



# GLOBAL WATER & ENERGY

A member of the  Group

## DIGESTATE MANAGEMENT VIA AEROBIC MBR

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January 2024

Solutions for Clean Water & Green Energy

# GWE GROUP – 33 YEARS SERVICING THE F&B INDUSTRY

## A DEDICATED TEAM

More than 160 employees

Supporting you from feasibility studies to turnkey project execution



## GLOBAL PRESENCE

Offices in Belgium, Germany, Netherlands, Hong-Kong, Philippines, Thailand, USA  
Extended network of qualified partners in more than 20 countries



## EXPERTISE

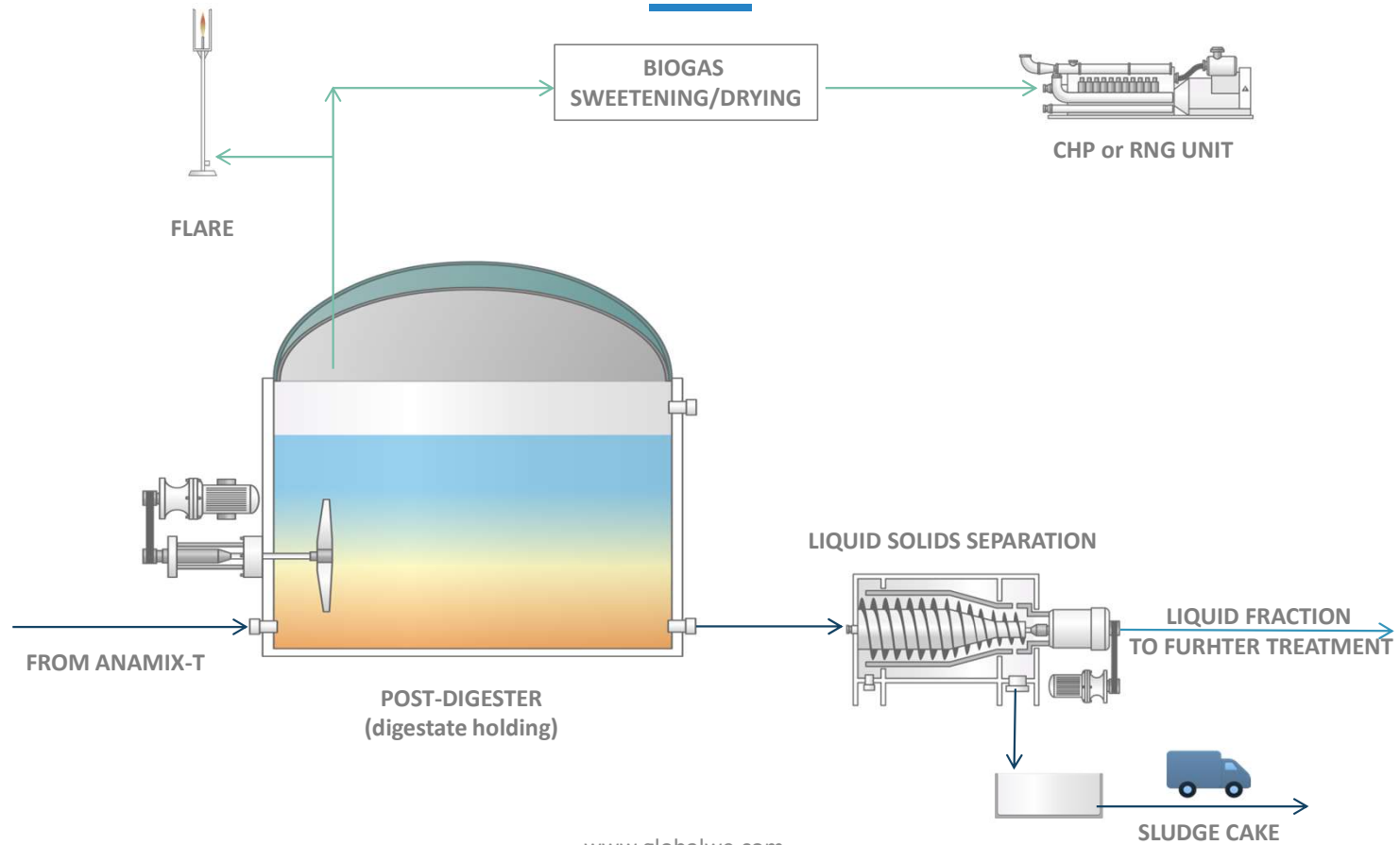
Over 500 projects in 68 countries since 1991

Over 7,500 t COD treated and 900 MW daily

Leader in Food Waste to Energy Market



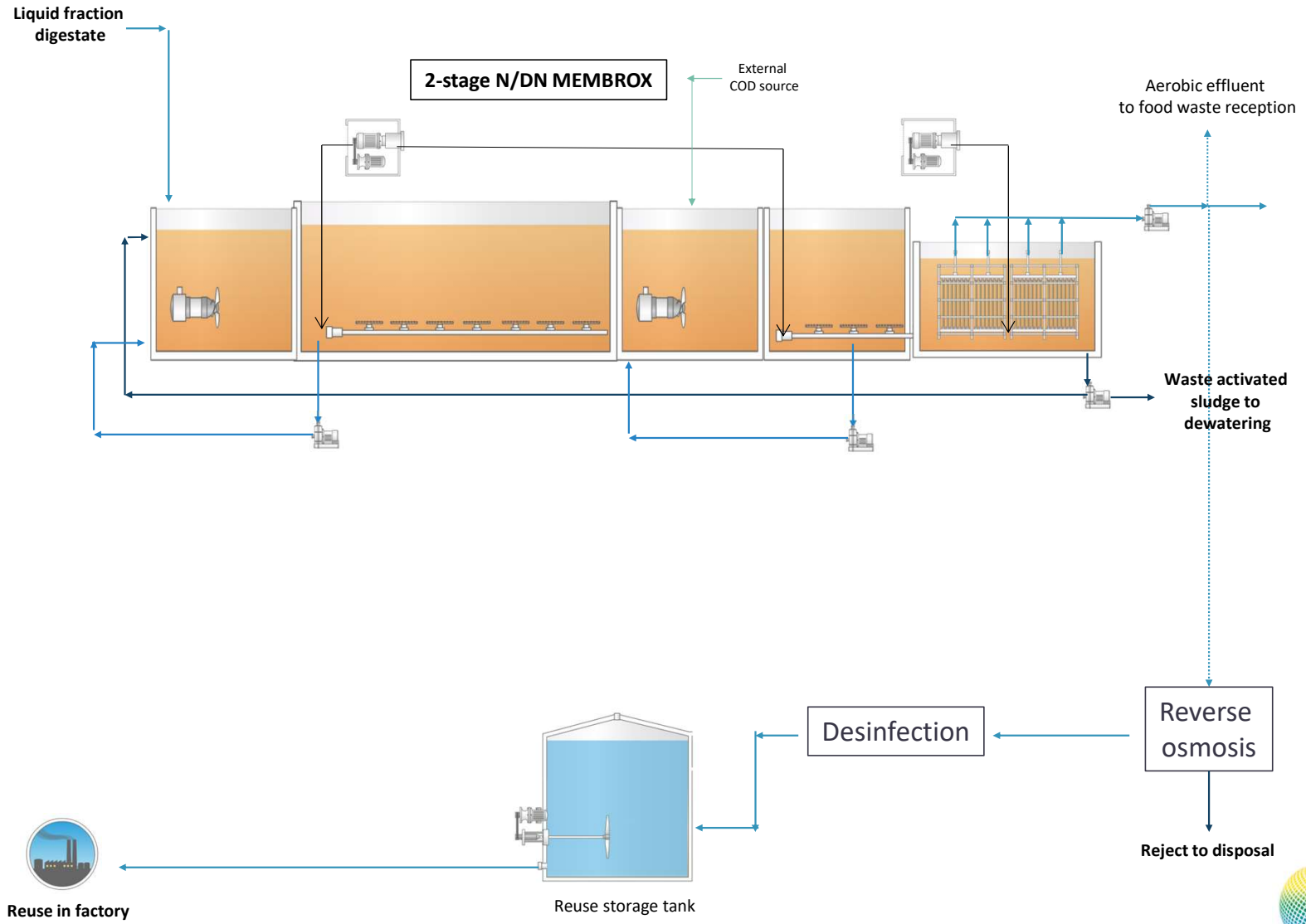
# DIGESTATE PRODUCTION



# DIGESTATE MANAGEMENT VIA AEROBIC PROCESSES

- Secure & Reliable Method to Dispose of Digestate
- Assures Discharge Requirements Are Met
- Reasonable CapEx : < 10% of the project cost
- No Reliance on 3<sup>rd</sup> Parties
- Option to Use Seasonally or “Moth Ball”



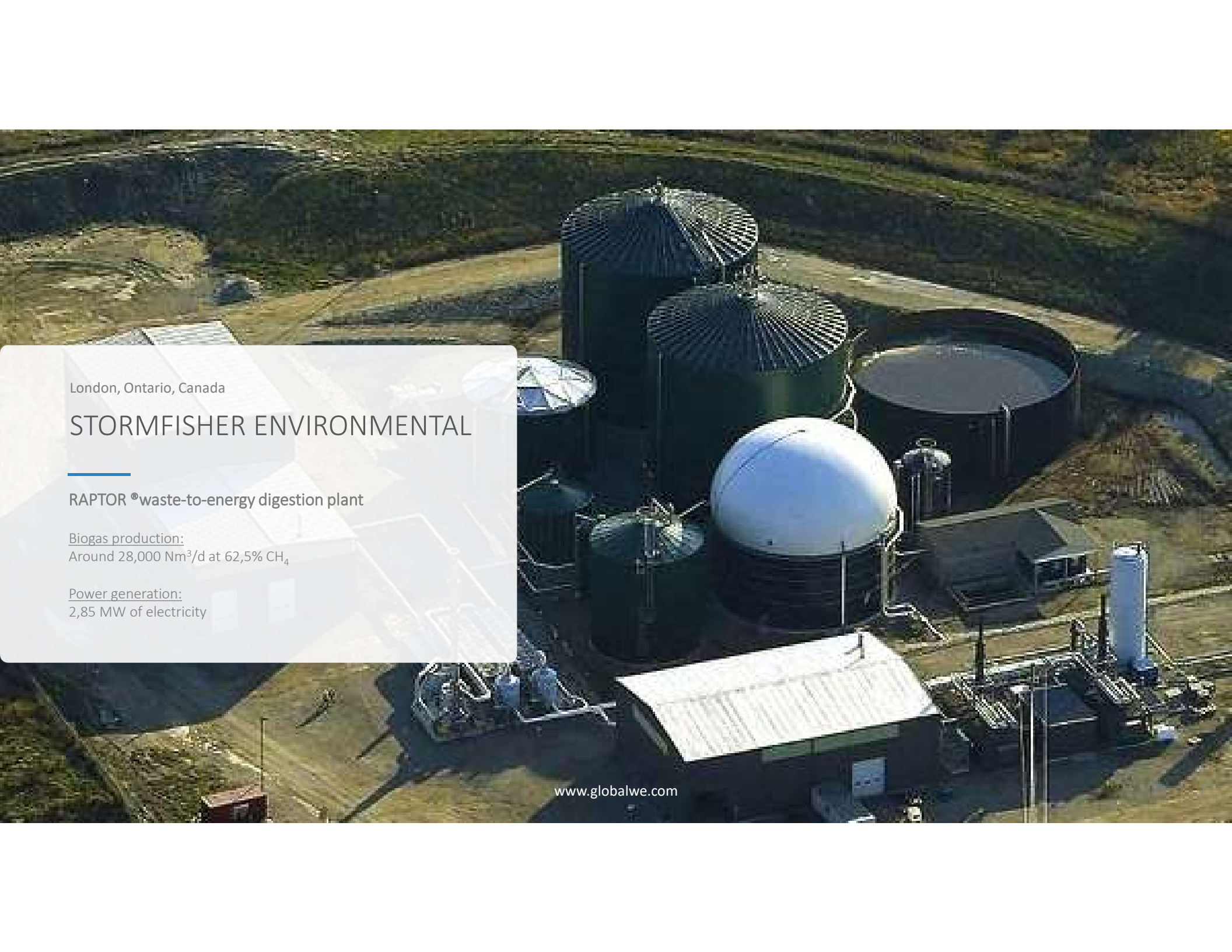


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## DIGESTATE TREATMENT



Aeration tank and MBR modules



London, Ontario, Canada

## STORMFISHER ENVIRONMENTAL

RAPTOR<sup>®</sup> waste-to-energy digestion plant

Biogas production:

Around 28,000 Nm<sup>3</sup>/d at 62,5% CH<sub>4</sub>

Power generation:

2,85 MW of electricity

[www.globalwe.com](http://www.globalwe.com)

Southington, CT, USA

# QUANTUM BIOPOWER

RAPTOR® waste-to-energy digestion plant

Biogas production:  
up to 18,000 Nm<sup>3</sup>/d

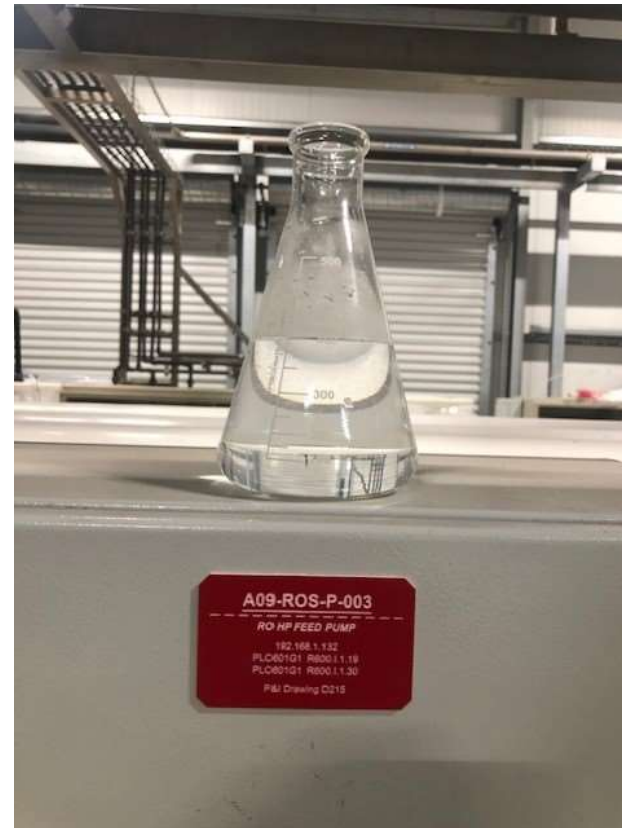
Power generation:  
At full capacity 1,2 MW, power sold to the city



## DIGESTATE TREATMENT OBJECTIVES – MEET DISCHARGE PERMIT LIMITS & DILUTION WATER REQUIREMENTS

### Typical Ranges

- BOD – 200 to 500 mg/l
- TSS – 200 to 500 mg/l
- Nitrogen – 10 to 40 mg/l
- Phosphorus – 5 to 20 mg/l

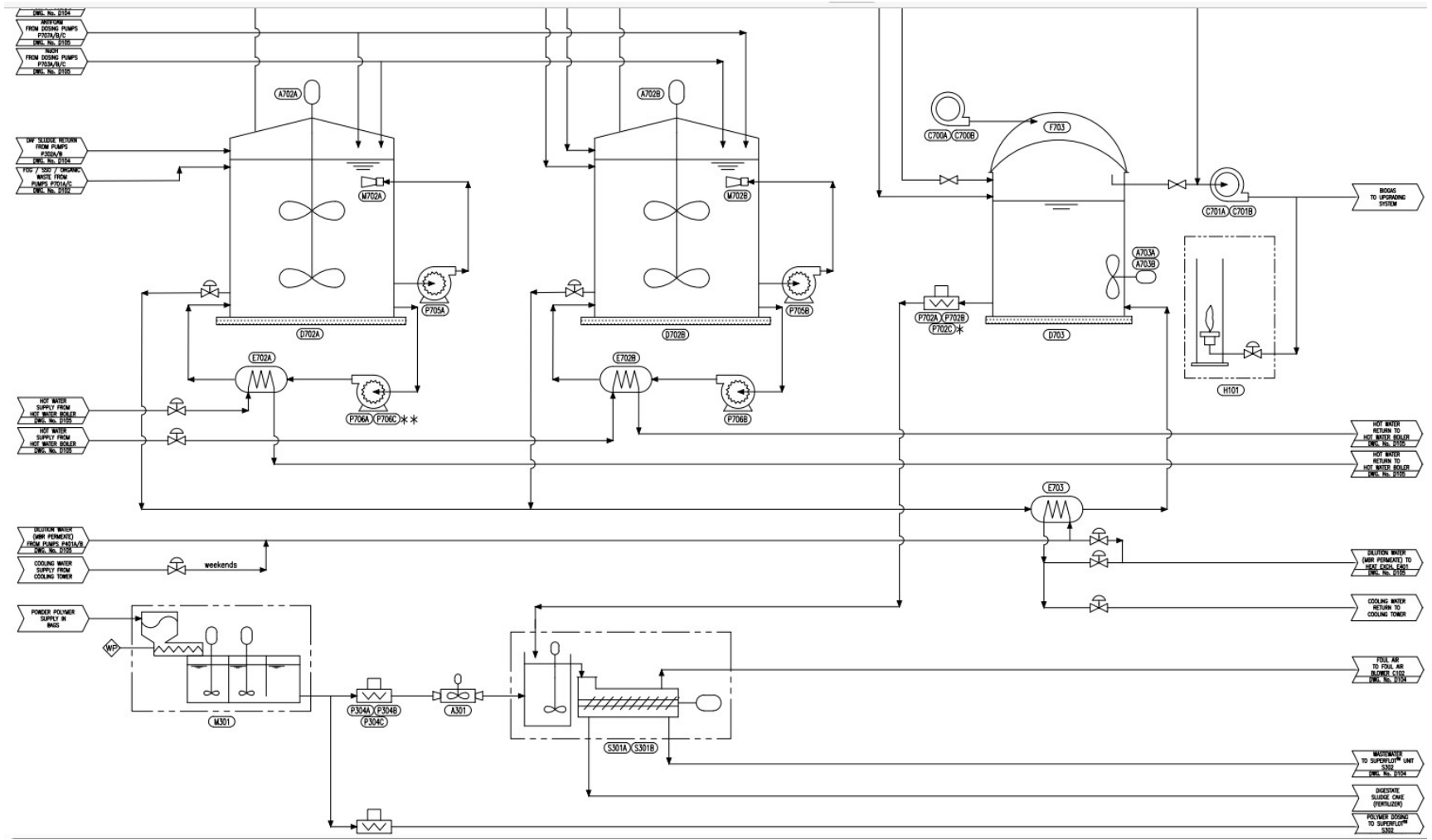


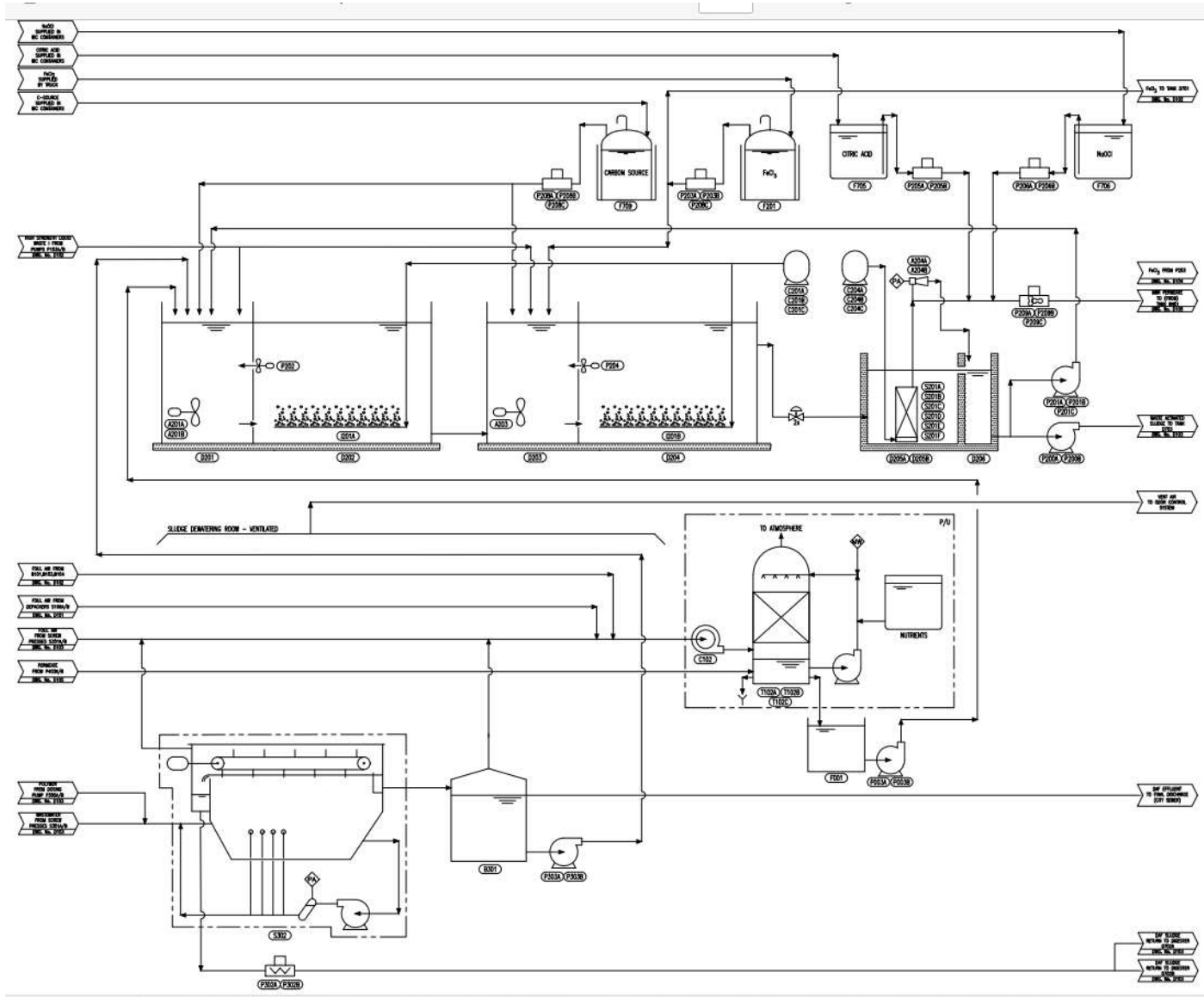
## NITROGEN REMOVAL – NITRIFICATION/DE-NITRIFICATION

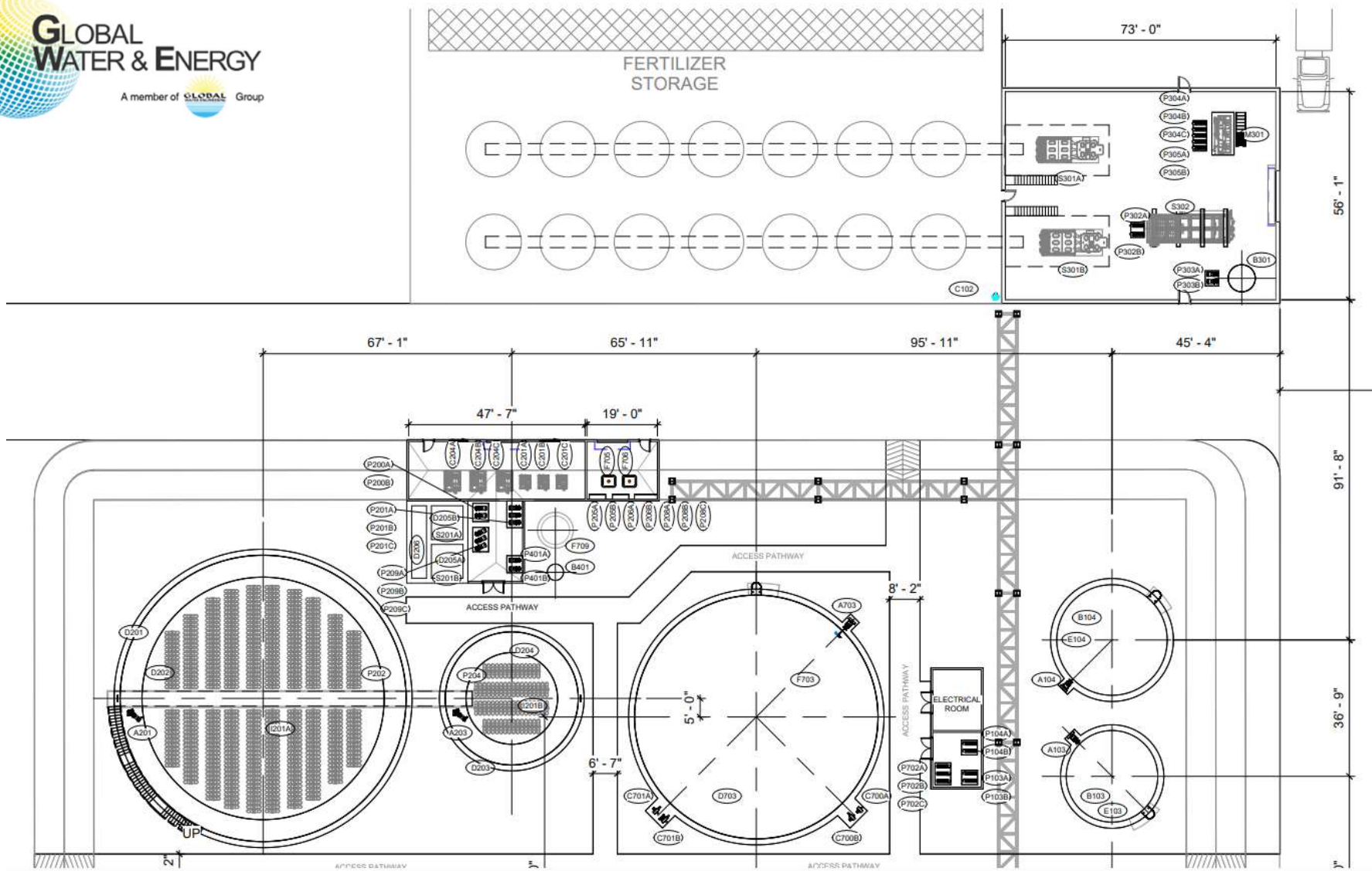
- Post Anaerobic – All Nitrogen Converted to TKN
- Organic N – Most Removed with the Solids
- Ammonia N – Soluble; Stays in the Liquid
- 3 KG of BOD is Required to Biologically Remove 1 KG N
  - COD/BOD is 2:1 = 6 KG COD per 1 KG N
- $SLR = \text{kg N} / \text{kg MLVSS}$  – N Up-Take Capacity of Aerobic Biomass
  - Temperature Sensitive – Can Range from 0.1 to 0.01 kg N/kg VSS per Day

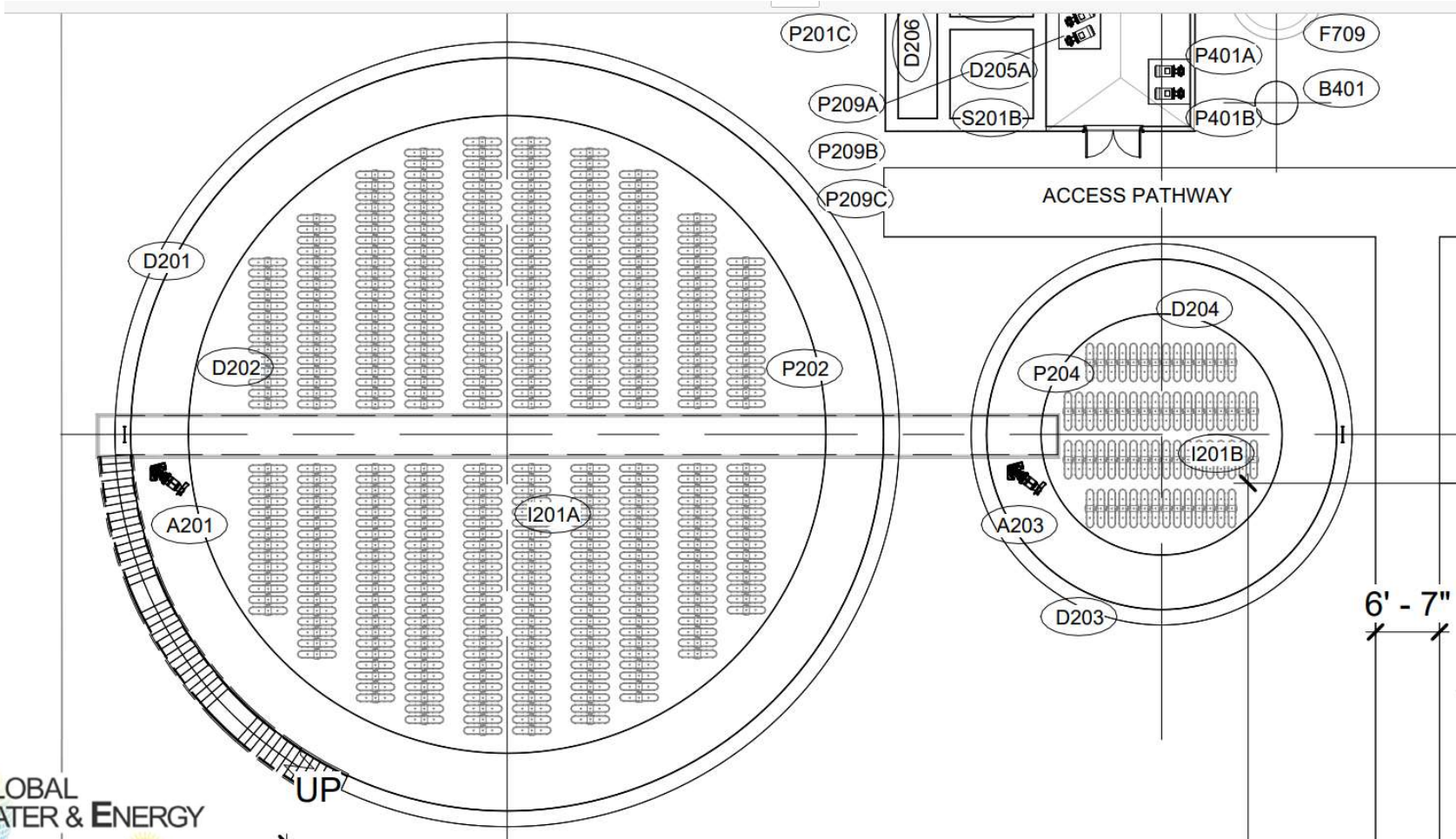
## PHOSPHORUS REMOVAL – CHEMICAL PRECIPITATION

- Total Phosphorus (digestate) – ~150 to 300 mg/l (feedstock dependent)
- >70 % Leaves with the Sludge Cake – Balance to Aerobic Process
- +/- 50% is Incorporated into the Aerobic Sludge
- Small Percentage is Precipitated by Ions Present in the WW (Ca, Mg,...)
- Balance is Precipitated with the Addition of  $\text{FeCl}_3$
- Important to Understand the VSS/TSS of the MLSS; Can Drop by >10%









## TAKE AWAYS

- DAF Post Dewatering
- Don't Under Estimate COD Conversion
- Pay Attention to Seasonal Temperature Changes (SLR variations)
- Dose  $\text{FeCl}_3$  in Stage Two
- Check the VSS/TSS Ratio







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Group

## CONTACT INFORMATION

Global Water Engineering is a group of companies that operates globally through local offices in:

- Belgium,
- Hong Kong,
- Netherlands,
- Philippines,
- Thailand,
- USA,
- Singapore.

The extended network of qualified local partners in more than 50 countries allow us to serve our clients all over the world.

Brian Healy  
303 868-9460

[Brian.healy@globalwe.com](mailto:Brian.healy@globalwe.com)

<http://www.globalwe.com>