

COLORADO ANNUAL MONITORING NETWORK PLAN 2009 - 2010



**Colorado Department
of Public Health
and Environment**

**Prepared by the Air Pollution Control Division
Technical Services Program
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Table of Contents

INTRODUCTION	1
PURPOSE OF THE NETWORK PLAN.....	1
Overview.....	1
APCD Monitoring Operations	1
Network Modification Procedures	1
CARBON MONOXIDE.....	15
Larimer and Weld Counties	15
Metropolitan Denver Counties	15
El Paso, Park & Teller Counties	15
Western Counties	15
Quality Assurance Checks for Carbon Monoxide Monitors	16
Planned Changes in the Carbon Monoxide Monitoring for 2009	16
OZONE	17
Larimer and Weld Counties	17
Metropolitan Denver Counties	17
El Paso, Park & Teller Counties	18
Western Counties	18
Quality Assurance Checks for Ozone Monitors	18
Planned Changes in Ozone Monitoring for 2009/2010.....	19
NITROGEN DIOXIDE	20
Metropolitan Denver Counties	20
Quality Assurance Checks for Oxides of Nitrogen Monitors.....	20
Planned Changes in Nitrogen Dioxide Monitoring for 2009/2010	20
SULFUR DIOXIDE.....	21
Metropolitan Denver Counties	21
Quality Assurance Checks for Sulfur Dioxide Monitors	21
Planned Changes in Sulfur Dioxide Monitoring for 2009/2010	21
METEOROLOGICAL MEASUREMENTS.....	22
Planned Changes in Meteorological Monitoring for 2009/2010	22
PARTICULATE MONITORING.....	23
PM ₁₀ Monitoring.....	23
Larimer and Weld Counties	23
Metropolitan Denver Counties	23
El Paso, Park & Teller Counties	23
Western Counties	24
Planned Changes in PM ₁₀ Monitoring for 2009/2010	24
PM _{2.5} Monitoring.....	25
Larimer and Weld Counties	25
Metropolitan Denver Counties	25
El Paso, Park, Pueblo, Elbert & Teller Counties.....	25
Western Counties	26
PM _{2.5} Sites not intended for NAAQS Comparison	26
Planned Changes in PM _{2.5} Monitoring for 2009/2010.....	27
Metropolitan Denver Counties	27
Planned Changes in TSP and Lead Monitoring for 2009/2010	27
Quality Assurance Accuracy Audits for Particulate Monitors.....	27
Quality Assurance Precision Checks for Particulate Monitors.....	29

Appendix A - Carbon Monoxide Site Descriptions.....	30
Appendix B - Ozone Site Descriptions.....	33
Appendix C - Nitrogen Dioxide Site Descriptions	37
Appendix D - Sulfur Dioxide Site Descriptions.....	38
Appendix E - Meteorological Site Descriptions.....	39
Appendix F - PM ₁₀ Site Descriptions	42
Appendix G - PM _{2.5} Site Descriptions	48
Appendix H - TSP/Lead Site Descriptions	52
Appendix I - National Core (NCore) Monitoring Station.....	53

Table of Tables

Table 1 - APCD Sites in Operation for 2009 - 2010.....	3
Table 2 - Population Projections for 2005 - 2010	10
Table 3 - Precision Checks for Carbon Monoxide in 2008	16
Table 4 - Accuracy Audits for Carbon Monoxide in 2009	16
Table 5 - Precision Checks for Ozone in 2008	19
Table 6 - Accuracy Audits for Ozone in 2008	19
Table 7 - Precision Checks for Oxides of Nitrogen in 2008	20
Table 8 - Accuracy Audits for Oxides of Nitrogen in 2008	20
Table 9 - Precision Checks for Sulfur Dioxide in 2008	21
Table 10 - Accuracy Audits for Sulfur Dioxide in 2008	21
Table 12 - Accuracy Audits for Particulates in 2008.....	28
Table 13 - Precision Checks for Particulates in 2008.....	29
Table 14 - Parameters and Scale for the Denver Municipal Animal Shelter.....	53
Table 15 - Traffic Information for the Denver Municipal Shelter	54

INTRODUCTION

PURPOSE OF THE NETWORK PLAN

The purpose of the Network Plan is to provide an overview of the current Air Pollution Control Division's air quality monitoring network and projected plans for the coming year. This plan shows the general reason for monitoring, the location of the monitor, and finally the type and frequency of measurements taken at each location. This is the third year that this review has been released to the general public for comment prior to its submittal to the U. S. Environmental Protection Agency (EPA) for approval. This change was initiated because of a change in Federal Regulations implemented in December 2006.

Overview

In 2009 the Colorado Air Pollution Control Division (APCD) plans to operate monitors at 62 locations. In 2008 the APCD operated monitors at 59 separate locations. Particulate monitors including Total Suspended Particulates (TSP), Particulate Matter 10 Microns and smaller (PM_{10}), Particulate Matter 2.5 Microns and smaller ($PM_{2.5}$) are the most abundant and widespread of monitoring types across the state. Currently, there are PM_{10} monitors at 30 separate locations and $PM_{2.5}$ monitors at 19 separate locations. There are 23 meteorological sites in operation. These sites monitor wind speed, wind direction, resultant speed, resultant direction, standard deviation of horizontal wind direction and temperature. Three meteorological sites also monitor for relative humidity. Only 9 of the 62 locations will monitor for 3 or more parameters (with meteorological and $PM_{2.5}$ measurements counting as only one parameter each). Only 3 locations monitored for more than 6 parameters, all of which are in the Denver Metro Area.

Increasing the amount of automated versus manual monitoring will require modifications to the particulate network since in the current network these are primarily manually operated monitors. The APCD currently operates one TSP monitor that is used for lead analysis. Only 6 of the 30 PM_{10} monitors are continuous "hourly," while 12 of the 19 $PM_{2.5}$ monitors are continuous. This difference reflects the age of the technology more than anything else.

Thirty-seven of the 62 current monitoring sites have been in operation for more than 10 years and 18 of these have been in operation for 20 or more years. Ten monitoring sites have been in operation for more than 30 years. These sites are: Denver CAMP (44 years), Greeley-Hospital (42 years), Alamosa Adams State College (39 years), Welby and Arvada (36 years), Pagosa Springs, Lamar Power Plant and Steamboat Springs (34 years). Conversely, 24 of the 62 monitoring sites have begun operation since the start of the year 2000.

APCD Monitoring Operations

The APCD attempts to operate all of its monitors on an annual schedule. We attempt to begin operation of new monitors in January and to terminate existing monitors in December. Circumstances both in and out of our control make that desired schedule generally difficult to achieve. The primary reason for this is that the Division does not own either the land or the buildings that most of our monitors where most of the monitors are located.

When modifications to the network are required, the Division will provide EPA Region VIII with the appropriate modification forms prior its implementation for their approval. All currently operating monitors have been approved by EPA and meet the requirements set forth in Appendices A, C, D and E.

Network Modification Procedures

The APCD develops changes to its monitoring network in several ways. New monitoring locations have been added as the result of community concerns about air quality. An example of this would be the PM_{10} monitors that were established in Cripple Creek and Hygiene. Other monitors have been established as a result of special studies. Examples of this would be the new ozone monitoring in

Aurora, Rifle, Cortez, Aspen Park, Rist Canyon, and Palisade. The Denver Firehouse #6 carbon monoxide monitor was begun when models showed that it should have elevated carbon monoxide concentrations.

The most common reason for monitors being removed from the network is that either the land/building is being modified, or the area surrounding the monitor is being modified in a way that changes the monitoring location. The most current example of this is the Pueblo PM₁₀ monitor. It will have to be moved this year because of the construction of a new multi story building on the next lot. Monitors are also removed from the network after review of the data shows that the levels have dropped to the point where it is no longer reasonable to continue monitoring at that location. Examples of this are the reduction of TSP lead monitoring around the state from six monitors to one. Another example of this type of change is the termination of carbon monoxide monitoring at the NJH-E location. The carbon monoxide concentrations at that location have dropped to the point that the Division ,with EPA's approval, felt that the monitor could be better used elsewhere in the system.

Finally, all monitors are reviewed on a regular basis to determine if they are continuing to meet their monitoring objectives. Has the population, land use or vegetation around the monitor changed significantly since the monitor was established? If it has is there a "better" location for the monitor?

Table 1 lists the locations and monitoring parameters of each site currently in operation, by county alphabetically.

Table 1 - APCD Sites in Operation for 2009 - 2010

AQS #	Site Name	Address	Started	Ended	Latitude	Longitude	Elevation
Adams							
08 001 0006	Commerce City	7101 Birch St.	01/2001		39.826007	-104.937438	1,565
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	1	01/2001	P.O. Neigh	Partisol 2025	SLAMS	1/3
	PM _{2.5}	1	01/2001	P.O. Neigh	Partisol 2025	SLAMS	1/3
	PM _{2.5}	2	01/2001	P.O. Neigh	Partisol 2025	SLAMS	1/6
	PM _{2.5}	3	01/2001	P.O. Neigh	TEOM-1400ab	SPM	Continuous
	PM _{2.5}	5	01/2001	P.O. Neigh	SASS	Trends Spec	1/3
	PM _{2.5} Carbon	5	04/2009	P.O. Neigh	URG 3000N	Trends Spec	1/3
	WS/WD/Temp	1	06/2003	Other	Met - One	Other	Continuous
08 001 3001	Welby	3174 E. 78 th Ave.	07/1973		39.838119	-104.949840	1,554
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	CO	1	07/1973	P.O. Neigh	Thermo 48C	SLAMS	Continuous
	SO ₂	2	07/1973	P.O. Neigh	API 100E	SLAMS	Continuous
	NO	2	01/1976	P.O. Urban	API 200E	Other	Continuous
	NO ₂	1	01/1976	P.O. Urban	API 200E	SLAMS	Continuous
	O ₃	2	07/1973	P.O. Neigh	API 400A	SLAMS	Continuous
	WS/WD/Temp	1	01/1975	Other	Met - One	Other	Continuous
	PM ₁₀	1	07/1990	P.O. Neigh	SA/GMW-1200	SLAMS	1/6
	PM ₁₀	3	06/1990	P.O. Neigh	TEOM-1400ab	SLAMS	Continuous
Alamosa							
08 003 0001	Alamosa - ASU	208 Edgemont Blvd	01/1970		37.469391	-105.878691	2,302
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	1	06/1989	P.O. Neigh	SA/GMW-1200	SLAMS	1/1
08 003 0003	Alamosa Municipal	425 4 th St.	04/2002		37.469584	-105.863175	2,301
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	1	04/2002	P.O. Neigh	SA/GMW-1200	SLAMS	1/1
Arapahoe							
08 005 0002	Highland Reservoir	8100 S. University Blvd	06/1978		39.567887	-104.957193	1,747
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	O ₃	1	06/1978	P.O. Neigh	API 400A	SLAMS	Continuous
	WS/WD/Temp	1	07/1978	Other	Met - One	Other	Continuous
08 005 0005	Arapahoe Comm. Coll.	6190 S. Santa Fe Dr.	12/1998		39.604399	-105.01526	1,636
	Parameter	POC	Started	Scale	Monitor	Type	Sample
	PM _{2.5}	1	03/1999	P.O. Neigh	Partisol 2025	SLAMS	1/3
08 005 0006	Aurora - East	36001 W Quincy Ave.	04/2009				
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	O ₃	1	04/2009	SPM Region	API 400E	SPM	Continuous
	WS/WD/Temp	+		Other	Met - One	Other	Continuous
Archuleta							
08 007 0001	Pagosa Springs	309 Lewis St.	08/1975		37.268420	-107.009659	2,165
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	3	06/2001	P.O. Neigh	SA/GMW-1200	SLAMS	1/1

AQS #	Site Name	Address	Started	Ended	Latitude	Longitude	Elevation
Boulder							
08 013 0003	Longmont-Municipal	350 Kimbark St.	06/1985		40.164576	-105.100856	1520
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	2	04/1985	P.O. Neigh	SA/GMW-1200	SLAMS	1/6
	PM _{2.5}	1	01/1999	P.O. Neigh	Partisol 2025	SLAMS	1/3
	PM _{2.5}	3	01/1985	P.O. Neigh	TEOM 1400ab	SLAMS	Continuous
08 013 0009	Longmont - Main	440 Main St.	11/1989		40.166586	-105.102402	1,519
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	CO	1	11/1989	P.O. Micro	Thermo 48C	SLAMS	Continuous
08 013 0011	Boulder - Foothills	1405 ½ S. Foothills Parkway	06/1994		39.957159	-105.238513	1,669
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	O ₃	1	06/1994	H.C. Urban	API 400E	SLAMS	Continuous
08 013 0012	Boulder Chamber	2440 Pearl St.	12/1994		40.021097	-105.263382	1,619
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	1	12/1994	P.O. Neigh	SA/GMW-1200	SLAMS	1/6
	PM _{2.5}	1	01/1999	P.O. Neigh	Partisol 2025	SLAMS	1/3
08 013 1001	Boulder CU/Athens	2102 Athens St.	12/1980		40.012969	-105.264212	1,622
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM _{2.5}	3	11/2004	P.O. Neigh	TEOM FDMS	SPM	Continuous
Delta							
08 029 0004	Delta	560 Dodge St.	08/1993		38.739213	-108.073118	1,511
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	1	08/1993	P.O. Neigh	SA/GMW-1200	SLAMS	1/3
Denver							
08 031 0002	Denver - CAMP	2105 Broadway	01/1965		39.751184	-104.987625	1,593
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	CO	2	01/1971	P.O. Micro	Thermo 48C	SLAMS	Continuous
	SO ₂	1	01/1967	P.O. Neigh	API 100E	SLAMS	Continuous
	NO	1	01/1973	Other	API 200E	Other	Continuous
	NO ₂	1	01/1973	P.O. Neigh	API 200E	SLAMS	Continuous
	WS/WD/Temp	1	01/1965	Other	Met - One	Other	Continuous
	PM ₁₀	1	01/1986	P.O. Micro	SA/GMW-1200	SLAMS	1/6
	PM ₁₀	2	08/1986	P.O. Micro	SA/GMW-1200	SLAMS	1/6
	PM ₁₀	3	01/1988	P.O. Micro	TEOM-1400ab	SLAMS	Continuous
	PM _{2.5}	1	01/1999	P.O. Micro	Partisol 2025	SLAMS	1/1
	PM _{2.5}	2	09/2001	P.O. Micro	Partisol 2025	SLAMS	1/3
	PM _{2.5}	3	01/1999	P.O. Micro	TEOM FDMS	SLAMS	Continuous
08 031 0013	NJH-East	14 th Ave. & Albion St.	01/1983		39.738578	-104.939925	1,620
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM _{2.5}	3	10/2003	P.O. Middle	TEOM FDMS	SPM	Continuous
08 031 0014	Denver - Carriage	2325 Irving St.	06/1982		39.751761	-105.030681	1,621
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	O ₃	2	01/1982	P.O. Neigh	API 400E	SLAMS	Continuous
	WS/WD/Temp	1	01/1983	Other	Met - One	Other	Continuous
08 031 0017	Denver Visitor Center	225 W. Colfax Ave.	12/1992		39.740342	-104.991037	1,597
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	1	12/1992	P.O. Middle	SA/GMW-1200	SLAMS	1/1

AQS #	Site Name	Address	Started	Ended	Latitude	Longitude	Elevation
08 031 0019	Denver Firehouse #6	1300 Blake St.	11/1993		39.748163	-105.002564	1,585
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	CO	1	11/1993	P.O. Micro	Thermo 48C	SLAMS	Continuous
08 031 0021	Auraria Campus Met	12 th St. and Auraria Parkway	03/1999		39.746955	-105.003604	1,586
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	WS/WD/Temp	1	03/1999	Other	Met - One	Other	Continuous
	Relative Humidity	1	03/1999	Other	Rotronic	Other	Continuous
08 031 0023	Denver - Swansea	4650 Columbine St	07/2002		39.781083	-104.956650	1,583
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM _{2.5}	1	12/2004	P.O. Neigh	Partisol 2025	SPM	1/1
08 031 0025	Denver Municipal Animal Shelter	678 S. Jason St.	07/2005		39.704005	-104.998113	1,594
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	CO (Trace)	1	04/2009	P.O. Neigh	Thermo 48C-TLE	NCore	Continuous
	SO ₂ (Trace)	1	06/2009	P.O. Neigh	Ecotech 9850T	NCore	Continuous
	NO _y		+				
	O ₃	1	04/2008	Neigh/Urban	API 400A	NCore	Continuous
	WS/WD/Temp (U)	1	07/2008	P.O. Neigh	Met - One	NCore	Continuous
	Relative Humidity	1	+		Rotronic	NCore	Continuous
	Barometric Pressure	1	+			NCore	Continuous
	Solar Radiation	1	+			NCore	Continuous
	Precipitation	1	+			NCore	Continuous
	Temp (L)	1	07/2008	P.O. Neigh	Met - One	NCore	Continuous
	TSP	1	07/2005	P.O. Neigh	TSP	SLAMS	1/6
	TSP	2	07/2005	P.O. Neigh	TSP	SLAMS	1/6
	Pb	1	07/2005	P.O. Neigh	TSP	SLAMS	1/6
	Pb	2	07/2005	P.O. Neigh	TSP	SLAMS	1/6
	PM ₁₀	1	07/2005	P.O. Neigh	SA/GMW-1200	SLAMS	1/6
	PM ₁₀	2	07/2005	P.O. Neigh	SA/GMW-1200	SLAMS	1/6
	PM ₁₀	3	08/2005	P.O. Neigh	TEOM-1400ab	SLAMS	Continuous
	PM _{2.5}	1	10/2007	P.O. Neigh	Partisol 2025	NCore	1/6
	PM _{2.5}	3	10/2007	P.O. Neigh	TEOM FDMS	SPM	Continuous
Douglas							
08 035 0004	Chatfield State Park	11500 N Roxborough Pk Rd	04/2004		39.534488	-105.070358	1,676
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	O ₃	1	05/2005	H.C. Urban	API 400E	SLAMS	Continuous
	WS/WD/Temp	1	04/2004	Other	Met - One	Other	Continuous
	PM _{2.5}	1	07/2005	P.O. Neigh	Partisol 2025	SPM	1/3
	PM _{2.5}	3	05/2004	P.O. Neigh	TEOM 2000	SPM	Continuous
Elbert							
08 039 0001	Elbert County	24950 Ben Kelly Rd.	12/1998		39.231384	-104.634770	2,139
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM _{2.5}	1	05/1999	Back Region	Partisol 2025	SLAMS	1/6
El Paso							
08 041 0013	U. S. Air Force Academy	USAFA Rd 640	05/1996		39.958341	-104.817215	1,971
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	O ₃	1	06/1996	P.O. Urban	ML 8810	SLAMS	Continuous
08 041 0015	Colorado Springs Hwy-24	690 W. Hwy 24	11/1998		39.830895	-104.839243	1,824
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	CO	1	11/1998	P.O. Micro	Thermo 48C	SLAMS	Continuous
	WS/WD/Temp	+		Other	Met - One	Other	Continuous

AQS #	Site Name	Address	Started	Ended	Latitude	Longitude	Elevation
08 041 0016	Manitou Springs	101 Banks Pl.	04/2004		38.853097	-104.901289	1,955
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	O ₃	1	04/2004	P.O. Neigh	API 400E	SLAMS	Continuous
08 041 0017	Colorado College	130 W. Cache la Poudre	12/2007		38.848014	-104.828564	1,832
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	1	12/2007	P.O. Neigh	Partisol 2000	SLAMS	1/6
	PM _{2.5}	1	12/2007	P.O. Neigh	Partisol 2025	SLAMS	1/3
	PM _{2.5}	3	01/2008	P.O. Neigh	TEOM FDMS	SPM	Continuous
Fremont							
08 043 0003	Canyon City – City Hall	128 Main St.	10/2004		38.438290	-105.245040	1,626
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	1	10/2004	P.O. Neigh	SA/GMW-1200	SLAMS	1/6
Garfield							
08 045 0005	Parachute	100 E. 2 nd St.	01/1982		38.453654	-108.053269	1,557
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	1	05/2000	P.O. Neigh	SA/GMW-1200	SLAMS	1/3
08 045 0007	Rifle – Henry Bldg	144 3 rd St.	05/2005		39.531813	-107.782298	1,627
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	1	05/2005	P.O. Neigh	SA/GMW-1200	SPM	1/3
	PM _{2.5}	1	09/2008	P.O. Neigh	TEOM 1405	SPM	Continuous
	PM ₁₀	3	09/2008	P.O. Neigh	TEOM 1405	SPM	Continuous
	PM Course	1	09/2008	P.O. Neigh	TEOM 1405	SPM	Continuous
	WS/WD/Temp	+		Other	Met - One	Other	Continuous
08 045 0012	Rifle - Health	195 W. 14 th Ave.	06/2008		39.54182	-107.78413	1,629
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	O ₃	1	06/2008	SPM Neigh	API 400E	SPM	Continuous
Gunnison							
08 051 0004	Crested Butte	603 6 th St.	09/1982		38.867595	-106.981436	2,714
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	2	03/1987	P.O. Neigh	SA/GMW-1200	SLAMS	1/3
	PM ₁₀	3	10/2008	P.O. Neigh	SA/GMW-1200	QA Collocated	1/6
08 051 0007	Mt. Crested Butte	19 Emmons Rd.	07/2005		38.900392	-106.966104	2,866
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	1	07/2005	P.O. Neigh	SA/GMW-1200	SLAMS	1/1
Jefferson							
08 059 0002	Arvada	9101 W. 57 th Ave.	01/1973		39.800333	-105.099973	1,640
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	O ₃	1	08/1973	P.O. Neigh	API 400E	SLAMS	Continuous
	WS/WD/temp	1	01/1975	Other	Met - One	Other	Continuous
08 059 0005	Welch	12400 W. Hwy 285	08/1991		39.638781	-105.139480	1,742
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	O ₃	1	08/1991	P.O. Urban	API 400A	SLAMS	Continuous
	WS/WD/temp	1	11/1991	Other	Met - One	Other	Continuous
08 059 0006	Rocky Flats - N	16600 W. Hwy 128	06/1992		39.912899	-105.188587	1,802
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	O ₃	1	09/1992	H.C. Urban	API 400E	SLAMS	Continuous
	WS/WD/temp	1	09/1992	Other	Met - One	Other	Continuous
08 059 0008	Rocky Flats - SE	9901 Indiana St.	06/1992		39.876390	-105.165611	1,716
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	WS/WD/temp	1	08/1991	Other	Met - One	Other	Continuous

AQS #	Site Name	Address		Started	Ended	Latitude	Longitude	Elevation
08 059 0011	NREL	2054 Quaker St.		06/1994		39.743724	-105.177989	1,832
	Parameter	POC	Started	Scale	Monitor	Type	Sample	
	O ₃	1	06/1994	H.C. Urban	API 400E	SLAMS	Continuous	
08 059 0013	Aspen Park	26137 Conifer Rd.		04/2009		39.540321	-105.296512	2,467
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample	
	O ₃	1	04/2009	SPM Neigh	API 400E	SLAMS	Continuous	
	WS/WD/Temp	+		Other	Met - One	Other	Continuous	
La Plata								
08 067 0004	Durango-RCH	1235 Camino del Rio		09/1985		37.277298	-107.880928	1,986
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample	
	PM ₁₀	1	12/2002	P.O. Neigh	API 400E	SLAMS	Continuous	
Larimer								
08 069 0009	Fort Collins - CSU	251 Edison Dr		12/1998		40.571288	-105.079693	1,524
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample	
	PM ₁₀	1	07/1999	P.O. Neigh	SA/GMW-1200	SLAMS	1/3	
	PM ₁₀	3	+	P.O. Neigh	Thermo 1405 DF	SLAMS	Continuous	
	PM _{2.5}	1	07/1999	P.O. Neigh	Partisol 2025	SLAMS	1/3	
	PM _{2.5}	3	+	P.O. Neigh	Thermo 1405 DF	SPM	Continuous	
08 069 0011	Fort Collins - West	3416 La Porte Ave.		05/2006		40.592543	-105.141122	1,571
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample	
	O ₃	1	05/2006	H.C. Urban	API 400E	SLAMS	Continuous	
08 069 0012	Rist Canyon	11835 Rist Canyon Rd.		04/2009		40.592543	-105.141122	1,512
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample	
	O ₃	1	04/2009	SPM Urban	API 400E	SPM	Continuous	
	WS/WD/Temp	1	04/2009	Other	Met - One	Other	Continuous	
08 069 1004	Fort Collins - Mason	708 S. Mason St.		12/1980		40.577470	-105.078920	1,524
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample	
	CO	1	12/1980	P.O. Neigh	Thermo 48C	SLAMS	Continuous	
	O ₃	1	12/1980	P.O. Neigh	API 400E	SLAMS	Continuous	
	WS/WD/Temp	1	01/1981	Other	Met - One	Other	Continuous	
Mesa								
08 077 0017	Grand Junction - Powell	650 South Ave.		02/2002		39.063798	-108.561173	1,398
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample	
	PM ₁₀	3	01/2005	P.O. Neigh	Partisol 2025	SLAMS	1/3	
	PM ₁₀	4	03/2005	P.O. Neigh	Partisol 2000	SPM	1/6	
	PM _{2.5}	1	11/2002	P.O. Neigh	Partisol 2025	SLAMS	1/6	
	PM _{2.5}	3	01/2005	P.O. Neigh	TEOM 1400ab	SLAMS	Continuous	
	PM _{2.5}	5	11/2002	P.O. Neigh	SASS	Supplemental Speciation	1/6	
	PM _{2.5} Carbon	5	04/2009	P.O. Neigh	URG 3000N	Supplemental Speciation	1/6	
08 077 0018	Grand Junction - Pitkin	645 ¼ Pitkin Ave.		01/2004		39.064289	-108.561550	1,398
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample	
	PM ₁₀	1	01/2004	P.O. Neigh	Met-One BAM	SLAMS	Continuous	
	CO	1	01/2004	P.O. Micro	Thermo 48C	SLAMS	Continuous	
	WS/WD/Temp	1	01/2004	Other	Met - One	Other	Continuous	
	Relative Humidity	1	01/2004	Other	Rotronic	Other	Continuous	
08 077 0019	Clifton	Hwy 141 and D Rd.		10/2006		39.062514	-108.457382	1,413
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample	
	PM ₁₀	1	10/2007	P.O. Neigh	SA/GMW -1200	SLAMS	1/3	
08 077 0020	Palisade Water Treatment	Rapid Creek Rd.		04/2009		39.062514	-108.457382	1,413
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample	
	O ₃	1	04/2009	SPM Urban	API 400E	SLAMS	Continuous	
	WS/WD/Temp	+	04/2009	Other	Met - One	Other	Continuous	

AQS #	Site Name	Address	Started	Ended	Latitude	Longitude	Elevation
Montezuma							
08 083 0006	Cortez	106 W. North St.	06/2006		37.349963	-108.587159	1,890
	Parameter	POC	Started	Scale	Monitor	Type	Sample
	O ₃	1	04/2009	SPM Urban	API 400E	SLAMS	Continuous
	WS/WD/Temp	1	04/2009	Other	Met - One	Other	Continuous
	PM _{2.5}	1	06/2008	SPM Region	Patisol 2000	SPM	1/6
Pitkin							
08 097 0006	Aspen - Library	120 Mill St.	05/2002		39.191040	-106.818864	2,408
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	1	05/2002	P.O. Neigh	SA/GWM 1200	SLAMS	1/3
	PM ₁₀	2	05/2002	P.O. Neigh	SA/GWM 1200	SLAMS	1/3
	PM ₁₀	3	05/2002	P.O. Neigh	TEOM-1400ab	SLAMS	Continuous
Prowers							
08 099 0001	Lamar Power Plant	100 N. 2 nd St.	08/1975		38.090949	-102.613912	1,107
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	2	03/1987	P.O. Neigh	SA/GMW-1200	SLAMS	1/1
08 099 0002	Lamar Municipal	104 E. Parmenter St.	12/1976		38.084688	-102.618641	1,107
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	2	03/1987	P.O. Neigh	SA/GMW-1200	SLAMS	1/1
08 099 0003	Lamar Port of Entry	7100 US Hwy 50.	03/2005		38.113792	-102.626181	1,108
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	WS/WD/Temp	1	03/2005	Other	Met - One	Other	Continuous
Pueblo							
08 101 0012	Pueblo Public Works	211 D St.	07/1998		38.263058	-104.612133	1,421
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	1	07/1998	P.O. Neigh	SA/GMW-1200	SLAMS	1/1
	PM _{2.5}	1	02/1999	P.O. Neigh	Partisol 2025	SLAMS	1/3
Routt							
08 107 0003	Steamboat Springs	136 6 th St.	09/1975		40.485201	-106.831625	2,054
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	2	03/1987	P.O. Neigh	SA/GMW-1200	SLAMS	1/1
San Miguel							
08 113 0004	Telluride	333 W. Colorado Ave.	03/1990		37.937872	-107.813061	2,684
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	1	03/1990	P.O. Neigh	SA/GMW-1200	SLAMS	1/3
Summit							
08 117 0002	Breckenridge	501 N. Park Ave.	04/1992		39.491461	--106.047325	2,904
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	1	04/1992	P.O. Neigh	SA/GMW-1200	SLAMS	1/3
Weld							
08 123 0006	Greeley-Hospital	1516 Hospital Rd.	04/1967		40.414877	-104.706930	1,441
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample
	PM ₁₀	2	03/1987	P.O. Neigh	SA/GMW-1200	SLAMS	1/3
	PM _{2.5}	1	02/1999	P.O. Neigh	Partisol 2025	SLAMS	1/3
	PM _{2.5}	3	02/1999	P.O. Neigh	TEOM - 1400ab	SPM	Continuous

AQS #	Site Name	Address		Started	Ended	Latitude	Longitude	Elevation
08 123 0008	Platteville	1004 Main St		12/1998		40.209387	-104.824050	1,469
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample	
	PM _{2.5}	1	08/1999	P.O. Region	Partisol 2025	SLAMS	1/3	
	PM _{2.5}	5	08/1999	P.O. Region	SASS	Supplemental Speciation	1/6	
	PM _{2.5} Carbon	5	04/2009	P.O. Neigh	URG 3000N	Supplemental Speciation	1/6	
08 123 0009	Greeley -Tower	3101 35 th Ave.		06/2002		40.386368	-104.737440	1,484
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample	
	O ₃	1	06/2002	P.O. Neigh	API 400E	SLAMS	Continuous	
	WS/WD/Temp	1	+	Other	Met - One	Other	Continuous	
08 123 0010	Greeley – West Annex	905 10 th Ave.		12/2003		40.423432	-104.694790	1,421
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample	
	CO	1	12/2003	P.O. Neigh	Thermo 48C	SLAMS	Continuous	

The following abbreviations were used in Table 1 ,with orientation (Orient) referring to the reason why the monitor was placed in that location, and scale referring to the size of the area that concentrations from the monitor represent.

Orientation

- P.O. - Population oriented
- Back - Background orientation
- SPM - Special Projects Monitor
- H.C. - Highest Concentration
- Parm - Parameter Code

Scale

- Micro - Micro-scale
- Neigh - Neighborhood Scale
- Middle - Middle Scale
- Urban - Urban Scale
- Regional - Regional Scale

Also included in the above table are listings as “Other” which are meteorological monitors that do not include either orientation or scale. The “+” in the “Start” column indicates that the monitor has not been installed. .

Table 2 - Population Projections for 2005 - 2010

REGIONS/Counties	Projected Population		Annual Change		CO	SO ₂	NO _x	NO _y	O ₃	Met	R.H.	Precip	TSP	Pb	PM ₁₀	PM ₁₀ H	PM _{2.5}	PM _{2.5} H
	July, 2005	July, 2010	00 05	05-10														
COLORADO	4,718,562	5,207,801	1.7%	2.0%	9	3	3		21	23	3		1	1	27	6	16	12
FRONT RANGE	3,862,633	4,250,332	1.8%	1.9%	7	3	3		16	15	2		1	1	9	4	11	9
DNVR-BLDR REGION	2,623,871	2,845,175	1.6%	1.6%														
DENVER PMSA	2,337,991	2,546,353	2.0%	1.7%														
Adams	402,110	452,411	1.9%	2.4%														
	08 001 0006 Commerce City									1					1		1/C/S	1
	08 001 3001 Welby				1	1	1		1	1					1	1		
Arapahoe	534,252	581,897	1.7%	1.7%														
	08 005 0002 Highland Reservoir								1	1								
	08 005 0005 Arapahoe Community College																1	
	08 005 0006 Aurora Reservoir								+	+								
Broomfield	45,755	51,970	---	2.6%														
Denver	571,848	606,667	0.6%	1.2%														
	08 031 0002 Denver CAMP				1	1	1			1					1/C	1	1/C	1
	08 031 0013 Denver NJH																	1
	08 031 0014 Denver Carriage								1	1								
	08 031 0017 Denver Visitor Center														1			
	08 031 0019 Denver Firehouse #6				1													
	08 031 0021 Auraria Met									1	1							
	08 031 0023 Swansea																	1
	08 031 0025 Denver Animal Shelter				1	1		+	1	1	1	+	1/C	1/C	1/C	1	1	1
Douglas	251,418	303,362	6.8%	3.8%														
	08 035 0004 Chatfield Reservoir								1	1								
Jefferson	532,608	550,046	0.2%	0.6%														
	08 059 0002 Arvada								1	1								
	08 059 0005 Welch								1	1								
	08 059 0006 Rocky Flats - N								1	1								
	08 059 0008 Rocky Flats - SE									1								
	08 059 0011 NREL								1									
	08 059 0013 Aspen Park								+	+								
BOULDER PMSA/Co	285,880	298,822	-0.7%	0.9%														
	08 013 0003 Longmont Municipal														1		1	1
	08 013 0009 Longmont - Main				1													
	08 013 0011 Boulder - Foothills								1									
	08 013 0012 Boulder Chamber														1		1	

REGIONS/Counties	Projected Population		Annual Change		CO	SO ₂	NO _x	NO _y	O ₃	Met	R.H.	Precip	TSP	Pb	PM ₁₀	PM ₁₀ H	PM _{2.5}	PM _{2.5} H
	July, 2005	July, 2010	00 05	05-10														
	08 013-1001 Boulder CU/Athens																1	
NORTH FRONT RANGE	499,962	566,072	2.7%	2.5%														
FORT COLLINS MSA	271,951	299,040	1.4%	1.9%														
	08 069 0009 Fort Collins - CSU														1	1	1	
	08 069 0011 Fort Collins - West								1									
	08 069 0012 –Rist Canyon								+	+								
	08 069 1004 Fort Collins - Mason				1				1	1								
GREELEY MSA	228,011	267,032	4.4%	3.2%														
	08 123 0006 Greeley Hospital														1		1	1
	08 123 0008 Platteville																1/C	
	08 123 0009 Greeley - Tower								1	+								
	08 123 0010 Greeley - West Annex				1													
COLO. SPRINGS MSA	587,696	674,103	1.6%	2.8%														
El Paso	565,350	649,217	1.7%	2.8%														
	08 041 0013 USAFA								1									
	08 041 0015 Colorado Springs - Hwy-24				1					+								
	08 041 0016 Manitou Springs								1									
	08 041 0018 Colorado College														1		1	1
Teller	22,346	24,886	1.1%	2.2%														
PUEBLO MSA	151,104	164,982	1.2%	1.8%														
	08 101 0012 Pueblo Public Works														1		1	
WESTERN SLOPE	513,332	589,836	1.9%	2.8%														
REGION 9	87,019	97,620	1.5%	2.3%														
Archuleta	11,716	14,131	3.2%	3.8%														
	08 007 0001 Pagosa Springs														1			
Dolores	1,846	2,076	0.0%	2.4%														
La Plata	48,019	53,282	1.5%	2.1%														
	08 067 0004 Durango - RCH														1			
Montezuma	24,862	27,523	0.8%	2.1%														
	08 083 0006 Cortez								1									1
San Juan	576	608	0.6%	1.1%														
REGION 10	94,835	107,287	1.8%	2.5%														
Delta	30,257	34,200	1.6%	2.5%														
	08 029 0004 Delta														1			
Gunnison	14,264	15,233	0.4%	1.3%														
	08 051 0004 Crested Butte														1/C			
	08 051 0007 Mt. Crested Butte														1			
Hinsdale	821	918	0.8%	2.3%														
Montrose	37,880	43,875	2.4%	3.0%														

REGIONS/Counties	Projected Population		Annual Change		CO	SO ₂	NO _x	NO _y	O ₃	Met	R.H.	Precip	TSP	Pb	PM ₁₀	PM ₁₀ H	PM _{2.5}	PM _{2.5} H
	July, 2005	July, 2010	00 05	05-10														
Ouray	4,303	4,781	2.7%	2.1%														
San Miguel	7,310	8,280	1.9%	2.5%														
08 113 0004 Telluride														1				
REGION 11	222,739	260,304	2.1%	3.2%														
Garfield	50,673	64,097	2.7%	4.8%														
08 045 0005 Parachute															1			
08 045 0007 Rifle - Henry Building										1					1			
08 045 0012 Rifle - Health									1									
Mesa	130,662	150,504	2.1%	2.9%														
08 077 0017 Grand Junction - Powell															1/C		1/C	1
08 077 0018 Grand Junction - Pitkin					1				1	1	1					1		
08 077 0019 Cifton															1			
08 077 0020 Palisade Water Treatment									1	1								
Moffat	13,426	14,424	0.4%	1.4%														
Rio Blanco	6,073	6,651	0.3%	1.8%														
Routt	21,905	24,628	1.7%	2.4%														
08 107 0003 Steamboat Springs															1			
REGION 12	108,739	124,625	1.8%	2.8%														
Eagle	49,375	58,196	2.6%	3.3%														
Grand	13,906	15,920	1.5%	2.7%														
Jackson	1,531	1,584	-0.6%	0.7%														
Pitkin	16,420	17,427	0.6%	1.2%														
08 097 0006 Aspen - Library															1/C	1		
Summit	27,507	31,498	1.3%	2.7%														
08 117 0002 Breckenridge															1			
CENTRAL MTNS.	131,841	145,235	0.9%	2.0%														
CLR CRK. & GILPIN	14,514	15,737	0.5%	1.6%														
Clear Creek	9,510	10,242	0.3%	1.5%														
Gilpin	5,004	5,495	0.9%	1.9%														
Park	16,595	19,616	2.5%	3.4%														
REGION 13	76,529	83,284	0.6%	1.7%														
Chaffee	16,889	17,941	0.7%	1.2%														
Custer	3,964	4,599	2.3%	3.0%														
Fremont	47,727	51,454	0.5%	1.5%														
08 043 0003 Canyon City - City Hall															1			
Lake	7,949	9,290	0.1%	3.2%														
REGION 14	24,203	26,598	0.9%	1.9%														
Huerfano	7,932	8,771	0.2%	2.0%														
Las Animas	16,271	17,827	1.3%	1.8%														

REGIONS/Counties	Projected Population		Annual Change		CO	SO ₂	NO _x	NO _y	O ₃	Met	R.H.	Precip	TSP	Pb	PM ₁₀	PM ₁₀ H	PM _{2.5}	PM _{2.5} H
	July, 2005	July, 2010	00 05	05-10														
SAN LUIS VALLEY	48,506	50,608	0.9%	0.9%														
Alamosa	15,765	16,692	0.8%	1.1%														
08 003 0001 Alamosa - ASC															1			
08 003 0003 Alamosa - Municipal															1			
Conejos	8,586	8,881	0.4%	0.7%														
Costilla	3,628	3,767	-0.2%	0.8%														
Mineral	946	1,029	2.6%	1.7%														
Rio Grande	13,043	13,263	1.0%	0.3%														
Saguache	6,538	6,976	1.9%	1.3%														
EASTERN PLAINS	162,250	171,790	0.4%	1.1%														
REGION 1	72,165	77,354	0.6%	1.4%														
Logan	21,605	23,327	0.7%	1.5%														
Morgan	28,348	31,241	0.8%	2.0%														
Phillips	4,631	4,745	0.7%	0.5%														
Sedgwick	2,667	2,705	-0.6%	0.3%														
Washington	4,936	4,990	0.1%	0.2%														
Yuma	9,978	10,346	0.2%	0.7%														
REGION 5	38,693	41,884	1.1%	1.6%														
Cheyenne	2,120	2,068	-1.0%	-0.5%														
Elbert	22,786	25,848	2.4%	2.6%														
08 035 0001 Elbert County																		1
Kit Carson	7,882	8,002	-0.3%	0.3%														
Lincoln	5,905	5,966	-0.9%	0.2%														
REGION 6	51,392	52,552	-0.4%	0.4%														
Baca	4,263	4,128	-1.1%	-0.6%														
Bent	6,314	6,432	1.1%	0.4%														
Crowley	5,740	6,235	0.8%	1.7%														
Kiowa	1,533	1,501	-1.1%	-0.4%														
Otero	19,569	19,971	-0.7%	0.4%														
Prowers	13,973	14,285	-0.6%	0.4%														
08 099 0001 Lamar Power Plant																		1
08 099 0002 Lamar - Municipal																		1
08 099 0003 Lamar Port of Entry																		1

+ - indicates monitors that will be installed in 2009.

C - Collocated monitors

S - SASS PM₁₀ monitor

CARBON MONOXIDE

In 2009 as in 2008 the APCD will operate nine carbon monoxide monitors. The levels have declined from a statewide maximum 8-hour value of 48.1 ppm in 1973 to a value of 3.1 ppm in 2008. The level of the standard has not been exceeded since 1999. The carbon monoxide monitors currently operated by the APCD are associated with State Implementation Plan requirements.

Larimer and Weld Counties

Larimer and Weld counties have a population of 532,759 (July 2007 population estimates), an increase of 23.2 percent since the 2000 Census. The two major urban centers are Fort Collins in Larimer County and Greeley in Weld County. Larimer County has irrigated farmland in the eastern half while the western half is mountainous. Weld County is predominantly grassland and irrigated farmland. Motor vehicle activity is a major source of pollutants. However, there are several small industries and manufacturing processes located within the two counties. These industries include a brewery, power plants, cement plants, mining, electronics and film manufacturing facilities and rock quarries.

The carbon monoxide monitors in this area are:

08 069-1004 Fort Collins, 708 S. Mason Street
08 123 0010 Greeley -West Annex, 905 10th Avenue

Metropolitan Denver Counties

This area includes the Front Range Counties of Adams, Arapahoe, Boulder, Broomfield, Clear Creek, Douglas, Gilpin, Jefferson and Denver. The population of the area is 2,749,032 (July 2007 population estimates). This is an increase of 12 percent from the 2000 census. Carbon monoxide monitoring is conducted only in the Denver metropolitan area. This consists of all of Denver County, the western half of Adams and Arapahoe counties, most of Boulder and Jefferson counties, the northern portion of Douglas County and none of Clear Creek and Gilpin counties.

The carbon monoxide monitors in this area are:

08 001 3001 Welby, 3174 E. 78th Avenue
08 013 0009 Longmont -Main, 440 Main Street
08 031 0002 Denver CAMP, 2105 Broadway
08 031 0019 Denver Firehouse #6, 1300 Blake Street
08 031 0025 Denver Municipal Animal Shelter, 678 S. Jason Street

El Paso, Park & Teller Counties

This area has a population of 617,864 according to the July 2007 population estimate this is an increase of 12.0 percent from the 2000 census. It is a very popular tourist area with rapid urban growth. The land usage varies from open prairies in eastern El Paso County to very mountainous in Teller and Park Counties. Only El Paso County has a large urbanized area, Colorado Springs, with a population of 394,177 according to the July 2007 estimate. This is an increase of 9.2 percent since the 2000 census. The City of Colorado Springs and El Paso County both operate separate monitoring networks that are not included as a part of this report.

The carbon monoxide monitors in this area are:

08 041 0015 Colorado Springs - Hwy-24, 690 W. Highway 24

Western Counties

The Western Slope consists of the 21 counties west of the Continental Divide. The population of the area is 579,813 (July 2007 population estimate). This is an increase of 14.4 percent over the 2000 census. However, the population is not evenly distributed among the counties and ranges from Mesa

County with 140,416 to San Juan County with only 571 according to the July 2007 estimate. Short-term special purpose monitoring for carbon monoxide has been done in Summit County at Vail and near the oil shale projects of Rio Blanco County. Grand Junction is the largest city on the western slope with a population of 53,662 (July 2007 estimate). This is an increase of 27.8 percent from the 2000 census.

The carbon monoxide monitors in this area are:

08 077 0018 Grand Junction-Pitkin, 645¼ Pitkin Avenue

Quality Assurance Checks for Carbon Monoxide Monitors

The APCD staff performs two types of gaseous analyzer performance audits, assessment audits and accuracy audits. These audits challenge the analyzer with pollutant gases of known concentration within the range of the analyzer. The following table shows the number of these audits conducted on the carbon monoxide analyzers for 2008.

The APCD Quality Assurance staff conducts audits on all of the carbon monoxide instruments at least twice per year. The APCD Field staff conducts precision checks nominally once every two weeks. The details and minimum standards for this program are set out in the Code of Federal Regulations (Part 58 Ambient Air Quality Surveillance). A complete description of the procedures and the results are available from the APCD.

Table 3 - Precision Checks for Carbon Monoxide in 2008

Site	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Welby	6	7	7	7
Longmont	6	7	6	6
CAMP	6	8	8	7
Firehouse	6	8	6	6
Highway 24	7	7	7	7
Ft Collins	6	7	6	6
Grand Junction	7	6	7	7
Greeley - Annex	6	7	6	6

Table 4 - Accuracy Audits for Carbon Monoxide in 2009

Site	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Welby	1		1	
Longmont	1		1	
CAMP	1		1	
Firehouse		1		1
Highway 24		1	1	1
Ft Collins	1		1	
Grand Junction		1		1
Greeley - Annex	1	1	1	

Planned Changes in the Carbon Monoxide Monitoring for 2009

None

OZONE

On March 12, 2008, the U.S. Environmental Protection Agency released the new level of the National ambient ozone standard. The change in the level was from 0.08 ppm as a 8-hour average to 0.075 ppm. This made a significant change in the number of ozone monitors that exceed the 3-year average 8-hour concentration standard. The following locations have exceeded the new level: Highland Reservoir, Boulder - Foothills, Chatfield Reservoir, Arvada, Rocky Flats, NREL Solar Radiation Research, Welch Fort Collins-West and Greeley - Tower. The following monitors are listed as marginal as they are close to exceeding the level of the standard but have not exceeded the standard in the past three years: Fort Collins, Denver Carriage, USAF Academy and Manitou Springs. The only monitors operated by the CDPHE that are not close to exceeding the level of the new standard are the Denver CAMP and Welby locations.

The non-CDPHE monitor in Colorado that has 3-year average concentrations greater than the new standard is at Rocky Mountain National Park. The ozone monitors operated at Mesa Verde National Park and the Shamrock Mine site located northeast of Bayfield, Colorado are listed as marginal for being near to the level of the standard.

Larimer and Weld Counties

Larimer and Weld counties have a population of 532,759 (July 2007 population estimates), an increase of 23.2 percent since the 2000 Census. The two major urban centers are Fort Collins in Larimer County and Greeley in Weld County. Larimer County has irrigated farmland in the eastern half while the western half is mountainous. Weld County is predominantly grassland and irrigated farmland. Motor vehicle activity is a major source of pollutants. However, there are several small industries and manufacturing processes located within the two counties. These industries include a brewery, power plants, cement plants, mining, electronics and film manufacturing facilities and rock quarries.

The ozone monitors in this area are:

- 08 069 0011 Fort Collins-West, 251 Edison Drive
- 08 069 0012 Rist Canyon, 11838 Rist Canyon Road
- 08 069 1004 Fort Collins-Mason, 708 S. Mason Street
- 08 123 0009 Greeley-Tower, 3101 35th Avenue

Metropolitan Denver Counties

This area includes the Front Range Counties of Adams, Arapahoe, Boulder, Broomfield, Clear Creek, Douglas, Gilpin, Jefferson and Denver. The population of the area is 2,749,032 (July 2007 population estimates). This is an increase of 12 percent from the 2000 census. The Denver metropolitan area consists of all of Denver County, the western half of Adams and Arapahoe counties, most of Boulder and Jefferson counties, the northern portion of Douglas County and none of Clear Creek and Gilpin counties. Only Adams, Arapahoe, Boulder, Douglas, Jefferson and Denver Counties have ozone monitors.

The ozone monitors in this area are:

- 08 001 3001 Welby, 3174 E. 78th Avenue
- 08 005 0002 Highland Reservoir, 8100 S. University Boulevard
- 08 005 0006 Aurora-East, 36001 Quincy Avenue
- 08 031 0011 Boulder-Foothills, 1405 ½ S. Foothills Parkway
- 08 031 0014 Denver-Carriage, 2325 Irving Street
- 08 031 0025 Denver Municipal Animal Shelter, 678 S. Jason Street
- 08 035 0004 Chatfield State Park, 11500 N. Roxborough Park Road
- 08 059 0002 Arvada, 9101 W. 57th Avenue
- 08 059 0005 Welch, 12400 W. Hwy 285

08 059 0006 Rocky Flats-N, 16600 W. Hwy 128
08 059 0011 NREL, 2054 Quaker Street
08 059 0013 Aspen Park, 26137 Conifer Road

El Paso, Park & Teller Counties

This area has a population of 617,864 according to the July 2007 population estimate this is an increase of 12.0 percent from the 2000 census. It is a very popular tourist area with rapid urban growth. The land usage varies from open prairies in eastern El Paso County to very mountainous in Teller and Park Counties. Only El Paso County has a large urbanized area, Colorado Springs, with a population of 394,177 according to the July 2007 estimate. This is an increase of 9.2 percent since the 2000 census. In addition, the City of Colorado Springs and El Paso County both operate separate monitoring networks that are not included as a part of this report.

The ozone monitors in this area are:

08 041 0013 U. S. Air Force Academy, USAFA Road 640
08 041 0016 Manitou Springs, 101 Banks Place

Western Counties

The Western Slope consists of the 21 counties west of the Continental Divide. The population of the area is 579,813 (July 2007 population estimate). This is an increase of 14.4 percent over the 2000 census. However, the population is not evenly distributed among the counties and ranges from Mesa County with 140,416 to San Juan County with only 571 according to the July 2007 estimate. Short-term special purpose monitoring for ozone has been done in Summit County at Vail and near the oil shale projects of Rio Blanco County. Grand Junction is the largest city on the western slope with a population of 53,662 (July 2007 estimate). This is an increase of 27.8 percent from the 2000 census.

The ozone monitors in this area are:

08 045 0012 Rifle-Health, 195 W. 14th Avenue
08 077 0020 Palisade Water Treatment, Hwy 141 and D Road
08 083 0006 Cortez, 106 W. North Street

Quality Assurance Checks for Ozone Monitors

The APCD staff performs two types of gaseous analyzer performance audits, assessment audits and accuracy audits. These audits challenge the analyzer with pollutant gases of known concentration within the range of the analyzer. The following table shows the number of these audits conducted on the ozone analyzers for 2008.

The APCD Quality Assurance staff conducts audits on all of the ozone instruments at least twice per year. The APCD Field staff conducts precision checks nominally once every two weeks. The details and minimum standards for this program are set out in the Code of Federal Regulations (Part 58 Ambient Air Quality Surveillance). A complete description of the procedures and the results are available from the APCD.

Table 5 - Precision Checks for Ozone in 2008

Site	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Welby	6	7	7	7
Highlands	7	1		
Boulder - Foothills	6	7	6	6
CAMP	1			
Carriage	6	7	6	6
Denver Animal Shelter		4	7	7
Chatfield	6	6	6	6
Air Force Academy	7	6	7	7
Manitou	7	7	7	7
Arvada	6	6	6	6
Welch	8	7	7	7
Rocky Flats - N.	6	6	6	6
NREL	6	6	8	6
Ft. Collins - West	7	6	6	6
Ft. Collins - Mason	6	6	6	6
Greeley - Tower	6	8	6	6

Table 6 - Accuracy Audits for Ozone in 2008

Site	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Welby		1		1
Highlands		1		
Boulder - Foothills	1		1	
CAMP	1			
Carriage		1		1
Chatfield		1		1
Air Force Academy		1	1	1
Manitou		1	1	1
Arvada		1		1
Welch	1		1	
Rocky Flats - N.	1	1	1	
NREL				1
Ft. Collins - West	1		1	
Ft. Collins - Mason	1		1	
Greeley - Tower	1		1	

Planned Changes in Ozone Monitoring for 2009/2010

- 1) Possible installation of additional monitors in western Colorado in 2010 to address oil and gas development concerns.
- 2) Review of monitoring sites in North Front Range for possible enhancement.
- 3) Possible installation of new site in the Pueblo area in 2010 to meet possible new Federal monitoring requirements.

NITROGEN DIOXIDE

The Air Pollution Control Division has monitored nitrogen dioxide at eight locations in Colorado. All but two of these locations are no longer operating. Only the CAMP monitor has ever approached the standard of 0.053 ppm. It recorded 0.052 in 1975, 1976 1979 and in 1983. In the past 20 years the levels have been declining and in the past three years the levels have been reduced to nearly one half of the standard.

Metropolitan Denver Counties

This area includes the Front Range Counties of Adams, Arapahoe, Boulder, Broomfield, Clear Creek, Douglas, Gilpin, Jefferson and Denver. The population of the area is 2,749,032 (July 2007 population estimates). This is an increase of 12 percent from the 2000 census. The Denver metropolitan area consists of all of Denver County, the western half of Adams and Arapahoe counties, most of Boulder and Jefferson counties, the northern portion of Douglas County and none of Clear Creek and Gilpin counties.

The nitrogen dioxide monitors in this area are:

08 001 3001 Welby, 3174 E. 78th Avenue
08 031 0002 Denver-CAMP, 2105 Broadway

Quality Assurance Checks for Oxides of Nitrogen Monitors

The APCD staff performs two types of gaseous analyzer performance audits, assessment audits and accuracy audits. These audits challenge the analyzer with pollutant gases of known concentration within the range of the analyzer. The following table shows the number of these audits conducted on the oxides of nitrogen analyzers for 2007.

The APCD Quality Assurance staff conducts audits on all of the oxides of nitrogen instruments at least twice per year. The APCD Field staff conducts precision checks nominally once every two weeks. The details and minimum standards for this program are set out in the Code of Federal Regulations (Part 58 Ambient Air Quality Surveillance). A complete description of the procedures and the results are available from the APCD.

Table 7 - Precision Checks for Oxides of Nitrogen in 2008

Site	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
CAMP	3	6	4	3
Welby	5	7	7	7

Table 8 - Accuracy Audits for Oxides of Nitrogen in 2008

Site	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
CAMP	1		1	
Welby		1		1

Planned Changes in Nitrogen Dioxide Monitoring for 2009/2010

- 1) Addition of NO_y analyzer at the Denver Municipal Animal Shelter.

SULFUR DIOXIDE

The Air Pollution Control Division has monitored sulfur dioxide at eight locations in Colorado. All but two of these locations are no longer operating. Sulfur dioxide has never approached the level of any of the sulfur dioxide standards even in the mid-1970's, when the levels were at their highest, they were generally less than one half of the level of the standard. The primary reason for these low levels is that what coal fired industry there is in Colorado uses low sulfur coal for combustion. In 2009 a new trace/precursor-level sulfur dioxide monitor will be established as a part of the NCore monitoring at the Denver Animal Shelter.

Metropolitan Denver Counties

This area includes the Front Range Counties of Adams, Arapahoe, Boulder, Broomfield, Clear Creek, Douglas, Gilpin, Jefferson and Denver. The population of the area is 2,749,032 (July 2007 population estimates). This is an increase of 12 percent from the 2000 census. The Denver metropolitan area consists of all of Denver County, the western half of Adams and Arapahoe counties, most of Boulder and Jefferson counties, the northern portion of Douglas County and none of Clear Creek and Gilpin counties.

The sulfur dioxide monitors in this area are:

- 08 001 3001 Welby, 3174 E. 78th Avenue
- 08 031 0002 Denver-CAMP, 2105 Broadway
- 08 031 0025 Denver Municipal Animal Shelter, 678 S. Jason Street

Quality Assurance Checks for Sulfur Dioxide Monitors

The APCD staff performs two types of gaseous analyzer performance audits, assessment audits and accuracy audits. These audits challenge the analyzer with pollutant gases of known concentration within the range of the analyzer. The following table shows the number of these audits conducted on the sulfur dioxide analyzers for 2008.

The APCD Quality Assurance staff conducts audits on all of the sulfur dioxide instruments at least twice per year. The APCD Field staff conducts precision checks nominally once every two weeks. The details and minimum standards for this program are set out in the Code of Federal Regulations (Part 58 Ambient Air Quality Surveillance). A complete description of the procedures and the results are available from the APCD.

Table 9 - Precision Checks for Sulfur Dioxide in 2008

Site	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
CAMP	6	6	8	7
Welby	6	7	7	7

Table 10 - Accuracy Audits for Sulfur Dioxide in 2008

Site	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
CAMP	1		1	
Welby		1		1

Planned Changes in Sulfur Dioxide Monitoring for 2009/2010

- 1) None

METEOROLOGICAL MEASUREMENTS

Meteorological measurements taken by the APCD consist of Wind Speed, Wind Direction, Temperature and Humidity. The wind speed and direction measurements are made as both scalar and vector averages. The last measurement that is made at the meteorological sites is the standard deviation of horizontal wind direction. This is a calculation, not a direct measurement of the variation of wind direction over time.

The meteorological monitors are:

- 08 001 0006 Commerce City, 7101 Birch Street
- 08 001 3001 Welby, 3174 E. 78th Avenue
- 08 005 0002 Highland Reservoir, 8100 S. University Boulevard
- 08 005 0006 Aurora-East, 36001 Quincy Avenue
- 08 031 0002 Denver-CAMP, 2105 Broadway
- 08 031 0014 Denver-Carriage, 2325 Irving Street
- 08 031 0021 Auraria Campus Met, 12th and Auraria Parkway
- 08 031 0025 Denver Municipal Animal Shelter, 678 S. Jason Street
- 08 035 0004 Chatfield State Park, 11500 N. Roxborough Park Road
- 08 059 0002 Arvada, 9101 W. 57th Avenue
- 08 059 0005 Welch, 12400 W. Hwy 285
- 08 059 0006 Rocky Flats-N, 16600 W. Hwy 128
- 08 059 0008 Rocky Flats-SE, 9901 Indiana Street
- 08 059 0013 Aspen Park, 26137 Conifer Road
- 08 069 0012 Rist Canyon, 11838 Rist Canyon Road
- 08 069 1004 Fort Collins-Mason, 708 S. Mason Street
- 08 077 0018 Grand Junction-Pitkin, 645 ¼ Pitkin Avenue
- 08 077 0020 Palisade Water Treatment, Hwy 141 and D Road
- 08 099 0003 Lamar Port of Entry, 7100 US Hwy 50

Planned Changes in Meteorological Monitoring for 2009/2010

- 1) Elimination of the Rocky Flats SE site at the end of 2009.
- 2) Installation of sensors at the Greeley-Weld County Tower site.
- 3) Installation of sensors at the Colorado Springs - Hwy 24 site.
- 4) Installation of additional sensors at the Denver Municipal Animal Shelter site.

PARTICULATE MONITORING

PM₁₀ Monitoring

Larimer and Weld Counties

Larimer and Weld counties have a population of 532,759 (July 2007 population estimates), an increase of 23.2 percent since the 2000 Census. The two major urban centers are Fort Collins in Larimer County and Greeley in Weld County. Larimer County has irrigated farmland in the eastern half while the western half is mountainous. Weld County is predominantly grassland and irrigated farmland. Motor vehicle activity is a major source of pollutants. However, there are several small industries and manufacturing processes located within the two counties. These industries include a brewery, power plants, cement plants, mining, electronics and film manufacturing facilities and rock quarries.

The PM₁₀ monitors in this area are:

08 069 0009 Fort Collins-CSU, 251 Edison Drive
08 123 0006 Greeley-Hospital, 1516 Hospital Road

Metropolitan Denver Counties

This area includes the Front Range Counties of Adams, Arapahoe, Boulder, Broomfield, Clear Creek, Douglas, Gilpin, Jefferson and Denver. The population of the area is 2,749,032 (July 2007 population estimates). This is an increase of 12 percent from the 2000 census. The Denver metropolitan area consists of all of Denver County, the western half of Adams and Arapahoe counties, most of Boulder and Jefferson counties, the northern portion of Douglas County and none of Clear Creek and Gilpin counties.

The PM₁₀ monitors in this area are:

08 001 0006 Commerce City, 7101 Birch Street
08 001 3001 Welby, 3174 E. 78th Avenue
08 013 0003 Longmont-Municipal, 350 Kimbark Street
08 013 0012 Boulder Chamber Building, 2440 Pearl Street
08 031 0002 Denver CAMP, 2105 Broadway
08 031 0017 Denver Visitor Center, 225 W. Colfax Avenue
08 031 0025 Denver Municipal Animal Shelter, 678 S. Jason Street

El Paso, Park & Teller Counties

This area has a population of 617,864 according to the July 2007 population estimate this is an increase of 12.0 percent from the 2000 census. It is a very popular tourist area with rapid urban growth. The land usage varies from prairie in eastern El Paso County to very mountainous in Teller and Park Counties. Only El Paso County has a large urbanized area, Colorado Springs, with a population of 394,177 according to the July 2007 estimate. This is an increase of 9.2 percent since the 2000 census. The City of Colorado Springs and El Paso County both operate separate monitoring networks that are not included as a part of this report.

The PM₁₀ monitors in this area are:

08 041 0017 Colorado College, 130 W. Cache la Poudre Street
08 043 0003 Canon City-City Hall, 128 Main Street

Western Counties

The Western Slope consists of the 21 counties west of the Continental Divide. The population of the area is 579,813 (July 2007 population estimate). This is an increase of 14.4 percent over the 2000 census. However, the population is not evenly distributed among the counties and ranges from Mesa County with 140,416 to San Juan County with only 571 according to the July 2007 estimate. Grand Junction is the largest city on the western slope with a population of 53,662 (July 2007 estimate). This is an increase of 27.8 percent from the 2000 census.

The PM₁₀ monitors in this area are:

08 003 0001 Alamosa-Adams State College, 208 Edgemont Boulevard
08 003 0002 Alamosa Municipal, 425 4th Street
08 007 0001 Pagosa Springs, 309 Lewis Street
08 029 0004 Delta, 560 Dodge Street
08 045 0005 Parachute, 100 E. 2nd Street
08 045 0007 Rifle-Henry Building, 144 3rd Street
08 051 0004 Crested Butte, 603 6th Street
08 051 0007 Mount Crested Butte, 19 Emmons Road
08 067 0004 Durango-River City Hall, 1235 Camino del Rio
08 077 0017 Grand Junction-Powell, 650 South Avenue
08 077 0018 Grand Junction, 645¼ Pitkin Avenue
08 077 0019 Clifton, Hwy 141 and D Road
08 097 0006 Aspen-Library, 120 Mill Street
08 099 0001 Lamar Power Plant, 100 N. 2nd St.
08 099 0002 Lamar Municipal, 104 E. Parmenter Street
08 101 0012 Pueblo Public Works, 211 D St.
08 107 0003 Steamboat Springs, 136 6th Street
08 113 0004 Telluride, 333 W. Colorado Avenue
08 117 0002 Breckenridge, 501 N. Park Avenue

Planned Changes in PM₁₀ Monitoring for 2009/2010

- 1) The Lamar Power Plant monitor will be considered for removal and replacement in 2009 due to conversion of the plant to coal burning.
- 2) The Pueblo site will be relocated in 2009 due to the construction of a tall building next to the current building.

PM_{2.5} Monitoring

Larimer and Weld Counties

Larimer and Weld counties have a population of 532,759 (July 2007 population estimates), an increase of 23.2 percent since the 2000 Census. The two major urban centers are Fort Collins in Larimer County and Greeley in Weld County. Larimer County has irrigated farmland in the eastern half while the western half is mountainous. Weld County is predominantly grassland and irrigated farmland. Motor vehicle activity is a major source of pollutants. However, there are several small industries and manufacturing processes located within the two counties. These industries include a brewery, power plants, cement plants, mining, electronics and film manufacturing facilities and rock quarries. The following PM_{2.5} sites with manual method FRM sites in the APCD network as of December 31, 2008, are suitable for comparisons to the annual PM_{2.5} NAAQS. These sites include:

The PM_{2.5} monitors in this area are:

- 08 069 0009-1 Fort Collins-CSU, 251 Edison Drive
- 08 123 0006-1 Greeley-Hospital, 1516 Hospital Road
- 08 123 0008 1 Platteville, 1004 Main Street

Metropolitan Denver Counties

This area includes the Front Range Counties of Adams, Arapahoe, Boulder, Broomfield, Clear Creek, Douglas, Gilpin, Jefferson and Denver. The population of the area is 2,749,032 (July 2007 population estimates). This is an increase of 12 percent from the 2000 census. The Denver metropolitan area consists of all of Denver County, the western half of Adams and Arapahoe counties, most of Boulder and Jefferson counties, the northern portion of Douglas County and none of Clear Creek and Gilpin counties.

The PM_{2.5} monitors in this area are:

- 08 001 0006-1 Commerce City, 7101 Birch Street
- 08 005 0005-1 Arapahoe Community College, 6190 S. Santa Fe Boulevard
- 08 013 0003-1 Longmont-Municipal, 350 Kimbark Street
- 08 013 0012-1 Boulder/Chamber Building, 2440 Athens Street
 - Middle scale site but determined to be representative of neighborhood scale with several contiguous middle scale sites in that area of Boulder. EPA approved.
- 08 031 0002-1 Denver CAMP, 2105 Broadway
 - micro scale but determined to be representative of neighborhood scale with several contiguous micro scale sites in downtown Denver. EPA approved.
- 08 031 0023-1 Denver Swansea, 4650 Columbine Street
- 08 031 0025-1 Denver Animal Shelter, 678 S. Jason Street
- 08 035 0004-1 Chatfield Reservoir, 11500 N. Roxborough Park Road

El Paso, Park, Pueblo, Elbert & Teller Counties

This area has a population of 807,732 according to the July 2007 population estimate this is an increase of 12.0 percent from the 2000 census. It is a very popular tourist area with rapid urban growth. The land usage varies from open prairies in eastern El Paso County to very mountainous in Teller and Park Counties. Only El Paso County has a large urbanized area, Colorado Springs, with a population of 394,177 according to the July 2007 estimate. This is an increase of 9.2 percent since the 2000 census. The City of Colorado Springs and El Paso County both operate separate monitoring networks that are not included as a part of this report. The following PM_{2.5} sites with manual method FRM sites in the APCD network as of December 31, 2008, are suitable for comparisons to the annual PM_{2.5} NAAQS. These sites include:

The PM_{2.5} monitors in this area are:

- 08 039 0001-1 Elbert County, 24950 Ben Kelly Road
- 08 041 0017-1 Colorado College, 130 W. Cache la Poudre Street
- 08 101 0012-1 Pueblo, 211 E. D Street

Western Counties

The Western Slope consists of the 21 counties west of the Continental Divide. The population of the area is 579,813 (July 2007 population estimate). This is an increase of 14.4 percent over the 2000 census. However, the population is not evenly distributed among the counties and ranges from Mesa County with 140,416 to San Juan County with only 571 according to the July 2007 estimate. Short-term special purpose monitoring for carbon monoxide has been done in Summit County at Vail and near the oil shale projects of Rio Blanco County. Grand Junction is the largest city on the western slope with a population of 53,662 (July 2007 estimate). This is an increase of 27.8 percent from the 2000 census.

The PM_{2.5} monitors in this area are:

- 08 077 0017-1 Grand Junction-Powell, 650 South Avenue

PM_{2.5} Sites not intended for NAAQS Comparison

The following sites are not intended for comparison with the NAAQS. Although they are using FEM or FRM samplers. These sites are:

- 08 001 0006-3 Commerce City, 7101 Birch Street
- 08 013 0003-3 Longmont-Municipal, 350 Kimbark Street
- 08 013 1001-3 Boulder CU/Athens, 2440 Pearl Street
- 08 031 0002-3 Denver-CAMP, 2105 Broadway
- 08 031 0013-3 Denver NJH-E, 14th Avenue and Albion Street
- 08 031 0025-3 Denver Municipal Animal Shelter, 678 S. Jason Street
- 08 035 0004-3 Chatfield Reservoir, 11500 N. Roxborough Park Road
- 08 041 0017-3 Colorado College, 130 W. Cache la Poudre
- 08 045 0007-1 Rifle, Henry Building, 144 N. 3rd Street
- 08 069 0009-3 Fort Collins-CSU, 251 Edison Drive
- 08 077 0017-3 Grand Junction-Powell, 650 South Avenue
- 08 083 0006-1 Cortez, 106 W. North Street
- 08 123 0006-3 Greeley-Hospital, 1516 Hospital Road

Community Monitoring Zones

Community monitoring zones are an additional method of defining an area for comparison with the PM_{2.5} NAAQS where two or more monitors are averaged together for comparison with the standard. Currently, the APCD does not have any areas where this technique is used.

The definition of community monitoring zone (CMZ) in 40 CFR Part 58.1 is as follows: “Community monitoring zone (CMZ) means an optional averaging area with established, well defined boundaries, such as county or census block, within an MPA that has relatively uniform concentrations of annual PM_{2.5} as defined by appendix N of part 50 of this chapter. Two or more community oriented SLAMS monitors within a CMZ that meet certain requirements as set forth in appendix N of part 50 of this chapter may be averaged for making comparisons to the annual PM_{2.5} NAAQS.” The CMZ is an optional technique that averages the PM_{2.5} 24-hour concentrations from two or more monitors located in the same community.

If the PM_{2.5} monitoring network is changed by the creation/change of a CMZ or changing the location of a violating monitor, then the APCD will ask EPA Region VIII for approval via the current

network modification process, then notify the appropriate governments of affected communities. The APCD will also provide the proposed changes to the affected communities and concerned citizens on our web site. A public comment period will be open for thirty (30) days prior to the APCD selecting a new site. Many times the APCD has no control over a site closure. For example, a site is closed due to the planned demolition of the building that hosts the monitor. In such cases a new site must be found. The PM_{2.5} instruments may be moved to a temporary site and monitoring resumed. However, the final site selection will go through the public vetting process to locate the best possible site.

Planned Changes in PM_{2.5} Monitoring for 2009/2010

1. The Pueblo site will be relocated in 2009 due to the construction of a tall building next to the current building.
2. Addition of a PM_{10/2.5} TEOM in Fort Collins in 2009.
3. Possible relocation of Boulder CU/Athens TEOM site due to new construction near the site.
4. Add URS carbon sampler for PM_{2.5} chemical speciation at the Platteville and Grand Junction/Powell sites in 2009.
5. Plan to move PM_{2.5} chemical speciation sampler from the Grand Junction Powell to NCore site at DMAS by December 31, 2009.

Total Suspended Particulates and Lead Monitoring

In December 2006 Total Suspended Particulate (TSP) monitoring by the Air Pollution Control Division was reduced from six monitors to a single monitor at the Denver Municipal Animal Shelter. TSP is monitored only as a first step in ambient lead analysis. In the past ten years the maximum quarter lead concentration has generally been less than a tenth of the standard. In addition, Colorado has not recorded an exceedance of the lead standard since the first quarter of 1980.

In December 2008 a new lead standard was promulgated a level of 0.15 µg/m³ for a rolling three-month average. This new standard is one-tenth the level of the old standard.

Metropolitan Denver Counties

This area includes the Front Range Counties of Adams, Arapahoe, Boulder, Broomfield, Clear Creek, Douglas, Gilpin, Jefferson and Denver. The population of the area is 2,749,032 (July 2007 population estimates). This is an increase of 12 percent from the 2000 census. The Denver metropolitan area consists of all of Denver County, the western half of Adams and Arapahoe counties, most of Boulder and Jefferson counties, the northern portion of Douglas County and none of Clear Creek and Gilpin counties.

The TSP/Lead monitor in this area is:

08 031 0025 Denver Municipal Animal Shelter, 678 S. Jason Street

Planned Changes in TSP and Lead Monitoring for 2009/2010

1. In 2009 the Division will establish a source-oriented TSP/Lead monitor at Centennial Airport. This site is needed due to the changes in the lead monitoring regulations that require source-oriented monitoring at facilities with emissions of more than one ton per year.
2. A new population oriented led monitor will be established in Colorado Springs in 2010. This site is in response to changes in new minimum population requirements for lead monitoring.

Quality Assurance Accuracy Audits for Particulate Monitors

The audit checks performed on the particulate monitors consist of calibrated flow checks.

Table 12 - Accuracy Audits for Particulates in 2008

Site / Station Name	PM _{2.5} PEP	PM _{2.5} FRM/FEM	PM ₁₀ Low-Vol	PM ₁₀ High-Vol	TSP	TEOM _(2.5)	TEOM ₍₁₀₎
Commerce City		4	4			3	
Commerce City (collocated)		4					
Welby				4			4
Chatfield Reservoir		4				4	
Alamosa - ASC				16			
Alamosa - Municipal Bldg				16			
Arapahoe Community College		4					
Pagosa Springs. Middle School				16			
Longmont - Municipal		4		4		4	
Boulder Chamber of Commerce		4		4			
Boulder - CU/Athens						4	
Delta				8			
Denver - CAMP		4		4		3	3
Denver - CAMP (collocated)		4		4			
Denver Municipal Animal Shelter (primary)		4		4	4	4	4
Denver Municipal Animal Shelter (collocated)				4	4		
Denver - Swansea		3					
Denver Visitor Center				16			
Denver - NJH						3	
Elbert		4					
Colorado Springs - RBD		1		1			
Co. Springs - RBD (collocated)				1			
Colorado College		4	4			3	
Canon City – City Hall			4				
Parachute				6			
Rifle				8			
Crested Butte				8			
Mt. Crested Butte				16			
Durango River City Hall				8			
Ft. Collins - CSU	3	4		8			
Grand Junction - Powell	3	4	4			3	
Grand Junction - Powell (collocated)			4				
Clifton				8			
Aspen Library				8			
Lamar Power Plant				16			
Lamar - Municipal				16			
Pueblo Public Works		4		8			
Steamboat Springs				12			
Telluride				8			
Breckenridge				16			
Greeley - Hospital		4		8		4	
Platteville		3					
Total Particulate Audits	6	67	20	256	8	35	11

Quality Assurance Precision Checks for Particulate Monitors

The precision checks that are made on particulate monitors consist of samplers that operate side-by-side on the same operating schedule. The samples are then compared to ensure that the data are within federal limits.

Table 13 - Precision Checks for Particulates in 2008

Site	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
TSP				
Denver Municipal Animal Shelter	15	15	15	14
LEAD				
Denver Municipal Animal Shelter	15	15	15	10
PM₁₀ High-Volume				
Denver - CAMP				
Denver Municipal Animal Shelter	15	14	15	14
Colorado Springs - RBD	16			
Crested Butte				15
PM₁₀ Low-Volume				
Grand Junction - Powell	15	15	15	12
PM_{2.5} FEM				
Commerce City	15	15	15	15
Denver - CAMP	16	15	15	15
Grand Junction - Powell				
PM_{2.5} Continuous				
Commerce City	3	6	7	5
Longmont - Municipal	5	2	4	5
Boulder - CU/Athens	3	3	4	6
Denver - CAMP	5	4	6	6
Denver - NJH	6	6	6	5
Chatfield	6	6	6	5
Denver Municipal Animal Shelter	3	6	7	6
Colorado College		4	6	7
Grand Junction - Powell	5	5	4	3
Greeley - Hospital	6	6	5	6
PM₁₀ Continuous TEOM				
Welby	8	7	7	6
Denver - CAMP	6	5	7	7
Denver Municipal Animal Shelter	4	6	8	6
PM₁₀ Continuous Beta				
Grand Junction - Pitkin	5	5	4	0

Appendix A - Carbon Monoxide Site Descriptions

Welby, 3174 E. 78th Avenue (08 001 3001)

Located 8 miles north-northeast of the Denver Central Business District (CBD) on the bank of the South Platte River, this site is ideally located to measure nighttime drainage of the air mass from the Denver metropolitan area and the thermally driven, daytime upriver flows. The monitoring shows that high carbon monoxide levels are associated with winds from the south-southwest. While this is the direction of five of the six major sources in the area, it is also the direction of the primary drainage winds along the South Platte River.

Carbon monoxide monitoring began in 1973 and continued through the spring of 1980. Monitoring was stopped from the spring of 1980 until October 1986 when it began again as a special study. Welby has not recorded an exceedance of either the 1-hour or 8-hour carbon monoxide standard since January 1988. In the last few years its primary value has been as an indicator of changes in the air quality index (AQI).

Longmont, 440 Main Street (08 013 0009)

The town of Longmont is a growing, medium sized, Front Range community. Denver/Boulder Metro-area and Fort Collins. Longmont is both suburban and rural in nature. There are no major carbon monoxide sources within 12 miles of the monitor.

In January and February of 1988 and again in the winter of 1988/89 the APCD conducted a study at a site near 11th Avenue and Main Street, a few blocks north of the downtown area. Because two exceedances of the standard were recorded during the study, the Division felt that a permanent carbon monoxide site should be established closer to the downtown area. These exceedances resulted in Longmont being designated as a carbon monoxide nonattainment area and required a SIP for carbon monoxide be developed showing attainment by December 31, 1995. The Air Quality Control Commission accepted the Longmont SIP on June 16, 1995. In 1999, Longmont was redesignated as an attainment area. Longmont has contended that its carbon monoxide problems are generally the result of transport from the Denver metropolitan area north to the Longmont area. The review of the time series plots for Longmont, Denver CAMP, Greeley and Boulder show that the carbon monoxide maximum at all four locations generally coincide. In addition these peaks are bimodal at 7 to 9 A.M. and 4 to 6 P.M. at all four locations. This pattern is associated with locally generated emissions from traffic, not transport from another area. The carbon monoxide emissions inventories developed for the SIP show that 78 percent of the carbon monoxide comes from on-road mobile sources. These findings are consistent with the observed distribution of the data.

Carbon monoxide monitoring is expected to continue for the next several years at the current location since the monitoring is a part of the maintenance plan for Longmont.

Denver CAMP, 2105 Broadway (08 031 0002)

The Denver CAMP site is located in the north-central part of the Denver CBD. Denver is the largest city in Colorado. Carbon monoxide monitoring began in February 1965 as a part of the Federal Continuous Air Monitoring Project. It was established as a maximum concentration, population-oriented monitor. The CAMP site measures the exposure of the people who work or reside in the CBD. Its location in a high traffic street canyon causes this site to record most of the high pollution episodes in the metro area. The street canyon effect at CAMP results in variable wind directions for high carbon monoxide levels and as a result wind direction is less relevant to high concentrations than wind speed. Wind speeds less than 1 mph, especially up-valley, combined with temperature inversions trap the pollution in the area.

Historically the CAMP monitor has recorded some of the highest carbon monoxide levels in the state. It has not recorded an 8-hour concentration over the standard since 1995. The concentrations have

continued their steady decline to the point that in 2008 they are now less than one third the level of the standard.

Denver Firehouse #6, 1300 Blake Street (08 031 0019)

The Denver Firehouse #6 is located on the block between Auraria Parkway and Blake Street where they intersect with Speer Boulevard. This is one of the busiest intersections in downtown Denver and computer modeling indicated that it would have high levels of carbon monoxide.

In the winter of 1995 the monitor was converted from a special purpose monitor to a SLAMS monitor. In 1999 the Firehouse monitor recorded the last exceedance of the 8-hour CO standard in the Denver Metro area. The levels have continued their decline and in 2008 the maximum 8-hour concentration was 2.4 ppm.

Denver Municipal Animal Shelter, 678 S. Jason Street (08 031 0025)

The Denver Municipal Animal Shelter (DMAS) site was established as a replacement for the Denver Gates particulate monitor that was located at 1050 S. Broadway about one half mile south-southeast and on the other side of the South Platte River and I-25 South. The DMAS location represents the core area of the South Platte drainage in Denver. It has a good mixture of light industrial, residential areas and is strongly affected by the mobile sources along I-25 as well as South Santa Fe Drive. The openness of the area also permits the meteorological data to be representative of the larger core Denver area. Finally the site is on City owned property and will presumably be available for long-term trend analysis. When fully developed the site will be established as the NCore site for the Denver Metropolitan area and will include a trace/precursor-level carbon monoxide analyzer.

Colorado Springs Hwy-24, 690 W. Highway 24 (08 041 0015)

The 690 W. Highway 24 site is located just to the west of I-25 and just to the east of the intersection of U.S. Highway 24 and 8th Street, approximately 0.8 miles to the west of the Colorado Springs CBD. Commencing operation in November 1998, this site is a replacement for the Tejon Street (08 041 0004) carbon monoxide monitor. The site is located in the Fountain Creek drainage and is in one of the busiest traffic areas of Colorado Springs. Additionally, traffic is prone to back-up along Highway 24 due to a traffic light at 8th Street. Thus, this site is well suited to monitor maximum concentrations of carbon monoxide in the area both from automotive sources and also from nearby industry which includes a power plant. It also provides a micro-scale setting for the Colorado Springs area, which has not been possible in the past.

Fort Collins- Mason, 708 S. Mason Street (08 069 1004)

Fort Collins does not have the population to require a carbon monoxide monitor under Federal regulation. However, it is one of the largest cities along the Front Range and was declared in nonattainment for carbon monoxide in the mid-1970s after exceeding the 8-hour standard in both 1974 and 1975. The current level of monitoring is in part a function of the resulting carbon monoxide SIP for the area.

The 708 S. Mason Street site began operation in December 1980 and is located one block west of College Avenue in the Central Business District. The 1-hour carbon monoxide standard of 35 ppm as a 1-hour average has only been exceeded on December 1, 1983, at 4:00 P.M. and again at 5:00 P.M. The values reported were 43.9 ppm and 43.2 ppm respectively. The 8-hour standard of 9 ppm, as an 8-hour average, was exceeded one or more times a year from 1980 through 1989. The last exceedances were in 1991 on January 31 and December 6 when values of 9.8 ppm and 10.0 ppm respectively were recorded.

Grand Junction - Pitkin, 645¼ Pitkin Avenue (08 077 0018)

The Grand Junction-Pitkin monitor began operation in January 2004. This monitor replaced the monitor at the Stocker Stadium. The Stocker Stadium location had become less than ideal with the growth

of the trees surrounding the park and the Division felt that a location nearer to the CBD would provide a better representation of carbon monoxide concentration values for the city. The carbon monoxide concentrations at the Stocker Stadium site had been declining from an 8-hour maximum in 1991 of 7.8 ppm to a 3.3 ppm in 2003. The Powell monitor has shown a continuing decline in values to a 1.8 ppm in 2007. These levels are approaching the detection limits of the carbon monoxide monitor.

Greeley West Annex Bldg, 905 10th Avenue (08 123 0010)

Greeley does not have the population to require a carbon monoxide monitor under Federal regulation. However, it is one of the larger cities along the Front Range and was declared in nonattainment for carbon monoxide in the late-1970s after exceeding the 8-hour standard in 1976 and 1977. The first Greeley monitor operated from December 1976 to December 1980. It was located at 15th Street and 16th Avenue and exceeded the 8-hour standard numerous times from 1976 through 1980.

The 811 15th Street location began operation in November 1981 and was discontinued in 2002. The current monitor is located in the Weld County Health Department Annex. This location is in the Greeley Central Business District. The levels recorded at this site are comparable but slightly lower than those at the former 811 15th Street site, about a quarter of the 8-hour standard.

Appendix B - Ozone Site Descriptions

Welby, 3174 E. 78th Avenue (08 001 3001)

The Welby ozone site began operation in July 1973. In 1974, Welby recorded a 1-hour concentration of 0.375 ppm. This is the highest level of ozone ever reported in the State. Since then it has experienced a declining trend of ozone and now records some of the lowest levels in the area. It is unclear if declining levels are due to controls on precursors, increases in nitric oxide levels, high levels of precursors present in the area of the site, or a shift in the path of the ozone “cloud.” Its location in the up and down river drainage path of the Denver air mass that has been “cooking” gives either a warning of the events to come or the results of the day's exposure. The site serves as a good drainage location but it may be a target for deletion or relocation farther down the South Platte River valley from Denver.

The Welby monitor has not recorded an exceedance of the old 1-hour standard since 1998. It would not have recorded an exceedance of the new 8-hour standard since 1998. However, the trend in the 3-year average of the 4th maximum 8-hour average has been increasing since 2002. The site is still not expected to exceed the new standard in the near future though.

Highland Reservoir, 8100 S. University Boulevard (08 005 0002)

The Highlands site began operation in 1978. It was intended to be a background location. However, with urban growth and the construction of C-470, it has become a long-term trend site that monitors changes in the air quality of the area. It is currently believed to be near the southern edge of the ozone “cloud,” although it may not be in the area of maximum concentrations. The Highlands site would have exceeded the new standard eight of the last ten years.

Aurora – East, 36001 Quincy Ave. (08 005 0006)

The Aurora East site began operation in June 2009. It is intended to act as a background site and an aid in the determination of the easternmost extent of the ozone “cloud” in the metro area. It is located along the eastern edge of the former Lowry bombing range, on a flat, grassy plains area. This site is currently outside of the rapid urban growth area taking place around Aurora Reservoir. There are currently plans to begin developing the Lowry area in the near future, however, which would shift the focus of this site from being a background site to an urban corridor site.

Boulder, 1405½ S. Foothills Parkway (08 013 0011)

The city of Boulder is located about 30 miles to the northwest of Denver. The Boulder Foothills, South Boulder Creek site was established as a special purpose ozone monitor as a part of the “Summer 1993 Denver Ozone Study.” During that summer a 1-hour level of 0.128 ppm was recorded on July 2, 1993. In 1994 the monitor was converted from an SPM to a seasonal SLAMS and in 1995 to a year-round ozone monitor when the instruments were moved into a new shelter. The South Boulder Creek monitor has not recorded an exceedance of the 1-hour NAAQS since the summer of 1993.

Although the Foothills monitor had not exceeded the previous standard of 0.085 ppm as an 8-hour average. It would have exceeded the new standard of 0.075 ppm as an 8-hour average five of the past six years.

Denver - Carriage, 2325 W. Irving Street (08 031 0014)

Carriage is located 2.5 miles west of the CBD. The site represents an ideal neighborhood exposure setting due to its unique location in an old carriage lot in the center of the block surrounded by houses. The Carriage ozone site began operation in 1981. It represents a good neighborhood site for ozone exposure since it is isolated enough to be unaffected by local traffic. Ozone levels at this site have not exceeded the old 1-hour NAAQS since 1987. The Denver Carriage monitor would have exceeded the new standard only once in the past ten years.

Denver Municipal Animal Shelter, 678 S. Jason Street (08 031 0025)

The Denver Municipal Animal Shelter (DMAS) was established as a replacement for the Denver Gates particulate monitor that was located at 1050 S. Broadway about one half mile south-southeast and on the other side of the South Platte River and I-25 South. The DMAS location represents the core area of the South Platte drainage in Denver. It has a good mixture of light industrial, residential areas and is strongly affected by the mobile sources along I-25 as well as South Santa Fe Drive. The openness of the area also permits the meteorological data to be representative of the larger core Denver area. Finally the site is on City owned property and will presumably be available for long-term trend analysis. When fully developed the site will be established as the NCore site for the Denver Metropolitan area.

Chatfield Reservoir, 11500 N. Roxborough Park Road (08 035 0004)

The Chatfield Reservoir location was established as the result of the 1993 Summer Ozone Study. The site is located on the south side of Chatfield Reservoir at the park offices. This location was selected over the Corps of Engineers Visitor Center across the reservoir because it was more removed from the influence of traffic along C-470. Located in the South Platte River drainage, this location is well suited for monitoring southwesterly ozone formation in the Denver metro area. The Chatfield monitor would have exceeded the new standard each of the past four years and the trend of the 3-year averages is increasing.

Colorado Springs, USAFA Road 640 (08 041 0013)

The United States Air Force Academy site was installed as a replacement maximum concentration ozone monitor for the Chestnut Street (08 041 0012) site. Modeling in the Colorado Springs area indicates that high ozone concentrations should generally be found along either the Monument Creek drainage to the north of the Colorado Springs CBD or to a lesser extent along the Fountain Creek drainage to the west of the CBD. The decision was made to locate this site near the Monument Creek drainage, approximately 9 miles north of the CBD. This location is near the south entrance of the Academy but away from any roads.

The Academy monitor did record an exceedance of the old 1-hour standard in 2003 but it would not have recorded any exceedances of the new 8-hour standard. However the trend in values over the past ten years is increasing.

Manitou Springs, 101 Banks Place (08 041 0016)

Manitou Springs is located 4 miles west of Colorado Springs. It was established because of concern that the “ozone cloud” was traveling farther up the canyon and the current monitoring network was not adequate. The Manitou Springs monitor began operations in April 2004. It is located in the foothills above Colorado Springs in the back of the maintenance area. In its four seasons of operation it has not recorded any levels greater than the new standard. The trend in 8-hour concentrations is increasing.

Rifle - Health, 195 14th Ave. (08 045 0012)

The Rifle Health site is located at the Garfield County Health Department building. The site is 1km to the north of the downtown area and next to the Garfield County fairgrounds. The site is uphill from the downtown area. A small residential area is to the north and a commercial area to the east. This site was established to measure ozone in Rifle, which is the largest population center in the oil and gas impacted area of the Grand Valley. Monitoring commenced in June 2008.

Arvada, 9101 57th Avenue (08 059 0002)

The city of Arvada is located 15 miles west-northwest of the Denver CBD. The Arvada site began operation before 1973. It is located to the northwest of the Denver CBD near the western end of the diurnal midday wind flow of the ozone “cloud.” As a result, when conditions are proper for daylong

ozone production, this site has received some of the highest levels in the city. In the early and mid 1970s, these wind patterns caused Arvada to have the most violations in the metro area. The Arvada monitor would have exceeded the new standard six of the past ten years and the years that it would not have exceeded the standard it was just below the level of the standard.

Welch, 12400 W. Highway 285 (08 059 0005)

The Division conducted a short-term ozone study on the grounds of Chatfield High School from June 14, 1989 until September 28, 1989. The Chatfield location was chosen because it sits on a ridge southwest of the Denver CBD. Wind pattern studies showed a potential for elevated ozone levels in the area on mid to late afternoon summer days. There were no exceedances of the NAAQS recorded at the Chatfield site but the levels were frequently higher than those recorded at the other monitoring sites south of the metro area.

One finding of the study was the need for a new, permanent site further north of the Chatfield High School location. As with most Denver locations, the predominant wind pattern is north/south. The southern flow occurs during the upslope, daytime warming period. The northern flow occurs during late afternoon and nighttime when drainage is caused by cooling and settling. The major drainages of Bear Creek and Turkey Creek were selected as target downwind transport corridors. These are the first major topographical features north of the Chatfield site. A point midway between the valley floor (Englewood site) and the foothill's hogback ridge was modeled to be the best estimate of the maximum downwind daytime transport area. These criteria were used to evaluate available locations. The Welch site best met these conditions. This site is located off State Highway 285 between Kipling Street and C-470.

The Welch monitor would not have exceeded the new standard in the past ten years. However, since 2002 the trend in values is increasing and in 2008 the 3-year average was above the level of the standard.

Rocky Flats - N, 16600 W. Highway 128 (08 059 0006)

The Rocky Flats - N site is located north-north east of the plant on the south side of Colorado Highway 128, approximately 1¼ miles to the west of Indiana Street. The site began operation in June 1992 as a part of the first phase of the APCD's monitoring effort around the Rocky Flats Environmental Technology Site.

Ozone monitoring began as a part of the "Summer 1993 Ozone Study". The monitor recorded some of the highest ozone levels of any of the sites during that study. Therefore, it was included as a regular part of the APCD ozone-monitoring network. The Rocky Flats – N monitor would have exceeded the new standard each of the last ten years and thirteen out of the last fifteen years.

NREL Solar Radiation Research Laboratory, 2054 Quaker Street (08 059 0011)

The National Renewable Energy Laboratory (NREL) site is located on the south rim of South Table Mountain, near Golden and was part of the 1993 Summer Ozone Study. Based on the elevated concentrations found at this location, it was made a permanent monitoring site in 1994. This site typically records some of the higher 8-hour ozone concentrations in the Denver area. It would have exceeded the new standard each of the past thirteen years it has been in operation.

Aspen Park, 26137 Conifer Road (08 059 0013)

The Aspen Park site began operation in May 2009. It is intended to verify/refute model predictions of above normal ozone levels. In addition, passive ozone monitors used in the area in a 2007 study indicated the possibility of larger than normal ozone levels. The monitor is located in an urban setting at a Park N Ride facility off of Highway 285, at an elevation of just over 8,100 feet. Because the site is nearly 3,000 feet higher than the average metro area elevation, it should see ozone levels that are larger than those seen in the metro area, as ozone concentrations increase with increasing elevation.

Whether or not the increased concentrations will be a health concern will be determined with the data gathered from this monitor.

Fort Collins - West, 3416 W. La Porte Avenue (08 069 0011)

The Fort Collins-West monitor began operation in May of 2006. The location was established based on modeling and to satisfy permit conditions for a major source in Fort Collins area. The levels recorded for the first season of operation have shown consistently higher concentrations than the 708 S. Mason Street monitor. For 2008 the 8-hour average, 4th maximum was 0.085 ppm. The 4th maximum, 8-hour average at the Mason Street monitor was 0.069 ppm for the same period.

Fort Collins - Mason, 708 S. Mason Street (08 069 1004)

The Fort Collins ozone site has been in operation since 1981 and has recorded only one exceedance of the former 1-hour standard since it began operation. It has only recorded four concentrations greater than the level of the 8-hour standard and has not ever had a third or fourth maximum concentration at or above the level of the 8-hour standard. Monitoring in this area will likely continue so that changes in the Fort Collins area may be examined, although violations are not expected. At this time there have not been any changes in the area that would require adjustment in the current monitoring level. Due to the size of the community, elevated ozone readings in Fort Collins probably result from second day transport/reactions from the Denver area.

Rist Canyon, 11838 Rist Canyon Road, (08 069 0011)

The Rist Canyon site began operation in May 2009. The monitor is located within the Rist Canyon Volunteer Fire Department Station Number 1, in the foothills west of Fort Collins. The monitor is at an elevation of 6,750 feet, which is roughly 1,600 feet above the Fort Collins – West monitor. Model predictions have indicated the development of larger than normal ozone levels in this area. The site is intended to verify/refute the model prediction.

Palisade Water Treatment, Rapid Creek Rd (08 077 0020)

The Palisade site is located at the Palisade Water Treatment Plant. The site is 4km to the east-northeast of downtown Palisade, just into the DeBeque Canyon area. The site is remote from any significant population and was established to measure maximum concentrations of ozone that may result from summertime up-flow conditions into a topographical trap. Monitoring commenced in May 2008.

Cortez, 106 W. North St. (08 083 0006)

The Cortez site is located in downtown Cortez at the Montezuma County Health Department building. Cortez is the largest population center in Montezuma County in the southwest corner of Colorado. This site was established to address community concerns of possible high ozone from oil and gas and power plant sources in the area. Many of these sources are in New Mexico. Monitoring commenced in May 2008.

Greeley - Weld County Tower, 3101 35th Avenue (08 123 0009)

The Weld County Tower monitor began operation in June 2002. The site was established after the 811 15th Street building was sold and was scheduled for demolition. The Weld County Tower site has generally recorded levels greater than the old site and would have exceeded the new standard each year since it began operation in 2002.

Appendix C - Nitrogen Dioxide Site Descriptions

Welby, 3174 E. 78th Avenue (08 001 3001)

The Welby nitrogen dioxide site began operation in July 1976. Its location in the up and down river drainage path of the Denver air mass that has been “cooking” gives either a warning of the events to come or the results of the day's exposure. The site serves as a good drainage location but it may be a target for deletion or relocation farther down the South Platte River valley from Denver.

Denver CAMP, 2105 Broadway (08 031 0002)

The City and County of Denver is located approximately 30 miles east of the foothills of the Rocky Mountains. Denver sits in a basin and the terrain of the city is characterized as gently rolling hills with the Platte River running from southwest to northeast just west of the downtown area.

The site represents a location typical of most of the downtown Denver area. The Division has shown that the downtown Denver area and the fringe area surrounding the downtown area is homogeneous and indicates that the CAMP station is representative of a wider area. Thus, the CAMP nitrogen dioxide site is representative of a neighborhood scale area.

Denver Municipal Animal Shelter, 678 S. Jason Street (08 031 0025)

The Denver Municipal Animal Shelter (DMAS) was established as a replacement for the Denver Gates particulate monitor that was located at 1050 S. Broadway about one half mile south-southeast and on the other side of the South Platte River and I-25 South. The DMAS location represents the core area of the South Platte drainage in Denver. It has a good mixture of light industrial, residential areas and is strongly affected by the mobile sources along I-25 as well as South Santa Fe Drive. The openness of the area also permits the meteorological data to be representative of the larger core Denver area. Finally the site is on City owned property and will presumably be available for long-term trend analysis. When fully developed the site will be established as the NCore site for the Denver Metropolitan area.

Appendix D - Sulfur Dioxide Site Descriptions

Welby, 3174 E. 78th Avenue (08 001 3001)

The Welby sulfur dioxide site began operation in July 1975. Its location in the up and down river drainage path of the Denver air mass that has been “cooking” gives either a warning of the events to come or the results of the day's exposure. The site serves as a good drainage location but it may be a target for deletion or relocation farther down the South Platte River valley from Denver.

Denver CAMP, 2105 Broadway (08 031 0002)

The City and County of Denver is located approximately 30 miles east of the foothills of the Rocky Mountains. Denver sits in a basin and the terrain of the city is characterized as gently rolling hills with the Platte River running from southwest to northeast just west of the downtown area.

However, this site represents a location typical of most of the downtown Denver area. This area has similar land uses, VMT (vehicle miles traveled) and sulfur dioxide sources. The Division has shown that the downtown Denver area and the fringe area surrounding the downtown area is homogeneous and indicates that the CAMP station is representative of a wider area. Thus, the CAMP sulfur dioxide site is representative of a neighborhood scale area.

Denver Municipal Animal Shelter, 678 S. Jason Street (08 031 0025)

The Denver Municipal Animal Shelter (DMAS) was established as a replacement for the Denver Gates particulate monitor that was located at 1050 S. Broadway about one half mile south-southeast and on the other side of the South Platte River and I-25 South. The DMAS location represents the core area of the South Platte drainage in Denver. It has a good mixture of light industrial, residential areas and is strongly affected by the mobile sources along I-25 as well as South Santa Fe Drive. The openness of the area also permits the data to be representative of the larger core Denver area. Finally the site is on City owned property and will presumably be available for long-term trend analysis. When fully developed the site will be established as the NCore site for the Denver Metropolitan area.

Appendix E - Meteorological Site Descriptions

Commerce City, 7101 Birch Street (08 001 0006)

The Commerce City monitor is located on the roof of the Alsup Elementary School. It began operation in November of 2001. The Commerce City site is in a predominantly residential area north of the Denver Central Business District (CBD) near the Platte River valley downstream from the Denver urban air mass.

Welby, 3174 E. 78th Avenue (08 001 3001)

The Welby site began operation in July 1973. The site is located along the bank of the South Platte River downstream from the Denver CBD. Welby is one of the longest continuously operating monitoring sites in the system.

Highland Reservoir, 8100 S. University Boulevard (08 005 0002)

The Highlands site began operation in 1978. It was intended to be a background location. However, with urban growth and the construction of C - 470, it has become a long-term trend site that monitors changes in the air quality of the area. It is a good orientation downwind from the Denver CBD.

Aurora – East, 36001 Quincy Ave. (08 005 0006)

The Aurora East site began operation in June 2009. It is intended to act as a background site and an aid in the determination of the easternmost extent of the ozone “cloud” in the metro area. It is located along the eastern edge of the former Lowry bombing range, on a flat, grassy plains area. This site is currently outside of the rapid urban growth area taking place around Aurora Reservoir. There are currently plans to begin developing the Lowry area in the near future, however, which would shift the focus of this site from being a background site to an urban corridor site.

Denver CAMP, 2105 Broadway (08 031 0002)

The City and County of Denver is located approximately 30 miles east of the foothills of the Rocky Mountains. Denver sits in a basin and the terrain of the city is characterized as gently rolling hills with the Platte River running from southwest to northeast just west of the downtown area.

The winds at the CAMP site are strongly affected by the street canyon effect of the downtown buildings. Meteorological data shows that winds are predominately from the south, south-southwest, north and north-northwest. However, due to the downtown location of this site, winds are shown to flow from almost all directions at similar frequencies.

Denver - Carriage, 2325 Irving Street (08 031 0014)

The Denver Carriage site is located 2.5 miles west of the CBD. The site represents an ideal neighborhood exposure setting due to its unique location in an old carriage lot in the center of the block surrounded by houses.

Auraria Met, 12th Street & Auraria Parkway (08 031 0021)

The Auraria meteorological monitor is located at the edge of the athletic fields and next to the parking lot for Metropolitan State College/ CU Denver. The monitor is 230 feet away from the Auraria Parkway and 350 feet from Speer Boulevard. It is one of the few locations in the CBD where wind data will be little affected by the street canyon effect of the buildings.

Denver Municipal Animal Shelter, 678 S. Jason Street (08 031 0025)

The Denver Municipal Animal Shelter was established as a replacement for the Denver Gates particulate monitor that was located at 1050 S. Broadway about one half mile south-southeast and on the

other side of the South Platte River and I-25 South. The DMAS location represents the core area of the South Platte drainage in Denver. Meteorological monitoring is expected to begin in the summer of 2007.

Chatfield Reservoir, 11500 N. Roxborough Park Road (08 035 0004)

The Chatfield Reservoir location was established as the result of the 1993 Summer Ozone Study. The site is located on the south side of Chatfield Reservoir at the Park offices. This location is away from the influence of trees and other influences.

Arvada, 9101 W. 57th Avenue (08 059 0002)

The city of Arvada is located 15 miles west-northwest of the Denver CBD. The Arvada site began operation before 1973. It's location to the northwest of the Denver CBD near the western end of the diurnal midday wind flow of the ozone "cloud" and development in the area make this a good population oriented site.

Welch, 12400 W. Highway 285 (08 059 0005)

The Welch site is located off State Highway 285 between Kipling Street and C-470. It is approximately 11 miles southwest of the Denver CBD and located between the drainages of Bear Creek and Turkey Creek. It is in position to monitor the southern flow that occurs during the upslope, daytime warming period and the northern flow, which occurs during late afternoon and nighttime when drainage is caused by cooling and settling.

Rocky Flats - N, 16600 W. Highway 128 (08 059 0006)

The Rocky Flats - N site is located north-northeast of the plant on the south side of Colorado Highway 128, approximately 1¼ miles to the west of Indiana Street. The site began operation in June 1992 as a part of the first phase of the APCD's monitoring effort around the Rocky Flats Environmental Technology Site. It has continued after the closing of Rocky Flats because it is one of the highest concentration ozone monitors in the state.

Rocky Flats - SE, 9901 Indiana Street (08 059 0008)

This site is located along Indiana Street southeast of Rocky Flats. The winds at this location are appreciably different from either the Rocky Flats North site or the Arvada site.

Aspen Park, 26137 Conifer Road (08 059 0013)

The Aspen Park site began operation in May 2009. It is intended to verify/refute model predictions of above normal ozone levels. In addition, passive ozone monitors used in the area in a 2007 study indicated the possibility of larger than normal ozone levels. The monitor is located in an urban setting at a Park N Ride facility off of Highway 285, at an elevation of just over 8,100 feet. Because the site is nearly 3,000 feet higher than the average metro area elevation, it should see ozone levels that are larger than those seen in the metro area, as ozone concentrations increase with increasing elevation. Whether or not the increased concentrations will be a health concern will be determined with the data gathered from this monitor.

Rist Canyon, 11838 Rist Canyon Road, (08 069 0011)

The Rist Canyon site began operation in May 2009. The monitor is located within the Rist Canyon Volunteer Fire Department Station Number 1, in the foothills west of Fort Collins. The monitor is at an elevation of 6,750 feet, which is roughly 1,600 feet above the Fort Collins – West monitor. Model predictions have indicated the development of larger than normal ozone levels in this area. The site is intended to verify/refute the model prediction.

Fort Collins - Mason, 708 S. Mason Street (08 069 1004)

The Mason Street site is the only meteorological site operated by the APCD in the Fort Collins area.

Grand Junction - Pitkin, 645¼ Pitkin Avenue (08 077 0018)

This location monitors carbon monoxide, wind speed, wind direction, temperature and hourly PM₁₀. It is located at the northern edge of a low usage parking lot near the Powell monitor.

Palisade Water Treatment, Rapid Creek Rd (08 077 0020)

The Palisade site is located at the Palisade Water Treatment Plant. The site is 4km to the east-northeast of downtown Palisade, just into the DeBeque Canyon area. The site is remote from any significant population and was established to measure maximum concentrations of ozone that may result from summertime up-flow conditions into a topographical trap. Monitoring commenced in May 2008.

Lamar Port of Entry, 7100 US Highway 50, (08 099 0003)

The particulate monitors in Lamar have recorded some of the highest readings in the state. These readings are primarily associated with east winds in excess of 20 mph. The Division first established a meteorological monitor in Lamar at the Municipal Building but this location was too protected and the monitor was moved to the Port of Entry location in March of 2005.

Appendix F - PM₁₀ Site Descriptions

Commerce City, 7101 Birch Street (08 001 0006)

The Commerce City site is in a predominantly residential area north of the Denver Central Business District (CBD) near the Platte River valley downstream from the Denver urban air mass. There are two schools in addition to the Alsup Elementary school in the immediate vicinity; a middle school and a high school. There is a large industrial area to the south and gravel pits to the west and northwest. This is a good location to capture particulate matter pollution draining down the Platte River Valley from downtown Denver and up slope valley flows from the Greeley area. Adams City/Commerce City has historically shown high PM₁₀ concentrations as well.

Welby, 3174 E. 78th Avenue (08 001 3001)

Welby is located 8 miles north-northeast of the Denver CBD on the bank of the South Platte River, this site is ideally located to measure nighttime drainage of the air mass from the Denver metropolitan area and the thermally driven, daytime upriver flows. It is located in the up and down river drainage path of the Denver air mass that has been “cooking” gives either a warning of the events to come or the results of the day's exposure. The site serves as a good drainage location but it may be a target for deletion or relocation farther down the South Platte River valley from Denver.

Alamosa - ASC, 208 Edgemont Boulevard (08 003 0001)

This Alamosa site is located on the science building of Adams State College in a principally residential area. The only significant traffic is on US 160 through the center of town. The site is along this highway but far enough away to reduce impacts on the levels. Meteorological data are not available from the area. The city has a population of 8,458 (July 2007 population estimate). This is an increase of 6.2 percent from the 2000 census. The major particulate source is wind-blown dust. This site began operation in 1973 as a TSP monitor and was changed to a PM₁₀ monitor in June 1990.

Alamosa - Municipal, 425 4th Street (08 003 0003)

The Alamosa 425 4th Street was started in May 2002. The site was established closer to the center of the city to be more representative of the population exposure in the area.

Pagosa Springs, 309 Lewis Street (08 007 0001)

The Pagosa Springs site was located on the roof of the Town Hall from April 24, 2000 through May 2001. When the Town Hall building was planned to be demolished, the PM₁₀ monitor was relocated to the Pagosa Springs Middle School and the first sample was collected on June 7, 2001.

The Pagosa Springs Middle School site is located next to Highway 160 near the center of town. Pagosa Springs is a small town spread over a large area. The San Juan River runs through the south side of town. The town sits in a small bowl like setting with hills all around. A small commercial strip area along Highway 160 and single-family homes surrounds this location. It is representative of residential neighborhood exposure. Pagosa Springs was a PM₁₀ nonattainment area and a SIP was implemented for this area. PM₁₀ concentrations were exceeded a few times in the late 1980's. However, the PM₁₀ pollution was cleaned up through the SIP control measures and the area has only exceeded the PM₁₀ standard once since 1994 and that was a regional blowing dust event in March of 1999.

Winds for this area predominantly blow from the north, with secondary winds from the north-northwest and the south. The predominant wind directions closely follow the valley topography in this rugged terrain. McCabe Creek, which is very near the meteorological station that was on the Town Hall building, runs north south through this area.

Longmont, 350 Kimbark Street (08 013 0003)

The town of Longmont is a growing, medium sized, Front Range community Longmont is located between the Denver/Boulder Metro-area and Fort Collins. Longmont is both suburban and rural in nature. The town of Longmont is located approximately 30 miles north of Denver along the St. Vrain Creek and is about six miles east of the foothills. Longmont is partly a bedroom community for the Denver-Boulder area. The elevation is 4978 feet. The Front Range peaks rise to an elevation of 14,000 feet just to the west of Longmont. In general, the area experiences low relative humidity, light precipitation and abundant sunshine.

Longmont's predominant wind direction is from the north through the west due to winds draining from the St. Vrain Creek Canyon. The PM₁₀ site is near the center of the city near both commercial and residential areas. This location provides the best available monitoring for population exposure to particulate matter. The distance and traffic estimate for the controlling street easily falls into the neighborhood scale in accordance with federal guidelines found in 40 CFR, Part 58, Appendix D.

Boulder Chamber of Commerce, 2440 Pearl Street (08 013 0012)

The city of Boulder is located on the eastern edge of the Rocky Mountain foothills. Most of the city sits on rolling plains. The Boulder PM_{2.5} site is approximately 7,000 feet east of the base of the Front Range foothills and about 27.4 feet south of a small branch of Boulder Creek, the major creek that runs through Boulder.

The predominant wind direction is from the west with secondary maximum frequencies from the west-northwest and west-southwest. The distance and traffic estimate for Pearl Street and Folsom Street falls into the neighborhood scale in accordance with federal guidelines found in 40 CFR, Part 58, Appendix D.

Delta, 560 Dodge Street (08 029 0004)

Delta is a small agricultural community midway between Grand Junction and Montrose. Louisiana Pacific's plywood manufacturing facility is only major point source of particulate matter in the area. The topography in and around Delta is relatively flat as it sits in the broad flat Uncompaghre River Valley. There are high mesas and mountains surrounding this high valley. Delta sits in a large bowl shaped basin that can effectively trap air pollution especially during persistent temperature inversions.

The Delta County Health Department site was chosen because it is a one story building near the downtown area. The site is representative of the large basin with the potential for high PM₁₀ due to agricultural burning, automobile traffic and the Louisiana Pacific plant.

Denver CAMP, 2105 Broadway (08 031 0002)

The City and County of Denver is located approximately 30 miles east of the foothills of the Rocky Mountains. Denver sits in a basin and the terrain of the city is characterized as gently rolling hills with the Platte River running from southwest to northeast just west of the downtown area.

Meteorological data gathered at the CAMP monitoring station is inconclusive for evaluation of the location as a PM₁₀ micro-scale site. The winds are strongly affected by the street canyon effect of the downtown buildings. Meteorological data shows that winds are predominately from the south, south-southwest, north and north-northwest. However, due to the downtown location of this site, winds are shown to flow from almost all directions at similar frequencies. Modeling of the emissions, traffic volume and history show that the CAMP monitor is well situated to be a maximum concentration, micro-scale site. However, this site represents a location typical of most of the downtown Denver area. This area has similar land uses, VMT (vehicle miles traveled) and PM₁₀ sources. The Division has shown that the downtown Denver area and the fringe area surrounding the downtown area is homogeneous and indicates that the CAMP station is representative of a wider area than just its own micro-scale setting.

Denver Visitor Center, 225 W. Colfax Avenue (08 031 0017)

The Denver Visitor Center site is located near the corner of Colfax Avenue and Tremont Street. It began operation on December 28, 1992. In 1993, this site along with the Denver CAMP and Gates monitors recorded the first exceedances of the 24-hour PM_{10} standard in the Denver metropolitan area since 1987. The Visitor Center recorded a PM_{10} level of $161 \mu\text{g}/\text{m}^3$ on January 14, 1993. Since then, the maximum value recorded at the site has been $119 \mu\text{g}/\text{m}^3$ in 2001. In the past ten years, the 24-Hour maximum levels have trended downward while the annual average has been relatively flat remaining around $25 \mu\text{g}/\text{m}^3$.

Denver Municipal Animal Shelter, 678 S. Jason Street (08 031 0025)

The Denver Municipal Animal Shelter was established as a replacement for the Denver Gates particulate monitoring site that was located at 1050 S. Broadway about one half mile south-southeast and on the other side of the South Platte River and I-25 South. The DMAS location represents the core area of the South Platte drainage in Denver. It has a good mixture of light industrial, residential areas and is strongly affected by the mobile sources along I-25 as well as South Santa Fe Drive. The openness of the area also permits the meteorological data to be representative of the larger core Denver area. Finally the site is on City owned property and will presumably be available for long-term trend analysis. When fully developed the site will be established as the NCore or National Core site for the Denver Metropolitan area.

Colorado College, 130 W. Cache la Poudre Street (08 041 0017)

The Colorado College monitor was established after the revised particulate regulations required that Colorado Springs needed a continuous $PM_{2.5}$ monitor. The Department elected to collocate the new $PM_{2.5}$ monitor with the corresponding filter based monitors from the RBD site at the Colorado College location. These monitors began operation in January of 2008.

The nearest representative meteorological site is located at the Colorado Springs Airport. Wind flows at the Colorado College site are affected by its proximity to Fountain Creek, so light drainage winds will follow the creek in a north/south direction.

Cañon City - City Hall, 128 Main Street (08 043 0003)

Cañon City is located 39 miles west of Pueblo. Particulate monitoring began on January 2, 1969 with the operation of a TSP monitor located on the roof of the courthouse building at 7th Avenue and Macon Street.

The Cañon City PM_{10} site began operation in December 1987. On May 6, 1988, the Macon Street monitor recorded a PM_{10} concentration of $172 \mu\text{g}/\text{m}^3$. This is the only exceedance of either the 24-hour or annual NAAQS since PM_{10} monitoring was established at Cañon City. The Macon Street site was relocated to the City Hall in October of 2004.

Parachute, 100 E. 2nd Street (08 045 0005)

The annual average has been trending upward but is still just over one half of the former annual standard for PM_{10} which was $50 \mu\text{g}/\text{m}^3$.

Rifle - Henry Building, 144 3rd Street (08 045 0007)

The first Rifle site began operation in June 1985 and ended operation in May 1986. The next site began operation in December 1987 and continued until 2001. The levels at that site, with the exception of the March 31, 1999 high wind event were always less than one half of both the annual and the 24-hour standards. The current location on the Henry Building began operation in May of 2005 as a part of the Garfield County study.

Crested Butte, 603 6th Street (08 051 0004)

The Crested Butte PM₁₀ site began operation in June 1985. Crested Butte is a high mountain ski town. The monitor is at the east end of town near the highway and in the central business district. Any wood burning from the residential area to the west directly affects this location. The physical setting of the town, near the end of a steep mountain valley, makes wood burning, Street sanding and wintertime inversions a major concern. The town is attempting to regulate the number of wood burning appliances, since this is a major source of wintertime PM₁₀. Crested Butte has not recorded an exceedance of the NAAQS since it began monitoring.

Mt. Crested Butte, 19 Emmons Road (08 051 0007)

Mount Crested Butte is located at an elevation of 8,940 feet (2,725 m) at the base of the Crested Butte Mountain Resort ski area. Mount Crested Butte is a unique location for high particulate matter concentrations because it is located on the side of a mountain (Crested Butte 12,162 ft. or 3,707 m), not in a bowl, valley, or other topographic feature that would normally trap air pollutants. There is not a representative meteorological station in or near Mt. Crested Butte.

The location for the Mt. Crested Butte site was selected because it had an existing PM₁₀ site that had several high PM₁₀ concentrations including five exceedances of the 24-hour standard in 1997 and one in 1998. Mt. Crested Butte also exceeded the PM₁₀ annual average standard in 1997. A CMB source apportionment from 10 PM₁₀ filters identified crustal material as the mostly likely source (91 percent) of PM₁₀. Carbon, which is most likely from residential woodsmoke, made up 8 percent of the statistically composite sample and secondary species made up the remaining 1 percent. The Mt. Crested Butte site was also selected because it is an area representative of the residential impact of PM_{2.5}.

Durango - River City Hall, 1235 Camino del Rio (08 067 0004)

Durango is the second largest city on the western slope. The town is situated in the Animas River Valley in southwestern Colorado. Its elevation is approximately 6,500 feet (1981 meters) above mean sea level. The Animas valley through Durango is steep and narrow. Even though little meteorological information is available for the area, the microclimate of Colorado mountain communities is characterized by cold air subsidence, or drainage flows during the evening and early morning hours and up valley flows during afternoon and early evening hours when solar heating is highest. Temperature inversions that trap air pollutants near the surface are common during night and early morning hours.

Fort Collins - CSU, 251 Edison Street (08 069 0009)

Fort Collins does not have the population to require a particulate monitor under Federal regulation. However, it is one of the largest cities along the Front Range.

Grand Junction - Powell, 650 South Avenue (08 077 0017)

Grand Junction is the largest city on the western slope in the broad valley of the Colorado River. The monitors are on county owned buildings in the south side of the city. The site is on the southern end of the central business district and close to the industrial area along the train tracks. It is about a half a mile north of the river and about a quarter mile east of the railroad yard. This site monitors 24-hour and hourly PM₁₀ as well as for 24-hour and hourly PM_{2.5} and PM_{2.5} Speciation.

Grand Junction - Pitkin, 645¼ Pitkin Avenue (08 077 0018)

This location monitors carbon monoxide, wind speed, wind direction, temperature and hourly PM₁₀. It is located at the northern edge of a low usage parking lot near the Powell monitor.

Clifton, Hwy 141 & D Road (08 077 0019)

The Clifton monitor is located in the town of Clifton which is a southeastern suburb of Grand Junction, Colorado. The monitor is in a low usage parking lot operated by the sanitation district. It is one

half mile north of the Colorado River. The site was established at the request of the Mesa County Health Department to address concerns of the oil and gas development in the area.

The monitor began operations in October 2007 and operates on an every third day schedule.

Aspen - Library, 120 Mill Street (08 097 0006)

Aspen is at the upper end of a steep mountain valley. The major difference is that Aspen does not have an interstate running through it. Aspen was classified as nonattainment for PM₁₀ but it is now under an attainment/maintenance plan. The valley is more restricted at the lower end and thus forms a tighter trap for pollutants in the valley. The transient population due to winter skiing and summer mountain activities greatly increases the population and traffic during these seasons. There is also a large down valley population that commutes to work each day from as far away as the Glenwood Springs area 41 miles to the northeast.

There have been several particulate monitors in the Aspen area. Only three have not been short-term special studies. The first PM₁₀ monitor began operation in June 1985. The next, the Sport Stalker, was chosen after an intense effort involving EPA, State and local agency personnel. The need was to find an acceptable middle or middle scale location.

Lamar Power Plant, 100 2nd Street (08 099 0001)

Lamar is one of the largest cities on the eastern plains. Particulate monitoring in Lamar began in August 1975 with the installation of a TSP site at the Lamar power plant at 100 2nd Street. It operated as a TSP site until August of 1986. The first Lamar PM₁₀ site began operation in June 1985 at the power plant. In August 1986, the monitoring site was moved to the Municipal Complex (08 099 0002).

On March 19, 1976, the Lamar power plant monitor recorded a TSP of 1,033 µg/m³. This is the fourth highest particulate concentration ever reported in Colorado. Lamar has regularly recorded its highest TSP and PM₁₀ levels in March. Between 1975 and 1986 the power plant monitor reported 25 concentrations greater than the 24-hour TSP NAAQS of 260 µg/m³, twelve of these occurred in March, no other month had more than three. Three of the seven exceedances of the 24-hour PM₁₀ NAAQS have also occurred in March. The primary reason for this relationship is due to the combination of low humidity and high winds that are common during the month of March. Lamar is the only Colorado city east of Denver to have been designated as a PM₁₀ nonattainment area and is now under an attainment/maintenance plan. In 1992, the Division reinstated the power plant location as well. This was done after a review showed that levels at the power plant were generally higher than those at the City Complex. As a part of the SIP for Lamar, a meteorological site was established in 1992 at the city complex location. Analysis of these data was included as a part of the SIP process.

Lamar - Municipal Building, 104 Parmenter Street (08 099 0002)

The Lamar Municipal site was established in January of 1996 as a more population oriented location than the Power Plant. The Power Plant site is located on the northern edge of town while the Municipal site is near the center of the town. Both sites have recorded exceedances of the 24-hour standard of 150 µg/m³ and both sites regularly record values above 100µg/m³ as a 24-hour average.

Pueblo - Public Works, 211 E. D Street (08 101 0012)

Pueblo is the third largest city in the state, not counting communities that are part of Metropolitan Denver. Pueblo is principally characterized by rolling plains and moderate slopes with elevations ranging from 4,474 ft to 4,814 ft (1,364 to 1,467 m). The Rocky Mountain Front Range is about 25 miles (40 km) west and the sight of Pikes Peak is easily visible on a clear day.

Meteorologically, Pueblo can be described as having mild weather with an average of about 300 days of sunshine per year. Generally, wind blows up valley from the southeast during the day and down valley from the west at night. Pueblo experiences average wind speed ranges from 7 miles per hour in the fall and early winter to 11 miles per hour in the spring.

The site is located on the roof of the Public Works Building at 211 E. D St., in a relatively flat area found two blocks northeast of the Arkansas River. It is also located near Fountain Creek. The distance and traffic estimate for Main Street and surrounding streets easily falls into the middle scale in accordance with federal guidelines found in 40 CFR, Part 58, Appendix D.

The Division is in the process of finding a location for the Pueblo monitors since a new tall building is under construction adjacent to the monitors.

Steamboat Springs, 136 6th Street (08 107 0003)

Like other ski towns, Steamboat Springs has problems with wintertime inversions, high traffic density, wood smoke and street sand. These problems are exacerbated by temperature inversions that trap the pollution in the valleys.

The first site began operation in Steamboat Springs in June 1985 at 929 Lincoln Avenue. It was moved to the current location in October 1986. The 136 6th Street location not only provides a good indication of population exposure, since it is more centrally located, but it has better accessibility than the previous location.

Telluride, 333 W. Colorado Avenue (08 117 0002)

Telluride is a high mountain ski town in a narrow box end valley. The San Miguel River runs through the south end of town and the town is only about ½ mile wide from north to south. The topography of this mountain valley regime creates temperature inversions that can last for several days during the winter. Temperature inversions can trap air pollution close to the ground. Telluride sits in a valley that trends mainly east to west, which can trap air pollutants more effectively since the prevailing winds in this latitude are the westerly and the San Miguel River Valley is closed off on the east end.

Breckenridge - 501 N. Park Avenue (08 119 0002)

The City of Breckenridge is located in the valley of the Blue River. It is a tourist center with skiing in the winter and numerous summertime festivals and activities. The resulting woodsmoke and traffic caused sufficient concern that the city of Breckenridge requested that the Division establish PM₁₀ monitoring in the area. The Breckenridge site began operation in April 1992 and it recorded exceedances of the level of the 24-hour standard in both 2000 and in 2005. The site is currently operating on an every third day sampling schedule.

Greeley - Hospital, 1516 Hospital Road (08 123 0006)

Winds in this area are primarily out of the northwest, with dominant wind speeds less than 3.1 m/s. Secondary winds are from the north, north-northwest and east-southeast, with the most frequent wind speeds also being less than 3.1 m/s. The most recent available wind data for this station is for the period December 1986 to November 1987. Predominant residential growth patterns are to the west and north with large industrial growth expected to the west. There are two feedlots located about 11 miles east of the town. There was a closer feedlot on the east edge of town, but it was moved in early 1999, after the town of Greeley purchased the land in 1997.

The Greeley PM₁₀ monitor is on the roof of a hospital office building at 1516 Hospital Road. Greeley Central High School is located immediately to the east of the monitoring site. Overall, this is in an area of mixed residential and commercial development that makes it a good population exposure, neighborhood scale monitor. The distance and traffic estimate for the most controlling street easily falls into the neighborhood scale in accordance with federal guidelines found in 40 CFR, Part 58.

Appendix G - PM_{2.5} Site Descriptions

Commerce City, 7101 Birch Street (08 001 0006)

The Commerce City site is in a predominantly residential area north of the Denver Central Business District (CBD) near the Platte River valley downstream from the Denver urban air mass. There are two schools in addition to the Alsup Elementary School in the immediate vicinity, a middle school to the north and a high school to the southeast. There is a large industrial area to the south and gravel pits to the west and northwest. This is a good location to capture particulate matter pollution draining down the Platte River Valley from downtown Denver and up slope valley flows from the Greeley area. The old Adams City/Commerce City site, which was about 180 meters north of the Alsup Elementary School, recorded high PM₁₀ concentrations as well.

Arapahoe Community College, 6190 S. Santa Fe Drive (08 005 0005)

The ACC site is located in south suburban metropolitan Denver. It is located on the south side of the Arapahoe Community College in a distant parking lot. The site is near the bottom of the Platte River Valley along Santa Fe Drive (Hwy. 85) in the city of Littleton. It is also near the city of Englewood. There is a large residential area located to the east across the railroad and Light Rail tracks. The PM_{2.5} monitor is located on a mobile shelter in the rarely used South parking lot. Located at 6190 S. Santa Fe Drive, this small trailer is close to the Platte River and the monitor has excellent 360° exposure. Based on the topography and meteorology of the area ACC is in an area where PM_{2.5} emissions may collect. This location may capture high concentrations during periods of upslope flow and temperature inversion in the valley. However, since it is further south in a more sparsely populated area than the Broadway-CAMP site, the concentrations are usually not as high as other Denver locations.

Winds are predominately out of the south-southwest and south, with secondary winds out of the north and north-northeast (upslope). Observed distances and traffic estimates easily fall into the neighborhood scale in accordance with federal guidelines found in the 40 CFR, Part 58, Appendix D. The site meets all other neighborhood scale criteria.

Longmont, 350 Kimbark Street (08 013 0003)

The town of Longmont, located in Boulder County, is a growing, medium sized, Front Range community. It is located approximately 30 miles north of Denver along the St. Vrain Creek and is about six miles east of the foothills. Longmont is partly a bedroom community for the Denver-Boulder area. The elevation is 4,978 feet. The Front Range peaks rise to an elevation of 14,000 feet just to the west of Longmont. In general, the area experiences low relative humidity, light precipitation and abundant sunshine

Longmont's predominant wind direction is from the north through the west due to winds draining from the St. Vrain Creek Canyon. The PM_{2.5} site is near the center of the city near both commercial and residential areas. This location provides the best available monitoring for population exposure to particulate matter. The distance and traffic estimate for the AADT controlling street easily falls into the neighborhood scale in accordance with federal guidelines found in 40 CFR, Part 58, Appendix D.

Boulder Chamber of Commerce, 2440 Pearl Street (08 013 0012)

The city of Boulder is located on the eastern edge of the Rocky Mountain foothills. Most of the city sits on rolling plains. The Boulder PM_{2.5} site is approximately 7,000 feet (2.13 km) east of the base of the Front Range foothills and about 27.4 feet (8.35 m) south of a small branch of Boulder Creek, the major creek that runs through Boulder.

The predominant wind direction is from the west with secondary maximum frequencies from the west-northwest and west-southwest. The distance and traffic estimate for Pearl Street and Folsom Street falls into the neighborhood scale in accordance with federal guidelines found in 40 CFR, Part 58,

Appendix D. Thus, the Boulder Chamber of Commerce PM_{2.5} site is representative of a neighborhood scale area and meets all other neighborhood scale criteria.

Boulder - CU/Athens, 2102 Athens Street (08 013 1001)

The Boulder - CU site is located at the edge of a low usage parking lot to the north and the football practice field to the south. This location provides a good neighborhood representation for particulates. This site will be removed in 2009 due to construction of a new domed practice field.

Denver CAMP, 2105 Broadway (08 031 0002)

The City and County of Denver is located approximately 30 miles east of the foothills of the Rocky Mountains. Denver sits in a basin and the terrain of the city is characterized as gently rolling hills with the Platte River running from southwest to northeast just west of the downtown area.

Meteorological data gathered at the CAMP monitoring station is inconclusive for evaluation of the location as a PM_{2.5} micro-scale site. The winds are strongly affected by the street canyon effect of the downtown buildings. Meteorological data shows that winds are predominately from the south, south-southwest, north and north-northwest. However, due to the downtown location of this site, winds are shown to flow from almost all directions at similar frequencies. Modeling of the emissions, traffic volume and history show that the CAMP monitor is well situated to be a maximum concentration, micro-scale site. However, this site represents a location typical of most of the downtown Denver area. This area has similar land uses, VMT (vehicle miles traveled) and PM_{2.5} sources. The Division has shown that the downtown Denver area and the fringe area surrounding the downtown area is homogeneous and indicates that the CAMP station is representative of a wider area than just its own micro-scale area.

Denver NJH-E, 14th Avenue & Albion Street (08 031 0013)

This site is located three miles east of the Denver CBD, close to one of the busiest intersections in Denver (Colorado Boulevard and Colfax Avenue). The current site began operations in 1982. Two previous sites were located just west of the current location. The first operated for only a few months before it was moved to a new and “temporary” site in the corner of the laboratory building at the corner of Colorado Boulevard and Colfax Avenue.

Denver - Swansea, 4650 Columbine Street (08 031 0023)

The Swansea Elementary school site was established as a part of the toxicological study associated with the ASARCO Study conducted by the Colorado Department of Public Health and Environment.

Denver Municipal Animal Shelter, 678 S. Jason Street (08 031 0025)

The Denver Municipal Animal Shelter was established as a replacement for the Denver Gates monitor that was located at 1050 S. Broadway about one half mile south-southeast and on the other side of the South Platte River and I-25 South. The DMAS location represents the core area of the South Platte drainage in Denver. It has a good mixture of light industrial, residential areas and is strongly affected by the mobile sources along I-25 as well as South Santa Fe Drive. The openness of the area also permits the meteorological data to be representative of the larger core Denver area. Finally the site is on City owned property and will presumably be available for long-term trend analysis. When fully developed the site will be established as the NCore site for the Denver Metropolitan area.

Chatfield Reservoir, 11500 N. Roxborough Park Road (08 035 0004)

The Chatfield Reservoir location was established as the result of the 1993 Summer Ozone Study. The site is located on the south side of Chatfield Reservoir at the campground registration building. This location was selected over the Corps of Engineers Visitor Center across the reservoir because it was more

removed from the influence of traffic along C-470. Located in the South Platte River drainage, this location is well suited for monitoring southwesterly PM_{2.5} particulates in the Denver metro area.

Elbert County, 24950 Ben Kelly Road (08 039 0001)

The Elbert County site is believed to be a good location to measure urban background concentrations of PM_{2.5}. Winter winds at Elbert are from the southwest to southeast at 4-5 m/s during the morning hours. During the afternoon hours, brisk winds are generally from the south-southwest to the southeast. This shows that the Denver Metropolitan Area does not influence the winds moving across the monitoring site. A July 1981 analyses of surface streamline was done to study summer wind patterns in this same area. The study shows that in the later morning hours (0800), winds predominately blow from the north and northeast, placing the Denver Metro-Area upwind of the site. Although, during the early morning hours, wind flows off the Cheyenne Ridge and Palmer Lake Divide into the river basins to the north and south, away from the Elbert County monitoring site. By early afternoon (1100) and continuing through later afternoon (1400), up slope flow occurs over nearly the entire region, bringing clean air from the east and northeast to the site. By the evening hours, winds again predominately flow from the mountain region, with these westerly winds again flowing off the Palmer Lake Divide, away from the monitoring site. This would suggest that the Elbert County site is a very clean location for winter months and for early morning, afternoon and evening hours during the summer months.

The location of this Elbert County site classifies it as an urban background site, in accordance with federal guidelines found in 40 CFR, Part 58, Appendix D. The site meets all guidelines for the urban background site.

Colorado College, 130 W. Cache la Poudre Street (08 041 0017)

The Colorado College monitor was established after the revised particulate regulations required that Colorado Springs needed a continuous PM_{2.5} monitor. The Department elected to collocate the new PM_{2.5} monitor with the corresponding filter based monitors from the RBD site at the Colorado College location. These monitors began operation in January of 2008.

The nearest representative meteorological site is located at the Colorado Springs Airport. Wind flows at the Colorado College site are affected by its proximity to Fountain Creek, so light drainage winds will follow the creek in a north/south direction.

Fort Collins - CSU, 251 Edison Street (08 069 0009)

Fort Collins does not have the population to require a carbon monoxide monitor under Federal regulation. However, it is one of the largest cities along the Front Range.

Grand Junction - Powell, 650 South Avenue (08 077 0017)

Grand Junction is the largest city on the western slope in the broad valley of the Colorado River. The monitors are on county owned buildings in the south side of the city. The site is on the southern end of the central business district and close to the industrial area along the train tracks. It is about a half a mile north of the river and about a quarter mile east of the railroad yard. This site monitors 24-hour and hourly PM₁₀ as well as for 24-hour and hourly PM_{2.5} and PM_{2.5} Speciation.

Pueblo - Public Works, 211 S. D Street (08 101 0012)

Not counting communities that are part of Metropolitan Denver, Pueblo is the third largest city in the state. Pueblo is principally characterized by rolling plains and moderate slopes with elevations ranging from 4,474 ft to 4,814 ft. The Rocky Mountain Front Range is about 25 miles west and the sight of Pikes Peak is easily visible on a clear day.

Meteorologically, Pueblo can be described as having mild weather with an average of about 300 days of sunshine per year. Generally, wind blows up valley from the southeast during the day and down

valley from the west at night. Pueblo experiences average wind speed ranges from 7 miles per hour in the fall and early winter to 11 miles per hour in the spring.

The site is located on the roof of the Public Works Building at 211 S. D St., in a relatively flat area found two blocks northeast of the Arkansas River. It is also located near Fountain Creek. The distance and traffic estimate for Main Street and surrounding streets easily falls into the neighborhood scale in accordance with federal guidelines found in 40 CFR, Part 58, Appendix D.

The Division is in the process of finding a location for the Pueblo monitors since a new tall building is under construction adjacent to the monitors.

Greeley - Hospital, 1516 Hospital Road (08 123 0006)

The current Greeley site has been in operation since 1982.

Winds in this area are primarily out of the northwest; with dominant wind speeds less than 3.1 m/s. Secondary winds are from the north, north-northwest and east-southeast, with the most frequent wind speeds also being less than 3.1 m/s. The most recent available wind data for this station is for the period December 1986 to November 1987. Predominate residential growth patterns are to the west and north with large industrial growth expected to the west. There are two feedlots located about 11 miles east of the town. There was a closer feedlot on the east edge of town, but it was moved at the first of 1999, after the town of Greeley purchased the land in 1997.

The Greeley PM_{2.5} monitor is on the roof of a hospital office building at 1516 Hospital Road. Greeley Central High School is located immediately to the east of the monitoring site. Overall, this is in an area of mixed residential and commercial development that makes it a good population exposure, neighborhood scale monitor. The distance and traffic estimate for the most controlling street easily falls into the neighborhood scale in accordance with federal guidelines found in 40 CFR, Part 58, Appendix D.

Platteville, 1004 Main Street (08 123 0008)

Platteville is located immediately west of Highway 85 along the Platte River valley bottom four miles east of I 25, at an elevation of 4,825 feet. The area is characterized by relatively flat terrain and is located about one mile east of the South Platte. The National Oceanic and Atmospheric Administration operated the PROFS (Prototype Regional Observational Forecasting System) Mesonet network of meteorological monitors from the early 1980's through the mid 1990's in the northern Colorado Front Range area. Based on this data, the area around Platteville is one of the last places in the wintertime that the cold pool of air that is formed by temperature inversions burns off. This is due to solar heating. The upslope/downslope Platte River Valley drainage and wind flows between Denver and Greeley, make Platteville a good place to monitor PM_{2.5}. These characteristics also make it an ideal location for chemical speciation sampling, which began at the end of 2001.

The Platteville site is located at 1004 Main Street at the South Valley Middle School, located on the south side of town on Main Street. The school is a one-story building and it has a roof hatch from a locked interior room providing easy access to its large flat roof. There is a 2-story gym attached to the building approximately 28 meters to the Northwest of the monitor. The location of the Platteville monitor easily falls into the regional transport scale in accordance with federal guidelines found in 40 CFR, Part 58, Appendix D.

Appendix H - TSP/Lead Site Descriptions

Denver Municipal Animal Shelter, 678 S. Jason Street (08 031 0025)

The Denver Municipal Animal Shelter was established as a replacement for the Denver Gates particulate monitor that was located at 1050 S. Broadway about one half mile south-southeast and on the other side of the South Platte River and I-25 South. The DMAS location represents the core area of the South Platte drainage in Denver. It has a good mixture of light industrial, residential areas and is strongly affected by the mobile sources along I-25 as well as South Santa Fe Drive. The openness of the area also permits the meteorological data to be representative of the larger core Denver area. Finally the site is on city owned property and will presumably be available for long-term trend analysis. When fully developed the site will be established as the NCore site for the Denver Metropolitan area.

Appendix I - National Core (NCore) Monitoring Station

The Colorado Department of Public Health and Environment, Air Pollution Control Division's NCore monitoring station is located on the Denver Municipal Animal Shelter (DMAS) lot at 678 S. Jason Street in Denver, Colorado. This location is in the Denver-Boulder Region with its projected population for 2008 of 2.845 million. This is a projected increase of 1.6 percent from the 2000 census. The site is located approximately 4 miles directly south of the Denver CBD along the South Platte River. This location was established as the NCore site in conjunction with EPA Region VIII and the City and County of Denver.

The DMAS site was also chosen because it represented a better neighborhood scale for carbon monoxide, ozone and particulate matter. The site also had enough space available for the number of samplers required for an NCore monitoring site. Its location along the South Platte River provides maximum exposure to the up and down-valley pollution carried by the diurnal winds. This last point is supported by the wind rose. The wind rose has data only for seven months but the trend is evident.

Area of Representativeness

40 CFR Part 58 Appendix provides design criteria for ambient air quality monitoring. The monitoring objective for the NCore site is to produce data that represents a fairly large area and therefore the spatial scale of the site is important. The special scale defines the physical dimensions of the air parcel nearest to the monitoring site throughout which actual pollutant concentrations are similar. It is determined by the characteristics of the area surrounding the air monitoring site and the site's distance from nearby air pollution sources such as roadways, factories, etc. In the case of urban NCore the special scales to be used are neighborhood and urban. The following table shows the area of representativeness for each pollutant for the DMAS site.

Table 14 - Parameters and Scale for the Denver Municipal Animal Shelter

AQS #	Site Name	Address		Started	Ended	Latitude	Longitude	Elevation
08 031 0025	Denver Municipal Animal Shelter	678 S. Jason St.		07/2005		39.704005	-104.998113	1,594
	Parameter	POC	Started	Orient/Scale	Monitor	Type	Sample	
	CO	1	05/2009	P.O. Neigh	Thermo 48C-TLE	NCore	Continuous	
	SO ₂	1	05/2008	P.O. Neigh	Ecotech 9850T	NCore	Continuous	
	NO _y		+					
	O ₃	1	04/2008	Neigh/Urban	API 400A	NCore	Continuous	
	WS/WD/Temp (U)	1	07/2008	P.O. Neigh	Met - One	NCore	Continuous	
	Relative Humidity	1	+		Rotronic	NCore	Continuous	
	Barometric Pressure	1	+			NCore	Continuous	
	Solar Radiation	1	+			NCore	Continuous	
	Precipitation	1	+			NCore	Continuous	
	Temp (L)	1	07/2008	P.O. Neigh	Met - One	NCore	Continuous	
	TSP	1	07/2005	P.O. Neigh	TSP	SLAMS	1/6	
	TSP	2	07/2005	P.O. Neigh	TSP	SLAMS	1/6	
	Pb	1	07/2005	P.O. Neigh	TSP	SLAMS	1/6	
	Pb	2	07/2005	P.O. Neigh	TSP	SLAMS	1/6	
	PM ₁₀	1	07/2005	P.O. Neigh	SA/GMW-1200	SLAMS	1/6	
	PM ₁₀	2	07/2005	P.O. Neigh	SA/GMW-1200	SLAMS	1/6	
	PM ₁₀	3	08/2005	P.O. Neigh	TEOM-1400ab	SLAMS	Continuous	
	PM _{2.5}	1	10/2007	P.O. Neigh	Partisol 2025	NCore	1/6	
	PM _{2.5}	3	10/2007	P.O. Neigh	TEOM FDMS	SPM	Continuous	
	PM _{2.5} Speciation		+			NCore	1/6	

+ - Indicates that these parameters have not begun operation at this time but are scheduled to begin in 2010.

The neighborhood scale is set to represent an area up to 4 km in diameter from the site. In the case of the DMAS site this represents an area from the state capitol on the north almost to Colfax

Boulevard and Alameda Avenue on the east. The southern end of the neighborhood scale area is Yale Avenue and Santa Fe Drive. The western boundary is almost to Alameda Avenue and Sheridan Boulevard. This area is a mix of residential, commercial and light industry and contains 28 schools, two hospitals and three clinics. The Xcel Energy's Zuni Power Plant is located 4 km north-northwest of the DMAS site along the South Platte River and the Arapahoe Power Plant is 3.7 km to the south.

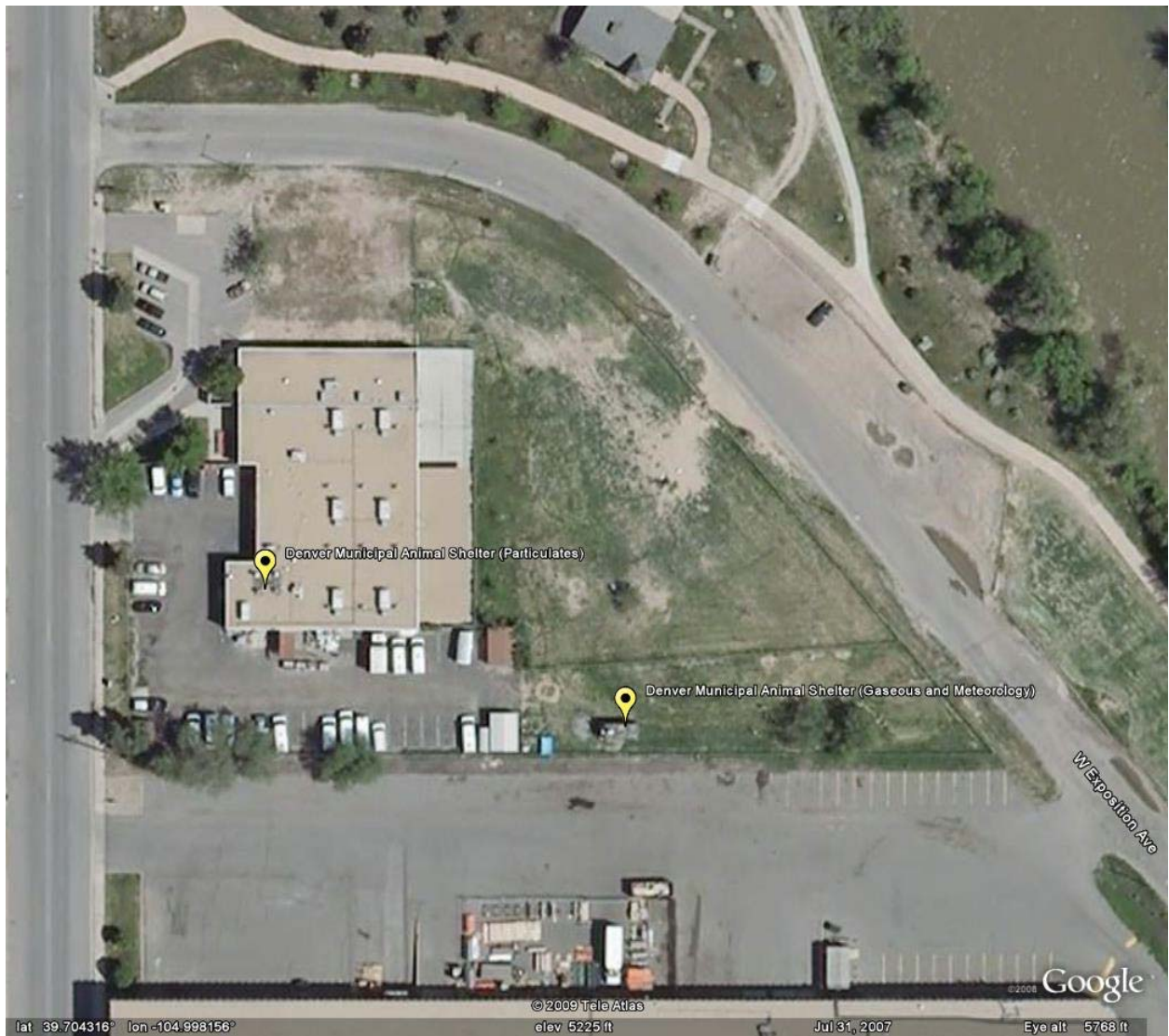
The urban scale of up to 50 km encompasses all of the Denver Metro Area and stretches from Longmont on the north to below Castle Rock on the south and from Bennett on the east to Idaho Springs on the west. The western scale boundary is more reasonably restricted to the edge of the foothill near Golden.

Traffic in the immediate area around the site is limited as shown in the following table.

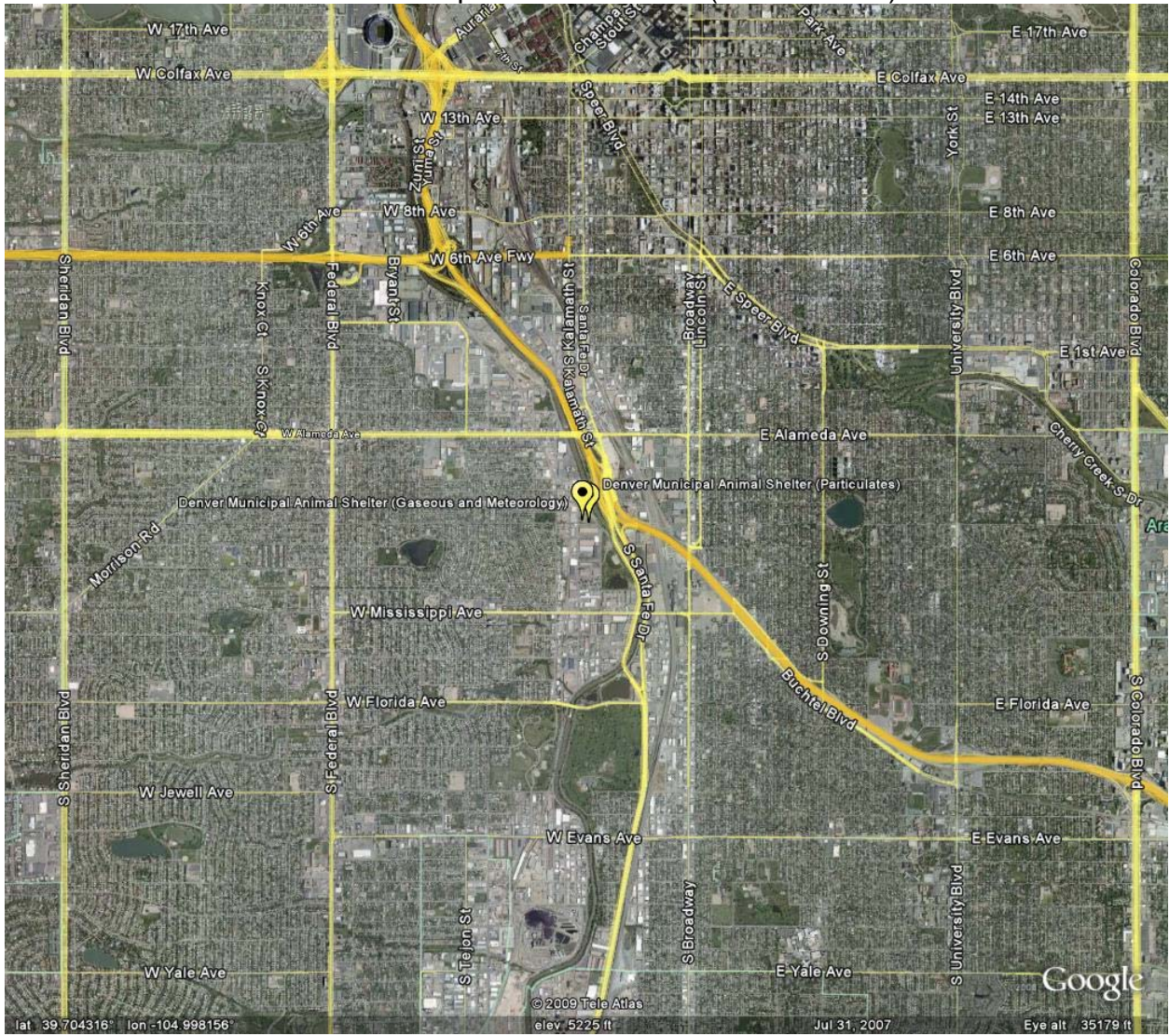
Table 15 - Traffic Information for the Denver Municipal Shelter

Distance to the nearest roadway	Direction	Daily Traffic Estimates	Year of Traffic Estimates	Type of Roadway	Comments
58 meters	North/East	<2000	2008	6-local	Estimates only
	East				
	South				
91 meters	West	<2000	2008	6-local	Estimates only

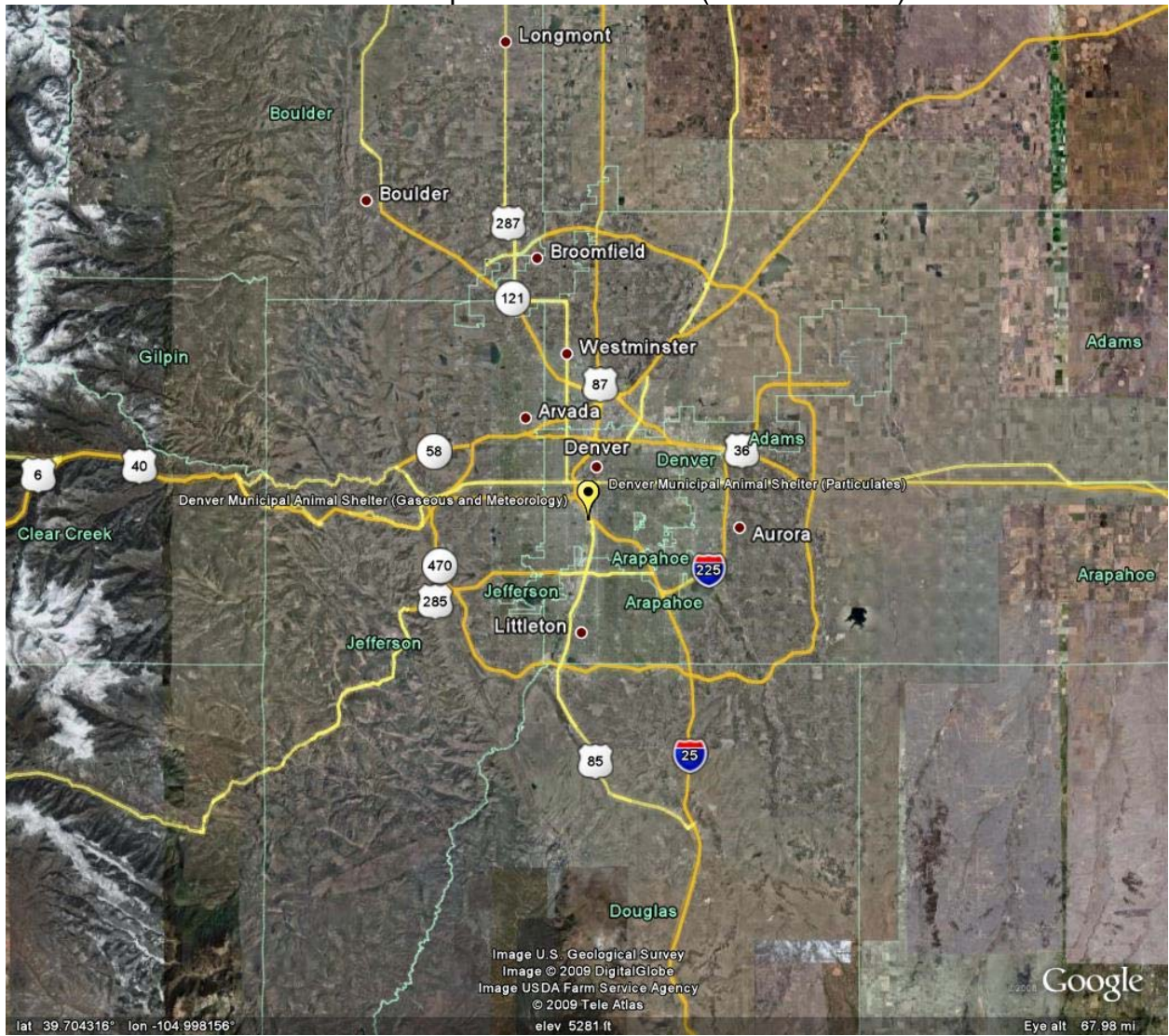
Denver Municipal Animal Shelter Site Photos



Denver Municipal Animal Shelter (4 Km Radius)

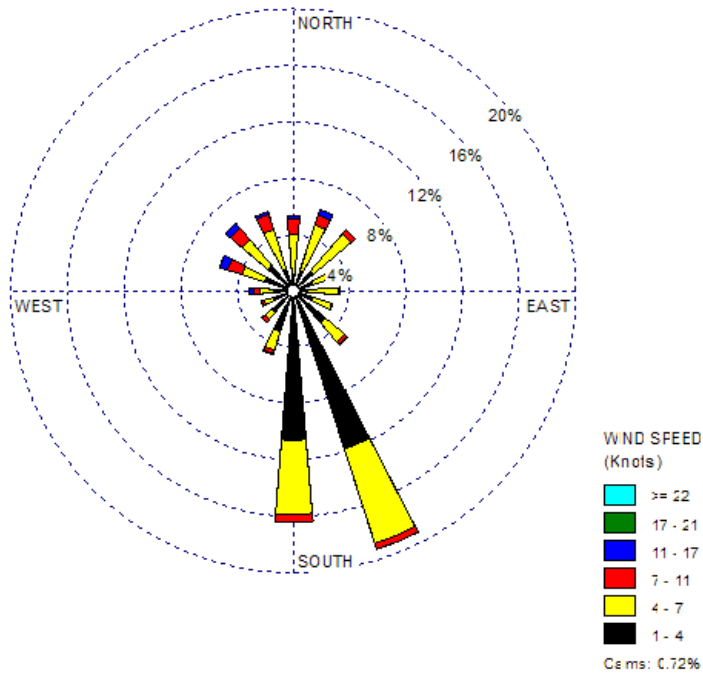


Denver Municipal Animal Shelter (50 Km Radius)

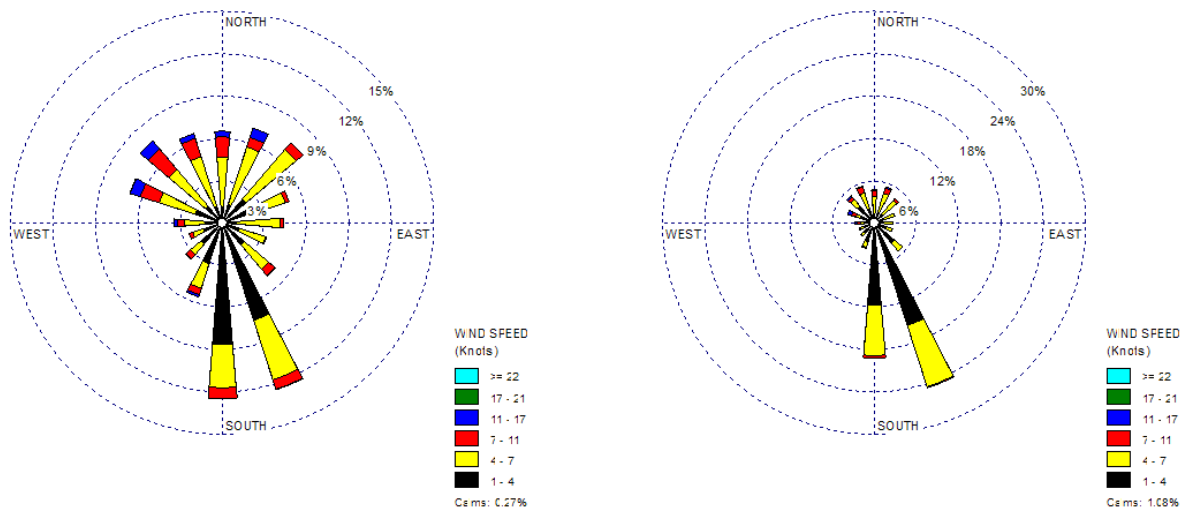


Wind Speed and direction measurements at the DMAS site began in July 2008, the rest of the suite of meteorological measurements are scheduled to begin operation in 2009 but the equipment has not been purchased. The following wind roses show the data from July 2008 through January 2009.

Wind Rose July 2008 - January 2009 - All Hours

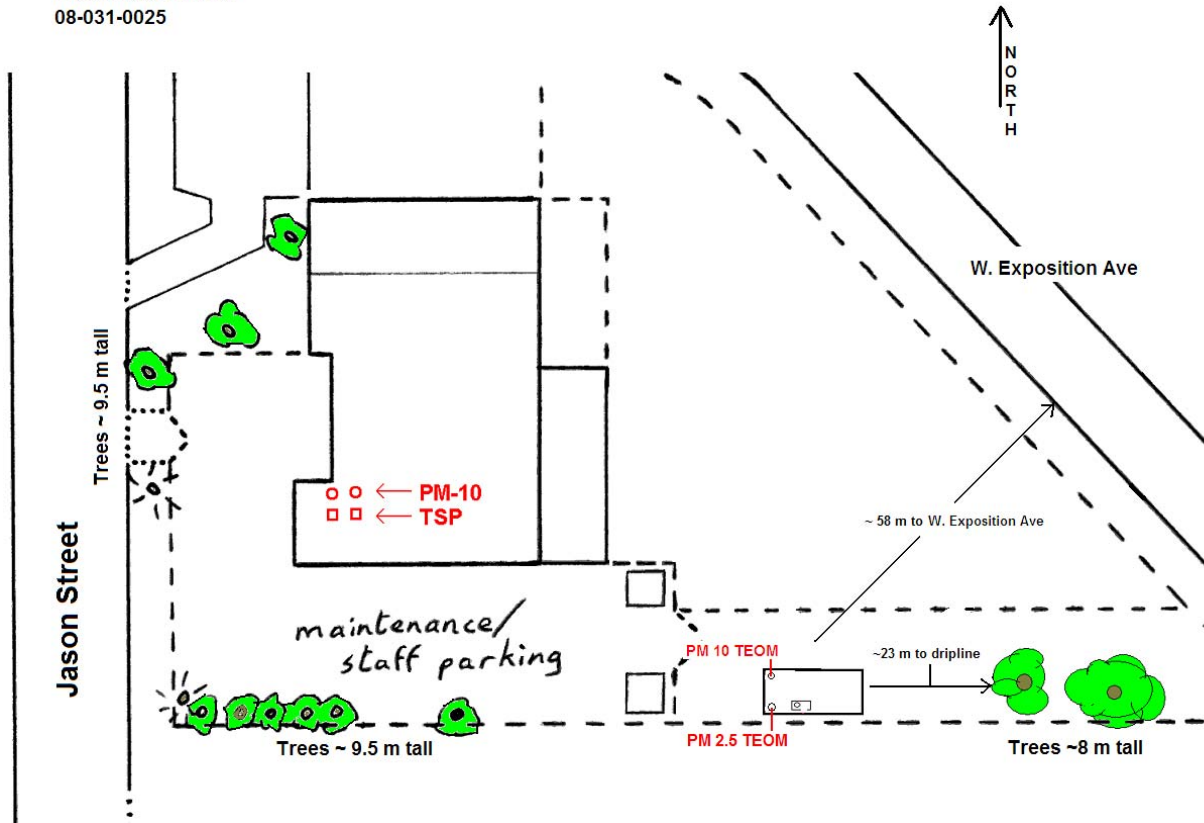


Wind Rose July 2008 – January 2009 - AM Hours / Wind Rose July 2008 – January 2009 - PM Hours



Drawings of Denver Municipal Animal Shelter Site layout.

Denver Municipal Animal Shelter
678 S. Jason Street
08-031-0025



Denver Municipal Animal Shelter
Monitoring Shelter
08-031-0025

Proposed NCORE configuration

