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Q&A with LADWP & Riverside Public Utilities
40
YEARS
OSIsoft

LADWP
Intelligent Water Utility Implementation

Presented By: Nicole Smith & Vincent Rivera

LA DWP Los Angeles Department of Water & Power

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LADWP INTELLIGENT UTILITY IMPLEMENTATION ROADMAP IS UNDER DEVELOPMENT

THE WAY FORWARD

Complete WIN Phase I

- Create Full-Scale Implementation Plan

Automate Edge Data Collection

Develop AI & Advanced Decision Making Processes

Start Next Phase

- Establish Technology Governance
- Resource & Team Building
- Implement All Use Cases

Integrate All Data Systems & Omni-Channel Data Sharing

Digital Transformation:
Using Data to Drive Operational Efficiency @ Riverside Public Utilities

Robin Glenney, Water Quality Administrator

Brando Crozier, Project Coordinator

WATER | ENERGY | LIFE

CITY OF RIVERSIDE

PUBLIC UTILITIES

RPU'S STORY

CHALLENGES

- Lots of data in disparate systems
- Time intensive manual reporting
- Limited access to real time operational data

SOLUTION

- PI as a Data Hub
- Near real time PI Vision displays
- Automated PI DataLink Reports

BENEFITS

- Easy access to previously difficult to reach data
- Four hours a day saved from day late reporting

"Utilizing PI provides insight into our system in real time, allowing us to make effective operational decisions."

David Garcia, Water Systems Operations Manager, Riverside Public Utilities

Contact Us!

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謝謝
KEA LEBOHA
TAPADH LEIBH
고맙습니다
DZIĘKUJĘ CI
БАЯРЛАЛАА
MISAOTRA ANAO
SALAMAT
NGIYABONGA
GRÀCIES
OBRIGADO
شكرا
TEŞEKKÜR EDERIM
DANKIE
TERIMA KASIH
DANKON
TANK
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DI OU MÈSI
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PAXMAT САГА
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TERIMA KASIH
ĎAKUJEM
MATUR NUWUN
CẢM ƠN BẠN
FALEMINDERIT
UA TSAUG RAU KOJ
WAZVIITA
ТИ БЛАГОДАРАМ
СИПОС

LADWP
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City of Los Angeles

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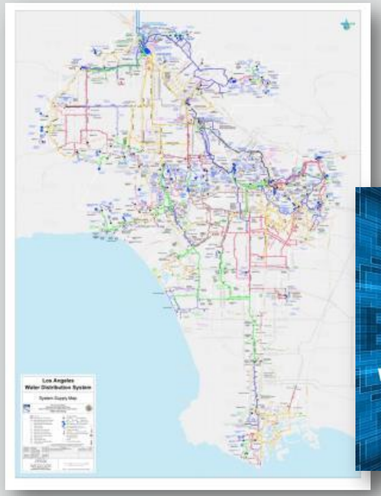
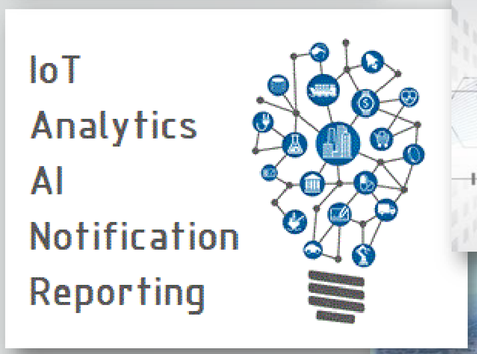


LADWP

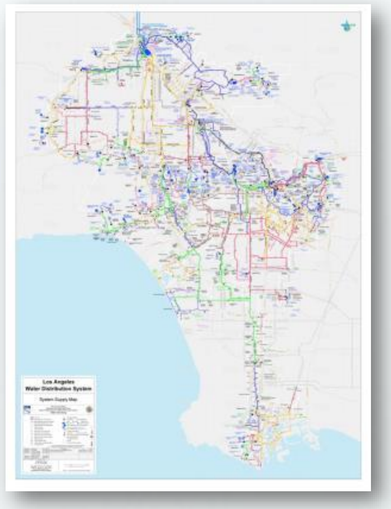
Intelligent Water Utility Implementation



WIN Team:
Nicole Smith – Project management
Vincent Rivera – Operation Technology
Eric Kim – Project management
Charles Freeman – Information Technology

Water System Management:
Richard Harasick
Heidi Hiraoka
Dave Christensen
Louis Rubalcaba

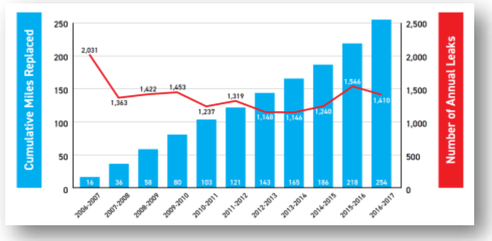
A BRIEF INTRO OF THE WATER SYSTEM & GOALS



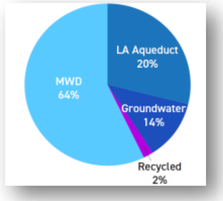
- 4 million customers served & 465 square mile service area
- 2,806 large valves
- 60,714 fire hydrants & 681,000 service connections
- 7,337 miles of distribution mains (distance from Los Angeles to Sydney)
- 95 pump stations
- 29 treatment stations
- 328 regulation stations
- 118 reservoirs & tanks
- 70 water wells

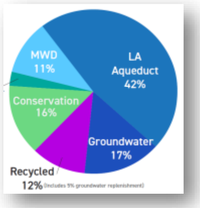
OPERATIONAL STRATEGIC GOALS

- MANAGE INFRASTRUCTURE OPTIMALLY



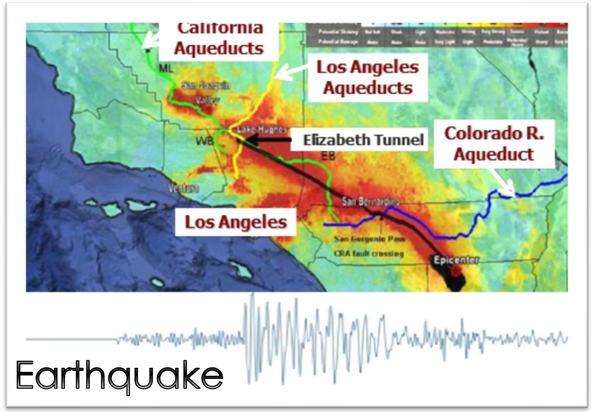
- DIVERSIFY WATER SUPPLY PORTFOLIO



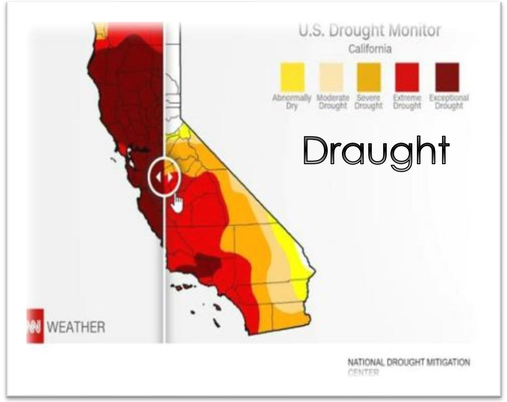


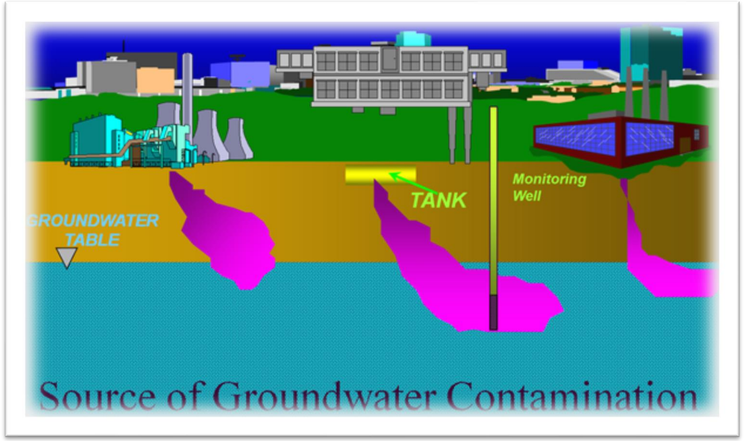
- PROVIDE SAFE, HIGH QUALITY WATER

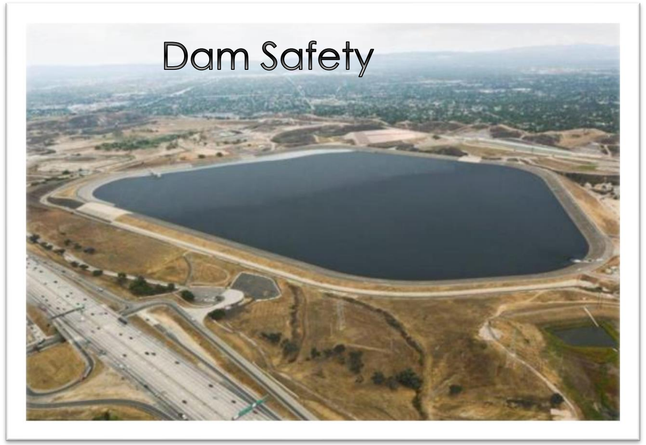
LA'S DRINKING WATER QUALITY REPORT



DUTIES & CHALLENGES



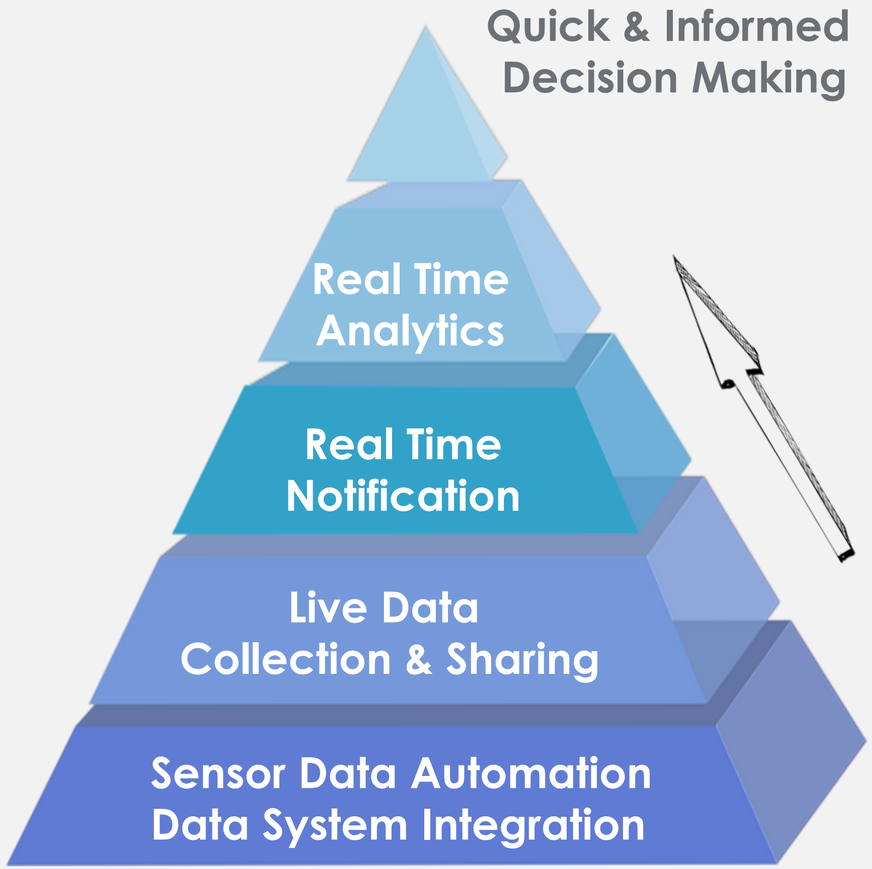




Intelligent Water Utility

Solution to Water System Challenges – The Data Component

HOW?



Identified LADWP Water System Technology Goals

- Automated online monitoring and data collection
- Innovative methods to capture knowledge
- Improved communication with customers on leads and conservation
- Analytical decision support tools for data driven decision-making

Water Information Network (WIN) Project is an important component to achieve the goals.

WATER SYSTEM CURRENT DATA SYSTEMS

- ❖ Best of Breed
- ❖ Both New Tech & Legacy
- ❖ Both In-House & Vendor Customizations
- ❖ Both On-Premise & Cloud
- ❖ Not Fully Integrated

Time Series Data

Proficy Historian

OSIsoft

SCADA

- Control Functions
- Critical
- Operational
- High Security

PI Historian

- Non Control Functions
- Critical & Non Critical
- Operational
- Low Security

Relational Data

IBM maximo

ORACLE

LIMS

Customer Billing System

CMMS

- Work Order Tracking
- Asset Management
- High Security

Spatial Data

esri

Spatial Data

- Maps & Locations

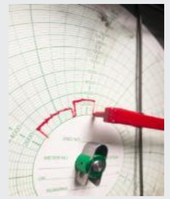
File Data

Microsoft

IBM Content Navigator ICN

In-House Development

Any Type of Applications



Reports, Logs, Paper Charts

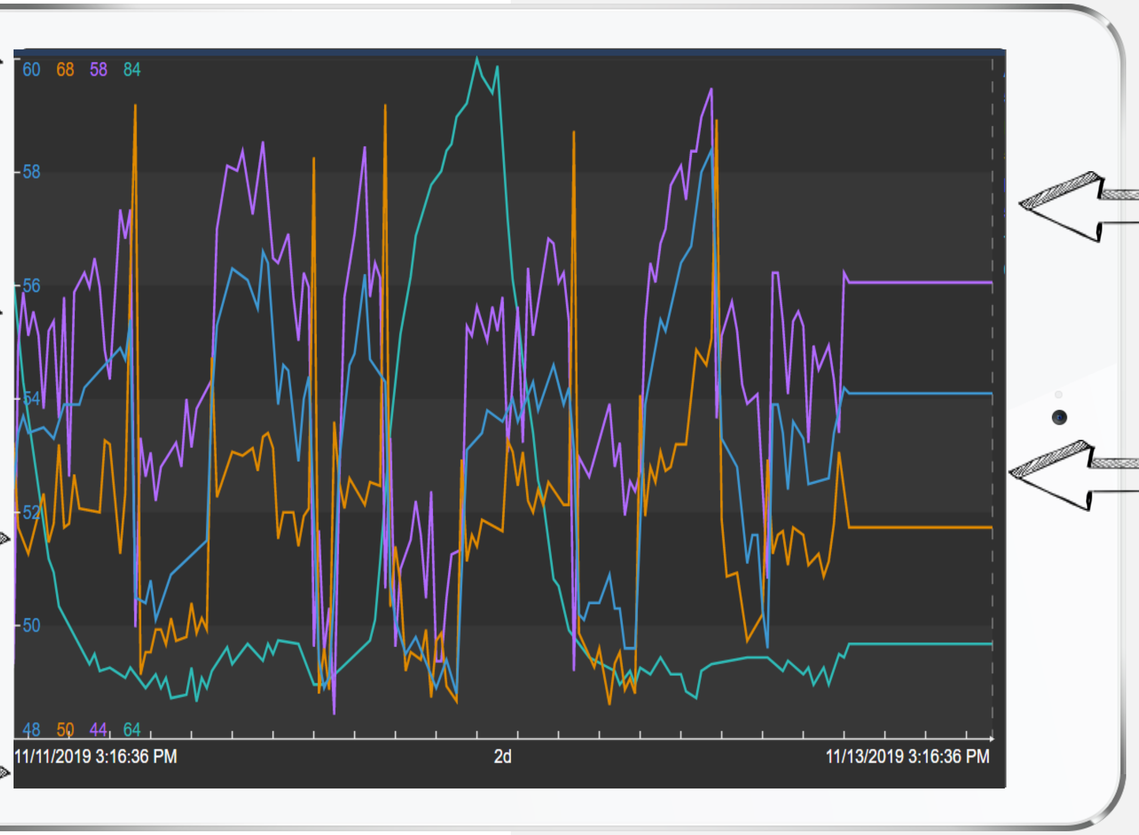
Data Type

Time Series Data

Relational Data

Spatial Data

File Data



Data Collecting System

Institutional Data Systems

Edge Data Devices

Scenario: Equipment Repair

1. SCADA or Historians detect sensor reading anomalies
2. Analytics are performed to determine equipment needs repairing
3. SCADA or Historian then trigger Maximo work order
4. Crew is dispatched to inspect and repair the damage, and is able to access records and drawings of the equipment as well as to navigate and log findings using GIS Apps
5. Work is done and closed out in real time, all field and office data is logged onto system

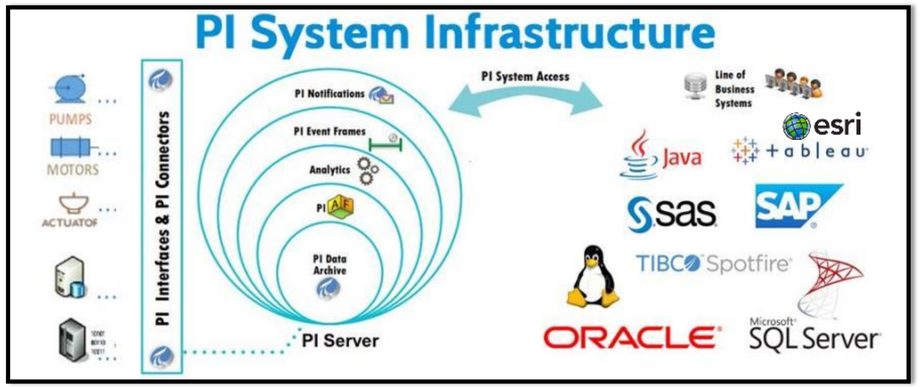
Water Information Network (WIN) Project

GOALS – Centralize All Water System Data, Remove Data Silos, Collect New Edge Data, and Integrate Systems

Deliverables (June 2020)	As of Now
USER REQUIREMENT STUDY & GROWN PLAN	120+ Use Cases identified, started growth estimates
INTELLIGENT WATER UTILITY ROAD MAP	Initiated research and internal investigations
ESTABLISH A PI SYSTEM	Built PI system with 30,000 data points
5 + PILOTS FOR FIVE DIVISIONS	Initiated 3 Pilot Use Cases

Discoveries

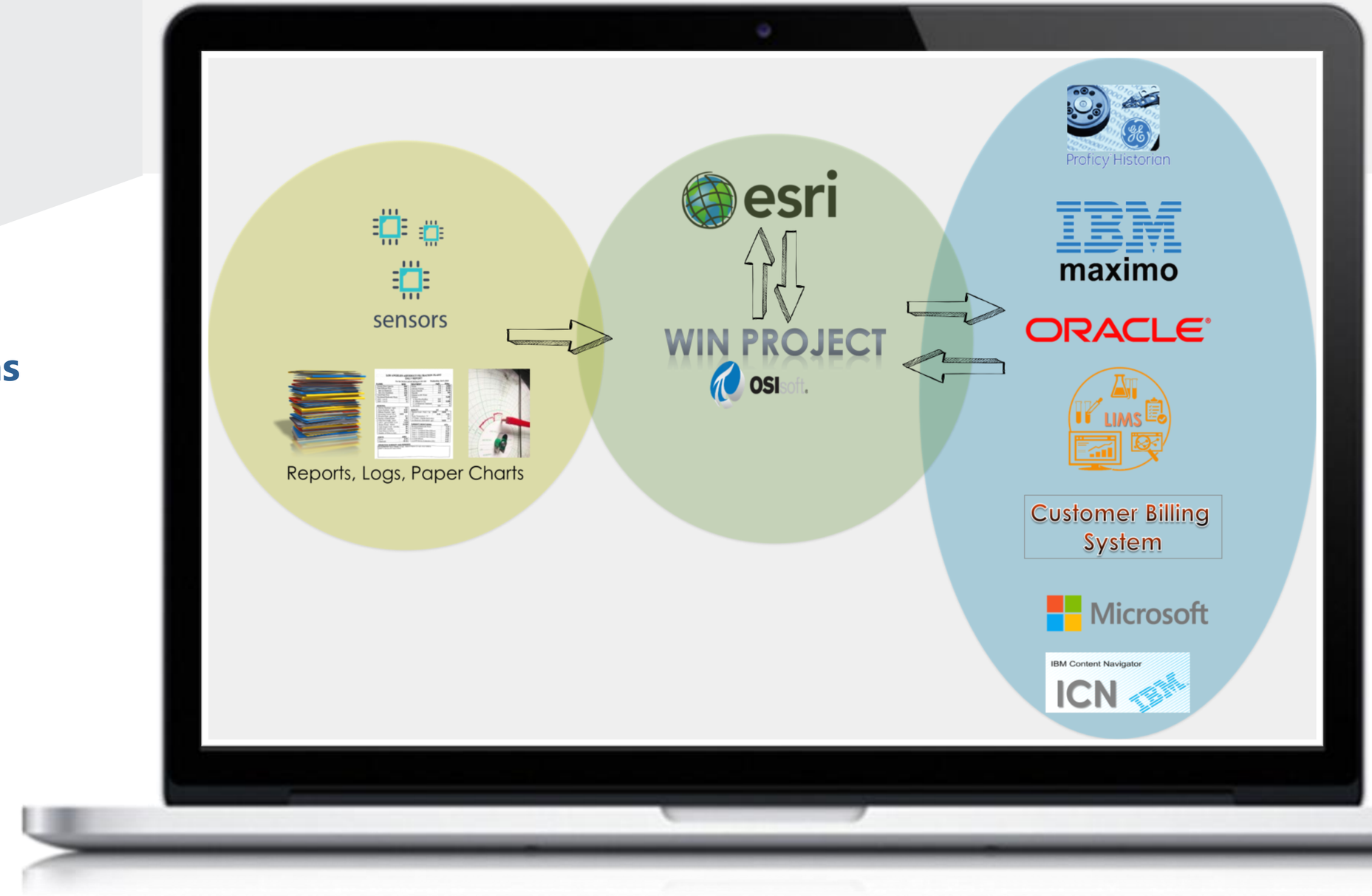
- Internal and external talents, many technology projects are already on-going
- Multiple stakeholders and complex work flows
- Needs both creativity & technology governance
- System integration is still in its infancy



WIN Project Demo

WHY WHAT WHO HOW

Connect Data Systems



WIN Project Demo

WHY WHAT WHO HOW

- Connect Data Systems
- Pilots

WIN Project Demo

WHY WHAT WHO HOW

- Connect Data Systems
- Pilots
- OT to IT Proces

IMPLEMENTATION

The Two-Train Approach

Technical Train

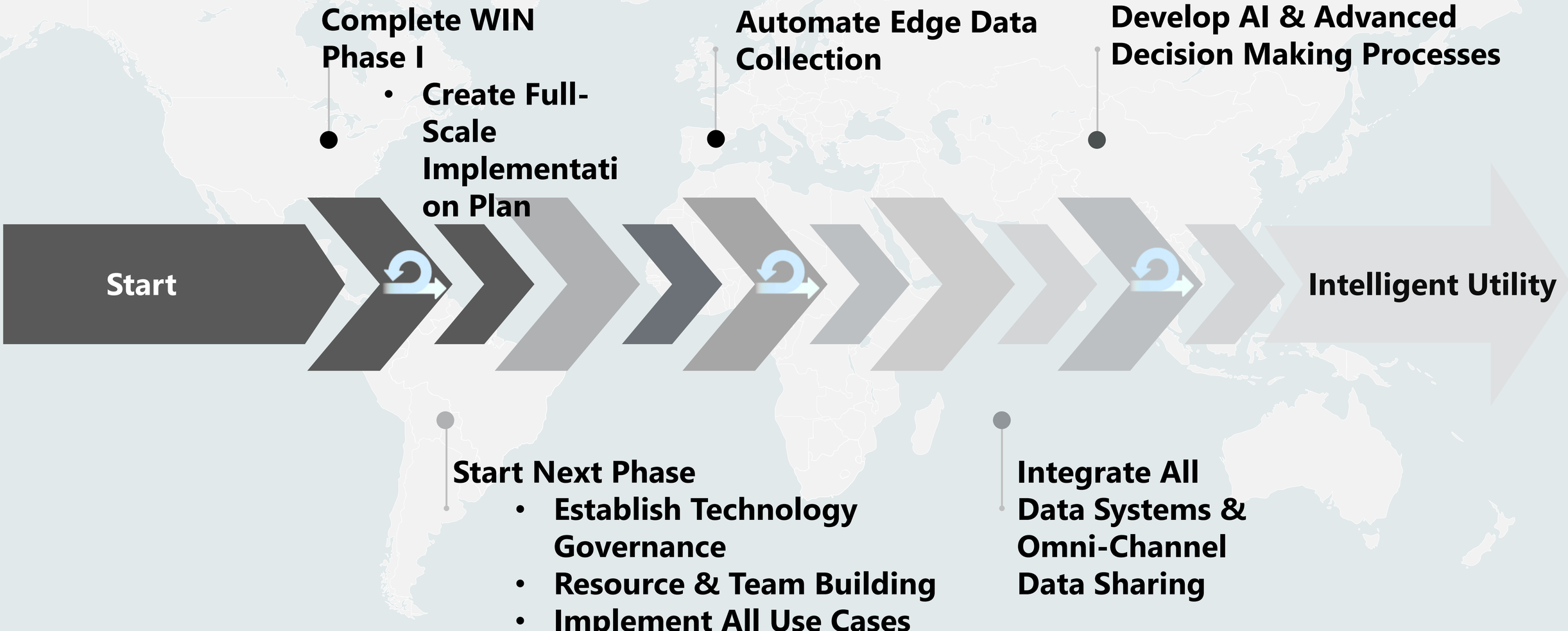
- 83+ Use Cases & Criteria
  System Integration Criteria
- Individual Case
  Resource Needs
- Individual Case
  Schedule Estimates
- Developer Training
- Agile Development &
  Implementation
- User Training

Business Train

- User Interview & Stakeholder Workshop
- Overall Resource Estimates
- Overall Schedules
- Road Map
- Request Management Support
- Build Team
- Project Reporting

LADWP INTELLIGENT UTILITY IMPLEMENTATION ROADMAP IS UNDER DEVELOPMENT

THE WAY FORWARD



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LADWP
Intelligent Water Utility Implementation

Thank You!

OSIsoft.

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Robin Glenney, Water Quality Administrator

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WATER | ENERGY | LIFE

CITY OF RIVERSIDE

PUBLIC UTILITIES

Riverside Public Utilities

- Population - 324,000 residents
- Southern California - 60 miles east of Los Angeles
- Established in 1895
- Consumer-owned water & electric utility
- 81 square mile service territory
- 112,000 electric meters
- 65,000 water meters

Background

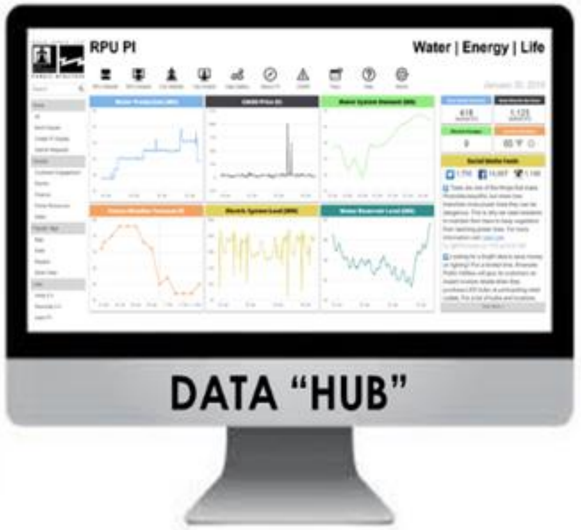
- All divisions within RPU rely on data to make operational and fiscal decisions
- Hundreds of Thousands of data points are collected daily
- RPU recognized the need to move away from storing data in various formats and disparate systems
- In response to this need, RPU implemented OSIsoft PI System in 2016

OSIsoft PI System – Data Hub

SAS & Synergi
- Empowering real-time analytics

Outage Data
- OMAR
- Automated analytics & reports

PI System



UWAM
- Increased visibility into asset performance

Substation Data
- Equipment alarms
- Ability to prevent equipment failure

GIS
- Changing the way our field crews work
- Enhancing decision-making

Electric & Water SCADA
- System alarms

Generations Historian

Grid Sensors
- More visibility into outages
- Faster response times

Other
- Weather, CAISO & spreadsheets

Land Mobile Radio
- Vehicle location

Examples of PI System Benefits

- Improved operational efficiencies
- Reduced staff time by automating processes
- Increased visibility into systems and assets
- Improved system reliability
- Reduced operating costs
- Advanced methods for monitoring CAISO market activity

Status of PI Implementation

- Currently in 4th year of 5-year Enterprise Agreement with OSIsoft
- PI team supports entire Utility (Water, Electric, Generation)
  - 2 full-time PI Consultants

  - 1 Analyst (50% time)
  - 1 Database Developer (50%)
  - Sr. GIS Analyst (supports GIS integration)
- Training / developing Super Users
  - Intro, Advanced, Advanced 2.0, and customized on-site courses
  - OSIsoft self-paced on-line courses
- 30 integrated systems
- Many operating dashboards, display and alerts

Return on Investment (ROI)

- Since implementing PI, RPU has achieved a return on investment of over $820,000 per year
- This far surpasses the annual enterprise service cost of the OSIsoft PI system
- Additionally, a significant amount of new development is currently underway that will continue to increase ROI

RPU'S STORY

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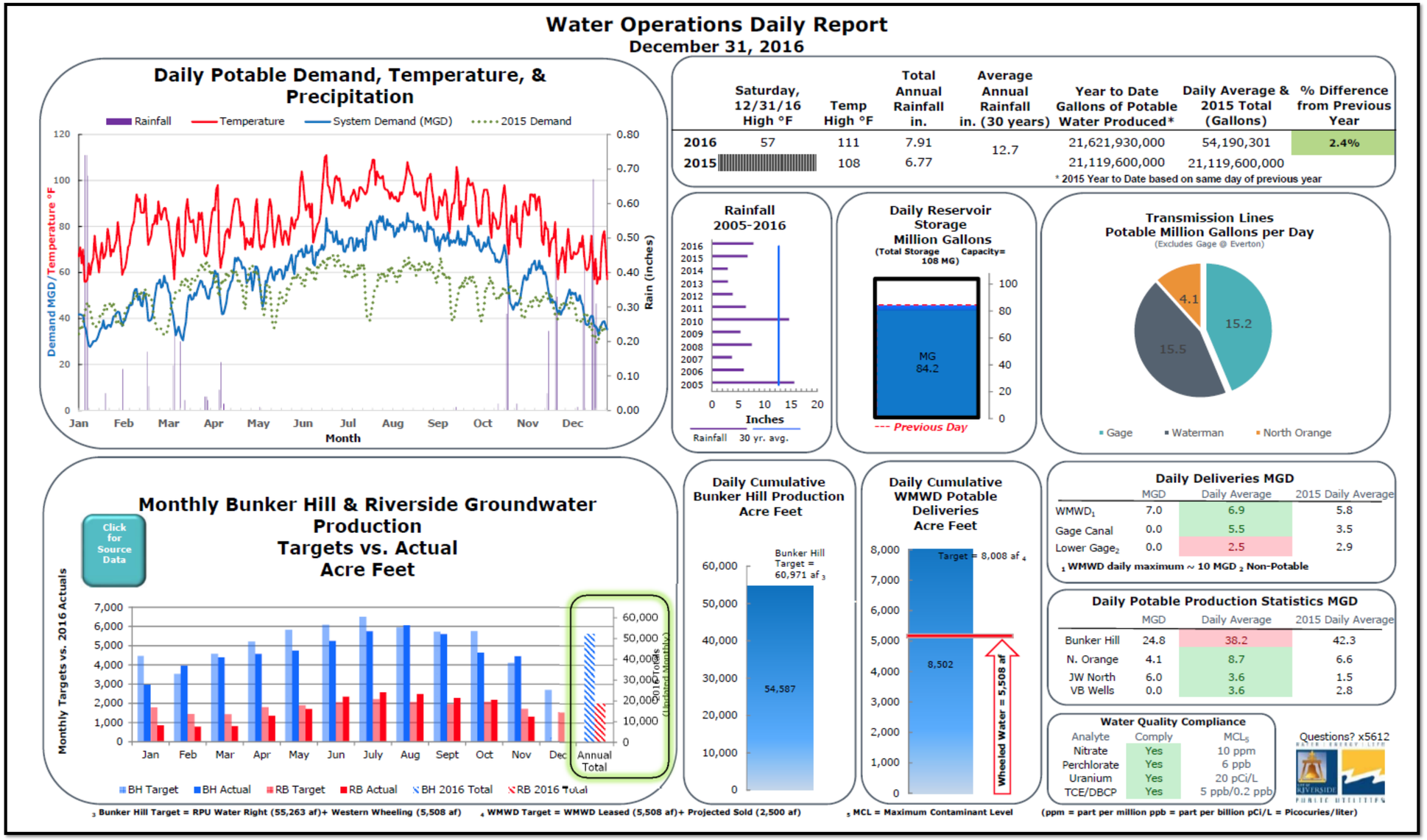
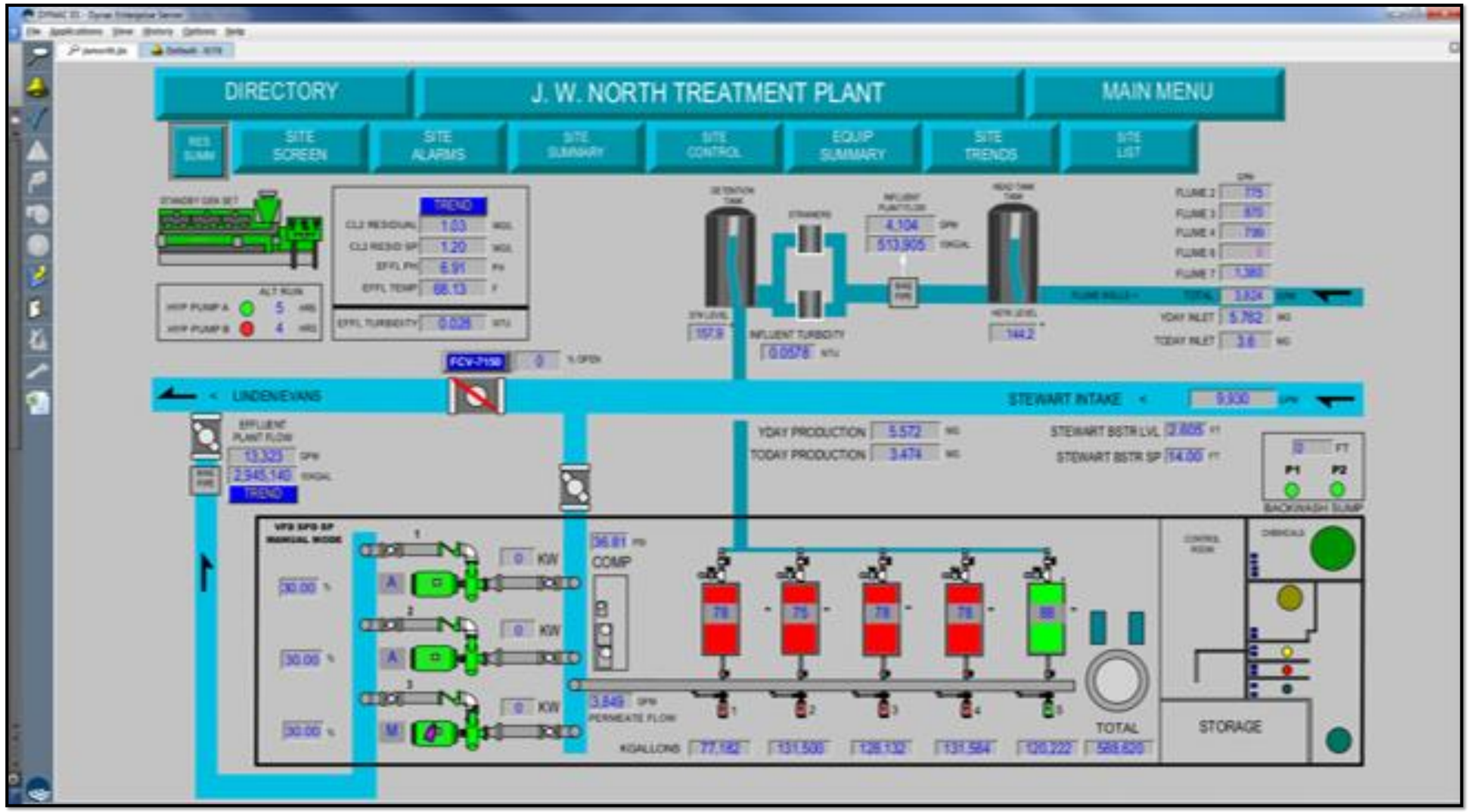
Water Operations Dashboard – Prior State



SCADA Display



SCADA Extraction

Time	RESERVOIR points/RESTOTAL	WATERMAN WELLS points/R041FI1TOTAL	GARNER B points/R021FLOWTOT	GARNER C points/R022FLWTOT	GARNER D points/R023FLOWTOT
12/14/15 12:00 AM	87515048	2329124	1803192	342773	1831967
12/14/15 1:00 AM	87491520	2329202	1803284	342773	1831967
12/14/15 2:00 AM	87486800	2329280	1803376	342773	1831967
12/14/15 3:00 AM	87202728	2329358	1803468	342773	1831967
12/14/15 4:00 AM	86810568	2329436	1803560	342773	1831967
12/14/15 5:00 AM	86649176	2329514	1803651	342773	1831967
12/14/15 6:00 AM	86581776	2329593	1803742	342773	1831967
12/14/15 7:00 AM	86534392	2329671	1803833	342773	1831967
12/14/15 8:00 AM	86664640	2329748	1803925	342773	1831967
12/14/15 9:00 AM	86998768	2329827	1804017	342773	1831967
12/14/15 10:00 AM	87244784	2329905	1804109	342773	1831967
12/14/15 11:00 AM	87636840	2329983	1804201	342773	1831967
12/14/15 12:00 PM	88031360	2330061	1804293	342773	1831967
12/14/15 1:00 PM	88374232	2330139	1804384	342773	1831967
12/14/15 2:00 PM	88745960	2330215	1804476	342773	1831967
12/14/15 3:00 PM	89196304	2330293	1804567	342773	1831967
12/14/15 4:00 PM	89451472	2330371	1804658	342773	1831967
12/14/15 5:00 PM	89588120	2330449	1804750	342773	1831967
12/14/15 6:00 PM	89664688	2330527	1804841	342773	1831967
12/14/15 7:00 PM	89482056	2330606	1804932	342773	1831967
12/14/15 8:00 PM	89161888	2330684	1805023	342773	1831967
12/14/15 9:00 PM	88717064	2330762	1805114	342773	1831967
12/14/15 10:00 PM	88431480	2330839	1805205	342773	1831967
12/14/15 11:00 PM	88238008	2330917	1805296	342773	1831967
12/15/15 12:00 AM	88103736	2330995	1805388	342773	1831967

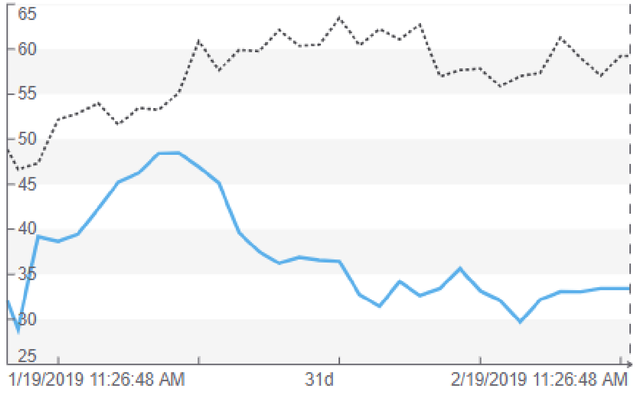
SCADA Data Manipulation

Date	Day of Year	Temperature	Precipitation	Gage - Bunker Hill	Deberry + Van Buren Well (flowing to Gage)	Total Gage Production (mgd)	Waterman Wells
01/01/15	1	54	0.00	14.7	3.8	18.5	12.4
01/02/15	2	60	0.00	14.6	3.8	18.4	14.5
01/03/15	3	61	0.00	14.6	3.8	18.4	13.9
01/04/15	4	69	0.00	14.5	3.8	18.3	15.0
01/05/15	5	76	0.00	13.3	3.8	17.1	20.3
01/06/15	6	81	0.00	13.1	3.8	16.9	28.4
01/07/15	7	81	0.00	12.3	3.7	16.0	29.7
01/08/15	8	74	0.00	13.1	3.7	16.8	29.6
01/09/15	9	65	0.00	14.6	3.8	18.3	18.9
01/10/15	10	65	0.00	14.9	3.8	18.6	13.0
01/11/15	11	59	0.20	14.2	3.8	18.0	14.4
01/12/15	12	64	0.01	14.1	3.8	17.9	12.6
01/13/15	13	67	0.00	13.8	3.8	17.5	10.6
01/14/15	14	69	0.00	14.8	3.7	18.5	12.4
01/15/15	15	72	0.00	14.7	3.7	18.4	13.0
01/16/15	16	77	0.00	14.7	3.7	18.4	17.5
01/17/15	17	80	0.00	14.6	3.7	18.3	19.9
01/18/15	18	76	0.00	14.6	3.7	18.3	15.5
01/19/15	19	74	0.00	14.7	3.7	18.4	16.4
01/20/15	20	67	0.00	14.5	3.7	18.3	19.8
01/21/15	21	72	0.00	14.4	3.7	18.2	16.5
01/22/15	22	75	0.00	14.1	3.7	17.8	14.9
01/23/15	23	73	0.00	13.5	3.7	17.2	21.4

Water Operations Dashboard

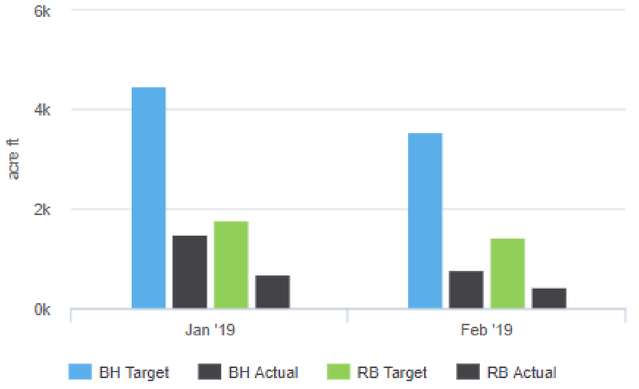
Home / Water / Water Operations

Cumulative Daily System Demand



Monthly Bunker Hill & Riverside Groundwater Production

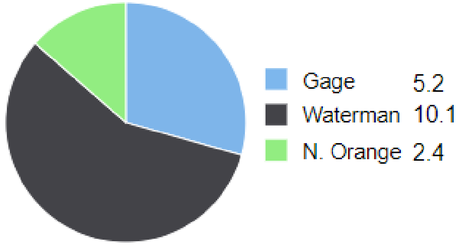
Target vs Actual (AF)



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	36.9 MGD	2 BG % Diff -26.1	2.7 BG	23.6 BG

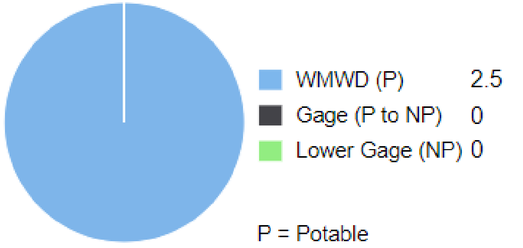
Production (MG)

by Transmission Line



Water Delivery (MG)

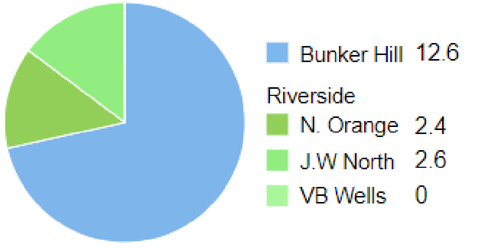
Potable & Non Potable



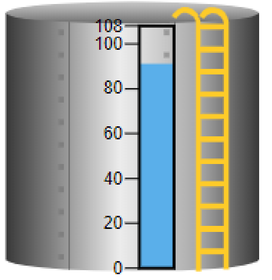
P = Potable
NP = Non Potable

Potable Production (MG)

by Basin



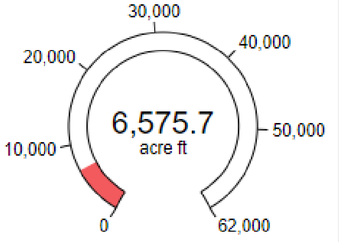
Reservoir Level 91.1 MG



Capacity = 108 MG

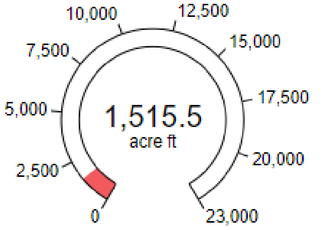
Bunker Hill Production

Target = 61,898 acre feet



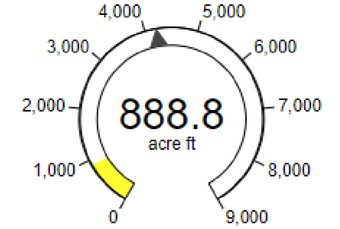
Riverside Production

Target = 22,245 acre feet



WMWD Potable Delivery

Target = 8,008 acre feet



Water Operations Blend Summary – Prior State

Print Close

Blended Averages

1/31/2019

	Flow	Gross Alpha (PC/L)	Uranium (PC/L)	PCE (ug/L)	TCE (ug/L)	DBCP (ug/L)	Nitrates (Mg/L)	Perchlorate (ug/L)	Arsenic (ug/L)	Cr +6 (ug/L)
San Bernardino 42	18143	2.43	6.35	0.00	0.45	0.01	24.68	3.73	3.45	2.18
Gage Inlet	7500	1.00	23.78	0.00	0.08	0.01	26.99	0.25	0.59	1.58
North Orange	4840	1.00	11.25	0.00	0.00	0.00	46.97	2.99	1.03	0.72
G.T. Turnout	0	2.43	6.35	0.00	0.45	0.01	24.68	3.73	3.45	2.18

Booster Flow	Gross Alpha MCL=15 DLR=7.5	Uranium MCL=20 DLR=10	PCE MCL=5 DLR=2.5	TCE MCL=5 DLR=2.5	DBCP MCL=0.2 DLR=0.1	Nitrates MCL=45 DLR=22.5	Perchlorate MCL=6 DLR=4	Arsenic MCL=10 DLR=2	Cr +6 MCL=10 DLR=5
30483	1.85	11.42	0.00	0.29	0.01	28.79	2.76	2.36	1.80

Water Operations Blend Summary

- Data Input

1/30/2019
Ken Olson

	GPM	Gross Alpha PC/L	Gross Alpha WT. AVG	Uranium PC/L	Uranium WT. AVG	PCE ug/L	PCE WT. AVG	TCE ug/L	TCE WT. AVG	DBCP ug/L	DBCP WT. AVG	Nitrates Mg/L	Nitrates WT. AVG	Perchlorate ug/L	Perchlorate WT. AVG	Arsenic ug/L	Arsenic WT. AVG	Cr +6 ug/L	Cr +6 WT. AVG
Gage Delivery																			
Van Buren1	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Van Buren2	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Gage 56-1	1625	1	1625.00	13	21125.00	0	0.00	0	0.00	0.03	48.75	19	30875.00	1.4	2275.00	1.21	1966.25	1	1625.00
Gage 46-1	2175	1	2175.00	30	65250.00	0	0.00	0.32	696.00	0	0.00	28	60900.00	8.3	2	0	0.00	0.9	1957.50
Gage 31-1	0	1	0.00	32	0.00	0	0.00	0	0.00	0	0.00	29.18	0.00	3.89	0.00	1.21	0.00	1.3	0.00
Gage 29-3	0	1	0.00	31	0.00	0	0	10	0	0.02	0	35.41	0.00	18.19	2	0	0.00	1.4	0.00
Gage 29-2	0	1	0.00	27	0.00	0	0	18.9	0	0.01	0	28.27	0.00	8.86	2	0.36	0.00	2	0.00
Gage 51-1	0	1	0.00	12	0.00	0	0	9.4	0	0.22	0	41.72	0.00	39.24	2	0.72	0.00	2.5	0.00
Gage 26-1	0	1	0.00	49	0.00	0	0.00	1.05	0.00	0	0.00	34	0.00	6.3	0.00	1.15	0.00	3.4	0.00
Gage 27-1	0	1	0.00	27	0.00	0	0.00	0.51	0.00	0	0.00	34.48	0.00	7.5	0.00	0	0.00	4.2	0.00
Gage 66-1	0	1	0.00	8.7	0.00	0	0	2.88	0	0.08	0	53	0.00	14.7	2	0	0.00	8.8	0.00
Gage 27-2	0	1	0.00	11	0.00	0	0.00	0	0.00	0	0.00	42.69	0.00	9	0.00	0	0.00	4.8	0.00
Gage 29-1	0	2	0.00	5.2	0.00	0	0.00	0	0.00	0	0.00	51.99	0.00	11.46	0.00	2.78	0.00	4.9	0.00
Gage DeBerry	0	1	0.00	2.2	0.00	0	0.00	0	0.00	0	0.00	17	0.00	0.6	0.00	0	0.00	0.14	0.00
Gage 92-1	2580	1	2580.00	11	28380.00	0	0	1.9	0	0.04	0	25.27	65196.60	16.05	2	1.3	3354.00	1.9	4902.00
Gage 92-2	0	3	0.00	5	0.00	0	0.00	0	0.00	0	0.00	15	0.00	1.27	0.00	1.33	0.00	2.2	0.00
Gage 92-3	0	1	0.00	7.4	0.00	0	0.00	0	0.00	0	0.00	13	0.00	1.22	0.00	1.4	0.00	2	0.00
Gage 98-1	0	3.1	0.00	2	0.00	0	0.00	0.67	0.00	0	0.00	4	0.00	3	0.00	2.7	0.00	3.8	0.00
Tippecanoe	2600	1	2600.00	38	98800.00	0	0	7.69	0	0.15	0	32.83	85358.00	29.26	2	0	0.00	2.2	5720.00
TOTALS	8980.00		8980.00		213555.00		0.00		696.00		48.75		242329.60		2289.00		5320.25		14204.50
GAGE WT. AVG			1.00		23.78		0.00		0.08		0.01		26.99		0.25		0.59		1.58
North Orange																			
Garner B	1350	1	1350.00	3.4	4590.00	0	0.00	0	0.00	0	0.00	27	36450.00	0.82	1107.00	1.32	1782.00	0.44	594.00
Garner C	0	1	0.00	2.4	0.00	0	0.00	0	0.00	0	0.00	28	0.00	1.18	0.00	1.2	0.00	0.61	0.00
Garner D	0	1	0.00	2	0.00	0	0.00	0	0.00	0	0.00	28	0.00	2.15	0.00	1.2	0.00	1.2	0.00
Brunton 1R	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Electric Street	1465	1	1465.00	14	20510.00	0	0	0	0	0.37	0	46.41	67990.65	2.75	4028.75	2.2	3223.00	0.59	864.35
Twin Springs	0	1	0.00	6.1	0.00	0	0	0	0	0.25	0	33	0.00	3.56	0.00	0	0.00	1.1	0.00
Moore Griffith	0	1	0.00	3.6	0.00	0	0	0	0	0.22	0	28.5	0.00	3.77	0.00	0	0.00	2	0.00
Palmyrita	2025	1	2025.00	14.5	29362.50	0	0	0	0	0.52	0	60.7	122917.50	4.61	9335.25	0	0.00	1	2025.00
TOTALS	4840		4840.00		54462.50		0.00		0.00		0.00		227358.15		14471.00		5005.00		3483.35
N.O. WT. AVG			1.00		11.25		0.00		0.00		0.00		46.97		2.99		1.03		0.72

Data Collection

260 Daily Flow Chart

Weather:

Date: 01/30/19

Wells

Stiles	
Scheuer ✓	2927
Garner 1	
Garner 4	
Garner 5	
Garner 6	
Garner 7	
Cooley H	
Cooley I	
Cooley J	
Raub 4 R	
Raub 5 R ✓	2717
Raub 6 ✓	1798
Raub 7 ✓	2321
Raub 8 ✓	2309
Thorne 12 ✓	1946

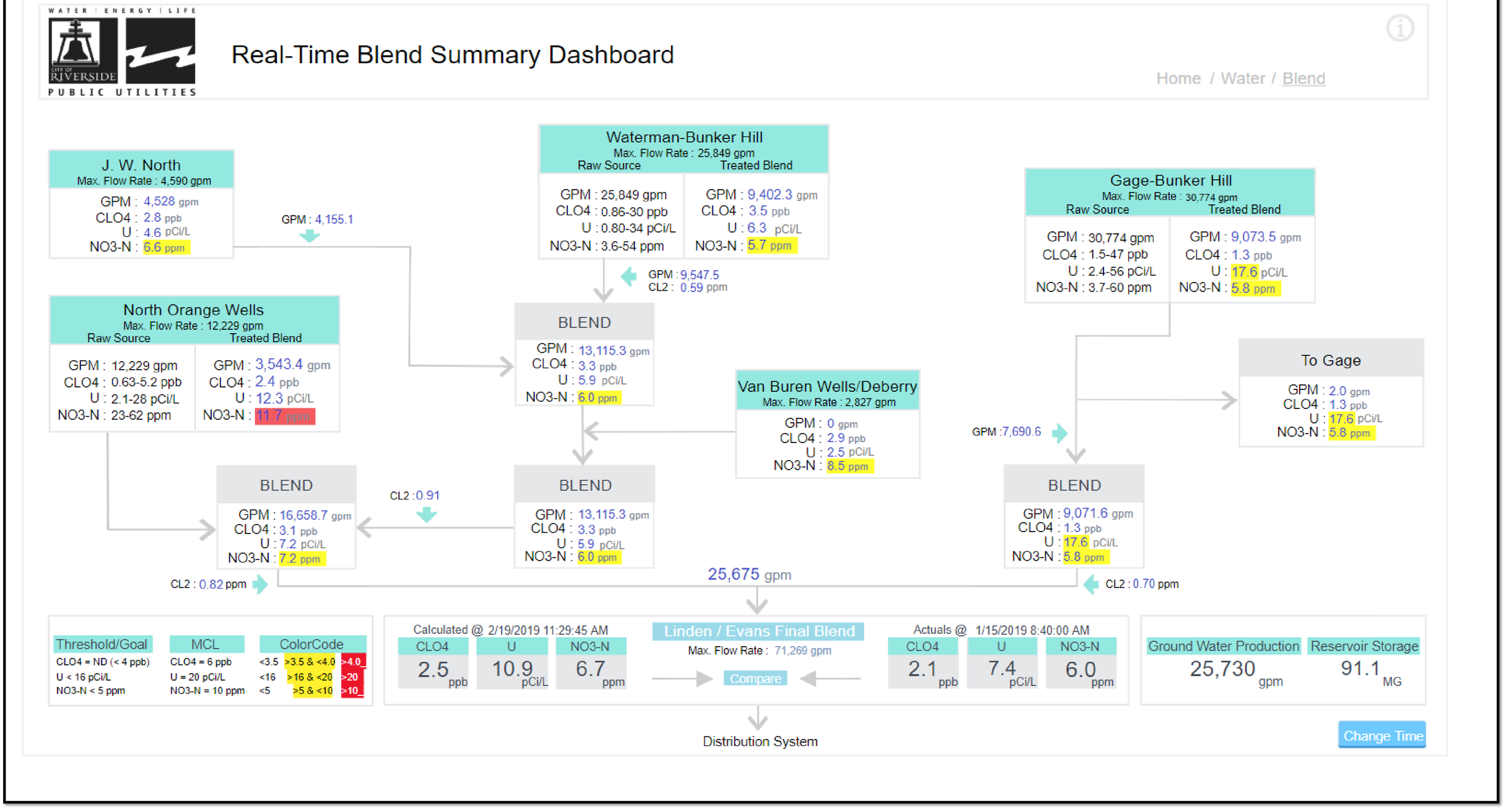
Y Total Res. Gal. @ 07:00	85,400,000
T Total Res. Gal. @ 07:00	89,149,856
Change in Ft. = Loss/Gain in Gal:	+3,749,856

Calculated Totals:

Linden/Gage Calculated Flow:	
JW North Read:	
42":	
Total Res. Gal:	

Operator Notes :

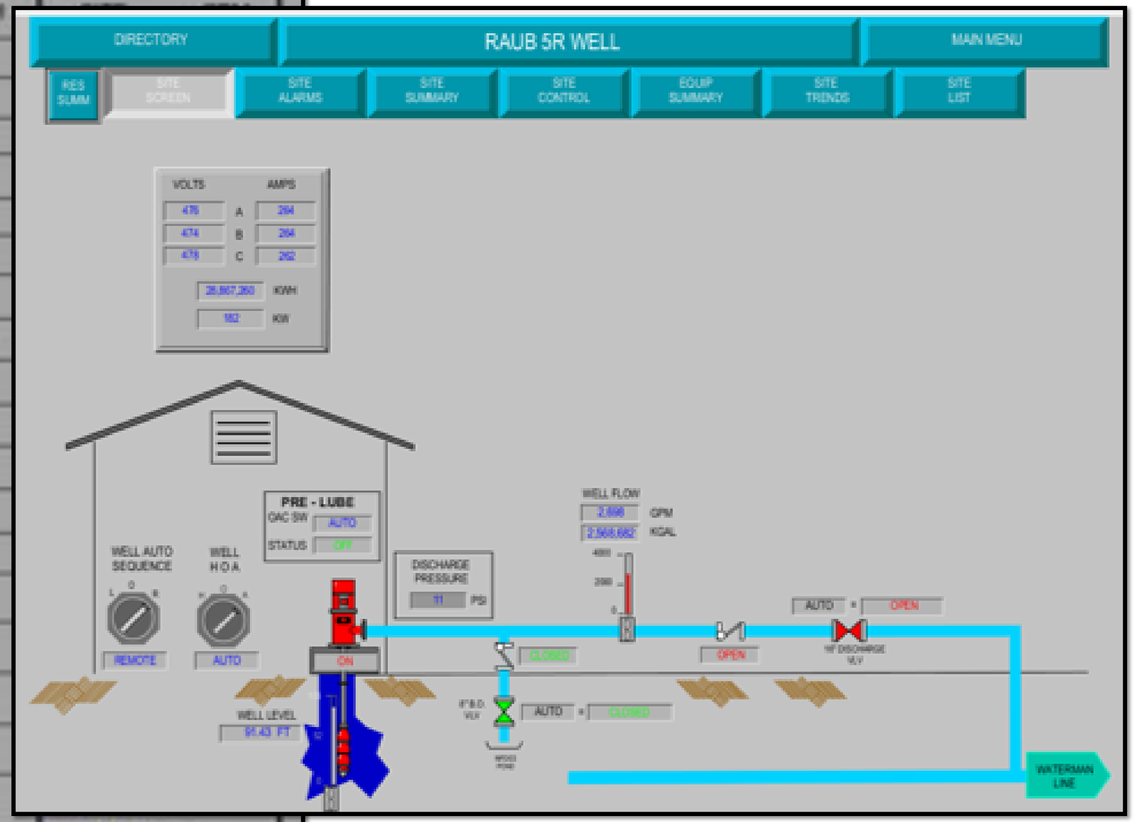
Twin Springs & Warren 1 to be sampled today.
Cage dialing in booster's @ Sunnyside.


WATER | ENERGY | LIFE
CITY OF RIVERSIDE
PUBLIC UTILITIES
Real-Time Blend Summary Dashboard
Home / Water / Blend
J. W. North
Max. Flow Rate : 4,590 gpm
GPM : 4,528 gpm
CLO4 : 2.8 ppb
U : 4.6 pCi/L
NO3-N : 6.6 ppm
GPM : 4,155.1
Waterman-Bunker Hill
Max. Flow Rate : 25,849 gpm
Raw Source
GPM : 25,849 gpm
CLO4 : 0.86-30 ppb
U : 0.80-34 pCi/L
NO3-N : 3.6-54 ppm
Treated Blend
GPM : 9,402.3 gpm
CLO4 : 3.5 ppb
U : 6.3 pCi/L
NO3-N : 5.7 ppm
GPM : 9,547.5
CL2 : 0.59 ppm
Gage-Bunker Hill
Max. Flow Rate : 30,774 gpm
Raw Source
GPM : 30,774 gpm
CLO4 : 1.5-47 ppb
U : 2.4-56 pCi/L
NO3-N : 3.7-60 ppm
Treated Blend
GPM : 9,073.5 gpm
CLO4 : 1.3 ppb
U : 17.6 pCi/L
NO3-N : 5.8 ppm
North Orange Wells
Max. Flow Rate : 12,229 gpm
Raw Source
GPM : 12,229 gpm
CLO4 : 0.63-5.2 ppb
U : 2.1-28 pCi/L
NO3-N : 23-62 ppm
Treated Blend
GPM : 3,543.4 gpm
CLO4 : 2.4 ppb
U : 12.3 pCi/L
NO3-N : 11.7 ppm
BLEND
GPM : 13,115.3 gpm
CLO4 : 3.3 ppb
U : 5.9 pCi/L
NO3-N : 6.0 ppm
Van Buren Wells/Deberry
Max. Flow Rate : 2,827 gpm
GPM : 0 gpm
CLO4 : 2.9 ppb
U : 2.5 pCi/L
NO3-N : 8.5 ppm
To Gage
GPM : 2.0 gpm
CLO4 : 1.3 ppb
U : 17.6 pCi/L
NO3-N : 5.8 ppm
GPM :7,690.6
BLEND
GPM : 16,658.7 gpm
CLO4 : 3.1 ppb
U : 7.2 pCi/L
NO3-N : 7.2 ppm
CL2 :0.91
BLEND
GPM : 13,115.3 gpm
CLO4 : 3.3 ppb
U : 5.9 pCi/L
NO3-N : 6.0 ppm
BLEND
GPM : 9,071.6 gpm
CLO4 : 1.3 ppb
U : 17.6 pCi/L
NO3-N : 5.8 ppm
CL2 : 0.82 ppm
25,675 gpm
CL2 : 0.70 ppm
Threshold/Goal
CLO4 = ND (< 4 ppb)
U < 16 pCi/L
NO3-N < 5 ppm
MCL
CLO4 = 6 ppb
U = 20 pCi/L
NO3-N = 10 ppm
ColorCode
<3.5 >3.5 & <4.0 >4.0
<16 >16 & <20 >20
<5 >5 & <10 >10
Calculated @ 2/19/2019 11:29:45 AM
CLO4 2.5 ppb
U 10.9 pCi/L
NO3-N 6.7 ppm
Linden / Evans Final Blend
Max. Flow Rate : 71,269 gpm
Compare
Actuals @ 1/15/2019 8:40:00 AM
CLO4 2.1 ppb
U 7.4 pCi/L
NO3-N 6.0 ppm
Ground Water Production
25,730 gpm
Reservoir Storage
91.1 MG
Distribution System
Change Time

Water Operations Water Well Flow Rates – Prior State

DIRECTORY | PRODUCTION WELL SUMMARY | MAIN MENU

BUNKER HILL/WATERMAN		RIV N BASIN		RIV S BASIN		BUNKER HILL/GAGE		RIV CANAL	
SITE	GPM	SITE	GPM	SITE	GPM	SITE	GPM	SITE	GPM
STILES	0	FLUME 2	775	GARN B	0	51-1	0	FILL ST	0
SCHELER	2908	FLUME 3	870	GARN C	0	56-1	1652	FIRST ST	0
GARNER 1	0	FLUME 4	797	GARN D	0	66-1	0	FLUME 6	0
GARNER 4	0	FLUME 6	0	BRUNTON SR	0	62-1	2567	MULBERRY	0
GARNER 5	0	FLUME 7	1382	PALMYRITA	2032	52-2	0	OLIVEW 1	0
GARNER 6	0			MOORE GRIFF	0	62-3	0	OLIVEW 2	0
GARNER 7	0			ELECTRIC ST	1439	56-1	0	OLIVEW 3	0
COOLEY H	0			TWIN SPRING	0	TIPPIE	2541	PALM WELL	NA
COOLEY I	0					MAIN # 1	7967	PALMYRITA	0
COOLEY J	0			GAGE CANAL		VB 1 WELL	0	JOHNSON 4	0
THORNE 12	0			26-1	0	VB 2 WELL	0		
RAUB 4R	0			27-1	0	DEERY	0		
RAUB 5R	2701			27-2	0	MAIN # 2			
RAUB 6	0			29-1	0	7,528			
RAUB 7	1796			29-2	0				
RAUB 8	2274			29-3	0	EVERTON			
WARREN 1	0			33-1R	0	0			
WARREN 4	0			46-1	2157				
HUNT 10	0	JWN PERM GPM				LIN/GAGE			36.774 MGD
10,010		3,837				7,244		2,443	25,538 GPM



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Current Water Production Well Flow Rate

Home / Water / GPM

Waterman

Name	Value ▲	Trend ▲	Average	Maximum	Units
Cooley H|Flow Rate GPM	0		0	0	gpm
Cooley I|Flow Rate GPM	0		0	0	gpm
Cooley J|Flow Rate GPM	0		0	0	gpm
Garner 1|Flow Rate GPM	0		2.3133	298.75	gpm
Garner 4|Flow Rate GPM	0		0	0	gpm
Garner 5|Flow Rate GPM	0		0	0	gpm
Garner 6|Flow Rate GPM	0		0	0	gpm
Garner 7|Flow Rate GPM	0		0	0	gpm
Hunt 10|Flow Rate GPM	0		0	0	gpm
Raub 5R|Flow Rate GPM	0		1,862.1	2,794.1	gpm
Raub 6|Flow Rate GPM	0		517	1,940	gpm
Raub 8|Flow Rate GPM	0		95.371	2,494.9	gpm
Stiles|Flow Rate GPM	0		0	0	gpm
Warren 1|Flow Rate GPM	0		0	0	gpm
Warren 4|Flow Rate GPM	0		0	0	gpm
Raub 7|Flow Rate GPM	1,902.9		1,656.7	1,974.6	gpm
Thorne 12|Flow Rate GPM	1,936.8		1,713.1	2,137.7	gpm
Raub 4R|Flow Rate GPM	2,599.6		589.69	2,724.5	gpm
Scheuer|Flow Rate GPM	2,962		2,639.5	3,199	gpm

Flow rate @
2/19/2019 11:32:00 AM

View 365 Day Flow Trends

Gage

Name	Value ▲	Trend ▲	Average	Maximum	Units
Gage 26-1|Flow Rate GPM	0		0	0	gpm
Gage 27-1|Flow Rate GPM	0		0	0	gpm
Gage 27-2|Flow Rate GPM	0		0	0	gpm
Gage 29-1|Flow Rate GPM	0		0	0	gpm
Gage 29-2|Flow Rate GPM	0		0.089512	1.5	gpm
Gage 29-3|Flow Rate GPM	0		145.63	1,672	gpm
Gage 31-1R|Flow Rate GPM	0		0	0	gpm
Gage 51-1|Flow Rate GPM	0		6.688	1,389	gpm
Gage 66-1|Flow Rate GPM	0		0	0	gpm
Gage 92-2|Flow Rate GPM	0		0	0	gpm
Gage 92-3|Flow Rate GPM	0		0	0	gpm
Gage 98-1|Flow Rate GPM	0		149	3,082.5	gpm
Gage 56-1|Flow Rate GPM	1,724.6		1,688.6	1,894	gpm
Gage 46-1R|Flow Rate GPM	2,161.2		2,159.5	2,233.1	gpm
Tippecanoe|Flow Rate GPM	2,587.8		2,573	2,730.9	gpm
Gage 92-1|Flow Rate GPM	2,607		2,169.7	2,659	gpm

Transmission Mains

Name	Value ▲	Trend ▲	Average	Maximum	Units
Weir #2|Weir Flow Rate GPM	0		0.2	7.9	gpm
North Orange|Flow Rate	3,557		3,977.7	7,944.4	gpm
JW North|JW North Flowrate	4,058		3,508.8	6,516.5	gpm
Gage|Flow Rate GPM	7,323.4		7,560.8	11,537.5	gpm
Gage - Bunker Hill|Flow Rate G	8,079.8		8,079.7	8,184.4	gpm
Linden Evans|Flow Rate GPM	25,893.8		25,064.2	32,037.5	gpm

North Orange

Name	Value ▲	Trend ▲	Average	Maximum	Units
Brunton 1R|Flow Rate GPM	0		0	0	gpm
Garner B|Flow Rate GPM	0		507.84	1,648.6	gpm
Garner C|Flow Rate GPM	0		228.82	2,816	gpm
Garner D|Flow Rate GPM	0		7.5303	2,104	gpm
Moore Griffith|Flow Rate GPM	0		0	0	gpm
Twin Springs|Flow Rate GPM	0		30.258	2,662	gpm
Electric Street|Flow Rate GPM	1,514.8		1,140.6	1,796.6	gpm
Palmyrita|Flow Rate GPM	2,042.2		2,062.5	2,377.2	gpm

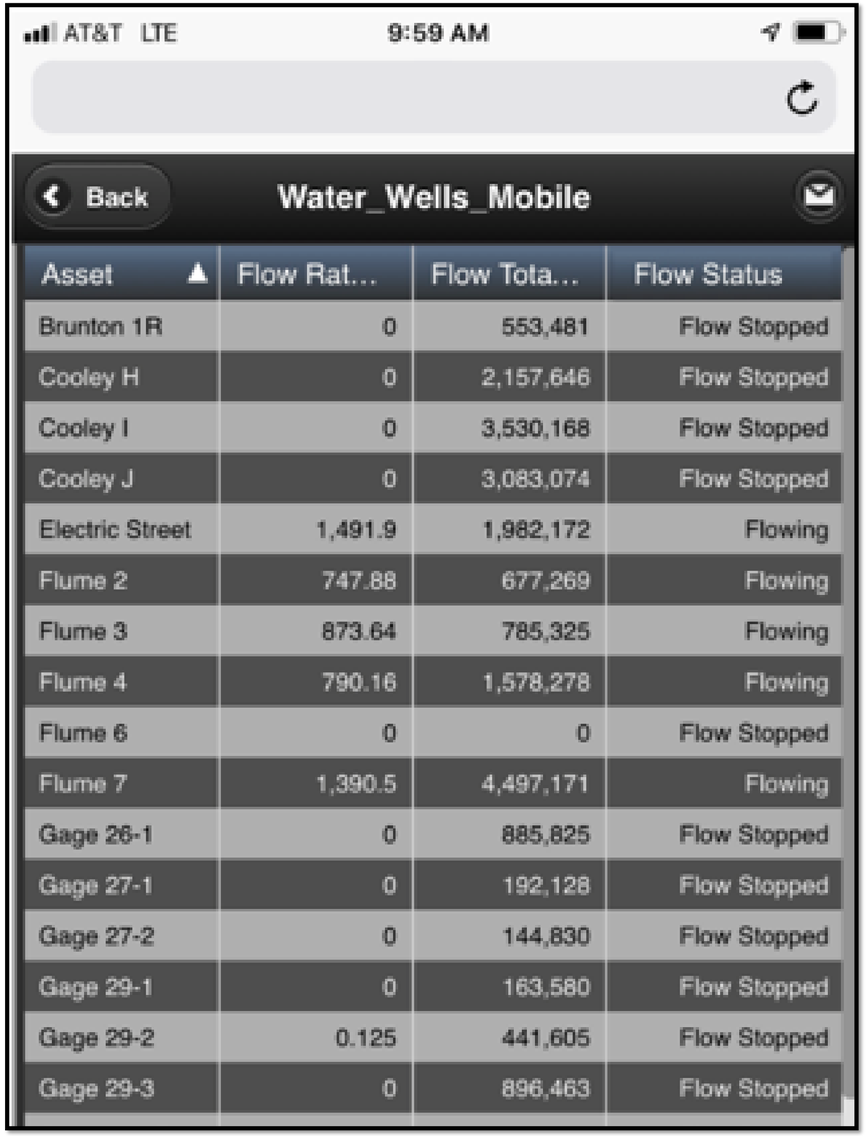
Riverside North

Name	Value ▲	Trend ▲	Average	Maximum	Units
Flume 6|Flow Rate GPM	0		0	0	gpm
Gage DeBerry|Flow Rate GPM	0		0	0	gpm
Van Buren1|Flow Rate GPM	0		1.8697	932.53	gpm
Van Buren2|Flow Rate GPM	0		0	0	gpm
Flume 2|Flow Rate GPM	812.88		771.75	4,000	gpm
Flume 3|Flow Rate GPM	891.72		857.65	902.89	gpm
Flume 4|Flow Rate GPM	1,273.8		1,136.8	1,371.1	gpm
Flume 7|Flow Rate GPM	1,550.5		901.29	1,564.8	gpm

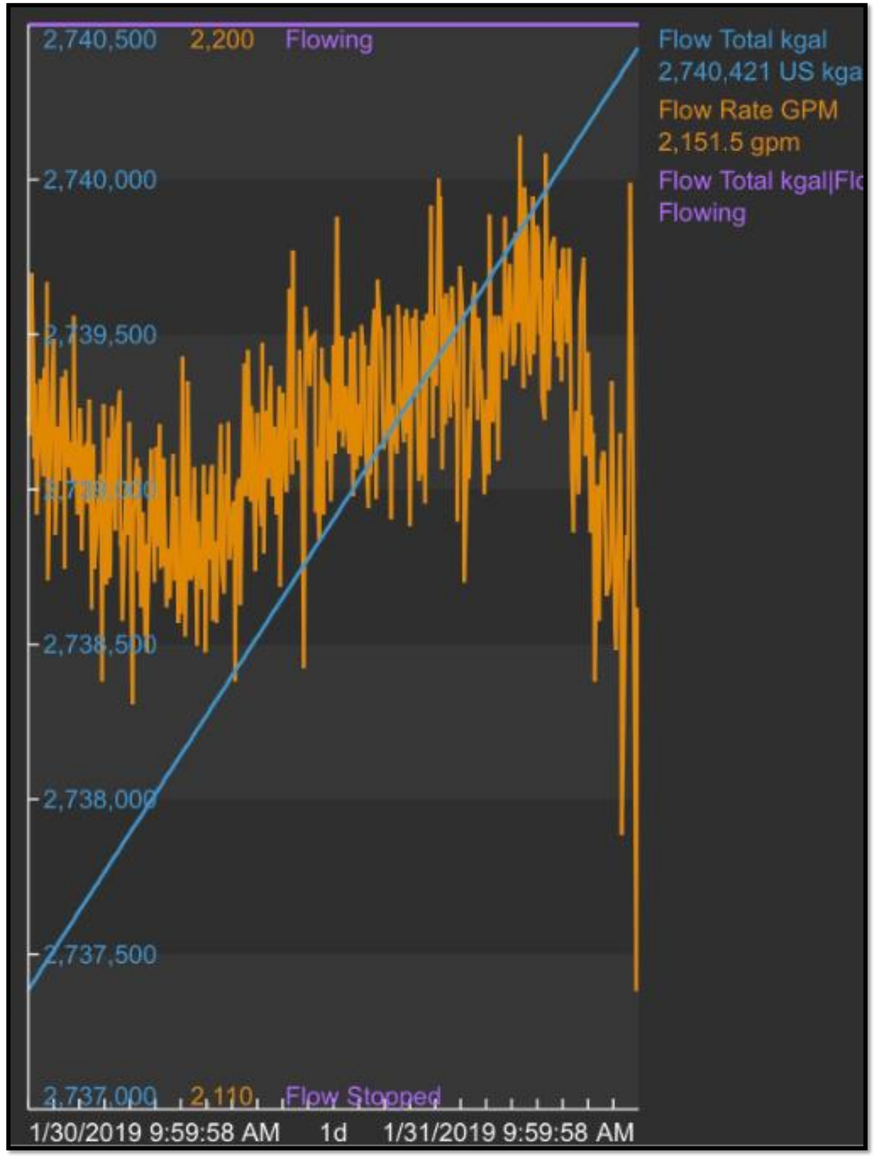
WMWD

Name	Value ▲	Trend ▲	Average	Maximum	Units
WMWD|WMWD Warmington Fl	0		0	0	gpm
WMWD|WMWD Green Orchard	0.98438		0.43322	1.3125	gpm
WMWD|WMWD Mockingbird Fl	2,589.8		4,161.7	4,366.4	gpm

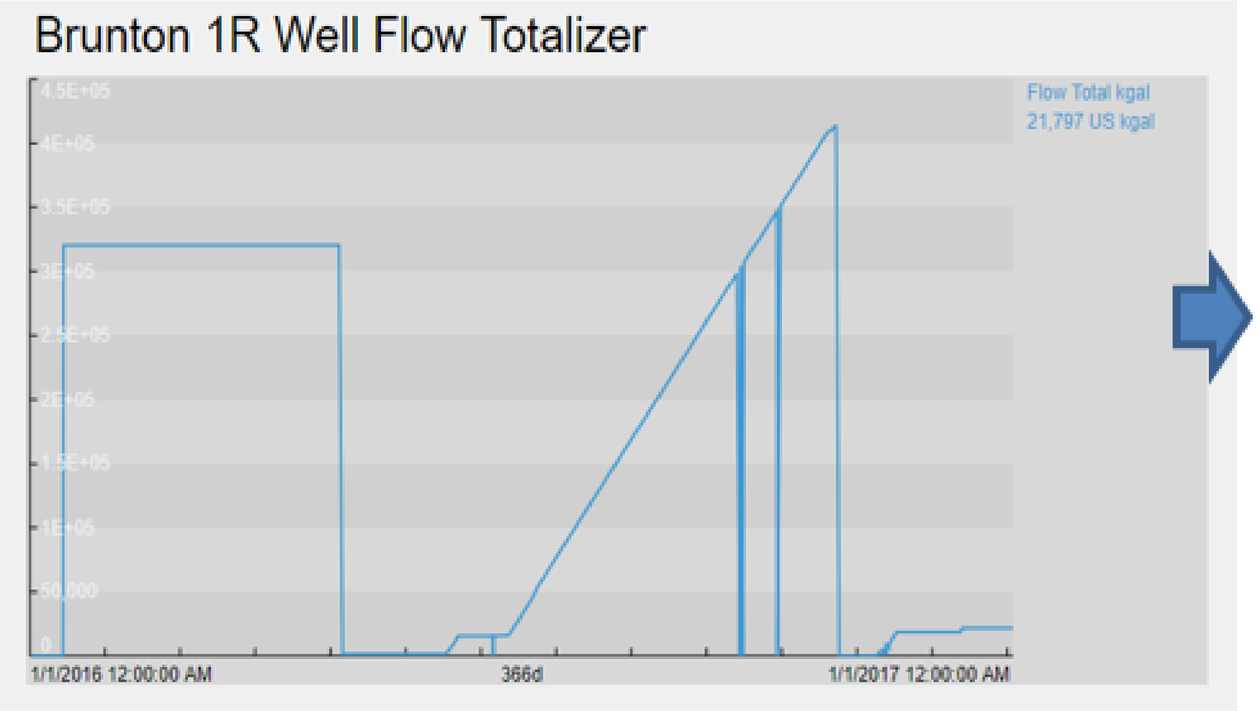
Water Operations Mobile App

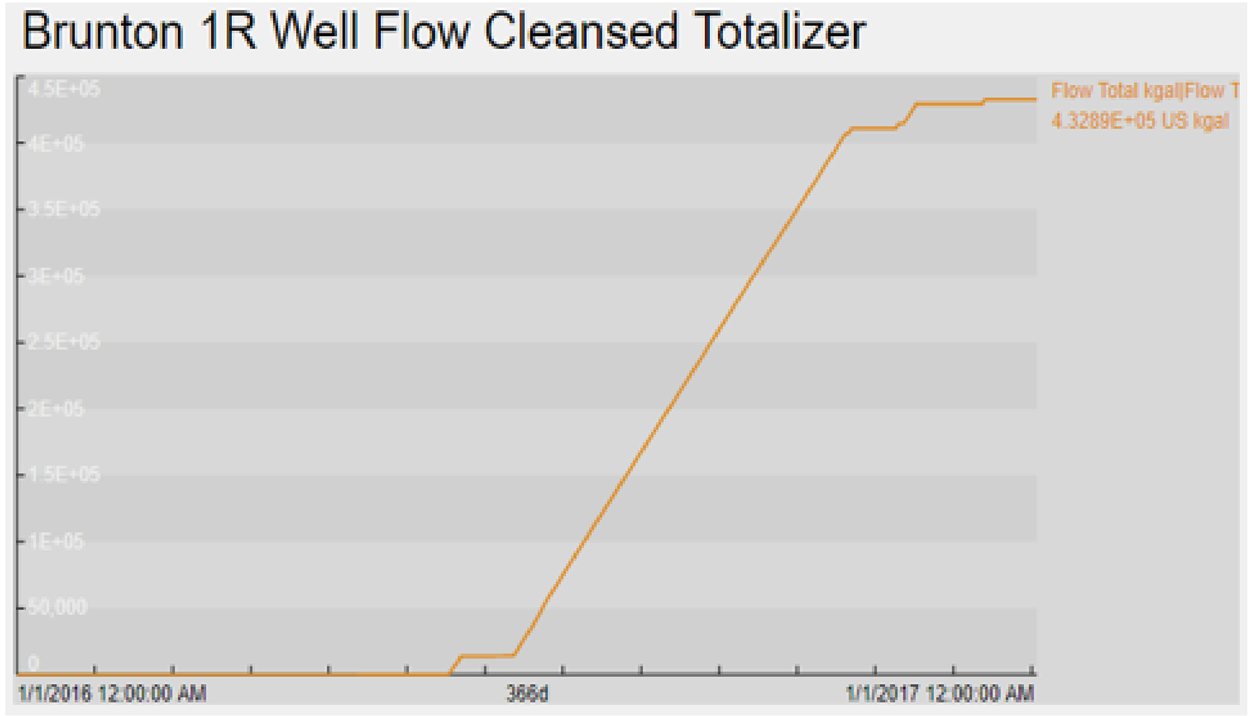


Asset	Flow Rat…	Flow Tota…	Flow Status
Brunton 1R	0	553,481	Flow Stopped
Cooley H	0	2,157,646	Flow Stopped
Cooley I	0	3,530,168	Flow Stopped
Cooley J	0	3,083,074	Flow Stopped
Electric Street	1,491.9	1,982,172	Flowing
Flume 2	747.88	677,269	Flowing
Flume 3	873.64	785,325	Flowing
Flume 4	790.16	1,578,278	Flowing
Flume 6	0	0	Flow Stopped
Flume 7	1,390.5	4,497,171	Flowing
Gage 26-1	0	885,825	Flow Stopped
Gage 27-1	0	192,128	Flow Stopped
Gage 27-2	0	144,830	Flow Stopped
Gage 29-1	0	163,580	Flow Stopped
Gage 29-2	0.125	441,605	Flow Stopped
Gage 29-3	0	896,463	Flow Stopped



Well Totalizer Trend Cleansing





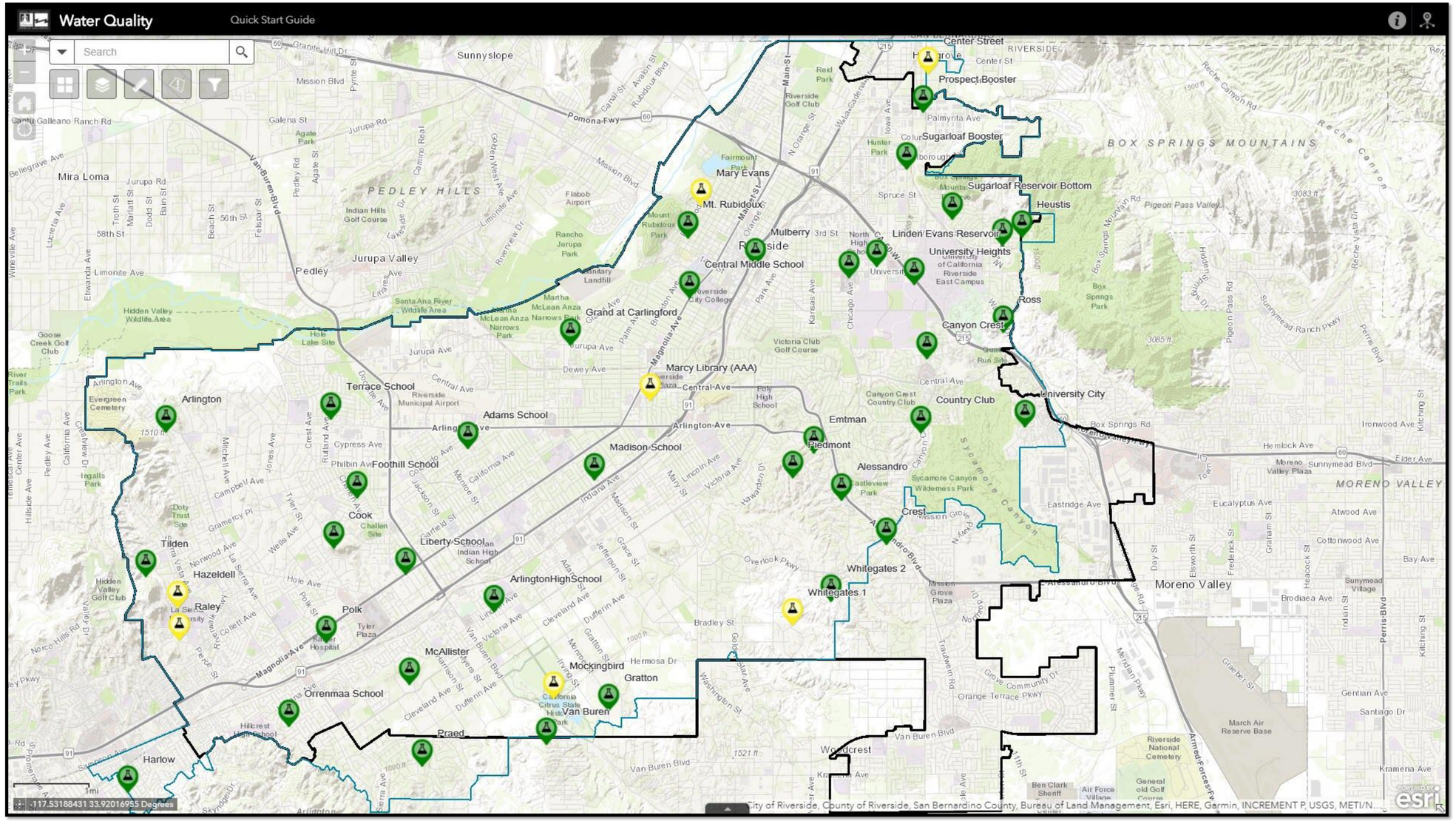
Data Validation Reporting

SCADA Data Validation Report

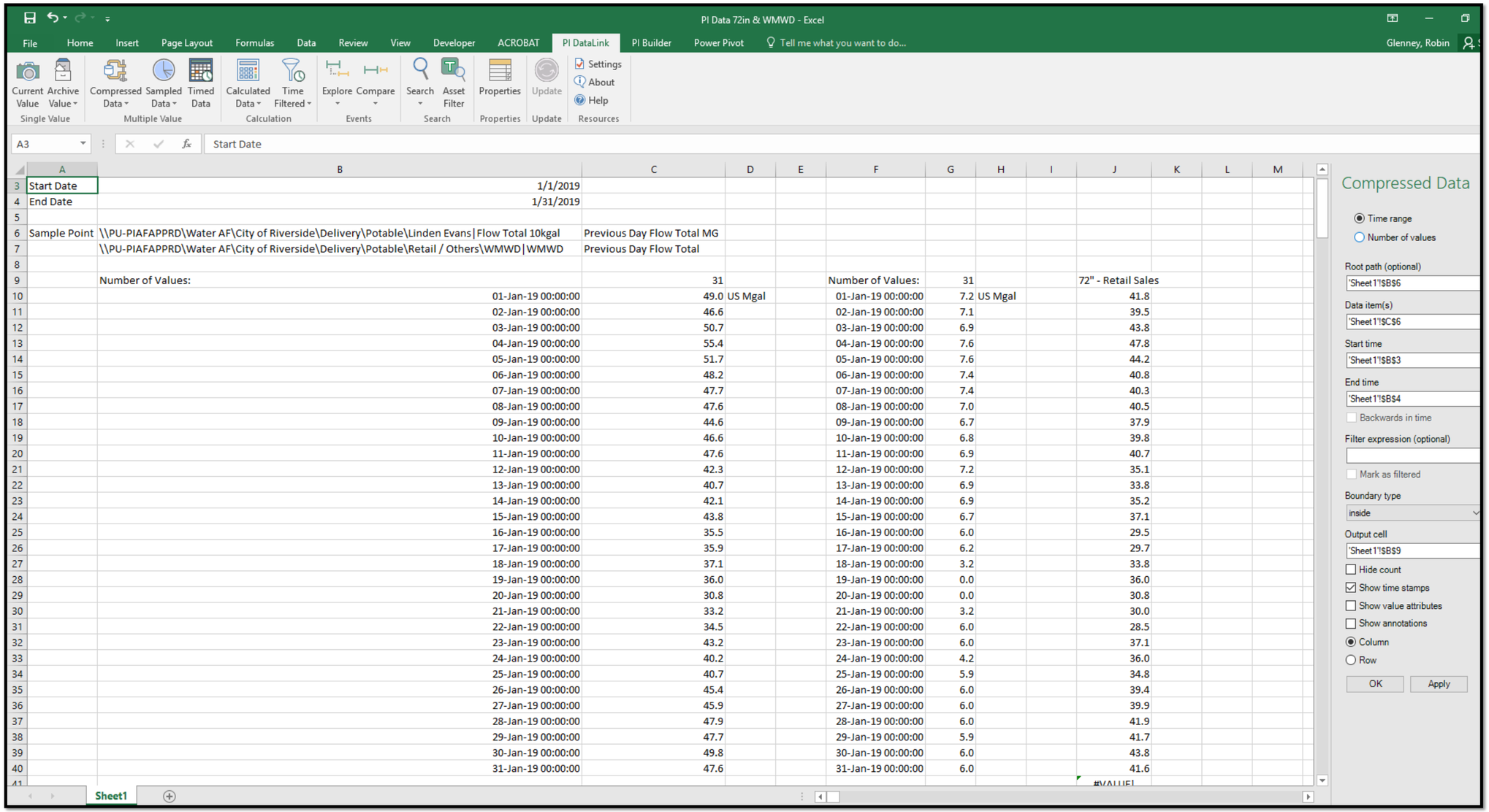
Select Date			
Start Time	1	Jan	2019
End Time	20	Jan	2019

FLOW			PI TOTALS				Diff
Row Labels	Sum of VALUE	AF	Row Labels	Min of VALUE	Max of VALUE2	AF	
BRUNTON 1R GPM	7559.275	1.392	BRUNTON 1R X 1000	553024	553481	1.40248273	-0.01057
COOLEY H GPM	0	0.000	COOLEY H X 1000	2157529	2157529	0	0
COOLEY I GPM	0	0.000	COOLEY I X 1000	3528852	3528852	0	0
COOLEY J GPM	1.933333333	0.000	COOLEY J X 1000	3083074	0	-9461.614968	9461.615
ELECTRIC GPM	574589.8375	105.801	ELECTRIC X 1000	1924124	1958485	105.4501293	[illegible]
EVERTON MID	106173.7505	19.550	EVERTON X 1000	6361531	6419376	177.5199421	-157.97
FILL IRR GPM	0	0.000	FILL IRR X 1000	1051626	1051626	0	0
FIRST ST IRR GPM	0	0.000	FIRST ST IRR X 1000	542993	542993	0	0
FLUME 2 GPM	319563.3146	58.842	FLUME 2 X 1000	644000	664388	62.56852932	-3.7263
FLUME 3 GPM	355732.4232	65.502	FLUME 3 X 1000	752960	774183	65.13105247	0.371111
FLUME 4 GPM	477926.3497	88.002	FLUME 4 X 1000	1531335	1559944	87.79787401	0.204253
[illegible]	0	0.000	[illegible]	0	0	0	0

OSIsoft PI and ESRI GIS

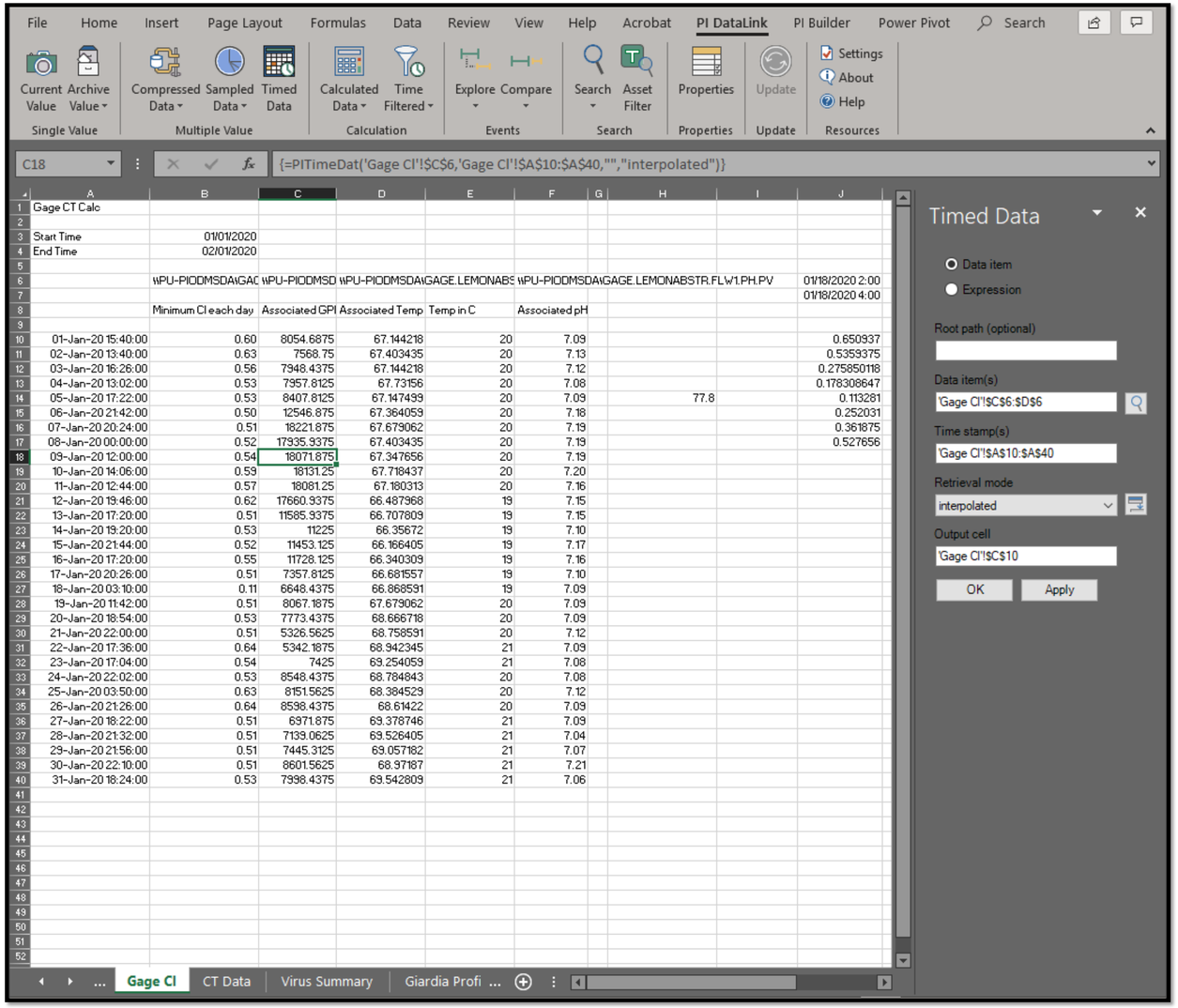


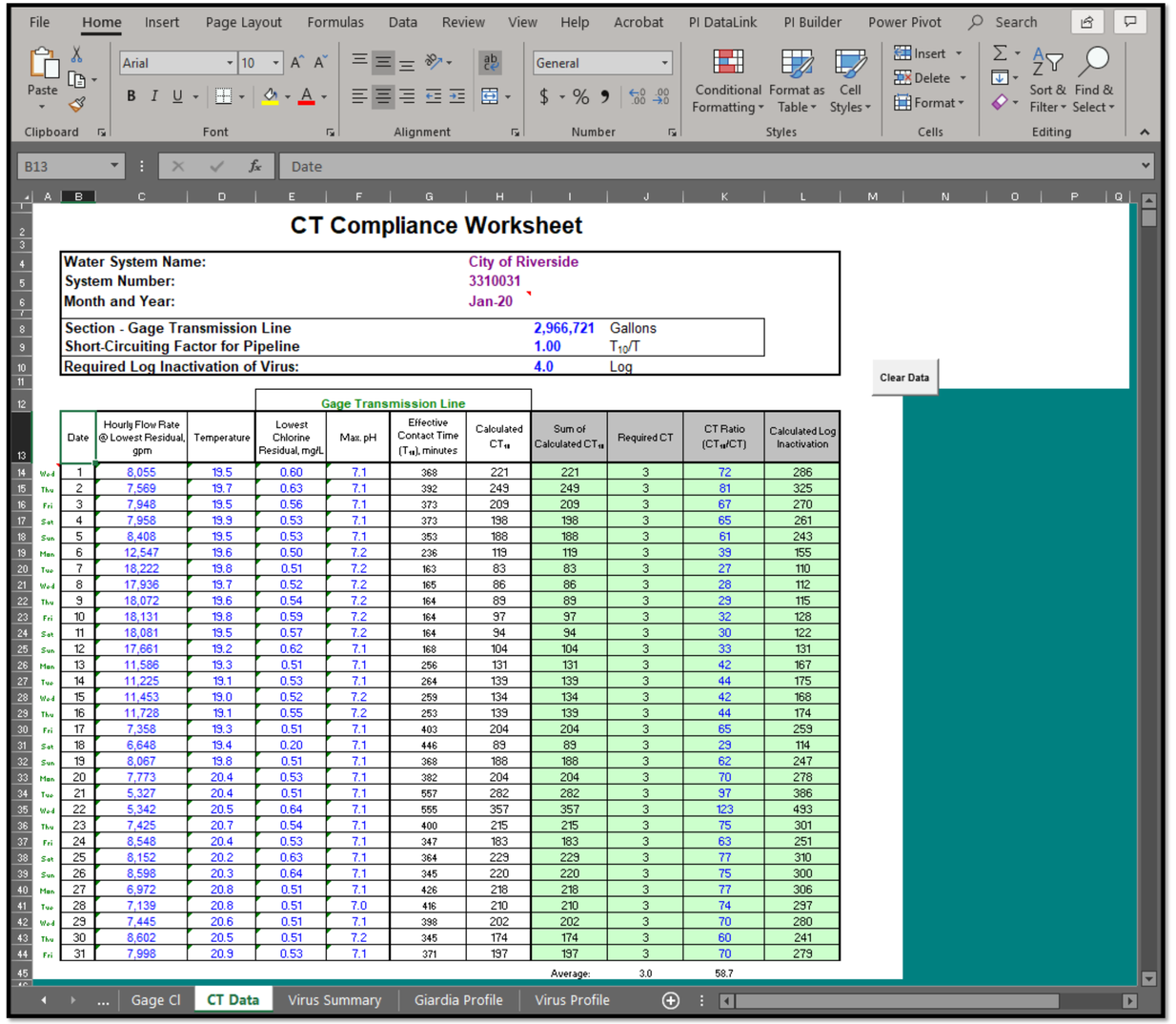
PI Datalink



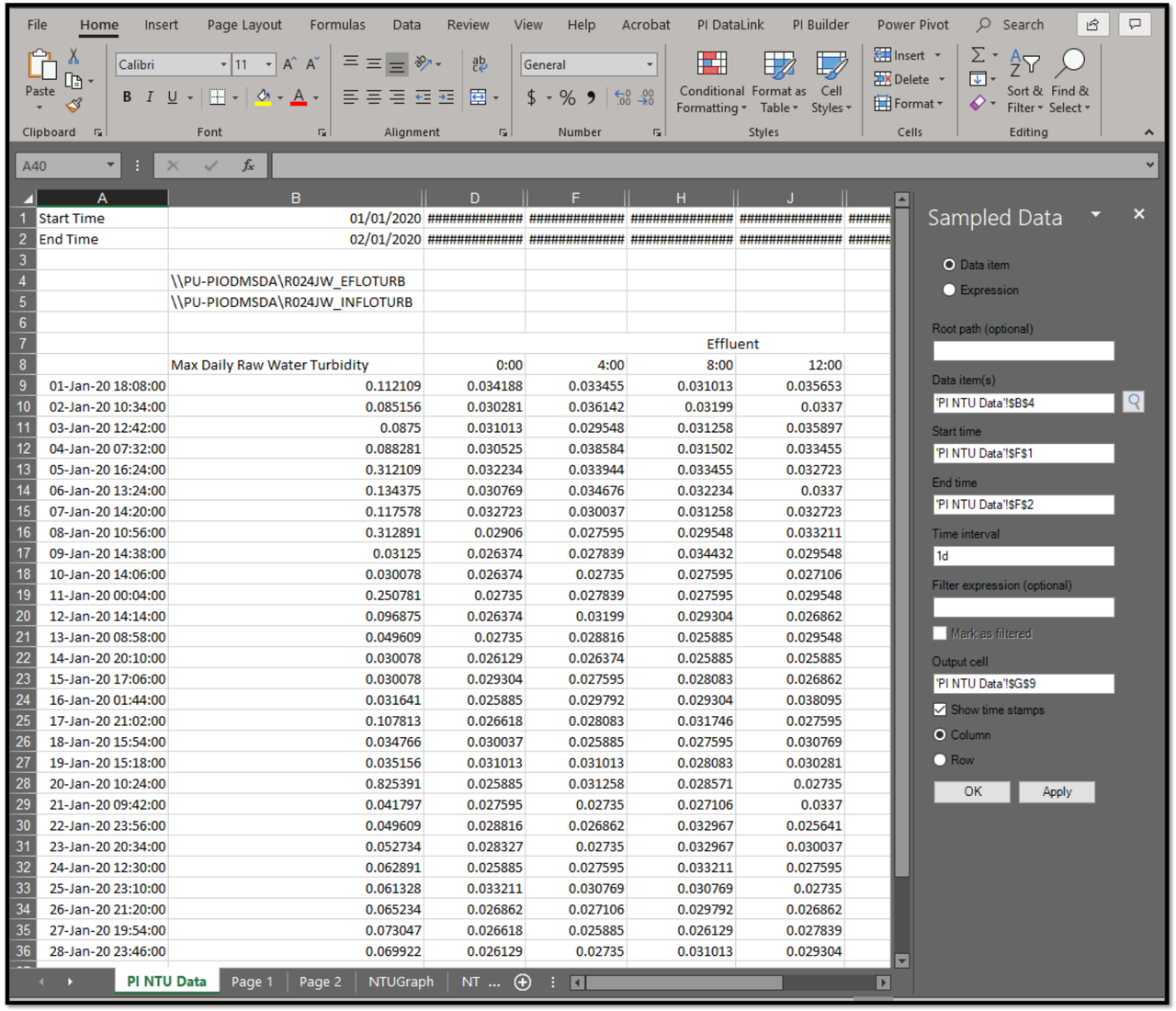
	A	B	C	D	E	F	G	H	I	J	K	L	M
3	Start Date	1/1/2019											
4	End Date	1/31/2019											
5													
6	Sample Point	\\PU-PIAFAPPRD\Water AF\City of Riverside\Delivery\Potable\Linden Evans|Flow Total 10kgal	Previous Day Flow Total MG										
7		\\PU-PIAFAPPRD\Water AF\City of Riverside\Delivery\Potable\Retail / Others\WMWD|WMWD	Previous Day Flow Total										
8													
9		Number of Values:	31			Number of Values:	31			72" - Retail Sales			
10		01-Jan-19 00:00:00	49.0	US Mgal		01-Jan-19 00:00:00	7.2	US Mgal		41.8			
11		02-Jan-19 00:00:00	46.6			02-Jan-19 00:00:00	7.1			39.5			
12		03-Jan-19 00:00:00	50.7			03-Jan-19 00:00:00	6.9			43.8			
13		04-Jan-19 00:00:00	55.4			04-Jan-19 00:00:00	7.6			47.8			
14		05-Jan-19 00:00:00	51.7			05-Jan-19 00:00:00	7.6			44.2			
15		06-Jan-19 00:00:00	48.2			06-Jan-19 00:00:00	7.4			40.8			
16		07-Jan-19 00:00:00	47.7			07-Jan-19 00:00:00	7.4			40.3			
17		08-Jan-19 00:00:00	47.6			08-Jan-19 00:00:00	7.0			40.5			
18		09-Jan-19 00:00:00	44.6			09-Jan-19 00:00:00	6.7			37.9			
19		10-Jan-19 00:00:00	46.6			10-Jan-19 00:00:00	6.8			39.8			
20		11-Jan-19 00:00:00	47.6			11-Jan-19 00:00:00	6.9			40.7			
21		12-Jan-19 00:00:00	42.3			12-Jan-19 00:00:00	7.2			35.1			
22		13-Jan-19 00:00:00	40.7			13-Jan-19 00:00:00	6.9			33.8			
23		14-Jan-19 00:00:00	42.1			14-Jan-19 00:00:00	6.9			35.2			
24		15-Jan-19 00:00:00	43.8			15-Jan-19 00:00:00	6.7			37.1			
25		16-Jan-19 00:00:00	35.5			16-Jan-19 00:00:00	6.0			29.5			
26		17-Jan-19 00:00:00	35.9			17-Jan-19 00:00:00	6.2			29.7			
27		18-Jan-19 00:00:00	37.1			18-Jan-19 00:00:00	3.2			33.8			
28		19-Jan-19 00:00:00	36.0			19-Jan-19 00:00:00	0.0			36.0			
29		20-Jan-19 00:00:00	30.8			20-Jan-19 00:00:00	0.0			30.8			
30		21-Jan-19 00:00:00	33.2			21-Jan-19 00:00:00	3.2			30.0			
31		22-Jan-19 00:00:00	34.5			22-Jan-19 00:00:00	6.0			28.5			
32		23-Jan-19 00:00:00	43.2			23-Jan-19 00:00:00	6.0			37.1			
33		24-Jan-19 00:00:00	40.2			24-Jan-19 00:00:00	4.2			36.0			
34		25-Jan-19 00:00:00	40.7			25-Jan-19 00:00:00	5.9			34.8			
35		26-Jan-19 00:00:00	45.4			26-Jan-19 00:00:00	6.0			39.4			
36		27-Jan-19 00:00:00	45.9			27-Jan-19 00:00:00	6.0			39.9			
37		28-Jan-19 00:00:00	47.9			28-Jan-19 00:00:00	6.0			41.9			
38		29-Jan-19 00:00:00	47.7			29-Jan-19 00:00:00	5.9			41.7			
39		30-Jan-19 00:00:00	49.8			30-Jan-19 00:00:00	6.0			43.8			
40		31-Jan-19 00:00:00	47.6			31-Jan-19 00:00:00	6.0			41.6			
41										#VALUE!			

Monthly Compliance Reports - Contact Time





Monthly Compliance Reports - Turbidity

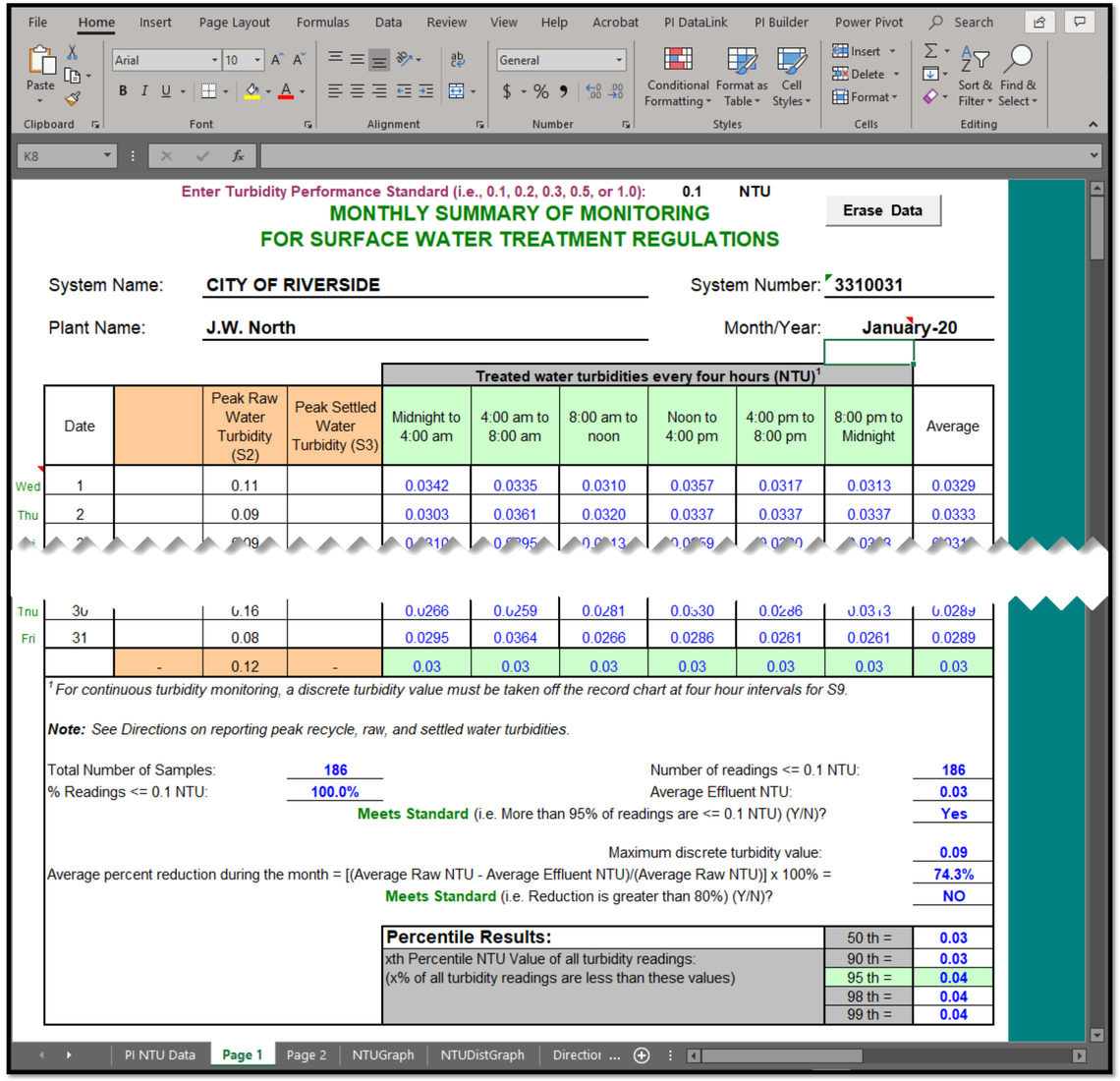


	A	B	D	F	H	J
1	Start Time	01/01/2020	###########	###########	###########	###########
2	End Time	02/01/2020	###########	###########	###########	###########
3						
4		\\PU-PIODMSDA\R024JW_EFLOTURB				
5		\\PU-PIODMSDA\R024JW_INFLOTURB				
6						
7					Effluent	
8		Max Daily Raw Water Turbidity	0:00	4:00	8:00	12:00
9	01-Jan-20 18:08:00	0.112109	0.034188	0.033455	0.031013	0.035653
10	02-Jan-20 10:34:00	0.085156	0.030281	0.036142	0.03199	0.0337
11	03-Jan-20 12:42:00	0.0875	0.031013	0.029548	0.031258	0.035897
12	04-Jan-20 07:32:00	0.088281	0.030525	0.038584	0.031502	0.033455
13	05-Jan-20 16:24:00	0.312109	0.032234	0.033944	0.033455	0.032723
14	06-Jan-20 13:24:00	0.134375	0.030769	0.034676	0.032234	0.0337
15	07-Jan-20 14:20:00	0.117578	0.032723	0.030037	0.031258	0.032723
16	08-Jan-20 10:56:00	0.312891	0.02906	0.027595	0.029548	0.033211
17	09-Jan-20 14:38:00	0.03125	0.026374	0.027839	0.034432	0.029548
18	10-Jan-20 14:06:00	0.030078	0.026374	0.02735	0.027595	0.027106
19	11-Jan-20 00:04:00	0.250781	0.02735	0.027839	0.027595	0.029548
20	12-Jan-20 14:14:00	0.096875	0.026374	0.03199	0.029304	0.026862
21	13-Jan-20 08:58:00	0.049609	0.02735	0.028816	0.025885	0.029548
22	14-Jan-20 20:10:00	0.030078	0.026129	0.026374	0.025885	0.025885
23	15-Jan-20 17:06:00	0.030078	0.029304	0.027595	0.028083	0.026862
24	16-Jan-20 01:44:00	0.031641	0.025885	0.029792	0.029304	0.038095
25	17-Jan-20 21:02:00	0.107813	0.026618	0.028083	0.031746	0.027595
26	18-Jan-20 15:54:00	0.034766	0.030037	0.025885	0.027595	0.030769
27	19-Jan-20 15:18:00	0.035156	0.031013	0.031013	0.028083	0.030281
28	20-Jan-20 10:24:00	0.825391	0.025885	0.031258	0.028571	0.02735
29	21-Jan-20 09:42:00	0.041797	0.027595	0.02735	0.027106	0.0337
30	22-Jan-20 23:56:00	0.049609	0.028816	0.026862	0.032967	0.025641
31	23-Jan-20 20:34:00	0.052734	0.028327	0.02735	0.032967	0.030037
32	24-Jan-20 12:30:00	0.062891	0.025885	0.027595	0.033211	0.027595
33	25-Jan-20 23:10:00	0.061328	0.033211	0.030769	0.030769	0.02735
34	26-Jan-20 21:20:00	0.065234	0.026862	0.027106	0.029792	0.026862
35	27-Jan-20 19:54:00	0.073047	0.026618	0.025885	0.026129	0.027839
36	28-Jan-20 23:46:00	0.069922	0.026129	0.02735	0.031013	0.029304

Sampled Data

Data item
Expression
Root path (optional)
Data item(s): 'PI NTU Data'!$B$4
Start time: 'PI NTU Data'!$F$1
End time: 'PI NTU Data'!$F$2
Time interval: 1d
Filter expression (optional)
Mark as filtered
Output cell: 'PI NTU Data'!$G$9
Show time stamps
Column
Row
OK Apply

PI NTU Data | Page 1 | Page 2 | NTUGraph | NT ...



Enter Turbidity Performance Standard (i.e., 0.1, 0.2, 0.3, 0.5, or 1.0): 0.1 NTU

Erase Data

MONTHLY SUMMARY OF MONITORING
FOR SURFACE WATER TREATMENT REGULATIONS

System Name: CITY OF RIVERSIDE
System Number: 3310031
Plant Name: J.W. North
Month/Year: January-20

	Date		Peak Raw Water Turbidity (S2)	Peak Settled Water Turbidity (S3)	Treated water turbidities every four hours (NTU)[1] Midnight to 4:00 am	4:00 am to 8:00 am	8:00 am to noon	Noon to 4:00 pm	4:00 pm to 8:00 pm	8:00 pm to Midnight	Average
Wed	1		0.11		0.0342	0.0335	0.0310	0.0357	0.0317	0.0313	0.0329
Thu	2		0.09		0.0303	0.0361	0.0320	0.0337	0.0337	0.0337	0.0333
[illegible]			0.09		0.0310	0.0395	0.0313	0.0359	0.0290	0.0313	0.0331
Tnu	30		0.16		0.0266	0.0259	0.0281	0.0330	0.0286	0.0313	0.0289
Fri	31		0.08		0.0295	0.0364	0.0266	0.0286	0.0261	0.0261	0.0289
		-	0.12	-	0.03	0.03	0.03	0.03	0.03	0.03	0.03

[1] *For continuous turbidity monitoring, a discrete turbidity value must be taken off the record chart at four hour intervals for S9.*

Note: *See Directions on reporting peak recycle, raw, and settled water turbidities.*

Total Number of Samples: 186
% Readings <= 0.1 NTU: 100.0%
Number of readings <= 0.1 NTU: 186
Average Effluent NTU: 0.03
Meets Standard (i.e. More than 95% of readings are <= 0.1 NTU) (Y/N)? Yes
Maximum discrete turbidity value: 0.09
Average percent reduction during the month = [(Average Raw NTU - Average Effluent NTU)/(Average Raw NTU)] x 100% = 74.3%
Meets Standard (i.e. Reduction is greater than 80%) (Y/N)? NO

Percentile Results:		
xth Percentile NTU Value of all turbidity readings: (x% of all turbidity readings are less than these values)	50 th =	0.03
	90 th =	0.03
	95 th =	0.04
	98 th =	0.04
	99 th =	0.04

PI NTU Data | Page 1 | Page 2 | NTUGraph | NTUDistGraph | Directio ...

Water Operations - Tomorrow

- Future PI enhancements / new development
  - Mobile entry of meter reads for collecting hard read data
    - PI Manual Logger
  - Replication of SCADA screens in PI Vision for increased visibility
  - Tokay integration

Contact Us!

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Brando Crozier
Project Coordinator
Riverside Public Utilities
BCrozier@RiversideCA.gov

謝謝
KEA LEBOHA
TAPADH LEIBH
고맙습니다
DZIĘKUJĘ CI
БАЯРЛАЛАА
MISAOTRA ANAO
SALAMAT
NGIYABONGA
GRÀCIES
OBRIGADO
شكرا
TEŞEKKÜR EDERIM
DANKIE
TERIMA KASIH
DANKON
TANK
TAPADH LEAT
KÖSZÖNÖM
СПАСИБО
MULȚUMESC
OSIsoft
PI World
РАКМЕТ СІЗГЕ
HVALA
FAAFETAI
GO RAIBH MAITH AGAT
MAHADSANID
ESKERRIK ASKO
THANK YOU
HVALA
ХВАЛА ВАМ
БЛАГОДАРЯ
GRACIAS
TEŞEKKÜR EDERIM
ТИ БЛАГОДАРАМ
DANK JE
ΕΥΧΑΡΙΣΤΩ
GRATIAS TIBI
GRAZIE
ДЯКУЙ
TAK
DANKE
AČIŪ
SALAMAT
MAHALO IĀ ‘OE
TAKK SKAL DU HA
DI OU MÈSI
RAHMAT
MERCI
GRAZZI
ÞAKKA ÞÉR
ありがとうございました
ĎAKUJEM
HATUR NUHUN
PAXMAT САГА
SIPAS JI WERE
TERIMA KASIH
MATUR NUWUN
CẢM ƠN BẠN
FALEMINDERIT
UA TSAUG RAU KOJ
WAZVIITA
ТИ БЛАГОДАРАМ
СИПОС