

# Electrical Savings Through Innovation and Engagement

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# Overview of the Drinking Water System

# Ottawa's Drinking Water System

## Britannia and Lemieux Island Surface Water Plants

- 5 reservoirs
- 4 elevated tanks
- 17 pumping stations

## Britannia and Lemieux Island Surface Water Plants

- Carp
- Munster Hamlet
- Kings Park
- Richmond West
- Shadow Ridge
- Vars

Total Value: > \$1 Billion

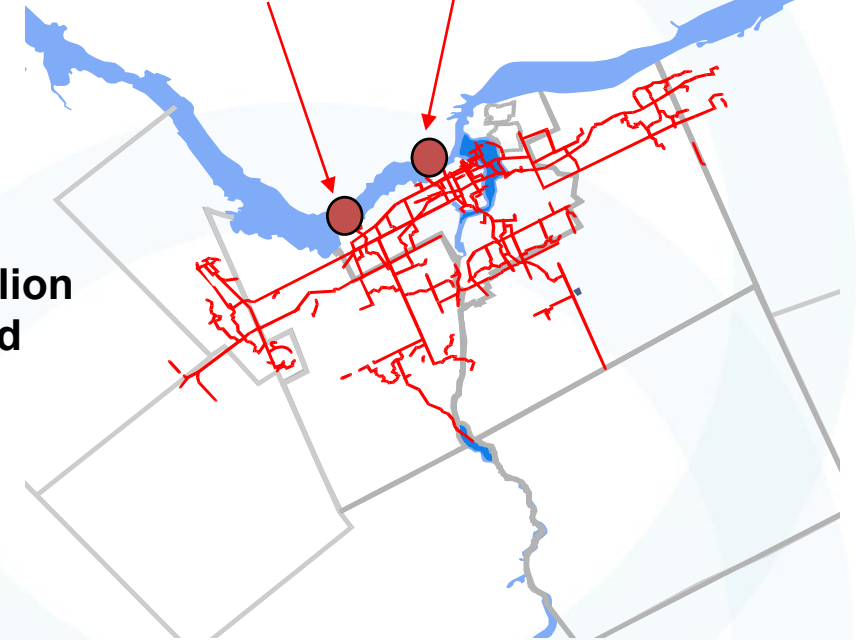
**Britannia Plant**  
**Cap: 360 ML/d**



**Lemieux Island Plant**  
**Cap: 400 ML/d**



**Service Population ~ 1 million**  
**Avg. Demand ~ 275 ML/d**  
(Million Liters of Water a Day)

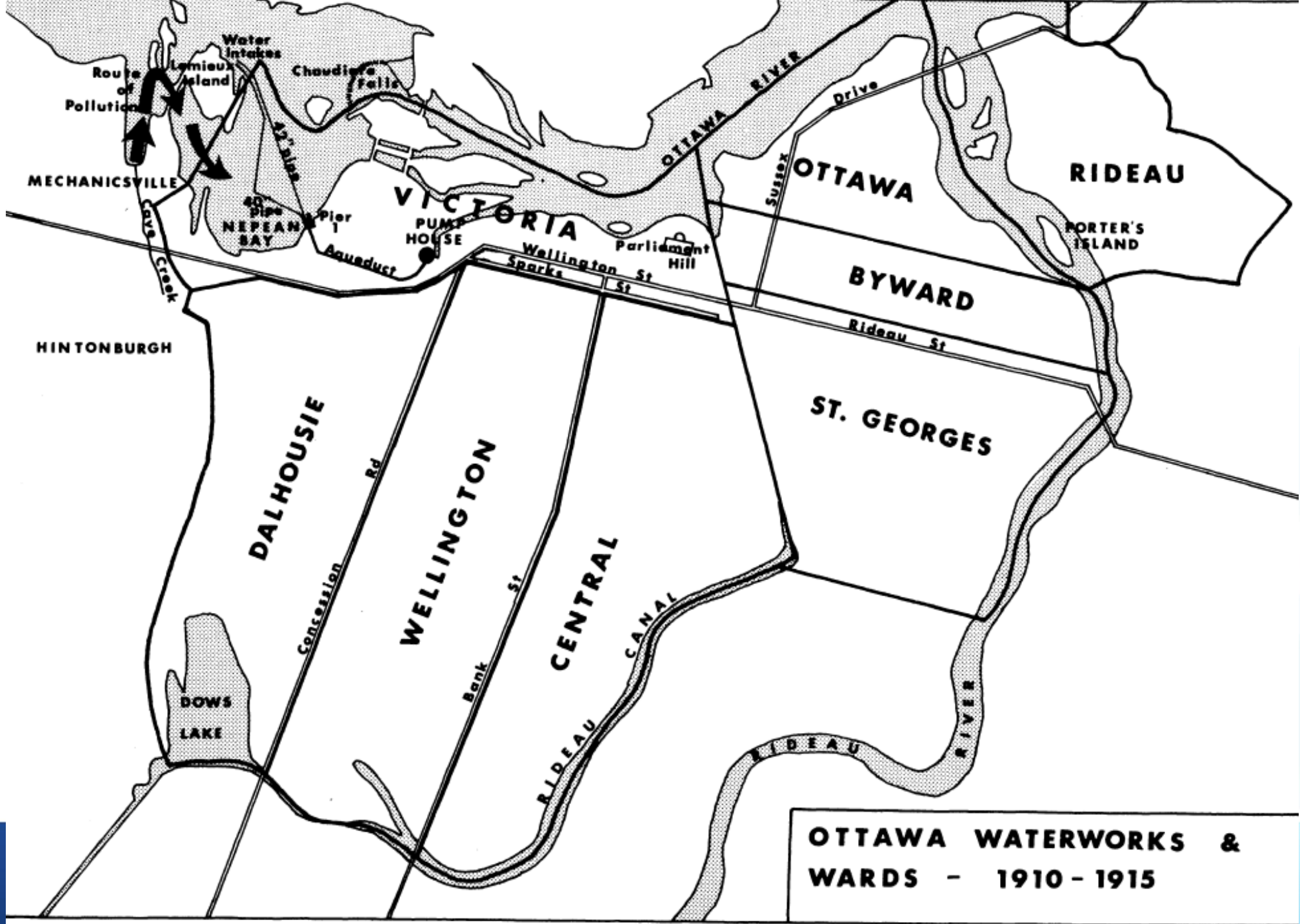


# A Brief History of Water: Going back 200 years...

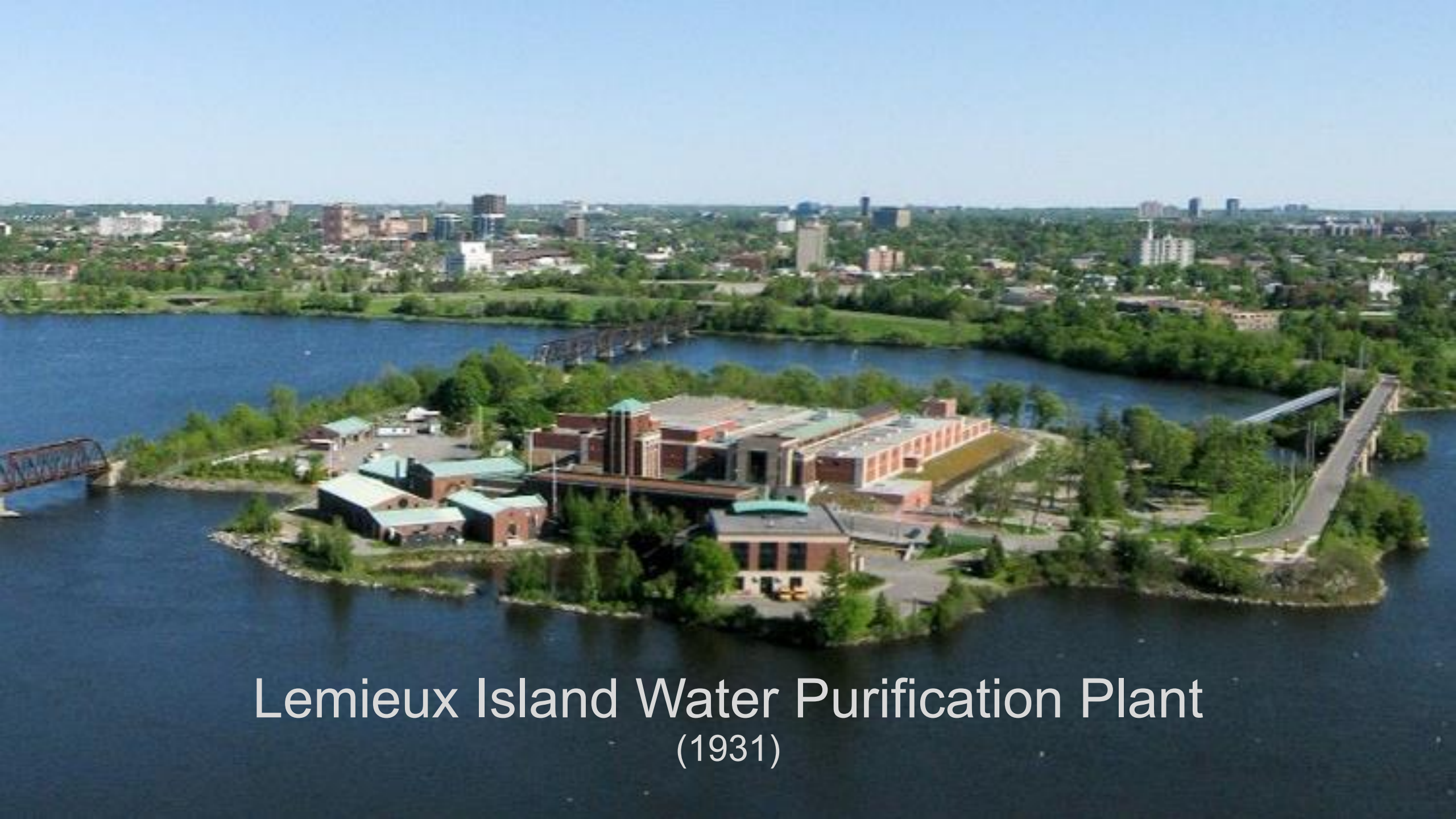




Fleet Street Pumping Station  
(1874)



**OTTAWA WATERWORKS & WARDS - 1910 - 1915**



Lemieux Island Water Purification Plant  
(1931)



Britannia Water Purification Plant  
(1961)



# Electrical Savings in Water Production

Global Adjustment Peak Avoidance

# Ontario Electricity Cost – Rules of the Games

## Class A Facilities (Large Users – Incentive Program):

- Electricity costs are based on the **top five peaks** over a 12-month base period (May 1 to April 30)
  - Known as Global Adjustment (GA) Peaks
  - These Peaks are unknown until the end of the 12-month cycle (The Game)
- GA Peaks are based on the Demand required by the entire electricity grid in **Ontario** at any one time
- Lower electricity costs are the incentive during off-peak times
  - ~ \$0.03 kWh off-peak vs. \$94.60 kWh during the top five peaks

**>3000 Times More Expensive During the Top Five Peak Hours!**

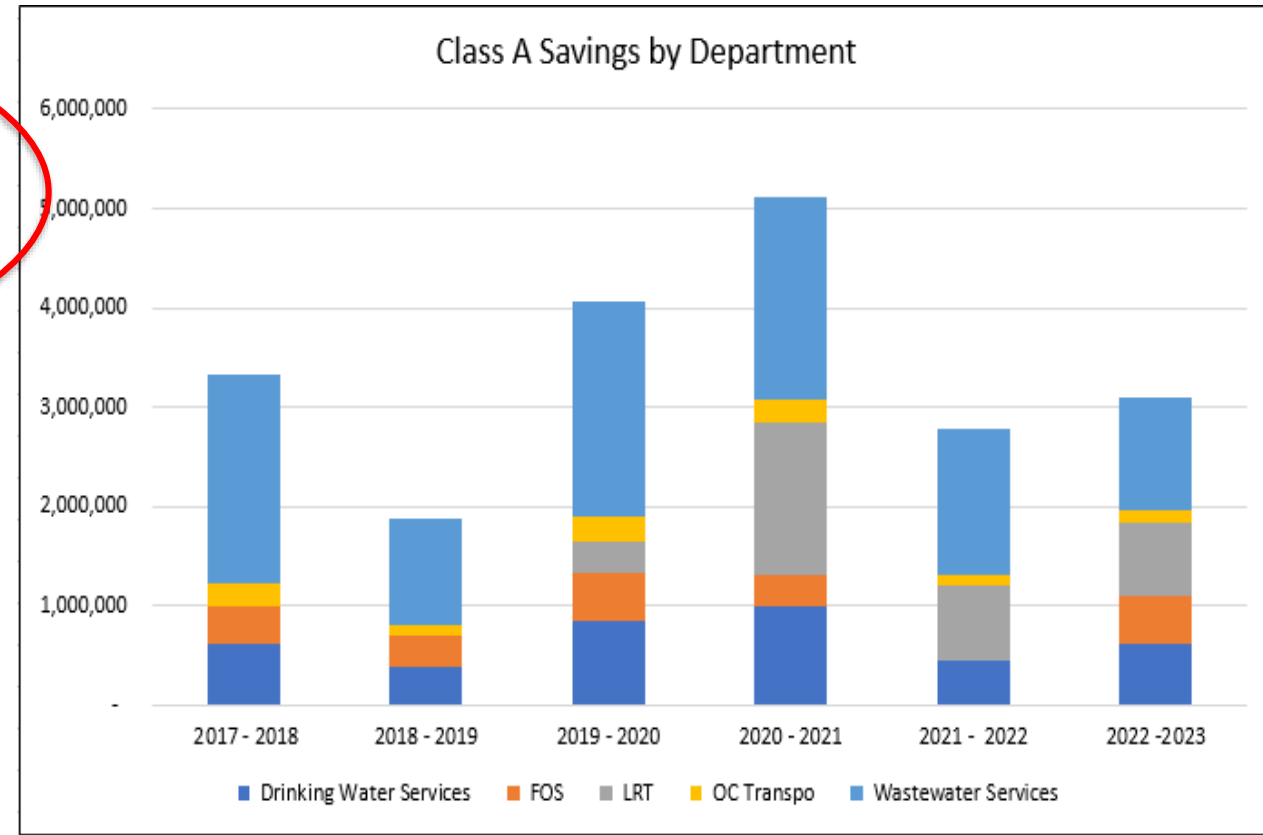
## Eligibility

- These facilities have high demand, >1000 kWh each month and are usually the largest electricity consumers
- These facilities have opportunity to opt-in to Class A program, otherwise they remain Class B (Remotes)

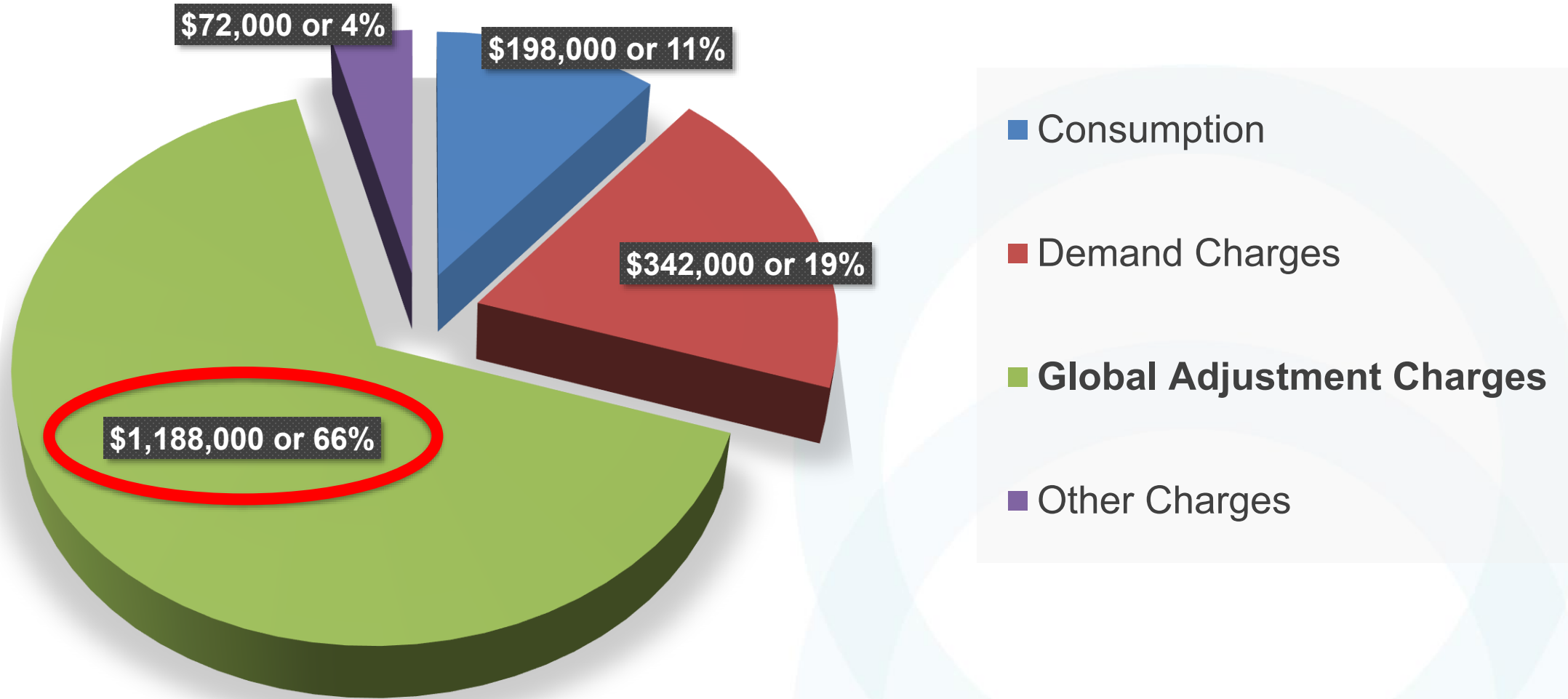
**Britannia, Lemieux, and ROPEC are Class A Facilities**

# Class A Savings/Cost Avoidances

Facility	Class A Savings (since July 2017)
Robert O. Pickard Environmental Centre	\$9,944,141
Britannia Water Purification Plant	\$2,734,293
OC Transpo - Belfast Yard - LRT	\$1,424,444
Lemieux Island	\$1,187,898
OC Transpo - 1500 St Laurent - Garages & Admin Building	\$1,065,199
Sportsplex	\$705,766
Cyrville Station - LRT	\$530,274
Lebreton Station - Pimisi - LRT	\$505,003
City Hall	\$440,756
Blair Station, OC Transitway & Pedestrian Overpass - LRT	\$435,339
Walter Baker Sport Centre	\$413,269
Mary Pitt Centre	\$390,887
Hurdman Station - LRT	\$364,013
Rideau Street Station - LRT	\$94,866
Lyon Station - LRT	\$16,502
Sportsplex - Field House	\$3,745
<b>City Total</b>	<b>\$20,256,395</b>



# 2020 Britannia Electricity Cost Breakdown



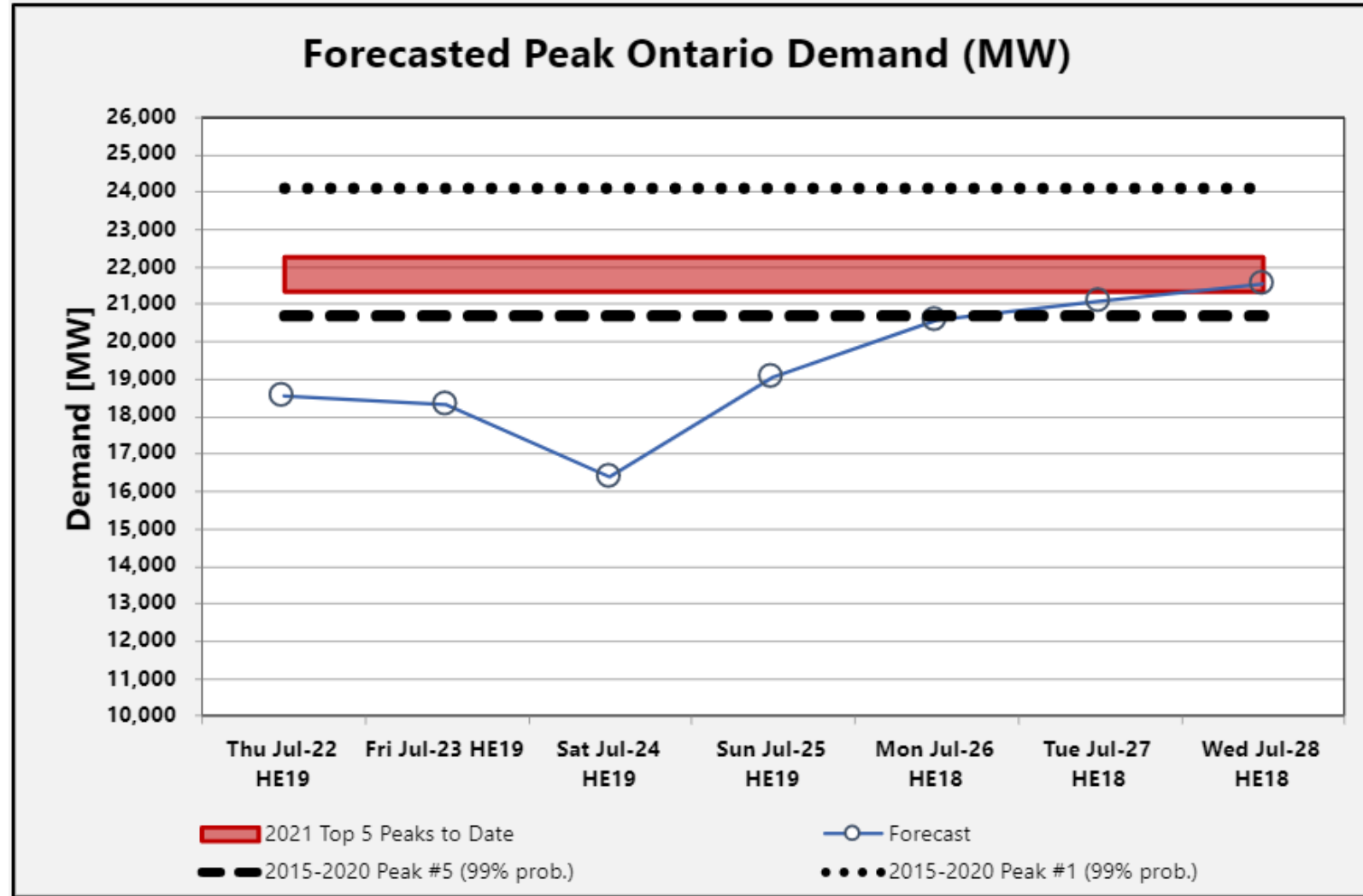
# Electricity Costs: GA Peak Vs Off-Peak

	<u>GA Peak</u>	<u>Off-Peak</u>
• Filter Backwashes:	\$13,500 per wash	\$3.51 per wash
• Small pump:	\$32,000 per hour	\$8.40 per hour
• Large pump:	\$100,000 per hour	\$39.13 per hour
• Britannia WPP:	\$189,200 per hour	\$70 per hour

**>3000 Times More Expensive During the Top Five Peak Hours!**

# Peak Cost Reduction Strategy

- Peak prediction spreadsheet developed by ROPEC.
- Predicts peak electrical demands for current day and next 6 days
- Three strategies used:
  - **Proactive**
  - **Load Shift**
  - **Peak Shave**



# Proactive Global Adjustment – Quick Wins

- Optimize overall plant processes
- Use the most efficient pumps
- Maximize Fleet St = *FREE PUMPING!*

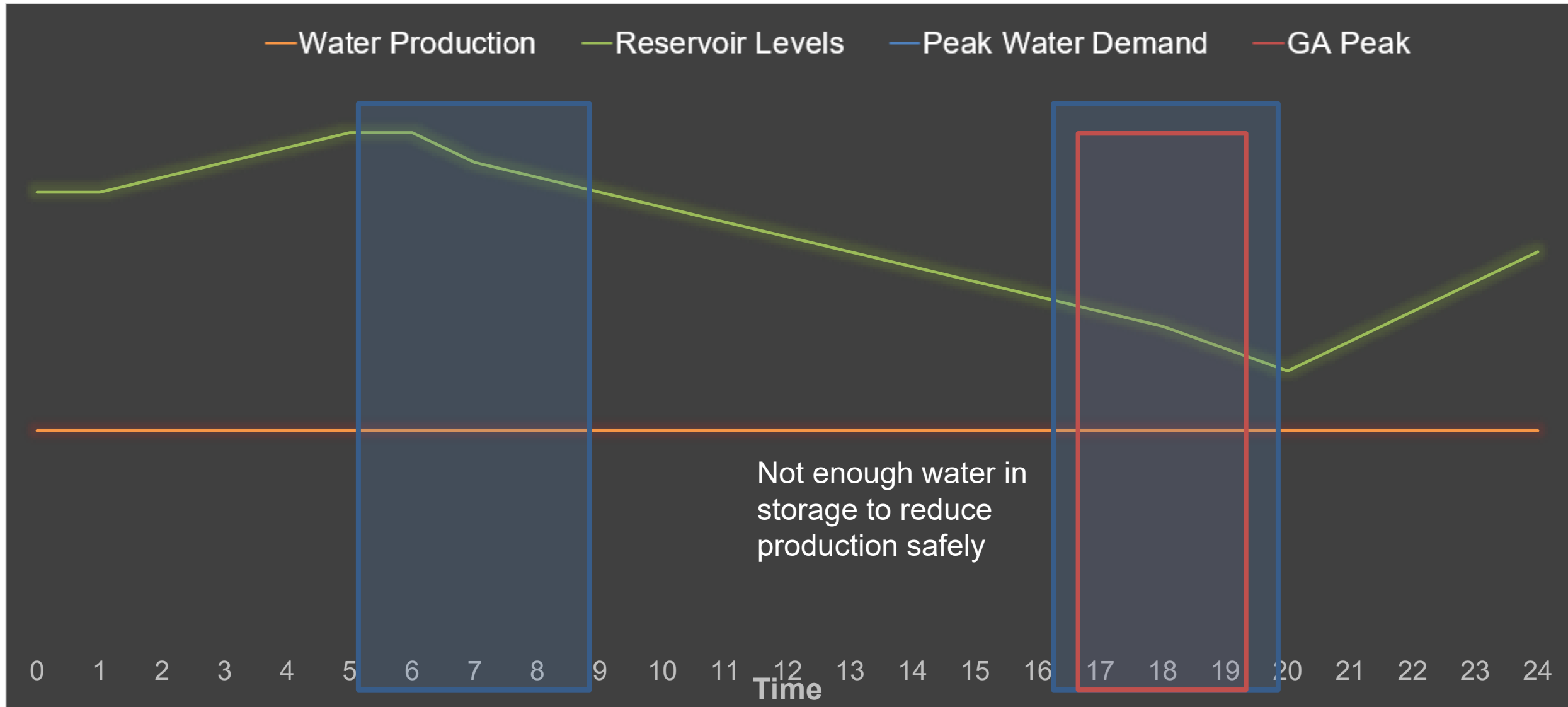


Optimized Settling

Fewer Filter Washes

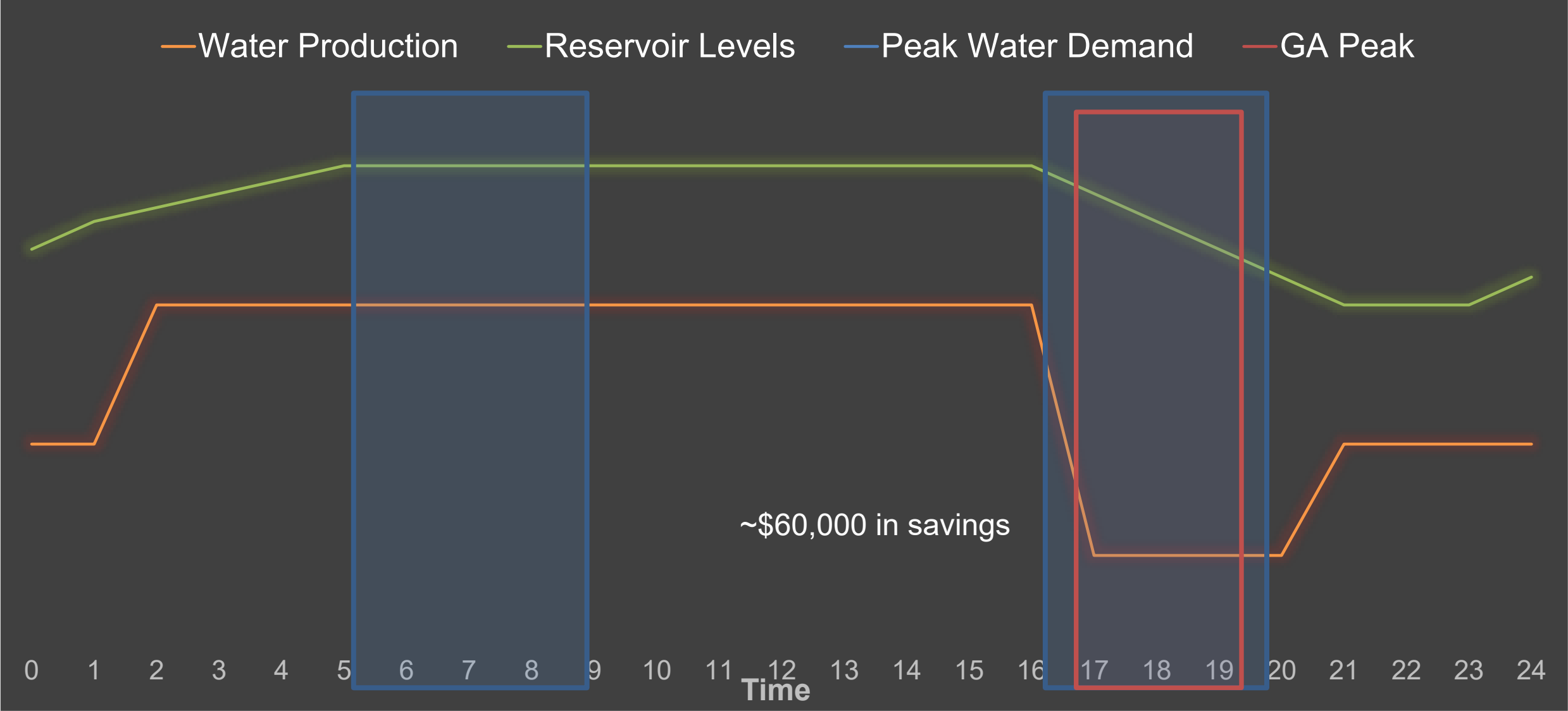
More Savings

# Load Shift Scenario: Normal Production Day





# Load Shift Strategy: Electrical Peak Day



# Peak Shave

- Align monthly preventative maintenance with electrical peaks
  - Via Ops Daily Check-ins
- The entire Britannia plant load can be taken off the grid!  
~\$200,000 in savings per peak



# GA Peak Avoidance 2023: Results

2023 Top Five Ontario Peaks			Britannia Response		
Rank	Date	Time	Action	kWh shed	Projected Savings
1	Tuesday, September 5	6:00 PM	Peak Shave	2075	\$196,295.00
2	Wednesday, September 6	6:00 PM	Peak Shave	2182	\$206,417.20
3	Wednesday, July 5	7:00 PM	Load Shift	900	\$85,140.00
4	Thursday, July 6	1:00 PM	Proactive	143	\$13,527.80
5	Monday, September 4	7:00 PM	Load Shift	458	\$43,326.80
<b>TOTAL SAVINGS</b>					<b>\$544,706.80</b>

~\$500,000 in incremental annual savings since 2021!

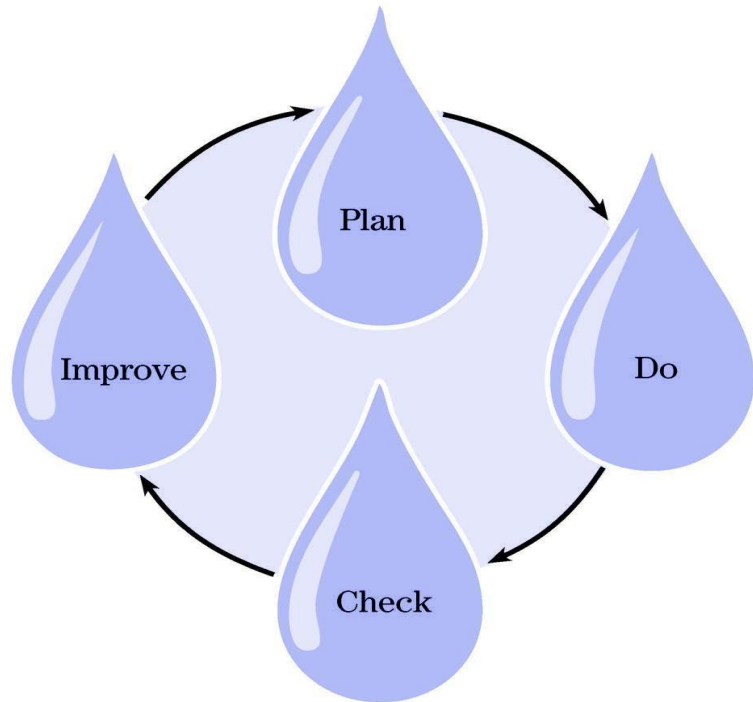
# GA Peak Avoidance 2024: Results

2024 Top Five Ontario Peaks			Britannia Response		
Rank	Date	Time	Action	kWh shed	Projected Savings
1	Wednesday, June 19	6:00 PM	Peak Shave	3000	\$283,800.00
2	Wednesday, July 31	6:00 PM	Peak Shave	3000	\$283,800.00
3	Thursday, August 1	6:00 PM	<i>No Action</i>	0	<i>System constraint</i>
4	Tuesday, June 18	5:00 PM	Peak Shave	1,500	\$141,900.00
5	Tuesday, August 27	6:00 PM	Peak Shave	2,100	\$198,660.00
<b>TOTAL SAVINGS</b>					<b>\$908,160.00</b>

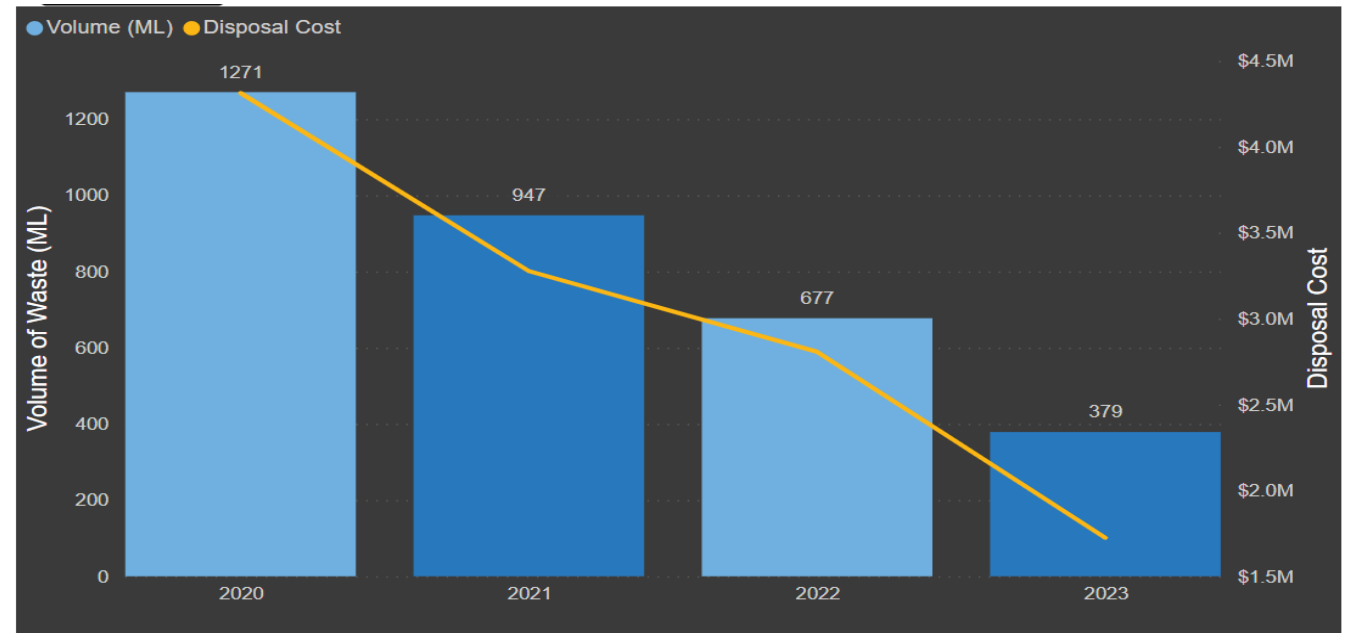
Fleet St. restrictions lead to increased Britannia demand

# Continual Improvement Culture

- One small change leads to major impacts... **Since 2020:**
  - Over \$2 million in electricity saved
  - 700 ML reduction in annual wastewater production
  - 60 MT reduction in annual silicate usage



BRITANNIA'S WASTE GENERATION



*Are you too busy to improve???*

No  
thanks!

We are  
too busy

