# Reliable Treatment Outcomes by Real-time Influent Monitoring

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*Great things happen here.*



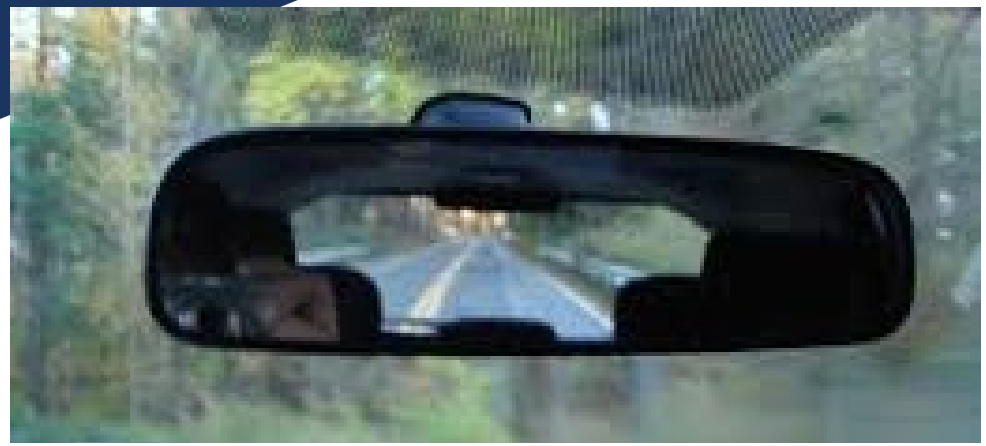
- Richard MacEwen, City of Charlottetown
- Jon Grant, SENTRY


Prince Edward Island
CANADA

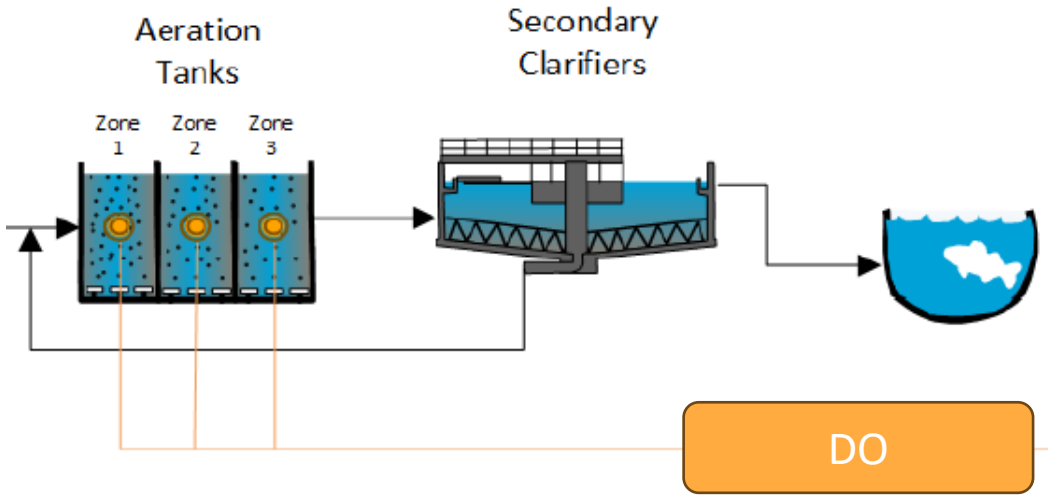
Outline

- What advances have been made in monitoring influent wastewater?
  - What can a Bioelectrode Sensor (BES) be used for?
- Aeration control modeling examples.
- Learn about the first live run of blowers based on BES information globally.
  - It happened here in Canada!

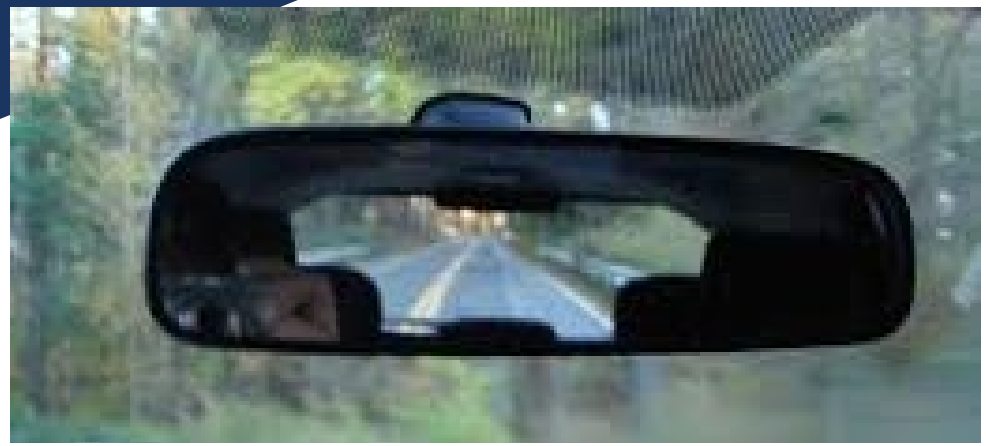
# Why Monitor Influent?



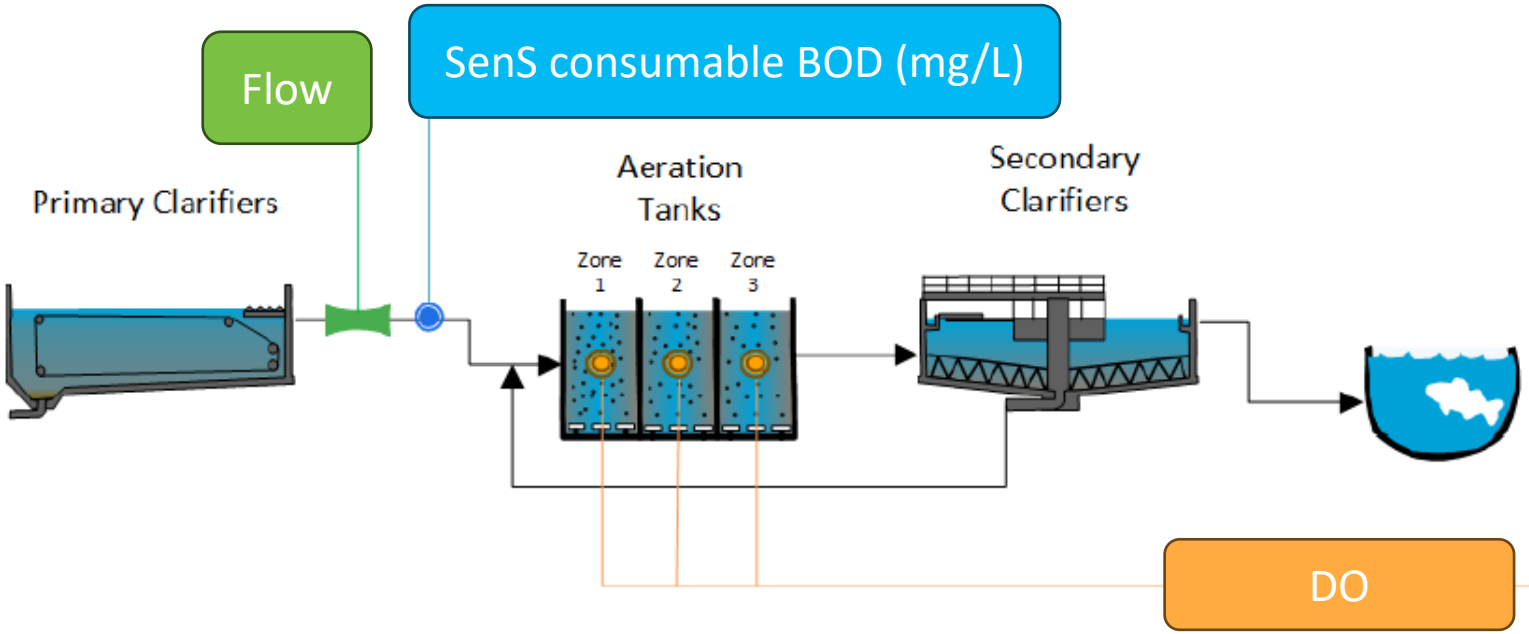
- We don’t drive looking in the rearview mirror.



# Why Monitor Influent?

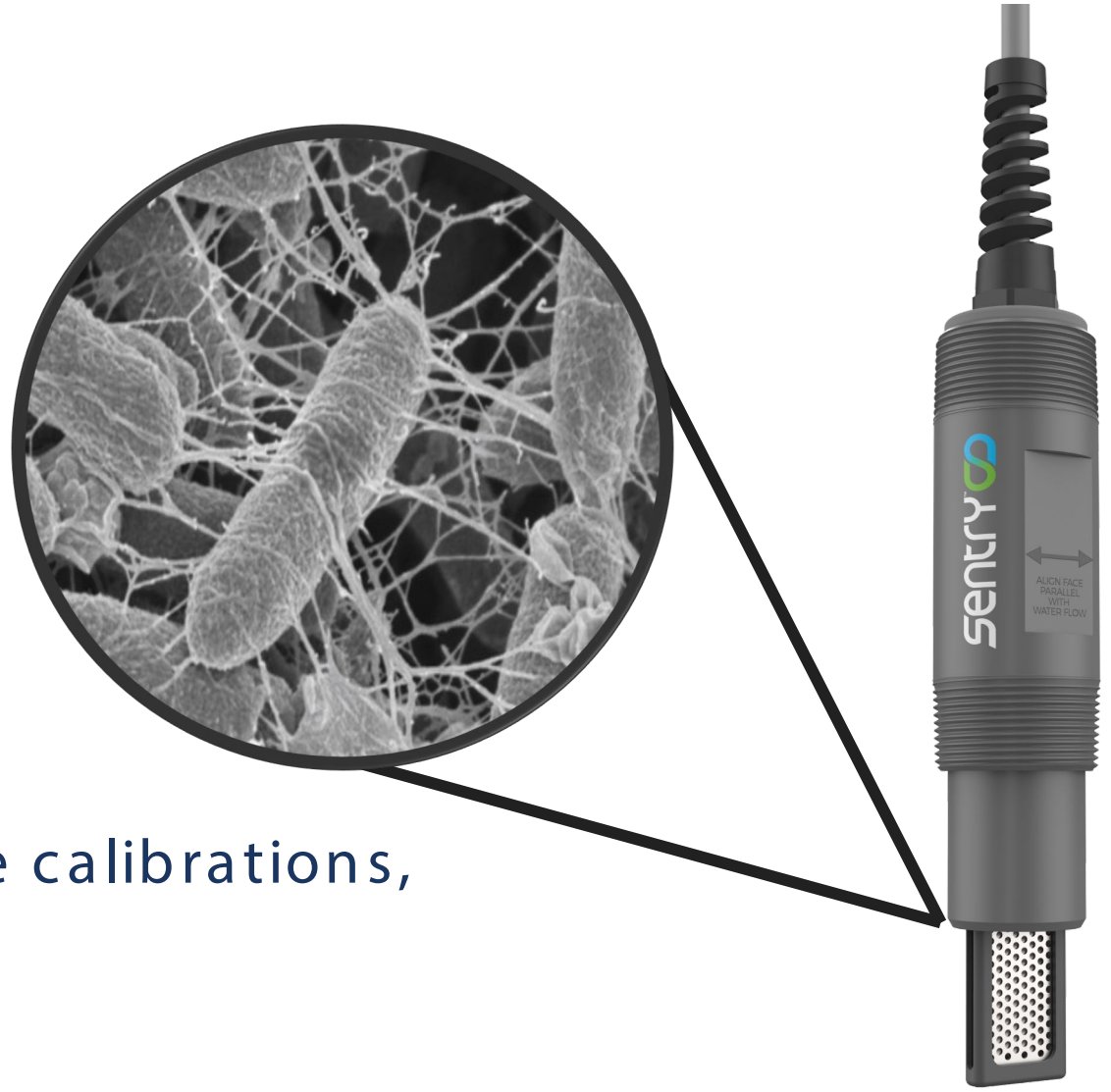


- We don’t drive looking in the rearview mirror.
- We shouldn’t treat wastewater that way either!

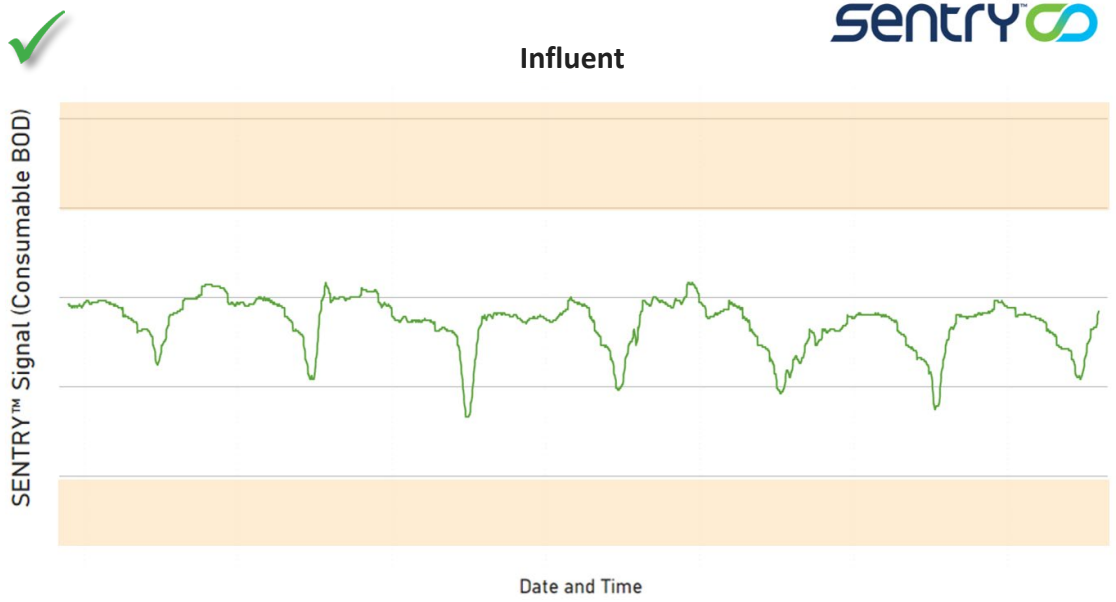


## How Does it Work?

Unlike traditional monitoring equipment, the SENTRY Sensor does not use light, or membranes to provide data but instead relies on the **metabolism** of the **microbes** present in the system.




No need for replacement parts, routine calibrations, or unreliable data!

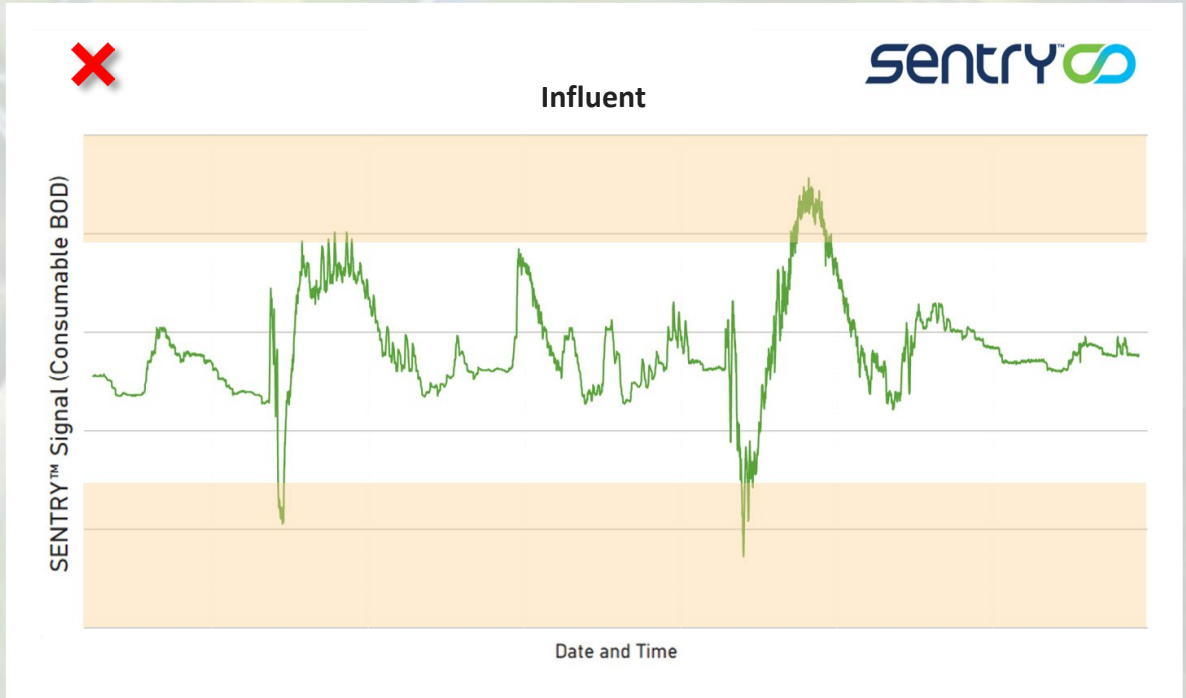



## Predictable Outcomes

Stable diurnal patterns as represented by the SENTRY Signal adds significant insight into predicting treatment efficiency

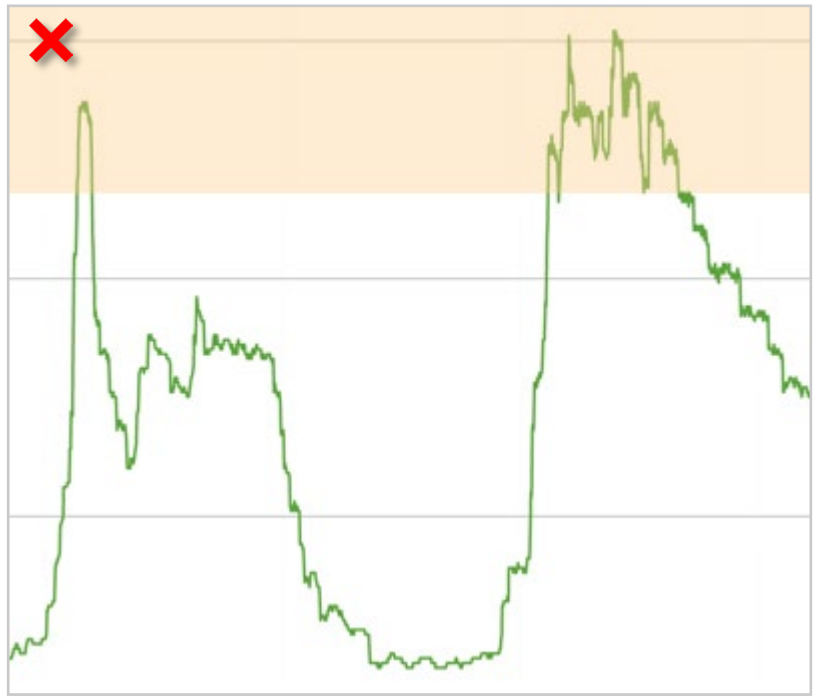
## Wastewater Imbalance

When variability inevitably disturbs the diurnal pattern, the sensors respond in real time capturing events that often result in significant treatment instability and potential compliance issues

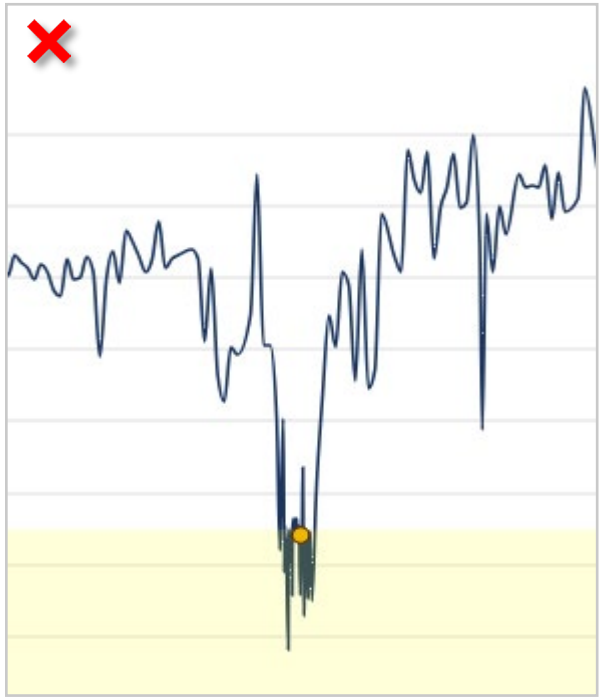


# Influent Monitoring

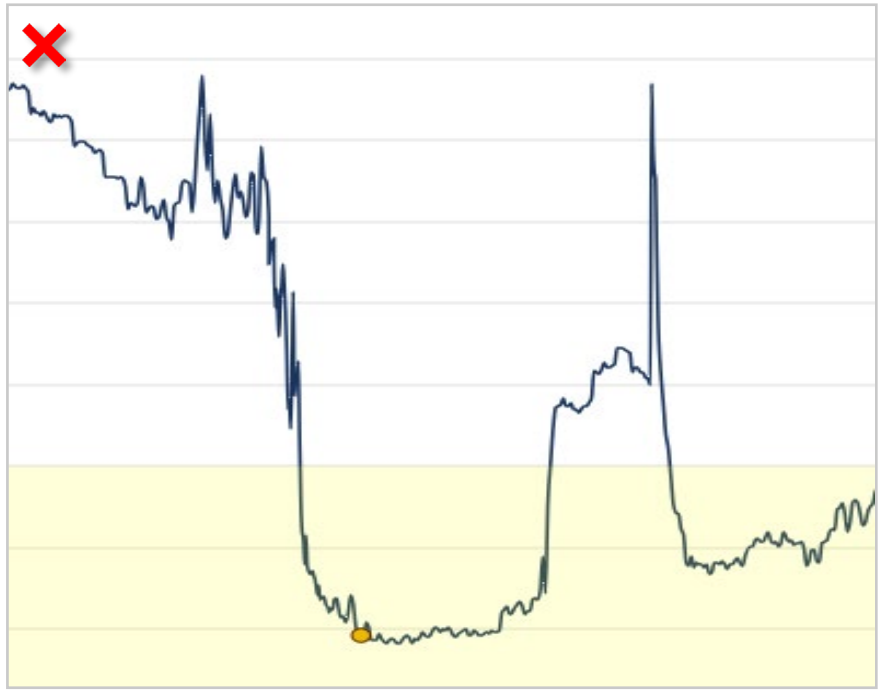
## Variable Influent - Predictable Outcomes



High Organic Discharge

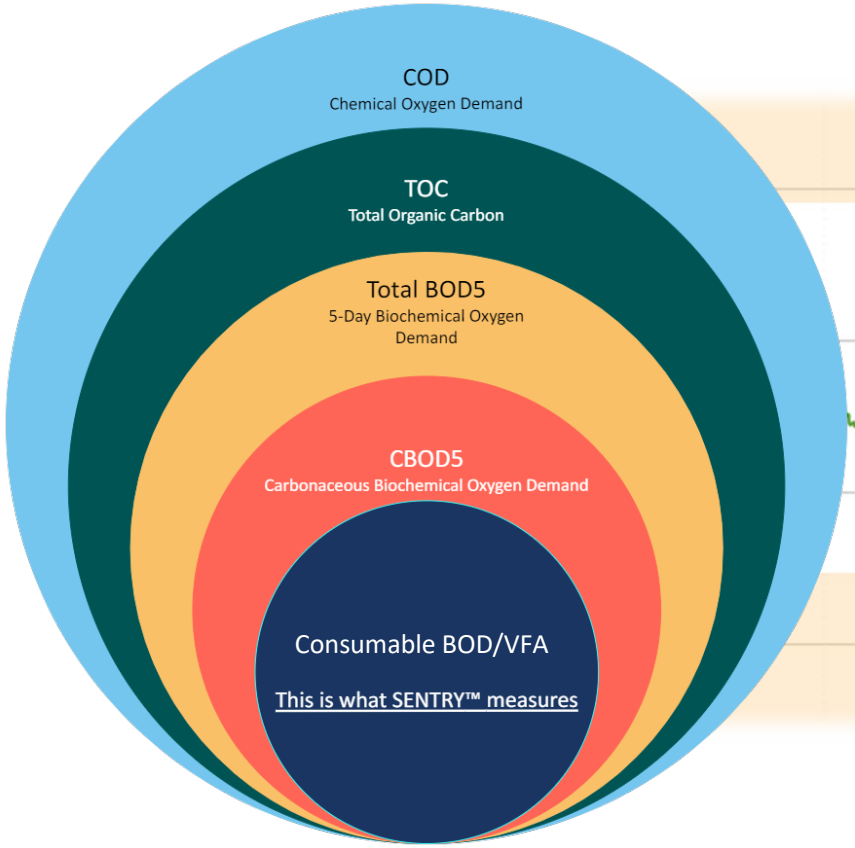


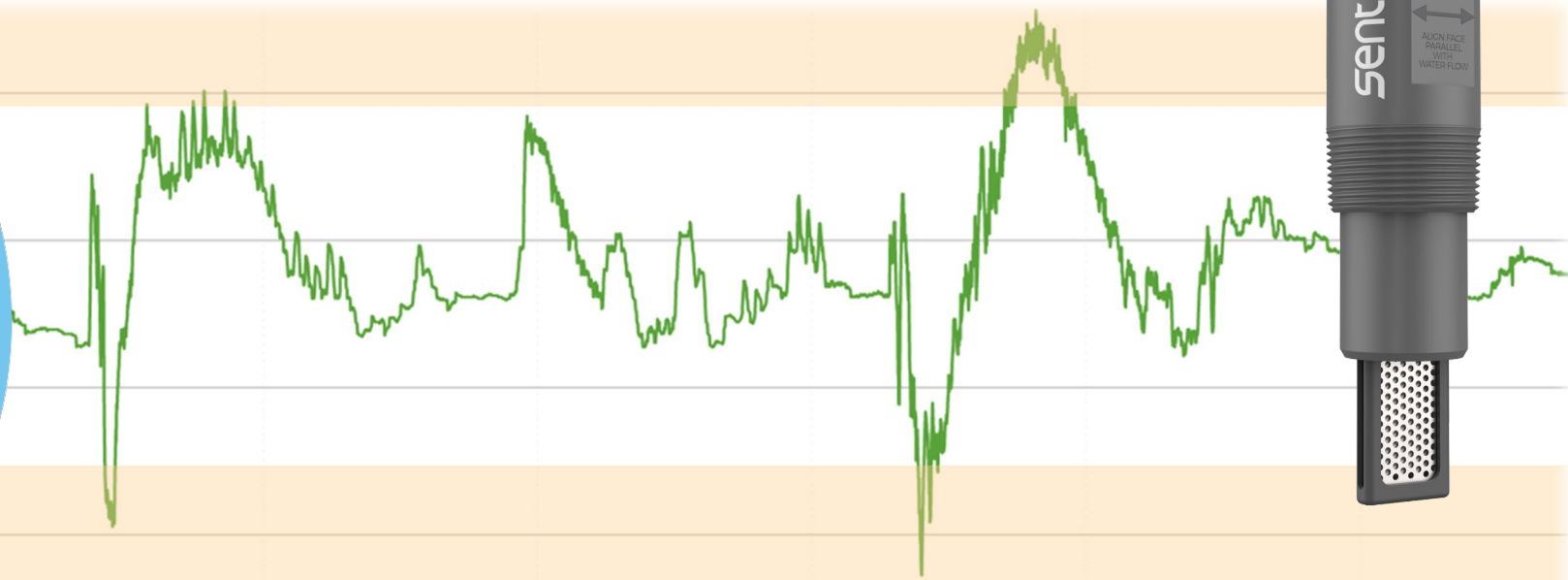
Toxic Discharge



Heavy Dilution

# W hat does it Measure?



# Case Study

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Prince Edward Island

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Trying something new requires a lot of collaboration.



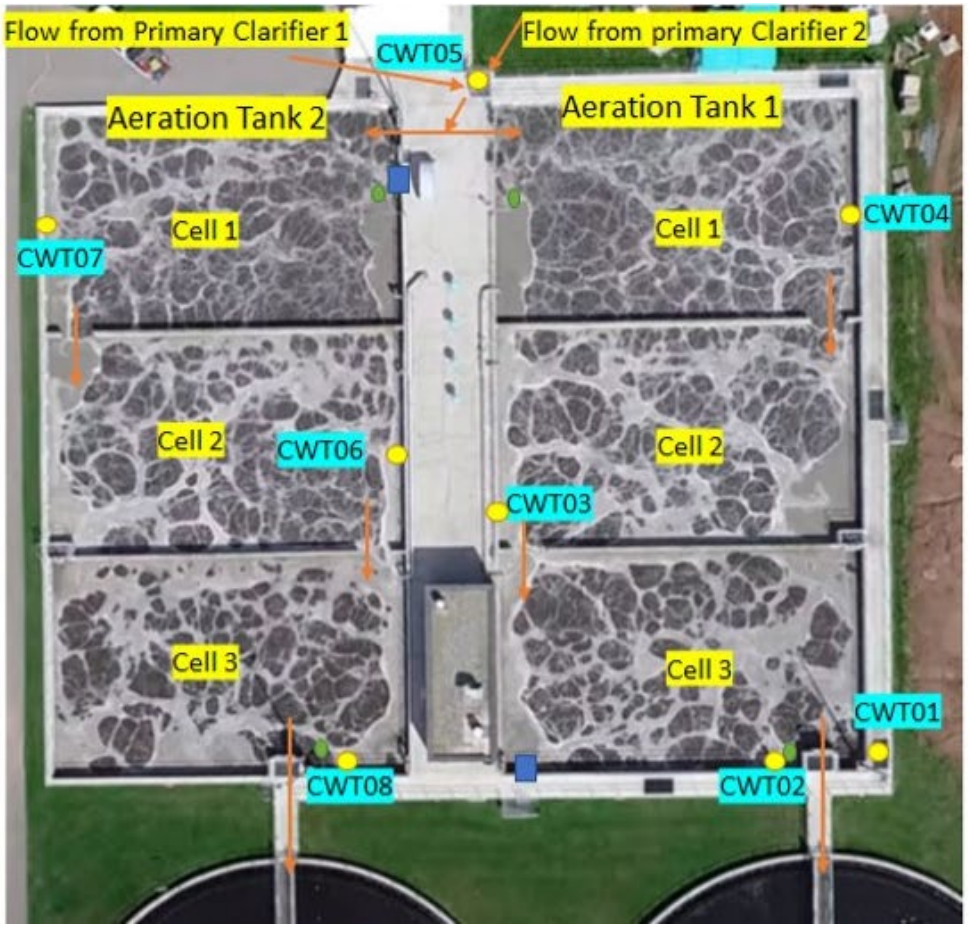




- PEI Climate Challenge Fund
- Application December of 2021
  - Put together a team
    - Engineers, modeling experts, private sector, and multiple levels of government
- Awarded March 2022
- Project start fall 2022

- Charlottetown Pollution Control Plant (CPCP)
  - Design capacity average daily flow of 7 MGD.
- Contributes 25.9% of GHG emissions in the community.
- Goal of the project:
  - Demonstrate the potential for influent monitoring to support Aeration Control to reduce energy and GHG emissions.

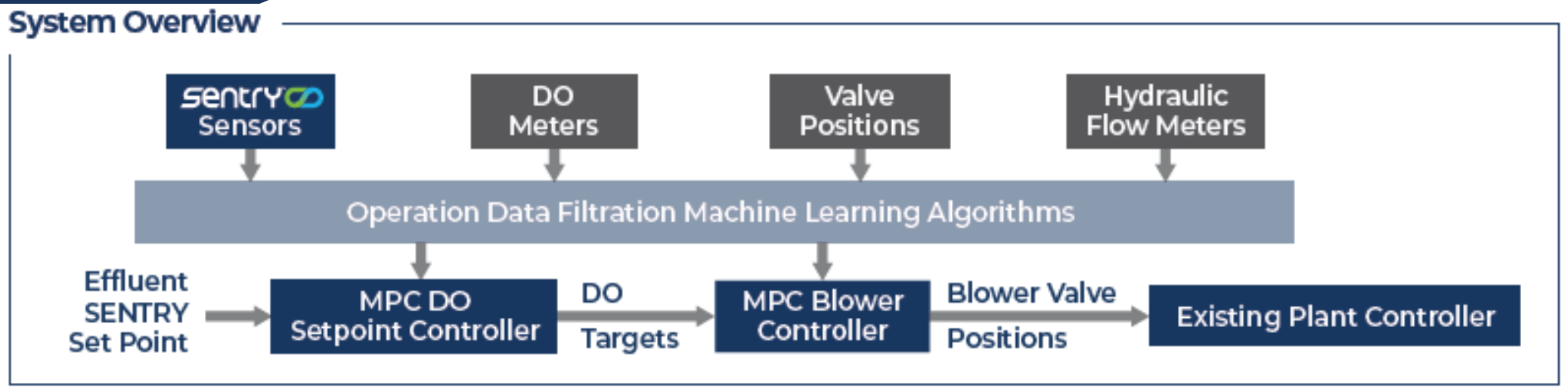
# Plant Overview and SENTRY sensor locations




CWT01: Secondary Clarifier Effluent
CWT02: Aeration Tank 1, Cell No. 3
CWT03: Aeration Tank 1, Cell No. 2
CWT04: Aeration Tank 1, Cell No. 1
CWT05: Primary Clarifier Effluent
CWT06: Aeration Tank 2, Cell No.2
CWT07: Aeration Tank 2, Cell No. 1
CWT08: Aeration Tank 2, Cell No. 3

Two Primary Clarifiers:
Primary Clarifier 1: Charlottetown
Primary Clarifier 2: Stratford & East Royalty

Flow directions
Sensor Location
Panel Location
DO Sensors




- CPCP teamed up with SENTRY™ and APG Neuros to improve aeration using an Advanced Aeration Control system (AAC).
- They use SENTRY™ BES Sensors to estimate incoming organic loads, with machine learning confirming its accuracy before AAC adjusts aeration.
  - DO sensors react downstream to wastewater conditions, these Sensors placed upstream offer a 'peak shaving' solution, giving 30 minutes to 2 hours of extra reaction time.

# Charlottetown


## Results and Value

- Live runs saw a 14% improvement in inactive phases of aeration using the Advanced Aeration Control (AAC) system, translating to annual savings of $30,000 in electricity costs and a reduction of 65 tonnes of CO2 in greenhouse gas emissions.
  - This is equivalent to providing electricity for over 150 homes in the community.
- SENTRY™ Sensors accounted for 20-30% of the savings.

# Questions?

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# Thank you

# Why do clients with conventional pla… need supp…

*"I've walked into our plant to find our oxidation ditch turned grey, and by then it's too late. I know I'm better protected because SENTRY gives me the early warning I need to take action."*

*Carl Groce, Plant Superintendent*
*Frankfort Sewer District*

*How do I improve processes with limited time and staff?*

*How do I save money while ensuring regulatory compliance?*

*How can I improve my treatment to reduce GHG emissions?*