

Lead Levels in Drinking Water at Middlebury Union Middle School, Middlebury, VT

Technical Summary

Molly Costanza-Robinson, Ph.D* and Gabrielle Davis

Dept. of Chemistry & Biochemistry; Program for Environmental Studies, Middlebury College, Middlebury, VT.

*Prof. of Environ. Chemistry, mcostanz@middlebury.edu

February 4, 2019

This summary is not intended as a stand-alone document, but rather as a ready reference for the primary findings and recommendations. Outlets prioritized for remediation are listed in **Table 1** and their locations shown in **Figures 1 and 2 (first and second floor)**. A full report, including description of the study methods, complete data, and additional information, is available at sites.middlebury.edu/mcostanz/research/lead.

Table 1. Middlebury Union Middle School outlets that exceeded the EPA action level (red) or the American Academy of Pediatrics safety level (blue) by outlet type, lead level, and remediation priority level.

| Outlet Type | Exceedance Level ¹ | Outlet ID | Outlet Location (see also Figure 1) | First Draw (ppb) | Flush (ppb) | Remediation Priority ² |
|---------------------------------|-------------------------------------|-----------|--|------------------|-------------|-----------------------------------|
| Water fountain or bottle filler | n/a | | | | | |
| Kitchen sink or sprayer | First Draw exceeds AAP safety level | RD01 | kitchen sprayer | 9 | 2 | Highest |
| | | RD04 | kitchen hand wash sink | 6 | 2 | Highest |
| | | RD02 | kitchen sink | 4 | 2 | Highest |
| | | PK08 | classroom kitchen sink | 4 | 1 | Highest |
| | | PK07 | classroom kitchen sink | 2 | 1 | Highest |
| Classroom or office sink | First Draw exceeds EPA action level | BL29 | classroom sink | 80 | 1 | Highest |
| | | GN14 | maker space sink | >50* | 1 | Highest |
| | | BL15 | classroom sink | 17 | 2 | Highest |
| | | OR09 | classroom sink | 16 | 1 | Highest |
| | | BL28 | classroom sink | 15 | 2 | Highest |
| | | OR11 | classroom sink | 15 | 1 | Highest |
| | First Draw exceeds AAP safety level | BL16 | classroom sink | 10 | 1 | High |
| | | PK05 | nurses office sink | 9 | 1 | High |
| | | BL19 | classroom sink | 4 | 1 | High |
| | | BL30 | classroom sink | 4 | 1 | High |
| | | GN15 | classroom sink | 3 | 1 | High |
| | | GN22.5 | classroom sink | 3 | 1 | High |
| | | GN26 | classroom sink | 3 | 1 | High |
| | | BL01 | classroom sink | 2 | 1 | High |

¹ Outlets/samples exceeded the U.S. Environmental Protection Agency (EPA) action level if water lead levels were ≥ 15 ppb; Outlets/samples exceeded the American Academy of Pediatrics (AAP) safety level if water lead levels were >1 ppb.

² Priority level is based on evaluation against the EPA and AAP levels and likelihood and frequency of use for consumption. See full report for more information.

| | | | | | | |
|---------------|-------------------------------------|------|-----------------------------|-----|------|--------|
| | | BL10 | classroom sink | 2 | 1 | High |
| | | BL11 | classroom sink | 2 | 1 | High |
| | | BL14 | classroom sink | 2 | 1 | High |
| | | BL17 | classroom sink | 2 | 1 | High |
| | | BL18 | classroom sink | 2 | 1 | High |
| | | OR01 | kitchenette sink | 2 | 1 | High |
| | | OR04 | classroom sink | 2 | 1 | High |
| | | OR05 | classroom sink | 2 | 1 | High |
| | | OR06 | classroom sink | 2 | 1 | High |
| | | GN13 | office sink | 2 | 1 | High |
| | | GN17 | art classroom sink | 2 | <0.5 | High |
| Bathroom sink | First Draw exceeds AAP safety level | BL23 | girls bathroom sink | 3 | 1 | High |
| | | BL26 | boys bathroom sink | 2 | 1 | High |
| | | BL27 | boys bathroom sink | 2 | 1 | High |
| | | GN02 | girls locker room sink | 2 | 2 | High |
| | | GN04 | boys locker room sink | 2 | 2 | High |
| | | PK03 | nurses bathroom sink | 2 | 1 | High |
| Other | First Draw exceeds EPA action level | BK07 | boys locker room shower | 391 | 7 | Medium |
| | | BK08 | boys locker room shower | 188 | 2 | Medium |
| | | BK05 | boys locker room shower | 72 | 3 | Medium |
| | | BK02 | girls locker room shower | 70 | 12 | Medium |
| | | BK01 | girls locker room shower | 35 | 3 | Medium |
| | | BK06 | boys locker room shower | 19 | 2 | Medium |
| | First Draw exceeds AAP safety level | PK04 | nurses bathroom shower | 2 | 2 | Medium |
| Utility sink | First Draw exceeds EPA action level | GN20 | custodial sink | 55 | 1 | Low |
| | | RD03 | floor sink | 52 | 5 | Low |
| | First Draw exceeds AAP safety level | GN05 | custodial closet floor sink | 4 | 1 | Low |
| | | BL07 | utility floor sink | 4 | 1 | Low |

* provisional value, due to high particulate; concentration could be higher than measured

Low FL sample lead concentrations for outlets that delivered elevated FD samples suggest that the predominant source of lead is the fixtures or their immediate connections rather than more distal pipes or the incoming water supply, which may simplify potential remediation approaches. The locker room showers do not seem to be in use and absorption of lead through the skin is negligible, accounting for their medium priority for remediation despite high lead levels.

We recommend that SCS pursue the following *permanent* remediation approaches for priority outlets:

- 1) replace existing outlet fixtures with “lead-free” fixtures/solder or remove the outlets entirely
- 2) if replaced, verify remediation efficacy via follow-up lead testing

Until priority outlets are permanently remediated, we suggest the following *temporary* approaches:

- 1) disconnect water supply to priority kitchen sinks/sprayers
- 2) disconnect water supply to priority sinks in locations where water is not needed for non-consumption uses
- 3) for priority sinks/showers/sprayers in locations where water *is* needed for non-consumption uses,
 - a. establish school-wide policies for water consumption from outlets by outlet type (e.g., “only drink from water fountains and bottle fillers”), rather than location-specific policies
 - b. complement school-wide water consumption policy with age-appropriate signage at each priority outlet instructing against consumption and with educational outreach regarding the policy and its rationale

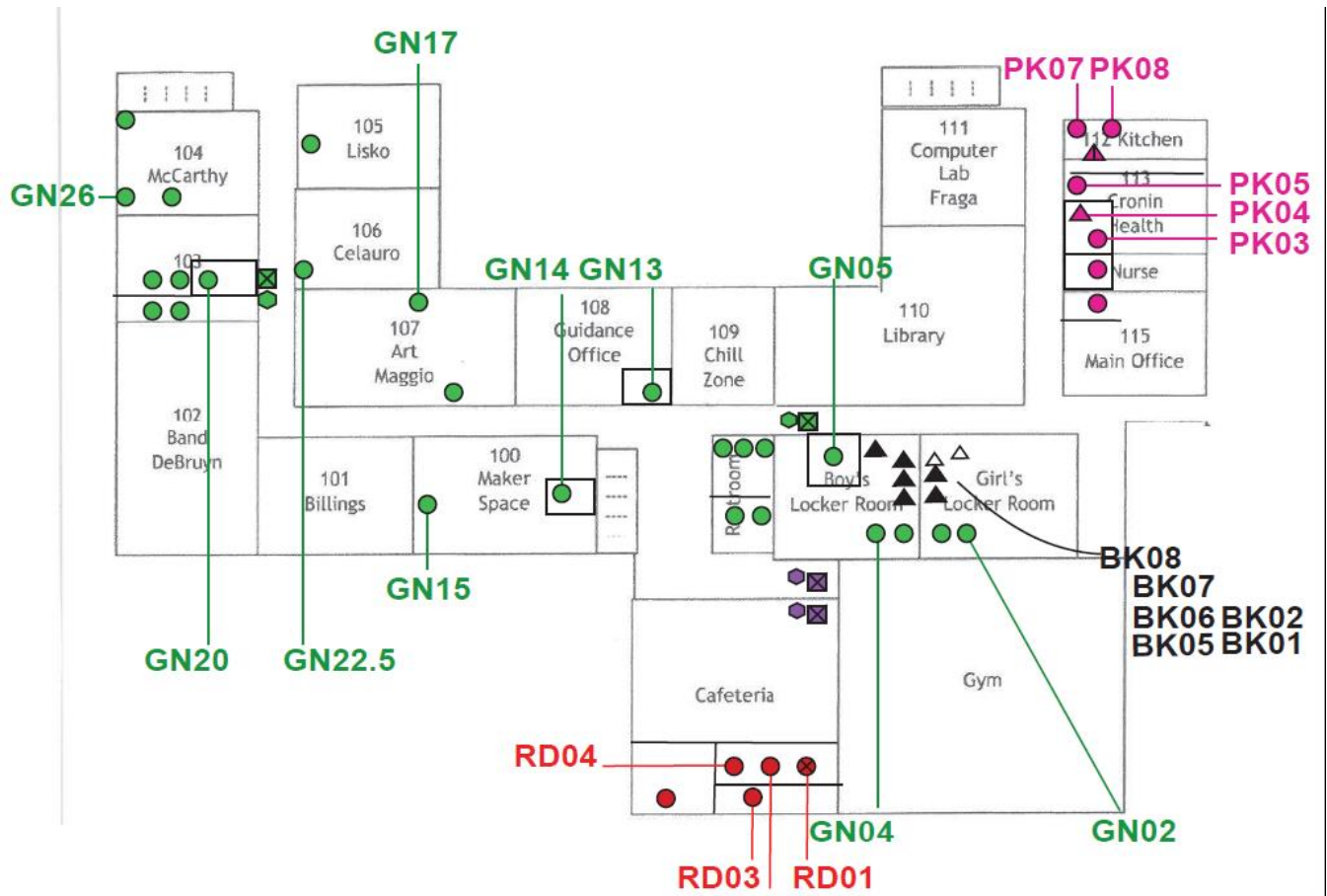


Figure 1. First floor plan showing locations of Middlebury Union Middle School outlets that exceeded the EPA action level or the American Academy of Pediatrics safety level (see also **Table1**).

