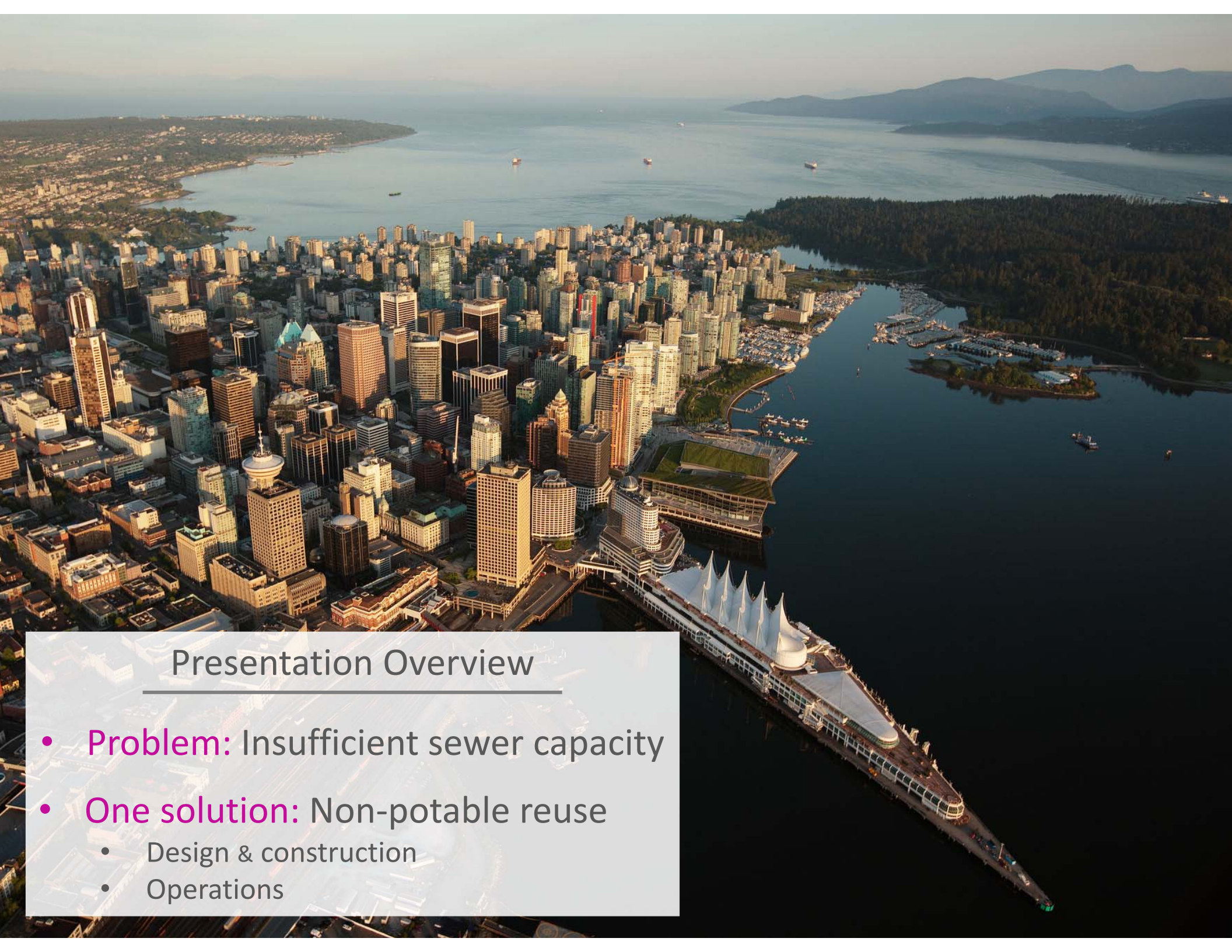


An aerial photograph of Vancouver, British Columbia, Canada, showing the city's dense urban core, the harbor, and the surrounding mountains. The city is built on a peninsula, with the harbor to the east and the mountains to the west. The harbor is filled with boats and ships, and the city is surrounded by lush greenery. The sky is clear and blue, and the water is a deep blue. The overall scene is a vibrant and scenic view of the city.

Non-Potable Water Systems: Unique Plumbing Code Considerations

Phillip White, City of Vancouver
Manager, Plumbing & Mechanical Inspections

Photo courtesy of Destination Vancouver

An aerial photograph of Vancouver, British Columbia, Canada, showing the city's dense urban core, the harbor, and the surrounding mountains. The city is built on a peninsula, with the harbor to the east and the mountains to the west. The harbor is filled with boats and ships, and the city is surrounded by lush greenery. The sky is clear and blue, and the water is a deep blue. The city is a mix of modern skyscrapers and older buildings, and the harbor is a busy area with many ships and boats. The mountains in the background are a mix of green and brown, and the sky is a clear blue.

Presentation Overview

- **Problem:** Insufficient sewer capacity
- **One solution:** Non-potable reuse
 - Design & construction
 - Operations



Source: Google Maps

THE MANSE THAT LEGGINGS BUILT.
LULULEMON ATHLETICA FOUNDER CHIP
WILSON'S WATERFRONT MEGA-HOME IN
KITSILANO COMES FIRST (AGAIN) AND
INCREASED IN VALUE BY 9.4%.

More Videos

00:20 / 02:59

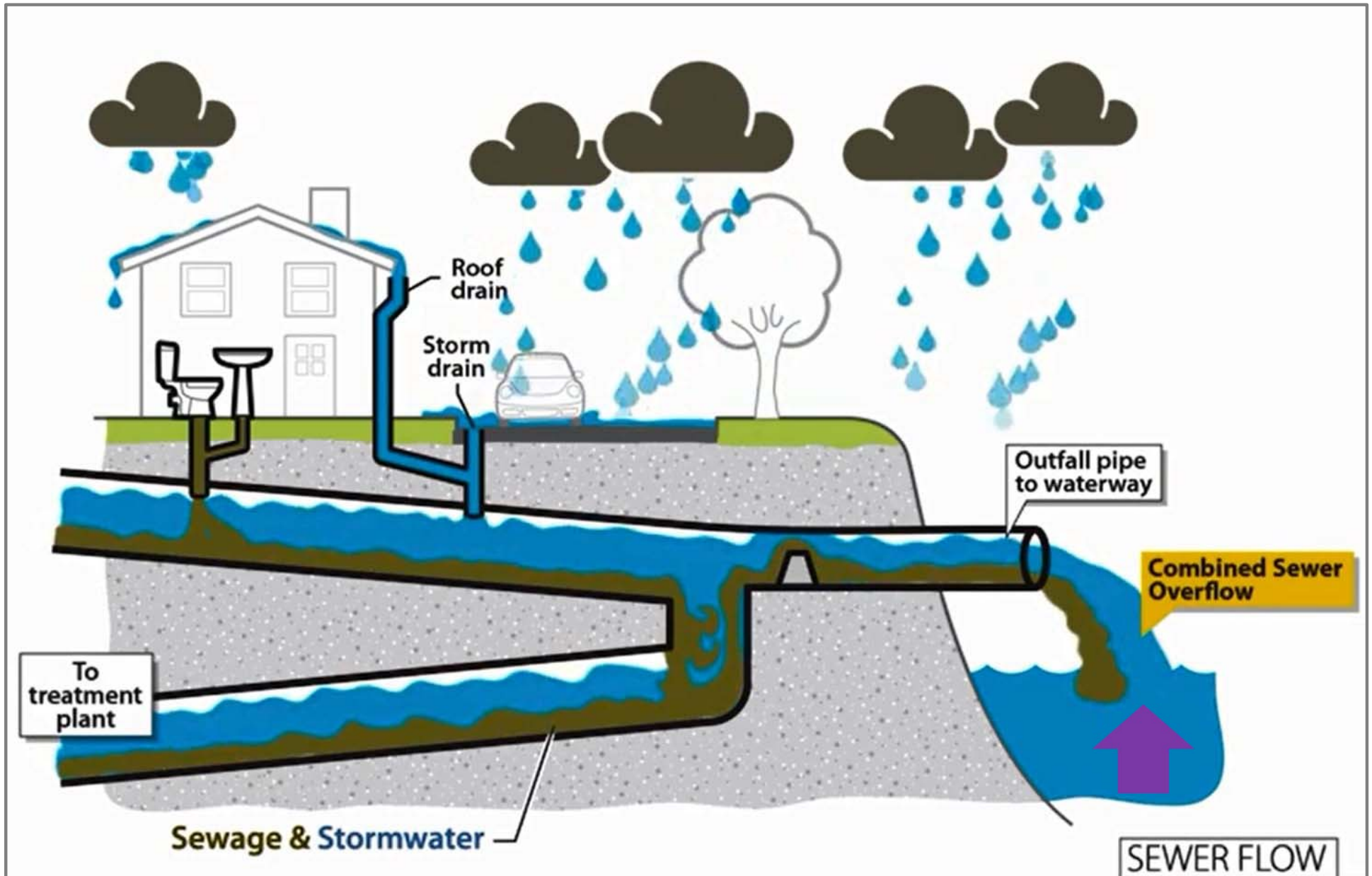
\$73.15 million (as of July 1, 2021 assessment)

Source: Vancouver Sun



Source: Metro Vancouver

10% of Vancouver's **sanitary sewage** is discharged as CSOs





Closed 50 years
(since 1972)

Area 28 - Sanitary contamination closures

! Important!

Eating contaminated shellfish can make you very sick. It can even be life threatening. Cooking shellfish does not destroy all biotoxins.

The shellfish you harvest and eat should always come from an open area. When an area is officially “closed,” it is both **illegal** and **unsafe** to harvest shellfish from that area. It is your responsibility to know where you are planning to harvest and to find out if the species you wish to harvest is open in that area.



Source: pac.dfo-mpo.gc.ca/fm-gp/contamination/sani/a-s-28-eng.html

9,000,000,000 gallons in CSOs for Metro Vancouver (2021)

Vancouver's Sunset Beach closed to swimmers due to E. coli levels

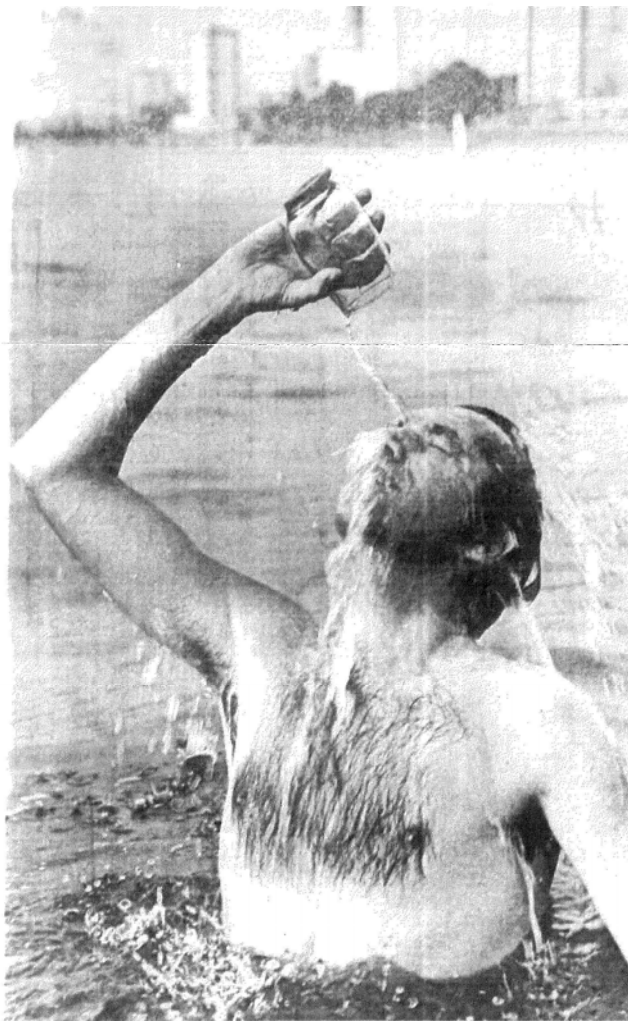
By The Canadian Press

Sun., Aug. 9, 2020 | 1 min. read



CLOCK TURNED BACK TO STALINISM


Mayor 'Proves' Beaches Safe With 15-Minute Dip at Kitsilano



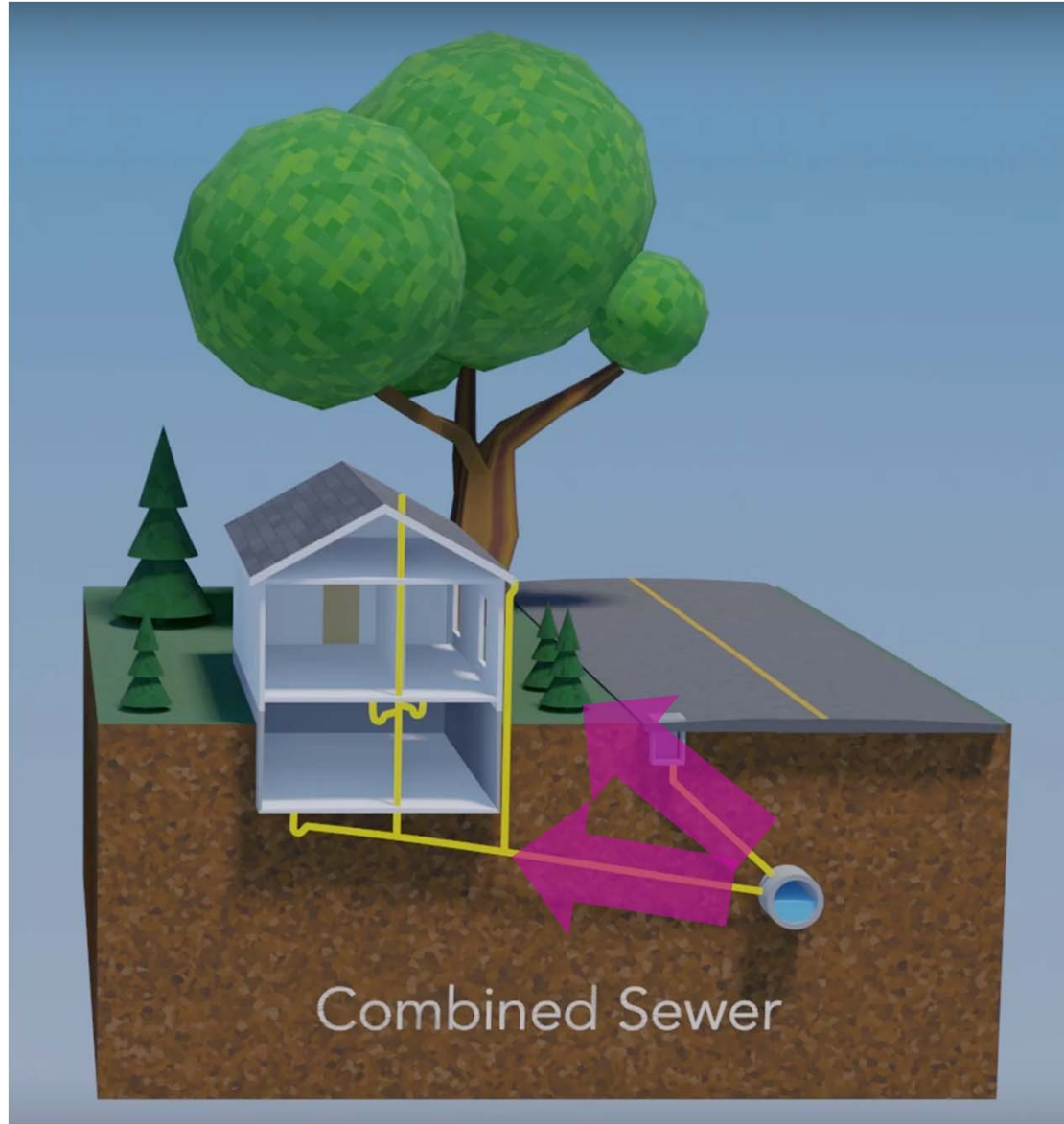
“frolic in the fecal surf”

Bob HUNTER

Pollution is too serious, too close to the ecological heart of things, to be treated as a hot-selling gimmick in the bargain basement of politics.



However since Mayor Tom Campbell has chosen to go swimming in Vancouver's toilet bowl, English Bay, to "prove" that the sewage be-

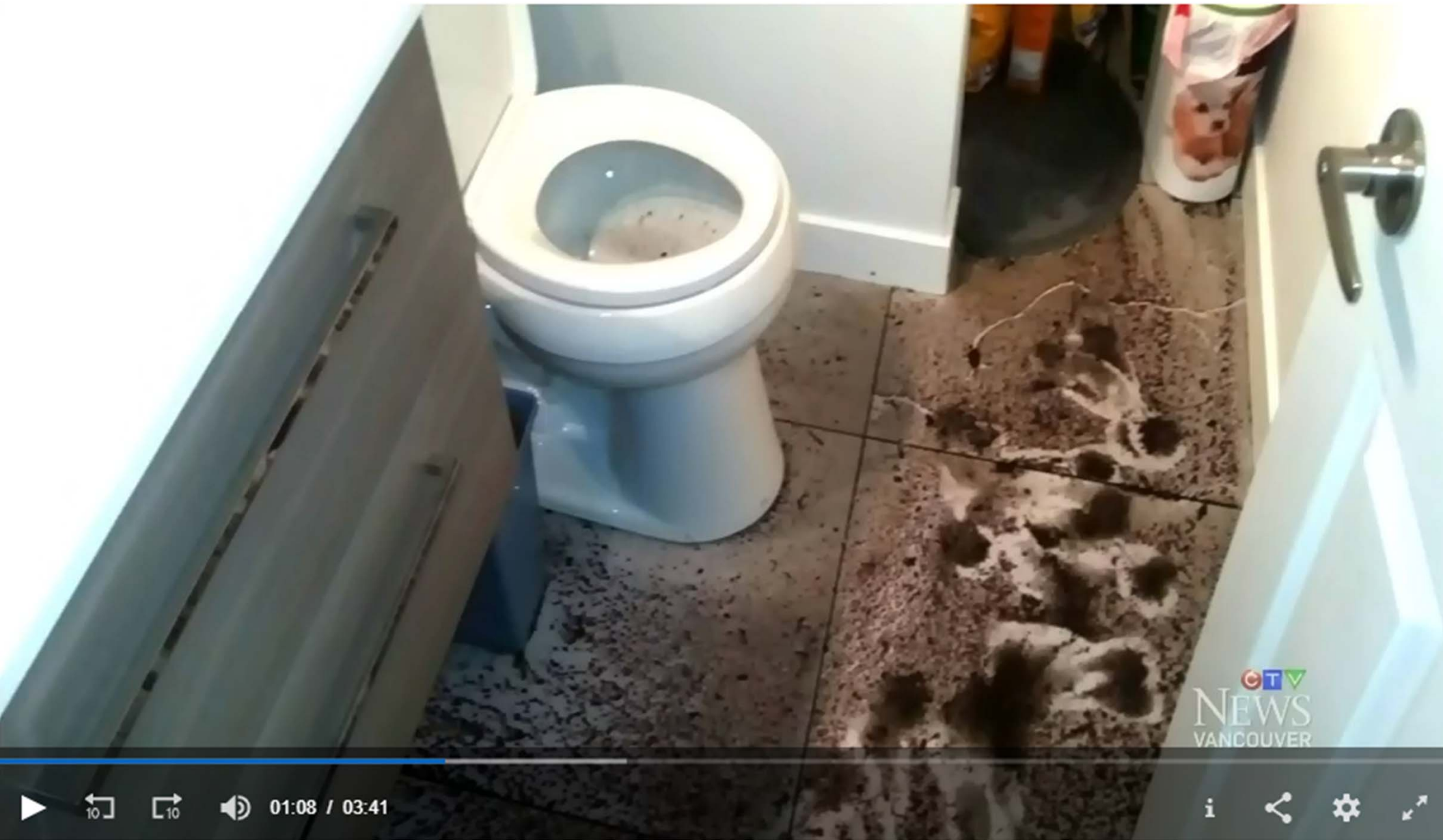


Combined Sewer Overflow (CSO)

Source: City of Hamilton, ON
[youtube.com/watch?v=iewH6iJMtS0](https://www.youtube.com/watch?v=iewH6iJMtS0)



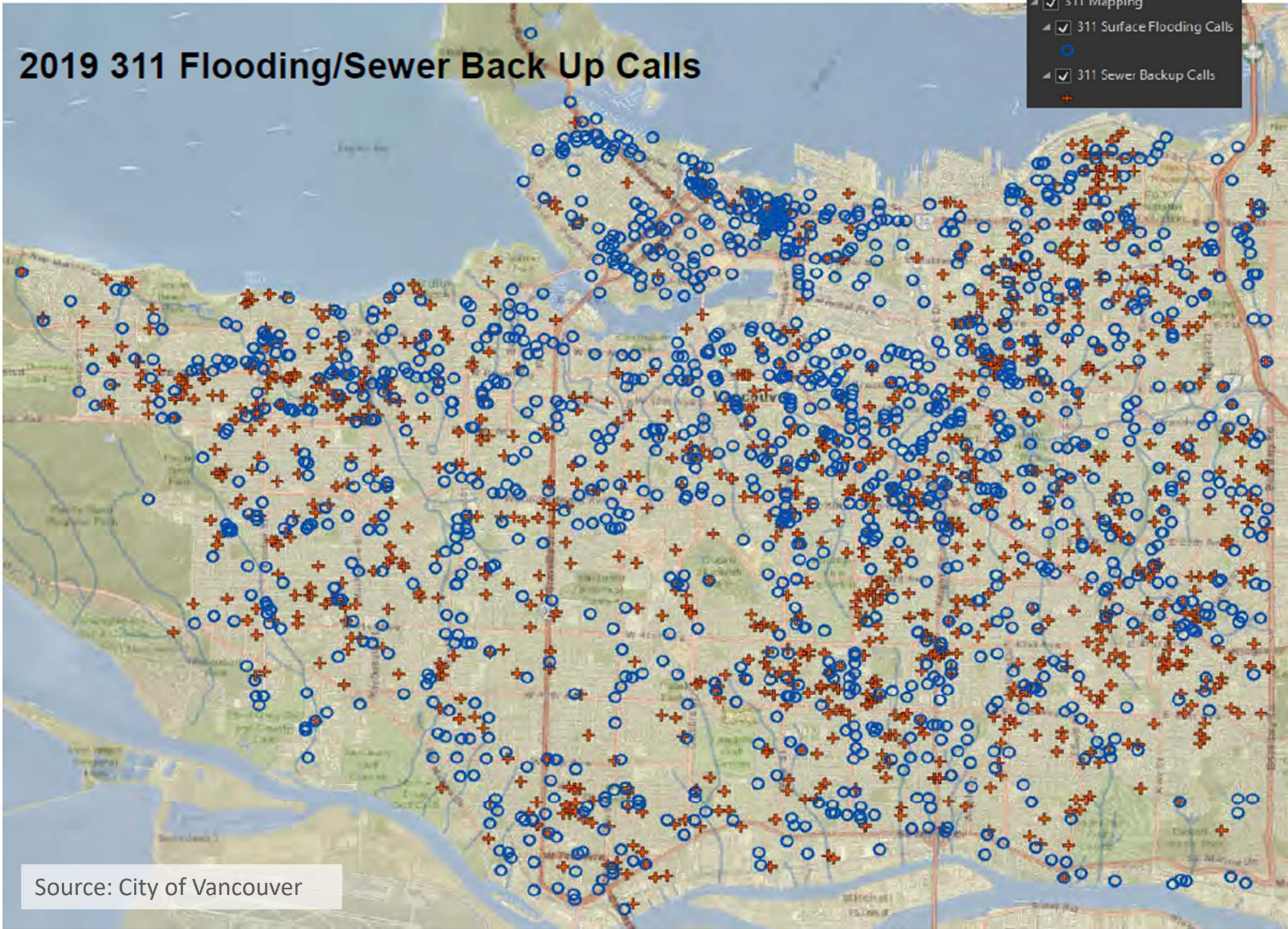
East King Edward Avenue & Glen Drive, Vancouver
Source: [youtube.com/watch?v=5LCloopx6ks](https://www.youtube.com/watch?v=5LCloopx6ks)



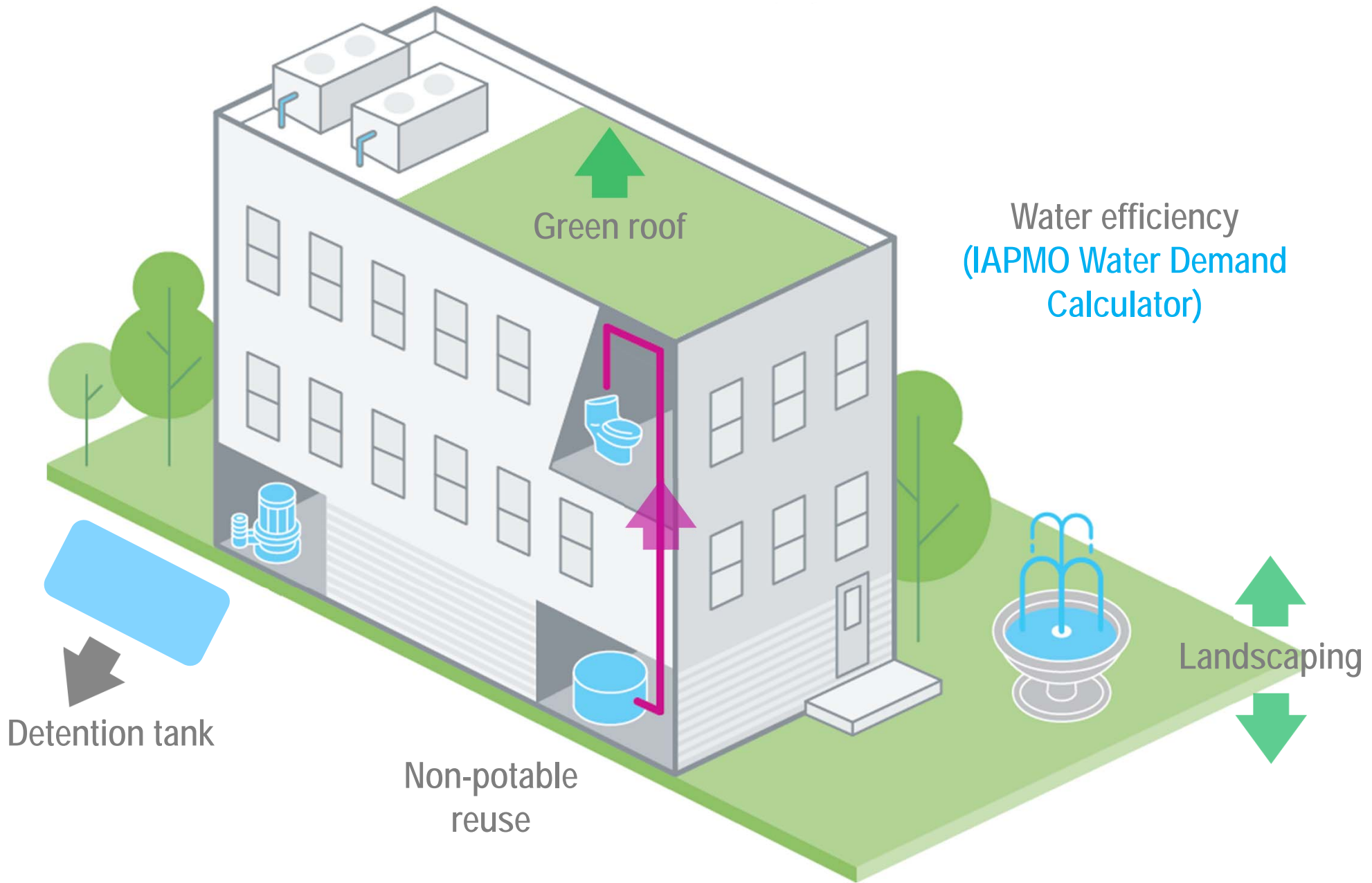
Cambie Corridor neighbourhood, Vancouver
Source: bc.ctvnews.ca/video?clipId=415780

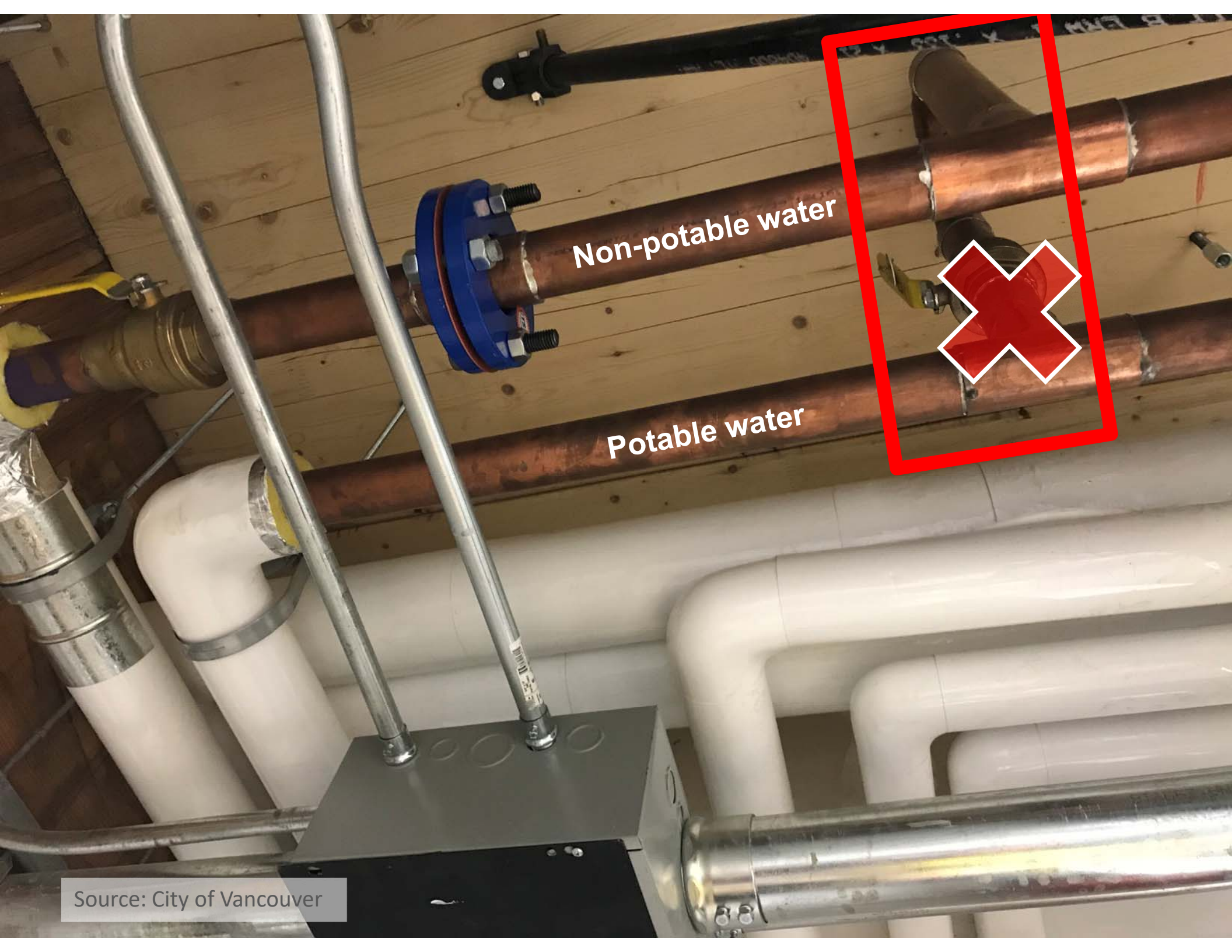
2019 311 Flooding/Sewer Back Up Calls

- 311 Mapping
- 311 Surface Flooding Calls
- 311 Sewer Backup Calls



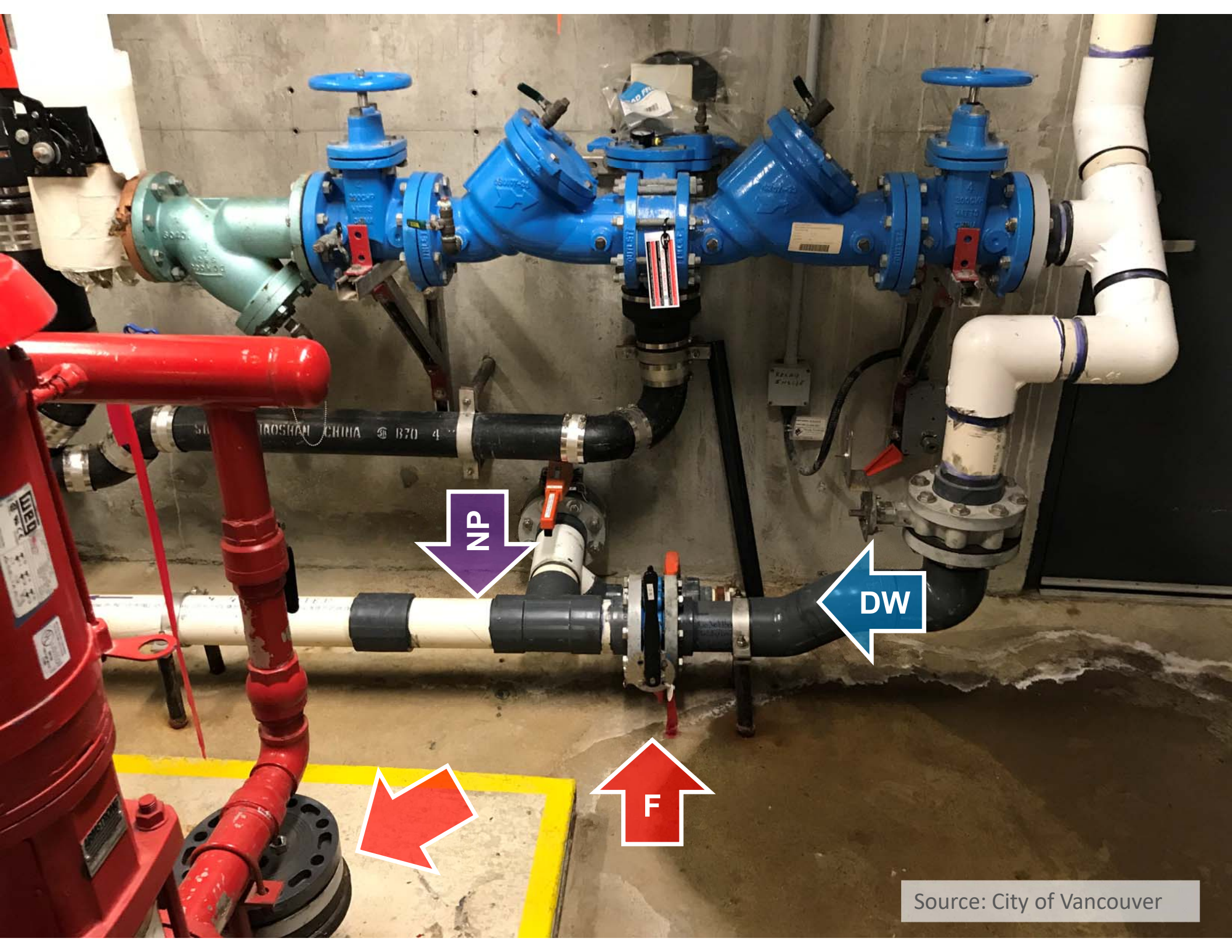
Source: City of Vancouver





Non-potable water

Potable water



NP

DW

F



Source: City of Vancouver



Source: City of Vancouver



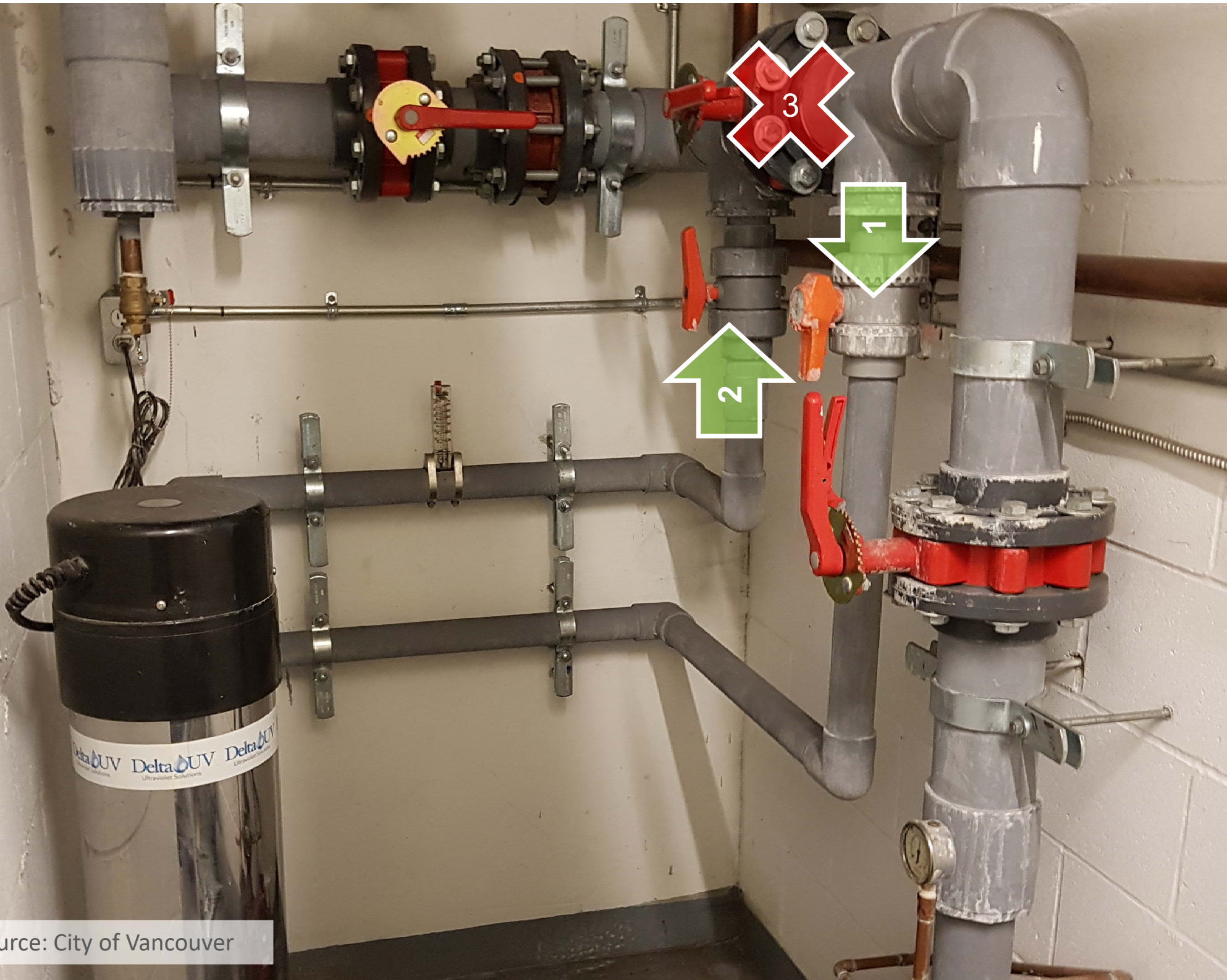
Sources: City of Vancouver, Google Maps



Source: City of Vancouver



Source: City of Vancouver



Source: City of Vancouver

Design & construction



Division B: Acceptable Solutions

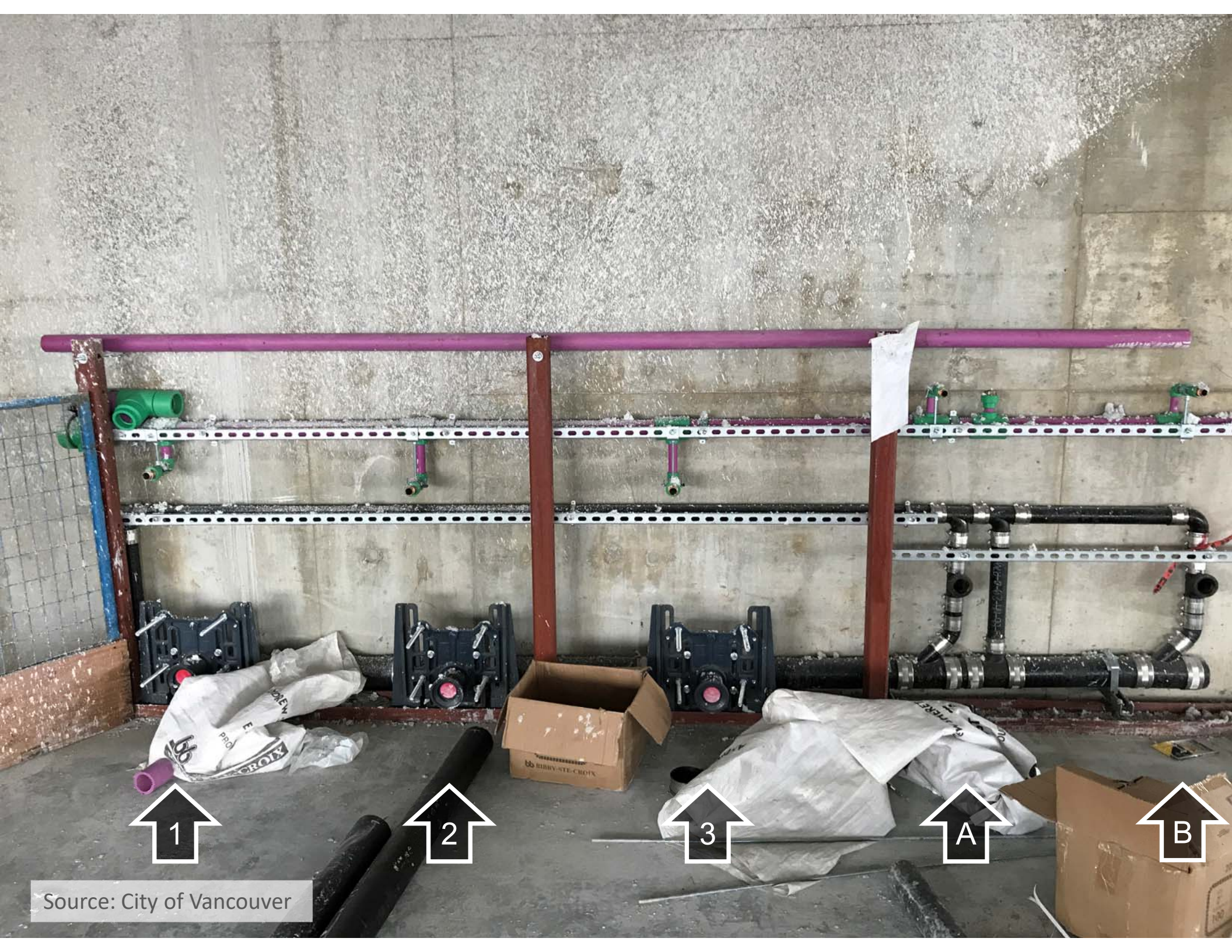
Section 2.7. Non-Potable Water Systems

Link via: vancouver.ca/operating-permit

- Design by a registered professional.
- Purple piping & residential sizing by the **IAPMO Water Demand Calculator**.
- **Mandatory applications:** toilets (tank-type), urinals and trap primers.
- **Sources:** greywater and blackwater not permitted.
- **Performance-based** regulations for treated water quality:
 - *Legionella pneumophila* < 10 CFU / mL
 - *Escherichia coli* < 100 CFU or MPN / 100 mL
 - Turbidity < 10 NTU
 - Temperature < 20°C (68°F)
 - (Proposed for 2023 with a storm water source: TSS < 20 mg/L and BTEX standards)
- **Commissioning:** 4 weeks of water quality tests, and a cross-connection test



Source: dailyhive.com/vancouver/deloitte-400-west-georgia-tower-westbank



1

2

3

A

B

Source: City of Vancouver



Source: City of Vancouver



OP-2021-00151: Issued (Rainwater Harvesting/...
410 W GEORGIA STREET, Vancouver, BC V6B...

Issue Date: Jun 8, 2021

Expiration Date: Jun 8, 2022

- Application
- Details
- Water Quality
- Application Documents
- Processes
- Subjobs
- Fees & Payments
- Inspections
- Terms
- Con...

Water Quality Information

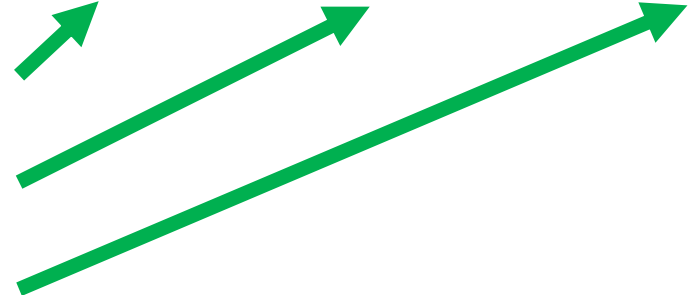
+ New

	System Status	Sample/Report Date	Meets VBBL	System Maintained	Corrective Action	Legionella Conc.	E.coli Conc.	Turbidity
	Inactive	Jan 21, 2022	N/A	No	No			
	Active	Jan 27, 2022	Yes	Yes	No		<1	3.62
	Active	Feb 3, 2022	Yes	Yes	No		<1	14.70
	Active	Feb 10, 2022	Yes	Yes	No		<1	6.10
	Active	Feb 17, 2022	Yes	Yes	No	<10	<2	4.57

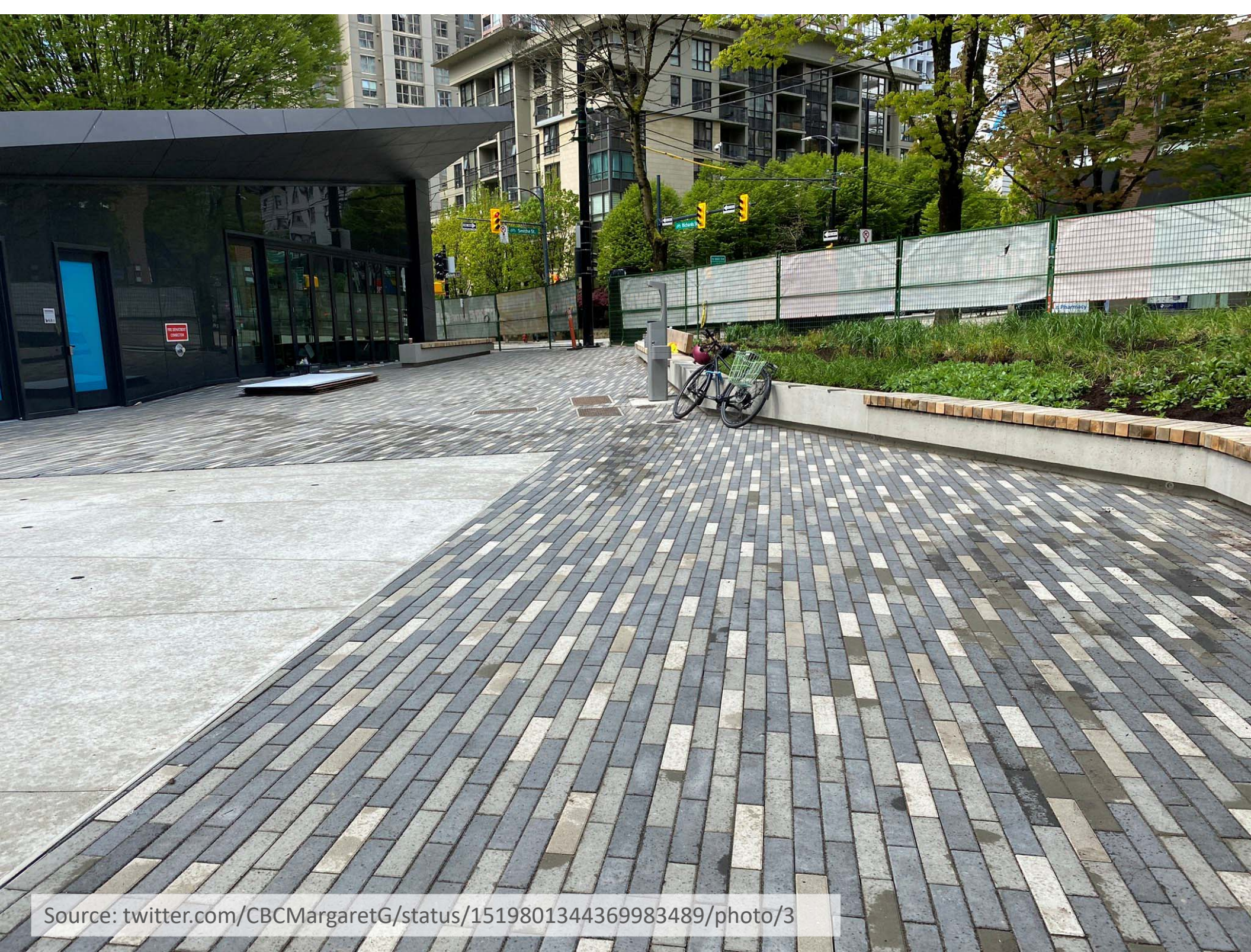
L. pneumophila < 10 CFU / mL

E. coli < 100 CFU / 100 mL

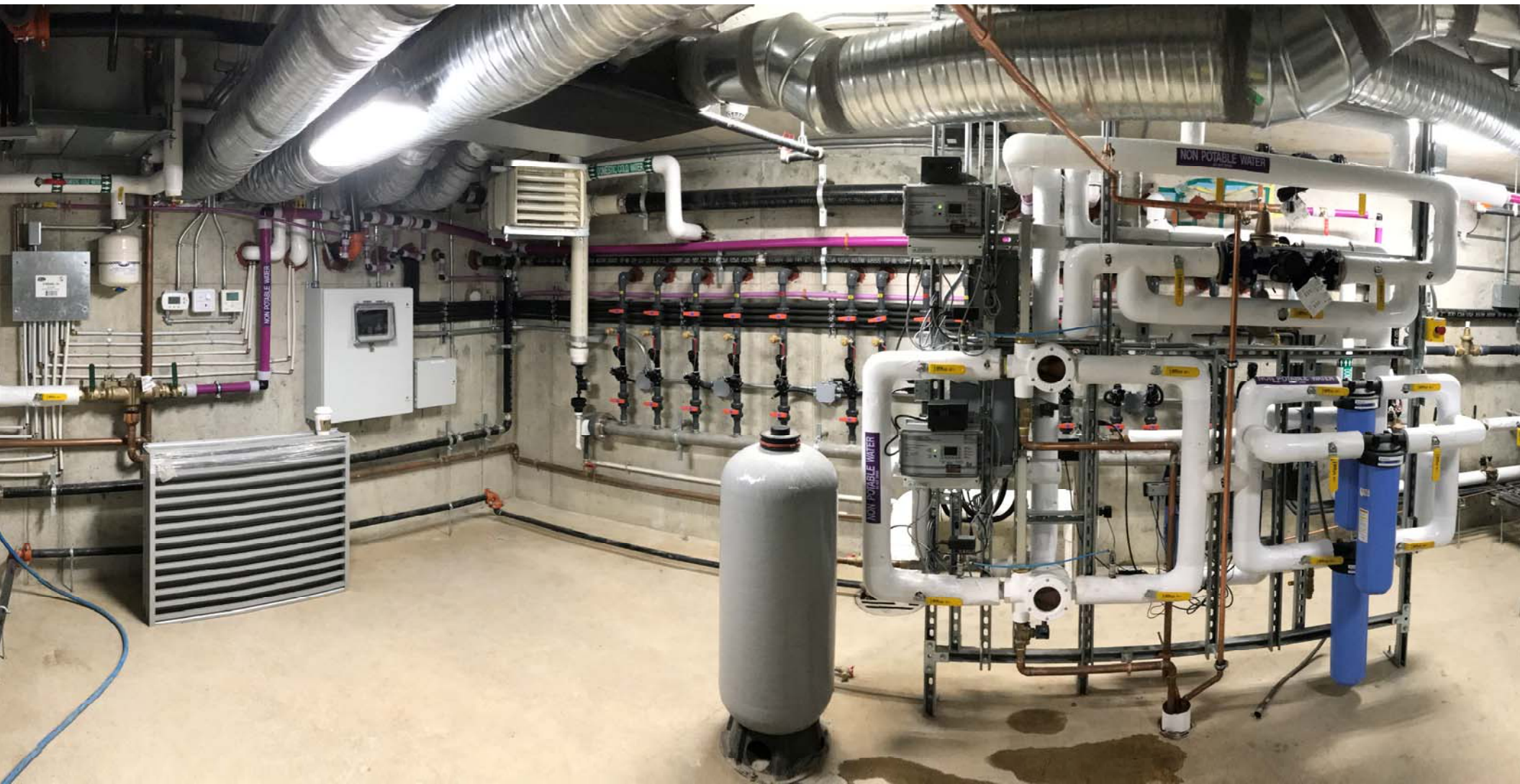
Turbidity < 10 NTU for 3 of 4 samples



Apr 14, 2022	Mechanical Operating System	Cross connection Test @ 10am	Cross connection test conducted with T. Carmichael. (DPI) Levels 2,4,7,9,18 tested and accepted
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Source: twitter.com/CBCMargaretG/status/1519801344369983489/photo/3



Source: City of Vancouver



OP-2021-00233: Issued (Rainwater Harvesting/Al...
860 RICHARDS STREET, Vancouver, BC V6B 3A7...

Issue Date: Oct 22, 2021

Expiration Date: Oct 22, 2022

- Application
- Details
- Water Quality
- Application Documents
- Processes
- Subjobs
- Fees & Payments
- Inspections
- ✓ Terms
- Condition

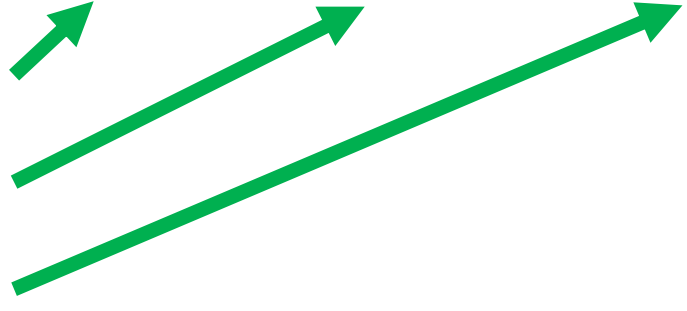
Water Quality Information

	System Status	Sample/Report Date	Meets VBBL	System Maintained	Corrective Action	Legionella Conc.	E.coli Conc.	Turbidity
	Inactive	Sep 1, 2021	Yes	Yes	No		<1.0	
	Inactive	Oct 29, 2021	Yes	Yes	No		<1.0	
	Inactive	Nov 5, 2021	Yes	Yes	No		<1.0	0.55
	Inactive	Nov 12, 2021	Yes	Yes	No		<1.0	1.81
	Inactive	Dec 8, 2021	Yes	Yes	No	<5		

L. pneumophila < 10 CFU / mL

E. coli < 100 CFU / 100 mL

Turbidity < 10 NTU for all samples



Completed Date	Description	Requestor Comments	Inspector Comments
Apr 11, 2022	Mechanical Operating System	Cross connection test	<p>Cross connection test performed with DPI Tyler Carmichael Only 2 out 3 water closets installed. WC located inside café is RI only and will be installed by different contractor.</p> <p>Water shut off from Cistern and confirmed the WC's not working</p>

Operations



Division B: *Acceptable Solutions*

Section 2.7. Non-Potable Water Systems

Link via: vancouver.ca/operating-permit

- Operating permit required.
- Water quality reporting every 2 calendar months.
- Regular inspections.
- On-site maintenance log.
- Operator certification.



Operating Permit

OP-2020-00003

City of Vancouver
453 West 12th Avenue
Vancouver, British Columbia
Canada V5Y 1V4

Issue Date: Jan 06, 2020

Expiration Date: Jan 05, 2023

Applicant

Location of Permit

111 E 2ND AVENUE
Vancouver, BC V5T 1B4

Type of System: Rainwater Harvesting/Alternative Water Systems

Specific Location:

Operating Since: Aug 01, 2019

Initial cross connection test date as per CSA B128.1: Aug 01, 2019

Collection Area Volume:

End Uses: Toilets

End Use Other Description:

Legal Description: LOT A BLOCK 7
DISTRICT LOT 200A
GROUP 1 NEW
WESTMINSTER
DISTRICT PLAN
EPP66726

Land Coordinate: 64018603

EOCP Certified Operator:

EOCP Certification Number:

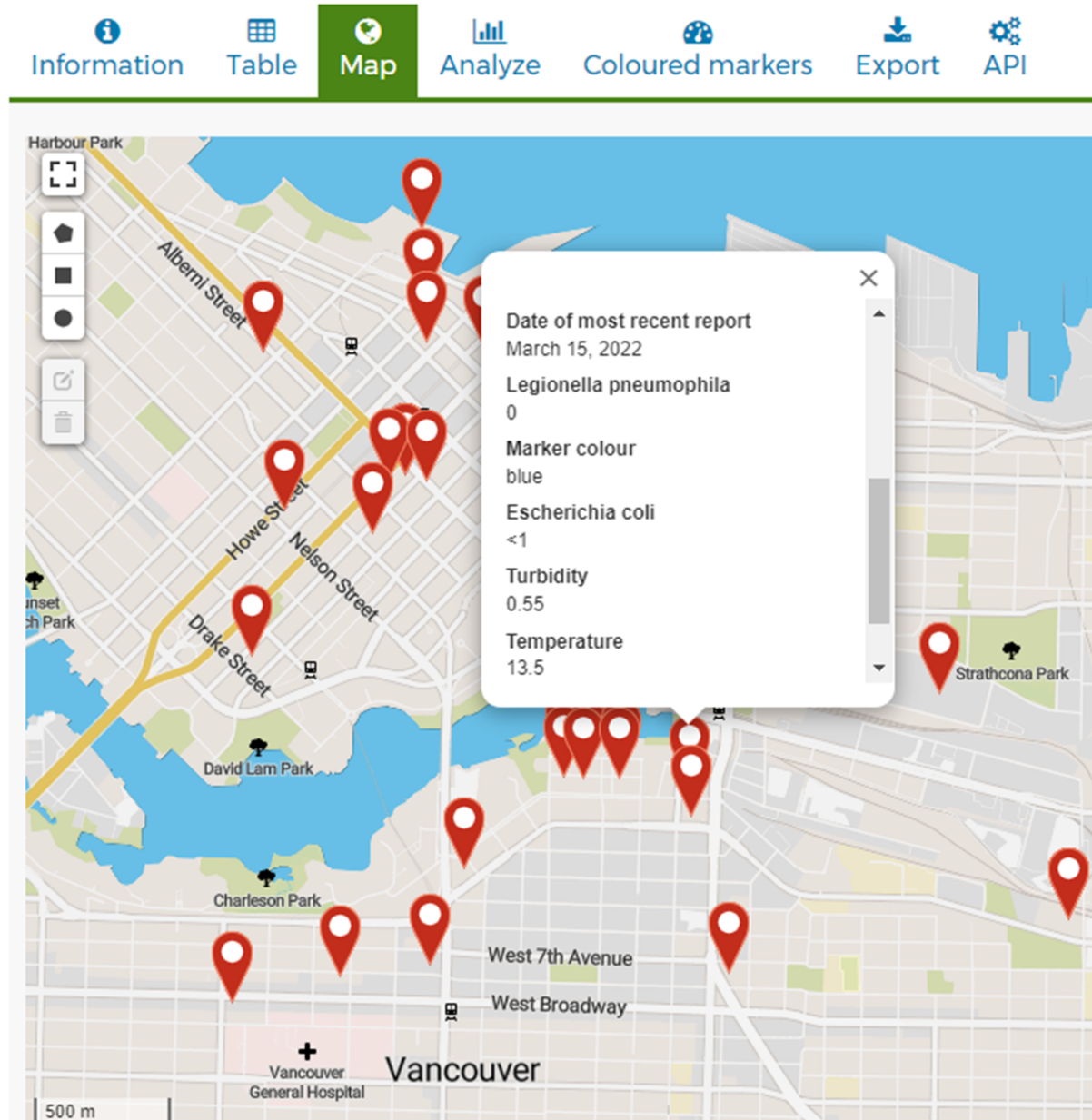
System Description

Dry puck chlorination

Additional Contact Information



Name	Role	Phone Number
	On-Site Contact	(604)
	On-Site Contact	(604)
	Agent for Owner	(604)
	Contractor	(604)

Issued operating permits – water systems



Link via vancouver.ca/operating-permit

Issued operating permits - water systems

-  Information
-  Table
-  Map
-  Analyze
-  Coloured markers
-  Export
-  API

Date of most recent report	Legionella pneumophila	Marker colour	Escherichia coli	Turbidity	Temperature
March 1, 2022	<10	blue	<1.0	2.46	7.1
April 27, 2022	0	blue	<1	0.25	13
March 1, 2022	<10	blue	<1	0.53	7.1
March 8, 2022	0	blue	<1	2.44	6.7
March 16, 2022	0	blue			
April 6, 2022	0	blue	<1	1.9	11.4
March 1, 2022	0	blue	46	5.11	7.1
March 1, 2022	<10	blue	<10	0.37	13
February 17, 2022	<10	blue	<2	4.57	
April 27, 2022	0	blue	<1	6.5	10
March 8, 2022	0	blue	3	0.66	10.1
March 8, 2022	0	blue	<1	0.2	7.2
March 16, 2022	0	blue	<100	0	
November 30, 2021		blue			
March 8, 2022	0	blue			
March 1, 2022	<10	blue	<10	0.34	16.2
April 1, 2022		blue	<1	0.89	12
March 10, 2022	0	blue	<1	6.6	8
April 6, 2022	0	blue	<1	1	

Client sample ID:

Irrigation Water System

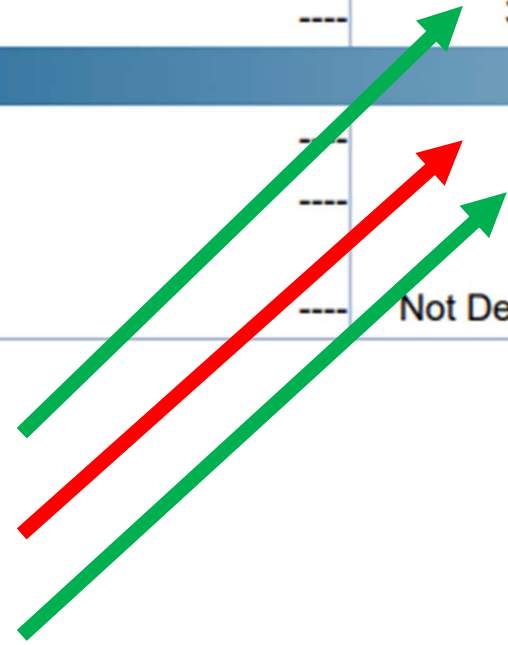
Client sampling date / time: 06-Apr-2022 12:15

Analyte	CAS Number	Result
Physical Tests		
turbidity	----	3.83
Microbiological Tests		
Legionella pneumophila	---	10
coliforms, Escherichia coli [E. coli]	----	<1
Legionella, non-pneumophila	----	Not Detected

Turbidity < 10 NTU

L. pneumophila = 10 CFU / mL

E. coli < 100 CFU / 100 mL



OP-2020-00003: Issued (Rainwater Harvesting/Al...
111 E 2ND AVENUE, Vancouver, BC V5T 1B4...

Issue Date: Jan 6, 2020

Created Date: Jan 6,

Expiration Date: Jan 5, 2023

Completed Date: mmm

Details Water Quality Application Documents Processes Subjobs Fees & Payments Inspections Terms Conditions Warnings File Notes Docu

Water Quality Information

+ New

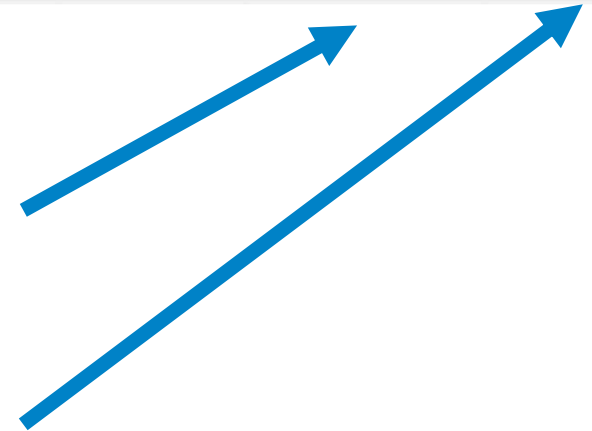
Sample/Report Date	Meets VBBL	System Maintained	Corrective Action	Legionella Conc.	E.coli Conc.	Turbidity	Max Temp.	Make-up Meter	Dist. Meter
Jun 30, 2021	Yes	Yes	No		<1	0.56	20.89		
Nov 1, 2021	Yes	Yes	No		<1	0.11			
Dec 22, 2021	Yes	Yes	No		<1	0.12	14.00	2,419.49	1,712.99
Feb 16, 2022	Yes	Yes	No	<10	<1	0.10	11.00	2,493.00	1,792.00
Apr 27, 2022	Yes	Yes	No	0	<1	0.25	13.00	2,720.00	2,022.00

Potable water make-up sub-meter

227 (=2720-2493)

System distribution sub-meter

230 (=2022-1792)

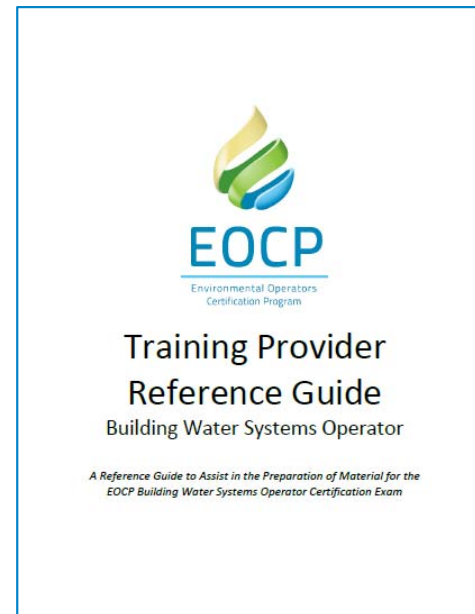
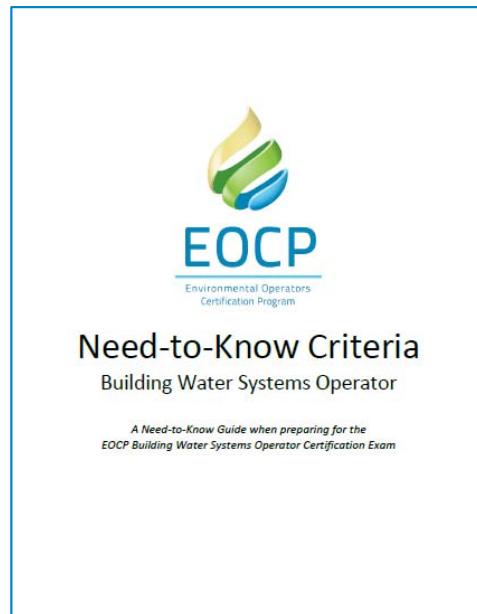


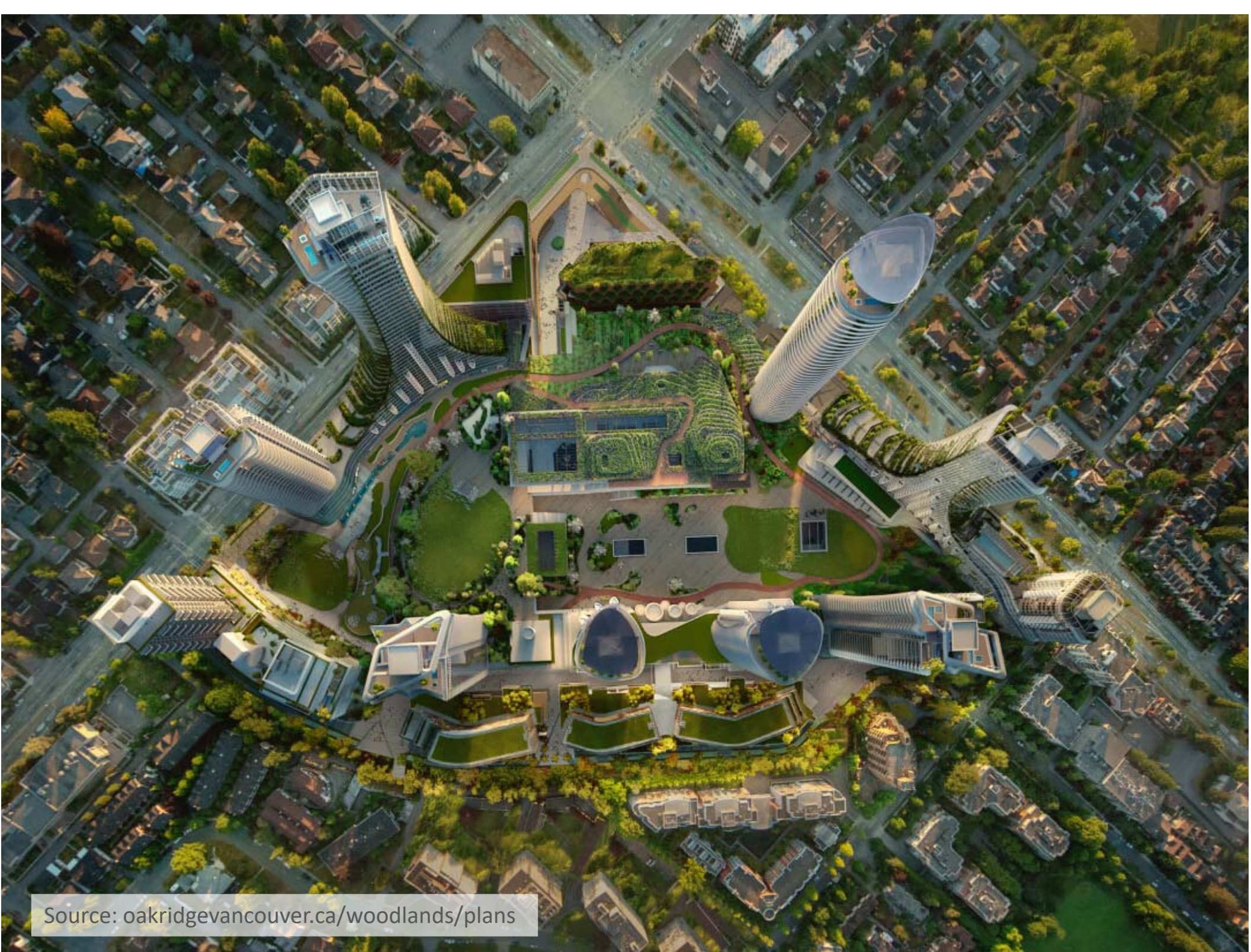
Operator Certification

Building Water System Operator

(EOCP: Environmental Operators Certification Program)

- 2 day course + independent exam (pathogen awareness, water sampling)
- Ongoing continuing education
- Also accepted: **ASSE/IAPMO 12080** Professional Qualifications Standard for *Legionella* Water Safety and Management Personnel
- Required as of January 1, 2022 (32 certified as of April 30, 2022)





Source: oakridgevancouver.ca/woodlands/plans

Contact & Questions

Phillip White

City of Vancouver, Manager,
Plumbing & Mechanical Inspections
604 873 7609, phillip.white@vancouver.ca
vancouver.ca/operating-permit

... with special thanks to Bob.

