

EACP Committee

From: Peter Flowers <pflowers@cw-llc.com>
Sent: Monday, November 04, 2019 4:42 PM
To: EACP Committee
Subject: Fwd: EACP-17(5) presentation for the 11/5 EACP Committee meeting
Attachments: CWI County of Maui PRESENTATION Wastewater 110519.pdf

Sent from my T-Mobile 4G LTE Device

----- Original message -----

From: Peter Flowers <pflowers@cw-llc.com>
Date: 11/3/19 6:44 PM (GMT-10:00)
To: eacp.committee@mauicounty.us
Subject: EACP-17(5) presentation for the 11/5 EACP Committee meeting

Presentation is in PDF format. Please advice if power point is mandatory.

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Low Voltage Ionic Electro-Flocculation with D.C. and D.S.A. Electrodes

ATTAINABLE WATER QUALITIES



POTENTIAL PROBLEMS

- **Municipal:**

- High Ammonia, Nitrogen and Phosphorus concentrations in effluent
- Treatment needed before discharging or reuse for irrigation
- High cost of traditional treatment systems.

- **Oil & Gas:**

- Wastewater generated from oil and gas production
- High salinity and H₂S content in wastewater

- Hydrocarbons in wastewater
- High cost of disposal
- Water needs for oil extraction process

- **Mining:**

- High toxic metal content
- High levels of suspended solids in discharge water

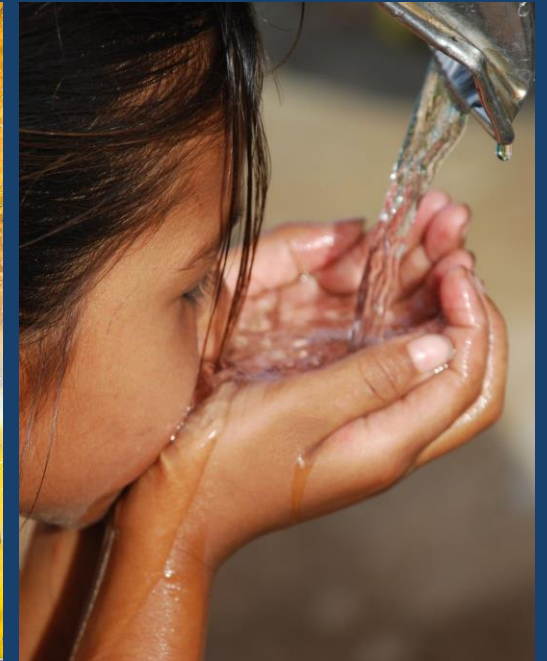
- **Desalination:**

- High salinity in areas of low water availability
- Disposal of salt from any Desalination system.



THE TECHNOLOGY

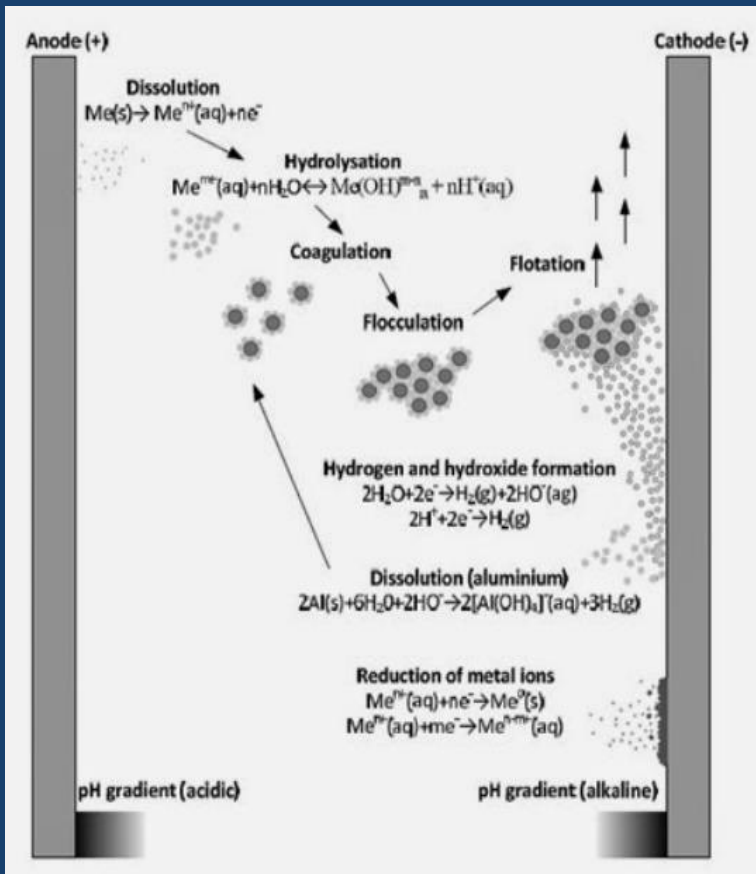
LOW VOLTAGE IONIC
ELECTRO-FLOCCULATION
TECHNOLOGY
WITH D.C. AND D.S.A.
ELECTRODES.



Over 28 years in development of custom applications for the separation and removal of almost 100% of known water pollutants.

THE TECHNOLOGY

ELECTROFLOCCULATION



<http://civilenggseminar.blogspot.com/2014/12/electrocoagulation-treatment.html>

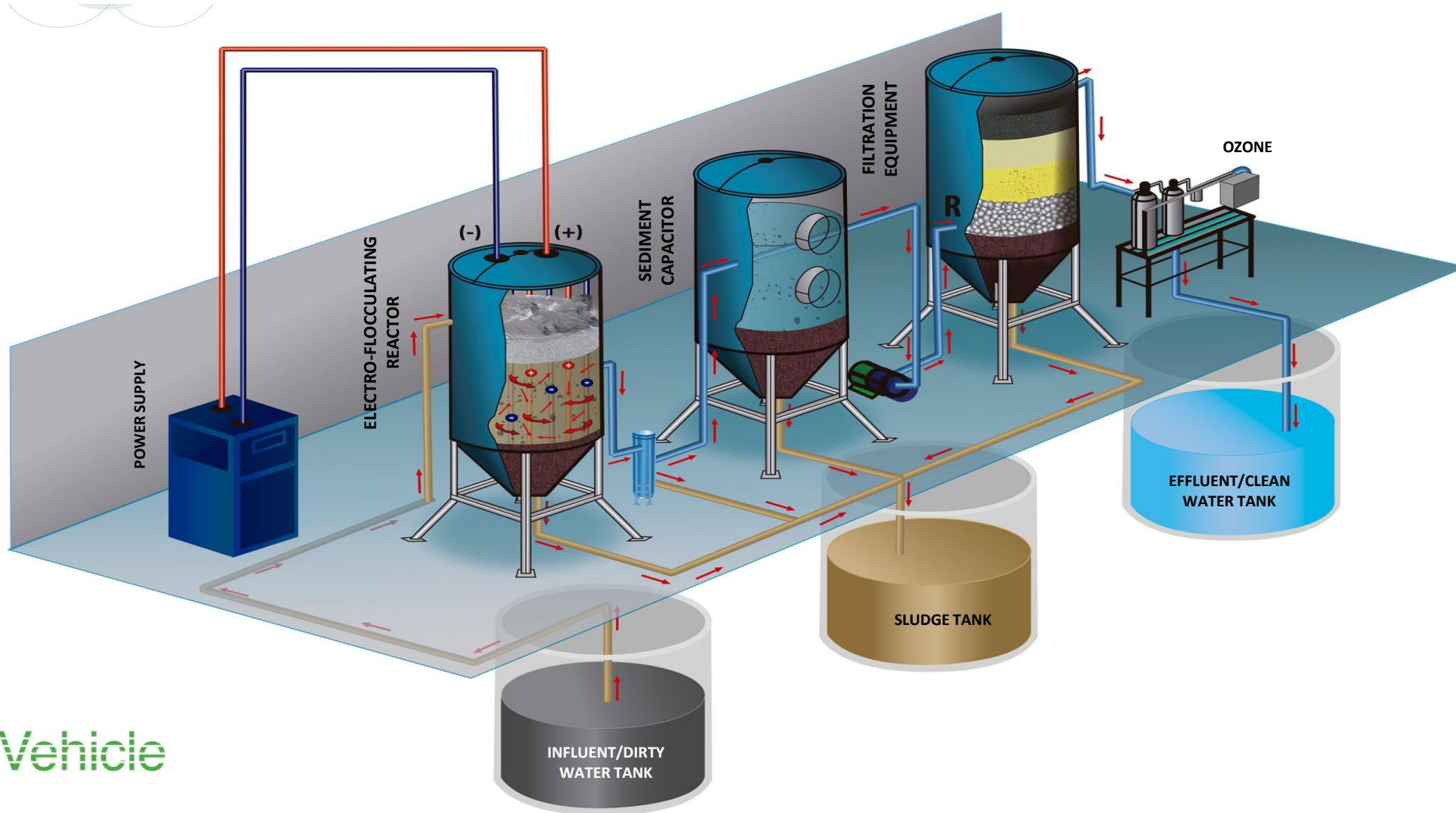
LOW VOLTAGE & D.C.

- Alternating current to direct current
- AC: 440/220/110 V
- DC: Around 40 V
- Water offers conductivity
- Electrodes are extension of power supply

D.S.A. ELECTRODES

- Dimensionally stable anodes
- Superior quality & long durability
- Good conductors & exhibit high catalytic activity
- Contributes towards energy savings
- More resistant to corrosion

PROCESS FLOW DIAGRAM (PFD)



Reactions within the EF Reactor

Hydrolysis

- Formation of oxygen and hydrogen in gas form
- Favors the separation of suspended organics, such as emulsified oils
- Destabilized by the gas bubbles formed

Advanced Oxidation

- Ruptures organic compounds, such as hydrocarbons
- Formation of the hydroxyl radical
- Radicals generate heterolytic ruptures of carbon chains
- Generates destabilization in the molecule therefore starts binding to other organic or inorganic molecules

Electromagnetic Fields

- Created by the electrical current passed through the electrodes
- Destabilized compounds react with compound having opposite charge or attracted to electrodes

Physical Reactions

- Contaminants get destabilized and carried out of solution physically by simple contact with other flocculants

WHAT MAKES CWI BETTER?

- Provide more combinations of anodes and cathodes
 - Cathodes: 7
 - Anodes: 24
- Electrodes can be rods or plates
- Customizable design of reactor and electrode configuration
- If influent quality changes, the electrodes are changed
- System utilizes electrochemistry, electrophysics and electromagnetism laws
- Easy expansion when flowrates increases
- Potential reuse of inert and innocuous sludge
- Reliable water treatment and proven technology
- No chemicals needed, No odor from plant.

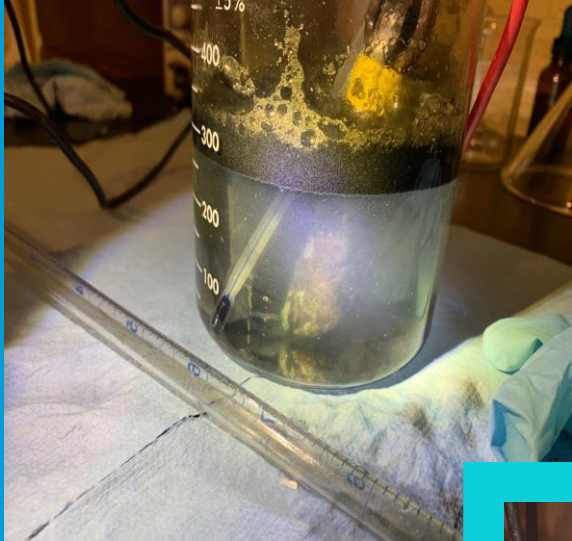


THE PROCESS

- Obtain influent water quantity and quality data
- Gather water samples
- Determine optimum treatment process
- Target effluent quality level and/or regulatory agency discharge standards
- Perform water analysis
- Design treatment facility
- Project O&M costs
- Quote project to customer, either sale or design-build-operate



Feasibility Testing



Step 1



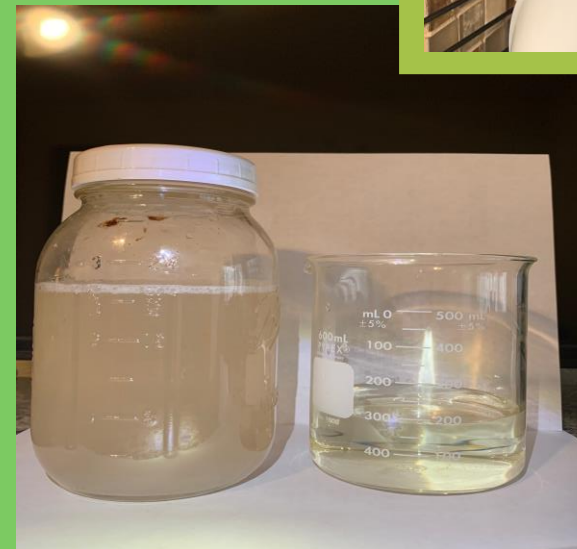
Step 3



Step 2

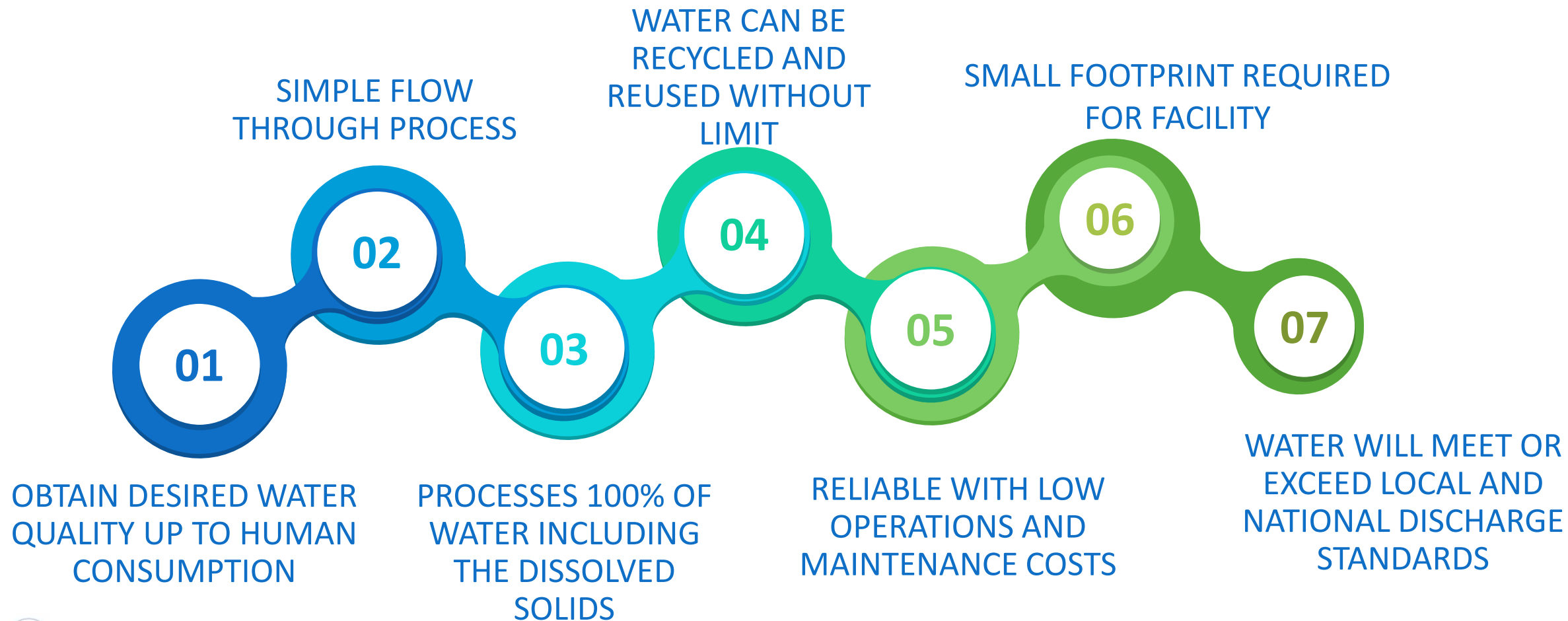


Filtered Sludge



Final Effluent

ADVANTAGES



EXAMPLE PROJECT - MUNICIPAL

WATER QUALITY: No.	Parameter	Influent	Effluent
1	Ammonia as (N) (mg/L)	261.0	15.0
2	Phosphate as (P) (mg/L)	7.58	2.0
3	TDS (mg/L)	120.0	10.0

CAPACITY: 950.0 m³/day (**250,000 GPD**) working a 24 hours a day / 11.0 lps

SURFACE FOOTPRINT: 200.0 m² or 2,152 ft²

GENERAL DIMENSIONS: Length: 66 ft; Width: 33 ft; Height: 14 ft

ENERGY CONSUMPTION (APPROX.): 1.75 kw-hrs / m³.

ELECTRICAL POWER REQUIRED: 600.0 KVAs in 440 Volts

MAIN ELECTRICAL CONNECTION: 600.0 KVAs / 440 Volts / 3 Phases / 4 wires / 60 Hz

DELIVERY TIME: Approximately 16 weeks

By adding modules the system can scale over time to meet future demand.

Deployed Solution– Walmart Complex

Problem: Mexico City Municipal Wastewater treatment at capacity restricting new development

- Walmart issued worldwide RFP for onsite wastewater treatment with goal to recycle.
- Awainnova Technology chosen, Original plant operating for over 6 years. Expansion planned to over 500 locations in Mexico.
- Recycling water for use in Walmart buildings (not-drinking water by request) resulting sludge used in fertilizer mixture.
- Types of pollutants both Organic and Inorganic.
- Key take away: This environment represents a cross section of most pollutants in Municipal wastewater successfully treated.

CURRENT CUSTOMERS



arte en Denim



BAJA AQUAFARMS

CLEAN
WATER
INNOVATIONS



OPERATING PLANTS



SUPERAMA
VALLE NORTE

15,850 GPD



SUPERAMA
TAXQUEÑA

15,850 GPD

OPERATING PLANTS

MONTERREY FACILITY

Capacity: 200,000 GPD



OPERATING PLANTS



TEXTILE COMPANY

Capacity: 140,000 GPD

CONCLUSION

- Provide a cost effective way to treat the various types of wastewater.
- Effluent water will meet desired and required quality standards.
- Recycle the treated water, resulting in cost savings.
- Company focused on Mexico, perfected technology and is now looking to expand worldwide.
- Currently have 30 facilities in operation, and the oldest facility has been running for 10 years.
- No chemical needed, hence no additional sludge generation.
- Sludge is inert and innocuous.
- Potential to recover nutrients in sludge and reuse as fertilizers & compost.
- Pilot plant in design.
- Design to fit. Centralized or de-centralized. Targeted or end to end solution.