



Noise Compatibility

3rd Quarter, 2015

December 21st, 2015

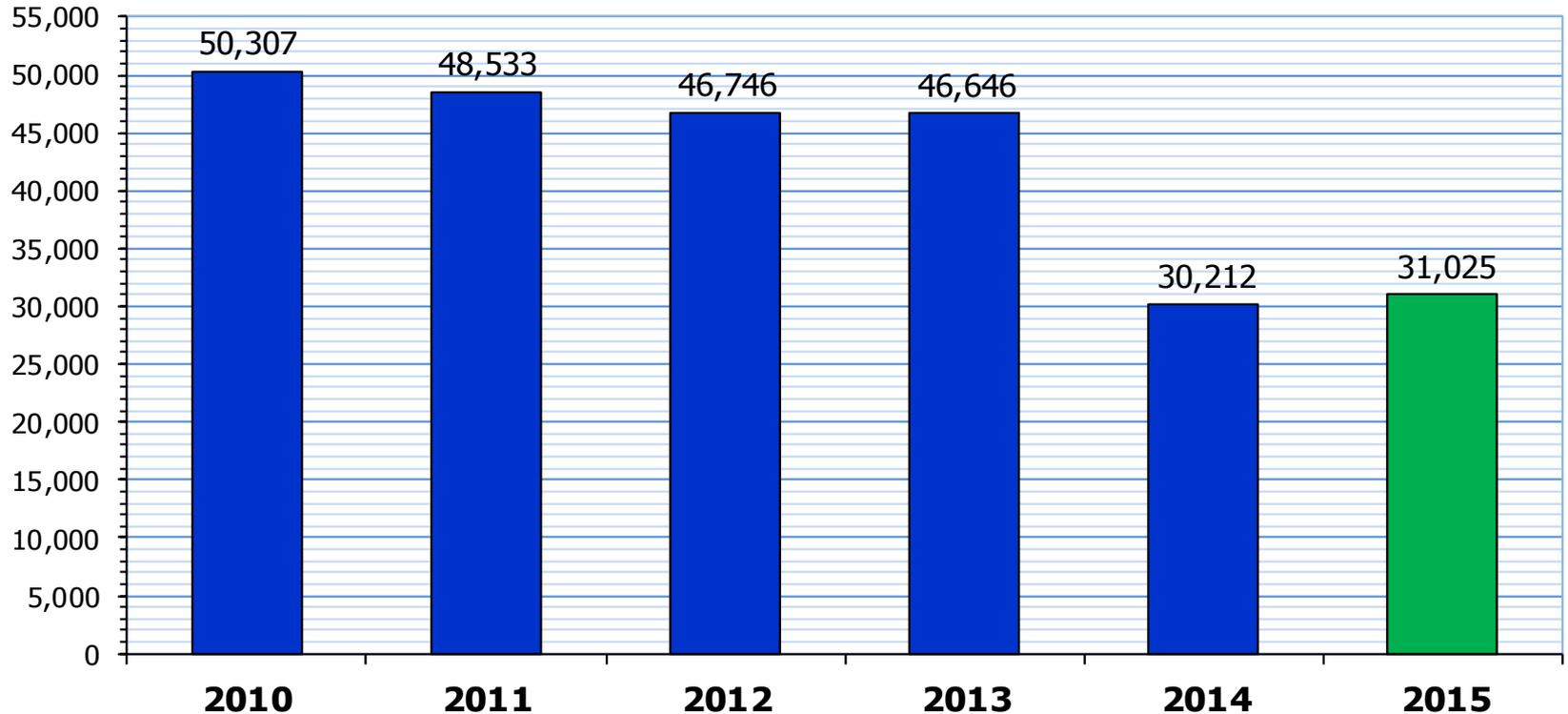
Disclaimer



- 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.

Aircraft Operations

Cleveland 3rd Qtr. Operations 2010 - 2015



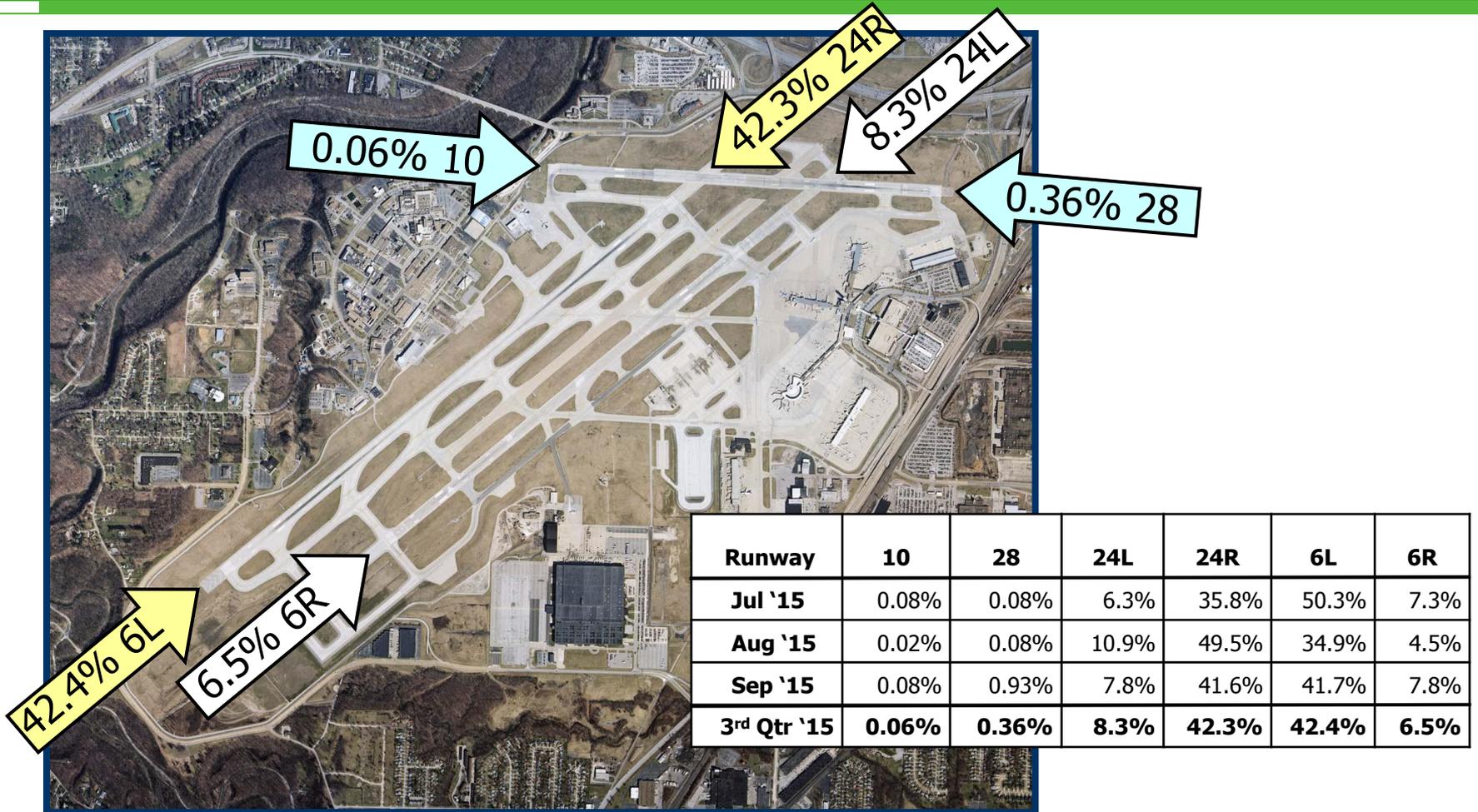
There were 31,025 landings and takeoffs in the 3rd Qtr. 2015; this is 2.7% above the 3rd Qtr. 2014.

Landings & Takeoffs

	3 rd Qtr., 2015		3 rd Qtr., 2014	
Commercial				
-Stage 2 with hush kit	13	0.04%	16	0.05%
-Heavy (incl. all B757s)	545	1.76%	621	2.06%
-MD80 series	1,630	5.25%	609	2.02%
-Other Stage 3	18,031	58.12%	14,457	47.85%
-Regional Jet	5,991	19.31%	7,803	25.83%
-Turboprop	1,435	4.63%	3,726	12.33%
Air Taxi	750	2.42%	632	2.09%
General Aviation	2,551	8.22%	2,285	7.56%
Military	79	0.25%	63	0.21%
Total	31,025	100.00%	30,212	100.00%

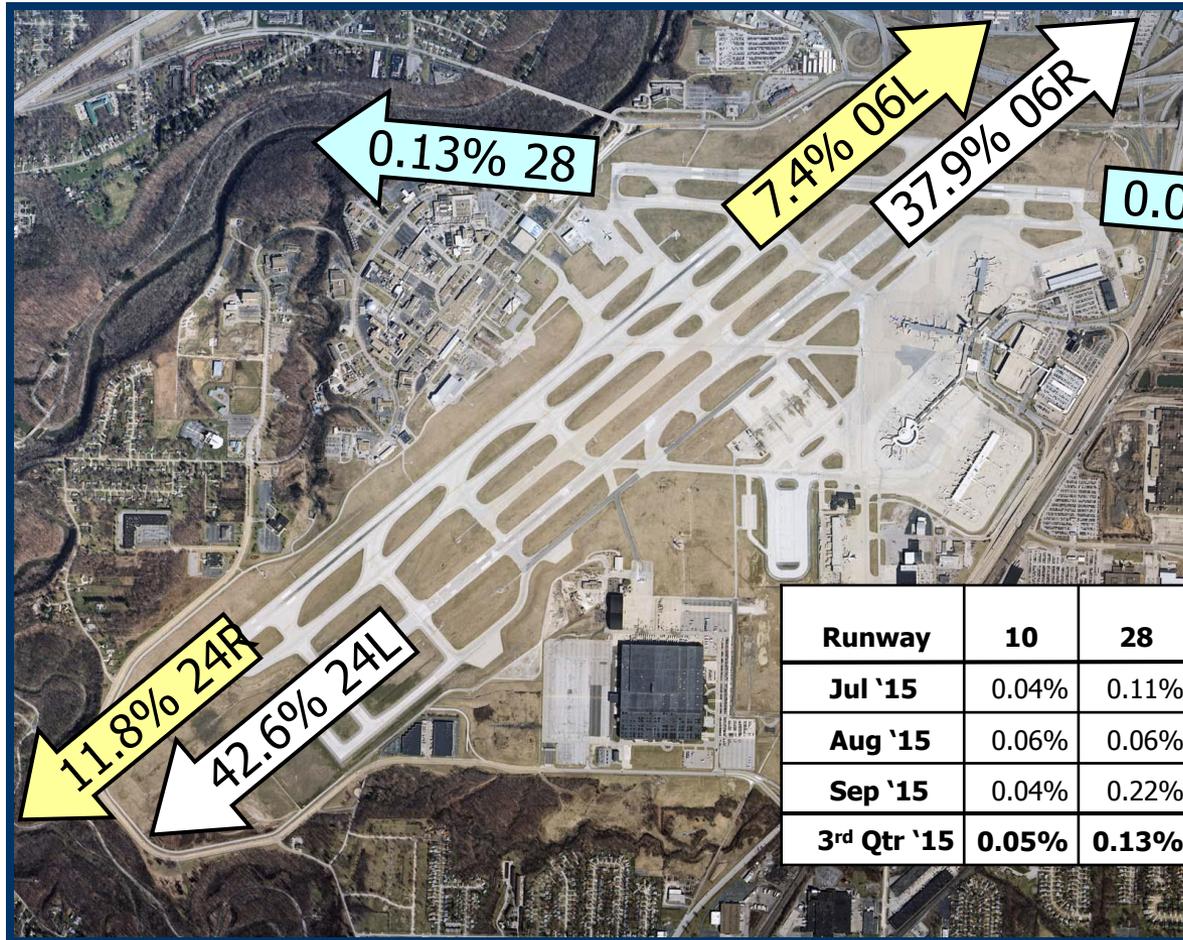
All aircraft above are Stage 3 certified with the exception of some Military and 1.3% of General Aviation (GA) aircraft. Stage 2 GA accordingly is 0.11% of the overall fleet. A hush kit reduces noise enough to meet Stage 3 levels, but well short of the noise level typical of aircraft originally manufactured as Stage 3.

Runway Use: 3rd Qtr, 2015 Arrivals



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

Runway Use: 3rd Qtr, 2015 Departures



Runway	10	28	24L	24R	6L	6R
Jul '15	0.04%	0.11%	37.6%	7.8%	7.1%	47.1%
Aug '15	0.06%	0.06%	47.0%	17.7%	10.3%	24.8%
Sep '15	0.04%	0.22%	43.4%	9.9%	4.6%	41.7%
3rd Qtr '15	0.05%	0.13%	42.6%	11.8%	7.4%	37.9%

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

Departure Headings, 3rd Qtr: Day-time

Jet Departures, 6:00 a.m. to 11:00 p.m. 3rd Qtr., 2015

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 magnetic 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 magnetic 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.

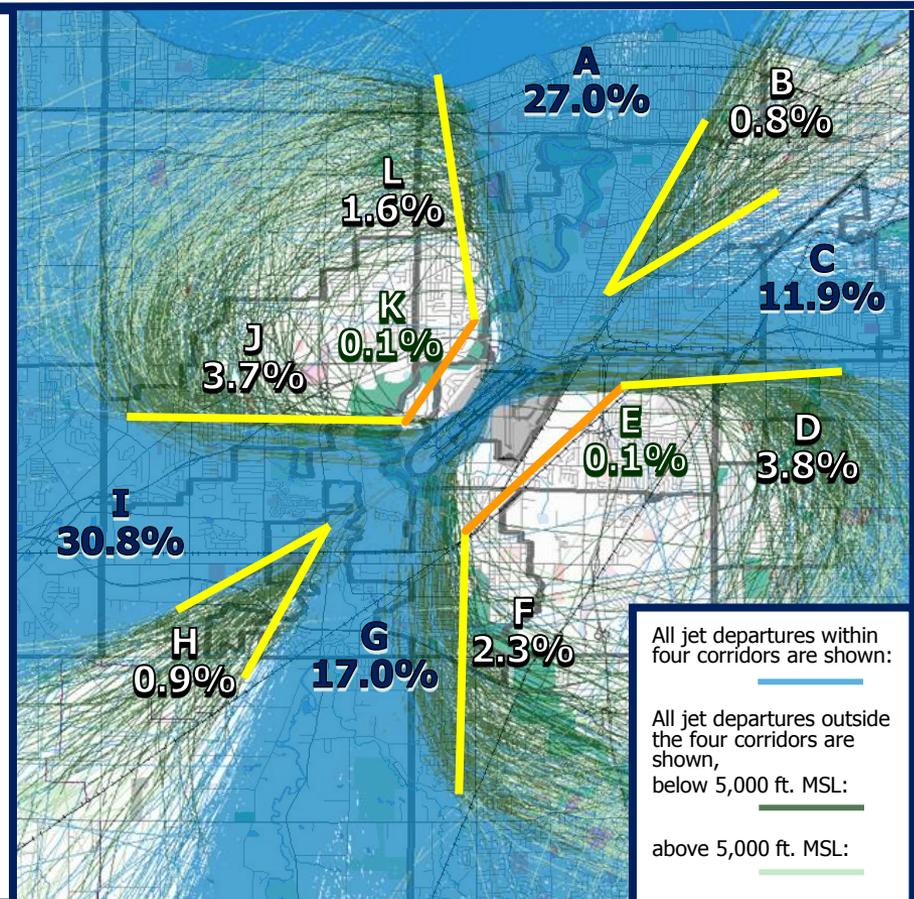
86.7% within corridors

- A. 27.0%:** north corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- C. 11.9%:** east corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- G. 17.0%:** south corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- I. 30.8%:** west corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL

13.3% outside corridors

- B. 0.8%:** flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the north and east corridors
- D. 3.8%:** flights crossing the south boundary below 5,000 ft. MSL
- E. 0.1%:** flights turning south before entering the corridor
- F. 2.3%:** flights crossing the east boundary below 5,000 ft. MSL
- H. 0.9%:** flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the west and south corridors
- J. 3.7%:** flights crossing the north boundary below 5,000 ft. MSL
- K. 0.1%:** flights turning north before entering the corridor
- L. 1.6%:** flights crossing the west boundary below 5,000 ft. MSL

(Percentages do not include Rwy 10/28 departures)



Departure Headings, 3rd Qtr: Night-time

Jet Departures, 11:00 p.m. to 6:00 a.m.

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.

61.6 % within corridors

A. 37.9%: 095 corridor, including flights crossing the 095 corridor boundaries above 5,000 ft. MSL

F. 23.7%: 200 corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL

38.4 % outside corridors

B. 4.1%: flights crossing the south boundary below 5,000 ft. MSL

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

D. 0.0%: flights departing south without entering the 200 corridor

E. 11.6%: flights crossing the east boundary below 5,000 ft. MSL

G. 6.6%: flights crossing the west boundary below 5,000 ft. MSL

H. 3.5%: flights departing southwest without entering the corridor

I. 3.5%: flights departing west without entering the corridor

J. 7.6%: flights departing north, not east with the 095 corridor

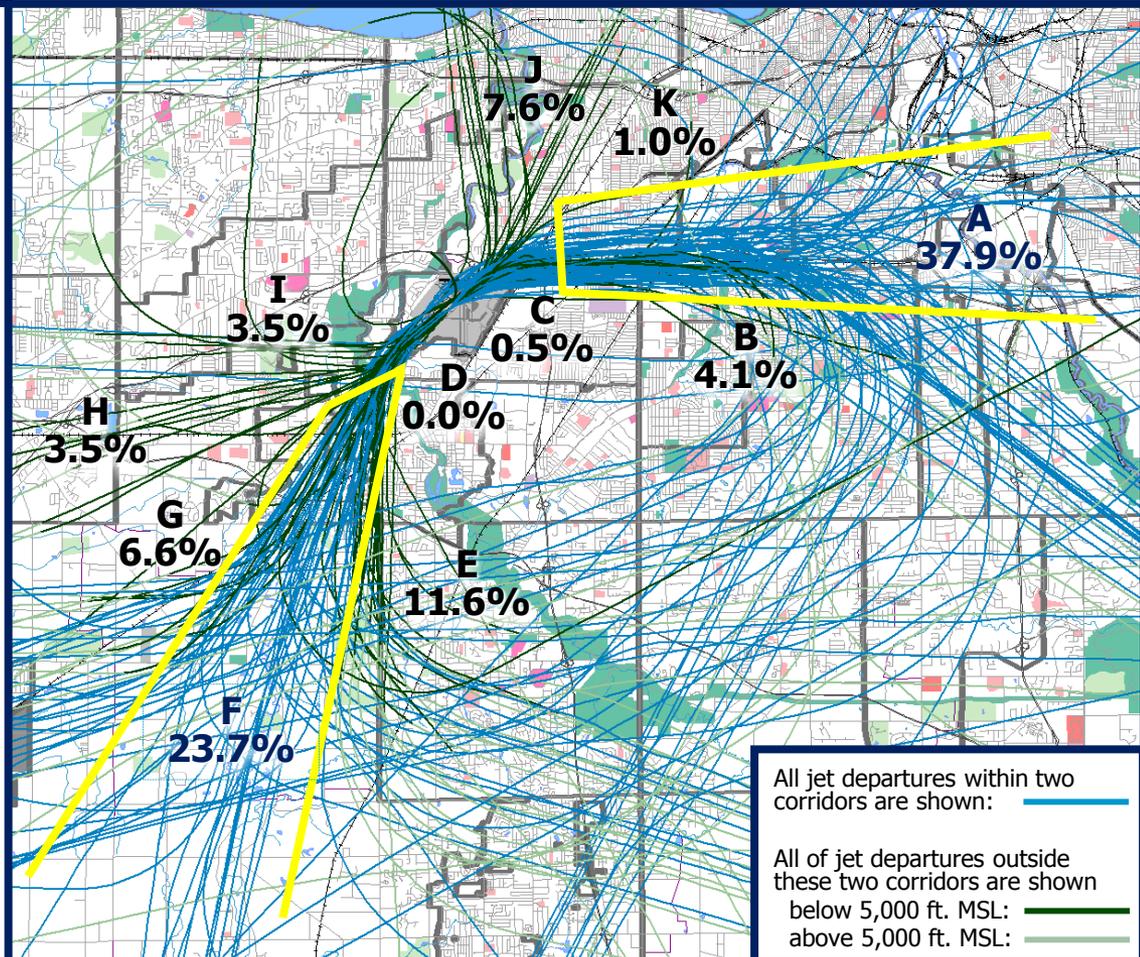
K. 1.0%: flights crossing the north boundary below 5,000 ft. MSL

(There were no Rwy 10 or 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:	0.0%	0.0%	43.8%	5.5%	5.9%	44.8%
For all aircraft:	0.0%	0.0%	42.7%	7.1%	6.6%	43.6%

88.2% of Jet Departures from Rwy 6L/6R are 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: ——

Arrival Headings, 3rd Qtr: Night-time

Arrivals, 10:00 p.m. to 6:59 a.m.

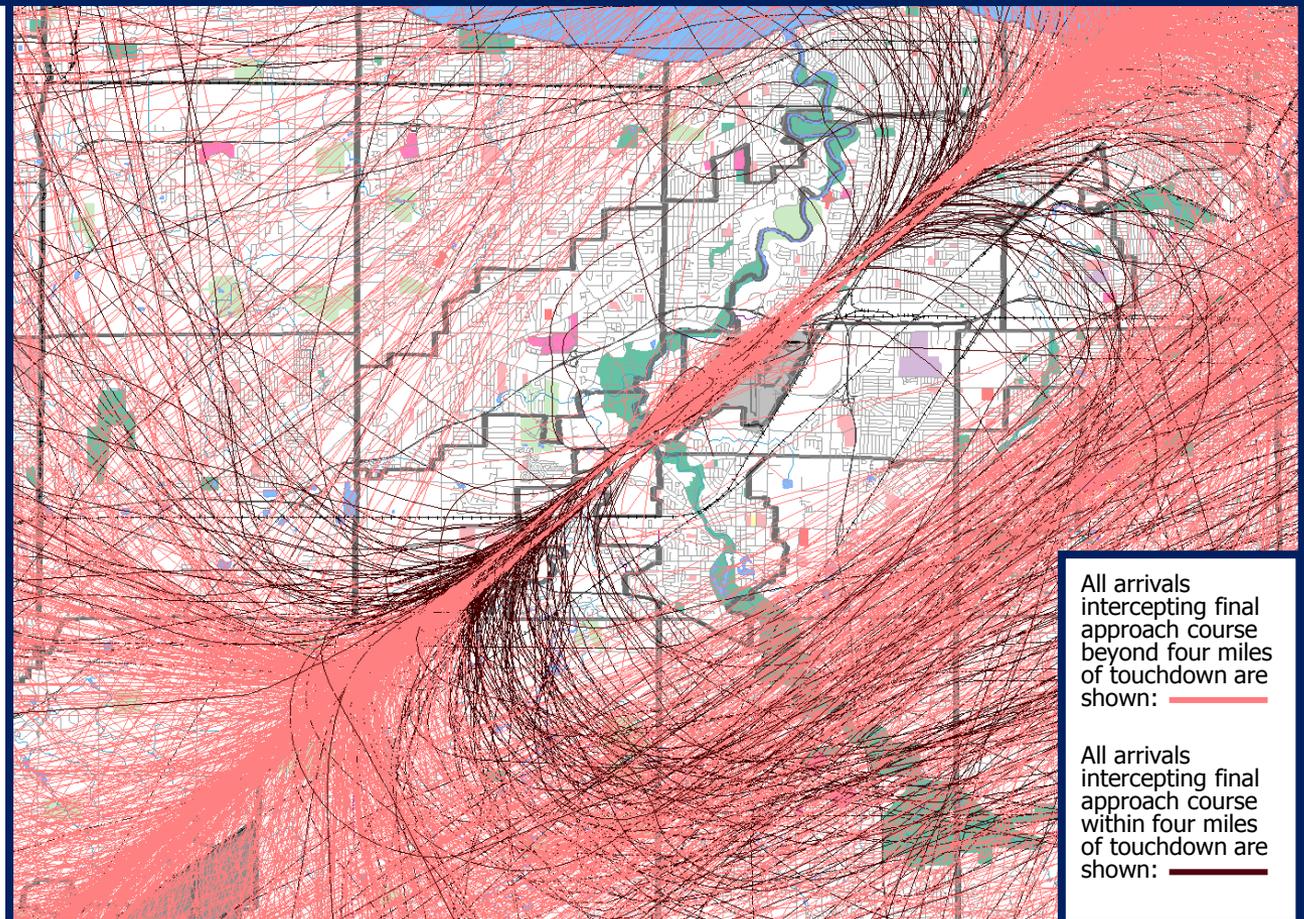
A voluntary measure of the Noise Compatibility Program calls for all aircraft arriving between 10:00 p.m. and 6:59 a.m., wind and weather permitting, to intercept final approach course no closer than four miles before touchdown.

**90.3% beyond four miles and
9.7% 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:

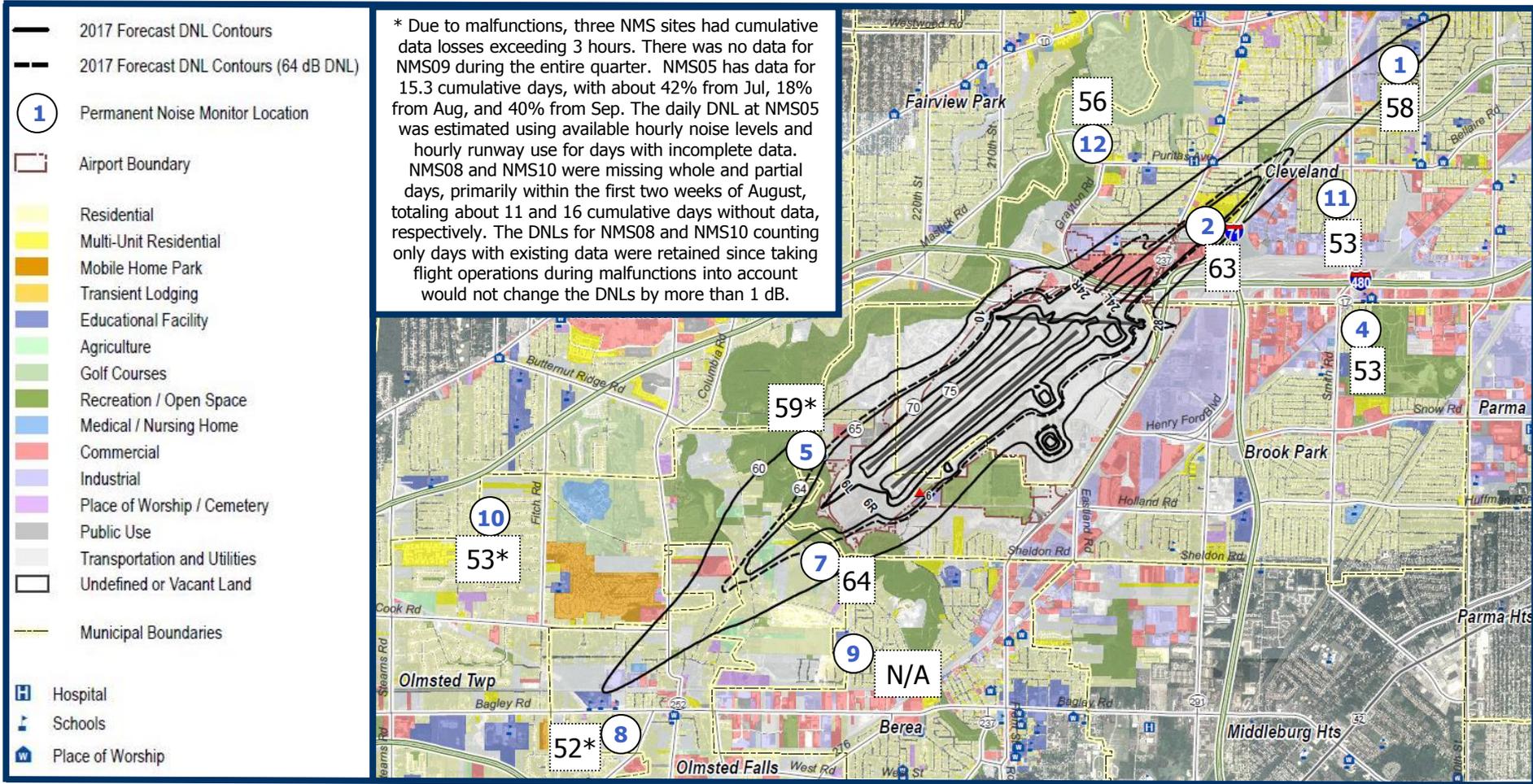
Rwy	Percentage of Arrivals	
	Jets	All Aircraft
10	0.0%	<0.1%
28	0.1%	0.1%
24L	8.5%	8.5%
24R	40.0%	40.1%
6L	42.8%	42.6%
6R	8.6%	8.7%
Total	100.0%	100.0%



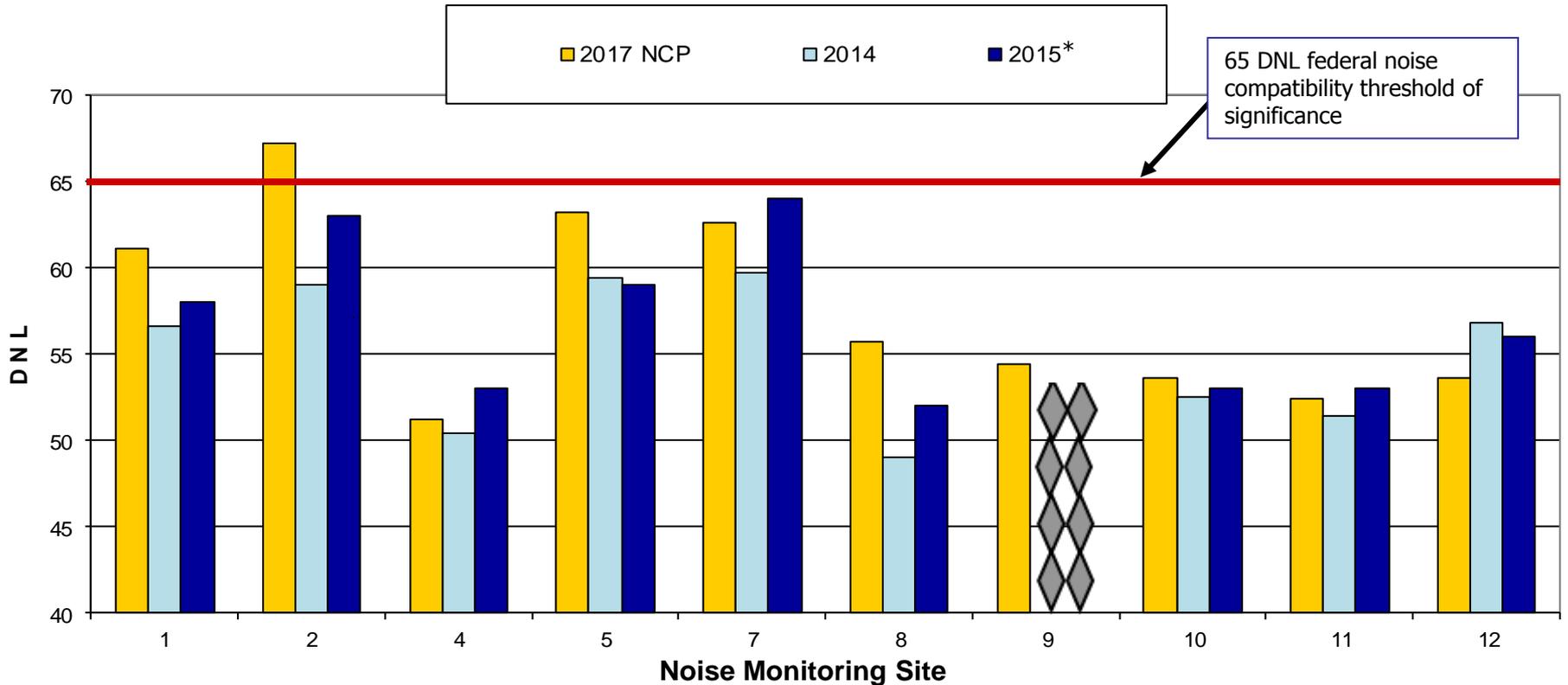
All arrivals intercepting final approach course beyond four miles of touchdown are shown: —

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

Aircraft Noise – DNL by Noise Monitoring Site

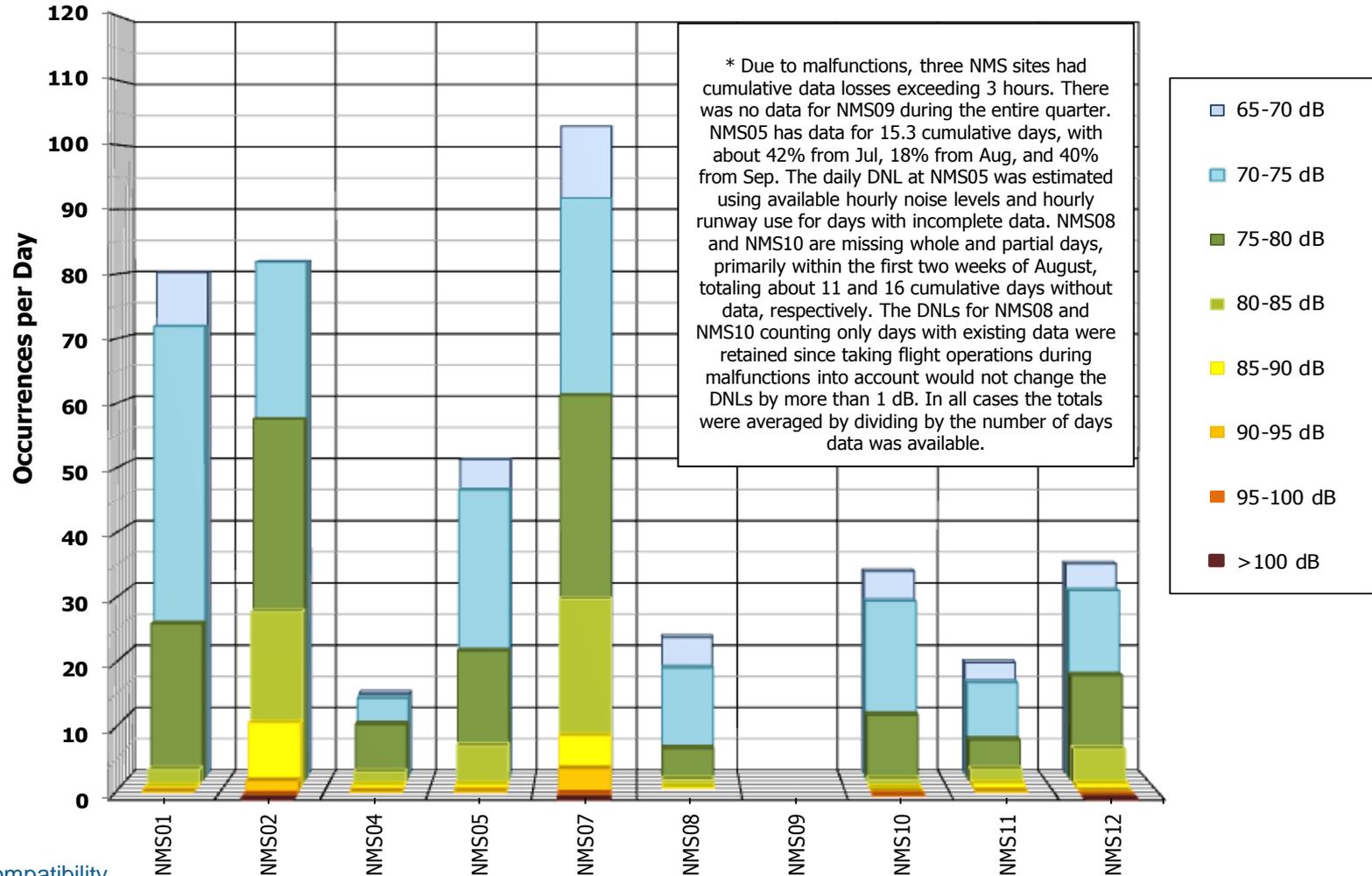


DNL: 3rd Qtr, 2015 vs. 3rd Qtr, 2014



* Due to malfunctions, three NMS sites had cumulative data losses exceeding 3 hours. There was no data for NMS09 during the entire quarter. NMS05 has data for 15.3 cumulative days, with about 42% from Jul, 18% from Aug, and 40% from Sep. The daily DNL at NMS05 was estimated using available hourly noise levels and hourly runway use for days with incomplete data. NMS08 and NMS10 were missing whole and partial days, primarily within the first two weeks of August, totaling about 11 and 16 cumulative days without data, respectively. The DNLs for NMS08 and NMS10 counting only days with existing data were retained since taking flight operations during malfunctions into account would not change the DNLs by more than 1 dB.

Average Daily Number of Aircraft Noise Occurrences Above Each 5 dB Increment



Top 3 Lmaxs at each NMS, (1 of 2)

NMS	Lmax (dB)	Aircraft	Operation	Time and date	Sound Exposure Level (dB)¹	Duration (sec)
NMS01	91.0	Military Jet(s)	Arrival on Rwy 24R	9/4/15 2:40 PM	94.9	26.0
NMS01	88.8	Boeing 757-200	Arrival on Rwy 24R	8/14/15 4:49 AM	97.0	42.0
NMS01	88.4	MD-82	Departure off Rwy 6R	7/23/15 6:13 AM	96.1	30.0
NMS02	108.3	Military Jet(s)	Departure off Rwy 6R	7/23/15 3:15 PM	113.6	32.5
NMS02	108.1	Military Jet(s)	Departure off Rwy 6R	9/5/15 3:25 PM	114.2	57.5
NMS02	104.5	Military Jet(s)	Departure off Rwy 6R	9/6/15 3:24 PM	111.2	57.0
NMS04	91.3	MD-88	Departure off Rwy 6R	9/30/15 4:46 PM	97.0	34.0
NMS04	90.3	MD-88	Departure off Rwy 6R	9/30/15 7:50 AM	97.1	25.5
NMS04	90.1	MD-88	Departure off Rwy 6R	7/15/15 12:29 PM	95.2	29.0
NMS05 ²	91.1	MD-88	Departure off Rwy 24L	8/1/15 8:55 AM	90.9	20.5
NMS05 ²	88.2	MD-82	Departure off Rwy 6R	7/29/15 6:14 AM	99.2	47.0
NMS05 ²	88.1	MD-88	Departure off Rwy 24L	9/23/15 7:53 AM	95.4	28.0
NMS07	111.2	Military Jet(s)	Departure off Rwy 24L	9/4/15 1:49 PM	118.4	78.5
NMS07	101.3	Military Jet(s)	Departure off Rwy 24L	9/4/15 1:35 PM	107.0	50.5
NMS07	99.2	MD-88	Departure off Rwy 24R	9/4/15 4:34 PM	103.7	26.0

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 15.3 days of the quarter.

Top 3 Lmaxs at each NMS, (2 of 2)

NMS	Lmax (dB)	Aircraft	Operation	Time and date	Sound Exposure Level (dB) ¹	Duration (sec)
NMS08 ²	87.2	MD-88	Departure off Rwy 24L	9/4/15 8:13 AM	97.2	45.0
NMS08 ²	86.9	MD-88	Departure off Rwy 24L	8/17/15 7:00 PM	93.7	24.0
NMS08 ²	86.2	MD-83	Arrival on Rwy 6R	7/15/15 11:33 PM	93.1	24.5
NMS10 ³	99.3	Military Jet(s)	Departure off Rwy 24L	9/7/15 2:51 PM	104.0	17.0
NMS10 ³	86.9	Military Jet(s)	Arrival on Rwy 6R	9/5/15 4:12 PM	91.5	19.5
NMS10 ³	84.5	MD-83	Departure off Rwy 24L	9/19/15 11:26 AM	91.5	30.5
NMS11	93.2	Military Jet(s)	Departure off Rwy 6R	7/23/15 3:16 PM	99.7	41.0
NMS11	92.1	MD-88	Departure off Rwy 6R	9/27/15 9:01 AM	97.7	29.5
NMS11	91.9	Military Jet(s)	Departure off Rwy 6R	9/3/15 5:33 PM	97.9	61.5
NMS12	103.2	Military Jet(s)	Departure off Rwy 6R	9/5/15 3:25 PM	109.2	55.5
NMS12	93.5	Military Jet(s)	Arrival on Rwy 24L	9/2/15 3:36 PM	96.7	22.0
NMS12	92.6	Military Jet(s)	Departure off Rwy 6R	9/3/15 3:33 PM	100.8	55.5

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 NMS08 is unavailable for 11 days in August and data for NMS09 is unavailable for the entire quarter.

³ Due to equipment malfunctions, NMS10 was missing partial days from each of the three months and 10 full days in August, totaling about 15 cumulative days of data.

Noise Complaints



City	Jul	Aug	Sep	3 rd Q '15 Calls	%	3 rd Q '14 Calls	%	3 rd Q '15 Callers	%	3 rd Q '14 Callers	%
Brook Park	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Cleveland	3	3	5	11	23.9%	29	39.2%	7	26.9%	8	26.7%
Cleveland Hts.	0	0	0	0	0.0%	1	1.3%	0	0.0%	1	3.3%
Columbia Station	0	2	0	2	4.3%	2	2.7%	1	3.8%	1	3.3%
Fairview Park	1	2	1	4	8.7%	15	20.3%	4	15.4%	12	40.0%
Lakewood	0	1	0	1	2.2%	0	0.0%	1	3.8%	0	0.0%
North Olmsted	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Olmsted Falls	4	3	2	9	16.9%	2	2.7%	4	15.4%	2	6.7%
Olmsted Twp.	0	2	6	8	17.4%	0	0.0%	2	7.7%	0	0.0%
Parma	1	0	1	2	4.3%	0	0.0%	1	3.8%	0	0.0%
Rocky River	5	0	2	7	15.2%	23	31.1%	4	15.4%	4	13.3%
Strongsville	0	1	0	1	2.2%	0	0.0%	1	3.8%	0	0.0%
Valley City	0	0	1	1	2.2%	0	0.0%	1	3.8%	0	0.0%
Westlake	0	0	0	0	0.0%	2	2.7%	0	0.0%	2	6.7%
Totals	14	14	18	46	100.0%	74	100.0%	26	100.0%	30	100.0%

Totals may not add to 100.0%, due to rounding.

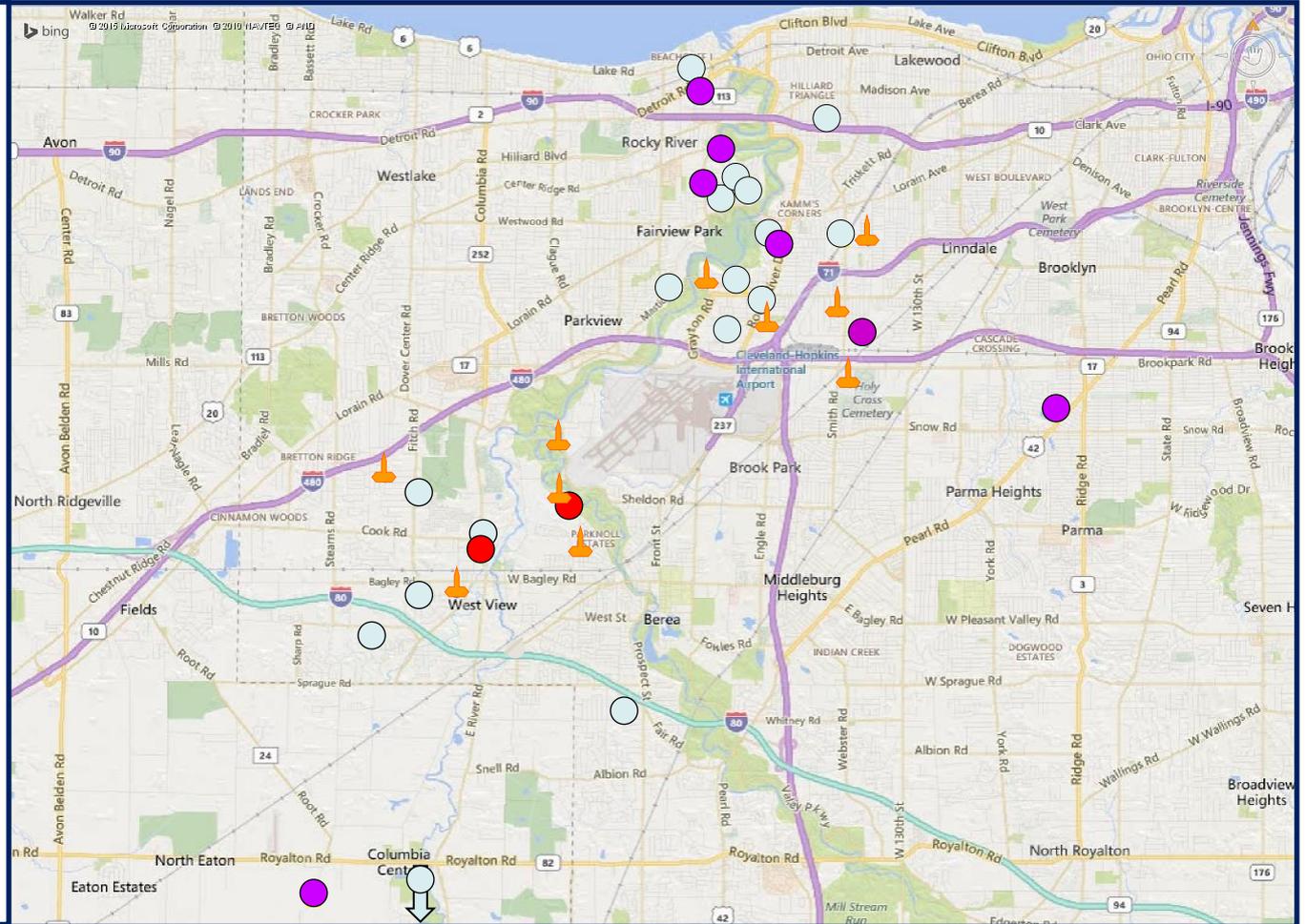
Noise Hotline – (216) 898-5220

3rd Quarter Complaint Map

LEGEND

Complaints per household

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



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