Louisville Metro Air Pollution Control District
$PM_{2.5}$ Monitoring Report
November 2020

This report summarizes $PM_{2.5}$ 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 ($\mu g/m^3$). The data are subject to further quality assurance checks and are not final.

$PM_{2.5}$ Monthly Data Summary for October 2020

	Maximum		Minimum		Sample	Monthly
Site Name	Conc.	Date	Conc.	Date	Recovery	Average
Algonquin Parkway *	16.1	10/27/20	3.2	10/24/20	NA	8.7
Durrett Lane	17.4	10/28/20	3.6	10/24/20	NA	9.4
Cannons Lane	17.5	10/28/20	3.4	10/24/20	NA	8.8
Watson Lane	15.4	10/28/20	3.0	10/29/20	NA	8.8
Overall	17.5	10/28/20	3.0	10/29/20	NA	8.9

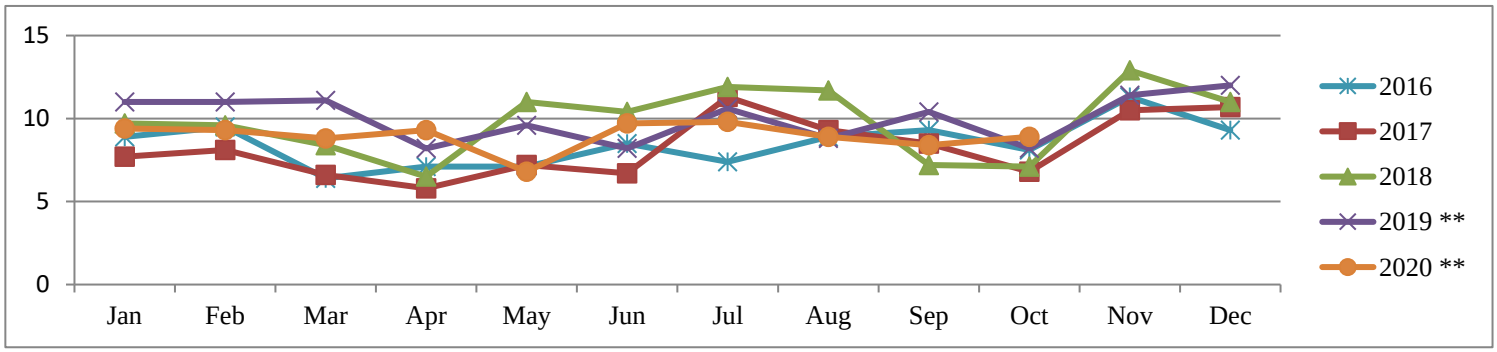
* LMAPCD officially changed the Firearms Training site name to Algonquin Parkway

$PM_{2.5}$ 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	**16.3**	12.2	12.2	11.0	14.1	**16.0**	**16.4**	11.0	**17.0**	12.6	13.7	**4**
2011	**15.2**	10.6	9.7	8.6	12.1	14.1	**19.7**	**16.2**	11.5	9.0	7.6	9.9	**3**
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	**0**
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	**0**
2014	7.5	**14.3**	11.7	9.6	10.7	**14.0**	**16.4**	**13.6**	9.9	7.9	9.8	**12.4**	**5**
2015	10.9	11.0	11.3	6.9	10.2	10.1	**13.1**	10.0	9.7	7.5	8.5	7.7	**1**
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	**0**
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	**0**
2018	9.7	9.6	8.4	6.5	11.0	10.4	11.9	11.7	7.2	7.1	**12.9**	11.0	**1**
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	**0**
2020 **	9.4	9.3	8.8	9.3	6.8	9.7	9.8	8.9	8.4	8.9			**0**
Average	10.3	10.8	9.4	8.1	10.3	10.8	12.6	11.7	9.7	8.8	10.5	10.7	

*The new $PM_{2.5}$ standard of 12 $\mu g/m^3$ became effective on March 18, 2013 ** Data from continuous FEM Instruments

$PM_{2.5}$ 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 $PM_{2.5}$ the levels of the primary and secondary standards are the same.

National Ambient Air Quality Standard for $PM_{2.5}$ - Annual Standard:
The annual standard is designed to provide an appropriate level of protection from long-term exposure to $PM_{2.5}$. The standard is met when the annual design value is less than or equal to 12 µg/m^3. The standard changed from 15 µg/m^3 to 12 µg/m^3 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 $PM_{2.5}$ annual standard.

$PM_{2.5}$ Annual Means and Annual Design Values

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

Bold: Design value for Louisville * Site name changed from Firearms Training to Algonquin Parkway

National Ambient Air Quality Standard for $PM_{2.5}$ - 24-Hour (Daily) Standard:
The 24-hour standard is designed to provide an appropriate level of protection from short-term exposure to $PM_{2.5}$. The standard is met when the 24-hour design value is less than or equal to 35 µg/m^3. The design value is based on 3 consecutive complete years of air quality data and is calculated by taking the average of the 98th percentile value for each of the 3 years. The 98th percentile value is the 24-hour average out of a year of $PM_{2.5}$ 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 $PM_{2.5}$.

$PM_{2.5}$ Annual 98th Percentiles and 24-Hour Design Values

	Annual 98th Percentile Value µg/m^3							24-Hour Design Values				
Site Name	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2014-2016**	**2015-2017**	**2016-2018**	**2017-2019**	**2018-2020**
Algonquin*	24.3	22.3	17.0	17.8	23.0	20.2	17.5	21.2	19.0	19.3	20.3	20.2
Durrett Lane	26.0	22.1	18.7	20.7	24.7	22.9	16.3	**22.3**	**20.5**	**21.4**	**22.8**	**21.3**
Cannons Lane	23.9	21.7	18.7	17.2	22.2	20.5	17.4	21.4	19.2	19.4	20.0	20.0
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 * Site name changed from Firearms Training to Algonquin Parkway

Louisville Metro Air Pollution Control District

8-Hour Ozone Monitoring Report

November 2020

This report summarizes ozone data collected by Automated Equivalent Method (AEM) ozone analyzers located within the Louisville Metropolitian Statistical Area. Measurements are reported as 8-hour averages in parts-per-billion (ppb). The data are subject to further quality assurance checks and are not final.

2020 8-Hour Ozone Maximum Values and Exceedances through October 31st

Date	# of 8-Hour Exceeds	# of Days Exceeds	Charlestown Clark County IN	New Albany Floyd County IN	Carrithers Jefferson County KY	Watson Lane Jefferson County KY	Cannons Lane Jefferson County KY	Buckner Oldham County KY	Shepherdsville Bullitt County KY
03/01/20	0	0	51.6	51.0	55.3	50.1	53.8	53.6	54.5
04/03/20	0	0	57.1	52.8	56.3	55.7	57.0	55.7	54.0
04/04/20	0	0	56.7	52.3	57.5	50.8	56.2	59.7	53.8
05/02/20	0	0	54.3	54.3	53.3	50.3	55.5	56.7	53.5
05/04/20	0	0	52.0	51.7	55.3	58.7	54.5	51.7	56.2
06/06/20	0	0	65.6	60.1	68.1	57.3	65.6	57.8	60.6
06/13/20	0	0	68.6	62.3	68.1	64.0	68.6	60.8	65.2
06/17/20	2	1	66.5	66.3	68.7	**71.8**	**71.5**	69.7	65.6
06/19/20	0	0	62.1	62.8	69.0	64.6	68.3	66.1	66.2
06/20/20	0	0	63.7	62.7	69.8	57.0	67.8	66.1	61.5
07/06/20	1	1	NA	66.5	54.6	57.1	**75.7**	46.8	49.2
07/07/20	2	1	NA	**83.6**	54.2	54.3	**72.0**	50.1	47.8
07/14/20	0	0	56.2	70.8	56.1	54.6	67.7	55.0	56.2
08/08/20	3	1	56.2	62.5	**73.3**	63.8	**73.5**	61.1	**75.1**
08/25/20	0	0	50.7	51.2	66.2	49.1	67.5	52.5	50.6
09/10/20	0	0	41.1	51.5	47.0	59.1	47.3	41.7	58.3
09/17/20	0	0	51.1	49.6	56.8	57.8	57.7	57.3	52.1
10/07/20	0	0	54.1	52.8	52.3	48.2	54.5	56.6	49.6
10/08/20	0	0	45.1	43.5	48.1	50.7	48.6	47.6	46.1
Total Exceeds	8	4	0	1	1	1	4	0	1
Truncated 4th Maximum			63	66	68	63	71	61	65

Values in **BOLD/RED** exceed the level of the 2015 ozone standard of 70 ppb (parts-per-billion).

This standard applies to air monitoring data beginning with the 2016 ozone season.

NA - Indicates data were not available.

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.

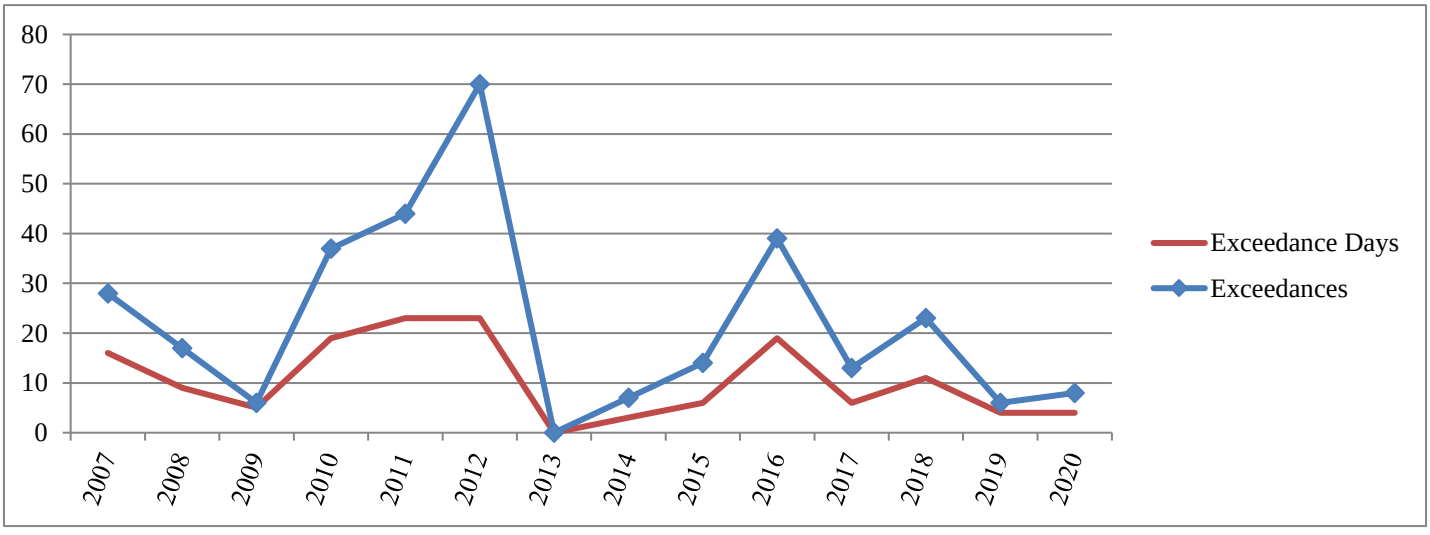
2007-2020 8-Hour Ozone Exceedance Summary through October 31st

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	1	1	1	4	0	1	8	4	6	4

* 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:

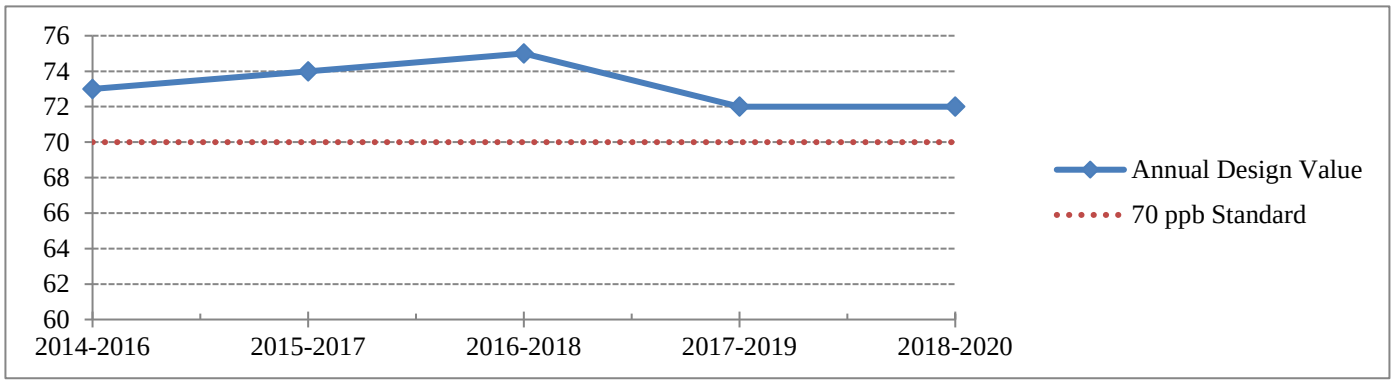
Attainment of the 8-hour standard for ozone at an individual monitor is achieved when the three-year average of the annual fourth-highest daily maximum (4th maximum) 8-hour average ozone concentration is less than 71 ppb. This three-year average is the design value for that monitor. The Louisville MSA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

8-Hour Ozone 4th Maximums and Design Values through October 31st

	4th Maximums							8-Hour Design Values				
Site Name	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2014-2016**	**2015-2017**	**2016-2018**	**2017-2019**	**2018-2020**
Charlestown	66	74	73	68	71	64	63	**71**	**71**	70	67	66
New Albany	66	67	73	74	73	63	66	68	**71**	**73**	70	67
Bates/Carrithers	65	71	73	65	70	64	68	69	69	69	66	67
Watson Lane	69	69	70	66	69	65	63	69	68	68	66	66
Cannons Lane	68	76	76	72	77	68	71	**73**	**74**	**75**	**72**	**72**
Buckner	68	73	69	64	69	65	61	70	68	67	66	65
Shepherdsville	65	67	67	63	68	60	65	66	65	66	63	64
Louisville MSA	69	76	76	74	77	68	71	**73**	**74**	**75**	**72**	**72**

* 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_2)
November 2020

On June 2, 2010, EPA strengthened the primary National Ambient Air Quality Standard for SO_2. 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_2. The new standard took effect August 23, 2010.

Exceedances of the 1-Hour SO_2 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_2 Daily Maximums and Exceedances through October 31st

	Algonquin Parkway		Watson Lane Elementary		Cannons Lane NCore		New Albany Indiana	
Date	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
06/02/20		2.6		4.9		18.6		2.4
06/20/20		2.3		8.4		6.9		2.1
06/30/20		4.1		1.5		1.4		2.8
Totals/Max	0	9.5	0	20.7	0	18.6	0	9.2
99^{th} Percentile		4.7		14.6		7.9		3.4

NA - Indicates data were not available

Louisville Metro Air Pollution Control District
Air Monitoring Report for Sulfur Dioxide (SO_2)
November 2020

Continuation of SO_2 Daily Maximums and Exceedances through October 31st

	Algonquin Parkway		Watson Lane Elementary		Cannons Lane NCore		New Albany Indiana	
Date	Exceeds	Daily Max	Exceeds	Daily Max	Exceeds	Daily Max	Exceeds	Daily Max
07/07/20		9.5		3.4		1.6		3.3
07/09/20		2.2		2.8		2.5		9.2
07/14/20		2.7		9.6		1.4		2.2
07/19/20		1.7		10.1		14.5		1.1
07/21/20		3.4		16.0		3.3		2.8
08/03/20		3.7		1.6		1.6		1.2
08/10/20		2.4		1.0		0.7		6.4
08/18/20		2.5		14.2		3.0		1.0
08/25/20		3.4		2.4		5.9		2.1
09/14/20		2.5		1.8		1.5		2.4
09/16/20		1.3		14.6		1.1		0.5
09/17/20		2.6		6.2		5.8		1.6
09/23/20		4.7		7.8		3.2		0.7
09/30/20		0.5		17.1		2.3		0.5
10/06/20		1.1		5.9		7.9		1.0
10/13/20		1.0		20.7		5.7		0.7
10/14/20		5.7		6.7		4.1		3.4
Totals/Max	0	9.5	0	20.7	0	18.6	0	9.2
99th Percentile		4.7		14.6		7.9		3.4

NA - Indicates data were not available

Attainment of the SO_2 Standard:

Attainment of the new standard is achieved when the 3-year average of the 99th 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 table below indicates those values based on 2014-2020 data.

SO_2 Annual 99th Percentiles and Annual Design Values

	Annual 99th Percentiles (ppb)							Annual Design Values				
Site Name	**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	15	76	31	19	15	15
Algonquin	42	25	16	11	12	6	5	28	17	13	10	8
Cannons Lane	29	19	8	7	8	9	8	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