
AVEVAWORLD

LOS ANGELES COUNTY SANITATION DISTRICTS

Converting Waste Into Resources

Los Angeles County Sanitation Districts

Centralizing, Visualizing and Sharing Real-time data Using PI, Asset Framework and CONNECT

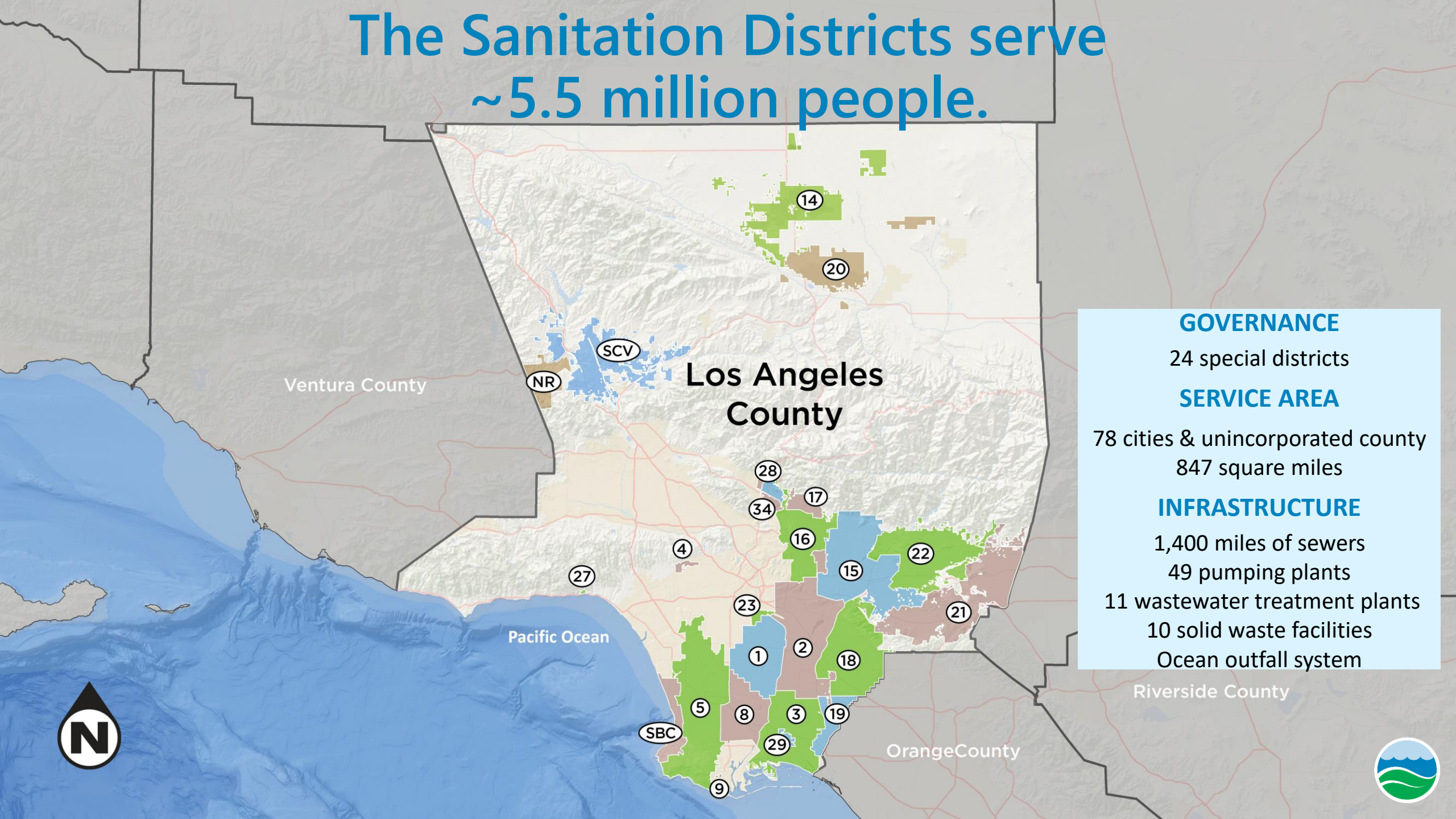
Greg Anderson

PI Server and PI System administrator

Wayne Holder

PI System administrator

The Sanitation Districts serve ~5.5 million people.



GOVERNANCE

24 special districts

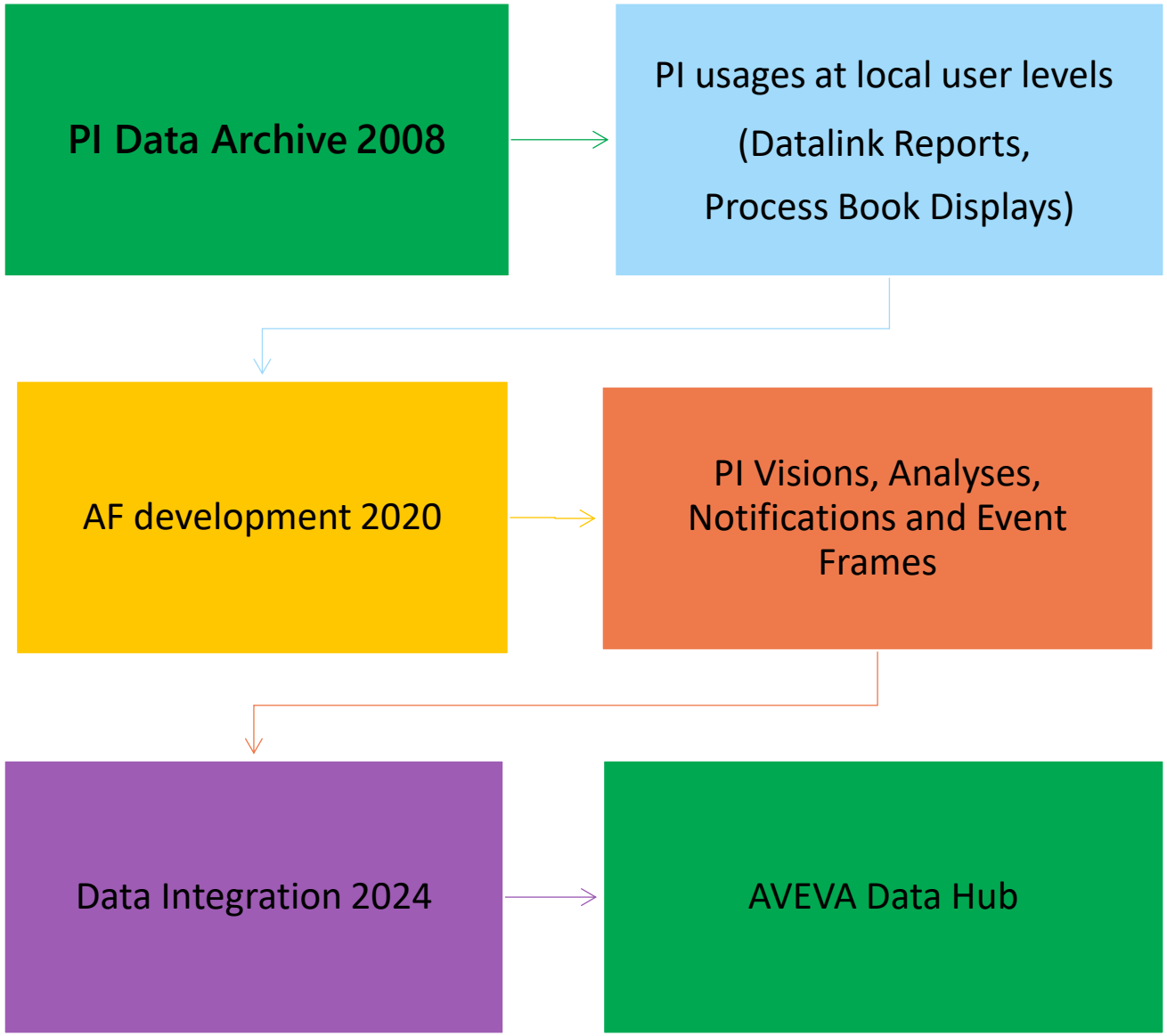
SERVICE AREA

78 cities & unincorporated county
847 square miles

INFRASTRUCTURE

1,400 miles of sewers
49 pumping plants
11 wastewater treatment plants
10 solid waste facilities
Ocean outfall system

PI History at LACSD



LACSD PI System Overview

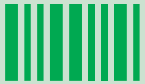
- PI Points (30K)
- PI Visions Displays (810)
- AF Analyses (1369)
- Notifications (405)

AVEVA™ PI AF use Cases

- Daily Chemical Tank inventories
- Sludge Storage Silo compliance notifications
- Total Energy Facility dual gas flow notification
- Sedimentation tank blanket level detector bad quality
- Pumping plant high level

Chemical Tank Inventories

Each day our operators would need to collect chemical inventories and forward the totals to our vendors



This process was automated using analyses that collect the total inventory every day at 12:00 AM. Event Frames are generated, and notifications are sent to our operators and our vendors

This example uses the Chemical Tank template, and Sec Hypo Tanks Element. Similar notifications are also generated for other chemicals

Event Frame Notification

All users in the subscription will receive the notification

Sec Hypo Tanks Previous Day Inventory notification.

PINotifications
To Holder, Wayne
Retention Policy LACSD 4 Month Delete (Permanent) - Inbox (4 months)
Translate message to: English | Never translate from: Japanese | Translation preferences

Name: Previous Day Inventory
Start Time: 1/14/2025 7:00:00 AM Pacific Standard Time (GMT-08:00:00)
Severity: Information
Send Time: 1/14/2025 7:00:08 AM Pacific Standard Time (GMT-08:00:00)

Current Total Volume-Secondary Hypochlorite:	82385 US gal
Previous Day Total Volume-Secondary Hypochlorite:	74991 US gal
Total Capacity:	120000 US gal

Hypo Tank1 Level 12AM	20.57 ft
Hypo Tank2 Level 12AM	19.67 ft
Hypo Tank3 Level 12AM	12.14 ft
Hypo Tank4 Level 12AM	0.16 ft
Hypo Tank5 Level 12AM	4.64 ft
Hypo Tank6 Level 12AM	10.35 ft
Hypo Tank7 Level 12AM	10.41 ft
Hypo Tank8 Level 12AM	10.46 ft

Secondary Hypo Pi Vision Screen

Solids Polymer Previous Day Chemical Inventory Notification Solids Polymer 2025-01-14

PINotifications
To Holder, Wayne
Retention Policy LACSD 4 Month Delete (Permanent) - Inbox (4 months)
Translate message to: English | Never translate from: Japanese | Translation preferences

Event: Previous Day Chemical Inventory Notification Solids Polymer 2025-01-14 07:00:00.000
Name: Previous Day Inventory
Start Time: 1/14/2025 7:00:00 AM Pacific Standard Time (GMT-08:00:00)
Severity: Information
Send Time: 1/14/2025 7:00:06 AM Pacific Standard Time (GMT-08:00:00)

Emulsion Polymer

Previous Day Active LBS-Emulsion:	248178 lb
Previous Day Total Volume-Emulsion Polymer:	64129 US gal
Total Capacity:	76000 US gal
Tank2-Emulsion Level 12AM	15.07 ft
Tank3-Emulsion Level 12AM	18.72 ft

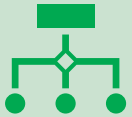
Mannich Polymer

Previous Day Total Volume-Mannich Polymer:	19188
Total Capacity:	38000 US gal
Tank1-Mannich Level 12AM	10.09 ft

Solids Polymer System PI Vision

Silo Sludge Notification

Our Reuse and Compliance department schedules additional hauling based on our storage silo end of day tonnage



The end of day storage tons is compared to compliance levels. If there is an exceedance, a notification is sent with the severity of the overage and the total tonnage

Event Frame Notification

Solids Silo Sludge End of shift notification to notify Reuse and Compliance as well as area engineers

TONS OF SLUDGE generated a new notification event.

P PINotifications@lacsd.org
To Holder, Wayne
Retention Policy LACSD 4 Month Delete (Permanent) - Inbox (4 months)
This message was sent with High importance.

Event: JWPCP TONS OF SLUDGE EOS SILOS 2024-02-12 06:00:00.000
Name: TONS OF SLUDGE
Start Time: 2/12/2024 6:00:00 AM Pacific Standard Time (GMT-08:00:00)
Severity: Major: > 1500 Tons
Send Time: 2/12/2024 6:00:05 AM Pacific Standard Time (GMT-08:00:00)

SLUDGE IN SILOS AT END OF SHIFT: 1880 TONS

TONS OF SLUDGE generated a new notification event.

P PINotifications@lacsd.org
To Holder, Wayne
Retention Policy LACSD 4 Month Delete (Permanent) - Inbox (4 months)
This message was sent with High importance.

Event: JWPCP TONS OF SLUDGE EOS SILOS 2024-03-05 06:00:00.000
Name: TONS OF SLUDGE
Start Time: 3/5/2024 6:00:00 AM Pacific Standard Time (GMT-08:00:00)
Severity: Critical: > 2000 Tons
Send Time: 3/5/2024 6:00:09 AM Pacific Standard Time (GMT-08:00:00)

SLUDGE IN SILOS AT END OF SHIFT: 2880 TONS

Total Energy Facility Dual Gas Flow

Our Total Energy Facility can utilize both digester and natural gas for electrical generation. Our operators and engineers need to know if we are using natural gas when digester gas is being flared.

A notification is sent when digester gas is being flared, and natural gas is being consumed for an extended time.

Event Frame Notification

WWRF Dual Gas Flow notification

TEF DUAL GAS FLOW NOTIFICATION generated a new notification event.

P

PINotifications@lacsd.org
To Holder, Wayne
Retention Policy LACSD 4 Month Delete (Permanent) - Inbox (4 months)

Event: TEF DUAL GAS FLOW NOTIFICATION
Start Time: 2/8/2024 3:36:14 AM Pacific Standard Time (GMT-08:00:00)
Target: JWPCP\Total Energy Facility
Severity: Major
Send Time: 2/8/2024 3:36:30 AM Pacific Standard Time (GMT-08:00:00)

Natural Gas Flow 60m Avg 631.85 ft3/m
PLANT GAS FLOW TO FLARES 60m avg 300.40 SCFM

Event Details Hyperlink

Bad Sedimentation Tank Blankets

Our Primary sedimentation tank RADAR blanket level detectors will sometimes show bad values.

Our Industrial Waste inspectors found that these bad values can be an indicator of industrial discharge issues.

This notification sends an email and a text to our inspectors whenever the specified number of blanket level detectors are showing bad values.

Event Frame Notification

WWRF Bad Blanket Detectors notification for Industrial Waste

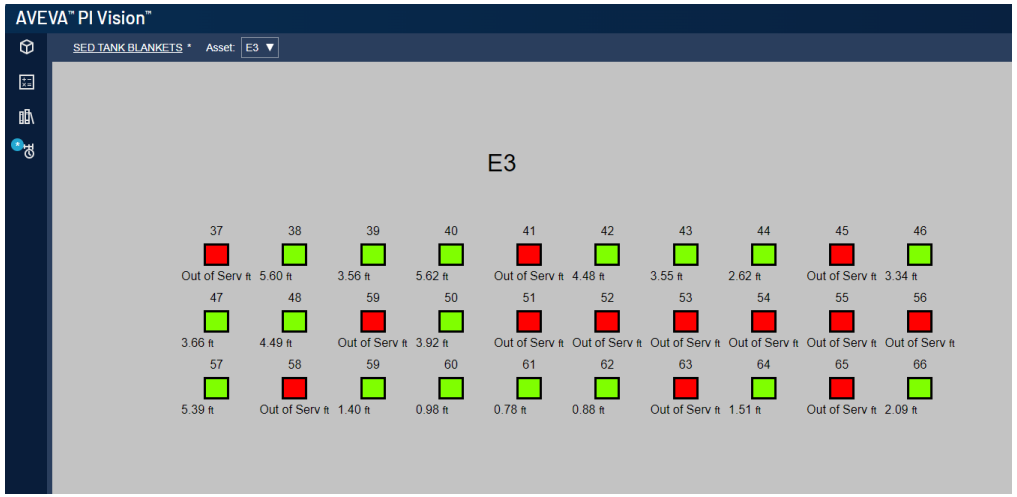
E3 Bad Blanket Readings generated a new notification event.

P PINotifications@lacsd.org
To Holder, Wayne
Retention Policy LACSD 4 Month Delete (Permanent) - Inbox (4 months)

Event: E3 Bad Blanket Readings
Name: Notification Rule
Start Time: 2/15/2024 6:40:30 PM Pacific Standard Time (GMT-08:00:00)
Target: JWPCP\Primary Treatment\Primary Effluent\E3
Send Time: 2/15/2024 7:10:45 PM Pacific Standard Time (GMT-08:00:00)

Bad Blanket Total 13

Blanket URL



Pumping Plant High Level

Our Industrial Waste inspectors noticed periodic high levels at one of our pumping plants that seemed suspicious

It was determined that a sustained high level could indicate a potential unauthorized discharge, requiring prompt investigation

This notification sends an email and a text to our inspectors whenever the wet well level exceeds the criteria

Event Frame Notification

Pumping Plant Hi Level notification

PP-MAIN_ST generated a new notification event.

P PINotifications@lacsd.org
To Holder, Wayne
Retention Policy LACSD 4 Month Delete (Permanent) - Inbox (4 months)

Event: PP-MAIN_ST
Name: WWLIT HI>2HRS
Server: JA845.lacsd.org
Database: Pumping Plants
Start Time: 2/6/2024 9:07:22 AM Pacific Standard Time (GMT-08:00:00)
Target: PP-MAIN_ST
Severity: Major
Send Time: 2/6/2024 11:07:28 AM Pacific Standard Time (GMT-08:00:00)

Event Details Hyperlink

Wetwell Level at Start- Primary	**7.6265**	**ft**	**2/6/2024 5:46:22 AM Pacific Standard Time (GMT-08:00:00)**
Wetwell Level at End- Primary	**7.6265**	**ft**	**2/6/2024 5:46:22 AM Pacific Standard Time (GMT-08:00:00)**

Wetwell Level at Start- Secondary	**7.346**	**ft**	**2/6/2024 5:46:22 AM Pacific Standard Time (GMT-08:00:00)**
Wetwell Level at End- Secondary	**7.346**	**ft**	**2/6/2024 5:46:22 AM Pacific Standard Time (GMT-08:00:00)**

Visualization and Asset Framework

Benchmark / snapshot a new process from day one

Monitor equipment

PI system monitoring

“Plus it up” Add a new Skill with each new project

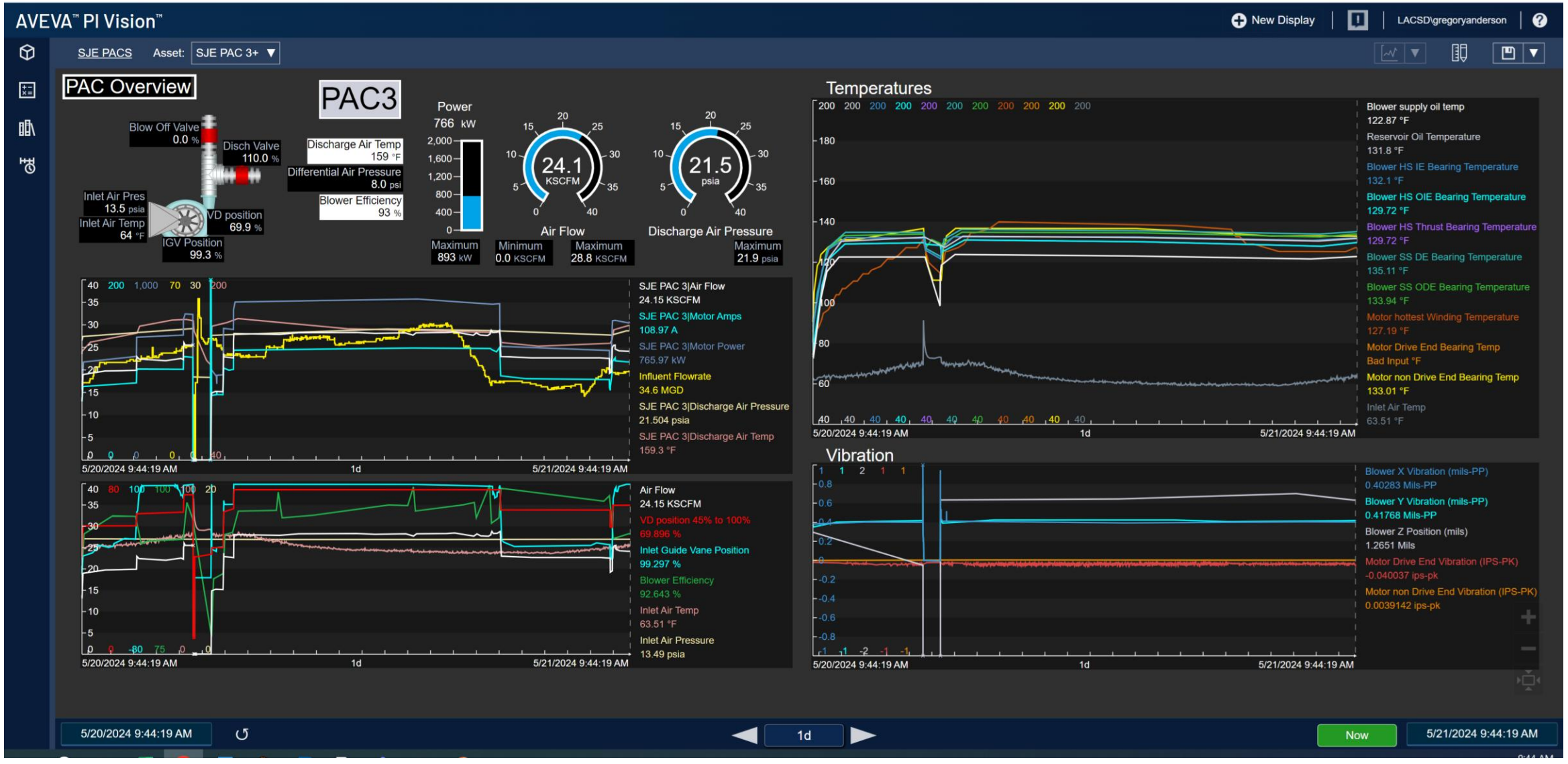
- Notification with a table or a link
- PI vision with table, link, navigation
- Analyses add efficiency calculation, add Max, Min. event frame

Benchmarking New ATWF Plant

- Chemical intensive process
- Technology New to the Districts
- Final process dependent on previous processes treating the water
- Creating PI tags before the process is commissioned to snapshot the plant running in the new condition

Advanced Water Treatment

Process Air Compressors



AVEVA™ PI System Monitoring

External data sources

Data Sources: Rain Data

- Gauge adjusted radar rainfall (GARR) Rainfall
- Divided into 1 square km areas in greater LA area.
- Integrated via REST API endpoint from data vendor

Data Sources: Flow Meter

- Flow Meters (measure flow, depth, etc.) for all sewers across LA
- Coming from 3 different meter vendors, all with their own REST APIs

Using PI Connector for UFL (Universal File and Stream Loading)

Connector can read direct from REST API endpoints or from structured text (.json, .csv, .txt, etc)

GARR Rain Data:

Polls data periodically directly from REST endpoint

Flow Meter Data:

Create .json payload via custom PowerShell script run using Windows Task Manager

.json processed by UFL sources for each respective flowmeter vendor

PI tag names, timestamp, other are all created via custom .ini files

Data Sources: Flow Meter Data

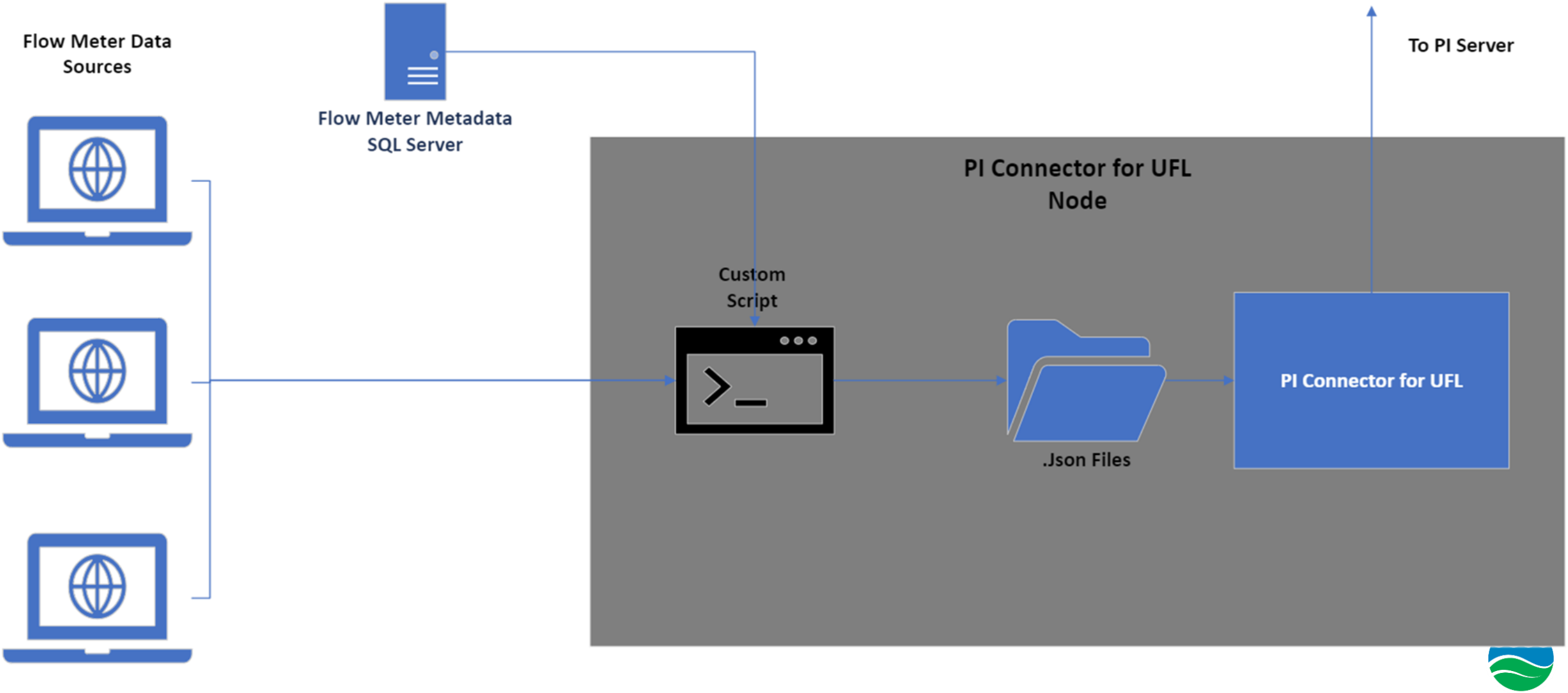
- Existing Long Term Meters (27)
- Flow Model Pilot Meters (133)
- Flow Model Phase 1 Meters (583)
- Flow Model Phase 2 Meters (300)

Flow Meter Database Integration

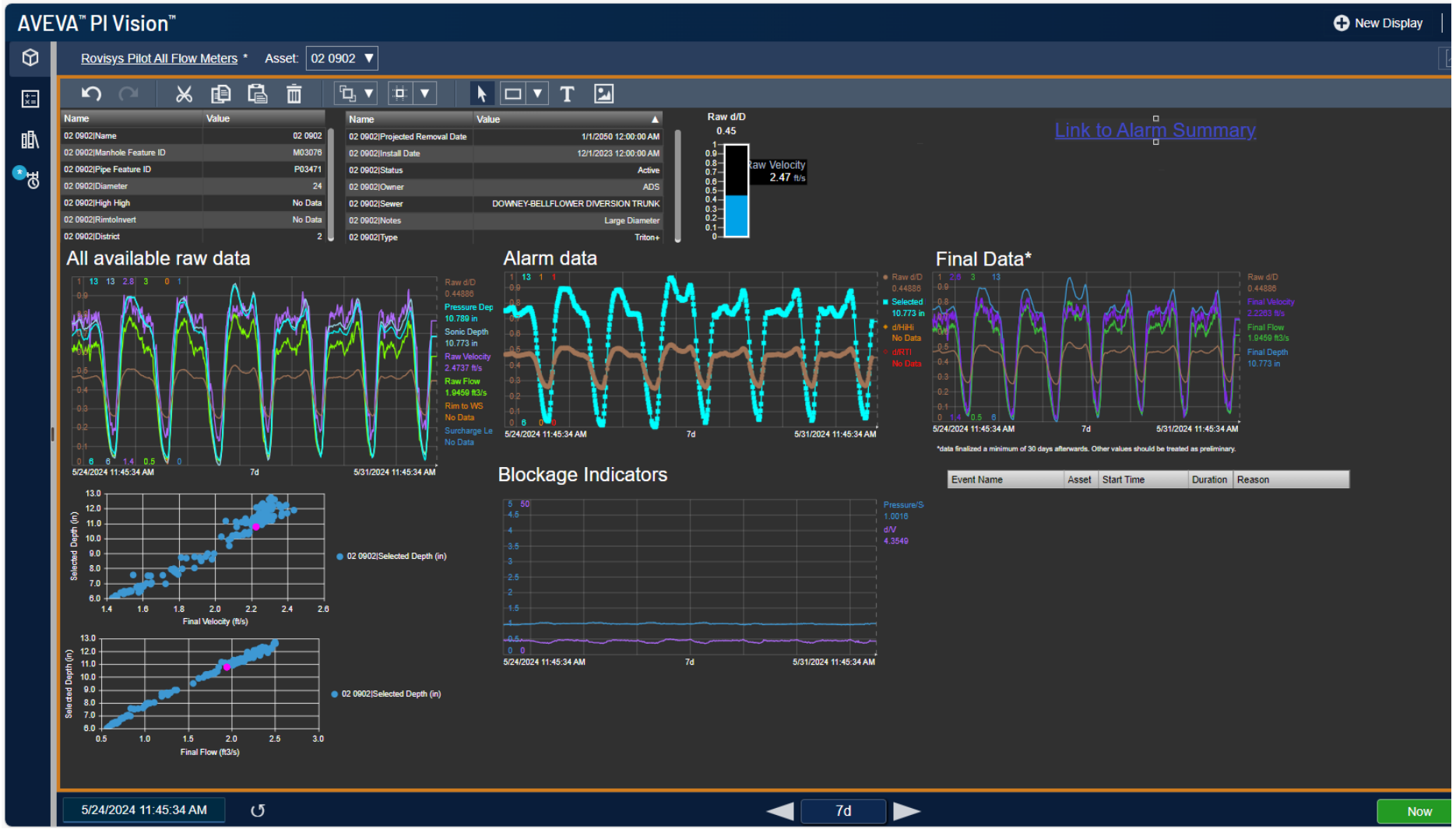
Use SQL database of all flowmeters to **automatically** create PI tags for all available active flowmeters

How it works: Custom PowerShell script queries API data from all active flow meters found in SQL database. Then, using UFL, we create unique tag names using the flow meter IDs and attribute name

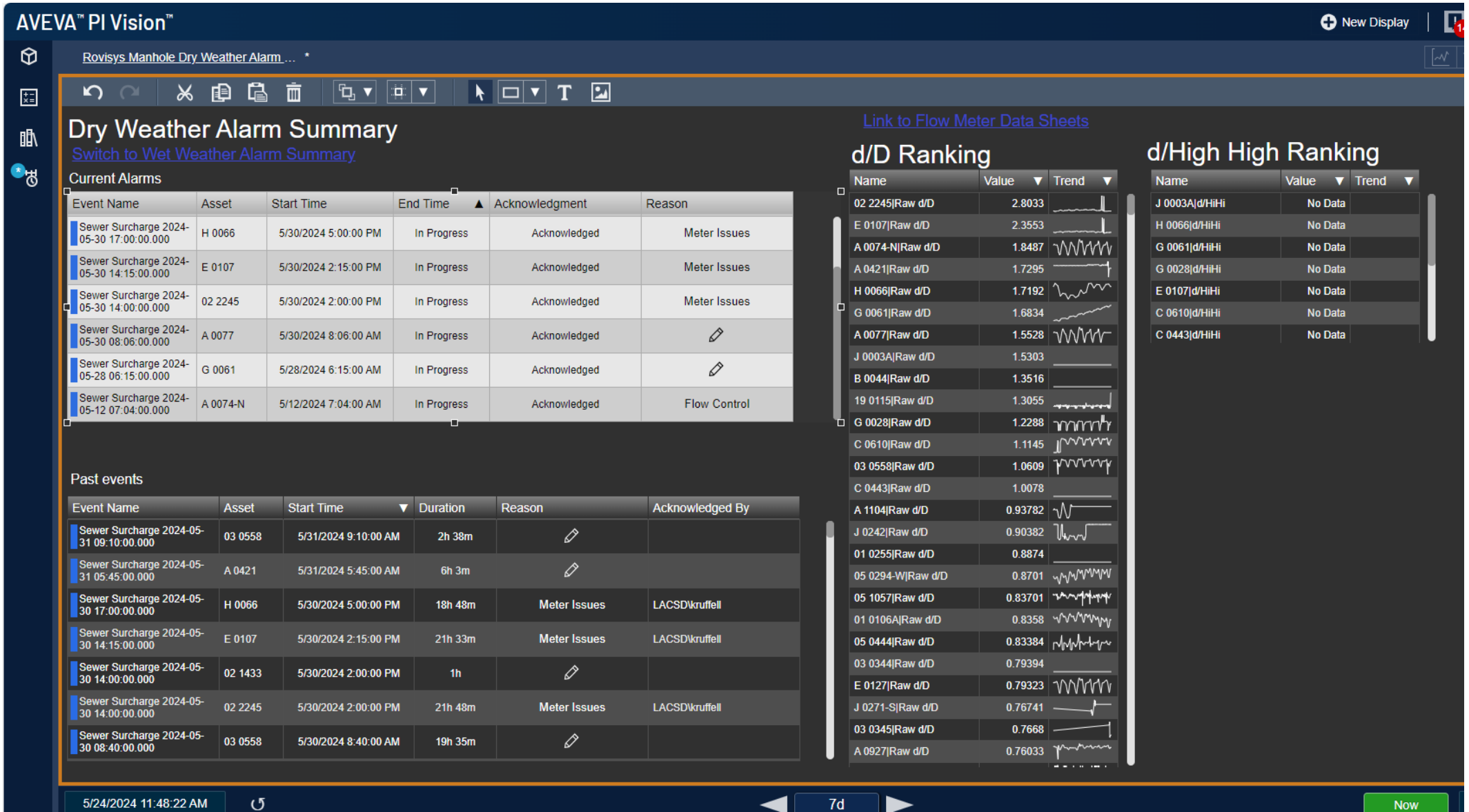
Flow Meter Data



Standardized Sewer Flow Analytics



Summary Data and Alarms

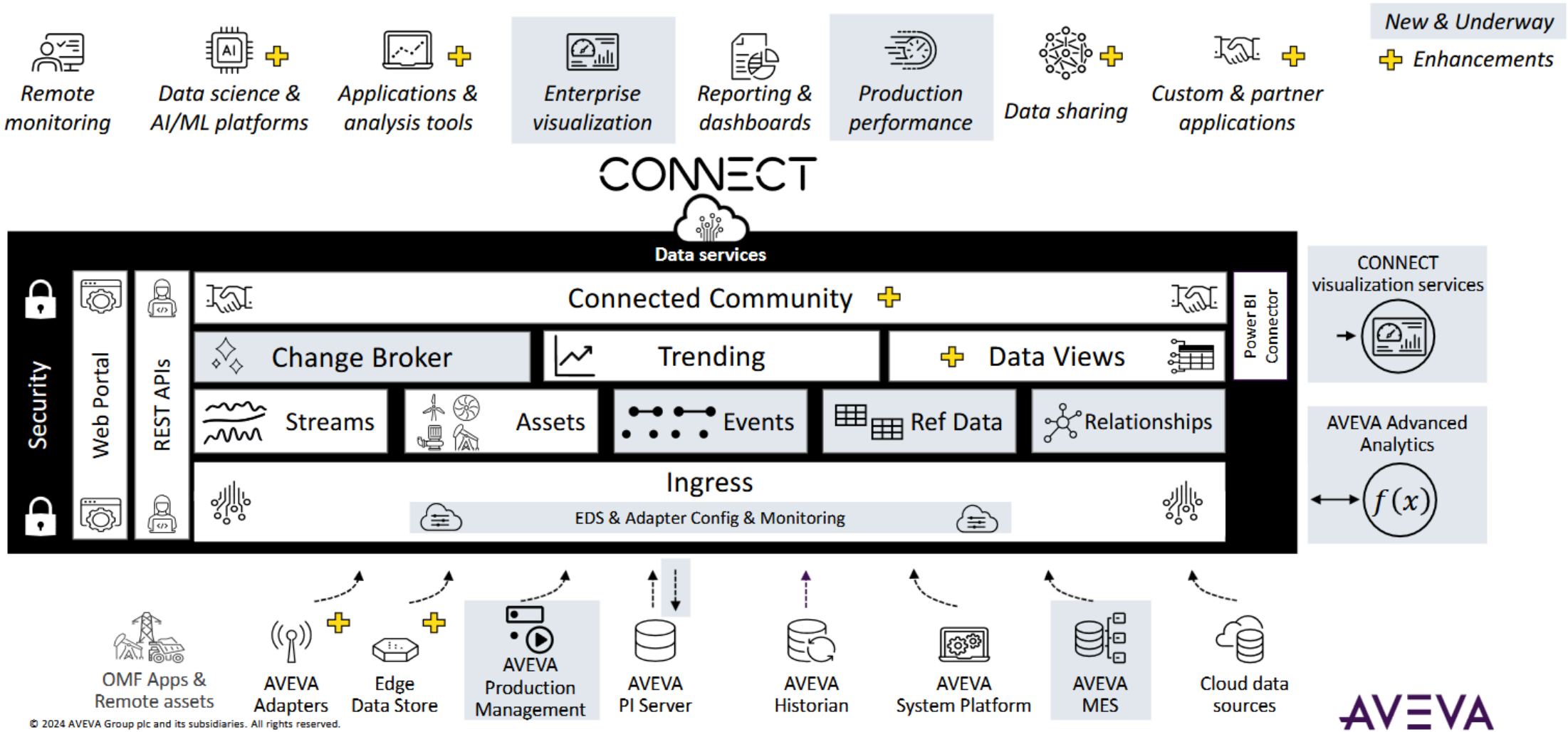


What are we working on

Machine Learning applications

- Detect and respond to blockages
  - Level from pressure sensor, level from sonic sensor, and velocity
- Identify areas to investigate for inflow and infiltration sources
  - Level, flow, tributary rainfall, water temperature
- Sewer Dischargers reporting flow directly to Aveva Data services

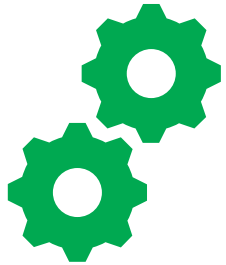
CONNECT Data services in 2024



Flow Equalization Modeling CONNECT

What's Next

Improved GIS Integration



Treatment Plant Optimization

Data Driven modeling to identify sensor drift

Machine Learning models to assist plant operators

WATER AND WASTEWATER | USA

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

Los Angeles County Sanitation Districts reduced downtime and improved efficiency

Challenge

- Chemical inventories were collected and forwarded manually
- Non-operational staff could not easily access operational data.
- Data system health could not be easily monitored.
- Potential operational issues were difficult to identify and address proactively, leading to reactive troubleshooting and potential downtime.

Solution

- Implemented AVEVA™ PI System for automated inventory management, identification of potential operational issues, system health monitoring and controlled visual access for non-operational staff.

Results

- **Eliminated manual inventory processes, resulting in improved inventory accuracy and vendor interaction.**
- **Empowered non-operational staff with easy access to relevant operational data through customized PI Vision dashboards.**
- **Achieved proactive system health monitoring, reducing unplanned downtime.**
- **Reduced reactive troubleshooting and potential downtime through proactive PI Notifications, resulting in a reduction in critical incident response time.**

Questions