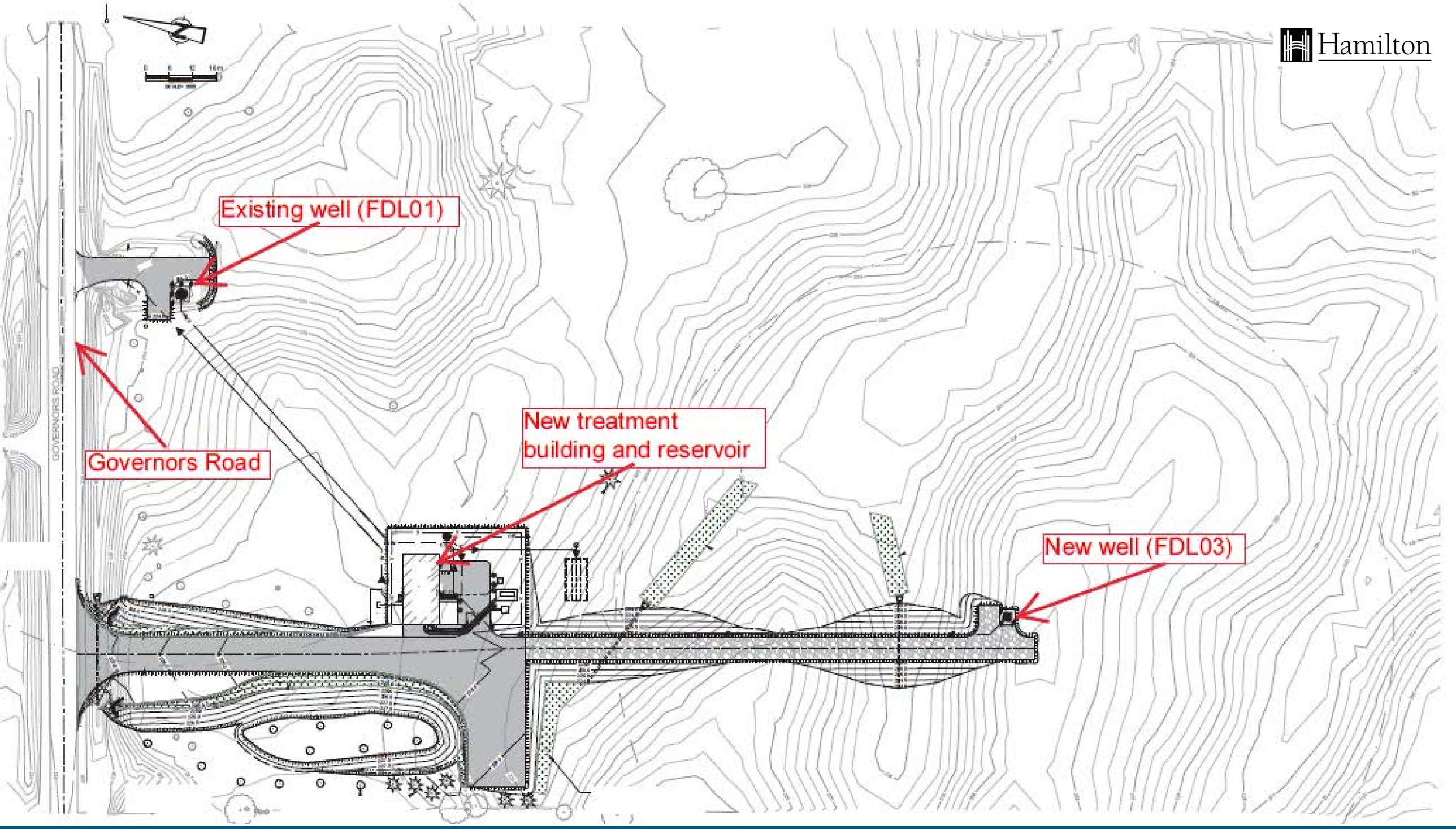
Lynden Municipal Water System
Public Update Drop-in Session

Cancelled due to COVID-19

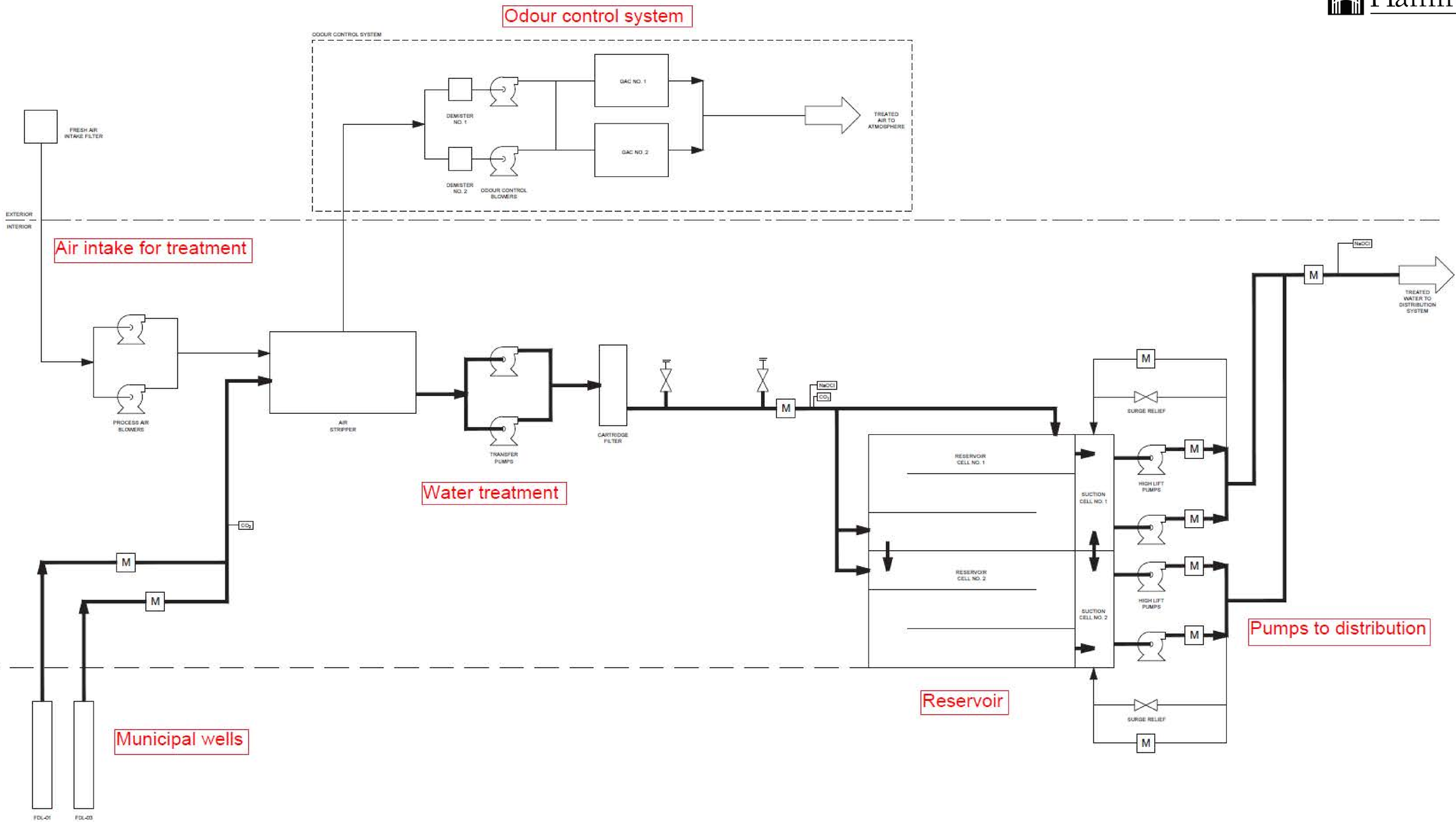
~~**Thursday, March 26, 2020 4 to 7 p.m.**~~

Information Boards

Hamilton



New Lynden Plant Property and Layout



New Lynden Plant Process Flow Diagram

New access road and new municipal well

Aerial of new reservoir

Rebar installation for the new reservoir

Construction Images

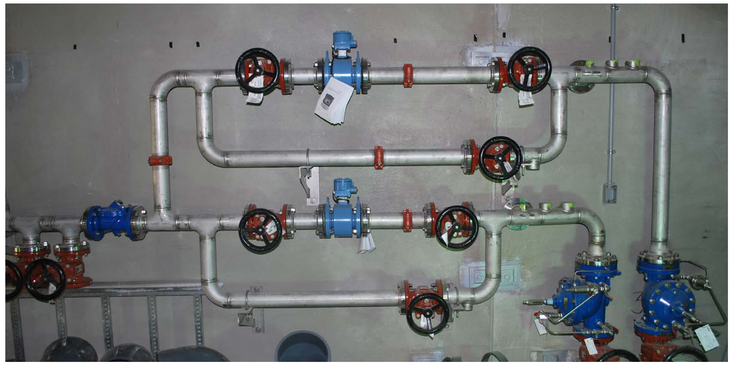
New reservoir under construction

New plumbing and electrical conduit before floor slab is poured

New treatment plant building

Piping and valves for high lift pumps

Hypochlorite disinfection storage tanks and chemical pumps



Piping and valves for municipal wells

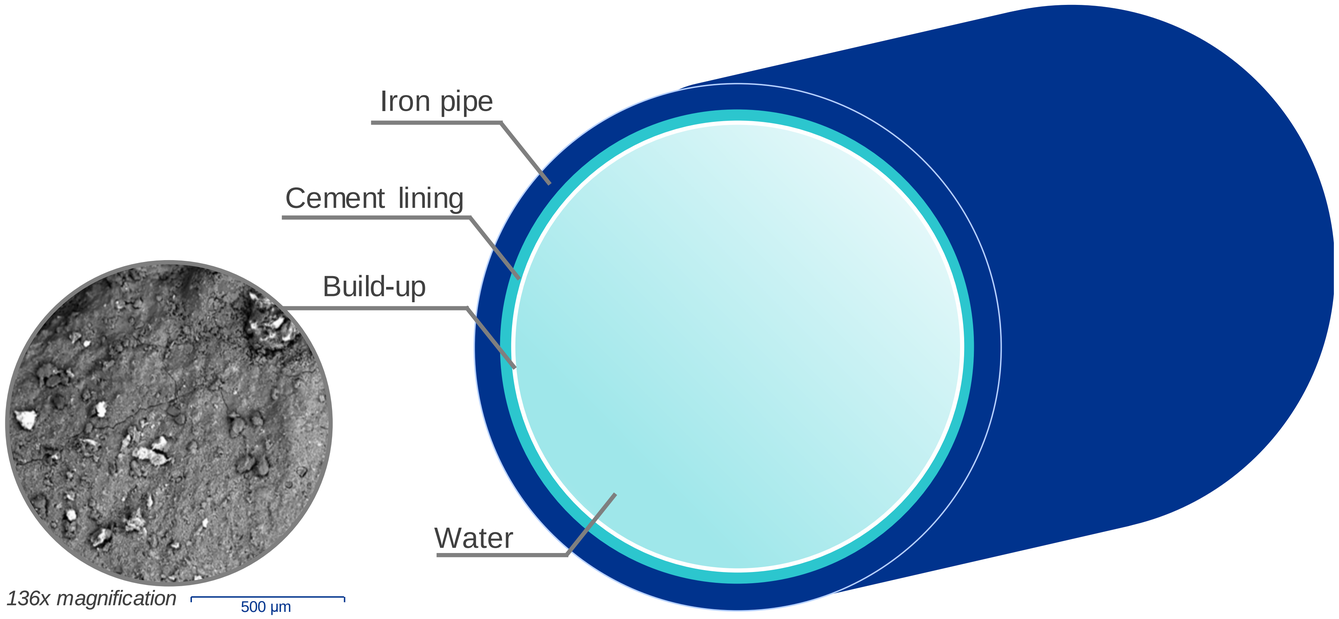
New odour control and C02 systems

Construction Images

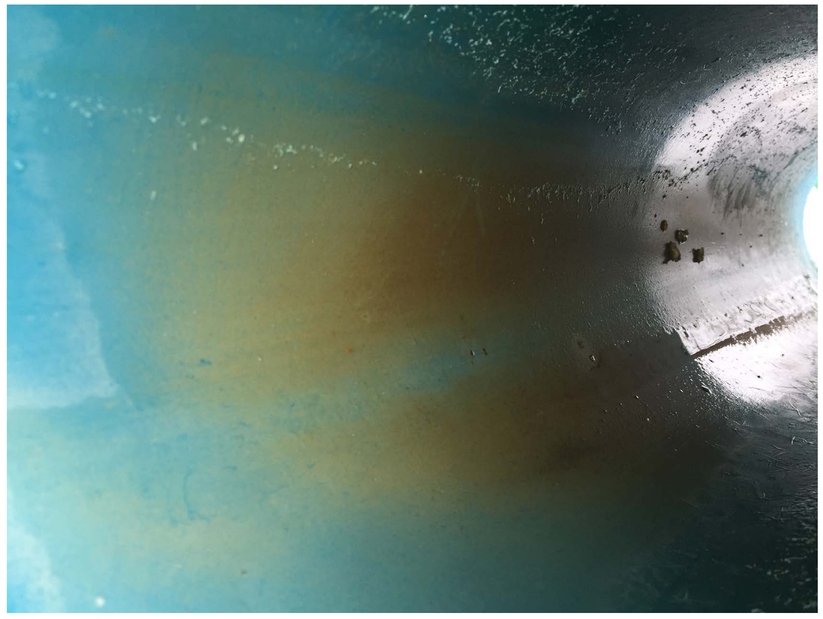
New backup diesel generator

New access road and municipal well FDL03

Primary and backup control units



Iron Pipe



Plastic Pipe

Build-up layer in a plastic pipe from Lynden. The yellowish colour is caused by iron and sulphur.

Lynden Water Distribution System Pipes

Inside Water Pipes

Over time, a layer of build-up forms naturally on the inside of water pipes. What is this build-up made of? It depends on the water chemistry.

Sometimes the build-up is hard like the scale in your kettle. Sometimes the build-up is soft, like the plaque on your teeth. Softer build-ups are easier to remove.

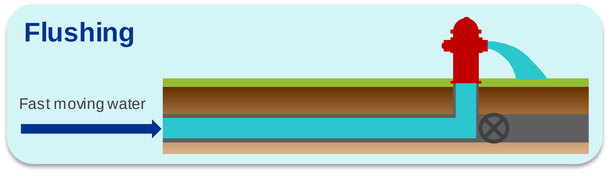
Watermains in Lynden are either plastic or cement-lined iron. The small pipes leading to your home are copper. Last year, we cut out some pipes from Lynden to find out what the build-up is made of.

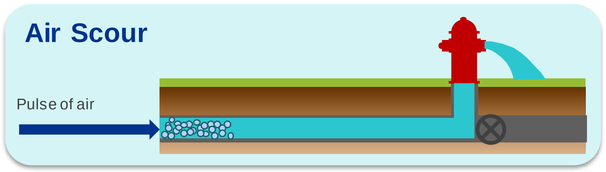
Lynden's build-up contains common minerals like calcium, iron, silicon, and aluminum. These can be naturally occurring in the water, or may come from the pipe material.

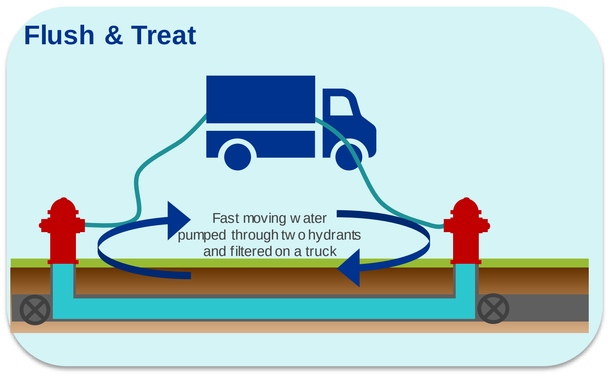
The layer also contains sulphur and barium, which are less common. These occur naturally in Lynden's groundwater.

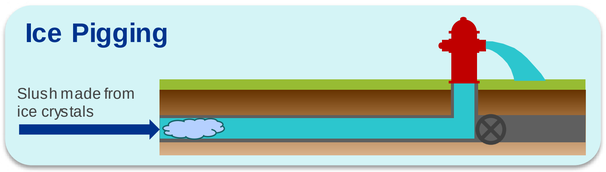
Very small amounts of other metals, including lead, were also trapped in the build-up.

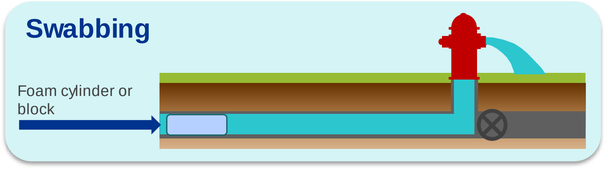
The build-up in Lynden is soft and can be disturbed easily—this is why lead has occasionally been detected in your tap water.











Pipe Cleaning Method	New Infrastructure	Can be Done by City Staff	Cleaning Performance	Capital Cost
Flushing	Simple install	Yes	Good	Lowest cost
Flush & Treat	Simple install	No	Good	Unknown*
Air Scour	Simple install	No	Good	Unknown*
Ice Pigging	Simple install	No	Very good	Unknown*
Swabbing	Complex install	Yes	Best	Highest cost

***Not commercially available in Ontario**

Pipe Cleaning Methods

How Can Pipes Be Cleaned?

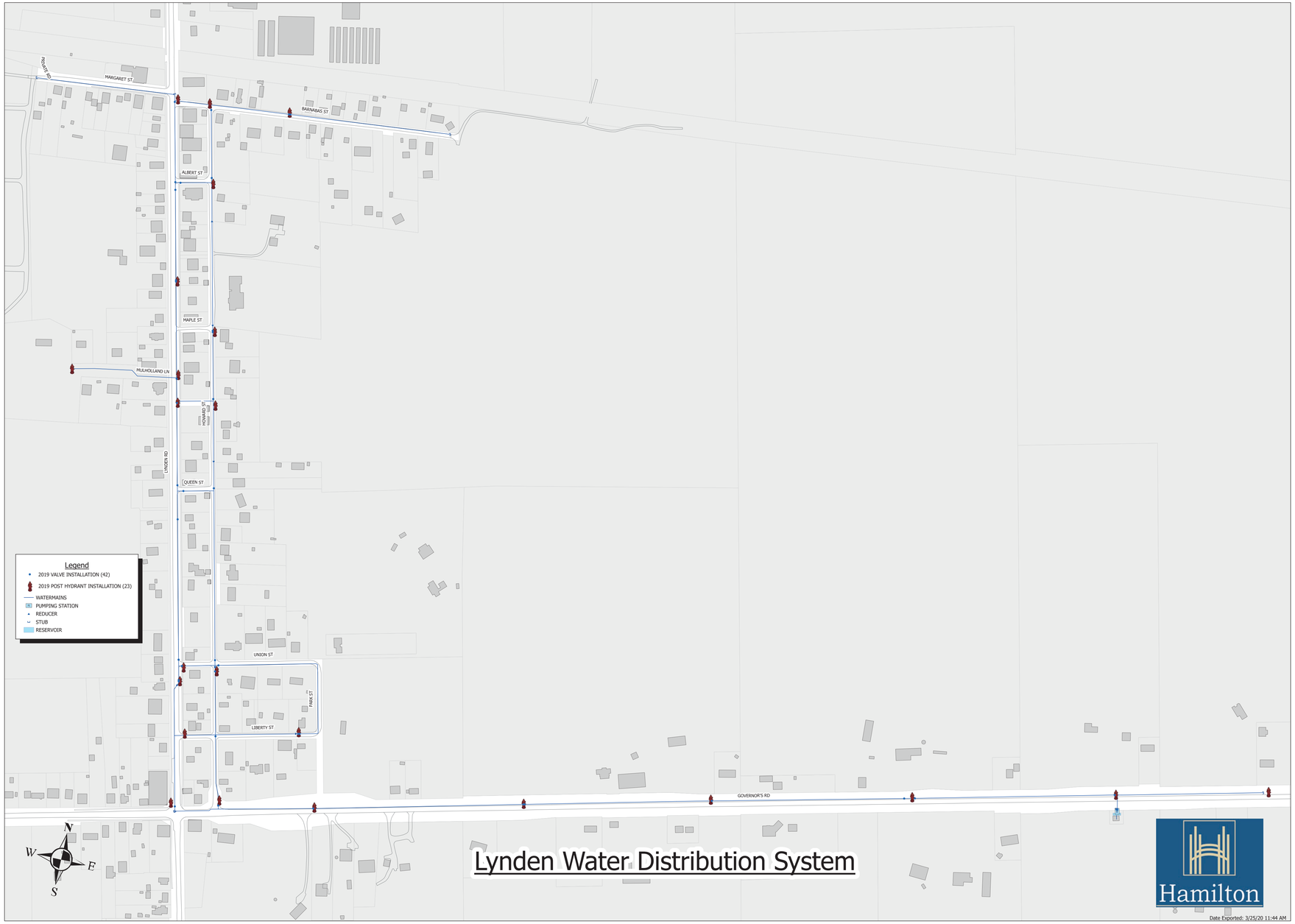
It's important to clean the pipes regularly to keep the build-up from getting too thick. This also helps keep the water clean. There are different ways to clean out the soft build-up from Lynden's pipes.

Choosing a pipe cleaning method for Lynden

Up until now, the pipes in Lynden had not been cleaned because there were no hydrants in the town and the treatment plant could not supply enough water.

We carefully considered different pipe cleaning options and chose flushing as the most practical option for Lynden. Ice pigging may be tried in the future but it is not yet commercially available in Ontario.

New Post Hydrants & Isolation Valves



A recent flushing post hydrant installation

The flushing post hydrants and valves that were installed in Lynden in 2019 were placed close enough together to provide good flushing while also keeping the number of new hydrants and valves to a minimum.

Tanker truck connected to a flushing hydrant with a hose

Flushwater flowing out of a diffuser connected to the flushing hydrant with a hose

Flushing hydrant with sampling port and hose

A flushwater sample being collected from a flushing hydrant

We tested the flushwater and found that it contained lead, showing that flushing removed lead from the pipes

Start of flush

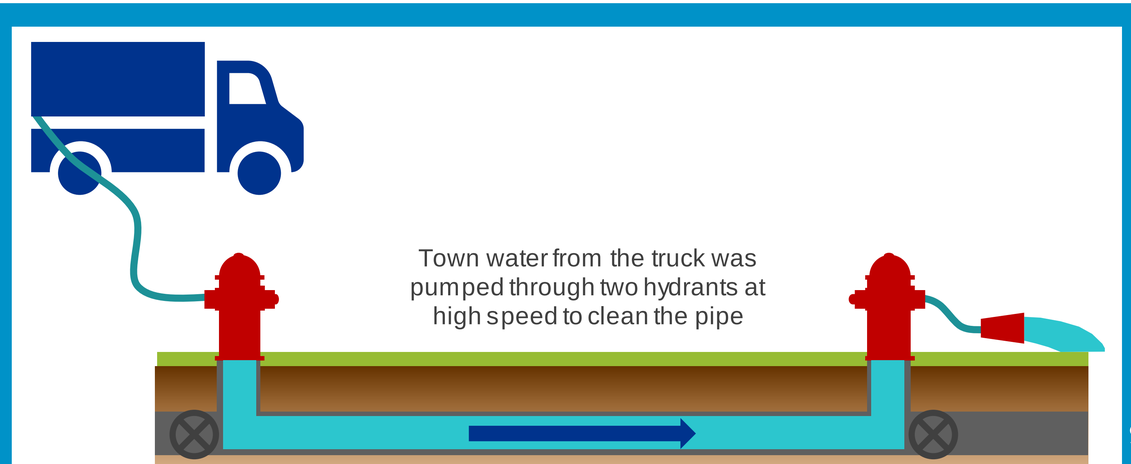
Water gets cleaner as flush continues

End of flush

Flushing in Lynden

Flushing Program

Did flushing remove the build-up? Yes. We took samples of flushwater to find out what was being removed from the pipe. Flushing was continued until the water ran clear and had a safe level of chlorine.



We flushed most of the system in 2019, but we'll need to flush again to get more of the build-up out of the pipes.

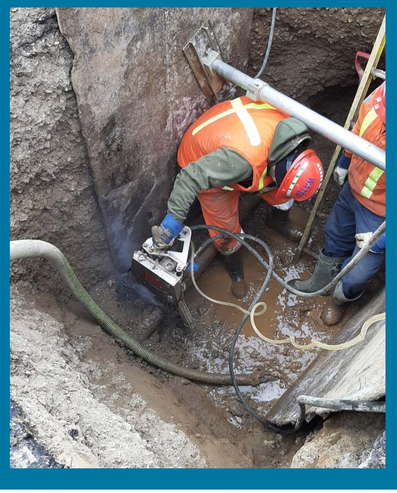
The new well will have different water chemistry compared to now. This change can cause the build-up to soften and flake off. The entire system will be flushed again when the new well and treatment plant are started up.

After that, the system will be flushed each year to keep the build-up from getting too thick. Flushing will be easier than before because the new reservoir will be able to supply more water compared to now.

Ice pigging may be tried if it becomes available in Ontario.

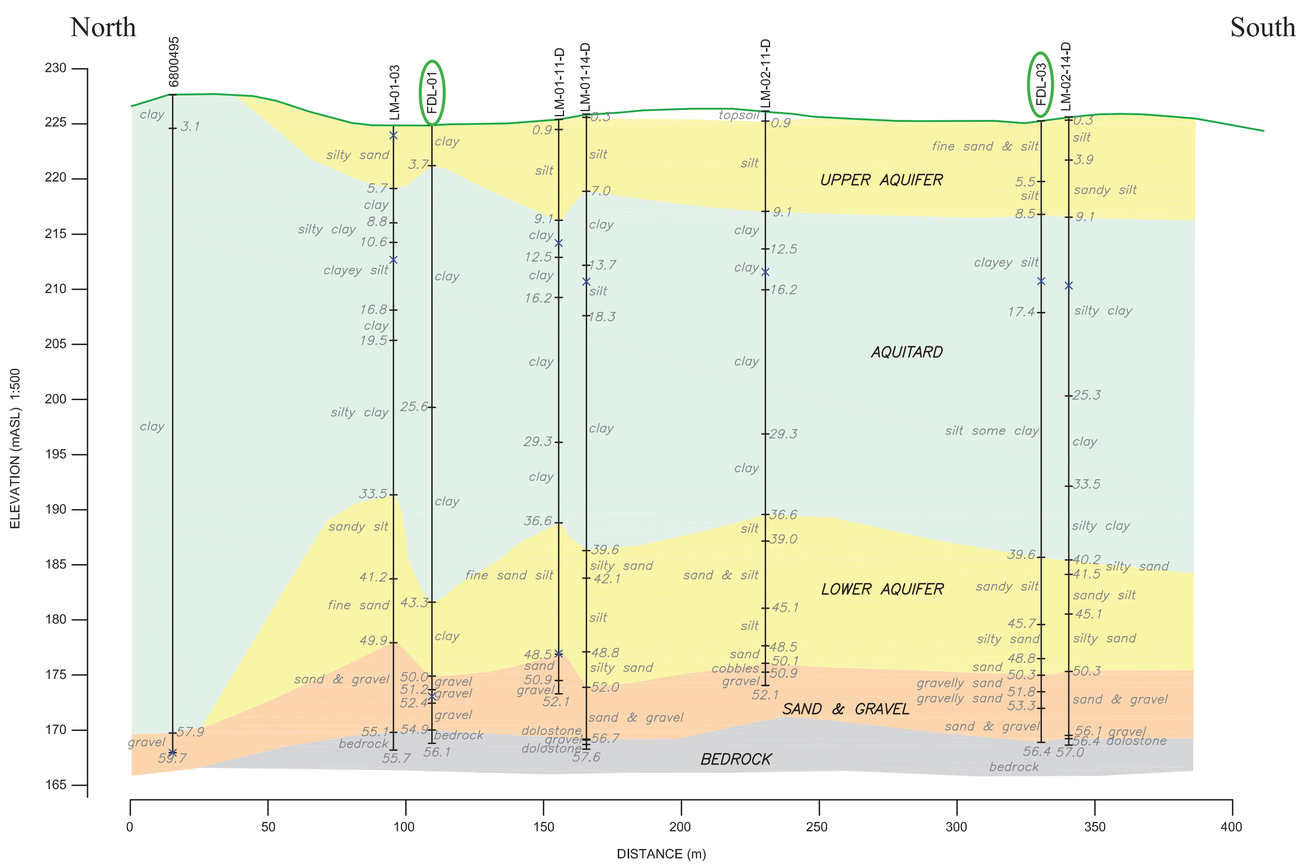
Flushing in Lynden

Is all of the build-up gone?



No. We cut out pipes after flushing to find out if the build-up layer was still there and if so, what was in it. The top layer of the build-up was removed but the bottom layer remained.

In the three pipes we cut out, lead was not detected within the build-up that remained after flushing.



Lynden Environmental Assessment
North-South Cross-Section

Hamilton

LEGEND

6413379

WELL DESIGNATION
GROUND SURFACE
STATIC WATER LEVEL
CHANGE IN STRATIGRAPHY
END OF BORING (mBGL)
26.8

SAND AQUIFER
AQUITARD
SAND & GRAVEL AQUIFER
BEDROCK AQUIFER

Lynden Municpial Wells - Source of Water

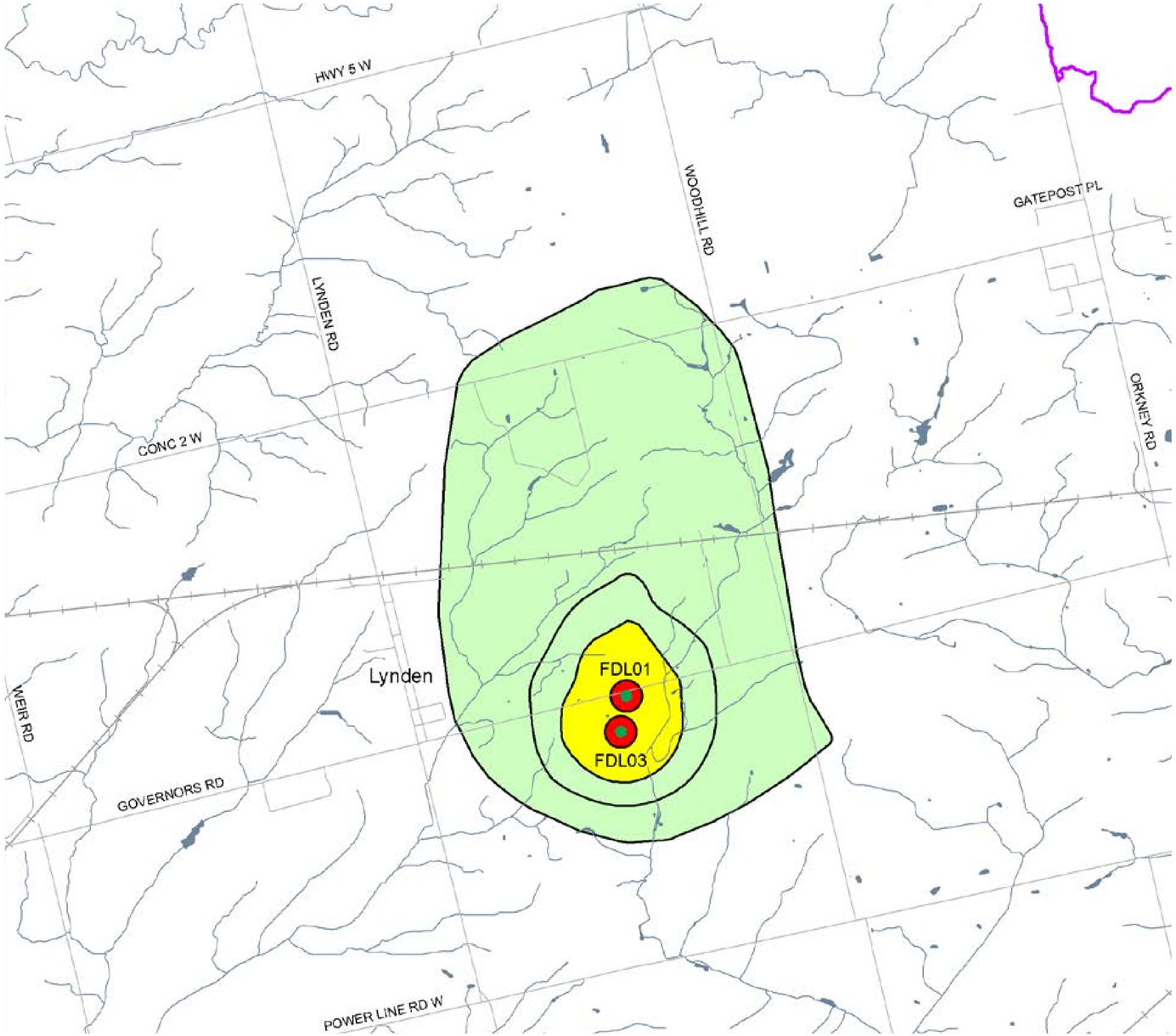
Groundwater

The water source for the community of Lynden is groundwater from two wells located 1.5km east of the Lynden community on Governors Rd.
The aquifer that supplies the two municipal wells is protected by more than 20 metres of clay deposits.

The process to locate a second well involved the following tasks:

- Private Water Well Survey and Implementation of Monitoring Program
- Drilling, soil sampling and well construction
- Step drawdown test
- 72-hour Constant Rate Aquifer Test
- Regulation 170/03 Chemical Analysis
- Groundwater under Direct Influence of Surface Water evaluation

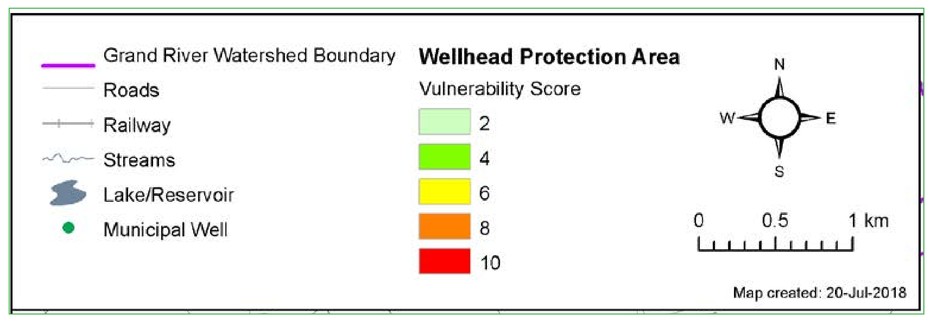
Lynden Municipal Wells - Water Taking



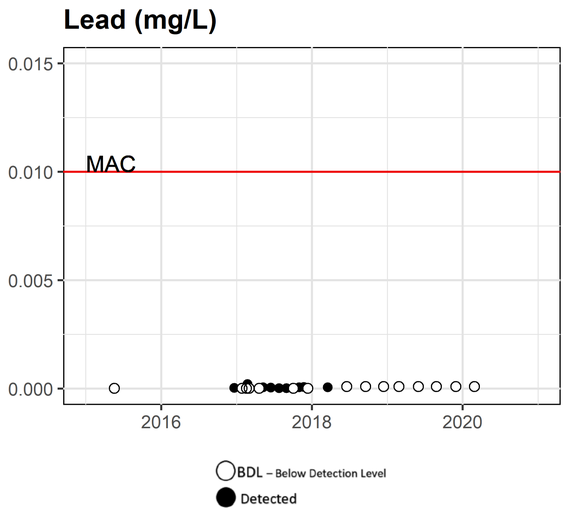
	Existing Well - FDL01	New Well - FDL03	Combined
Depth	55m below ground	55m below ground	Depth
Permit to Take Water	3.8L/s (327 m3/day)	6L/s (518 m3/day)	6L/s (518 m3/day)
Future Maximum Day Demand	4.8L/s (415 m3/day)		

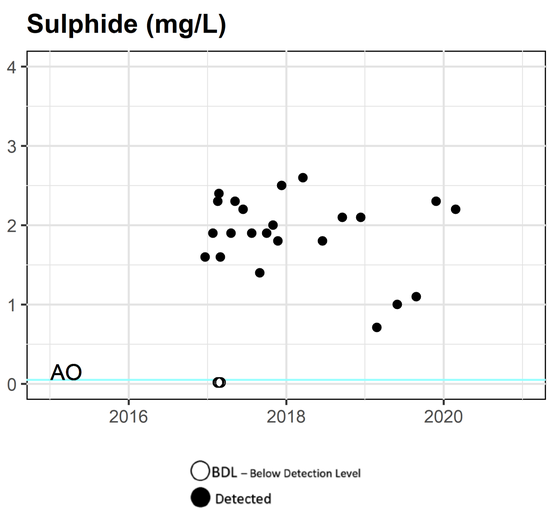
Well Head Protection Area:

- The area around the municipal wells where land use activities have the potential to affect the quality of water that flows into the well.
- Protecting this area around a well, helps protect a healthy supply of water now and in the future.
- Significant drinking water threats are primarily associated with agricultural activities, the use of septic systems and handling, and storage of fuel associated with residential dwellings.

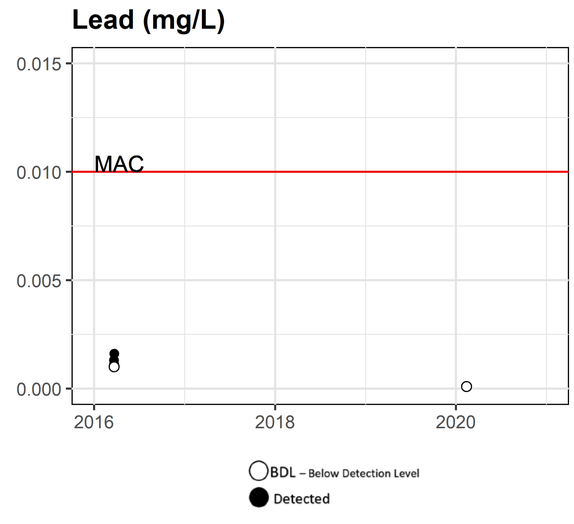


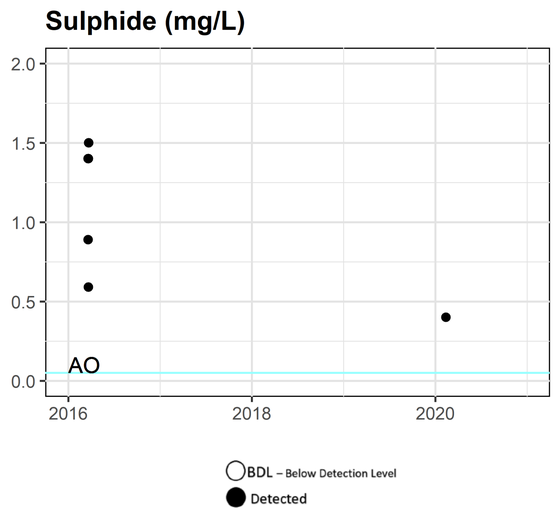
Existing Well FDL01 - Raw Water Quality





New Well FDL03 - Raw Water Quality





Lynden Municpial Wells - Groundwater Quality

Raw Groundwater

The raw groundwater has very low concentrations of naturally occurring lead, well below the maximum allowable concentration (MAC) and most of the time it's undetectable.

Raw water quality results:

- Elevated hydrogen sulfide - typical for the area, exceed the aesthetic objective of 0.05 mg/L.
- Low hardness - soft water. The hardness levels is below the Operational Guideline range of 80 to 100 mg/L as CaCO3.
- Low levels of barium in FDL03, higher in FDL01 (below MECP objectives)
- Low levels of lead (well below MECP objectives, ranged from below the detection limit of 0.001 mg/L up to 0.0016 mg/L.)
- Sodium levels require notification of Ministry of Health for sodium restricted diets (typical for the area)
- pH levels high (typical for the area)

2019 City of Hamilton Lynden Drinking Water System Annual Summary and Water Quality Report
Ontario Regulation 170/03 Section 11 & Schedule 22

Hamilton

WATER QUALITY DATA

Microbiological testing done under Schedule 10, 11, 12 and 17, 18 of Regulation 170/03, during this reporting period.

SAMPLE TYPE	NUMBER OF SAMPLES	RANGE OF E.COLI RESULTS (MIN #) to (MAX #) CFU/100mL	RANGE OF TOTAL COLIFORM RESULTS (MIN #) to (MAX #) CFU/100mL	NUMBER OF HPC SAMPLES	RANGE OF HPC RESULTS (MIN #) to (MAX #) CFU/1mL
RAW	52	0	0	N/A	N/A
TREATED	53	0	0	52	0 to 12
DISTRIBUTION	155	0	0 to 9	153	0 to 17

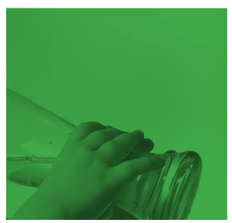
Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

NOTE: If results are obtained from continuous monitors, then 8,760 is reported as the number of samples.

PARAMETER - SAMPLE TYPE	NUMBER OF GRAB SAMPLES	RANGE OF RESULTS (MIN #) to (MAX #)	UNIT OF MEASURE
TURBIDITY - TREATED	52	0.07 – 0.30	NTU
FREE CHLORINE - TREATED	8,760	0.42 – 2.68	mg/L
FREE CHLORINE - DISTRIBUTION	365	0.40 – 2.18	mg/L

Summary of additional testing and sampling carried out in accordance with the requirement of a licence, approval, order or other legal instrument.

PARAMETER	NO. OF SAMPLES	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE
LEAD - TREATED	24	2019-01-09 to 2019-12-18	<0.0001 to 0.0045	mg/L
LEAD - DISTRIBUTION	72	2019-01-09 to 2019-12-18	<0.0001 to 0.0003	mg/L



Summary of Inorganic parameters required by Regulation 170/03 and tested during this reporting period.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
LYNDEN WELL TREATED				
ANTIMONY	2019-05-01 to 2019-10-31	<0.0001 to 0.0001	mg/L	0
ARSENIC	2019-05-01 to 2019-10-31	0.0001 to 0.0004	mg/L	0
BARIUM	2019-05-01 to 2019-10-31	0.605 to 0.805	mg/L	0
BORON	2019-05-01 to 2019-10-31	0.454 to 0.462	mg/L	0
CADMIUM	2019-05-01 to 2019-10-31	<0.0001 to 0.0001	mg/L	0
CHROMIUM	2019-05-01 to 2019-10-31	0.0004 to 0.0040	mg/L	0
FLUORIDE	2019-05-01 to 2019-10-31	0.64 to 0.66	mg/L	0
MERCURY	2019-05-01 to 2019-10-31	<0.05	mg/L	0
NITRATE AS N	2019-01-24 to 2019-10-31	0.02	mg/L	0
NITRITE AS N	2019-01-24 to 2019-10-31	<0.01	mg/L	0
SELENIUM	2019-05-01 to 2019-10-31	<0.0001	mg/L	0
SODIUM	2019-05-01 to 2019-10-31	58.1 to 60.9	mg/L	0
URANIUM	2019-05-01 to 2019-10-31	<0.002 to 0.006	ug/L	0

Summary of lead testing under Schedule 15.1 during this reporting period.

LOCATION TYPE	NO. OF POINTS SAMPLED	NO. OF LEAD SAMPLES TAKEN	NO. OF pH AND ALKALINITY SAMPLES TAKEN	RANGE OF pH RESULTS (min #) to (max #) pH Units	RANGE OF ALKALINITY RESULTS (min #) to (max #) mg/L	RANGE OF LEAD RESULTS (min #) to (max #) mg/L	NO. OF LEAD AWQIs	NO. OF LEAD EXCEEDANCES
PLUMBING-NR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PLUMBING-R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DISTRIBUTION	2	1	2	8.66 to 8.69	94	0.0008	0	N/A

NR - Non Residential R- Residential

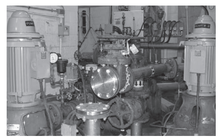
Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
LYNDEN WELL TREATED				
1,1-DICHLOROETHYLENE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
1,2-DICHLOROBENZENE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
1,2-DICHLOROETHANE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
1,4-DICHLOROBENZENE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
BENZENE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
CARBON TETRACHLORIDE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
CHLOROBENZENE	2019-05-01 to 2019-10-31	<0.3	ug/L	0
DICHLOROMETHANE	2019-05-01 to 2019-10-31	<0.5	ug/L	0
ETHYLBENZENE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
TETRACHLOROETHYLENE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
TOLUENE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
TRICHLOROETHYLENE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
VINYL CHLORIDE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
XYLENE	2019-05-01 to 2019-10-31	<0.3	ug/L	0
2,3,4,6-TETRACHLOROPHENOL	2019-05-01	<0.2	ug/L	0
2,4,6-TRICHLOROPHENOL	2019-05-01	<0.25	ug/L	0
2,4-D	2019-05-01	<0.19	ug/L	0
2,4-DICHLOROPHENOL	2019-05-01	<0.15	ug/L	0
ALACHLOR	2019-05-01	<0.02	ug/L	0
ATRAZINE + DESETHYL-ATRAZINE	2019-05-01	<0.01	ug/L	0
AZINPHOS-METHYL	2019-05-01	<0.05	ug/L	0
BENZO[A]PYRENE	2019-05-01	<0.004	ug/L	0
BROMOXYNIL	2019-05-01	<0.33	ug/L	0
CARBARYL	2019-05-01	<0.05	ug/L	0
CARBOFURAN	2019-05-01	<0.01	ug/L	0
CHLORPYRIFOS (DURSBAN)	2019-05-01	<0.02	ug/L	0
DIAZINON	2019-05-01	<0.02	ug/L	0
DICAMBA	2019-05-01	<0.20	ug/L	0
DICLOFOP-METHYL	2018-2019-05-01-16	<0.40	ug/L	0

Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period. (continued)...

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
DIMETHOATE	2019-05-01	<0.06	ug/L	0
DIQUAT	2019-05-01	<1	ug/L	0
DIURON	2019-05-01	<0.03	ug/L	0
GLYPHOSATE	2019-05-01	<1	ug/L	0
MALATHION	2019-05-01	<0.02	ug/L	0
MCPA (2-METHYL-4-CHLOROPHENOXYACETIC ACID)	2019-05-01	<0.00012	mg/L	0
METOLACHLOR	2019-05-01	<0.01	ug/L	0
METRIBUZIN (SENCOR)	2019-05-01	<0.02	ug/L	0
PARAQUAT	2019-05-01	<1	ug/L	0
PCBSTOTAL	2019-05-01	<0.05	ug/L	0
PENTACHLOROPHENOL	2019-05-01	<0.15	ug/L	0
PHORATE	2019-05-01	<0.01	ug/L	0
PICLORAM	2019-05-01	<1	ug/L	0
PROMETRYNE	2019-05-01	<0.03	ug/L	0
SIMAZINE	2019-05-01	<0.01	ug/L	0
TERBUFOS	2019-05-01	<0.01	ug/L	0
TRIALLATE	2019-05-01	<0.01	ug/L	0
TRIFLURALIN	2019-05-01	<0.02	ug/L	0
DISTRIBUTION				
TOTAL TRIHALOMETHANES*	Running annual average for the last four quarters.	56.8	ug/L	0
HALOACETIC ACIDS	2019-01-24 to 2019-10-31	<5.3 to 9.2	ug/L	N/A

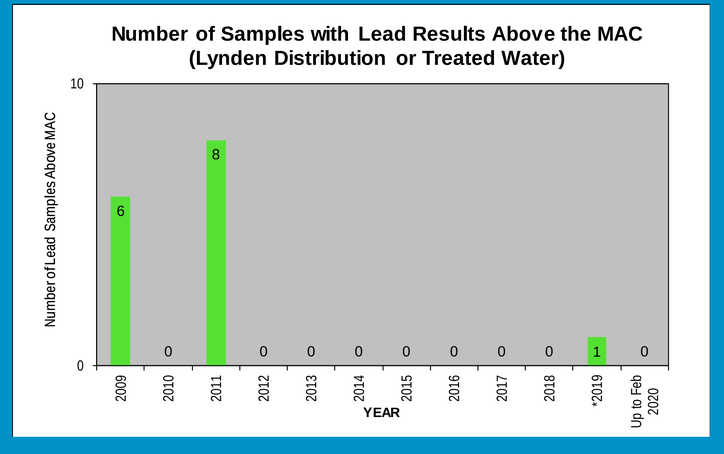
* The Maximum Acceptable Concentration for Trihalomethanes in the distribution is based on a running average of the results from all sampling events in the past four quarters. This running average can be found in the result value column.



Lynden Water Sampling & Analysis

Water Quality

Continuous chlorine residual analyzers and a turbidity analyzer are provided to monitor water quality at the well station. Raw, treated and distribution water is sampled and analyzed weekly. In addition, chlorine residual in the distribution system is analyzed daily.



*2019: Lead exceedance due to Flushing Program

MAC: Maximum Acceptable Concentration - 0.010 mg/L

Does the ongoing 2011 Drinking Water Advisory remain in place?

Yes, the advisory will remain in place. It states:
Consuming drinking water with slightly elevated lead concentrations for a short period of time is not a health risk. However, considering the prior history of intermittent increased lead levels in the Lynden Drinking Water System, the Medical Officer of Health recommends that a precautionary approach be taken. Accordingly, all users of the Lynden Drinking Water System are advised as follows:

DO NOT USE TAP WATER TO:

- Drink.
- Make meals such as soup, stew, pasta, instant hot cereal, etc.
- Make ice, juice, coffee, tea, puddings or other mixes, especially infant formula.

TAP WATER CAN BE USED TO:

- Wash fruits and vegetables, provided they are dried off prior to eating.
- Wash dishes, provided they are dried off with a clean towel prior to use.
- Shower and bathe.
- Wash hands, flush toilets, and laundry.
- Brush teeth, provided rinse water is not swallowed

The City of Hamilton provides water filters that meet NSF Standard #53 for lead removal at no cost to residents. These filters reduce lead concentrations in tap water to acceptable levels, provided the filter is used according to the manufacturer's instructions. Residents who wish to receive these filters are asked to contact the City of Hamilton at 905-546-2489.

Will the Drinking Water Advisory be lifted once construction of the new treatment plant is completed?

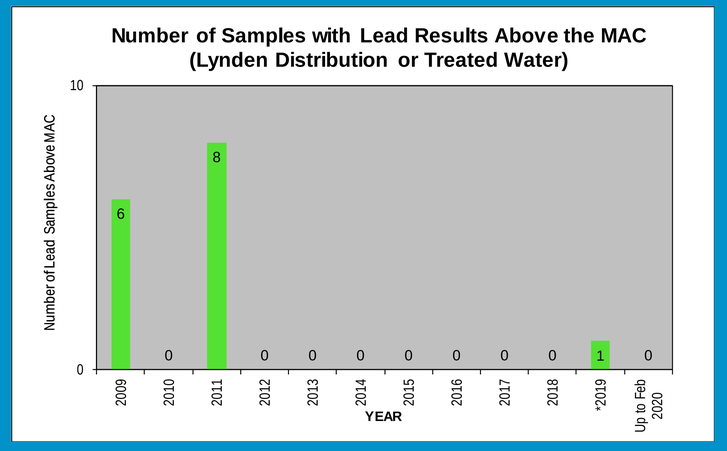
Public Health Services will consider removing the Drinking Water Advisory once satisfied that there are no further potential intermittent health risks to the users of the Lynden Drinking Water Supply. The Drinking Water Advisory will remain in place for a minimum 1 year after the new treatment plant is operational to allow Hamilton Water to operate the new treatment plant, conduct testing and complete distribution system flushing to ensure any residual lead sediment within the system is removed. After 1 year of operation of the new system with acceptable test results from the treatment plant and distribution system, Public Health Services will have the necessary data to consider removing the precautionary Drinking Water Advisory from Lynden.

Residents will be notified directly when the Advisory is lifted, until then the Advisory remains in place.

Lynden Water Drinking Water Advisory

Water Quality

The precautionary Drinking Water Advisory has been in place since 2011.



***2019: Lead exceedance due to Flushing Program**

MAC: Maximum Acceptable Concentration - 0.010 mg/L

Lynden Municipal Water System
Public Update

If you have questions about the information provided, please email ww_csr@hamilton.ca

Hamilton