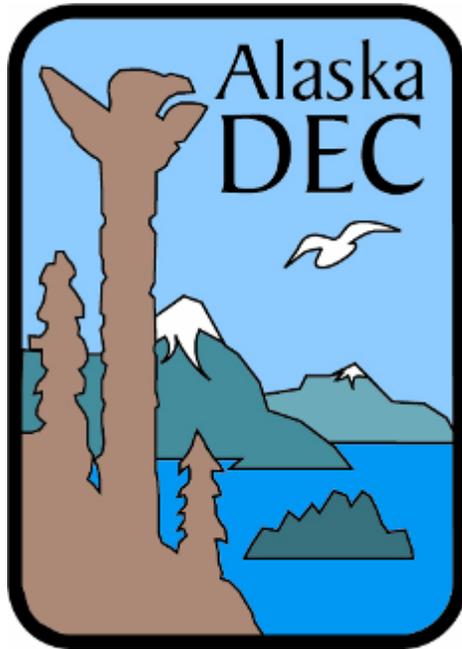


Alaska's Air Monitoring 2009 Network Plan

Chapter 4 - Fairbanks



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4 FAIRBANKS MONITORING SITES

4.1 *General Information*

Fairbanks is the second largest city in Alaska (population¹ 31,324), located within the Fairbanks North Star Borough (FNSB; population 87,560). Fairbanks is situated on the banks of the Chena River in the upper Tanana Valley. Interior Alaska experiences seasonal temperature extremes. The average temperatures range from -2°F to -19°F in the winter and from 53°F to 72°F in the summer. Temperatures have been recorded as low as -78°F in mid-winter, and as high as 93°F in summer. Average annual precipitation is 11.3 inches. Ice fog is common during the winter. Fairbanks experiences 21 hours of daylight between May 10th and Aug. 2nd each summer, and less than 4 hours of daylight between Nov. 18th and Jan. 24th each winter.

Fairbanks was designated non-attainment for carbon monoxide (CO) on November 15, 1990. The community developed a rigorous Inspection and Maintenance (I&M) program to reduce tail pipe emissions from automobiles and the EPA required automobile manufacturers to reduce environmental pollution, both of which have helped improve area air quality in the Fairbanks North Star Borough. Fairbanks was re-designated to CO “maintenance” status on July 23, 2004. Appendix A- lists the definitions of each designation.

The FNSB Air Program operates and manages four monitoring stations: two State and Local Air Monitoring Site (SLAMS) for CO, one SLAMS for PM_{2.5} and one Special Purpose Monitoring Site (SPM) for CO. The FNSB SLAMS and SPM sites are identified below in Table 4-1. Appendix B- lists siting criteria for each type of monitoring site.

The Fairbanks monitoring sites are located within the Northern Alaska Air Quality Control Region. Figure 4.1:1 is a map showing the entire Fairbanks area and surrounding geographical features. Figure 4.1:2 is a satellite map indicating locations of the four monitoring sites. Fairbanks is bordered by hills to the north and west, with the flats opening up to the south and east.

¹ Population data from 2005 US Census.

Table 4-1: SLAMS and SPM sites in the Fairbanks North Star Borough

<u>PM_{2.5}</u>					
<u>Site Name</u>	<u>Location</u>	<u>AQS ID</u>	<u>Designation</u>	<u>Install Date</u>	<u>Scale</u>
State Office	Fairbanks	02-090-0010	SLAMS	Oct, 1998	neighborhood
Sadler's	Fairbanks	n/a	SPM	Nov, 2006	neighborhood
Nordale	Fairbanks	n/a	SPM	Nov, 2006	neighborhood
Peger Rd	Fairbanks	n/a	SPM	Nov, 2007	neighborhood
<u>CO</u>					
<u>Site Name</u>	<u>Location</u>	<u>AQS ID</u>	<u>Designation</u>	<u>Install Date</u>	<u>Scale</u>
Hunter School	Fairbanks	02-090-0020	SLAMS	Jan, 1979	neighborhood
Old Post Office	Fairbanks	02-090-0002	SLAMS	Jan, 1972	micro

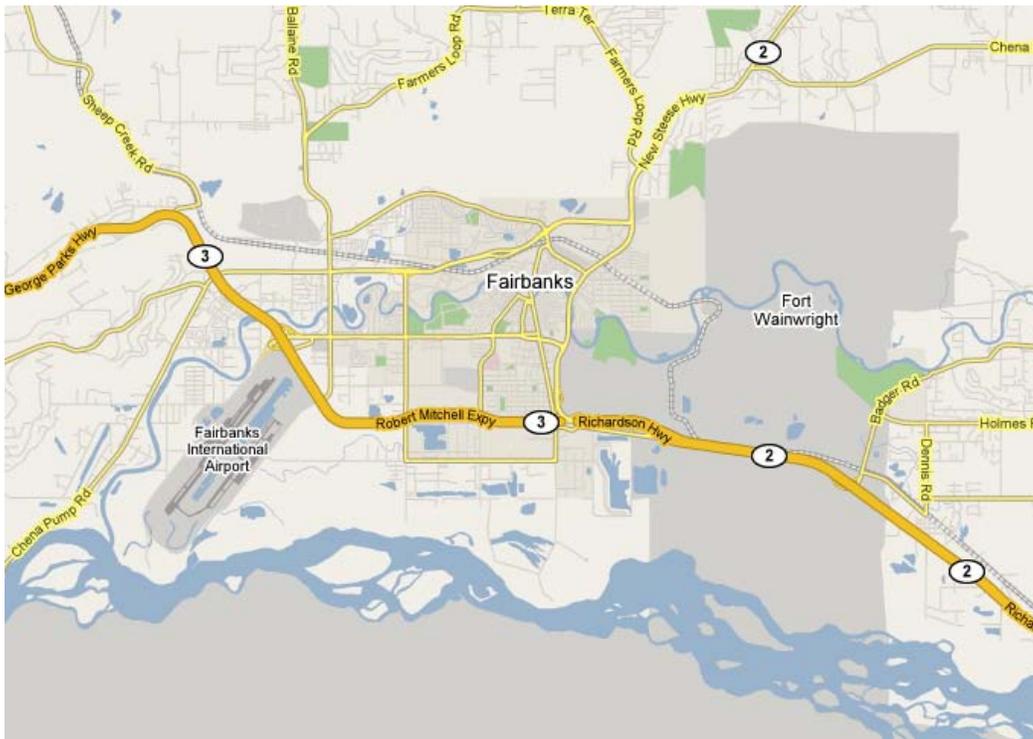


Figure 4.1.1: Map of Fairbanks area



Figure 4.1:2: Satellite photo of Fairbanks. Red circles indicate (in order from top down) the (1) Old Post Office, (2) State Office Building, (3) Hunter Elementary School, (4) Sadler, (5) TAC (Peger Rd), and (6) Nordale School sites.

4.2 OLD POST OFFICE SITE - FAIRBANKS

250 Cushman Street
Parameters: CO

AQS ID 02-090-0002
Established: January 1, 1972

4.2.1 Site Information

The site is located in the Old Post Office building at 250 Cushman Street at latitude $64^{\circ} 50' 43''$, longitude $-147^{\circ} 43' 16''$, and 460 feet (140 meters) above sea level. Figure 4.2:1 shows a street map of downtown Fairbanks and satellite image of the area. The site is located in the middle of the central business district. The Old Post Office is a micro-scale, population-oriented site located in downtown Fairbanks.

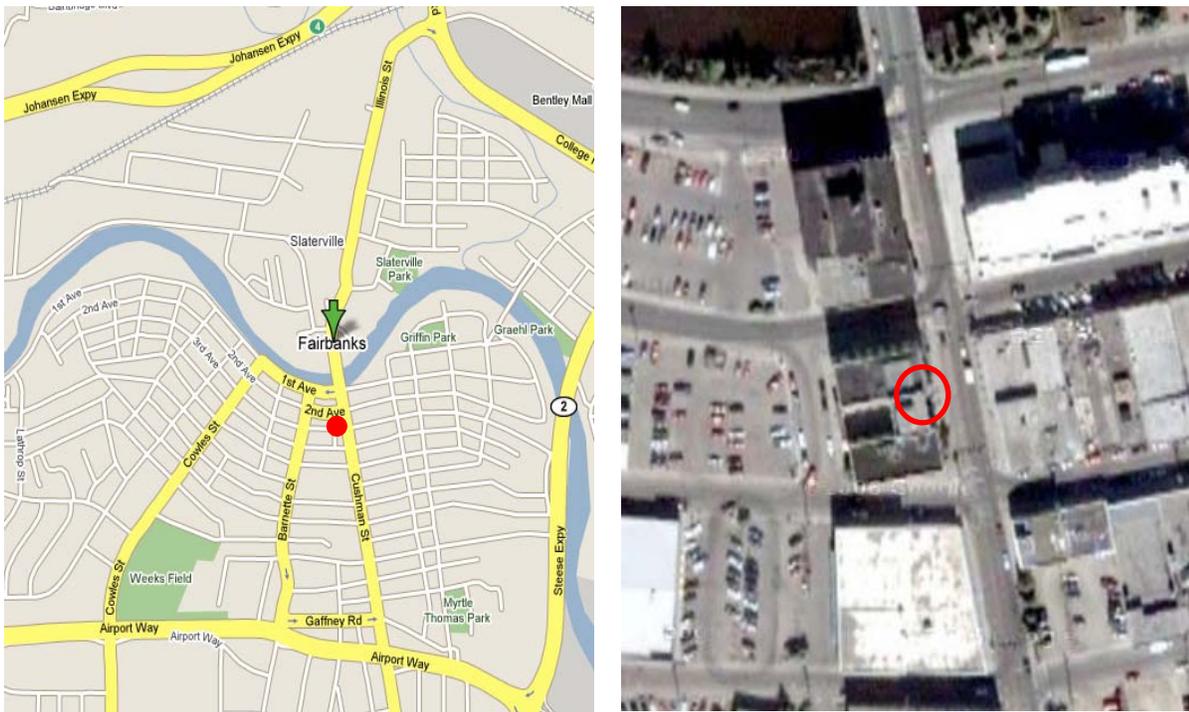


Figure 4.2:1: Map and satellite image of the Old Post Office monitoring site. The red circles indicate the site location.

4.2.2 Sources

The dominant source of CO emissions for this site is automobile exhaust. Within 200 meters of the site, land use is predominantly business (generally medical practices and small offices) with some small single family dwellings. Many older downtown houses have chimneys and may be using woodstoves in the winter for supplemental heat. The Alaska Railroad industrial area (north) and the Aurora Energy coal fired power plant (west) are both located within one mile of the site. Coal-fired power plants operated by the University of Alaska (to the west) and Fort Wainwright Army Post (to the east) are located within five miles. Fairbanks is occasionally impacted by wildland fire smoke in the summer months.

4.2.3 Monitors

The Old Post Office site is currently equipped with:

- CO (SLAMS) – A single Thermo Electron 48C CO monitor operates seasonally (October – March) with an inlet approximately 3 meters above the ground.

4.2.4 Siting

The Old Post Office is located between 2nd and 3rd Avenues on the west side of Cushman Street. The probe passes through the eastern exterior wall and extends out one meter at a height of two meters above the ground. The inlet is three meters from the nearest traffic lane on Cushman Street, and ten meters (32 feet) from the intersection at 2nd Avenue. There are no parking lots in the vicinity of the probe, but there is parallel parking on both 2nd and 3rd Avenues.

4.2.5 Traffic

This site is located at one of the busiest intersections in downtown Fairbanks. Traffic within one mile of the site sees daily traffic counts ranging from 3,700 to 7,400 vehicles per day.

Figure 4.2:2: Pictures of the Old Post Office Site

North	East	South
 <p>A street-level view looking north from the Old Post Office Site. On the left is a building with a flower box. In the center, a white car is driving on the street. In the background, there are traffic lights and other buildings under a cloudy sky.</p>	 <p>A view looking east from the Old Post Office Site. The main building is a single-story structure with a blue base and large windows. There are flower boxes hanging from the building. The sky is cloudy.</p>	 <p>A view looking south from the Old Post Office Site. The street is wide and paved. On the right, there are modern buildings and a sidewalk with some planters. The sky is blue with scattered clouds.</p>
<p>Views in three cardinal directions from the Old Post Office Site</p>		
North	South	West
 <p>A view looking north toward the Old Post Office Site. The street is lined with modern buildings on the right. A few cars are visible in the distance. The sky is overcast.</p>	 <p>A view looking south toward the Old Post Office Site. A person is pushing a shopping cart on the sidewalk. In the background, there are buildings and a street with traffic lights. The sky is cloudy.</p>	 <p>A view looking west toward the Old Post Office Site. The image shows a multi-story building with a classical architectural style, featuring tall columns and arched windows. A red circle highlights a specific window on the second floor. A person is walking on the sidewalk in the foreground.</p>
<p>Views in three cardinal directions toward the Old Post Office Site</p>		

4.3 STATE OFFICE BUILDING

675 Seventh Avenue
Parameters: PM_{2.5}

AQS IDs 02-090-0010
Established: January 1, 1972

4.3.1 Site Information

The site is located on the State Office Building at 675 7th Avenue. The latitude is 64° 50' 27", longitude is -147° 43' 23", and 460 feet (140 meters) above sea level. Figure 4.3:1 shows a street map of the downtown Fairbanks area and satellite image of the area. The site is located in the middle of the central business district. This is a neighborhood-scale, population-oriented PM_{2.5} site.

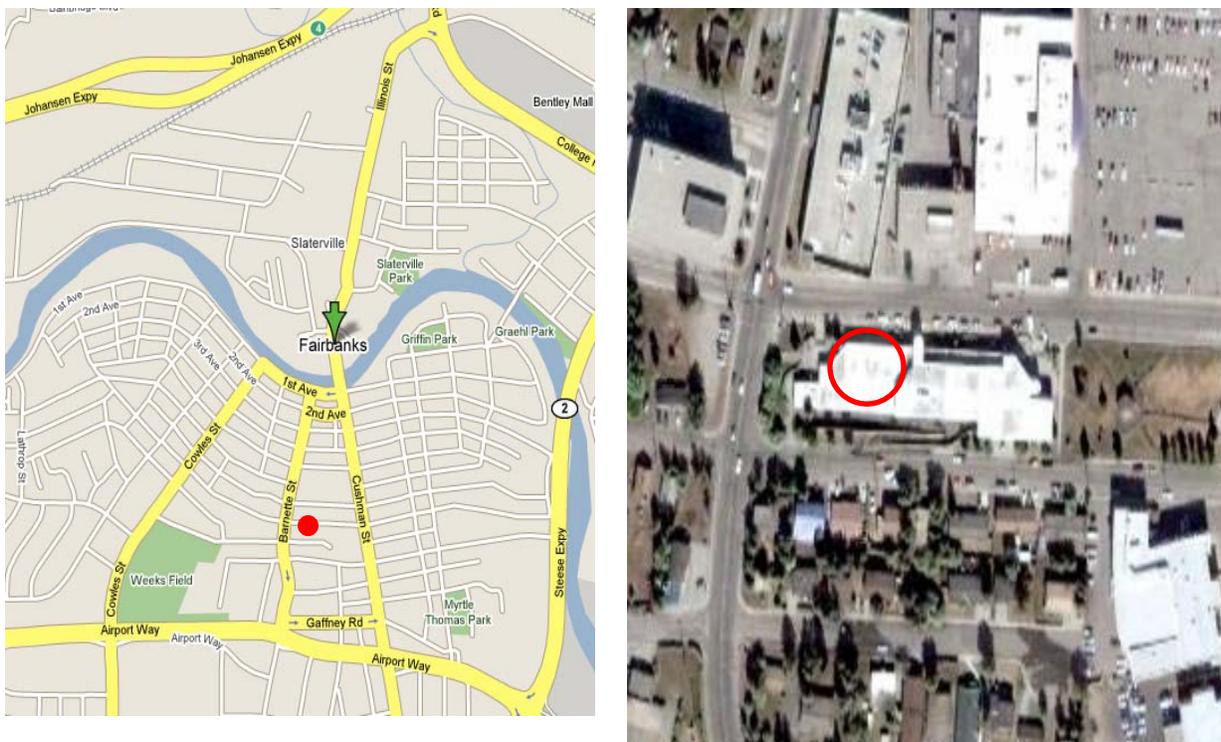


Figure 4.3:1: Map and satellite image of the State Office Building. The red circles indicate the sites location.

4.3.2 Sources

The dominant source of fine particulate matter (PM_{2.5}) for this site changes season to season. During the long winter months the primary sources of fine particulates are; home heating, automobile exhaust, and wood smoke. During the summer months, the main source is from wildland fire smoke.

4.3.3 Monitors

The State Office Building site is currently equipped with:

- PM_{2.5} (SLAMS) – Two Thermo Electron (formerly Rupprecht & Patashnick) Partisol 2000 samplers. One sampler runs on a 1-in-3 day alternating sampling schedule with the second operating as a collocated monitor.
- PM_{2.5} (SPM) – A single Met-One Beta Attenuation Monitor (BAM 1020) was installed to provide information in real time for evaluating the Air Quality Index.
- PM_{2.5} (SPM) – A single Met-One Super SASS Speciation Monitor. This multi filter sampler is set to sample on a 1-in-3 day sampling schedule.

4.3.4 Siting

The equipment is located on the west end of the State Office Building's first story roof. The inlets for all samplers are approximately six meters above the ground. There is unrestricted airflow around the samplers. The building has a partial second floor that is approximately 3.75 meters higher than the roof the samplers sit upon. The nearest second floor wall is approximately thirty meters west of the samplers. There is a birch tree approximately ten meters south of the samplers whose height exceeds that of the inlets.

4.3.5 Traffic

This site is located in downtown Fairbanks with numerous roads within one mile of the site. Area roads have daily traffic counts ranging from 3,700 to 7,400 vehicles per day. There are no parking lots in the vicinity of the probe, but there is parallel parking on 7th Ave.

Figure 4.3.2: Pictures of the State Office Building

North	East	South	West
			
<p>Views in four directions from the State Office Building</p>			
			
<p>Views in four directions towards the State Office Building Site</p>			

4.4 HUNTER ELEMENTARY SCHOOL SITE - FAIRBANKS

1630 Gillam Way
Parameters: CO

AQS ID 02-090-0020
Established: January 1, 1979

4.4.1 Site Information

The site is located at Hunter Elementary School, on the corner of 17th Avenue and Gillam Way. The latitude is 64° 49' 58", longitude is -147° 43' 53", and 446 feet (136 meters) above sea level. Figure 4.4:1 shows a street map of the local area and a satellite picture of the Hunter site. This is a neighborhood-scale, population-oriented site.

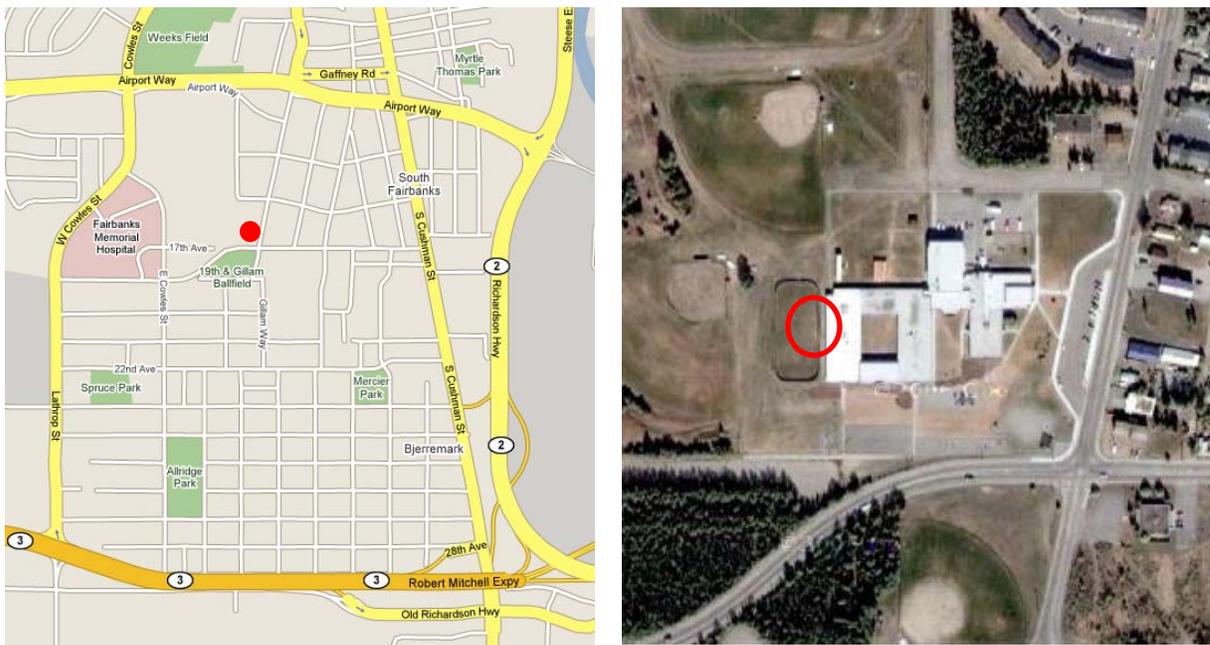


Figure 4.4:1: Map and satellite image of the Hunter Elementary site. The red circles indicate site location.

4.4.2 Sources

The dominant source of CO emissions for this site is from vehicle exhaust. Within 200 meters of the site, land use is predominantly single family dwellings, small businesses (generally medical practices and small offices) and public schools. Many houses have chimneys and may be using wood stoves in the winter for supplemental heat.

Other sources of CO may be from the Fairbanks Memorial Hospital (less than one quarter mile west), the Aurora Energy coal fired power plant (one mile north), and the coal-fired power plants operated by the University of Alaska (two to three miles northwest) and Fort Wainwright Army Post (one mile east).

4.4.3 Monitors

The Hunter Elementary site is currently equipped with:

- CO (SLAMS) – A single Thermo Electron 48C CO monitor operates seasonally (October – March) with an inlet approximately 2.5 meters above the ground.

4.4.4 Siting

The school is between 16th Avenue and 17th Avenue on the west side of Gillam Way. The CO inlet is 50 meters from the nearest traffic lane on 17th Avenue, and approximately 30 meters from the nearest traffic lane on 16th Avenue. The probe extends 1.5 meters through the western exterior wall at a height of 2.9 meters. On the west side of the school is a grass strip of land and a hockey rink. There are no streets or parking areas in the vicinity of the probe.

The school parking lot is on the east side of the building and is paved. A smaller, paved, faculty parking lot is on the north side of the building. A small unpaved lot provides supplementary parking near the faculty lot, but is used very little. All parking lots have plug-ins for automobile head-bolt heaters in winter.

4.4.5 Traffic

Average daily traffic for this location is unknown at this time, but is expected to be below 5,000 vehicles per day.

Figure 4.4:2: Pictures of the Hunter Elementary School Site

North	West	South
 A photograph showing a view from the school site looking North. The foreground shows a green lawn and a utility pole. In the background, there are other buildings and a cloudy sky.	 A photograph showing a view from the school site looking West. A large tree is prominent in the middle ground, with a green lawn in the foreground and other buildings in the distance under a cloudy sky.	 A photograph showing a view from the school site looking South. The view is from a side angle of a light green building with windows, looking down a green lawn towards a line of trees in the background under a cloudy sky.
Views in three directions from the Hunter Elementary School Site		
North	East	South
 A photograph showing a view towards the school site looking North. A utility pole is circled in red. The view shows a green lawn, a light green building with windows, and other buildings in the background under a cloudy sky.	 A photograph showing a view towards the school site looking East. A long, light green building is visible in the middle ground, with a green lawn in the foreground and a cloudy sky above.	 A photograph showing a view towards the school site looking South. The view is from a side angle of a light green building with windows, looking down a green lawn towards a line of trees in the background under a cloudy sky.
Views in three directions towards the Hunter Elementary School Site		

4.5 *SADLER SITE - FAIRBANKS*

610 Cushman, St.

Parameters: PM_{2.5}, SO₂, NO₂, Black Carbon

AQS ID: n/a

Established: Nov. 1, 2006

4.5.1 Site Information

The site is located at the Sadler's Furniture Store on the corner of 6th Avenue and Cushman St. at latitude 64° 50'26", longitude -147° 43'19", and 446 feet (136 meters) above sea level. Figure 4.6:1 shows a street map of the local area. This is a neighborhood-scale, population-oriented site.

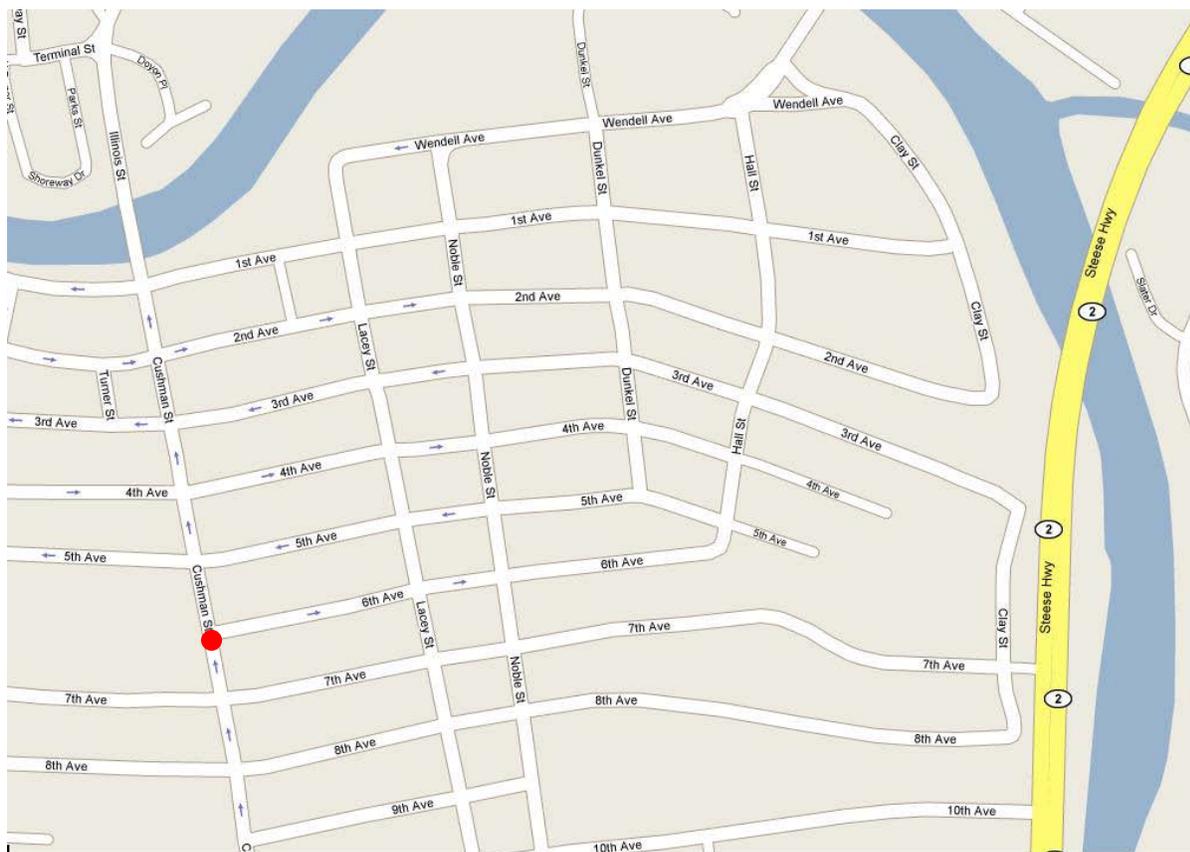


Figure 4.5:1: Map of the Sadler monitoring site. The red circle indicates site location.

4.5.2 Sources

The source of the NAAQS pollutants in Fairbanks is unclear. The FNSB Winter Monitoring Project during the winters of 2008-09 and 2009-10 hope to determine the major sources of the pollutants and develop a strategy to reduce the concentration in Fairbanks.

4.5.3 Monitors

The Sadler site is currently equipped with:

- PM_{2.5} (SLAMS) – Two Thermo Electron (formerly Rupprecht & Patashnick) Partisol 2000 samplers. One sampler runs on a 1-in-3 day alternating sampling schedule with the second operating as a collocated monitor.
- PM_{2.5} (SPM) – A single Thermo Electron TEOM 1400a samples continuously.
- Elemental Carbon – a Magee Scientific Aethalometer with GBI 2.5 µm sharp cut cyclone samples continuously.
- NO_x – A TECO Model 42C samples continuously.
- SO_x - A TECO Model 43C samples continuously.

4.5.4 Siting

The Sadler site is located in the Sadler's Furniture store parking lot in downtown Fairbanks. The parking lot is paved, and is located very near Cushman Street.

4.5.5 Traffic

This site is located in downtown Fairbanks with numerous roads within one mile of the site. Area roads have daily traffic counts ranging from 3,700 to 7,400 vehicles per day.

Figure 4.5.2: Pictures of the Sadler site



4.6 TAC (PEGER ROAD) SITE - FAIRBANKS

3175 Peger Road
Parameters: PM_{2.5}

AQS ID: n/a
Established: Nov. 1, 2007

4.6.1 Site Information

The site is located at the Transit Admin Center (TAC) on Peger Road at latitude 64° 49'08", longitude -147° 46'27", and 436 feet (133 meters) above sea level. Figure 4.7:1 shows a street map of the local area. This is a neighborhood-scale, population-oriented site.

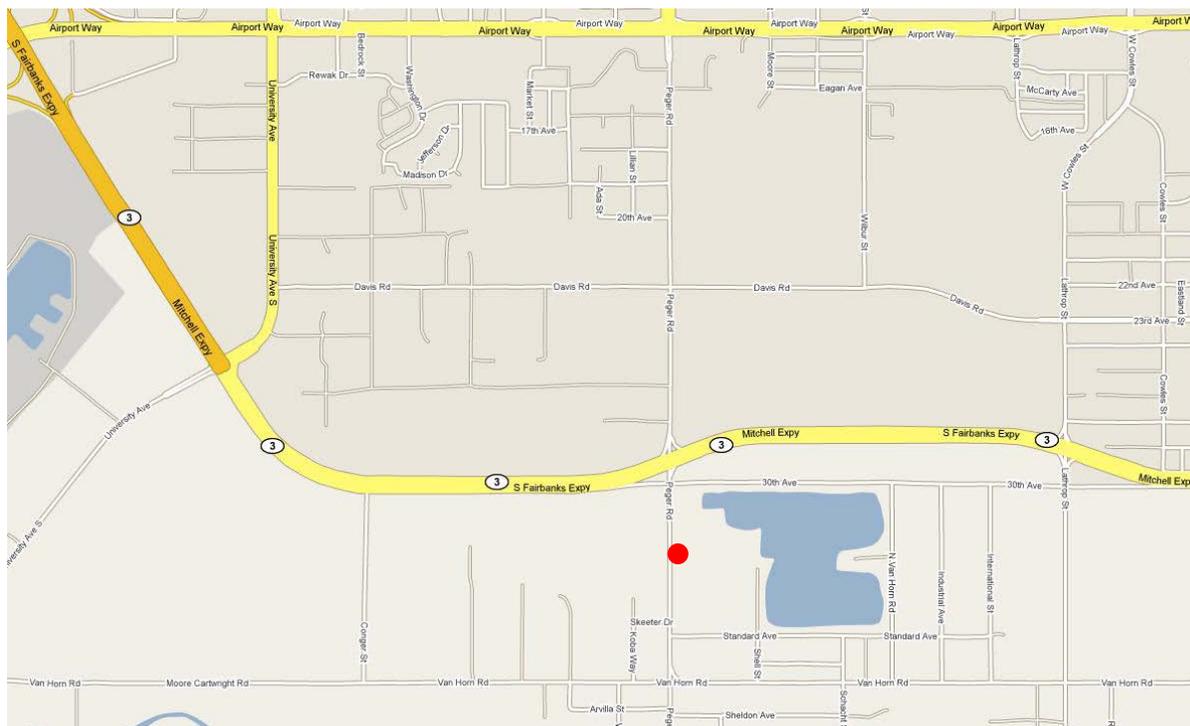


Figure 4.6:1: Map of the TAC (Peger Road) monitoring site. The red circle indicates site location.

4.6.2 Sources

The source of the NAAQS pollutants in Fairbanks is unclear. The FNSB Winter Monitoring Project during the winters of 2008-09 and 2009-10 hope to determine the major sources of the pollutants and develop a strategy to reduce the concentration in Fairbanks.

4.6.3 Monitors

The TAC site is currently equipped with:

- PM_{2.5} (SLAMS) – Two Thermo Electron (formerly Rupprecht & Patashnick) Partisol 2000 samplers. One sampler runs on a 1-in-3 day alternating sampling schedule with the second operating as a collocated monitor.
- PM_{2.5} (SPM) – A single Met-One Beta Attenuation Monitor (BAM 1020) was installed to provide information in real time for evaluating the Air Quality Index.
- PM_{2.5} (SPM) – A single Met-One Super SASS Speciation Monitor. This multi filter sampler is set to sample on a 1-in-3 day sampling schedule.
- PM_{2.5} (SPM) – A single Thermo Electron TEOM 1400a samples continuously.

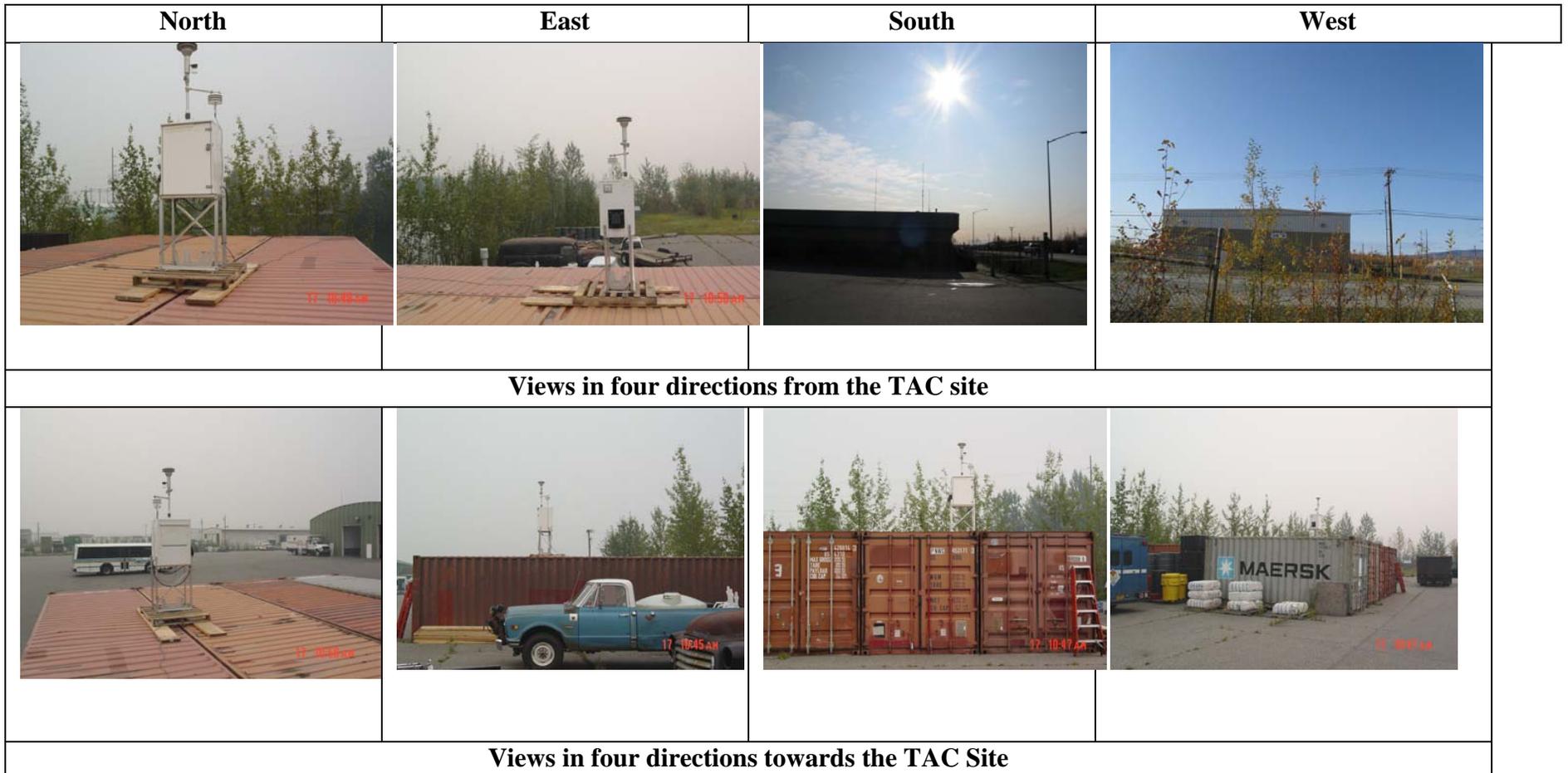
4.6.4 Siting

The TAC site is in an industrial area, approximately 730' from the Peger Road/Mitchell Expressway intersection. One of the PM_{2.5} Partisol samplers is located approximately 270' to the east of the rest of the monitoring equipment and acts as a non-road baseline to compare with the roadway site.

4.6.5 Traffic

Average daily traffic for this location is unknown at this time, but this location is in an industrial area near the Mitchell Expressway.

Figure 4.6:2: Pictures of the TAC (Peger Rd.) site.



4.7 NORDALE SCHOOL SITE - FAIRBANKS

397 Hamilton Avenue

Parameters: PM_{2.5}, Black Carbon

AQS ID: n/a

Established: Nov. 1, 2006

4.7.1 Site Information

The site is located at the Nordale School on the corner of Hamilton Avenue and Eureka Avenue at latitude 64° 50'45", longitude -147° 41'35", and 446 feet (136 meters) above sea level. Figure 4.8:1 shows a street map of the local area. This is a neighborhood-scale, population-oriented site.

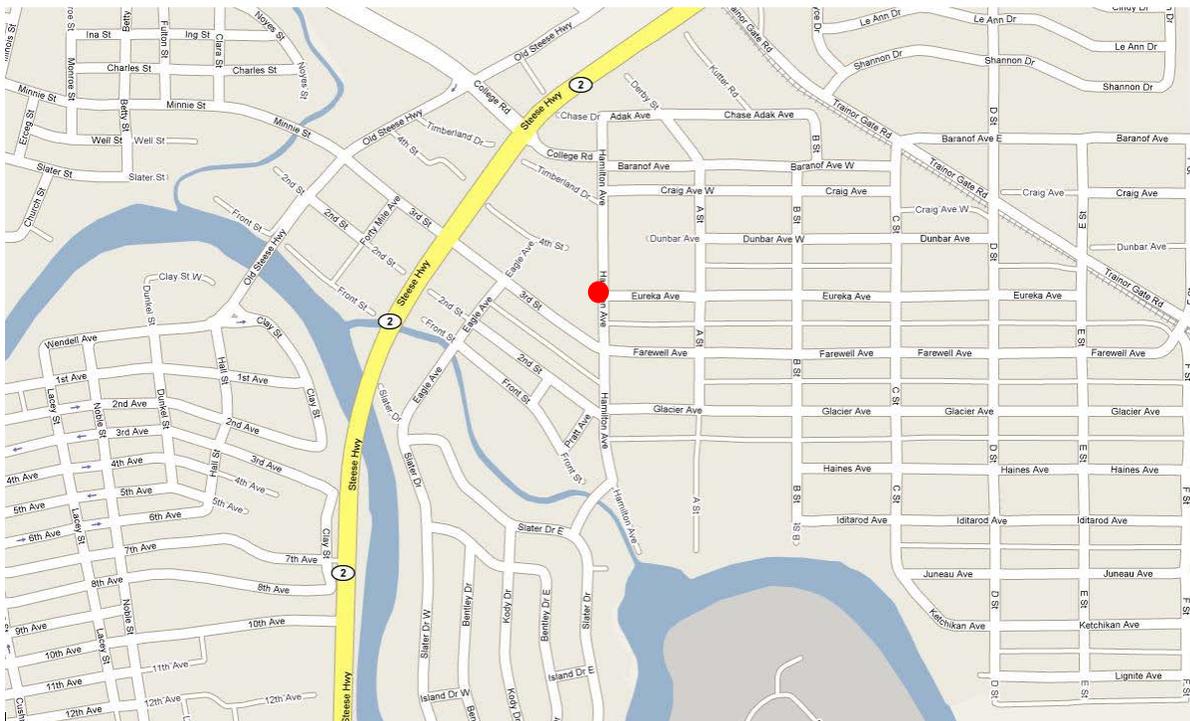


Figure 4.7:1: Map of the Nordale School monitoring site. The red circle indicates site location.

4.7.2 Sources

The source of the NAAQS pollutants in Fairbanks is unclear. The FNSB Winter Monitoring Project during the winters of 2008-09 and 2009-10 hope to determine the major sources of the pollutants and develop a strategy to reduce the concentration in Fairbanks.

4.7.3 Monitors

The Nordale site is currently equipped with:

- PM_{2.5} (SLAMS) – Two Thermo Electron (formerly Rupprecht & Patashnick) Partisol 2000 samplers. One sampler runs on a 1-in-3 day alternating sampling schedule with the second operating as a collocated monitor.
- PM_{2.5} (SPM) – A single Thermo Electron TEOM 1400a samples continuously.
- Elemental Carbon – a Magee Scientific Aethalometer with GBI 2.5 µm sharp cut cyclone samples continuously.

4.7.4 Siting

The Nordale site is located in the parking of Nordale Elementary School on Hamilton Avenue.

4.7.5 Traffic

Average daily traffic for this location is unknown at this time, but is expected to be below 5,000 vehicles per day. The Nordale site is located in a residential neighborhood called Hamilton Acres, east-northeast of the downtown area.

Figure 4.7:2: Pictures of the Nordale School Site

