O'HARE INTERNATIONAL AIRPORT
NOISE RECOMMENDATIONS

INTRODUCTION

Everyone agrees that not all aircraft noise exposure can be eliminated. However, there is no question that the aircraft noise at O'Hare impacts our neighbors in many different ways. Over the past few months under the leadership of Commissioner Evans as charged by Mayor Emanuel, the Chicago Department of Aviation (CDA) has listened to many impacted citizens, community groups and civic leaders, visited surrounding neighborhoods, and studied O'Hare's noise landscape. Having now completed this process, CDA is committed to exploring new elements intended to enhance and improve our noise program.

The May 29, 2015 MOU signed by the CDA and state legislators, stated in pertinent part that the CDA would "communicate to all parties any and all solutions available to address airport noise in the affected areas," prior to August 1, 2015. CDA has widely communicated with all parties and has reviewed and analyzed specific suggestions made by FAiR, SOC, and ONCC. The CDA has evaluated all suggestions made during these collaborations and has included those that are viable within CDA's own Recommendations.

In determining CDA's approach to Recommendations, we first established the primary goals for our actions. These goals are:

- Allow O'Hare to operate safely and efficiently
- Analyze and Mitigate noise impacts to the extent allowable and reasonable
- Comply with all existing agreements
- Allow O'Hare to grow

With these goals as our guiding principles, the CDA makes Recommendations in the following pages that we believe have a high chance of success to impact noise. In a separate document, we explain the difficulties and challenges of implementing the various other noise abatement ideas that have been presented to us.

LEGAL DISCLAIMER

The recommendations set forth by the City of Chicago through its Department of Aviation (CDA) in this document are proposals only, without force or effect. All such recommendations must be fully reviewed and vetted in the context of the Federal Aviation Administration's Record of Decision (ROD) for O'Hare Modernization dated September 2005, as well as any other applicable law or regulation, for compliance and compatibility. The City of Chicago in no way intends to depart from, or to represent departure from, its commitments and obligations under the ROD and subsequent grant agreements.

The following pages will outline the four (4) categories of CDA's Recommendations and proposed solutions, including: Abatement, Mitigation, Communications and Reporting, and Citizen Involvement with individual measures in each category that CDA believes can be implemented.

1. ABATEMENT

The goal of this section is to outline noise relief solutions for communities through a change in the airport's current operations. This must be done without jeopardizing safety or reducing the efficiency of the airport. It is necessary to maintain compliance with overall air traffic patterns and modern airfield geometry, intended to promote pilot awareness and safer operations.

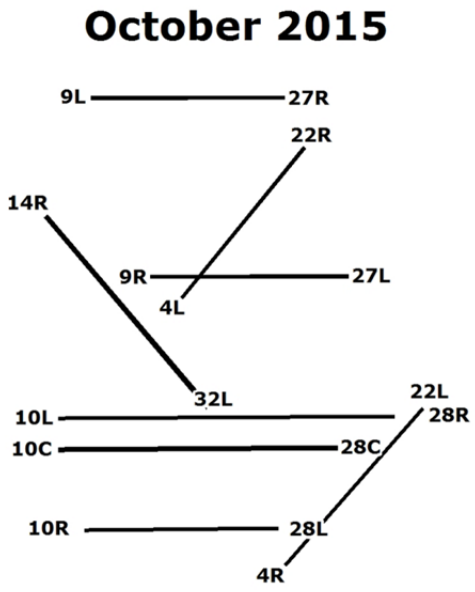
A. Fly Quiet. Our primary focus will be on the largest impact – nighttime noise. Nighttime noise most impacts the quality of life of airport neighbors. We've heard about these impacts consistently in our meetings and over time it appears in reports as a top area of concern. Not surprisingly, the FAA recognizes nighttime noise as disruptive and weighs it more heavily in its noise metric used to create contours. Lastly and most importantly, abatement of nighttime noise through operational changes is possible at O'Hare.

The Fly Quiet Program is an official group of measures recognized in the OMP Record of Decision, and it also provides the CDA a framework from which improvements can be made. Modifying this program offers several airport operational options that can help abate nighttime noise impacts. We plan to open the dialogue on the program to see what new or revised procedures can be implemented to abate noise in certain communities at certain times.

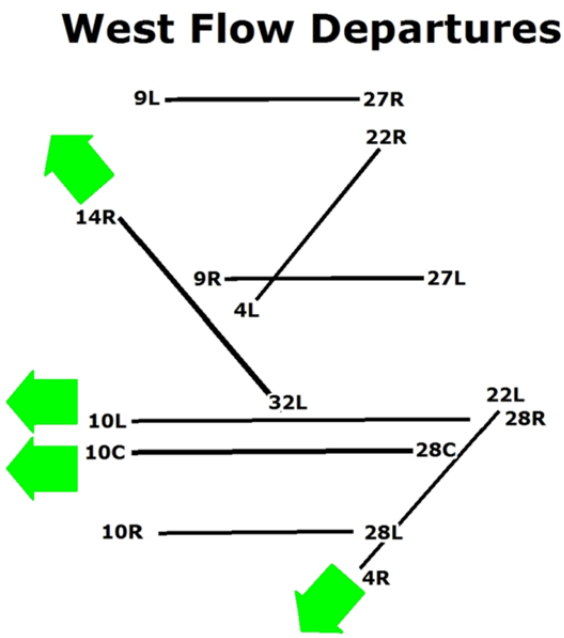
1. **Develop a Fly Quiet Rotation**. CDA is willing to change the intent of this program if community consensus and FAA approvals can be obtained. Specifically, changing the philosophy of Fly Quiet from concentrating on nighttime flights over compatible land near the airport to an approach that would spread out the noise via a rotation scheme that moves impacts due to nighttime flights from one community to another. This rotation would be on a set period (number of days or weeks), as weather and other operational conditions allow. The methodology we are using to analyze this initiative is outlined below.

   We would begin by identifying **all arrival and departure possibilities** on the airfield after the closing of runway 14L/32R and the commissioning of runway 10R/28L.

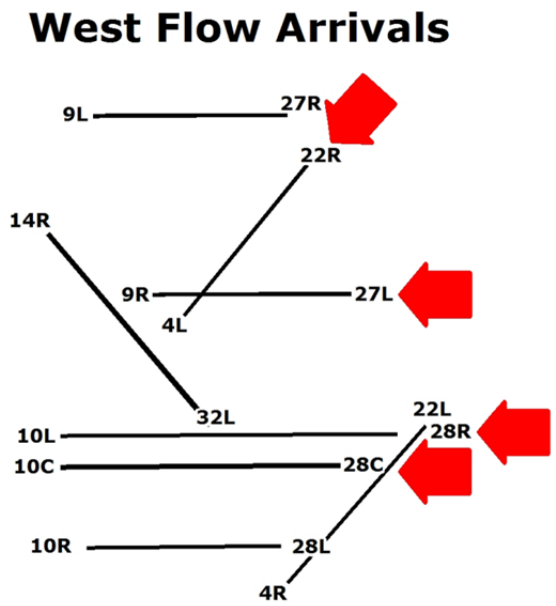
October 2015. This exhibit represents the configuration after the closing of 14L/32R and the opening of 10R/28L. After the Build Out of the OMP, there will be opportunities to revise/enhance this initiative with the addition of 9C/27C and the extension of 9R/27L.



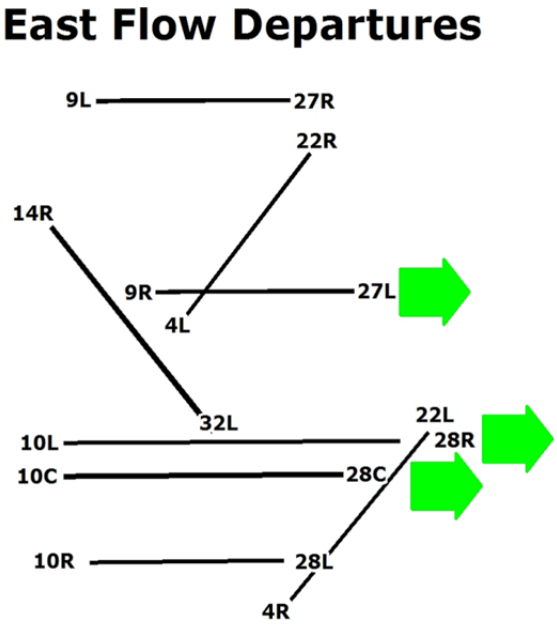
West Flow Departures. This exhibit highlights potential departure options for a Fly Quiet West Flow. Runways 27R and 28L will be closing nightly from 10 p.m. to 6 a.m. due to the closure of each air traffic control tower supporting those runways. Though 14R/32L will be decommissioned during the completion phase of the OMP, 32L is a viable alternative for west flow departures in the interim period until decommissioning or OMP completion.



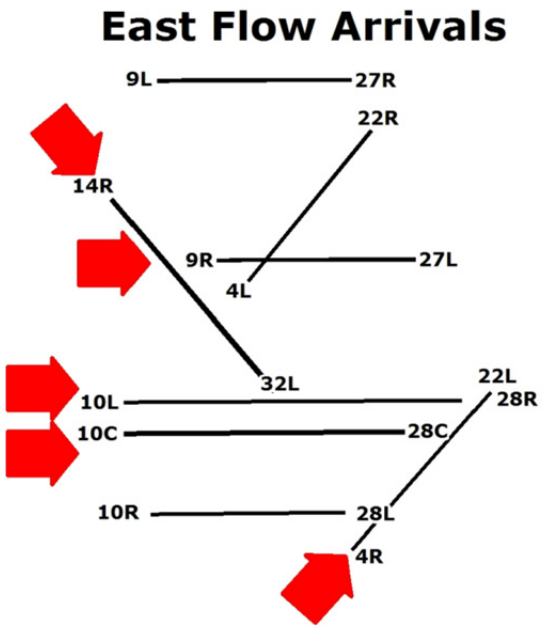
West Flow Arrivals. This exhibit highlights potential arrival options for a Fly Quiet West Flow. Runways 27R and 28L will be closing nightly from 10 p.m. to 6 a.m.



East Flow Departures. This exhibit highlights potential departure options for a Fly Quiet East Flow. Runways 9L and 10R will be closing nightly from 10 p.m. to 6 a.m. Runways 10L and 10C provide the safest and efficient east flow departures.



East Flow Arrivals. Similar to west flow arrivals there are several runway options. The optimum runways are 9R, 10L, 10C and 4R. Runways 9L and 10R will be closing nightly from 10 p.m. to 6 a.m.



We would then evaluate all possible alternatives that meet some important baseline criteria that would include:

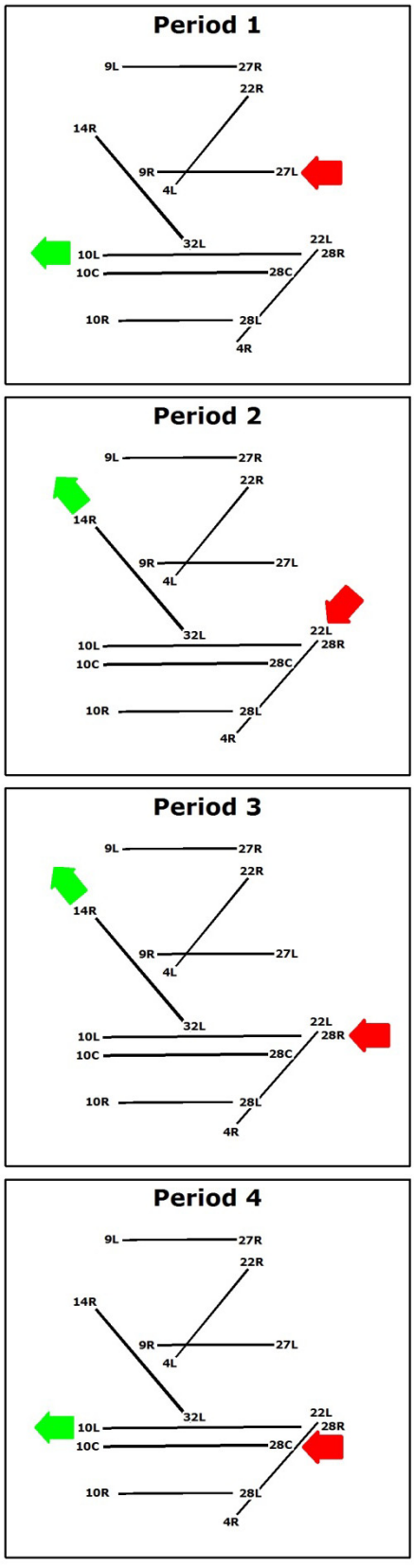
i. Departure runways would need to accommodate aircraft scheduled for nighttime departures in the period.

ii. Arrival runways should have minimal impact on surrounding ground movements.

iii. Alternate departure and arrival runways should be identified for periods when primary runways are out of service for construction, snow removal, runway maintenance, runway inspection and specific aircraft operational needs.

iv. Make maximum use of all runways that are appropriate for each rotation.

Fly Quiet West Flow Concept



This example represents one possible **Fly Quiet West Flow** alternative of a rotational configuration that will help distribute the impact of noise on the surrounding communities in a balanced manner.

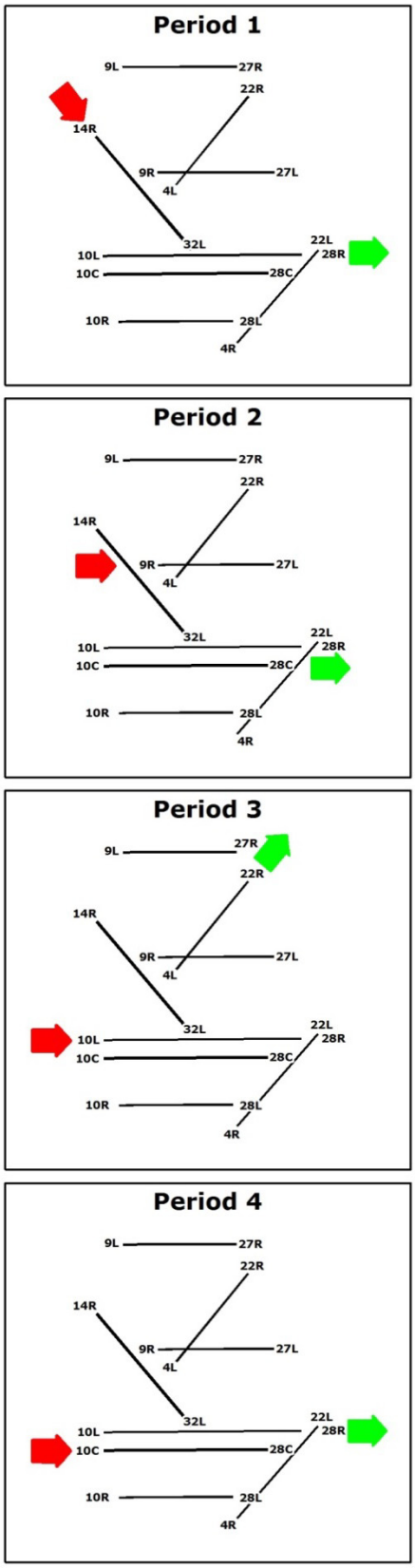
For each period (days or weeks), there will be a dedicated runway for arrivals and a dedicated runway for departures.

Operations for each period will be concentrated on specific designated runways in order to spread the noise impacts. There are numerous rotational options that CDA can analyze. **This specific example is merely a concept to illustrate how the rotation concept might operate.**

Note: Each runway will likely need a designated alternative to allow for construction, snow removal, runway maintenance, runway inspection and specific aircraft operational needs. Available runways are determined by CDA Operations, ATC, and prevailing winds.

The CDA will work with FAA to make Runways 9L/27R and 10R/28L available for this revised Fly Quiet concept. This would allow for a great spread of noise impacts for this alternative because of their locations. It should be noted that any change to the Fly Quiet Program would have to reviewed and agreed to by both the ONCC and the FAA.

Fly Quiet East Flow Concept



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As stated above, each runway will likely need a designated alternative to allow for construction, snow removal, runway maintenance, runway inspection and specific aircraft operational needs. Available runways will be determined by CDA Operations, ATC, and prevailing winds.

Like the West Flow alternative, the CDA will work with FAA to make Runways 9L/27R and 10R/28L available for this revised Fly Quiet concept. This would allow for a great spread of noise impacts for this alternative because of their locations. As noted above, any change to the Fly Quiet Program would have to reviewed and agreed to by both the ONCC and the FAA.

2. **Utilize Runway 14R/32L.** The use of Runway 14R/32L, especially during nighttime operations and until the commissioning of 9C/27C and the extension of 9R/27L, is a reasonable possibility. The CDA is recommending to the FAA and the airlines additional utilization of this runway. This will provide more options for the Fly Quiet preferential runways.

3. **Modify existing preferential departure procedures.** Existing procedures could be examined to enhance preferential departure flight paths are over the most compatible land use.

4. **Enhance existing preferential departure procedures (RNP).** Existing procedures are vector (non-precision) procedures. By incorporating precision guidance (GPS or RNP) procedures, the adherence to the preferential flight tracks could increase.

5. **Redesign the Ground Run-Up Enclosure (GRE).** In March 1997, the Chicago Department of Aviation (CDA) opened a Ground Run-Up Enclosure (GRE) on the Scenic Hold Pad at Chicago O'Hare International Airport in order to reduce aircraft noise from aircraft engine ground run-ups. The GRE was built at a cost of $3.2 million, was the first of its kind in the United States, and has logged more than 15,000 run-ups since its commissioning. The GRE is a non-roofed, three-sided facility with acoustic panels that absorb and attenuate noise. The existing GRE will need to be relocated as an enabling project for Runway 9C/27C which will provide an opportunity for expanded capability at the future location.

6. **Require One-Engine Airfield Taxiing.** Require airlines to employ single engine taxi operations. This operational change not only reduces noise effects during night time movements, it also would reduce emissions and save the airlines operating costs. This has been an effective measure at other airports.

7. **Add Noise Abatement Signs.** Added noise abatement signs will serve a reminder to pilots about the Fly Quiet Program.

8. **Add the Fly Quiet Program to the Pilot Aeronautical Charts.** Adding the Fly Quiet Program into the pilot aeronautical charts will serve as a reminder to pilots about the Fly Quiet Program.

B. Fully Modernize O'Hare's Airfield.

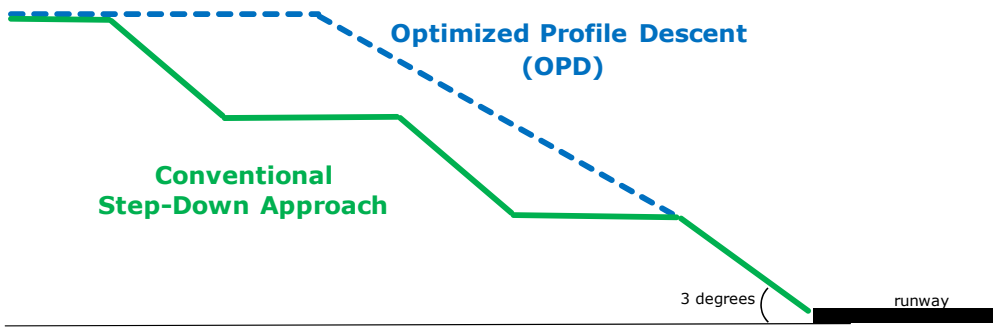
1. **OMP Build Out.** It is in the community's interest to complete the airfield so that use of the runways can be finally balanced as intended in the original design. Not only will use of the airfield be balanced between the north and south runways, the balance of east flow and west flow may be balanced from the current 70/30 split to closer to 60/40. Additional east/west runways will

provide the opportunity to decrease operations on existing runways and existing flight paths and therefore spread out the impact of aircraft noise.

Moving forward with the airfield will reduce the noise in the community in the southeast area from O'Hare created by the interim (2015 to 2021) condition of higher use of the south airfield, which is required until the north airfield is completed.

2. **Airspace Changes.** As O'Hare's airfield is modernized, so is the airspace that supports it. Completing the buildout of the OMP may provide opportunities to improve airspace configuration and/or procedures as a result of new technologies, evolving regulations, or other factors. The CDA will work with FAA and airlines to identify and evaluate those options.

   One example is Optimized Profile Descent (OPD) or Continuous Descent Approach. OPD is an aircraft arrival method that permits the aircraft to descend from cruise altitude to final approach using the most economical power setting at all times. OPD allows the aircraft to remain at higher altitudes on arrival to the airport and use lower power settings during descent.



   Conventional arrival procedures have multiple segments of level flight during the descent and each step down requires a change in power settings. OPD procedures enable arrival aircraft to descend from cruise altitudes to final approach with significantly fewer level-offs. Typically, this occurs between 30 and 15 nautical miles from the end of the runway. Since aircraft can use lower and steady power settings, OPD procedures can result in reduced fuel burn, lower emissions and reduced noise.

2. MITIGATION

RSIP and SSIP Programs. The CDA, working closely with the ONCC, has accomplished much in the area of Residential and School Sound Insulation. Together we have provided mitigation to those most impacted by noise and we have mitigated noise impacts for children trying to learn at school.

Since 1995, the Chicago Department of Aviation (CDA) has administered the Residential Sound Insulation Program (RSIP) in communities surrounding O'Hare International Airport and is one of the most aggressive programs in the world. More

than $600 million has been spent on noise insulation, including over $273 million on over 10,900 residential units.

Since 1982, the Chicago Department of Aviation (CDA) has administered the School Sound Insulation Program (SSIP) in communities surrounding O'Hare International Airport and is the largest and one of the oldest programs in the world. More than $600 million has been spent on noise insulation, including more than $351 million on 123 schools.

However, these mitigation efforts do not provide relief to everyone impacted by airport noise. The CDA proposes to work with the FAA to identify additional mitigation for homes and facilities impacted by noise. This additional mitigation could include previously insulated homes in the 70 DNL and/or other noise sensitive facilities like libraries and churches.

3. COMMUNICATION AND REPORTING

A. Upgrade the CDA Webpage to include expanded content on airport noise and operations. The upgrade will include new subpages to answer general questions residents may have and provide information that will help residents better understand the complex issue of aircraft noise. The CDA will utilize various methods (such as whitepapers, graphics, or video tutorials) to provide pertinent understandable information on airport noise and operations.

B. Continue to explore new noise software. Continue the use of WebTrak software, one of the software systems recommended by the JDA/SOC reports. WebTrak allows users to watch the movement of flights and air traffic patterns within the Chicago metropolitan area. This flight tracking system includes specific information about flights departing from and arriving to O'Hare and Midway. Information includes the flight number, origin/destination airport, aircraft type, and altitude above mean sea level.

1. WebTrak has a graphical interface that helps users easily identify aircraft and their locations. Aircraft departing and arriving to O'Hare and Midway are shown in different shades of green and red.

2. In addition to the use of WebTrak, the CDA will continue to investigate and explore new noise software to provide more community education on the benefits and uses of this Airport Noise Management System.

C. Improve the collection of stakeholder noise concerns. The CDA understands the importance of addressing resident concerns from the communities surrounding O'Hare. In an effort to provide an improved level of customer service, the CDA will investigate various new resources for residents.

1. Options to investigate include: a 'live chat' feature for citizen inquires relating to noise, an airport specific alternative to the City of Chicago's 311 City Services, and a mobile application for airport noise.

i. A 'live chat' featured on the CDA's website would allow residents to receive real time assistance in locating information on the CDA's website and answering basic questions relating to airport noise.

ii. An airport specific noise hotline would allow CDA to directly address community inquiries on various noise topics.

iii. A potential mobile application could include relevant noise information (i.e. sound insulation eligibility, complaint entry, noise monitor information, etc.) that is readily accessible in a format that is convenient for residents.

D. Review Industry "Best Practices". The CDA will review "Best Practices" outlined in Airport Cooperative Research Program (ACRP) research projects like Report 15 "Aircraft Noise: A Toolkit for Managing Community Expectations" and adopt any not being performed.

E. Maximize the use of social media to update citizens on relevant noise topics. Social media has become a standard for communication worldwide. It is timely and prudent for the CDA to embrace this medium and find ways to enhance contact with its stakeholders.

F. Report single-event noise data. The CDA intends to begin reporting on single-event noise events. For every noise event (aircraft or community) recorded by the Airport Noise Management System, the CDA proposes to report three metrics. The CDA's noise monitors record noise events based on threshold exceedance. Each noise event starts at the time the noise level exceeds a decibel threshold, typically slightly above the background or ambient noise level, and ends at the time the noise level returns to the threshold. The three metrics reported for each noise event would include the Lmax, the Leq, and the SEL. The three noise metrics are industry standard metrics and are calculated at the noise monitor. The Lmax is the peak noise event in decibels, the Leq is the average sound level for the event in decibels, and the SEL is the average sound level for the event in decibels accounting for both intensity and duration. SEL takes all of the energy under the line in a noise versus time chart and compresses it to a 1 second value.

This single-event noise data will be uploaded to the CDA's website on a regular basis. Each file will contain: the monitor Site ID, the date and time of the event start time, the date and time of the peak noise for the event, the duration in seconds of the event, and the Lmax, the Leq, and the SEL of the noise event, all in decibels.

We are not aware of any other airport in the country that uploads data in this quantity and manner, so this would be setting an industry precedent.

4. CITIZEN INVOLVEMENT

A. ONCC - The ONCC was established to 1) determine certain Noise Compatibility Projects and Noise Compatibility Programs to be implemented at O'Hare, 2) oversee an effective and impartial noise monitoring system, and 3) advise Chicago concerning O'Hare related noise issues. ONCC has served as a model for other airports nationwide.

The City proposes that the ONCC provide a forum for direct citizen engagement with the ONCC in order to reflect their concerns in any recommendations presented to the CDA and the FAA for consideration.

B. CDA - Our staff will explore new and innovative activities to provide communities the opportunity to have 'hands on' experiences relative to operational aspects of the airport by expanding current special events (e.g. Runway Runs, school tours, etc.). Additionally, the CDA will conduct additional Noise 101/Airport Operations 101 Workshops in the local communities.

ON-GOING NOISE MEASURES

While the MOU addresses solutions as of August 1, 2015, the CDA is fully committed to continuing analysis and remediation of noise issues. Below are some examples of measures that will continue to be studied and implemented, once the rigorous analysis and required coordination is completed.

1. Coordinate with American Airlines regarding phase out of MD80 fleet at O'Hare
2. Closely monitor FAA's data evaluation and reconsideration of the 65 DNL noise standard
3. Support the addition of newer generation Stage 4 aircraft
4. Continue to make enhancements to the monthly Airport Noise Management System (ANMS) reports and quarterly Fly Quiet Reports

NEXT STEPS

The CDA intends to analyze the above measures as needed and present the findings to the ONCC. Once the ONCC makes recommendations to the CDA, the CDA will make a submittal to the FAA if applicable. Based on the impacts of recommendations, the FAA will then make a decision on the applicable processes for review and implementation.