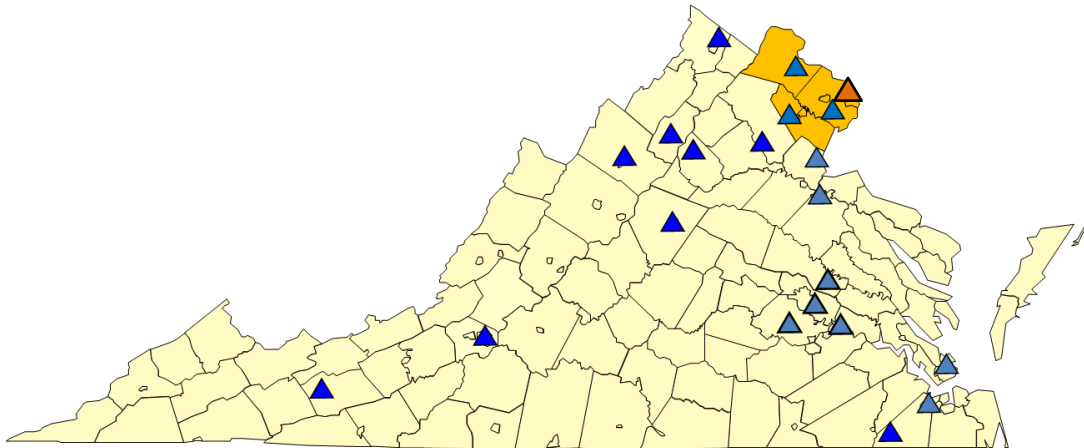


ENCLOSURE II

COMMONWEALTH OF VIRGINIA AREA DESIGNATION RECOMMENDATIONS UNDER THE 2015 8-HOUR OZONE NATIONAL AMBIENT AIR QUALITY STANDARD (NAAQS)

TECHNICAL SUPPORT DOCUMENT



BACKGROUND

On October 1, 2015, the U.S. Environmental Protection Agency (EPA) strengthened the National Ambient Air Quality Standard (NAAQS) for ground level ozone from 0.075 parts per million to 0.070 parts per million (ppm). This action was taken by EPA in light of new and compelling scientific evidence that a lower standard was needed to protect human health and welfare.

One of the first actions required when a new air quality standard is established is to designate areas in regard to compliance with the standard. Those areas that are not in compliance with the standard are designated as “nonattainment” areas, while areas in compliance are designated “attainment”. Areas where insufficient data is available to make a determination are designated as “unclassifiable”.

On February 25, 2015, the Acting Assistant Administrator, Janet G. McCabe, issued guidance to EPA and the states on the process and factors to consider when designating areas under the new ozone standard. In general, this guidance recommended the use of census bureau areas such as Core Based Statistical Areas (CBSA) or Combined Statistical Areas (CSA) as the starting point for nonattainment area designations when a violating ozone air quality monitor is present. However, EPA also allows states the flexibility to make area specific designations based on five ozone related factors that are listed below:

- Ozone air quality data,
- Emissions and emissions-related data (location of sources and contribution to ozone),
- Meteorology (weather/transport patterns),
- Geography/topography, and
- Jurisdictional boundaries.

The approach taken to making individual jurisdiction determinations is further based on the following hierarchy of criteria:

- Does the jurisdiction have a violating ozone monitor?
- Is the jurisdiction part of a current ozone nonattainment or maintenance area?
- Would exclusion of the jurisdiction create an illogical result, such as an attainment area within a larger nonattainment area?
- Does the jurisdiction significantly contribute to ozone formation in a nearby recommended nonattainment area?

For any areas requiring a determination of significant contribution and that do not meet any of the other criteria above, a clear and compelling case is required based on available data for the five EPA factors to make a nonattainment recommendation.

The purpose of this technical support document is to describe the analyses performed by the Virginia Department of Environmental Quality (VDEQ) to support the area designations recommendations that are being submitted to the EPA as part of the ozone standard implementation process.

EPA will consider these recommendations and either accept or modify these recommendations. EPA will notify the Commonwealth of any modifications made by letter no later than June 2, 2017 and will then provide a 30-day public comment period. The Commonwealth will then have an opportunity to submit additional information prior to EPA’s final issuance of designations by October 1, 2017.

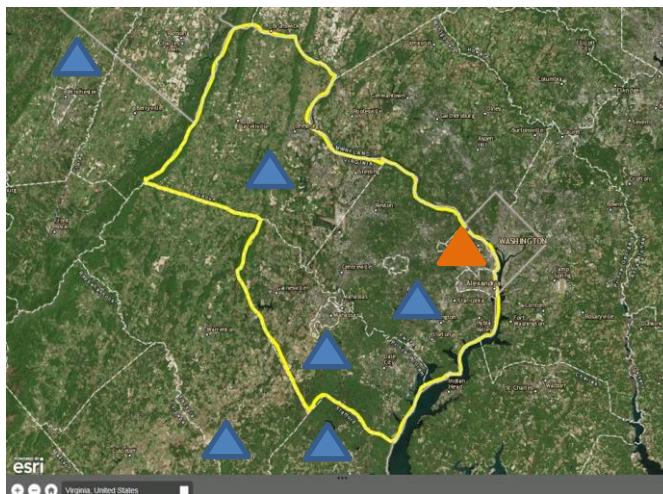
2015 OZONE AREA DESIGNATIONS

Section 107(d) (1) of the CAA directs the EPA to designate an area “nonattainment” if it is violating the NAAQS or if it is contributing to a violation of the NAAQS in a nearby area. In identifying any air quality monitoring sites with data that show a violation of the 2015 ozone NAAQS, VDEQ considered both the EPA certified 2013-2015 8-hour ozone data (Enclosure I) and preliminary 2014-2016 8-hour ozone data (Appendix A). The certified 2013-2015 8-hour ozone data clearly demonstrate that no monitors in Virginia are in violation of the new ozone standard of 70 ppb. However, preliminary 2014-2016 ozone data indicate that the Aurora Hills monitor in Arlington County, VA is above the new standard (i.e., 72 ppb). The Aurora Hills monitor is the only monitor in the Commonwealth that is out of compliance with the 2015 ozone standard.

2015 OZONE AREA DESIGNATIONS: NONATTAINMENT AREA ANALYSES AND BOUNDARY DETERMINATION

Arlington County, VA is part of the Greater Washington DC/MD/VA Metropolitan Statistical Area (MSA). When determining non-attainment area boundaries, this analysis primarily considers the ozone factors (Appendix B) and hierarchy or ranking of criteria for jurisdictions located in the Greater Washington DC/MD/VA MSA (Appendix C) and previous non-attainment area boundaries. As part of the 1997 ozone standard designation process, the City of Fredericksburg, Stafford County, and Spotsylvania County were designated as a separate nonattainment and air quality planning area for ozone in 2004. Because of the precedent set this separate status under the CAA and because the monitors associated with this area in compliance with the new 2015 ozone standard by a large margin, these jurisdictions were not included this analyses.

As a result of this analysis and other considerations, the Commonwealth of Virginia recommends retaining the boundaries of the Northern Virginia non-attainment area set during the designation process for the 1997 and 2008 ozone standards. The jurisdictions that make up this nonattainment area are shown and listed below:



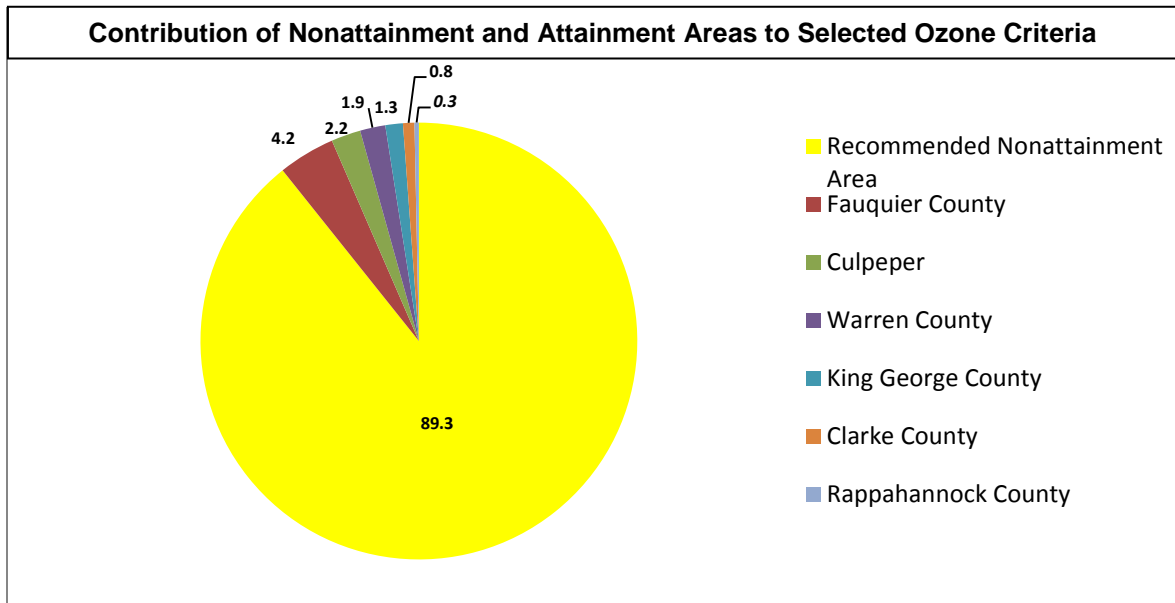
Northern VA Nonattainment Area

Arlington County
Fairfax County
Loudoun County
Prince William County
City of Alexandria
City of Fairfax
City of Falls Church
City of Manassas
City of Manassas Park

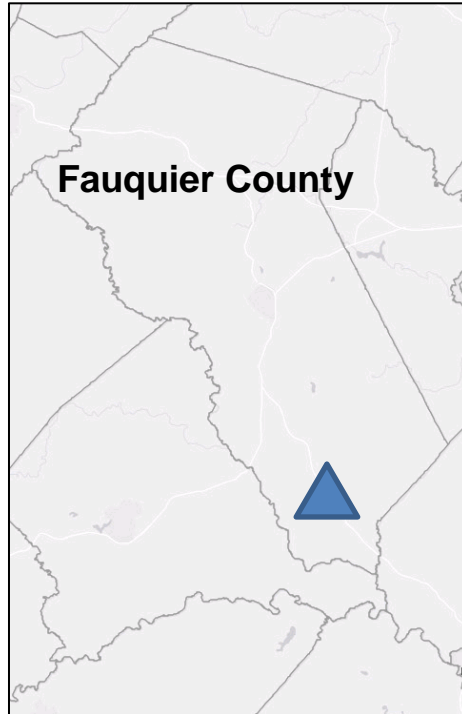
The Northern Virginia Nonattainment area is part of the Metropolitan Washington DC-MD-VA nonattainment area, which also includes the District of Columbia and jurisdictions in southern Maryland.

As shown by the figures below, the Commonwealth believes that these nonattainment recommendations for the Virginia portion of the Metropolitan Washington DC-MD-VA nonattainment area are reasonable and appropriate in that the recommended jurisdictions account for 89.3% of the ozone precursor pollutants, population, expected growth, and vehicle miles of travel for the area.

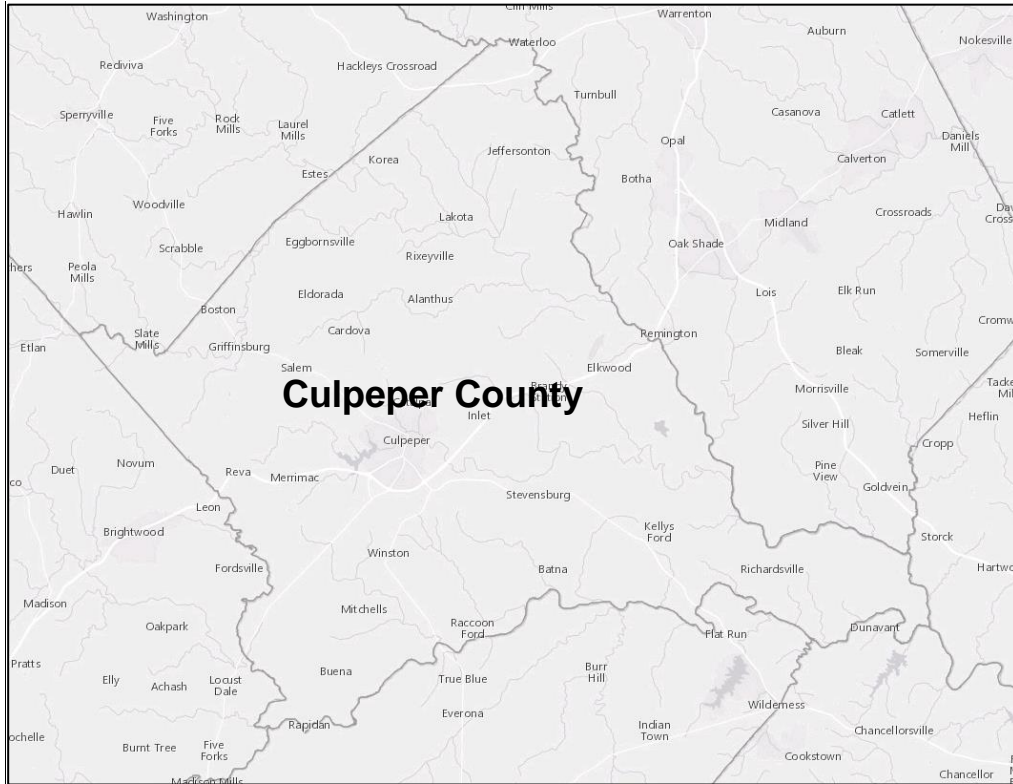
Ranking of Selected Ozone Criteria for the Virginia Jurisdictions in the Virginia portion of the DC/MD/VA MSA							
County/City	Area Emissions ¹	Area Population	Population Growth for Area Percent	Vehicle Miles Traveled	Combined Average	Emission Density ton/sq mile/per day	Population Density Population/sq mile
Recommended Nonattainment Jurisdictions							
FAIRFAX COUNTY	37.0	44.6	26.6	45.7	38.5	0.242	2,767
PRINCE WILLIAM COUNTY	15.6	16.6	21.9	15.7	17.4	0.118	1,195
LOUDOUN COUNTY	14.3	12.9	27.9	11.5	16.6	0.071	606
ARLINGTON COUNTY	8.0	8.6	9.5	7.7	8.4	0.790	7,994
ALEXANDRIA CITY	4.8	5.8	6.0	3.6	5.0	0.822	9,314
MANASSAS CITY	1.3	1.6	1.7	1.2	1.5	0.349	3827.6
FAIRFAX CITY	1.0	0.9	0.6	0.8	0.9	0.410	3616.8
MANASSAS PARK CITY	0.4	0.6	0.6	0.1	0.4	0.423	5632.6
FALLS CHURCH CITY	0.4	0.5	0.7	0.3	0.5	0.344	6169.1
Recommended Attainment Jurisdictions							
FAUQUIER COUNTY	6.8	2.7	1.6	5.7	4.2	0.027	100.7
CULPEPER COUNTY	3.1	1.9	1.2	2.5	2.2	0.021	123.1
WARREN COUNTY	3.3	1.5	0.7	2.0	1.9	0.039	176.0
KING GEORGE COUNTY	2.0	1.0	0.9	1.4	1.3	0.028	131.3
CLARKE COUNTY	1.4	0.6	0.1	1.3	0.8	0.020	79.7
RAPPAHANNOCK CO.	0.6	0.3	0.0	0.4	0.3	0.005	27.7
	100.0	100.0	100.0	100.0	100.0	0.081	766



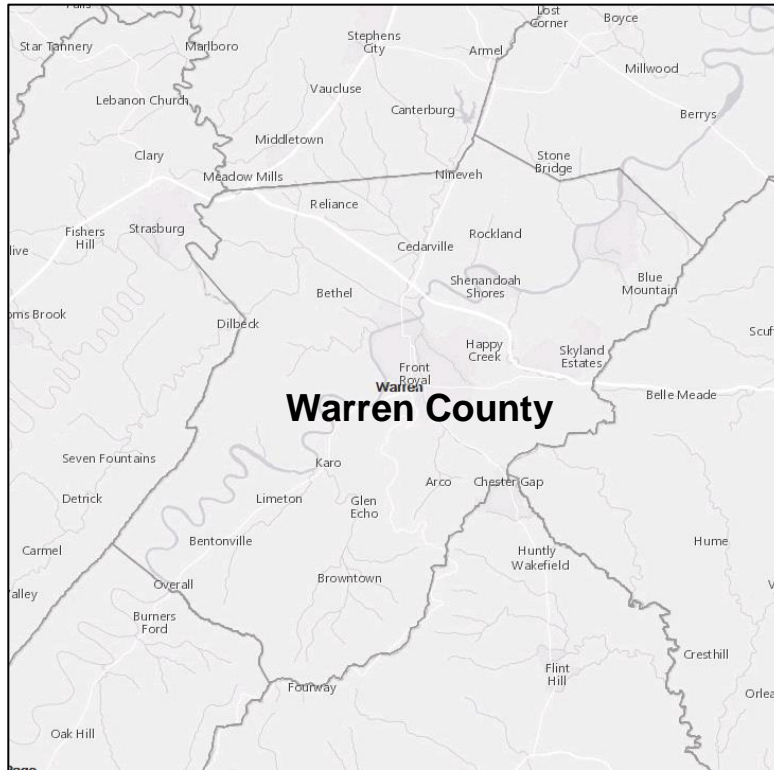
The individual jurisdictions recommended for attainment status do not significantly contribute to the overall levels of the major ozone related criteria of emissions, population, growth, and vehicle traffic. Also in the specific case of Fauquier County, there is an ozone monitor located in this county that has a certified design value of 58 ppb, has a preliminary design value of 59 ppb, and is in compliance with the new standard. Specific factor data is provided below for each recommended attainment jurisdiction.



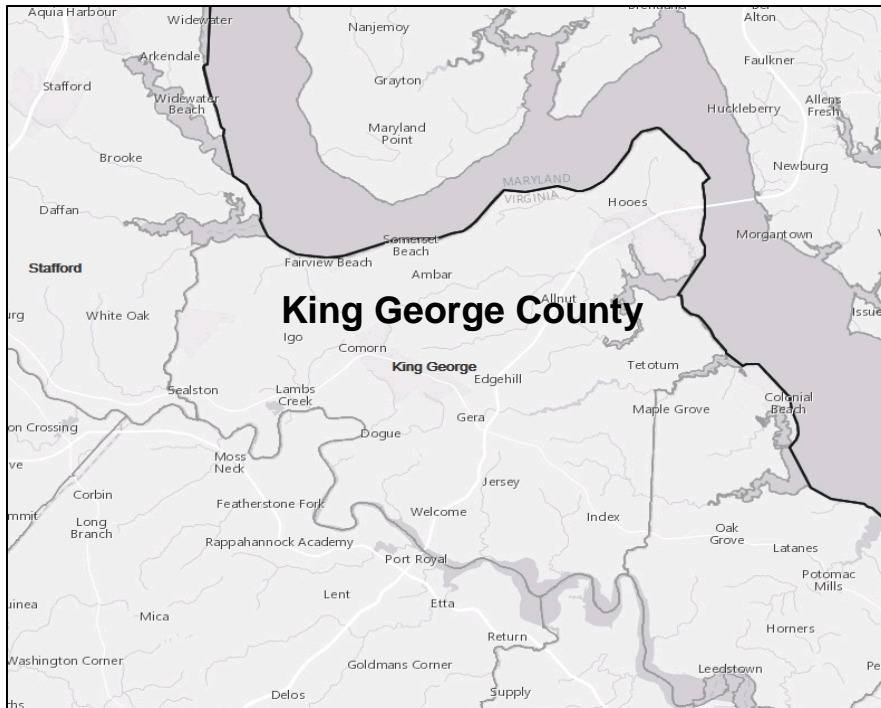
<i>Analysis of Ozone Related Criteria</i>	
Emissions (2011)	3,003 tons/year VOC and 3,377 tons/year NO _x (6.8% of ozone precursor emissions in the study area).
Emissions Density	0.027 tons/day/ square mile.
Population (2010)	65,203 – 101 per square mile (2.7% of the total population in the study area).
Population Growth	Population has grown to 68,782 in 2015, which represents only 1.6% of the total population growth expected in the study area.
Air Quality	Compliant Monitor - Design Value (20013 to 2015): 58 ppb .
Commuting Patterns	The majority of county workforce trips are internal. Most external commutes are to other jurisdictions in the study area.
Annual VMT (2011)	1.2 billion annual vehicle miles of travel (5.7% of total VMT in the area). Mostly through traffic on Interstate 66 and Route 17.
Major Sources	There are two major sources in the County which is a natural gas fired simple cycle peaking electric generation stations. However, these are new facilities that are controlled and subject to the CSAPR utility control program. Total County point source emission of both VOC and NO _x are less than 100 tons/year.
Geography	County is located to the Southwest of the proposed nonattainment area.
Boundaries	County is part of the Washington, DC-MD-VA MSA.
Level of Controls	Currently subject to attainment permit and control requirements. Emissions should be significantly reduced by regional and national controls.



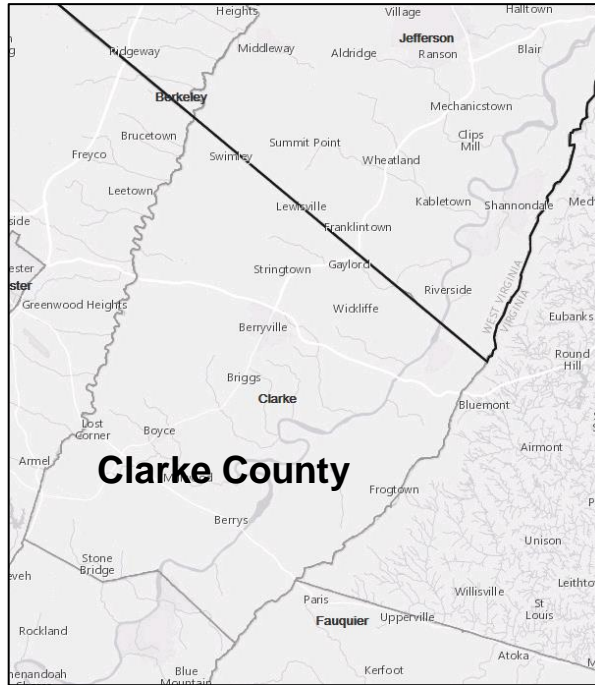
<i>Analysis of Ozone Related Criteria</i>	
Emissions (2011)	1,597 tons/year VOC and 1,343 tons/year NO _x (3.1% of ozone precursor emissions in the study area).
Emissions Density	0.021 tons per square mile.
Population (2010)	46,689 – 123 per square mile (1.9% of the total population in the study area).
Population Growth	Population has grown to 49,432 in 2015, which represents only 1.2% of the total population growth expected in the study area.
Air Quality	No monitor located in the County but ozone air quality is expected to be attainment based on closest monitored values.
Commuting Patterns	The majority of county workforce trips are internal. Most external commutes are to other jurisdictions in the study area.
Annual VMT (2011)	530 million annual vehicle miles of travel (2.5% of total VMT in the area). Mostly through traffic on Interstate 66 and Route 29.
Major Sources	There is one major source of VOCs in the County which is a cabinet manufacturing facility. However, VOCs do not contribute significantly to ozone formation in the area. Total County point source emission of both VOC and NO _x are less than 260 tons/year.
Geography	County is located to the Southwest of the proposed nonattainment area.
Boundaries	County is part of the Washington, DC-MD-VA MSA.
Level of Controls	Currently subject to attainment permit and control requirements. Emissions should be significantly reduced by regional and national controls.



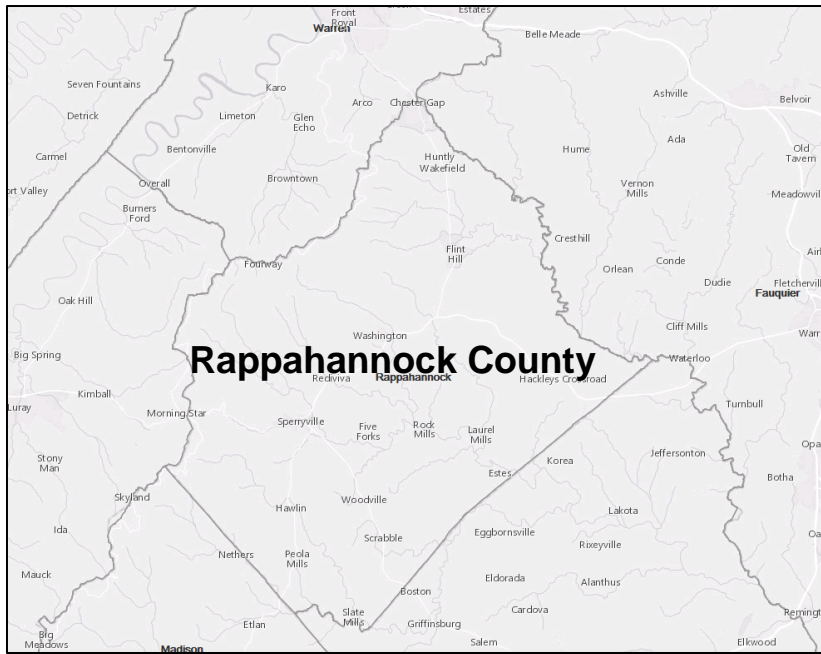
<i>Analysis of Ozone Related Criteria</i>	
Emissions (2011)	1,644 tons/year VOC and 1,397 tons/year NO _x (3.3% of ozone precursor emissions in the study area).
Emissions Density	0.039 tons/day/ square mile.
Population (2010)	37,575–176 per square mile (1.5% of the total population in the study area).
Population Growth	Population has grown to 39,083 in 2015, which represents only 0.7% of the total population growth expected in the study area.
Air Quality	No monitor located in the County but ozone air quality is expected to be attainment based on closest monitored values.
Commuting Patterns	The majority of county workforce trips are internal. Most external commutes are to other jurisdictions in the study area and the Winchester area.
Annual VMT (2011)	436.5 million annual vehicle miles of travel (2.0% of total VMT in the area). Mostly through traffic on Interstate 66 and Route 15.
Major Sources	There is one major source in the County which is a natural gas combined cycle electric generating station. This EGU did not commence commercial operation until 2014. However, this new facility is highly controlled and subject to the CSAPR utility control program. Total County point source emission of both VOC and NO _x are less than 100 tons/year.
Geography	County is located to the Southwest of the proposed nonattainment area.
Boundaries	County is part of the Washington, DC-MD-VA MSA.
Level of Controls	Currently subject to attainment permit and control requirements. Emissions should be significantly reduced by regional and national controls.



<i>Analysis of Ozone Related Criteria</i>	
Emissions (2011)	900 tons/year VOC and 924 tons/year NO _x (2.0% of ozone precursor emissions in the study area).
Emissions Density	0.028 tons/day/ square mile
Population (2010)	25,584 – 131 per square mile (1.0% of the total population in the study area).
Population Growth	Population has decreased to 25,515 in 2015, which represents only 0.9% of the total population growth expected in the study area.
Air Quality	No monitor located in the County but ozone air quality is expected to be attainment based on closest monitored values.
Commuting Patterns	The majority of county workforce trips are internal. Most external commutes are to the Fredericksburg area and southern Maryland.
Annual VMT (2011)	305.8 million annual vehicle miles of travel (1.4% of total VMT in the area). Mostly from traffic on Route 301.
Major Sources	There is one major source in the County which is a coal-fired electric generating station. However, this facility is highly controlled and subject to MACT and the CSAPR utility control program. Total County point source emission of both VOC and NO _x are less than 500 tons/year.
Geography	County is located to the Southeast of the proposed nonattainment area.
Boundaries	County is part of the Washington, DC-MD-VA MSA.
Level of Controls	Currently subject to attainment permit and control requirements. Emissions should be significantly reduced by regional and national controls.



Analysis of Ozone Related Criteria	
Emissions (2011)	666 tons/year VOC and 615 tons/year NO _x (1.4% of ozone precursor emissions in the study area).
Emissions Density	0.020 tons/day/ square mile.
Population (2010)	14,034 – 80 per square mile (0.6% of the total population in the study area)
Population Growth	Population has grown to 14,363 in 2015, which represents only 0.1% of the total population growth expected in the study area.
Air Quality	No monitor located in the County but ozone air quality is expected to be attainment based on closest monitored values.
Commuting Patterns	The majority of county workforce trips are external commutes to other jurisdictions in the study area.
Annual VMT (2011)	275.5 million annual vehicle miles of travel (1.3% of total VMT in the area). Mostly through traffic on Interstate 66 and Route 29 and Route 17.
Major Sources	There are no major point sources in the County. Total County point source emission of both VOC and NO _x are less than 50 tons/year.
Geography	County is located to the Southeast of the proposed nonattainment area.
Boundaries	County is part of the Washington, DC-MD-VA MSA.
Level of Controls	Currently subject to attainment permit and control requirements. Emissions should be significantly reduced by regional and national controls.



<i>Analysis of Ozone Related Criteria</i>	
Emissions (2011)	307 tons/year VOC and 209 tons/year NO _x (0.6% of ozone precursor emissions in the study area).
Emissions Density	0.005 tons/day/ square mile.
Population (2010)	7,373 – 28 per square mile (0.3% of the total population in the study area).
Population Growth	Population has grown to 7,378 in 2015, which represents only 0.0% of the total population growth expected in the study area.
Air Quality	No monitor located in the County but ozone air quality is expected to be attainment based on closest monitored values.
Commuting Patterns	The majority of county workforce trips are internal. Most external commutes are to other jurisdictions in the study area.
Annual VMT (2011)	94.4 million annual vehicle miles of travel (0.4% of total VMT in the area). Mostly through traffic on Route 522 and 211.
Major Sources	There are no major point sources in the County. Total County point source emission of both VOC and NO _x are less than 10 tons/year.
Geography	County is located to the Southwest of the proposed nonattainment area.
Boundaries	County is part of the Washington, DC-MD-VA MSA.
Level of Controls	Currently subject to attainment permit and control requirements. Emissions should be significantly reduced by regional and national controls.

Appendix A – Preliminary 2014-2016 Virginia Ozone 8-hour Ozone Data

Virginia Department of Environmental Quality					
2014-2016 Fourth Highest Daily Maximum Ozone 8-hour Averages					
Units, ppb					
Updated 9/26/16					
Monitoring Sites	AIRS ID	2014	2015	(through 9/25/16)	3-year average
				2016	
Wythe Co.	511970002	64	58	62	61
Rockbridge Co.	511630003	58	56	60	58
Page Co.	511390004	58	59	Disc	58
Fauquier Co.	510610002	59	56	63	59
Caroline Co.	510330001	61	62	62	61
Rockingham Co.	511650003	58	60	62	60
Albemarle Co.	510030001	59	59	62	60
Roanoke Area:					
Roanoke Co.	511611004	60	62	64	62
Frederick County Area:					
Frederick Co.	510690010	59	61	65	61
Richmond Area:					
Chesterfield Co.	510410004	61	63	63	62
Henrico Co.	510870014	62	64	66	64
Hanover Co.	510850003	62	61	65	62
Charles City Co.	510360002	66	59	65	63
Hampton Roads Area:					
Hampton	516500008	61	65	68	64
Suffolk - TCC	518000004	58	61	63	60
Suffolk - Holland	518000005	63	60	61	61
Fredericksburg Area:					
Stafford Co.	511790001	62	63	66	63
Northern Virginia Area:					
Loudoun Co.	511071005	63	71	68	67
Prince William Co.	511530009	62	67	67	65
<i>Arlington Co.</i>	510130020	71	73	72	72
Fairfax Co. - Lee Park	510590030	65	72	73	70
Shenandoah National Park - Madison Co. (Site operated by the National Park Service)	511130003	60	63	66	63
Giles Co. CASTNET	510719991	62	63	62	62
Prince Edward Co. CASTNET	511479991	63	57	60	60
<i>Sites in italics exceeded the 8-hour ozone standard for 2014-2016</i>					

Appendix B: Data Table for Virginia Nonattainment Designation Ozone Factors Analysis

County/City ¹	Land Area ²	Population ³		Growth Rate	Annual Emissions ⁴		Total	Area Emissions	Area Population	Population Growth for Area	Combined Average	Emission Density	Population Density	Vehicle miles Travelled ⁵	Vehicle miles Travelled	Certified 2013-2015 Design Values	Preliminary/Uncertified 2014-2016 Design Values
	Sq. Miles	2010	2015		Percent	NOX						VOC	ton/perday/sq. mile	No/sq. mile	Annual	Percent	ppb
				tons/year													
ALEXANDRIA CITY	15.03	139,966	153,511	1.86	2,266	2,244	4,510	4.8	5.8	6.0	5.5	0.822	9,314	776,631,863	3.6	N/A	N/A
ARLINGTON COUNTY	25.97	207,627	229,164	1.99	4,061	3,433	7,493	8.0	8.6	9.5	8.7	0.790	7,994	1,668,842,699	7.7	70	72
CLARKE COUNTY	176.18	14,034	14,363	0.46	615	666	1,281	1.4	0.6	0.1	0.7	0.020	80	275,483,696	1.3	N/A	N/A
CULPEPER COUNTY	379.23	46,689	49,432	1.15	1,343	1,597	2,940	3.1	1.9	1.2	2.1	0.021	123	530,145,141	2.5	N/A	N/A
FAIRFAX COUNTY	390.97	1,081,726	1,142,234	1.09	15,199	19,336	34,534	37.0	44.6	26.6	36.1	0.242	2,767	9,884,211,505	45.7	68	70
FAIRFAX CITY	6.24	22,565	24,013	1.25	258	675	933	1.0	0.9	0.6	0.9	0.410	3,617	182,988,258	0.8	N/A	N/A
FALLS CHURCH CITY	2.00	12,332	13,892	2.41	121	288	409	0.4	0.5	0.7	0.5	0.560	6,169	56,374,487	0.3	N/A	N/A
FAUQUIER COUNTY	647.45	65,203	68,782	1.07	3,377	3,003	6,379	6.8	2.7	1.6	3.7	0.027	101	1,236,123,735	5.7	58	59
KING GEORGE COUNTY	179.64	23,584	25,515	1.59	924	900	1,824	2.0	1.0	0.9	1.3	0.028	131	305,783,532	1.4	N/A	N/A
LOUDOUN COUNTY	515.56	312,311	375,629	3.76	6,689	6,648	13,338	14.3	12.9	27.9	18.3	0.071	606	2,489,966,360	11.5	66	67
MANASSAS CITY	9.88	37,821	41,764	2.00	466	791	1,258	1.3	1.6	1.7	1.5	0.349	3,828	257,068,406	1.2	N/A	N/A
MANASSAS PARK CITY	2.53	14,273	15,726	1.96	102	289	391	0.4	0.6	0.6	0.5	0.422	5,633	24,777,086	0.1	N/A	N/A
PRINCE WILLIAM COUNTY	336.40	402,002	451,721	2.36	6,784	7,739	14,523	15.6	16.6	21.9	18.0	0.118	1,195	3,394,199,629	15.7	65	65
RAPPAHANNOCK COUNTY	266.23	7,373	7,378	0.01	209	307	516	0.6	0.3	0.0	0.3	0.005	28	94,398,473	0.4	N/A	N/A
WARREN COUNTY	213.47	37,575	39,083	0.79	1,397	1,644	3,041	3.3	1.5	0.7	1.8	0.039	176	436,554,493	2.0	N/A	N/A
	3,167	2,425,081	2,652,207	1.81	43,812	49,557	93,369	100.0	100.0	100.0		0.081	766	21,613,549,363	100		

- 1) City of Fredericksburg, Stafford County, and Spotsylvania County were not included in the analyses because these jurisdictions are located in a separate regional transportation planning organization and there are no monitors in these jurisdictions in violation of the 2015 ozone NAAQS.
- 2) Dataset provided by EPA to support the five-factor analysis: County Population (excel spreadsheet) downloaded from <https://www.epa.gov/ozone-designations/ozone-designations-guidance-and-data>
- 3) Dataset provided by EPA to support the five-factor analysis: County Population (excel spreadsheet) downloaded from <https://www.epa.gov/ozone-designations/ozone-designations-guidance-and-data>
- 4) 2011-2011 NEI V2. Estimates of emissions and percentages include only anthropogenic sources.
- 5) Dataset provided by EPA to support the five-factor analysis: Vehicle Miles Traveled (excel spreadsheet) downloaded from <https://www.epa.gov/ozone-designations/ozone-designations-guidance-and-data>