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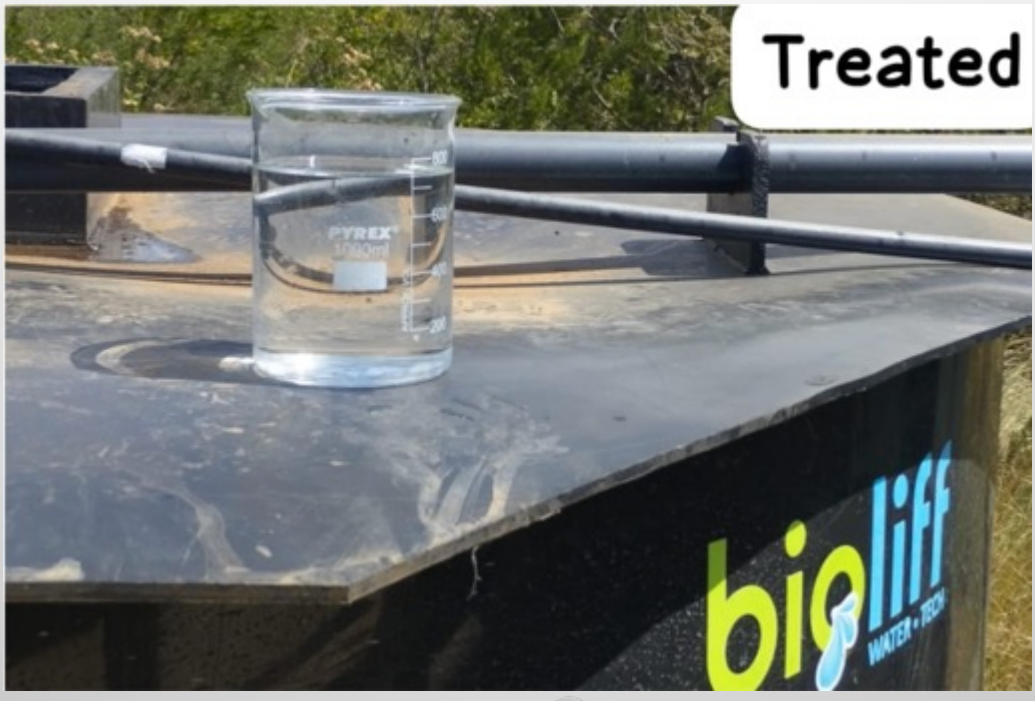
Sewage Treatment – Safe to Discharge into the Environment



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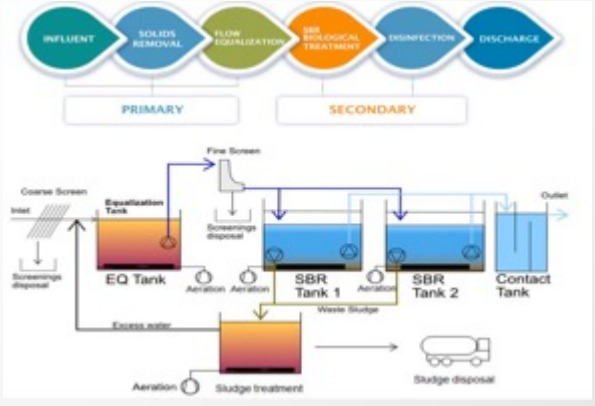

- **Project Synopsis: Co-op University, Nairobi, Kenya**

- 800m3/day ASBR STP installed in concrete tanks
- Replacement of traditional outdated pond system, unable to meet environmental regulation and odour nuisance for surrounding community. The university was expanding the facilities and student population capacity to 10,000 students.
- Bioliff delivered a wastewater & recycling system capable of purifying up to 800,000lts/day of sewage. Treated water for irrigation and discharge to to the river.

Technology:

Plant Size Status: 5,000PE ASBR STP, 800m3/day

Location: Nairobi, Kenya

Installation Date: Nov 2020

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cure
CHILDREN'S HOSPITAL OF ETHIOPIA

- **Project Synopsis: CURE Children's Hospital of Ethiopia**

- 75m3/day STP installed in Concrete Tanks constructed onsite
- Operational Unit Description: Inpatient Beds - 120, Employees – 160, Visitors
- The system combines anaerobic, anoxic, and aerobic treatment process to achieve effluent low in dissolved organic compounds as well as low total nitrogen content.

Technology:

Plant Size Status: 75M3/Day, 500PE MBBR

Location: Addis Ababa, Ethiopia

Installation Date: July 2023

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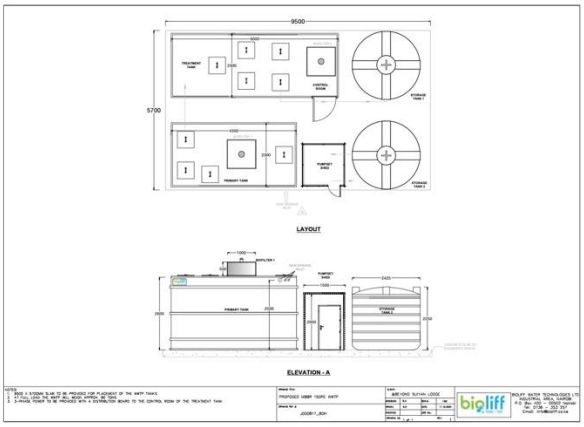
Basis of Design – 22m3/day

Bioliff is proposing a Moving Bed Biofilm Reactor (MBBR) process be used for treatment of luxury tourism wastewater sources due its high volumetric efficiency, proven performance, and minimum maintenance.

The MBBR process shall provide high-rate soluble organic reduction (BOD/COD), and Secondary clarification will separate solids to meet effluent objectives detailed herein. Nitrogen and Phosphorous will be used as nutrients for cell growth, thus meeting effluent objectives.
Return Activated Sludge (RAS) is not required and will simplify process operations.
Final effluent is sanitized to ensure public health & safety compliance.

Unit	Heads / Cycle	Flow	Total flow	BOD/pe (g)	Total BOD	SS/pe (g)	Total SS	Ammonia (g)/pe	Total Ammonia	PE
Guests (rooms with bath tubs)	31	300	9,300	105	3,255	80	2,480	12	372	
Staff	84	150	12,600	60	5,040	80	6,720	8	672	
			21,900		8,295		9,200		1,044	138

Primary Tank Influent Load		STP Influent Load	
Hydraulic Load	21,900 ℓ	Hydraulic Load	21,900 ℓ
BOD Concentration	379 mg/ℓ	BOD Concentration	303 mg/ℓ
COD Concentration (at 1.8)	682 mg/ℓ	COD Concentration (at 1.8)	545 mg/ℓ
Suspended Solids	420 mg/ℓ	Suspended Solids	30 mg/ℓ
Ammonia as N concentration	48 mg/ℓ	Ammonia as N concentration	48 mg/ℓ



- **Project Synopsis: &Beyond Suyian Lodge Sewage Treatment Plant STP**

- The STP is located at the utilities & services area. The STP is fed by 6 lift stations from the guest accommodation and gravity feed from the staff quarters. Treated water will go through filters in the pump house for reuse in car washing, irrigation, toilet reflushing at the staff ablution block and washing the solar panels.

Technology:

Plant Size Status: MBBR 150PE

Location: Suyian, Kenya

Installation Date: Nov 2024

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- **Project Synopsis: STP for Serena Hotels, Ngorongoro, Tanzania**
- 100m3/day Sewage Treatment Plant prefabricated in Paneltim plant structure
- Serena wanted to update the site from old septic tanks to modern wastewater treatment, avoiding the ingoing challenges of septic tanks, and meeting environmental standards.
- Due to logistical challenges of building on site in the national park, Serena opted for a prefabricated solution delivered and Trunkey.
- Factory manufacturing time: 6 weeks, Onsite installation approx. 7 days.

Technology:

Plant Size Status: 100 m3/day
Location: Ngorongoro, Tanzania
Installation Date: 2022

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- **Project Synopsis: STP for Acacia Tree Lodge, Karen Nairobi, Kenya**

- 24m3/day Sewage Treatment Plant
- The client's existing septic tank required frequent emptying, this was very costly. Bioliff custom designed a prefabricated system to neatly fit the tight space available. Delivery was within 2 weeks, and reduced disruption to ongoing hotel operations.
- NB: the client saw a ROI in as little as 1 year due to savings on septic emptying

Technology:

Plant Size Status: 24 m3/day

Location: Karen, Nairobi, Kenya

Installation Date: 2019

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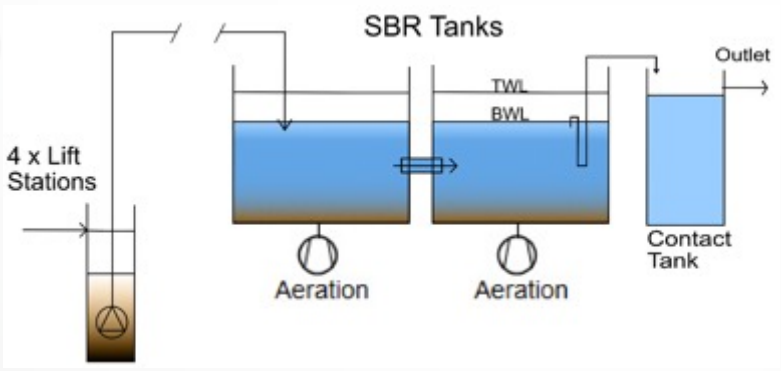

- **Project Synopsis: STP Mara Expedition (Great Plains)**

- SBR Mini 60 person Sewage Treatment Plant serving a 10 tent luxury camp & staff back of house.
- Customer initial tried septic tank with catastrophic results. They needed a rapid response AND under very tight budget constraints – therefore Bioliff suggested the SBR Mini as the most economical solution whilst still meeting standards.
- **SBR Mini -** This process has the benefit of treating all sludge aerobically with a similar process to that seen on municipal plants with aerobic sludge digesters (so no septic's which eventually need exhausting). The resulting sludge has very low VOC's, mineralised, and not odour offensive – allowing for onsite sludge disposal (including soil remediation, composting, landscaping). This solution is attractive for remote sites, avoiding exhauster services.
- System is prefabricated using the more economical HDPE sheet.
- Factory manufacturing time: 3 weeks, Onsite installation approx. 5 days.
- The system is can be aboveground, below ground, or half and half as above picture. Solution for ease of executions, reduced civil works, and the seasonal flooding that area experiences. The plant is centralised and the sewage is pumped to the plant using Lift Stations.

Technology:

Plant Size Status: 10m3/day plant)

Location: Masai Mara

Installation Date: 2022

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- **Project Synopsis: ETP for Kenchic Chicken Slaughter facility, Thika, Kenya**

- 600m3/day slaughter house effluent
- The client had originally opted for a system form India, but a lack of local support and some initial design errors led to failure. Bioliff renovated the plant, including added treatment capacity of 200m3/day which operates successfully under our care and support.

Technology:

Plant Size Status: 600 m3/day MBBR plant

Location: Thika, Kenya

Installation Date: 2022

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- **Project Synopsis: Three Rivers School, Nanyuki, Kenya**
- 75m3/day MBBR STP to serve 400 students & staff.
- The client originally opted for septic tanks, but poor draining soils and seasonal flooding caused regular failure.
- The MBBR plant was supplied in the more economical HDPE tanks fabricated with solid sheet. Incorporated several lift stations, EQ Tank, MBBR reactors & Clarifier with separate control room.
- Factory manufacturing time: 4 weeks, Onsite installation approx. 7 days.

Technology:

Plant Size Status: 70 m3/day

Location: Nanyuki, Kenya

Installation Date: 2023

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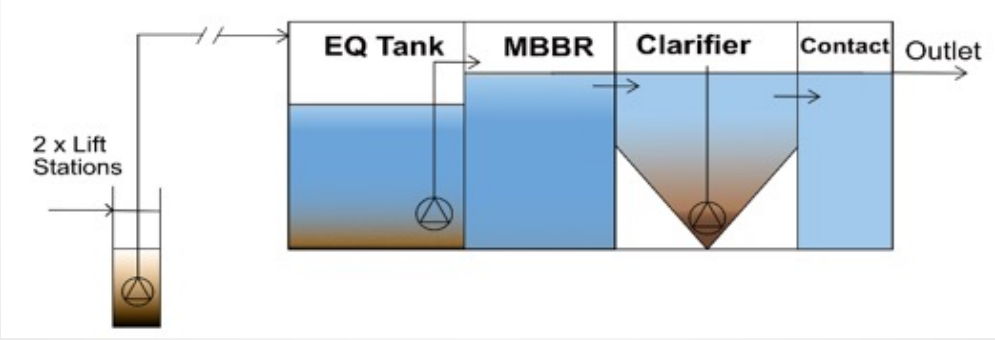

- **Project Synopsis: Angama Amboseli**

- Initial objective was for modern compliance with environmental standards & and water conservation in a water scares area, requiring a wastewater treatment plant. The luxury camp on the Amboseli plains is subject to seasonal flooding demanding and above ground solution.
- Factory manufacturing time: 3 weeks, onsite installation approx. 5 days.
- **Enpura Pro MBBR** - completely aboveground solution for ease of executions, reduced civil works, and the seasonal flooding that area experiences. The plant is centralised, and the sewage is pumped to the plant using Lift Stations.

Technology: Plant Size Status: 10 x tent site (15m3/day plant)
Location: Amboseli
Installation Date: 2023

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- **Project Synopsis: STP for Angama Safari Camp, Masai Mara, Kenya**

- Logistics Consideration, 2 x Retrofitted 20ft Shipping Containers & 2 x 20,000lt GRP Primary Tanks.
- Factory manufacturing time: 6 weeks ex works Nairobi, Onsite installation approx. 7 days.

Technology:

Plant Size Status: 40 m3/day

Location: Angama Lodge, Masai Mara, Kenya

Installation Date: 2015

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- **Project Synopsis: Containerised STP for BGP CNOPC China, Mobile Exploration Labour Camps.**

- Modular Containerised Sewage Treatment Plant with possibility of easy decommissioning and redeployment.
- 1 x 20ft for Screening, Primary Clarification & Flow Equalisation
- 1 x 20ft container for Fixed-Film Biological Treatment
- 1 x 20ft Container for Aerobic Sludge Treatment & Storage
- Factory manufacturing time: 12 weeks, Onsite installation approx. 5 days.

Technology:

Plant Size Status: 45 m3/day

Location: Turkana, Kenya

Installation Date: 2015

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- **Project Synopsis: STP for Oil & Gas Labour Camps, Uganda**

- Modular Sewage Treatment Plant with possibility of easy decommissioning and redeployment.
- Logistics Consideration, 2 x 20ft tanks with container locks. Tank measured 6m x 2.4m x 2.9m.
- Factory manufacturing time: 6 weeks ex works Nairobi, Onsite installation approx. 7 days.

Technology:

Plant Size Status: 250 m3/day

Location: Bulisa, Lake Albert, Uganda

Installation Date: 2022

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- **Project Synopsis: Banda School, Langata, Nairobi, Kenya**

- 70m3/day STP Enpura Fixed-Film plant to serve 450PE.
- An update to an old failed lagoon system, the school was under pressure to comply with environmental discharge standards, quickly. Prefabricated turnkey solution was favoured for fast implementation during school break.
- 2 x 20ft Paneltim tanks with separate control room.
- Factory manufacturing time: 3 weeks, Onsite installation approx. 7 days.

Technology:

Plant Size Status: 70 m3/day

Location: Langata, Nairobi, Kenya

Installation Date: 2019

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- **Project Synopsis: GCC Labour Camp, 300 Person, Uganda**

- 2 x Paneltim Tanks, 1 above and another below ground.
- Logistics Consideration, 1 x 40ft for the tanks and a closed truck for fittings and accessories. Each Tank measured 5.9 x 2.3 x 2.7m and weighs approx. 2.5tons
- Factory manufacturing time: 6 weeks, Onsite installation approx. 7 days.

Technology: MBBR
Plant Size Status: 60m3/day
Location: Bulisa, Lake Albert, Uganda
Installation Date: May 2023

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Paneltim swimming pools are an ideal solution for lodges and camps and areas with unstable base soils. They can be emptied and moved. Paneltim allows for design creativity. It is UV stabilised and does not deteriorate in sunlight. Patterned pool liners can be installed allowing for finishes resembling, tiles, mosaics or other custom finishes.

Paneltim panels are suitable for the construction of liquid storage tanks, water reservoirs, swimming pools, fish ponds, grease traps and chemical storage.

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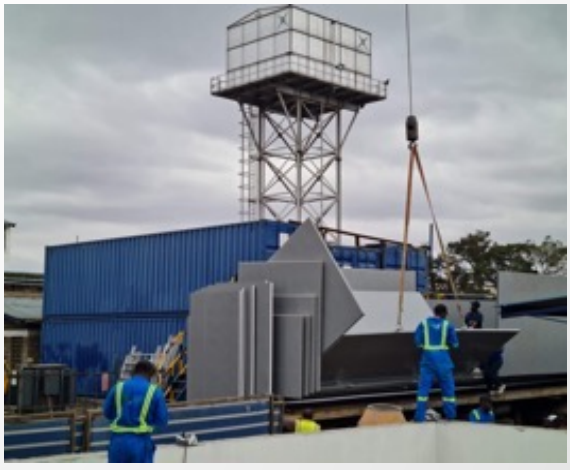

- **Project Synopsis: Paneltim Tanks for acid water holding for ABM, Kenya**

- Four (4) x 12m x 4m x 2m Tanks
- One (1) x 6m x 5m x 2m Tanks
- Factory manufacturing & Preparation time: 3 weeks, Onsite installation approx. 7 days.

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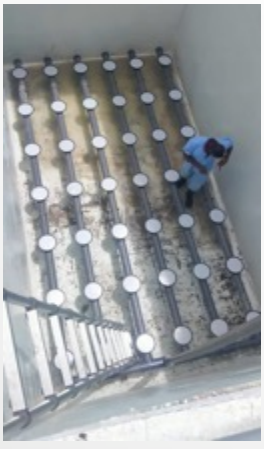

- **Project Synopsis: ETP for Ravine Dairy Farm, Nakuru, Kenya**

- 450m3/day Dairy Effluent Treatment Plant
- A new Dairy processing facility, the client wished to meet modern expectations for responsible waste management with the goals of environmental compliance, as well as reuse of treated water for washdown & irrigation.

Technology:

Plant Size Status: 450 m3/day MBBR plant. Also supplied with Dissolved Air Flotation (DAF) for effective control of FOG & TSS primary treatment.

Location: Nakuru, Kenya

Installation Date: 2023

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- **Project Synopsis: AAR Hospital, Nairobi**

- 75m3/day STP installed in Concrete Tanks constructed onsite
- The treatment plant is low profile, installed in the basement carpark
- Treated effluent is discharged to an ornamental pond and then reused for irrigation
- The system combines anaerobic, anoxic, and aerobic treatment process to achieve effluent low in dissolved organic compounds as well as low total nitrogen content.

Technology:

Plant Size Status: 75M3/Day, 500PE MBBR

Location: Nairobi, Kenya

Installation Date: 2020

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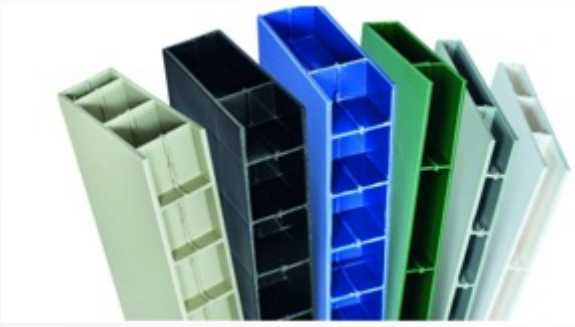

Paneltim plastic panels are light, strong and clean. Paneltim offers an assortment of plastic panels, with a broad range of types, different thickness and structure. There is a Paneltim solution for every possible application.

Liquid – Paneltim panels are suitable for the construction of liquid storage tanks, water reservoirs, swimming pools, fish ponds, grease traps and chemical storage.

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