



Ruthven WTP: Hybrid DAF/Sedimentation Retrofit

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Outline

1. Background
2. Options Review
3. Implementation
4. Challenges
5. Next Steps



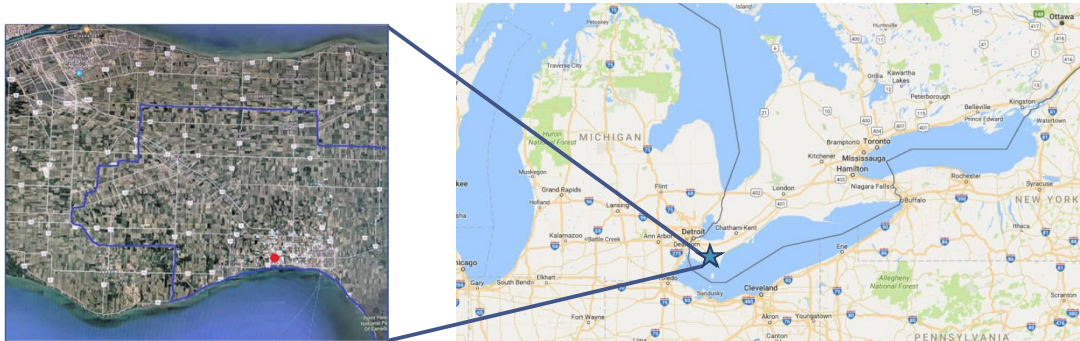
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Background

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Union Water Supply System (UWSS)

UWSS is owned by and supplies water to the Towns of Kingsville, Essex, Lakeshore and the Municipality of Leamington in Southern Ontario



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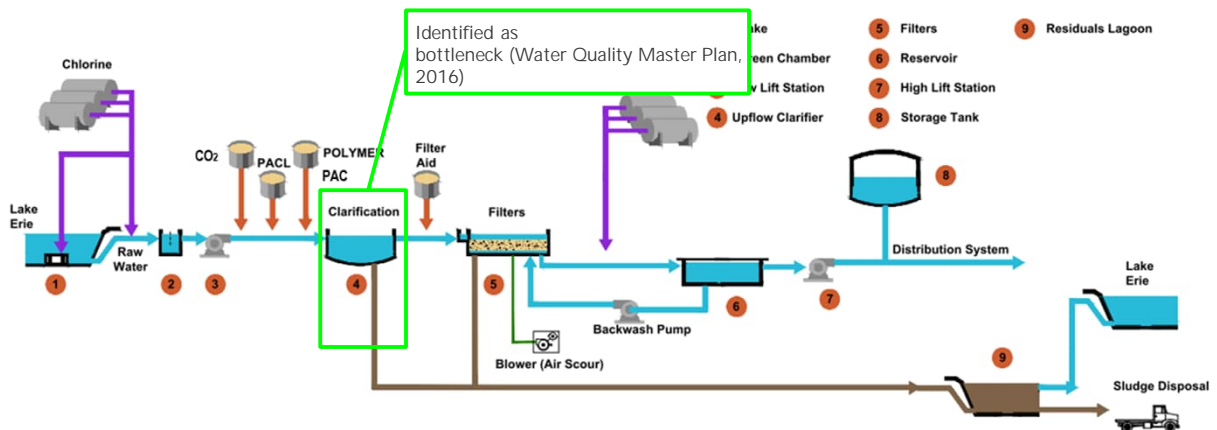
Raw Water Source - Lake Erie



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Ruthven WTP

- Rated Capacity: 124.6 MLD (1442 L/s)
- Operated & Maintained by Ontario Clean Water Agency



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Upflow Clarifier Operation Challenges

Startup Time to develop sludge blanket

Sludge Blanket Sensitivity

Sensitive to Changes in Flow

Water quality from storm events



Cleaning

Algae and Solids that tend to float are difficult to remove

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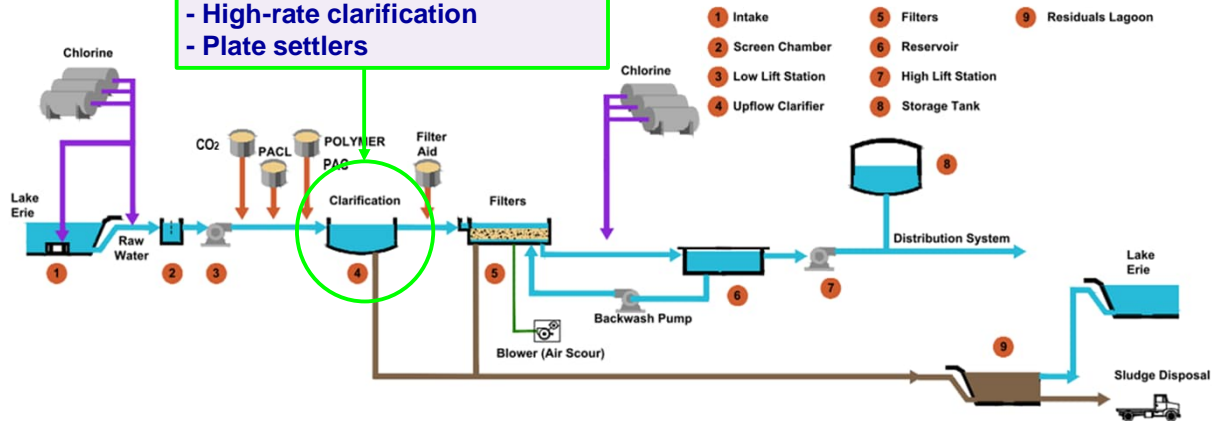
Options Review

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Treatment Process Review

Pre-treatment Upgrade Options:

- Rapid mixing
- DAF
- High-rate clarification
- Plate settlers



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DAF Testing

- Bench-Scale DAF jar testing completed in 2017 collaboration with Roberts Filter Group
- DAF pilot-scale testing completed to evaluate feasibility of DAF as a clarification alternative
- Key Finding: High Turbidity Events require multi-stage pre-treatment
- Value bench-scale and pilot-scale testing



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Hybrid DAF

- Hybrid DAF = combining DAF & Sedimentation
- Maximize Existing Infrastructure
- Resilient to Changes in Water Quality



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Implementation

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Implementation Plan

Phased Upgrades

- P1: Upgrade one Clarifier to Hybrid DAF
- P2: Upgrade another Clarifier to Hybrid DAF

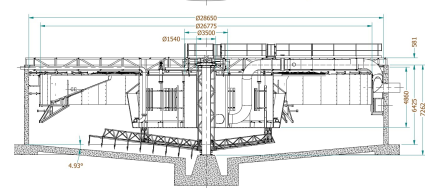


Ruthven WTP:
DAF Phase 1
Retrofit

Retrofit Use existing circular clarifier tanks



Engage WTP
Equipment Suppliers
Custom Solution Hybrid DAF



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Retrofit Approach

Existing Tank

- 1960's Circular Concrete Tank

Flowrate and Hydraulic Loading Rate

- DAF retrofit 2x the capacity of previous clarifier



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DAF Tank: How it Flows



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DAF Tank: How it Flows



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DAF Tank: How it Flows



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DAF Tank: How it Flows



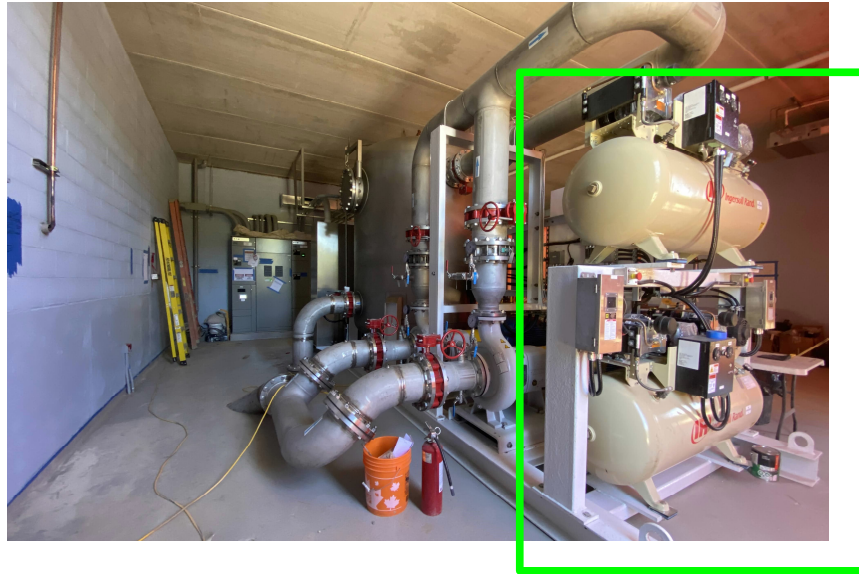
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DAF Saturation Skid: How it Flows



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DAF Saturation Skid: How it Flows



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DAF Saturation Skid: How it Flows



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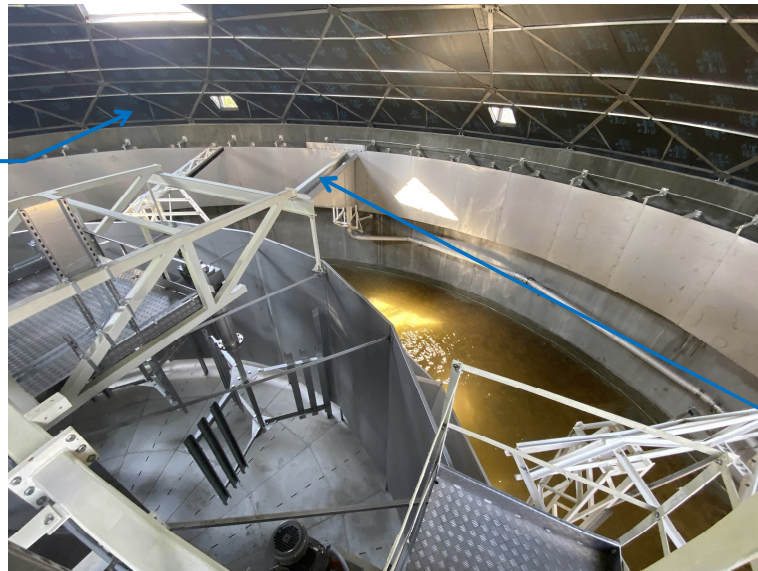
Challenges

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Design Challenges

Aluminum
Dome Cover

Retrofit

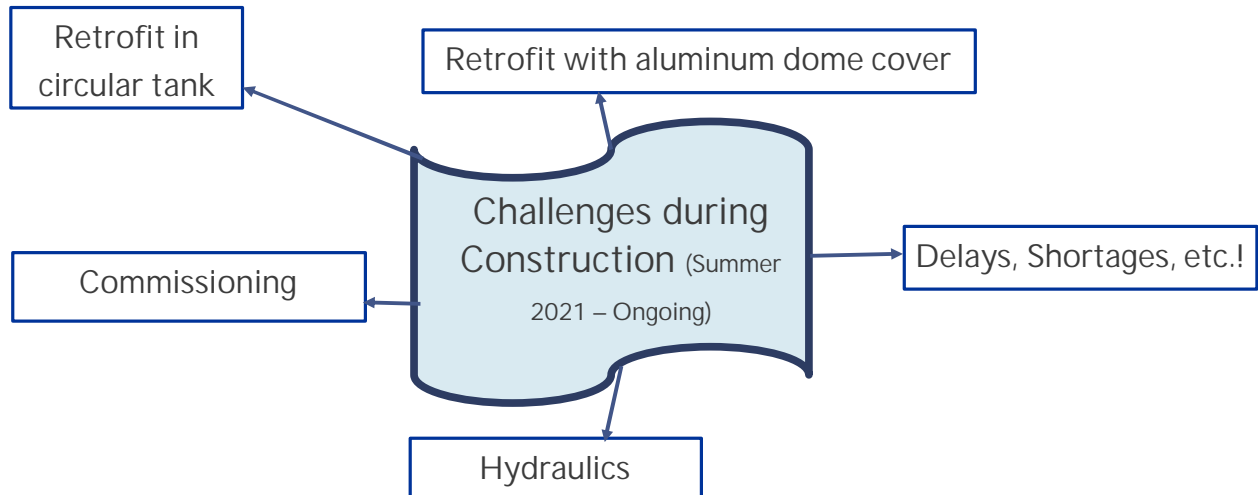


Unique
Concept:
Combining
two W&WW
Treatment
processes
in one tank

Hydraulics

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Construction Challenges



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Lessons Learned

- Minimize Impacts of Potential Delays
- Validate Existing Conditions
- Confirm Proof of Concept
- Promote Good Teamwork & Collaboration



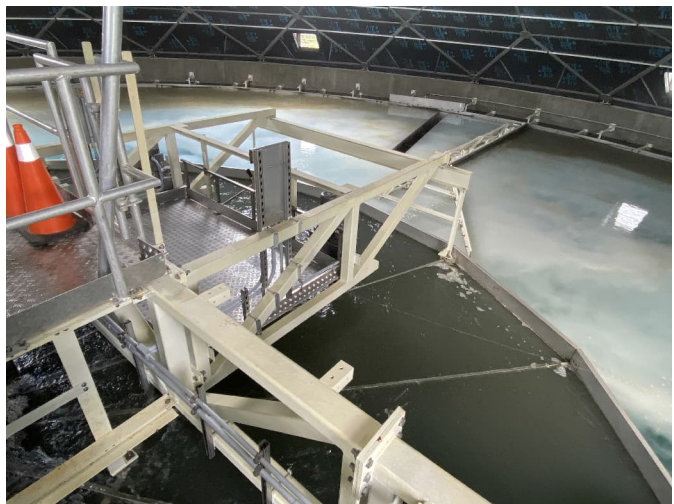
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Performance & Next Steps

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Summary of Performance

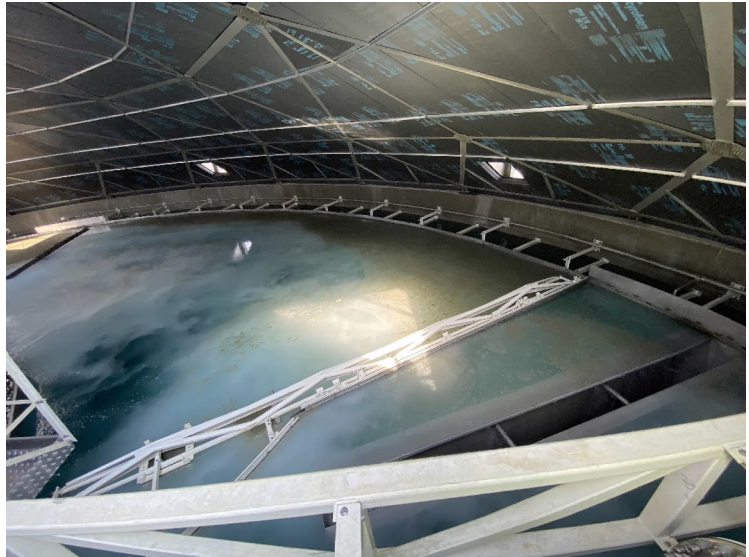
- Quick Startup
- Flotation / DAF Process works well
- Operator Friendly



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Next Steps

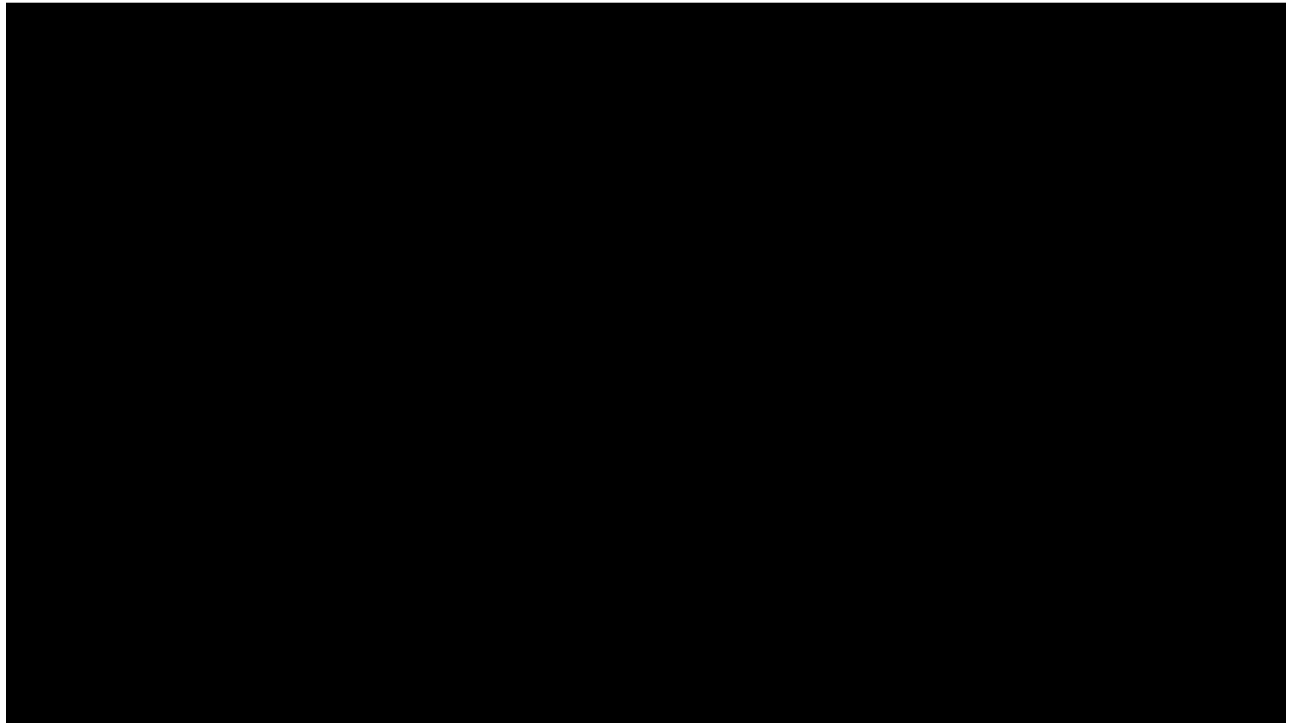
- Implement DAF Skimmer Modifications
- Optimize DAF system
- Monitor DAF performance including seasonal
- Initiate Phase 2 DAF Upgrades



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DAF Video

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Questions?

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