



## Lead in Drinking Water Sampling Report

**Roy Cloud Elementary School**  
3790 Red Oak Way  
Redwood City, CA 94061

**Prepared For:**

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A handwritten signature in black ink, appearing to read "Chip Prokop".

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# Lead in Drinking Water Sampling Report

## Roy Cloud Elementary School

### Introduction

The Redwood City School District (RCSD) requested that the potable water at this school used for drinking and cooking by students and staff be tested for the presence of the heavy metal lead. Schools are not required under federal or state law to test potable water sources for lead if their water is supplied by a public water supply system; however, the RCSD recognizes that schools, particularly older facilities (pre-1990), may contain sources of lead in the plumbing pipes and fixtures which could contribute to lead levels in school drinking water. The presence of lead in drinking water can lead to adverse health effects in people, especially children. Therefore, AWS was requested to prepare a sampling plan to quantitatively assess the presence and/or amount of lead in the drinking water at schools within the district.

### Sources of Lead in Drinking Water at Schools

Lead can enter the drinking water at a school either by being present in the water entering the school from the municipal water source (i.e. public water supply agency) or through the plumbing system within the school where materials containing lead, such as lead pipes, lead solder and fluxes, may be present. Stagnant water in the school pipes can have extended contact with lead containing materials and components. Due to these irregular use patterns elevated concentrations of lead could be present in the drinking water. Other factors such as the pH of the water and the temperature can also affect the rate at which lead is absorbed into the water.

### Summary of Regulations to Reduce Lead in Drinking Water

In 1986 the Safe Water Drinking Act (SWDA) required the use of “lead-free” pipe, solder, and flux in the installation or repair of any public water system or any plumbing in a residential or non-residential facility providing water for human consumption. Solders and flux are considered to be lead-free when they contain less than 0.2% lead. Pipes and pipe fittings were considered “lead-free” when they contained less than 8% lead. Before the SWDA took effect on June 19, 1986, solders used to join water pipes typically contained about 50% lead. In January 2010, California enacted a law which reduced the maximum allowable lead content of pipes, pipe fittings, plumbing fittings and fixtures used to convey water for human consumption

to less than 0.25% lead of wetted surfaces as determined by a weighted average. On January 4, 2014 the "Reduction of Lead in Drinking Water Act", more commonly known as the Lead Free Law, went into effect. This resulted in a national mandate requiring that every pipe, fixture, and fitting used to convey water for potable use contain less than 0.25% of lead by weight.

In 1988, the Lead Contamination Control Act (LCCA) was signed. This required the identification of water coolers that were not lead-free, the removal or repair of water coolers with lead lined tanks, banned the manufacture and sale of water coolers that are not lead-free and required the identification and resolution of lead problems in schools. The LCCA was aimed at secondary and primary schools, kindergartens, daycare centers, water cooler manufacturers and federal, state and local agencies.

In 1991 the Lead and Copper Rule (LCR) was signed into law. The LCR requires public water suppliers to monitor for lead and copper in drinking water at select residential dwellings supplied water by the public agency. If lead or copper are found above the EPA action levels, the water supply agency must provide corrosion treatment.

#### Lead Contaminant Levels in Drinking Water

The United States Environmental Protection Agency (EPA) guidance document for testing for lead in the potable water supply at schools is entitled "*3Ts for Reducing Lead in Drinking Water in Schools, Revised Technical Guidance, October 2006*" (EPA 3Ts). This document recommends that water fountains and/or other outlets used for consumption be taken out of service if lead levels exceed 20 µg/L. This is based on the collection of 250 mL first-draw samples (i.e., samples of water that have remained stagnant for 8-18 hours prior to flushing or use occurs). The EPA recommends this first-draw sample combined with the 8-18 hour waiting period in order to maximize the likelihood that the highest concentrations of lead are found in the outlets being tested.

The State of California and local water supply agencies must comply with the LCR which sets the federal regulatory action level for lead in water at 15 µg/L for public water supply systems. The regulatory action level is the concentration of a contaminant which, when exceeded, triggers treatment or other requirements that a water system must follow.

The lead testing protocol specified by the LCR and used by public water systems is aimed at identifying system-wide problems rather than problems at outlets in individual buildings. The

LCR for public water systems established the EPA lead action level of 15 µg/L for a one liter sample, collected at high-risk residences. If more than 10% of the samples at residences exceed 15 µg/L, system-wide corrosion control treatment may be necessary. The 15 µg/L action level for public water systems is the trigger level for treatment.

Although EPA recommends using a lead concentration of 20 µg/L in drinking water as the trigger level for schools to conduct additional testing to determine the source, AWS has recommended, with the school district's concurrence, to use exceedances of 15 µg/L lead in drinking water in the district schools as the trigger point to take an outlet out of service and to perform additional testing to determine the source of lead.

### **Purpose and Scope of Work**

The scope of work is to determine if the drinking water in the school contains elevated levels of the heavy metal lead. The scope of work includes:

- Collect drinking water samples from high priority outlets.
- Record the manufacturer and model of any water coolers identified and compare them against the list of lead lined water coolers banned by EPA in 1990.
- Compare water sampling results to the EPA action level for public water supply systems of 15 µg/L for lead.
- Provide recommendations for additional sampling, if needed.

This sampling strategy, procedures and analytical tests were based on guidance provided by the *EPA 3Ts* guidance document.

### **Site Background**

The Roy Cloud Elementary School (RCES) is located at 3790 Red Oak Way in Redwood City, CA. The school is an elementary school and serves children from Kindergarten to 8<sup>th</sup> grade. The exact year the school was built is unknown. It is also unknown if there have been any plumbing improvements, replacements, or modernizations since its original construction.

### Drinking Water Outlet Selection Procedure

Water samples were collected from selected high priority drinking water outlets identified by AWS with collaboration and approval by RCSD. High priority outlets are defined as those that are used regularly for cooking and drinking. These include: drinking fountains (all types), kitchen sinks, classroom combination sinks with drinking fountains, and sinks in teachers' lounges, nurse's offices, and special education and/or home economics classrooms.

RCSD provided AWS with site maps showing the water distribution lines throughout the school and identifying all high priority drinking water outlets. All service connections from the public water supply system were also identified. This information was used to select representative outlets to be sampled.

Where practical, all exterior and wall mounted water fountains were sampled. Representative samples were collected from the following types of outlets, if present: kitchen faucets, classrooms water fountain/sink combinations, and pairs of drinking water fountains. When representative samples were collected approximately one sample was collected per two or three outlets. These outlets were selected by grouping identical outlets in proximate locations. This strategy was applied for three cases: 1) in classroom wings or quads where all classroom sink combination drinking fountains are identical, 2) drinking water fountain pairs located immediately adjacent to each other and 3) in kitchens with multiple identical faucets. Generally AWS did not sample medium and low priority outlets such as classroom sinks (without drinking fountains), bathroom faucets, and utility sinks during the initial sampling, unless the faucets appeared to be used for drinking or cooking (i.e. cups or mugs nearby).

Water samples representative of the service connection and municipal water supply main were also collected during the testing.

There were no water coolers observed at this school which were banned by EPA in 1990 due to lead lining of the tanks.

### Water Sampling Procedures

Drinking water samples were collected at RCES on December 15, 2016. The day before sampling school representatives taped off all outlets selected for sampling using tape and plastic bags. This was done on a school day after 3:00PM.

The water samples were collected by an AWS environmental scientist in accordance with the *EPA 3Ts* guidance document. AWS collected a first-draw water sample from each selected outlet, with the exception of the service connection samples, between the hours of 6:00AM-9:00AM. A first-draw sample of water is the first to come out of the tap after a period of inactivity. This water was stagnant, meaning that the outlet was not used for at least eight hours prior to sampling. Since the selected outlets were taped off after the end of the previous school day the outlets had remained stagnant for a period between 8 and 18 hours.

Three (3) samples representative of the water service connection and the municipal water supply main were collected from the cold water outlet that was assumed to be closest to the service connection. Following the *EPA 3Ts* sampling guidelines these samples were not first-draw. The first sample was collected approximately 30 seconds after running the water and the second sample was collected after running the water for approximately three minutes. These samples should be representative of the water quality entering the facility from the service connection and the municipal water supply main, respectively. A duplicate sample was also collected from this outlet as a Quality Assurance/Quality Control (QA/QC) sample.

Samples were collected in a 250 milliliters (ml) laboratory provided container. The sample size is representative of a smaller section of plumbing primarily associated with the fixture providing the water and, therefore, more effective in identifying the source if elevated lead levels are identified. A smaller sample is also more representative of the water serving size consumed by a child.

Samples were each given a unique sampling identification number. The sample location, date, time of collection and the type of outlet were recorded, and are shown on the attached chain-of-custody (COC), preceded by the attached laboratory report.

AWS collected a total of twenty-four (24) primary (first-draw) samples from selected high-priority faucets and drinking water fountains from RCES. In addition, three (3) flush samples were collected from the outlet assumed closest to the service connection. These included: one (1) 30 second flush sample, one (1) 3 minute flush sample and one (1) field duplicate of the 3 minute flush sample for QA/QC. The sample locations and types of samples collected are shown on the attached table (Table 1) and the attached figure (Figure 1).

### Analytical Methods

Samples were delivered by courier to Alpha Analytical Laboratories in Ukiah, California under standard chain-of-custody procedures. This laboratory is certified by the State of California as part of the Environmental Laboratory Accreditation Program (ELAP# 1551). Water samples were analyzed for lead by EPA Method 200.8 which is the determination of trace elements in waters and wastes by Inductively Coupled Plasma - Mass Spectrometry (ICP-MS). The reporting limit as determined by the laboratory is 4 µg/L.

### Analytical Results

The analytical results from the testing are shown on the attached table (Table 1). All of the samples collected from this site were equal to or below the EPA's action level of 15 µg/L for lead in public water supply systems and below the EPA's 20 µg/L recommendation for lead in school drinking water.

### Conclusions and Recommendations

As mentioned above, the *EPA 3Ts* guidance document recommends that the sample results not exceed 20 µg/L in any outlets that provide drinking or cooking water and that remedial measures be implemented to reduce or eliminate lead sources in outlets that exceed 20 µg/L. The EPA's action level for lead in public water supply systems is 15 µg/L and is used as a trigger to determine when system-wide corrosion control treatment may be necessary. AWS has recommended, with the school district's concurrence, to use exceedances of 15 µg/L lead in drinking water in the schools as the trigger point to take an outlet out of service and to perform additional testing to determine the source.

**None of the samples collected at the school site exceeded the EPA action level of 15 µg/L, therefore, no additional testing is warranted at this time.**

It is recommended that periodic monitoring of the outlets be performed at all of the schools built before 1990 to ensure that the older suspected lead containing fixtures and solders do not leach into the drinking water supply in the future.

The presence of aerators may contribute to lead in the water if lead-bearing solids have accumulated over time on the aerator; therefore it is also recommended that all aerators in the

school be put on a regular maintenance schedule which includes the removal and cleaning of the aerator or the removal and replacement of the aerator if needed.

### **Limitations**

The conclusions and results contained herein are based solely on the information presented in this report. Additional information or contamination that was hidden, undiscovered, inaccessible, or are not a part of the finding presented herein, would result in the modification of the conclusions and recommendations of this report. Any remediation guidelines are minimum general guidelines based solely on the findings contained herein and are not to be considered a complete or detailed set of remediation specifications. AWS is not responsible for the accuracy of information provided by others, or for conditions or consequences arising from relevant facts that were withheld, concealed, undiscovered or not fully disclosed.

The scope of services provided by AWS was limited to the sampling of drinking water outlets identified in this report. Drinking water outlets, hazardous materials or controlled substances not specifically mentioned in this report were not evaluated. AWS is not qualified to present medical advice. If any present or future health issues are in question, it is recommended that the findings in this report be presented to a qualified medical professional for evaluation. AWS is not a law firm and, therefore, makes no representations regarding any potential liability of any person or entity for site conditions.

### **References**

*3Ts for Reducing Lead in Drinking Water in Schools: Revised Technical Guidance*  
United States Environmental Protection Agency, October 2006.

*Drinking Water Best Management Practices*, United States Environmental Protection Agency,  
April 2013

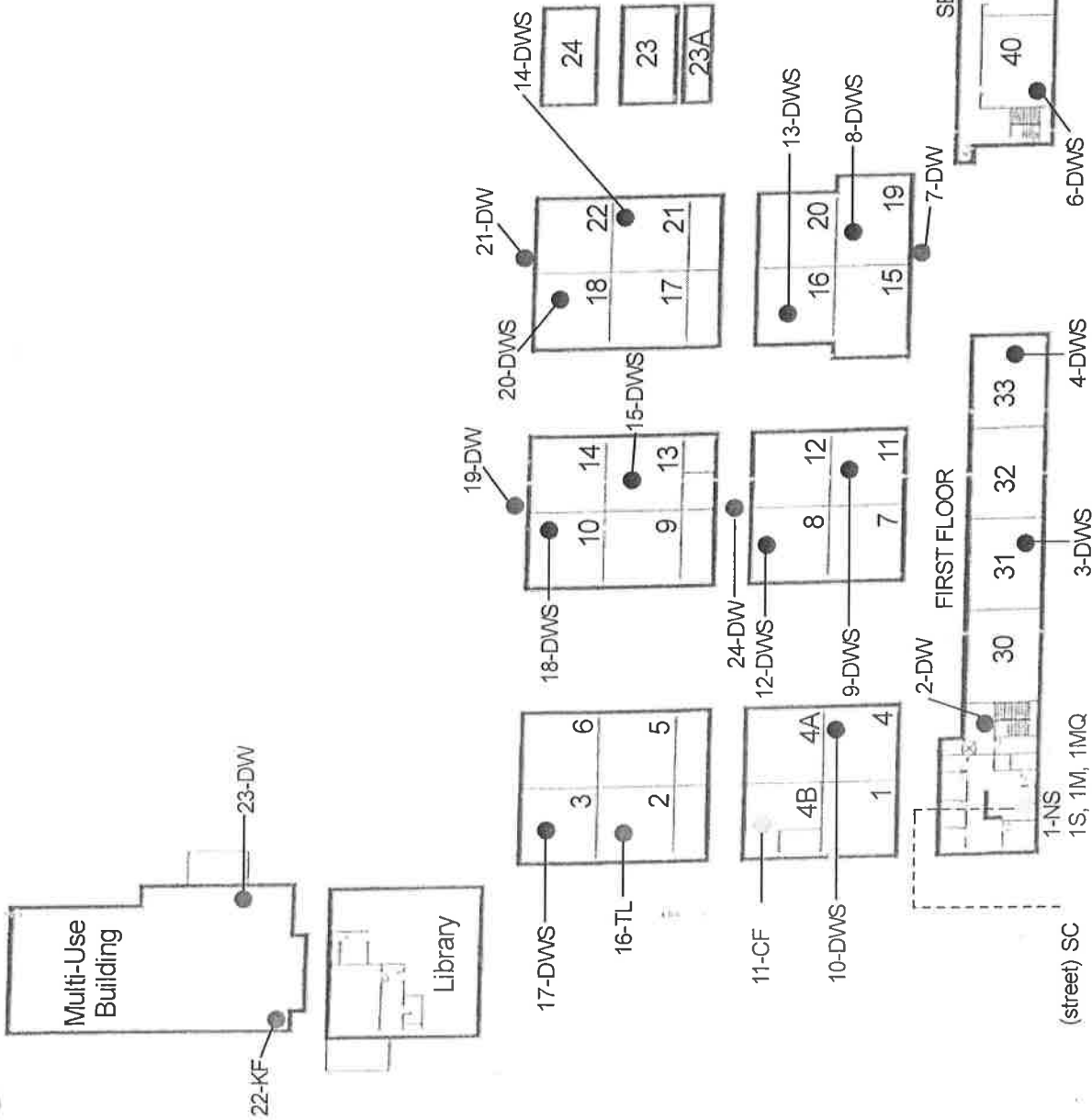




NORTH

LEGEND

- DW - Drinking Water Fountain
- DWS - Drinking Fountain in Sink
- KF - Kitchen Faucet
- NS - Nurse's Office Sink
- TL - Teacher/Staff Lounge Sink
- CF - Classroom Faucet
- SC - Service Connection



**ROY CLOUD ELEMENTARY SCHOOL**  
 3790 Red Oak Way  
 Redwood City, CA 94061

BASEMAP: REDWOOD CITY SCHOOL DISTRICT

FIGURE 1

LEAD IN WATER  
 SAMPLE LOCATION MAP

PROJECT NO. 1778

**Table 1**  
**Analytical Results**  
**Lead in Drinking Water**  
**Roy Cloud Elementary School**

Sample ID Number	Date	Type of Outlet	Sample Location	Type of Sample	Lead (Pb) (µg/L)
RCES-1-NS-P	12/15/2016	Faucet	Nurse's Station	Primary	ND
RCES-1S-NS-F	12/15/2016	Faucet	Nurse's Station, representative of service connection	Flush (30 Sec.)	ND
RCES-1M-NS-F	12/15/2016	Faucet	Nurse's Station, representative of main	Flush (3 Min.)	ND
RCES-1MQ-NS-F	12/15/2016	Faucet	Nurse's Station, representative of main	Flush (3 Min.)	ND
RCES-2-DW-P	12/15/2016	Drinking Fountain	Hallway (Near Main Office)	Primary	ND
RCES-6-DWS-P	12/15/2016	Drinking Fountain in Sink	Room 40	Primary	ND
RCES-5-DWS-P	12/15/2016	Drinking Fountain in Sink	Room 43	Primary	ND
RCES-3-DWS-P	12/15/2016	Drinking Fountain in Sink	Room 31	Primary	ND
RCES-4-DWS-P	12/15/2016	Drinking Fountain in Sink	Room 33	Primary	ND
RCES-7-DW-P	12/15/2016	Drinking Fountain	Outside (Near Room 19)	Primary	ND
RCES-8-DWS-P	12/15/2016	Drinking Fountain in Sink	Room 19	Primary	8.9
RCES-14-DWS-P	12/15/2016	Drinking Fountain in Sink	Room 21	Primary	11
RCES-21-DW-P	12/15/2016	Drinking Fountain	Outside (Near Room 22)	Primary	ND
RCES-20-DWS-P	12/15/2016	Drinking Fountain in Sink	Room 18	Primary	7.2
RCES-15-DWS-P	12/15/2016	Drinking Fountain in Sink	Room 13	Primary	ND
RCES-13-DWS-P	12/15/2016	Drinking Fountain in Sink	Room 16	Primary	8.8
RCES-9-DWS-P	12/15/2016	Drinking Fountain in Sink	Room 11	Primary	ND

**Notes:**

- 1) Primary= sampled at first draw. Flush= sampled after water running for time indicated.
- 2) EPA Action Level is >15 ug/L
- 3) ND = None detected
- 4) Samples analyzed by EPA Method 200.8. Reporting limit is 4 ug/L

Jle 1  
**Analytical Results**  
**Lead in Drinking Water**  
**Roy Cloud Elementary School**

Sample ID Number	Date	Type of Outlet	Sample Location	Type of Sample	Lead (Pb) (µg/L)
RCES-10-DWS-P	12/15/2016	Drinking Fountain in Sink	Room 4	Primary	ND
RCES-11-CF-P	12/15/2016	Faucet	Room 4B	Primary	6.2
RCES-12-DWS-P	12/15/2016	Drinking Fountain in Sink	Room 8	Primary	ND
RCES-24-DW-P	12/15/2016	Drinking Fountain	Outside (Near Room 8)	Primary	ND
RCES-18-DWS-P	12/15/2016	Drinking Fountain in Sink	Room 10	Primary	ND
RCES-19-DW-P	12/15/2016	Drinking Fountain	Outside (Near Room 10)	Primary	ND
RCES-23-DW-P	12/15/2016	Drinking Fountain	Multi-Use Building	Primary	ND
RCES-22-KF-P	12/15/2016	Faucet	Multi-Use Building (Kitchen)	Primary	ND
RCES-17-DWS-P	12/15/2016	Drinking Fountain in Sink	Room 3	Primary	10
RCES-16-TL-P	12/15/2016	Faucet	Staff Room	Primary	5.0

**Notes:**

- 1) Primary= sampled at first draw. Flush= sampled after water running for time indicated.
- 2) EPA Action Level is >15 ug/L
- 3) ND = None detected
- 4) Samples analyzed by EPA Method 200.8. Reporting limit is 4 ug/L

## ATTACHMENTS

Laboratory Analytical Reports