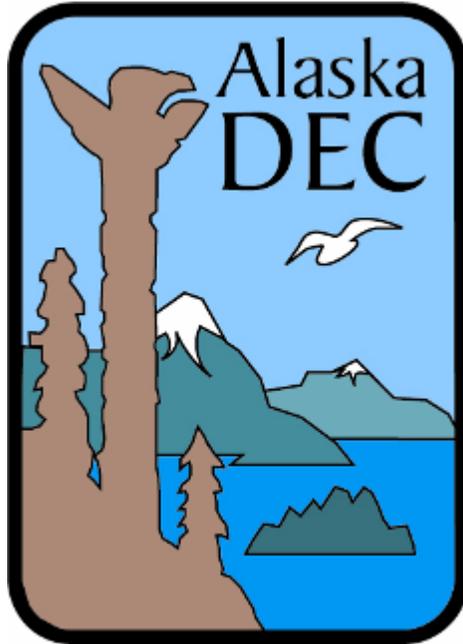


Alaska's Air Monitoring 2012 Network Plan

Chapter 5 – Matanuska Susitna Valley



Prepared by:

State of Alaska Department of Environmental Conservation
Division of Air Quality
Air Monitoring and Quality Assurance Section
619 E. Ship Creek Ave. Suite 249
Anchorage, AK 99501

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5 MATANUSKA-SUSITNA VALLEY MONITORING SITES

5.1 *General Information*

The Matanuska-Susitna Valley (Mat-Su) Borough has a population¹ of 88,995 and covers 24,682 square miles of land and 578 square miles of water. There are three incorporated cities, several unincorporated communities, and twenty-five recognized community councils within the Mat-Su Borough. Average temperatures in the winter range from 6°F to 14°F; in the summer, 47°F to 67°F. Annual precipitation is 16.5 inches, with 58 inches of snowfall.

The State of Alaska has been conducting long-term air quality monitoring investigations into particulate matter concentrations in the Matanuska–Susitna (Mat-Su) Valley since 1998. Monitoring was initiated in response to staff observations and well-documented accounts of wind-blown dust off the Matanuska and Knik River drainages. Particulate matter (PM) is divided into three factions depending on the size of the particle: PM₁₀, PM_{2.5}, and PM_{Coarse}. Monitoring in Mat-Su Valley began with sampling for PM₁₀ which means coarse particulate that is all particulate matter of a particle size less than or equal to 10 micrometers (µm). PM₁₀ is usually associated with crustal materials, which in this case is primarily wind-blown glacial silt from the river basins. PM_{2.5} is referred to fine particulate and is particulate matter equal or less than 2.5 µm and usually associated with smoke. PM_{Coarse} is a recent monitoring development to further differentiate PM₁₀ from PM_{2.5} and represents the faction of particles in the size range between PM₁₀ and PM_{2.5}.

Currently, there are three particulate monitoring sites located near the population centers in the southern Mat-Su Borough. All three sites are operated by Alaska Department of Environmental Conservation, Air Quality Division staff.

The designated State & Local Air Monitoring Site (SLAM) site is located at Harrison Court in the unincorporated area of Butte. The Harrison Court site AQS ID number is 02-0170-0008. The other two monitoring sites located in Palmer and Wasilla are special purpose monitoring (SPM) sites. The Palmer site is located between E Dahlia Avenue and E Elmwood Avenue near S Gulkana Street. The Wasilla site is located adjacent to Fire Station 61 near the intersection of W Swanson and Lucille. Figure 5.1:1 provides the map locations for all three monitoring sites.

¹ Population data obtained from 2010 U.S. Census (April 1, 2011).

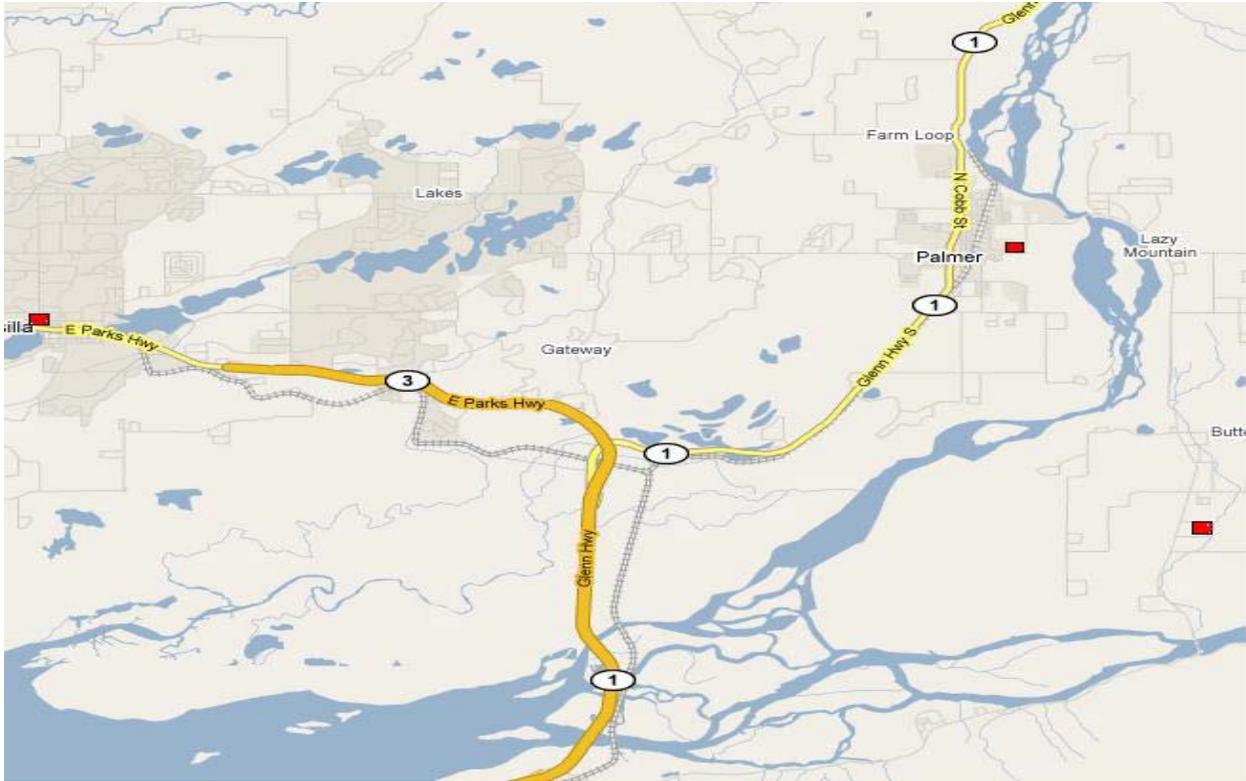


Figure 5.1:1 Map of the Southern Mat-Su Borough area. The red squares indicate the location of the three monitoring sites. (Courtesy of Google Maps)

5.2 Harrison Court (Butte) Site- Matanuska-Susitna Borough

Harrison Court
Parameters: PM₁₀, PM_{2.5}

AQS ID 02-170-0008
Established: April 11, 1998

5.2.1 Site Information

This monitoring site is located at the end of the Harrison Court cul-de-sac off of McKechnie Loop. The site coordinates are latitude 61° 32' 2.986" north (61.534163), longitude 149° 1' 53.96" (-149.031655), and 28 meters (90 feet) above sea level. This site has manual samplers for PM_{2.5} and PM₁₀, as well as a continuous monitor. As of December 2010 the continuous monitor at Butte was changed from full time yearly monitoring of PM₁₀ to seasonal monitoring of both large and fine particulate monitoring. PM_{2.5} monitoring will commence from the months of the 1st of December to the 30th of April and PM₁₀ from the 1st of May or the 30th of November. This sampling schedule will continue until an additional monitor can be installed for real time monitoring of both parameters can occur. This site is scheduled to be upgraded during the summer of 2011 by replacing the PM₁₀/PM_{2.5} monitor with two new monitors which allow continuous monitoring of PM₁₀, PM_{2.5}, and PM_{Coarse}. Figure 5.2:1 is a street map of the monitoring site and surrounding area. Harrison Court is a neighborhood PM site.

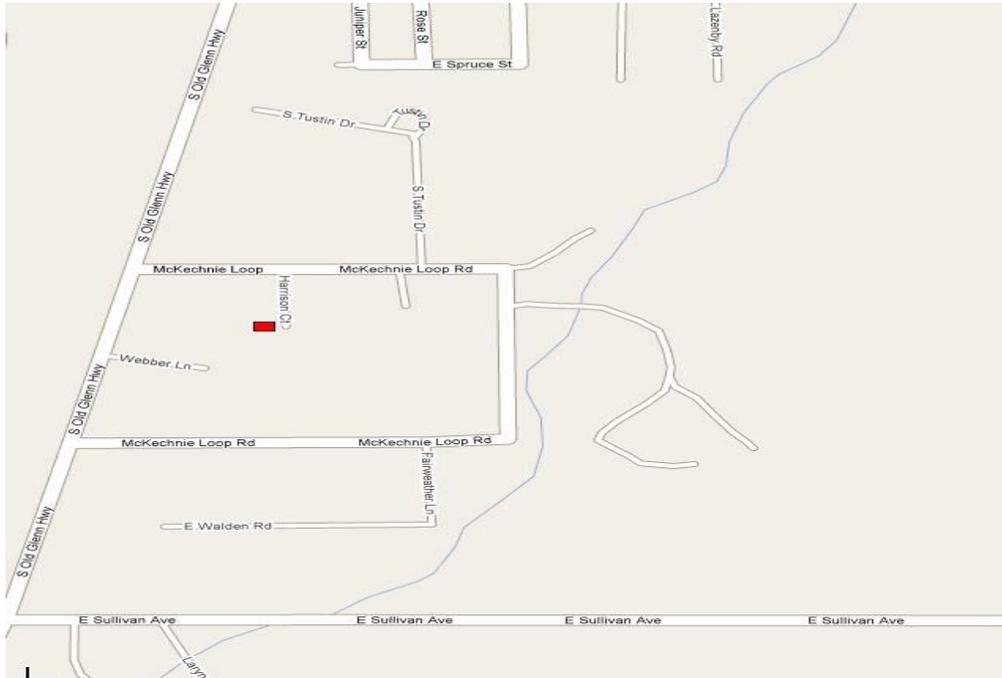


Figure 5.2:1 Map of the Butte area. The red square denotes the Harrison Court site. (Courtesy of Google Maps)

5.2.2 Sources

The major sources of coarse particulate matter impacting this site are dust from the Knik and Matanuska River basins. Both are glacier fed meandering rivers that deposit glacial silt over wide braided riverbeds and out to the Cook Inlet tidal zone. During times when the river is low

(spring and fall), dry windy weather suspends large amounts of silt in the air from the tidal flats and gravel bars. Additionally, within 8 km (5 miles) are two small gravel airstrips (activity unknown but expected to be light), a dirt-track motor raceway, farmland, and recreation areas along both river basins. Most land in the area is undeveloped forest. Sources of fine particulate matter include residential wood smoke, vehicular exhaust, and forest fires. Typically, several air quality alerts are issued per year during spring and fall months because of wind-blown dust events.

5.2.3 Monitors

The Harrison Court (Butte) Site is currently equipped with:

- PM_{2.5} (SLAMS) – Two Thermo Electron (formerly Rupprecht & Patashnick) Partisol 2000 samplers. Two samplers are operated on alternating 1-in-6 day schedules. This operating mode results with samples collected at the site which are in accordance with the EPA 1-in-3 day air monitoring schedule.
- PM₁₀ (SPM) – One Thermo Electron (formerly Rupprecht & Patashnick) Partisol 2000 sampler. Operated on a 1-in-6 sampling schedule.
- PM₁₀ / PM_{2.5} (SPM) – A single Met-One BAM 1020 continuous monitor is currently operating to provide information in real time for evaluating the Air Quality Index. The particle size selective inlets are switched on a seasonal basis.
- PM₁₀, PM_{2.5} & PM_{Coarse} (SPM) – One set of two Met-One BAM 1020X particulate monitors to replace the existing single BAM 1020. (Scheduled for summer 2011)

5.2.4 Siting

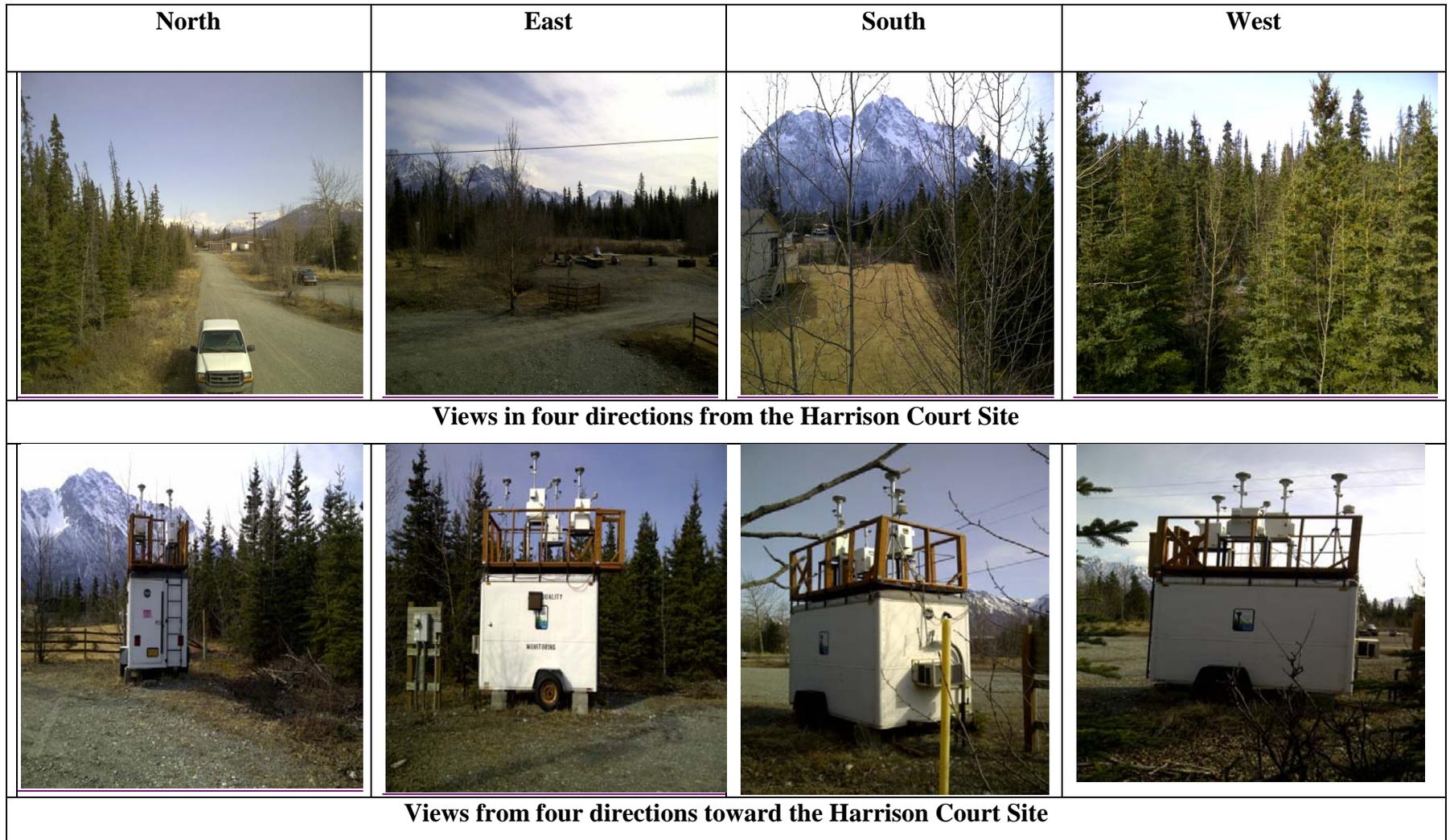
The manual operated equipment is located on the roof of the trailer and the continuous monitor is housed inside the trailer. All inlets are at a height of approximately four meters (13 feet) above the ground. There is uninterrupted airflow around the inlets. The monitoring objective of this site is to measure airborne glacial loess raised by high winds on the Knik and Matanuska river beds, as well as measure exposure to fine particulate matter from automobiles and home heating in this rural location. The trailer is on the southwest corner of the unpaved Harrison Court cul-de-sac. Photographs of the Harrison Court site are presented in Figure 5.2:2 (below).

5.2.5 Traffic

There are only three house lots on Harrison Court, and traffic is very light. There are numerous unpaved roadways throughout the area. All main roads are paved. Average daily traffic for the area is 270 vehicles per day along the McKechnie Loop. Average daily traffic along the Old Glenn Highway is 3004 vehicles per day.²

² State Department of Transportation and Public Facilities, 2009 traffic maps, <http://www.dot.state.ak.us/stwdplng/mapping/trafficmaps/2009/Central/matsu09.pdf>

Figure 5.2:2 Photographs of the Harrison Court Site



5.3.2 Sources

The major sources of coarse particulate matter impacting this site are dust from the Knik and Matanuska River basins. Both are glacier fed meandering rivers that deposit glacial silt over wide braided riverbeds and out to the Cook Inlet tidal zone. During times when the rivers are low (spring and fall) dry, windy weather suspends large amounts of silt in the air from the tidal flats and gravel bars. Additionally, within 8km (5 miles) is one small paved airport (activity unknown but expected to be light), a dirt-track motor raceway, farmland and recreation areas along the Matanuska River basin. Sources of fine particulate matter include residential wood smoke, vehicular exhaust, and forest fires. Typically, several air quality alerts are issued per year during spring and fall months because of wind-blown dust events.

5.3.3 Monitors

The Palmer Site is currently equipped with:

- PM_{2.5}, PM₁₀, PM_{Coarse} (SPM) – One MetOne BAM1020 FRM_{2.5}. This includes one BAM1020 for continuous monitoring of PM₁₀ and one BAM1020 for continuous monitoring of PM_{2.5} and give real time data for evaluating the Air Quality Index.
- Meteorological sensors for wind speed, wind direction, and ambient temperature.

5.3.4 Siting

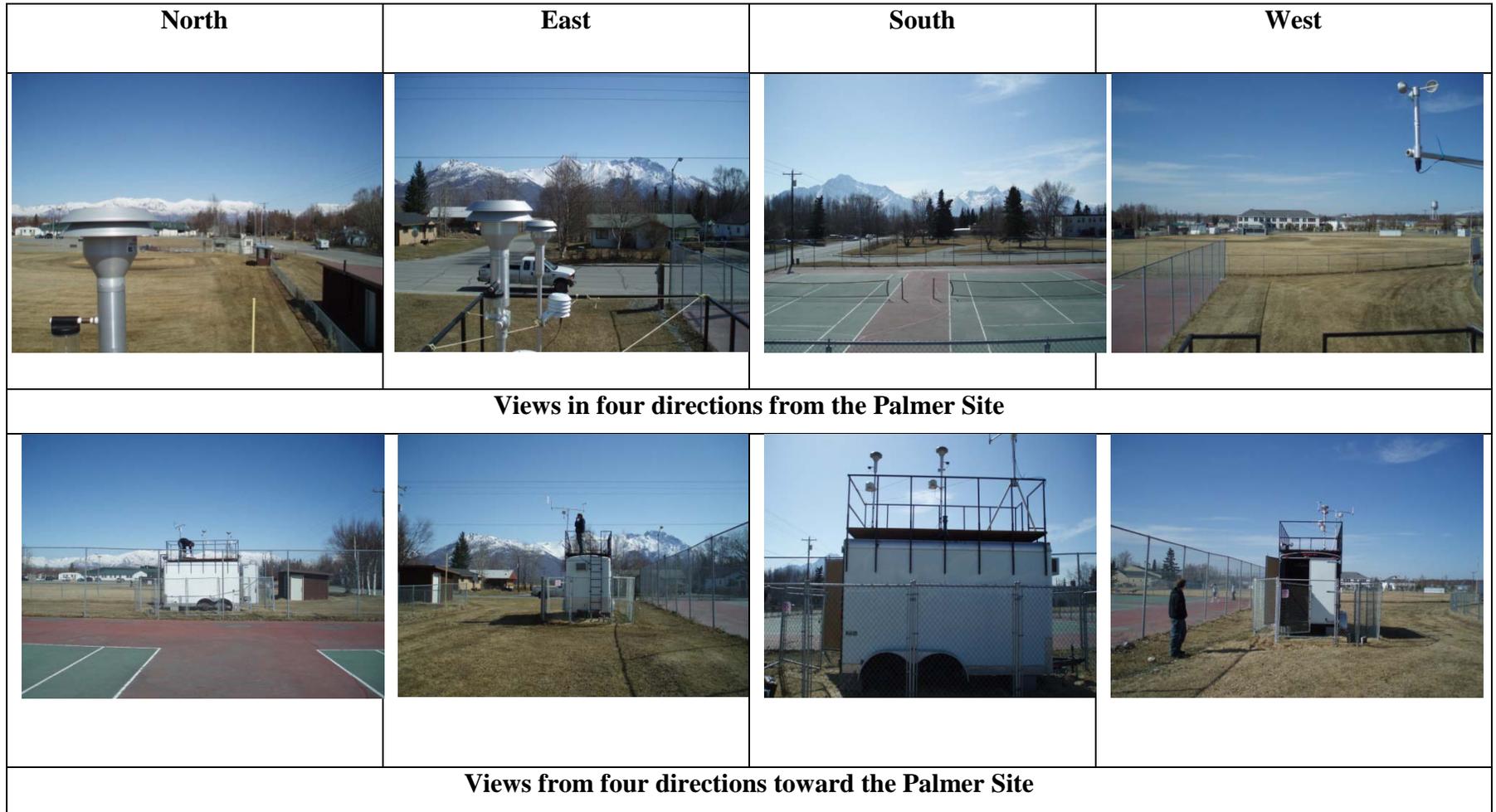
The continuous particulate monitors are housed in an insulated temperature-controlled trailer. All inlets are at a height of approximately four meters (13 feet) above the ground. There is uninterrupted airflow around the inlets. The monitoring objective of this site is to measure coarse particulate from airborne glacial silt raised by high winds on the Knik and Matanuska river beds, as well as measure exposure to fine particulate matter from vehicular exhaust, wood smoke from residential heating and forest fires and then compare the emissions coarse versus fine particulates for PM difference. Photographs of the Palmer site are presented in Figure 5.3:2.

5.3.5 Traffic

All main roads in immediate area of the monitoring site are paved. Average daily traffic for the Palmer downtown district ranges from 400 to 3,300 vehicles per day. The nearest traffic count site to the monitoring location is 1,390 vehicles per day along E. Dahlia Avenue.³

³State Department of Transportation and Public Facilities, 2009 traffic maps, <http://www.dot.state.ak.us/stwdplng/mapping/trafficmaps/2009/Central/matsu09.pdf>

Figure 5.3:2 Photographs of the Palmer Site



5.4 Wasilla Site - Matanuska-Susitna Borough

Wasilla

Parameters: PM₁₀, PM_{2.5}, PM_{Coarse}, O₃

AQS ID 02-170-0013

Established: October 1, 2008

5.4.1 Site Information

The Wasilla monitoring site is located in the 100 block of West Swanson Avenue adjacent to the Station 61 Fire Station near the intersection with Lucille Street. The site coordinates are latitude 61° 34.998' north (61.598796), longitude 149° 27.212' west (-149.455255). The average elevation for Wasilla is 104 meters (341 feet) above mean sea level. The monitoring site is located in the downtown district and approximately 200 meters north of the George Parks Highway. The predominant land use is residential and commercial buildings with paved roads, parking lots, and mixed areas of land, both vegetated and graveled. Figure 5.4:1 is a street map of the monitoring site and surrounding area. Wasilla is a neighborhood scale PM site.

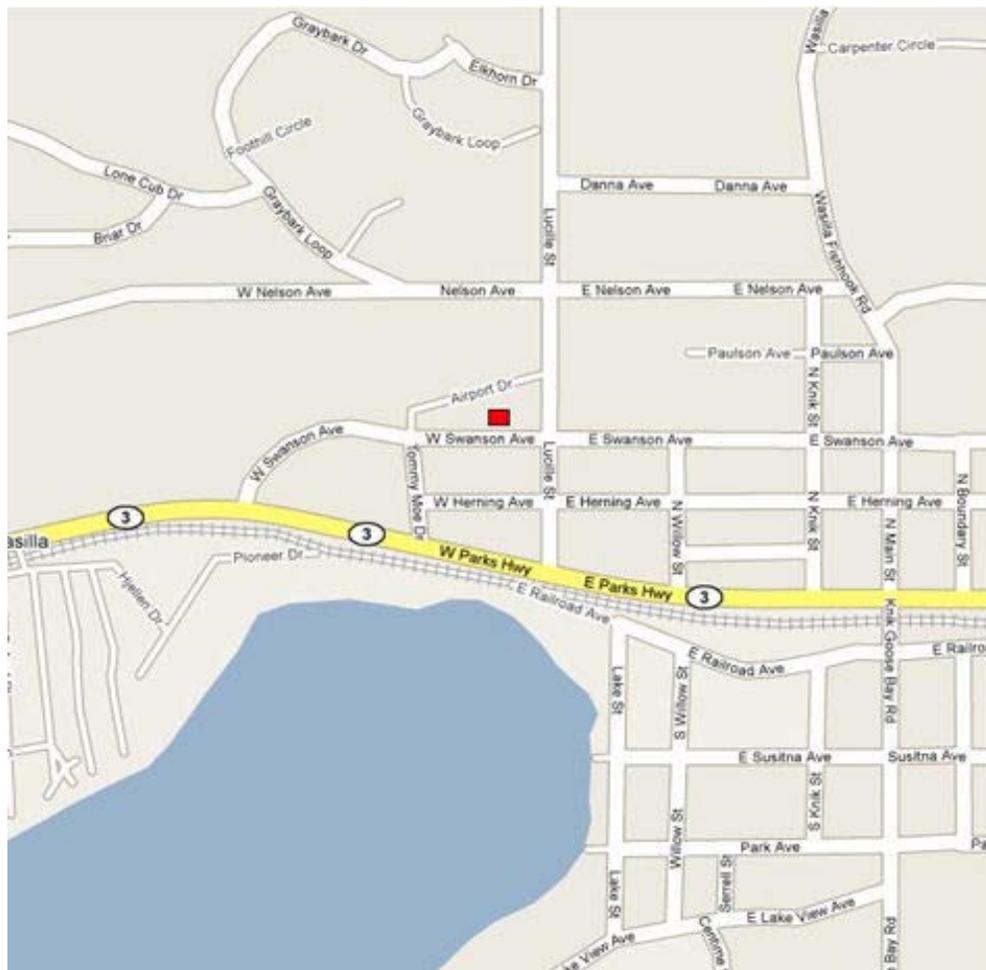


Figure 5.4:1 Map of the City of Wasilla. The red square denotes the monitoring site. (Courtesy of Google Maps)

5.4.2 Sources

The major sources of coarse particulate matter impacting the Wasilla site are wind-blown dust from unpaved areas, traffic dust and glacial silt from river beds feeding in the northern end of the Cook Inlet. Several air quality alerts are issued per year during spring and fall months because of wind-blown dust events. Sources of fine particulate matter include residential wood smoke, vehicular exhaust, and forest fires.

5.4.3 Monitors

The Wasilla Site is currently equipped with:

- PM_{2.5}, PM₁₀, PM_{Coarse}, (SPM) – One MetOne BAM1020 FRM_{2.5}. This includes one BAM1020 for continuous monitoring of PM₁₀ and one BAM1020 for continuous monitoring of PM_{2.5} and give real time data for evaluating the Air Quality Index.
- PM_{2.5} (SPM) – A single Thermo Electron (formerly Rupprecht & Patashnick) Partisol 2000 sampler. The manual sampler runs on a 1-in-6 day sampling schedule.
- Ozone (O₃) (SPM) – A single Teledyne API 400E O₃ analyzer was installed March 2011.

5.4.4 Siting

The continuous particulate monitors are housed in an insulated temperature-controlled trailer within a small security fenced area. All inlets are at a height of approximately four meters (13 feet) above the ground. There is uninterrupted airflow around the inlets. The monitoring objective of this site is to measure coarse particulate from airborne road dust, glacial loess raised by high winds on exposed ground and river beds, as well as measure exposure to fine particulate matter from vehicular exhaust, wood smoke from residential heating and forest fires and then compare the emissions course versus fine particulates. Photographs of the Wasilla Site are presented in Figure 5.4:2

5.4.5 Traffic

All main roads in immediate area of the monitoring site are paved. Average daily traffic for the area streets is not known. Commuter traffic and summer tourist traffic along the George Parks Highway can be heavy at times with a average daily traffic count of 30,330 vehicles per day. The average daily traffic for the nearest traffic count along Lucille Street is 7,900 vehicles per day.⁴

⁴ State Department of Transportation and Public Facilities, 2009 traffic maps, <http://www.dot.state.ak.us/stwdplng/mapping/trafficmaps/2009/Central/matsu09.pdf>

Figure 5.4:2 Photographs of the Wasilla Site



Views in four directions from the Wasilla Site



Views from four directions toward the Wasilla Site