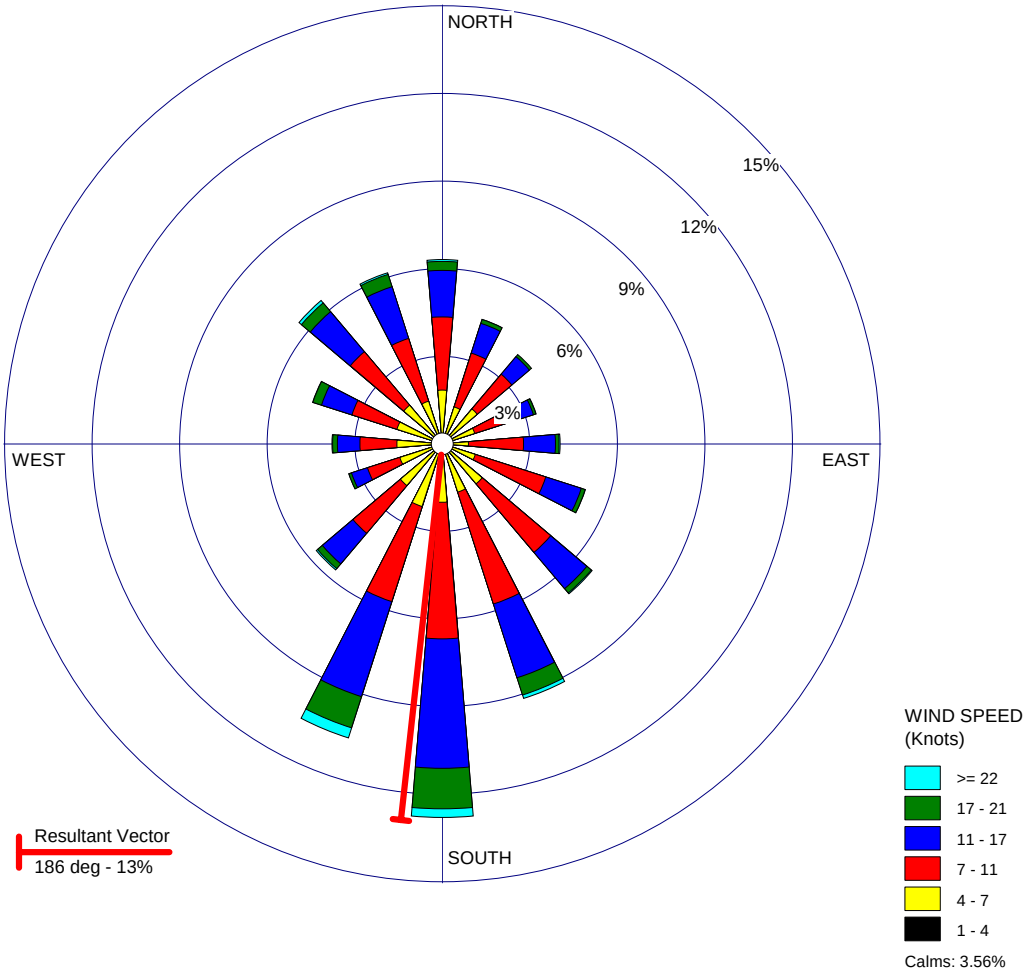
Appendix C
WindRoses and Back Trajectories for Kansas City

WIND ROSE PLOT:

Station #03947 - KANSAS CITY/INT'L ARPT, MO

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Kansas City Int'l Arpt. Jan. 1 - Dec. 31 2005-2007	**2005 2006 2007** **Jan 1 - Dec 31** **00:00 - 23:00**	**Kansas Department of Health and Environment**	
		MODELER: **Douglas Watson**	
	CALM WINDS: **3.56%**	TOTAL COUNT: **25867 hrs.**	
	AVG. WIND SPEED: **9.16 Knots**	DATE: **7/18/2008**	PROJECT NO.: **1**

WRPLOT View - Lakes Environmental Software

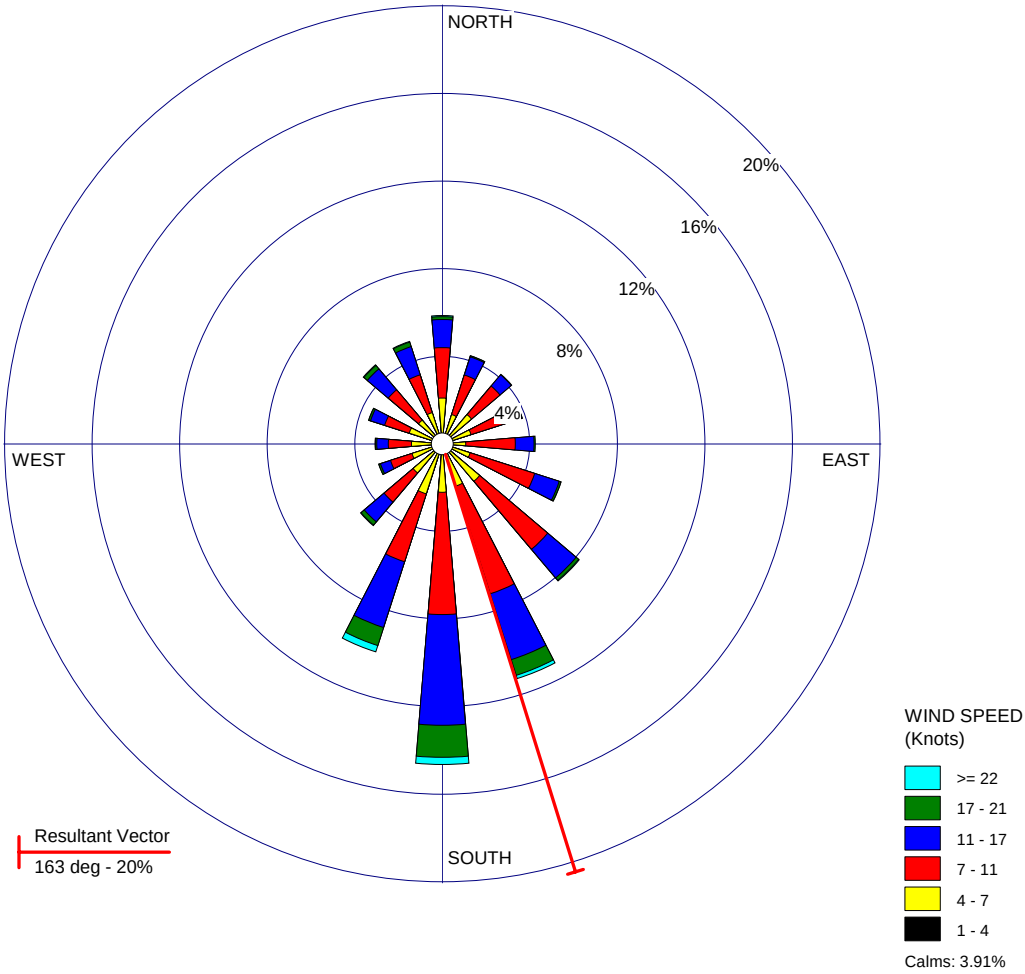
Figure C-1. KCI Airport Wind Rose (Jan. 1 - Dec. 31, 2005-2007)

WIND ROSE PLOT:

Station #03947 - KANSAS CITY/INT'L ARPT, MO

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Kansas City Int'l Arpt. April 1 - Oct. 31 2005-2007 Total Ozone Season	**2005 2006 2007** **Apr 1 - Oct 31** **00:00 - 23:00**	**Kansas Department of Health and Environment**	
		MODELER: **Douglas Watson**	
	CALM WINDS: **3.91%**	TOTAL COUNT: **15078 hrs.**	
	AVG. WIND SPEED: **8.80 Knots**	DATE: **7/18/2008**	PROJECT NO.: **2**

WRPLOT View - Lakes Environmental Software

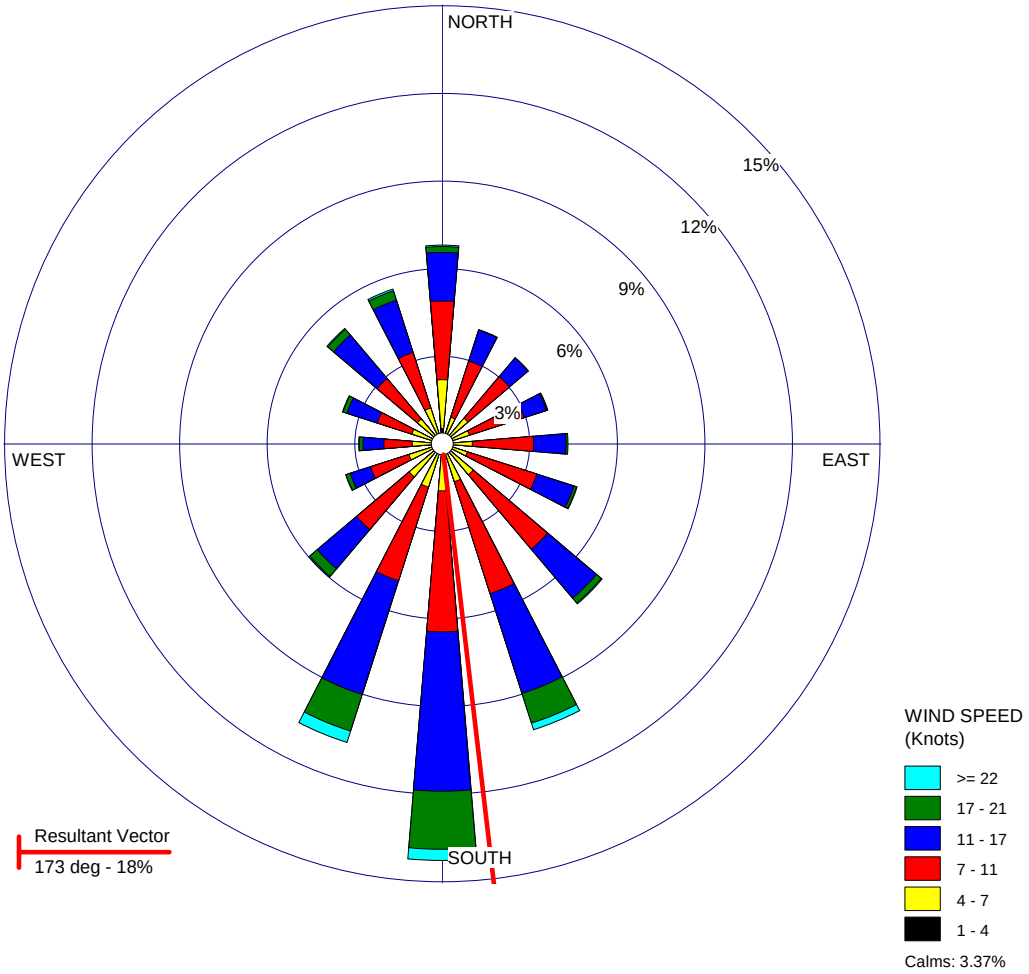
Figure C-2. KCI Airport Ozone Season Wind Rose (Apr. 1 – Oct. 31, 2005-2007)

WIND ROSE PLOT:

Station #03947 - KANSAS CITY/INT'L ARPT, MO

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Kansas City Int'l Arpt. April 1 - Oct. 31 2005-2007 Total Ozone Season 7am-7pm	**2005 2006 2007** **Apr 1 - Oct 31** **07:00 - 19:00**	**Kansas Department of Health and Environment**	
		MODELER: **Douglas Watson**	
	CALM WINDS: **3.37%**	TOTAL COUNT: **8074 hrs.**	
	AVG. WIND SPEED: **9.66 Knots**	DATE: **8/6/2008**	PROJECT NO.: **1**

WRPLOT View - Lakes Environmental Software

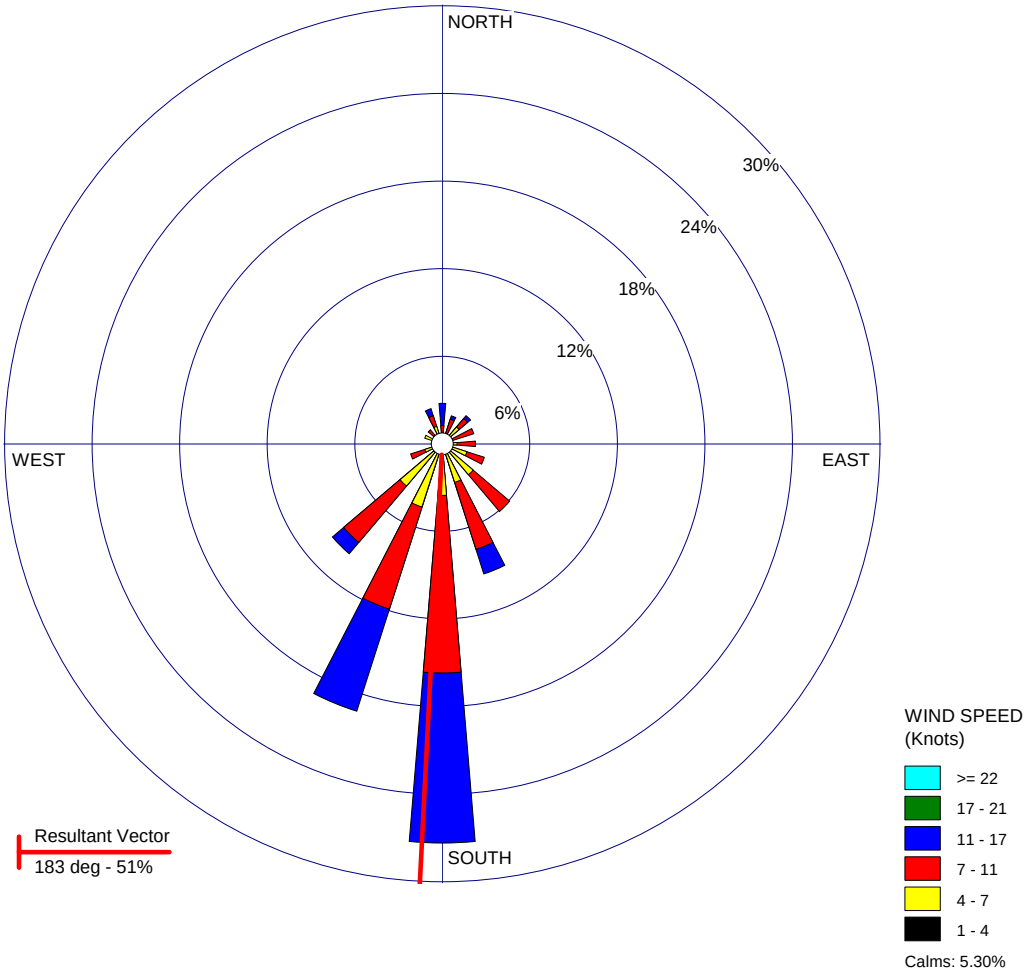
Figure C-3. KCI Airport Ozone Season Wind Rose (Apr. 1 – Oct. 31, 2005-2007) (7am-7pm)

WIND ROSE PLOT:

Station #03947 - KANSAS CITY/INT'L ARPT, MO

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Kansas City Int'l Arpt. April 1 - Oct. 31 2005 8-Hr. Ozone Days >=0.076ppm 7am-7pm	**2005** **Check Date Range Report** **07:00 - 19:00**	**Kansas Department of Health and Environment**	
		MODELER: **Douglas Watson**	
	CALM WINDS: **5.30%**	TOTAL COUNT: **396 hrs.**	
	AVG. WIND SPEED: **7.97 Knots**	DATE: **7/30/2008**	PROJECT NO.: **3**

WRPLOT View - Lakes Environmental Software

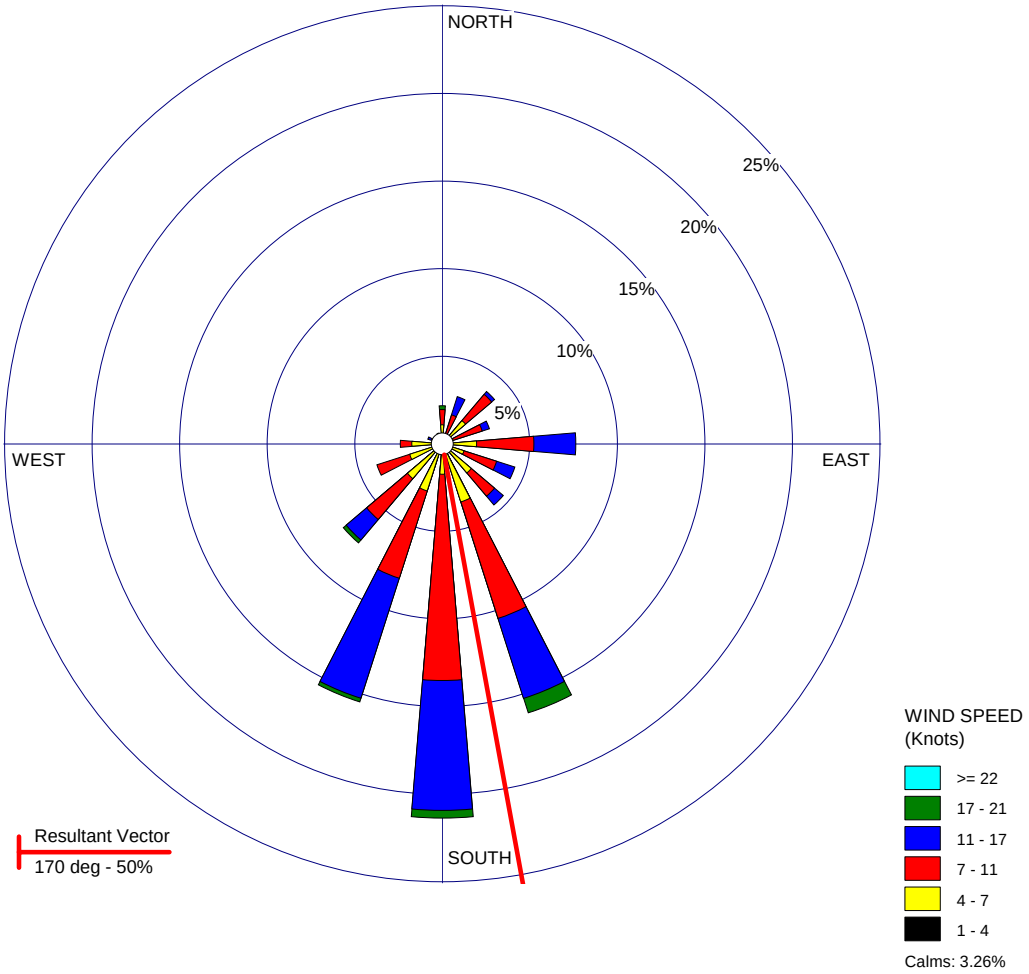
Figure C-4. KCI Airport 8-Hour Ozone Exceedance Days Wind Rose, 2005

WIND ROSE PLOT:

Station #03947 - KANSAS CITY/INT'L ARPT, MO

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Kansas City Int'l Arpt. April 1 - Oct. 31 2006 8-Hr. Ozone Days >=0.076ppm 7am-7pm	**2006** **Check Date Range Report** **07:00 - 19:00**	**Kansas Department of Health and Environment**	
		MODELER: **Douglas Watson**	
	CALM WINDS: **3.26%**	TOTAL COUNT: **460 hrs.**	
	AVG. WIND SPEED: **8.68 Knots**	DATE: **7/30/2008**	PROJECT NO.: **4**

WRPLOT View - Lakes Environmental Software

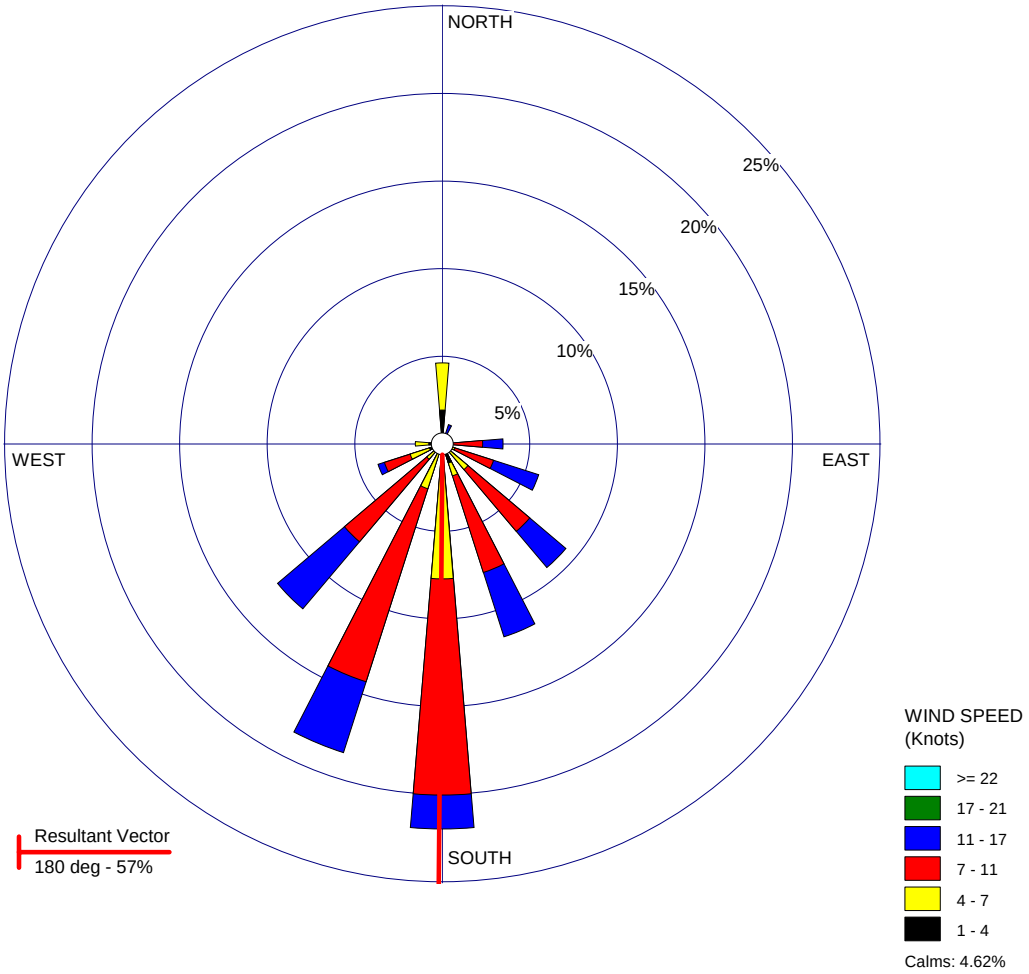
Figure C-5. KCI Airport 8-Hour Ozone Exceedance Days Wind Rose, 2006

WIND ROSE PLOT:

Station #03947 - KANSAS CITY/INT'L ARPT, MO

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Kansas City Int'l Arpt. April 1 - Oct. 31 2007 8-Hr. Ozone Days >=0.076ppm 7am-7pm	**2007** **Check Date Range Report** **07:00 - 19:00**	**Kansas Department of Health and Environment**	
		MODELER: **Douglas Watson**	
	CALM WINDS: **4.62%**	TOTAL COUNT: **260 hrs.**	
	AVG. WIND SPEED: **8.08 Knots**	DATE: **7/30/2008**	PROJECT NO.: **5**

WRPLOT View - Lakes Environmental Software

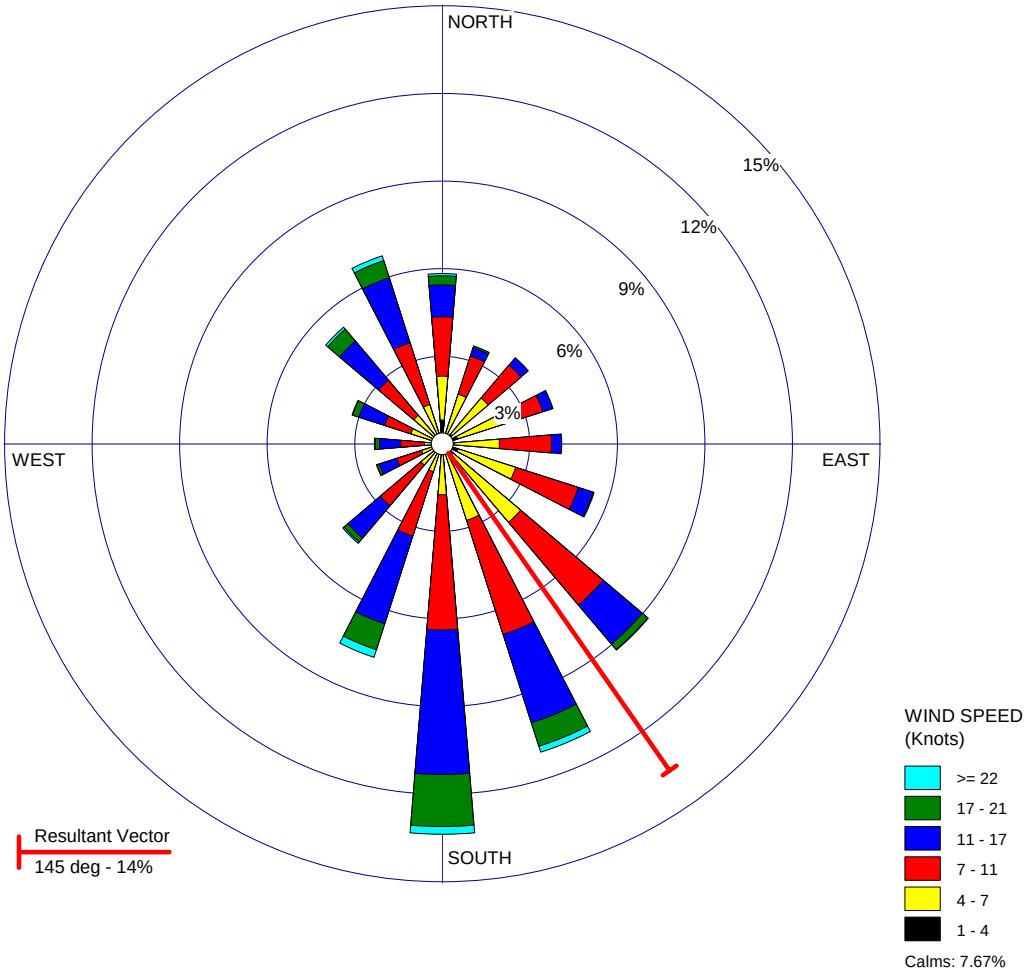
Figure C-6. KCI Airport 8-Hour Ozone Exceedance Days Wind Rose, 2007

WIND ROSE PLOT:

Station #03997 - Lawrence Airport, KS

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Lawrence Airport April 1 - Oct. 31 2005-2007 Total Ozone Season 7am-7pm	**2005 2006 2007** **Apr 1 - Oct 31** **07:00 - 19:00**	**Kansas Department of Health and Environment**	
		MODELER: **Douglas Watson**	
	CALM WINDS: **7.67%**	TOTAL COUNT: **8083 hrs.**	
	AVG. WIND SPEED: **8.63 Knots**	DATE: **8/6/2008**	PROJECT NO.: **1**

WRPLOT View - Lakes Environmental Software

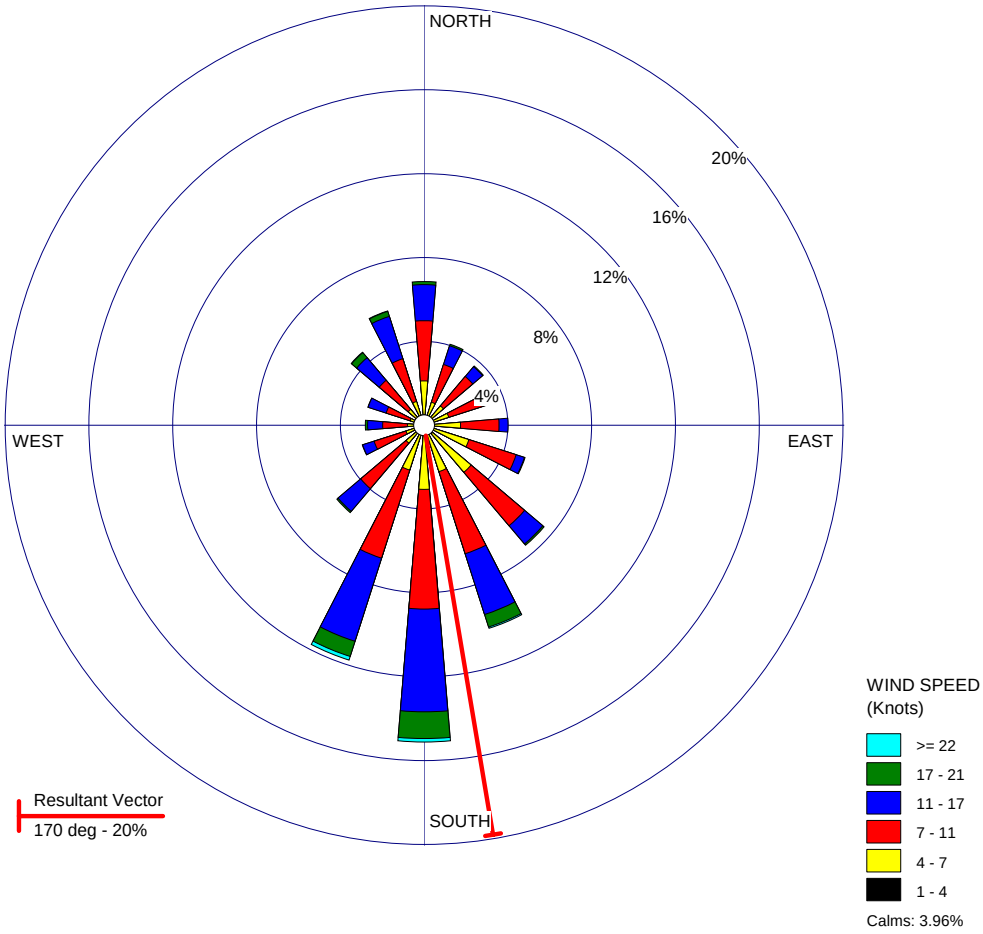
Figure C-7. Lawrence Airport Ozone Season Wind Rose (Apr. 1 – Oct. 31, 2005-2007) (7am-7pm)

WIND ROSE PLOT:

Station #03967 - Olathe Airport, KS

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Olathe Airport April 1 - Oct. 31 2005-2007 Total Ozone Season 7am-7pm	**2005 2006 2007** **Apr 1 - Oct 31** **07:00 - 19:00**	**Kansas Department of Health and Environment**	
		MODELER: **Douglas Watson**	
	CALM WINDS: **3.96%**	TOTAL COUNT: **8000 hrs.**	
	AVG. WIND SPEED: **8.71 Knots**	DATE: **8/6/2008**	PROJECT NO.: **1**

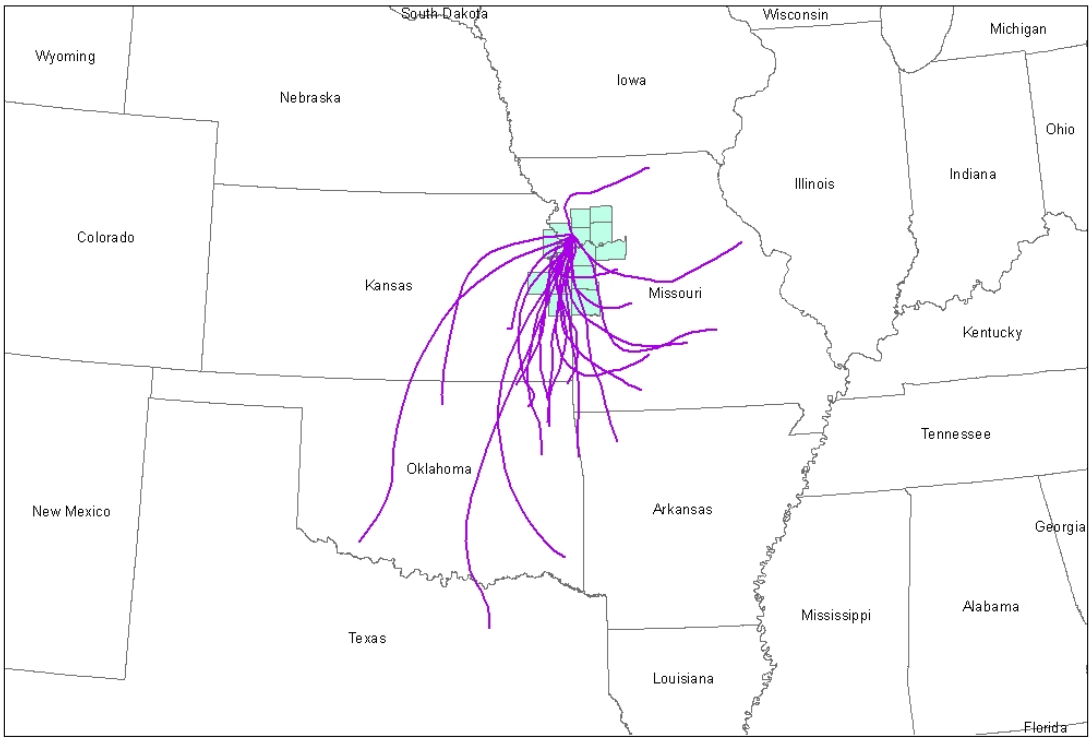
WRPLOT View - Lakes Environmental Software

Figure C-8. Olathe Airport Ozone Season Wind Rose (Apr. 1 – Oct. 31, 2005-2007) (7am-7pm)

Back Trajectories

The following back trajectories were performed at the Rocky Creek monitoring site, the site which is driving the design value for the area. The trajectories are during periods with > 75 ppb ozone readings, 24 hours in duration, and end at 5pm on the day that the elevated ozone reading occurred. Trajectories were run for two elevations, 20m and 500m above ground level.

20-Meter Back Trajectories
with Ozone Values > 75 ppb for the Year 2005 at Ending Time 1700



500-Meter Back Trajectories
with Ozone Values > 75 ppb for the Year 2005 at Ending Time 1700

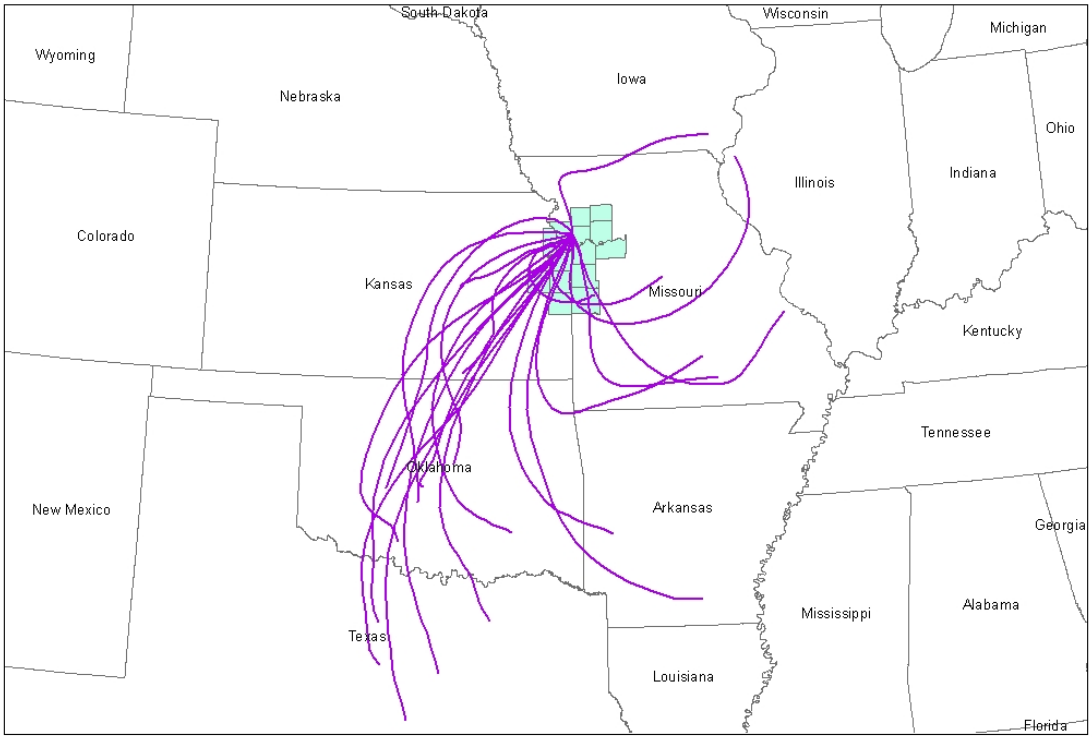
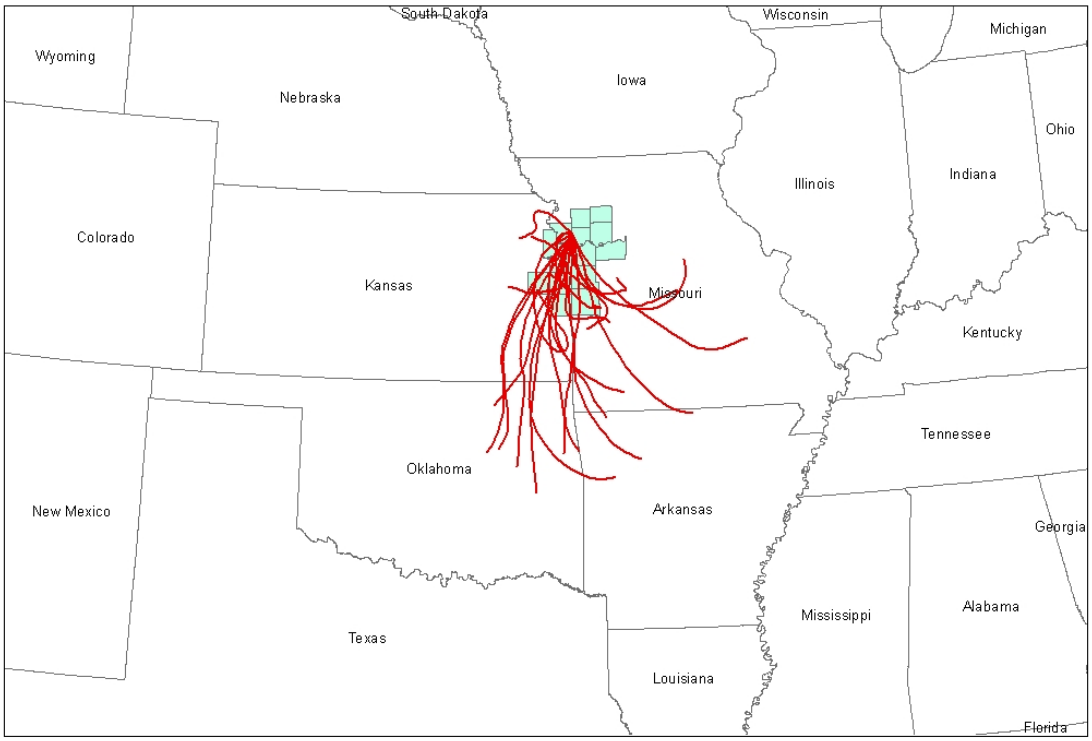


Figure C-9. Kansas City 20m and 500m Back Trajectories, 8-Hour Ozone Exceedance Days, 2005

20-Meter Back Trajectories
with Ozone Values > 75 ppb for the Year 2006 at Ending Time 1700



500-Meter Back Trajectories
with Ozone Values > 75 ppb for the Year 2006 at Ending Time 1700

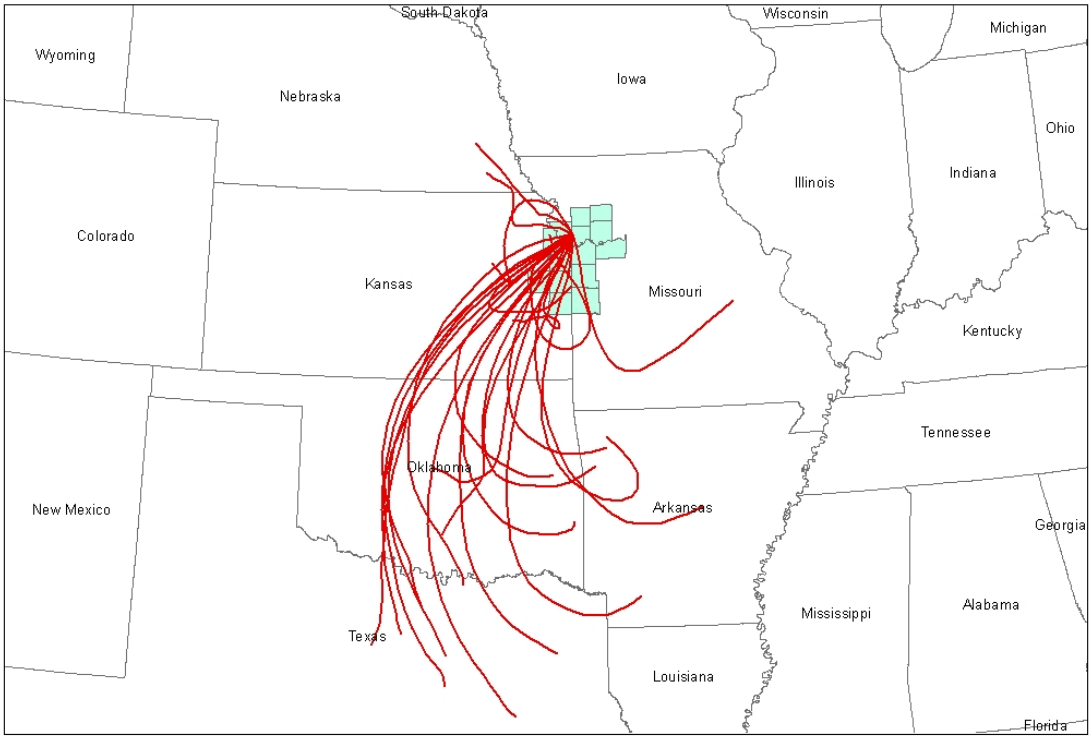
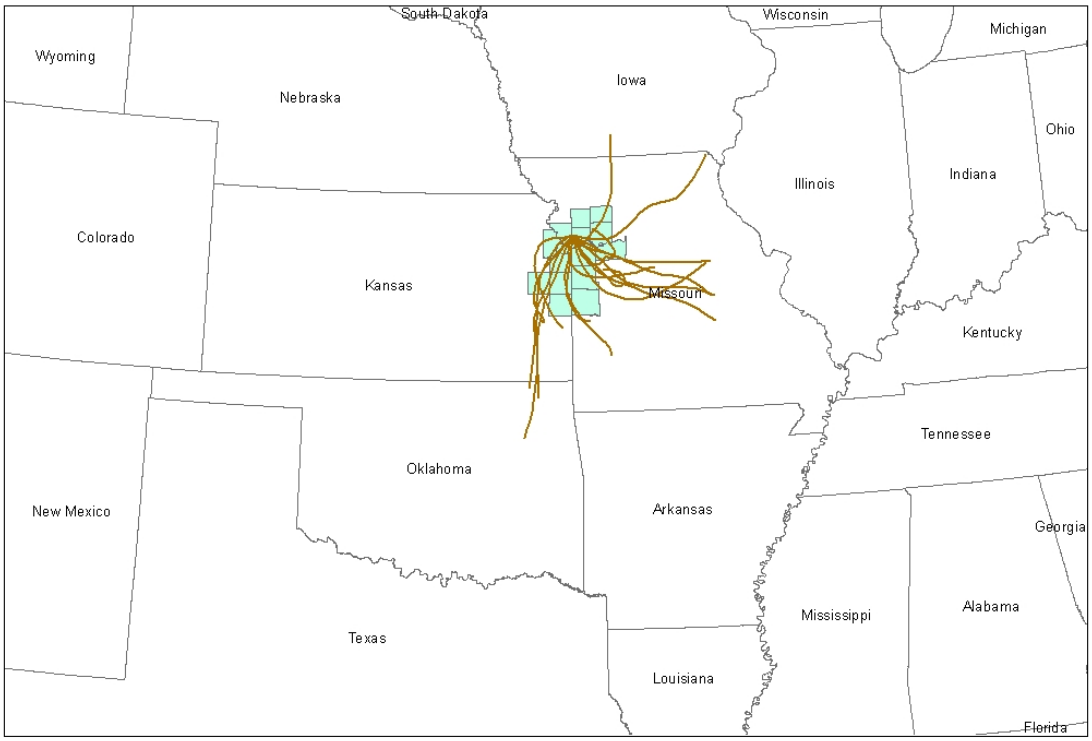


Figure C-10. Kansas City 20m and 500m Back Trajectories, 8-Hour Ozone Exceedance Days, 2006

20-Meter Back Trajectories
with Ozone Values > 75 ppb for the Year 2007 at Ending Time 1700



500-Meter Back Trajectories
with Ozone Values > 75 ppb for the Year 2007 at Ending Time 1700

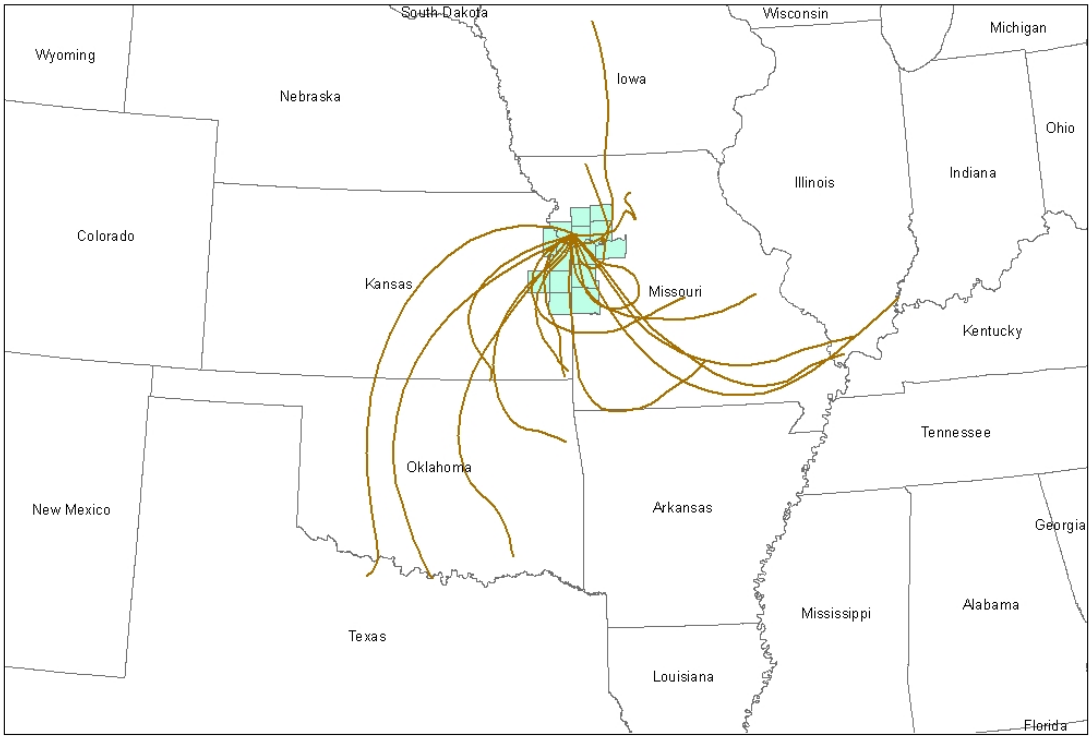


Figure C-11. Kansas City 20m and 500m Back Trajectories, 8-Hour Ozone Exceedance Days, 2007

YR.	MO.	DAY	SITE NAME	MAX. SAMPLE VALUE (PPM)	MAX. TEMP. (°F)	MIN. TEMP. (°F)	AVG. TEMP. (°F)	AVG. WIND SPEED (MPH)	AVG. WIND DIR. (DEG)
2006	APRIL	22	Heritage Park	0.078	80	54	67	6.2	40
		22	RG South	0.080					
	MAY	19	JFK	0.078	95	60	78	6.9	230
		19	Liberty	0.079					
	JUNE	8	JFK	0.078	92	66	79	6.6	230
		9	Watkins Mill	0.077	93	69	81	12.6	190
		9	Liberty	0.081					
		9	Rocky Creek	0.082					
		9	Trimble	0.080					
		10	JFK	0.077	91	66	79	10.4	150
		10	Liberty	0.086					
		10	Rocky Creek	0.087					
		13	Lawrence	0.078	83	57	70	5.7	100
		14	Mine Creek	0.079	89	59	74	11.0	160
		14	Rocky Creek	0.083					
		14	Trimble	0.081					
		15	Lawrence	0.076	91	69	80	17.7	170
		15	Liberty	0.079					
		15	Rocky Creek	0.081					
		15	Trimble	0.078					
		19	JFK	0.077	92	67	80	5.4	170
		19	Liberty	0.085					
		19	Rocky Creek	0.076					
		28	Liberty	0.087	92	59	76	5.2	150
		28	Rocky Creek	0.081					
		29	Mine Creek	0.082	95	65	80	9.5	190
		29	Watkins Mill	0.079					
		29	Liberty	0.084					

YR.	MO.	DAY	SITE NAME	MAX. SAMPLE VALUE (PPM)	MAX. TEMP. (°F)	MIN. TEMP. (°F)	AVG. TEMP. (°F)	AVG. WIND SPEED (MPH)	AVG. WIND DIR. (DEG)
		29	Rocky Creek	0.078					
		30	Lawrence	0.080	95	73	84	11.9	200
		30	Heritage Park	0.076					
		30	Leavenworth	0.080					
		30	Mine Creek	0.081					
		30	JFK	0.080					
		30	RG South	0.077					
		30	Watkins Mill	0.092					
		30	Liberty	0.094					
		30	Rocky Creek	0.087					
		30	Trimble	0.081					
	JULY	1	Lawrence	0.084	97	73	85	12.8	200
		1	Heritage Park	0.082					
		1	Leavenworth	0.083					
		1	Mine Creek	0.081					
		1	JFK	0.085					
		1	RG South	0.080					
		1	Watkins Mill	0.091					
		1	Liberty	0.094					
		1	Rocky Creek	0.087					
		1	Trimble	0.082					
		2	Liberty	0.076	98	72	85	12.0	190
		6	Leavenworth	0.077	83	63	73	8.0	90
		8	JFK	0.081	89	63	76	7.8	170
		8	Watkins Mill	0.083					
		8	Liberty	0.088					
		8	Rocky Creek	0.094					
		8	Trimble	0.089					

YR.	MO.	DAY	SITE NAME	MAX. SAMPLE VALUE (PPM)	MAX. TEMP. (°F)	MIN. TEMP. (°F)	AVG. TEMP. (°F)	AVG. WIND SPEED (MPH)	AVG. WIND DIR. (DEG)
		12	Liberty	0.076	91	71	81	4.1	240
		12	Rocky Creek	0.077					
		13	Rocky Creek	0.086	98	69	84	10.5	160
		13	Trimble	0.086					
		15	JFK	0.099	95	73	84	4.2	160
		15	Rocky Creek	0.078					
		16	Watkins Mill	0.076	99	73	86	8.9	170
		16	Liberty	0.081					
		16	Rocky Creek	0.083					
		16	Trimble	0.083					
		17	Watkins Mill	0.083	100	77	89	10.4	190
		17	Liberty	0.087					
		18	Lawrence	0.081	96	75	86	9.3	80
		19	JFK	0.084	104	79	92	9.7	170
		19	RG South	0.078					
		19	Watkins Mill	0.105					
		19	Liberty	0.106					
		19	Rocky Creek	0.091					
		19	Trimble	0.084					
		20	Heritage Park	0.081	98	82	90	10.4	300
		20	JFK	0.077					
		20	RG South	0.085					
		20	Liberty	0.078					
		24	Liberty	0.076	92	65	79	9.2	180
		25	Watkins Mill	0.077	98	73	86	14.0	180
		25	Liberty	0.078					
		25	Rocky Creek	0.078					
		25	Trimble	0.078					
		26	Liberty	0.076	98	78	88	12.6	210

YR.	MO.	DAY	SITE NAME	MAX. SAMPLE VALUE (PPM)	MAX. TEMP. (°F)	MIN. TEMP. (°F)	AVG. TEMP. (°F)	AVG. WIND SPEED (MPH)	AVG. WIND DIR. (DEG)
		28	Rocky Creek	0.085	96	69	83	7.2	170
		28	Trimble	0.081					
	AUG.	5	Rocky Creek	0.084	98	73	86	11.0	150
		5	Trimble	0.077					
		6	Liberty	0.092	104	78	91	9.5	160
		6	Rocky Creek	0.078					
		7	Lawrence	0.085	95	75	85	10.7	70
		8	Lawrence	0.080	91	76	84	11.7	90
		9	Watkins Mill	0.093	103	75	89	8.8	170
		9	Liberty	0.093					
		9	Rocky Creek	0.083					
		9	Trimble	0.083					
		11	Lawrence	0.076	93	71	82	8.6	60
		17	Liberty	0.079	93	72	83	8.3	160
		17	Rocky Creek	0.079					
		17	Trimble	0.087					
		22	Lawrence	0.084	89	69	79	6.9	70
		23	Liberty	0.079	94	68	81	9.2	160
		23	Rocky Creek	0.082					
		23	Trimble	0.085					
		24	Rocky Creek	0.081	96	71	84	9.5	160
		24	Trimble	0.080					
2007	MAY	13	Rocky Creek	0.082	87	60	74	8.7	170
		13	Trimble	0.083					
	JUNE	13	Rocky Creek	0.084	85	69	77	8.8	140
		13	Trimble	0.080					
		14	Heritage Park	0.079	86	66	76	9.4	130
		14	JFK	0.078					
		14	RG South	0.081					

YR.	MO.	DAY	SITE NAME	MAX. SAMPLE VALUE (PPM)	MAX. TEMP. (°F)	MIN. TEMP. (°F)	AVG. TEMP. (°F)	AVG. WIND SPEED (MPH)	AVG. WIND DIR. (DEG)
		14	Watkins Mill	0.077					
		14	Liberty	0.083					
		14	Rocky Creek	0.089					
		14	Trimble	0.090					
		15	Rocky Creek	0.082	90	68	79	7.5	130
		15	Trimble	0.081					
		16	Watkins Mill	0.079	89	65	77	4.6	180
		16	Liberty	0.081					
		16	Rocky Creek	0.089					
		16	Trimble	0.087					
	JULY	6	Rocky Creek	0.083	89	68	79	4.6	190
		6	Trimble	0.081					
		16	Trimble	0.081	91	68	80	7.2	190
		25	Rocky Creek	0.082	89	67	78	7.5	190
		25	Trimble	0.080					
		26	Watkins Mill	0.084	91	64	78	9.0	200
		26	Liberty	0.086					
		26	Rocky Creek	0.079					
	Aug.	1	Leavenworth	0.088	94	73	84	4.7	160
		1	JFK	0.079					
		1	Liberty	0.079					
		1	Rocky Creek	0.099					
		1	Trimble	0.086					
		10	Rocky Creek	0.084	96	72	84	7.5	150
		10	Trimble	0.082					
		12	Liberty	0.099	100	74	87	5.4	150
		12	Rocky Creek	0.092					
		14	Liberty	0.078	101	74	88	8.1	210
		15	Liberty	0.078	102	74	88	9.0	210

YR.	MO.	DAY	SITE NAME	MAX. SAMPLE VALUE (PPM)	MAX. TEMP. (°F)	MIN. TEMP. (°F)	AVG. TEMP. (°F)	AVG. WIND SPEED (MPH)	AVG. WIND DIR. (DEG)
		16	Heritage Park	0.080	97	77	87	7.1	60
		16	JFK	0.077					
		16	RG South	0.078					
		17	Leavenworth	0.077	94	74	84	9.5	100
		17	Rocky Creek	0.076					
		28	Liberty	0.078	98	70	84	10.4	200
		28	Rocky Creek	0.076					
	SEPT.	2	Liberty	0.079	91	59	75	4.5	170
		2	Rocky Creek	0.078					
		3	Liberty	0.077	94	63	79	6.6	190
		3	Rocky Creek	0.078					
		4	Rocky Creek	0.076	95	69	82	7.3	180
2008	JUNE	18	Trimble	0.078	82	61	72	3.2	180
	JULY	17	Rocky Creek	0.077	90	67	79	9.3	180
		17	Trimble	0.078					
	AUG.	5	RG South	0.079	91	76	84	9.8	20
				2006-2008 Averages	93.4	69.3	81.5	8.6	

Table C-1. Summary of Meteorological Conditions on 8-Hour Ozone Exceedance Days, 2006-2008