

# POST-FILTER INSTALLATION SAMPLING RESULTS REPORT

Brownell STEM Academy



December 14, 2016

## INTRODUCTION

During the month of February, 2016, the Department of Licensing and Regulatory Affairs (DLARA) completed replacement of drinking water fixtures at Brownell STEM Academy. These fixture replacements were required because testing results indicated that the older fixtures at most schools were imparting lead to the drinking water. After the fixtures were replaced, a more thorough flushing of the plumbing lines was completed to remove any remaining materials from the building's water supply system.

On Saturday, March 19, 2016, the DLARA and the Department of Environmental Quality (DEQ) conducted a post-fixture sampling assessment of the plumbing system at the facility.

For the protection of public health, DLARA started offering the installation of filters in Flint's daycares and schools. This work began in July, 2016.

Filters were installed in October, 2016 at Brownell STEM Academy. A post-filter installation sampling assessment was completed by DEQ and DLARA on October 15, 2016.

## Water Main Description

An internal inspection of the building yielded a four-inch cast iron water service main transitioning into galvanized metal and then into copper piping with lead solder joints.

## SAMPLING METHODS

### Fixture Sampling

There are 23 drinking water fixtures that were identified at the school. After a minimum six-hour stagnation period, four samples were collected at each of the fixtures identified. Two initial samples were collected immediately after turning on the tap. The water was then flushed for 30 seconds and a third sample was collected. Finally, the water was flushed for another two minutes, and the fourth sample was collected. These samples were used to determine the impact of any lead sources in and around each specific fixture and its connecting plumbing.

### Deep Plumbing Sampling

A different sampling method is used to determine the impact of any lead sources

located deep in the supply plumbing of the building. During this method, ten bottles are collected in a row (consecutively). These bottles are one liter in size, which is larger than those used for the fixture sampling method.

## Sampling Notes

### October 31, 2015

- Ninety-two samples from 23 fixtures were collected and sent to the lab for analysis.
- Thirty samples from three specific fixtures were collected to test the deeper part of the plumbing system and sent to the lab for analysis.

## Sampling Notes

### March 19, 2016

- Ninety-two samples from 23 fixtures were collected and sent to the lab for analysis.
- Thirty samples from three specific fixtures were collected to test the deeper part of the plumbing system and sent to the lab for analysis.

## Sampling Notes

### October 15, 2016

- Twenty-three samples from 23 fixtures were collected and sent to the lab for analysis. These samples were collected in 250 milliliter bottles.
- Fixtures CF004 and CF005, in Room 17, were lab faucets so filters were not installed. These fixtures are not suitable for drinking water.

## SAMPLING RESULTS

### Pre-Fixture Replacement

October 31, 2015

Of the 122 samples:

- Lead Range: Non-Detected (ND) to 166 parts per billion (ppb)
- Copper Range: ND to 2040 ppb

## Post-Fixture Replacement

March 19, 2016

Of the 122 samples:

- Lead Range: ND to 412 ppb
- Copper Range: ND to 1,480 ppb

## Post-Filter Installation

October 15, 2016

Of the 23 samples:

- Lead Range: ND to 11 ppb\*
- Copper Range: ND to 330 ppb

\* Lead results for fixtures 004 and 005 were from unfiltered lab faucets. All samples (other than 004 and 005) were ND for lead.

\* Where the result is non-detected for lead it means that the amount of lead in the water was less than 1 ppb.

\* Where the result is non-detected for copper it means that the amount of copper in the water was less than 50 ppb.

November 28, 2016

# Brownell STEM Academy

October 31, 2015

Lead	Result (ppb)	Sample Description	Site Code	Copper	Result (ppb)
Lead	64	DW001 N HALL BY JANITOR CLOSET	P1	Copper	110
Lead	4	DW001 N HALL BY JANITOR CLOSET	P2	Copper	90
Lead	2	DW001 N HALL BY JANITOR CLOSET	F01	Copper	90
Lead	ND	DW001 N HALL BY JANITOR CLOSET	F02	Copper	ND
Lead	12	DW002 N HALL BY STORAGE ROOM	P1	Copper	140
Lead	7	DW002 N HALL BY STORAGE ROOM	P2	Copper	80
Lead	4	DW002 N HALL BY STORAGE ROOM	F01	Copper	ND
Lead	1	DW002 N HALL BY STORAGE ROOM	F02	Copper	ND
Lead	7	CF003 ROOM 15	P1	Copper	140
Lead	11	CF003 ROOM 15	P2	Copper	110
Lead	1	CF003 ROOM 15	F01	Copper	90
Lead	ND	CF003 ROOM 15	F02	Copper	ND
Lead	56	CF004 ROOM 17	P1	Copper	210
Lead	29	CF004 ROOM 17	P2	Copper	140
Lead	7	CF004 ROOM 17	F01	Copper	160
Lead	3	CF004 ROOM 17	F02	Copper	170
Lead	31	CF005 ROOM 17	P1	Copper	80
Lead	6	CF005 ROOM 17	P2	Copper	70
Lead	2	CF005 ROOM 17	F01	Copper	60
Lead	1	CF005 ROOM 17	F02	Copper	60
Lead	9	CF006 ROOM 26	P1	Copper	70
Lead	10	CF006 ROOM 26	P2	Copper	150
Lead	4	CF006 ROOM 26	F01	Copper	160
Lead	ND	CF006 ROOM 26	F02	Copper	ND
Lead	164	CF007 ROOM 26	P1	Copper	2,040
Lead	166	CF007 ROOM 26	P2	Copper	1,740
Lead	15	CF007 ROOM 26	F01	Copper	780
Lead	1	CF007 ROOM 26	F02	Copper	60
Lead	46	DW008 HALL ACROSS ROOM 26	P1	Copper	420
Lead	11	DW008 HALL ACROSS ROOM 26	P2	Copper	100
Lead	4	DW008 HALL ACROSS ROOM 26	F01	Copper	ND
Lead	1	DW008 HALL ACROSS ROOM 26	F02	Copper	ND
Lead	23	DW009 HALL ACROSS ROOM 26	P1	Copper	330
Lead	7	DW009 HALL ACROSS ROOM 26	P2	Copper	90
Lead	3	DW009 HALL ACROSS ROOM 26	F01	Copper	ND
Lead	2	DW009 HALL ACROSS ROOM 26	F02	Copper	ND
Lead	25	CF010 ROOM 27	P1	Copper	190
Lead	34	CF010 ROOM 27	P2	Copper	160
Lead	2	CF010 ROOM 27	F01	Copper	ND
Lead	ND	CF010 ROOM 27	F02	Copper	ND
Lead	11	WC011 HALL BY GYM	P1	Copper	560

Non-detected (ND) means; for lead the amount in water is less than 1 pbb andfor copper the amount in water is less than 50 pbb.

# Brownell STEM Academy

October 31, 2015

Lead	Result (ppb)	Sample Description	Site Code	Copper	Result (ppb)
Lead	14	WC011 HALL BY GYM	P2	Copper	670
Lead	14	WC011 HALL BY GYM	F01	Copper	390
Lead	2	WC011 HALL BY GYM	F02	Copper	60
Lead	ND	CF012 COMMUNITY ROOM	P1	Copper	60
Lead	14	CF012 COMMUNITY ROOM	P2	Copper	130
Lead	ND	CF012 COMMUNITY ROOM	F01	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	F02	Copper	ND
Lead	27	DW013 CLOSE TO ROOM 1	P1	Copper	140
Lead	15	DW013 CLOSE TO ROOM 1	P2	Copper	130
Lead	8	DW013 CLOSE TO ROOM 1	F01	Copper	90
Lead	2	DW013 CLOSE TO ROOM 1	F02	Copper	ND
Lead	16	DW014 CLOSE TO ROOM 2	P1	Copper	80
Lead	3	DW014 CLOSE TO ROOM 2	P2	Copper	ND
Lead	2	DW014 CLOSE TO ROOM 2	F01	Copper	ND
Lead	1	DW014 CLOSE TO ROOM 2	F02	Copper	ND
Lead	7	KC015 ROOM 1	P1	Copper	130
Lead	2	KC015 ROOM 1	P2	Copper	270
Lead	2	KC015 ROOM 1	F01	Copper	ND
Lead	2	KC015 ROOM 1	F02	Copper	70
Lead	11	KC016 ROOM 1	P1	Copper	140
Lead	3	KC016 ROOM 1	P2	Copper	140
Lead	2	KC016 ROOM 1	F01	Copper	50
Lead	ND	KC016 ROOM 1	F02	Copper	ND
Lead	13	KC017 ROOM 2	P1	Copper	180
Lead	8	KC017 ROOM 2	P2	Copper	180
Lead	1	KC017 ROOM 2	F01	Copper	ND
Lead	ND	KC017 ROOM 2	F02	Copper	ND
Lead	10	CF018 ROOM 4	P1	Copper	90
Lead	7	CF018 ROOM 4	P2	Copper	110
Lead	ND	CF018 ROOM 4	F01	Copper	ND
Lead	ND	CF018 ROOM 4	F02	Copper	ND
Lead	16	KC019 ROOM 4	P1	Copper	180
Lead	10	KC019 ROOM 4	P2	Copper	280
Lead	ND	KC019 ROOM 4	F01	Copper	ND
Lead	ND	KC019 ROOM 4	F02	Copper	ND
Lead	33	DW020 NEXT TO ROOM 7	P1	Copper	160
Lead	15	DW020 NEXT TO ROOM 7	P2	Copper	120
Lead	20	DW020 NEXT TO ROOM 7	F01	Copper	ND
Lead	2	DW020 NEXT TO ROOM 7	F02	Copper	ND
Lead	38	DW021 NEXT TO ROOM 6	P1	Copper	100
Lead	27	DW021 NEXT TO ROOM 6	P2	Copper	ND

Non-detected (ND) means; for lead the amount in water is less than 1 ppb and for copper the amount in water is less than 50 ppb.

# Brownell STEM Academy

October 31, 2015

Lead	Result (ppb)	Sample Description	Site Code	Copper	Result (ppb)
Lead	2	DW021 NEXT TO ROOM 6	F01	Copper	ND
Lead	2	DW021 NEXT TO ROOM 6	F02	Copper	ND
Lead	11	CF022 ROOM 6	P1	Copper	200
Lead	6	CF022 ROOM 6	P2	Copper	220
Lead	2	CF022 ROOM 6	F01	Copper	ND
Lead	ND	CF022 ROOM 6	F02	Copper	70
Lead	8	CF023 ROOM 7	P1	Copper	ND
Lead	12	CF023 ROOM 7	P2	Copper	150
Lead	ND	CF023 ROOM 7	F01	Copper	60
Lead	ND	CF023 ROOM 7	F02	Copper	ND
Lead	10	CF004 ROOM 17	CA1	Copper	170
Lead	3	CF004 ROOM 17	CA2	Copper	170
Lead	3	CF004 ROOM 17	CA3	Copper	180
Lead	3	CF004 ROOM 17	CA4	Copper	190
Lead	2	CF004 ROOM 17	CA5	Copper	200
Lead	2	CF004 ROOM 17	CA6	Copper	190
Lead	2	CF004 ROOM 17	CA7	Copper	190
Lead	2	CF004 ROOM 17	CA8	Copper	190
Lead	2	CF004 ROOM 17	CA9	Copper	180
Lead	2	CF004 ROOM 17	CA10	Copper	170
Lead	2	CF012 COMMUNITY ROOM	CB1	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	CB2	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	CB3	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	CB4	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	CB5	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	CB6	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	CB7	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	CB8	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	CB9	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	CB10	Copper	ND
Lead	2	CF023 ROOM 7	CC1	Copper	ND
Lead	ND	CF023 ROOM 7	CC2	Copper	ND
Lead	ND	CF023 ROOM 7	CC3	Copper	ND
Lead	ND	CF023 ROOM 7	CC4	Copper	ND
Lead	ND	CF023 ROOM 7	CC5	Copper	ND
Lead	ND	CF023 ROOM 7	CC6	Copper	ND
Lead	ND	CF023 ROOM 7	CC7	Copper	ND
Lead	ND	CF023 ROOM 7	CC8	Copper	ND
Lead	ND	CF023 ROOM 7	CC9	Copper	ND
Lead	ND	CF023 ROOM 7	CC10	Copper	ND

Non-detected (ND) means; for lead the amount in water is less than 1 ppb and for copper the amount in water is less than 50 ppb.

# Brownell STEM Academy

March 19, 2016

Lead	Result (ppb)	Sample Description	Site Code	Copper	Result (ppb)
Lead	4	DW001 N HALL BY JANITOR CLOSET	P1	Copper	120
Lead	2	DW001 N HALL BY JANITOR CLOSET	P2	Copper	80
Lead	1	DW001 N HALL BY JANITOR CLOSET	F01	Copper	100
Lead	ND	DW001 N HALL BY JANITOR CLOSET	F02	Copper	140
Lead	34	DW002 N HALL BY STORAGE ROOM	P1	Copper	170
Lead	5	DW002 N HALL BY STORAGE ROOM	P2	Copper	120
Lead	1	DW002 N HALL BY STORAGE ROOM	F01	Copper	90
Lead	ND	DW002 N HALL BY STORAGE ROOM	F02	Copper	70
Lead	2	CF003 ROOM 15	P1	Copper	90
Lead	7	CF003 ROOM 15	P2	Copper	80
Lead	ND	CF003 ROOM 15	F01	Copper	60
Lead	ND	CF003 ROOM 15	F02	Copper	ND
Lead	22	CF004 ROOM 17	P1	Copper	870
Lead	25	CF004 ROOM 17	P2	Copper	830
Lead	8	CF004 ROOM 17	F01	Copper	510
Lead	4	CF004 ROOM 17	F02	Copper	320
Lead	19	CF005 ROOM 17	P1	Copper	120*
Lead	13	CF005 ROOM 17	P2	Copper	130
Lead	3	CF005 ROOM 17	F01	Copper	70
Lead	2	CF005 ROOM 17	F02	Copper	90
Lead	5	CF006 ROOM 26	P1	Copper	280
Lead	4	CF006 ROOM 26	P2	Copper	160
Lead	ND	CF006 ROOM 26	F01	Copper	80
Lead	ND	CF006 ROOM 26	F02	Copper	ND
Lead	5	CF007 ROOM 26	P1	Copper	270
Lead	2	CF007 ROOM 26	P2	Copper	420
Lead	ND	CF007 ROOM 26	F01	Copper	500
Lead	ND	CF007 ROOM 26	F02	Copper	70
Lead	19	DW008 HALL ACROSS ROOM 26	P1	Copper	320
Lead	5	DW008 HALL ACROSS ROOM 26	P2	Copper	110
Lead	2	DW008 HALL ACROSS ROOM 26	F01	Copper	ND
Lead	2	DW008 HALL ACROSS ROOM 26	F02	Copper	ND
Lead	150	DW009 HALL ACROSS ROOM 26	P1	Copper	280
Lead	69	DW009 HALL ACROSS ROOM 26	P2	Copper	130
Lead	7	DW009 HALL ACROSS ROOM 26	F01	Copper	ND
Lead	1	DW009 HALL ACROSS ROOM 26	F02	Copper	ND
Lead	3	CF010 LOUNGE ROOM 27	P1	Copper	140
Lead	9	CF010 LOUNGE ROOM 27	P2	Copper	120
Lead	ND	CF010 LOUNGE ROOM 27	F01	Copper	ND
Lead	ND	CF010 LOUNGE ROOM 27	F02	Copper	ND
Lead	2	WC011 HALL BY GYM	P1	Copper	390
Lead	2	WC011 HALL BY GYM	P2	Copper	420

\* CF005 Copper quality control result was not within allowable limits due to matrix interference.

Non-detected (ND) means; for lead the amount in water is less than 1 pbb and for copper the amount in water is less than 50 pbb.



# Brownell STEM Academy

March 19, 2016

Lead	Result (ppb)	Sample Description	Site Code	Copper	Result (ppb)
Lead	3	WC011 HALL BY GYM	F01	Copper	370
Lead	1	WC011 HALL BY GYM	F02	Copper	130
Lead	2	CF012 COMMUNITY ROOM	P1	Copper	150
Lead	1	CF012 COMMUNITY ROOM	P2	Copper	60
Lead	ND	CF012 COMMUNITY ROOM	F01	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	F02	Copper	ND
Lead	44	DW013 CLOSEST TO ROOM 1	P1	Copper	390
Lead	13	DW013 CLOSEST TO ROOM 1	P2	Copper	180
Lead	4	DW013 CLOSEST TO ROOM 1	F01	Copper	110
Lead	3	DW013 CLOSEST TO ROOM 1	F02	Copper	1,480
Lead	30	DW014 CLOSEST TO ROOM 2	P1	Copper	220
Lead	9	DW014 CLOSEST TO ROOM 2	P2	Copper	70
Lead	3	DW014 CLOSEST TO ROOM 2	F01	Copper	ND
Lead	2	DW014 CLOSEST TO ROOM 2	F02	Copper	ND
Lead	15	KC015 ROOM 1	P1	Copper	840
Lead	8	KC015 ROOM 1	P2	Copper	460
Lead	ND	KC015 ROOM 1	F01	Copper	ND
Lead	ND	KC015 ROOM 1	F02	Copper	ND
Lead	412	KC016 ROOM 1	P1	Copper	453
Lead	1	KC016 ROOM 1	P2	Copper	260
Lead	ND	KC016 ROOM 1	F01	Copper	ND
Lead	ND	KC016 ROOM 1	F02	Copper	ND
Lead	34	KC017 ROOM 2	P1	Copper	220
Lead	2	KC017 ROOM 2	P2	Copper	120
Lead	ND	KC017 ROOM 2	F01	Copper	ND
Lead	ND	KC017 ROOM 2	F02	Copper	ND
Lead	2	CF018 ROOM 4	P1	Copper	110
Lead	3	CF018 ROOM 4	P2	Copper	90
Lead	ND	CF018 ROOM 4	F01	Copper	ND
Lead	ND	CF018 ROOM 4	F02	Copper	ND
Lead	4	KC019 ROOM 4	P1	Copper	140
Lead	4	KC019 ROOM 4	P2	Copper	230
Lead	ND	KC019 ROOM 4	F01	Copper	ND
Lead	ND	KC019 ROOM 4	F02	Copper	ND
Lead	10	DW020 NEXT TO ROOM 7	P1	Copper	190
Lead	5	DW020 NEXT TO ROOM 7	P2	Copper	180
Lead	2	DW020 NEXT TO ROOM 7	F01	Copper	50
Lead	1	DW020 NEXT TO ROOM 7	F02	Copper	ND
Lead	178	DW021 NEXT TO ROOM 6	P1	Copper	150
Lead	15	DW021 NEXT TO ROOM 6	P2	Copper	50
Lead	1	DW021 NEXT TO ROOM 6	F01	Copper	ND
Lead	1	DW021 NEXT TO ROOM 6	F02	Copper	ND
Lead	350	CF022 ROOM 6	P1	Copper	160

Non-detected (ND) means; for lead the amount in water is less than 1 ppb and for copper the amount in water is less than 50 ppb.

## Brownell STEM Academy

March 19, 2016

Lead	Result (ppb)	Sample Description	Site Code	Copper	Result (ppb)
Lead	4	CF022 ROOM 6	P2	Copper	100
Lead	ND	CF022 ROOM 6	F01	Copper	ND
Lead	ND	CF022 ROOM 6	F02	Copper	50
Lead	4	CF023 ROOM 7	P1	Copper	110
Lead	16	CF023 ROOM 7	P2	Copper	150
Lead	ND	CF023 ROOM 7	F01	Copper	50
Lead	ND	CF023 ROOM 7	F02	Copper	ND
Lead	10	CF004 ROOM 17	A1	Copper	420
Lead	5	CF004 ROOM 17	A2	Copper	380
Lead	3	CF004 ROOM 17	A3	Copper	300
Lead	7	CF004 ROOM 17	A4	Copper	420
Lead	4	CF004 ROOM 17	A5	Copper	330
Lead	5	CF004 ROOM 17	A6	Copper	380
Lead	4	CF004 ROOM 17	A7	Copper	330
Lead	4	CF004 ROOM 17	A8	Copper	310
Lead	3	CF004 ROOM 17	A9	Copper	300
Lead	3	CF004 ROOM 17	A10	Copper	280
Lead	ND	CF012 COMMUNITY ROOM	B1	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	B2	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	B3	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	B4	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	B5	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	B6	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	B7	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	B8	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	B9	Copper	ND
Lead	ND	CF012 COMMUNITY ROOM	B10	Copper	ND
Lead	1	CF023 ROOM 7	C1	Copper	50
Lead	ND	CF023 ROOM 7	C2	Copper	ND
Lead	ND	CF023 ROOM 7	C3	Copper	ND
Lead	ND	CF023 ROOM 7	C4	Copper	ND
Lead	ND	CF023 ROOM 7	C5	Copper	ND
Lead	ND	CF023 ROOM 7	C6	Copper	ND
Lead	ND	CF023 ROOM 7	C7	Copper	ND
Lead	ND	CF023 ROOM 7	C8	Copper	ND
Lead	ND	CF023 ROOM 7	C9	Copper	ND
Lead	ND	CF023 ROOM 7	C10	Copper	ND

Non-detected (ND) means; for lead the amount in water is less than 1 ppb and for copper the amount in water is less than 50 ppb.



Brownell Stem Academy

October 15, 2016

Lead	Result (ppb)	Sample Description	Site Code	Copper	Result (ppb)
Lead	ND	DW001 N HALL BY JANITOR CLOSET	P1	Copper	50
Lead	ND	DW002 N HALL BY STORAGE ROOM	P1	Copper	60
Lead	ND	CF003 ROOM15	P1	Copper	ND
Lead	3	CF004 ROOM 17	P1	Copper	130
Lead	11	CF005 ROOM17	P1	Copper	160
Lead	ND	CF006 ROOM 26	P1	Copper	ND
Lead	ND	CF007 ROOM 26	P1	Copper	ND
Lead	ND	DW008 HALL ACROSS FROM ROOM 26	P1	Copper	80
Lead	ND	DW009 HALL ACROSS FROM ROOM 26	P1	Copper	90
Lead	ND	CF010 LOUNGE ROOM 27	P1	Copper	ND
Lead	ND	WC011 HALL BY GYM	P1	Copper	330
Lead	ND	CF012 COMMUNITY ROOM	P1	Copper	ND
Lead	ND	DW013 CLOSEST TO ROOM 1	P1	Copper	ND
Lead	ND	DW014 CLOSEST TO ROOM 2	P1	Copper	ND
Lead	ND	KC015 ROOM 1	P1	Copper	ND
Lead	ND	KC016 ROOM 1	P1	Copper	ND
Lead	ND	KC017 ROOM 2	P1	Copper	ND
Lead	ND	KC019 ROOM 4	P1	Copper	ND
Lead	ND	CF022 ROOM 6	P1	Copper	ND
Lead	ND	CF023 ROOM 7	P1	Copper	ND

Non-detected (ND) means; for lead the amount in water is less than 1 pbb and for copper the amount in water is less than 50 pbb.