

CONSTRUCTION OF

WASTEWATER TREATMENT PLANTS

Wastewater treatment for urban areas 250 - 50 000 m³/ day

Technology Provider



Exclusive Partner



Executive Summary

This presentation aims to demonstrate the feasibility of designing compact block and modular sewage treatment plants that are unified in both technical functionality and aesthetic appeal.



Modular sewage treatment plants



WASTEWATER TREATMENT FACILITY - HANDLES UP TO 240 M³ DAILY.

- Capacity of 1 module is up to 40 m³/day;
- Large Complex Capacity: Up to 240 m³/day (up to 6 modules);
- 100% Factory Pre-fabricated;
- Rapid Installation;
- Staged Commissioning;
- Equipment is designed for a minimum service life of 30 years.

Modular Wastewater treatment plants



BIOREACTOR

Polypropylene tank segmented into distinct compartments. It features four primary zones:

- Anaerobic
- Anoxic
- Aeration zone
- Secondary clarifiers

Internally, it is outfitted with aeration elements, airlifts, water collection trays, and distribution manifolds.

OPTIONAL EQUIPMENT

- Influent metering station
- Inlet pumping station
- Distribution chamber
- Sludge storage tank
- Tertiary filter
- UV disinfection unit
- Flow meter
- Clean water pumping station
- Flocculant dosing unit

MEDIUM COMPLEX FOR TREATING 40 M³ DAILY.

1. Equipment housing (Contains root blowers and control cabinets)

2. Inlet pumping station

3. Treatment plant for 40 m³/day

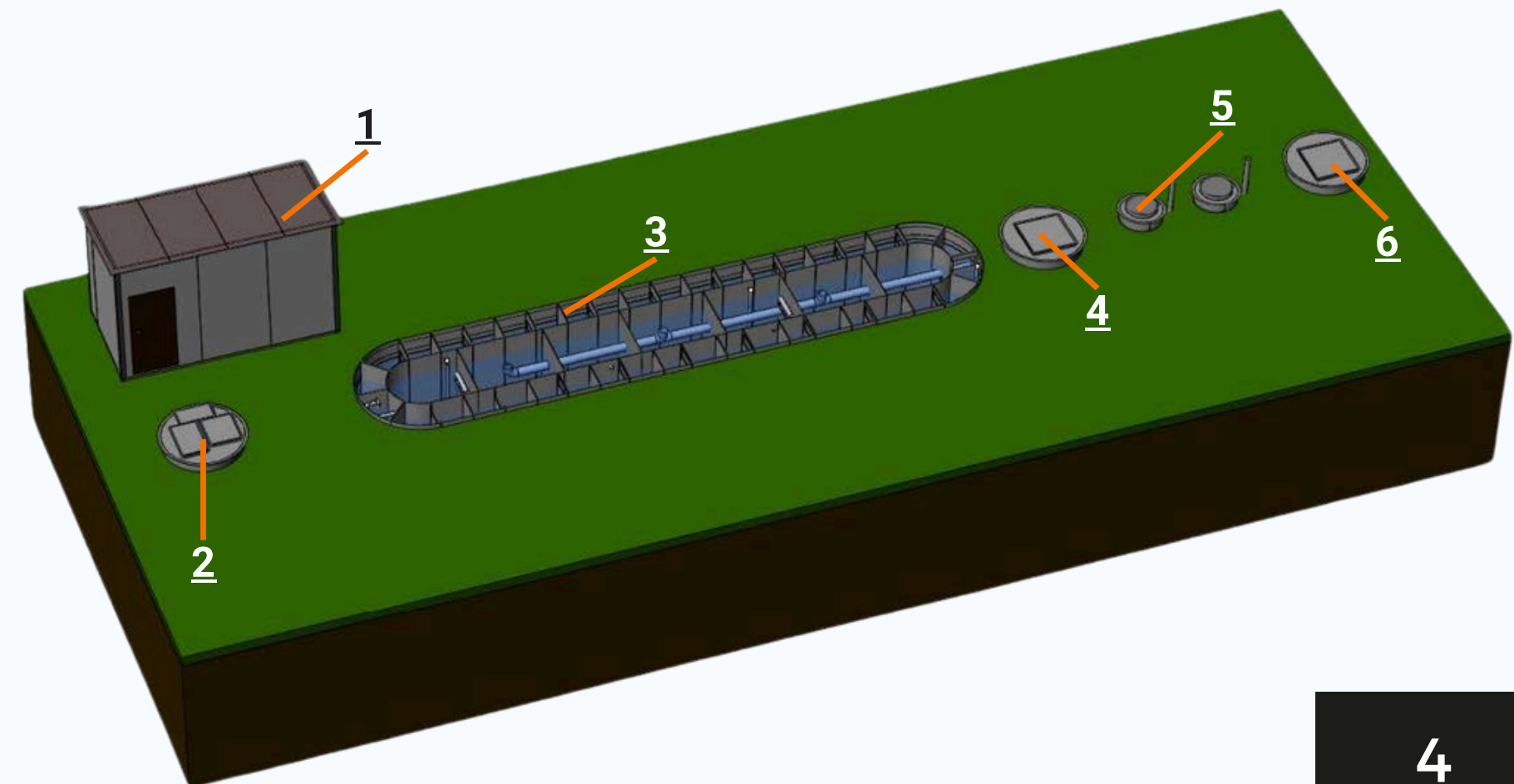
4. Sludge storage tank

5. After-treatment filter

6. UV disinfection unit

The equipment supply package is tailored to meet customer specifications and the necessary wastewater treatment criteria.

Medium Wastewater treatment plants



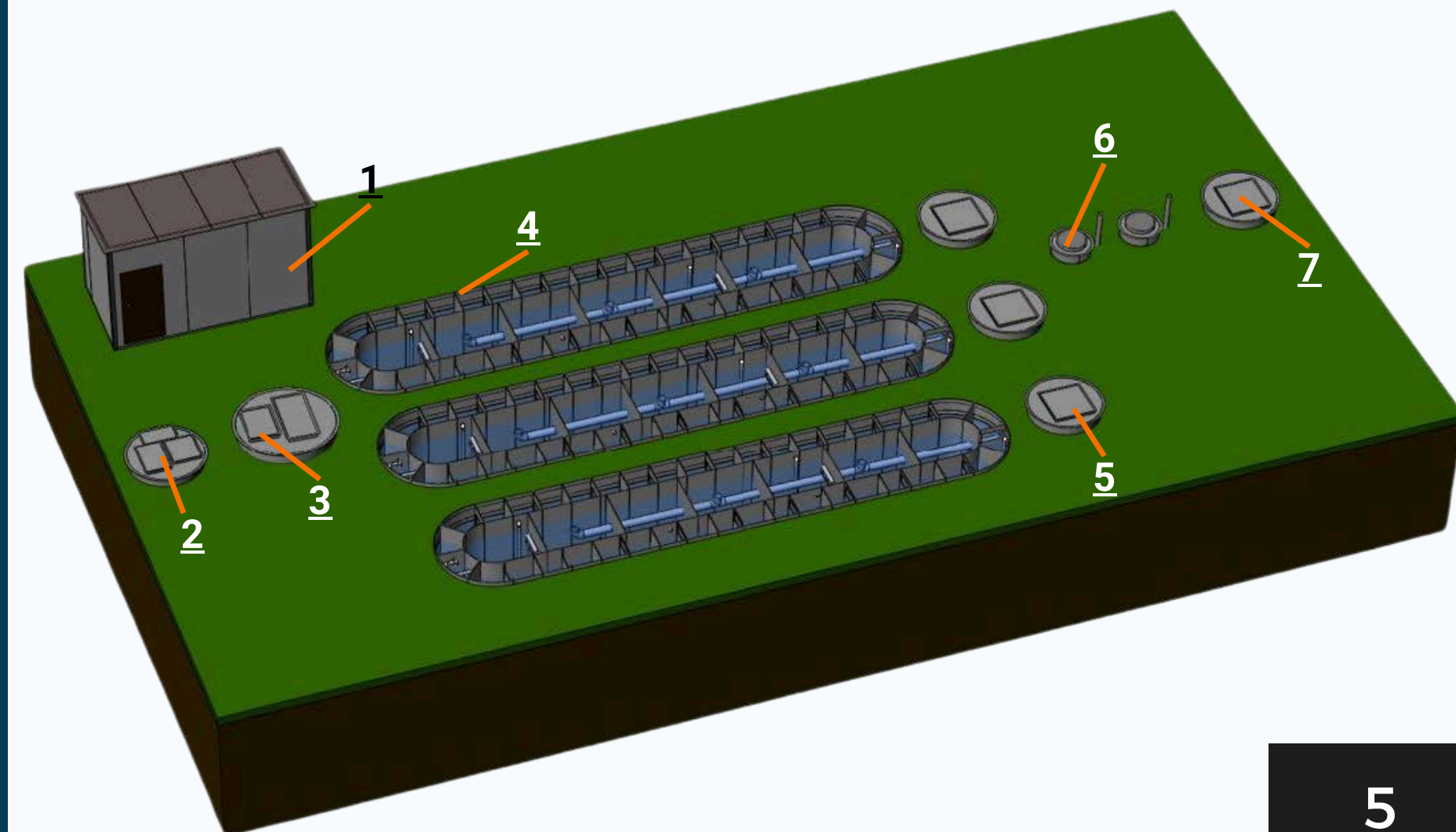
Large

Wastewater treatment plants

LARGE COMPLEX FOR TREATING 120 M³ DAILY.

1. Equipment housing (contains root blowers and control cabinets)
2. Inlet pumping station
3. Distribution chamber
4. Treatment plant for 40 m³/day (3 units = 120m³/day)
5. Sludge storage tank (3 units)
6. Tertiary filter
7. UV disinfection unit

Equipment supply package is determined based on customer requirements and required wastewater treatment parameters.

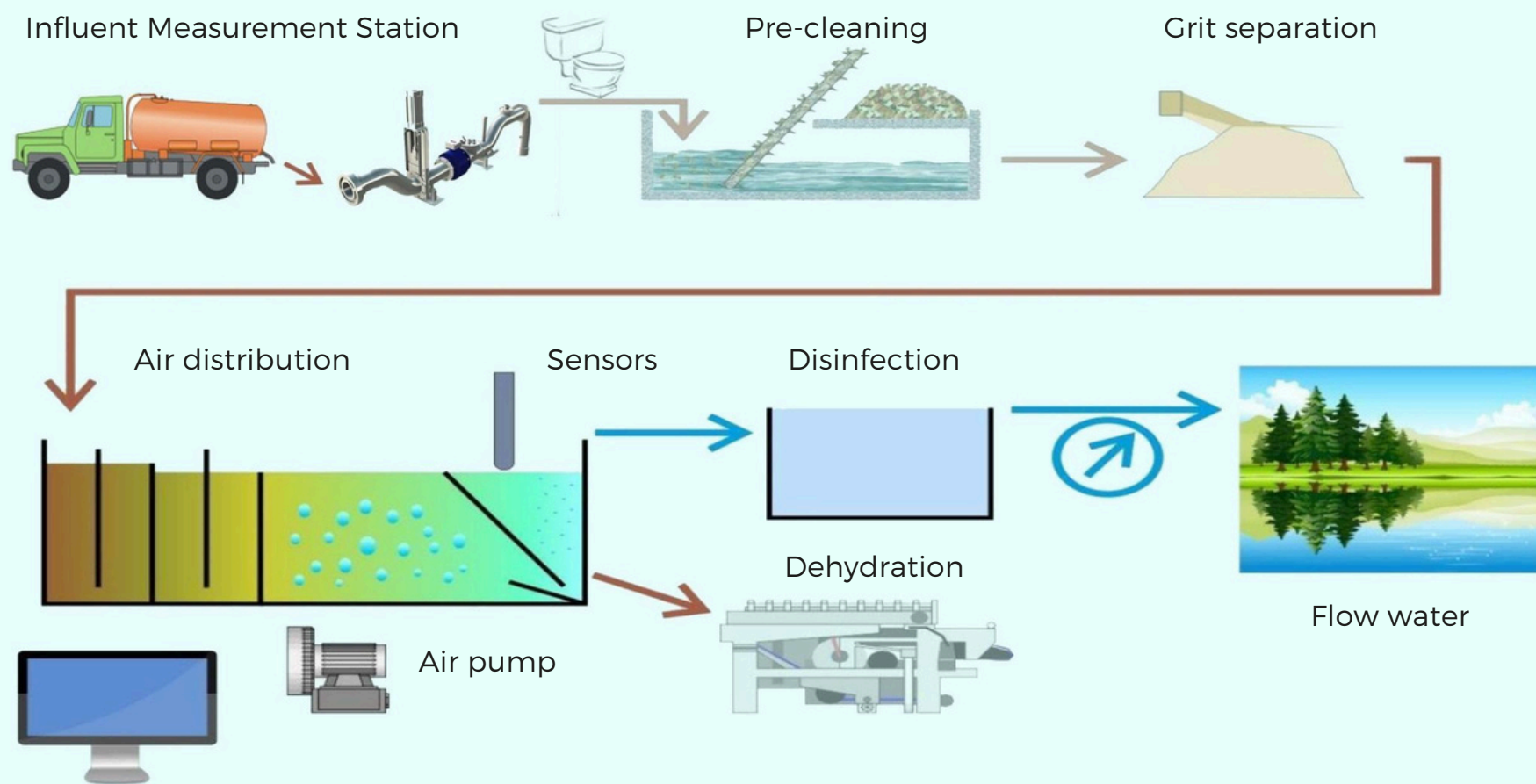


CONCRETE WASTEWATER TREATMENT PLANTS UP TO 50000 M³

- The bioreactor is composed of conventional, standard blocks;
- The housing of the bioreactor is constructed from reinforced concrete;
- The building features modular structures that can be assembled quickly;
- It includes standard technological equipment.



Technological Process Diagram



In the treatment facility, wastewater undergoes purification through mechanical and biological treatment processes. The biological treatment phase features a single tank with distinct wastewater treatment lines, housing anaerobic and anoxic chambers, an aeration chamber, and secondary clarifiers. Each section maintains aerobic and anoxic conditions to facilitate nitrification and denitrification processes. Activated sludge is separated from the treated wastewater using Dortmund-type clarifiers, which are positioned adjacent to the aeration chamber.

The LOSBEL technology enables the simultaneous nitrification and denitrification processes, along with biological phosphorus removal.

Biological Treatment Technology



Biological treatment is implemented through LOSBEL technology, which features a vertical hydraulic labyrinth. This method eliminates the need for mixers, as the mixing of sludge occurs hydraulically with air supplied by roots blowers.

This technology allows for the straightforward segregation of aerobic, anaerobic, and anoxic zones within a single bioreactor.

As a result, it complies with contemporary standards in wastewater treatment, achieving purification that meets fishery requirements, all while maintaining an exceptionally low power consumption of no more than 0.3 kW per 1m³ of wastewater.

Inflow Sewage Metering Station

TECHNICAL SPECIFICATIONS

- Productive Capacity: from 1 to 100 m³/hour;
- Power Consumption: up to 7.5 kW;
- Housing Dimensions: 2400 x 1400 x 2400 mm;
- Weight: 600 kg.

EQUIPMENT INCLUDES:

- Inlet pipe
- Pneumatic valve
- Piping
- Sandwich panel housing
- Convector heater
- Electromagnetic flow meter
- Measuring module equipped with pH sensor
- Electronic key cards
- Identification device
- AI-powered Software
- Outlet pipe



Combine Mechanical Treatment

TECHNICAL SPECIFICATIONS

- Productive Capacity: from 30 to 720 m³/hour;
- Bar spacing: 2 to 6 mm;
- Power consumption: 2.2 to 8.4 kW;
- Material - stainless steel.

EQUIPMENT INCLUDES:

- Control cabinet
- Grit catching plant
- Grid for trapping debris
- Screw conveyor for grit removal
- Screw conveyor for debris removal



DESCRIPTION

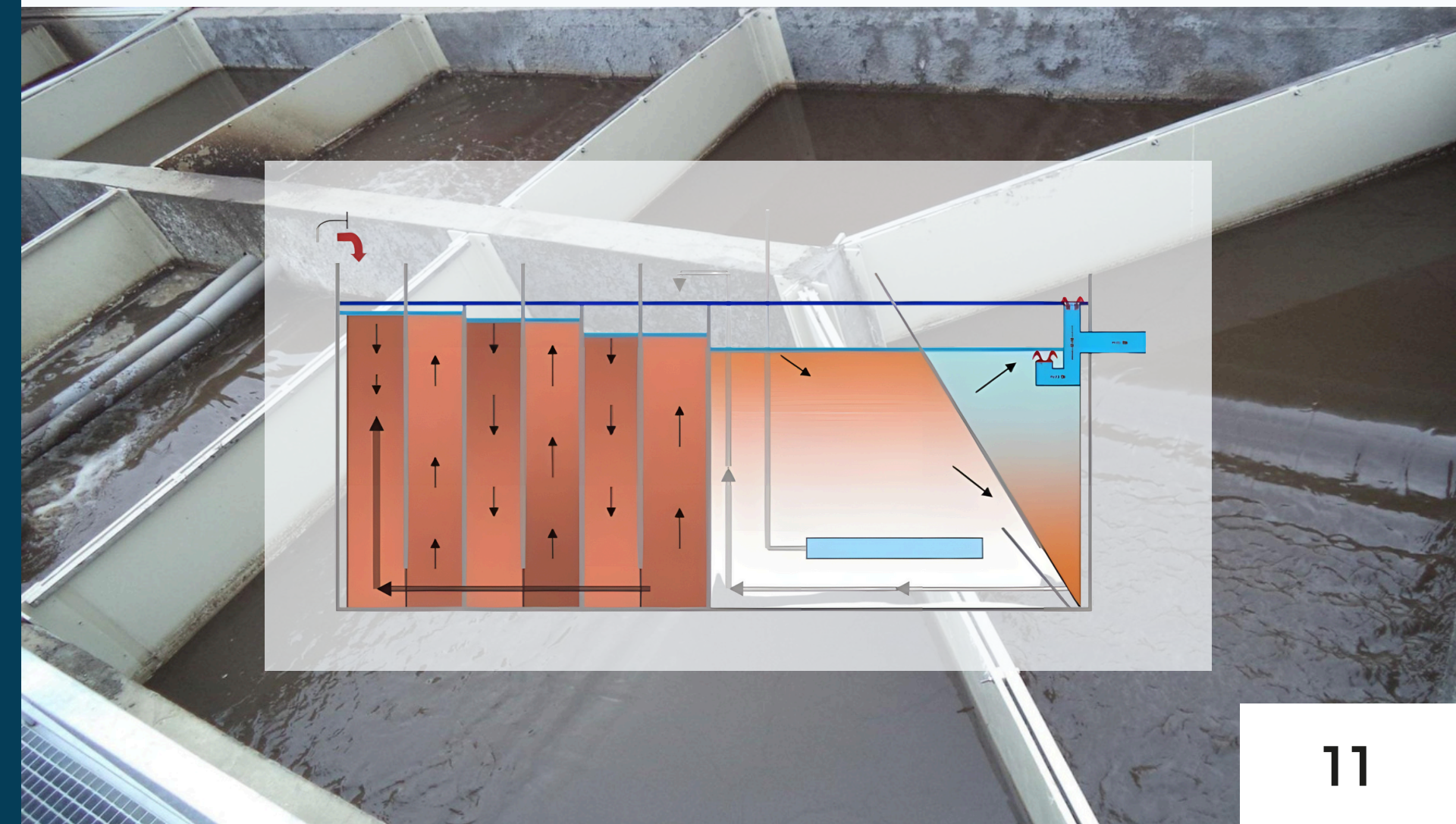
The design of the denitrification zone, structured as a vertical labyrinth, facilitates both upward and downward movement of wastewater. This configuration promotes thorough mixing with activated sludge, eliminating the need for mixers.

Airlift pumps circulate activated sludge within the denitrification zone, ensuring that fluid movement remains consistent even when there are no incoming wastewater flows.

EQUIPMENT INCLUDES:

- Reinforced concrete tank
- Polypropylene and reinforced concrete partitions
- Airlift pumps

Anaerobic and Anoxic Zones



DESCRIPTION

Tubular aerators crafted from high-strength polyurethane film with laser perforations are positioned at the base of the aeration chamber, allowing for air supply. These aerators are organized into groups and can be turned off using valves located on the distribution manifold.

Additionally, airlift pumps are installed within the aeration chamber to remove surplus activated sludge from the secondary clarifiers.

EQUIPMENT INCLUDES:

- Reinforced concrete tank
- Tubular aerators
- Distribution manifolds
- Airlift pumps

Aeration Chamber



Secondary Sedimentation Tanks



DESCRIPTION

The walls of the secondary sumps consist of reinforced concrete and polypropylene.

The lower section is divided into two inverted pyramid-shaped compartments, allowing sludge to settle before being pumped out with airlift pumps.

At the top, there is a water collection tray crafted from stainless steel.

EQUIPMENT INCLUDES:

- Reinforced concrete partitions
- Polypropylene partitions
- Airlift pumps
- Water collection tray
- PVC pipes

Administrative Building



DESCRIPTION

The administrative and amenity building accommodates technological equipment designed for the removal of sand and debris from incoming wastewater, along with blower equipment. Additionally, the building features sludge dewatering rooms, maintenance personnel areas, restrooms, and various technical rooms.

THE BUILDING INCLUDES:

- Room designated for initial mechanical treatment units
- Room allocated for mechanical sludge dewatering
- Utility and amenity spaces

Post-Treatment and Disinfection Unit



DESCRIPTION

The drum-type micro filter enables the attainment of fresh water qualities, while the ultraviolet disinfection unit effectively neutralizes viruses and bacteria.

As an alternative, a membrane filtration unit can be employed, offering superior purification standards without the need for additional disinfection.

EQUIPMENT INCLUDES:

- Drum-style micro-screen filters
- Ultrasonic self-cleaning ultraviolet disinfection units
- Membrane filtration systems

Artificial Intelligence-Controlled System



DESCRIPTION

Information regarding equipment operating modes, sensor readings, and analyzer data is stored in the database and analyzed by AI. Using the collected data, the system identifies patterns related to maximum and minimum flow values, pollution levels, and more. These patterns enable the AI to forecast equipment performance in the near future. For instance, during nighttime or weekends, the equipment operates at 30% of its total capacity, while during peak discharge times, it increases air supply and recirculation to ensure effective water purification.

However, if the current conditions deviate from the predictions—such as an unexpected night peak discharge—the system promptly adjusts the equipment's operation based on real-time data from analyzers and measuring instruments. To ensure the system functions properly, data on pH, ORP, and temperature is sufficient.

EXAMPLE OF A WASTEWATER TREATMENT PLANT OPERATION WITH A CAPACITY OF 5000 M³/DAY

Time Interval	0:00 - 6:00	6:00 - 12:00	12:00 - 18:00	18:00 - 0:00
Wastewater Flow, m ³ /hour	83	340	250	158
Peak Flow, m ³ /hour	130	500	300	230
Total Flow, m ³	500	2,050	1,500	950
Number of Operating Blowers, units	2	4	4	2
Operating Frequency, Hz	35	60	45	60
Operating Mode (work-rest, min)	5/15	10/10	10/10	10/10
Total Electricity Consumption, kW*h	54	432	324	216

EXAMPLE OF A WASTEWATER TREATMENT PLANT OPERATION WITH A CAPACITY OF 5000 M³/DAY

Conclusion	
Daily Wastewater Influent, m ³	5,000
Electricity Consumption, kW*h	1,026
Energy consumption achieved: ~ 0.2 kWh/m ³ , which is 3 times less than in any other applied technology.	

CONSTRUCTION OF SEWAGE TREATMENT PLANTS OPTIONS.

OVERT TYPE



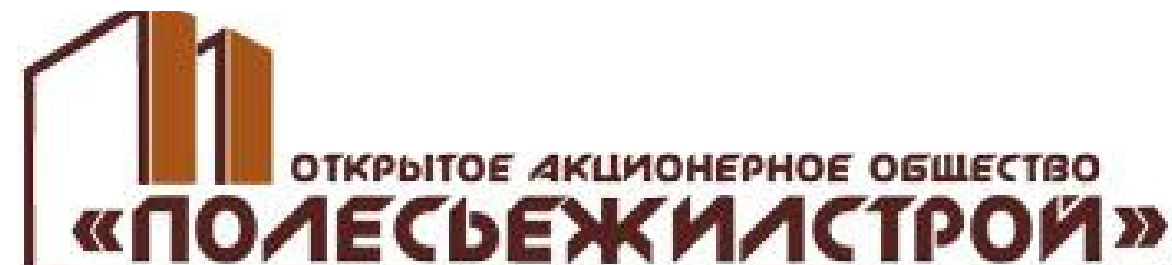
ENCLOSED TYPE



OUR PARTNERS



THE WORLD BANK



GEOGRAPHY OF APPLICATION OF M-UCT TECHNOLOGY IN SEWAGE TREATMENT PLANTS.

The implementation of a cohesive concept in the design and construction of sewage treatment plants, along with the adoption of standardized equipment and modular designs, enables:

- The development of unified projects for rapid expert assessment
- The construction of sewage treatment facilities that do not require maintenance staff
- The establishment of a centralized control room to oversee all operations with AI integration
- The reduction of operational expenses



BENEFIT OF APPLICATION

WHEN PROJECTS FOR SEWAGE TREATMENT PLANTS ARE EXECUTED BASED ON A UNIFIED CONCEPT, WE CAN EXPECT THE FOLLOWING BENEFITS:

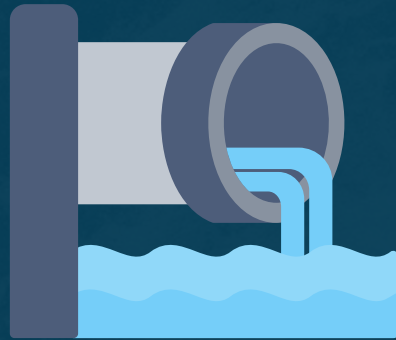
- Flexibility to modify the capacity of the sewage treatment facility
- Quick implementation timeframe
- Extended lifespan
- Structural reliability
- Superior treatment performance
- Up to 90% phosphorus removal without chemical reagents
- Utilization of corrosion-resistant materials
- Minimal operating expenses

BENEFIT OF APPLICATION

WHEN PROJECTS FOR SEWAGE TREATMENT PLANTS ARE EXECUTED BASED ON A UNIFIED CONCEPT, WE CAN EXPECT THE FOLLOWING BENEFITS:

- Innovative, contemporary design for sewage treatment facilities;
- Advanced automation that eliminates the need for highly skilled maintenance personnel;
- Exceptionally low energy expenses;
- Minimal use of reagents;
- Reliable operation even in low temperatures;
- Optimal utilization of materials and equipment produced in the Russian Federation;
- Consistent commitment to achieving zero emissions of pollutants into the environment.

OUR ADVANTANGES



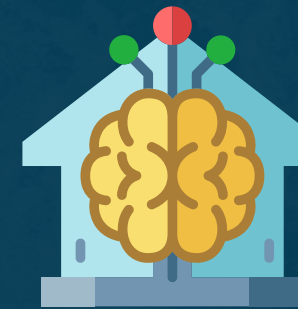
Top-notch equipment from premier global manufacturers.



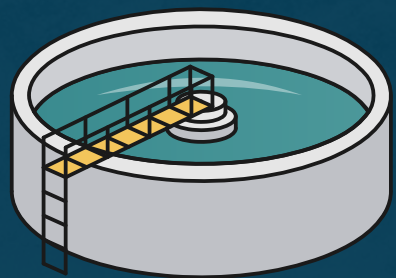
Energy consumption is minimal, ranging from 0.2 to 0.5 kW/m³.



Biological methods for the removal of nitrogen and phosphorus.



An artificial intelligence-based control system.



Increasing capacity can be achieved by adding more units.



No maintenance personnel required.

IMPLEMENTATION OVERVIEW: LOCATIONS AND CAPACITIES

No.	Location of completed treatment plants	Capacity, m ³ /day
1.	Stroyitel, Belgorodskaya Oblast, Russian Federation	10,000
2.	Rogachev, Gomelskaya Oblast, Belarus	9,300
3.	Smolevichi, Minskaya Oblast, Belarus	7,100
4.	Berezino, Minskaya Oblast, Belarus	5,000
5.	Drogichin, Brestskaya Oblast, Belarus	4,000
6.	Korocho, Belgorodskaya Oblast, Russian Federation	2,500
7.	Svisloch, Grodnenskaya Oblast, Belarus	2,000
8.	Novy Oskol, Belgorodskaya Oblast, Russian Federation	1,500

No.	Location of completed treatment plants	Capacity, m ³ /day
9.	Voronovo, Grodnenskaya Oblast, Belarus	1,500
10.	Malinovka, Kharkovskaya Oblast, Ukraine	1,500
11.	Shpitki, Kievskaya Oblast, Ukraine	1,500
12.	Oktyabrsky, Belgorodskaya Oblast, Russian Federation	1,500
13.	Cherikov, Mogilevskaya Oblast, Belarus	1,200
14.	Proletarsky, Belgorodskaya Oblast, Russian Federation	1,200
15.	Raubichi, Minskaya Oblast, Belarus	800
16.	Tavrovo, Belgorodskaya Oblast, Russian Federation	800

IMPLEMENTATION OVERVIEW: LOCATIONS AND CAPACITIES

No.	Location of completed treatment plants	Capacity, m ³ /day
17.	Poultry farm "Khalch", Gomelskaya Oblast, Belarus	660
18.	Veidelevka, Belgorodskaya Oblast, Russian Federation	600
19.	Graivoron, Belgorodskaya Oblast, Russian Federation	600
20.	Politotdelsky, Belgorodskaya Oblast, Russian Federation	600
21.	Kozelsk, Kaluzhskaya Oblast, Russian Federation	500
22.	Pyatnitskoye, Belgorodskaya Oblast, Russian Federation	400
23.	d. Uborki, Minskaya Oblast, Belarus	323
24.	Ivnya, Belgorodskaya Oblast, Russian Federation	300

No.	Location of completed treatment plants	Capacity, m ³ /day
25.	Khvastovichi, Kaluzhskaya Oblast, Russian Federation	200
26.	Kardymovo, Kaluzhskaya Oblast, Russian Federation	200
27.	Sovkhoz Lenina, Kaluzhskaya Oblast, Russian Federation	200
28.	d. Shchilovichi, Lyubansky district, Belarus	160
29.	Kutuzovskoye, KP "Luginino Park", Moscow Region, Russian Federation	120
30.	Bolshetroitskoye, Belgorodskaya Oblast, Russian Federation	120
31.	Cherikov, Mogilevskaya Oblast, Belarus	105
32.	Vorniany, Military unit "Vorniany", Grodnenskaya Oblast, Belarus	105

WASTEWATER TREATMENT PLANTS IN SYRIA

No.	Location of completed treatment plants	Capacity, m ³ /day
1.	Wastewater treatment in Zakia	3,000 PE
2.	Wastewater treatment in Dar Alkaramah	300 PE
3.	Wastewater treatment in Ghasola	3,000 PE
4.	Wastewater treatment in Sida	2,500 PE
5.	Wastewater treatment in Talkalkh hospital	200 / Beds
6.	Wastewater treatment in Alrasten hospital	200 / Beds

No.	Location of completed treatment plants	Capacity, m ³ /day
7.	Wastewater treatment in Alajami	700 PE
8.	Wastewater treatment in Jelin	3,000 PE
9.	Wastewater treatment in Alnashabia hospital	70 / Beds
10.	Wastewater treatment in Ghrez prison	1,200 PE
11.	Wastewater treatment in Aldomier	6,000 PE
12.	Wastewater treatment in Alktifea hospital	50 / Beds

WASTEWATER TREATMENT PLANTS IN SYRIA

No.	Location of completed treatment plants	Capacity, m ³ /day
13.	Wastewater treatment in Habran	7,000 PE
14.	Wastewater treatment in Nemrah	6,500 PE
15.	Wastewater treatment in Salah	2,700 PE
16.	Wastewater treatment in Shahba hospital	60 / Beds
17.	Wastewater treatment in Salaa hospital	60 / Beds

No.	Location of completed treatment plants	Capacity, m ³ /day
18.	Wastewater treatment in Alayadt hospital	60 / Beds
19.	Wastewater treatment in Nahas establishment	10 PE
20.	Wastewater treatment in Khasib establishment	30 PE
21.	Wastewater treatment in Carton factory	5m/day
22.	Wastewater treatment in Biroty restaurant	50 PE

THANK YOU

Technology Provider



Exclusive Partner

