CLEARFORD
WATER SYSTEMS INC.

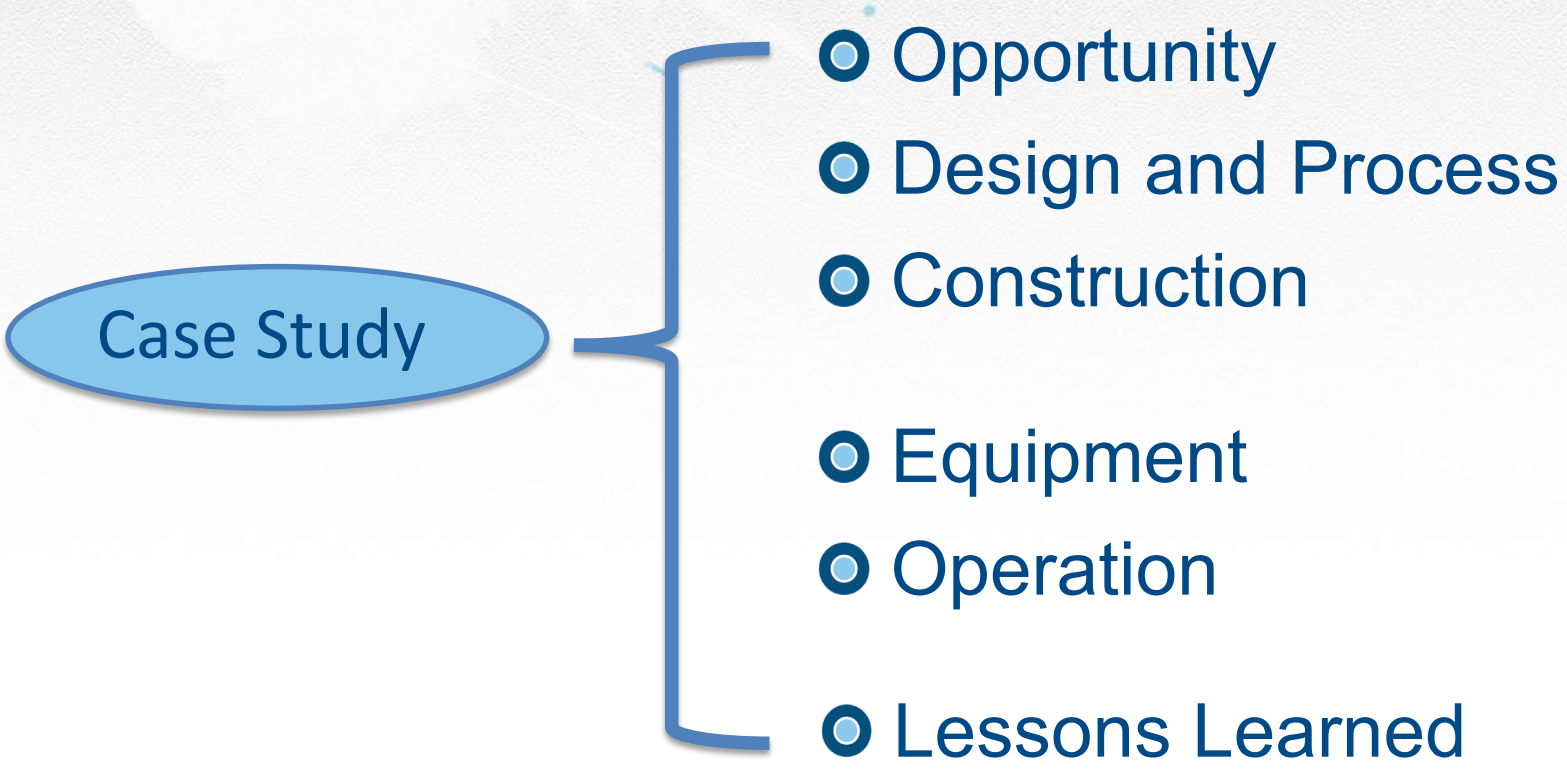
Case Study:

On-Site Sewage Treatment Plant Servicing a 1 Million Sq. Ft Distribution Warehouse

By Ying Zhu & Leslie Sina

OOWA 2020
London | March 3, 2020

Contents


Case Study
Opportunity
Design and Process
Construction
Equipment
Operation
Lessons Learned

Opportunity

East of Ottawa

Over 1 million ft^2

Outside Municipal Waste Service Area

Economic Development

No Defined Timeline of Municipal Service Connection

Photo credit : Broccolini Construction
Source Link: https://www.broccolini.com/en/project/view/?id=334

CLEARFORD WATER SYSTEMS INC.

Design Challenges

❖ Strict Effluent Discharge Criteria

✓ Activated Sludge + Membrane Bioreactor

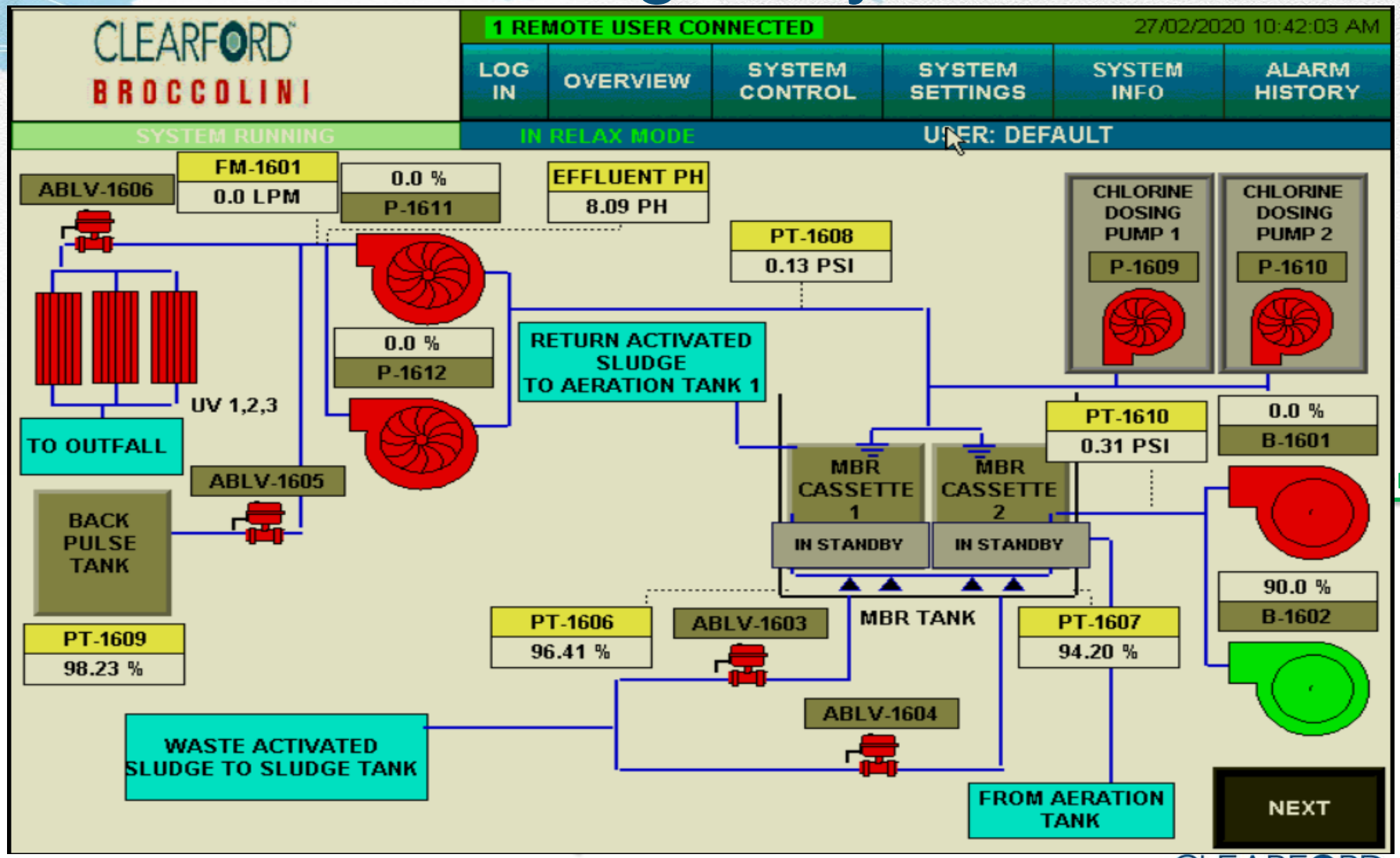
Parameter	Limits	Design Value	Units
$CBOD_5$	10	5	mg/L
Total Suspended Solids (TSS)	10	1	mg/L
Total Ammonia Nitrogen	3 (Nov-Apr) 1 (May-Oct)	0.5	mg/L
Total Phosphorus	0.10	0.05	mg/L
E.coli	200	2.2	MPN/100 mL

❖ Challenging Site Conditions

- High Water Table ✓ Flotation calculations + Anti-flotation Slabs
- Soil Bearing Capacity ✓ Small Footprint +Weight Distribution Verifications
- Cold Weather/winter ✓ Frost prevention + Insulations

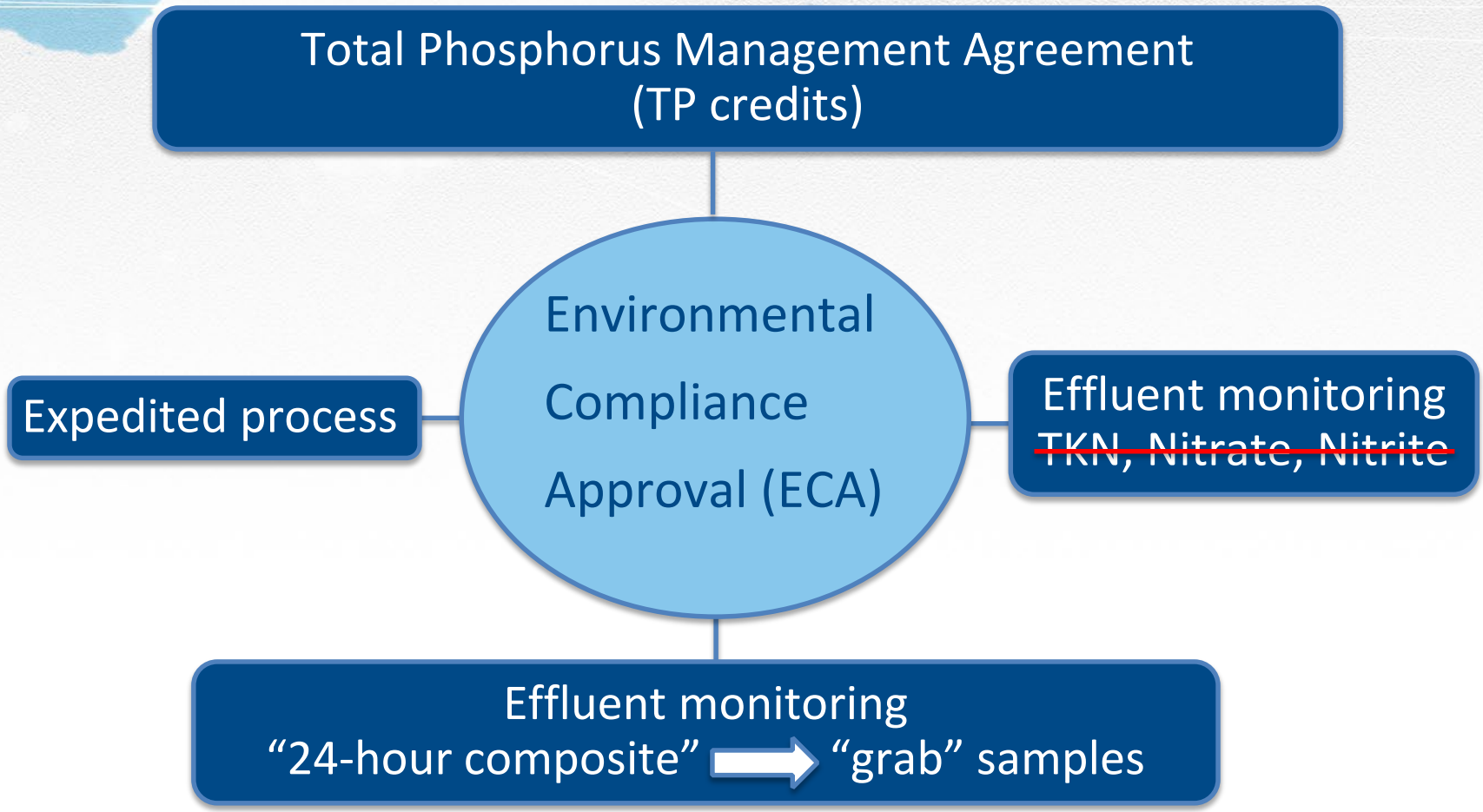
CLEARFORD WATER SYSTEMS INC.

Design Layout



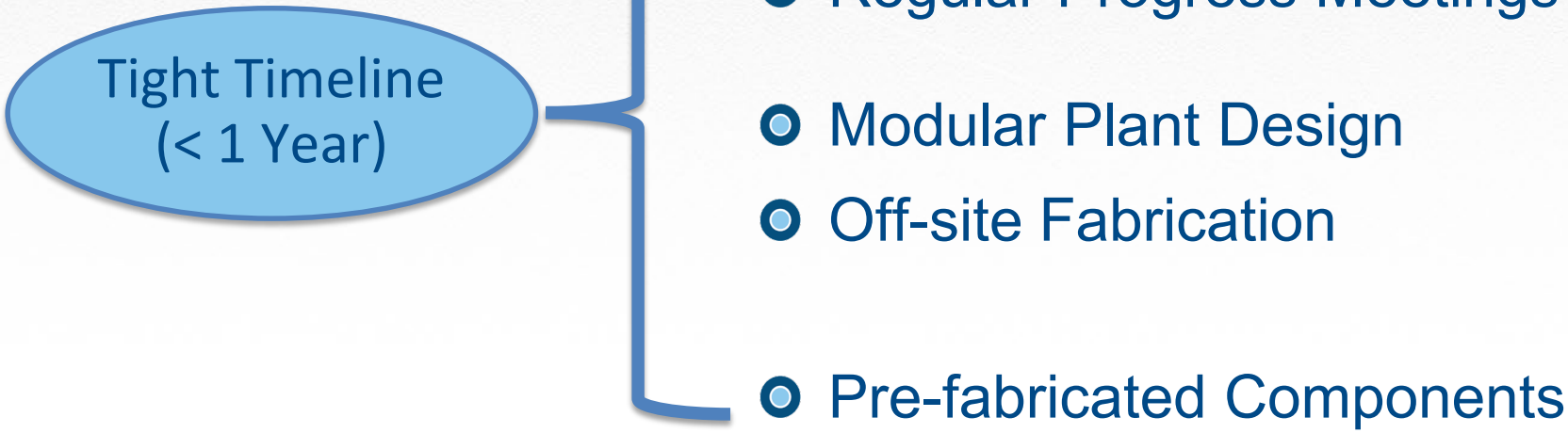
CLEARFORD WATER SYSTEMS INC.

Approval



CLEARFORD WATER SYSTEMS INC.

Tight Timeline



CLEARFORD WATER SYSTEMS INC.

Construction Challenges: No Access Road

CLEARFORD WATER SYSTEMS INC.

Installation Challenge: Adverse Soil Condition

Reinforced Crane Pad

Larger Excavation Slope

→ Larger Crane

CLEARFORD WATER SYSTEMS INC.

Installation Challenge: High Water Table & Weather

CLEARFORD WATER SYSTEMS INC.

EQUIPMENT

- PUMPS – Lift station, PST, MBR
- BLOWERS

CLEARFORD WATER SYSTEMS INC.

EQUIPMENT

- STRAINERS – 2 types

CLEARFORD WATER SYSTEMS INC.

EQUIPMENT

- DECANTER
- DOSING PUMPS – CL2 & Alum

CLEARFORD WATER SYSTEMS INC.

EQUIPMENT

- UV

CLEARFORD WATER SYSTEMS INC.

ISSUES

- LOW pH
- TOILETS – Plant Online
- MANIFOLD
- DECANTER
- UV’s

CLEARFORD WATER SYSTEMS INC.

ISSUES

- STRAINERS

CLEARFORD WATER SYSTEMS INC.

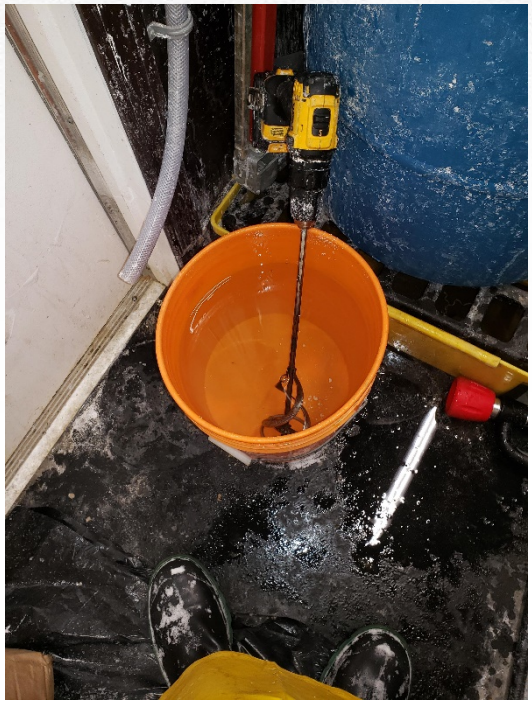
ISSUES

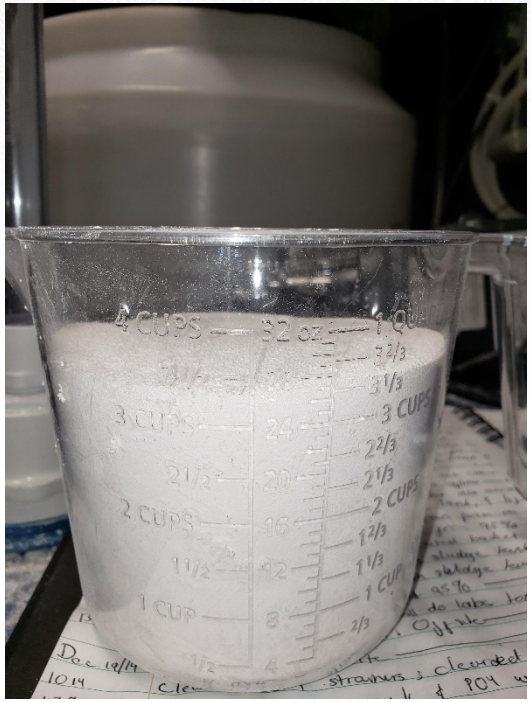
- STRAINERS

CLEARFORD WATER SYSTEMS INC.

IMPROVMENTS

- SODA ASH

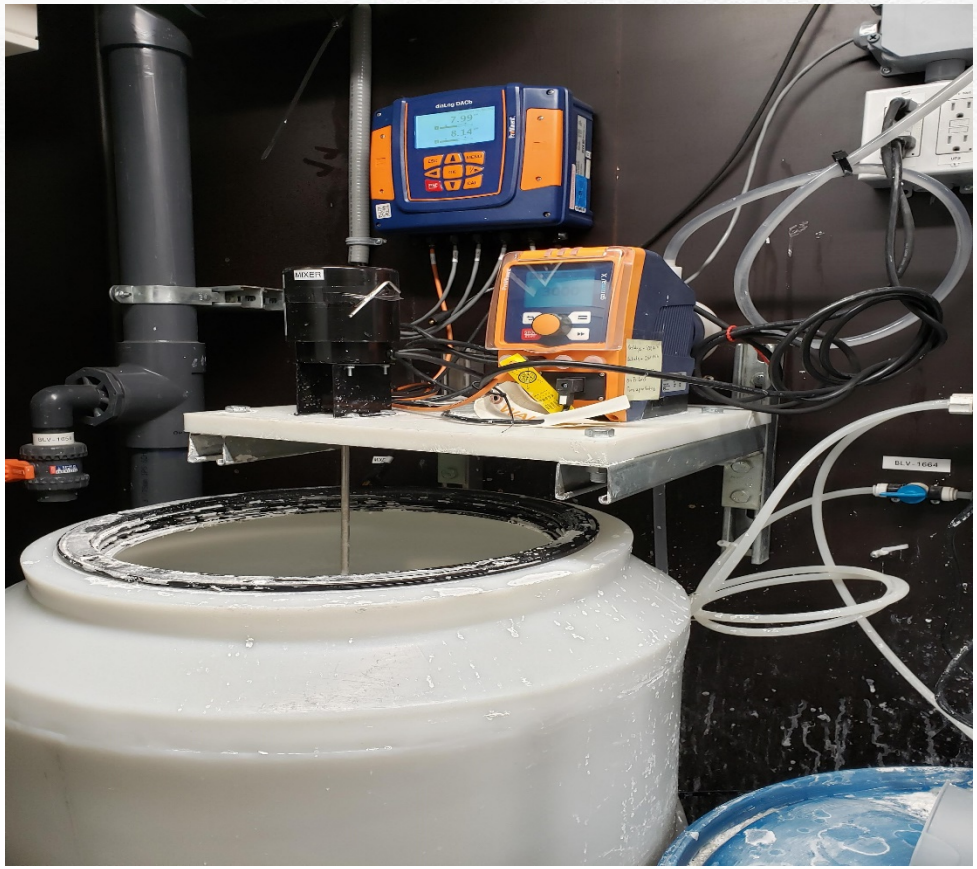




CLEARFORD WATER SYSTEMS INC.

IMPROVMENTS

- SODA ASH



CLEARFORD WATER SYSTEMS INC.

IMPROVMENTS

- P.M’s

CLEARFORD WATER SYSTEMS INC.

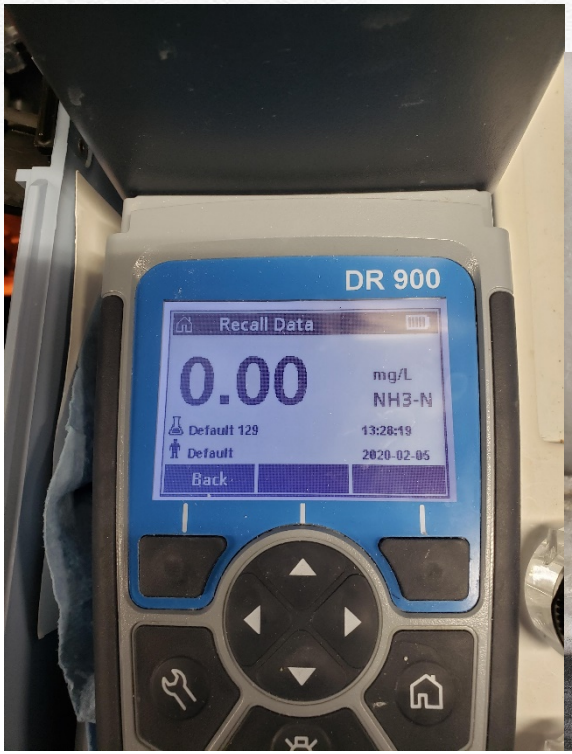
IMPROVMENTS

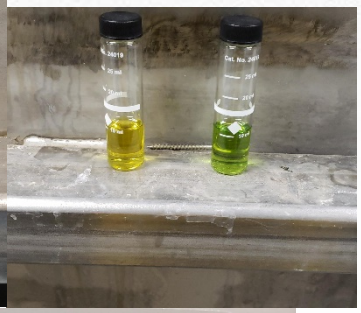
- STRAINERS

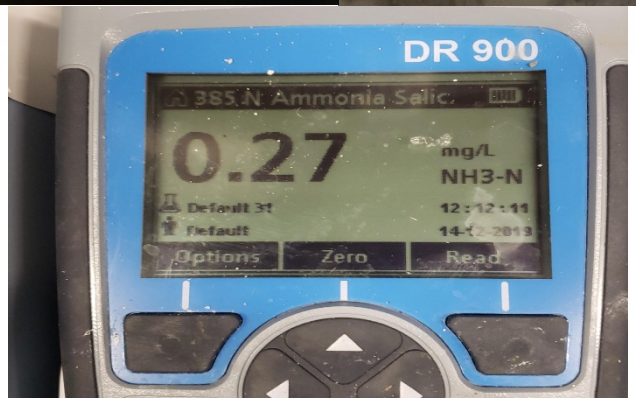
EARFORD
ER SYSTEMS INC.

IMPROVMENTS

- Regular Effluent testing



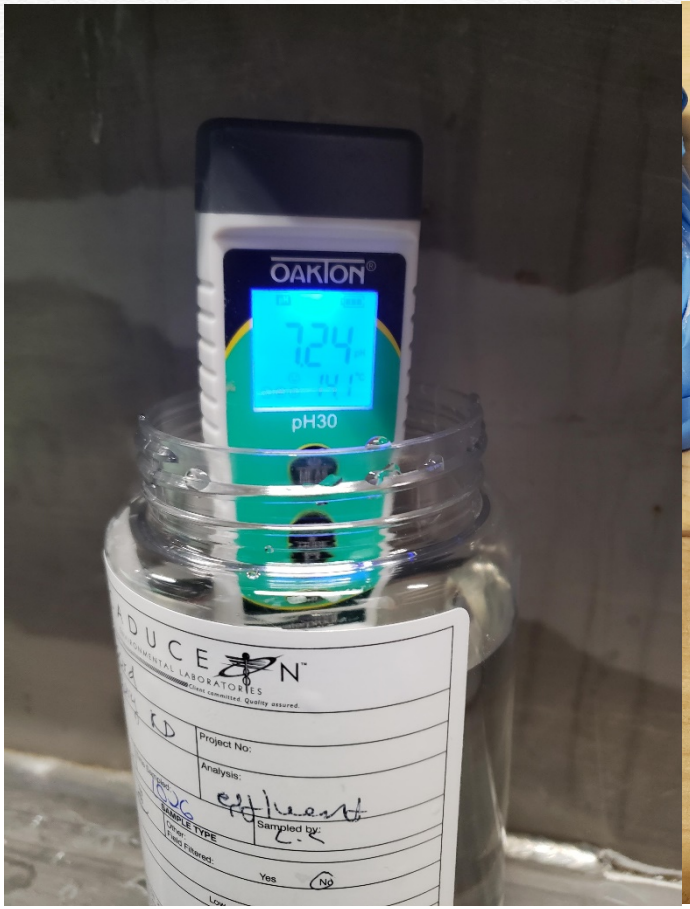


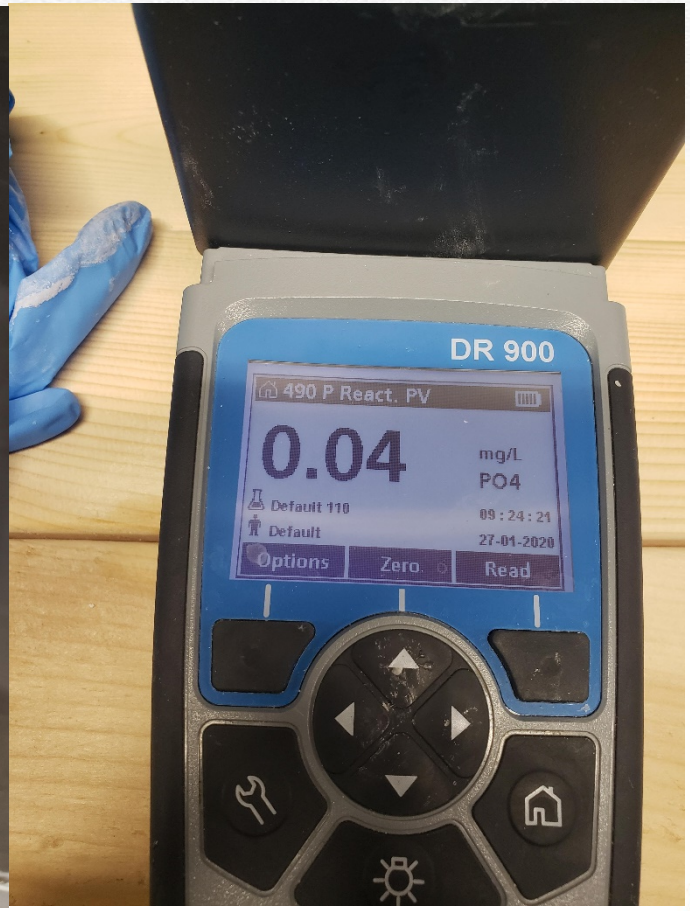


CLEARFORD WATER SYSTEMS INC.

IMPROVMENTS

- Regular Effluent Testing





CLEARFORD WATER SYSTEMS INC.

Lessons Learned

CLEARFORD WATER SYSTEMS INC.

Thank You !

Questions?

CLEARFORD
WATER SYSTEMS INC.