



Lansing Board of Water & Light 2016 Annual Water Quality Report



Water as Hydro-Electric Power, Charles Pollock 1941

Dear Customer,

We are pleased to present the 19th annual report summarizing the quality of the drinking water provided to you by the Lansing Board of Water & Light (BWL) for the 2016 calendar year. This *Consumer Confidence Report* is required by the Federal and State of Michigan Safe Drinking Water Acts (SDWA). This report discusses the source of your tap water, the results of tests we regularly conduct to assure the quality of your water and additional information that you may wish to know about your drinking water.

As a publicly-owned utility, the BWL encourages public interest and participation in decisions affecting the community's drinking water. The BWL's Board of Commissioners meet on the fourth Tuesday of every other month at our REO Town Depot Facility, 1201 S. Washington Avenue in Lansing. Meeting dates and times are published in advance and may be found on the BWL's website at lbwl.com/BWL-Governance or by calling us at 517-702-6006. Our board meetings are open to the public.

The Bottom Line

During 2016, BWL drinking water **continues to meet or exceed** all quality standards established by the U.S. Environmental Protection Agency (EPA) and the Michigan Department of Environmental Quality (MDEQ).

About Us

The BWL was established in 1885 by a vote of the people of Lansing to fund a publicly owned utility to meet their need for adequate fire protection, proper sanitation and improved street lighting for the city. The Lansing community and the BWL service territory has been very fortunate to be located over the center of the Saginaw Aquifer, which has been called one of the finest natural sources of groundwater ever discovered.

BWL Facts:

- 125 Wells, approximately 400 ft deep
- 2 Water Conditioning Plants
- 166,000 Population Served
- 40,450 Wholesale Population Served
- Average use of 19.2 Million Gallons per Day
- 862 miles of water mains

Recognitions:

In 2014 the John F. Dye Water Conditioning Plant was recognized as a National Waterworks Landmark by the American Water Works Association and the Plant was also presented with a Clean Corporate Citizen Award by the MDEQ for its environmental stewardship.

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How to Read the Water Quality Data Tables

The BWL tests the water frequently and the results of all detected contaminants, even in the smallest traces, are shown in the tables below. These tables contain the name of each substance, the highest level allowed if regulated, the ideal goals for public health if established, the amount detected and the usual sources of such contamination. There are also footnotes explaining our findings and a key to units of measurement. The presence of contaminants in the water does not necessarily indicate that the water poses a health risk.

Unless otherwise noted, the data presented in this table is from testing done January 1 – December 31, 2016. The BWL is allowed to monitor for certain contaminants less often than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year. While all the data are representative of the BWL's water quality, some results are more than a year old.

The tables do not list the hundreds of contaminants for which the BWL tested but did not detect a presence.

Key to Tables:

AL	Action Level: The concentration of a contaminant which, if exceeded, triggers treatment of other requirements that a water system must follow.
MCL	Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
MCLG	Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
MRDL	Maximum Residual Disinfectant Level: The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MRDLG	Maximum Residual Disinfectant Level Goal: The level of a disinfectant in drinking water below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contamination.
N/A	Not Applicable
ND	Not detectable at testing limit
pCi/l	Picocuries per liter (a measure of radioactivity)
PPB	Parts Per Billion , or micrograms per liter (ug/l) (equivalent to one penny in \$10,000,000).
PPM	Parts Per Million , or milligrams per liter (mg/l) (equivalent to one penny in \$10,000).

Substances Measured in the Distribution System

Disinfectants and Disinfection By-Products

The BWL adds chloramine to its water at the conditioning plant to protect against bacterial growth. Chloramine is used instead of other disinfectant options because it minimizes the number and level of chlorination by-products, persists longer in the distribution system and leaves little or no unpleasant odor and taste. The following table lists the chloramine levels and disinfection by-products created by the reaction of our chloramine treatment and naturally occurring organic compounds.

Regulated Contaminant	Unit	MCL	MCLG	Highest Average Detected Level	Range of Detected Levels	Major Sources	Violation?
Haloacetic Acids (HAA5)	PPB	60	N/A	2.4	0 to 3.6	By-product of drinking water disinfection	No
Total Trihalomethanes (TTHMs)	PPB	80	N/A	4.0	2.9 to 4.6	By-product of drinking water disinfection	No
Chloramines	PPM	MRDL	MRDLG	1.7	1.2 to 1.9	Water additive to control microbes	No
		4	4				

Substances Measured at the Water Conditioning Plant

Regulated Contaminant	Unit	MCL	MCLG	Highest Detected Level	Range	Date Tested	Major Sources	Violation?
Barium	PPM	2	2	0.022	0.015 to 0.022	7/25/12	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits.	No
Fluoride	PPM	4	4	0.56	0 to 0.56*	7/7/16	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories.	No

Radioactive Contaminant	Unit	MCL	MCLG	Highest Detected Level	Range	Date Tested	Major Sources	Violation?
Radium 226 and 228	pCi/L	5	0	1.95±0.44	0.84±0.51 to 1.95±0.44	7/7/16	Erosion of natural deposits.	No

***Water Quality Table Footnote:** Dye Conditioning Plant was not feeding fluoride from March through Dec 2016 while the fluoride feed equipment was down for repair.

Special Monitoring (Not Regulated)	Unit	MCL	Highest Detected Level	Range	Date Tested	Major Sources	Violation?
Sodium	PPM	Not Established	120	82-120	7/7/16	Natural constituent of groundwater.	N/A



Fluoride

The raw water coming into the BWL's two water conditioning plants has a naturally occurring level of fluoride at approximately 0.35 ppm. The BWL adds fluoride to the water to bring it to the optimal level of 0.7 ppm recommended by the Center for Disease Control (CDC) and Prevention and the U.S. Public Health Service and approved by the EPA.

As stated on the CDC.gov/fluoridation/safety website, the "CDC monitors the public health benefits and risks of community water fluoridation from studies published by panels of experts from health and scientific fields. These reviews, conducted over many years, have concluded that water fluoridation is both safe and effective."

Further information about fluoride in drinking water, including specific information about infants, can be obtained from the CDC website at cdc.gov/fluoridation.

Unregulated Contaminants

Unregulated contaminants are those that do not have an MCL or MCLG but are reported to and evaluated by the MDEQ and EPA. Monitoring helps the EPA determine which areas of the country these contaminants are being detected and whether they should be regulated. As our customers, you may request the results of our tests by contacting Angie Goodman at 517-702-7059 or angie.goodman@lbwl.com.

Unregulated Contaminant Monitoring Rule 3 That Were Detected

Unregulated Contaminants	Unit	Average Detected Level	Range	Date Tested	Major Sources
Chromium	PPB	0.2	0.2-0.3	Feb & Aug 2015	Natural constituent of groundwater
Molybdenum	PPB	1.1	0-1.2	Feb & Aug 2015	Industrial activities; naturally occurring sources
Strontium	PPB	166	120-210	Feb & Aug 2015	Industrial activities; naturally occurring sources
Vanadium	PPB	0.3	0.2-0.4	Feb & Aug 2015	Industrial activities; naturally occurring sources
Chromium, Hexavalent	PPB	0.2	0.14-0.24	Feb & Aug 2015	Industrial activities; naturally occurring sources
Chlorate	PPB	174	32-330	Feb & Aug 2015	By-product of disinfection
1,4-Dioxane	PPB	0.14	0.14-0.14	Feb & Aug 2015	Groundwater contamination from manufacturing processes & landfills

Important Information about Lead

From the early 20th century through the early 1950s, the BWL and other water utilities across the country commonly used lead service lines to deliver water from the distribution mains to individual customers. Even though the BWL has been in compliance with the EPA's lead regulations and was not required to remove lead service lines, the BWL knew it was in the best interest of our customers and our utility to eliminate lead service lines from our system.

In December 2016, the BWL replaced its last active lead service line, joining Madison, Wisconsin as the only two water utilities in the nation that have removed all lead service lines. The project began in 2004 and removed 12,150 active lead services lines at a cost of \$44.5 million.



Is There Lead in My Water?

There is no detectable lead in BWL drinking water when it leaves our conditioning plants. However, since water is naturally corrosive, small amounts of lead can dissolve into your drinking water if your water sits for several hours in contact with household plumbing fixtures, solder or faucets. The BWL uses a corrosion control additive to create a protective coating to reduce or eliminate the risk of exposure.

Substances Measured in Homes and Businesses*

Contaminant Subject to AL	Unit	AL	9 out of 10 homes were below a level of:	# of samples above the action level:	Major Sources	Violation?
Copper	PPM	**1.3 at 90th percentile	0.02	0	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives	No
Lead	PPB	***15 at 90th percentile	7.8	2	Corrosion of household plumbing systems; erosion of natural deposits	No

Water Quality Table Footnotes:

* Lead and copper were last sampled in June 2014

** 9 out of 10 homes tested must show a concentration equal to or lower than 1.3 parts per million

*** 9 out of 10 homes tested must show a concentration equal to or lower than 15 parts per billion

If you're concerned about lead, have the water tested. Arrangements can be made for water testing through the Ingham County Health Department at 517-887-4312 and each test costs about \$20. Or you may choose to install a water filter that is NSF-certified for lead removal. If a water filter is installed, replace it at least as often as recommended by the manufacturer.

EPA's Message About Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water comes primarily from materials and components associated with water service lines and home plumbing. The BWL is responsible for providing high-quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the **EPA's Safe Drinking Water Hotline (800-426-4791)** or at water.epa.gov/drink/info/lead/index.cfm.



Minimize Lead in Your Home

- **Flush your pipes before drinking.** If your water has sat in your home's plumbing for more than 6 hours, flush the tap until the water feels cold. To conserve water, the water could be collected to water household plants.
- **Use only cold water for drinking, cooking and especially for making baby formula.** Hot water is likely to contain higher levels of lead.
- **Check your plumbing fixtures.** A new "lead-free" law came into effect in 2014 limiting the amount of lead in faucets and plumbing.

Lead and copper sampling was conducted by the BWL during the summer of 2014. Monitoring results can be found in the tables under the heading, "Substances Measured in the Homes and Businesses." BWL compliance monitoring is every three years, and the next sampling round will be 2017.

For more information about lead, please visit our website at lbwl.com/water

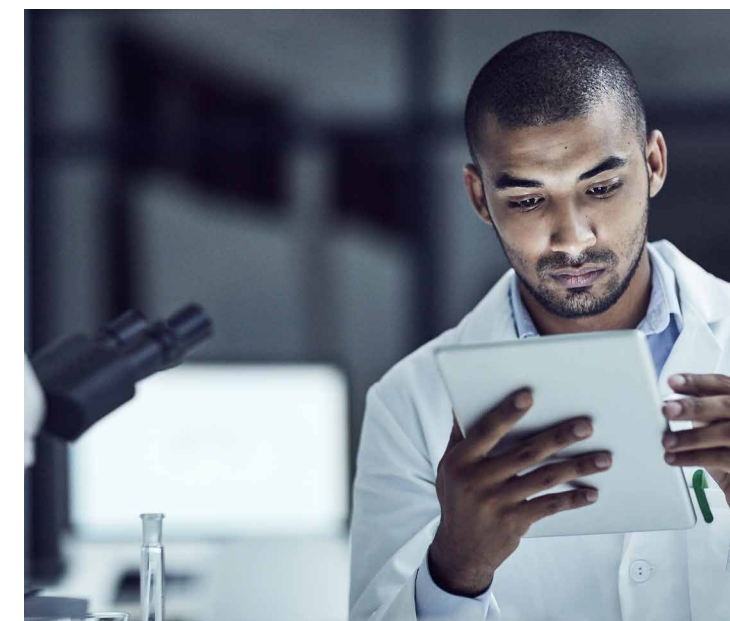
Additional Water Quality Parameters of BWL Conditioned Water

The BWL performs an average of 16,000 water quality tests per year. This table represents results of typical concentrations and ranges of other parameters present in your water supply. All of these results are within acceptable ranges. These results can vary depending on the wells that are in use, the time of the year and the different areas of the water distribution system. For a pdf version of this list, visit the BWL website at lbwl.com/water and click the *Typical Analysis of Conditioned Water*.

Parameter	Units	Your Water Results	
		Typical Concentration	Range
Calcium (as CaCO ₃)	PPM	57	50-65
Magnesium (as CaCO ₃)	PPM	42	33-54
Hardness* (as CaCO ₃)	PPM	100	85-110
	Grains per gallon	5.8	4.9-6.4
Carbonate (as CaCO ₃)	PPM	20	15-30
Bicarbonate (as CaCO ₃)	PPM	15	10-15
Total Alkalinity (as CaCO ₃)	PPM	35	30-45
Iron*	PPM	0.1	0.1-0.7
Sulfate*	PPM	90	45-80
Chloride*	PPM	60	10-100
Phosphate, Total (as P)	PPM	0.6	0.2-0.8
Phosphate, Ortho (as P)	PPM	0.3	0.2-0.4
pH	pH units	9.2	9.0-9.8
Turbidity	NTU	0.1	0.1-0.5
Conductivity*	uS/cm	480	380-620

*These parameters will typically be at the high end of the range during high demand periods in the summer months of June, July and August.

The BWL has ZERO water quality violations!



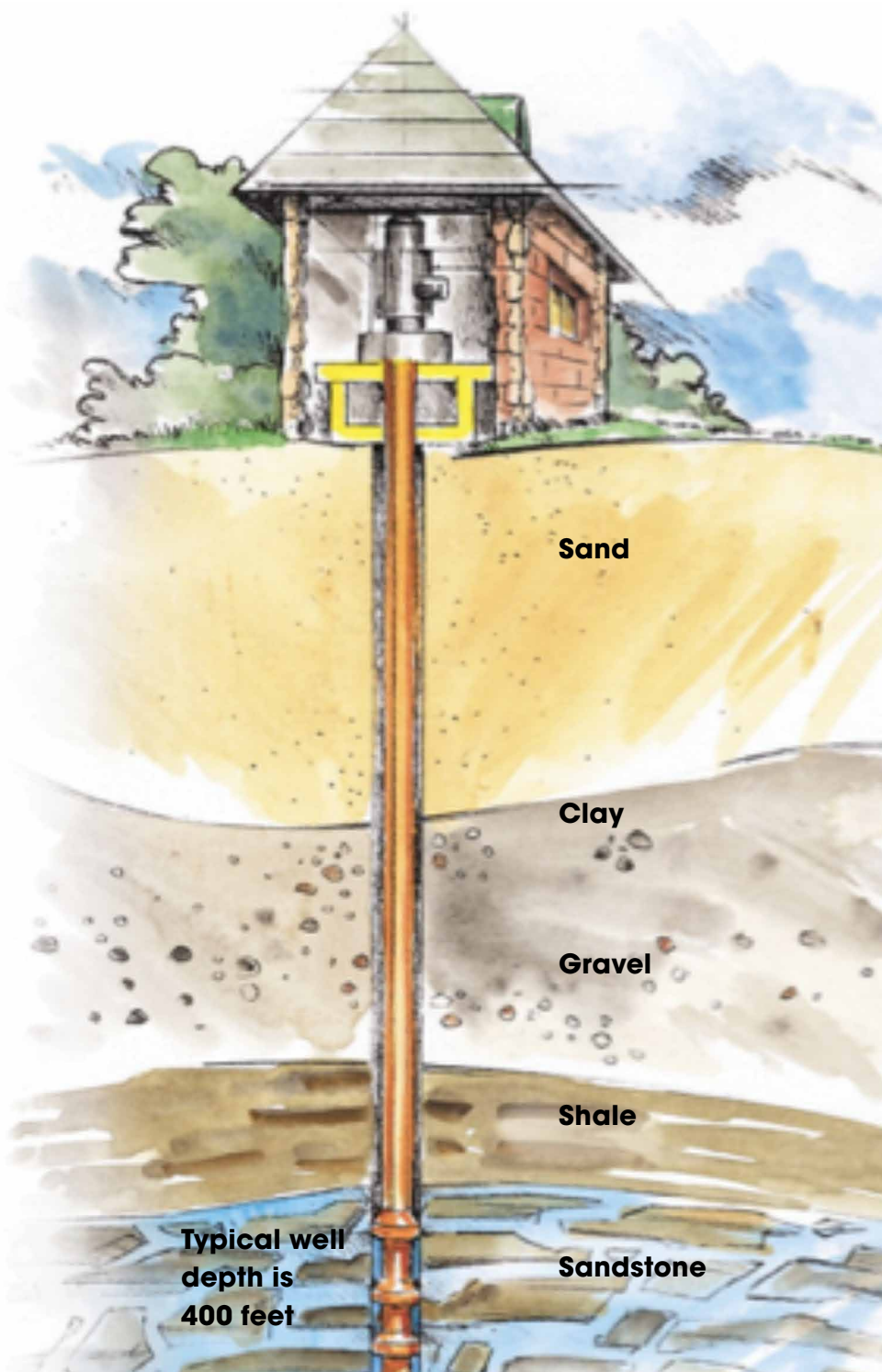
Water Source

BWL drinking water comes from 125 groundwater wells that are approximately 400 feet deep. The source of this plentiful supply is an underground aquifer called the Saginaw Formation, which underlies much of the mid-Michigan region. Water from BWL wells is transported through large transmission mains to one of two water conditioning plants.

The plants soften the water by removing about 80 percent of the hardness. The softened water is then chlorinated, fluoridated, treated with corrosion control, filtered and stored in reservoirs for distribution to customers. Lansing is one of the largest communities in the country to rely exclusively on groundwater to meet its drinking water requirements.



Protect Your Water Supply



Lansing's drinking water source is largely protected from contamination or direct contact with surface waters by layers of clay and shale. There are areas at the surface, however, that directly contribute to the aquifer without the protection of clay and shale layers.

During 2003, the MDEQ conducted an assessment of the vulnerability of the aquifer to impacts from human activities. Because there are several known and potential sources of contamination in and near the BWL's wellhead protection areas, the aquifer in this region has been assessed as "highly susceptible" to contamination. If you desire more information on this local Source Water Assessment, contact Angie Goodman at 517-702-7059 or angie.goodman@lbwl.com.

The BWL actively supports regional wellhead protection activities. The United States Geological Survey has developed a regional aquifer computer model of the mid-Michigan area that provides important information about the groundwater supplies. Major support for the project was provided through a state-administered wellhead protection grant to the BWL.

Protect Your Water Source

Conserve:
Saving water reduces energy costs and helps keep more water in our lakes, rivers and groundwater supply.

Never Flush:
Many items containing toxins are non-biodegradable. They clog pipes, destroy protective bacteria and wreak havoc at the Wastewater Treatment Plant. For a complete list, visit epa.gov/septic.

Waste Disposal:
Properly dispose of waste such as gasolines, oils, pesticides, paints, and antifreeze. Toxic substances poured/spilled on the ground or down a drain can contaminate the water you drink.

Medications:
Are NOT safe to flush. They break down in the water and wastewater treatment plants. Treatment plants are not equipped to remove them and they end up back in our water supply. Visit takebackyourmeds.org to find a place to dispose of them properly.

**Actions taken on the surface can impact the groundwater we drink.
Help protect this essential resource!**



General Health Information Provided by the EPA

In order to ensure that tap water is safe to drink, the EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. United States Food and Drug Administration (FDA) regulations also establish limits for contaminants in bottled water which must provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the **EPA's Safe Drinking Water Hotline (800-426-4791)**.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

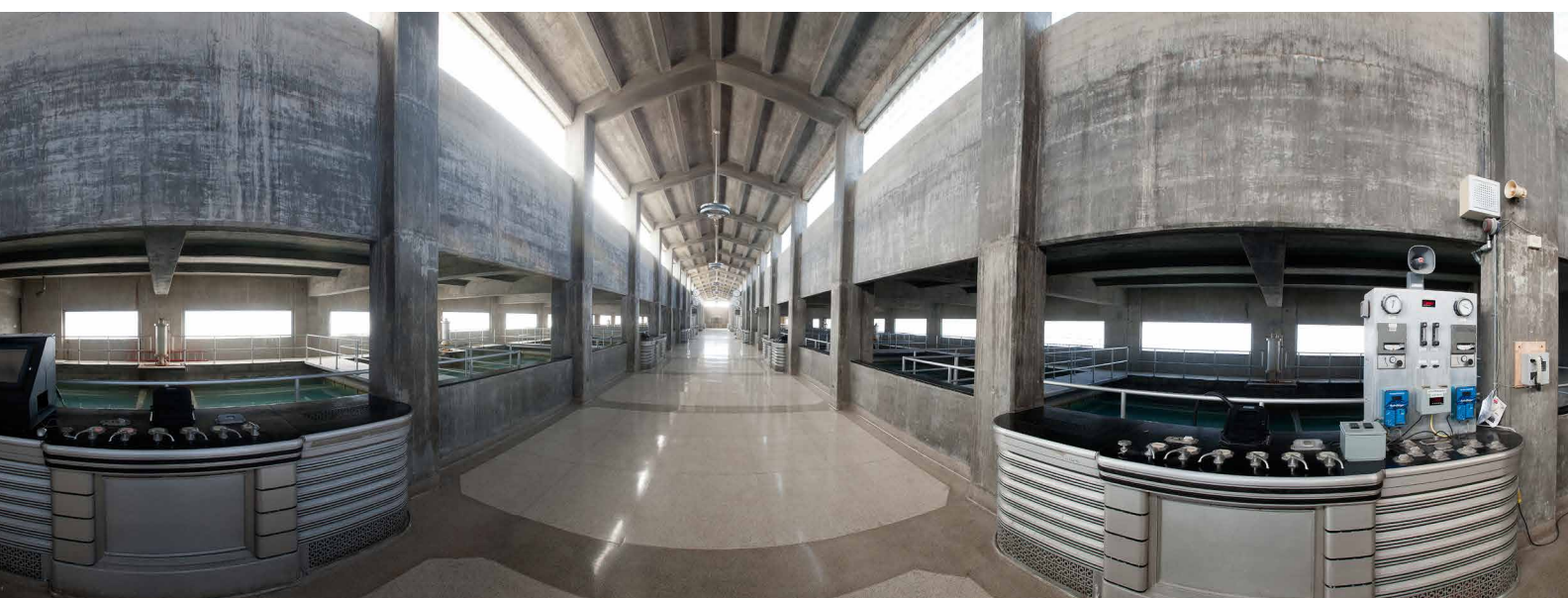
- (A) **Microbial contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.
- (B) **Inorganic contaminants**, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- (C) **Pesticides and herbicides**, which may come from a variety of sources such as agriculture, stormwater runoff and residential uses.
- (D) **Organic chemical contaminants**, including synthetic and volatile organics, which are by-products of industrial processes and petroleum production, can also come from gas stations, urban stormwater runoff and septic systems.
- (E) **Radioactive contaminants**, which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. FDA regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly and infants can be particularly at risk of infections. These people should seek advice about drinking water from their healthcare providers. EPA /CDC guidelines on appropriate means to lessen the risk of infection from microbial contaminants are available from the **EPA's Safe Drinking Water Hotline (800-426-4791)**.

National Primary Drinking Water Regulation Compliance

For more information about our water quality, please contact Angie Goodman at 517-702-7059 or angie.goodman@lbwl.com. Learn more about the BWL water system at lbwl.com/water. For more information about safe drinking water, visit the U.S. Environmental Protection Agency (EPA) at epa.gov/safewater/.



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