NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Air Resources
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April 28, 2020

Superintendent Joseph Kardash
Rensselaer City School District
25 Van Rensselaer Drive
Rensselaer, NY 12144

Dear Joe:

At your request, staff from the New York State Department of Environmental Conservation (DEC) conducted air sampling for volatile organic compounds (VOCs) and speciated analysis (for specific elemental components) of particulate matter (10 microns and less in size (PM_{10})) on the roof of the elementary school. The results for the fourteen VOC samples, which were collected every sixth day from October 30, 2019 to January 16, 2020, show that the air quality at the school is typical of the general air quality for a suburban area. The air concentrations for the PM_{10} mass and associated elemental components, which were collected from October 12, 2019 to December 8, 2019, were low and similar to measurements at an identical monitor in Loudonville during the same time period. In particular arsenic and lead air concentrations were also low and similar for the two locations. While landfill operations can have the potential to increase short-term particulate levels near the school, DEC actions to curtail this influence, particularly on windy days, may have helped to keep the PM_{10} levels at the school similar to levels measured at the Loudonville monitor. These data collected do not appear to indicate that landfill operations were measurably increasing the levels of PM_{10} and VOCs monitored at the school above levels measured at other DEC monitors.

Details About the Sampling Results for Volatile Organic Compounds

The volatile pollutants measured in the air samples represent chemicals that can be typically found in outdoor air, including in suburban communities. The list includes chemicals identified as hazardous air pollutants and toxic air contaminants by the EPA and DEC.

VOC sampling results were compared to DEC's short-term health-based guideline concentrations (SGCs). SGCs are used by the DEC to protect the general population from adverse exposure to toxic air contaminants for short-term exposure periods of one hour. We also compared the results to DEC's annual health-based guideline concentrations (AGCs). The AGCs and SGCs are set at levels below those that cause health effects. AGCs are used by the DEC to protect the general population from adverse health effects from long-term (lifetime) exposure to the toxic air contaminant. While these values are used for comparisons to ambient measurements taken over the course of an entire year, in this case we also compared the 24-hour sampling results measured at your school to assess potential long-term exposure, assuming the limited samples collected are representative of long-term exposures.

None of the VOC results were above the SGC. The results for four VOCs were detected above the AGC: 1,2-dichloroethane, 1,3-butadiene, benzene, and carbon tetrachloride. These four VOCs are commonly detected above the AGC across the State, including in the rural areas of Whiteface Mountain and Pinnacle State Park.

The following VOCs were detected in the air samples we collected and also were reported as detected in the leachate at Dunn Landfill in the facility's solid waste annual report for 2018 or 2019: 1,2-dichloroethane, dichloromethane, benzene, ethylbenzene, toluene, trichloroethylene, trichlorofluoromethane, vinyl chloride, *m,p*-xylene, and *o*-xylene. All of these compounds were found at levels commonly found in outdoor air samples from other areas of the State.

More detailed information about the results can be found in the ***VOC Technical Notes*** section which describes the collection and analysis method used for the samples. We used the same methods to collect and analyze the school samples as we use in the network monitoring conducted across the State. Also included are the results for all VOCs detected and graphs of comparisons to the State monitoring network for the four VOCs which were found above the AGC.

Details about the PM_{10} Mass and Elemental Speciation Results

Activities that create a lot of noticeable dust typically create PM_{10} particles. Because some particles in this size range are light enough to remain suspended, they can travel from distant upwind areas so a portion of the PM_{10} measured locally would reflect transport of particles from activities outside the area, and would therefore not be related to the Dunn Landfill. To determine if local particulate concentrations at the Rensselaer City School (RCS) were elevated compared to another location in the Capital District, DEC installed an identical monitor in Loudonville to collect samples to evaluate speciated elemental constituents in PM_{10}. The PM_{10} samples were collected in a manner consistent with EPA's sampling guidelines and on the same 1-in-3 day, 24-hour sampling schedule as used in the State's monitoring network.

The results in Figure 1 show that the PM_{10} concentrations were low and similar at both locations. Closer inspection shows that the results can vary substantially from day to day depending upon meteorological factors (e.g., wind speed and direction), traffic and other local factors, and there were a few days when concentrations were higher at either the RCS or Loudonville monitor. The results for both monitors were well below the daily average National Ambient Air Quality Standard (NAAQS) for PM_{10} of 150 micrograms per cubic meter of air ($\mu g/m^3$).

More information about the PM_{10} analysis and specific elemental results (including metals) can be found in the ***PM_{10} Technical Notes*** section.

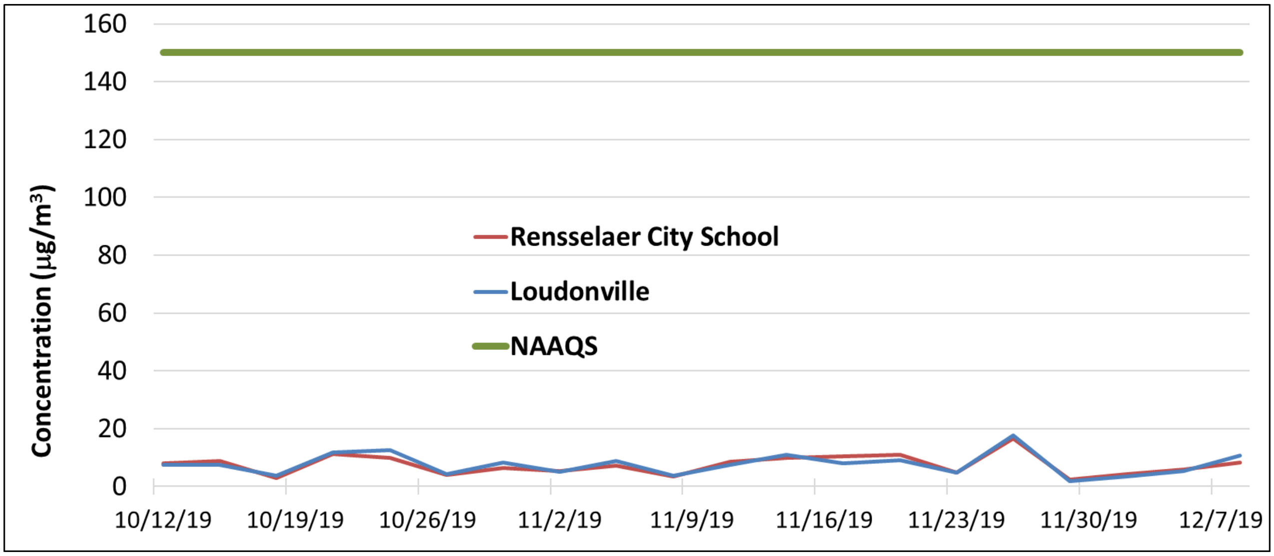

Figure 1. PM_{10} Concentrations compared to the NAAQS

If you have any further questions, please don't hesitate to contact me at (518) 402-8452.

Sincerely,

Steven E. Flint, PE
Director, Division of Air Resources

c: Keith Goertz – DEC Region 4, Regional Director
Victoria Schmitt - DEC Region 4, Regional Engineer
Brian Maglienti - DEC Region 4, Engineer
Benjamin Potter - DEC Region 4, Regional Air Pollution Control Engineer
Gary Ginsberg – New York State Department of Health
Brian Lay - DEC
Dirk Felton - DEC
Margaret LaFarr – DEC
Tom Gentile - DEC
Randi Walker - DEC

VOC Technical Notes

Monitoring instrument and analysis method

Air samples were collected for 24-hours using an evacuated pre-cleaned 6-liter stainless steel canister. The canisters were sent to DEC's Bureau of Air Quality Surveillance (BAQS) laboratory in Rensselaer, for analysis of 43 target compounds consistent with NYS Toxics Air Monitoring Network. The canister samples were analyzed using a modified version of EPA method TO-15. The analytical process is described as follows: air samples are taken from the canister at a controlled flow and temperature by an Entech Model 7100A pre-concentrator. The sample was injected into an Agilent gas chromatograph/mass spectrometer.

Results for all air toxics

Of the 43 target compounds analyzed, only 26 were detected. Tables 1 and 2 list all VOCs detected with associated SGCs and AGCs. None of the VOCs were found above the SGC. Four VOCs (1,2 dichloroethane, 1,3-butadiene, benzene, carbon tetrachloride) had at least one result above the AGC. These four VOCs are commonly found above the long-term guideline concentration in all areas of the State. Figure 2 illustrates how the concentrations for these four VOCs measured at the Rensselaer Public School were within the range found in other areas of the State. Two monitors have been designated as source collection. One is adjacent to a formerly active coke oven facility and the other is located on a large landfill and near chemical manufacturing, petroleum storage and refining facilities in New Jersey.

Table 1. Air Sample Results for October 30, 2019 - December 5, 2019

Chemical (all results in units of ppb)	**10/30/2019**	**11/5/2019**	**11/11/2019**	**11/17/2019**	**11/23/2019**	**11/29/2019**	**12/5/2019**	**Short-Term Health-Based Guideline Conc. (SGC) (ppb)**	**Long-Term Health-Based Guideline Conc. (AGC) (ppb)**
1,2,4-Trimethylbenzene	0.021	0.0095	0.013	0.012	0.0077	0.0051	0.0097	- -	1.2
1,2-Dichloroethane	0.016	0.014	0.015	0.017	0.015	0.015	0.018	- -	0.0093
1,2-Dichloropropane	nd	nd	nd	nd	nd	nd	0.0045	- -	0.87
1,3,5-Trimethylbenzene	0.0052	nd	0.0034	0.0032	nd	nd	nd	- -	59
1,3-Butadiene	0.012	nd	0.013	0.019	0.0082	nd	nd	- -	0.015
1,4-Dichlorobenzene	nd	nd	nd	nd	nd	nd	nd	- -	0.015
Acrolein	0.065	0.054	0.073	0.076	0.055	0.036	0.040	1.1	0.15
Benzene	0.10	0.082	0.12	0.14	0.094	0.085	0.12	400	0.04
Bromomethane	0.0071	0.0069	0.0074	0.0068	0.0076	0.0068	0.0075	1,000	1.3
Carbon tetrachloride	0.081	0.077	0.080	0.080	0.078	0.077	0.080	300	0.027
Chlorobenzene	0.013	nd	nd	nd	nd	nd	nd	- -	13
Chloroethane	nd	nd	nd	nd	nd	nd	nd	- -	3,800
Chloroform	0.019	0.017	0.021	0.021	0.016	0.016	0.017	31	3
Chloromethane	0.51	0.51	0.50	0.57	0.51	0.49	0.49	11,000	44
Dichlorodifluoromethane	0.51	0.49	0.50	0.49	0.50	0.48	0.48	- -	2,400
Dichloromethane	0.093	0.069	0.072	0.072	0.067	0.068	0.077	4,000	13
Dichlorotetrafluoroethane	0.016	0.015	0.017	0.016	0.016	0.015	0.015	- -	2,400
Ethylbenzene	0.025	0.012	0.017	0.017	0.011	0.009	0.016	- -	230
m,p-Xylene	0.061	0.027	0.040	0.038	0.021	0.017	0.033	5,100	23
o-Xylene	0.026	0.011	0.017	0.015	0.0099	0.0072	0.013	5,100	23
Styrene	0.0048	nd	0.0052	0.0044	nd	nd	0.0028	4,000	230
Tetrachloroethylene	0.015	0.0076	0.0067	0.0085	0.0052	0.0050	0.0070	44	0.59
Toluene	0.17	0.076	0.14	0.13	0.069	0.052	0.097	9,800	1,300
Trichloroethylene	nd	nd	nd	nd	nd	nd	nd	4	0.037
Trichlorofluoromethane	0.23	0.20	0.21	0.20	0.20	0.20	0.20	1,600	900
Trichlorotrifluoroethane	0.073	0.065	0.070	0.070	0.069	0.069	0.069	130,000	23,000

- - indicates no short-term health-based air concentration value has been developed for this chemical
nd - results are below analytical method detection limit

Table 2. Air Sample Results for December 11, 2019 - January 16, 2020

Chemical (all results in units of ppb)	**12/11/2019**	**12/17/2019**	**12/23/2019**	**12/29/2019**	**1/4/2020**	**1/10/2020**	**1/16/2020**	**Short-Term Health-Based Guideline Conc. (SGC) (ppb)**	**Long-Term Health-Based Guideline Conc. (AGC) (ppb)**
1,2,4-Trimethylbenzene	0.0049	0.017	0.016	0.022	0.037	0.012	0.022	- -	1.2
1,2-Dichloroethane	0.016	0.018	0.019	0.020	0.021	0.019	0.020	- -	0.0093
1,2-Dichloropropane	0.0050	nd	0.0039	0.0039	0.0046	0.0045	0.0045	- -	0.87
1,3,5-Trimethylbenzene	nd	0.0049	0.0031	0.0061	0.0099	0.0032	0.0064	- -	59
1,3-Butadiene	nd	0.029	0.012	0.022	0.034	0.012	0.019	- -	0.015
1,4-Dichlorobenzene	nd	nd	nd	nd	0.0036	nd	nd	- -	0.015
Acrolein	0.037	0.075	0.13	0.088	0.091	0.078	0.065	1.1	0.15
Benzene	0.094	0.20	0.30	0.19	0.28	0.15	0.20	400	0.04
Bromomethane	0.0071	0.0066	0.007	0.0074	0.0072	0.0077	0.007	1,000	1.3
Carbon tetrachloride	0.077	0.080	0.082	0.080	0.080	0.084	0.083	300	0.027
Chlorobenzene	nd	nd	nd	nd	nd	nd	nd	- -	13
Chloroethane	nd	nd	nd	nd	0.024	nd	nd	- -	3,800
Chloroform	0.016	0.019	0.020	0.022	0.023	0.018	0.020	31	3
Chloromethane	0.50	0.52	0.52	0.58	0.60	0.53	0.52	11,000	44
Dichlorodifluoromethane	0.48	0.49	0.51	0.49	0.51	0.50	0.52	- -	2,400
Dichloromethane	0.073	0.081	0.089	0.089	0.10	0.094	0.092	4,000	13
Dichlorotetrafluoroethane	0.015	0.015	0.016	0.016	0.016	0.017	0.016	- -	2,400
Ethylbenzene	0.010	0.025	0.035	0.030	0.050	0.018	0.033	- -	230
m,p-Xylene	0.018	0.055	0.060	0.067	0.118	0.036	0.074	5,100	23
o-Xylene	0.0078	0.021	0.026	0.031	0.047	0.015	0.028	5,100	23
Styrene	nd	0.0080	nd	0.0062	0.010	0.0037	0.0063	4,000	230
Tetrachloroethylene	0.0051	0.0092	0.012	0.0087	0.024	0.0098	0.012	44	0.59
Toluene	0.065	0.17	0.24	0.23	0.39	0.12	0.20	9,800	1,300
Trichloroethylene	nd	nd	nd	0.0034	nd	nd	nd	4	0.037
Trichlorofluoromethane	0.20	0.20	0.25	0.21	0.22	0.21	0.22	1,600	900
Trichlorotrifluoroethane	0.067	0.067	0.068	0.068	0.069	0.068	0.070	130,000	23,000

- - indicates no short-term health-based air concentration value has been developed for this chemical
nd - results are below analytical method detection limit

Figure 2. Comparison with the State's Monitoring Network

PM_{10} Technical Notes

Monitoring instrument and analysis method

The PM_{10} measurements were collected with filters that were weighed and a mass concentration was determined. The elemental composition of the particles collected were determined by Energy Dispersive X-ray Fluorescence. The PM_{10} samples collected in Loudonville, were collected with the same type of instrument on the same sampling schedule as samples collected at the Rensselaer City School, (RCS).

The full list of the 33 elements measured in the particle samples are show in Table 3. Most of these elements were found at very low concentrations, if at all. Elements considered crustal components (aluminum, calcium, iron, silicon and titanium) are often used as indicators of windblown dust. As illustrated in Figure ***3***3, the amount of windblown dust at both locations is very low and would contribute a small portion to the overall PM_{10} concentrations at either location. Some of the differences in PM_{10} concentrations between the two sites appear to be related to windblown dust.

Table 3. Elements Measured in PM_{10} Samples

Element Abbreviation	Element Name	Element Abbreviation	Element Name
Ag	Silver	Mn	Manganese
Al	Aluminum	Na	Sodium
As	Arsenic	Ni	Nickel
Ba	Barium	P	Phosphorous
Br	Beryllium	Pb	Lead
Ca	Calcium	Rb	Rubidium
Cd	Cadmium	S	Sulfur
Ce	Cerium	Sb	Antimony
Cl	Chlorine	Se	Selenium
Co	Cobalt	Si	Silicon
Cr	Chromium	Sn	Tin
Cs	Cesium	Sr	Strontium
Cu	Copper	Ti	Titanium
Fe	Iron	V	Vanadium
In	Indium	Zn	Zinc
K	Potassium	Zr	Zirconium
Mg	Magnesium		

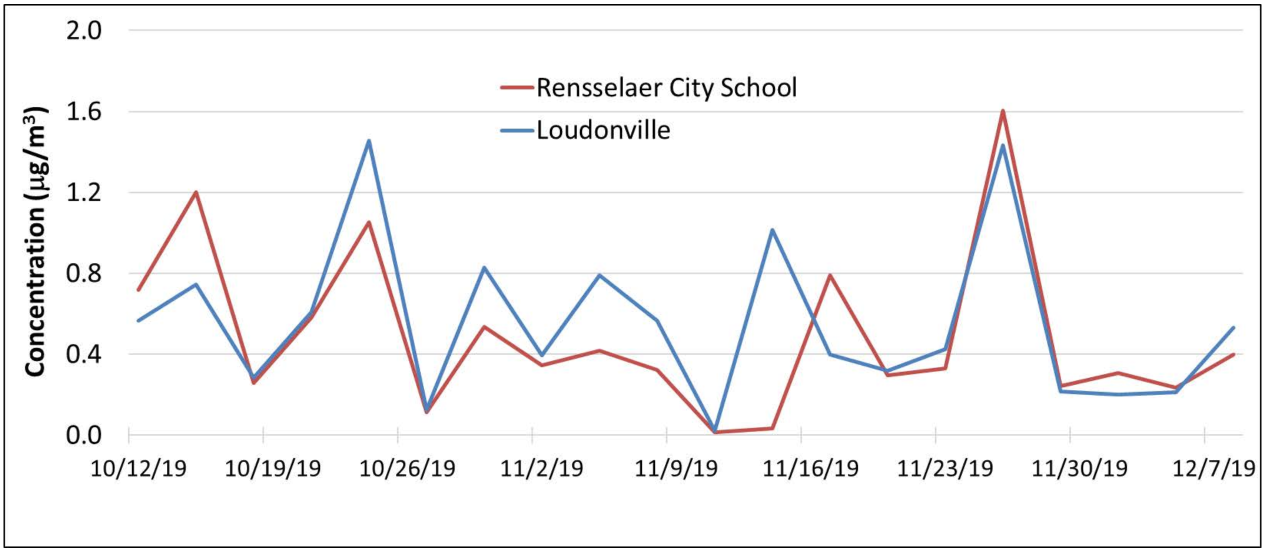

Figure 3. Sum of the Crustal Elements (Al, Ca, Fe, Si, and Ti)

Another local source that can be identified by elemental analysis is road salt. Elements associated with road salt include sodium, chloride and sometimes calcium. In Figure4, the common road salt elements have been added together. Road salt is often found in PM_{10} measurements one or more days after a snowstorm when the roads are dry, and vehicles re-entrain salt from the road surface. It is apparent that the crustal element concentrations are low when the road salt concentrations are high. This is likely due to snow cover which prevents windblown dust from snow covered surfaces.

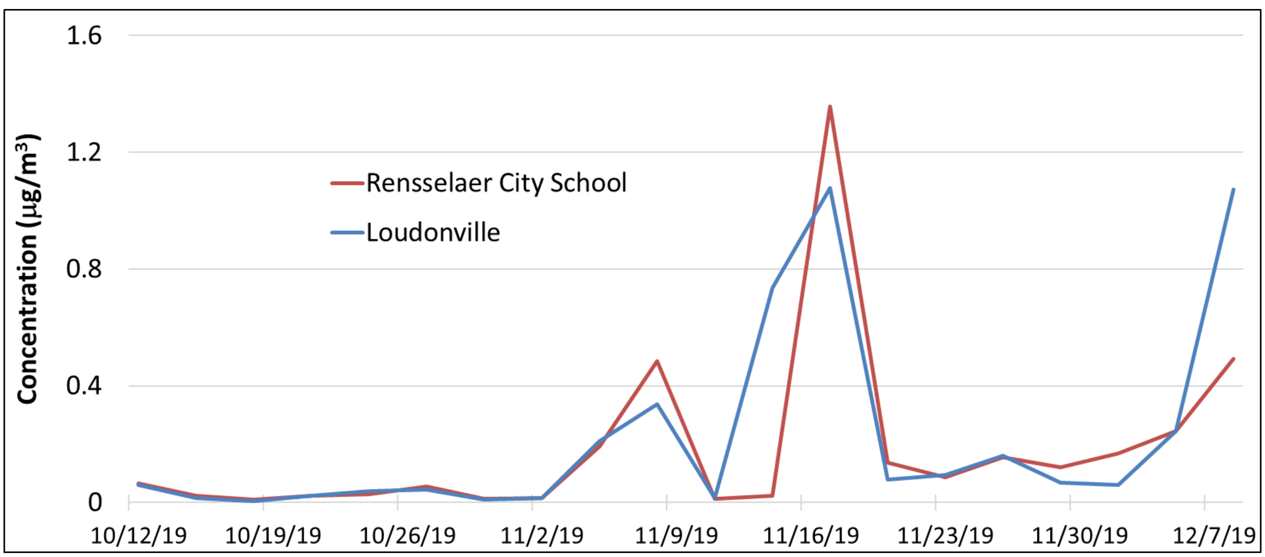

Figure 4. Sum of the Road Salt Elements (Na, Cl)

We looked at two elements particularly closely, arsenic and lead. The results for lead are similar for the two locations and well below the NAAQS as shown in Figure 5.

The results for arsenic, as shown in Figure 6, are slightly different for the two locations with RCS sometimes higher and lower than Loudonville. Arsenic is a natural element found among the crustal elements and commonly detected in air samples such as the type of analysis conducted at the RCS. Since a NAAQS does not exist for arsenic, we compared the results to PM_{10} measurements collected by a different method in the Bronx and Rochester for 2019. As shown in Table 4, the arsenic averages for the four sites are very similar, illustrating the ubiquitous nature of arsenic.

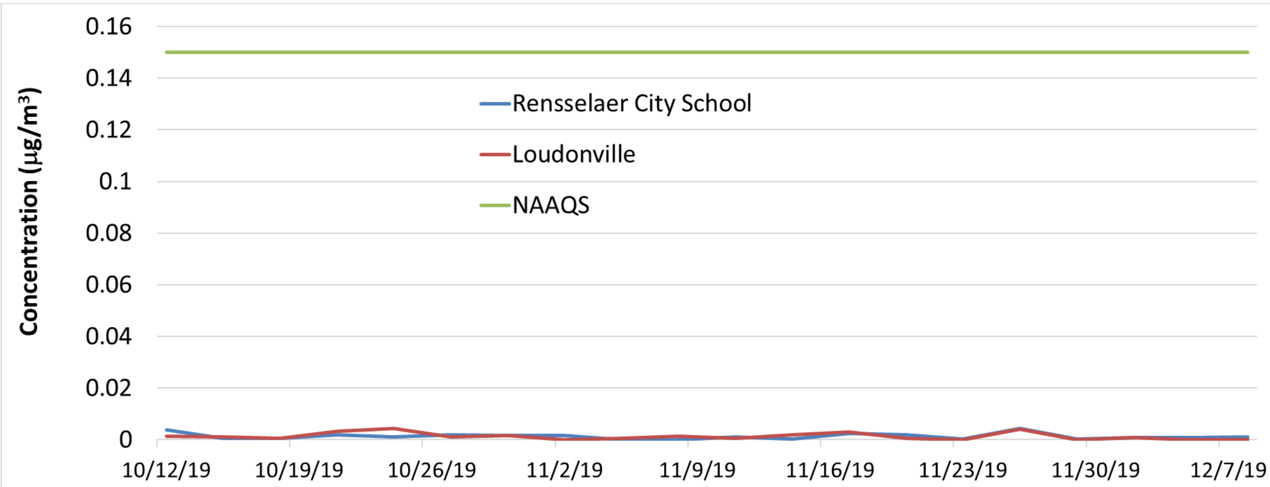

Figure 5. Lead Concentrations compared to the NAAQS

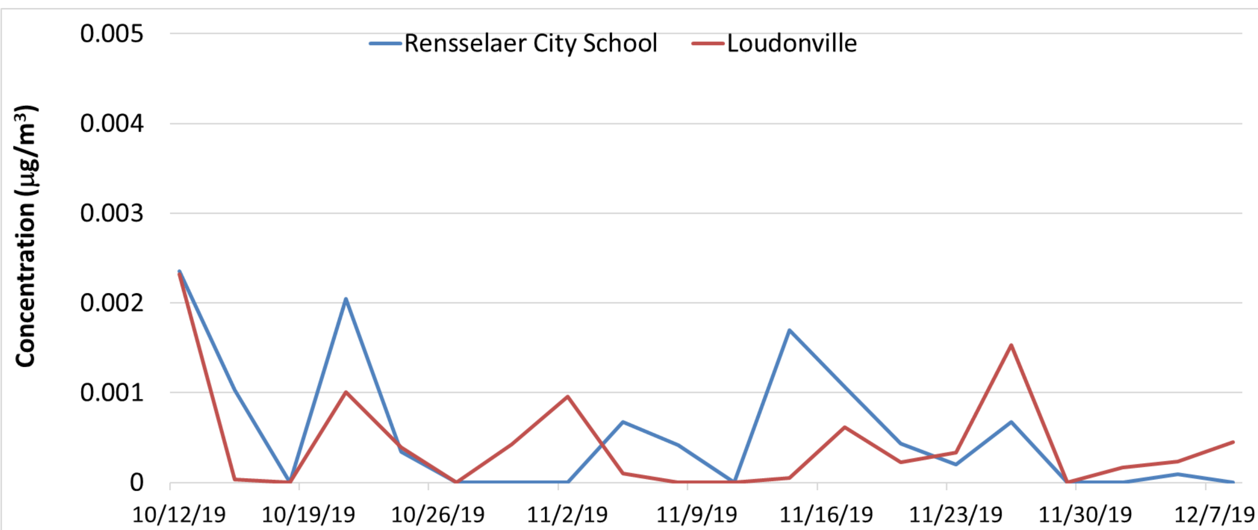

Figure 6. Arsenic Concentrations

Table 4. Arsenic Concentrations

	Rensselaer City School	Loudonville	Bronx 2019	Rochester 2019
Arsenic Average ($\mu g/m^3$)	0.00055	0.00044	0.00041	0.00052