Wastewater Treatment Proposal
Marion Cross Elementary School

Champlin Associates

Pump & Controls Specialists

A Crawford Champlin Company

Marion Cross Elementary School Wastewater Project

Prepared for:
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algaewheel®

Changing the perception of wastewater treatment

- Low Energy
- Socially Acceptable
- Low Odor, Low Noise
- Stable & Autonomous Operation
- Low Carbon Process

* Shape & design of covers or greenhouse may vary

I. Project Overview

Pursuant to your request, we are pleased to provide a Proposal for a new Algaewheel Wastewater Treatment Plant for Marion Cross Elementary School. The low energy, simple operating, and aesthetically pleasing features make Algaewheel an ideal and sustainable solution for the project.

Champlin Associates is proposing an Algaewheel wastewater treatment system with a following disinfection system to meet "swimming pool" quality effluent in response to the surfacing wastewater from Marion Cross Elementary School's leach field. Champlin Associates has been providing water and wastewater solutions since 1972. With backing from manufacturers including factory training, the Champlin Associates has become the go-to engineering support and water and wastewater solution provider in Northern New England. In addition to onsite work, Champlin Associates has given presentations for operators, engineers, state officials, industry owners, and the EPA for different water and wastewater technologies and practices.

In addition to meeting treatment requirements, the goal of this proposal is to repurpose the existing system as much as possible. We propose to use the first two septic tanks (5,000gal and 4,000gal) as storage/Equalization (EQ) tanks, repurpose the first, 5,000gal "dosing chamber" as a feed forward system for the Algaewheel system. This tank and pumping system will give a consistent feed to the Algaewheel system while the first two septic tanks act as storage and settling tanks. The last existing 5,000gal "dosing chamber" will be kept as is to continue to dose to the leach fields. Inside this tank will be a sludge return system to the first 5,000gal septic tank. This can be seen in the included Flow Diagram.

Key Personnel:

- Alec Distler (Champlin Associates)
- Dave Crawford (Champlin Associates)
- Dan Johnson (Algaewheel)
- Mark Bauer (Algaewheel)

In-House Services Normally Provided:

- Engineering Support
- Troubleshooting
- Sales Support
- Pricing and Sizing of Equipment
- Education and Training

References:

- Shepherd's Eye Brewing
  - George Taylor
  - (845) 651-7437
  - 9 Industrial Dr, Florida, NY 10921
- Ranch Hand Brewing
  - John Johnson
  - (520) 307-2931
  - 6565 N. Toltec Buttes Rd, Eloy, AZ 85131
- Town of Naples, NY (Project by Algaewheel)
  - Brian Schenk
  - (585) 755-5615
  - 2-98 Ontario St, Naples, NY 14512

PRELIMINARY DESIGN PARAMETERS:

Influent Flows	Rate
Average Daily Flow	5,460 GPD
Peak Daily Flow	10,920 GPD
EQ Pump Rate	8 GPM

Assumed Monthly Ave. Influent Parameters	Concentration	Monthly Effluent Limits Parameters	Effluent Limit Concentrations
BOD5:	750 mg/l	CBOD5:	30 mg/l
TSS:	150 mg/l	TSS:	30 mg/l
Ammonia:	65 mg/l	Ammonia:	20 mg/l
TKN	NA mg/l	TIN:	NA mg/l
Total Phosphorous	NA mg/l	TP:	NA
Alkalinity:	500-600 mg/l	Consumed:	572 mg/l

DESIGN NOTES:

- Influent water temperature of 13° C is assumed for Algaewheel treatment system sizing.
- System design and functionality is based on Design Parameters listed above. Variation from these Design Parameters may impact the system's performance and ability to meet listed effluent limits and may require system modifications that would be the responsibility of the Owner.
- No substances shall be introduced in quantities that are toxic to biological organisms, including biocidal cleaning products.
- Anti-flotation provisions may be required for precast tanks and are excluded from this proposal.
- Until Algaewheel covers or greenhouse construction is complete and exhaust fans, intake louvers, and heaters are operational, contractor needs to include provisions to control internal greenhouse temperatures to prevent damage to equipment. Temperatures need to be maintained between 40- and 120-degrees F at all times.
- Surface overflow rates for the settling tanks (clarifiers) are based on the Design Peak Daily Flow.
- Residual alkalinity of minimum 100 mg/l is required for nitrification. Supplemental alkalinity may be required (by others) if insufficient alkalinity is present in influent wastewater.

II. Scope of Supply & Pricing

SCOPE:

Supply of a **5,460 GPD** average daily flow Algaewheel Treatment Plant.

INCLUDED EQUIPMENT:

- **Algaewheel System:**
  - Algaewheel treatment tanks, including:
    - One (1) ~8'-6"Wx~'19-3"Lx~3'-9"H internal dimension, open-top precast modular tanks for six (6) Algaewheel axles each. Modular sections provided with bolt pockets, hardware, and sealant for installation onsite by Contractor. Heaviest pick ~11 tons.
  - Algaewheel kits, including:
    - Internal air diffuser systems, baffles, wheel support system, axles, type 3 Algaewheels (3' dia.) for field installation by others. Algaewheel axles pre-assembled with five (5) wheels each.
    - Recirculation pumps (~0.4HP duplex for each tank).
  - Algaewheel blower package, including:
    - ~3.5 HP maximum of duty blowers (duplex regenerative blowers with 1 operating at a time on VFD). Blower kit includes air filter/silencers and pressure relief valves.
- **Greenhouse:**
  - Standard Algaewheel greenhouse package ~15'W x ~30'L to house treatment system, blowers, and controls. Greenhouse includes:
    - Framing, multi-layer polycarbonate, vent fan(s), intake louver(s), heater, (2) std double doors, gutters & downspouts.
    - Reactions will be provided for foundation design by others.
- **Transfer pump systems.**
  - Algaewheel feed system and sludge return system.
- **Complete controls system.**
- **Disinfection system.**
  - Ultraviolet (UV) disinfection or Chlorine, depending on owner's needs.
- **Interconnecting piping**
  - All piping, fittings, valves and gauges outside Algaewheel tanks and ancillary tanks), collection and discharge systems, conduit and wiring.

II. Scope of Supply & Pricing – continued

INCLUDED SERVICES:

- Drawings and submittals for Algaewheel system and supplied ancillary components.
- Operations and maintenance manuals for all included equipment.
- Delivery FOB factory for all included and optional equipment.
- Assembly/installation of Algaewheel tank covers or greenhouse.
- Jobsite installation of pre-assembled Algaewheel axles into Algaewheel tanks.
- Excavation and foundation for Algaewheel Greenhouse.
- Installation of interconnecting piping including feed line to Algaewheel, return from Algaewheel, and sludge return line.
- Electrical service connection.
- All other work onsite, including excavation and tanks and setting of equipment.

EQUIPMENT AND WORK BY OTHERS:

- Detailed civil, mechanical, and electrical engineering design.
- Grease traps/interceptors for commercial (non-residential) kitchens, if required.
- Blowing out of leach fields.
- Backup generators, required.
- Any items not specifically listed as included equipment or included services above.

II. Scope of Supply & Pricing – continued

PRICING:

Item	Cost
Algaewheel Equipment	$143,000
Algaewheel Greenhouse	$71,500
Disinfection System (UV or Chlorination)	$2,600
Pumps & Controls	$65,000
Excavation & Tank Work	$200,000
Electrical	$70,000
Piping	$30,000
Concrete	$30,000
Installation & Supervision	$94,000
TOTAL	**$706,100**

TAXES:

- All taxes are excluded from this proposal. The Purchaser shall provide a valid Tax-Exempt Certificate at the time of order, otherwise, applicable taxes shall be added to the purchase price.

PAYMENT TERMS:

- To be determined, however a deposit will be required for equipment ordering.

SUBMITTALS:

- Estimated submittal schedule is four (4)-six (6) weeks after signed order.
- Onsite power phase and voltage must be verified by Purchaser prior to completion of design and submittals.

DELIVERY:

- Approximate equipment delivery is twelve (12) – sixteen (16) weeks from approval, depending on current factory workload.

FIELD SERVICES:

- Technical representation from Algaewheel during construction, startup and commissioning, and operator training – billable at $1000/day for normal 8-hour weekdays. Minimum 2 days required. This is currently not included in the price.
- The Owner's operator will be required onsite on a daily weekday basis until the system is meeting effluent limits.

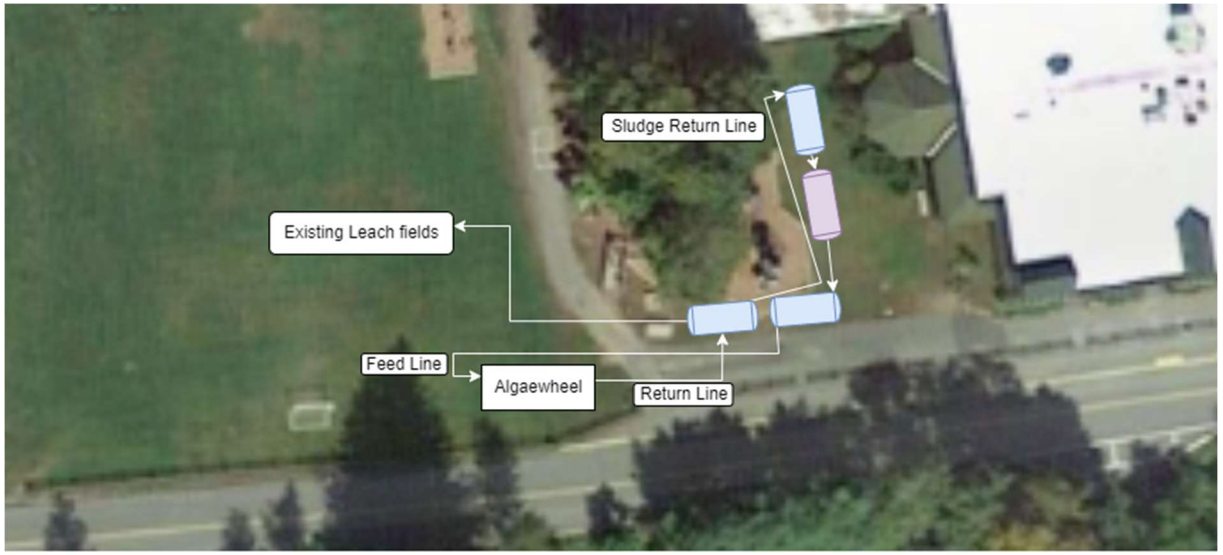
EQUIPMENT WARRANTY:

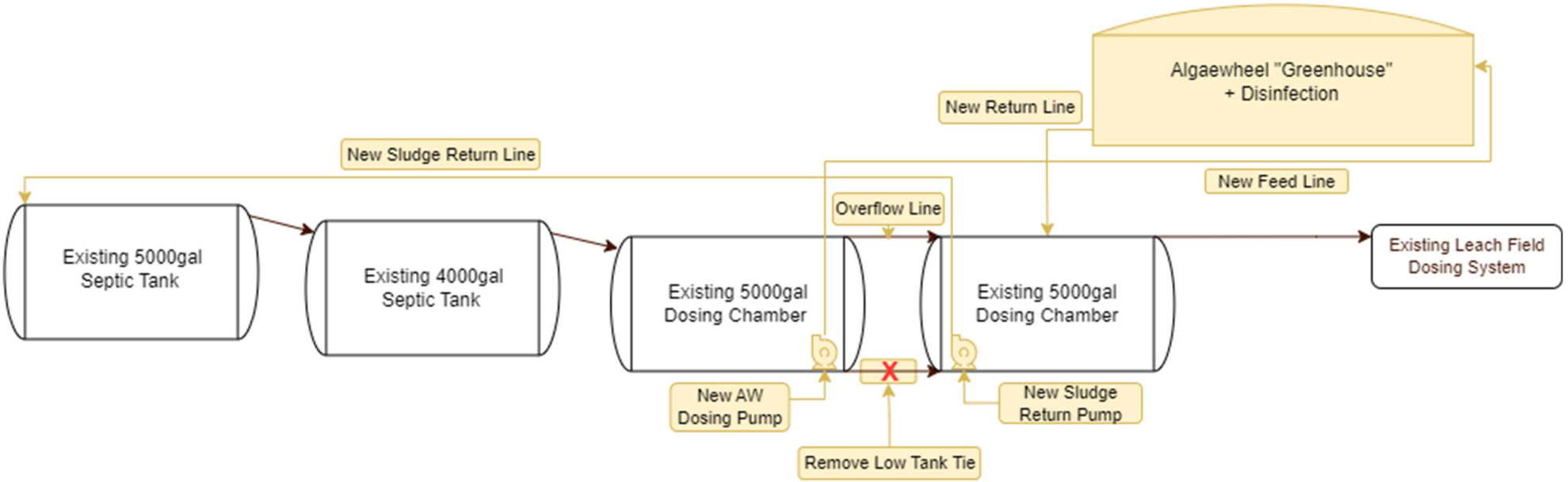
- All Algaewheel supplied equipment is warranted against defects in material and workmanship for a period of 1 year from start-up and is subject to standard Algaewheel Terms & Conditions.

PROPOSAL VALIDITY:

This proposal is valid for thirty (30) days from the issue date.

III.Flow Diagram

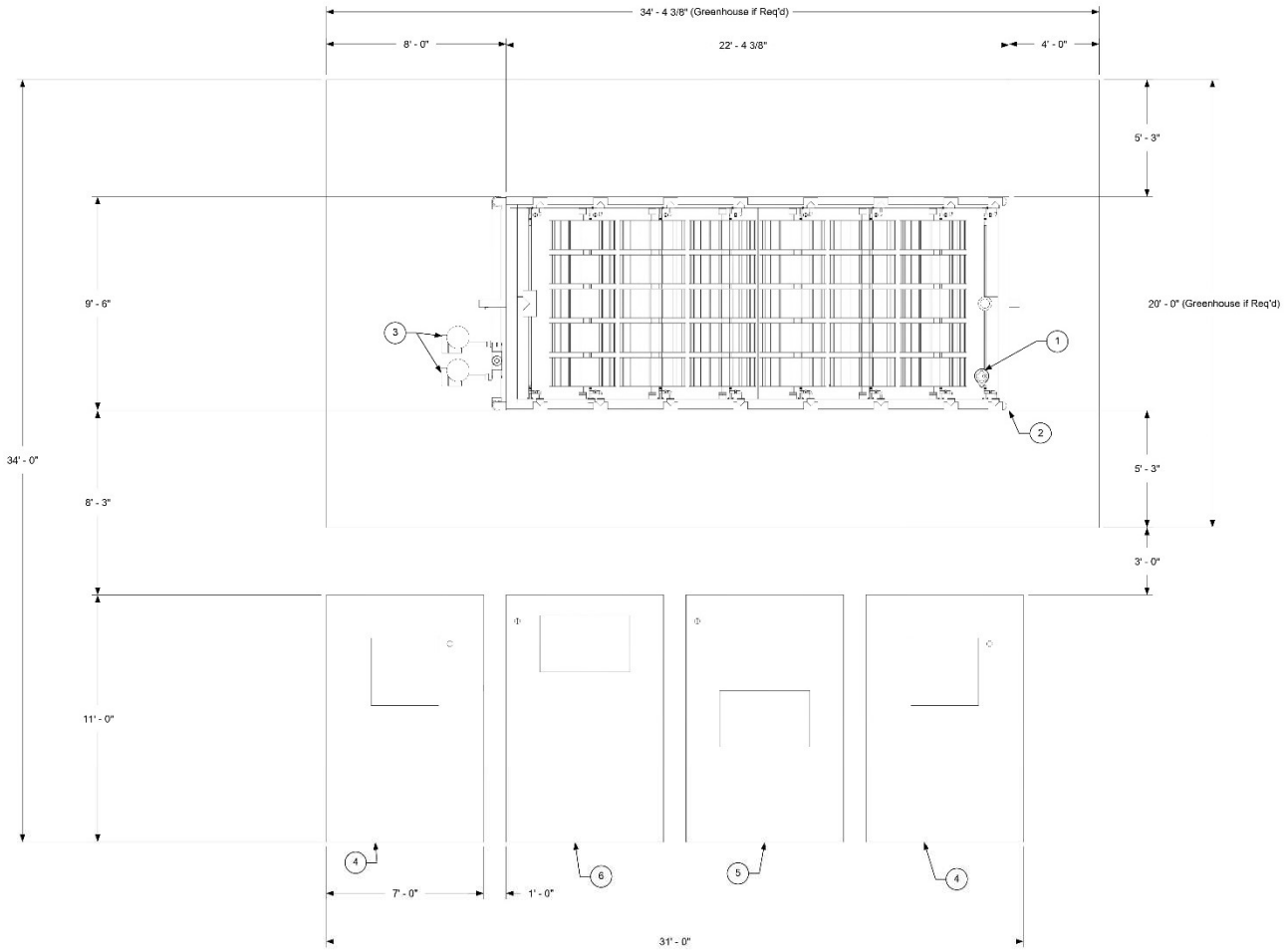




IX. Algaewheel Greenhouse Diagram

Item No.	Qty	Description
1	1	Recirculation Pump
2	1	Algaewheel Tank
3	1	Algaewheel Blower
4	2	6x10 Clarifier
5	1	6 x 10 Sludge Holding Tank
6	1	6 x 10 EQ Tank

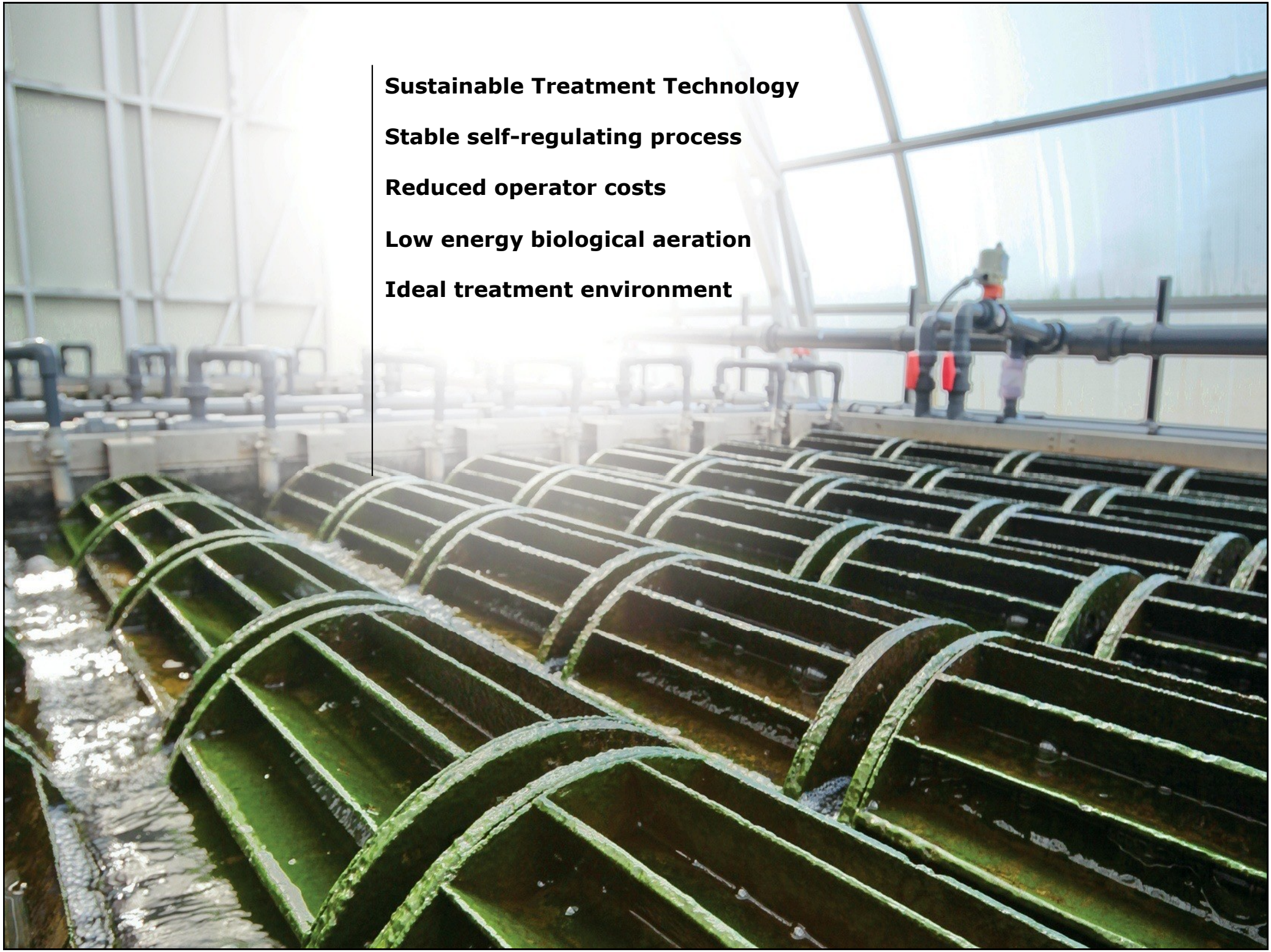
REV STATUS REV	SH	REVISION HISTORY REV	DESCRIPTION	DATE	APPROVED



TITLE: Algaewheel Treatment Plant
Vermont Elementary School
Floor Plan

SIZE	DWG NO	PROJECT NO	REV
D		22010	

SCALE: 3/8" = 1'-0" | DATE: 10.27.22 | SHEET: 1 of 1


Sustainable Treatment Technology
Stable self-regulating process
Reduced operator costs
Low energy biological aeration
Ideal treatment environment


When used for retrofit applications:
Built in parallel
Uses existing infrastructure
Easily expanded
Built in weeks not months

20 Year Life Cycle Costs **11/01/22**

Project Name:	**Marion Cross**
Plant Size (gpd):	**5,420**
Number of Algaewheel shafts:	**6**
Number of Wheels:	30
E.Q. Pump Flow Capacity (gpm):	12.0
Power Costs ($/kw-hr):	$0.100
Sludge Hauling Costs ($/gallon):	$0.15
Liquid Sludge Generated 2% (gal/year):	9,855
Annual Sludge Hauling Costs:	$1,478

FPZ K04 2 HP 1 ph

Item	Life Expectancy (years)	Repl. Cost ($/each)	Quantity each	20-Year Repl. Cost ($)	Annual Replacement Cost ($)	Motor Size Each (HP)	Motor Size Total (HP)	Run Time (hrs/day)	Annual Power Costs ($)
Influent Screening Structures	50		**0**	$0			0.00		$0
Primary Clarifiers							0.00		$0
Tanks	50		**1**	$0	$0		0.00		$0
Weirs, Baffles, & Piping	50		**2**	$0	$0		0.00		$0
Geyser Pumps	20	$1,000	**0**	$0	$0		0.00		$0
Sludge Pumps	10	$1,000	**0**	$0	$0	**2.00**	0.00	**0.50**	$0
Cycle Timer Controllers	10	$100	**0**	$0	$0		0.00		$0
EQ Tank					$0		0.00		$0
Tanks	50		**0**	$0	$0		0.00		$0
Rails, Valves, Piping, Disconnects, Floats	20	$3,000	**0**	$0	$0		0.00		$0
Pumps (Alternating)	10	$1,000	**0**	$0	$0	**4.00**	0.00	12.00	$0
Controls	20	$1,000	**0**	$0	$0		0.00		$0
Air Blowers	10	$3,500	**0**	$0	$0	**1.00**	0.00	**2.00**	$0
Diffusers	10	$200	**0**	$0	$0		0.00		$0
ATP					$0		0.00		$0
Greenhouse Polycarbonate	20	$500	**0**	$0	$0		0.00		$0
Shafts	30	$0	**6**	$0	$0		0.00		$0
Wheels, Support Frame, Weirs, Baffles, & Piping	40	$0	**120**	$0	$0		0.00		$0
Diffusers	20	$80	**120**	$9,600	$480		0.00		$0
Duty Blowers - Normal	10	$1,000	**1**	$2,000	$100	**2.00**	2.00	**12.00**	$653
Duty Blowers - Backup	10	$1,000	**1**	$2,000	$100	**2.00**	2.00	**12.00**	$653
Backup Blowers	20	$1,400	**0**	$0	$0	**0.00**	0.00	**1.00**	$0
Cleaning Blowers	20	$1,000	**0**	$0	$0	**0.00**	0.00	**1.00**	$0
Cycle Timer Controllers	10	$100	**1**	$200	$10		0.00		$0
Secondary Clarifiers					$0		0.00		$0
Tanks	50		**2**	$0	$0		0.00		$0
Weirs, Baffles, & Piping	50		**2**	$0	$0		0.00		$0
Geyser Pumps	20	$1,000	**0**	$0	$0		0.00		$0

Sludge Pumps	10	$1,000	**0**	$0	$0	**2.00**	0.00	**0.50**	$0
Cycle Timer Controllers	10	$100	**0**	$0	$0		0.00		$0
Post Treatment Tank					$0		0.00		$0
Tank	50		**0**	$0	$0		0.00		$0
Chlorinator/Dechlorinator	20	$1,000	**0**	$0	$0		0.00		$0
UV Disinfection Equipment	20		**0**	$0	$0		0.00		$0
Post Aeration Blowers	10	$310	**0**	$0	$0	**0.12**	0.00	**24.00**	$0
Flow Meter Manhole	50		**0**	$0	$0		0.00		$0
Flow Meter & Recorder	20	$5,500	**0**	$0	$0		0.00		$0
Sludge Holding Tank					$0		0.00		$0
Tanks	50		**2**	$0	$0		0.00		$0
Diffusers	10	$200	**0**	$0	$0		0.00		$0
Air Blowers	10	$3,500	**0**	$0	$0	**2.00**	0.00	**3.00**	$0
Cycle Timer Controllers	10	$100	**0**	$0	$0		0.00		$0
Decant Manhole	40		**1**	$0	$0		0.00		$0
Decant Piping	40		**0**	$0	$0		0.00		$0
Decant Pumps	10	$500	**0**	$0	$0	**0.50**	0.00	**1.00**	$0
Recycle/Alum mixing tank					$0		0.00		$0
Tank	50		**1**	$0	$0		0.00		$0
Mixers	10	$3,700	**0**	$0	$0	**2.00**	0.00	**24.00**	$0
Air Pumps	10		**0**	$0	$0		0.00		$0
Recycle Pumps (Alternating)	10	$550	**0**	$0	$0	**4.00**	0.00	12.00	$0
Sieves	20	$5,000	**0**	$0	$0		0.00		$0
Dosing pump	40	$450	**0**	$0	$0		0.00		$0
TOTALS					$690				$1,305

algaewheel®

Hybrid Attached Growth Technology

Algaewheel is an award winning technology that sustainably solves the problems of distributed treatment

algaewheel®

Changing the look of wastewater treatment

Socially acceptable

No odor

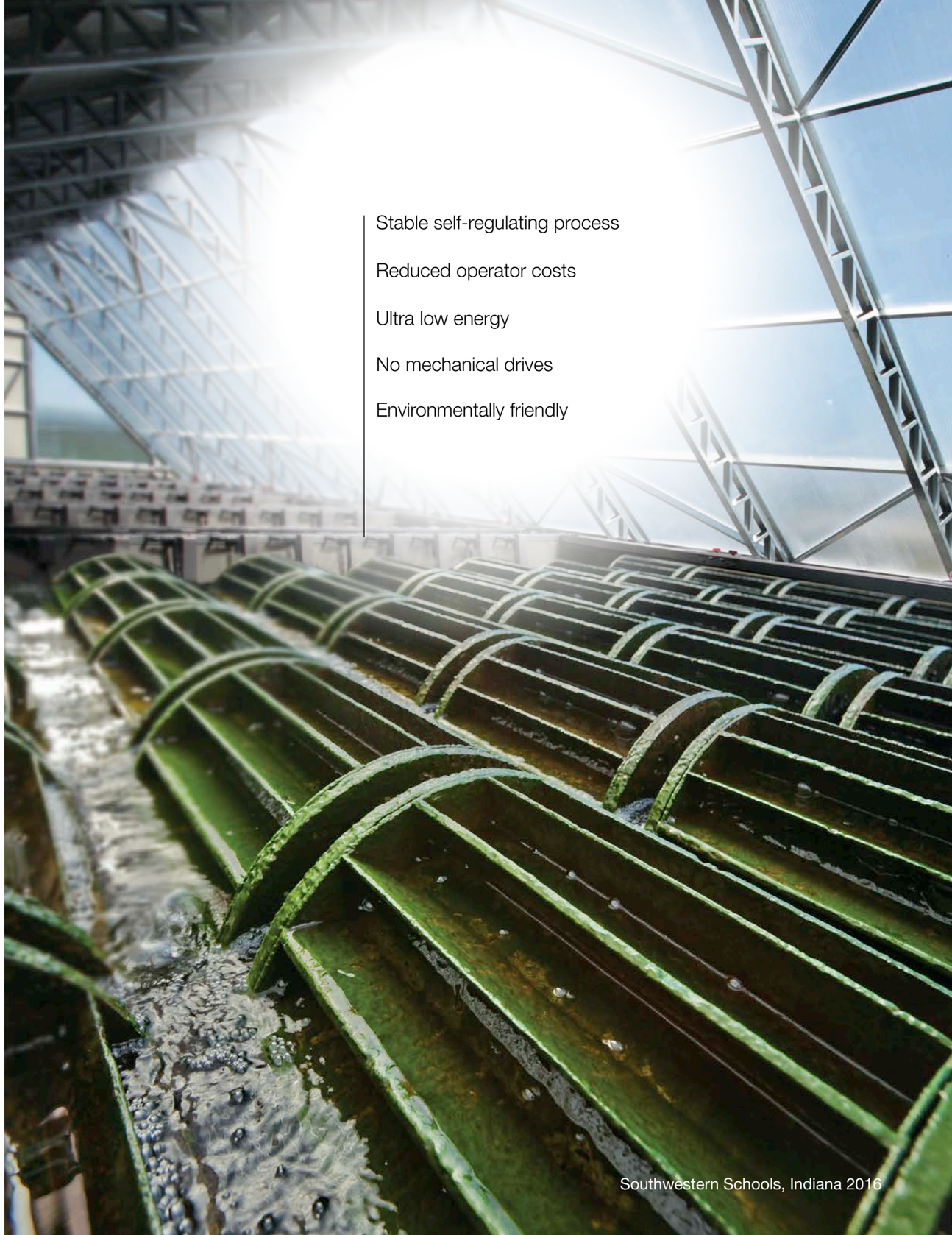
No noise

Cost effective

Southwestern Schools, Shelbyville, Indiana 2016

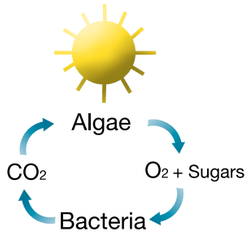
Algaewheel is a hybrid technology that integrates algae into a proven process to enhance treatment efficiency

algaewheel®

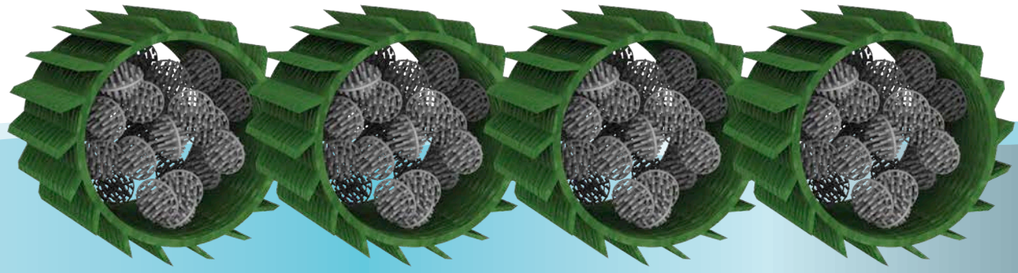


algaewheel®
treatment redefined

Photosynthetic Algal Biofilm



Stable, self regulating process

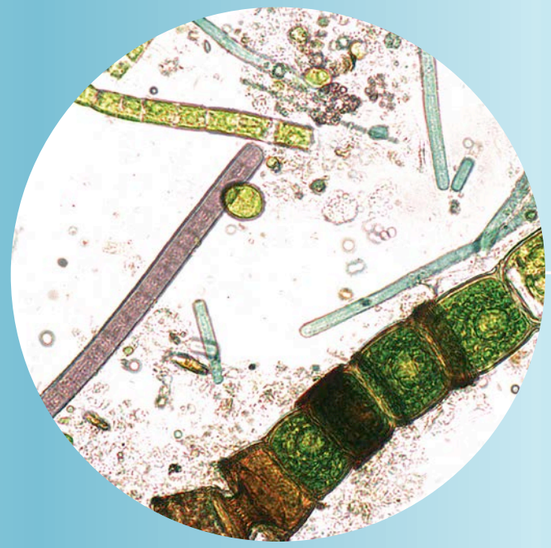


The photosynthetic algal biofilm which forms on the Algaewheels cultivates and sustains a large and diverse algal and bacterial ecosystem that provides enhanced treatment performance.

Over millions of years, algae and bacteria have developed an intricate relationship where the by-products of one group are the inputs for the other. Algae grow on rotating wheels, using light, CO_2 and nutrients. Algae produce oxygen, consume carbon-dioxide, and generate polysaccharides (sugars). Bacteria consume the oxygen and sugars and produce carbon dioxide - completing the cycle.

When subjected to light, the algal biofilms become saturated with oxygen. When combined with wheel rotation, high dissolved oxygen (DO) levels enhance BOD reduction and nitrification.

A small air blower generates bubbles that lift and slowly rotate the buoyant Algaewheels.



Biofilm containing algae and bacteria at 400x magnification

Symbiotic Biofilm

Algae

Grow on wheels using light, CO_2 and nutrients

- Host large and diverse bacterial populations
- Produce oxygen and polysaccharides (food) for bacterial growth
- Polysaccharides also improve solids settlement

Bacteria

Grow around the algae and inside the wheels on biomedia

- Produce CO_2 - used by the algae
- Feed on polysaccharides in low flows

The synergy between algae & bacteria maintains effective treatment during variable flows and loads

Algaewheel will optimize your
overall treatment performance

algaewheel®

Summit Lake State Park (DNR) - Retrofit 2014

Modular construction
...simply a smarter way

algaewheel®

Complete preassembled modules

Factory assembled quality

No scale-up risk

Rapid site installation

Algaewheel Tank Modules
Precast concrete tanks delivered preassembled with Algaewheels and associated components, ready for placement and connection.

www.algaewheel.com

ONEcowater®

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