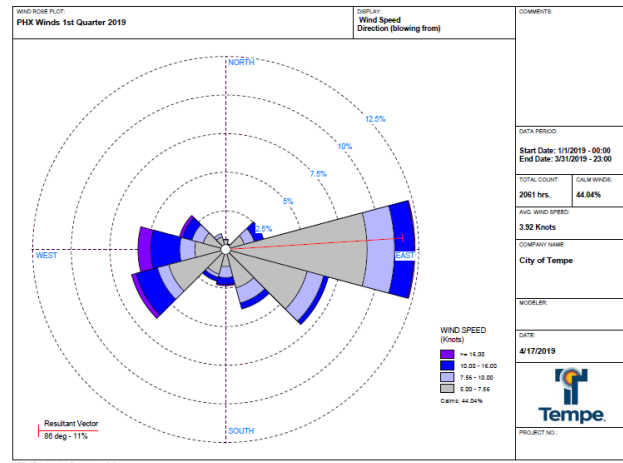
C. Non-compliance Notification:

The IGA with City of Phoenix requires notifying the airlines about aircraft that fail to follow the initial part of the Standard Instrument Departure (SID) routing towards the east, which ends at the SR-202 and SR-101 Red Mountain exchange (4-DME) where Phoenix has set up an imaginary gate to determine which aircraft are compliant and which are not.

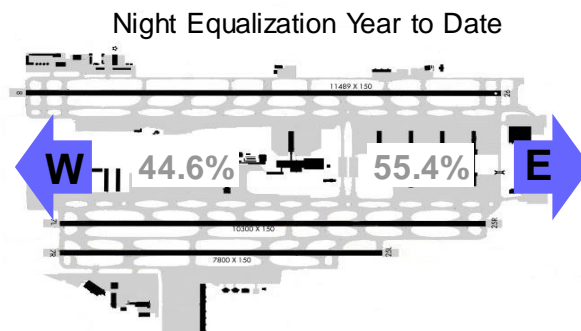
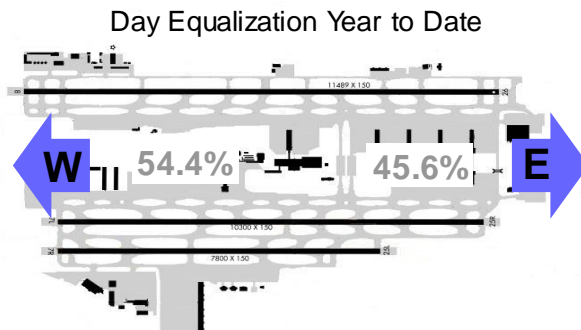
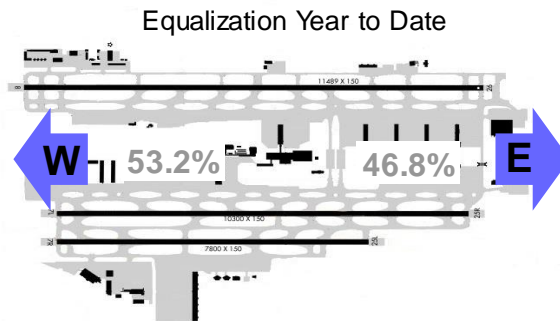


The City of Phoenix flagged 46 non-compliant departures in notices to airlines during the quarter.

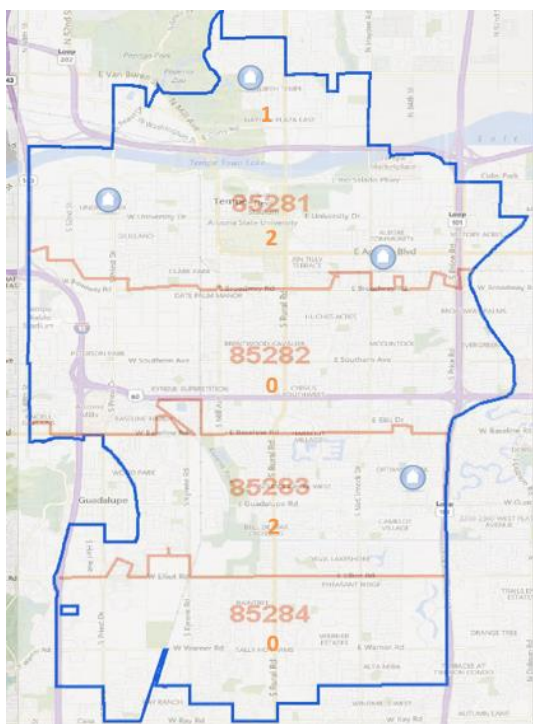
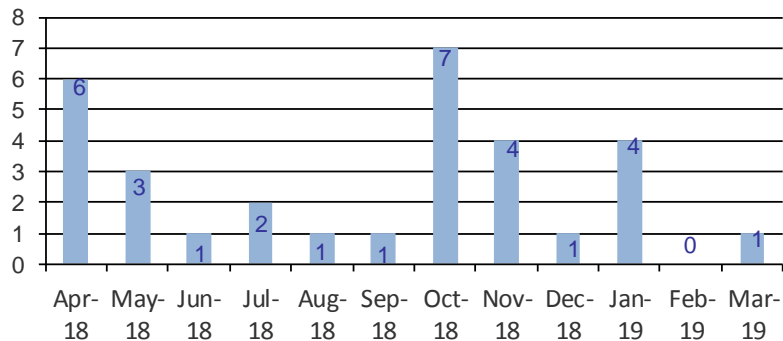
Wind speeds during the quarter were on average was 3.92 knots mainly from the east with the highest wind speeds coming in from the west.



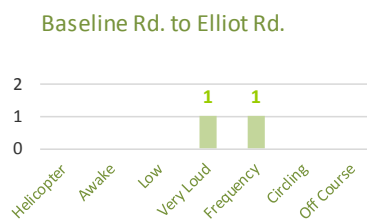
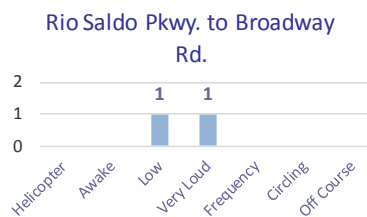
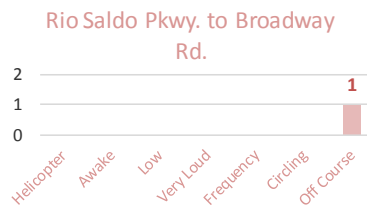
The noise mitigation agreement between the City of Tempe and the City of Phoenix calls for equalizing the noise burden from jet and large turboprop aircraft departures east and west during daytime and nighttime hours on an annual basis. The agreement calls for FAA compensation for periodic changes in flight pattern, so equalization is accomplished over a twelve months period.



Complaints Received by City of Tempe



Complaints by location, zip code.



Complaints by type of reported disturbance.

Complaints are the number of phone calls, voice-mails, and electronic messages from residents calling in or using the Tempe 311 noise complaint form, <https://www.tempe.gov/government/communication-and-media-relations/tempe-311/submit-service-request>. A city smart phone app is available for download that includes aircraft noise complaint reporting.

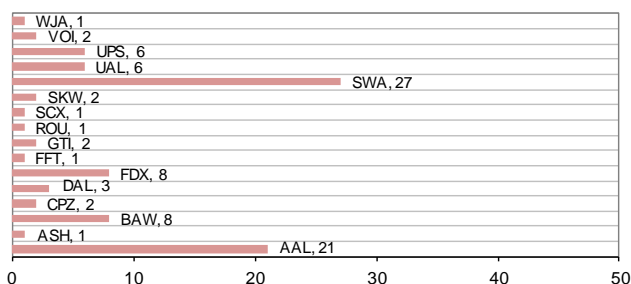




D. Maximum Sound Energy Levels:

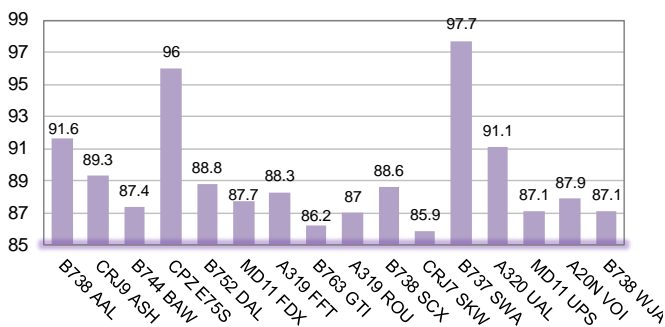
The number of higher sound energy level events attributed to airline operations varies each month, which influences monthly Ldn average levels. Lmax is the maximum A-weighted sound level, dB (A) registered during a sound event. A-weighted means the sound is measured at frequencies that reflect the sensitivity ranges of the human ear.

East Departures - Lmax Events >85 by Airline



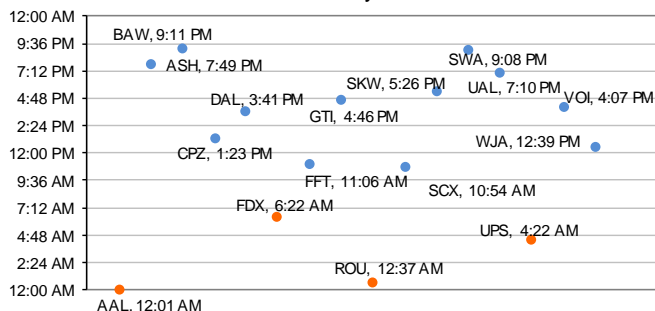
WJA: Westjet Airlines
 VOI: Volaris
 UPS: UPS
 UAL: United Airlines
 SWA: Southwest Airlines
 SKW: Sky West Airlines
 SCX: Sun Country Airlines
 ROU: Air Canada Rouge
 GTI: Atlas Air
 FFT: Frontier Airlines
 FDX: FedEx
 DAL: Delta Airlines
 CPZ: Compass Airlines
 BAW: British Airways
 ASH: Mesa Airlines
 AAL: American Airlines

East Departures - Highest Lmax Event by Equipment



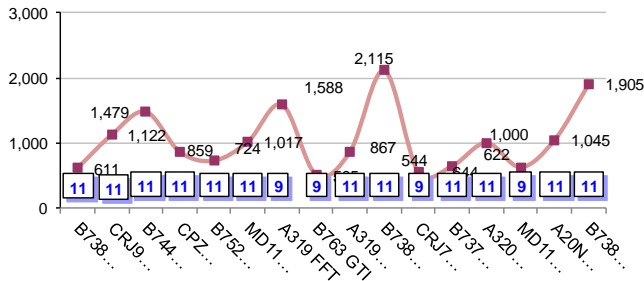
The graphs rank the highest maximum magnitude (Lmax) of sound from a departing jet registered by an airport monitor in Tempe.

East Departures - Highest Lmax Event by Time of Day



Noise magnitudes (Lmax) above 85 dB registered during night-time hours are depicted in orange.

East Departures - Event Altitudes for Highest Lmax >85 over Monitoring Sites in Tempe



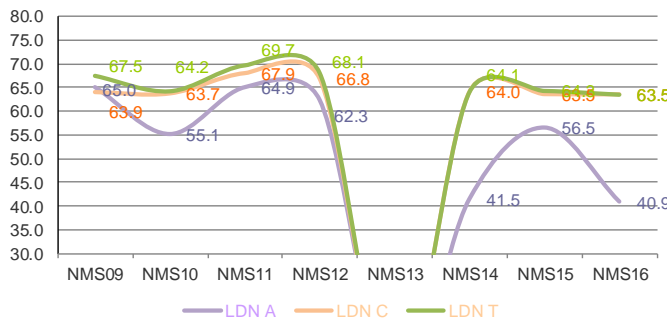
The PHX ANOMS has eight fixed Noise Monitoring Sites (NMS) in Tempe located in neighborhoods around the Town Lake/ Rio Salado area.

NMS 11 is in Tempe Beach Park and NMS 9 is located at W. 5th Street west of S. Priest Drive.

E. Averaged Sound Energy Levels:

Average aircraft sound exposure event levels are calculated from the Ldn or day-night average sound level also called Day Night Level (DNL) that includes a penalty of 10 dB (A) added for sound events occurring between 22.00-07.00 hours.

Average LDN Levels -Tempe NMS 1st Quarter 2019



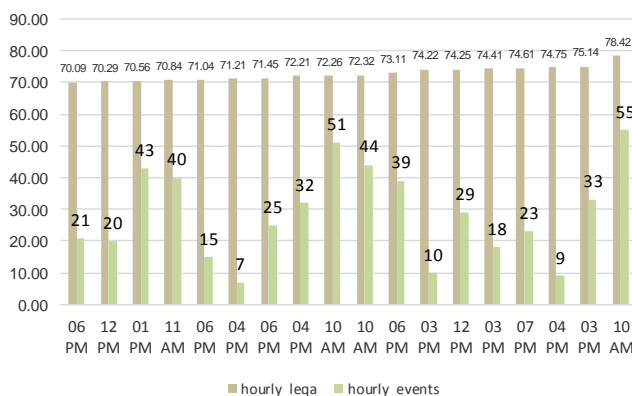
Ldn A is sound metrics used to identify aircraft sounds. Sound energy from other community sources C, and total Ldn T, are included.

Average LDN Levels -Tempe NMS 1st Quarter 2019

F. Equivalent Sound Energy levels:

This is a description of noise based on long-term equivalent level (Leq) where the total sound energy is measured over a stated period.

Hourly Leq A >70 dB 1st Quarter 2019



The graph shows the hours of the day the Leq (A) events were measured to be above 70 dB in north Tempe during the quarter and how many of those events occurred during those hours. The events were registered at NMS 9, 10 and NMS 11, all located on the south side of the Salt River/Tempe Town Lake.