

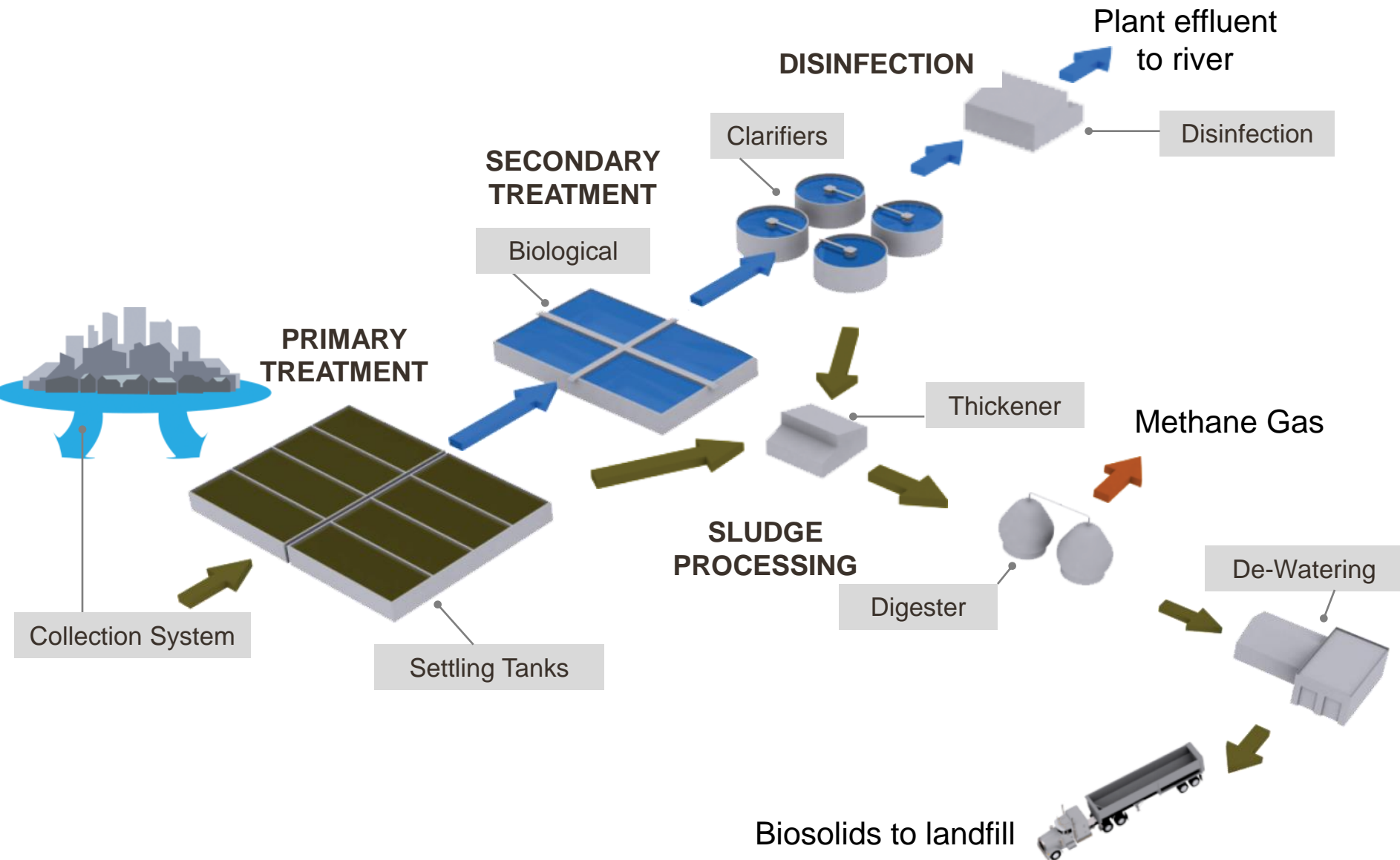
WWTP's Continuous-Loop Filter Technology for Sludge Thickening & Dewatering

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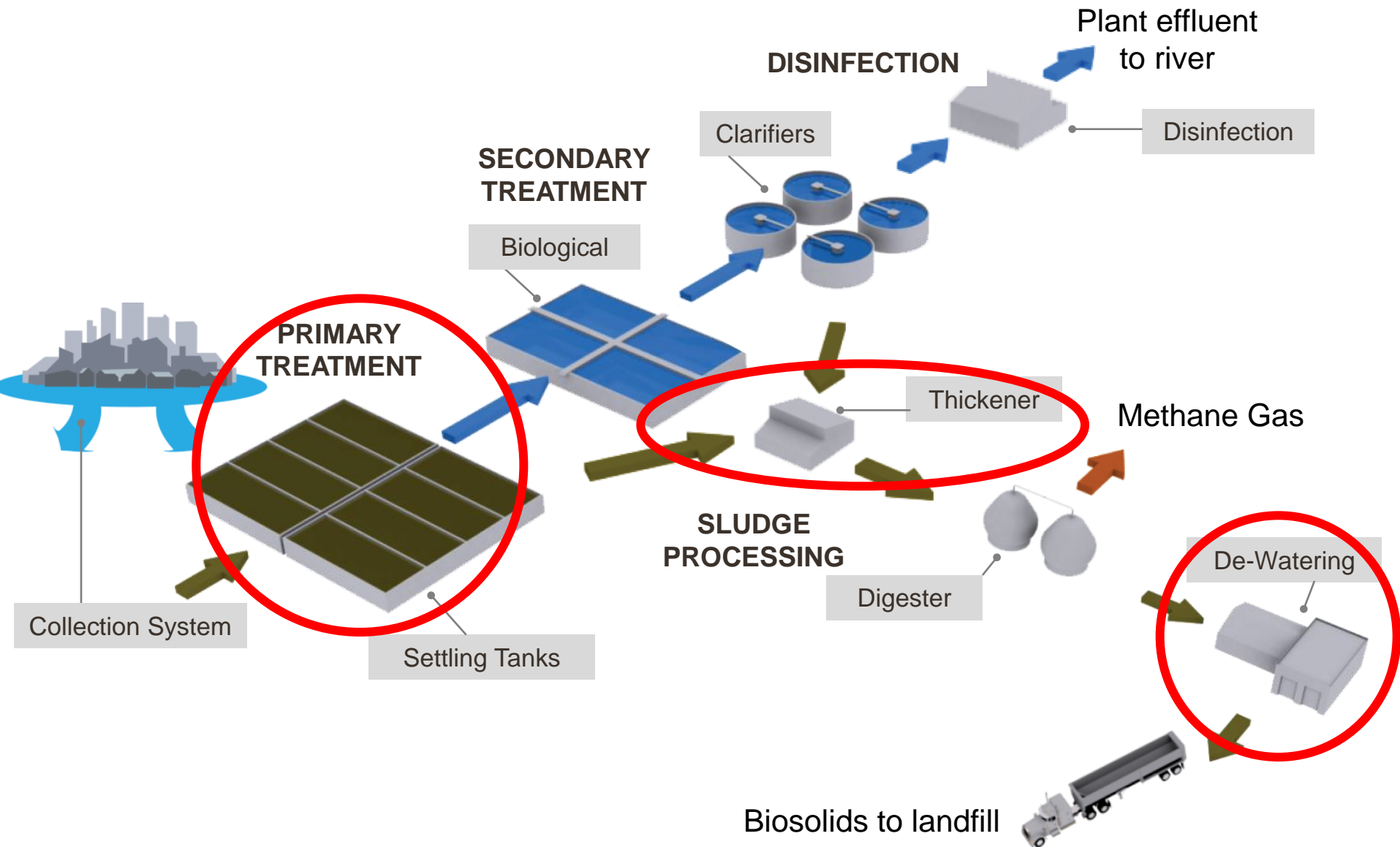


- Conventional WWTP Scheme
- Continuous-loop Filtration Technology Overview
- Process Description
- Case Study: Enderby, British Columbia, Canada
- Summary

CONVENTIONAL WWTP SCHEME



CONVENTIONAL WWTP SCHEME



ALTERNATIVES FOR PRIMARY TREATMENT



Purpose of primary treatment:

To remove particulates from raw municipal wastewater – thereby reducing the organic loading downstream.

Available technologies for primary:

- Large settling tanks/clarifiers (conventional)
- Continuous-loop filtration

CONTINUOUS-LOOP FILTER MUNI APPLICATIONS

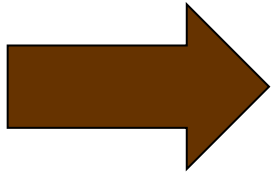
- Enhance solids removal performance for **Overloaded primary** sedimentation tanks.
- **Plant expansion** where land is expensive or unavailable by increasing primary or secondary process capacity.
- Primary treatment for **New plants** (Dig-free, concrete-free solution for mountainous or earthquake-prone areas).
- Provide **Integrated solution** for primary solid separation, sludge thickening and dewatering (3 in 1).



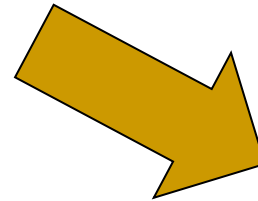
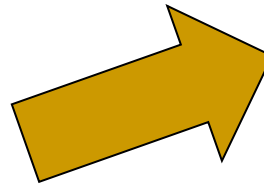
MUNICIPAL APPLICATION



Enhance solids removal performance for **overloaded** primary tanks



TSS 300-500 mg/L

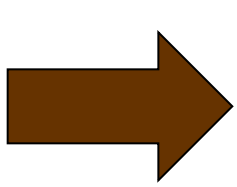


TSS 200-400 mg/L

Overloading can be due to:

- Poor engineering design (i.e. undersizing)
- Increase in flow rate to the plant (i.e. population growth)
- Regulatory change (i.e. more stringent discharge limit)

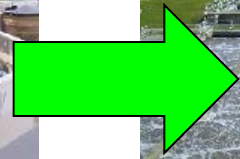
Option #1 – Reduce incoming solids with continuous-loop filter, prior to primary treatment



TSS 300-500 mg/L



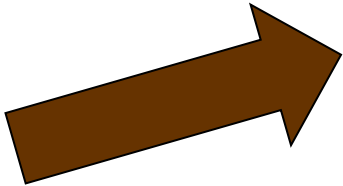
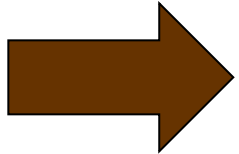
TSS 150-250 mg/L



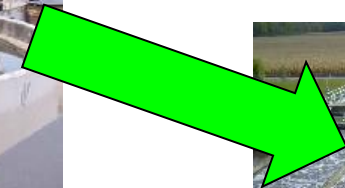
TSS 100-200 mg/L



Option #2 – Parallel treatment of primary with continuous-loop filter



TSS 300-500 mg/L



TSS 100-200 mg/L



MUNICIPAL APPLICATIONS



- Primary treatment for new plants
- Primary sludge thickening
- Primary sludge dewatering
- Stormwater and CSO treatment
- Expanding primary or secondary capacity



“We were facing an expansion of 2 to 3.5 MGD by adding another oxidation ditch. Instead we added better primary treatment and were able to defer spending several million dollars by spending \$250k on a Salsnes Filter”

INDUSTRIAL APPLICATIONS

- Tanneries, pulp & paper, slaughterhouses, food processing, aquaculture



Thickening

A photograph showing a large industrial tank with a thick, brown, slurry-like substance being processed. The substance is being stirred or mixed within the tank.



Filtration

A photograph showing a large industrial tank with a thick, brown, slurry-like substance being processed. The substance is being stirred or mixed within the tank.



Cleaning

A photograph showing a large industrial roller or drum covered in a thick, brown, slurry-like substance. The roller is being cleaned or scraped by a mechanical arm.



Dewatering

A photograph showing a large pile of thick, brown, slurry-like substance, likely the result of a dewatering process, contained in a dark blue bucket.

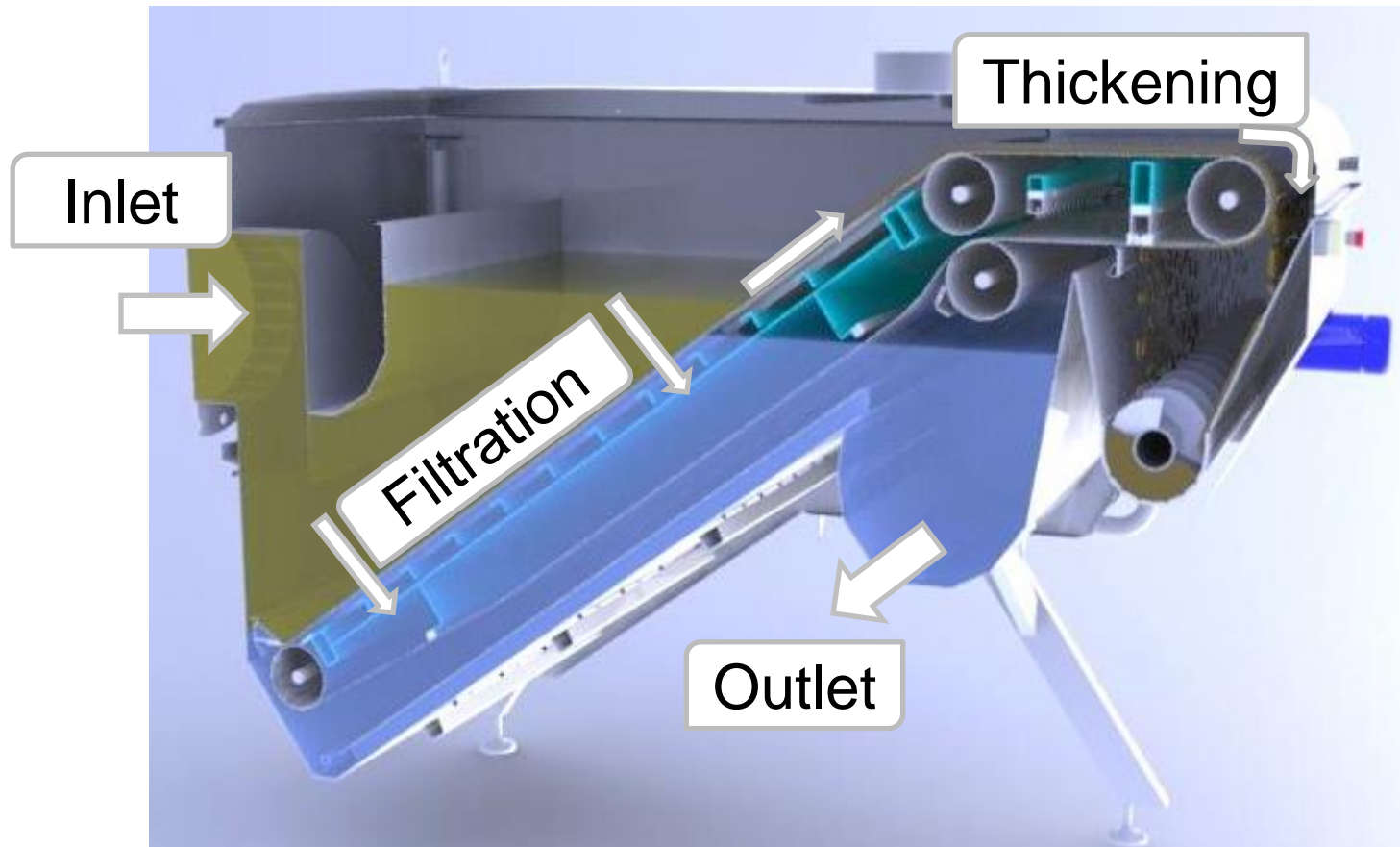
Tromso, Norway – 10.5 MGD (1,660 m³/hr)

1600 ft² (150 m²) Footprint



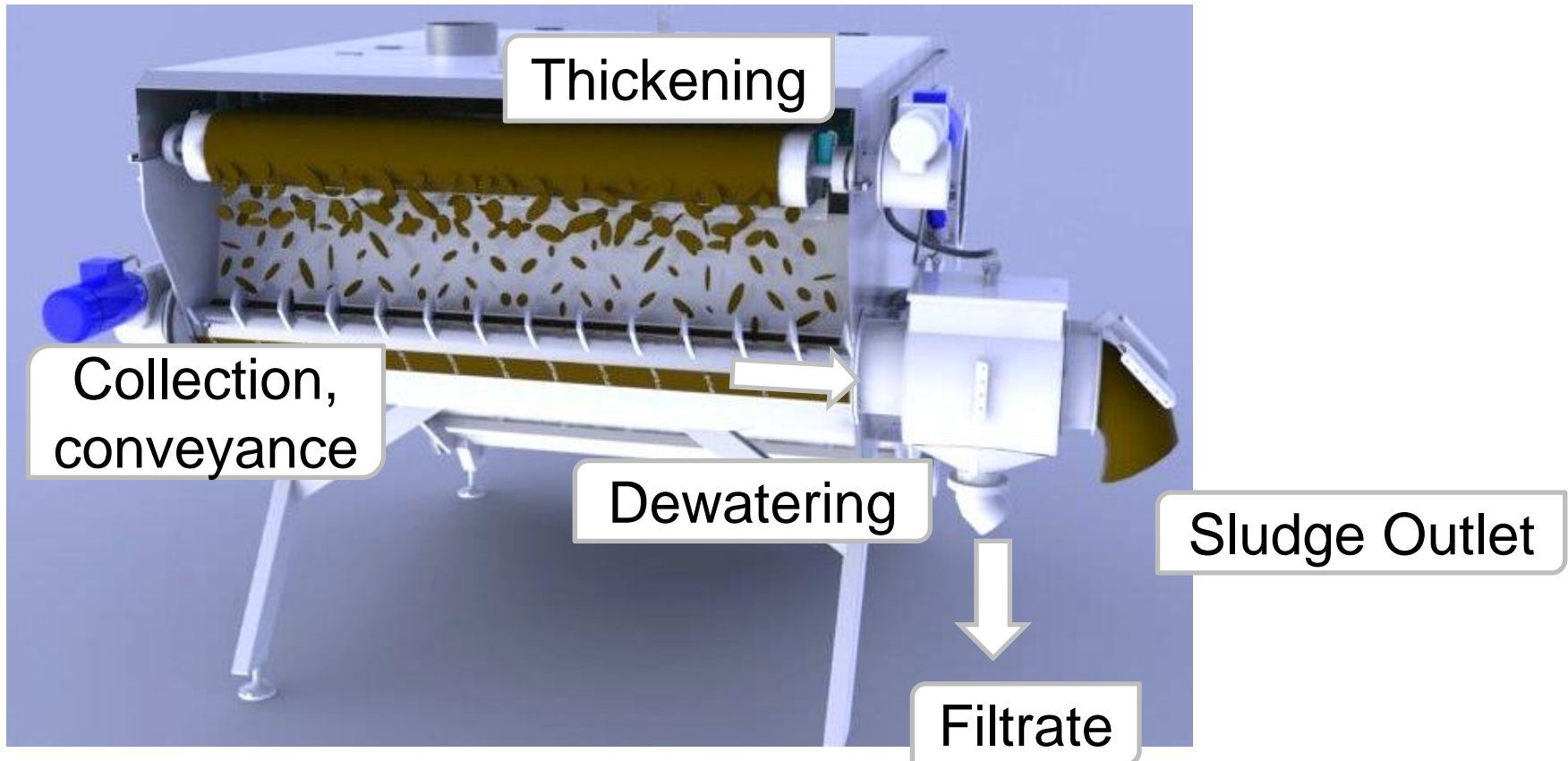
LET THE SOLIDS DO THE JOB

- Influent suspended solids (TSS) form a filter mat on the mesh
- Filter mat itself enables high TSS and BOD removal



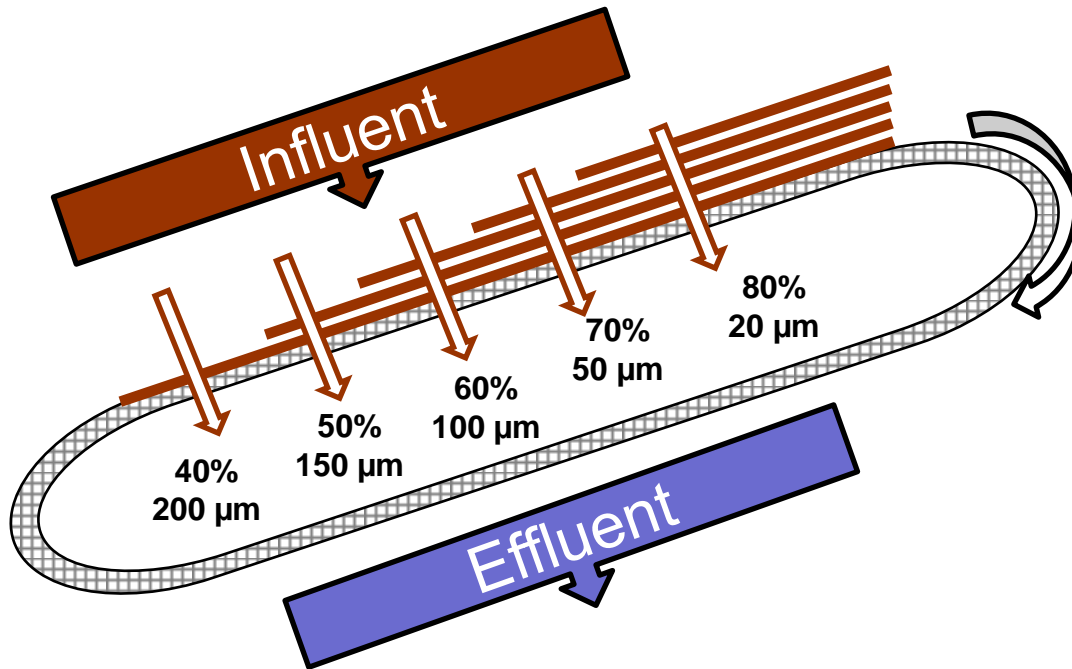
INTEGRATED THICKENING & DEWATERING

- Screw-press dewatering, evacuates odors
- 4-6% DM after thickening, 20-30% after dewatering



THE KEY: CONTROLLING THE FILTER MAT

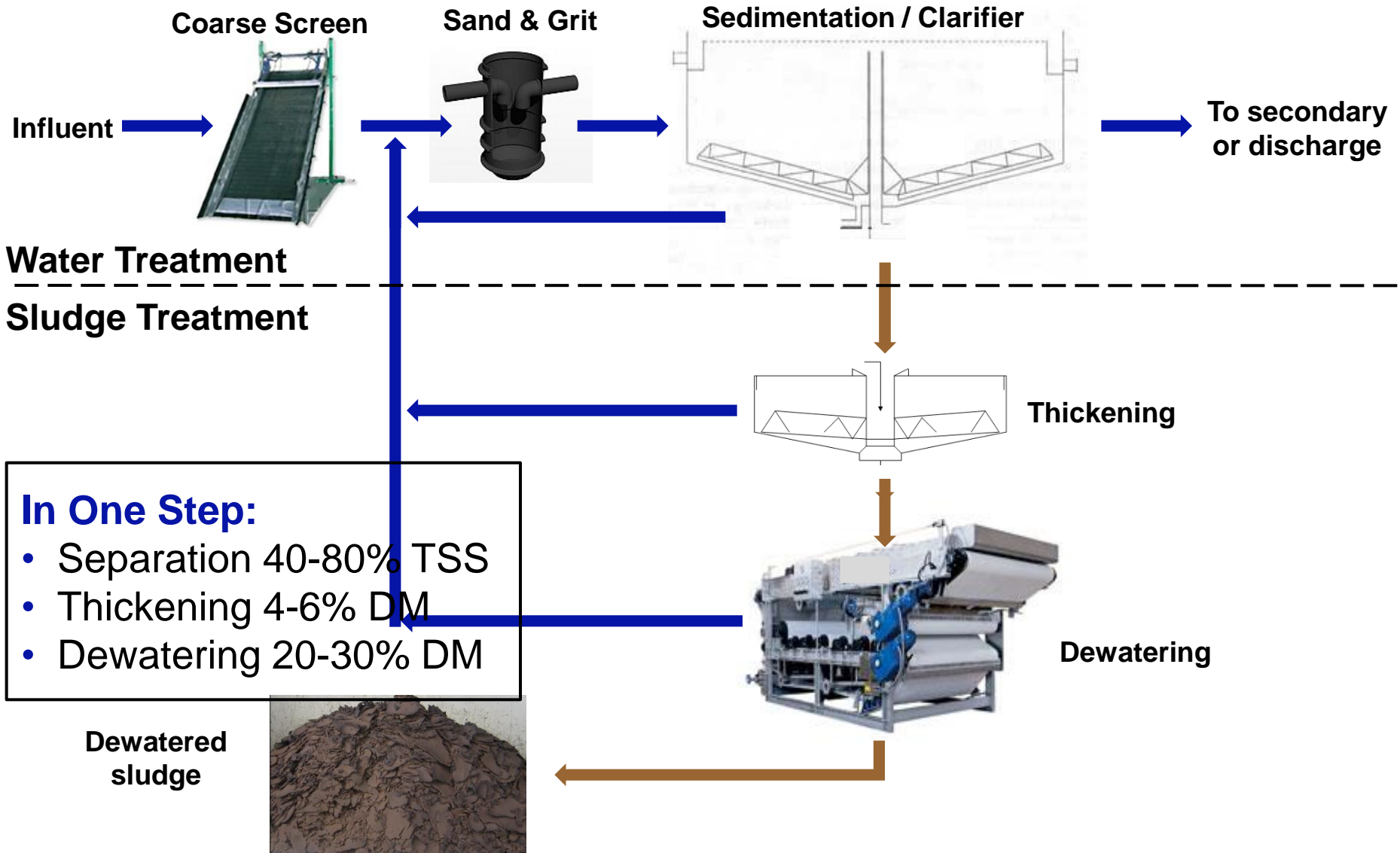
- If 25% of particles in influent > filter mesh opening = filter mat build-up
- Thicker mat → more TSS/BOD removal, smaller solids



Operating Variables:

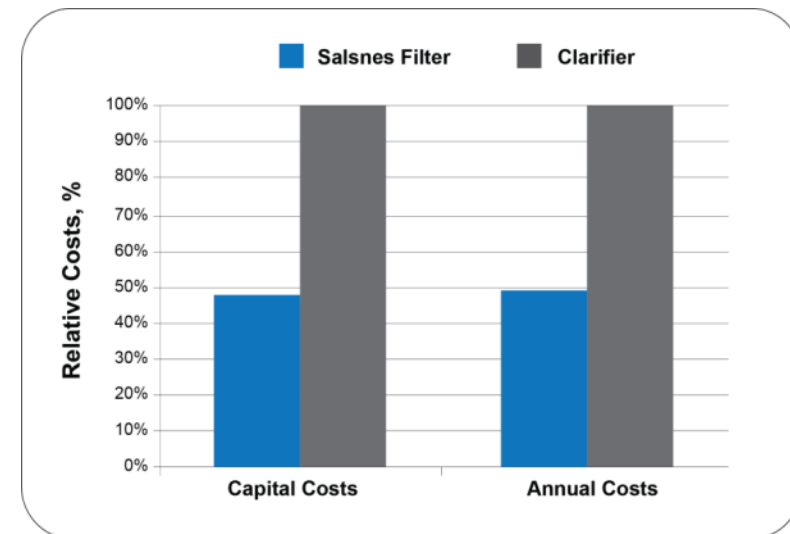
- Influent flow rate
- Particle size distribution
- Influent TSS levels
- Belt speed
- Mesh size (microns)

PRIMARY TREATMENT WITH SANDS AND SLUDGES FILTER



BENEFITS OF SALSNES CONTINUOUS-LOOP FILTRATION

- <50% the cost of sedimentation/clarification
- Ideal for greenfield and plant upgrades
- Compact, modular design significantly reduces footprint to 1/10th of traditional primary treatment
- High treatment efficacy (>50% SS, >30% BOD)
- Sludge dewatering reduces disposal costs
- Enables waste to energy conversion
- Reduces environmental footprint



Per: Norwegian State Pollution Control Agency

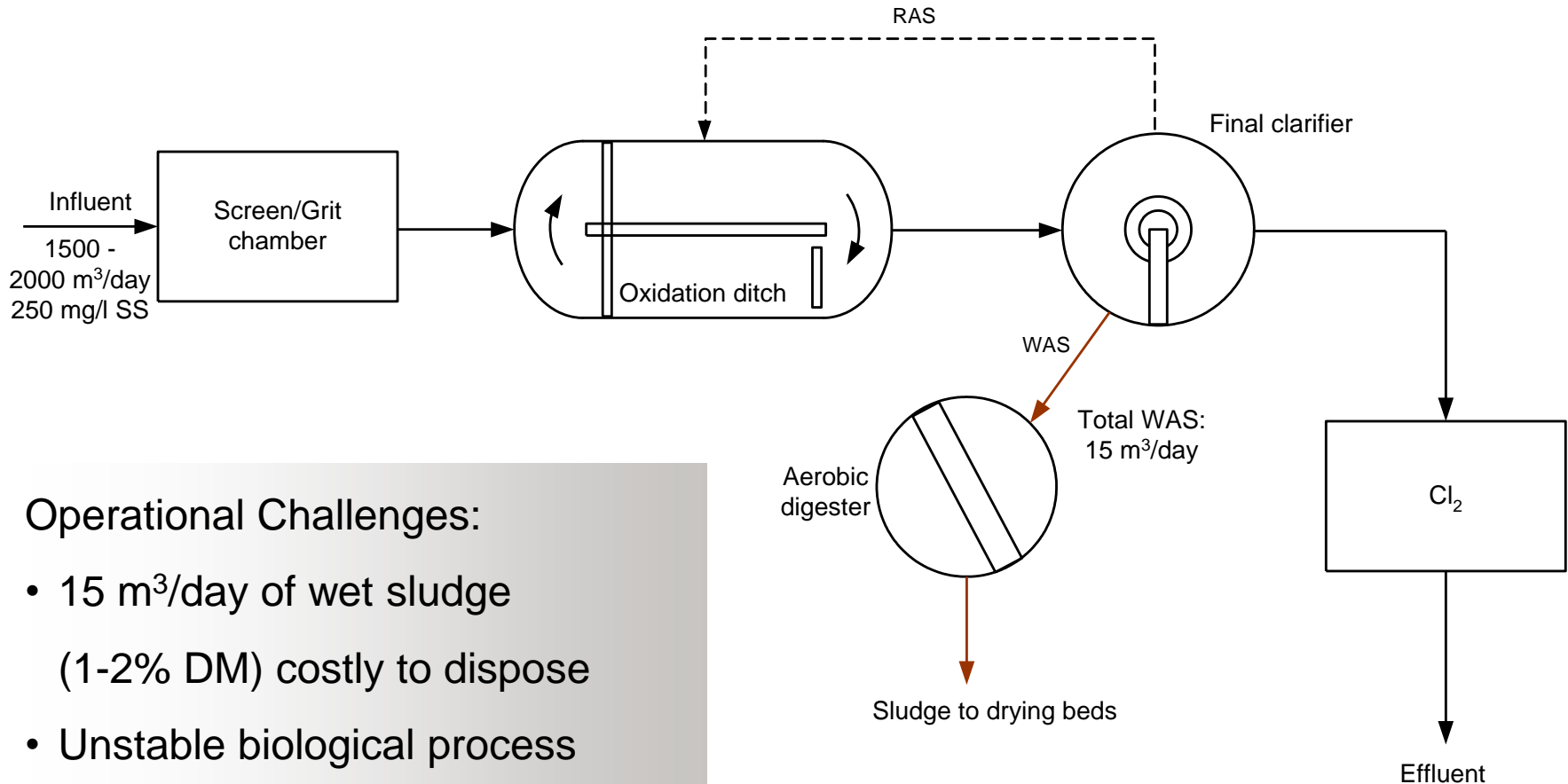
ENDERBY, BC CANADA – CASE STUDY

1500-2000 m³/day (0.5 MGD)

250 mg/l TSS influent



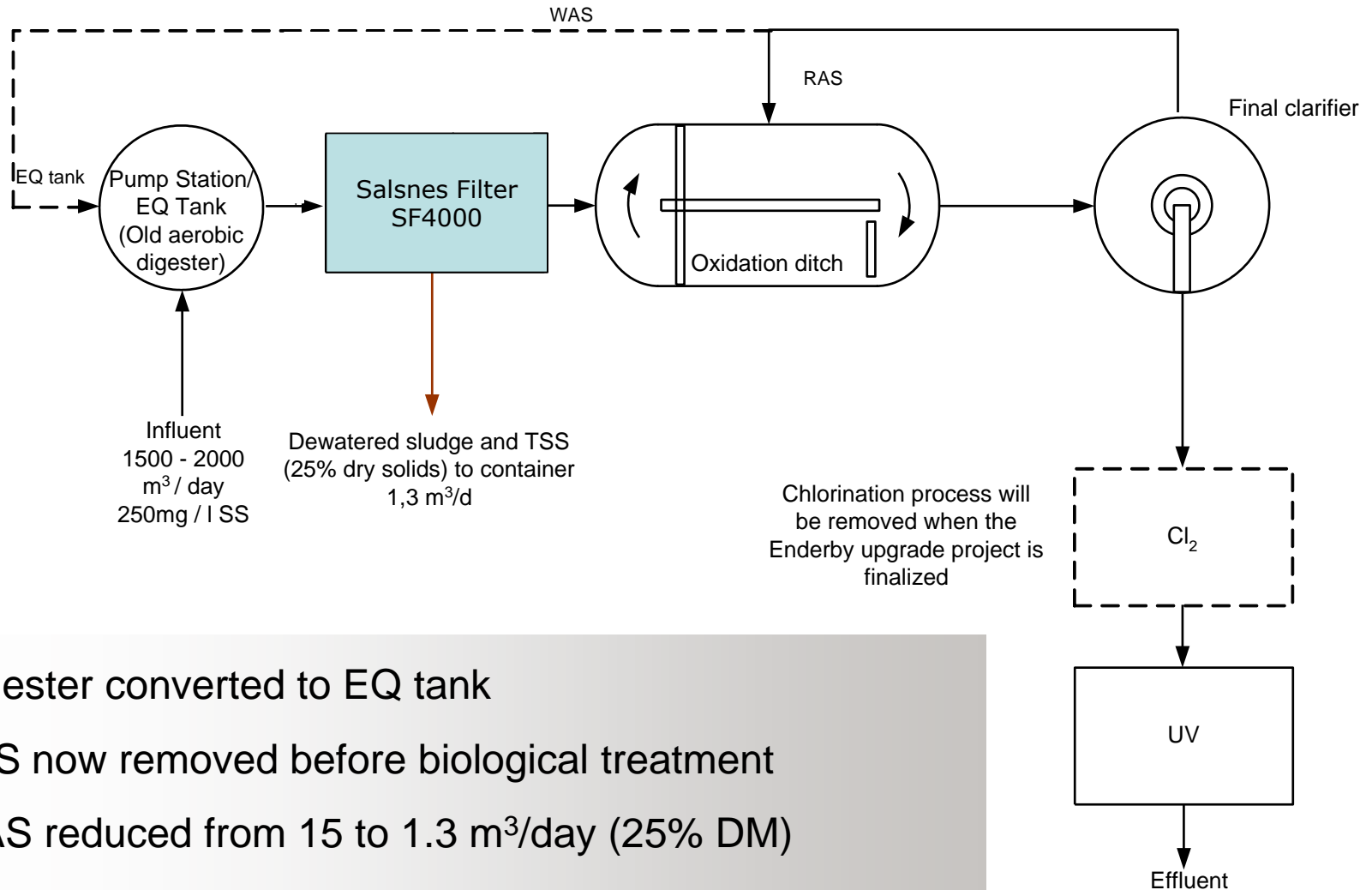
ENDERBY ORIGINAL PLANT



Operational Challenges:

- 15 m³/day of wet sludge (1-2% DM) costly to dispose
- Unstable biological process
- Limited footprint for expansion

ENDERBY REDESIGNED PLANT

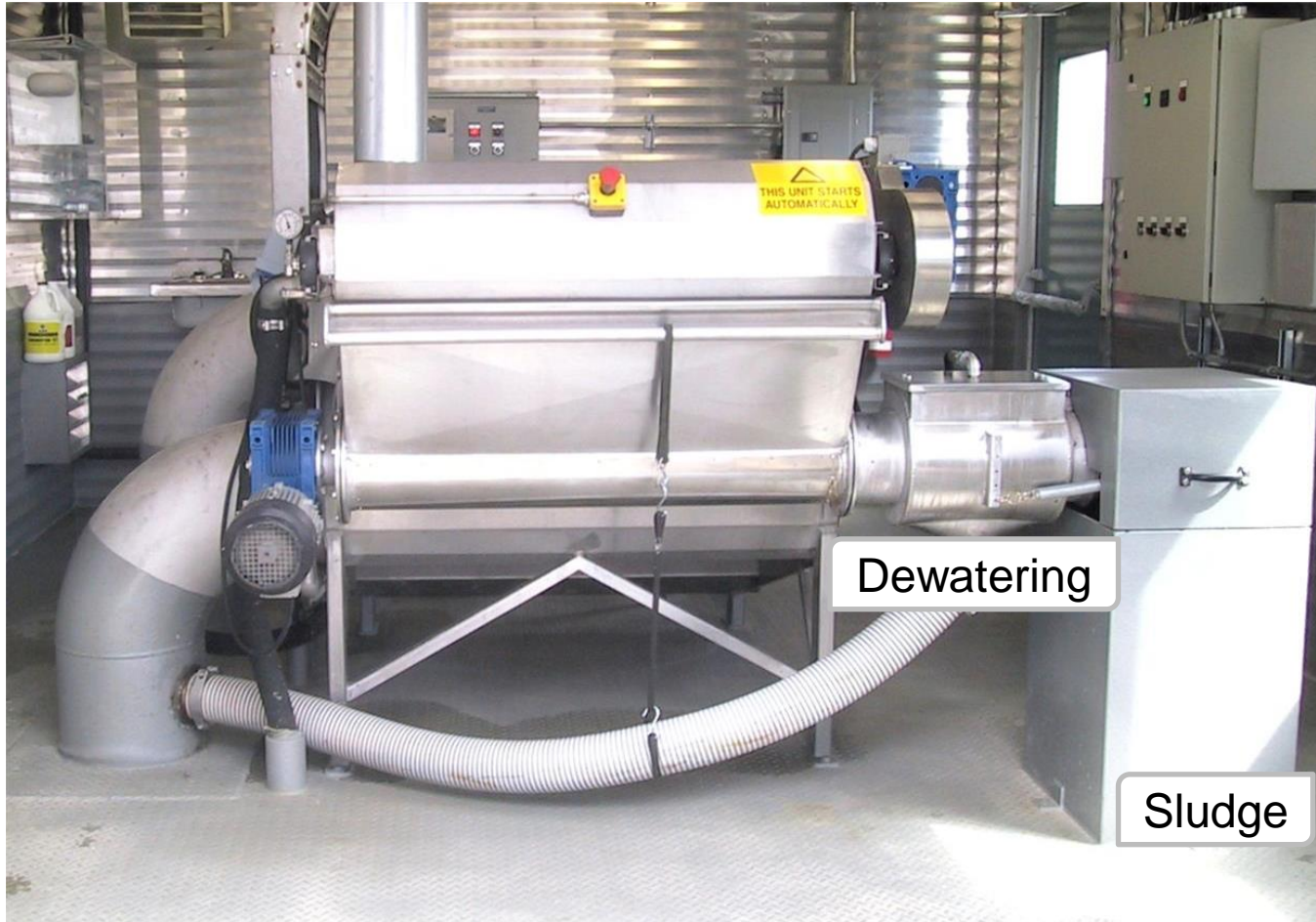


- Digester converted to EQ tank
- TSS now removed before biological treatment
- WAS reduced from 15 to 1.3 m³/day (25% DM)
- Chlorine replaced with UV Disinfection

ENDERBY REDESIGNED PLANT



SF4000 AT ENDERBY



Reduced sludge volume from 2.8 to 0.2 gpm (0.2 to 0.01 L/s)
Sludge DM increased from 1-2% to 20-25%

COST BENEFITS

- Significantly lower total lifecycle cost
- Less land needed (1/10th of conventional primary)
- Less civil works
- Can be designed for higher TSS/BOD removal rates than conventional primary → enables downsizing / less aeration
- No need for separate thickening or dewatering processes
- Higher energy value in primary sludge
- Low maintenance and operation
- Fully automated equipment

A TROJAN TECHNOLOGIES COMPANY
salsnes
Filter™

SUMMARY

- Continuous-loop filter technology provides cost-effective integrated sludge thickening and dewatering for primary treatment and many industrial applications
- Ideal solution to replace/augment conventional primary
- Benefits include:
 - Lower capital, installation and operating costs
 - Highest TSS/BOD removals in smallest footprint
 - Reduced stress on downstream processes (i.e. activated sludge)
 - Produces smaller volume of drier sludge
 - Proven technology for over 20 years
 - Over 550 units operating around the world

QUESTIONS?

Thank you for your attention.

For more information, please visit:

www.salsnes-filter.com or
www.trojantechnologies.com

