



Community Air Monitoring Project

Summary Report - East Phillips Neighborhood Little Earth Residential Complex



Project overview

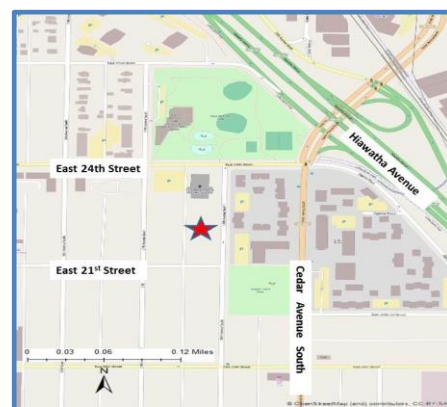
In 2013, the Minnesota Legislature funded a two-year air monitoring study to measure air quality in Minnesota communities where low income or communities of color might be disproportionately impacted by pollution from highway traffic, air traffic, and industrial sources. This legislation funds one monitor to be moved to seven locations in a two-year period.

The project began on October 1, 2013, with monitoring in the East Phillips Neighborhood of Minneapolis. This area is mostly residential and is located near heavily used roadways and industries. Monitoring was completed on December 31, 2013.

What we monitored

Air was monitored for specific chemicals that are associated with adverse public health effects (Attachment A). These chemicals are classified as fine particles (PM_{2.5}) or air toxic pollutants (carbonyls, metals or volatile organic compounds). The data collected were examined to see if any results were above air quality standards or health benchmarks.

The data were compared with other data collected in the same time period at other monitors in Minnesota. Within each comparison group, the Minnesota Pollution Control Agency (MPCA) looked for results that were significantly different and had average daily values above air quality standards and health benchmarks.



Little Earth Residential Complex
Air Monitoring Site

Findings at a glance:

- Of the 74 air toxic pollutants measured, the levels of 38 pollutants were so low that they were not detected by the monitor.
- Of the detected pollutants, average measured values were at or below the established health benchmark or air quality standard values.
- In general, average air toxics values and trends over time were similar between the Little Earth monitor and other MPCA air monitors.
- For all days, average daily PM_{2.5} values were below the daily standard of 35 µg/m³.
- Average daily PM_{2.5} values measured at the Little Earth monitor were generally higher than the values seen at most other sites for a majority of the monitoring days.

Summary of results

Fine Particles (PM_{2.5})

Fine particulate matter is a mixture of very small particles found in the air including dust, dirt, smoke and even small liquid droplets. Some are so small they can only be detected with a microscope. Because of their small size, fine particles can become lodged in the lungs and cause health problems.



U.S. Environmental Protection Agency (EPA) regulations state that a monitored site meets daily PM_{2.5} regulatory requirements if the 98th percentile of the 24-hour PM_{2.5} concentrations in a year, averaged over 3 years, is less than or equal to 35 µg/m³. For more information: http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_index.html

Regulatory standards exist for fine particle measurements, but these standards require a monitoring period of three years or greater. The monitoring period for this project is too short to consider regulatory compliance for safe PM_{2.5} levels. However, as an informal comparison, for all days, the average daily PM_{2.5} values were below the daily regulatory PM_{2.5} standard of 35 µg/m³.

The daily trends (**Figure 1**) over the three month period were similar between the Little Earth monitor and nearby Minneapolis monitors (**Figure 2**). While all average daily PM_{2.5} values were below the daily PM_{2.5} standard of 35 µg/m³, average daily values measured at the Little Earth monitor were generally higher than those seen at most other sites (**Figure 3**) for a majority of the monitoring days (**Table 1**).

Figure 1. Average daily PM_{2.5} values at all Minneapolis sites from October 1 to December 31, 2013.

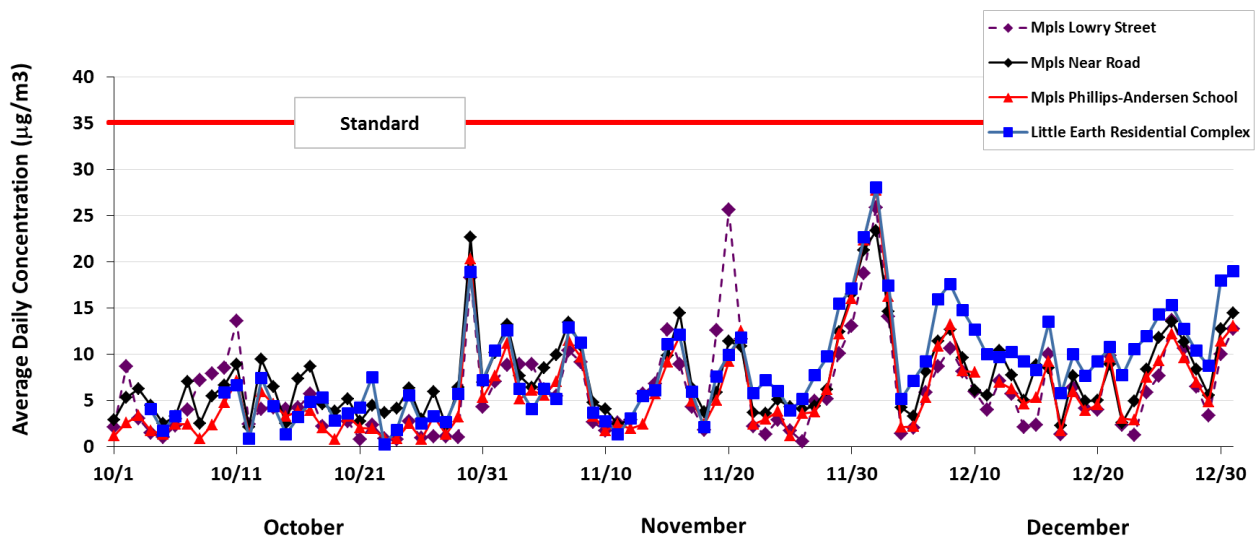


Figure 2. Location of the community air monitor in relation to other PM_{2.5} air monitors in the Minneapolis metro area.



Figure 3. Location of the community air monitor in relation to other PM_{2.5} air monitors in the Twin Cities metro area.

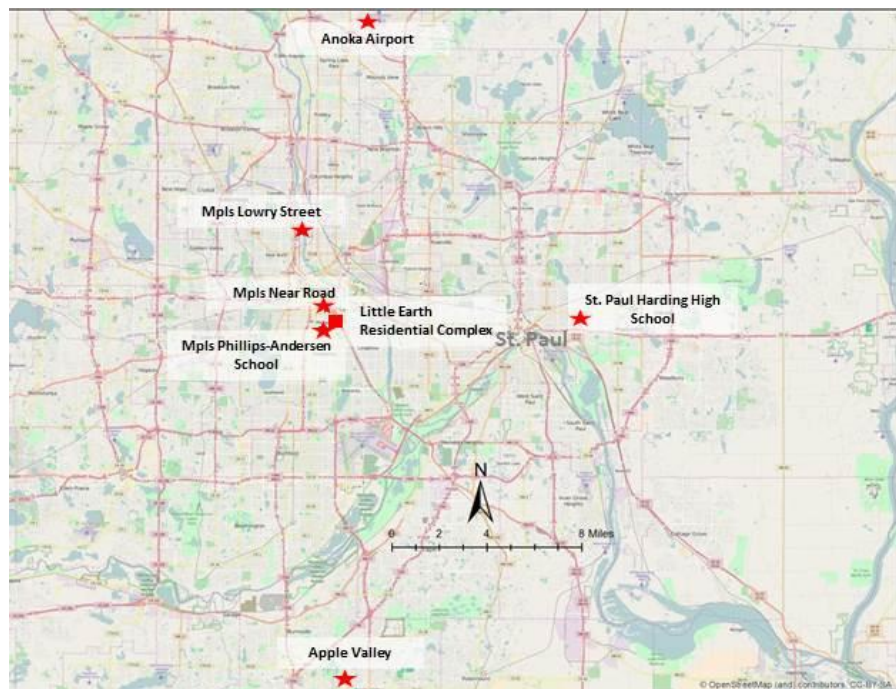


Table 1. Summary information describing average daily PM_{2.5} values found at MPCA monitors during the monitoring period of October 1, 2013 to December 31, 2013.

Site	Min µg/m ³	Max µg/m ³	Mean ¹ µg/m ³	Median ² µg/m ³	Standard Deviation* µg/m ³	Number of days that average daily values at Little Earth were		Total Number of Monitoring Days ⁺
						higher	lower	
Little Earth	0.3	28.0	8.5	7.5	5.3			
Mpls Near Road	2.1	23.4	7.5	6.3	4.5	48	36	84
Mpls Lowry St	0.5	25.9	6.2	4.9	5.1	69	16	85
Mpls Phillips-Andersen School	0.8	27.8	6.0	4.6	5.0	72	13	85
St. Paul - Harding High School	0.5	21.5	6.7	5.3	4.6	61	25	86
Anoka Airport	1.1	21.8	6.8	5.7	4.4	57	29	86
Apple Valley	1.2	27.1	6.6	5.6	4.7	62	22	84
Virginia	4.9	18.8	9.1	8.2	2.9	25	50	75
Rochester	0.6	25.8	6.5	5.6	4.5	61	25	86
Talahi School	0.3	27.4	6.2	5.3	4.7	66	16	82
St Michael	1.3	30.0	6.0	4.3	4.8	58	21	79
Detroit Lakes	1.1	16.3	5.5	4.9	3.1	58	18	76
Marshall Airport	1.4	23.2	5.2	4.2	3.6	64	22	86
Laura McA School	0.6	15.5	5.0	4.1	3.7	60	12	72
Ely	0.9	14.5	3.8	3.2	2.4	72	14	86
Brainerd Airport	0.0	15.0	3.5	2.5	3.4	84	2	86

¹The mean value is the arithmetic average value of all of the average daily PM_{2.5} measurements

²The median value is the middle value of the set of average daily PM_{2.5} measurements

*This is the standard deviation of the mean values reported in this table

⁺Not all monitoring days had complete data available for analysis

Summary of results (cont'd)

Air toxics

Air toxic pollutants are those chemicals known or suspected to cause serious human health effects or adverse environmental effects. Example pollutants include *methylene chloride*, used as a solvent and paint stripper, *perchloroethylene*, emitted by some dry cleaning facilities and *benzene*, which is found in gasoline. Some air toxic pollutants are metals such as *cadmium*, *chromium*, or *lead* compounds.

Air toxics health benchmarks


Existing air quality standards and health benchmarks come from a variety of sources. However, these are not available for all chemicals. For the air toxics, the MPCA uses available published health benchmarks. Specific information about standards and health benchmarks can be found at:

<http://www.pca.state.mn.us/bkzq4b0>.

Of the 74 air toxic pollutants measured (**Attachment A**), there were 36 pollutants detected at the Little Earth monitor.

The majority of pollutants measured at Little Earth were not different from levels measured at other monitoring sites (**Figure 4**). Several air toxic pollutants measured at Little Earth were higher than levels measured in suburban locations, but were very similar to levels measured at other monitoring sites in the urban core cities of Minneapolis and St. Paul.

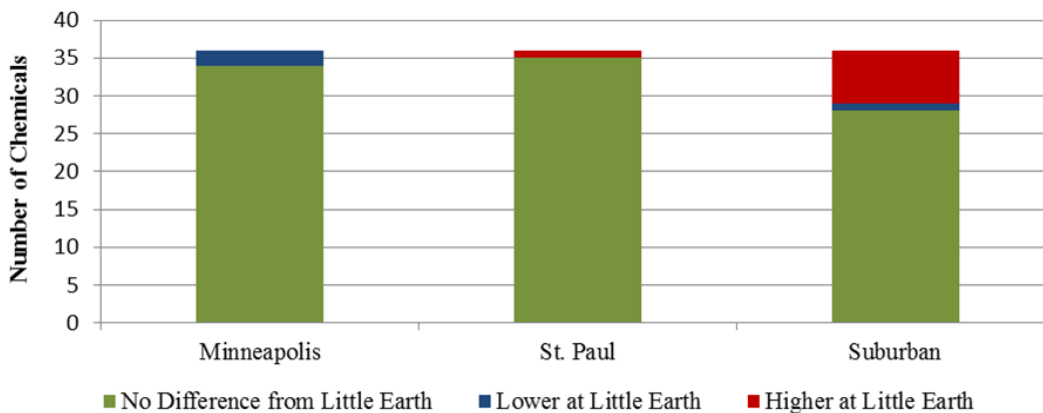
All measured values were at or below the established health benchmark values.



Minnesota
Public Health Data
can be found at
<https://apps.health.state.mn.us/mndata/home>

This data can be searched by county to help you find public health information relevant to your local area.

Figure 4. The number of air toxic pollutants that had a statistically different daily average value between the Little Earth monitor and the group of monitors in St. Paul, Minneapolis and around the suburban area of the Twin Cities.



Links to other information

Information about other environmental hazards, health outcomes, and socioeconomic indicators is available from the EPA at <http://epamap14.epa.gov/ejmap/entry.html>. This information is available by searching an address.

For more information and to view updates about the Community Air Monitoring Project, please visit www.pca.state.mn.us/9xc4ahc.

For more information on the air monitoring results from the Little Earth Residential Complex site or other air quality monitoring studies, please call 651-296-6300 or 1-800-657-3864 and ask for air data analysis staff. More information about the MPCA's air monitoring program is available on the web at <http://www.pca.state.mn.us/ruu6fhw>.

Attachment A. Community Air Monitoring Project - Monitored Air Quality Pollutants

Carbonyls

Acetaldehyde
 Benzaldehyde
 Butyraldehyde
 Formaldehyde
 Propionaldehyde
 Trans-Crotonaldehyde

Metals

Antimony
 Arsenic
 Barium
 Beryllium¹
 Cadmium¹
 Chromium
 Cobalt¹
 Iron
 Lead
 Manganese
 Nickel
 Selenium^{*}
 Zinc

PM_{2.5} Continuous

PM_{2.5} Concentration

Volatile Organic Compounds

1,1,2,2-Tetrachloroethane¹
 1,1,2-Trichloroethane¹
 1,1-Dichloroethane¹
 1,1-Dichloroethylene¹
 1,2,4-Trichlorobenzene¹
 1,2,4-Trimethylbenzene
 1,2-Dichlorobenzene¹
 1,2-Dichloropropane¹
 1,3,5-Trimethylbenzene¹
 1,3-Butadiene
 1,3-Dichlorobenzene¹
 1,4-Dichlorobenzene¹
 Benzene
 Benzene, 1-Ethenyl-4-Methyl¹
 Benzyl Chloride¹
 Bromodichloromethane¹
 Bromoform¹
 Bromomethane¹
 Carbon Disulfide^{*}
 Carbon Tetrachloride
 Chlorobenzene¹
 Chloroethane¹
 Chloroform¹
 Chloromethane
 Cis-1,2-Dichloroethene¹
 Cis-1,3-Dichloropropene¹
 Cyclohexane
 Dibromochloromethane¹

Dichlorodifluoromethane
 Dichloromethane
 Ethylbenzene
 Ethylene Dibromide¹
 Ethylene Dichloride¹
 Freon 113
 Freon 114
 Furan, Tetrahydro-
 Hexachlorobutadiene¹
 M/P Xylene
 Methyl Butyl Ketone¹
 Methyl Chloroform¹
 Methyl Ethyl Ketone
 Methyl Tert-Butyl Ether¹
 N-Heptane
 N-Hexane
 O-Xylene
 Propylene
 Styrene^{*}
 Tetrachloroethylene¹
 Toluene
 Trans-1,2-Dichloroethylene¹
 Trans-1,3-Dichloropropene¹
 Trichloroethylene¹
 Trichlorofluoromethane
 Vinyl Acetate
 Vinyl Chloride¹

¹Indicates chemicals that were below detection limits at all monitors in Minnesota, including the Little Earth residential complex monitor, for this three month monitoring time.

^{*}Indicates chemicals that were below the detection limit at the Little Earth residential complex, but were detected at one or more monitoring sites in Minnesota.