

Lake Margaret Water System Status Summary

LMCPC Annual Meeting

10-June-2017

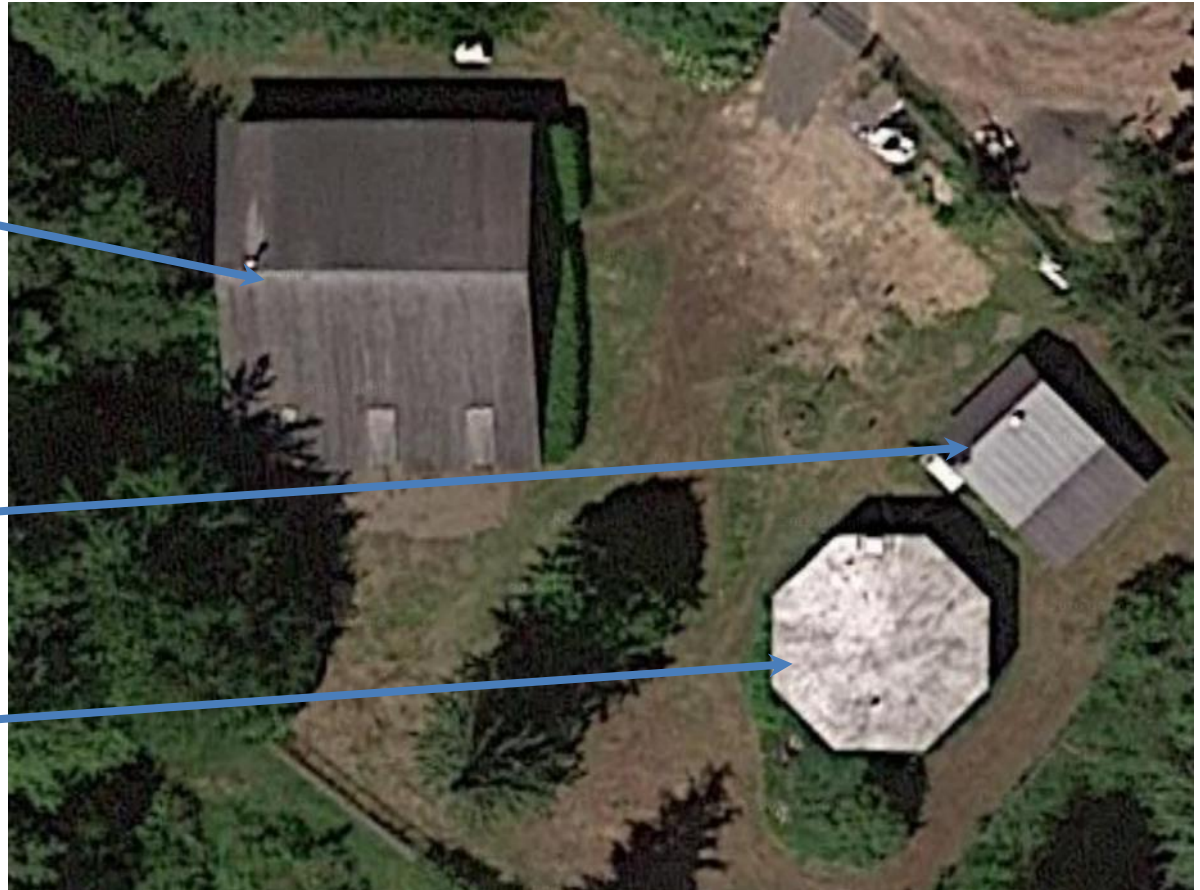


LMCPC Water Treatment Facility

Water Treatment Plant

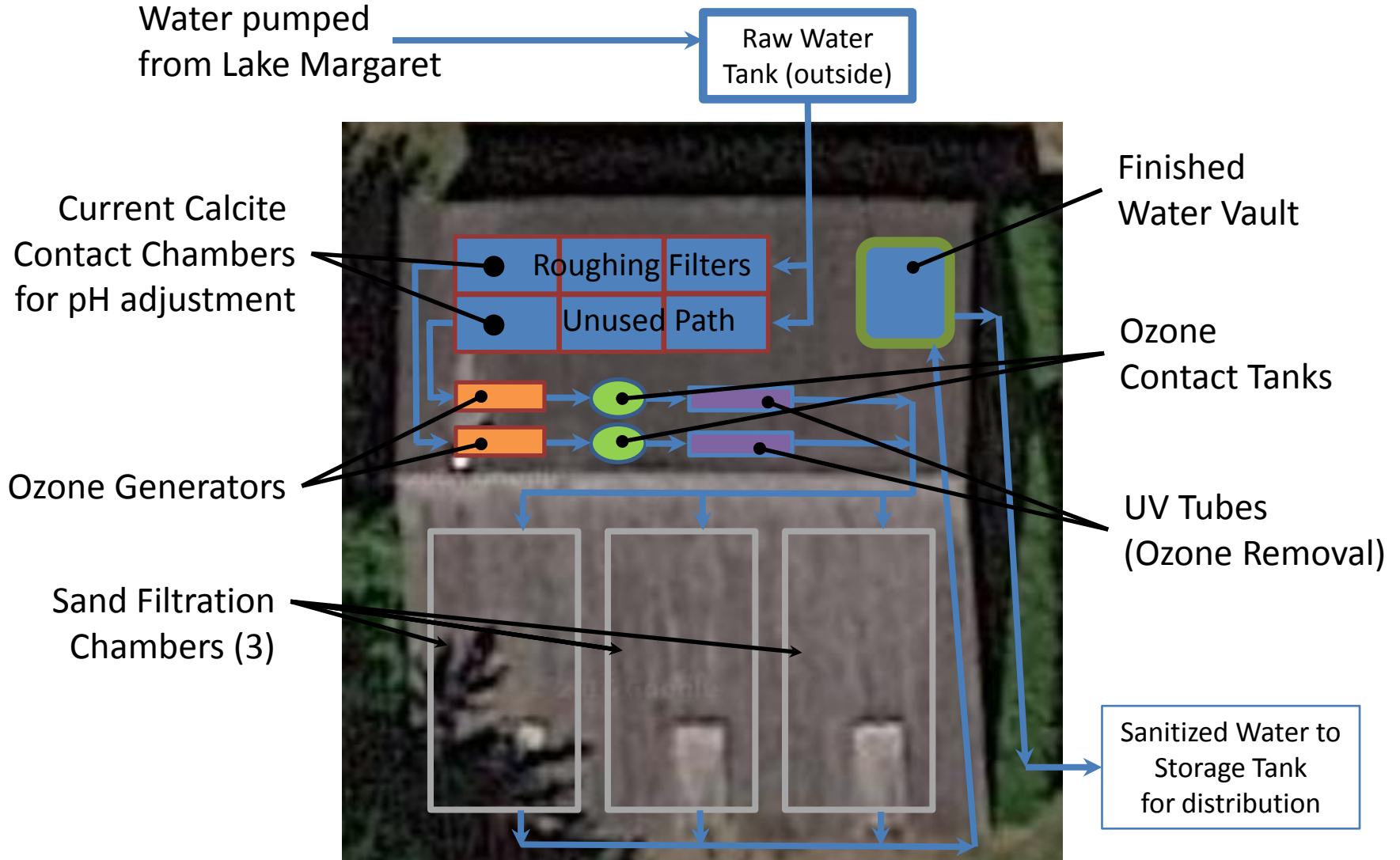
Booster Pump House

Water Storage Tank





Treatment Plant Block Diagram





Inside the Treatment Plant

Roughing filters (2 separate paths)

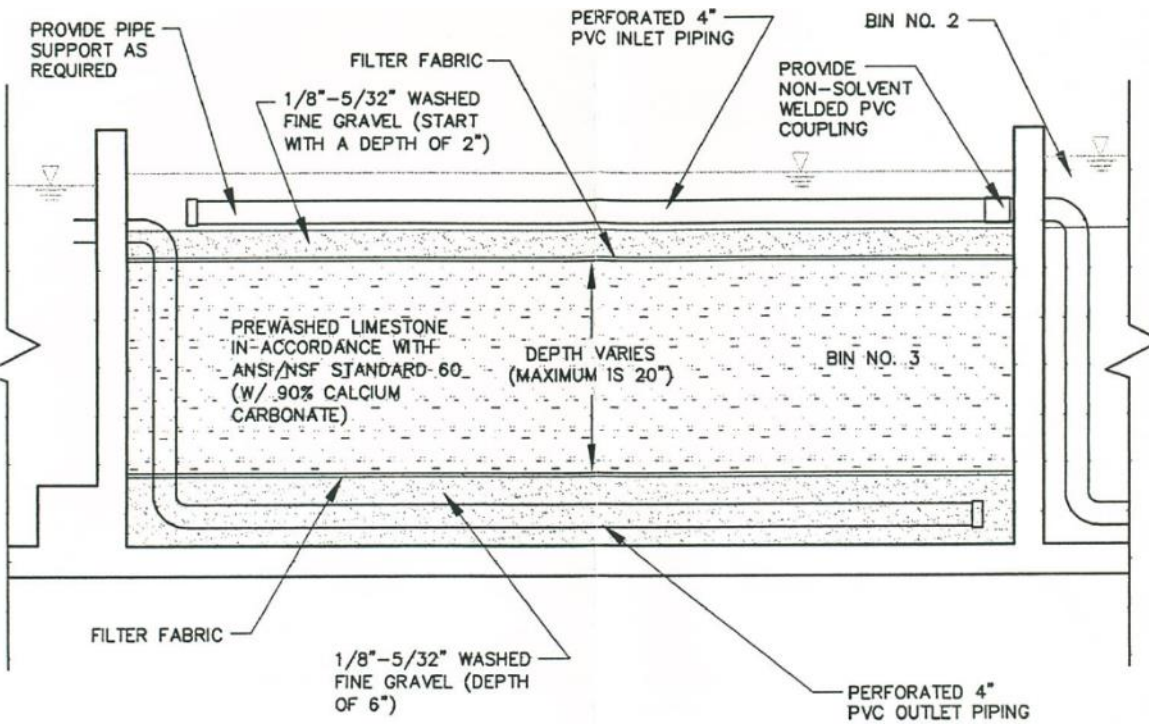
Last chamber is the calcite contact chamber, for pH adjustment



Ozone generators (2, rectangular) and contact chambers (2, cylindrical), with the UV ozone destruct units (2, small rectangular boxes in front of contact chambers).



Calcite Contact Chamber



Currently, the 20" thick layer of limestone in the 3rd chamber of the roughing filters is worn out

Identified a source for replacement; logistics in-process.

Kudos to Dex Burlingame for engineering a pH treatment system that needed no maintenance or additional materials for 16+ years



Water Distribution Line



Replaced 2 miles of
Asbestos-Concrete (AC)
distribution pipeline with
PVC.

Completed June 2015.



AC pipe was 60 years old
& disintegrating.

Represented a significant
pH buffering system to
raise pH before entering
residences.



PVC pipe is more robust
and will last at least 120
years.

The pH adjustment system
changes effectively caused
our lead TTV in 2016.



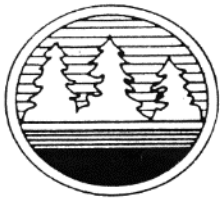
Summary of pH Issues

- Lake water has been showing increased levels of manganese in recent years.
 - Manganese has been coating our calcite material, at a much more rapid rate, causing our existing process of pH adjustment in the roughing filters to be much less efficient.
 - We have come up with additional treatment techniques to raise the pH to be neutral or basic (7.0 or above), but are difficult to maintain and are only temporary.
- As we do this pH treatment before the sanitization processes, we must be careful that pH adjustments do not affect those later processes. This is a balancing act.
- As most other water systems use post-sanitization pH adjustment techniques, we are evaluating several long-term options for our system.



Water TTV

- The low pH is the cause for our current water Treatment Technique Violation (TTV) for Lead from the Washington DOH.
 - A TTV requires the water system to work with an engineer to determine the cause, and design & implement treatment system modifications.
- LMCPC applied for and was awarded a \$30,000 grant from Washington DOH to address our pH and Lead TTV.
 - We are obligated to not begin work until after the contract is signed, currently planned for mid-July.
 - Engineering by Northwest Water Systems will take several weeks, ending with drawings and bid packages for the work
 - DOH plan approval takes 8-10 weeks; estimated to be complete by the end of October.
 - System modifications are estimated to take 6-8 weeks; estimated to be complete around the holidays.



Summary of Upcoming Costs

20170403 Board Meeting					
2017 LMPCP Water Treatment Plant Upgrades & Enhancements					
Additional expenditures summary					
Upcoming Engineering to solve Washington DOH TTV issues with pH (lead and copper)					
Item	Description	QTY	Unit cost	Total cost	Source
1	Post-treatment pH adjustment with soda ash	1	\$2,500	\$2,500	NWS estimate, installed
2	Control loop hardware for automatic constant pH monitoring	1	\$1,500	\$1,500	NWS estimate, installed
3	Manganese removal system (replaces roughing filters)	1	\$5,000	\$5,000	NWS estimate, installed
4	Small Water System Engineering Plan	1	\$4,000	\$4,000	NWS estimate
5	Engineering costs to NWS	1	\$13,000	\$13,000	NWS estimate
TOTAL:				\$26,000	
NOTE: LMPCP is awaiting word on a \$30,000 grant for the items mentioned above.					
Costs required to bring the second treatment path online					
Item	Description	QTY	Unit cost	Total cost	Source
1	CRN5 booster pump	1	\$2,120	\$2,120	PumpTec quotation
2	CRN4 booster pump rebuild	1	\$516	\$516	PumpTec quotation
3	UV System Quartz tubes (pricing based on buying 8 tubes)	8	\$168	\$1,344	Ideal Horizons quotation
4	UV System Lamps	8	\$162	\$1,296	Ideal Horizons quotation
5	Replacement Ozone Generator from Clearwater	1	\$10,000	\$10,000	Clearwater quotation
6	Licensed electrician labor to install new Ozone Generator	5	\$120	\$600	Carl estimate
7	Labor hours to fix piping and prime/prep system (Carl & Paul)	20	\$32	\$640	Carl estimate
TOTAL:				\$16,516	
Upcoming Plant improvements					
Item	Description	QTY	Unit cost	Total cost	Source
1	Exhaust Fan Replacement (with labor)	1	\$550	\$550	Carl estimate
2	Replacement Ozone Generator from Clearwater	1	\$10,000	\$10,000	Clearwater quotation
3	Licensed electrician labor to install new Ozone Generator	5	\$120	\$600	Carl estimate
4	Labor & support hours (Carl & Paul)	8	\$32	\$256	Carl estimate
TOTAL:				\$11,406	
GRAND TOTAL:				\$53,922	



Key System Enhancements

- Implementation of a post-treatment pH adjustment system, with soda ash, like most modern treatment plants.
 - Will not increase water hardness
 - Includes a continuous feedback electronic test & pump system
- **BIG NEWS** here is that after many weeks of investigation and hounding by LMCPC, the DOH finally relented and is allowing us to design & install the soda ash pH adjustment system as an emergency fix. Engineering is in process, system will be installed within weeks!
- Bring second treatment path back online to provide system redundancy.
- Replace 20 year old ozone generators with modern units. Old ozone generators have been a significant maintenance issue.
- Implementation of a different type of manganese removal, which will function much like a pool filter. Increased manganese levels have had a significant performance impact on our plant. This will reduce the manual labor required to clean & maintain the roughing filters.



Moving Forward

1. LMCPC has received new limestone material for pH adjustment
 - New limestone was installed last Saturday (3-June) in the chamber.
 - The pH has settled to 7.6, which is an ideal level for our system.
 - System will function normally again while the upgrades are implemented.
2. Frequency of pH testing, both pre- & post-upgrades, will be daily during this transition phase. This includes testing at the plant, in the distribution line, and home testing upon request.
3. Remaining water system upgrades will complete around the holidays, which will ease maintenance, restore redundancy, and provide a much higher overall reliability.



DOH Advice for Residents

1. Should you have copper piping and/or lead solder in your home (built pre-1987), or just have a concern or aren't sure, simply running the water until the temperature changes (about 30-45 seconds) brings the lead and copper levels down to near ND.
2. After exposure of pipes to acidic (low pH) water, there is a period of "passivation" that occurs, lasting some 3-6 months, where the copper and lead solder re-develop a protective coating. During passivation, some leaching of copper and lead can occur.
3. The DOH classifies pH as a secondary water quality measure. Drinking acidic water in the ranges where our water has tested has been shown to have no ill effect on your health (your stomach fluid pH is 100-1000 times more acidic).



Questions & Answers