

Memphis Light, Gas & Water

Water Filter System Upgrades





Agenda

- MLGW
- Filter Media Analysis – Analysis & Recommendations
- Filter Rehabilitation Project

MLGW Water Fast Facts

(2022)

Memphis and Shelby County – Population just under 769,292 of whom 255,000 are MLGW Water consumers.

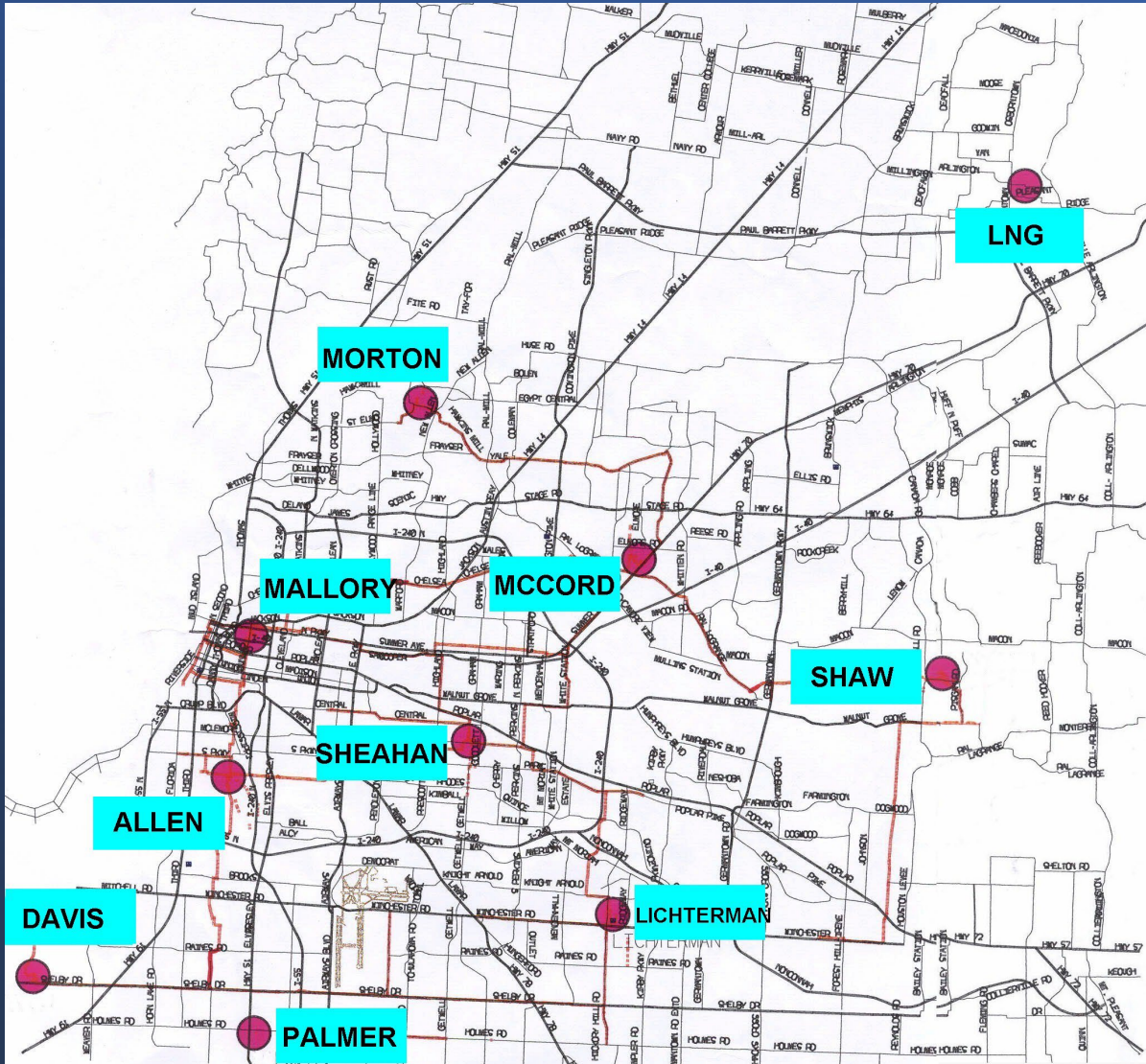
Average daily demand of 170 mgd

3,958 miles of water distribution main throughout the county

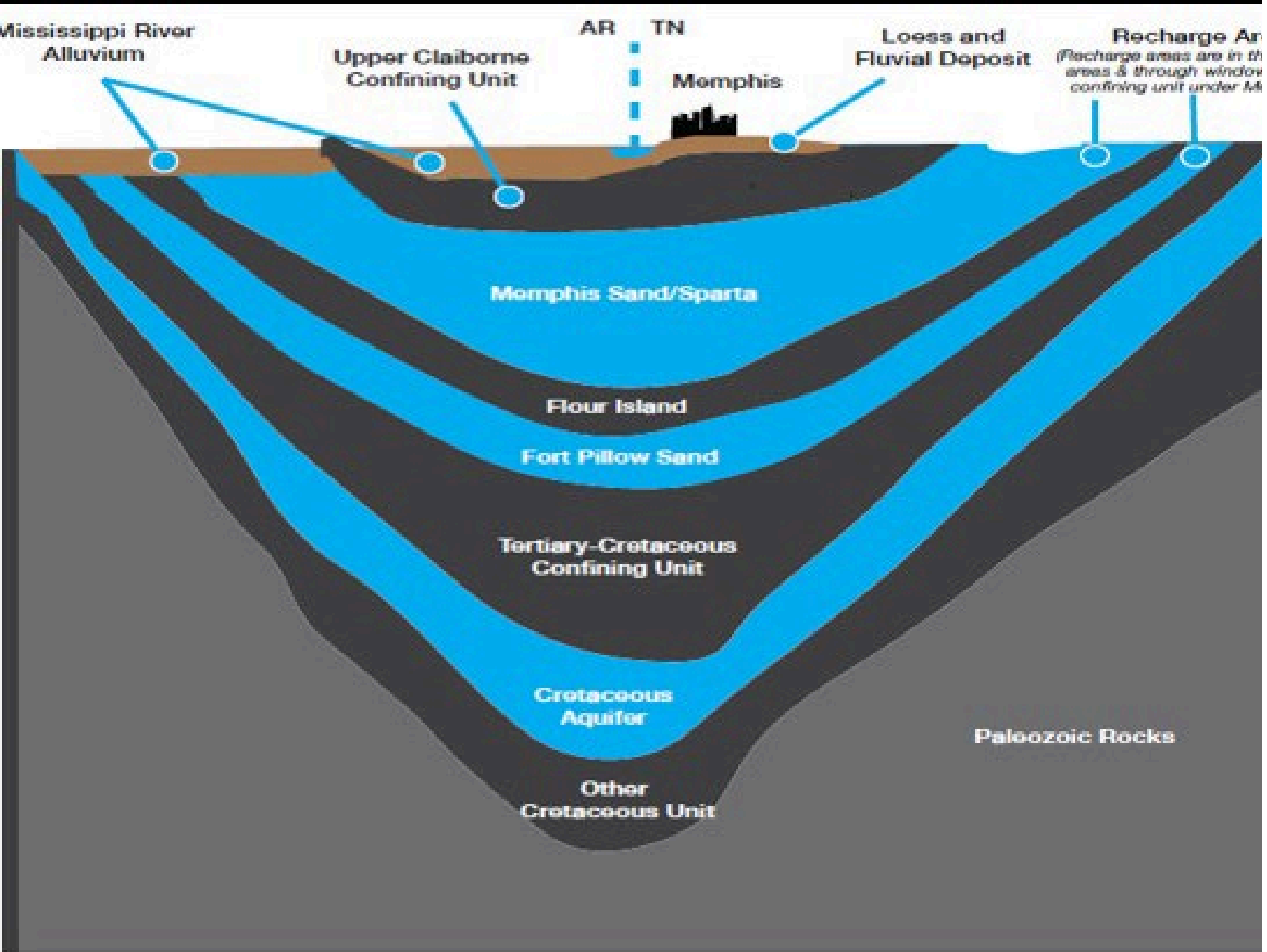
10 water treatment pumping stations

136 active source water wells

15 Water Storage Tanks

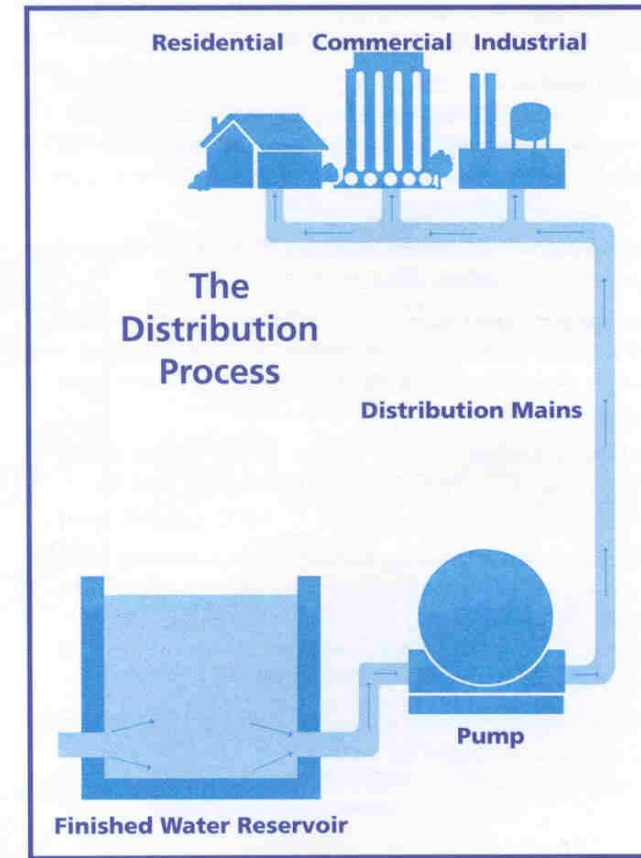
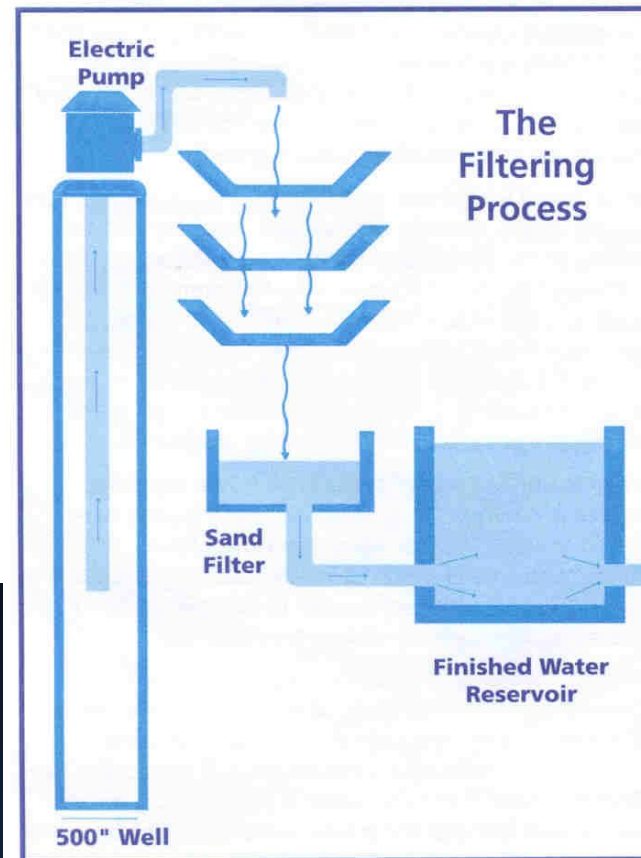


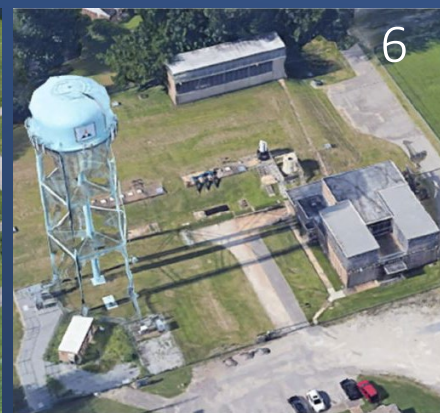
10 Water Treatment Pumping Stations that deliver the water to the many customers of MLGW.



Main source of drinking water is the Memphis Sands with a few Fort Pillow wells.

MLGW's typical treatment & distribution process





	Pump Station	Built	Upgraded/Expanded	Capacity (MGD)
1.	Allen	1951	—	30
2.	Mallory	1924	1969	35
3.	Shaw	1990	1997	30
4.	Sheahan	1932	1973	35
5.	Lichterman	1963	1975	30
6.	Palmer	1970	—	5.5
7.	McCord	1956	1973	30
8.	Morton	1979	—	30
9.	Davis	1969	1999	30
10	LNG <small>not pictured</small>	1968	—	1.1



Average well producing 2 mgd with most wells screened in the Memphis aquifer.



Average elevated storage capacity ranges from 100,000 gal to 500,000 gal.

Filter Upgrades – Assessment & Recommendation

Assessment

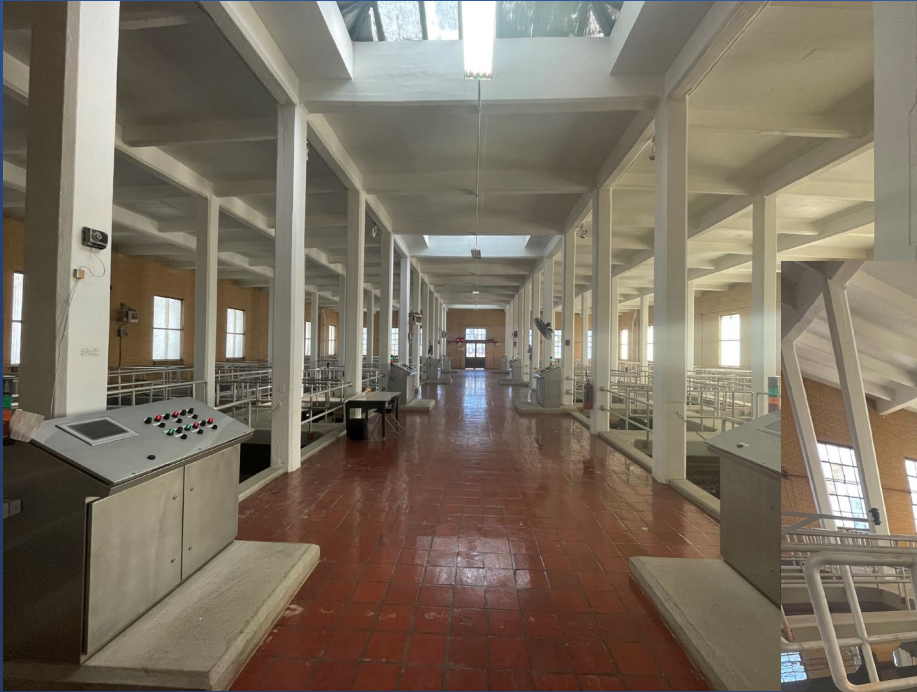
Analyze the performance of select filters at each pumping station.

Evaluate

Evaluate the conditions of filter media and bed expansion during the backwash process.

Recommend

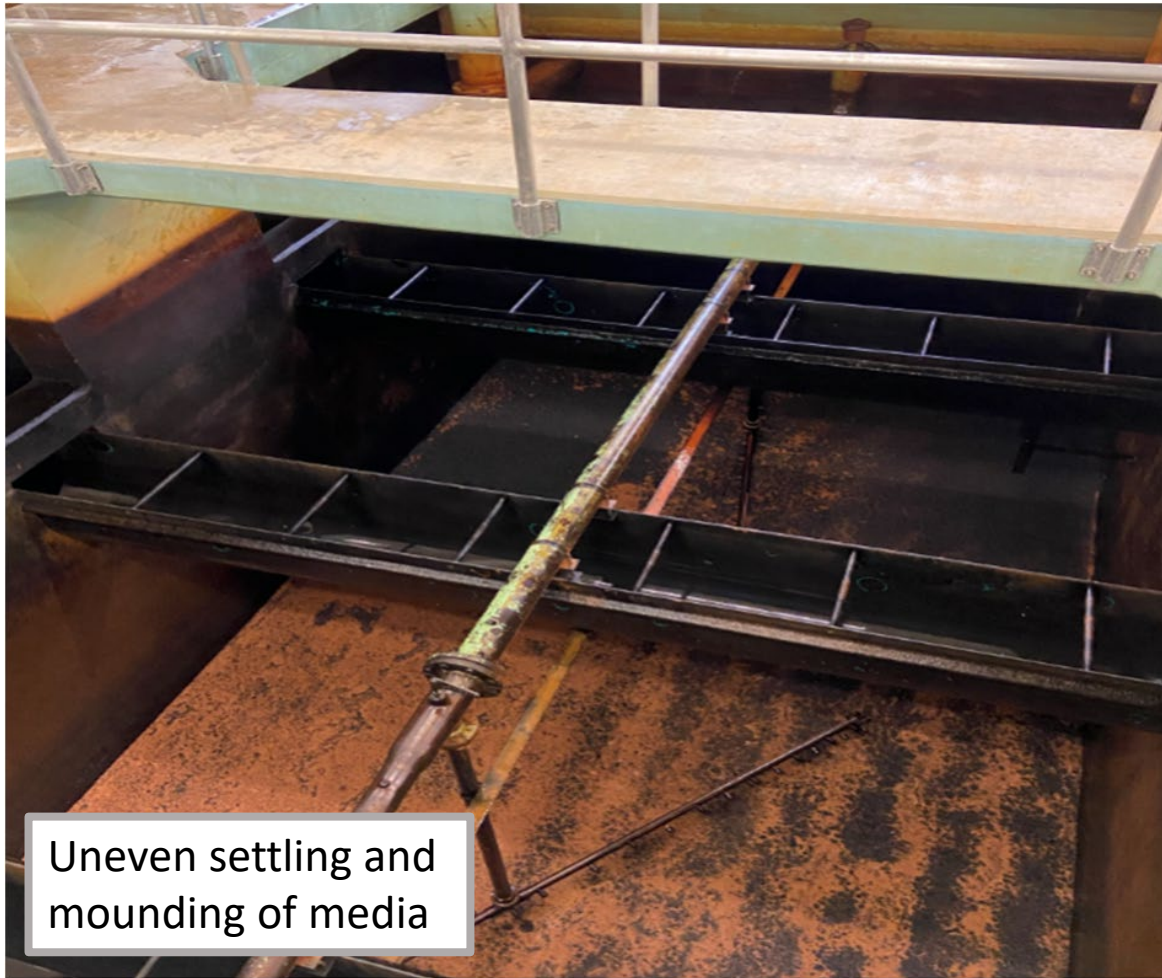
Provide recommendations for future operation maintenance for filters or improvements to backwash strategy.



To assess each pump station the following methods were used:

- Physical & Backwash Observations
- Media Analysis
- Sludge Retention
- Bed Expansion & Rise Rate

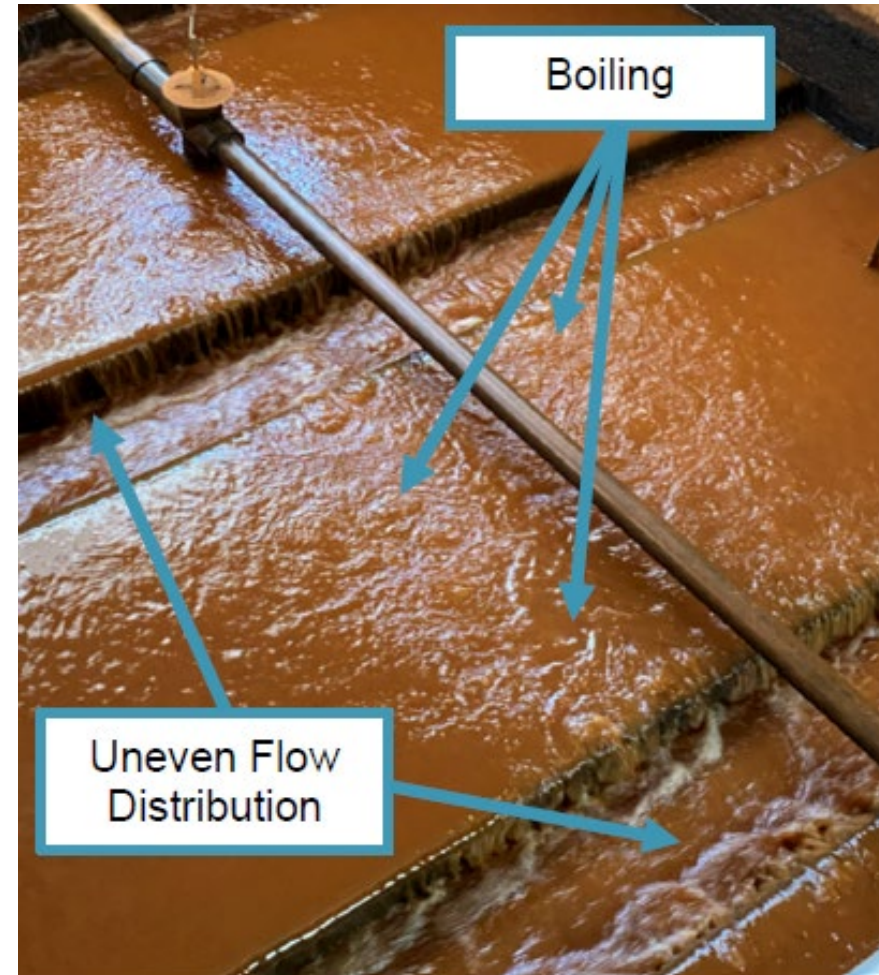
Assessment & Evaluation Results



Drained Filter



Assessment & Evaluation Results



The summary of the filter evaluation included:

1. All experienced issues during backwashing.
2. Filter media showed signs of degradation and iron/calcium carbonate build-up.
3. The backwashing process appeared inadequate in terms of removing sludge from the filter media.

PS	Rehabilitate Troughs	Add Media	Replace Media	Modify Backwash Operations / Upgrade Backwash System	Underdrain Replacement
Allen	Yes – repair liner	No	Yes	Yes	Yes
Mallory	No	No	Yes	Yes	Yes
Shaw	Yes – repair leaks at structural bracing, repair liner	No	Yes	Yes	Yes
Sheahan	Yes – repair liner	No	Yes	Yes	Yes
Lichterman	Yes – repair trough	No	No	Yes	Yes
Palmer	Yes – repair leaks and wall penetrations	Yes	No	Yes	Yes
McCord	Yes – repair liner and leaks at surface wash penetrations and wall connections	No	Yes	Yes	Yes
Morton	Yes – repair leaks	No	Yes	Yes	Yes
Davis	Yes – repair leaks	No	Yes	Yes	Yes

Filter System Recommendations

Rehabilitate troughs,
repair or replace with
new

Filter Media, add
additional or replace
all with new

Modify backwash
process for efficiency

Complete upgrade of
filter system:
Underdrains, Troughs,
BW system, Air Scour.

Filter Rehabilitation Project

5 Stations chosen – Top 5 deemed critical from assessment.

Complete upgrade of filter system to occur:

- New Underdrain
- New Media Retention Troughs
- New Media
- Addition of air scour system

Filter System Recommendations

	Estimate	Class 2 Low	Class 2 High
Mallory (Plastic)	\$ 15,930,137.40	\$ 13,540,616.79	\$ 20,709,178.62
Mallory (SST)	\$ 17,466,824.18	\$ 14,846,800.56	\$ 22,706,871.44
Morton (Plastic)	\$ 6,414,710.32	\$ 6,414,710.32	\$ 8,339,123.42
Morton (SST)	\$ 6,759,234.41	\$ 5,745,349.24	\$ 8,787,004.73
Shaw (Plastic)	\$ 6,414,710.32	\$ 5,452,503.77	\$ 8,339,123.42
Shaw (SST)	\$ 6,759,234.41	\$ 5,745,349.24	\$ 8,787,004.73
McCord (Plastic)	\$ 5,949,876.24	\$ 5,057,394.80	\$ 7,734,839.11
McCord (SST)	\$ 6,696,345.09	\$ 5,691,893.32	\$ 8,705,248.61
Davis (Plastic)	\$ 5,579,312.80	\$ 4,742,415.88	\$ 7,253,106.64
Davis (SST)	\$ 5,815,947.18	\$ 4,943,555.10	\$ 7,560,731.33
Total (Plastic)	\$ 40,288,747.08	\$ 35,207,641.56	\$ 52,375,371.20
Total (SST)	\$ 43,497,585.26	\$ 36,972,947.47	\$ 56,546,860.83

Opinion of Construction Costs (OPCC) was provided by the consultant. It provides best costs analysis for a low, average and high dollar amount.

Questions?