Creating a Perfect "View" of Municipal Assets

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CITY OF LAKE CITY
Florida's Gateway Est. 1859

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Case 1: City of Boca Raton Florida

The Boca Raton Wastewater Treatment Plant is part of the city's Utility Services complex situated on Glades Road near Interstate 95. The plant meets the city's wastewater treatment needs while minimizing environmental impact, including operating a 100% reuse system

Waste Water Treatment

- Service Population: 86,000
- Wastewater Plant: 17.5 MGD Capacity
- Lift Stations: 240
- Lime Softening Plant: 30 MGD
- Nanofiltration plant: 40 MGD

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Boca Raton – Opportunity

In 2011 the Boca Raton utilities were controlled by GE Proficy iFix SCADA platform. The existing solution had over 22,000 tags but the Classic Ifix Historian was limited to 2500 tags.

Need

“We needed the ability to collect, store and monitor all 22,000 tags to provide both real-time and historical data access and trending capabilities.”

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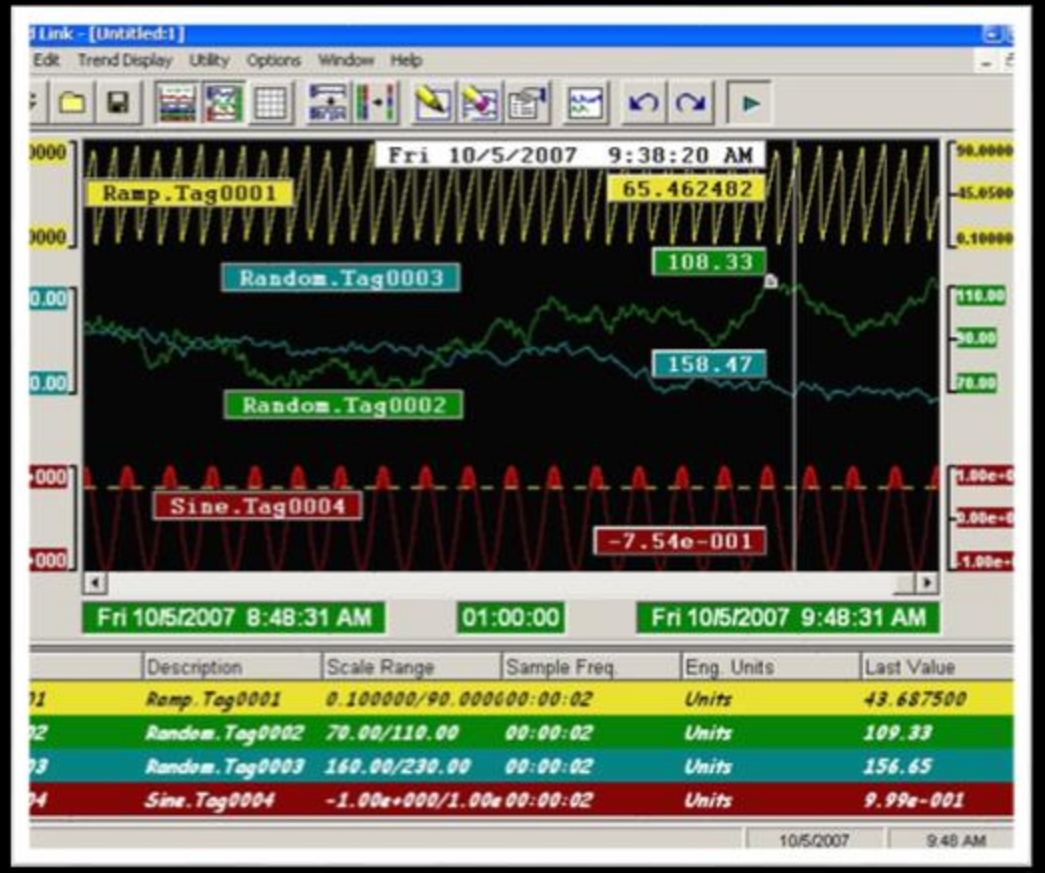
Boca Raton – Solution

After evaluating GE's newly released iHistorian and other alternative platforms the team ultimately selected and implemented the Canary Historian.

Canary Historian Benefits

- Provided the ability to Collect and Store all 22,000 tags.
- Scalable for future growth.
- Support for redundant historians.
- Open Data Access
- Trend Link a thick client trending control that could be embedded in the GE Proficy iFix displays.



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Case 2: City of Lake City – The Gateway to Florida

The City of Lake City is located at the intersection of Interstate 75 and Interstate 10 and is therefore known as "The Gateway to Florida.”

City Facts

- Population – 12,600
- Deep Civil War history, including the Battle of Olustee, the largest Civil War battle fought in Florida.
- The City offers outdoor activities like hiking, fishing, and tubing at Ichetucknee Springs State Park.
- The area also has many natural springs.
- Come and Visit!

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Water & Wastewater Treatment Utilities

The City has 1 Water Treatment plant and 3 Wastewater Treatment Facilities.

Price Creek WT

- 20,488 Service Customers
- 4 Ground Wells
- Ozone Treatment - Disinfection
- Chlorine and Ammonia Injection
- Phosphate Injection

Saint Margarets WWT: Aeration 3.0 MGD

Kicklighter WWT: Aeration 3.0 MGD

North Fl Water WWT: 4 Stage .5 MGD Bardepho Process Plant

Distributed Lift Stations: 64

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Initial Challenges

Control systems were acquired over time with no established OT standards. Each site is unique and requires various system drivers.

Existing SCADA & Control Solutions

- Kicklighter WWTP: Ignition
- Price Creek WTP: GE Proficy iFix
- Saint Margarets WWTP: Currently installing SCADA system with Ignition.
- North Florida Mega MPI: VTScada
- Lift Stations: Dataflow HT4
- Weather Station: Columbia Weather
- Rockwell Hardware: PLC’s & Power Meters.

Wastewater Treatment Plant

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Opportunity & Goals

There was an opportunity to improve operational performance if we could centrally collect, store and analyze data from all site systems in one centralized and accessible platform.

Goals

- Make all SCADA data available to supervisors at the administrative level without compromising network security.
- Get everyone on board with the Idea – IT department and plant Operations are the biggest hurdles.
- Ensure that the solution was completely secure. (Recent Ransomware attack – Strict guidelines must be met.)
- Ensure that the final solution is simple and easy to use.
- Leverage graphical displays to aid user navigation.

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Solution

Implement a Enterprise Historian on the enterprise network to collect data from all underlying control systems and devices to make all data available to management and plant operations without creating vulnerability on the SCADA network.

Canary Selection

- Previous experience and success with Canary at my previous position for the City of Boca Raton.
- Ability to meet challenges and goals.
- Flexibility of Axiom to create graphical displays similar to existing SCADA displays.
- High Level of security with ISP and data encryption support.
- Open Data Access to support integration and data sharing with third party solutions.

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Basic Architecture

Control Network

Enterprise Network

Price Creek WTP
OPC 1
OPC 2

Kicklighter WWTP
OPC 1
OPC 2

Lift Stations
OPC 1

St. Margrets WWTP
OPC 1
OPC 2

North Florida MIP
OPC 1
OPC 2

Canary Historian
7136 Tags
2000+ New

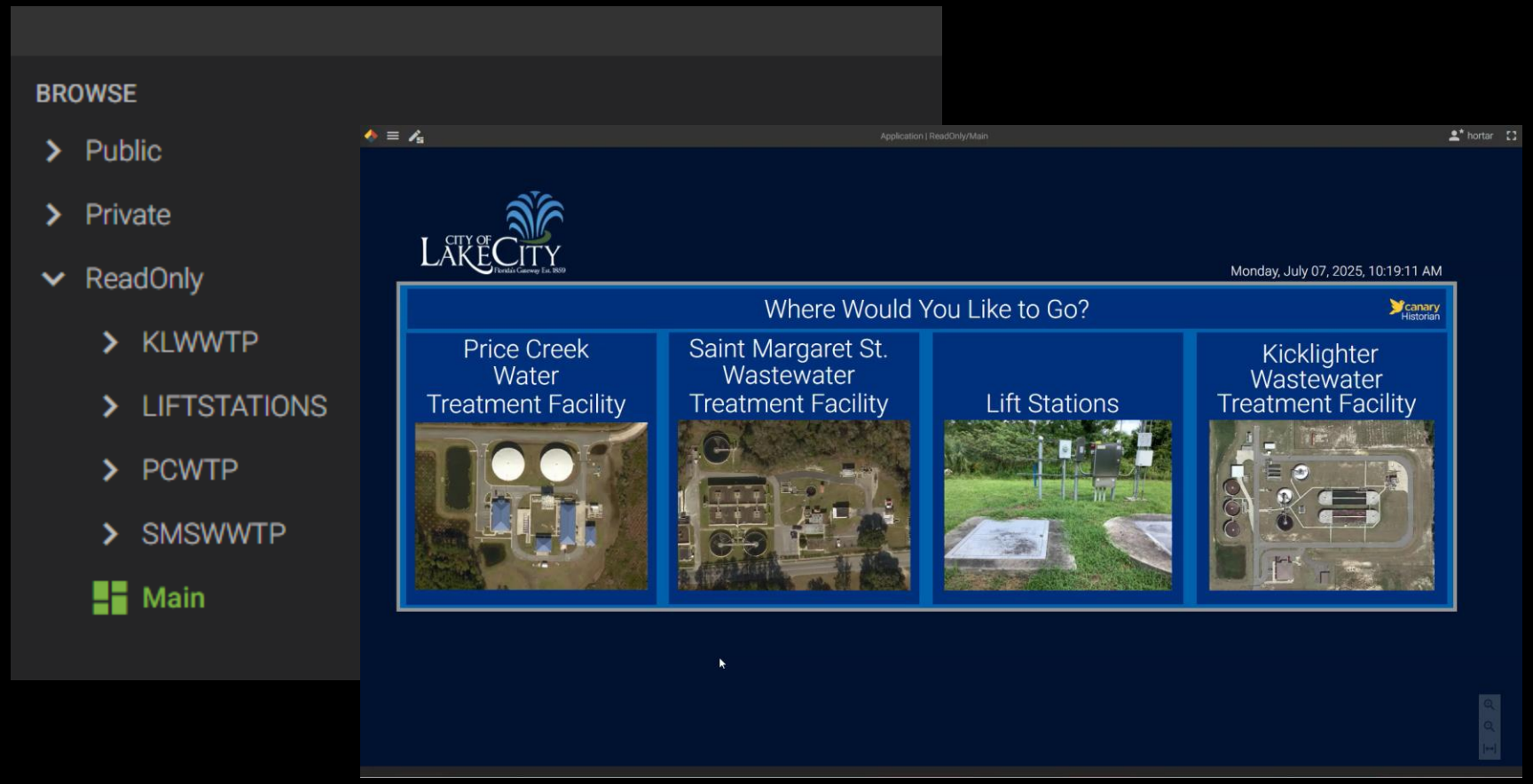
Canary Views Service

AXIOM Clients

Axiom - Main Navigation Screens

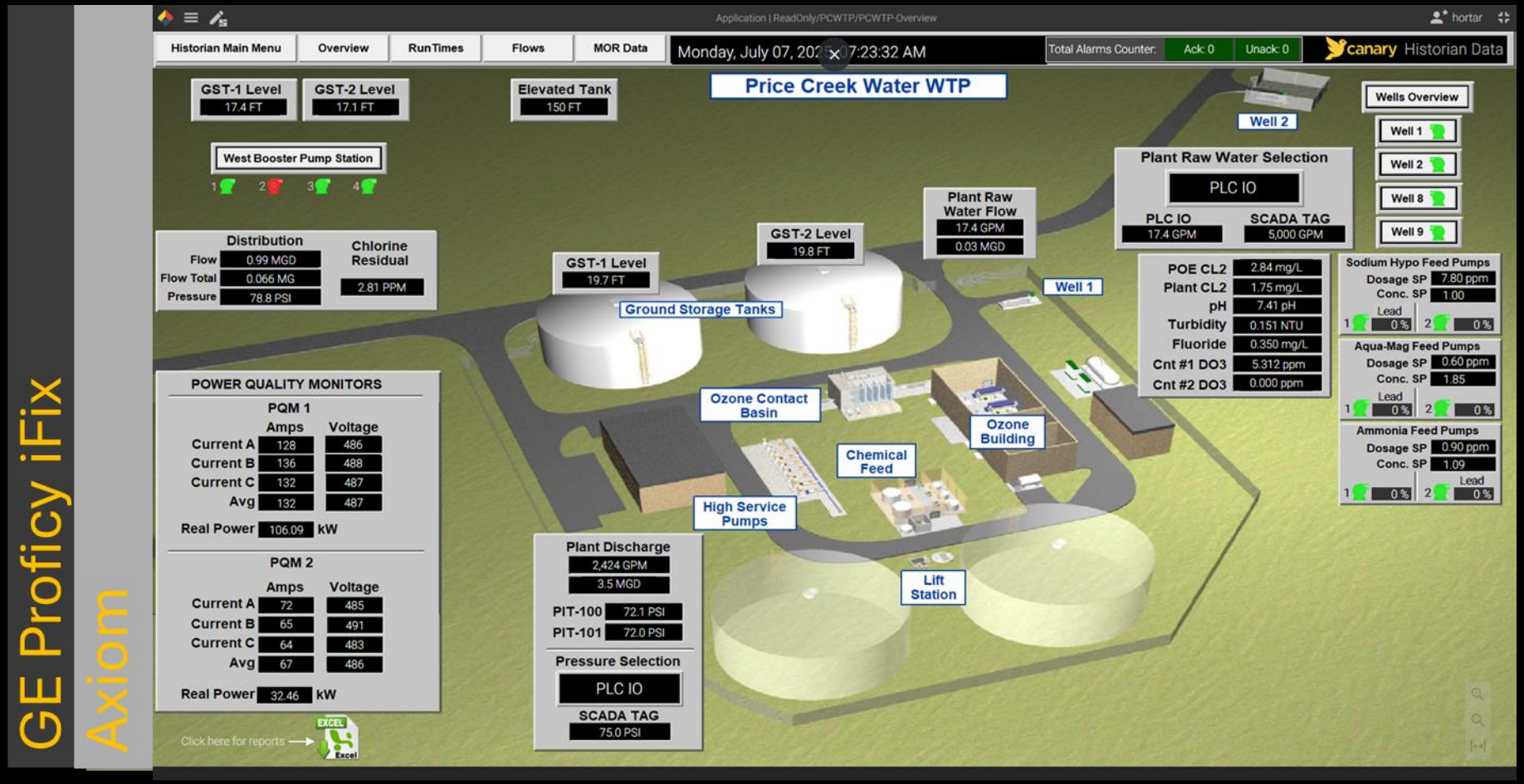
Design Goals

- Easy to Navigate
- Visual to provide users with physical location awareness.
- Graphics are Drillable to dive deeper into each asset.



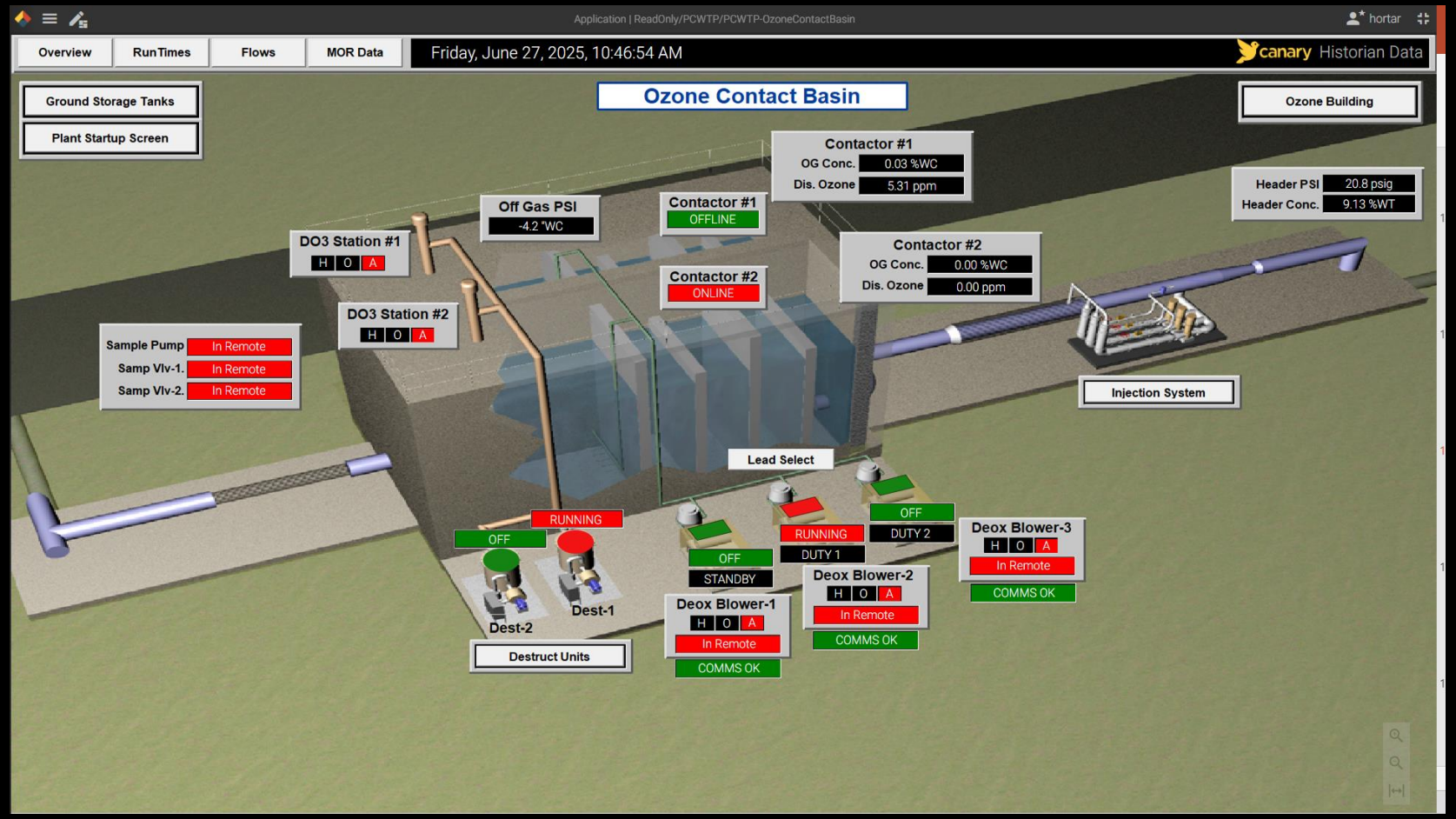
Price Creek Water Treatment Plant Overviews

Graphical displays were designed to look similar between the Ignition SCADA system and Axiom.



Price Creek - Ozone Treatment Contact Basin

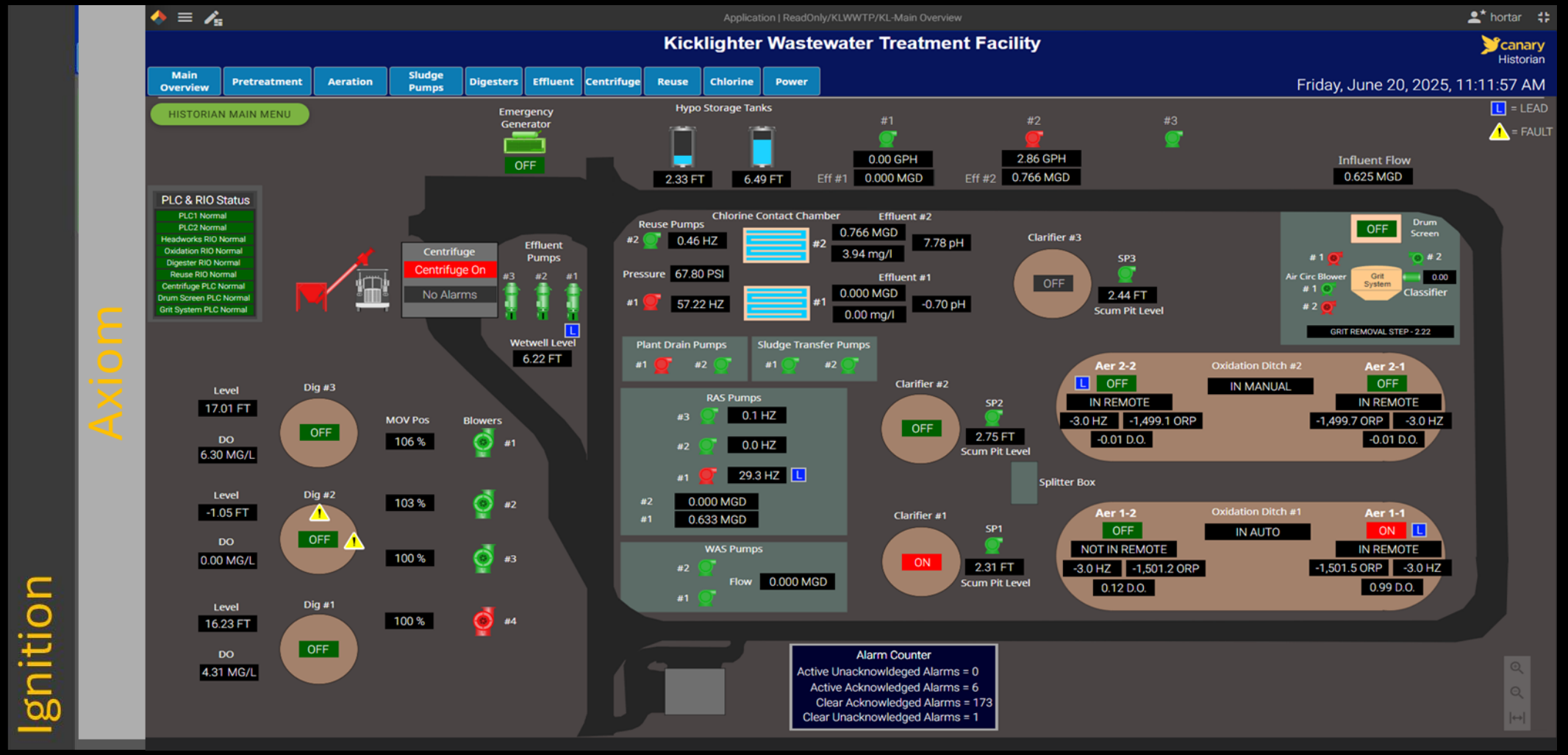
Graphical displays are Drillable to support diving into deeper details of each asset.



Price Creek Water Production Dashboard

Dashboards have been configured to provide quick insights into the operating status and conditions of the overall facility.

Kicklighter Wastewater Plant Overview



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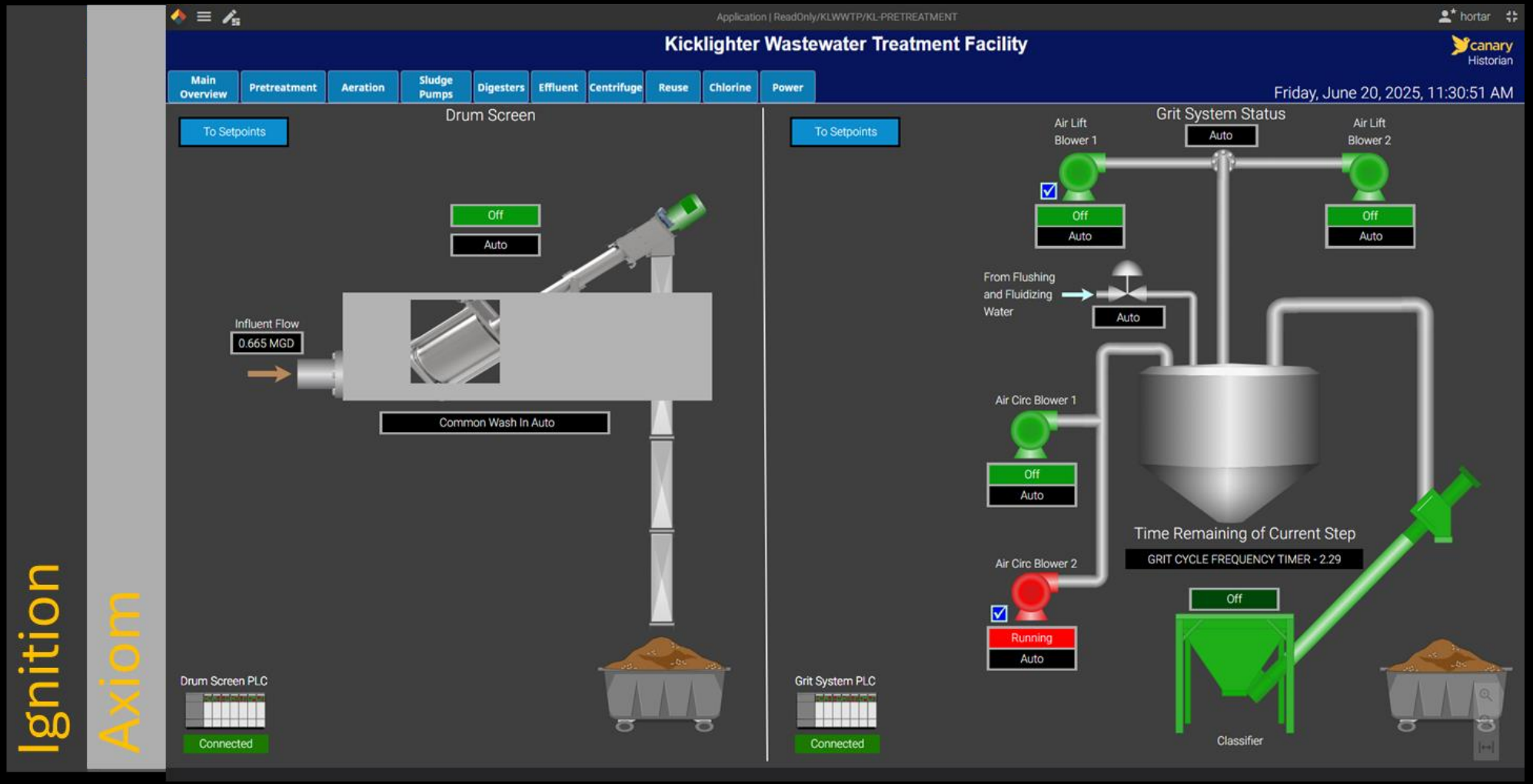
Kicklighter Wastewater Pretreatment – Drill Down



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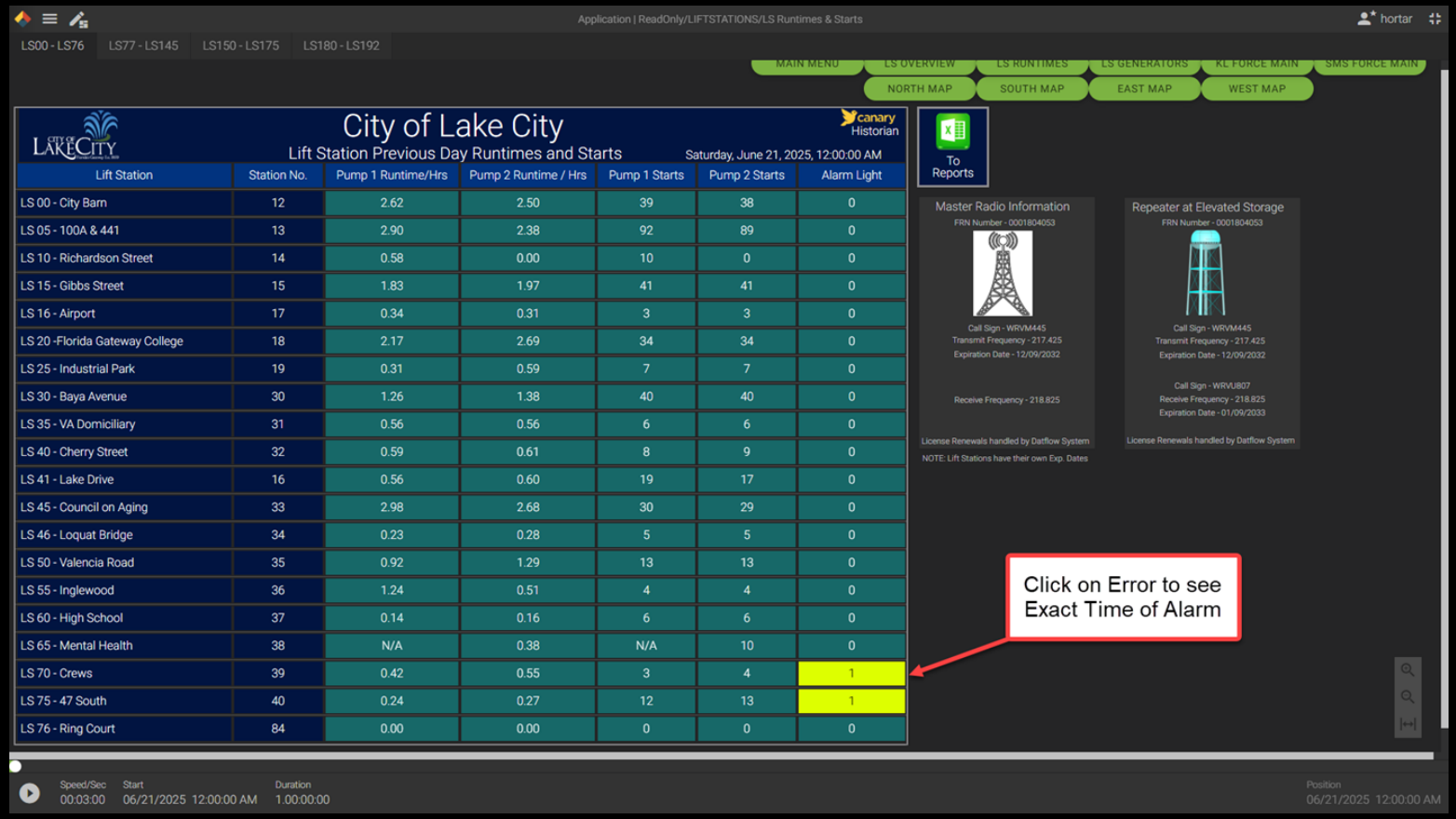
Lift Stations – Previous Day Run Status Dashboard

For Lift Stations, we provided daily runtime hours, pump starts and faults for each of the lift stations. The lift station operators view the screens in the morning to identify previous day issues with the lift stations.

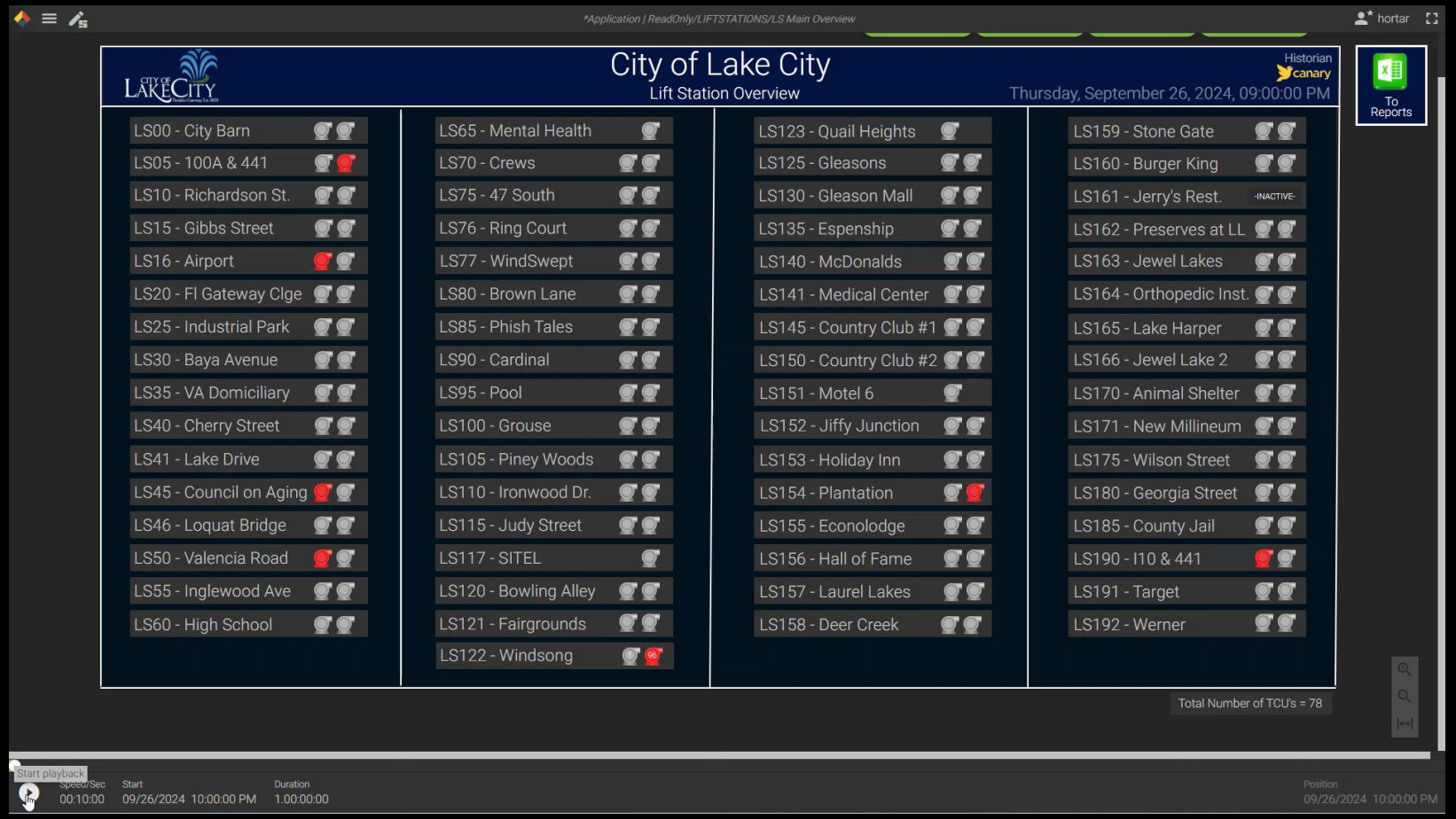


Lift Station	Station No.	Pump 1 Runtime/Hrs	Pump 2 Runtime / Hrs	Pump 1 Starts	Pump 2 Starts	Alarm Light
LS 00 - City Barn	12	2.62	2.50	39	38	0
LS 05 - 100A & 441	13	2.90	2.38	92	89	0
LS 10 - Richardson Street	14	0.58	0.00	10	0	0
LS 15 - Gibbs Street	15	1.83	1.97	41	41	0
LS 16 - Airport	17	0.34	0.31	3	3	0
LS 20 -Florida Gateway College	18	2.17	2.69	34	34	0
LS 25 - Industrial Park	19	0.31	0.59	7	7	0
LS 30 - Baya Avenue	30	1.26	1.38	40	40	0
LS 35 - VA Domiciliary	31	0.56	0.56	6	6	0
LS 40 - Cherry Street	32	0.59	0.61	8	9	0
LS 41 - Lake Drive	16	0.56	0.60	19	17	0
LS 45 - Council on Aging	33	2.98	2.68	30	29	0
LS 46 - Loquat Bridge	34	0.23	0.28	5	5	0
LS 50 - Valencia Road	35	0.92	1.29	13	13	0
LS 55 - Inglewood	36	1.24	0.51	4	4	0
LS 60 - High School	37	0.14	0.16	6	6	0
LS 65 - Mental Health	38	N/A	0.38	N/A	10	0
LS 70 - Crews	39	0.42	0.55	3	4	1
LS 75 - 47 South	40	0.24	0.27	12	13	1
LS 76 - Ring Court	84	0.00	0.00	0	0	0

Lift Station - Hurricane Helene Sept. 26

Lift stations were overwhelmed during the Hurricane Helene on September 26, 2024. This recording of the Axiom playback feature shows the impact of the storm over time.

"User especially love the Axioms playback feature. It allows them to see how situations have developed over time."



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Axiom Mobile Screens – Plant Overview Screens

- Axiom is developed with HTML5.
- Dashboards can be shared with any device that support a browser.
- Display are configured for mobile users.
- Provide visibility of operations for users on the go.
- Great for technicians working in the field.

Price Creek WTP

Kicklighter WWTP

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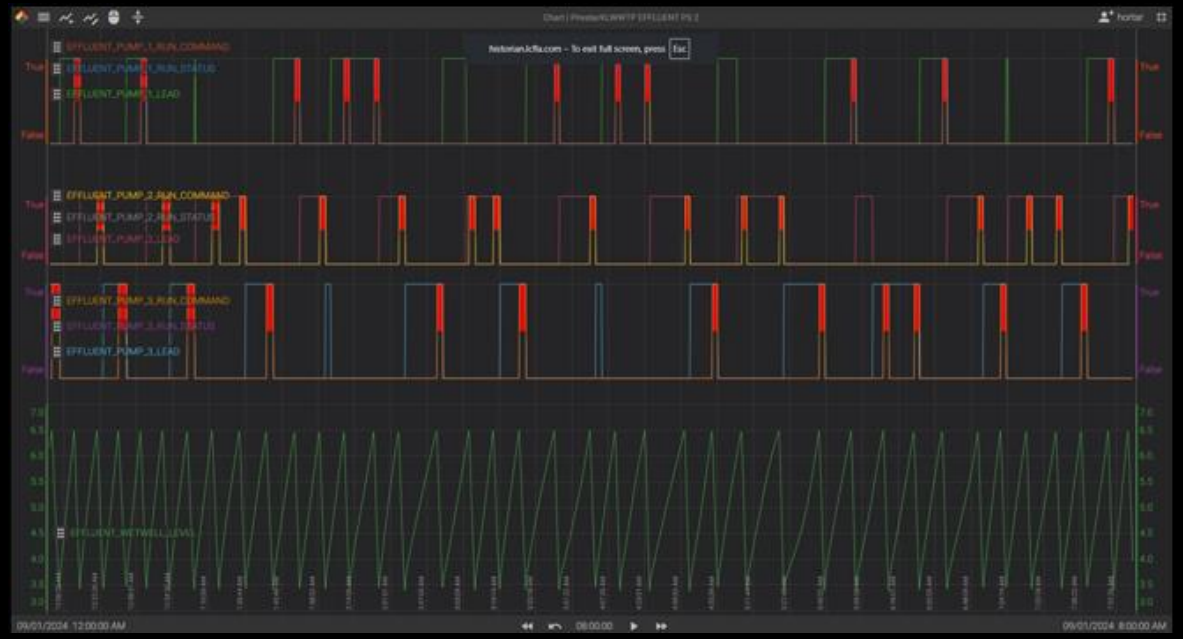
Canary Simplifies Problem Solving

The Canary System provides both real-time and historical operational insights. Powerful trending capabilities, dashboarding and graphical displays provide users with situational awareness.

Troubleshooting Examples

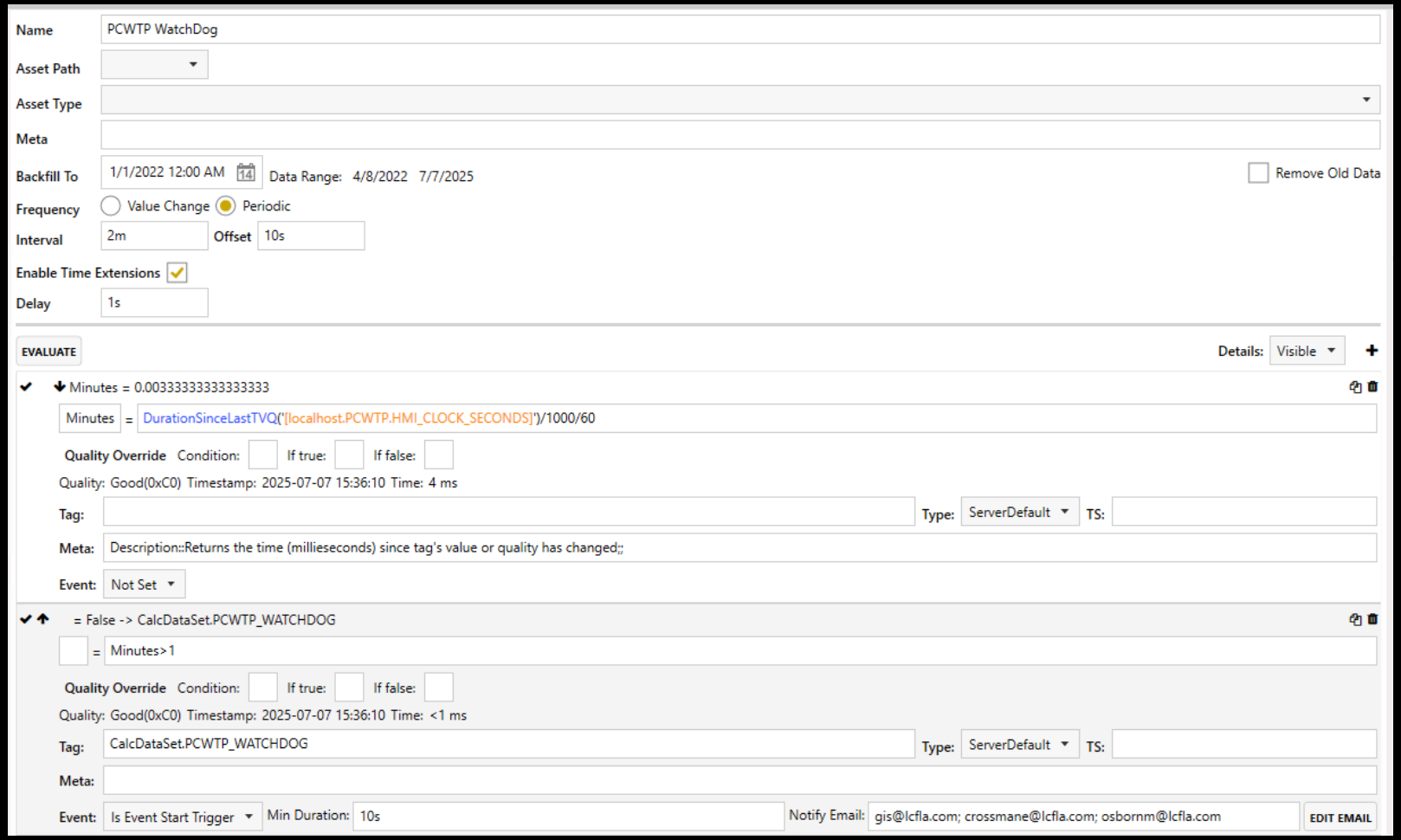
Pump Alternations



Network Monitoring

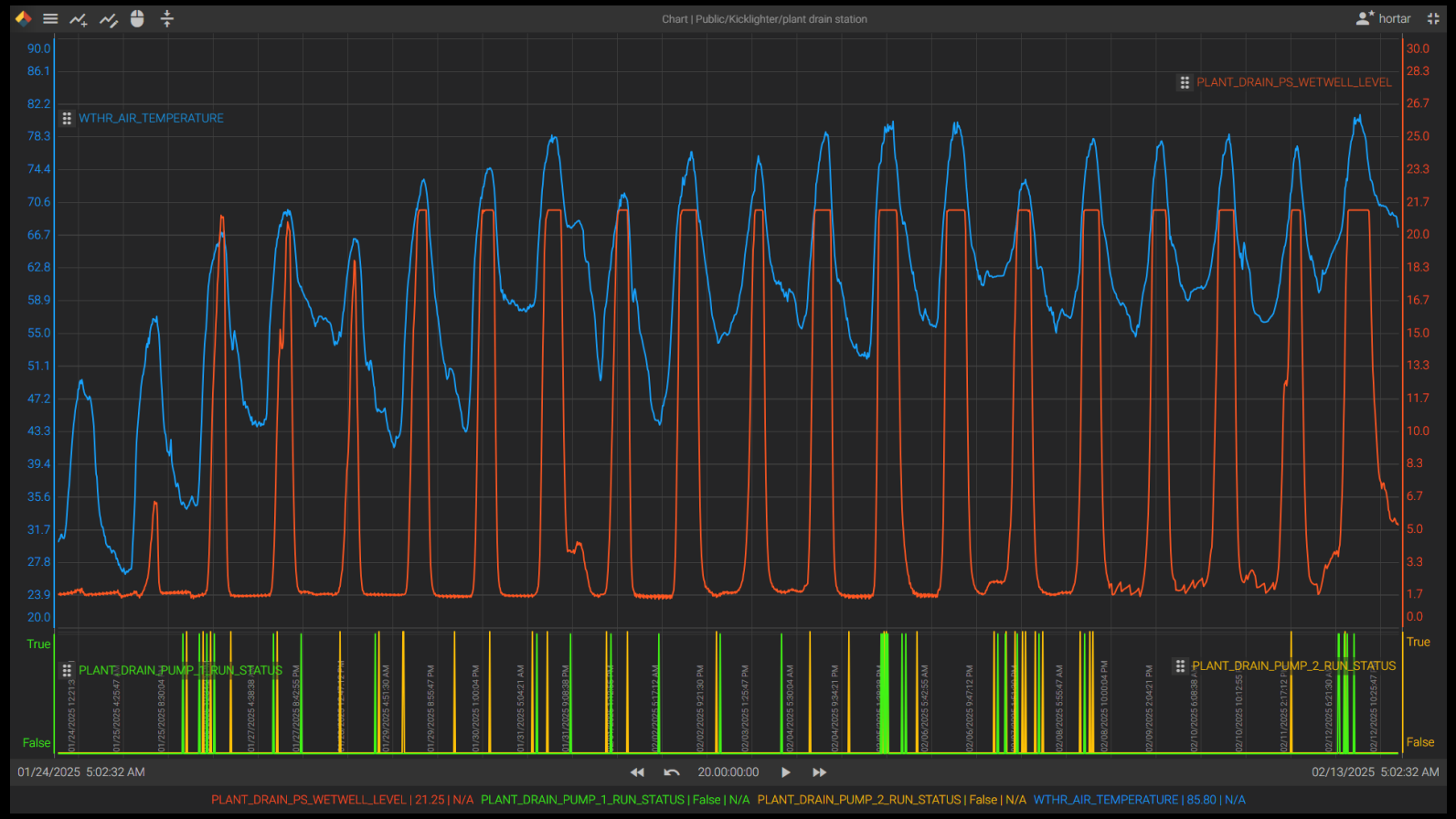
Network Outage Calculation

- Canary Calcs & Events make it easy to configure alerts that are triggered with a set of conditions are met.
- Problems come to you versus you finding them.
- Email notifications can be assigned to events to notify a group of users of abnormal conditions.



Wet well Level Affected by Air Temperature

With Trends we were able to identify a correlation of well levels to ambient air temperatures that we collect from our weather station.



Recommendations

- Collect as much data as possible from your system to help you identify abnormal conditions and avoid long and unnecessary interruptions.
- Collaborate with End Users to develop screens that provide them with information to optimize operations.
- Create initial displays and keep navigation simple to help users get comfortable using Axiom.
- Don’t underestimate the power of the Playback function.
- Take advantage of Calcs & Events to automate excursion and abnormal condition detection.
- Enhance displays and reports as new insights are gained.

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Thank You

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