

**Louisville Metro Air Pollution Control District**  
**PM<sub>2.5</sub> Monitoring Report**  
**June 2020**

This report summarizes PM<sub>2.5</sub> data collected by Federal Reference Method (FRM) and Federal Equivalent Method (FEM) instruments. Measurements are reported as 24-hour averages in micro-grams per cubic meter (µg/m<sup>3</sup>). The data are subject to further quality assurance checks and are not final.

**PM<sub>2.5</sub> Monthly Data Summary for May 2020**

Site Name	Maximum		Minimum		Sample	Monthly
	Conc.	Date	Conc.	Date	Recovery	Average
Firearms Training *	12.4	5/2/20	3.2	5/20/20	NA	6.4
Durrett Lane	10.2	5/14/20	3.2	5/21/20	NA	6.9
Cannons Lane	10.7	5/3/20	2.9	5/21/20	NA	6.9
Watson Lane	13.6	5/2/20	2.9	5/20/20	NA	7.0
Overall	13.6	5/2/20	2.9	5/20/20	NA	6.8

\* Firearms Training replaced Southwick on 1/5/2018

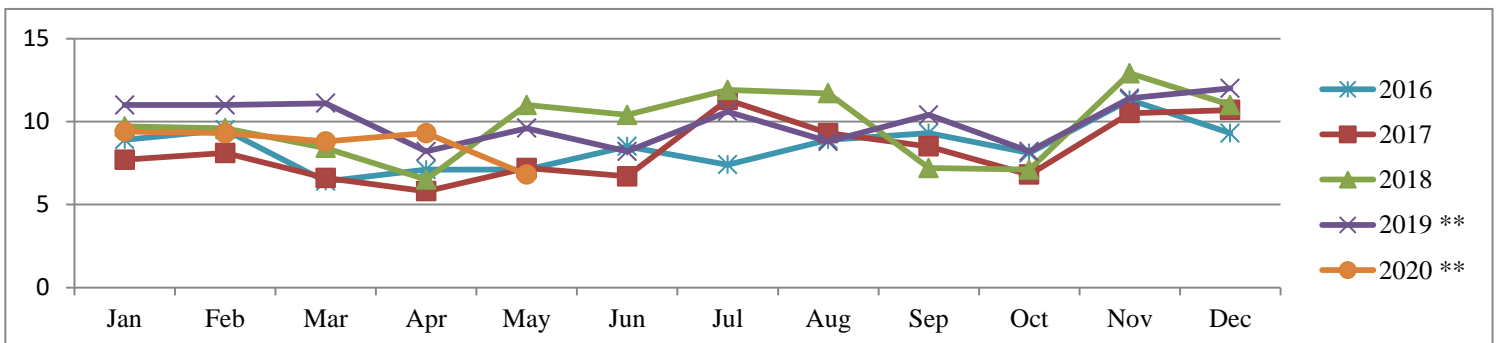
**PM<sub>2.5</sub> Monthly Averages Tracking Table for 2010-2020**

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Months >Annual Standard
2010	13.3	<b>16.3</b>	12.2	12.2	11.0	14.1	<b>16.0</b>	<b>16.4</b>	11.0	<b>17.0</b>	12.6	13.7	<b>4</b>
2011	<b>15.2</b>	10.6	9.7	8.6	12.1	14.1	<b>19.7</b>	<b>16.2</b>	11.5	9.0	7.6	9.9	<b>3</b>
2012	8.9	9.5	9.2	7.2	11.7	10.9	12.5	11.9	8.6	7.3	13.1	9.6	<b>0</b>
2013*	10.5	10.0	8.5	7.6	8.8	11.6	10.1	12.7	11.9	9.3	7.2	10.7	<b>0</b>
2014	7.5	<b>14.3</b>	11.7	9.6	10.7	<b>14.0</b>	<b>16.4</b>	<b>13.6</b>	9.9	7.9	9.8	<b>12.4</b>	<b>5</b>
2015	10.9	11.0	11.3	6.9	10.2	10.1	<b>13.1</b>	10.0	9.7	7.5	8.5	7.7	<b>1</b>
2016	8.9	9.5	6.4	7.1	7.1	8.5	7.4	8.9	9.3	8.1	11.3	9.3	<b>0</b>
2017	7.7	8.1	6.6	5.8	7.2	6.7	11.3	9.3	8.5	6.8	10.5	10.7	<b>0</b>
2018	9.7	9.6	8.4	6.5	11.0	10.4	11.9	11.7	7.2	7.1	<b>12.9</b>	11.0	<b>1</b>
2019 **	11.0	11.0	11.1	8.2	9.6	8.2	10.6	8.8	10.4	8.2	11.4	12.0	<b>0</b>
2020 **	9.4	9.3	8.8	9.3	6.8								<b>0</b>
Average	10.3	10.8	9.4	8.1	10.3	10.9	12.9	12.0	9.8	8.8	10.5	10.7	

\*The new PM<sub>2.5</sub> standard of 12 µg/m<sup>3</sup> became effective on March 18, 2013

\*\* Data from continuous FEM Instruments

**PM<sub>2.5</sub> Monthly Averages 5-Year Trend**



**National Ambient Air Quality Standards (NAAQS):**

National Ambient Air Quality Standards consist of primary and secondary standards. The primary standards define levels of air quality which EPA judges are necessary, with an adequate margin of safety, to protect the public health. The secondary standards define levels of air quality which EPA judges necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. For PM<sub>2.5</sub> the levels of the primary and secondary standards are the same.

**National Ambient Air Quality Standard for PM<sub>2.5</sub> - Annual Standard:**

The annual standard is designed to provide an appropriate level of protection from long-term exposure to PM<sub>2.5</sub>. The standard is met when the annual design value is less than or equal to 12 µg/m<sup>3</sup>. The standard changed from 15 µg/m<sup>3</sup> to 12 µg/m<sup>3</sup> on March 18, 2013. The annual design value is calculated by averaging the annual means of 3 consecutive complete years of air quality data. The table below compares data collected from 2014 through year-to-date 2020 to the PM<sub>2.5</sub> annual standard.

**PM<sub>2.5</sub> Annual Means and Annual Design Values**

Site Name	Annual Means µg/m <sup>3</sup>							Annual Design Values				
	2014	2015	2016	2017	2018	2019	2020	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020
Firearms Tr*	11.2	10.4	8.3	8.3	9.5	10.2	8.6	10.0	9.0	8.7	9.3	9.4
Durrett Lane	12.0	10.0	9.2	8.9	10.2	10.4	8.9	<b>10.4</b>	<b>9.4</b>	<b>9.4</b>	<b>9.8</b>	9.8
Cannons Lane	11.0	9.5	7.9	7.9	9.1	9.6	8.4	9.5	8.4	8.3	8.8	9.0
Watson Lane	12.2	10.4	8.4	8.1	10.5	10.0	9.2	10.3	9.0	9.0	9.6	<b>9.9</b>

**Bold:** Design value for Louisville

\* Firearms Training replaced Southwick in 2018

**National Ambient Air Quality Standard for PM<sub>2.5</sub> - 24-Hour (Daily) Standard:**

The 24-hour standard is designed to provide an appropriate level of protection from short-term exposure to PM<sub>2.5</sub>. The standard is met when the 24-hour design value is less than or equal to 35 µg/m<sup>3</sup>. The design value is based on 3 consecutive complete years of air quality data and is calculated by taking the average of the 98<sup>th</sup> percentile value for each of the 3 years. The 98<sup>th</sup> percentile value is the 24-hour average out of a year of PM<sub>2.5</sub> monitoring data below which 98 percent of all 24-hour averages fall. The table below compares data collected from 2014 through year-to-date 2020 to the 24-hour standard for PM<sub>2.5</sub>.

**PM<sub>2.5</sub> Annual 98<sup>th</sup> Percentiles and 24-Hour Design Values**

Site Name	Annual 98 <sup>th</sup> Percentile Value µg/m <sup>3</sup>							24-Hour Design Values				
	2014	2015	2016	2017	2018	2019	2020	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020
Firearms Tr*	24.3	22.3	17.0	17.8	23.0	20.2	15.5	21.2	19.0	19.3	20.3	19.6
Durrett Lane	26.0	22.1	18.7	20.7	24.7	22.9	15.5	<b>22.3</b>	<b>20.5</b>	<b>21.4</b>	<b>22.8</b>	<b>21.0</b>
Cannons Lane	23.9	21.7	18.7	17.2	22.2	20.5	14.7	21.4	19.2	19.4	20.0	19.1
Watson Lane	26.2	22.8	16.2	17.7	24.3	21.4	17.7	21.7	18.9	19.4	21.1	21.1

**Bold:** Design value for Louisville

\* Firearms Training replaced Southwick in 2018



### 8-Hour Ozone Exceedances:

The National Ambient Air Quality Standard for ozone is measured as an 8-hour average. An ozone exceedance occurs when the highest 8-hour average for each day is greater than the NAAQS. The NAAQS was lowered from 80 ppb to 75 ppb in 2007 and from 75 ppb to 70 ppb in 2016. The data below lists the number of exceedances based on the NAAQS at the time the data was collected.

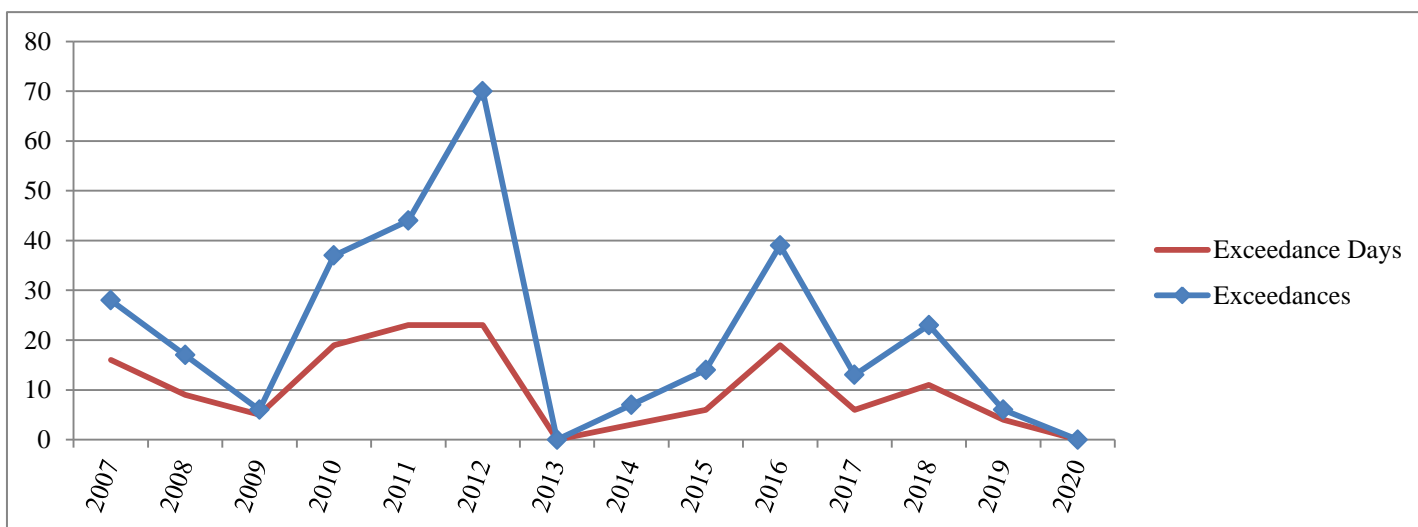
**2007-2020 8-Hour Ozone Exceedance Summary through June 11th**

Year	Charles-town	New Albany	Bates & Carri-thers	Watson	WLKY& Cannons Lane	Buckner	Shepherds-ville	Louisville MSA Total		Jefferson County Total	
								Exceedances	Days	Exceedances	Days
2007	8	3	8	4	2	3	0	28	16	14	11
2008	3	3	2	2	1	4	2	17	9	5	5
2009	0	0	2	4	0	0	0	6	5	6	5
2010	4	2	3	3	15	8	2	37	19	21	15
2011	6	5	6	5	8	13	1	44	23	19	14
2012	8	13	7	11	13	14	4	70	23	31	17
2013	0	0	0	0	0	0	0	0	0	0	0
2014	1	2	0	2	2	0	0	7	3	4	3
2015	3	0	4	1	4	2	0	14	6	9	5
2016	7	6	5	3	14	3	1	39	19	22	16
2017	1	5	1	1	4	1	0	13	6	6	4
2018	4	5	3	2	6	1	2	23	11	11	8
2019	1	0	2	0	2	1	0	6	4	4	2
2020	0	0	0	0	0	0	0	0	0	0	0

\* Cannons Lane replaced WLKY in 2010. Data through 2009 are from WLKY.

\* Carrithers replaced Bates in 2018. Data through 2017 are from Bates.

**Historical Graph of 8-Hour Ozone Exceedances**



## National Ambient Air Quality Standard for Ozone - 8-Hour Standard:

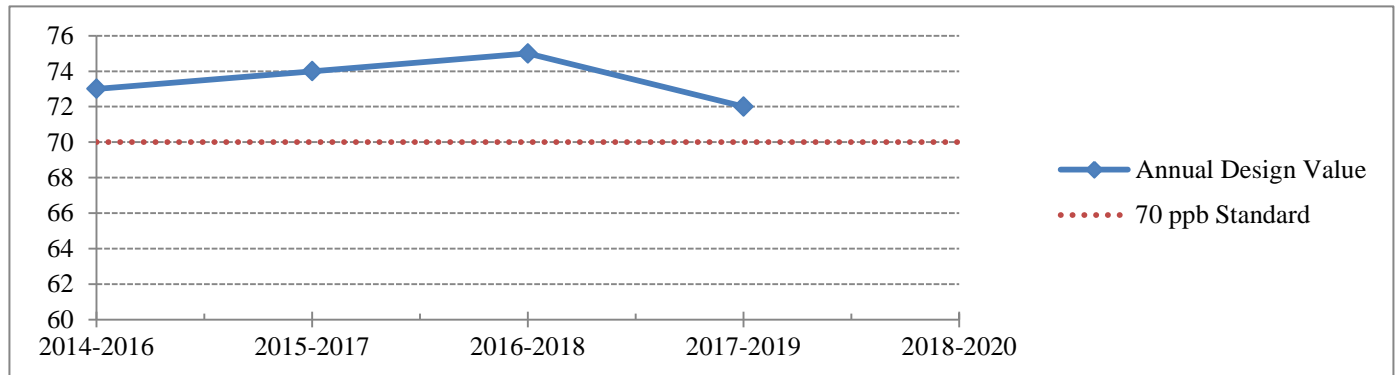
Attainment of the 8-hour standard for ozone at an individual monitor is achieved when the three-year average of the annual fourth-highest daily maximum (4<sup>th</sup> maximum) 8-hour average ozone concentration is less than 71 ppb. This three-year average is the design value for that monitor. The Louisville MSA row represents the largest 4<sup>th</sup> maximum and design value\* for all monitors within the MSA.

### 8-Hour Ozone 4<sup>th</sup> Maximums and Design Values through June 11th

Site Name	4 <sup>th</sup> Maximums							8-Hour Design Values				
	2014	2015	2016	2017	2018	2019	2020	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020
Charlestown	66	74	73	68	71	64		71	71	70	67	
New Albany	66	67	73	74	73	63		68	71	73	70	
Bates/Carrithers	65	71	73	65	70	64		69	69	69	66	
Watson Lane	69	69	70	66	69	65		69	68	68	66	
Cannons Lane	68	76	76	72	77	68		73	74	75	72	
Buckner	68	73	69	64	69	65		70	68	67	66	
Shepherdsville	65	67	67	63	68	60		66	65	66	63	
<b>Louisville MSA</b>	69	76	76	74	77	68	#N/A	73	74	75	72	#N/A

\* Design Value calculations are approximations based on preliminary summary data and may differ from official design value calculations

### 8-Hour Ozone Design Value Trend Chart



**Louisville Metro Air Pollution Control District**  
**Air Monitoring Report for Sulfur Dioxide (SO<sub>2</sub>)**  
**June 2020**

On June 2, 2010, EPA strengthened the primary National Ambient Air Quality Standard for SO<sub>2</sub>. Specifically, EPA replaced the existing annual (30 ppb) and 24-hour (140 ppb) primary standards with a new 1-hour standard set at 75 ppb. The 1-hour standard was set to better protect public health by reducing exposure to high short-term concentrations of SO<sub>2</sub>. The new standard took effect August 23, 2010.

**Exceedances of the 1-Hour SO<sub>2</sub> Standard:**

An exceedance occurs when a measured 1-hour average is greater than 75 ppb. Since up to twenty-four 1-hour averages are recorded each day, multiple exceedances may occur in one day. However, only the maximum 1-hour average (Daily Max) for each day is used in determining if the area is in compliance with the standard. The table below indicates the number of exceedances and the daily maximums reported thus far this year. The data are subject to further quality assurance checks and are not final.

**SO<sub>2</sub> Daily Maximums and Exceedances through May 31st**

Date	Fire Arms Training		Watson Lane Elementary		Cannons Lane NCore		New Albany Indiana	
	Exceeds	Daily Max	Exceeds	Daily Max	Exceeds	Daily Max	Exceeds	Daily Max
01/07/20		4.4		3.0		1.5		1.4
01/09/20		2.1		5.4		0.1		2.6
01/30/20		1.8		2.1		2.3		1.2
02/02/20		5.0		3.1		2.3		1.1
02/03/20		1.7		6.8		4.7		1.5
02/21/20		1.2		8.5		1.2		1.6
02/22/20		2.2		6.7		4.0		2.7
03/05/20		3.2		6.7		0.7		NA
03/09/20		4.6		5.1		0.1		3.3
03/17/20		0.2		1.1		9.1		1.6
04/11/20		1.3		1.1		5.9		2.1
04/22/20		1.6		1.7		2.9		3.5
04/29/20		3.5		5.9		2.5		2.7
05/07/20		3.9		0.9		1.2		1.4
05/16/20		1.0		13.7		0.7		1.2
05/28/20		0.9		1.1		6.3		1.3
Totals/Max	0	5.0	0	13.7	0	9.1	0	3.5
99 <sup>th</sup> Percentile		4.6		8.5		6.3		3.3

NA - Indicates data were not available

### Attainment of the SO<sub>2</sub> Standard:

Attainment of the new standard is achieved when the 3-year average of the 99<sup>th</sup> percentile annual distribution of the daily maxima is less than or equal to 75 ppb. Since this value can be calculated from historical data, the chart below indicates those values based on 2014-2020 data.

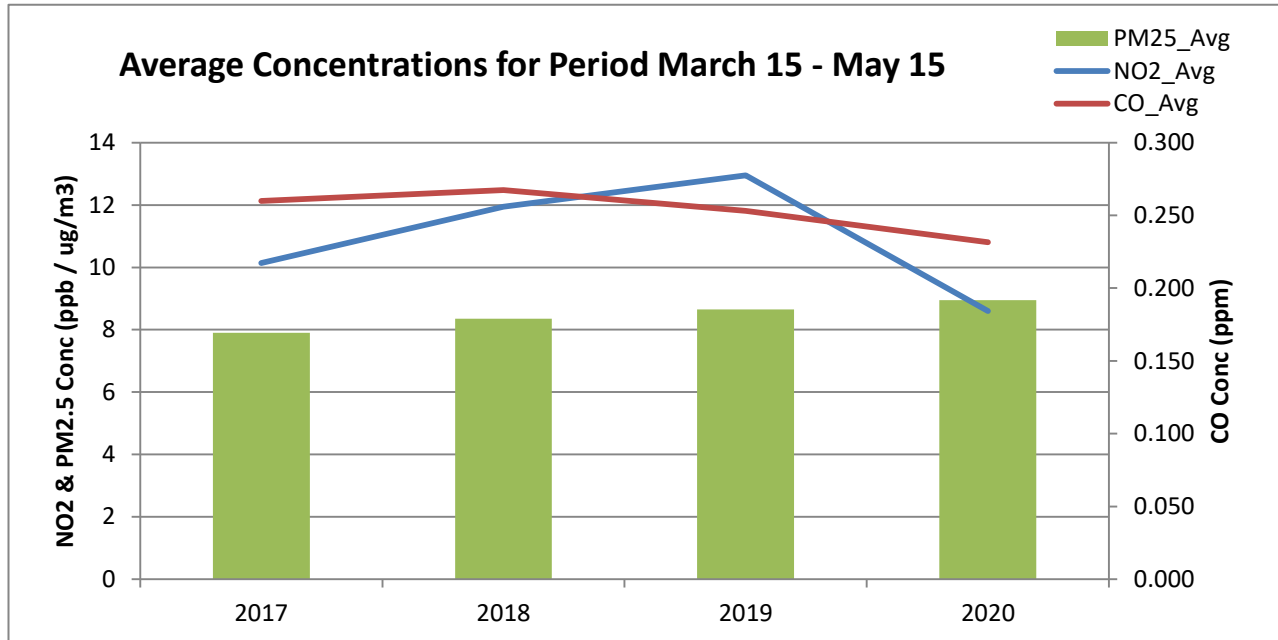
#### SO<sub>2</sub> Annual 99<sup>th</sup> Percentiles and Annual Design Values

Site Name	Annual 99 <sup>th</sup> Percentiles (ppb)							Annual Design Values				
	2014	2015	2016	2017	2018	2019	2020	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020
Watson Lane	149	54	26	14	16	15	9	76	31	19	15	13
Fire Arms	42	25	16	11	12	6	5	28	17	13	10	8
Cannons Lane	29	19	8	7	8	9	6	19	11	8	8	8
New Albany	44	26	11	8	9	7	3	27	15	9	8	7

\* Design Value calculations are approximations based on preliminary summary data and may differ from official design value calculations

## Louisville Metro Air Pollution Control District Special Report on COVID-19 Potential Impact on Ambient Air Quality

This Special Report provides an initial evaluation of ambient air quality data collected by the Louisville Metro Air Pollution Control District for the period March 15th - May 15th, 2020 when social distancing measures were maximized in response to the COVID-19 pandemic. This report summarizes air quality concentrations measured during this period in comparison to the same period from prior years. Three pollutants were evaluated: Carbon Monoxide (CO), Nitrogen Dioxide (NO<sub>2</sub>), and Fine Particulate (PM<sub>2.5</sub>). The results were mixed as some pollutants saw decreases (CO & NO<sub>2</sub>) while others saw increases (PM<sub>2.5</sub>) relative to prior years.



While comparing like time periods is a critical first step to evaluating the potential impact from the social distancing measures, additional considerations are also needed to better understand variability in ambient air quality conditions. One important consideration is the meteorological conditions that were in place during the time. An evaluation of these meteorological conditions showed that the March 15 - May 15th, 2020 period was on average, cooler and less windy than the same time period from prior years. This means that conditions were less favorable for pollutant dispersion compared to prior years. As a result, one may expect ambient concentrations to be higher for this period in 2020, compared to prior years. While PM<sub>2.5</sub> concentrations were higher, CO and NO<sub>2</sub> concentrations were lower. The lower CO and NO<sub>2</sub> concentrations were likely attributable to mobile source emission reductions due to reduced traffic. While CO and NO<sub>2</sub> have strong ties to mobile source emissions, PM<sub>2.5</sub> has a much broader mix of sources. With vehicular traffic emissions likely seeing the most significant reduction, it may not be surprising that CO and NO<sub>2</sub> saw the largest decreases. The change in air quality concentrations and meteorological conditions between Spring, 2020 and prior years are shown below.

CO	NO <sub>2</sub>	PM <sub>2.5</sub>	Wind	Temp
-11.0%	-26.4%	7.8%	-7.3%	-9.6%

Change in ambient air quality concentrations and meteorological conditions for March 15 - May 15, 2020 compared to prior years during same period.