



Noise Compatibility Report

2014 Year End

Feb 24, 2015

Disclaimer



- Adherence to approved noise abatement measures is voluntary and subject to change based on weather, efficiency, and safety.
- The contents of this report are for informational purposes only. The information cannot be used for enforcement of any Noise Abatement Measure.

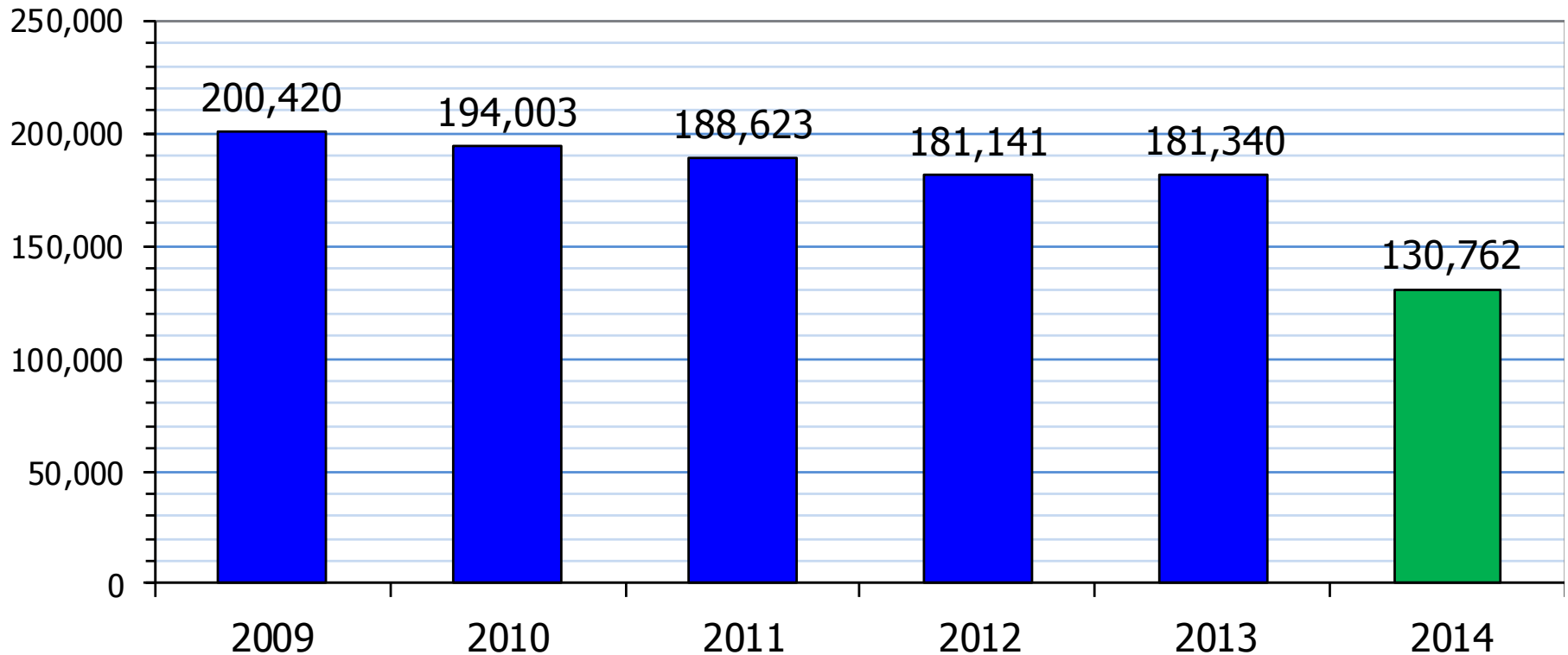
Noise Highlights of 2014



- Airport operations for Year 2014 were down 27.89%, compared to Year 2013.
- Noise Complaints for Year 2014 were down 47.86%, compared to Year 2013.
- Runway 24L/6R at Cleveland Hopkins International Airport was closed from July 8th to September 29th, 2014 for construction.
- HMMH was selected as the consultant for the evaluation of the current Noise and Operations Monitoring System.

Aircraft Operations

Cleveland Annual Operations 2009 - 2014



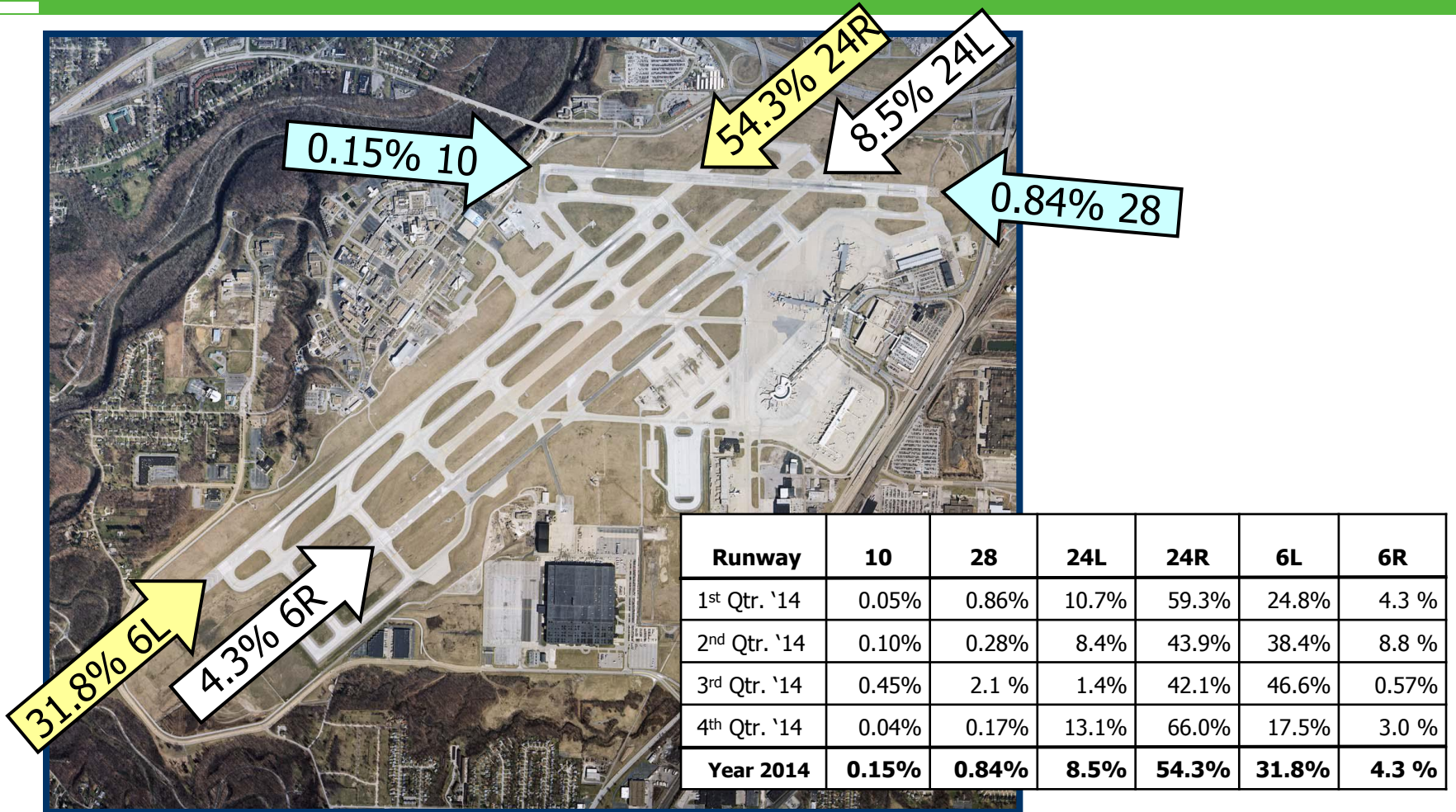
There were 130,762 landings and takeoffs in 2014; this is 27.89% below 2013.

Landings & Takeoffs

	Year 2014		Year 2013	
Commercial				
-Stage 2 with hush kit	74	0.06%	752	0.42%
-Heavy (incl. all B757s)	2,498	1.91%	3,031	1.67%
-MD80 series	1,873	1.43%	2,914	1.61%
-Other Stage 3	56,191	42.97%	49,745	27.43%
-Regional Jet	41,236	31.54%	83,340	45.96%
-Turboprop	17,431	13.33%	30,870	17.02%
Air Taxi	2,424	1.85%	1,831	1.01%
General Aviation	8,814	6.74%	8,638	4.76%
Military	221	0.17%	219	0.12%
Total	130,762	100.00%	181,340	100.00%

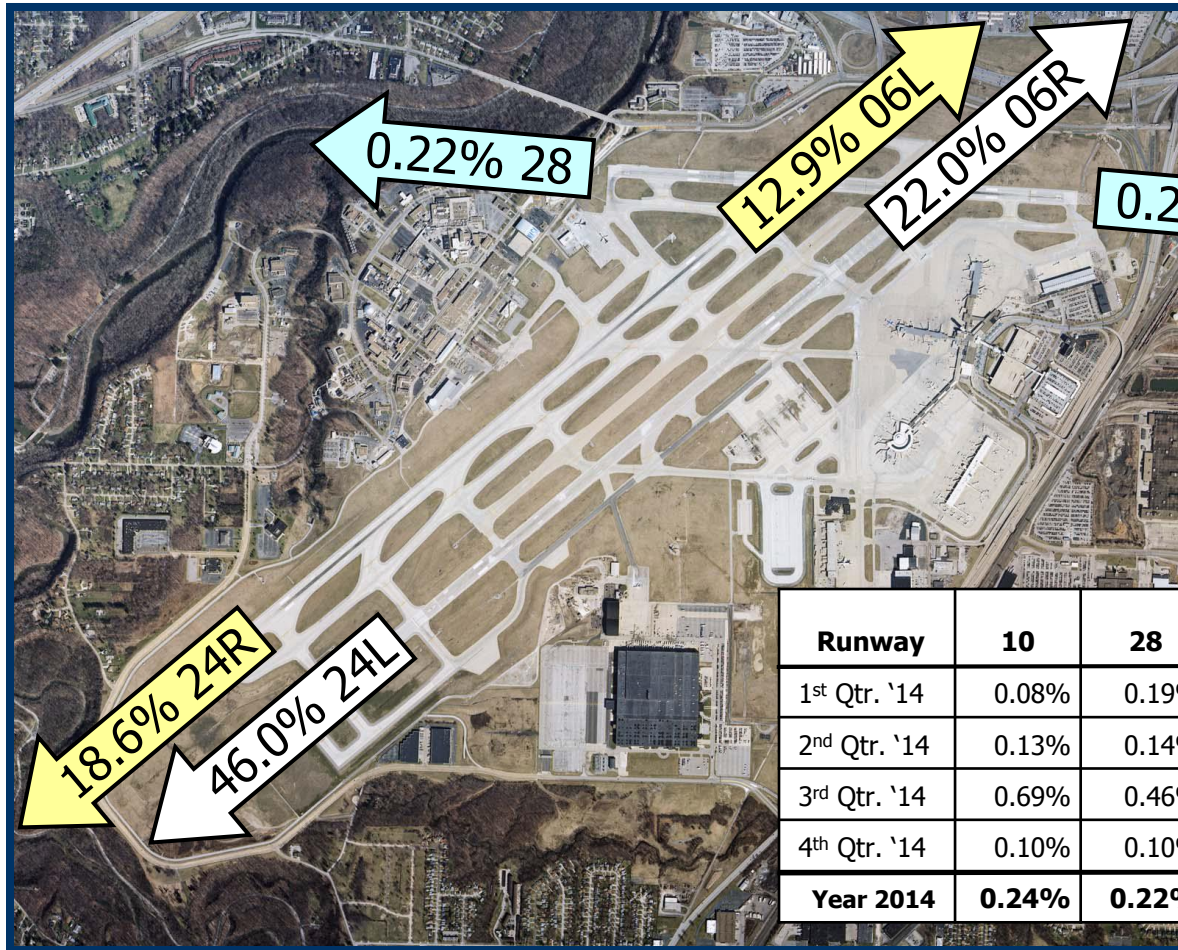
All aircraft above are Stage 3 certified with the exception of some Military and 1.5% of General Aviation (GA) aircraft, excluding helicopters. Stage 2 GA accordingly is 0.07% of the overall fleet. A hush kit reduces noise enough to meet Stage 3 levels, but well short of the noise level typical of aircraft originally manufactured as Stage 3.

Runway Use: Year 2014 Arrivals



Totals may be less than 100%, as helicopter operations do not use runways.

Runway Use: Year 2014 Departures



Runway	10	28	24L	24R	6L	6R
1 st Qtr. '14	0.08%	0.19%	63.5%	8.3%	4.7%	23.2 %
2 nd Qtr. '14	0.13%	0.14%	46.3%	7.8%	3.4%	42.2 %
3 rd Qtr. '14	0.69%	0.46%	5.2%	49.0%	43.6%	0.97%
4 th Qtr. '14	0.10%	0.10%	66.2%	13.0%	2.4%	18.2 %
Year 2014	0.24%	0.22%	46.0%	18.6%	12.9%	22.0%

Departure Headings, 4th Qtr: Day-time

Jet Departures, 6:00 a.m. to 11:00 p.m. 4th Qtr., 2014

A voluntary measure of the Noise Compatibility Program 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 Program 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.

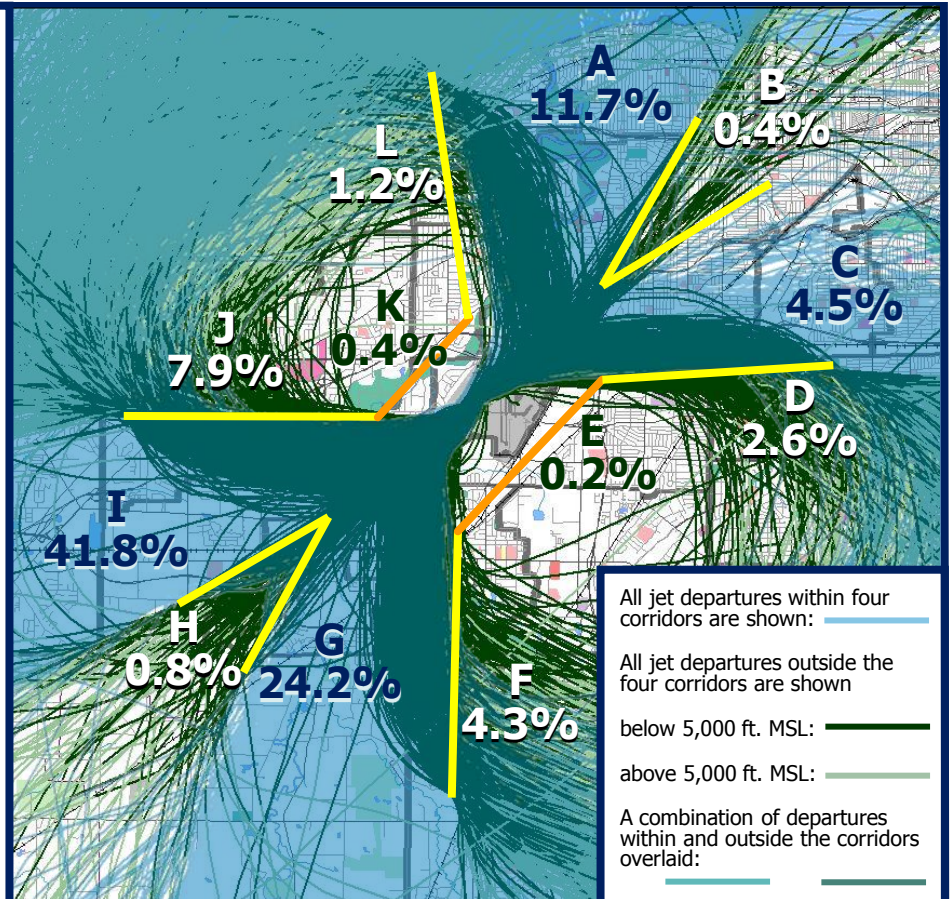
82.2% within corridors

- A. **11.7%:** north corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- C. **4.5%:** east corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- G. **24.2%:** south corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- I. **41.8%:** west corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL

17.8% outside corridors

- B. **0.4%:** flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the north and east corridors
- D. **2.6%:** flights crossing the south boundary below 5,000 ft. MSL
- E. **0.2%:** flights turning south before entering the corridor
- F. **4.3%:** flights crossing the east boundary below 5,000 ft. MSL
- H. **0.8%:** flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the west and south corridors
- J. **7.9%:** flights crossing the north boundary below 5,000 ft. MSL
- K. **0.4%:** flights turning north before entering the corridor
- L. **1.2%:** flights crossing the west boundary below 5,000 ft. MSL

(Percentages do not include Rwy 10/28 departures)



For the entire year of 2014, 82.8% of jet departures between 6:00 a.m. and 11:00 p.m. were within the four corridors. 17.2% were not.

Departure Headings, 4th Qtr : Night-time

Jet Departures, 11:00 p.m. to 6:00 a.m. 4th Qtr., 2014

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

Another voluntary measure of the Noise Compatibility Program 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.

54.8% within corridors

A. 13.7%: 095 corridor, including flights crossing the 095 corridor boundaries above 5,000 ft. MSL

F. 41.1%: 200 corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL

45.2% outside corridors

B. 1.4%: flights crossing the south boundary below 5,000 ft. MSL

C. 0.5%: flights turning south before entering the 095 corridor

D. 4.1%: flights departing south without entering the 200 corridor

E. 11.0%: flights crossing the east boundary below 5,000 ft. MSL

G. 5.0%: flights crossing the west boundary below 5,000 ft. MSL

H. 13.2%: flights departing southwest without entering the corridor

I. 5.5%: flights departing west without entering the corridor

J. 3.6%: flights departing north, not east with the 095 corridor

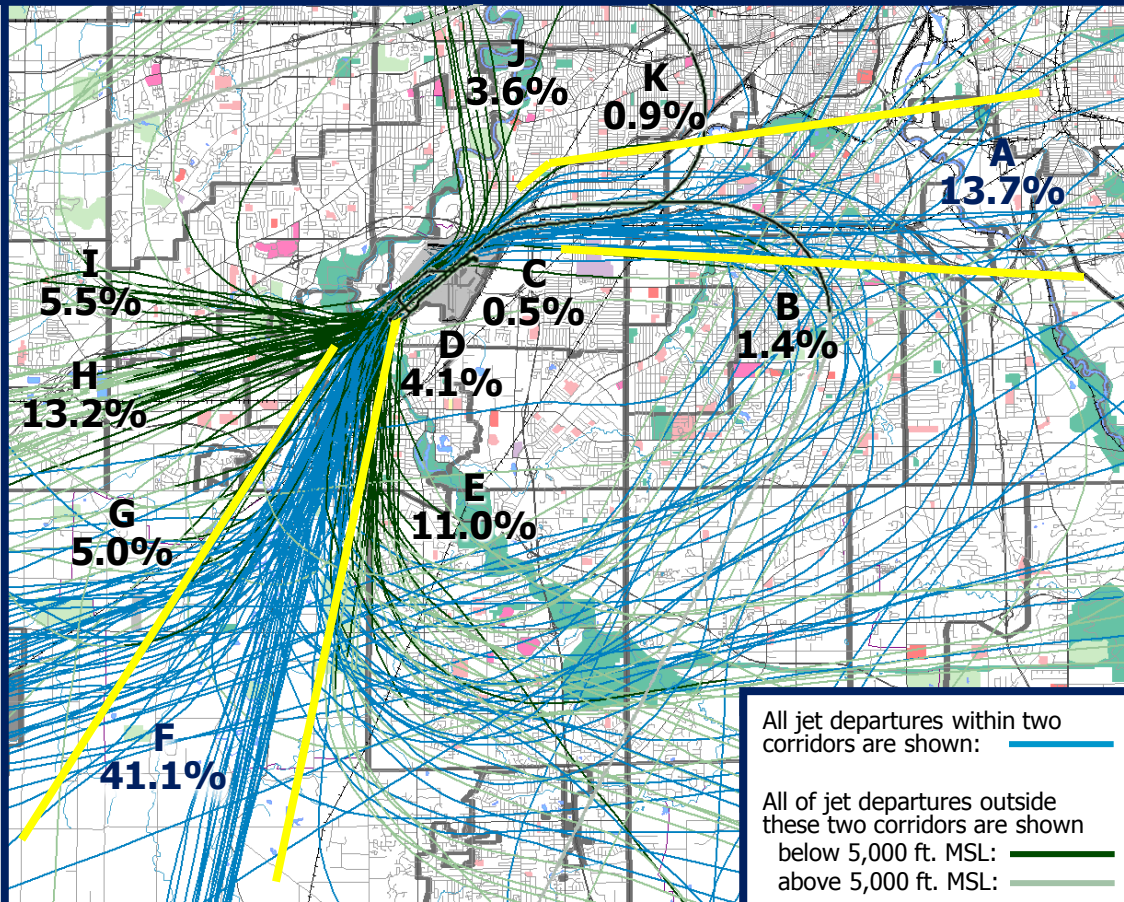
K. 0.9%: flights crossing the north boundary below 5,000 ft. MSL

(There were two Rwy 10 and no Rwy 28 jet departures between 11:00 p.m. and 6:00 a.m. during the quarter.)

The percentage of departures on each runway from 11:00 p.m. to 6:00 a.m. during the quarter were as follows:

Rwy	10	28	24L	24R	6L	6R
For jets:	0.9%	0.0%	67.9%	12.2%	1.4%	17.7%
For all aircraft:	0.8%	0.0%	69.0%	13.2%	1.2%	15.9%

92.9% of Jet Departures from Rwy 6L/6R were on the preferred Rwy, 6R.



All jet departures within two corridors are shown: ———

All of jet departures outside these two corridors are shown
below 5,000 ft. MSL: ———
above 5,000 ft. MSL: ———

For the entire year of 2014, 55.7% of jets departing between 11:00 p.m. and 6:00 a.m. were within the two corridors and 44.3% were outside them.

Arrival Headings, 4th Qtr : Night-time

Arrivals, 10:00 p.m. to 6:59 a.m. 4th Qtr., 2014

A voluntary measure of the Noise Compatibility Program 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.

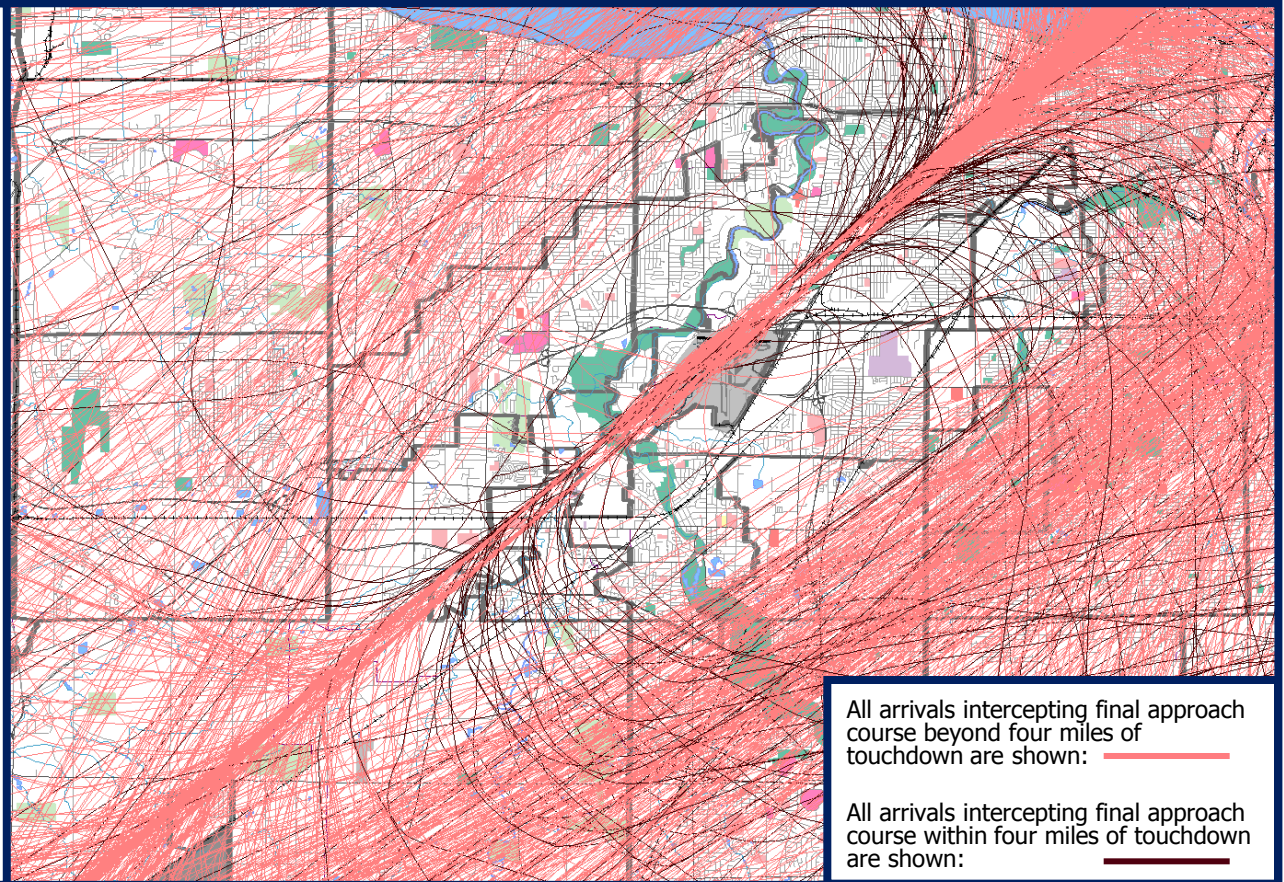
**94.5% beyond four miles and
5.5% within four miles**


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


Runway use by all arriving aircraft from 10:00 p.m. to 6:59 a.m. during the quarter was as follows:

Rwy	Percentage of Arrivals	
	Jets	All Aircraft
10	0.0%	0.0%
28	0.1%	0.2%
24L	15.0%	15.6%
24R	62.9%	62.7%
6L	18.8%	18.4%
6R	3.2%	3.1%

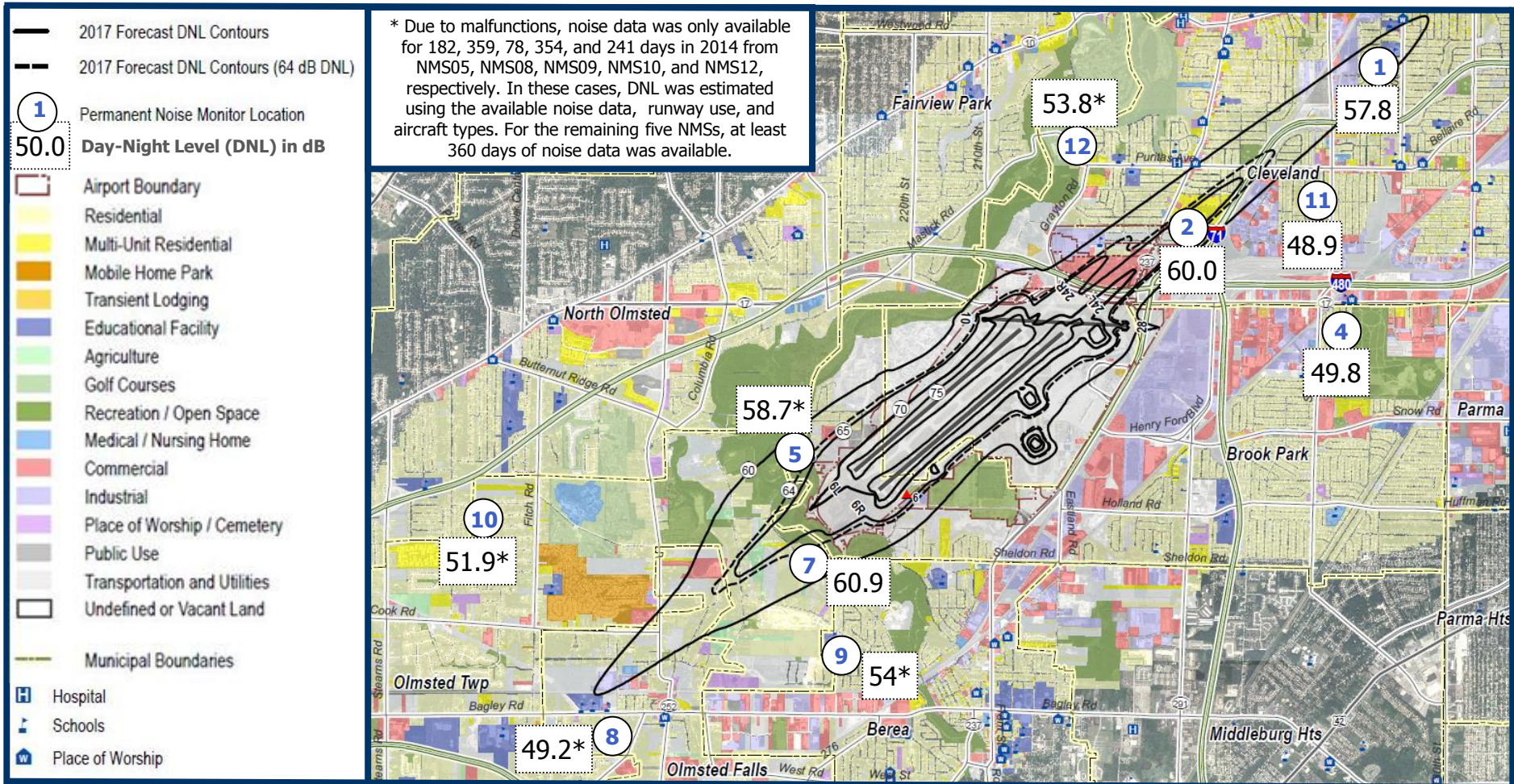
**For the entire year of 2014,
89.5% were beyond four miles
and 10.5% within four miles**



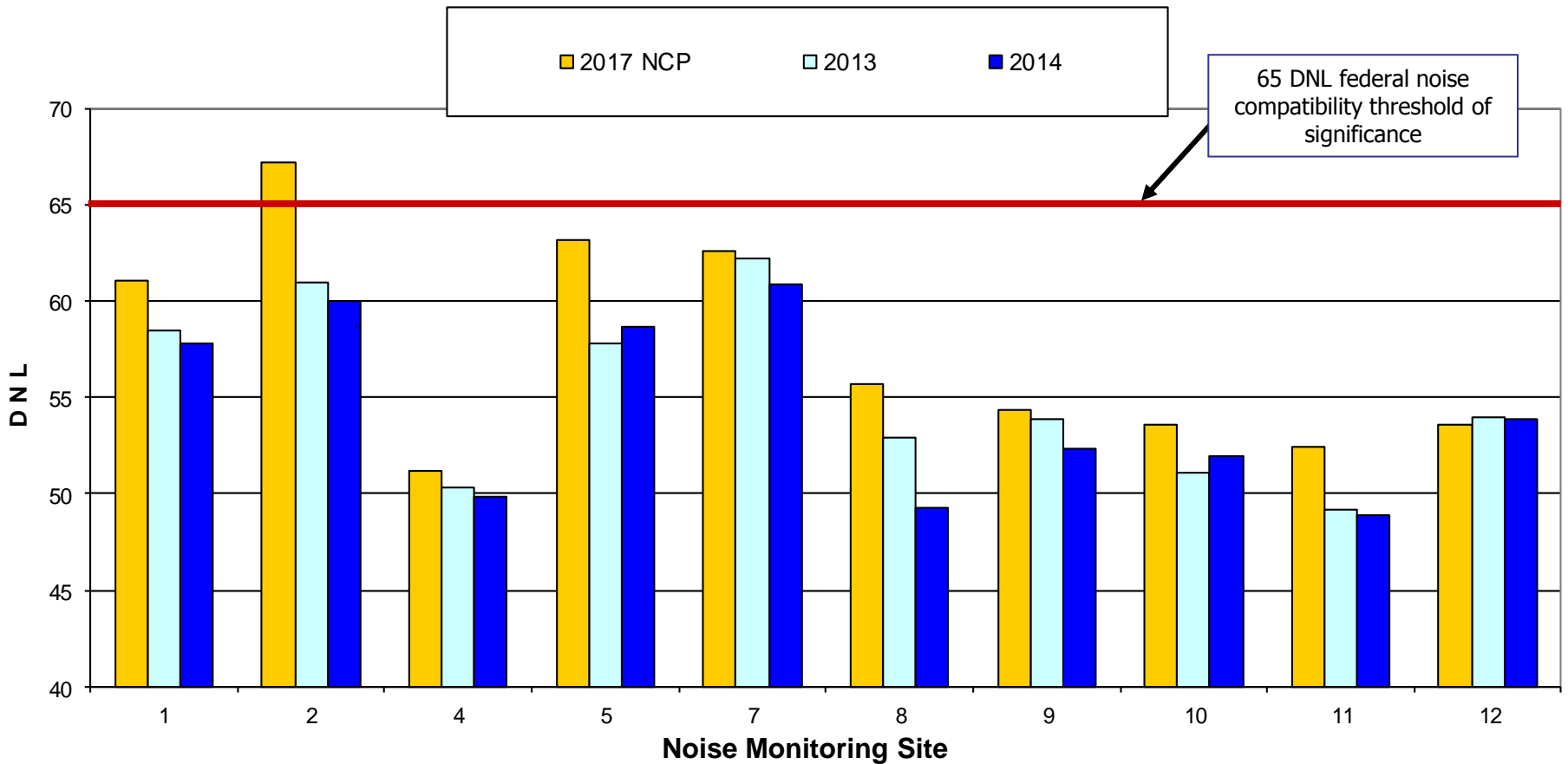
All arrivals intercepting final approach course beyond four miles of touchdown are shown: 

All arrivals intercepting final approach course within four miles of touchdown are shown: 

Annual Aircraft Noise: DNL by Noise Monitoring Site



DNL: Year 2014 vs. Year 2013



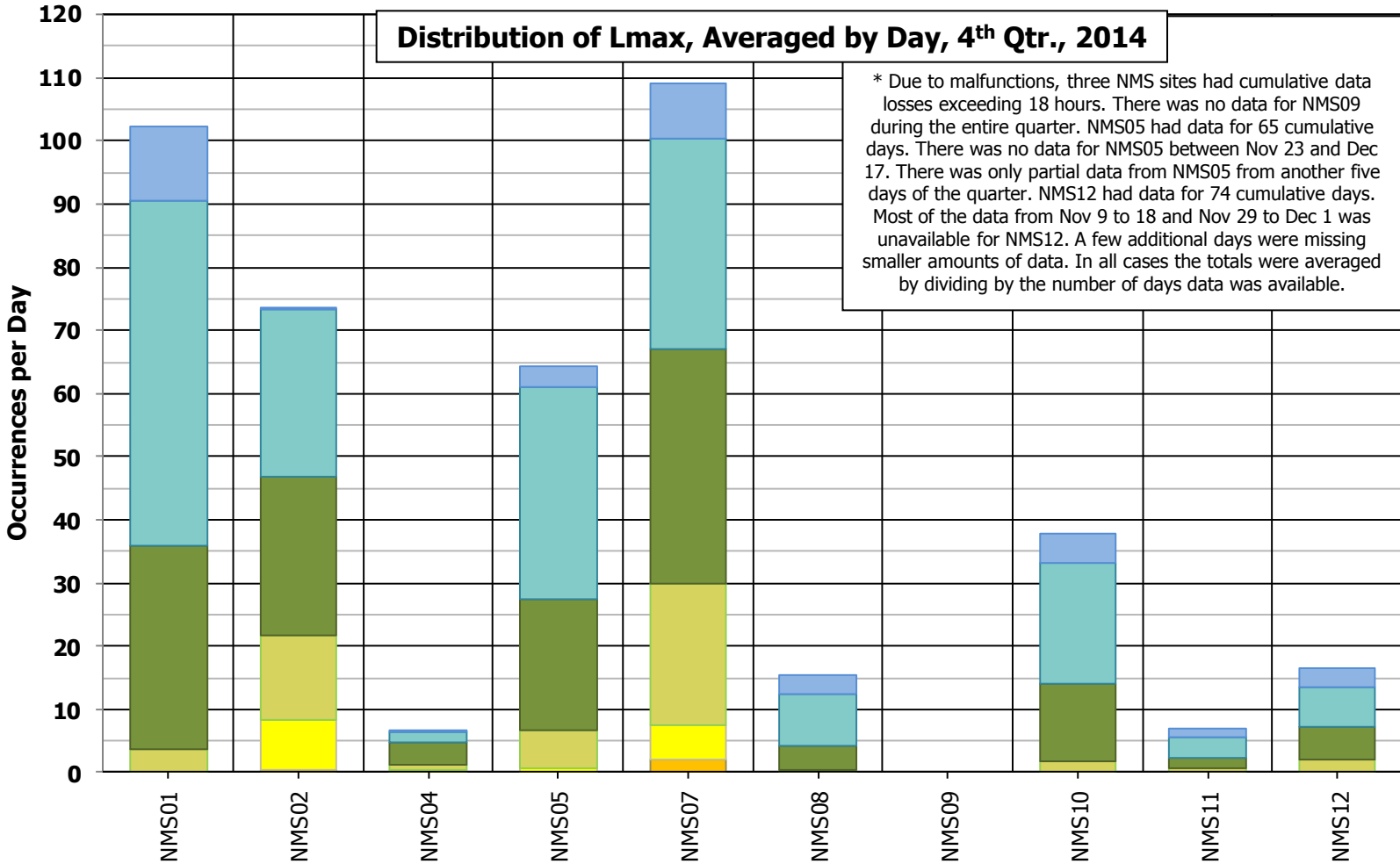
* Due to malfunctions, noise data was only available for 182, 359, 78, 354, and 241 days in 2014 from NMS05, NMS08, NMS09, NMS10, and NMS12, respectively. In these cases, DNL was estimated using the available noise data, runway use, and aircraft types. For the remaining five NMSs, at least 360 days of noise data was available.

Average Daily Occurrences of Aircraft Noise, Grouped by Maximum Decibel Level

Distribution of Lmax, Averaged by Day, 4th Qtr., 2014

* Due to malfunctions, three NMS sites had cumulative data losses exceeding 18 hours. There was no data for NMS09 during the entire quarter. NMS05 had data for 65 cumulative days. There was no data for NMS05 between Nov 23 and Dec 17. There was only partial data from NMS05 from another five days of the quarter. NMS12 had data for 74 cumulative days. Most of the data from Nov 9 to 18 and Nov 29 to Dec 1 was unavailable for NMS12. A few additional days were missing smaller amounts of data. In all cases the totals were averaged by dividing by the number of days data was available.

- 65 to 70 dB
- 70 to 75 dB
- 75 to 80 dB
- 80 to 85 dB
- 85 to 90 dB
- 90 to 95 dB
- 95 to 100 dB
- 100 to 105 dB



Top 3 Lmaxs at each NMS

Three highest aircraft decibel levels at each Noise Monitoring Site during the 4th Qtr., 2014, p. 1

NMS	Lmax (dB)	Aircraft	Operation	Time and date	Sound Exposure Level (dB) ¹	Duration (sec)
NMS01	88.1	MD-83	Arrival on Rwy 24R	12/16/14 10:05 PM	92.9	30.5
NMS01	87.7	MD-82	Arrival on Rwy 24L	12/17/14 10:43 PM	93.8	21.5
NMS01	86.6	MD-83	Arrival on Rwy 24R	12/11/14 5:27 PM	91.3	22.5
NMS02	96.8	MD-83	Departure off Rwy 6R	11/7/14 7:35 AM	101.6	28.0
NMS02	94.7	B767-400	Arrival on Rwy 24L	10/7/14 5:21 PM	99.2	18.5
NMS02	93.7	MD-82	Departure off Rwy 6R	12/29/14 6:55 PM	100.5	28.0
NMS04	91.0	MD-88	Departure off Rwy 6R	10/11/14 1:22 PM	96.9	53.0
NMS04	90.0	MD-88	Departure off Rwy 6R	12/7/14 1:11 PM	97.6	31.5
NMS04	89.6	MD-88	Departure off Rwy 6R	10/21/14 7:24 AM	97.2	30.0
NMS05 ²	97.0	MD-88	Departure off Rwy 24L	10/24/14 1:20 PM	108.1	60.0
NMS05 ²	91.5	MD-88	Departure off Rwy 24R	10/17/14 1:25 PM	98.5	24.5
NMS05 ²	90.9	MD-11	Departure off Rwy 24R	10/6/14 10:31 PM	97.9	31.0
NMS07	96.4	MD-88	Departure off Rwy 24L	11/6/14 7:25 PM	103.1	36.0
NMS07	96.4	MD-88	Departure off Rwy 24L	10/3/14 2:14 PM	102.0	26.5
NMS07	96.0	B727-200	Departure off Rwy 24L	10/31/14 3:16 AM	103.5	37.5

¹ Sound Exposure Level is a measure that takes into account all noise over the entire duration of an event.

² Due to equipment malfunctions, data for NMS05 is available for a cumulative total of 65 out of the 92 days of the quarter.

Top 3 Lmaxs at each NMS

Three highest aircraft decibel levels at each Noise Monitoring Site during the 4th Qtr., 2014, p. 2						
NMS	Lmax (dB)	Aircraft	Operation	Time and date	Sound Exposure Level (dB)¹	Duration (sec)
NMS08	86.9	MD-88	Departure off Rwy 24L	10/31/14 7:22 AM	95.1	35.0
NMS08	86.7	MD-88	Arrival on Rwy 6R	10/1/14 9:51 PM	93.0	21.0
NMS08 ²	86.3	MD-82	Departure off Rwy 24L	12/20/14 7:09 AM	94.6	32.5
NMS10	89.7	MD-82	Departure off Rwy 24L	11/25/14 7:20 AM	96.7	42.5
NMS10	88.6	MD-82	Departure off Rwy 24L	11/24/14 7:32 AM	94.8	41.0
NMS10	88.4	Lear Jet 25	Departure off Rwy 24R	12/11/14 11:58 AM	97.2	57.5
NMS11	89.9	MD-88	Departure off Rwy 6L	10/12/14 7:30 PM	97.2	31.5
NMS11	88.6	MD-88	Departure off Rwy 6R	10/11/14 9:41 AM	96.7	33.0
NMS11	88.5	MD-88	Departure off Rwy 6R	11/7/14 7:19 AM	95.2	36.0
NMS12 ³	90.0	MD-11	Departure off Rwy 6R	12/22/14 10:37 PM	96.2	23.0
NMS12 ³	89.2	MD-11	Departure off Rwy 6L	10/10/14 10:27 PM	96.6	35.5
NMS12 ³	88.8	MD-83	Departure off Rwy 6L	12/19/14 4:04 PM	97.0	35.5

¹ Sound Exposure Level is a measure that takes into account all noise over the entire duration of an event.

² Due to equipment malfunctions, no data is available for NMS09 within the 4th Quarter of 2014.

³ Due to equipment malfunctions, data for NMS12 is available for a cumulative total of 74 out of the 92 days of the quarter.

Noise Complaints



City	1 st Qtr.	2 nd Qtr.	3 rd Qtr.	4 th Qtr.	2014 Calls	%	2013 Calls	%	2014 Callers	%	2013 Callers	%
Berea	0	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Brook Park	0	0	0	0	0	0.0%	2	0.9%	0	0.0%	2	3.6%
Cleveland	6	12	29	20	67	54.9%	172	73.8%	15	35.7%	25	45.5%
Fairview Park	3	1	15	0	19	15.6%	16	6.9%	15	35.7%	13	23.6%
Lakewood	0	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Middleburg Hts.	0	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
North Olmsted	0	0	0	0	0	0.0%	1	0.4%	0	0.0%	1	1.8%
Olmsted Falls	0	0	2	1	3	2.5%	6	2.6%	2	4.8%	4	7.3%
Olmsted Twp.	0	2	0	1	3	2.5%	30	12.4%	2	4.8%	5	9.1%
Parma	0	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Parma Heights	0	0	0	0	0	0.0%	1	0.4%	0	0.0%	1	1.8%
Rocky River	0	0	23	2	25	20.5%	5	2.1%	4	9.5%	3	5.5%
Westlake	0	0	2	0	2	1.6%	0	0.0%	2	4.8%	0	0.0%
Other	0	0	3	0	3	2.5%	1	0.4%	2	4.8%	1	1.8%
Total 2013	9	15	74	24	122	100.0%	234	100.0%	42	100.0%	55	100.0%

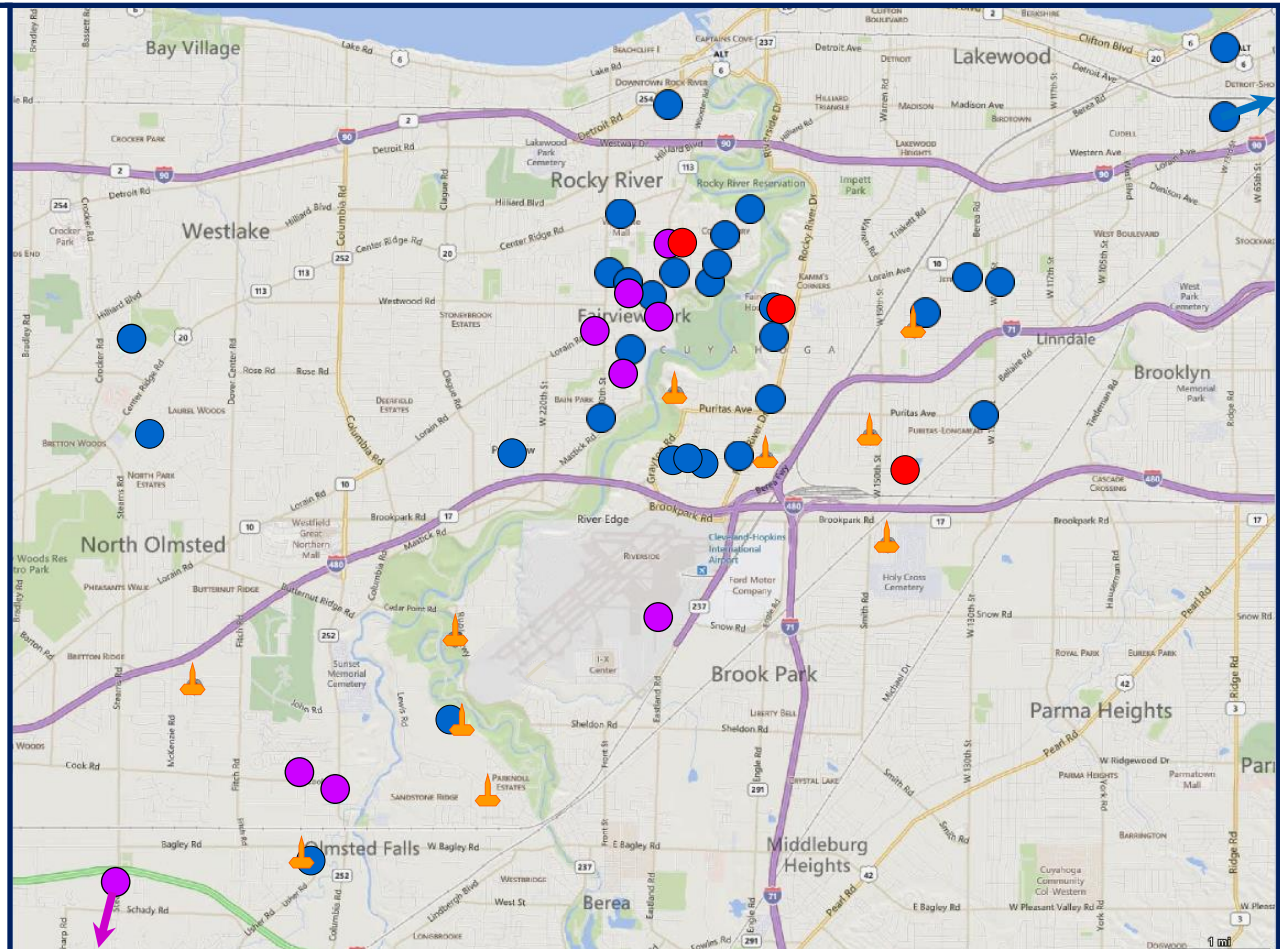
Noise Hotline – (216) 898-5220

Annual Complaint Map

LEGEND

Complaints per household

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



2015 Forward Plan



- Continue implementation of Part 150 measures that obtained FAA approval.
- Coordinate with the Air Traffic Control Tower on a quarterly basis.
- Noise consultant, HMMH, to evaluate the current Noise and Operations Monitoring System and make recommendations for new equipment.
- No major airfield construction projects planned for Cleveland Hopkins International Airport or for Burke Lakefront Airport for 2015.
- Cleveland National Air Show to be held Labor Day weekend at Burke Lakefront Airport featuring the U. S. Air Force Thunderbirds.

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