

# Michigan School Water Training Program: Providing Quality Drinking Water

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# Housekeeping

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# Today's Talk

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- Overview of the school drinking water program
- Key steps to a quality drinking water program
- Lead & copper risk reduction actions
- Assessing lead & copper water results
- Lead risk reduction responses & control measures
- School water moving program
- Water quality management practices

# Michigan School Water Training Program (SWTP)

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- To promote quality drinking water in school buildings & protect public health
- A partnership between MDE, MDEQ, DLARA
- Provide instruction, training and guidance materials
- A voluntary, proactive activity for schools on community water



# School Drinking Water Program Key Steps

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- Step 1 – Develop a plumbing profile inventory
- Step 2 – Establish a sampling plan
- Step 3 – Conduct drinking water tap monitoring
- Step 4 – Interpret sample results
- Step 5 – Take corrective actions
- Step 6 – Communicate results & actions
- Step 7 – Implement a routine water quality management plan
- Step 8 – Reassess

# Lead & Copper Risk Reduction

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Risk reduction is based on sample results for all taps sampled

- Assess
- Identify
- Reduce
- Control
- Reassess



Localized Risk  
vs  
Widespread Risk

# Assess & Identify (Lead Results)

Laboratory Result in Parts per Million (ppm) or (mg/L)	Conversion	Result in Parts per Billion (ppb) or (ug/L)
0.001 mg/L	$0.001 \times 1000 =$	1
0.002 mg/L	$0.002 \times 1000 =$	2
0.003 mg/L	$0.003 \times 1000 =$	3
0.004 mg/L	$0.004 \times 1000 =$	4
0.005 mg/L	$0.005 \times 1000 =$	5
0.006 mg/L	$0.006 \times 1000 =$	6
0.010 mg/L	$0.010 \times 1000 =$	10
0.015 mg/L	$0.015 \times 1000 =$	15
If lab reports 5.5 ug/L No conversion!		5.5

**1 ppm = 1000 ppb**  
**.0055 mg/L = 5.5 ug/L**

**Action Recommended:  
 >5 ppb**

Lead gets reported to "customers" in parts per billion (ug/L)

Elevated Lead  Action Recommended

# Assess & Identify (Copper Results)

Action Recommended >1.3 (mg/L)

Elevated Copper  
Action Recommended



1.35 mg/L  
1.36 mg/L  
1.37 mg/L  
1.38 mg/L  
1.39 mg/L  
1.40 mg/L  
Etc.

1 ppb = 1/1000 ppm  
Conversion: 1350 ppb ÷ 1000 = 1.35 ppm

Copper gets reported  
to "customers" in  
parts per million  
(mg/L)

1.3 mg/L = 1300 ug/L



# Factors for Lead & Copper Risk Reduction

- Every building is different
  - Age
  - Size
  - Plumbing configuration
  - Plumbing & fixture materials
  - Use & population served
- Money
- Time
- Perception



# Basic Lead Risk Reduction Options

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## Option 1: Removal of Lead Sources

- Remove tap/fixture from service
- Replace tap/fixture & other sources of lead with lead-free materials

## Option 2: Implement a Flushing Program

- Individual tap flushing
- Main pipe (building) flushing

## Option 3: Treatment

- Point-of-use device installation
- Point-of-entry whole building chemical treatment

# Lead Risk Reduction Responses

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- Interim (short term) Control Measures
- Permanent (long-term) Remedies
- Routine Control Measures

Note: Follow-up testing may need to also be incorporated



# Interim (Short-term) Control Measures

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## 1. Shut off or disconnect problem outlets

- Immediate recommended action with sample results >5 ppb
- Temporary measure until investigation & correction completed
- Put signs/notices at fixtures

## 2. Provide bottled water

- Expensive but may be warranted if problem is widespread
- Must meet Food & Drug Administration (FDA) and state standards
- Make sure you don't run out

# Interim (Short-term) Control Measures Cont'd

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3. Move the water in the plumbing system
  - Open suspect taps every morning before the building opens
  - Let the water run to remove idle water
  - Flushing time varies by type of outlet being cleared
  - Degree of flushing varies on age & condition of plumbing and corrosiveness of the water
4. Inform staff, parents/guardians, students
  - Make all test results and lead education materials accessible (website, letter, annual report, newsletter, etc.)

# Permanent (long-term) Remedies

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## 1. Fixture replacement

- If lead source is localized & limited to a few outlets
- New fixture must be “lead free” (NSF Standard 61)
- Typically replace the line and valve to the fixture also

## 2. Lead pipe replacement

- If service line is lead (contact your public water supplier)
- If lead source is widespread (must be “lead-free” materials)

## 3. Reconfiguration of plumbing

- Modify plumbing to bypass sources of lead contamination

# Permanent (long-term) Remedies Continued

## 4. "Hydration Stations"

- Bottle-fill drinking fountains located strategically throughout the building
- School wide program to direct students to drink only from these stations
- Must be "lead free" components & filter (NSF Standard 61 & Standard 53)
- May need to replace the line and valve(s) to the fixture
- Remove other outlets or put up signs



# Permanent (long-term) Remedies Continued

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## 5. Move the water in the plumbing system

- Manual flushing
- Automatic flushing

## 6. Treatment/Removal

- Point-of-use devices for lead reduction (NSF Standard 53)
- Require maintenance & cartridge filter replacement
- Point-of-entry whole water system treatment may subject school to Safe Drinking Water regulations (should be permitted)



# Permanent (long-term) Remedies Continued

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## 7. Permanently disconnect & remove outlet

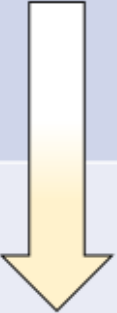
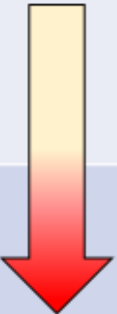
- If tap seldom used, may disconnect or remove from water supply line if not required for local building/plumbing code compliance
- Dead-end plumbing may create additional problems



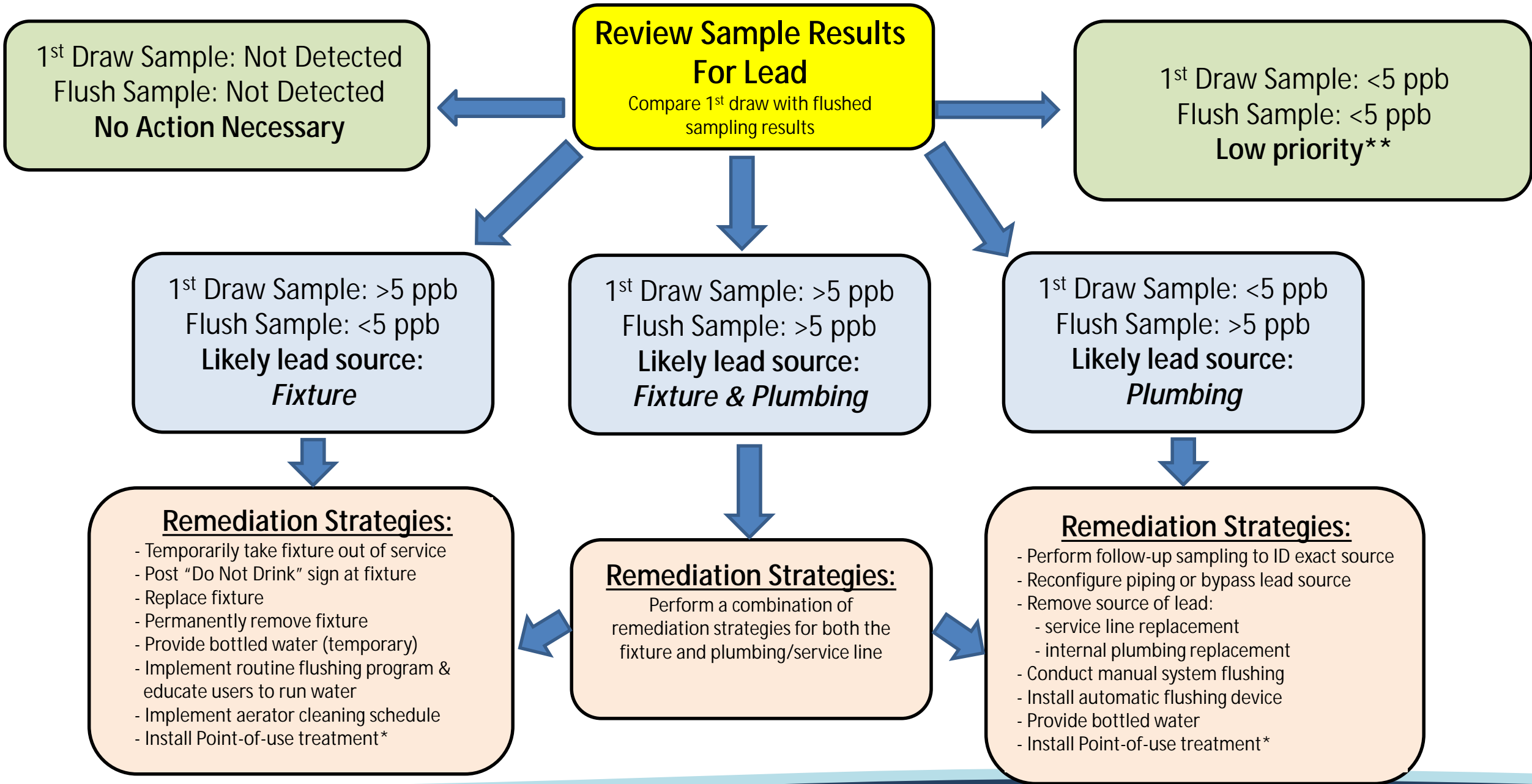
# Routine Control Measures

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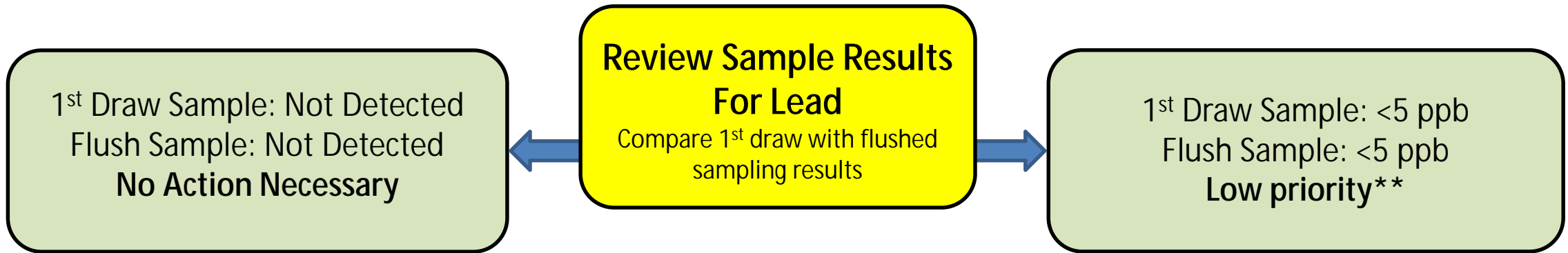
1. Create an aerator & screen cleaning maintenance schedule
2. Use only cold water for food & beverage preparation
3. Instruct the users to run the water before drinking
4. Move the water in the system (flushing protocol)
5. Placard bathroom & other non-potable sinks with notices that the water should not be consumed

Lead Level at the Tap	Lead Risk Reduction Options
<p>Not-detected or &lt; 5 ppb</p> 	<p>Lead was not detected or at a low amount.</p> <ul style="list-style-type: none"> <li>• Tap may be used as normal;</li> <li>• Record result and test again in 3-5 years; and</li> <li>• Make all test results and lead education materials accessible to the community, such as on a website, or annual report, and available upon request.</li> </ul>
<p>5 ppb</p> 	<p>The tap may be used for cooking and drinking water while steps are taken to reduce overall exposure. A higher number of taps with elevated results increases the urgency to implement hazard reduction.</p> <ul style="list-style-type: none"> <li>• Retest the sample tap &amp; attempt to more accurately determine the source of lead; consider monitoring tap more frequently until the source of lead is found and removed;</li> <li>• Consider the feasibility of flushing or other steps to minimize lead exposure;</li> <li>• Make all test results and lead education materials accessible to the community.</li> </ul>
<p>&gt; 5 ppb</p>	<p>Action should be taken to reduce exposure. The specific action(s) taken will be dependent on individual school conditions.</p> <ul style="list-style-type: none"> <li>• Remove tap from service until problem is demonstrably corrected by replacement, a flushing program, filtration,* or treatment**</li> <li>• Do <b>not</b> use tap for cooking or drinking water;</li> <li>• Provide targeted communication &amp; education to staff, parents/guardians, etc.</li> </ul>

\*See specifics on Lead Risk Reduction Options; \*\*Treatment may include... (text is partially obscured)

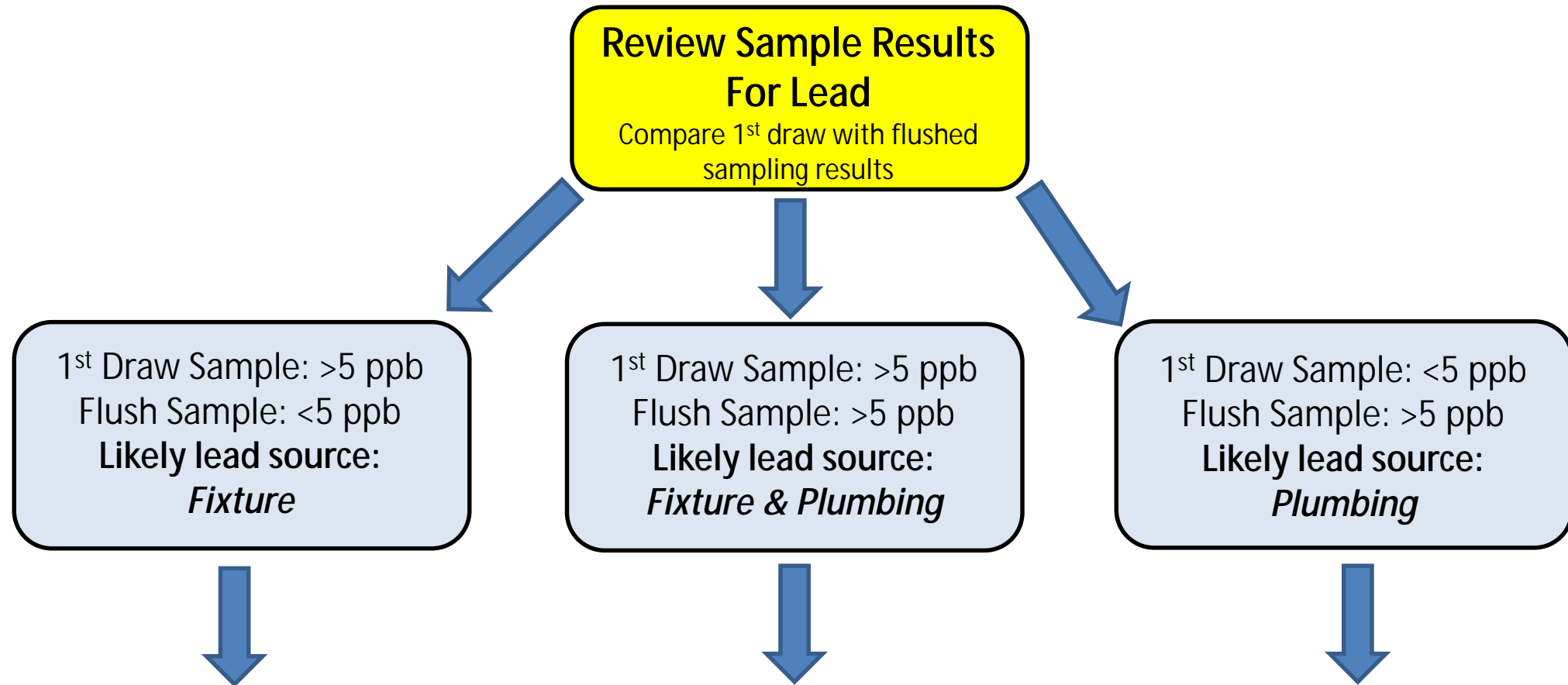


# Comparison flowchart of initial first draw & 30 second flush sample

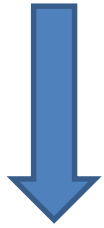


\*\*There is no "safe" level of lead in drinking water; schools are encouraged to take action to reduce lead levels as low as possible

# Comparison flowchart of initial first draw & 30 second flush sample

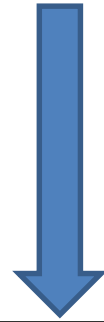


# Comparison flowchart of initial first draw & 30 second flush sample



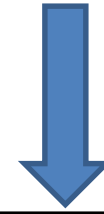
## Remediation Strategies:

- Temporarily take fixture out of service
- Post "Do Not Drink" sign at fixture
- Replace fixture
- Permanently remove fixture
- Provide bottled water (temporary)
- Implement routine flushing program & educate users to run water
- Implement aerator cleaning schedule
- Install Point-of-use treatment\*



## Remediation Strategies:

Perform a combination of remediation strategies for both the fixture and plumbing/service line



## Remediation Strategies:

- Perform follow-up sampling to ID exact source
- Reconfigure piping or bypass lead source
- Remove source of lead:
  - service line replacement
  - internal plumbing replacement
- Conduct manual system flushing
- Install automatic flushing device
- Provide bottled water
- Install Point-of-use treatment\*

\*Installation of point of use treatment is not encouraged and should be a last resort

\*\*There is no "safe" level of lead in drinking water; schools are encouraged to take action to reduce lead levels as low as possible

# School Water Moving Program

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Flush it  
Out!



# Why Move the Water in the Plumbing System?

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- Maintain the quality of drinking water
- Maintain the integrity of the plumbing system
- May remedy bacteria, lead & copper problems
- Keep contaminants out of drinking water
- Protect public health



# What is a Water Moving Program?

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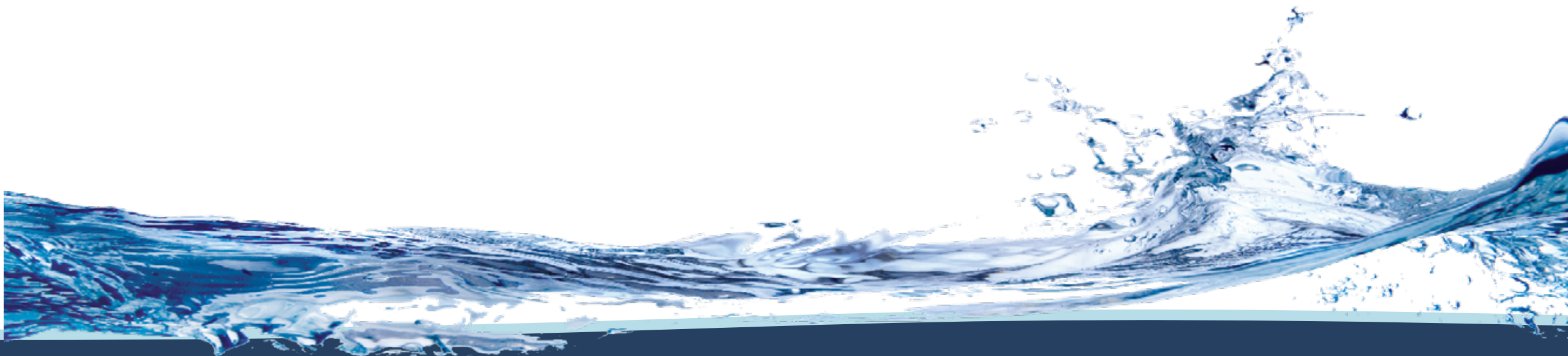
- A set of activities to reduce drinking water contaminant levels by controlling the age of the water
- May be short or long-term
- Dependent upon assessment of sample results & site specific conditions



# When do You Need to Move the Water?

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- After weekends (first thing Monday morning)
- After vacations (spring, summer, winter breaks)
- When test results show elevated levels of lead & copper



# Water Moving Protocol Determination

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## Different options depending on the intended purpose:

- Interim or short-term option
  - Localized problem (Individual tap flushing)
- Long-term option
  - Widespread problem (Unidirectional building plumbing flushing)
- No water quality problem option
  - Routine preventative measure to keep water in its quality state

# Localized Problem - Individual Tap Flushing

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## If lead concentrations are found to be high at certain taps

- Determine amount of time required to flush the tap. This depends on the type of water outlet being flushed
  - If tap is a faucet – typically run the water at that tap for 2 to 3 minutes
  - If tap is a water cooler with a chiller unit – run water at least 15 minutes
- Done each day the school is in session
  - Run in the morning before children arrive
  - Run midday if tap has been unused & stagnant for morning period

# Localized Problem - Individual Tap Flushing

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If lead concentrations are found to be high at certain taps

- Should be interim or short-term until tap is replaced with lead-free materials
- Keep records of flushing dates, times & any problems encountered

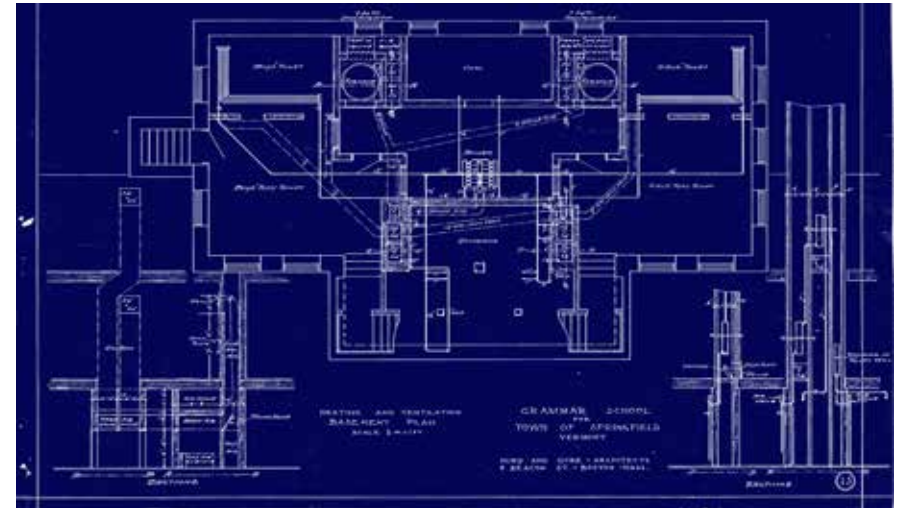


# Widespread Problem – Building System Flushing

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If lead concentrations are found to be high throughout entire school or confined to a certain area of the school

- May be needed on a long-term basis until funding is available for the removal of the lead source
- Periodic testing should accompany this protocol to ensure effectiveness
- Different methods depending on site-specific conditions



# Widespread Problem – Building System Flushing

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## Unidirectional flushing purpose

- Intended to systematically remove both aged water & particulates from the system
- Based on maintaining a flushing water velocity of at least 3 feet per second in the building's service line
- Can reduce the risk of contaminants associated with stagnant water conditions
- Can also be utilized for routine flushing



# Widespread Problem – Building System Flushing

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## Basic steps for Unidirectional flushing

1. Identify flushing zones (utilize plumbing profile)
2. Coordinate with enough people to participate in opening taps
3. Determine size of the service line entering the building
4. Use reference table to locate minimum flow required to achieve proper flow velocity (for the service line size)

# Widespread Problem – Building System Flushing

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## Basic steps for Unidirectional flushing

5. If possible, flush hot water tanks in utility room
6. Open all cold water fixtures & systematically flush all toilets in the first flushing zone
7. Read the water meter for flow rates
8. Keep fixtures open for at least 15 minutes
9. If flow velocity meets 3 ft/sec, close all fixtures in zone 1
10. Repeat steps in zone 2, etc., until all zones have been flushed

# Routine Water Moving Protocol

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- Should be part of your water quality management plan
- At a minimum, move the water out of drinking water outlets
  - After weekends (first thing Monday morning)
  - After vacations (spring, summer, winter breaks)
- Get others to help!
  - Responsible students (water safety program)
  - Parents
  - Teachers

# Teach the kids to Run Water Before Drinking

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# Water Quality Management Practices

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1. Clean drinking fountains daily
2. Clean debris out of all outlet screens or aerators regularly
3. Clean out hot water tanks & other equipment regularly
4. Test water periodically for contaminants
5. Evaluate facility for the presence of cross-connections
6. Routinely move the water through the plumbing system

# Guidance and Toolbox

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DEQ resources: [www.michigan.gov/schoolwater](http://www.michigan.gov/schoolwater)

- Guidance documents
- Templates
- Webinars
- Other resource information

Contact your community water supplier  
or local health department

# Summary

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- Take action to ensure quality drinking water
- Test the water periodically
- Remove lead sources
- Keep the water moving
- Follow DEQ guidance on sampling, action levels, flushing & water quality management



# When You Need Help or Resources...

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...Please call me!

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