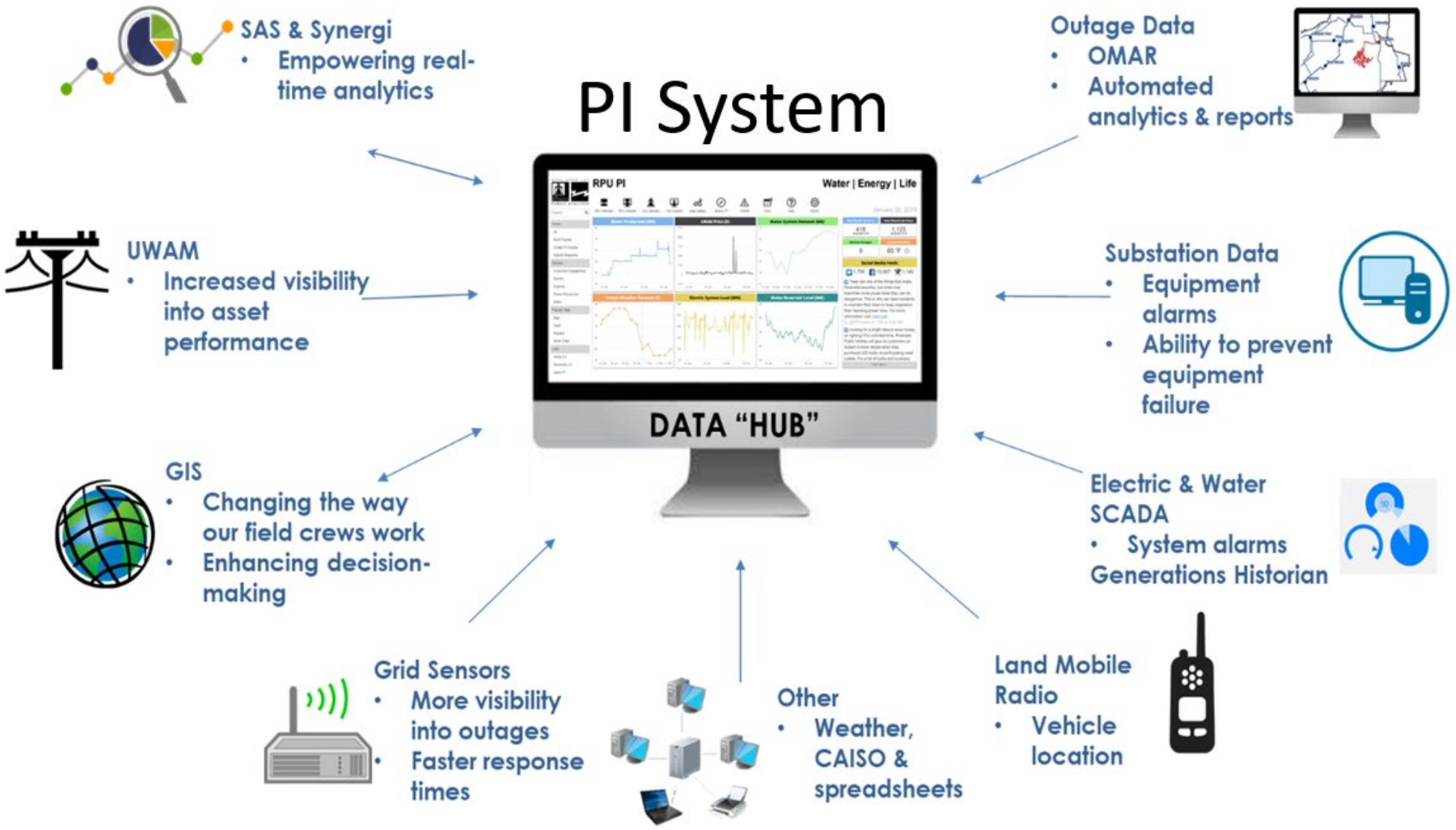
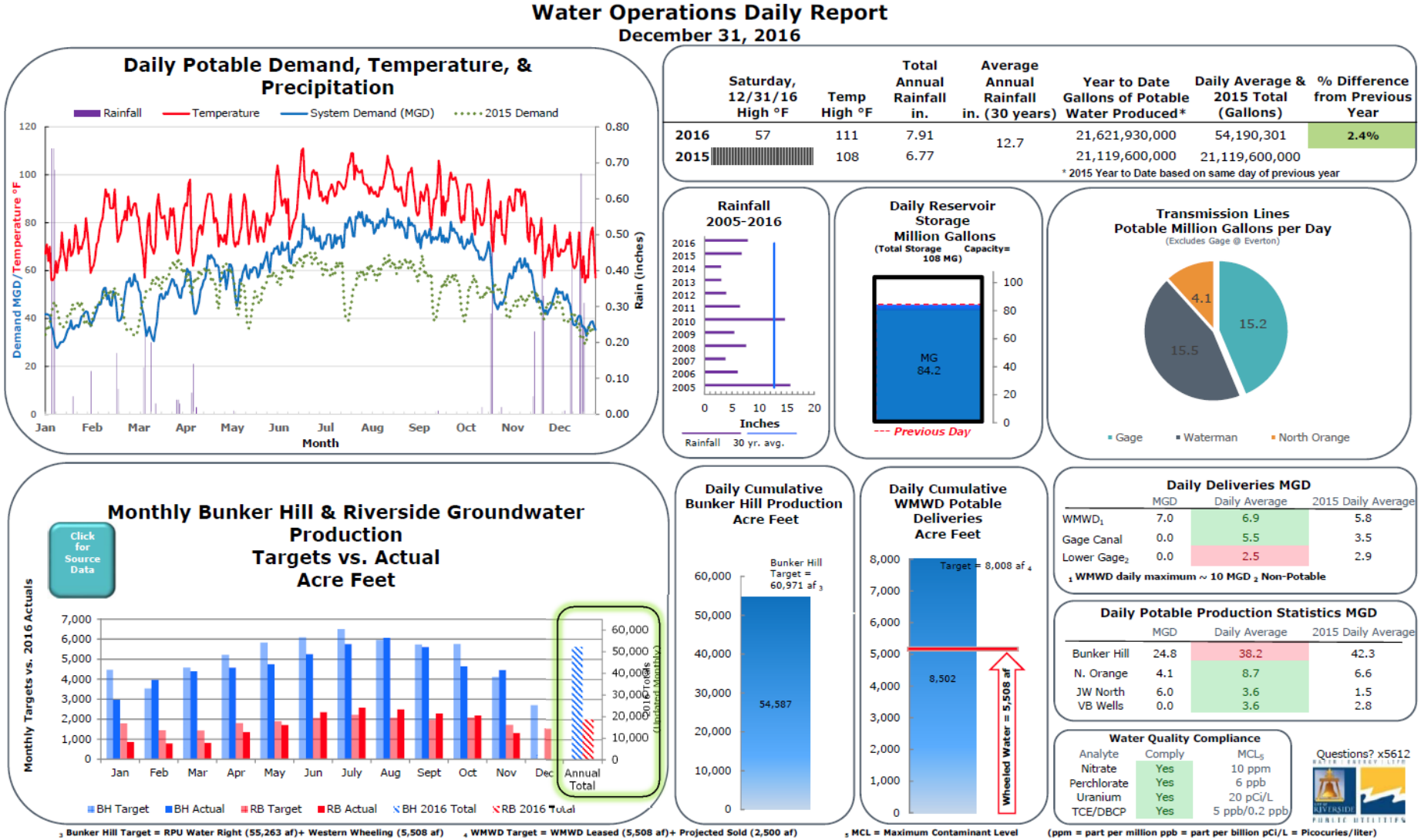
The PI System – Data Hub

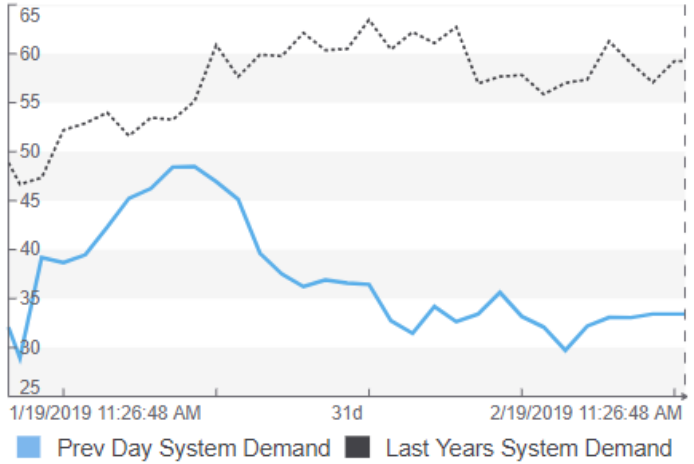


Water Operations Dashboard – Prior State



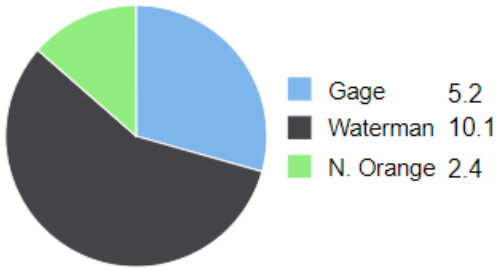
Water Operations Dashboard

Cumulative Daily System Demand

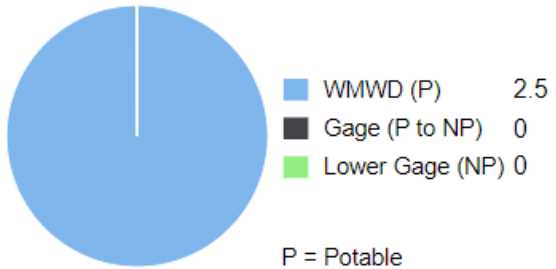


Today's High Temp Forecast	Today's Current Temperature	Current Water Production	YTD Prod. Potable Water 2,019	YTD Prod. Potable Water 2,018	Total 2,018
57 F	54 F	36.9MGD	2 BG % Diff -26.1	2.7 BG	23.6 BG

Production (MG) by Transmission Line

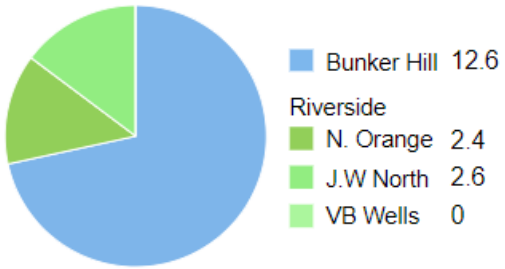


Water Delivery (MG) Potable & Non Potable



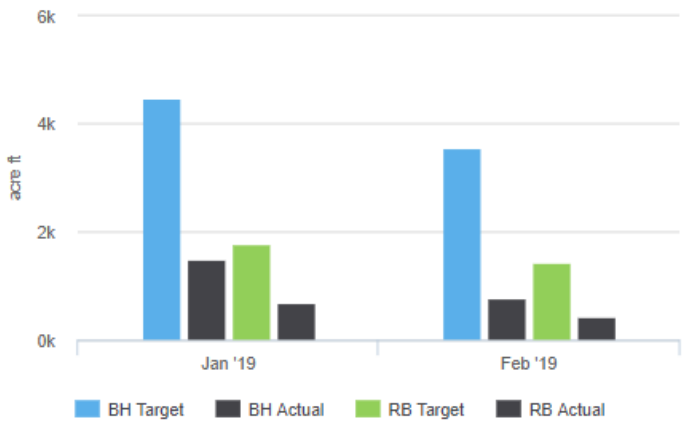
P = Potable
NP = Non Potable

Potable Production (MG) by Basin

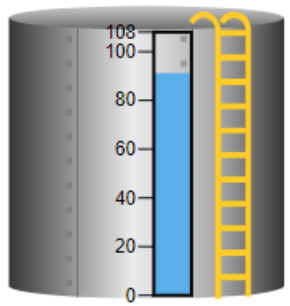


Monthly Bunker Hill & Riverside Groundwater Production

Target vs Actual (AF)



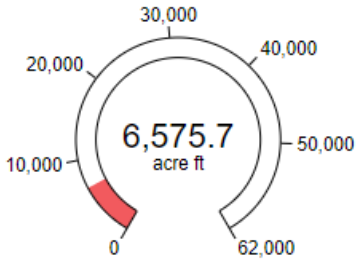
Reservoir Level 91.1 MG



Capacity = 108 MG

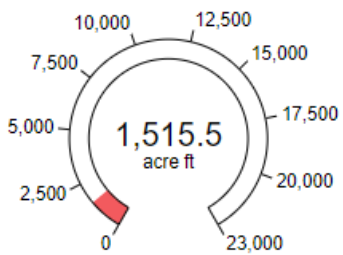
Bunker Hill Production

Target = 61,898 acre feet



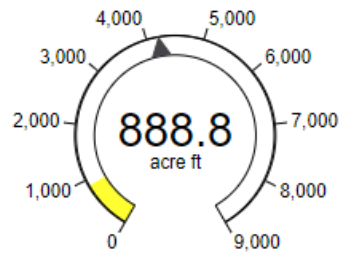
Riverside Production

Target = 22,245 acre feet



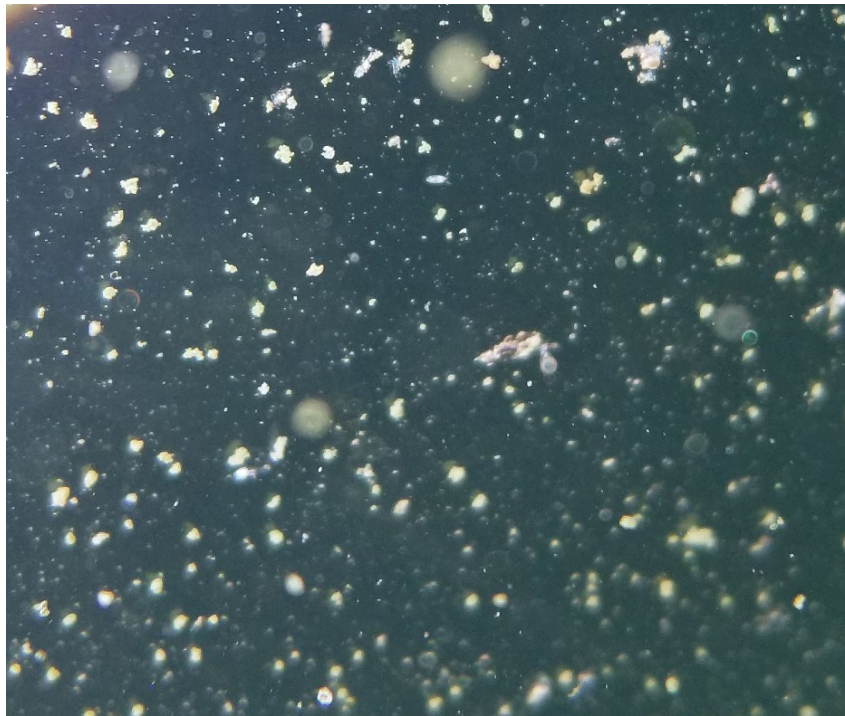
WMWD Potable Delivery

Target = 8,008 acre feet




CITY OF Salem
AT YOUR SERVICE
Willow Lake Laboratory
LIMS#
Date 5-21-18
Time 1100
By TS
Sample ID BD
Analysis Nutrients
Preserve


CITY OF Salem
AT YOUR SERVICE



CITY OF Salem AT YOUR SERVICE

Salem Water Quality | Indicators | Cyanobacteria | Map

Salem Water Quality Indicators

Selectors

Select a Date Range

Predefined | Calendar

- All Dates
- Today
- This Week
- Last Week
- This Month
- Last Month
- This Quarter
- This Year
- Last Year

Reset

Select a Site Code

All	1E	1W	3E	3W	4E
4W	AG	BB	BCR	BO	C2
CFE	HA	HT	LB	LBP	LBS
MG	MI	PK	PS	RF	S2

HandheldYSI

Selected Records

90

Total Records: 4.7k

pH

HandheldYSI

Cyanobacteria

Selected Records

673

Total Records: 4.6k

DO Percent

HandheldYSI

Cyanotoxins

Selected Records

262

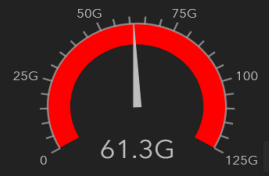
Total Records: 2.5k

BGA-PC RCU

HandheldYSI

Density Cells per mL

Cyanobacteria



Area Counted Total

Cyanobacteria

Salem Water Quality - Cyanobacteria

Selectors

Select a Date Range

Predefined | Calendar

- All Dates
- Today
- This Week
- Last Week
- This Month
- Last Month
- This Quarter
- This Year
- Last Year

Reset

Select a Site Code

All	1E	1W	3E	3W	4E
4W	AG	BB	BCR	BO	C2
CFE	HA	HT	LB	LBP	LBS
MG	MI	PK	PS	RF	S2

Algae Speciation

- Bio Volume Percent: 1.15 Density Cells per mL: 661.69 Date: September 21, 2021 **Site Code: pk**
- Bio Volume Percent: 1.15 Density Cells per mL: 661.69 Date: September 21, 2021 **Site Code: pk**
- Bio Volume Percent: 2.45 Density Cells per mL: 6,038.40 Date: September 21, 2021 **Site Code: bo**
- Bio Volume Percent: 0.05 Density Cells per mL: 539.70 Date: September 21, 2021 **Site Code: bo**
- Bio Volume Percent: 0.12 Density Cells per mL: 4.53 Date: September 21, 2021 **Site Code: bo**
- Bio Volume Percent: 2.28 Density Cells per mL: 5,494.17 Date: September 21, 2021 **Site Code: bo**
- Bio Volume Percent: 3.60 Density Cells per mL: 5,925.62 Date: September 21, 2021 **Site Code: ht**
- Bio Volume Percent: 0.00 Density Cells per mL: 318.91

Cyanobacteria

Selected Records

2.7k

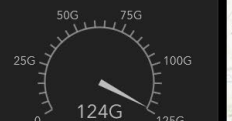
Total Records: 2.7k

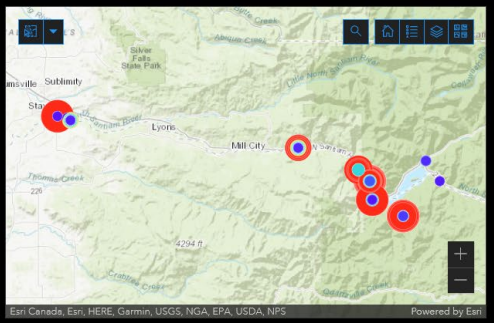
Cyanobacteria

Bio Volume Percent

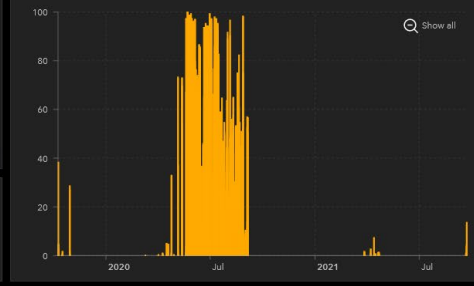
Cyanobacteria

Density Cells per mL

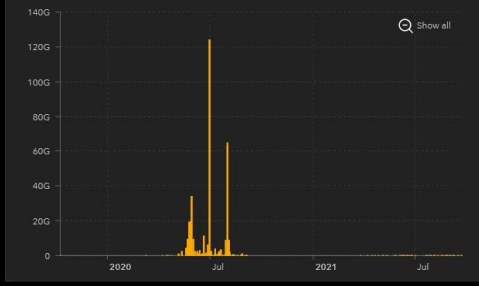




Cyanobacteria - Bio Volume Percent



Cyanobacteria - Density Cells per mL



Enterprise Monitoring – Secure Browser Access to SCADA

InTouch Access Anywhere is used to extend access to ***HMI applications*** to *mobile*, *casual* and *non-traditional* users using a wide variety of devices enabled with an HTML5 compliant browser.

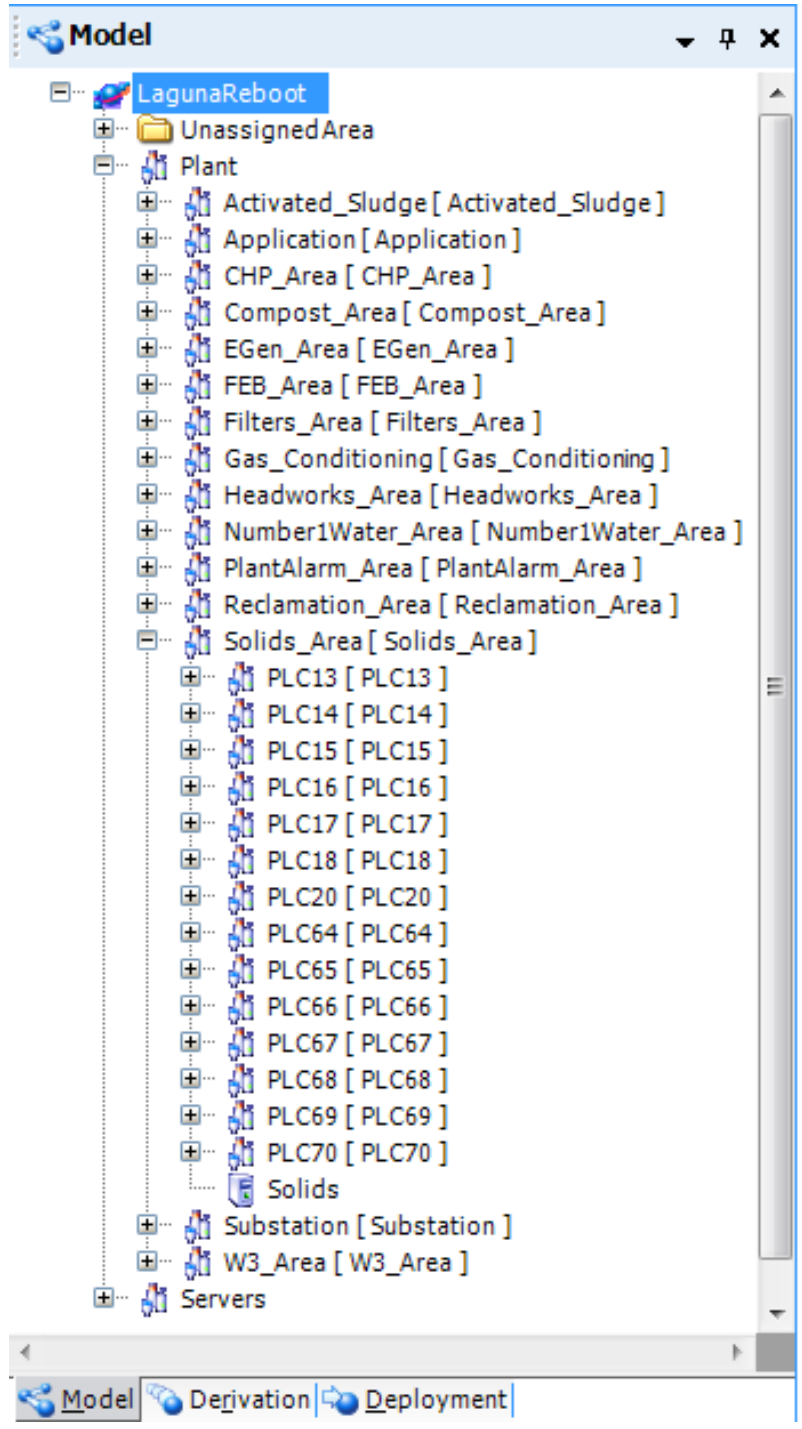
- **Desktops**
- **Laptops**
- **Tablets**
- **Smart phones**
- **Smart TVs**
- **And more!**

- **Safari**
- **Google Chrome**
- **Internet Explorer**
- **Firefox**
- **Opera**
- **And more!**

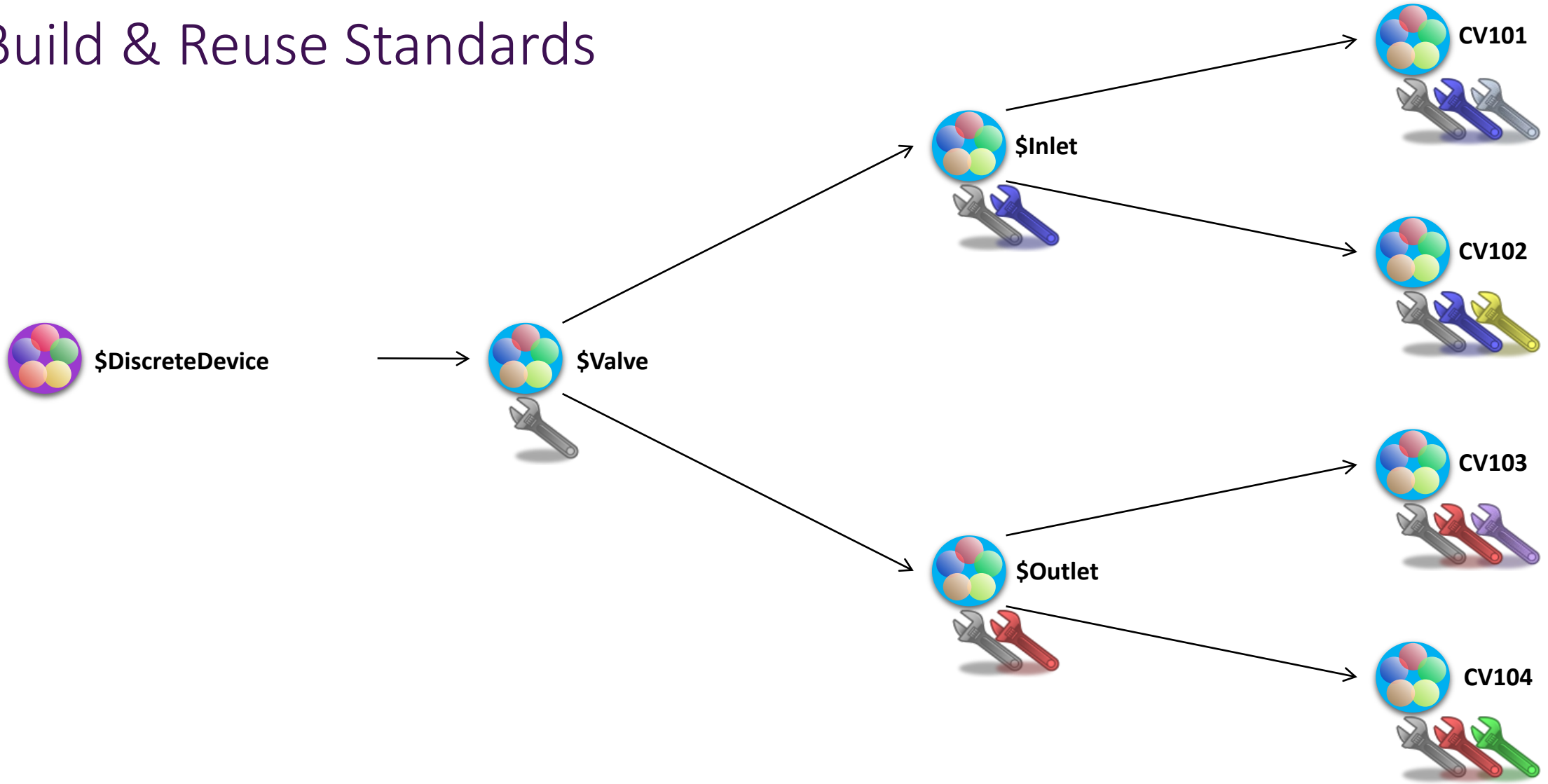
AVEVA | SELECT CALIFORNIA

Plant Model: Example

- 15 Areas
- 120 PLCs
  - 78 PLCs on the LTP Ethernet LAN
  - 36 PLCs on Serial Radios for Collection and Reuse
  - 6 PLCs on Ethernet Radios
    - 4 at LTP
    - 2 for the Reuse System



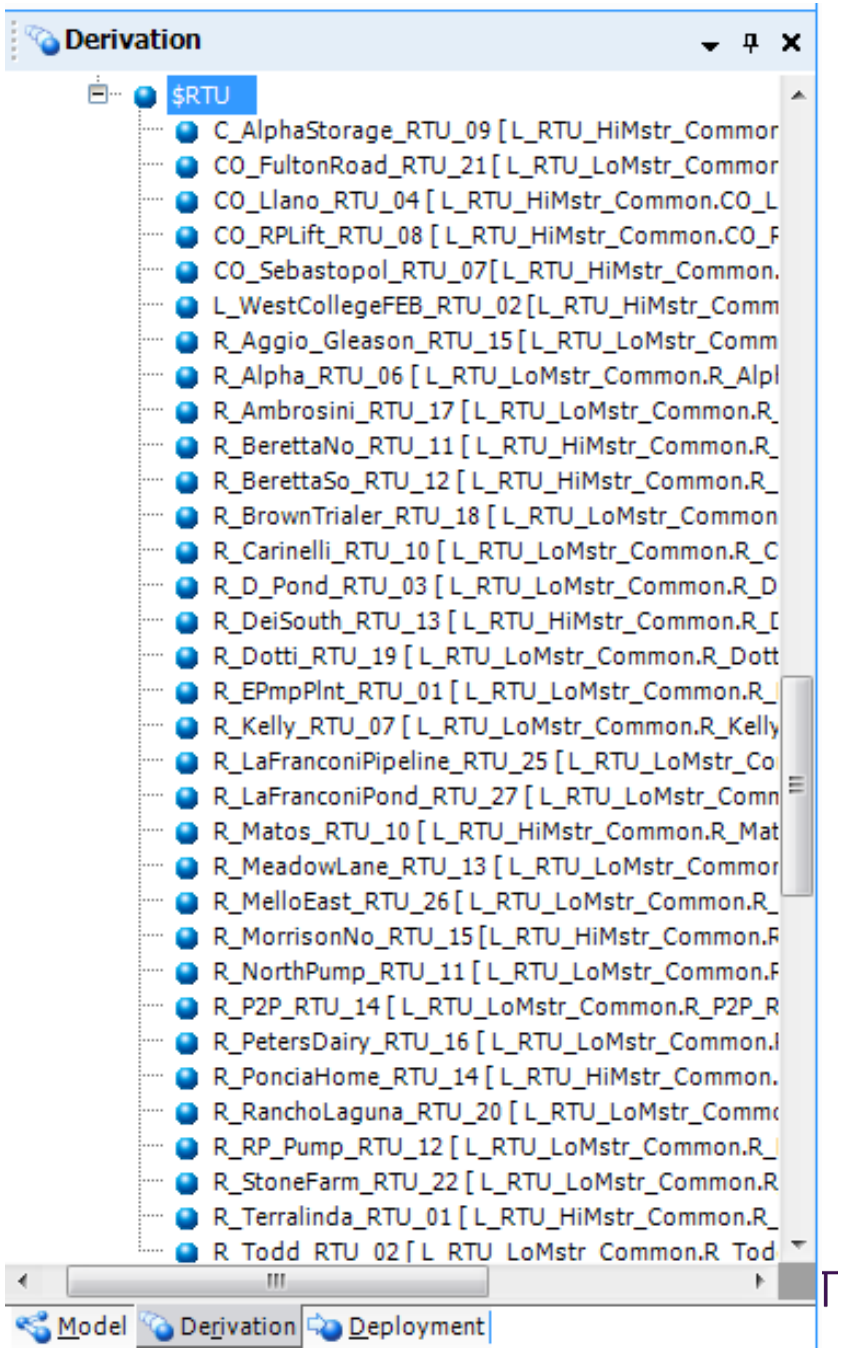
Build & Reuse Standards



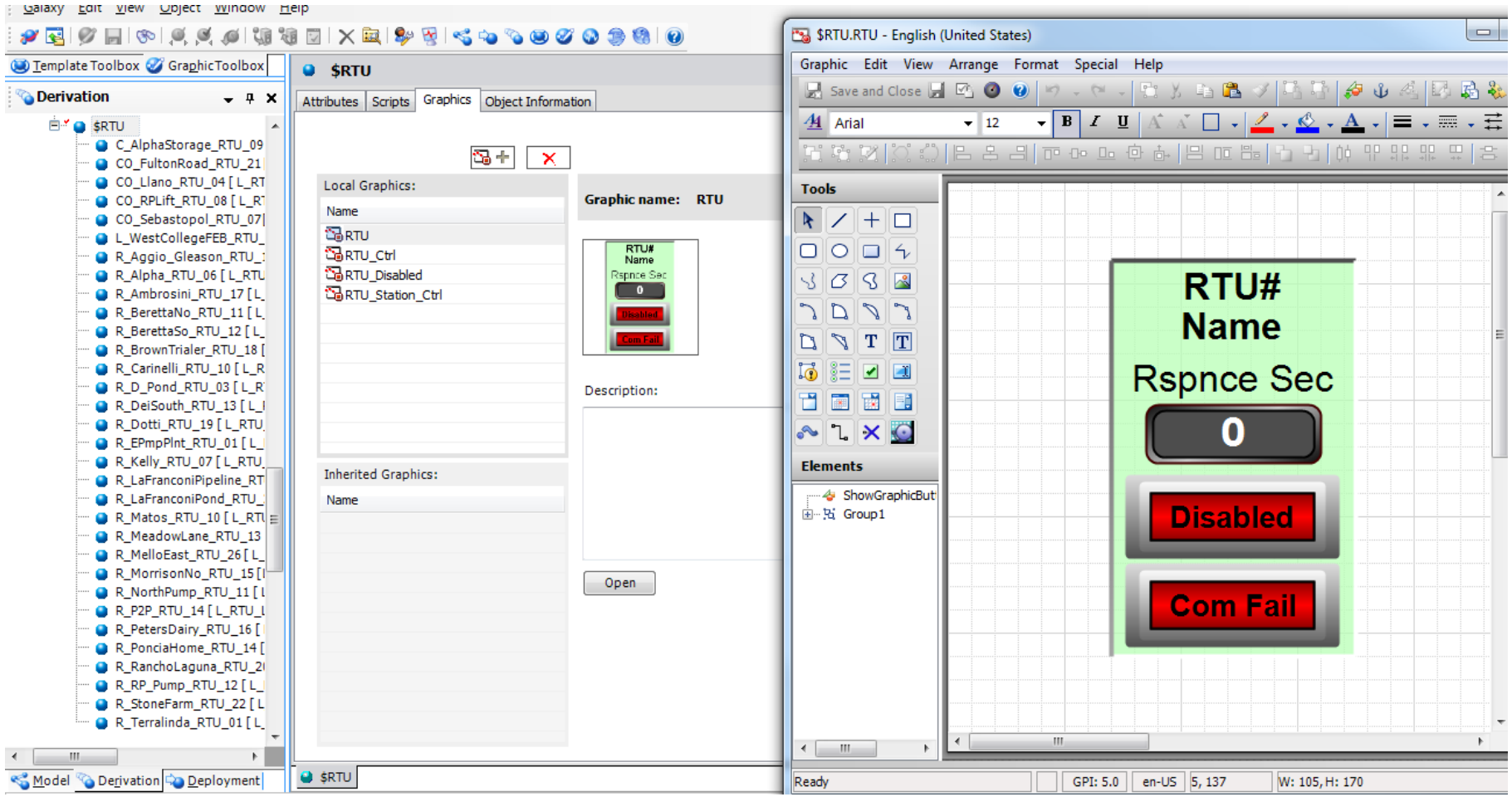
Example RTU Template

- Templates can be used with multiple similar equipment installations

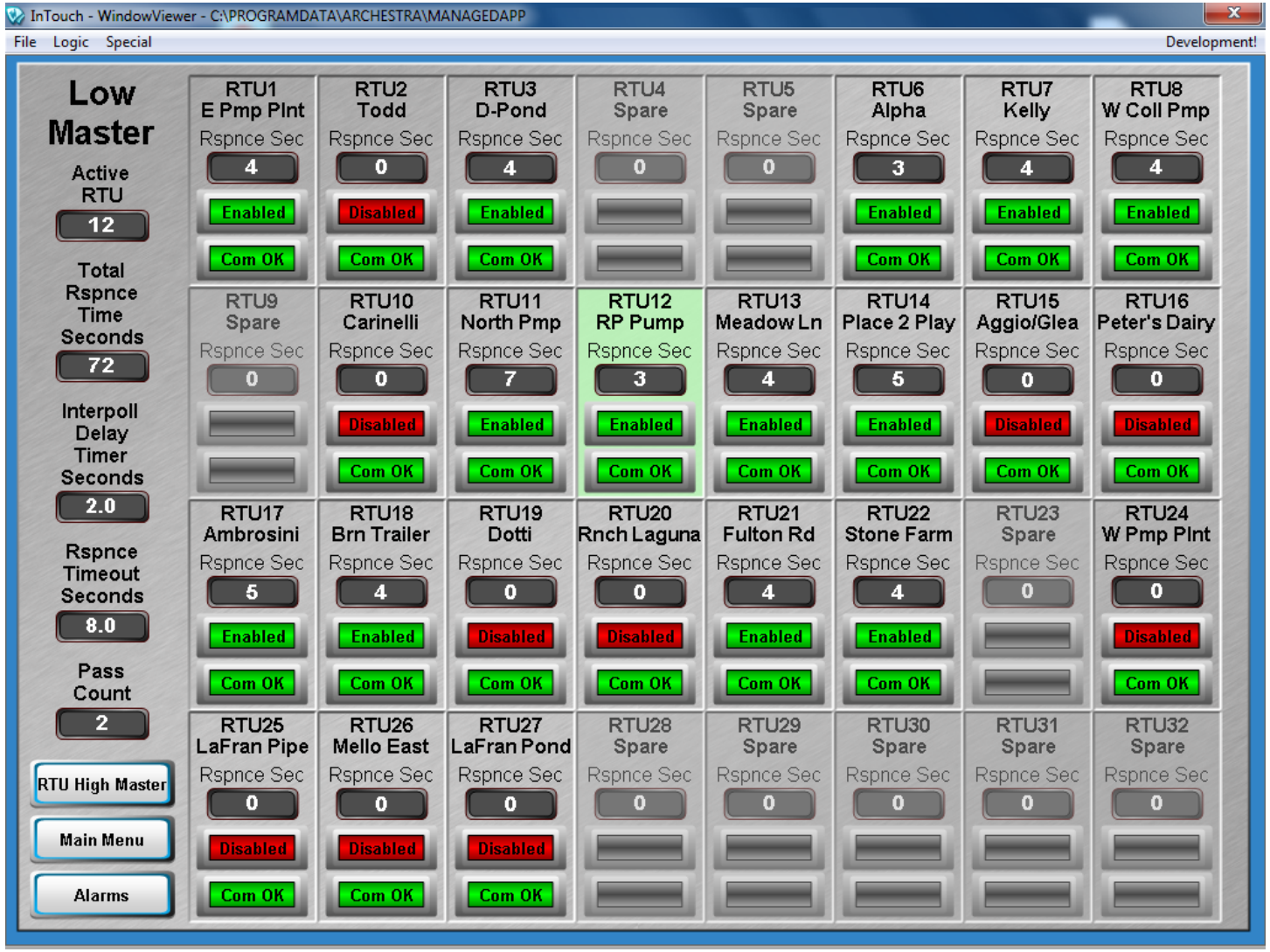
- RTU Template
  - 36 Instances



RTU Graphic Template



SCADA RTU Screen



Best Practice: Alarm signaling in the HMI

1 Severity 1 **Critical** response time < 5min

2 Severity 2 **High** response time < 30min

3 Severity 3 **Medium** response time < 60min

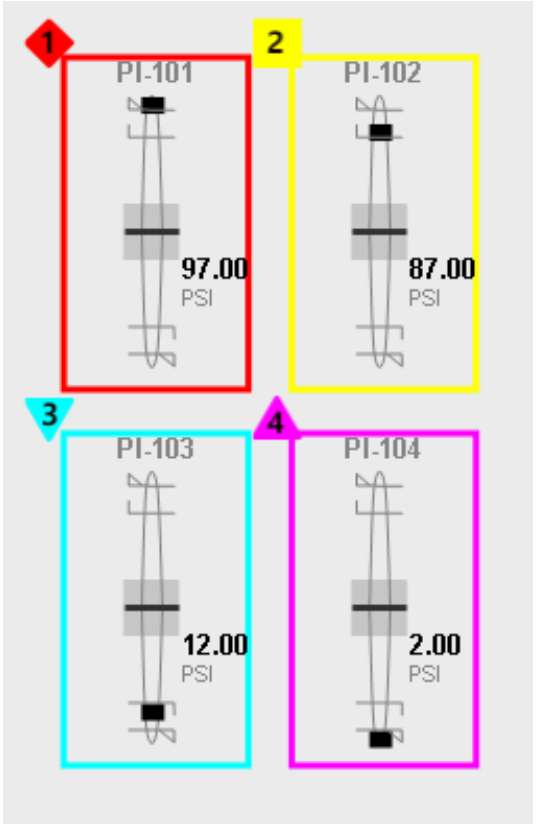
4 Severity 4 **Low** response time < 120min

Triple Coding: Shape, Color, Identifier

Priority	Safety Risk	Economic Loss	Environmental Risk
Critical	> 0.1	> $100,000	> 0.1
High	> 0.01	> $10,000	> 0.01
Medium	> 0.001	> $1,000	> 0.001
Low	< 0.001	< $1,000	< 0.001

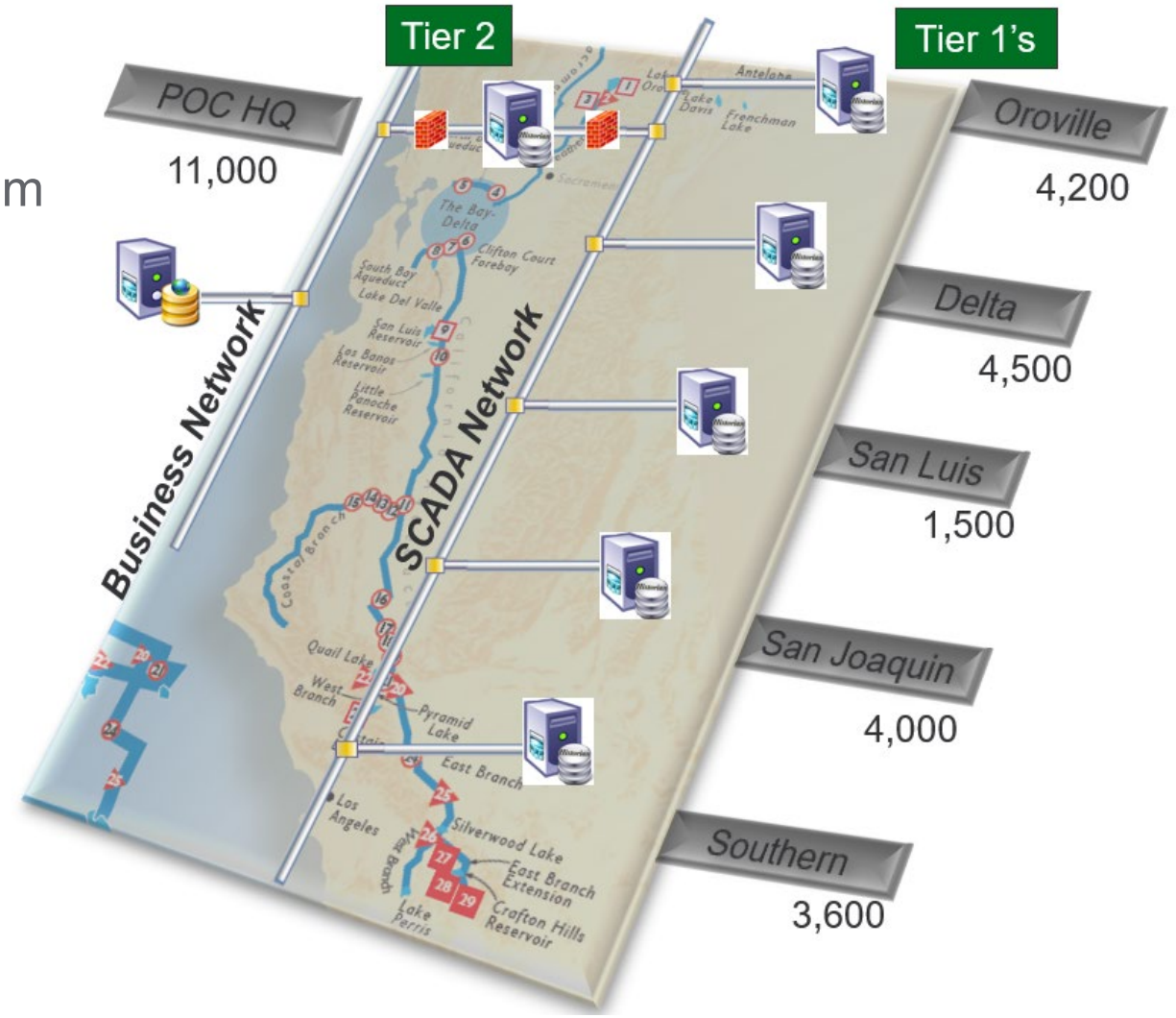
Operational risk of the Alarms.

Priority	Operational
Critical	Total loss of plant
High	Loss of plant area
Medium	Loss of equipment → loss of production
Low	Loss of equipment without loss of production



California State Water Project

- Secure, Centralized Data Collection & Reporting from Distributed Application
- Equipment Runtimes
- Flows, Volumes
- Operational Availability Reports
- Environmental Reports
- Water Demand Scheduling and modeling



AVEVA | SELECT CALIFORNIA

$200k+ Savings per Year with Increased Billing Accuracy

Previously direct billed by Regional Sanitation District.
AVEVA Historian Sewer Flow Daily/Monthly Totals are now used for billing because the city's flow meters are calibrated regularly.
Discrepancies were found averaging 2-3 MGD, saving an average of 18,000 a month

R72_STP_STA1_TOTALFLOW_NR
R72_STP_STA2_TOTALFLOW_I 1?2017 Change the month only
R74_STP_STA3_TOTALFLOW_I 2?2017 Change this month first

Do Not click "Save" when close the sheet!!!
Only print out the report
Or use "Save as" to save as under different name!

DateTime	R72_STP_STA1_TOTALFLOW	R72_STP_STA2_TOTALFLOW	R74_STP_STA3_TOTALFLOW	wwRetrievalMode			
1?1?17 12:00:00 AM	2215.555878	8233.7854	19.84182739	CYCLIC	0.585	2.675	0.001
1?2?17 12:00:00 AM	2216.141205	8236.459961	19.84314728	CYCLIC	0.661	2.727	0.001
1?3?17 12:00:00 AM	2216.802521	8239.187012	19.84414482	CYCLIC	0.964	3.364	0.002
1?4?17 12:00:00 AM	2217.766724	8242.55127	19.84648132	CYCLIC	0.231	5.665	0.003
1?5?17 12:00:00 AM	2217.998047	8248.215942	19.84915352	CYCLIC	0.009	4.778	0.002
1?6?17 12:00:00 AM	2218.006744	8252.994385	19.8508091	CYCLIC	0.038	4.249	0.002
1?7?17 12:00:00 AM	2218.045197	8257.243042	19.85245705	CYCLIC	0.159	4.451	#VALUE!
1?8?17 12:00:00 AM	2218.204346	8261.694336	Null	CYCLIC	0.862	8.639	#VALUE!
1?9?17 12:00:00 AM	2219.066772	8270.333252	19.86125374	CYCLIC	0.598	7.107	0.002
1?10?17 12:00:00 AM	2219.664612	8277.440186	19.86359406	CYCLIC	0.865	8.881	0.005
1?11?17 12:00:00 AM	2220.529938	8286.320801	19.86852455	CYCLIC	0.727	7.850	0.003
1?12?17 12:00:00 AM	2221.257324	8294.170532	19.87106705	CYCLIC	0.498	6.915	0.002
1?13?17 12:00:00 AM	2221.755524	8301.085205	19.87340355	CYCLIC	0.146	5.917	0.002
1?14?17 12:00:00 AM	2221.902008	8307.001953	19.87539482	CYCLIC	0.130	5.322	0.002
1?15?17 12:00:00 AM	2222.032471	8312.324219	19.87723732	CYCLIC	0.067	4.922	0.002
1?16?17 12:00:00 AM	2222.099609	8317.246094	19.87889481	CYCLIC	0.046	4.713	0.002
1?17?17 12:00:00 AM	2222.145996	8321.959229	19.88090515	CYCLIC	1.069	3.318	0.002
1?18?17 12:00:00 AM	2223.214874	8325.27771	19.8825531	CYCLIC	0.302	5.443	0.004
1?19?17 12:00:00 AM	2223.516998	8330.720215	19.88620186	CYCLIC	0.300	7.057	0.003
1?20?17 12:00:00 AM	2223.816681	8337.77771	19.88889503	CYCLIC	0.456	7.965	0.004
1?21?17 12:00:00 AM	2224.272308	8345.742798	19.89325905	CYCLIC	0.563	6.889	0.003
1?22?17 12:00:00 AM	2224.835358	8352.631836	19.89593697	CYCLIC	0.473	8.690	0.005
1?23?17 12:00:00 AM	2225.307922	8361.321411	19.90096664	CYCLIC	0.852	6.938	0.003
1?24?17 12:00:00 AM	2226.160278	8368.259888	19.90407372	CYCLIC	0.315	6.367	0.002
1?25?17 12:00:00 AM	2226.475525	8374.626465	19.90641594	CYCLIC	0.090	5.661	0.002
1?26?17 12:00:00 AM	2226.565857	8380.287476	19.90858841	CYCLIC	0.033	5.143	0.002
1?27?17 12:00:00 AM	2226.598358	8385.430908	19.91077042	CYCLIC	0.018	4.816	0.002
1?28?17 12:00:00 AM	2226.616364	8390.247192	19.91285324	CYCLIC	0.129	4.656	0.002
1?29?17 12:00:00 AM	2226.745758	8394.903564	19.91517258	CYCLIC	0.211	4.555	0.002
1?30?17 12:00:00 AM	2226.957092	8399.458618	19.91717339	CYCLIC	0.038	4.403	0.002
1?31?17 12:00:00 AM	2226.995544	8403.861694	19.91935539	CYCLIC	0.037	4.224	0.002
2?1?17 12:00:00 AM	2227.032471	8408.085327	19.92162514	CYCLIC			

City of Rohnert Park
Waste Water Total Flow Monthly Repo

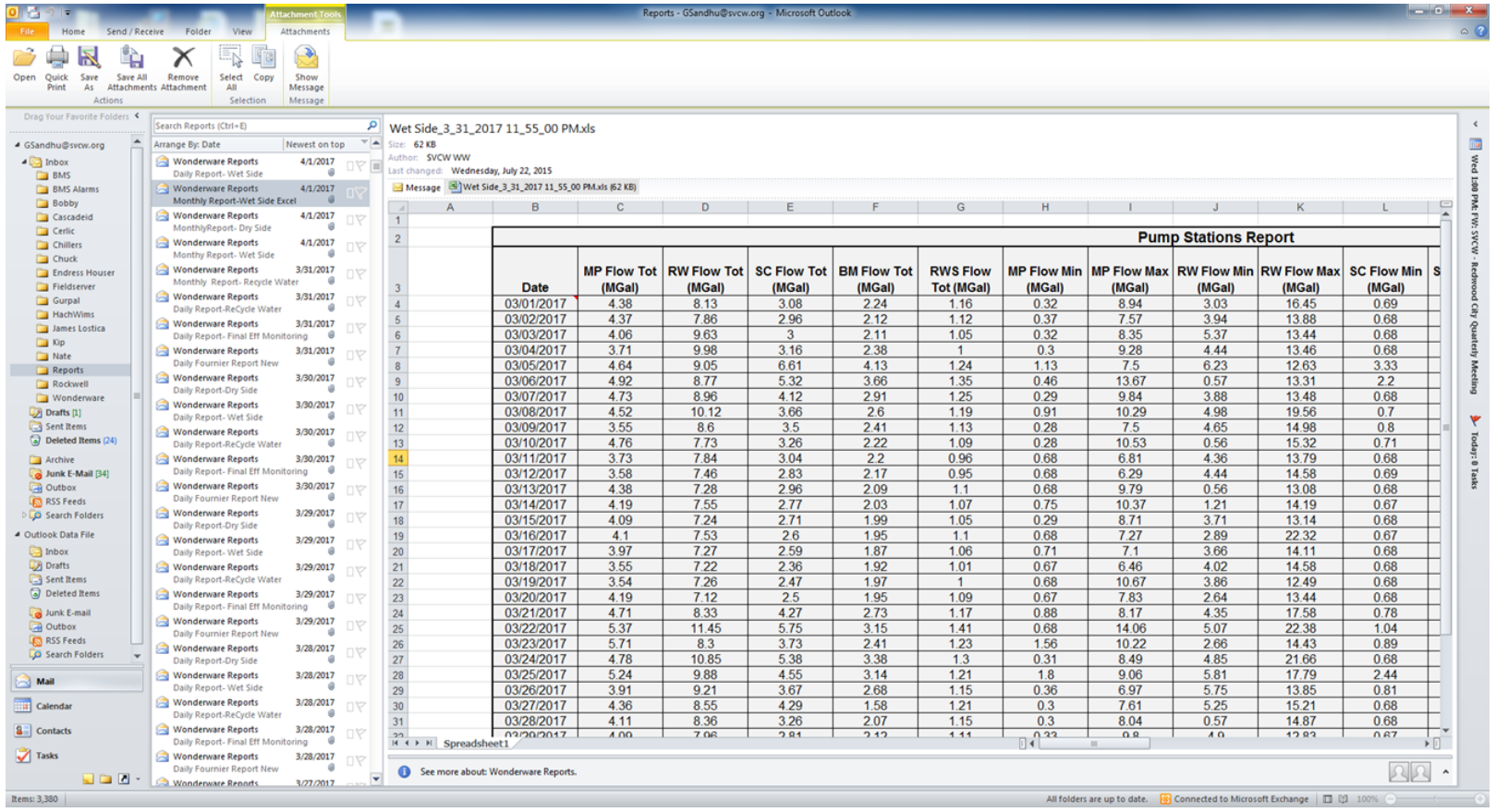
Start Date: 1?1?2017
End Date: 1?31?2017

Day	Station 1	Station 2	Station 3	Station 1 + 2 total
1	0.585	2.675	0.001	3.260
2	0.661	2.727	0.001	3.388
3	0.964	3.364	0.002	4.328
4	0.231	5.665	0.003	5.896
5	0.009	4.778	0.002	4.787
6	0.038	4.249	0.000	4.287
7	0.159	4.451	0.000	4.610
8	0.862	8.639	0.000	9.501
9	0.598	7.107	0.000	7.705
10	0.865	8.881	0.005	9.746
11	0.727	7.850	0.000	8.577
12	0.498	6.915	0.000	7.413
13	0.146	5.917	0.002	6.063
14	0.130	5.322	0.002	5.453
15	0.067	4.922	0.002	4.989
16	0.046	4.713	0.002	4.760
17	1.069	3.318	0.002	4.387
18	0.302	5.443	0.000	5.745
19	0.300	7.057	0.000	7.357
20	0.456	7.965	0.000	8.421
21	0.563	6.889	0.003	7.452
22	0.473	8.690	0.000	9.162
23	0.852	6.938	0.000	7.791
24	0.315	6.367	0.002	6.682
25	0.090	5.661	0.002	5.751
26	0.639	2.134	0.000	2.773
27	0.626	2.167	0.000	2.793
28	0.129	4.656	0.002	4.786
29	0.211	4.555	0.002	4.766
30	0.038	4.403	0.000	4.442
31	0.037	4.224	0.000	4.261
Totals	12.654	164.418	0.035	177.072

AVEVA | SELECT CALIFORNIA

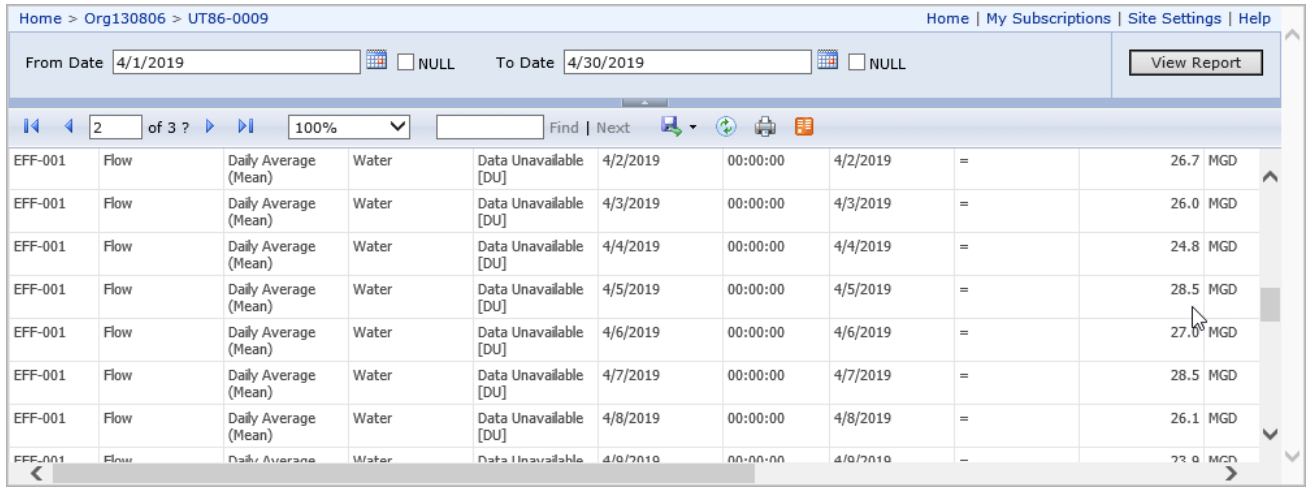
AVEVA Reports

Creating reports in-house saves time and money and provides flexibility
Reports can be generated in any format
Automatically get generated and distributed to clients- via email



Date	MP Flow Tot (MGal)	RW Flow Tot (MGal)	SC Flow Tot (MGal)	BM Flow Tot (MGal)	RWS Flow Tot (MGal)	MP Flow Min (MGal)	MP Flow Max (MGal)	RW Flow Min (MGal)	RW Flow Max (MGal)	SC Flow Min (MGal)
03/01/2017	4.38	8.13	3.08	2.24	1.16	0.32	8.94	3.03	16.45	0.69
03/02/2017	4.37	7.86	2.96	2.12	1.12	0.37	7.57	3.94	13.88	0.68
03/03/2017	4.06	9.63	3	2.11	1.05	0.32	8.35	5.37	13.44	0.68
03/04/2017	3.71	9.98	3.16	2.38	1	0.3	9.28	4.44	13.46	0.68
03/05/2017	4.64	9.05	6.61	4.13	1.24	1.13	7.5	6.23	12.63	3.33
03/06/2017	4.92	8.77	5.32	3.66	1.35	0.46	13.67	0.57	13.31	2.2
03/07/2017	4.73	8.96	4.12	2.91	1.25	0.29	9.84	3.88	13.48	0.68
03/08/2017	4.52	10.12	3.66	2.6	1.19	0.91	10.29	4.98	19.56	0.7
03/09/2017	3.55	8.6	3.5	2.41	1.13	0.28	7.5	4.65	14.98	0.8
03/10/2017	4.76	7.73	3.26	2.22	1.09	0.28	10.53	0.56	15.32	0.71
03/11/2017	3.73	7.84	3.04	2.2	0.96	0.68	6.81	4.36	13.79	0.68
03/12/2017	3.58	7.46	2.83	2.17	0.95	0.68	6.29	4.44	14.58	0.69
03/13/2017	4.38	7.28	2.96	2.09	1.1	0.68	9.79	0.56	13.08	0.68
03/14/2017	4.19	7.55	2.77	2.03	1.07	0.75	10.37	1.21	14.19	0.67
03/15/2017	4.09	7.24	2.71	1.99	1.05	0.29	8.71	3.71	13.14	0.68
03/16/2017	4.1	7.53	2.6	1.95	1.1	0.68	7.27	2.89	22.32	0.67
03/17/2017	3.97	7.27	2.59	1.87	1.06	0.71	7.1	3.66	14.11	0.68
03/18/2017	3.55	7.22	2.36	1.92	1.01	0.67	6.46	4.02	14.58	0.68
03/19/2017	3.54	7.26	2.47	1.97	1	0.68	10.67	3.86	12.49	0.68
03/20/2017	4.19	7.12	2.5	1.95	1.09	0.67	7.83	2.64	13.44	0.68
03/21/2017	4.71	8.33	4.27	2.73	1.17	0.88	8.17	4.35	17.58	0.78
03/22/2017	5.37	11.45	5.75	3.15	1.41	0.68	14.06	5.07	22.38	1.04
03/23/2017	5.71	8.3	3.73	2.41	1.23	1.56	10.22	2.66	14.43	0.89
03/24/2017	4.78	10.85	5.38	3.38	1.3	0.31	8.49	4.85	21.66	0.68
03/25/2017	5.24	9.88	4.55	3.14	1.21	1.8	9.06	5.81	17.79	2.44
03/26/2017	3.91	9.21	3.67	2.68	1.15	0.36	6.97	5.75	13.85	0.81
03/27/2017	4.36	8.55	4.29	1.58	1.21	0.3	7.61	5.25	15.21	0.68
03/28/2017	4.11	8.36	3.26	2.07	1.15	0.3	8.04	0.57	14.87	0.68

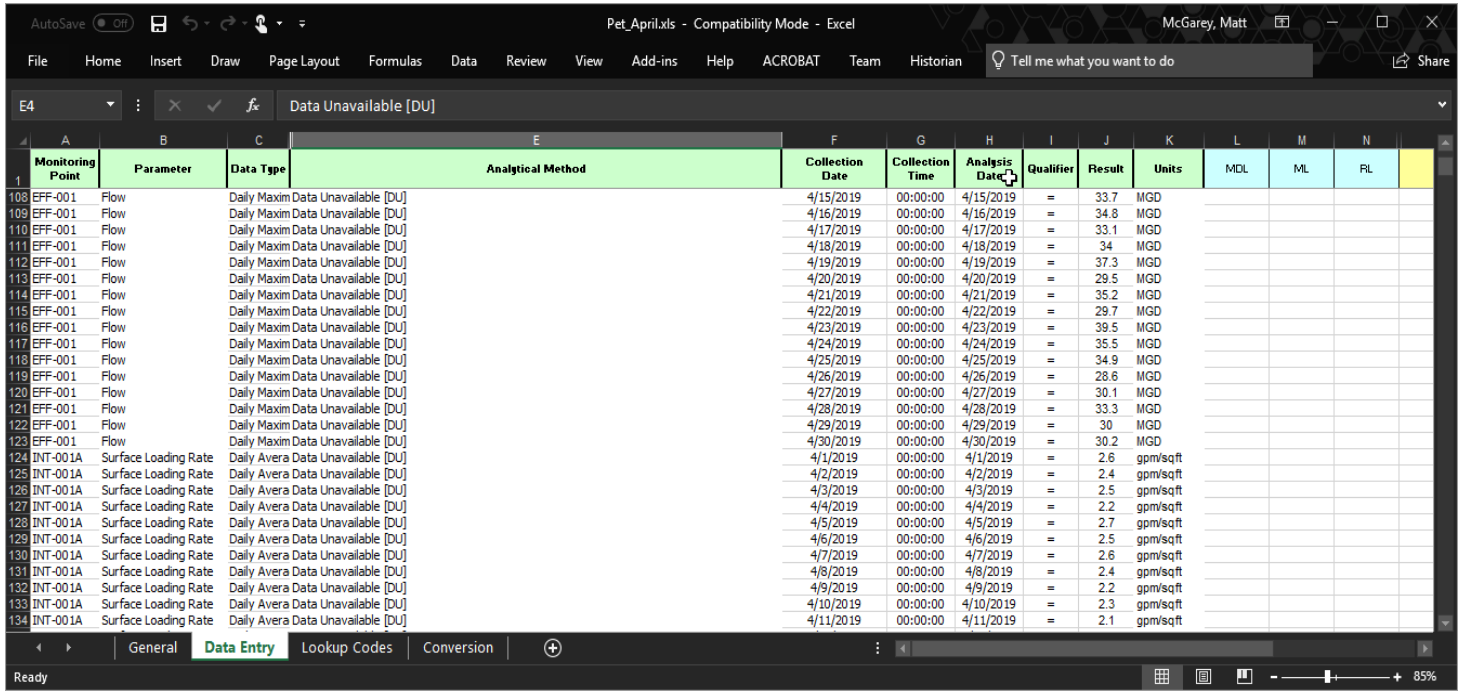
CIQWS / eSMR / PET Tool Reporting



EFF-001	Flow	Daily Average (Mean)	Water	Data Unavailable [DU]	4/2/2019	00:00:00	4/2/2019	=	26.7	MGD	
EFF-001	Flow	Daily Average (Mean)	Water	Data Unavailable [DU]	4/3/2019	00:00:00	4/3/2019	=	26.0	MGD	
EFF-001	Flow	Daily Average (Mean)	Water	Data Unavailable [DU]	4/4/2019	00:00:00	4/4/2019	=	24.8	MGD	
EFF-001	Flow	Daily Average (Mean)	Water	Data Unavailable [DU]	4/5/2019	00:00:00	4/5/2019	=	28.5	MGD	
EFF-001	Flow	Daily Average (Mean)	Water	Data Unavailable [DU]	4/6/2019	00:00:00	4/6/2019	=	27.0	MGD	
EFF-001	Flow	Daily Average (Mean)	Water	Data Unavailable [DU]	4/7/2019	00:00:00	4/7/2019	=	28.5	MGD	
EFF-001	Flow	Daily Average (Mean)	Water	Data Unavailable [DU]	4/8/2019	00:00:00	4/8/2019	=	26.1	MGD	

SSRS Report with lab and SCADA summaries from data warehouse, with custom SQL functions for required reporting parameters.

Output matches format of State Board Excel-based tool for electronic submission on SMR data.



	Monitoring Point	Parameter	Data Type	Analytical Method	Collection Date	Collection Time	Analysis Date	Qualifier	Result	Units	MDL	ML	RL
108	EFF-001	Flow	Daily Maxim	Data Unavailable [DU]	4/15/2019	00:00:00	4/15/2019	=	33.7	MGD			
109	EFF-001	Flow	Daily Maxim	Data Unavailable [DU]	4/16/2019	00:00:00	4/16/2019	=	34.8	MGD			
110	EFF-001	Flow	Daily Maxim	Data Unavailable [DU]	4/17/2019	00:00:00	4/17/2019	=	33.1	MGD			
111	EFF-001	Flow	Daily Maxim	Data Unavailable [DU]	4/18/2019	00:00:00	4/18/2019	=	34	MGD			
112	EFF-001	Flow	Daily Maxim	Data Unavailable [DU]	4/19/2019	00:00:00	4/19/2019	=	37.3	MGD			
113	EFF-001	Flow	Daily Maxim	Data Unavailable [DU]	4/20/2019	00:00:00	4/20/2019	=	29.5	MGD			
114	EFF-001	Flow	Daily Maxim	Data Unavailable [DU]	4/21/2019	00:00:00	4/21/2019	=	35.2	MGD			
115	EFF-001	Flow	Daily Maxim	Data Unavailable [DU]	4/22/2019	00:00:00	4/22/2019	=	29.7	MGD			
116	EFF-001	Flow	Daily Maxim	Data Unavailable [DU]	4/23/2019	00:00:00	4/23/2019	=	39.5	MGD			
117	EFF-001	Flow	Daily Maxim	Data Unavailable [DU]	4/24/2019	00:00:00	4/24/2019	=	35.5	MGD			
118	EFF-001	Flow	Daily Maxim	Data Unavailable [DU]	4/25/2019	00:00:00	4/25/2019	=	34.9	MGD			
119	EFF-001	Flow	Daily Maxim	Data Unavailable [DU]	4/26/2019	00:00:00	4/26/2019	=	28.6	MGD			
120	EFF-001	Flow	Daily Maxim	Data Unavailable [DU]	4/27/2019	00:00:00	4/27/2019	=	30.1	MGD			
121	EFF-001	Flow	Daily Maxim	Data Unavailable [DU]	4/28/2019	00:00:00	4/28/2019	=	33.3	MGD			
122	EFF-001	Flow	Daily Maxim	Data Unavailable [DU]	4/29/2019	00:00:00	4/29/2019	=	30	MGD			
123	EFF-001	Flow	Daily Maxim	Data Unavailable [DU]	4/30/2019	00:00:00	4/30/2019	=	30.2	MGD			
124	INT-001A	Surface Loading Rate	Daily Avera	Data Unavailable [DU]	4/1/2019	00:00:00	4/1/2019	=	2.6	gpm/sqft			
125	INT-001A	Surface Loading Rate	Daily Avera	Data Unavailable [DU]	4/2/2019	00:00:00	4/2/2019	=	2.4	gpm/sqft			
126	INT-001A	Surface Loading Rate	Daily Avera	Data Unavailable [DU]	4/3/2019	00:00:00	4/3/2019	=	2.5	gpm/sqft			
127	INT-001A	Surface Loading Rate	Daily Avera	Data Unavailable [DU]	4/4/2019	00:00:00	4/4/2019	=	2.2	gpm/sqft			
128	INT-001A	Surface Loading Rate	Daily Avera	Data Unavailable [DU]	4/5/2019	00:00:00	4/5/2019	=	2.7	gpm/sqft			
129	INT-001A	Surface Loading Rate	Daily Avera	Data Unavailable [DU]	4/6/2019	00:00:00	4/6/2019	=	2.5	gpm/sqft			
130	INT-001A	Surface Loading Rate	Daily Avera	Data Unavailable [DU]	4/7/2019	00:00:00	4/7/2019	=	2.6	gpm/sqft			
131	INT-001A	Surface Loading Rate	Daily Avera	Data Unavailable [DU]	4/8/2019	00:00:00	4/8/2019	=	2.4	gpm/sqft			
132	INT-001A	Surface Loading Rate	Daily Avera	Data Unavailable [DU]	4/9/2019	00:00:00	4/9/2019	=	2.2	gpm/sqft			
133	INT-001A	Surface Loading Rate	Daily Avera	Data Unavailable [DU]	4/10/2019	00:00:00	4/10/2019	=	2.3	gpm/sqft			
134	INT-001A	Surface Loading Rate	Daily Avera	Data Unavailable [DU]	4/11/2019	00:00:00	4/11/2019	=	2.1	gpm/sqft			

Power Quality Reporting

Luther Pass Pump Station
Monthly Power Report

Start Date: 2020-08-20 00:00:00
End Date: 2020-09-20 00:00:00

Energy Consumption for Report Period

Begin	End	Consumption
17,731,304 kWh	18,246,430 kWh	515,126 kWh

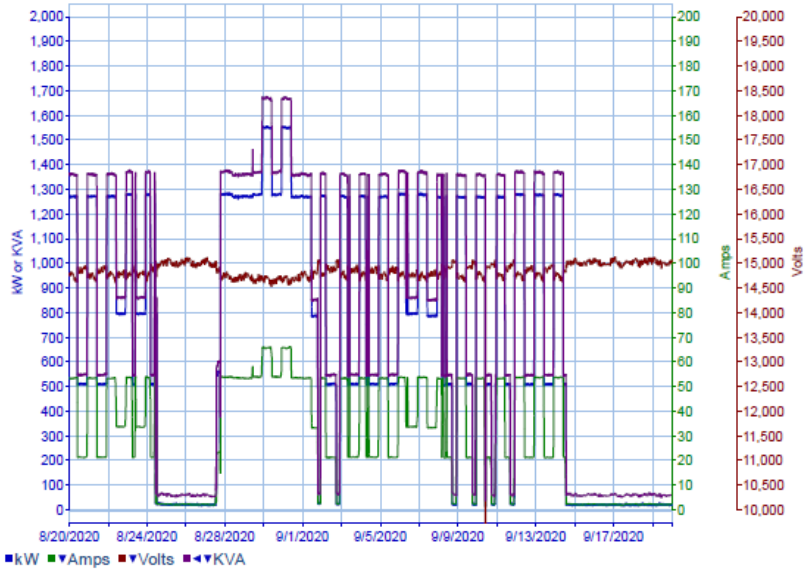
Power Factor for Report Period

Minimum	Maximum	Average
0.06	1.00	0.74

Maximum Power Measurement

Timestamp of Maximum Power	Maximum
8/29/2020 22:10:00	1,561 kW

Summary Power Trend



Luther Pass Pump Station
Monthly Power Report

Start Date: 2020-08-20 00:00:00
End Date: 2020-09-20 00:00:00

Power by Pump Combination

Pumps Running	Elapsed Time	Energy Consumption	Demand (max kW)
Pump 1	4 hrs	0 kWh	0 kW
Pump 2	148 hrs	0 kWh	0 kW
Pump 3	39 hrs	0 kWh	0 kW
Pump 4	19 hrs	0 kWh	0 kW
Pump 1 and 2	0 hrs	0 kWh	0 kW
Pumps 1 and 3	0 hrs	0 kWh	0 kW
Pumps 1 and 4	0 hrs	0 kWh	0 kW
Pumps 2 and 3	96 hrs	0 kWh	0 kW
Pumps 2 and 4	177 hrs	514,948 kWh	1,561 kW
Pumps 3 and 4	23 hrs	0 kWh	0 kW
Pumps 1, 2 and 3	0 hrs	0 kWh	0 kW
Pumps 1, 2 and 4	0 hrs	0 kWh	0 kW
Pumps 1, 3 and 4	0 hrs	0 kWh	0 kW
Pumps 2, 3 and 4	0 hrs	0 kWh	0 kW

Power Alarms during Report Period

Alarm Time	Tag Name	Alarm Text
...	...	...
9/14/2020 13:14:34	R_LPPS_P4_MPR_Trip_Volt_Undr	LPPS Pump 4 MPR Undervoltage Trip
9/14/2020 13:14:17	R_LPPS_P1_PQM_Volt_Sag	LPPS Pump 1 Power Quality Meter Voltage Sag
9/14/2020 13:14:17	R_LPPS_P1_PQM_Phas_Loss	LPPS Pump 1 Power Quality Meter Volts Interrupt
9/14/2020 13:14:07	R_LPPS_P2_PQM_Phas_Loss	LPPS Pump 2 Power Quality Meter Voltage Interrupt
9/14/2020 13:14:07	R_LPPS_P2_PQM_Volt_Sag	LPPS Pump 2 Power Quality Meter Voltage Sag
9/14/2020 13:13:53	R_LPPS_P3_PQM_Volt_Sag	LPPS Pump 3 Power Quality Meter Voltage Sag
9/14/2020 13:13:53	R_LPPS_P3_PQM_Phas_Loss	LPPS Pump 3 Power Quality Meter Volts Interrupt
9/14/2020 13:13:34	R_LPPS_P4_PQM_Volt_Sag	LPPS Pump 4 Power Quality Meter Voltage Sag
9/14/2020 13:13:34	R_LPPS_P4_PQM_Phas_Loss	LPPS Pump 4 Power Quality Meter Voltage Interrupt
9/11/2020 22:00:40	R_LPPS_P1_PQM_Volt_Sag	LPPS Pump 1 Power Quality Meter Voltage Sag
9/11/2020 22:00:40	R_LPPS_P1_PQM_Phas_Loss	LPPS Pump 1 Power Quality Meter Volts Interrupt
9/11/2020 22:00:39	R_LPPS_P3_PQM_Volt_Sag	LPPS Pump 3 Power Quality Meter Voltage Sag
9/11/2020 22:00:39	R_LPPS_P3_PQM_Phas_Loss	LPPS Pump 3 Power Quality Meter Volts Interrupt
9/11/2020 22:00:39	R_LPPS_P2_PQM_Volt_Sag	LPPS Pump 2 Power Quality Meter Voltage Sag
9/11/2020 22:00:39	R_LPPS_P2_PQM_Phas_Loss	LPPS Pump 2 Power Quality Meter Voltage Interrupt
9/11/2020 22:00:38	R_LPPS_P4_PQM_Volt_Sag	LPPS Pump 4 Power Quality Meter Voltage Sag
9/11/2020 22:00:38	R_LPPS_P4_PQM_Phas_Loss	LPPS Pump 4 Power Quality Meter Voltage Interrupt
9/10/2020 09:32:49	R_LPPS_P3_MPR_Trip_Volt_Undr	LPPS Pump 3 MPR Undervoltage Trip
9/10/2020 09:32:49	R_LPPS_P1_MPR_Trip_Volt_Undr	

Pump Performance Report

Luther Pass Pump Station
Pump Performance Report

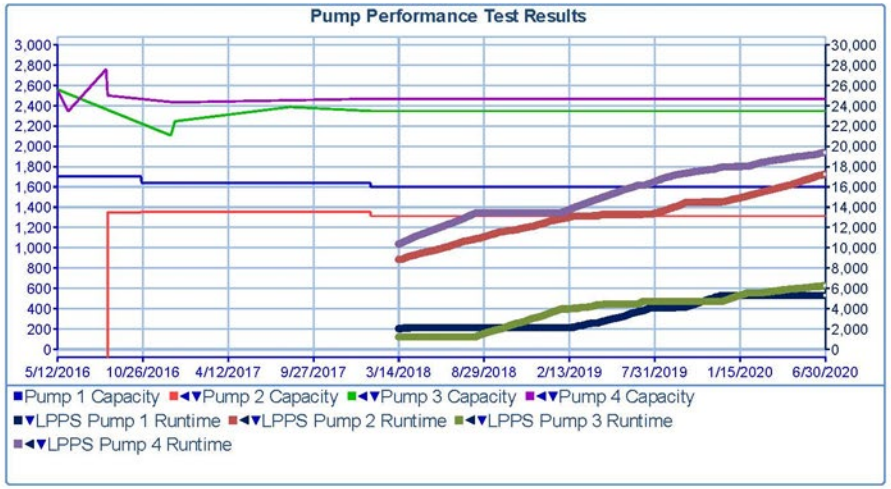
Start Date: 2020-04-01 00:00:00
End Date: 2020-07-01 00:00:00

Performance Values from End of Report Period

	Pump 1	Pump 2	Pump 3	Pump 4
Design capacity	1,740 gpm	1,740 gpm	2,410 gpm	2,410 gpm
Tested capacity	1,599 gpm	1,312 gpm	2,347 gpm	2,467 gpm
Tested % of design	92 %	75 %	97 %	102 %
Tested efficiency	70.91 %	58.50 %	68.84 %	71.63 %

Maximum Measurements During Report Period

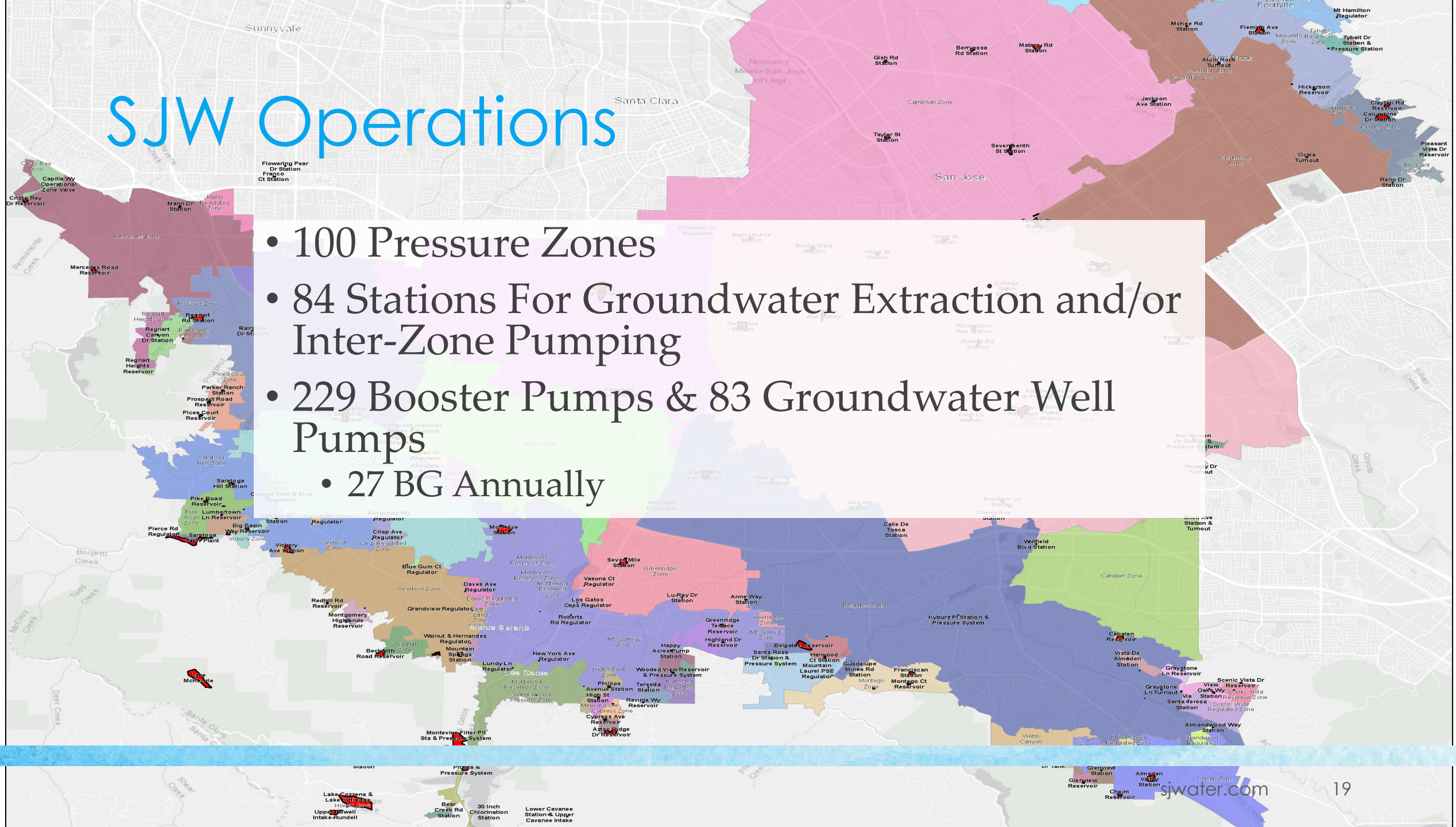
	Pump 1	Pump 2	Pump 3	Pump 4
Motor Vibration Inboard	0.07 in/s	0.09 in/s	0.12 in/s	0.20 in/s
Motor Vibration Outboard	0.06 in/s	0.10 in/s	0.16 in/s	0.18 in/s
Pump Vibration Inboard	0.08 in/s	0.85 in/s	0.16 in/s	0.92 in/s
Pump Vibration Outboard	0.08 in/s	0.55 in/s	0.27 in/s	0.64 in/s
Winding Temp.	108 °F	160 °F	221 °F	225 °F
Bearing Temp.	90 °F	144 °F	118 °F	154 °F
Housing Temp.	79 °F	70 °F	75 °F	77 °F



Generated: 2020-09-01 00:00

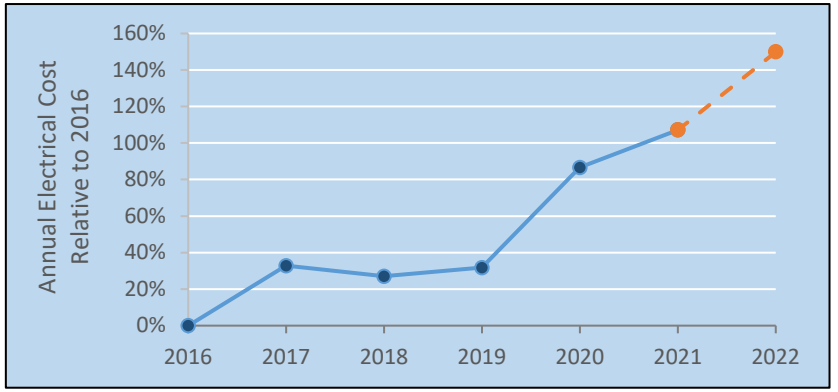
Page 1 of 1

SJW Operations



- 100 Pressure Zones
- 84 Stations For Groundwater Extraction and/or Inter-Zone Pumping
- 229 Booster Pumps & 83 Groundwater Well Pumps
  - 27 BG Annually

Costs of Pumping

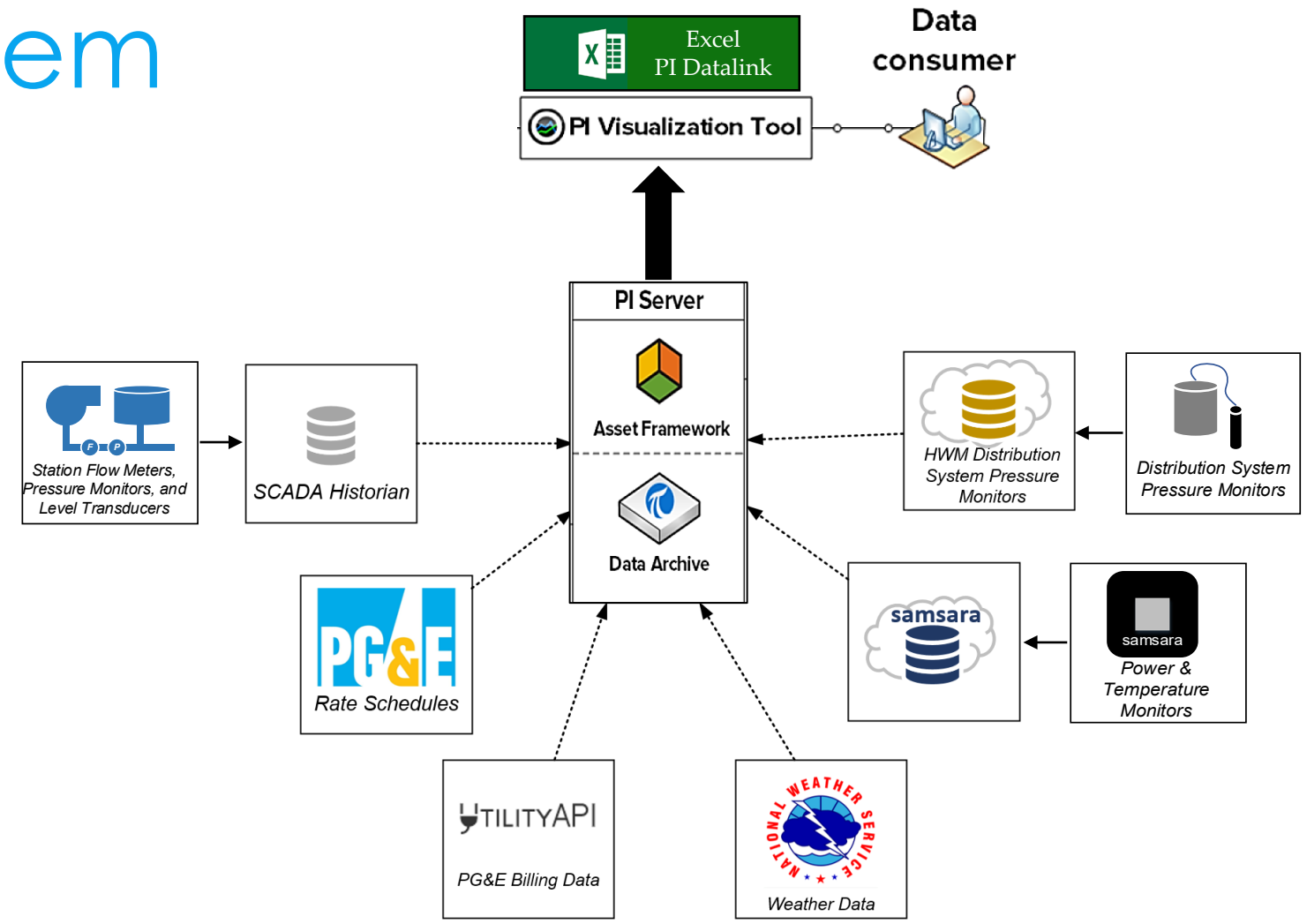


- 92% of Energy Use
  - ~40,000,000 kWh

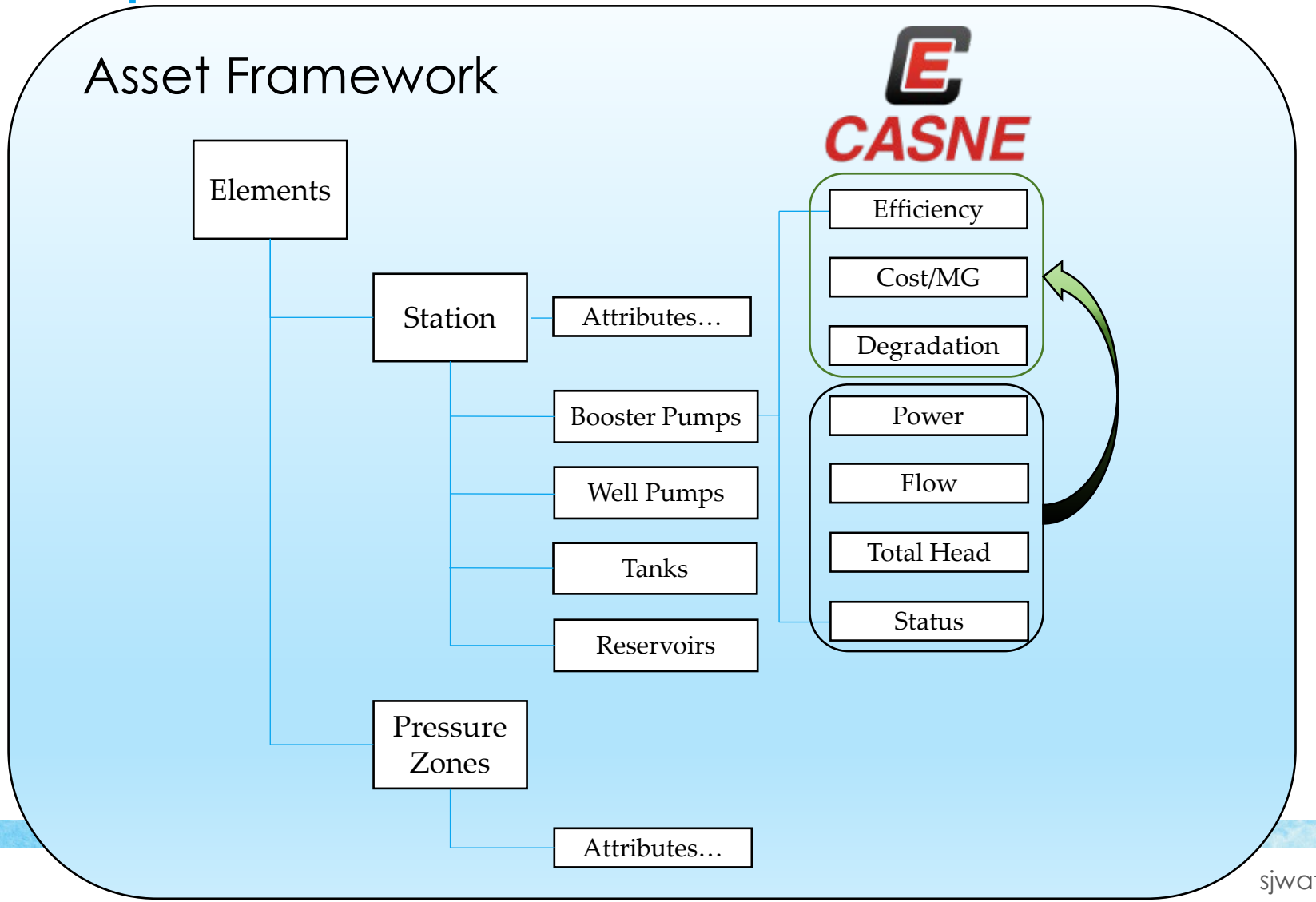
- Limited Monitoring = Reactive Maintenance
  - System Strain
  - Service Interruption
  - More Costly Repair/Replacement

- Pump Prioritization Reliant on Field Efficiency Tests
  - Resource demanding
  - Infrequent
    - Data is Often 2-5 Years Old

PI System


Excel
PI Datalink
Data consumer
PI Visualization Tool
PI Server
Asset Framework
Data Archive
Station Flow Meters, Pressure Monitors, and Level Transducers
SCADA Historian
HWM Distribution System Pressure Monitors
Distribution System Pressure Monitors
PG&E
Rate Schedules
samsara
samsara
Power & Temperature Monitors
UTILITYAPI
PG&E Billing Data
NATIONAL WEATHER SERVICE
Weather Data

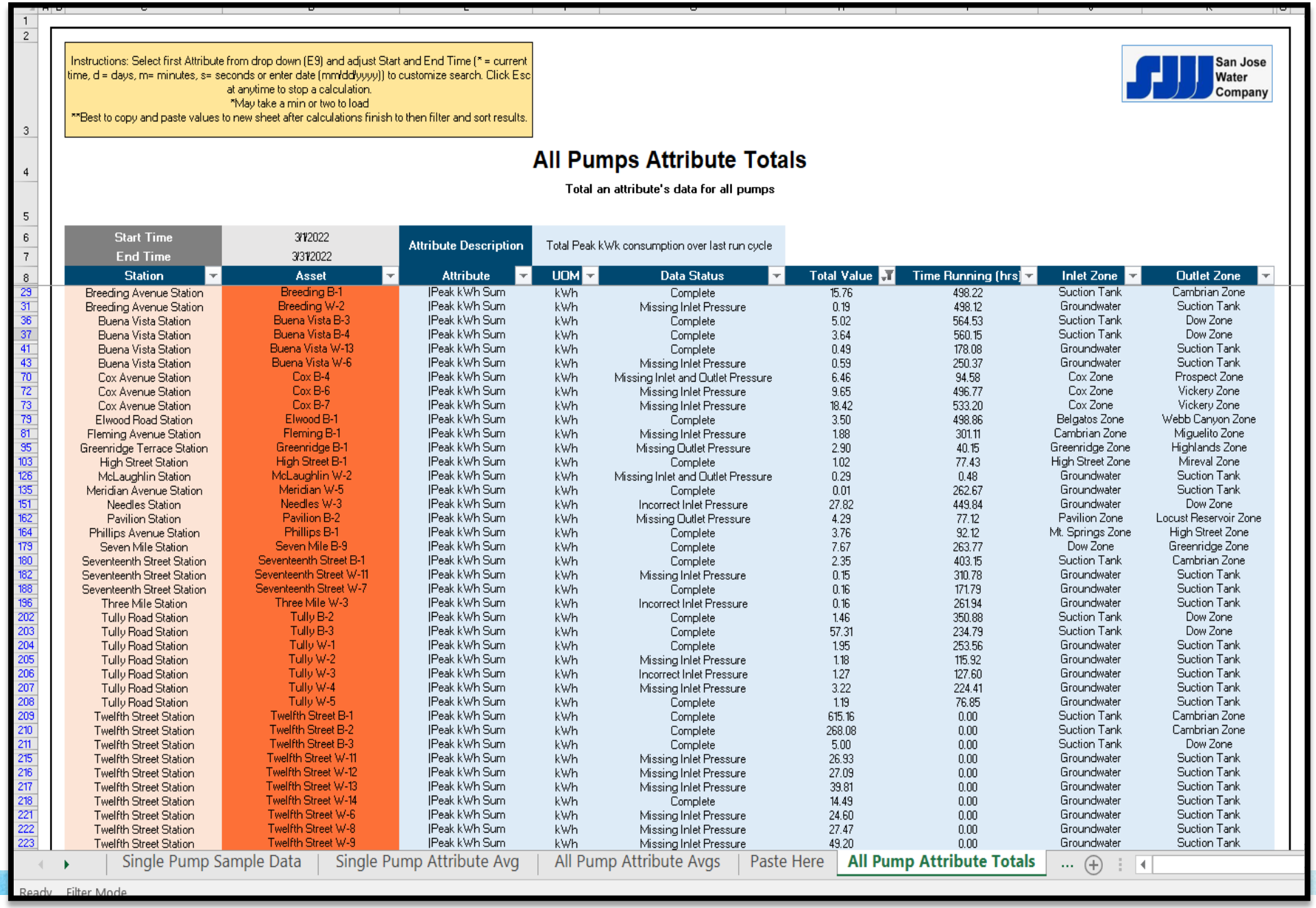
Implementation



Application: Alerts

- Pump

  - Efficiency < Threshold
  - Pump Degradation > Threshold
  - Max kW @ Peak ToU > Threshold
  - Pump On @ Peak ToU



Instructions: Select first Attribute from drop down (E9) and adjust Start and End Time (* = current time, d = days, m= minutes, s= seconds or enter date (mm/dd/yyyy)) to customize search. Click Esc at anytime to stop a calculation.
*May take a min or two to load
**Best to copy and paste values to new sheet after calculations finish to then filter and sort results.

San Jose Water Company

All Pumps Attribute Totals

Total an attribute's data for all pumps

Start Time	3/1/2022	Attribute Description	Total Peak kWk consumption over last run cycle
End Time	3/31/2022		

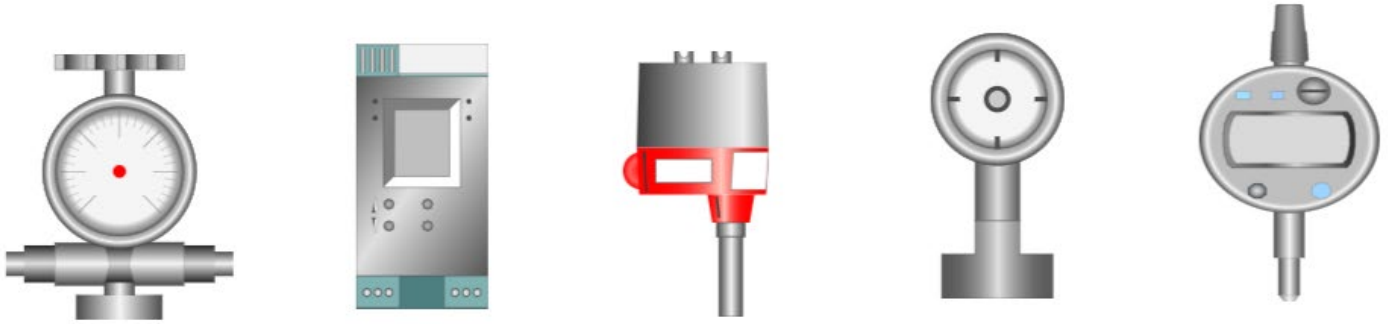
Station	Asset	Attribute	UOM	Data Status	Total Value	Time Running (hrs)	Inlet Zone	Outlet Zone
Breeding Avenue Station	Breeding B-1	IPeak kWh Sum	kWh	Complete	15.76	498.22	Suction Tank	Cambrian Zone
Breeding Avenue Station	Breeding W-2	IPeak kWh Sum	kWh	Missing Inlet Pressure	0.19	498.12	Groundwater	Suction Tank
Buena Vista Station	Buena Vista B-3	IPeak kWh Sum	kWh	Complete	5.02	564.53	Suction Tank	Dow Zone
Buena Vista Station	Buena Vista B-4	IPeak kWh Sum	kWh	Complete	3.64	560.15	Suction Tank	Dow Zone
Buena Vista Station	Buena Vista W-13	IPeak kWh Sum	kWh	Complete	0.49	178.08	Groundwater	Suction Tank
Buena Vista Station	Buena Vista W-6	IPeak kWh Sum	kWh	Missing Inlet Pressure	0.59	250.37	Groundwater	Suction Tank
Cox Avenue Station	Cox B-4	IPeak kWh Sum	kWh	Missing Inlet and Outlet Pressure	6.46	94.58	Cox Zone	Prospect Zone
Cox Avenue Station	Cox B-6	IPeak kWh Sum	kWh	Missing Inlet Pressure	9.65	496.77	Cox Zone	Vickery Zone
Cox Avenue Station	Cox B-7	IPeak kWh Sum	kWh	Missing Inlet Pressure	18.42	533.20	Cox Zone	Vickery Zone
Elwood Road Station	Elwood B-1	IPeak kWh Sum	kWh	Complete	3.50	498.86	Belgatos Zone	Webb Canyon Zone
Fleming Avenue Station	Fleming B-1	IPeak kWh Sum	kWh	Missing Inlet Pressure	1.88	301.11	Cambrian Zone	Miguelito Zone
Greenridge Terrace Station	Greenridge B-1	IPeak kWh Sum	kWh	Missing Outlet Pressure	2.90	40.15	Greenridge Zone	Highlands Zone
High Street Station	High Street B-1	IPeak kWh Sum	kWh	Complete	1.02	77.43	High Street Zone	Mireval Zone
McLaughlin Station	McLaughlin W-2	IPeak kWh Sum	kWh	Missing Inlet and Outlet Pressure	0.29	0.48	Groundwater	Suction Tank
Meridian Avenue Station	Meridian W-5	IPeak kWh Sum	kWh	Complete	0.01	262.67	Groundwater	Suction Tank
Needles Station	Needles W-3	IPeak kWh Sum	kWh	Incorrect Inlet Pressure	27.82	449.84	Groundwater	Dow Zone
Pavilion Station	Pavilion B-2	IPeak kWh Sum	kWh	Missing Outlet Pressure	4.29	77.12	Pavilion Zone	Locust Reservoir Zone
Phillips Avenue Station	Phillips B-1	IPeak kWh Sum	kWh	Complete	3.76	92.12	Mt. Springs Zone	High Street Zone
Seven Mile Station	Seven Mile B-9	IPeak kWh Sum	kWh	Complete	7.67	263.77	Dow Zone	Greenridge Zone
Seventeenth Street Station	Seventeenth Street B-1	IPeak kWh Sum	kWh	Complete	2.35	403.15	Suction Tank	Cambrian Zone
Seventeenth Street Station	Seventeenth Street W-11	IPeak kWh Sum	kWh	Missing Inlet Pressure	0.15	310.78	Groundwater	Suction Tank
Seventeenth Street Station	Seventeenth Street W-7	IPeak kWh Sum	kWh	Complete	0.16	171.79	Groundwater	Suction Tank
Three Mile Station	Three Mile W-3	IPeak kWh Sum	kWh	Incorrect Inlet Pressure	0.16	261.94	Groundwater	Suction Tank
Tully Road Station	Tully B-2	IPeak kWh Sum	kWh	Complete	1.46	350.88	Suction Tank	Dow Zone
Tully Road Station	Tully B-3	IPeak kWh Sum	kWh	Complete	57.31	234.79	Suction Tank	Dow Zone
Tully Road Station	Tully W-1	IPeak kWh Sum	kWh	Complete	1.95	253.56	Groundwater	Suction Tank
Tully Road Station	Tully W-2	IPeak kWh Sum	kWh	Missing Inlet Pressure	1.18	115.92	Groundwater	Suction Tank
Tully Road Station	Tully W-3	IPeak kWh Sum	kWh	Incorrect Inlet Pressure	1.27	127.60	Groundwater	Suction Tank
Tully Road Station	Tully W-4	IPeak kWh Sum	kWh	Missing Inlet Pressure	3.22	224.41	Groundwater	Suction Tank
Tully Road Station	Tully W-5	IPeak kWh Sum	kWh	Complete	1.19	76.85	Groundwater	Suction Tank
Twelfth Street Station	Twelfth Street B-1	IPeak kWh Sum	kWh	Complete	615.16	0.00	Suction Tank	Cambrian Zone
Twelfth Street Station	Twelfth Street B-2	IPeak kWh Sum	kWh	Complete	268.08	0.00	Suction Tank	Cambrian Zone
Twelfth Street Station	Twelfth Street B-3	IPeak kWh Sum	kWh	Complete	5.00	0.00	Suction Tank	Dow Zone
Twelfth Street Station	Twelfth Street W-11	IPeak kWh Sum	kWh	Missing Inlet Pressure	26.93	0.00	Groundwater	Suction Tank
Twelfth Street Station	Twelfth Street W-12	IPeak kWh Sum	kWh	Missing Inlet Pressure	27.09	0.00	Groundwater	Suction Tank
Twelfth Street Station	Twelfth Street W-13	IPeak kWh Sum	kWh	Missing Inlet Pressure	39.81	0.00	Groundwater	Suction Tank
Twelfth Street Station	Twelfth Street W-14	IPeak kWh Sum	kWh	Complete	14.49	0.00	Groundwater	Suction Tank
Twelfth Street Station	Twelfth Street W-6	IPeak kWh Sum	kWh	Missing Inlet Pressure	24.60	0.00	Groundwater	Suction Tank
Twelfth Street Station	Twelfth Street W-8	IPeak kWh Sum	kWh	Missing Inlet Pressure	27.47	0.00	Groundwater	Suction Tank
Twelfth Street Station	Twelfth Street W-9	IPeak kWh Sum	kWh	Missing Inlet Pressure	49.20	0.00	Groundwater	Suction Tank

Single Pump Sample Data | Single Pump Attribute Avg | All Pump Attribute Avgs | Paste Here | **All Pump Attribute Totals** | ...

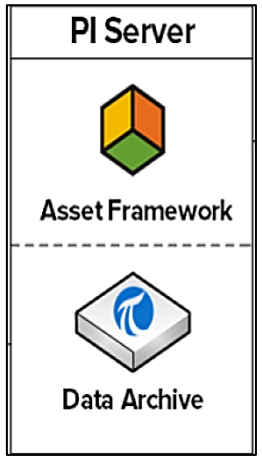
Ready Filter Mode

Expanding & Improving Coverage

- Calibration
- Replacement
- New Installation



Automated Pump Ranking



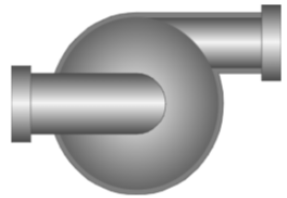
$/MG

API

SCADA

a) Control Variable A
   1. Pump B
   2. Pump A
   3. Pump C

b) …



Estimated Savings

- Peak → Off Peak = **$540,000 / Year**
  - 30 Pumps/Mon Unintentionally On During Peak
- Prioritizing Most Efficient Pump = 2% ↑ Eff.
- 2% ↑ Efficiency = **$210,000 / Year**
  - i.e., 800,000 kWh Reduction

  = 564 metric tons of CO_2