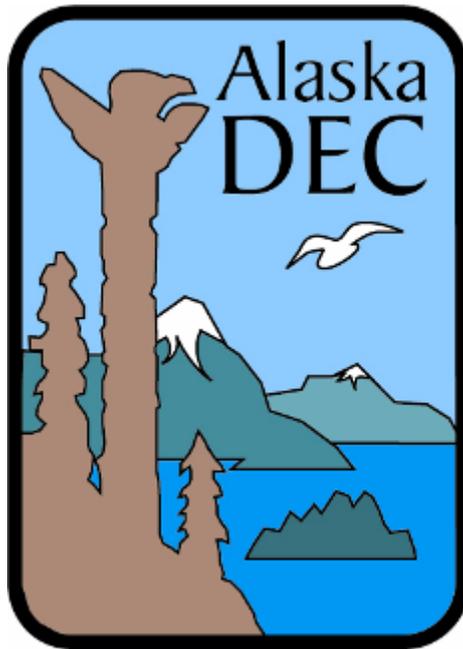


DRAFT

Alaska's 2008 Air Monitoring Network Plan

Chapter 3 - Anchorage



Please provide comments by August 17, 2007 to:

State of Alaska Department of Environmental Conservation
Division of Air Quality
Air Monitoring and Quality Assurance Section
555 Cordova St.
Anchorage, AK 99501

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3 ANCHORAGE MONITORING SITE DESCRIPTION

3.1 *General Information*

The Municipality of Anchorage (MOA) with a population¹ of 275,043 is the largest city in Alaska. Anchorage encompasses 1,697 square miles of land and 264 square miles of water and is located between the Chugach Mountains to the east, the Knik Inlet to the north, the Cook Inlet to the west, and the Turnagain Arm to the south. The average temperatures range from 6°F to 20 °F in the winter and from 50 ° F to 70 ° F in the summer. Annual precipitation is 15.9 inches, with 69 inches of snowfall.

Anchorage was designated non-attainment for CO on November 15, 1990. The community developed a rigorous Inspection and Maintenance (I&M) program to reduce tail pipe emissions from automobiles and EPA has required that new automobiles emit less environmental pollution, both of which have helped improve the air quality in Anchorage. The Municipality was successfully re-designated as a CO “maintenance” area on July 23, 2004. Appendix A –lists the definitions of each designation.

Plagued by springtime dust and residual volcanic ash from erupting Cook Inlet volcanoes in the late 1980s and in the early 1990s, the Municipality of Anchorage was flirting with a PM₁₀ problem. On December 5, 1995, the Municipality of Anchorage, the Alaska Department of Environmental Conservation, and the US Environmental Protection Agency (EPA) entered into a memorandum of agreement to reduce dust impacts and avoid a PM₁₀ non-attainment designation. A control strategy was developed and agreed to by all parties with the implementation responsibility placed on the Municipality. The control strategies were made part of a community’s long range transportation plan.

The Municipality of Anchorage’s (MOA) air program currently operates four air monitoring stations in the municipality. Each station can be equipped to monitor for multiple pollutants. The network contains: one State and Local Air Monitoring Site (SLAMS) which monitors for PM₁₀, PM_{2.5}, and CO, three Special Purpose Monitoring Sites (SPM) for carbon monoxide and three SPM sites for PM₁₀. The municipality’s SLAMS and SPM sites are described below in Table 3-1. Figure 3.1:1 is a map showing the entire Anchorage monitoring network. Appendix B –lists siting criteria.

¹ Population data from 2005 U. S. Census.

Table 3-1: SLAMS and SPM sites in the Municipality of Anchorage

<u>PM_{2.5}</u>					
Site Name	Location	AQS ID	Designation	Install Date	Scale
Garden	Anchorage	02-020-0018	SLAMS	Nov, 1998	neighborhood
PM₁₀					
Site Name	Location	AQS ID	Designation	Install Date	Scale
Garden	Anchorage	02-020-0018	SPM	Nov, 1998	neighborhood
Muldoon*	Anchorage	02-020-0043	SPM	Apr, 1995	middle
Tudor	Anchorage	02-020-0044	SPM	Oct, 1996	microscale
Parkgate	Eagle River	02-020-1004	SLAMS	Oct, 1987	neighborhood
CO					
Site Name	Location	AQS ID	Designation	Install Date	Scale
Garden	Anchorage	02-020-0018	SLAMS	Jan, 1979	neighborhood
Turnagain	Anchorage	02-020-0048	SPM	Oct, 1998	neighborhood
Bowman*	Anchorage	02-020-0050	SPM	Jan, 2006	neighborhood
Parkgate	Eagle River	02-020-1004	SPM	Dec, 2005	neighborhood

*these sites were recently shutdown.

Since January 2000 four sites have been terminated. The sites are (in order of AQS ID number):

02-020-017 Benson & Spenard (CO)
 02-020-037 Benson & Seward Hwy. (CO)
 02-020-042 Ocean View (PM₁₀)
 02-020-049 Jewel Lake (CO)



Figure 3.1:1: Map of Anchorage area. Red dots indicate monitoring sites.

3.2 GARDEN SITE - ANCHORAGE

3000 East 16th Avenue
Parameters: CO, PM_{2.5}, PM₁₀

AQS ID 02-020-0018
Established: January 1, 1979

3.2.1 Site Information

The Garden monitoring site is located at the Trinity Christian Reformed Church between 16th Avenue, Garden Street, and Sunrise Drive at latitude 61° 12' 25" ,longitude -149° 49' 15", and 128 feet (39 meters) above sea level. Figure 3.2:1 shows a street map of the central Anchorage area and a satellite image of the area. The site is located in a suburban, residential area. Garden is a neighborhood, population-oriented CO and PM site.

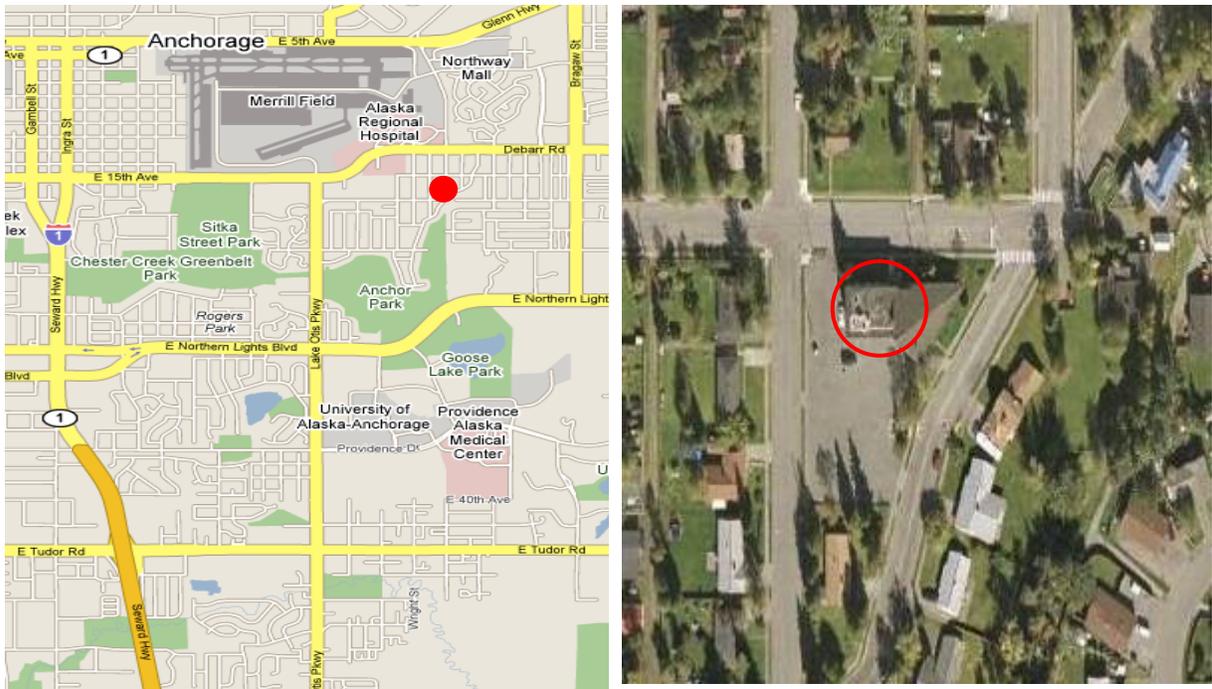


Figure 3.2:1: Street map and satellite image of the Garden monitoring site. The red circles indicate the sites location.

3.2.2 Sources

Carbon monoxide levels are closely associated with automobile activity and combustion from local residential heating systems in the area. Other sources in the Anchorage Bowl which might have influence on this site for CO are: the Municipal Light and Power (90 and 250 megawatt gas turbines – 3.5 miles west), Chugach Electric (48 MW gas turbine – 3.5 miles northeast), Fort Richardson (18 MW gas turbine – five miles northeast) and Elmendorf Air Force Base (22 MW gas turbine – 3.5 mile northwest). Fine and course particulate matter can also be impacted from the combustion from local heating systems as well as dust from the local road system. All roads in the vicinity are paved, the alleys

are mostly unpaved and roadways are sanded for traction during the winter months. Other contributing sources for coarse and fine particulate matter are: Merrill Field Airfield (one mile north) and The Alaska Railroad (two miles northwest). Anchorage is seasonally affected by wind-blown glacial loess, and occasionally impacted by wildfire smoke and ash from volcanic eruptions.

3.2.3 Monitors

The Garden Site is currently equipped with:

- PM_{2.5} (SLAMS) – Three Thermo Electron (formerly Rupprecht and Pattashnick) Partisol 2000 samplers. Two samplers run on a 1-in-6 day alternating sampling schedule resulting in a 1-in-3 day sampling frequency. The third sampler operates as a collocated monitor.
- PM₁₀ (SPM) – One General Metal Works high-volume sampler.
- PM_{2.5} (SPM) – A single Thermo Electron TEOM 1400a continuous monitor was installed to provide information in real time for evaluating the Air Quality Index.
- CO (SLAMS) – A single Thermo Electron 48C CO monitor operates seasonally (October – March) with an inlet approximately three meters (9.5 feet) above the ground.

3.2.4 Siting

The particulate matter samplers are located on the roof at the south end of the Trinity Christian Reformed Church. Access to the site is from use of a window from a split level section of the church. This split level area is several meters from the monitoring site. The roof height is six meters (19 feet), and there are no trees in the vicinity that significantly exceed the height of the samplers. The airflow to these samplers is unobstructed. The samplers are approximately 10 meters (32 feet) south of the nearest traffic lane of 16th Avenue.

The CO monitor is installed in the church. The inlet probe is approximately three meters (9.5 feet) above the ground. The inlet probe is approximately 10 meters (32 feet) from the nearest traffic lane of 16th Avenue. Between the inlet and 16th Avenue is one tall spruce tree. The church itself obstructs air flow from the south.

3.2.5 Traffic

There are six other major roadways within two miles with approximate average daily traffic ranging from 14,000 to 54,000 vehicles per day. All roads are paved; alleys are usually dirt roads.

Figure 3.2:2: Pictures of the Garden Site

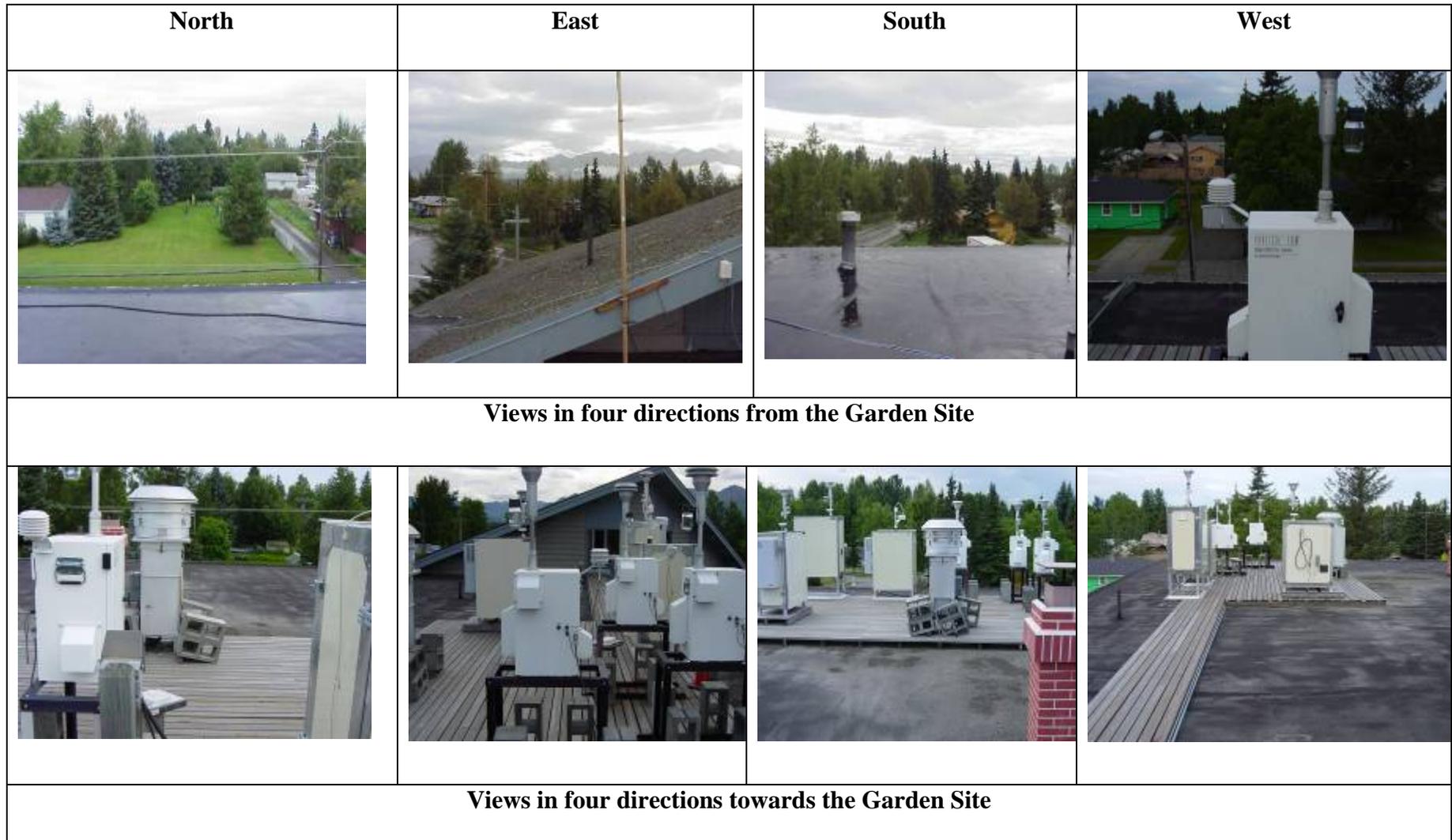




Figure 3.2:3: View of CO probe at Garden Site. The red circle indicates where the probe is located.

3.3 MULDOON SITE - ANCHORAGE

1100 Muldoon Road
Parameters: PM₁₀

AQS ID 02-020-0043
Established: April 15, 1995
Decommissioned: June 30, 2005

3.3.1 Site Information

The Muldoon PM₁₀ monitoring site was located at the First National Bank of Anchorage building on Muldoon Road at latitude 61° 12' 42", longitude -149° 43' 53" and 262 feet (80 meters) above sea level. Figure 3.3:1 shows a street map of the east Anchorage Muldoon area and a satellite picture of the monitoring site. The site was located in a suburban, commercial location. Muldoon was a middle scale, population-oriented site. Because of the primary source of coarse particulate matter this site was only operated seasonally during the summer months.

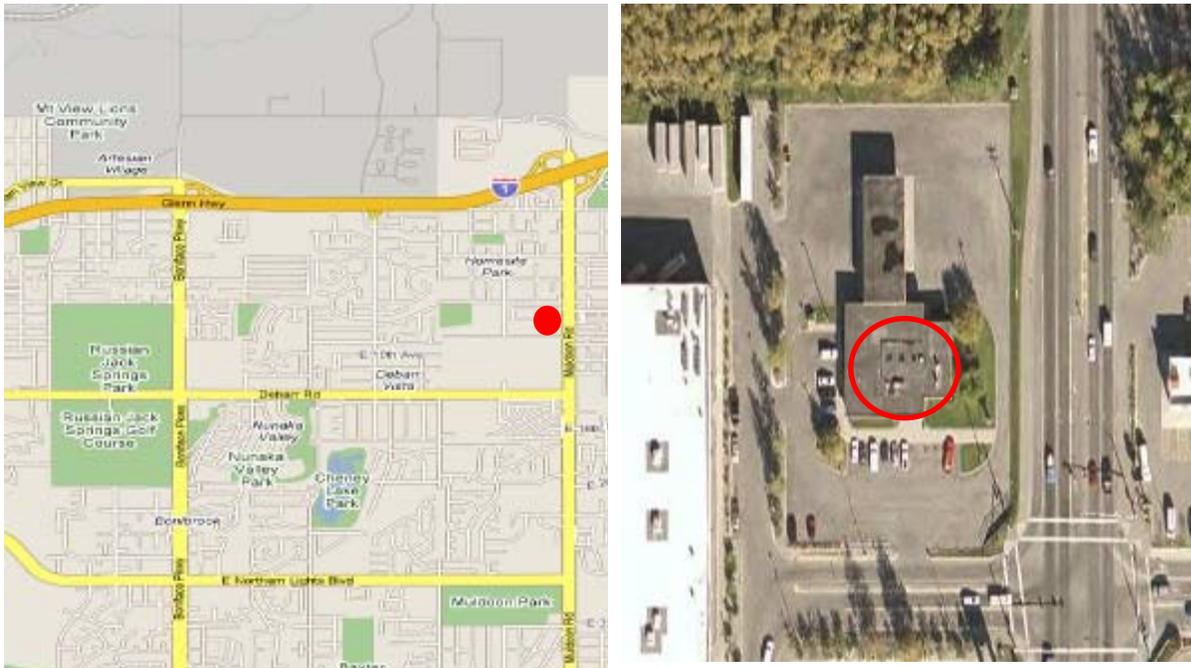


Figure 3.3:1: Street map and satellite image of the Muldoon monitoring site. The red circle indicates the sites location.

3.3.2 Sources

The primary source of coarse particulate matter at this site was from automobile activity. Roadways are sanded for traction during winter months and the sand gets re-entrained in the air during the dry summer days. Within five miles are Merrill Field (a small plane airport), Municipal Light and Power (90 and 250 megawatt gas turbines), and Elmendorf Air Force Base (22 MW gas turbine). The Alaska Railroad passes within three miles of the site. Anchorage is seasonally affected by wind-blown glacial loess, and occasionally affected by wildfire smoke and volcanic eruptions.

3.3.3 Monitors

The Muldoon Site was equipped with:

- PM₁₀ (SPM) – Two General Metal Works high-volume sampler. These samplers were operated seasonally on a 1-in-2 day schedule, when meteorological conditions were warm and dry enough to indicate that traction sand from the roadways might become airborne in late winter and spring, but had not yet been effectively swept up. Sampling was usually performed starting mid April to mid June.

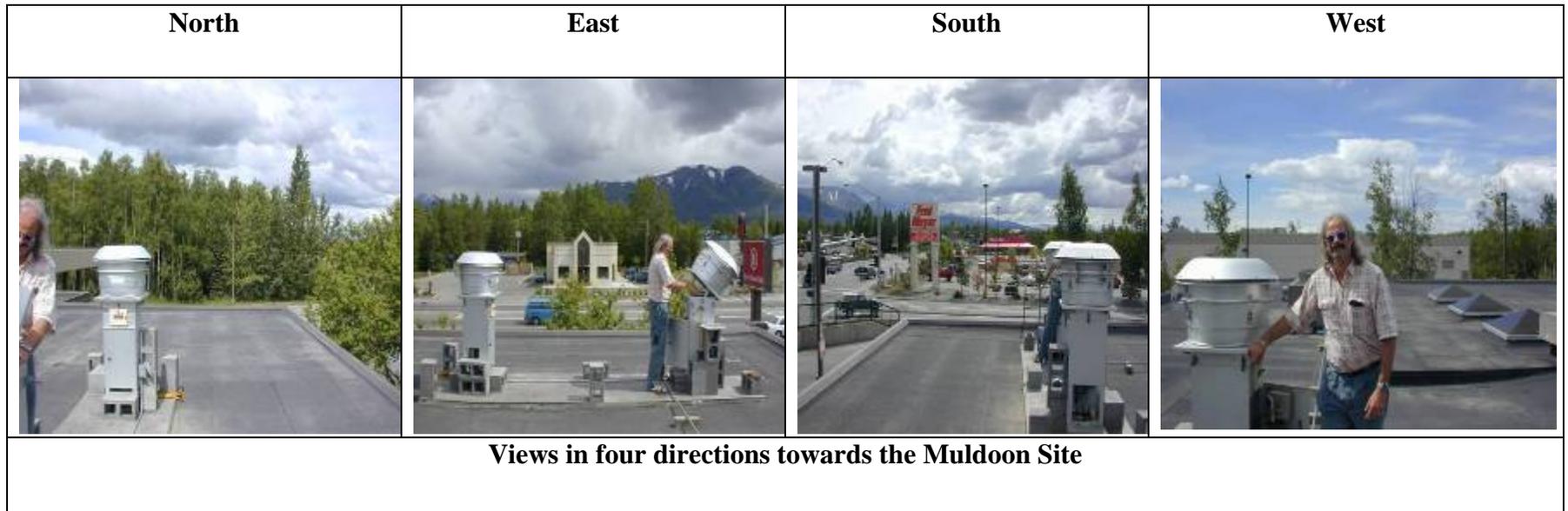
3.3.4 Siting

The particulate matter samplers were located on the roof at the east end of the bank. The roof height is 3.5 meters (11 feet), and there were no other structures. No trees in the vicinity significantly exceed the height of the samplers. The airflow to these samplers was unobstructed. The samplers were approximately 24 meters (76 feet) west of the nearest traffic lane of Muldoon Road.

3.3.5 Traffic

There were three major roadways within two miles with approximate average daily traffic ranging from 19,000 to 54,000 vehicles per day. There are typical residential and commercial streets and alleys in the vicinity. All roads are paved; alleys are usually dirt roads.

Figure 3.3:1: Pictures of the Muldoon Site



3.4 TUDOR SITE - ANCHORAGE

3335 East Tudor Road
Parameters: PM₁₀

AQS ID 02-020-0044
Established: October 12, 1996

3.4.1 Site Information

The Tudor monitoring site is located at the Allstate Insurance Company building on Tudor Road at latitude 61° 10' 56", longitude -149° 48' 50", and 164 feet (50 meters) above sea level. Figure 3.4:1 shows a street map of the central Anchorage area and a satellite picture of the area immediately surrounding the Tudor site. The site is located in an urban, commercial location. Tudor is a microscale, population-oriented site.

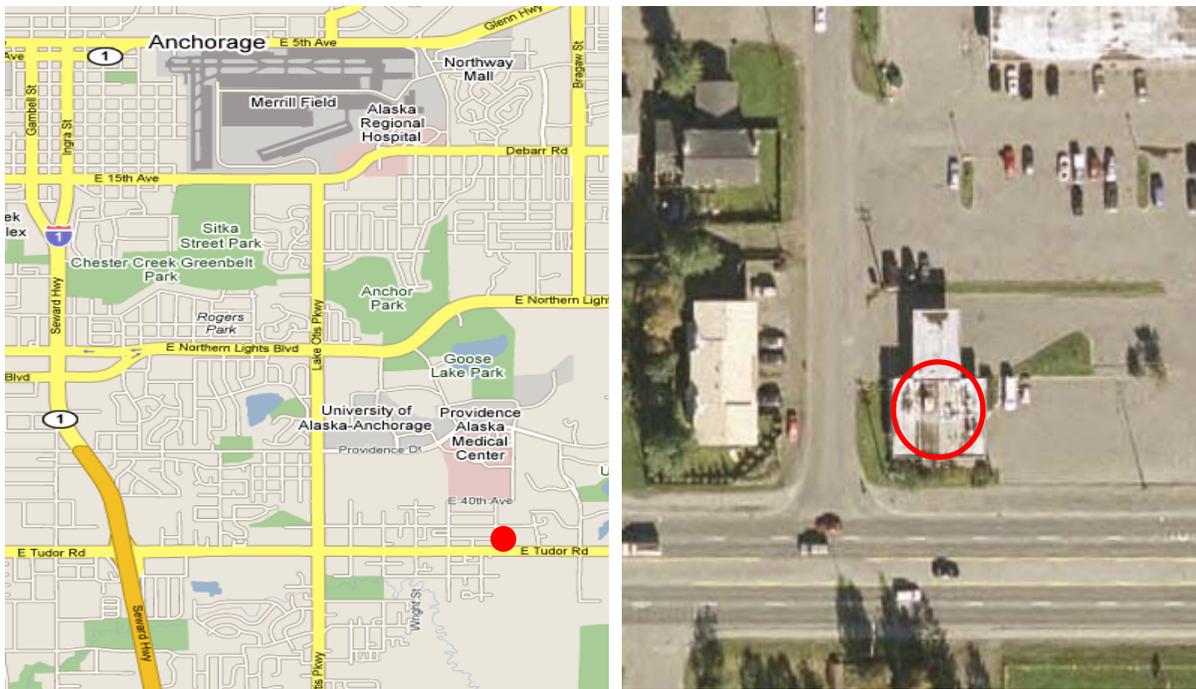


Figure 3.4:1: Street map and satellite image of the Tudor monitoring site. The red circle indicates the sites location.

3.4.2 Sources

The primary source of coarse particulate matter at this site is from automobile activity. Roadways are sanded for traction during winter months and the sand gets re-entrained in the air during the dry summer days. Within five miles is Merrill Field (a small plane airport) and the Alaska Railroad passes within six miles of the site. Anchorage is seasonally affected by wind-blown glacial loess, and occasionally affected by wildfire smoke and volcanic eruptions.

3.4.3 Monitors

The Tudor Site is currently equipped with:

- PM₁₀ (SPM) – Three General Metal Works high-volume sampler. The Hi-Vol samplers are operated on a 1-in-3 day sampling schedule. Collocated samples are collected at this site for precision determination.
- PM₁₀ (SPM) – A single Thermo Electron TEOM 1400a continuous monitor was installed in April 2005 to provide information in real time for evaluating the Air Quality Index.
- PM_{2.5} (SPM) – samplers were removed from the site end of December 2002.

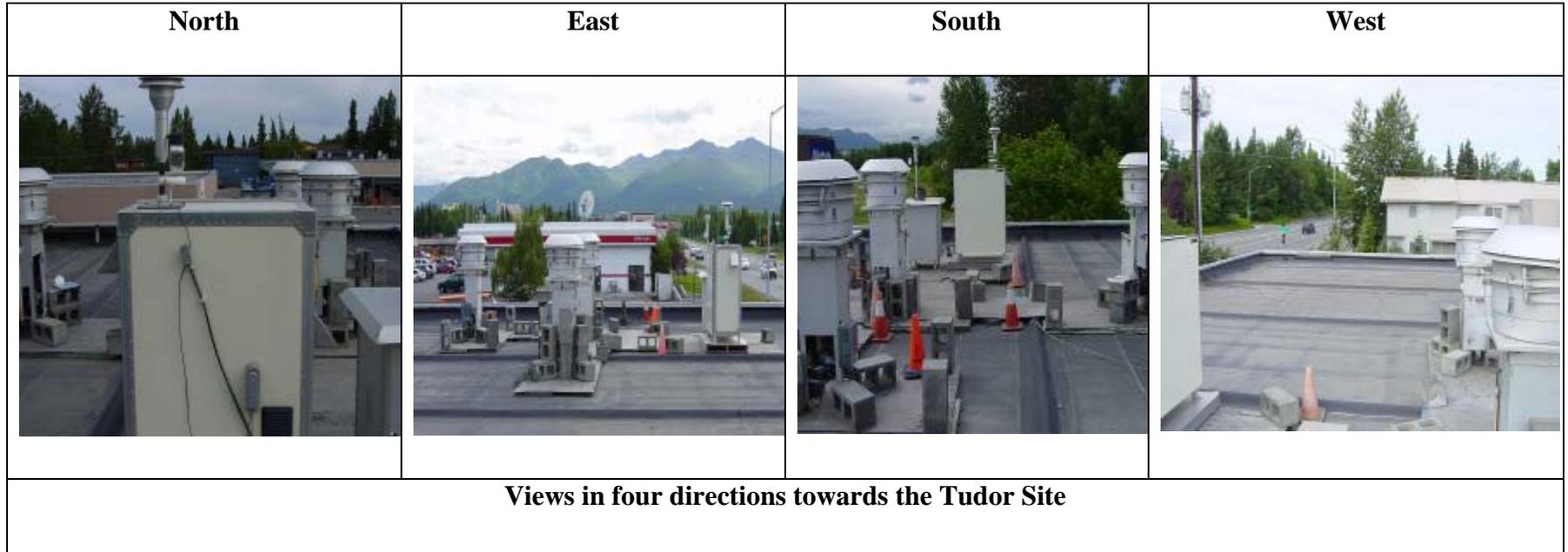
3.4.4 Siting

The particulate matter samplers are located on the roof near the southeast edge. The roof height is 3.3 meters (10.5 feet), and there are no other structures. Twenty foot tall mountain ash trees between the samplers and the roadway do not significantly exceed the height of the samplers. The airflow to these samplers is unobstructed. The samplers are approximately seven meters north of the nearest traffic lane of Tudor Road.

3.4.5 Traffic

There are three major roadways within two miles with approximate average daily traffic ranging from 30,000 to 54,300 vehicles per day. There are typical residential and commercial streets and alleys in the vicinity. All roads are paved; alleys are usually dirt roads.

Figure 3.4:1: Pictures of the Tudor Site



3.5 TURNAGAIN SITE - ANCHORAGE

3201 Turnagain Street
Parameters: CO

AQS ID 02-020-0048
Established: October 15, 1998

3.5.1 Site Information

The Turnagain carbon monoxide monitoring site is located at the corner of Turnagain Street and 32nd Avenue at latitude $61^{\circ} 11' 32''$, longitude $-149^{\circ} 56' 9''$, and 69 feet (21 meters) above sea level. Figure 3.5:1 is street map of the western part of Anchorage and a satellite picture of the Turnagain site and surrounding area. The site is located in a suburban location. Turnagain is a neighborhood scale, population-oriented site.

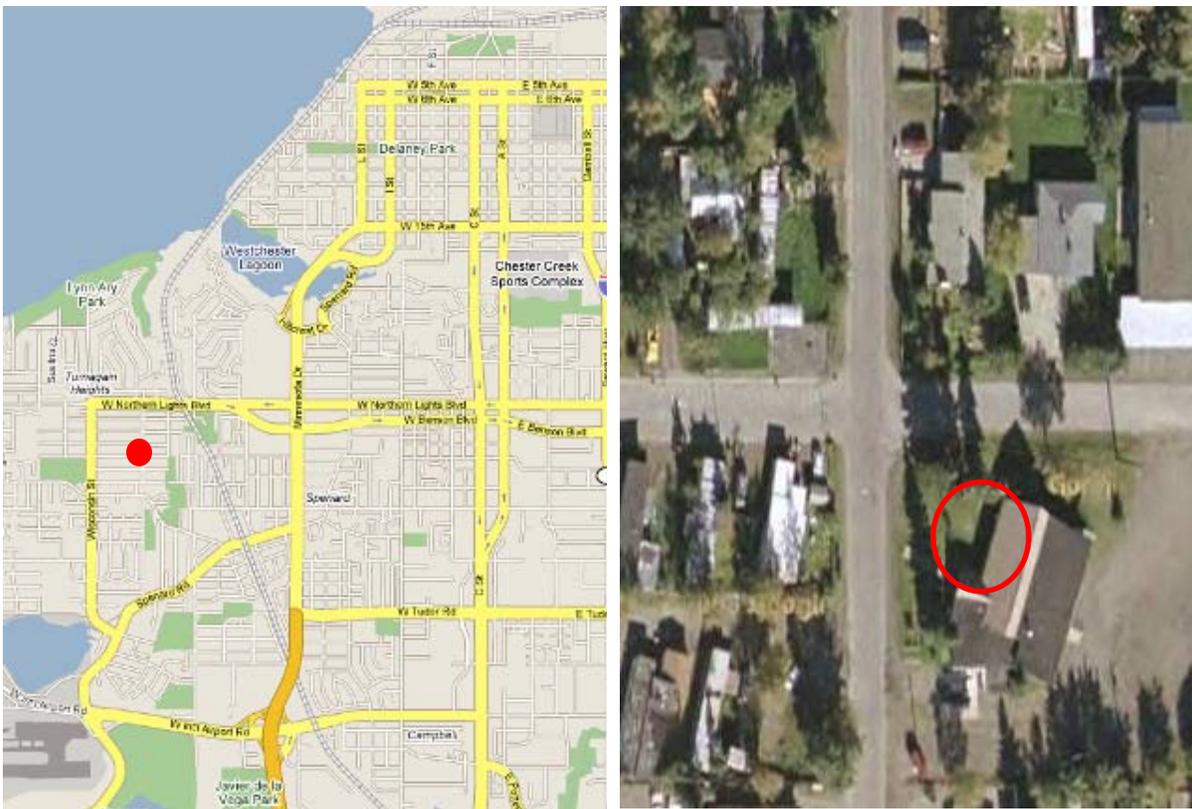


Figure 3.5:1: Street map and satellite image of the Turnagain monitoring site. The red circles indicate the sites location.

3.5.2 Sources

Advisory carbon monoxide levels are closely associated with automobile activity and combustion from local residential heating systems in the area. Other sources in the Anchorage Bowl which might have influence on this site for CO are: the Anchorage International Airport (including a lake for small float planes) is a half mile to the southwest, Municipal Light and Power (90 and 250 megawatt gas turbines), Chugach Electric (48 MW gas turbine), and Elmendorf Air Force Base (22 MW gas turbine).

3.5.3 Monitors

The Turnagain Site is currently equipped with:

- CO (SLAMS) – A single Thermo Electron 48C CO monitor operates seasonally (October – March).

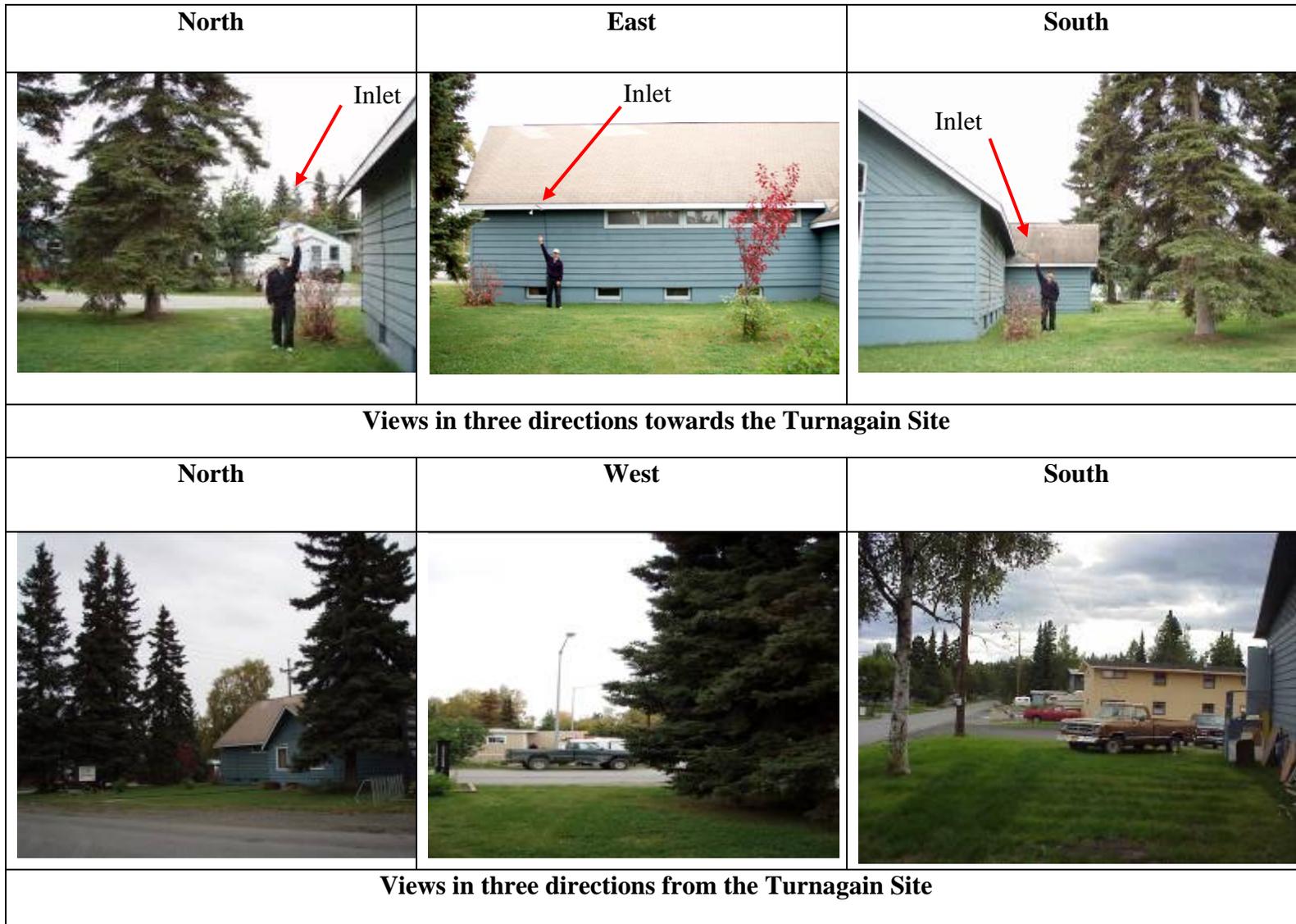
3.5.4 Siting

The monitor is installed in the Unitarian church. The inlet probe is approximately three meters (9.5 feet) above the ground. The inlet probe is approximately 18.5 meters (58 feet) from the nearest traffic lane of Turnagain Street. Between the inlet and Turnagain St are several tall white spruce trees. The church itself obstructs air flow from the south and east.

3.5.5 Traffic

There are five major roadways within 2 miles with approximate average daily traffic ranging from 18,000 to 54,000 vehicles per day. There are residential streets and alleys in the vicinity.

Figure 3.5:1: Pictures of the Turnagain Site



3.6 BOWMAN SITE - ANCHORAGE

11700 Gregory Rd.
Parameters: CO

AQS ID 02-020-0050
Established: January 1, 2006
Decommissioned: April 1, 2007

3.6.1 Site Information

The Bowman carbon monoxide monitoring site was located at the end of Gregory Rd. at latitude $61^{\circ} 6' 53.97''$, longitude $-149^{\circ} 50' 45.98''$, and 225 feet (69 meters) above sea level. Figure 3.6:1 shows a street map of the southern part of Anchorage and a satellite picture of the Bowman site and surrounding area. The site was located in a suburban location. Bowman was a neighborhood scale, population-oriented site.

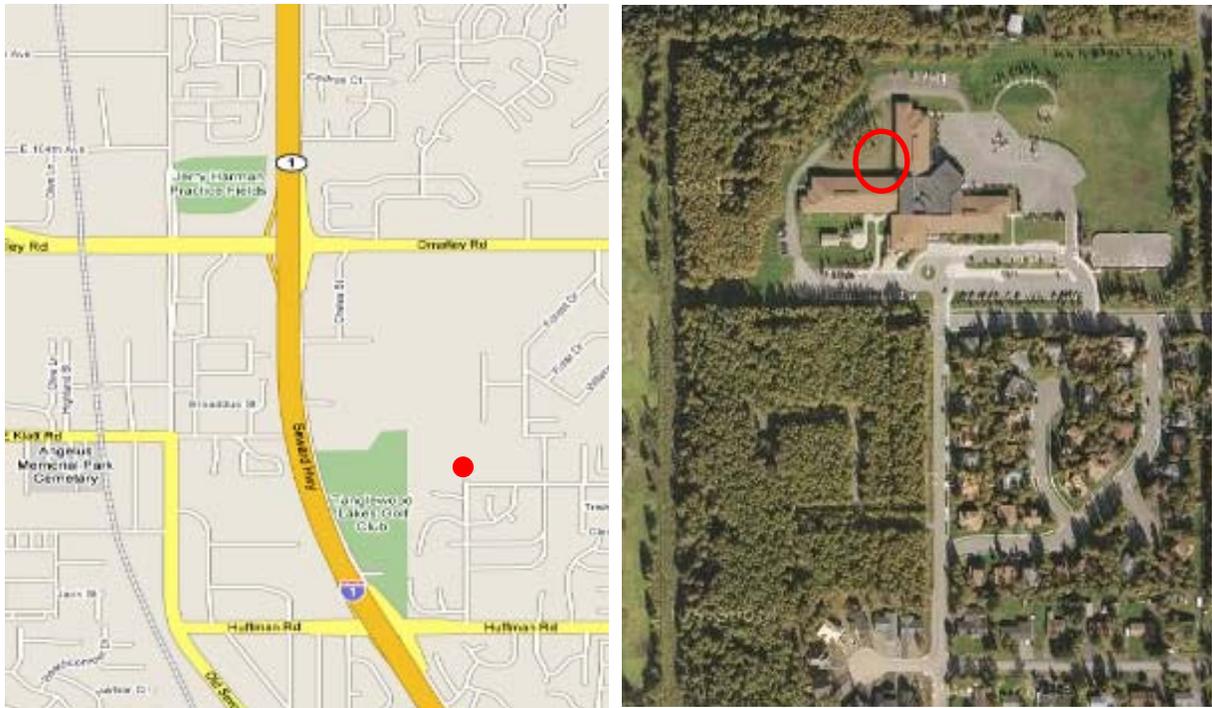


Figure 3.6:1: Street map and satellite image of the Bowman monitoring site. The red circles indicate the sites location.

3.6.2 Sources

There were no significant point sources to this site. This site was established by the Municipality of Anchorage as a background site for CO.

3.6.3 Monitors

The Bowman Site was equipped with:

- CO (SLAMS) – A single Thermo Electron 48C CO monitor which operated seasonally (October – March).

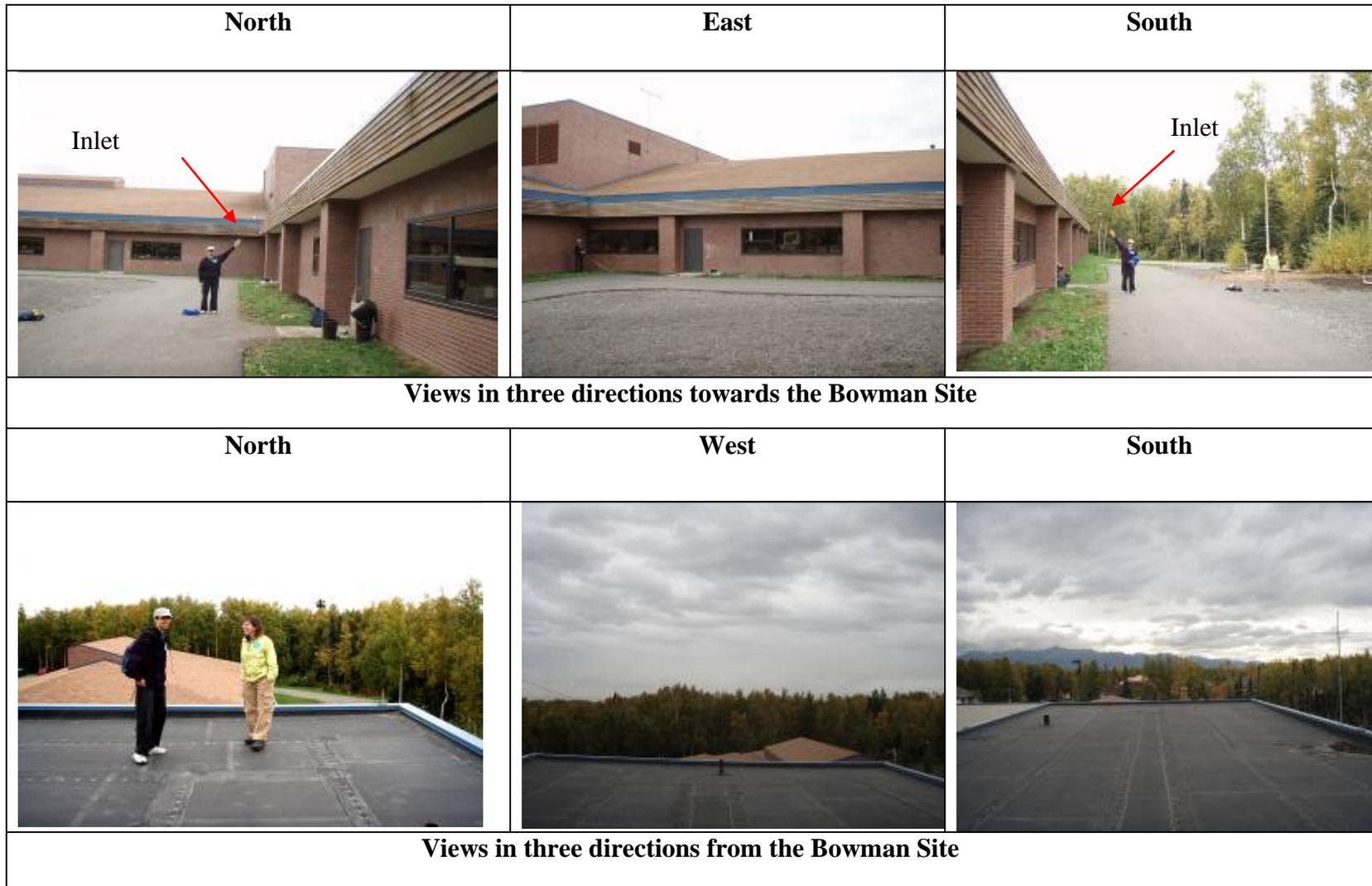
3.6.4 Siting

The monitor was installed at the Bowman elementary school. The inlet probe was approximately three meters (9.5 feet) above the ground. There were taller trees between the samplers and the roadway but they were far enough away from the probe to not pose a problem. The probe was located along the east side of the school and airflow was generally unobstructed.

3.6.5 Traffic

There was one major roadway within 500 meters (1600 feet) with approximate average daily traffic around 26,000 vehicles per day. There are residential streets and alleys in the vicinity.

Figure 3.6:1: Pictures of the Bowman Site



3.7 *PARKGATE, EAGLE RIVER- ANCHORAGE*

11723 Old Glenn Highway
Parameters: PM₁₀

AQS ID 02-020-1004
Established: January 1, 1974

3.7.1 Site Information

The Parkgate PM₁₀ monitoring site is located at the Parkgate Business Center building in Eagle River (a bedroom community of Anchorage that lies well within the Municipality) at latitude 61° 19' 27.5", longitude -149° 33' 15", and 328 feet (100 meters) above sea level. Figure 3.13 is a street map of the western Eagle River area and a satellite picture of the Parkgate site and surrounding area. The site is located in a suburban/commercial use area with monitoring site classified as neighborhood scale, population-oriented monitoring site.

The Eagle River dust problem goes all the way back to the late 1980s when the parking lot of the Parkgate Building was dirt and the monitor was placed right above the entrance to a Municipal Office. Failure to resolve the localized dust problem resulted in Eagle River being declared non-attainment for PM₁₀. The state SIP required the Municipality of Anchorage to pave almost all of Eagle River's dirt roads. Since paving most of the surrounding gravel roads, the air quality has improved to the point that no violations of the national ambient air quality standards have been recorded in over 15 years. Eagle River has applied for re-designation to "attainment" status and is classified as a "maintenance" area.

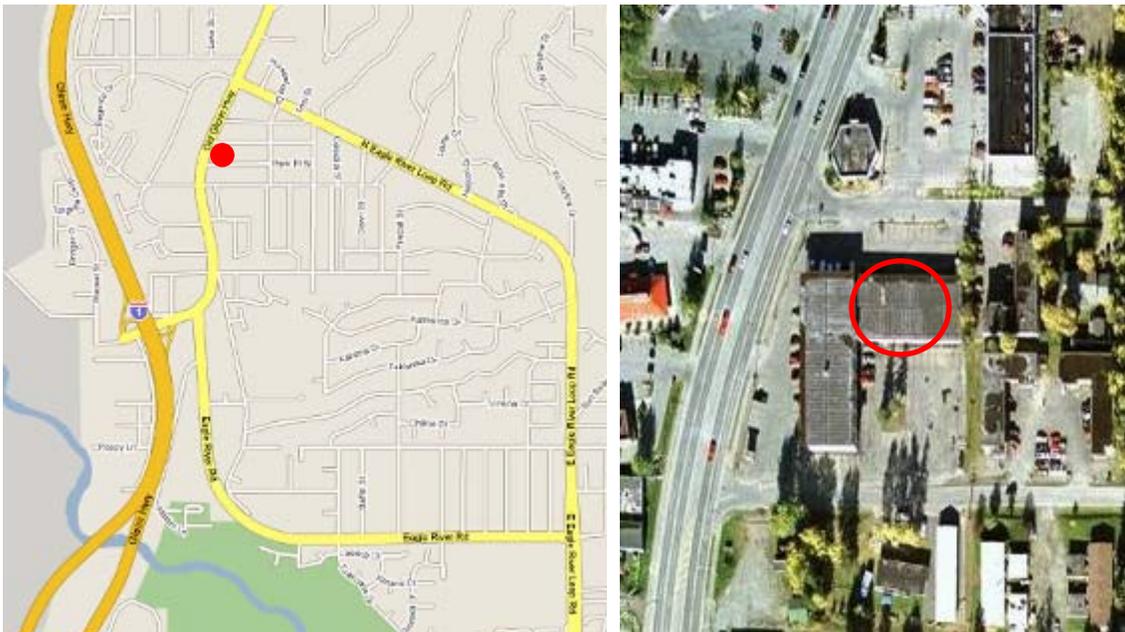


Figure 3.7:1: Street map and satellite image of the Eagle River monitoring site. The red circle indicates the sites location.

3.7.2 Sources

The primary source of coarse particulate matter at this site is from automobile activity. Roadways are sanded for traction during winter months and the sand gets re-entrained in the air during dry summer days. The Alaska Railroad passes within 3 miles of the site. Eagle River is seasonally affected by wind-blown glacial loess, and occasionally affected by wildfire smoke and volcanic eruptions.

3.7.3 Monitors

The Eagle River Site is currently equipped with:

- PM₁₀ (SLAMS) – One General Metal Works high-volume sampler. The Hi-Vol sampler is operated on a 1-in-6 day sampling schedule.
- CO (SPM) – A single Thermo Electron 48C CO monitor operates seasonally (October – March).

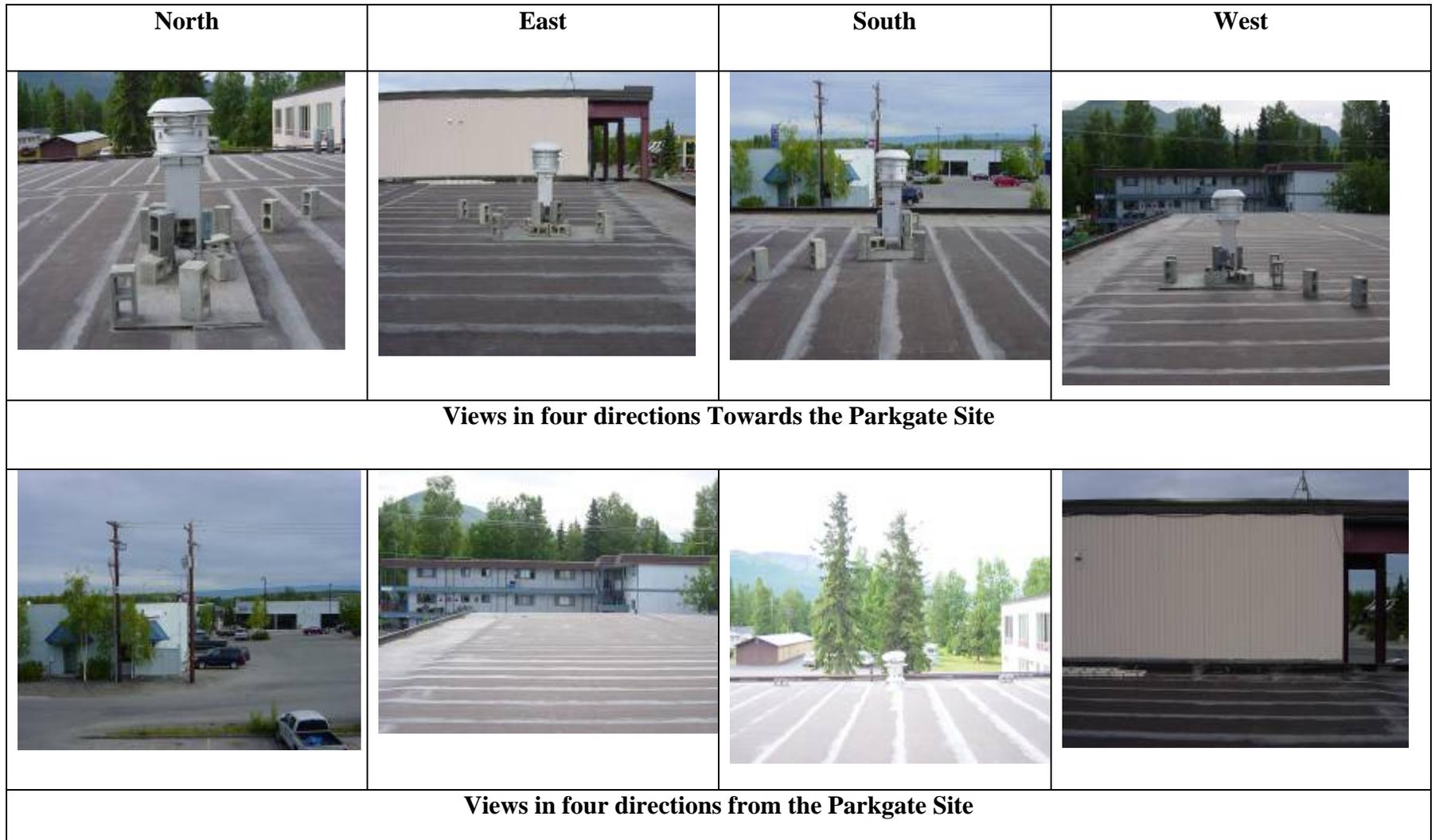
3.7.4 Siting

The particulate matter sampler is located on the roof of the first story of the Parkgate Business Center. The roof height is 5 meters (16 feet). There is another section of the building 13 meters (41 feet) to the west that is two stories tall (4 meters above the first story roof height). No trees in the vicinity significantly exceed the height of the samplers. The airflow to these samplers is unobstructed. The sampler is approximately 44 meters east of the nearest traffic lane of the Old Glenn Highway and 23 meters (73 feet) south of Easy Street.

3.7.5 Traffic

There are two major roadways within 2 miles ranging from 14,000 to 54,000 vehicles per day. There are typical residential and commercial streets and alleys in the vicinity. All roads are paved and alleys are unpaved.

Figure 3.7:1: Pictures of the Parkgate Site



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