

# PUMP STATION 196

Mar-21		PS 196	
		METER READING	24 HOUR FLOW
MON	1	32443270	0.132140
TUE	2	32575410	0.114260
WED	3	32689670	0.238190
THU	4	32927860	0.283990
FRI	5	33211850	0.271930
SAT	6	33483780	0.282770
SUN	7	33766550	0.274240
MON	8	34040790	0.271740
TUE	9	34312530	0.259700
WED	10	34572230	0.266790
THU	11	34839020	0.359810
FRI	12	35198830	0.371510
SAT	13	35570340	0.377380
SUN	14	35947720	0.377150
MON	15	36324870	0.368790
TUE	16	36693660	0.367110
WED	17	37060770	0.358390
THU	18	37419160	0.382300
FRI	19	37801460	0.391500
SAT	20	38192960	0.391900
SUN	21	38584860	0.393460
MON	22	38978320	0.369080
TUE	23	39347400	0.371090
WED	24	39718490	0.415910
THU	25	40134400	0.381520
FRI	26	40515920	0.387720
SAT	27	40903640	0.397240
SUN	28	41300880	0.411970
MON	29	41712850	0.396010
TUE	30	42108860	0.392850
WED	31	42501710	0.386270
TOTAL		42887980	10.444710
COUNT			31
AVERAGE			0.336926
MINIMUM			0.114260
MAXIMUM			0.415910

# LEWES BPW WWTP Biweekly InSight Report

**Date:** 3/10/2021

From: Erin Horocholyn - Suez Water Technologies & Solutions  
 To: Darrin Gordon, Austin Calaman, Inframark  
 cc: Matt Stapleford - Suez Water Technologies & Solutions

## System Equipment

4 × ZW trains, each train consists of 4 - 500D cassettes, 120 modules x 370 sq. ft. per train (surface area 44,400 sq. ft. per train)

Replacement membranes installed Q1 2020 on trains UF3 and UF4

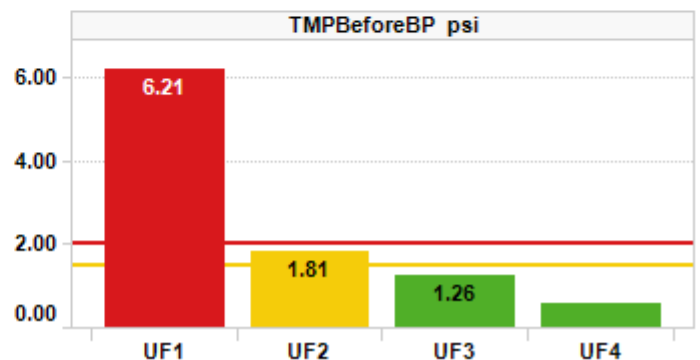
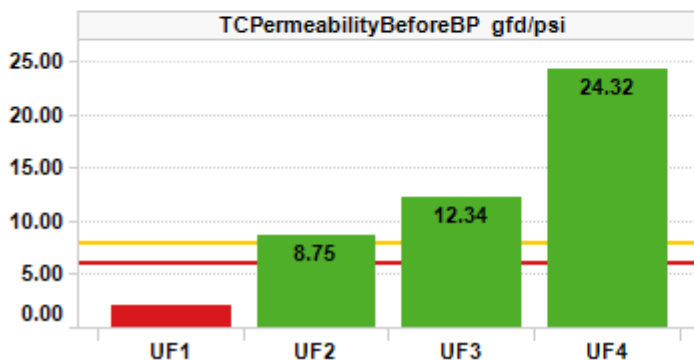
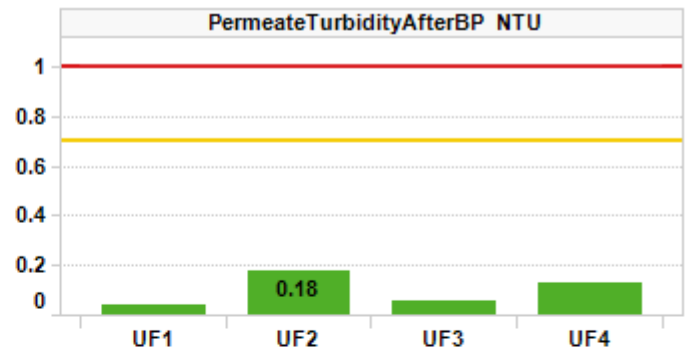
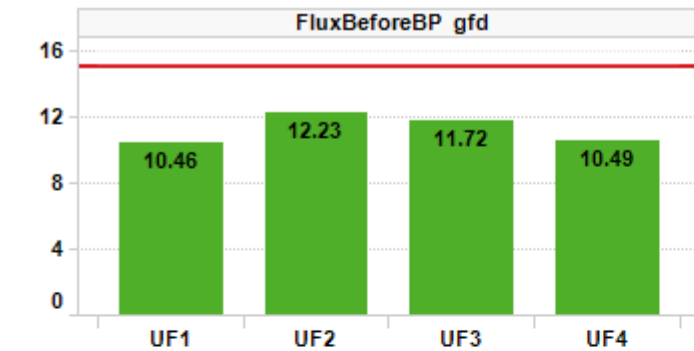
## Cleaning Strategy

Recovery cleaning - 2 NaOCl @ 2000 ppm dose/1000 ppm soak per year, 1 Citric acid @ 2000 ppm per year

Maintenance cleaning - 1 NaOCl per week @ 200 ppm, 1 Citric acid per week @ 2000 ppm

## KPI Dashboard – Avg values through reporting period

■ Action Required  
■ Caution  
■ No Limits  
■ Normal





## Plant Summary

Overall trains UF2 and UF3 operated well, with good TMPs and permeabilities. UF4 is showing excellent TMPs and permeability since coming back online March 8 after extensive manual cleaning. UF1 is offline since March 8 for manual cleaning.

- Daily permeate production averaged 1.2 MGD. Flow peaked on Feb 28 at 1.4 MGD. Permeate temperature averaged 55°F
- Flux BBP averages ranged from 10.46 – 12.23 gfd across trains. During periods of higher flux, UF1 was set to take on less of the extra flow to accommodate its higher TMPs, but UF1 still hit TMP control during these times
- Average TMP BBP was good on trains UF2, UF3, and UF4, averaging 1.81, 1.26, and 0.56 psi respectively. This low TMP average for UF4 is good to see after its long offline period, and indicates the manual cleaning was instrumental in getting these membranes working again
- Train UF1's TMP averaged 6.21 psi before it was taken offline on March 8. There was also a large gap between TMP and TC permeability before and after BP values indicating in-cycle fouling
- TC permeability BBP was good on UF2 and UF3, averaging 8.75 and 12.34 gfd/psi respectively. TCP on UF4 was excellent, averaging 24.32 gfd/psi. Train UF1 averaged 2.08 gfd/psi, which is below the TCP threshold of ~4.0 gfd/psi indicating heavily fouled membranes in this train
- Permeate turbidity ABP averaged 0.04, 0.18, 0.06, and 0.13 NTU on UF1, UF2, UF3, and UF4
- Maintenance cleans in this reporting period:
  - UF1 had 1 hypo and 2 acid MCs
  - UF2 had 2 hypo and 2 acid MCs
  - UF3 had 1 hypo and 3 acid MCs
  - UF4 had 1 hypo and 1 acid MC

### Acronyms:

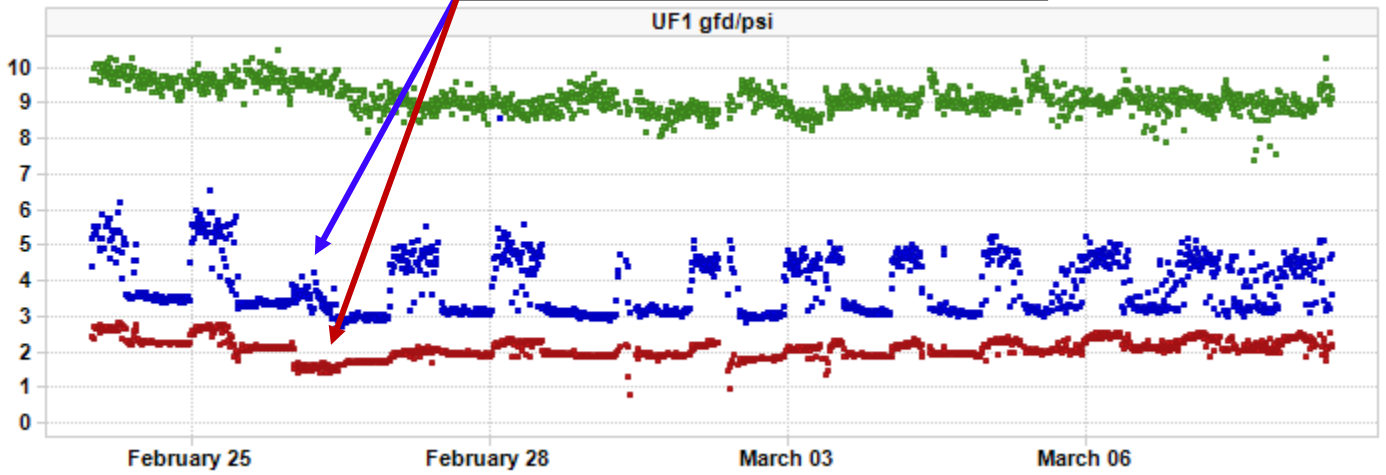
TC = temperature corrected, BBP = before backpulse, ABP = after backpulse, DBP = during backpulse, RC = recovery clean, MC = maintenance clean, TMP = trans membrane pressure



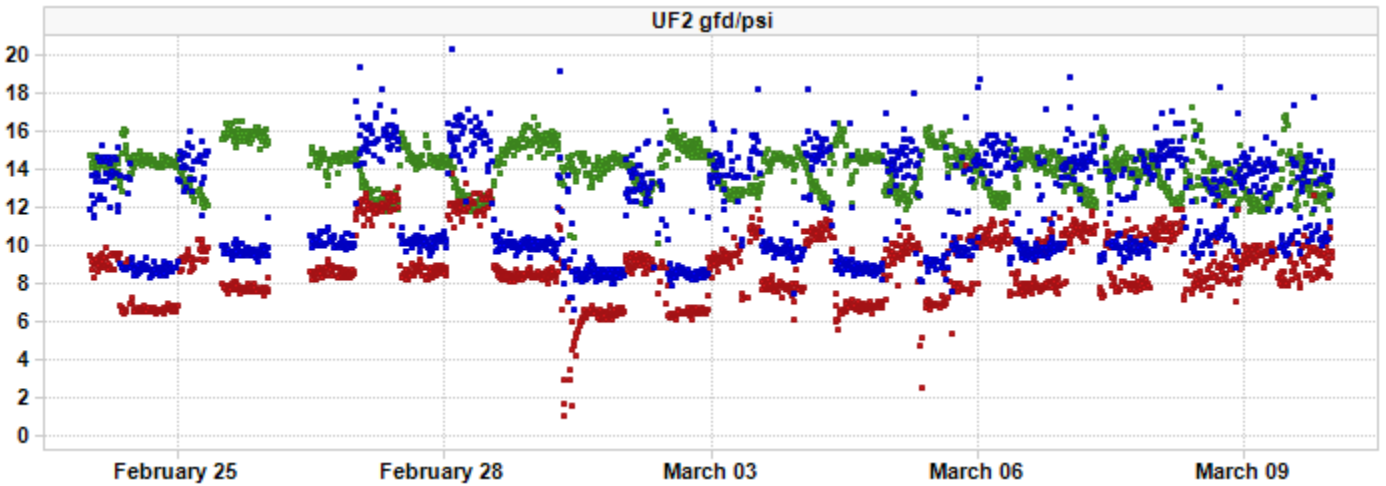
### TC Permeability Trends By Train

A large gap between TMP before and after BP values, indicating in-cycle fouling and possible solids build-up

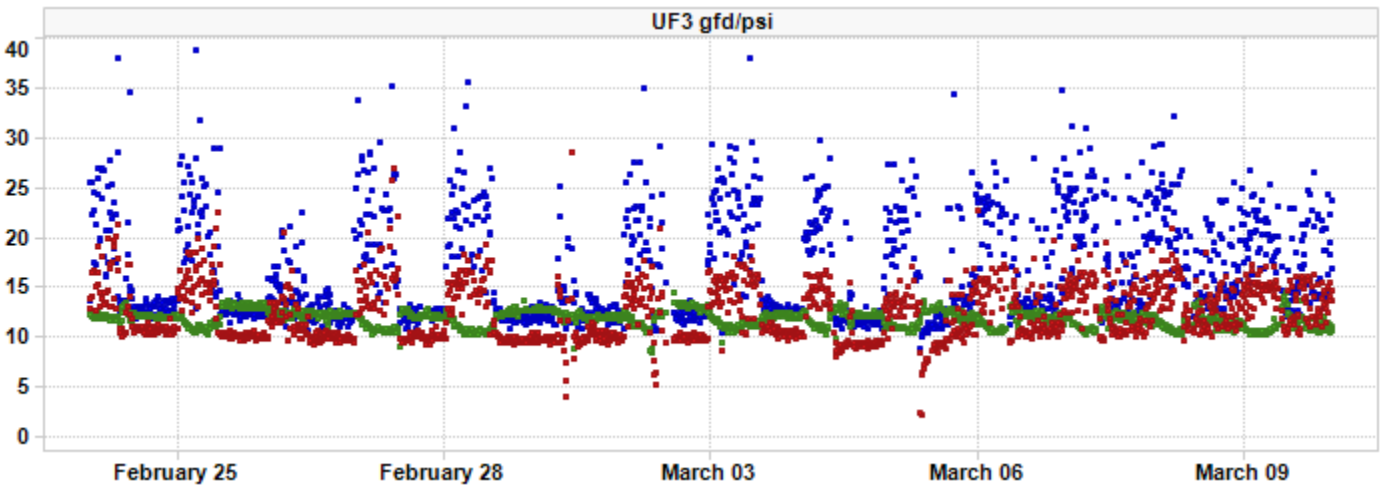
- TCPermeabilityAfterBP
- TCPermeabilityBeforeBP
- TCPermeabilityDuringBP



- TCPermeabilityAfterBP
- TCPermeabilityBeforeBP
- TCPermeabilityDuringBP

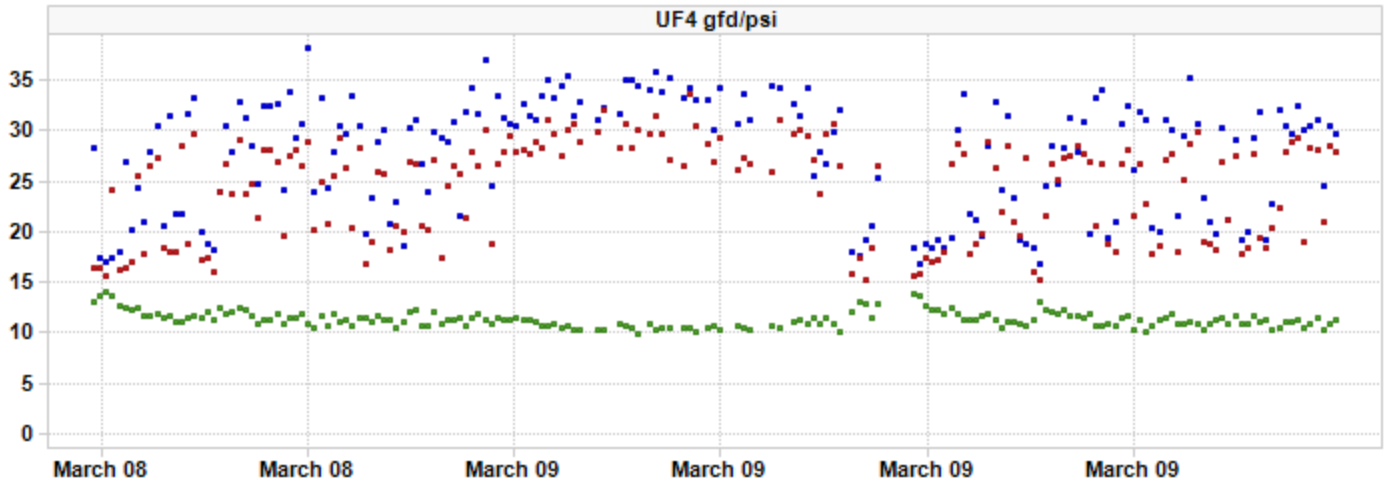


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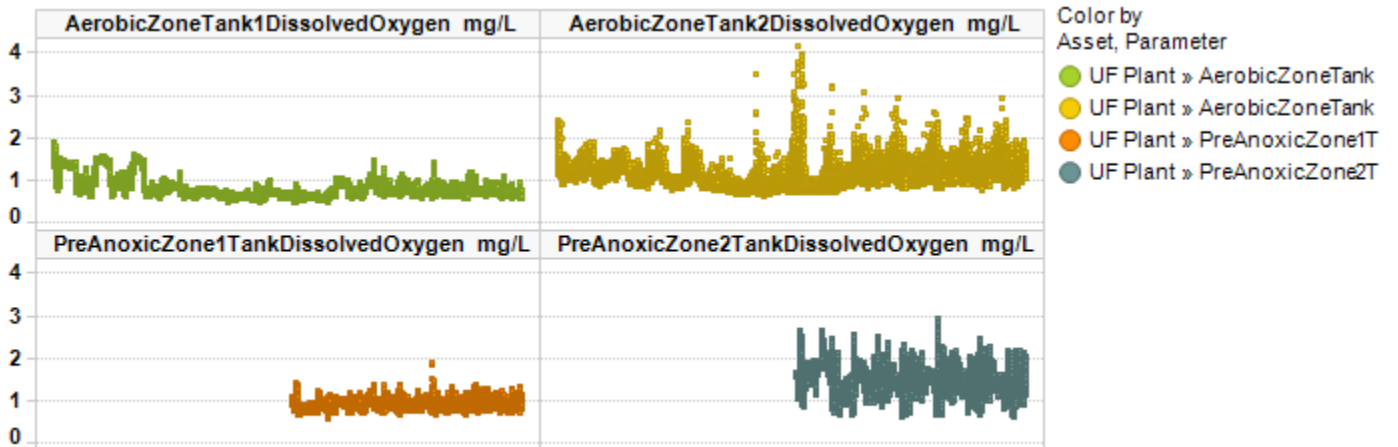




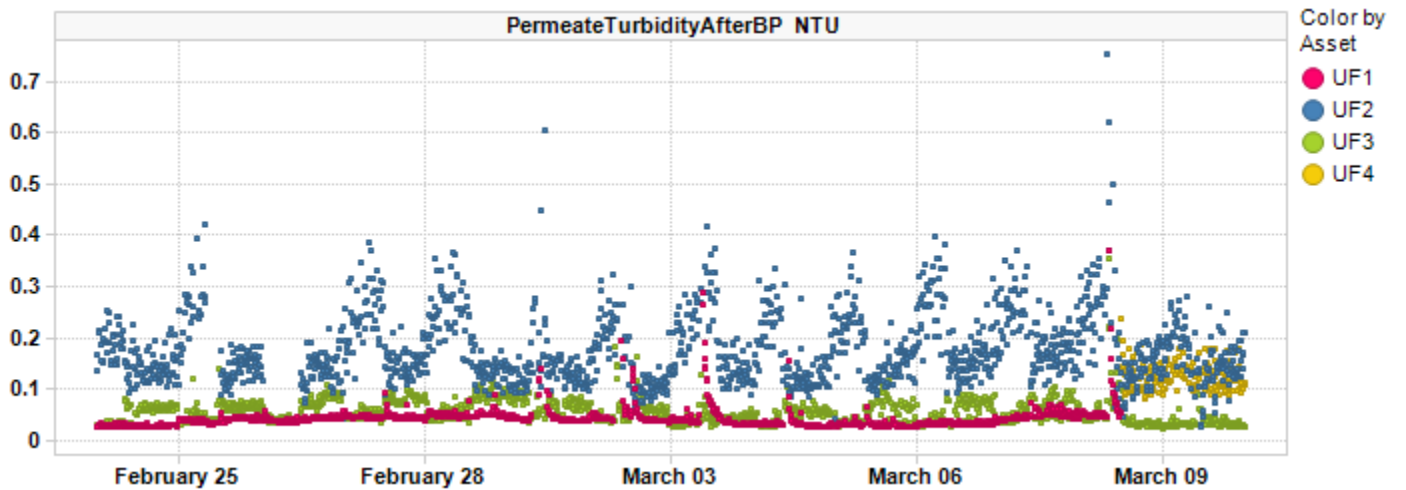
■ TCPermeabilityAfterBP  
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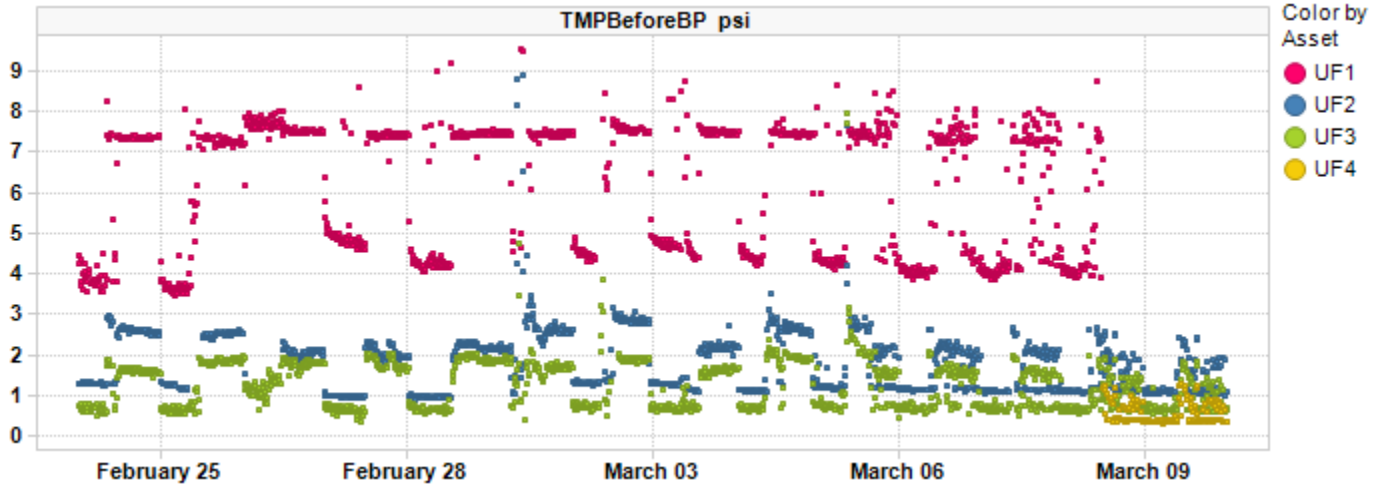
### Bioreactor Dissolved Oxygen



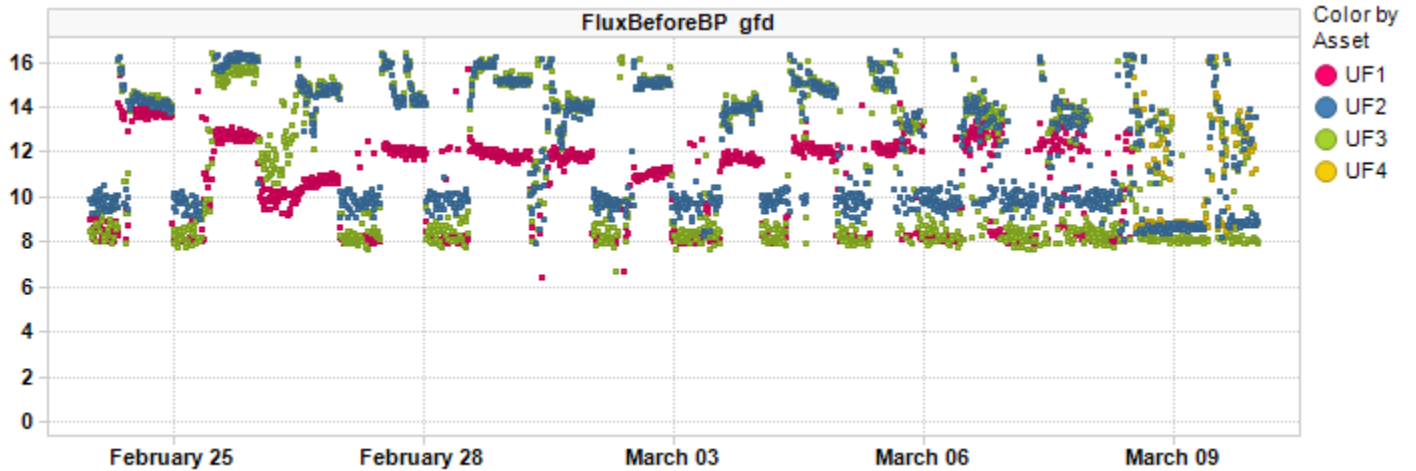
### Permeate Turbidity Trend



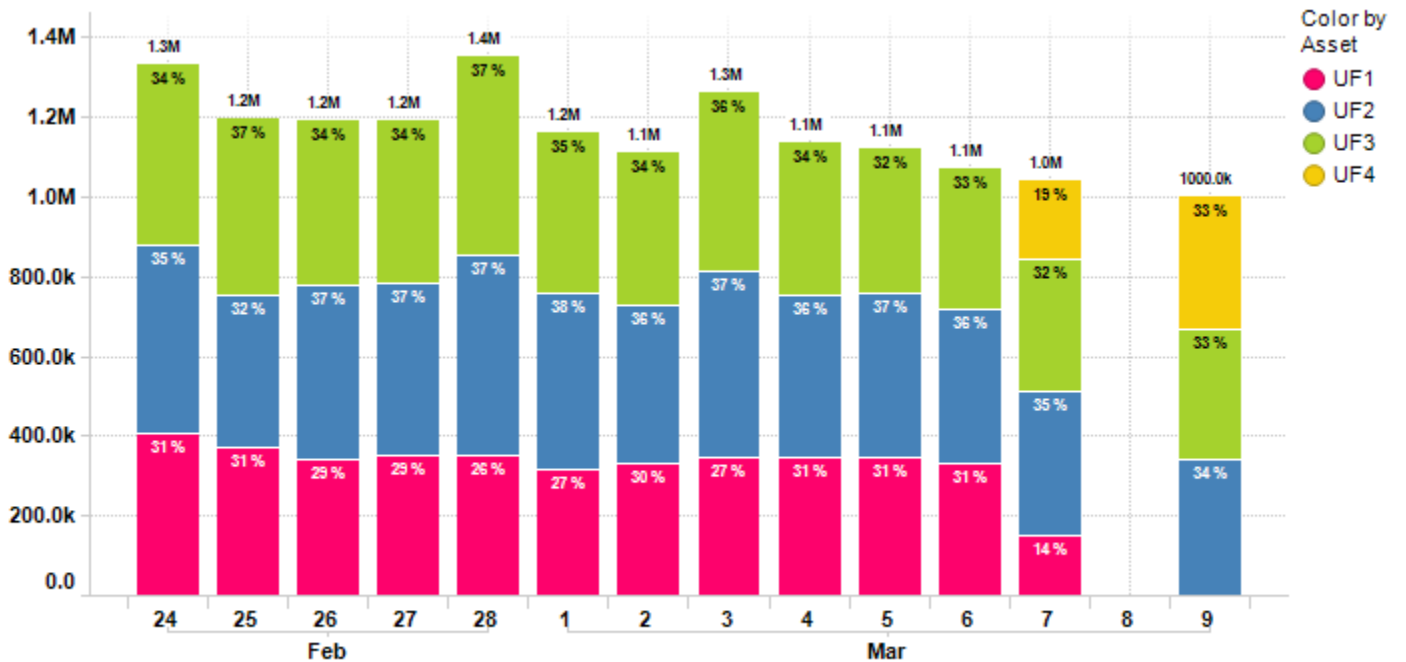
**Before BPTMP Trend**



**Before BP Flux Trend**



**Daily Permeate Flow**



Average Daily permeate flow from 2/24/2021 to 3/9/2021 is 1.2M gal with a maximum daily flow of 1.4M gal.



### Asset Summary

KPI Parameters	Value/Change	UF1	UF2	UF3	UF4
FluxBeforeBP gfd	Value	10.46	12.23	11.72	10.49
	Change	-4.11 %	6.52 %	4.38 %	
FluxDuringBP gfd	Value	18.87	18.70	18.63	18.74
	Change	0.01 %	0.56 %	0.00 %	
PermeateTurbidityAfterBP NTU	Value	0.04	0.18	0.06	0.13
	Change	-7.77 %	1.32 %	11.53 %	
TCPermeabilityBeforeBP gfd/psi	Value	2.08	8.75	12.34	24.32
	Change	-25.01 %	-25.08 %	-21.28 %	
TMPBeforeBP psi	Value	6.21	1.81	1.26	0.56
	Change	13.90 %	23.62 %	21.19 %	
TotalPermeateFlowDaily gal	Value	332.82k	419.01k	399.25k	40.48k
	Change	-15.34 %	-0.40 %	-2.85 %	100.00 %

### Plant Summary

KPI Parameters	Value/Change	UF Plant
PermeateTemperature °F	Value	55.06
	Change	0.47 %
TotalPermeateFlowDaily gal	Value	1.17M
	Change	-3.97 %

Contract Expiry Date : 08/11/2021

For InSight technical assistance please email [insight.src@suez.com](mailto:insight.src@suez.com) or please call technical support at 1 866 271 5425 or 905 469 7723 and follow the prompts, if you require after hours assistance please contact the 24/7 Emergency number provided in your plant documentation. This email is a summary of issues identified during a manual review of InSight data from the time period above. This review is an analysis of data that is logged by InSight and identifies key plant performance issues determined from this data. This data review was not focused on minor data issues but on identifying possible existing and/or upcoming critical operational issues.

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# LEWES BPW WWTP Biweekly InSight Report

**Date:** 3/24/2021

From: Erin Horocholyn - Suez Water Technologies & Solutions  
 To: Darrin Gordon, Austin Calaman, Inframark  
 cc: Matt Stapleford - Suez Water Technologies & Solutions

## System Equipment

4 × ZW trains, each train consists of 4 - 500D cassettes, 120 modules x 370 sq. ft. per train (surface area 44,400 sq. ft. per train)

Replacement membranes installed Q1 2020 on trains UF3 and UF4

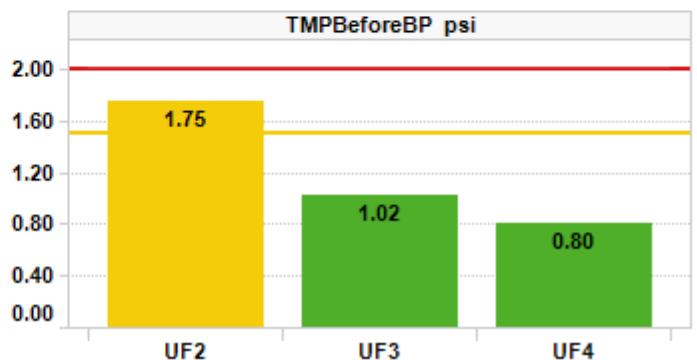
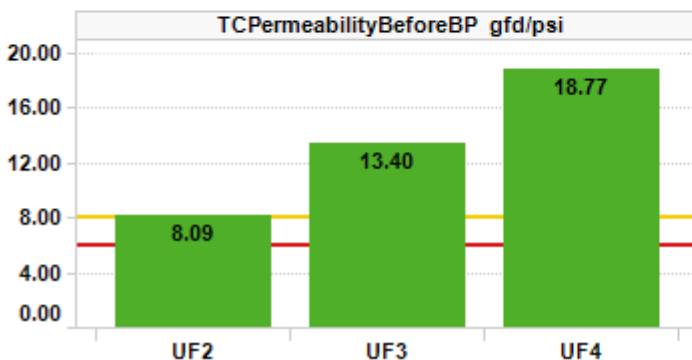
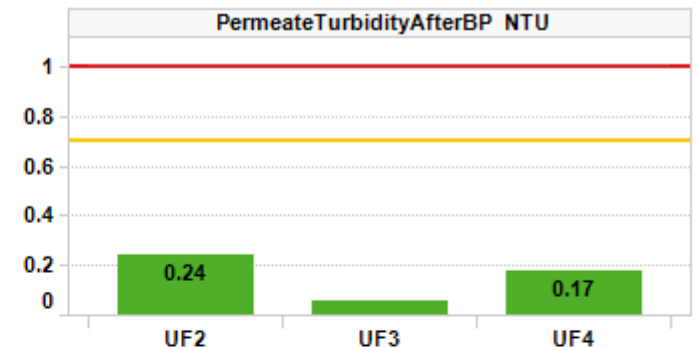
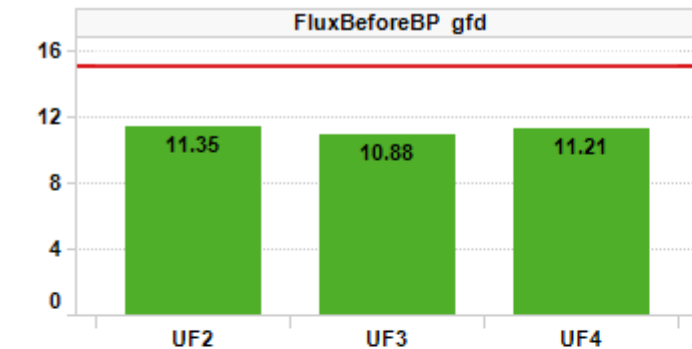
## Cleaning Strategy

Recovery cleaning - 2 NaOCl @ 2000 ppm dose/1000 ppm soak per year, 1 Citric acid @ 2000 ppm per year

Maintenance cleaning - 1 NaOCl per week @ 200 ppm, 1 Citric acid per week @ 2000 ppm

### KPI Dashboard – Avg values through reporting period

■ Action Required  
■ Caution  
■ No Limits  
■ Normal





## Plant Summary

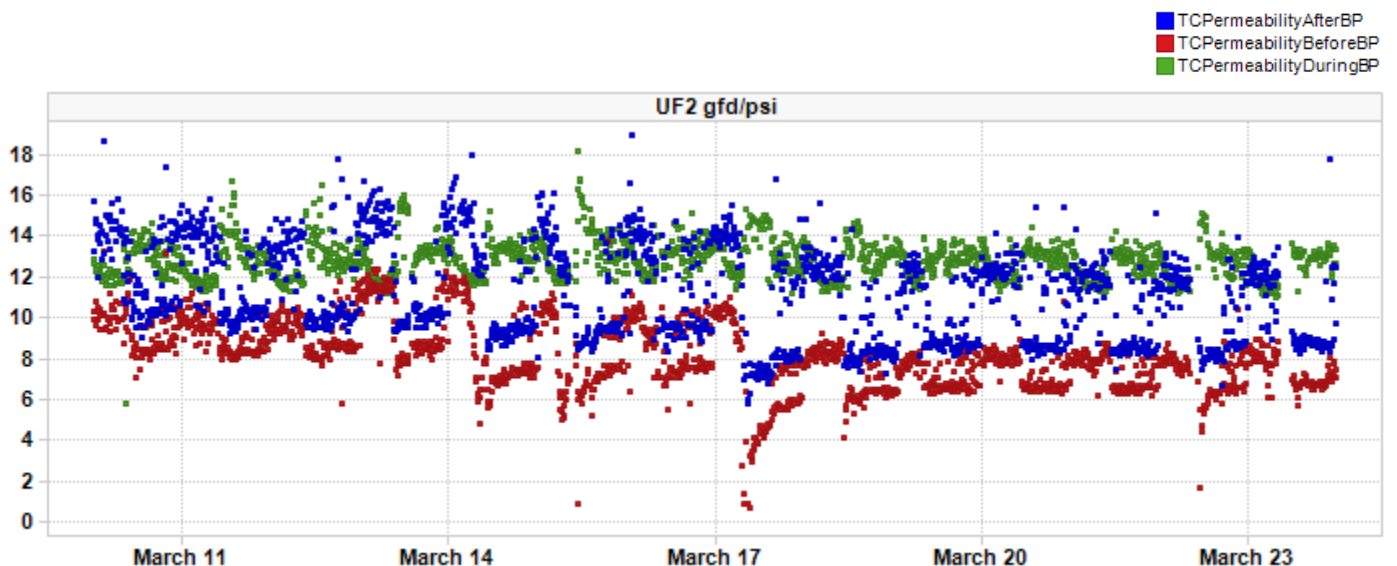
Overall trains UF2, UF3, and UF4 operated well, with good TMPs and permeabilities. UF1 is offline since March 8 for manual cleaning.

- Daily permeate production averaged 1.1 MGD. Permeate temperature averaged 58°F. Flux BBP averages ranged from 10.88 – 11.31 gfd across trains. Train UF1 has been offline since March 8
- Average TMP BBP was good on trains UF2, UF3, and UF4, averaging 1.75, 1.02, and 0.80 psi
- TC permeability BBP was good on UF2, UF3, and UF4, averaging 8.09, 13.40, and 18.77 gfd/psi
- Permeate turbidity ABP averages were somewhat elevated on UF2 at 0.24 NTU and on UF4 at 0.17 NTU
- Cleans in this reporting period:
  - UF1 had no MCs, and two hypo RCs from March 11 – 12
  - UF2 and UF4 had 2 hypo and 2 acid MCs
  - UF3 had 4 hypo MCs

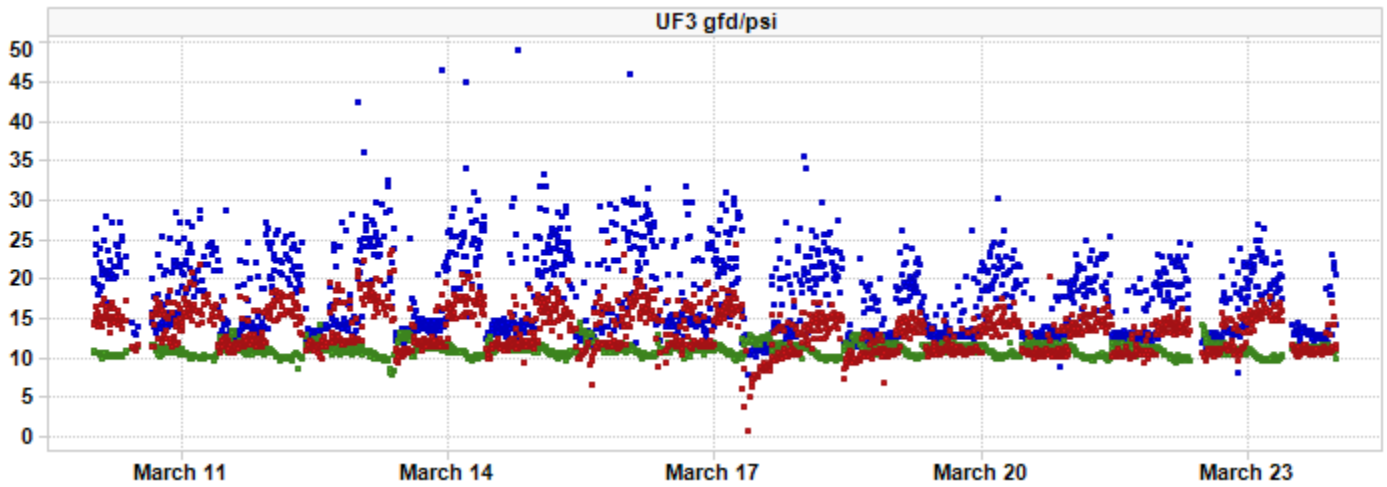
### Acronyms:

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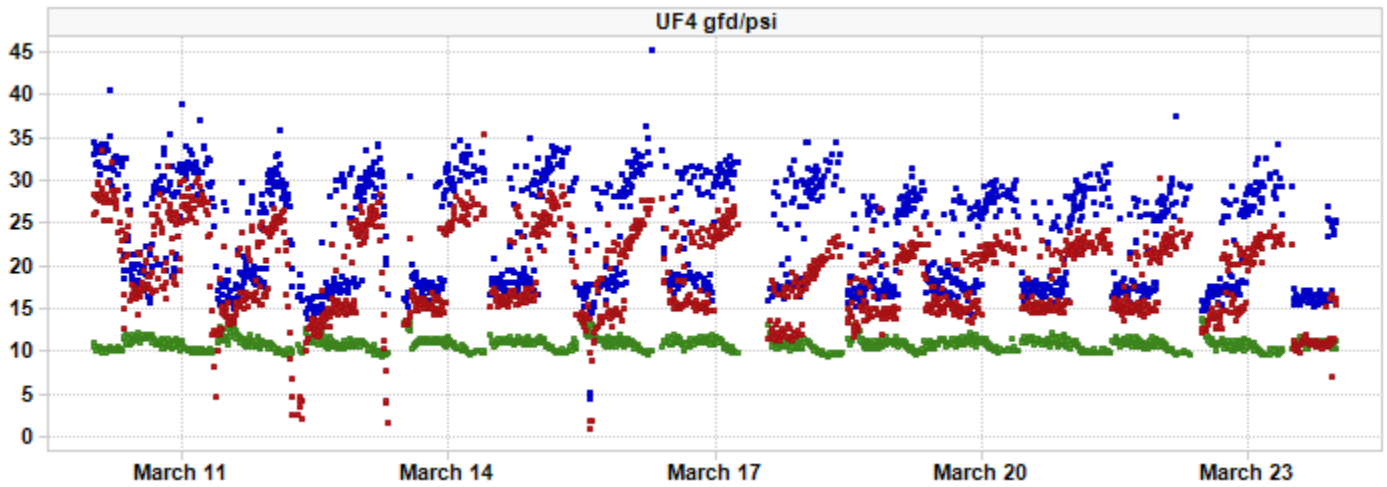
## TC Permeability Trends By Train



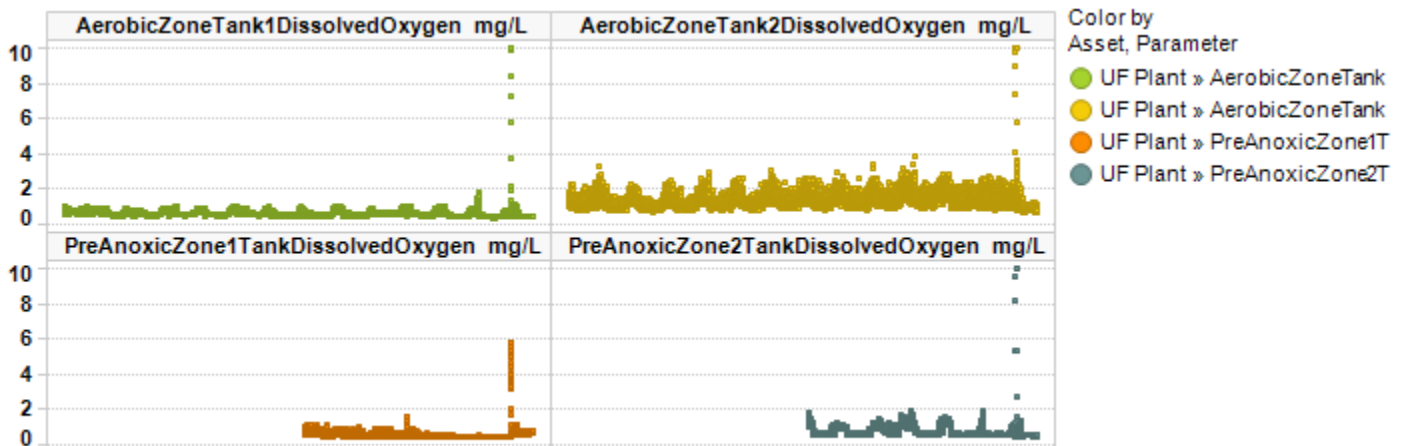
■ TCPermeabilityAfterBP  
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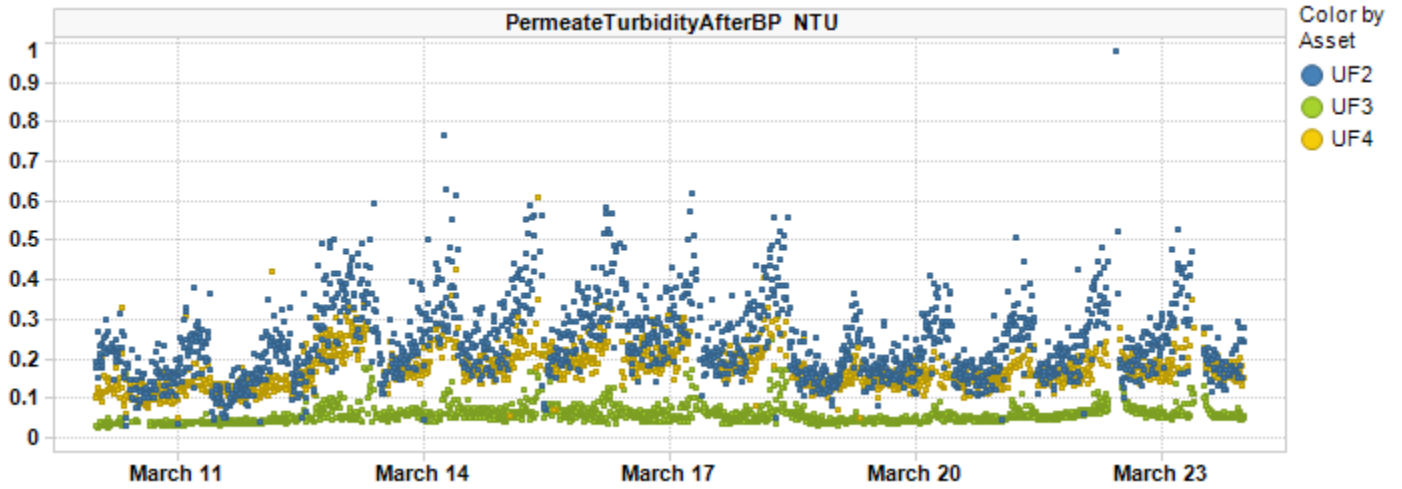


### Bioreactor Dissolved Oxygen

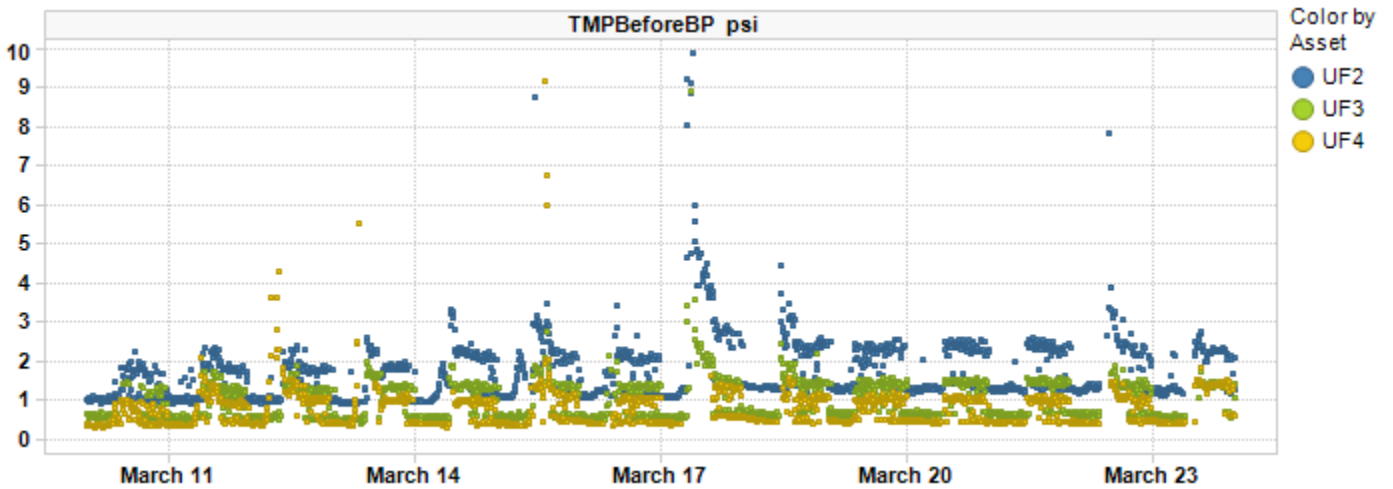




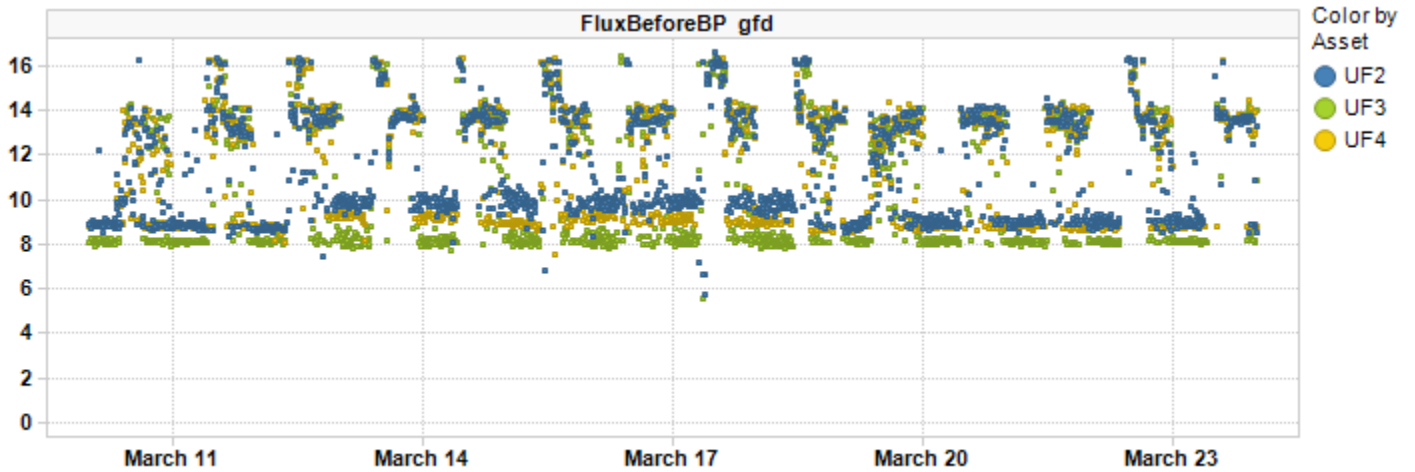
### Permeate Turbidity Trend



### Before BPTMP Trend

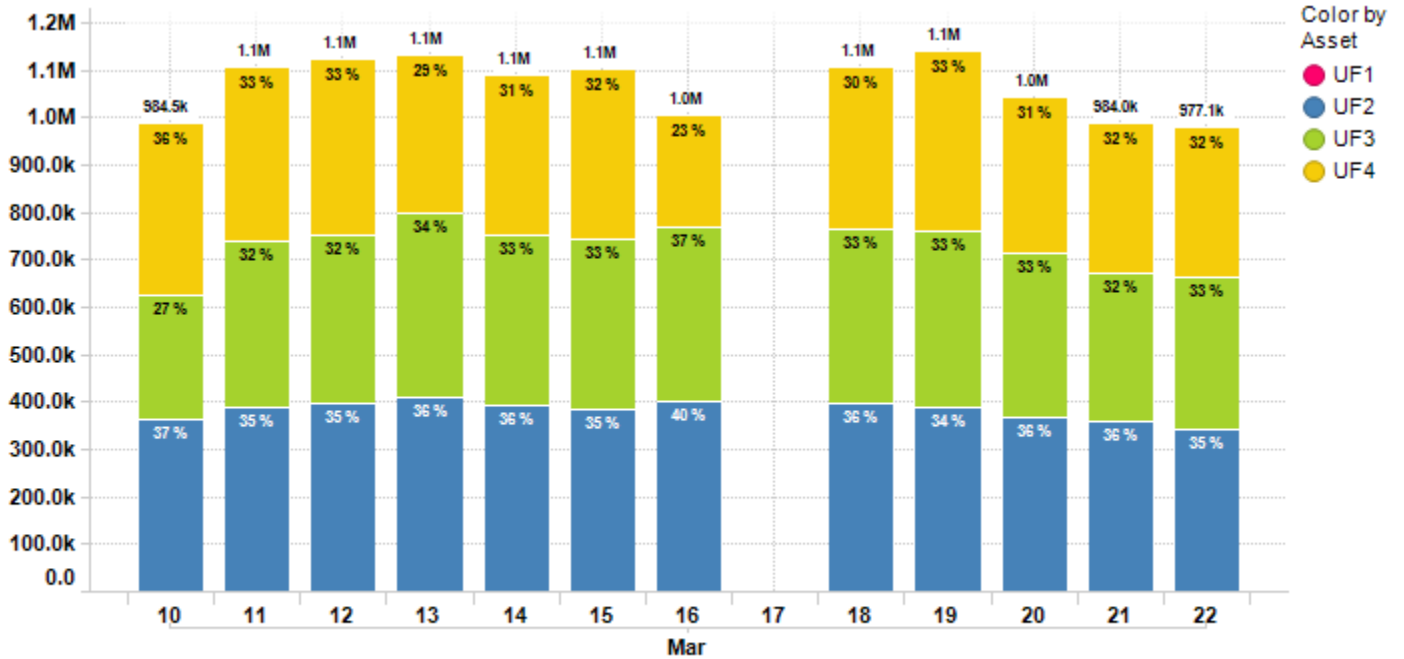


### Before BP Flux Trend





### Daily Permeate Flow



Average Daily permeate flow from 3/10/2021 to 3/23/2021 is 1.1M gal with a maximum daily flow of 1.1M gal.

### Asset Summary

KPI Parameters	Value/Change	UF1	UF2	UF3	UF4
FluxBeforeBP gfd	Value		11.35	10.88	11.21
	Change		-7.83 %	-7.81 %	6.45 %
FluxDuringBP gfd	Value		18.58	18.58	18.70
	Change		-0.62 %	-0.25 %	-0.23 %
PermeateTurbidityAfterBP NTU	Value		0.24	0.06	0.17
	Change		26.54 %	4.84 %	27.16 %
TCPermeabilityBeforeBP gfd/psi	Value		8.09	13.40	18.77
	Change		-8.24 %	7.89 %	-29.58 %
TMPBeforeBP psi	Value		1.75	1.02	0.80
	Change		-3.30 %	-23.70 %	29.76 %
TotalPermeateFlowDaily gal	Value	0.00	382.39k	347.29k	333.70k
	Change	0.00 %	-9.58 %	-14.96 %	87.87 %

### Plant Summary

KPI Parameters	Value/Change	UF Plant
PermeateTemperature °F	Value	58.18
	Change	5.38 %
TotalPermeateFlowDaily gal	Value	1.07M
	Change	-9.06 %



**Contract Expiry Date : 08/11/2021**

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# LEWES BPW WWTP Biweekly InSight Report

**Date:** 4/7/2021

From: Erin Horocholyn - Suez Water Technologies & Solutions  
To: Darrin Gordon, Austin Calaman, Inframark  
cc: Matt Stapleford - Suez Water Technologies & Solutions

## System Equipment

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Replacement membranes installed Q1 2020 on trains UF3 and UF4

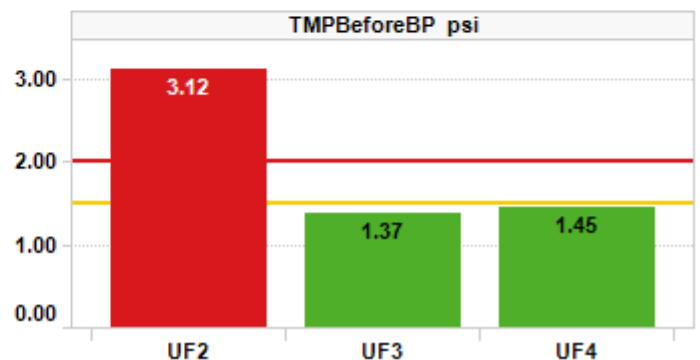
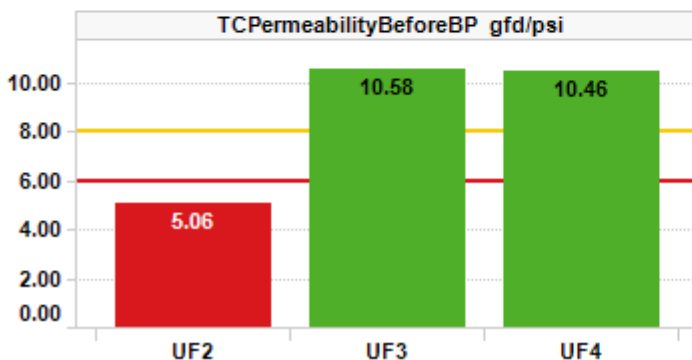
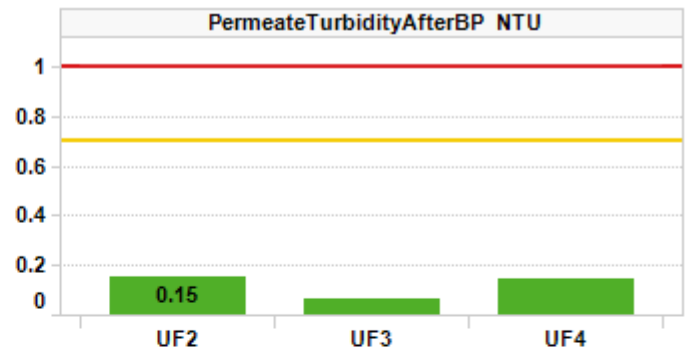
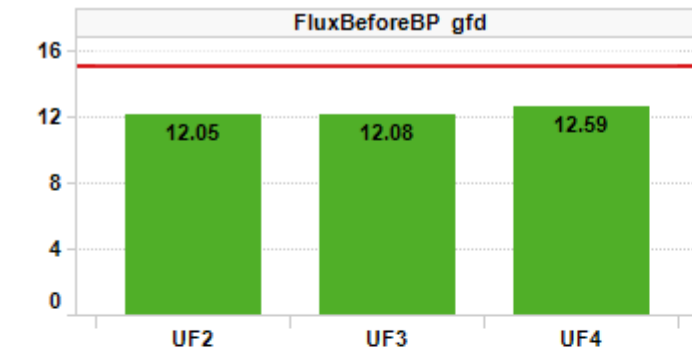
## Cleaning Strategy

Recovery cleaning - 2 NaOCl @ 2000 ppm dose/1000 ppm soak per year, 1 Citric acid @ 2000 ppm per year

Maintenance cleaning - 1 NaOCl per week @ 200 ppm, 1 Citric acid per week @ 2000 ppm

### KPI Dashboard – Avg values through reporting period

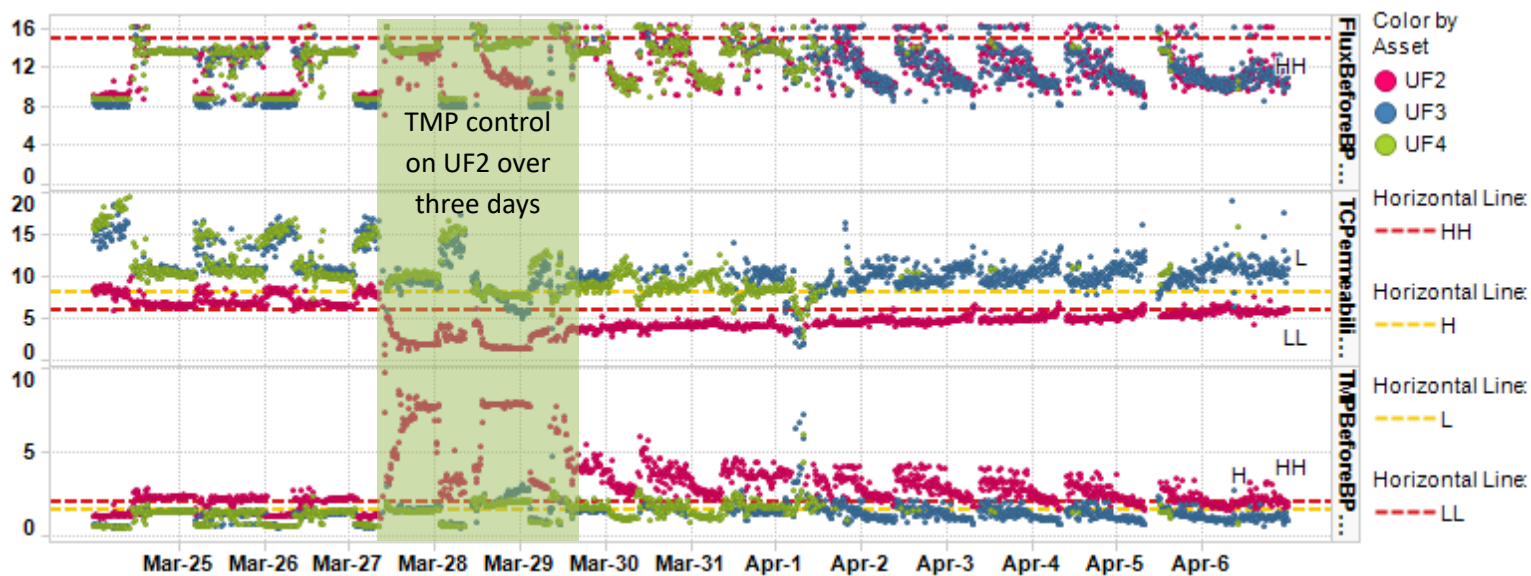
- Action Required
- Caution
- No Limits
- Normal



## Plant Summary

Overall trains UF3 and UF4 operated well, with acceptable TMPs and permeabilities during periods of high flux. UF2 hit TMP control over three days not correlated to a rise in flux and membranes may need inspection. UF2 sustained about 2 gfd/psi permeability by the end of this report period. UF1 is offline for cleaning.

- Daily permeate production averaged 1.0 MGD. Permeate temperature averaged 61°F, up from 58°F. Flux BBP averages ranged from 12.05 – 12.59 gfd across trains, showing a 10% increase from last report. Train UF1 has been offline since March 8. All online trains are in Backpulse mode
- Average TMP BBP rose on all trains between 25 – 45% compared to the last report. Trains UF2, UF3, and UF4 averaged 3.12, 1.37, and 1.45 psi. Ideally TMP should be close to or less than 1.0 psi
- TC permeability BBP was good on UF3 and UF4, averaging 10.58 and 10.46 gfd/psi. UF2 averaged 5.06 gfd/psi due to high TMPs
- In the following plot, flux, TMP, and permeability are compared across trains. Flux was about 10% higher in this report compared to the last, which will cause TMP to rise temporarily. UF2's TMP rose to TMP control levels between March 27 – 29, not correlated to a rise in flux, indicating this rise in TMP may need to be investigated in case debris is caught in the membranes. After the 29<sup>th</sup>, UF2's permeability rose to around 6 gfd/psi, sustaining about 2 gfd/psi of permeability loss since the increase

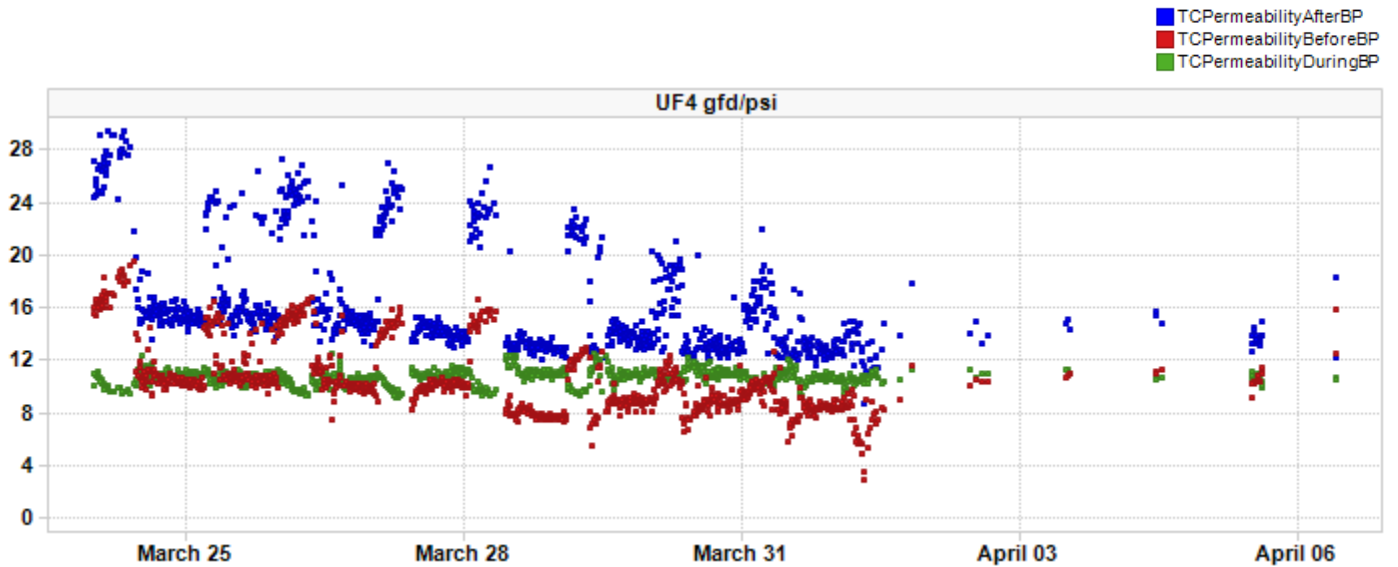
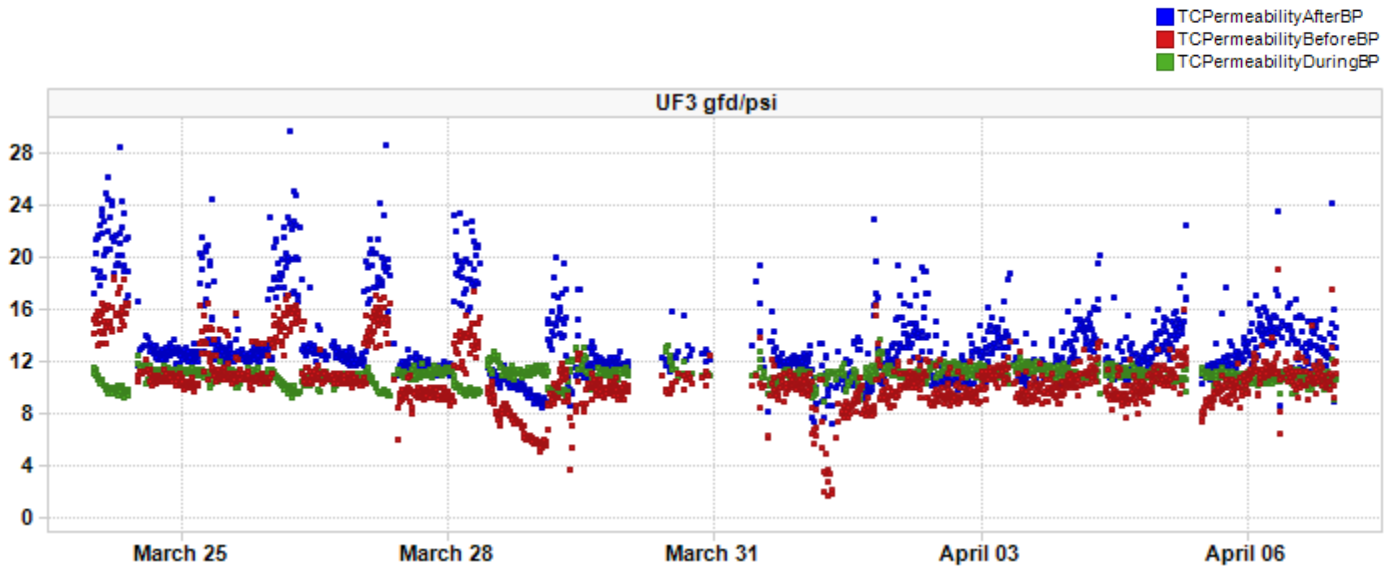
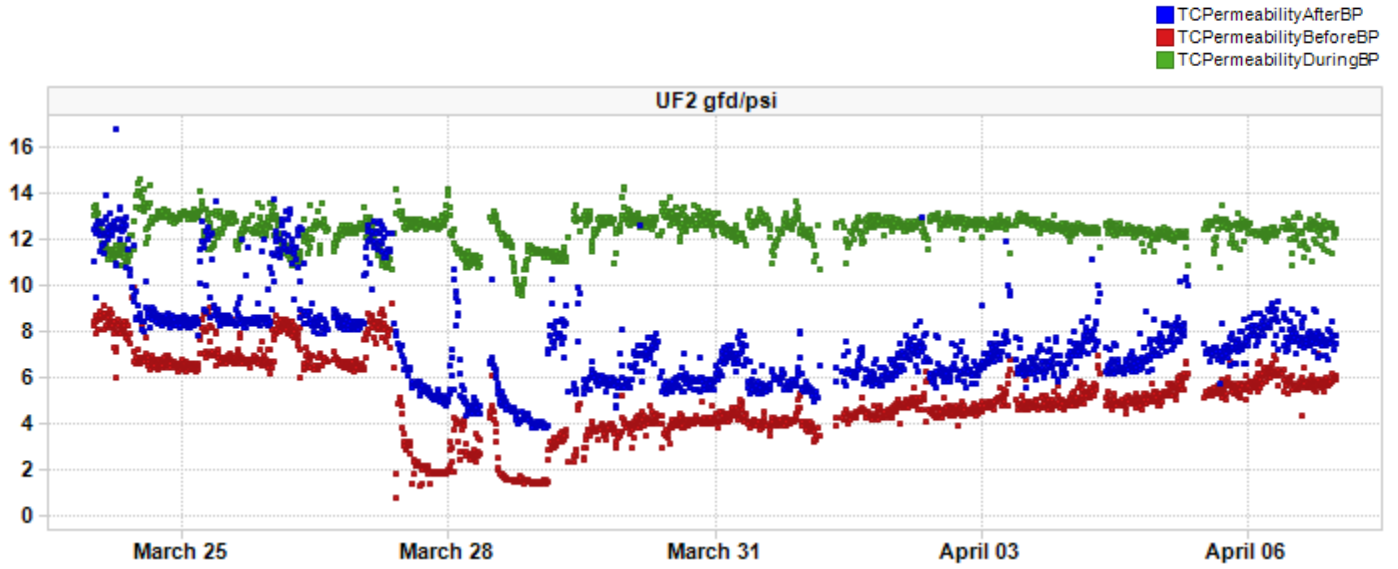


- Permeate turbidity ABP averages decreased from the last report, averaging 0.15, 0.07, and 0.14 NTU on UF2, UF3, and UF4. There were some spikes on UF2 from March 24 – 29, peaking around 0.5 NTU
- Cleans in this reporting period:
  - UF1 had no MCs, and two hypo RCs from March 11 – 12
  - UF2 had 2 hypo and 2 acid MCs
  - UF3 had 4 hypo MCs
  - UF4 had 2 acid MCs – UF4 could use hypo cleans to maintain a lower TMP

### Acronyms:

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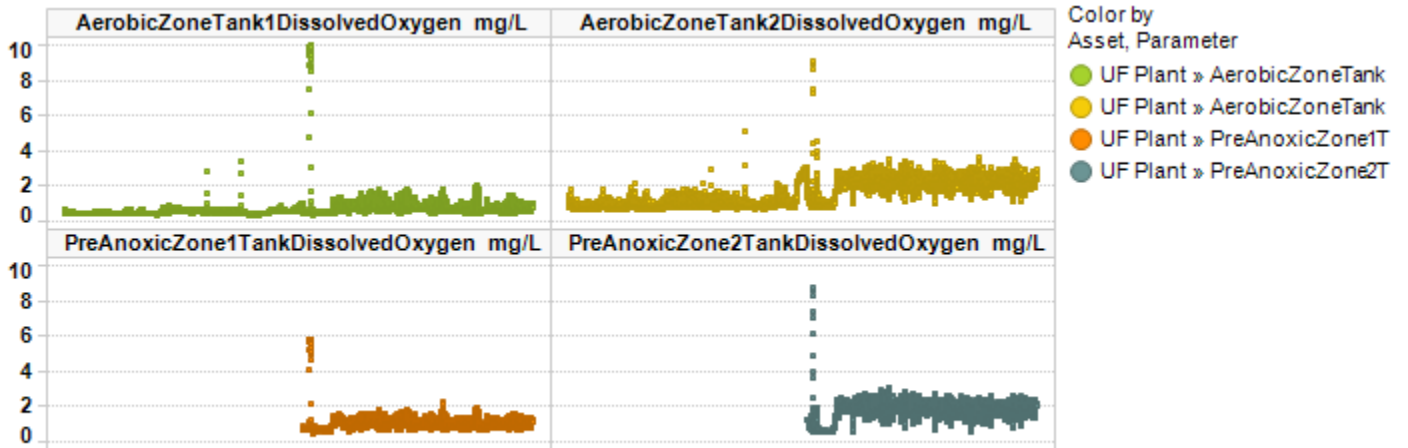
### TC Permeability Trends By Train



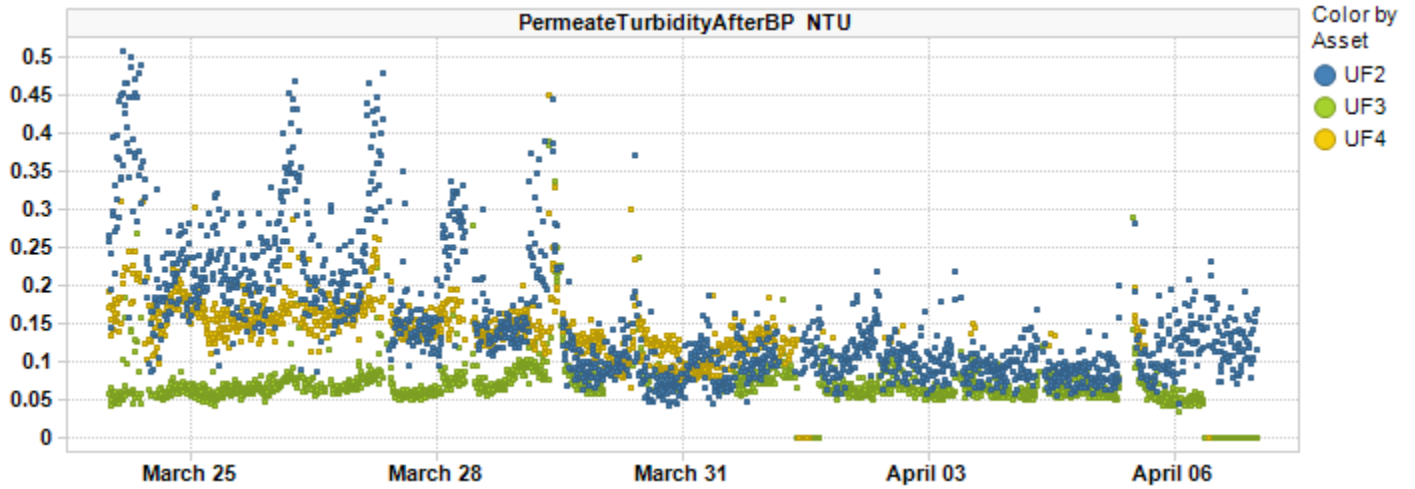




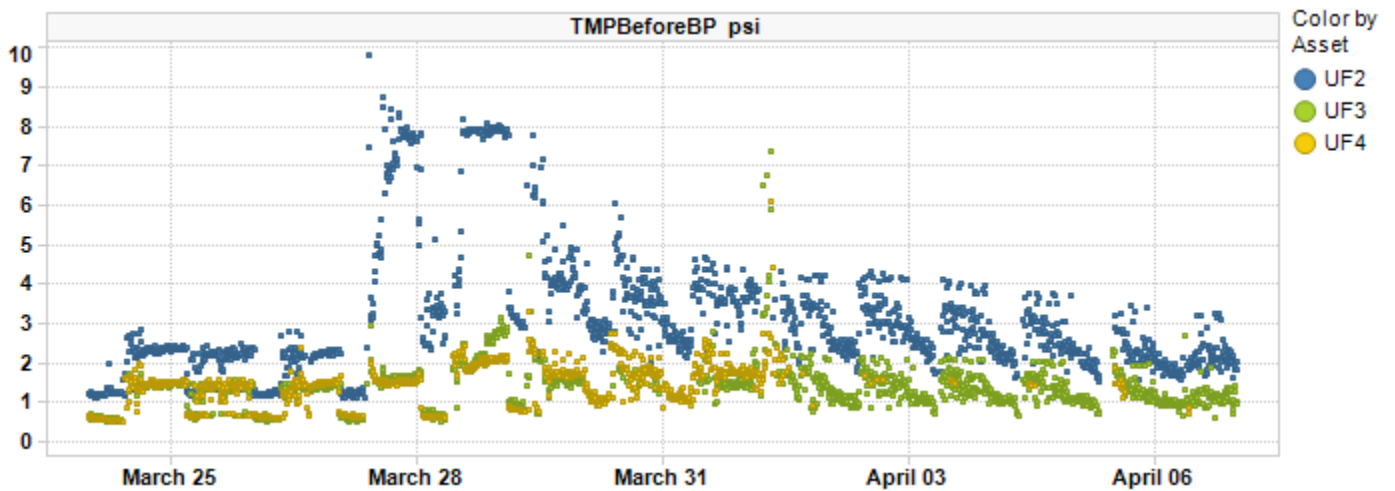
### Bioreactor Dissolved Oxygen



### Permeate Turbidity Trend

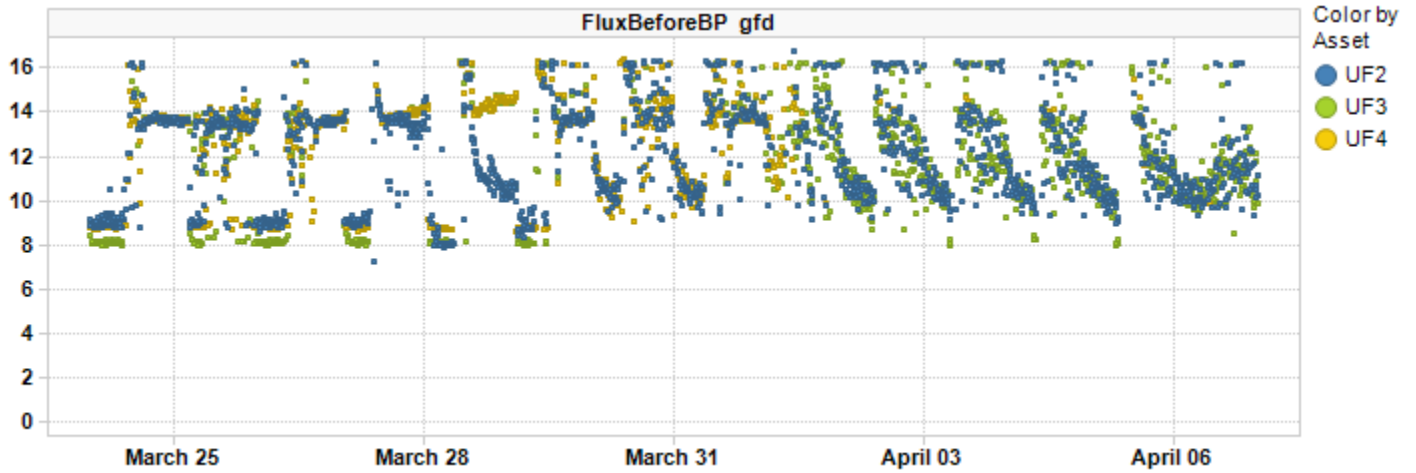


### Before BPTMP Trend

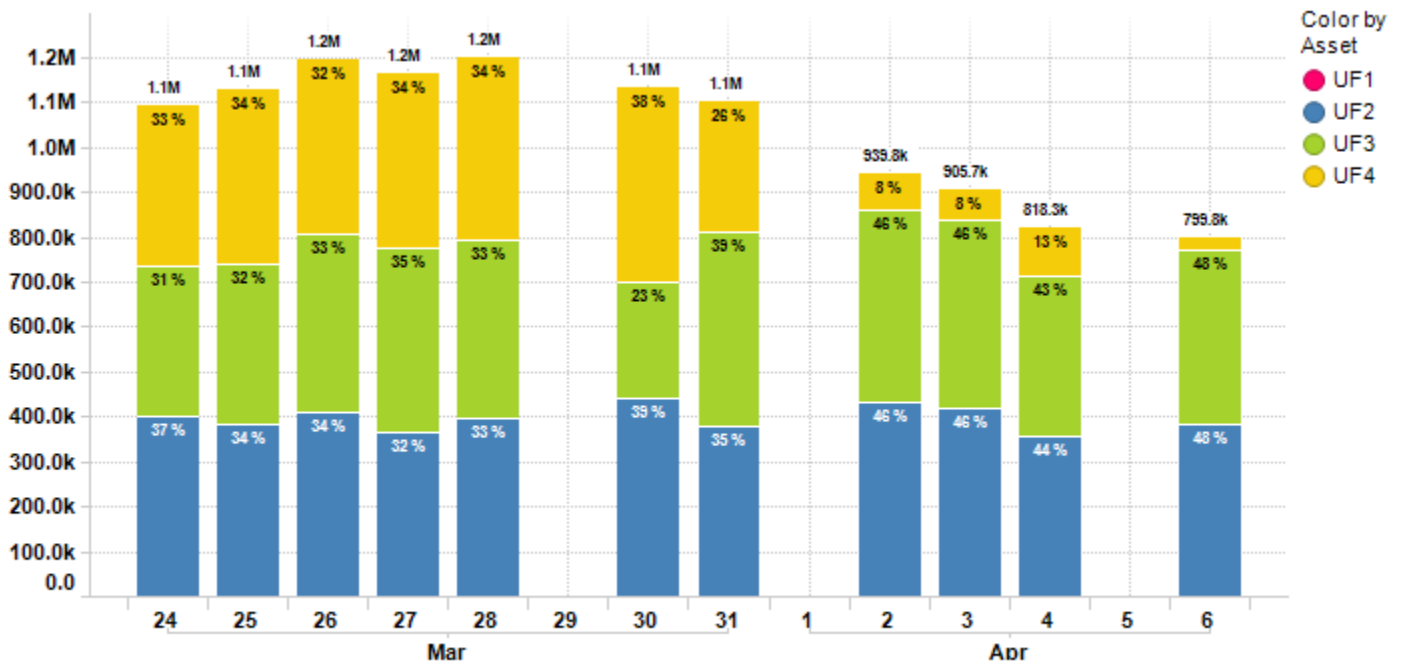




### Before BP Flux Trend



### Daily Permeate Flow



Average Daily permeate flow from 3/24/2021 to 4/6/2021 is 1.0M gal with a maximum daily flow of 1.2M gal.



### Asset Summary

KPI Parameters	Value/Change	UF1	UF2	UF3	UF4
FluxBeforeBP gfd	Value		12.05	12.08	12.59
	Change		5.86 %	9.99 %	10.97 %
FluxDuringBP gfd	Value		18.50	18.50	18.70
	Change		-0.44 %	-0.46 %	0.02 %
PermeateTurbidityAfterBP NTU	Value		0.15	0.07	0.14
	Change		-57.99 %	11.29 %	-20.92 %
TCPermeabilityBeforeBP gfd/psi	Value		5.06	10.58	10.46
	Change		-59.95 %	-26.68 %	-79.52 %
TMPBeforeBP psi	Value		3.12	1.37	1.45
	Change		43.95 %	25.41 %	44.68 %
TotalPermeateFlowDaily gal	Value	0.00	397.54k	379.24k	266.32k
	Change	0.00 %	3.81 %	8.42 %	-25.30 %

### Plant Summary

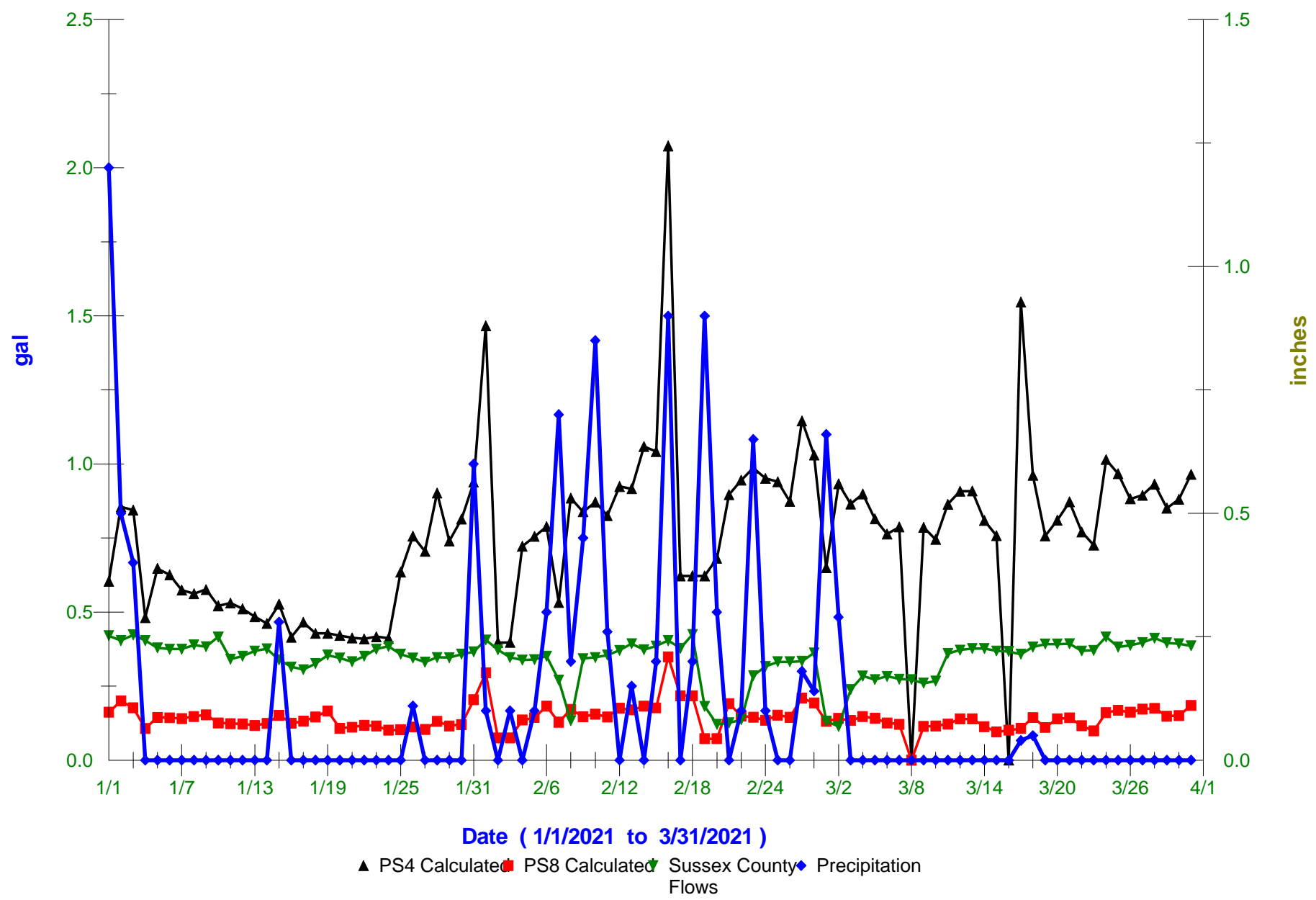
KPI Parameters	Value/Change	UF Plant
PermeateTemperature °F	Value	60.76
	Change	100.00 %
TotalPermeateFlowDaily gal	Value	1.05M
	Change	-2.41 %

Contract Expiry Date : 08/11/2021

For InSight technical assistance please email [insight.src@suez.com](mailto:insight.src@suez.com) or please call technical support at 1 866 271 5425 or 905 469 7723 and follow the prompts, if you require after hours assistance please contact the 24/7 Emergency number provided in your plant documentation. This email is a summary of issues identified during a manual review of InSight data from the time period above. This review is an analysis of data that is logged by InSight and identifies key plant performance issues determined from this data. This data review was not focused on minor data issues but on identifying possible existing and/or upcoming critical operational issues.

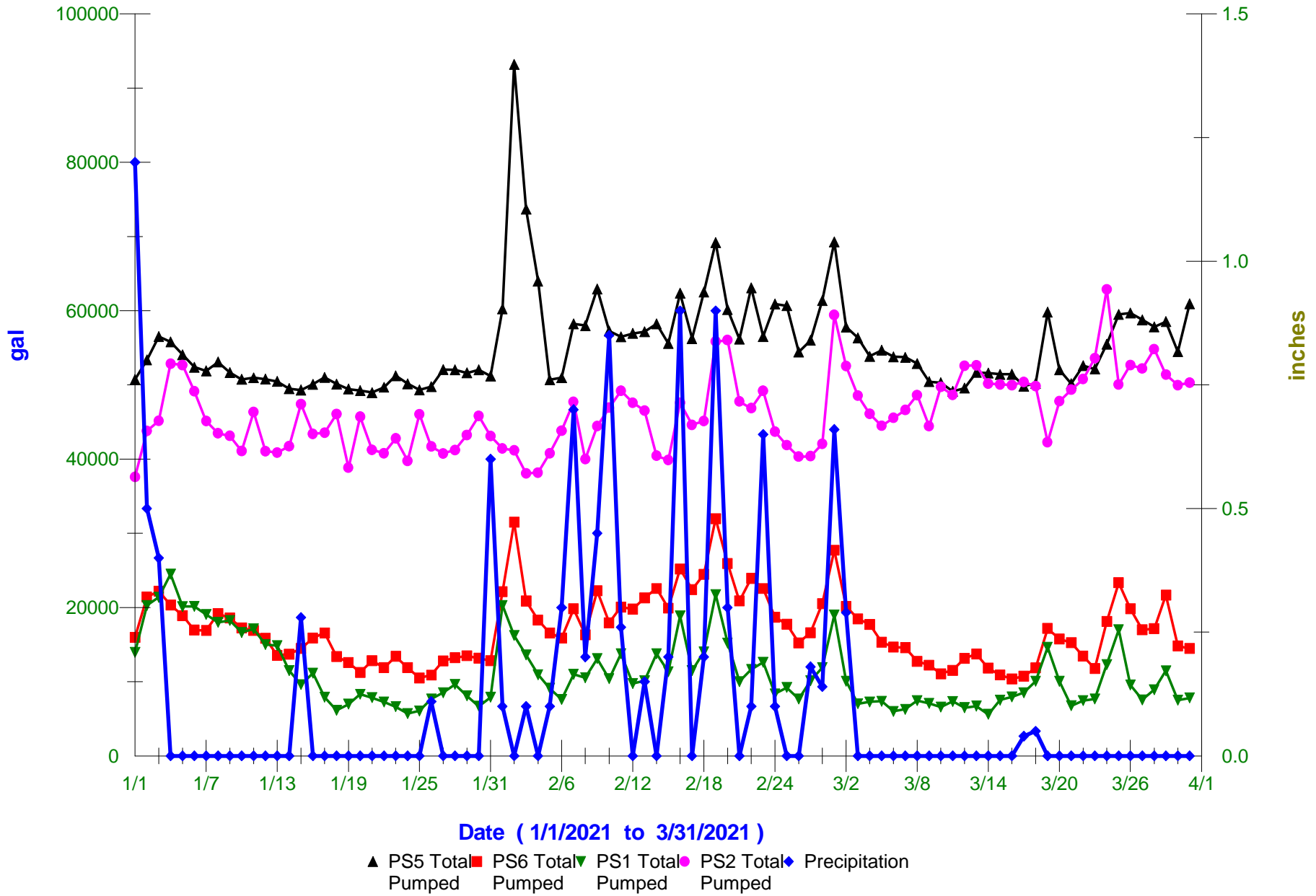
This review was prepared by SUEZ Water Technologies & Solutions solely to assist water treatment plant owners and/or operators in analyzing and optimizing plant performance and is not intended to be used or relied upon for regulatory compliance or any other purpose. The content of this review is based in whole or in part on operation data obtained from the plant using InSight software. SUEZ Water Technologies & Solutions makes no representations or warranties as to the accuracy of the plant data utilized in the preparation of this review. SUEZ Water Technologies & Solutions accepts no liability for consequences or actions taken in whole or in part by any person on the basis of this review or its contents

# Data Over Time



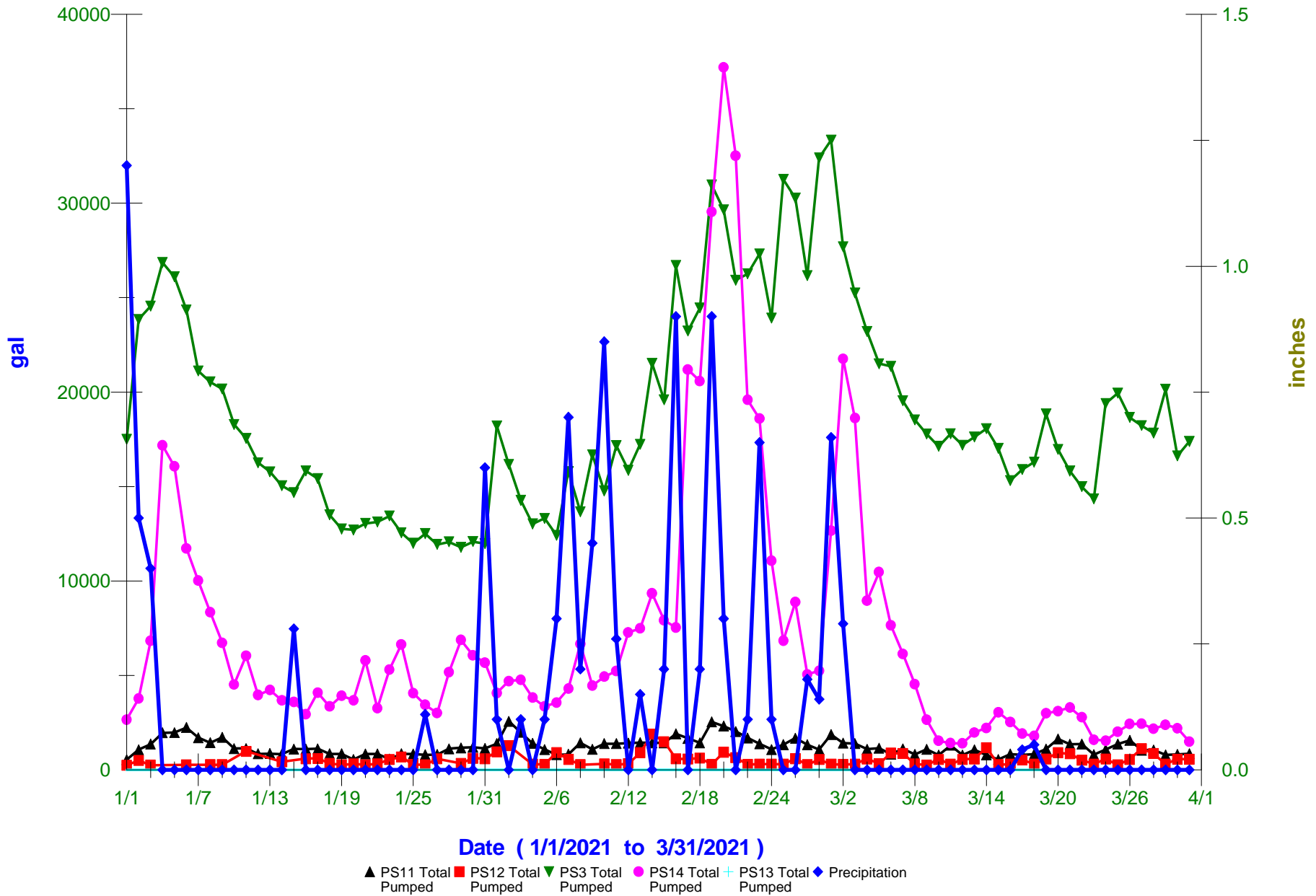
PS4,8 +County

# Data Over Time



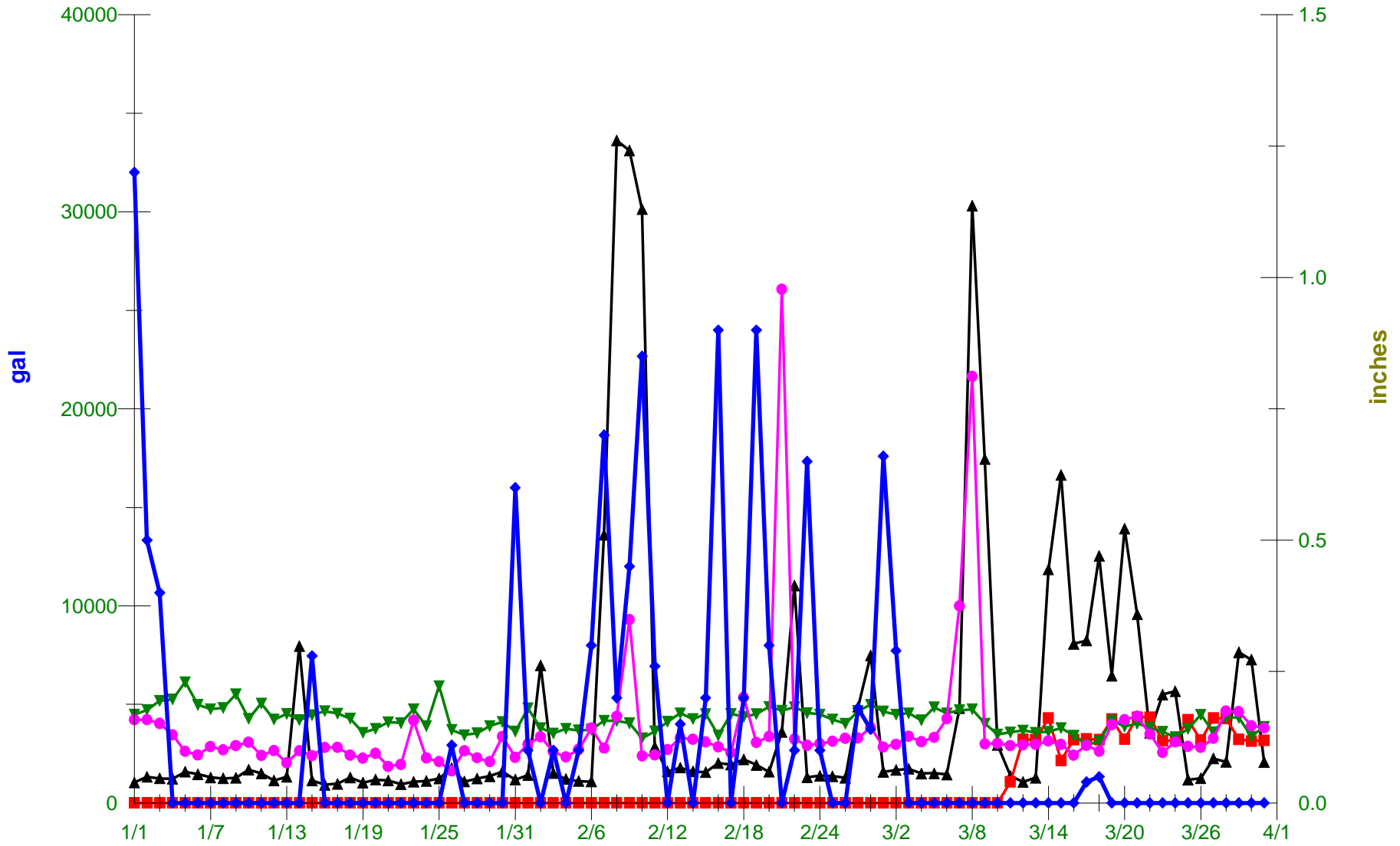
PS1,2,5,6

# Data Over Time



PS3,11,12,13,14

# Data Over Time

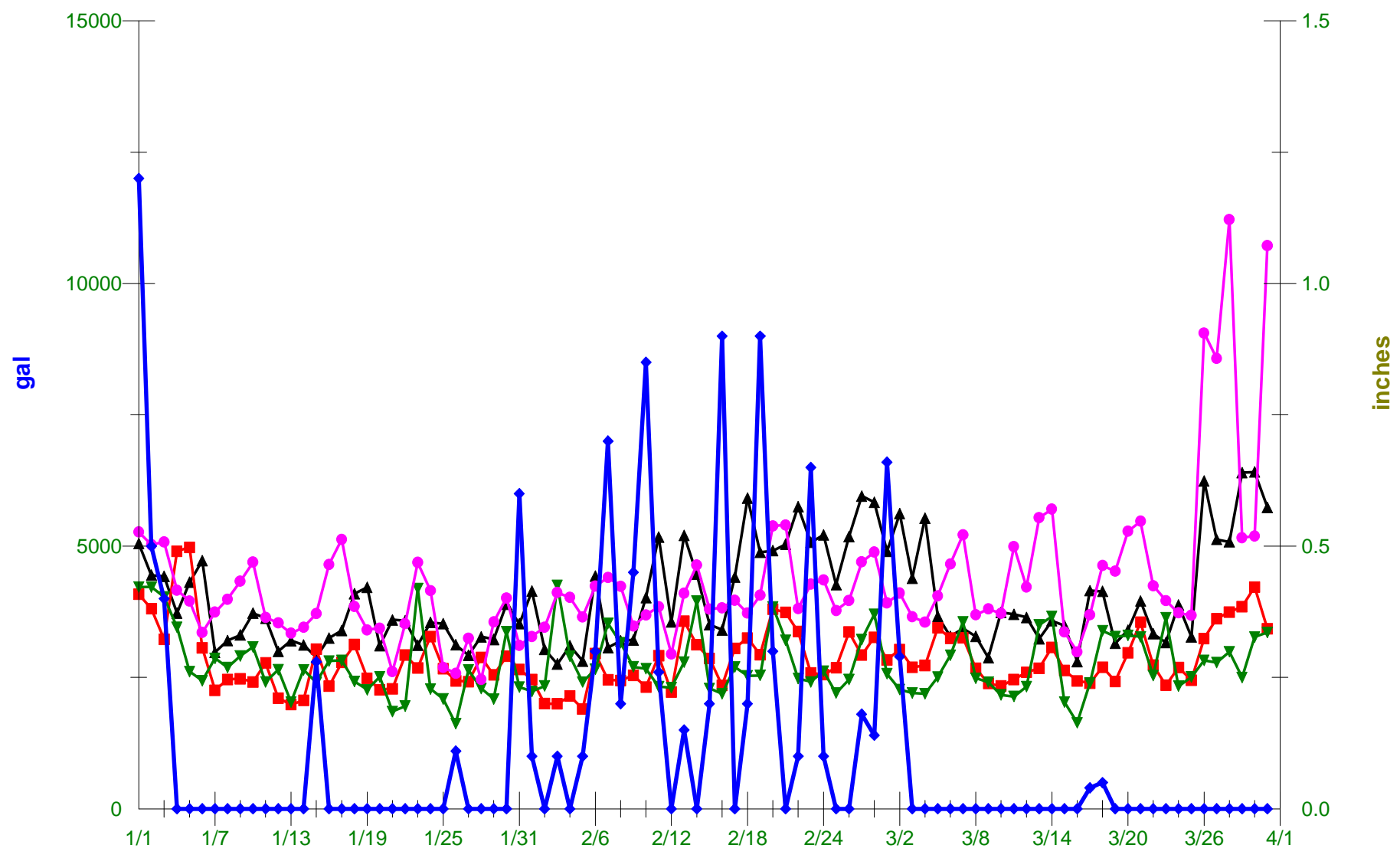


Date ( 1/1/2021 to 3/31/2021 )

▲ PS17 Total Pumped ■ PS17B Total Pumped ▼ PS18 Total Pumped ● PS16 Total Pumped ◆ Precipitation

PS16,17,17b,18

# Data Over Time



▲ PS74 Total Pumped ■ PS83 Total Pumped ▼ PS 15 Total Pumped ● PS7 Total Pumped ◆ Precipitation

PS7,15,83,74



# Data Over Time

