



# ***Noise Compatibility***

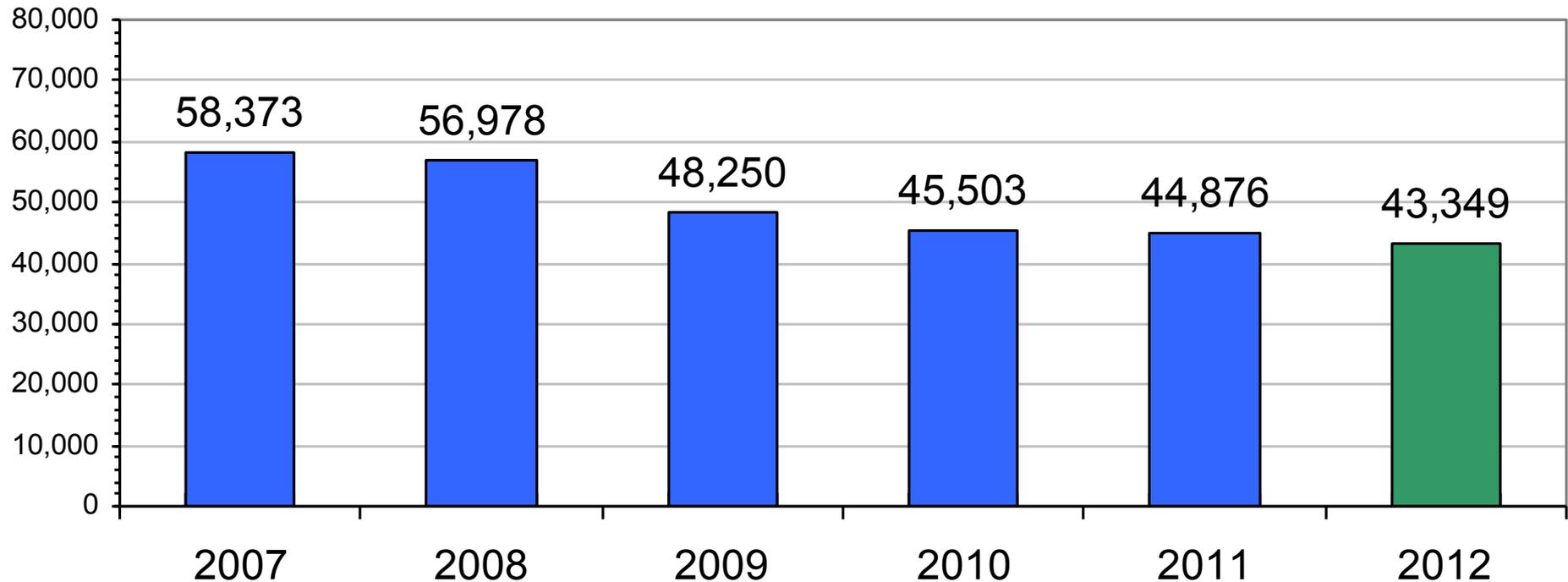
**1<sup>st</sup> Quarter 2012**

July 10, 2012

# Aircraft Operations



## Cleveland 1<sup>st</sup> Qtr. Operations 2007 - 2012



There were 43,349 landings and takeoffs in the 1<sup>st</sup> qtr. 2012; this is 3.40% below the 1<sup>st</sup> qtr. 2011.

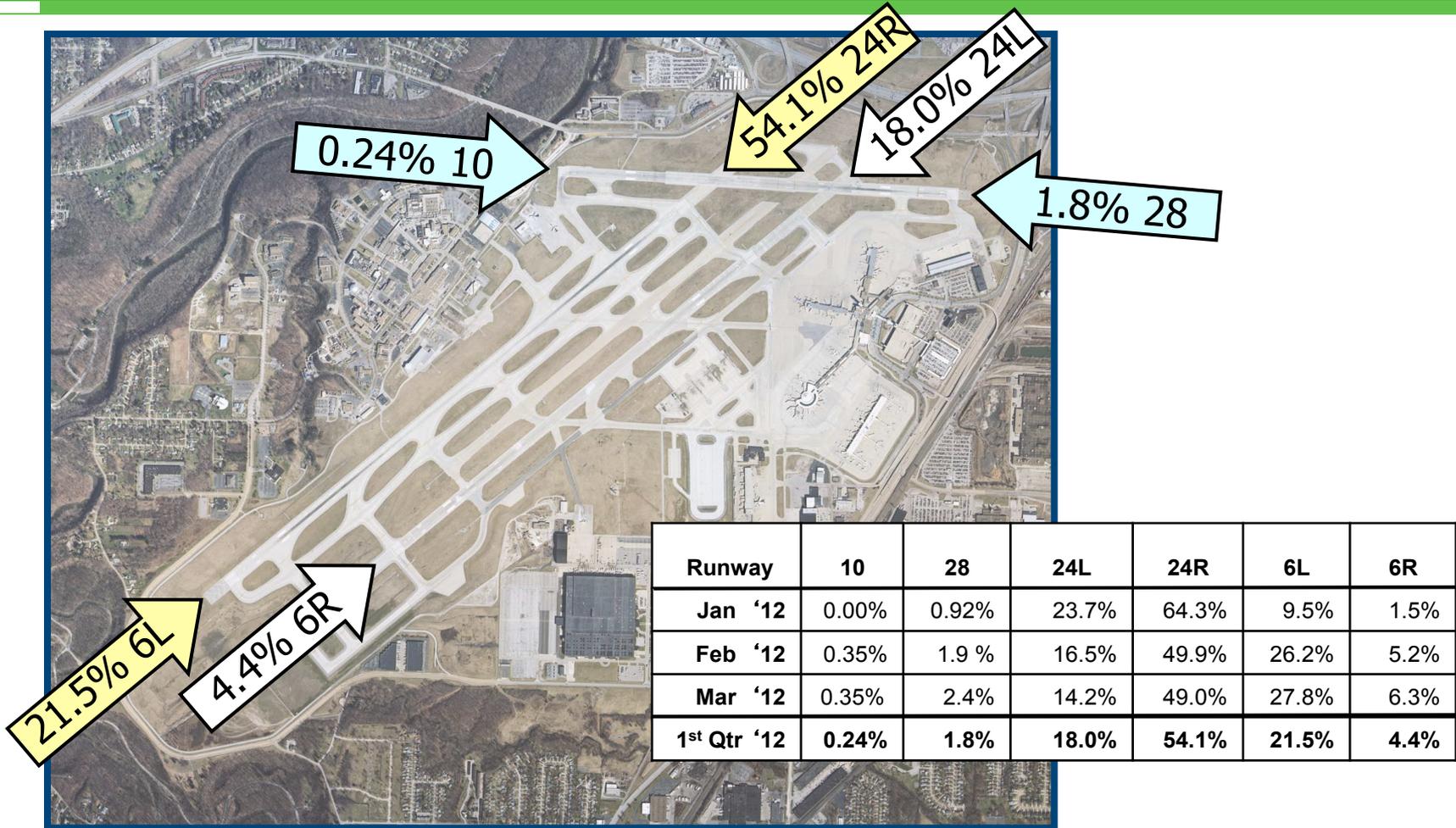
Source: FAA Control Tower Traffic Count Reports

## Landings & Takeoffs

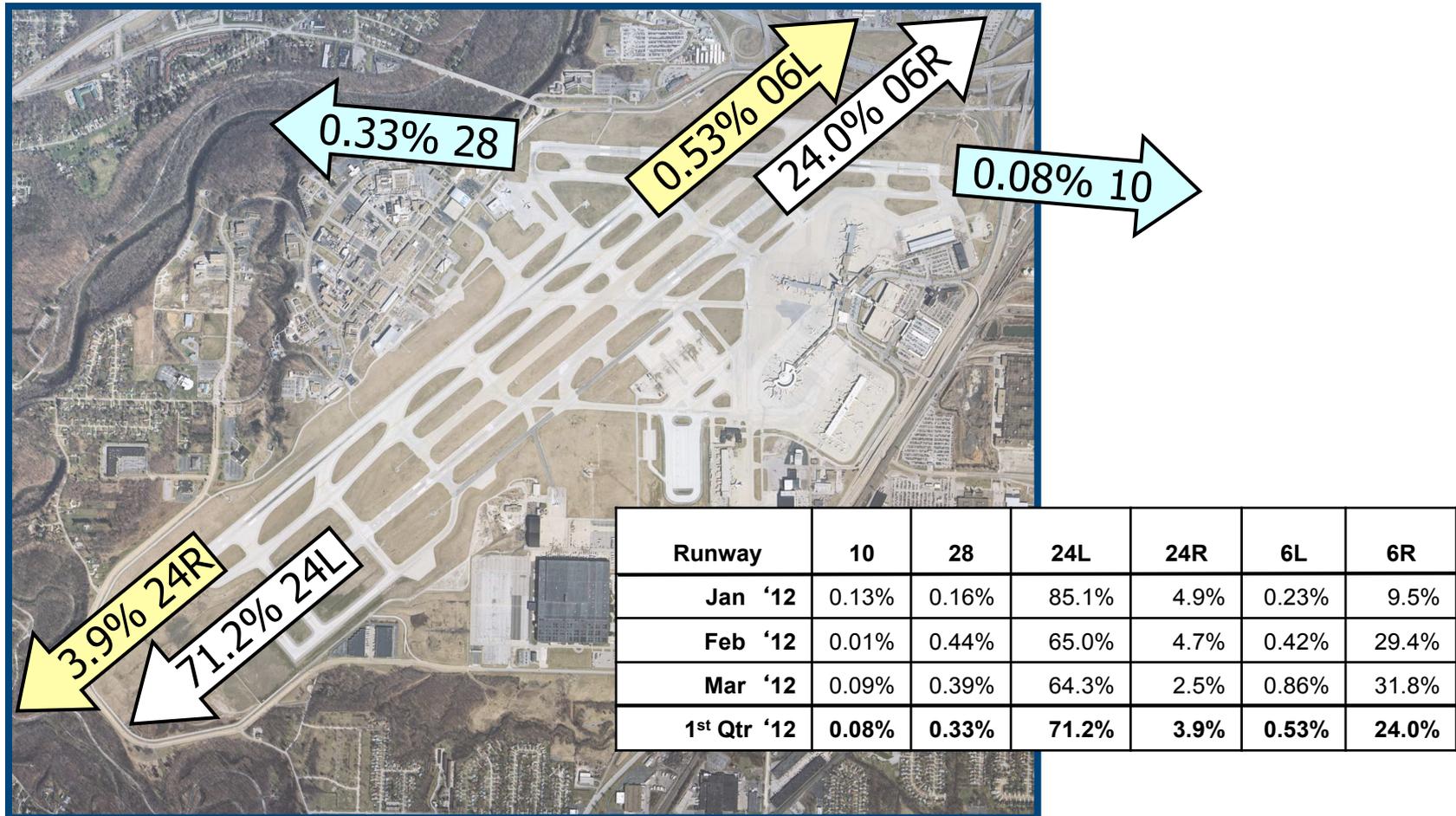
	1st Qtr, 2012		1st Qtr, 2011	
Commercial				
-Stage 2 with hush kit	190	0.44%	249	0.55%
-Heavy (Includes all B757s)	798	1.84%	800	1.78%
-MD80 Series	779	1.80%	160	0.36%
-Other Stage 3	10,645	24.56%	12,839	28.61%
-Regional Jet	20,326	46.89%	20,335	45.31%
-Turboprop	8,152	18.81%	8,118	18.09%
Air Taxi	335	0.77%	103	0.23%
General Aviation	2,076	4.79%	2,229	4.97%
Military	48	0.11%	43	0.10%
<b>Total</b>	<b>43,349</b>	<b>100.00%</b>	<b>44,876</b>	<b>100.00%</b>

All aircraft above are Stage 3 certified with the exception of some Military aircraft and about 2% of General Aviation aircraft. A hush kit reduces noise enough to meet Stage 3 levels, but well short of the noise level of typical aircraft originally manufactured as Stage 3.

# Runway Use: 1<sup>st</sup> Qtr, 2012 Arrivals



# Runway Use: 1<sup>st</sup> Qtr, 2012 Departures



# Departure Headings – Day-time

## Jet Departures, 6:00 a.m. to 11:00 p.m., 1<sup>st</sup> Qtr, 2012

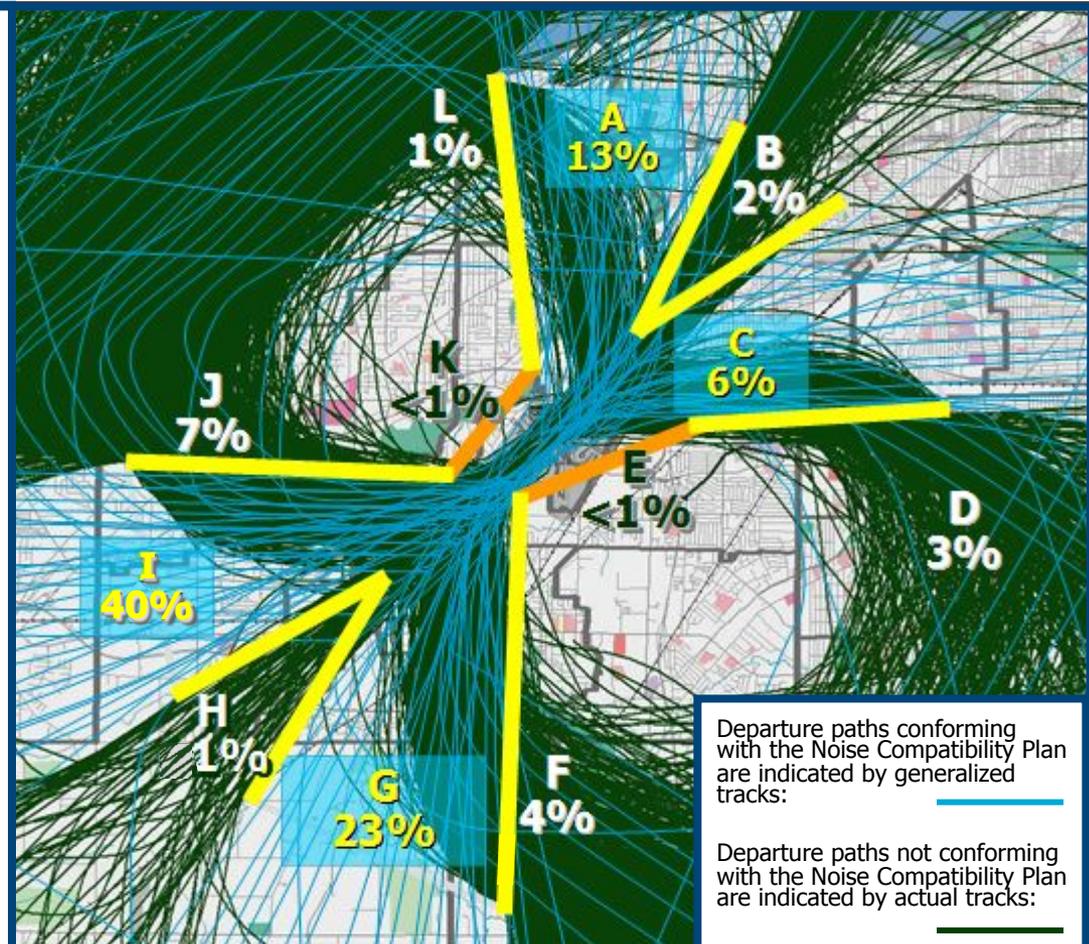
A voluntary measure of the Noise Compatibility Plan calls for jets departing between 6:00 a.m. and 11:00 p.m. from Runways 6L and 6R to take headings between 360° and 35° when turning left and between 65° and 95° when turning right until the jet is either 5 mi. away from the airport or has gained an altitude of 5,000 ft. above Mean Sea Level (MSL).

Another voluntary measure of the Noise Compatibility Plan calls for jets departing between 6:00 a.m. and 11:00 p.m. from Runways 24L and 24R to take headings between 190° and 220° when turning left and between 250° and 280° when turning right until the jet is either 5 mi. away from the airport or has gained an altitude of 5,000 ft. MSL.

### **83% conform and 17% do not conform**

- A. 13%:** north corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- B. 2%:** flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the north and south corridors
- C. 6%:** east corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- D. 3%:** flights crossing the south boundary below 5,000 ft. MSL
- E. <1%:** flights turning south before entering the corridor
- F. 4%:** flights crossing the east boundary below 5,000 ft. MSL
- G. 23%:** south corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- H. 1%:** flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the west and south corridors
- I. 40%:** west corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- J. 7%:** flights crossing the north boundary below 5,000 ft. MSL
- K. <1%:** flights turning north before entering the corridor
- L. 1%:** flights crossing the west boundary below 5,000 ft. MSL

(Percentages do not include Rwy 10/28 departures)



# Departure Headings – Night-time

## Jet Departures, 11:00 p.m. to 6:00 a.m., 1st Qtr, 2012

A voluntary measure of the Noise Compatibility Plan calls for jets departing between 11:00 p.m. and 6:00 a.m. from Runways 6L and 6R to take a heading of roughly 095° to 100° until reaching an altitude of 5,000 ft MSL.

Another voluntary measure of the Noise Compatibility Plan calls for jets departing between 11:00 p.m. and 6:00 a.m. from Runways 24L and 24R to take headings between 200° and 220° until reaching an altitude of 5,000 ft MSL.

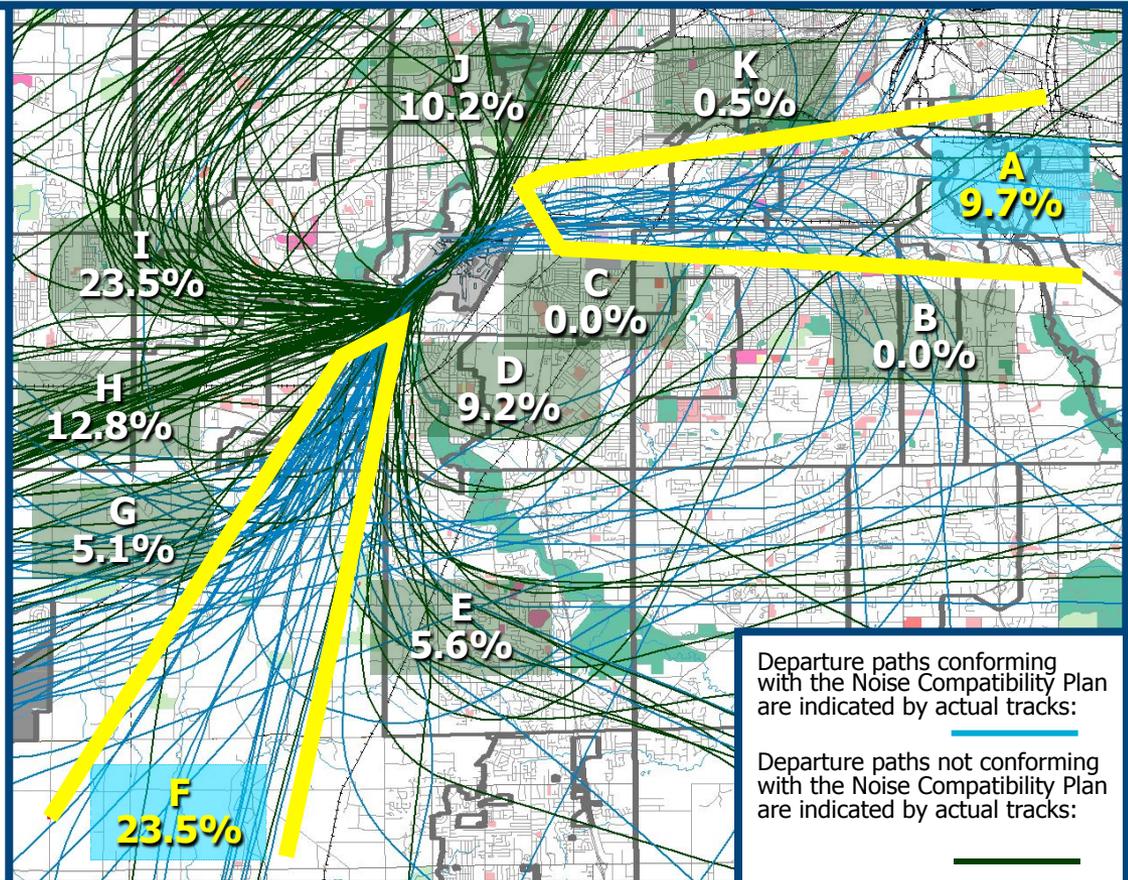
### 33.2% conform and 66.8% do not conform

- A. 9.7%:** 095 corridor, including flights crossing the 095 corridor boundaries above 5,000 ft. MSL
- B. 0.0%:** flights crossing the south boundary below 5,000 ft. MSL
- C. 0.0%:** flights turning south before entering the 095 corridor
- D. 9.2%:** flights departing south without entering the 095 corridor
- E. 5.6%:** flights crossing the east boundary below 5,000 ft. MSL
- F. 23.5%:** 200 corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- G. 5.1%:** flights crossing the west boundary below 5,000 ft. MSL
- H. 12.8%:** flights departing southwest without entering the corridor
- I. 23.5%:** flights departing west without entering the corridor
- J. 10.2%:** flights departing north without entering the corridor
- K. 0.5%:** flights crossing the north boundary below 5,000 ft. MSL

(There was only one Rwy 28 jet departure (not shown) and no Rwy 10 jet departures between 11:00 p.m. and 6:00 a.m.)

The percentage of departures on each runway from 11:00 p.m. to 6:00 a.m. during the 1<sup>st</sup> Qtr of 2012 were as follows:

Rwy	10	28	24L	24R	6L	6R
For jets:	0.0%	0.5%	67.7%	11.6%	2.0%	18.2%
For all aircraft:	0.0%	1.8%	68.8%	9.9%	1.8%	17.7%



Departure paths conforming with the Noise Compatibility Plan are indicated by actual tracks:

Departure paths not conforming with the Noise Compatibility Plan are indicated by actual tracks:

# Arrival Headings – Night-time

## Arrivals, 10:00 p.m. to 6:59 a.m., 1st Qtr, 2012

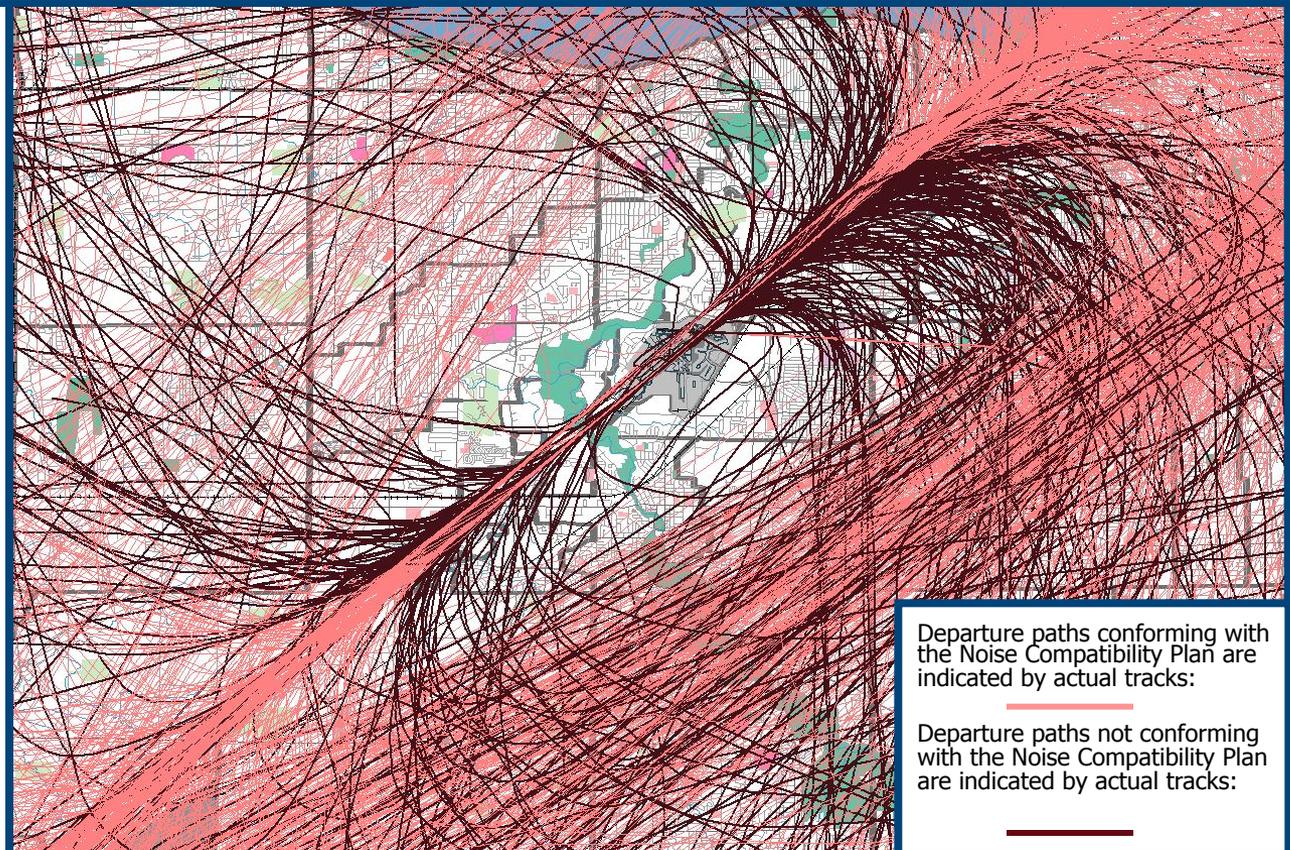
A voluntary measure of the Noise Compatibility Plan calls for all aircraft arriving between 10:00 p.m. and 6:59 a.m., wind and weather permitting, to intercept final approach course no closer than four miles before touchdown.

**84.6% conform and  
15.4% do not conform**

Runway use by all arriving aircraft from 10:00 p.m. to 6:59 a.m. during the 1<sup>st</sup> Qtr., 2012 was as follows:

Rwy	Percentage of Arrivals	
	Jets	All Aircraft
10	0.0%	0.0%
28	0.2%	0.4%
24L	36.3%	36.8%
24R	32.3%	32.9%
6L	17.3%	16.6%
6R	13.8%	13.2%

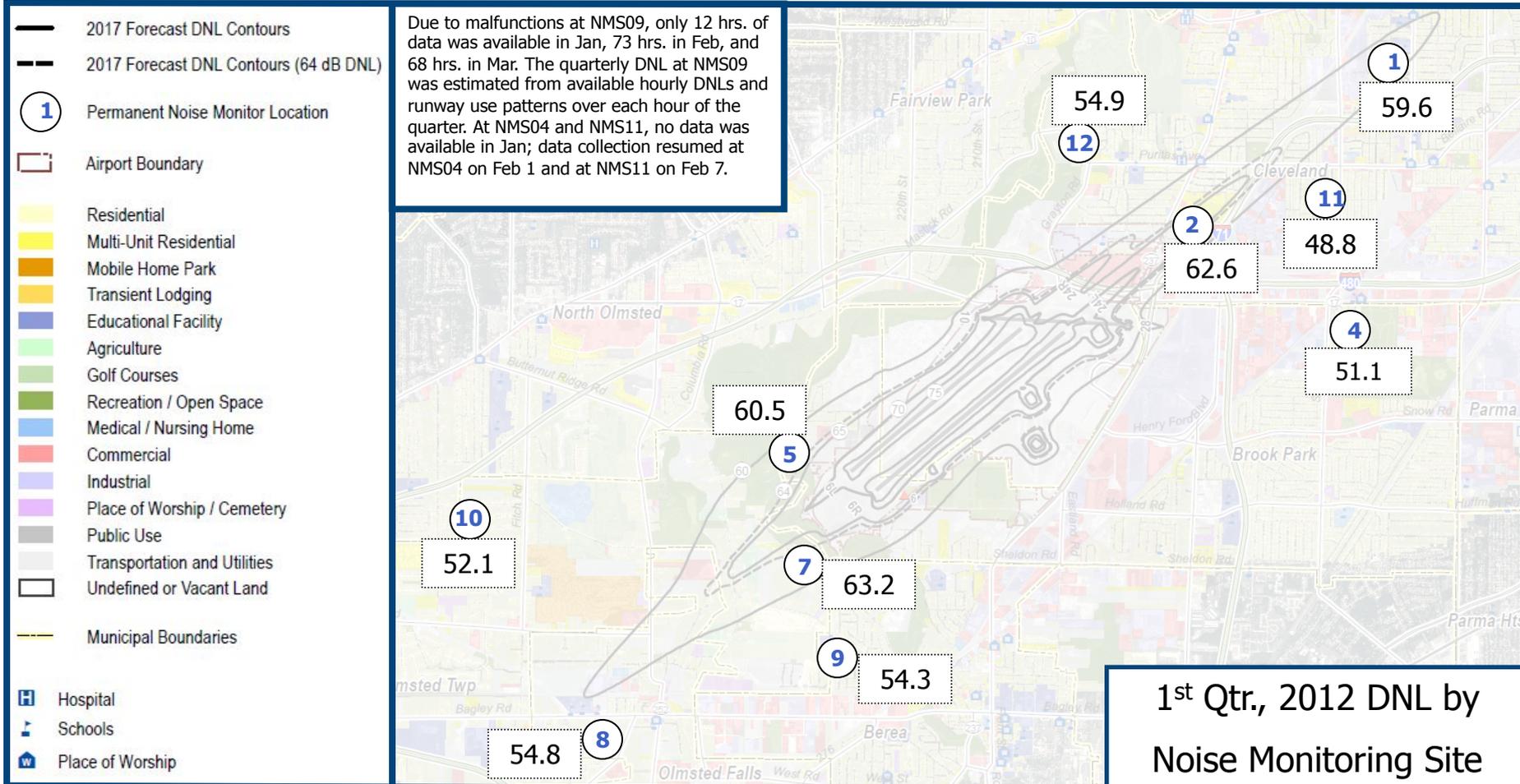
There is no comparable NCP measure regarding day-time arrivals.



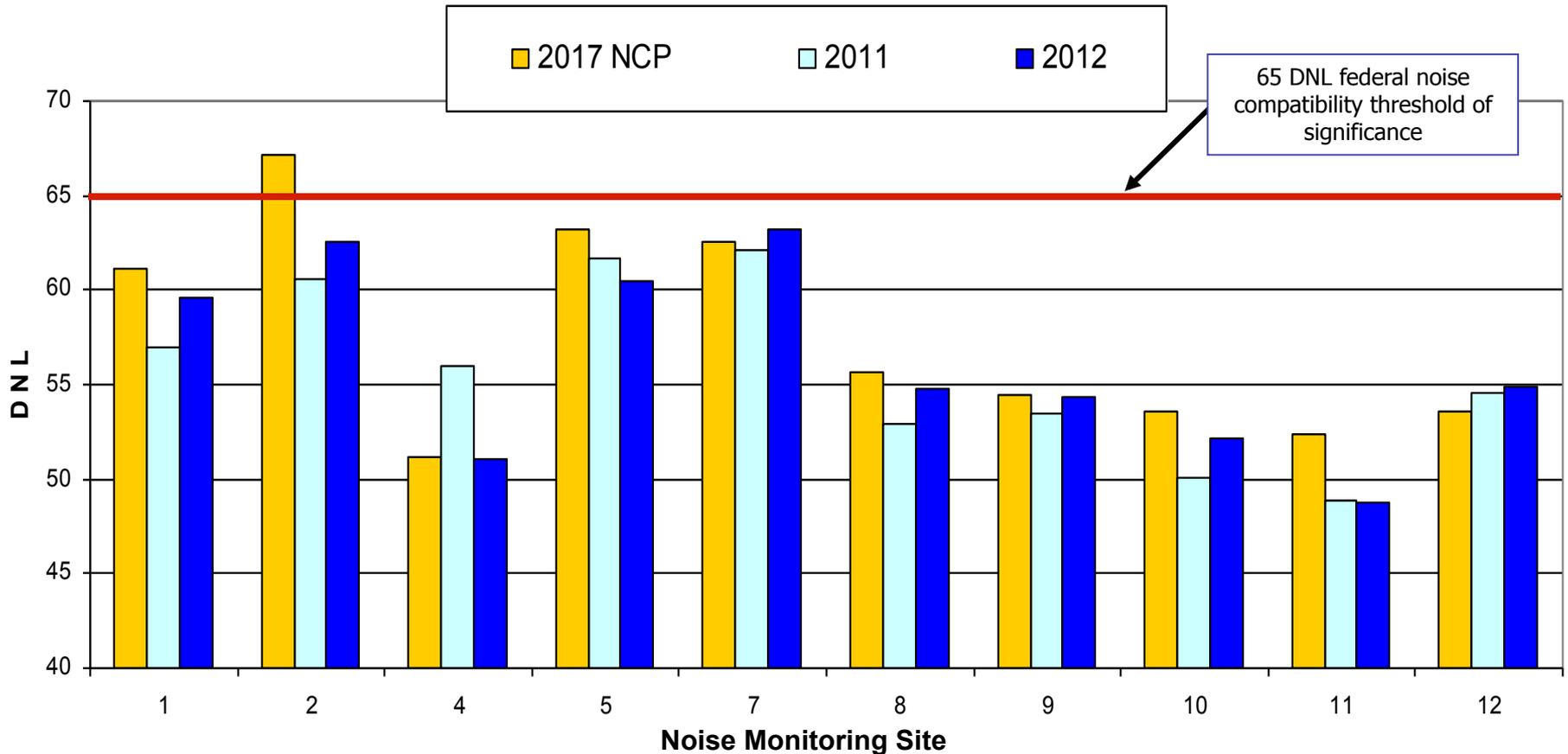
Departure paths conforming with the Noise Compatibility Plan are indicated by actual tracks:

Departure paths not conforming with the Noise Compatibility Plan are indicated by actual tracks:

# Aircraft Noise

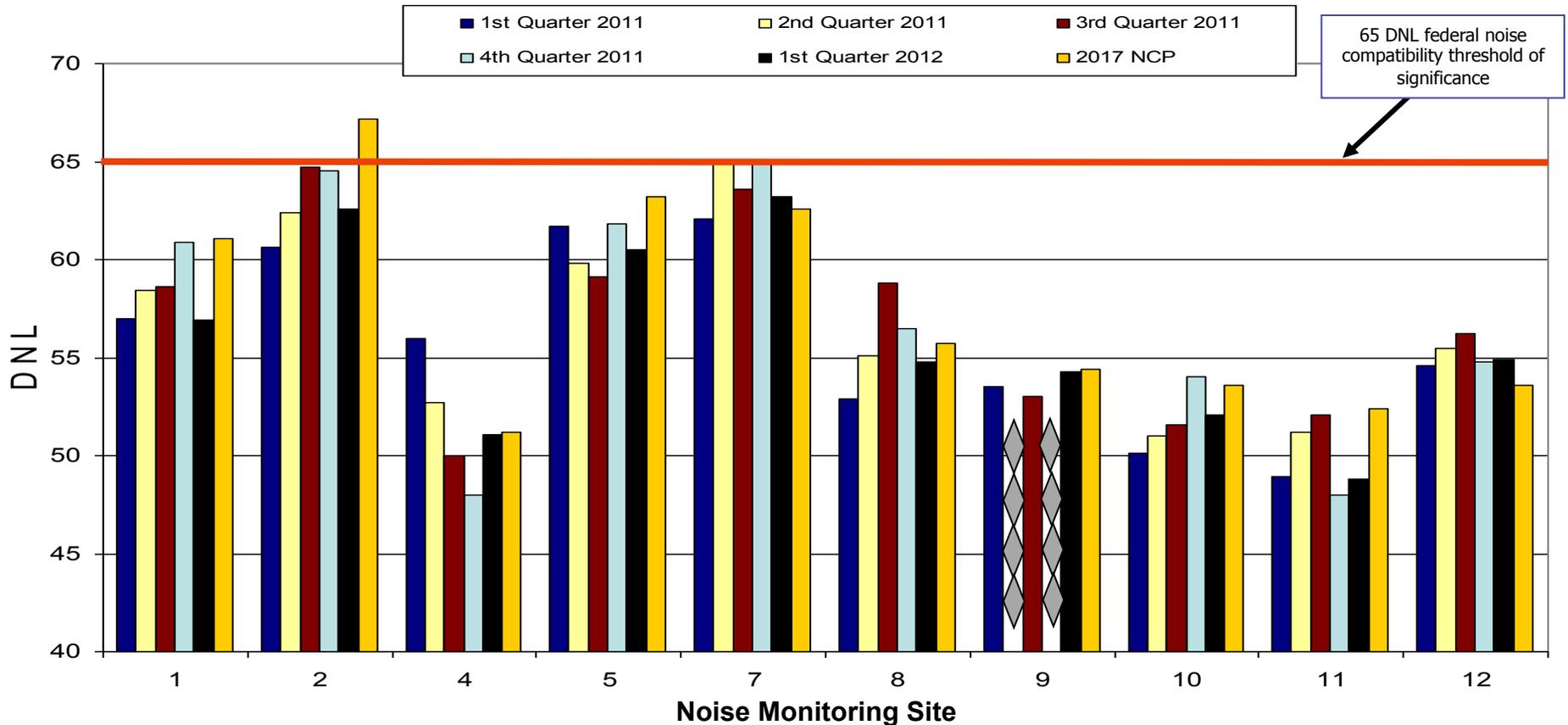


# DNL: 1<sup>st</sup> Qtr, 2012 vs. 1<sup>st</sup> Qtr, 2011



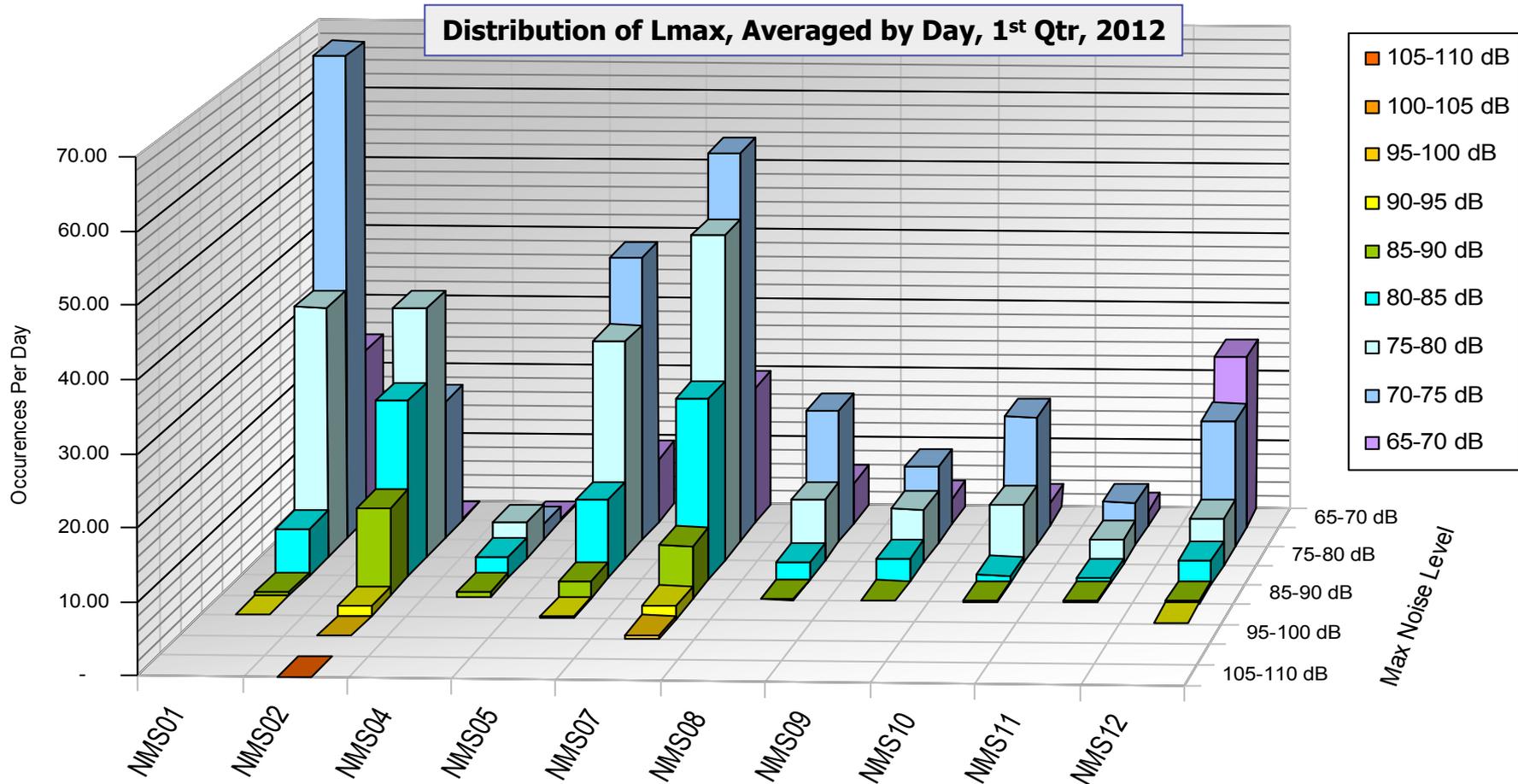
Due to malfunctions at NMS09, only 12 hrs. of data was available in Jan, 73 hrs. in Feb, and 68 hrs. in Mar. The quarterly DNL at NMS09 was estimated from available hourly DNLs and runway use patterns over each hour of the quarter. At NMS04 and NMS11, no data was available in Jan; data collection resumed at NMS04 on Feb 1 and at NMS11 on Feb 7.

# Five Qtr DNL Comparison



Due to malfunctions, all 2011 data for NMS09 was unavailable except for the month of Jan., the 1<sup>st</sup> half of Feb., one day in July, a few days in Aug. and Sep. and two half days in Oct. In the 1<sup>st</sup> Qtr. of 2012, NMS09 data was only available for 12 hrs. in Jan, 68 hours in Feb, and 72 hours in Mar. NMS04 data was missing from Nov 2, 2011 to the Feb 1, 2012. NMS11 data was missing from Nov 16, 2011 to Feb 7, 2012.

# Distribution of Noise Events



Noise Events in excess of 90 dB may have occurred at NMS09 during the 1<sup>st</sup> Qtr, 2012, but were not present in the limited available data.

## Top 3 Lmaxs at each NMS, 1<sup>st</sup> Qtr, (1 of 2)

<b>NMS</b>	<b>Lmax (dB)</b>	<b>Aircraft</b>	<b>Operation</b>	<b>Time and date</b>	<b>Sound Exposure Level (dB)</b>	<b>Duration (sec)</b>
NMS01	90.9	Boeing 747SP	Arrival on Rwy 24L	3/ 8/12 2:50 PM	97.6	37.5
NMS01	90.1	Learjet 25	Arrival on Rwy 24L	3/ 8/12 12:30 PM	97.5	37.5
NMS01	89.3	Learjet 25	Arrival on Rwy 24R	3/15/12 3:26 PM	97.3	30.5
NMS02	106.3	Gulfstream 2	Departure off Rwy 6R	3/23/12 10:15 AM	112.8	36.5
NMS02	96.9	MD-11	Arrival on Rwy 24L	3/13/12 6:09 AM	101.6	24.5
NMS02	96.1	MD-11	Arrival on Rwy 24L	2/16/12 5:31 AM	100.7	23.0
NMS04	93.1	Learjet 25	Arrival on Rwy 28	3/13/12 10:59 AM	100.2	26.0
NMS04	92.6	Boeing 737-200	Departure off Rwy 6R	2/ 5/12 11:06 AM	100.5	41.5
NMS04	91.8	DC9-50	Departure off Rwy 6R	2/18/12 4:32 PM	100.6	33.5
NMS05	94.0	DC9-50	Take-off Roll on Rwy 6R	1/26/12 12:36 PM	100.4	68.5
NMS05	93.4	MD-82	Departure off Rwy 24L	1/19/12 1:39 PM	101.3	39.0
NMS05	93.0	Boeing 727-200	Departure off Rwy 24L	2/14/12 7:12 AM	98.9	39.5
NMS07	99.9	DC9-50	Departure off Rwy 24L	1/22/12 12:24 PM	105.9	32.5
NMS07	99.7	DC9-50	Departure off Rwy 24L	3/ 1/12 7:35 AM	106.6	35.5
NMS07	99.4	DC9-50	Departure off Rwy 24L	2/18/12 7:35 AM	106.8	40.5

Sound Exposure Level is a measure that takes into account all noise over the entire duration of an event.

## Top 3 Lmaxs at each NMS, 1<sup>st</sup> Qtr, (2 of 2)

<b>NMS</b>	<b>Lmax (dB)</b>	<b>Aircraft</b>	<b>Operation</b>	<b>Time and date</b>	<b>Sound Exposure Level (dB)</b>	<b>Duration (sec)</b>
NMS08	89.4	Learjet 25	Arrival on Rwy 6L	3/13/12 10:04 AM	97.5	46.0
NMS08	88.3	MD-83	Departure off Rwy 24L	3/ 8/12 7:40 PM	95.5	40.5
NMS08	88.3	MD-88	Departure off Rwy 24L	3/ 7/12 4:14 PM	94.8	34.5
NMS09	89.3	Boeing 737-200	Departure off Rwy 24L	3/18/12 10:07 AM	97.9	48.0
NMS09	84.5	Boeing 737-700	Departure off Rwy 24L	3/18/12 6:10 PM	93.0	26.5
NMS09	84.5	Boeing 737-500	Departure off Rwy 24L	1/15/12 9:27 AM	90.6	22.0
NMS10	88.9	MD-83	Departure off Rwy 24L	2/17/12 7:14 AM	95.0	33.0
NMS10	86.9	Boeing 727-200 R	Departure off Rwy 24L	1/ 8/12 7:50 PM	95.1	37.0
NMS10	86.9	MD-83	Departure off Rwy 24L	3/ 8/12 1:47 PM	95.0	34.5
NMS11	91.8	MD-88	Departure off Rwy 6R	3/24/12 8:00 AM	98.3	27.5
NMS11	90.9	MD-88	Departure off Rwy 6R	3/31/12 8:02 AM	96.8	28.0
NMS11	89.7	MD-88	Departure off Rwy 6R	2/ 8/12 4:41 PM	96.5	26.5
NMS12	91.4	MD-82	Departure off Rwy 6R	2/ 4/12 1:23 PM	97.5	32.0
NMS12	91.1	MD-83	Departure off Rwy 6R	3/ 5/12 1:40 PM	98.1	32.0
NMS12	90.8	MD-83	Departure off Rwy 6R	2/28/12 6:49 PM	97.0	34.5

Sound Exposure Level is a measure that takes into account all noise over the entire duration of an event.

# Noise Hotline (216.898.5220)



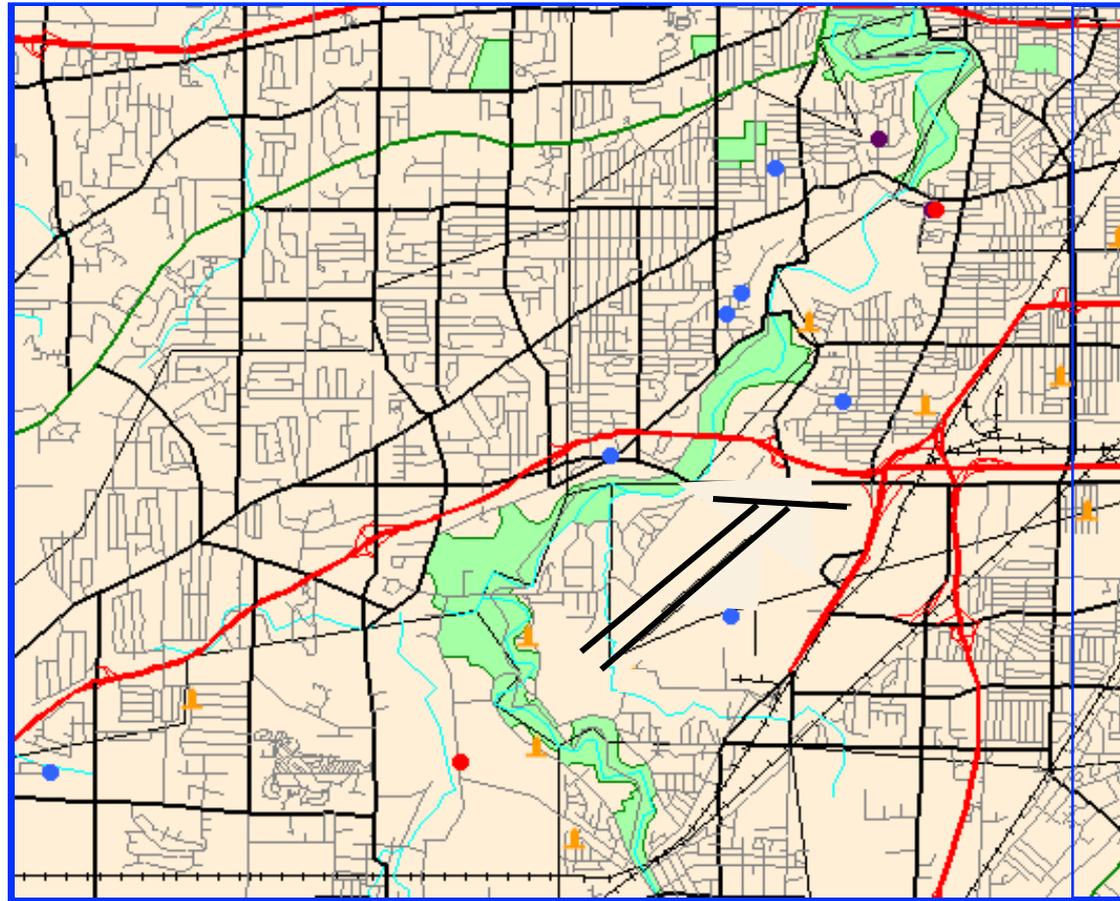
	Jan	Feb	Mar	1st Qtr	%	Callers	%
Berea	0	0	0	0	0.00%	<b>0</b>	0.00%
Brook Park	0	0	0	0	0.00%	<b>0</b>	0.00%
Cleveland	7	8	4	19	54.29%	<b>4</b>	30.77%
Fairview Park	3	0	6	9	25.71%	<b>7</b>	53.85%
Lakewood	0	0	0	0	0.00%	<b>0</b>	0.00%
Middleburg Hts.	0	0	0	0	0.00%	<b>0</b>	0.00%
North Olmsted	1	0	0	1	2.86%	<b>1</b>	7.69%
Olmsted Falls	0	0	0	0	0.00%	<b>0</b>	0.00%
Olmsted Twp	0	0	6	6	17.14%	<b>1</b>	7.69%
Parma	0	0	0	0	0.00%	<b>0</b>	0.00%
Parma Heights	0	0	0	0	0.00%	<b>0</b>	0.00%
Rocky River	0	0	0	0	0.00%	<b>0</b>	0.00%
Westlake	0	0	0	0	0.00%	<b>0</b>	0.00%
Other	0	0	0	0	0.00%	<b>0</b>	0.00%
<b>Total (2012)</b>	<b>11</b>	<b>8</b>	<b>16</b>	<b>35</b>	<b>100.00%</b>	<b>13</b>	<b>100.00%</b>
<b>Total (2011)</b>	<b>2</b>	<b>13</b>	<b>26</b>	<b>41</b>	<b>100.00%</b>	<b>15</b>	<b>100.00%</b>

# Complaint Location Map: 1<sup>st</sup> Qtr, 2012

## LEGEND

Complaints per household

- 1 complaint
- 2 to 5 complaints
- 6 or more
-  Noise Monitoring Station



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