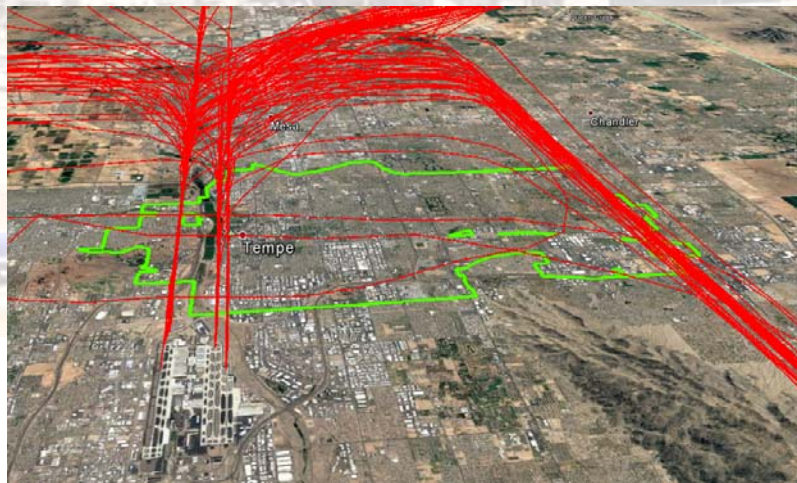
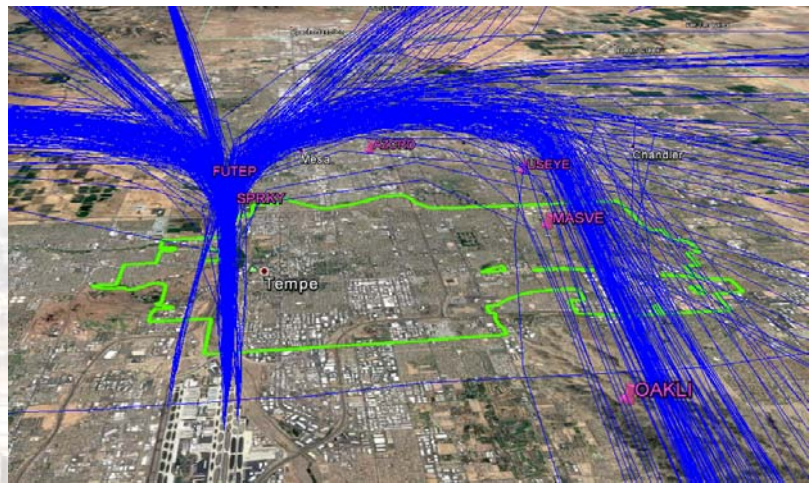


# 2016 Noise Mitigation Monitoring Summary PHX East

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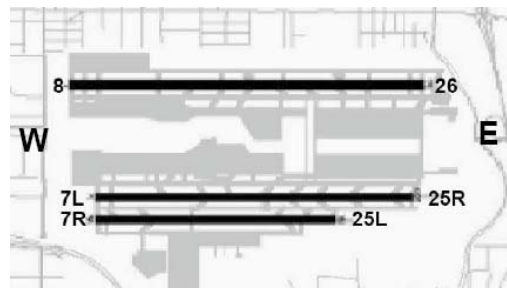


Report prepared for TAVCO  
by the City of Tempe  
255 East Marigold Lane  
Tempe, AZ 85281



## 1. Introduction

This summary is assembled for the Tempe Aviation Commission (TAVCO) to make an annual account of how airlines operations at Phoenix Sky Harbor International Airport complied with noise mitigation flight procedures over the City of Tempe. TAVCO consists of nine Tempe residents appointed by the Tempe Mayor with approval of the Tempe City Council to assist and give advice on how to deal with the impacts of airport operations, the implementation of a noise mitigation agreement with the City of Phoenix and assist with studies conducted of local airports and their development with regard to potential impacts on Tempe residents. The City of Tempe is located directly east of the Phoenix Sky Harbor International Airport. The airport is owned and operated by the City of Phoenix and expanded in October 2000 with a third parallel runway (7R/25L). After the FAA in 2002 suspended the implementation of a side step visual approach procedure to the new runway agreed upon between the two cities, the following two flight procedures remain in place to mitigate noise impact from large aircraft over Tempe:

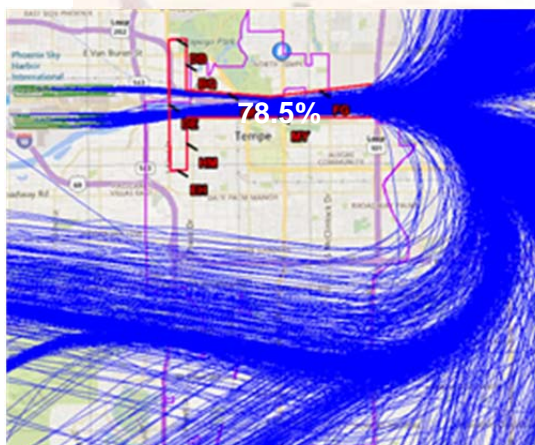


- The 4-DME Standard Instrument Departure Procedure to keep jet and large turboprop aircraft that depart to the east over the Salt River/Tempe Town Lake area before they make turns towards their route destinations.
- Annual equalization of all turbojet and large turboprop aircraft departing east and west of the airport during daytime and nighttime hours.

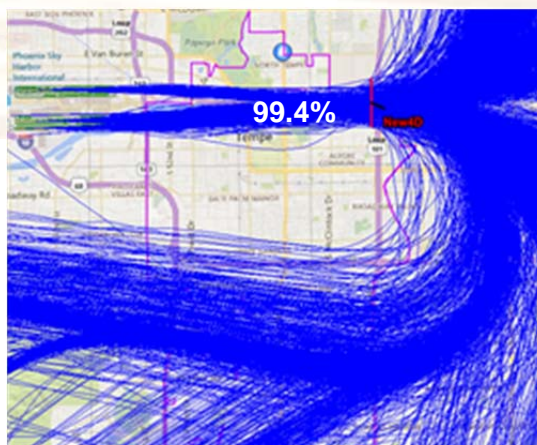
## 2. East Departure Compliance

### Compliance Rates

Under the Tempe and Phoenix intergovernmental agreement on noise mitigation flight procedures dated September 2, 1994 a measure was developed to track how large aircraft complied with the 4-DME instrument departure procedure to the east. The City of Phoenix implemented a gate the large aircraft had to pass through to avoid violating the procedure. This is an imaginary vertical line at 4-DME used as a filter in the Noise and Flight Track Monitoring System (NFTMS) for the Phoenix Sky Harbor International Airport. TAVCO developed a “Corridor”, which was based on Standard Instrument Departure procedures that were in use when the intergovernmental agreement with the City of Phoenix was made.



Jet departure tracks during the month of December 2016 inside the Tempe Corridor are shown in blue color.

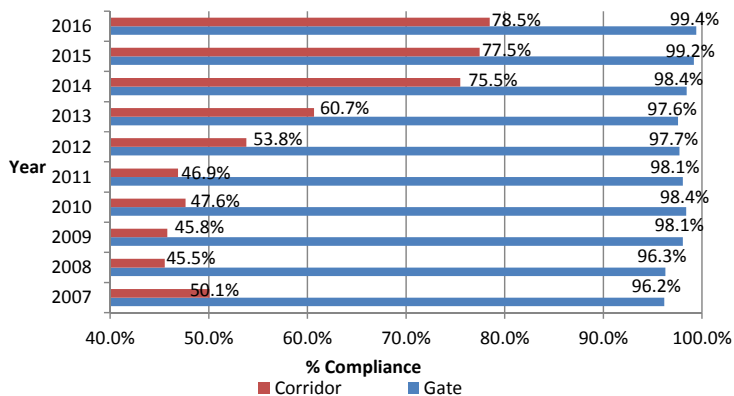


Jet departure tracks over the same period inside the Phoenix Gate depicted in blue.

Large turboprop aircraft are not included in the depictions. These aircraft are routinely routed outside the 4-DME gate on approximate departure angles of 120° towards the southeast and 60° towards the northeast.

## 2016 Noise Mitigation Monitoring Summary PHX East

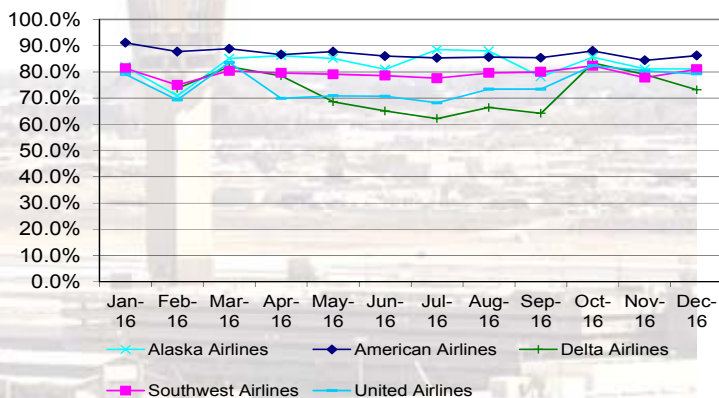
The annual average compliance rates are based on monthly numbers from the TAVCO Noise Mitigation Monitoring Reports. Typically cross winds of 10 knots or more has been used to filter out deviations due to weather, but this did not occur in 2005 and 2006. In 2007 the City of Phoenix Aviation Department resumed registering hours with weather conditions assumed to have negatively impacted large commercial jets' climb trajectory over Tempe.



Compared to 2015 daytime jet and large turboprop departures towards the east decreased 2.2%, and night-time departures increased 8.9%. Overall departures and arrival operations by these aircraft east of the airport decreased 0.9%.

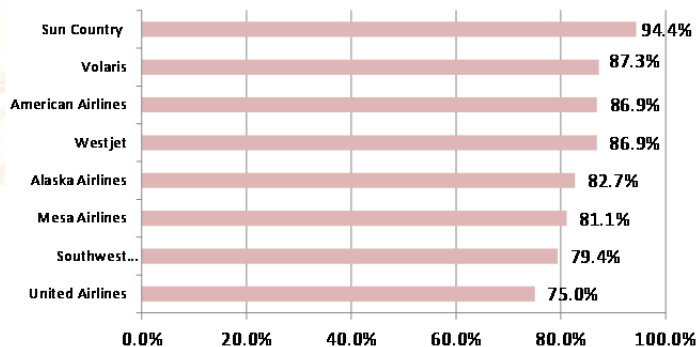
### Large Carrier Compliance

The graph shows corridor compliance rates for some of the airport's busiest airlines. New satellite based departure routing for PHX was turned on September 18, 2014.



Among the larger carriers, American Airways had on average best compliance with the Tempe Corridor during 2016. Only airlines with on average  $\geq 10$  departures to the east per month are included on this graph.

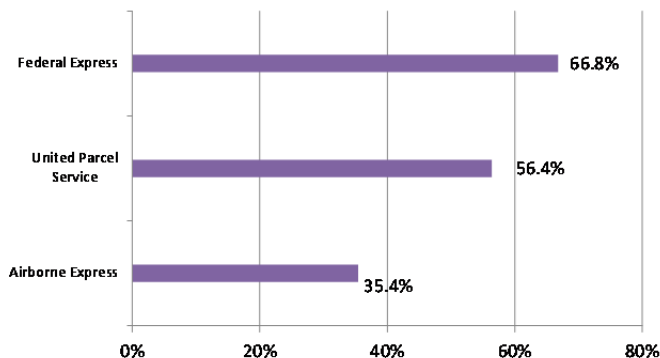
### Airline Compliance w. Tempe Corridor 2016



Top All Cargo Carriers

Among the larger, all cargo carriers FedEx had on average best compliance with the Tempe Corridor during 2016.

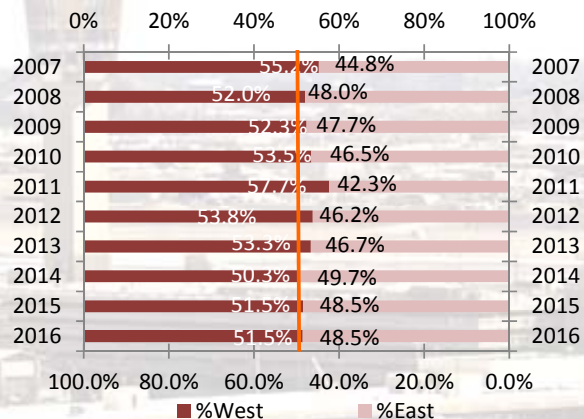
All Cargo Airline Compliance w. Tempe Corridor 2016



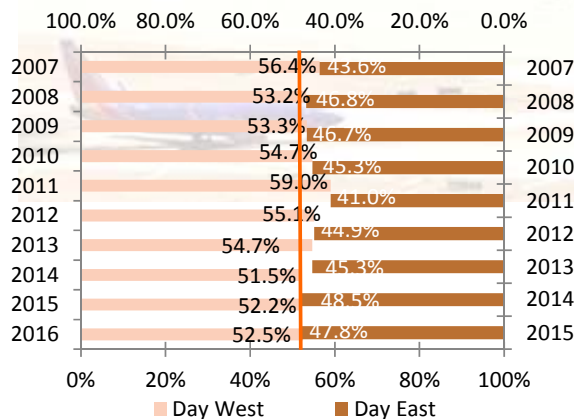
3. East/West Equalization

The annual split in all turbojet and large turboprop aircraft departures to the east and west of the Phoenix Sky Harbor International Airport differs between day- and day nighttime hours. The most of these operations goes towards the west when both day- and nighttime hours are combined. Departure traffic during the night and early hours of the day is predominantly going towards the east.

Annual Equalization (Day&Night)

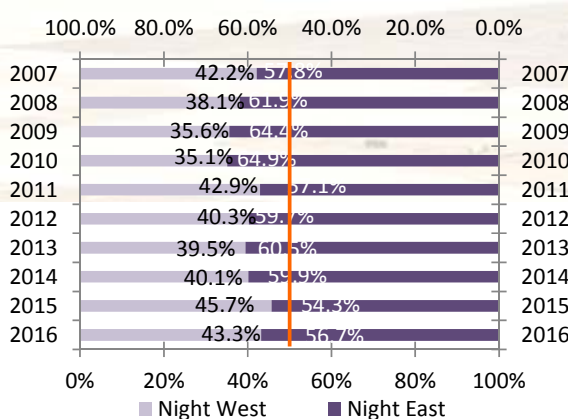


Day Equalization



Day = 7: 00 a.m. to 10:00 p.m. local time

Night Equalization



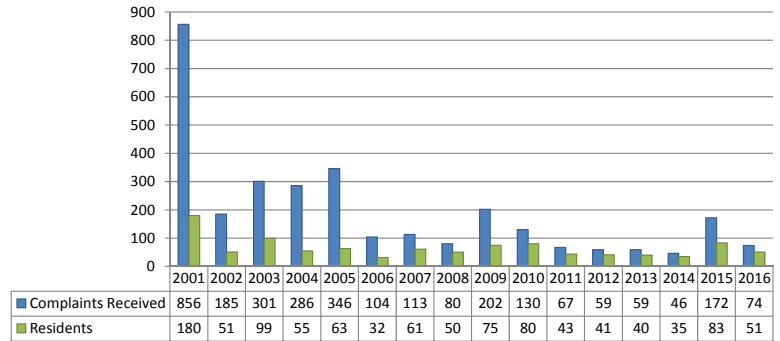
Night = 10:00 p.m. to 7:00 a.m.

## 4. Noise Complaints

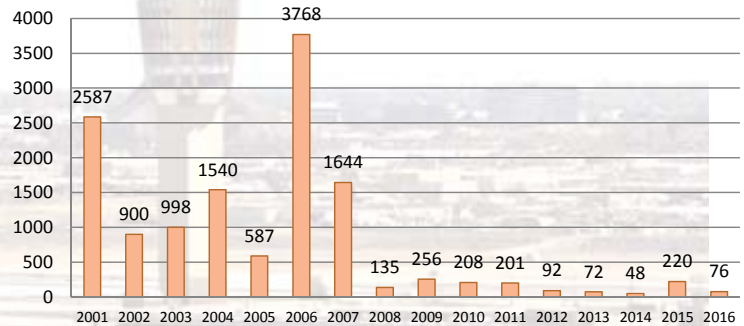
The City of Tempe started registering aircraft noise complaints from Tempe residents in October 2000 after the opening of the third runway at Phoenix Sky Harbor International Airport.

The flow of arrival operations has become more efficient due to the RNAV/RNP flight procedures that the airlines are using. It makes the air traffic flow more constant over areas of Tempe during peak hours. Commercial aircraft typically depart with high frequency in the morning hours to the east and line up to land from the east during afternoon hours.

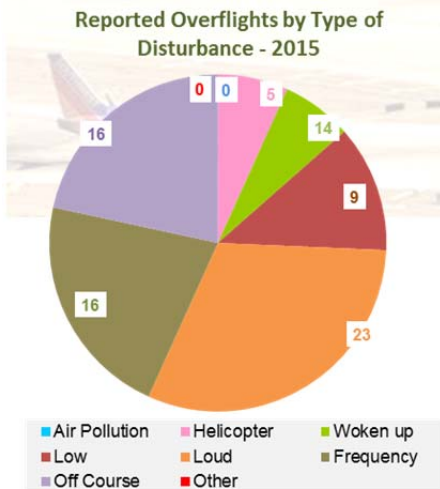
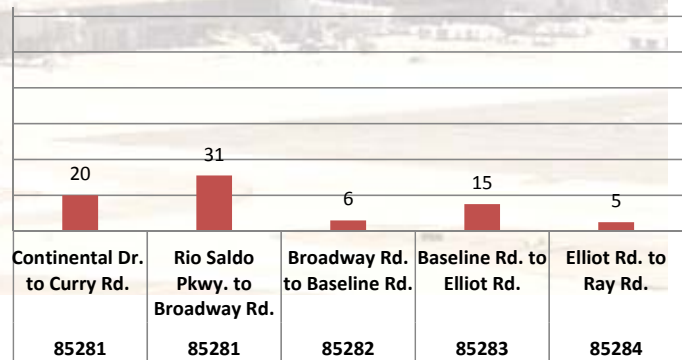
Most of the complaints on airline traffic have traditionally come from residents living in north Tempe neighborhoods where aircraft are at lower altitudes. In 2016 complaints were more equally distributed between areas in north and south Tempe. In 2015 most complaints were submitted by residents in south Tempe living under the September 2014 departure routes that concentrated flight paths over areas along Elliot Rd. and Western Canal in Tempe.



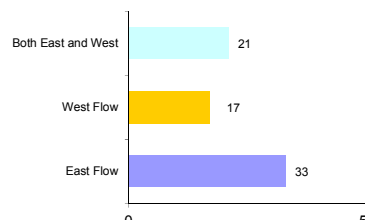
Number of Flights Addressed in Complaints to the City of Tempe



2016 Complaints by Area



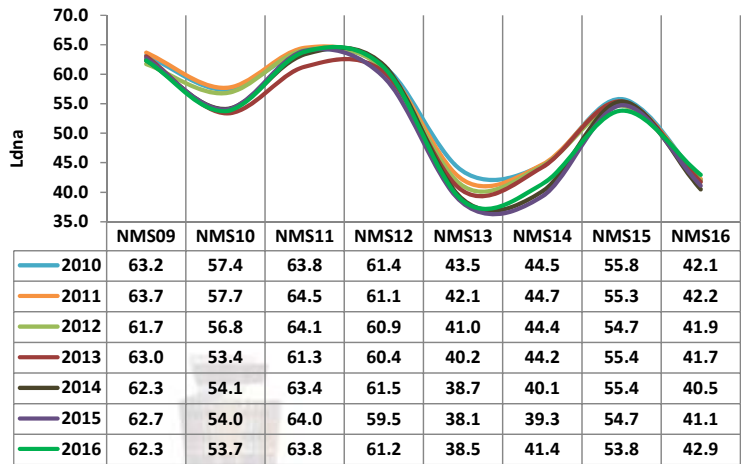
Reported Overflights by PHX Traffic Flow - 2016



## 5. Averaged Noise Levels

Annual (Day-Night) average sound levels, Ldn (A), registered at fixed monitoring sites operated by the City of Phoenix during 2016, were back up close to 2014 levels. NMS 14 was shut down September 9, 2016 because of construction work at the Valor on Eighth project.

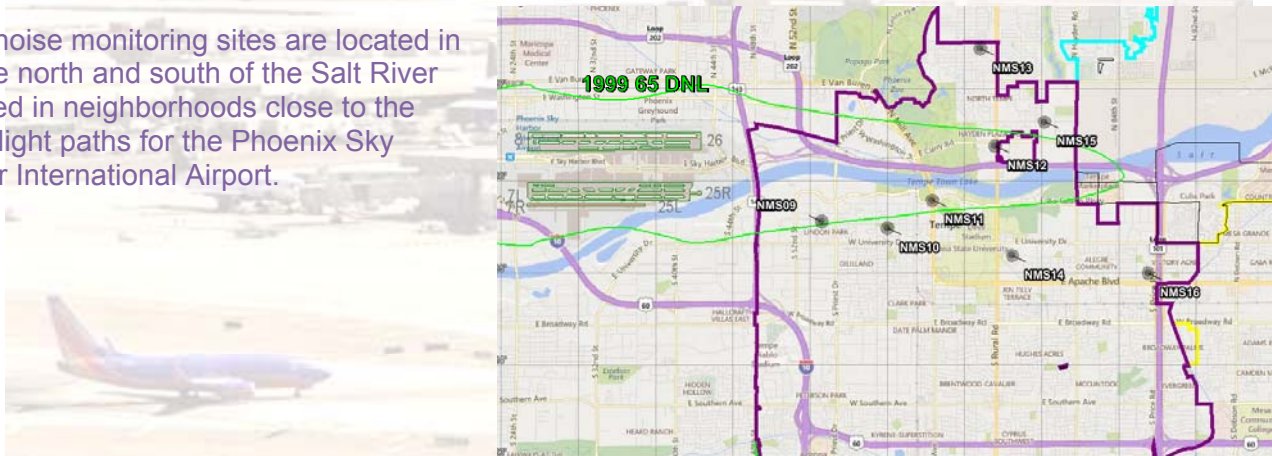
LDNA Annual Sound Energy Average



Noise Monitoring Sites



Eight noise monitoring sites are located in Tempe north and south of the Salt River riverbed in neighborhoods close to the main flight paths for the Phoenix Sky Harbor International Airport.

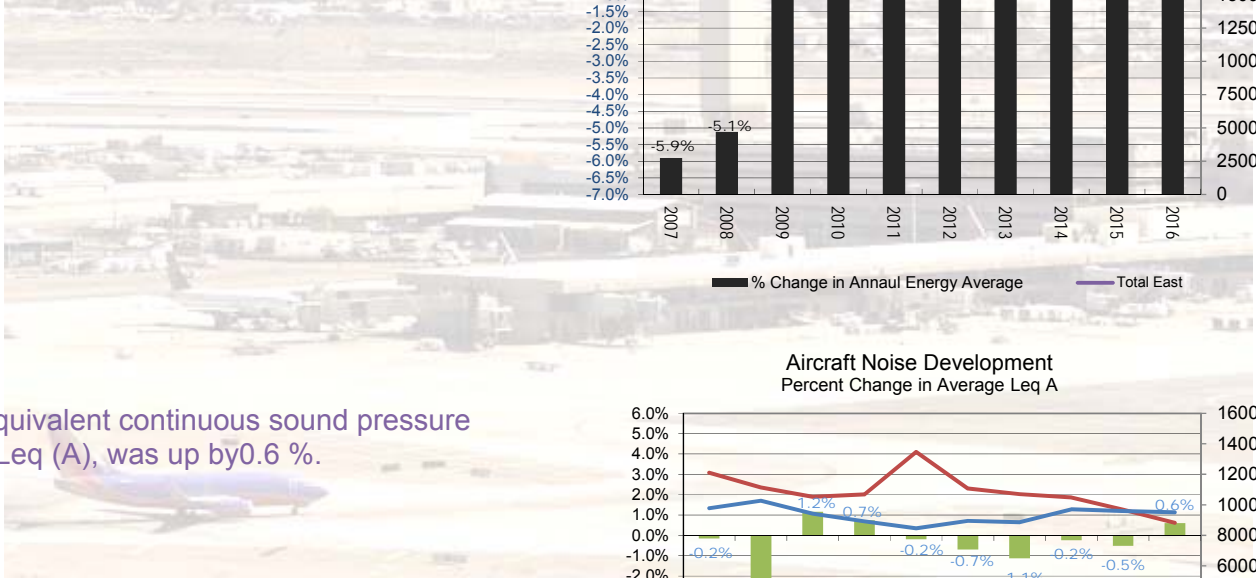


## 2016 Noise Mitigation Monitoring Summary PHX East

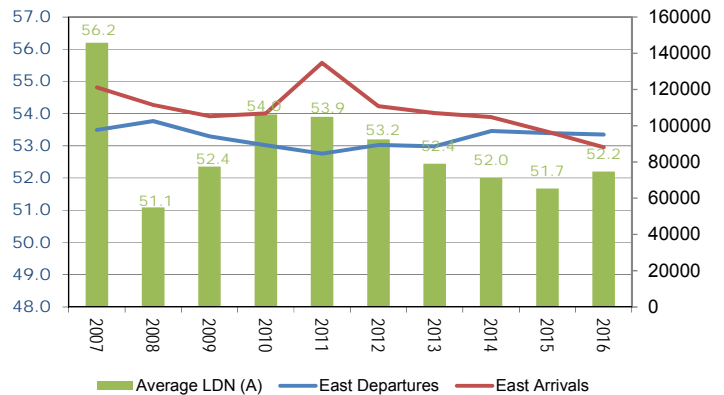
The overall number of large aircraft operations over Tempe decreased in 2016 compared to 2015. Night departures to the east increased by 8.9%. The way Ldn (A-weighted) sound level is calculated makes it sensitive to any changes in the number of nighttime operations.

The airport Ldn (A) average at east side monitors was up 0.5 % compared to the average reached in 2015.

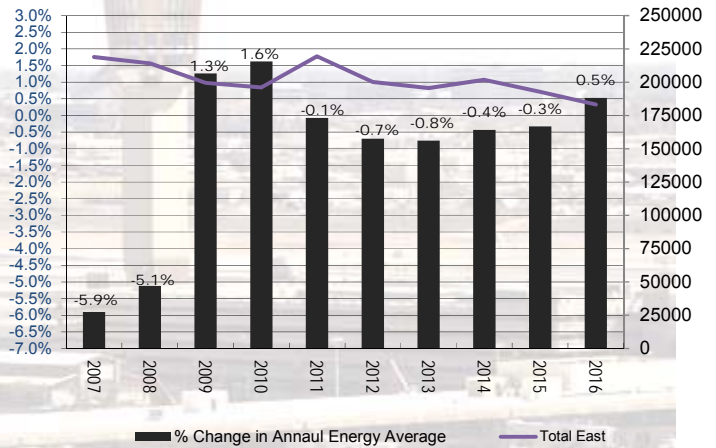
The equivalent continuous sound pressure level, Leq (A), was up by 0.6 %.



**Aircraft Noise Development**  
Change in Average Ldn A



**Percent Change in Average Ldn A in Tempe**



**Aircraft Noise Development**  
Percent Change in Average Leq A

