



BELEKPOL

220049 Belarus, Minsk,
Sevastopolskya st. 21
tel: +375 17 280-65-60
mob: +375 29 662-62-69
E-mail: info@belekpol.ru
Web: www.belekpol.ru

WASTE WATER TREATMENT TECHNOLOGIES AND EQUIPMENT



Principal Directions of Activity

35 years on the market

Design

Construction
Reconstruction

Production
and Installation
of Equipment
and Automatics

Capacity of
Designed Facilities
 $10\div 1200000\text{ m}^3/\text{day}$

Commissioning
and Start-up

Monitoring and
Optimization

Research and
Development
Consulting

GEOGRAPHIC REACH OF BELEKPOL COMPANY





For more than 33 years "Belekpól" has been successfully involved in survey, design, construction, reconstruction and commissioning of pumping stations and treatment facilities for urban and industrial waste water. "Belekpól" also provides manufacturing and installation of modern technological equipment the Company has successfully implemented the design and construction of more than 280 facilities of sewerage systems. The capacity of existing systems varies up to 1,200,000 m³/day.

"Belekpól" has won international tenders in Belarus, Poland, Macedonia, China, Yugoslavia, Kazakhstan and Russia. The Company has been awarded various certificates and diplomas. Belekpól has established business relationships with Western European countries, Egypt, UAE, Saudi Arabia.

Based on our own invention and experience **the Company has developed and introduced the whole range of new technologies and solutions of new generation, based on the use of bioblocks. Bioblocks are wastewater treatment units of different capacity providing all the processes for wastewater treatment in one facility.**

The Company has developed a number of projects of various capacities for the construction of deep biological sewage treatment and modern technological equipment, which provides development and modernization of existing objects, increasing their quantitative and qualitative characteristics to the required demand and making it economically viable. The results were confirmed by the state expertise and in the process of their functioning.

The advantages of such bioblocks are their compact dimensions, high performance and ability to work in semi-automatic (if necessary fully automatic) mode.

Reliability and durability of these structures is provided by their original compact design, energy-saving methods of biological processes and required technological equipment.

The absence of separate standing facilities, energy-intensive mechanical equipment, pumps, scrapers makes wastewater treatment plants more reliable. It also provides decrease of staff required to maintain the equipment and decrease of energy costs making the whole process of water treatment more efficient.

Modular principle of construction provides increase of construction phase by phase taking into consideration the required capacity and existing investments.

The specific feature of bioblock is that **the process of contaminations oxidation proceeds both in the aerated zone and in suspended anoxic layer of activated sludge in sludge separator (secondary settling tank).** Depending on impurities concentration to be treated, a special design of bioblock

with a required capacity and technological regime is developed, providing the necessary content of nitrogen and phosphorus in the treated water. **The following regimes can be provided: full biological treatment, nitrification-denitrification, biological dephosphating of water.**

After the required mass transfer between the aerated zone and sludge separator has been chosen, the desired degree of mixed liquor recycling in the bioblock, which provides the control of BOD and nitrogen and phosphorus compounds in the cleaning process might be controlled.

Bioblock is **equipped with pneumatic fine-bubble aeration system**, which in combination with the design of the facilities **provides the necessary oxygen regime and high mass transfer of mixed liquor.**

The number of aerosol emissions using bioblocks is sharply reduced as compared with traditional water treatment solutions.

There are almost no aerobic processes, therefore the proposed technology provides protection against smells, which can reduce the area of the sanitary protection zone. The combination of all technological processes in one modular construction significantly reduces the area of wastewater treatment facilities and the length of the necessary technological communications, which has been confirmed by already functioning for many years facilities. Therefore, such facilities can be placed in almost any part of the populated areas (the size of the sanitary zone is approx. 20-180 m.), i.e there is an opportunity to decentralize wastewater treatment systems in the cities. It makes the development of cities cheaper and less energy-intensive.

The use of bioblocks provides decrease of:

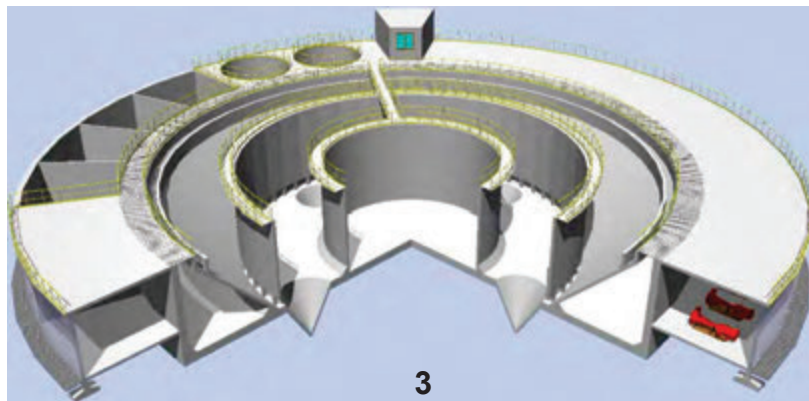
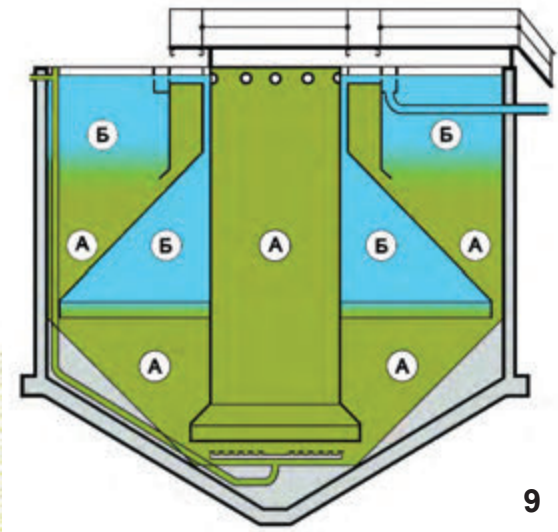
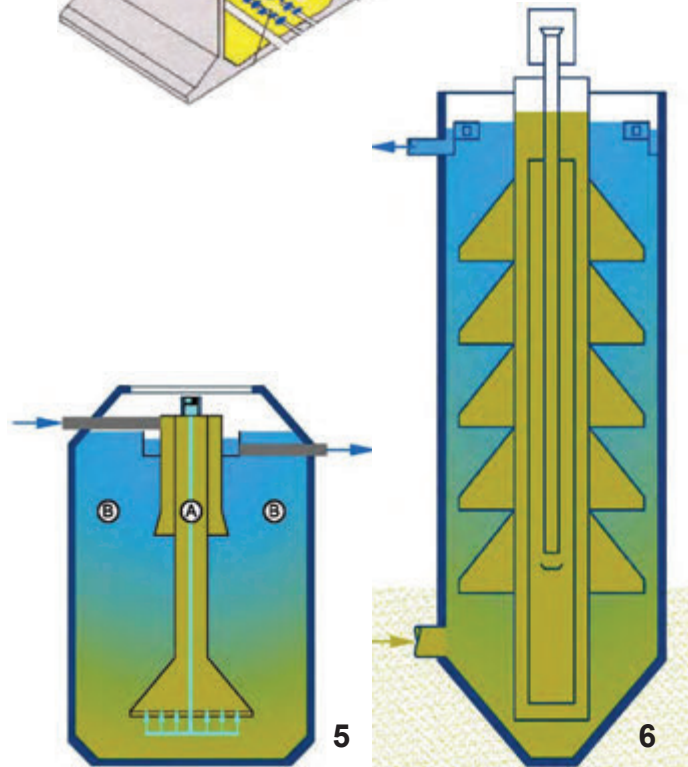
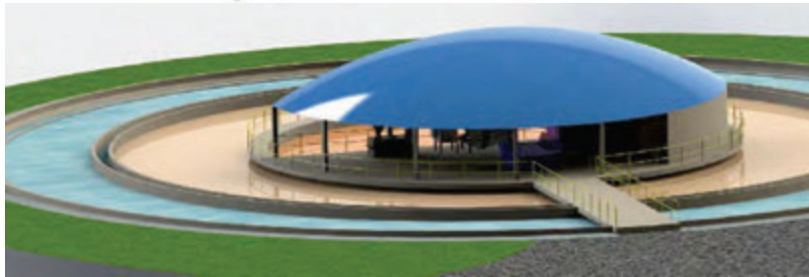
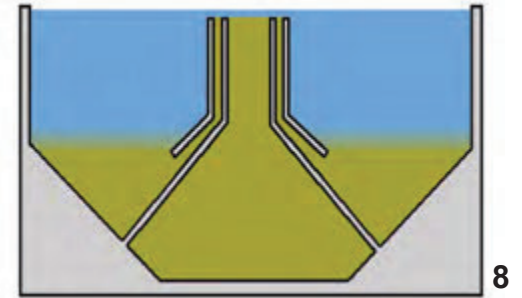
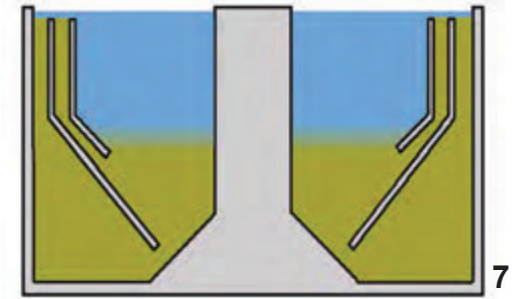
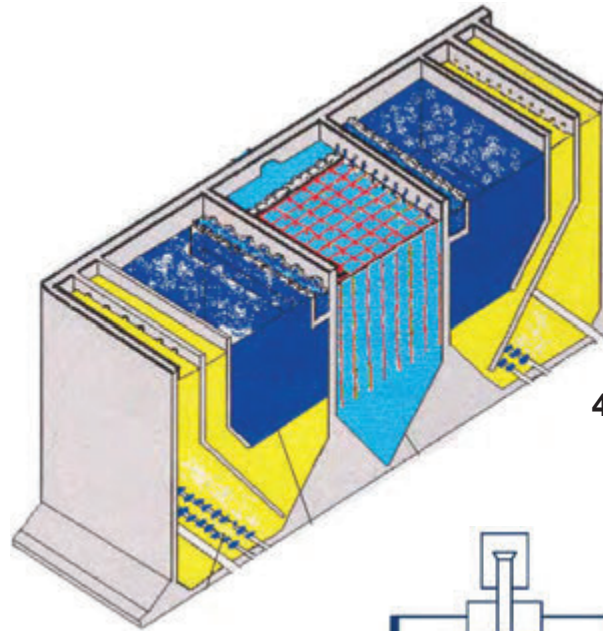
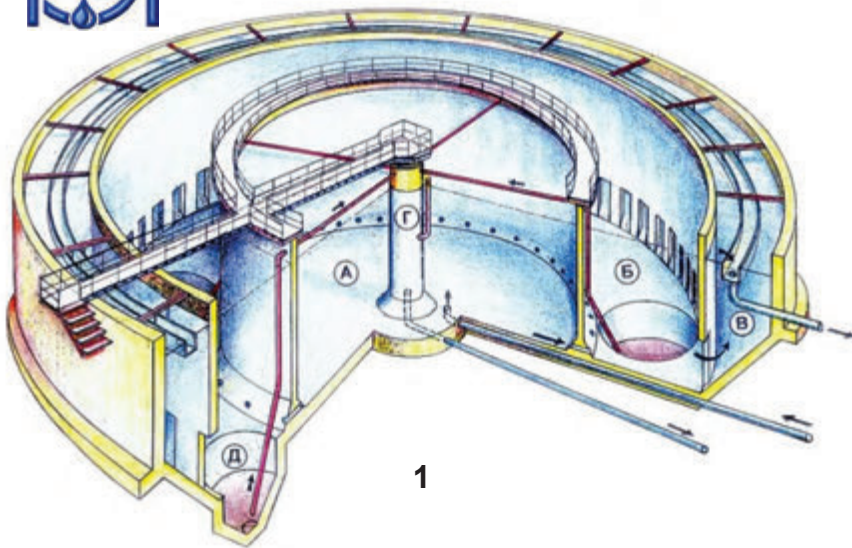
- | | |
|--|----------------------|
| • facilities construction | up to 60% |
| • earthworks | up to 70% |
| • extent of technological communication | by 2÷6 times |
| • energy consumption of facilities | up to 40% |
| • footprint | up to 50÷60% |
| • sanitary zone area | by 3÷10 times |
| • the number of staff | by 2÷3 times. |

Similar treatment facilities based on the use of bioblocks were designed and built in a number of cities in Belarus, Russia, Kazakhstan and Poland.

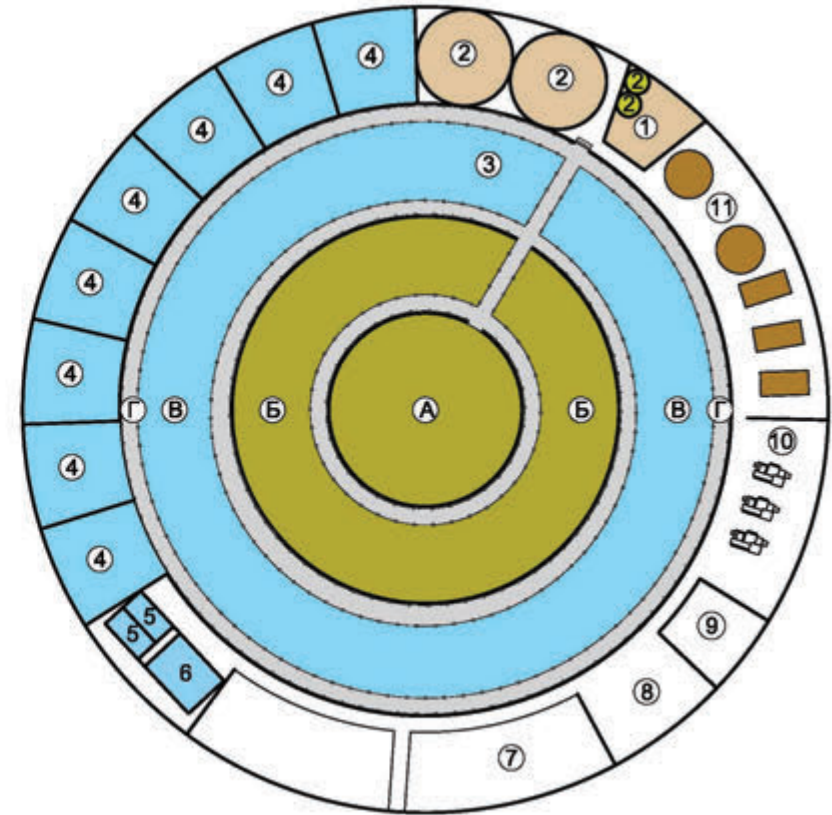
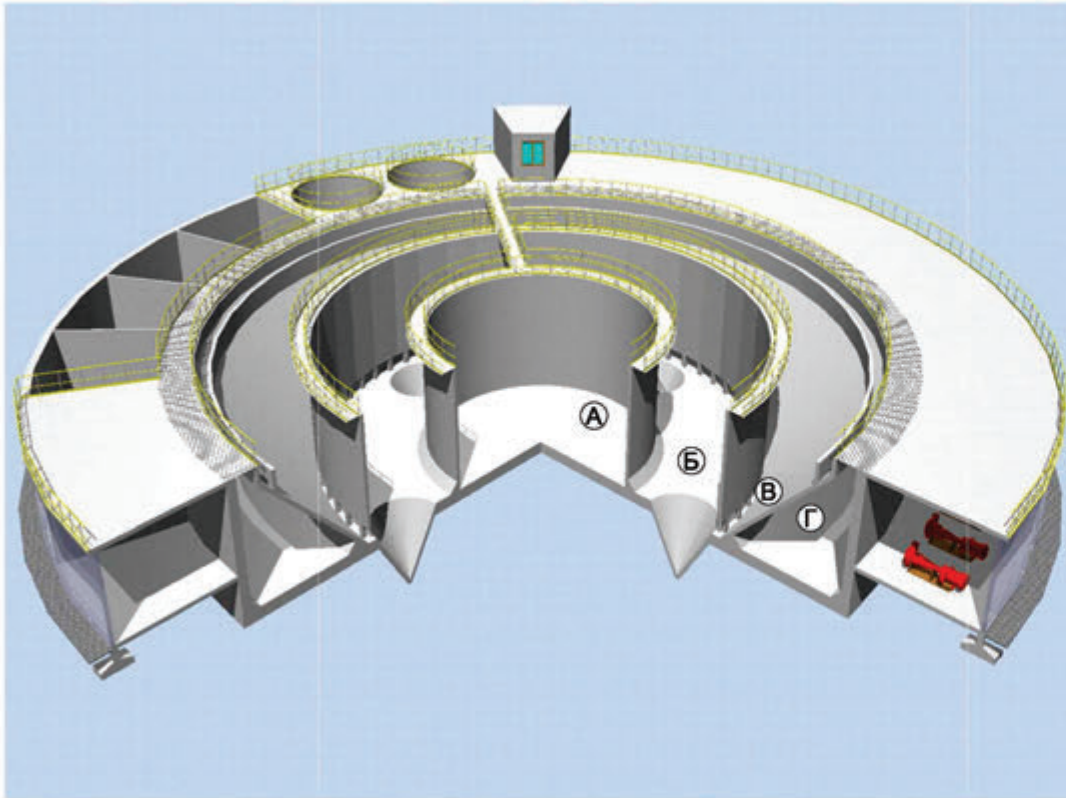
During operation all the above mentioned benefits were confirmed. The facilities have been functioning for many years in a number of cities in Western Europe and Belarus without any complaints received from the public and health services.



BELEKPOL COMPLETE BLOCK STATIONS – the new generation stations for deep municipal wastewater treatment



BELEKPOL COMPLETE BLOCK STATION - a new generation for deep municipal wastewater treatment (variant of treatment station arrangement inside open-type process and production facility)



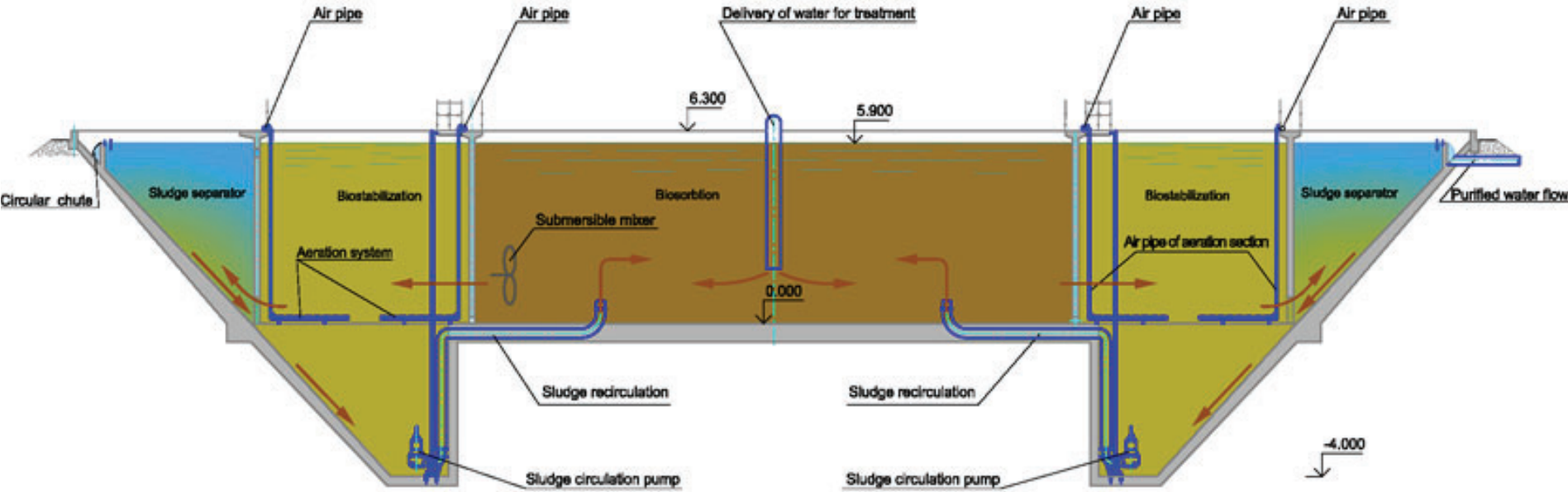
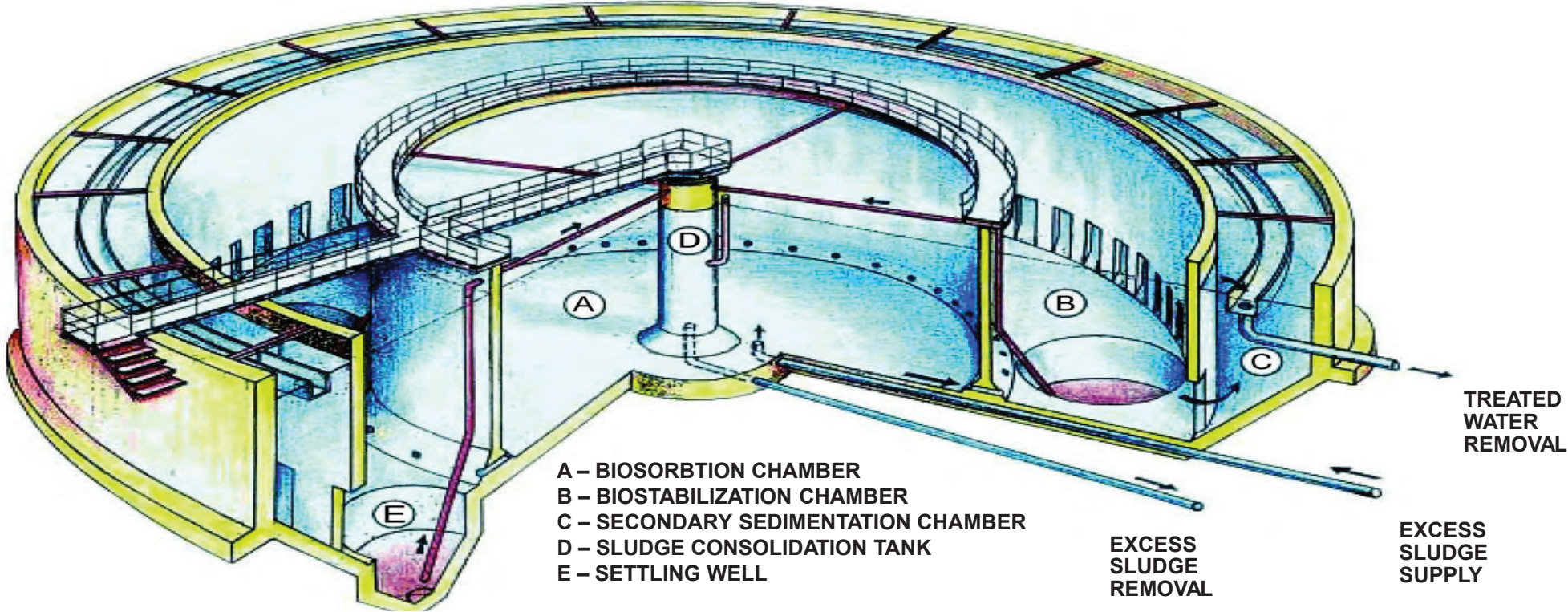
The technology, design features and equipment of BELEKPOL treatment facilities as compared to traditional solutions provide for the reduction of:

- | | |
|--|-------------|
| ◆ Pollution degree | up to 99 %; |
| ◆ Excessive sludge | 2-6 times; |
| ◆ Power consumption | over 40 %; |
| ◆ Building area | up to 50 %; |
| ◆ Construction period | over 50 %; |
| ◆ Length of process communication lines | 2-6 times; |
| ◆ Investment outlay | 2-3 times; |
| ◆ Cost and number of operating personnel | upto 50 %. |

Components of treatment facilities:

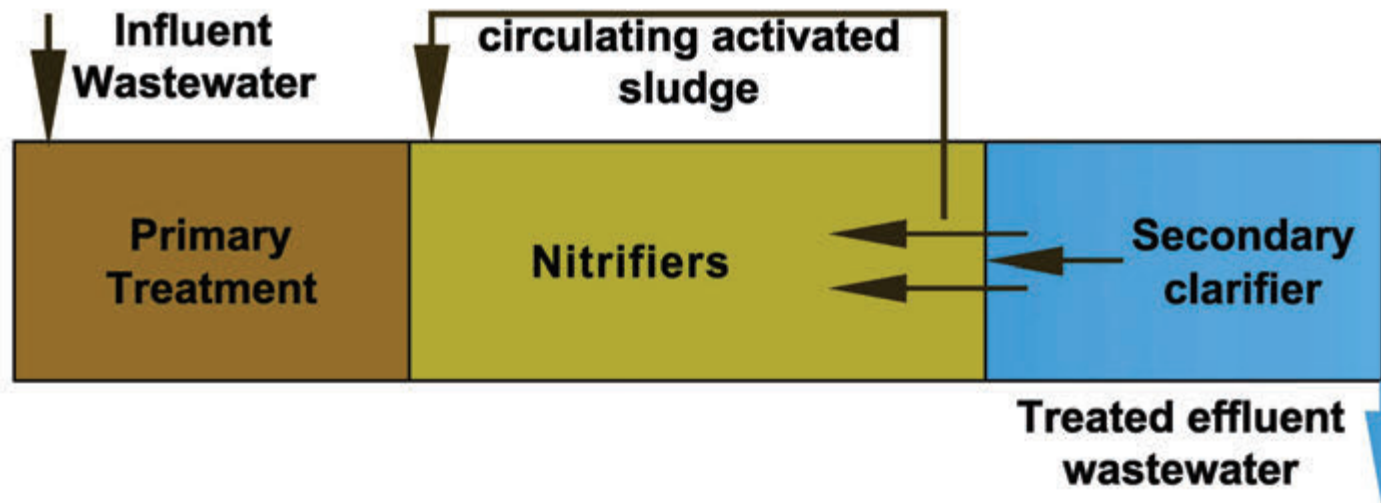
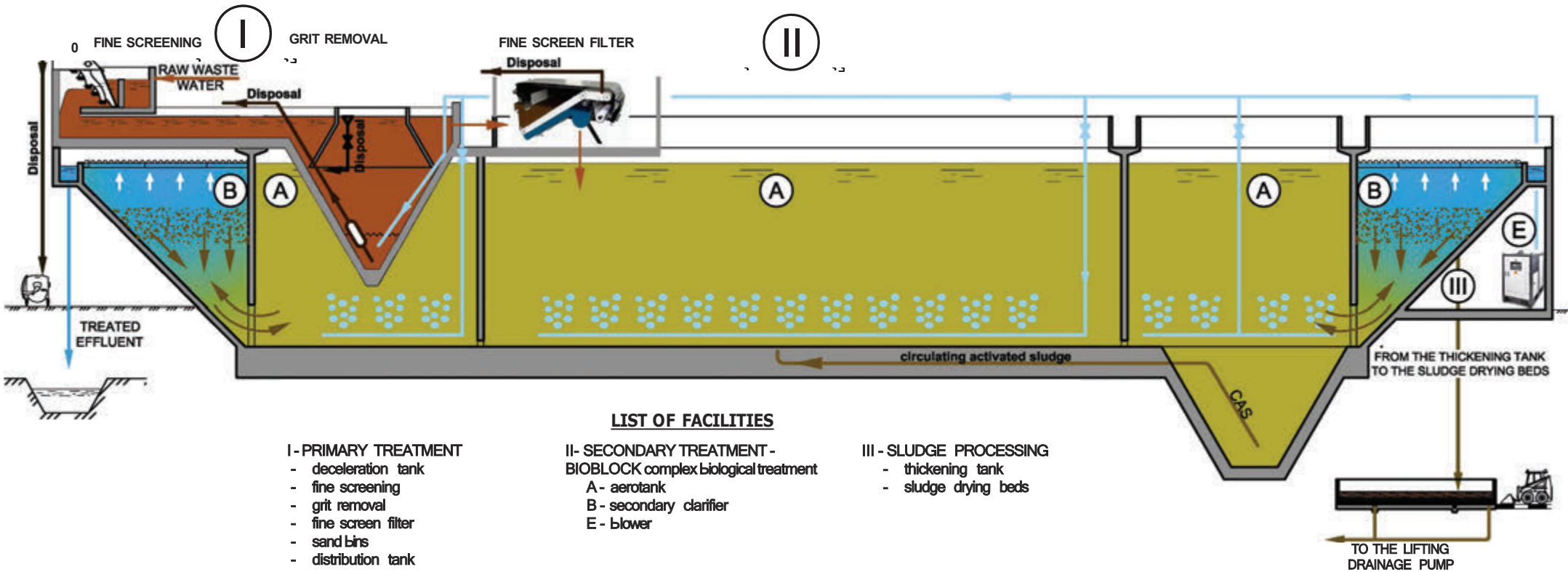
1. Screens hall
2. Grit chambers with sand bunkers
3. Bio-unit
4. Bioreactors for tertiary treatment
5. Microstrainers chamber
6. UV disinfection unit
7. Administration building with boiler house
8. Workshop
9. Transformer station
10. Blowing house
11. Mechanical sludge dewatering shop

BIOBLOCK – A COMPACT HIGH-CAPACITY WASTEWATER TREATMENT FACILITY

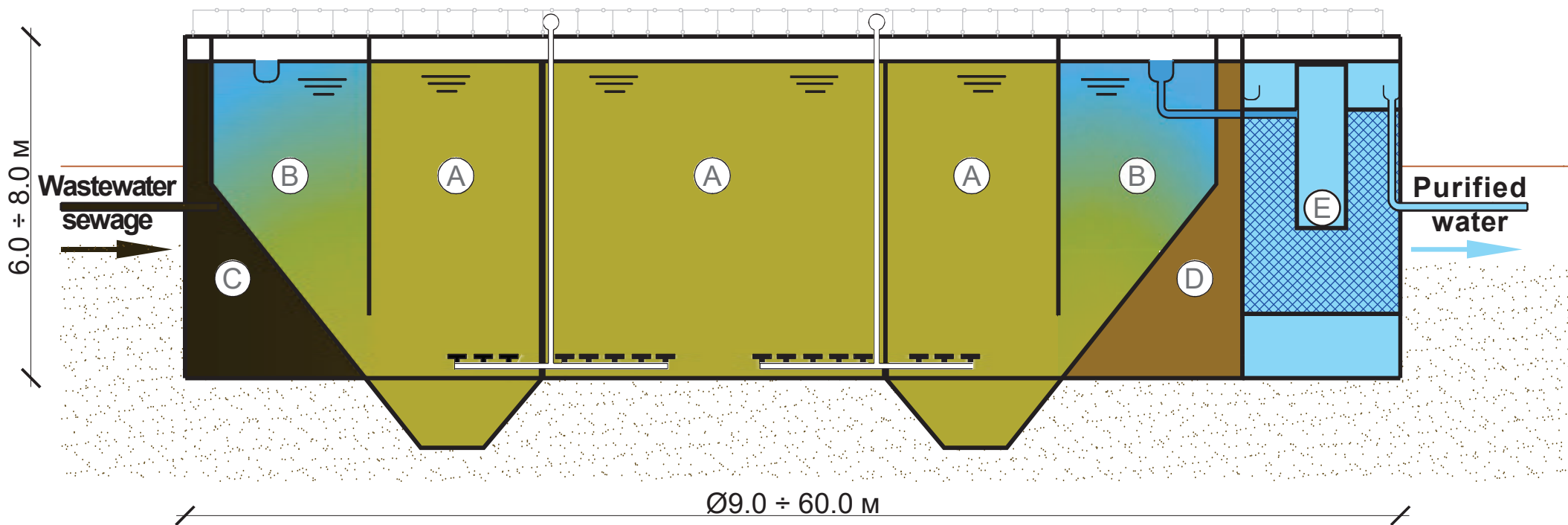


BELEKPOL COMPLETE BLOCK STATION - A new generation station for municipal wastewater treatment

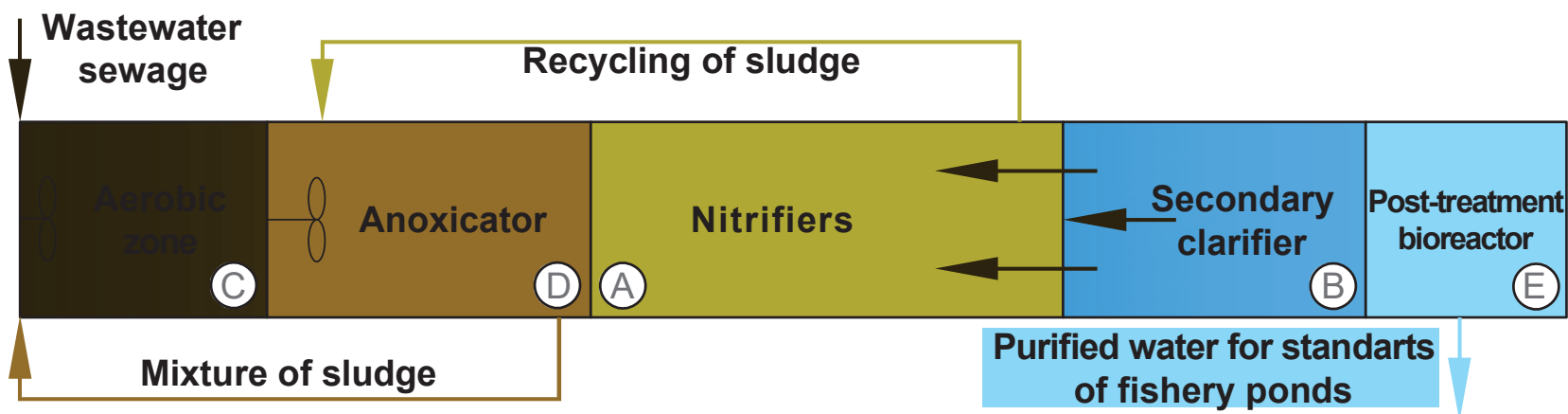
SCHEMATIC FLOW DIAGRAM OF WASTEWATER TREATMENT



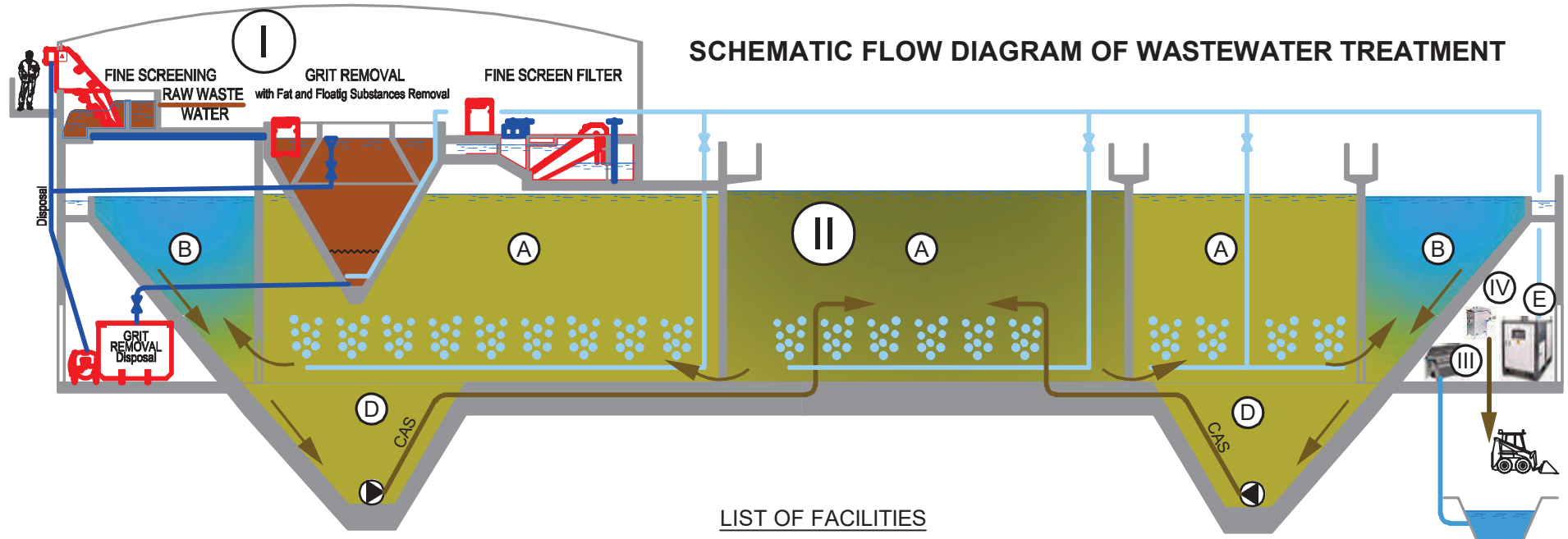
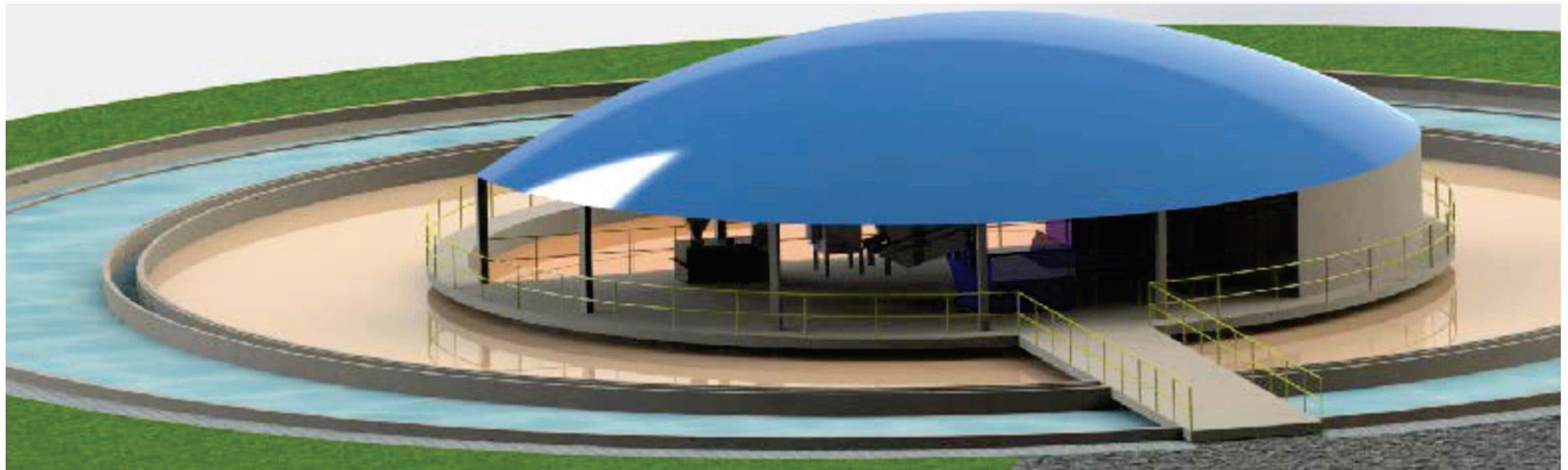
**COMPLETE - BLOCK STATION «BELEKPOL» -
station of new generation for deep cleaning of municipal wastewater (Q = 1 000 ÷ 20 000 m³/day)**



Technological scheme of sewage treatment in complete - block station "BELEKPOL"



BELEKPOL COMPLETE BLOCK STATION - A new generation station for municipal wastewater treatment



SCHEMATIC FLOW DIAGRAM OF WASTEWATER TREATMENT

LIST OF FACILITIES

- I- PRIMARY TREATMENT**
- deceleration tank
 - fine screening
 - fine screen filter
 - distribution tank

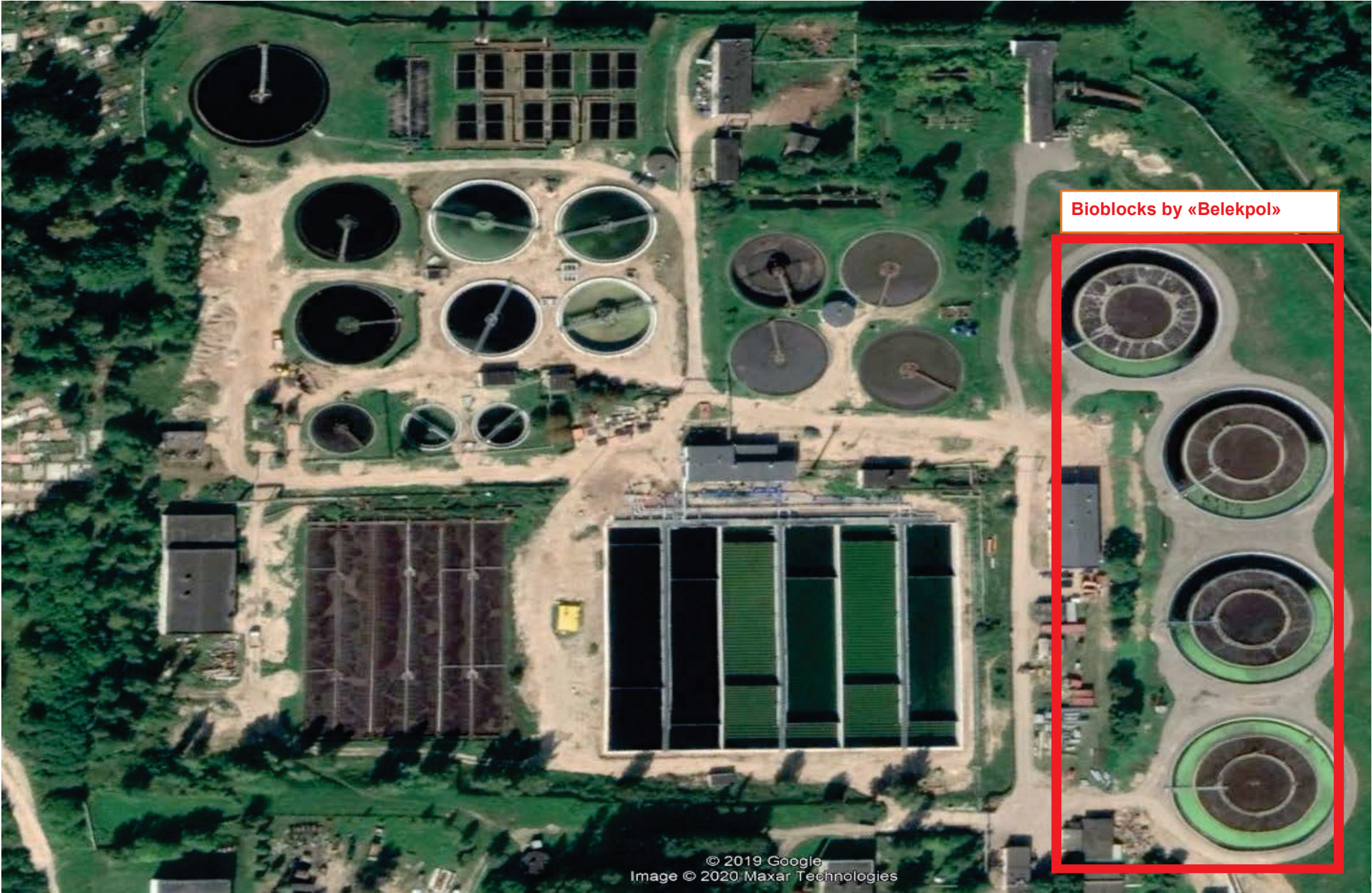
- II - SECONDARY TREATMENT - BIOBLOCK**
- complex biological treatment
- A - aerotank
 - B - secondary clarifier
 - D - return sludge pump
 - E - blower

- III - TERTIARY TREATMENT**
- microfiltration
 - disinfecting installation

- IV - SLUDGE PROCESSING**
- Sludge dehydrator

TREATED EFFLUENT

Increasing Capacity of Existing Wastewater Treatment Facilities in Vitebsk from 100 000 m³/day up to 160 000 m³/day using Belekpól Bioblocks



BELEKPOL BIOBLOCK IN VITEBSK, BELARUS



PRESENTATION OF BIOBLOCK
OPERATION TO THE DELEGATION
FROM THE UNITED ARAB EMIRATES

BELEKPOL BIOBLOCK IN VITEBSK, BELARUS



GORKI SEWAGE TREATMENT FACILITIES, BELARUS



LIDA SEWAGE TREATMENT FACILITIES, BELARUS



BIOBLOCK OPERATION



**TREATMENT OF MICRODISTRICT SEWAGE EFFLUENTS ON THE BASIS
OF BIO-UNITS FOR 50 THOUSAND PEOPLE IN CZECH REPUBLIC**



CONSTRUCTION BELEKPOL BIOBLOCK



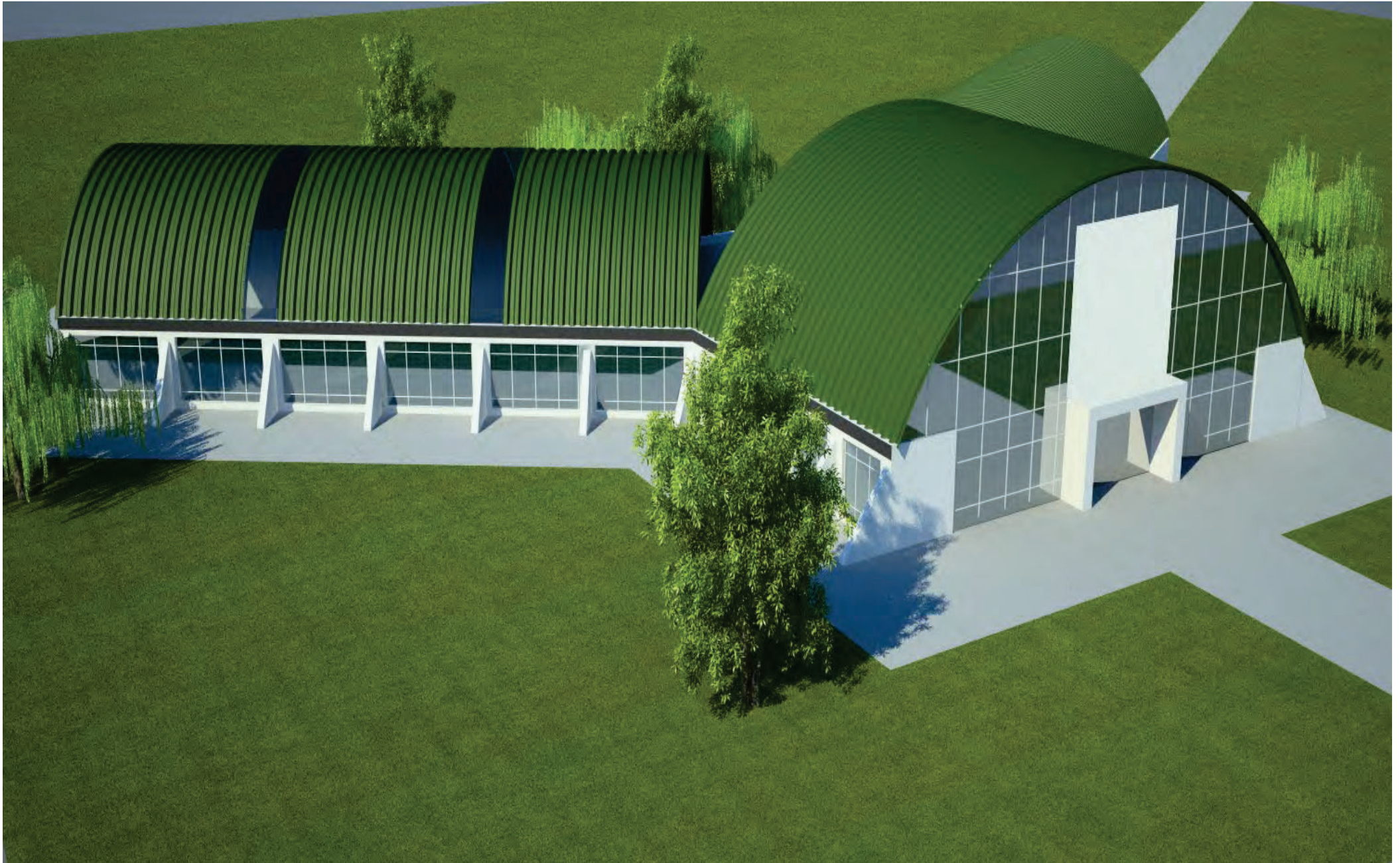
CONSTRUCTION BELEKPOL BIOBLOCK , BELARUS



CONSTRUCTION BELEKPOL BIOBLOCK, RUSSIA



**Variant of municipal wastewater treatment facilities complex
arranged inside a frameless arch building**



**Variant of the front of municipal wastewater treatment facilities
complex with a capacity of 5–20 thous. m³/day**



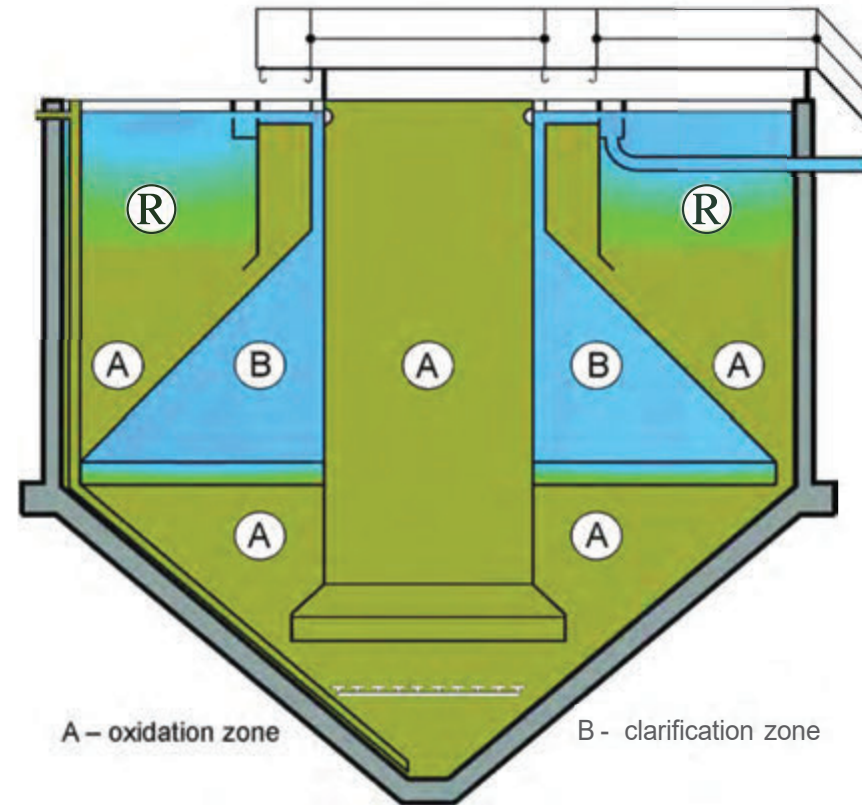
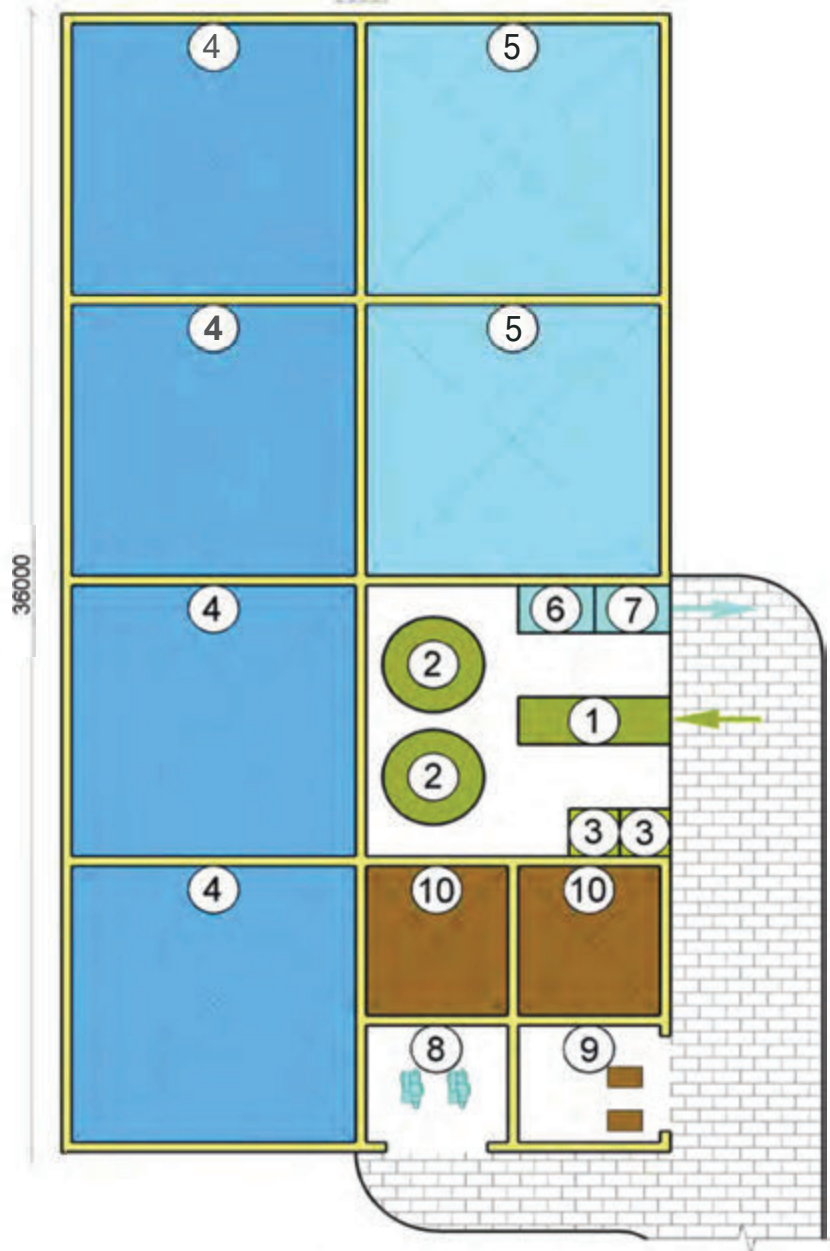
**VARIANT OF MUNICIPAL WASTEWATER TREATMENT FACILITIES COMPLEX
ARRANGED INSIDE A FRAMELESS ARCH BUILDING**



**ANALOGUE OF THE CONSTRUCTION SOLUTION OF COMPLETE-BLOCK SEWER TREATMENT FACILITIES
OF ABOVE-GROUND TYPE**



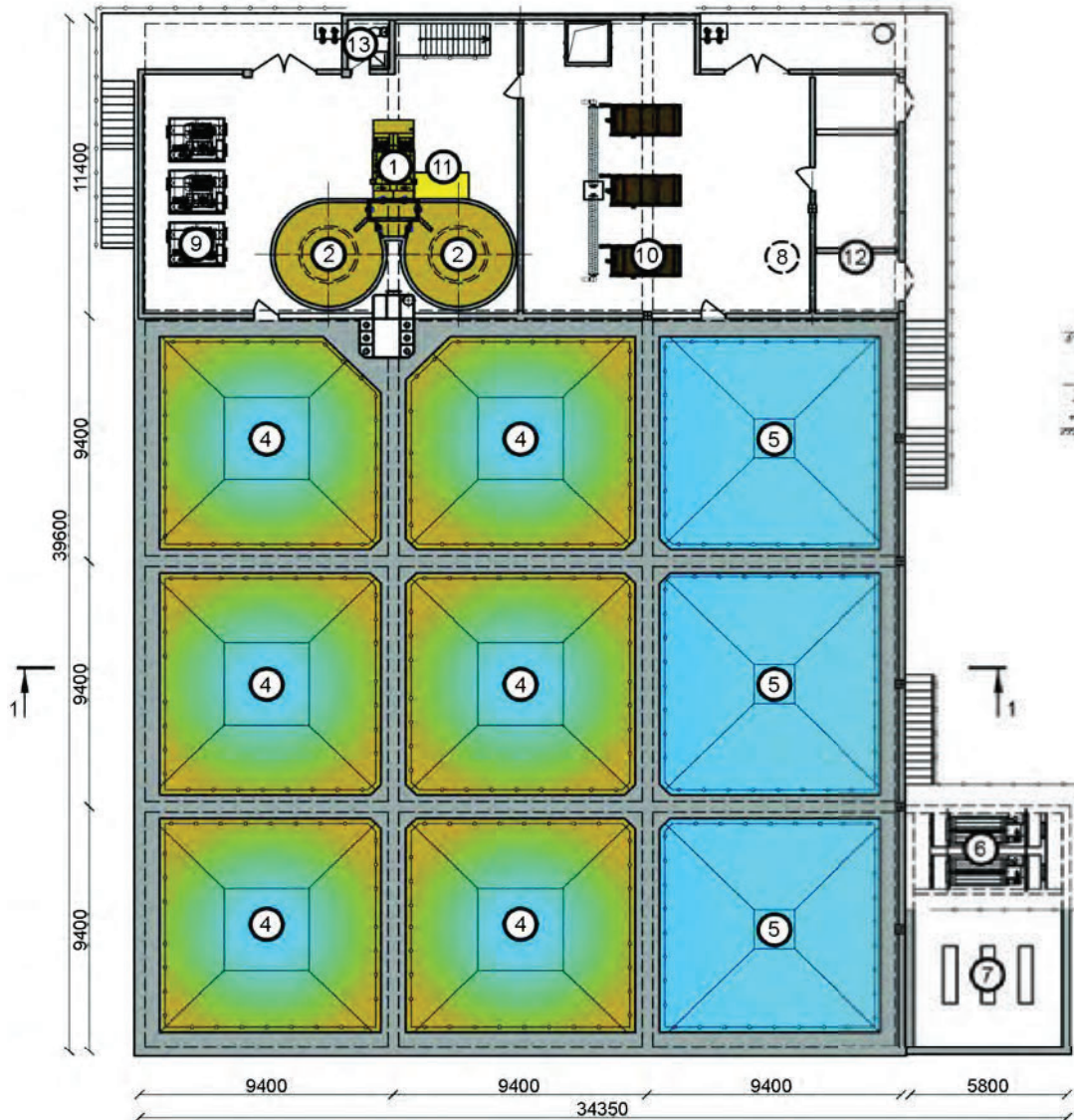
BELEKPOL complete block station
for deep wastewater treatment $Q = 4,000 \text{ m}^3/\text{day}$



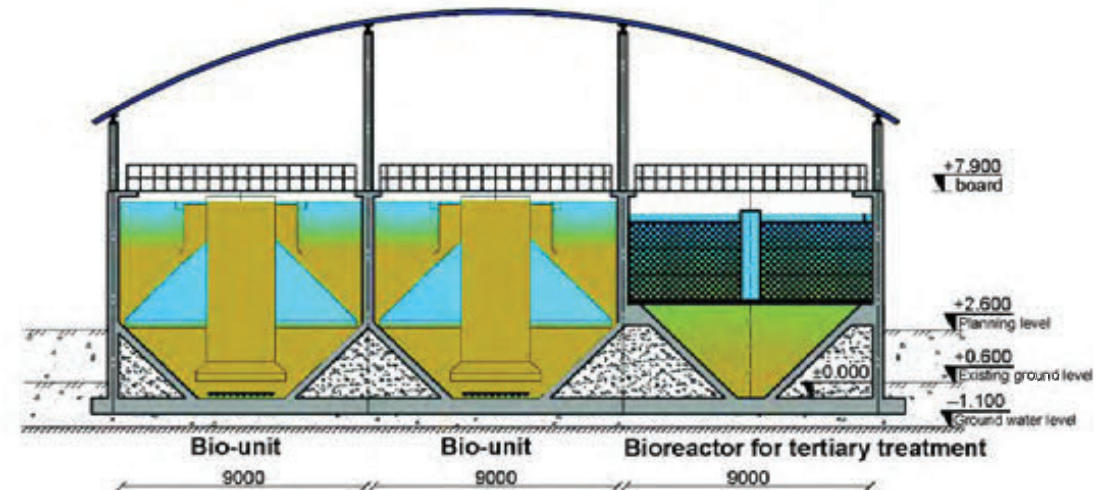
Components of treatment facilities:

- | | |
|--------------------------------------|-----------------------------------|
| 1. Screens hall | 6. Microstrainer |
| 2. Grit chambers | 7. Disinfection unit |
| 3. Sand bunker | 8. Blowing house |
| 4. Bio-units | 9. Sludge dewatering shop |
| 5. Bioreactor for tertiary treatment | 10. Sludge accumulating reservoir |

BELEKPOL modular facility – a new generation facility for deep municipal wastewater treatment with a capacity of 6,000 m³/day



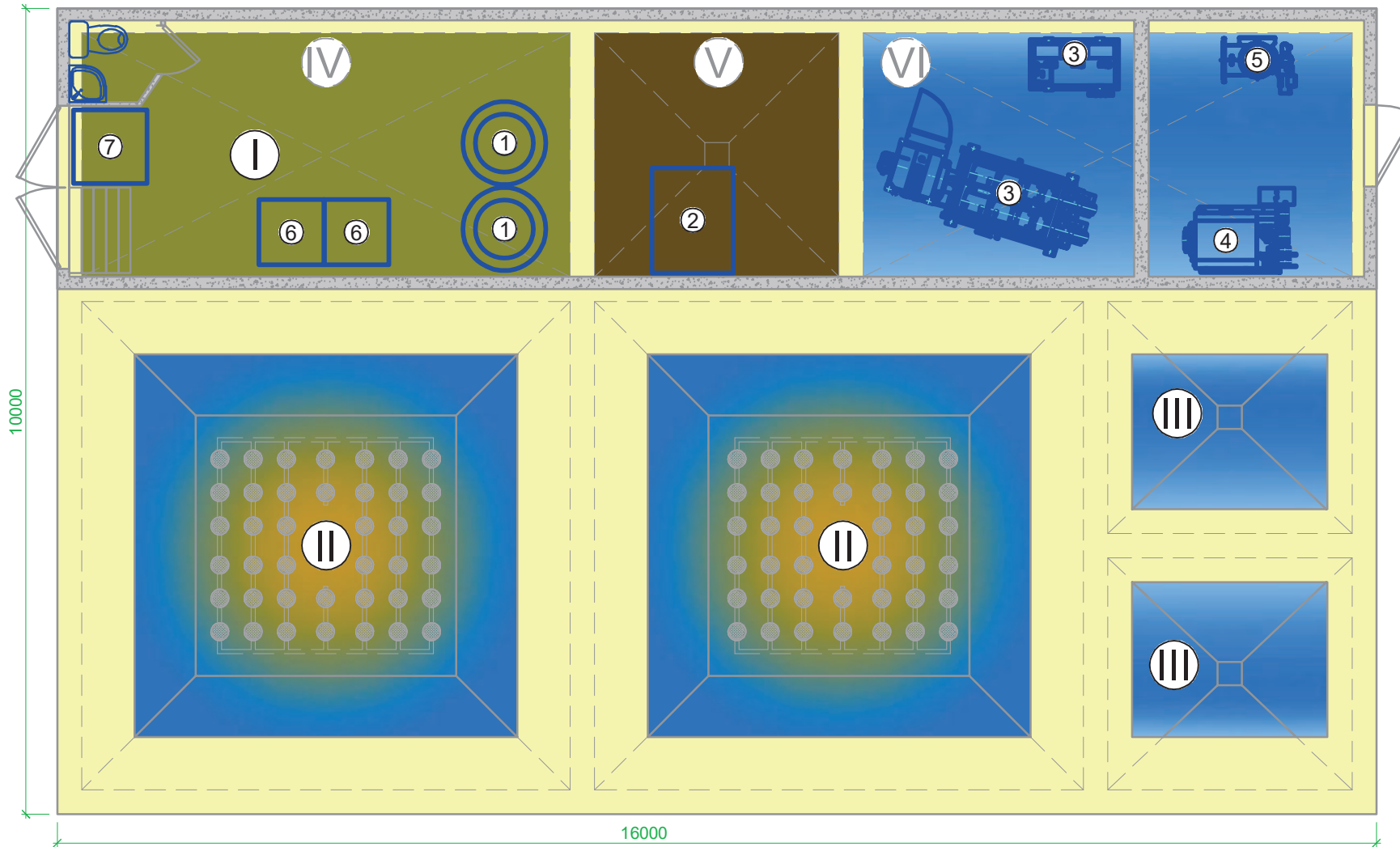
Section 1-1



- | | |
|--------------------------------------|---------------------------------------|
| 1. Mechanical filtering screen | 8. Sludge accumulator |
| 2. Grit chamber | 9. Blowing house |
| 3. Separation chamber | 10. Mechanical sludge dewatering unit |
| 4. Bio-unit | 11. Sand bunker |
| 5. Bioreactor for tertiary treatment | 12. Transformer station |
| 6. Microstrainers unit | 13. WC |
| 7. Water disinfection unit | |

Note. Treatment degree according to regulations for fishery water bodies

PLAN OF SEWAGE TREATMENT FACILITIES OF THE TOURIST COMPLEX



Ⓘ **Primary treatment.**
Zone of mechanical wastewater treatment

Ⓙ **Secondary treatment.**
Zone of biological wastewater treatment

Ⓚ **Tertiary treatment.**
Zone of deep biological wastewater treatment

Ⓛ **Equalization tank**
(Sewage regulator)

Ⓜ **Sludge thickener**

Ⓨ **Purified water tank**

TECHNOLOGICAL EQUIPMENT

① Sand trap, sand separator

② Mechanical sieve

③ Sludge dehydrator

④ Microscreen drum filter

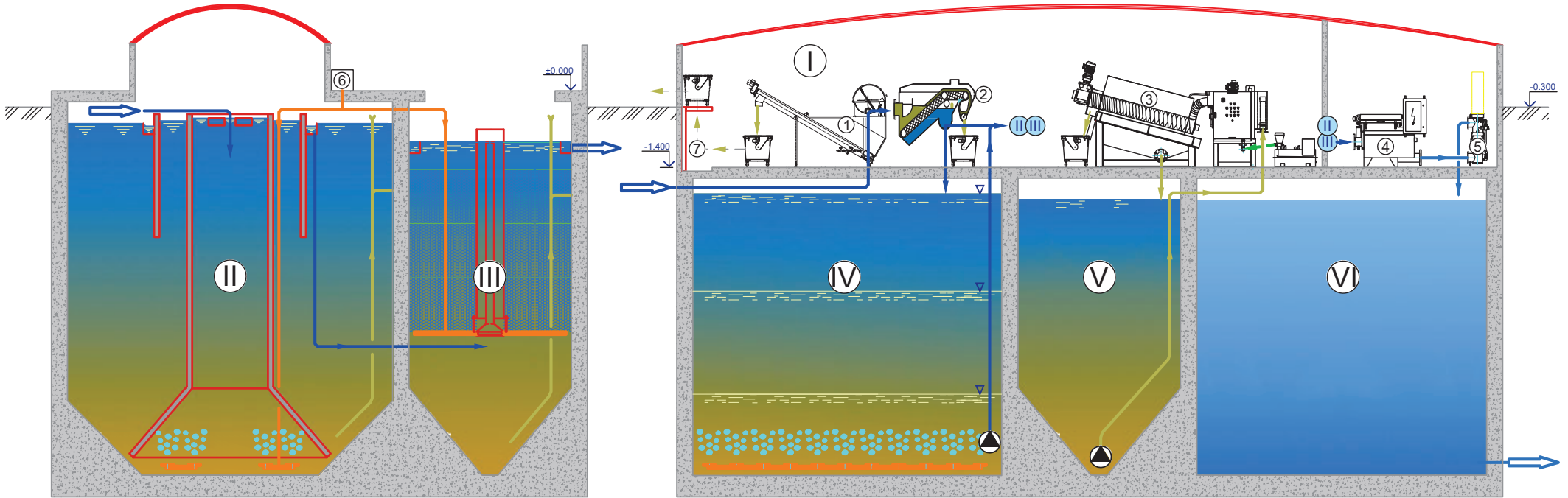
⑤ Ozonizer

⑥ Blower

⑦ Service lift



TECHNOLOGICAL SCHEME OF WASTEWATER TREATMENT OF THE TOURIST COMPLEX



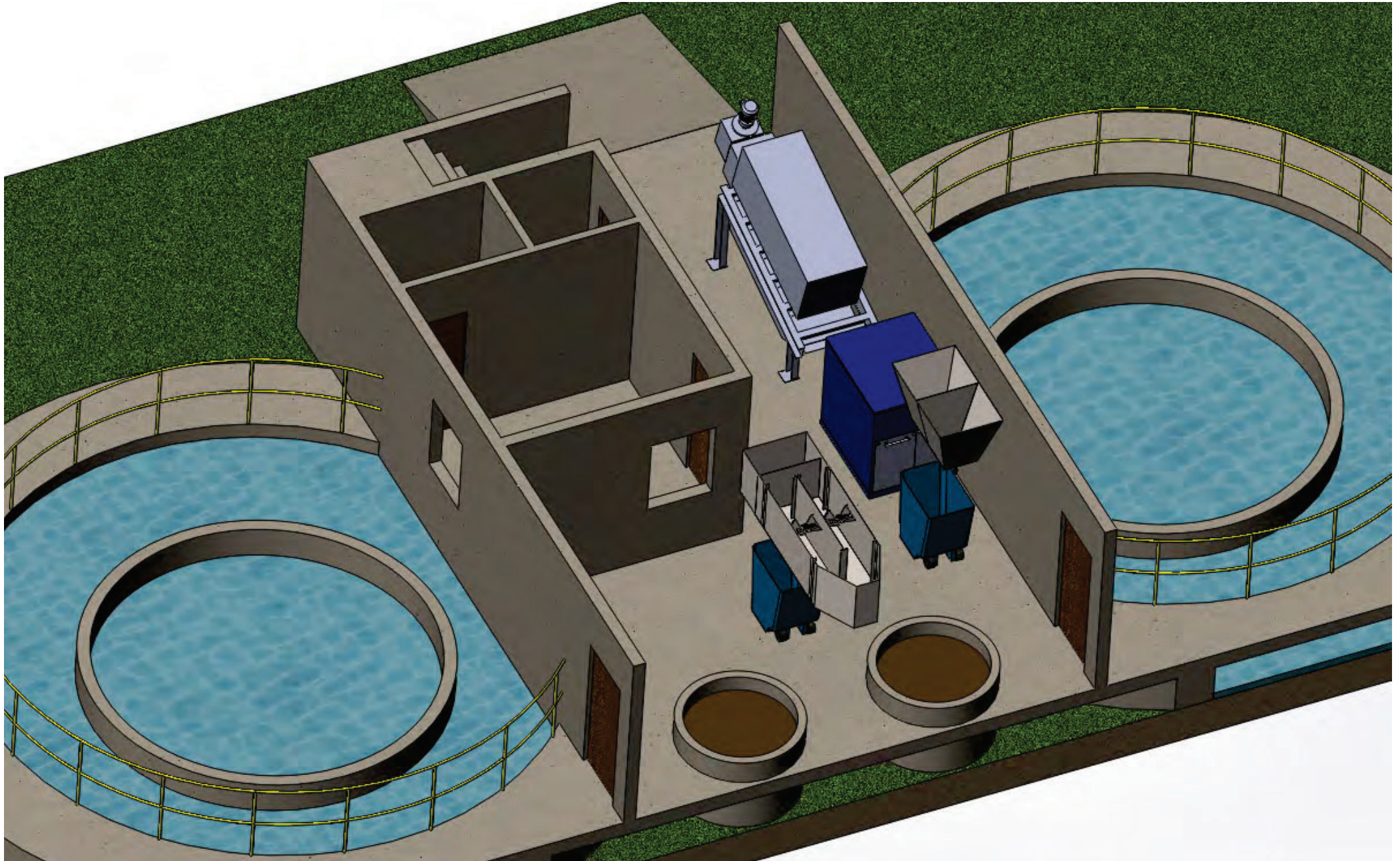
- Ⓘ **Primary treatment.**
Zone of mechanical wastewater treatment
- Ⓙ **Secondary treatment.**
Zone of biological wastewater treatment
- Ⓚ **Tertiary treatment.**
Zone of deep biological wastewater treatment

- Ⓛ **Equalization tank**
(Sewage regulator)
- Ⓜ **Sludge thickener**
- Ⓨ **Purified water tank**

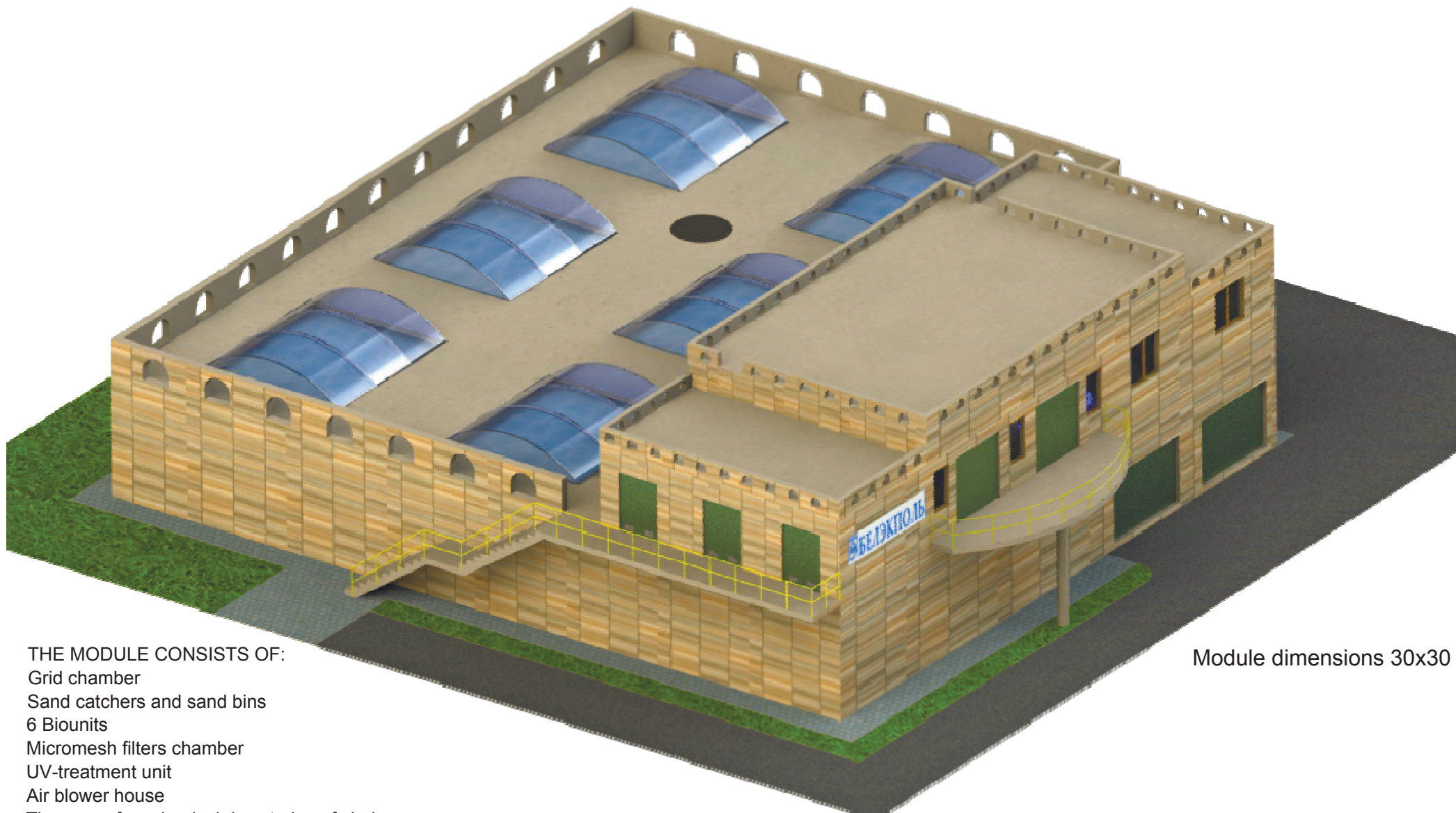
TECHNOLOGICAL EQUIPMENT

- | | |
|-----------------------------|----------------|
| Ⓐ Sand trap, sand separator | Ⓟ Ozonizer |
| Ⓑ Mechanical sieve | Ⓠ Blower |
| Ⓒ Sludge dehydrator | Ⓡ Service lift |
| Ⓓ Microscreen drum filter | |

**WASTEWATER TREATMENT FACILITIES WITH THE CAPACITY OF $Q = 2\,000\text{ m}^3/\text{day}$, $F=20\times 10\text{m}$
(WITH MECHANICAL DEWATERING OF SLUDGE)**



BIOLOGICAL MODULE FOR WASTEWATER TREATMENT $Q = 5\ 000\text{-}6\ 000\ \text{m}^3/\text{day}$



THE MODULE CONSISTS OF:

- Grid chamber
- Sand catchers and sand bins
- 6 Biounits
- Micromesh filters chamber
- UV-treatment unit
- Air blower house
- The area of mechanical dewatering of sludge
- 2 sludge tanks
- Administration building
- Maintenance facility

Module dimensions 30x30 m

BIO-UNIT DESIGNED BY BELEKPOL, $Q=1,000 \text{ m}^3/\text{day}$ ($D=9.0 \text{ m}$)



BERYOZOVKA SEWAGE TREATMENT FACILITIES, BELARUS (Q= 10 000 m³/day)



BIO-UNIT TYPE TREATMENT FACILITIES MODULE (UNDERGROUND VERSION)





LAYOUT OPTION OF SEWER TREATMENT FACILITIES BASED ON BIOBLOCKS "BELEKPOL" $Q=3000\text{m}^3/\text{day}$



BLACKPOOL BIOREACTOR WITH FIXED BED BIOFILM



BELEKPOL ARTIFICIAL ALGAE FOULING IS EVIDENT



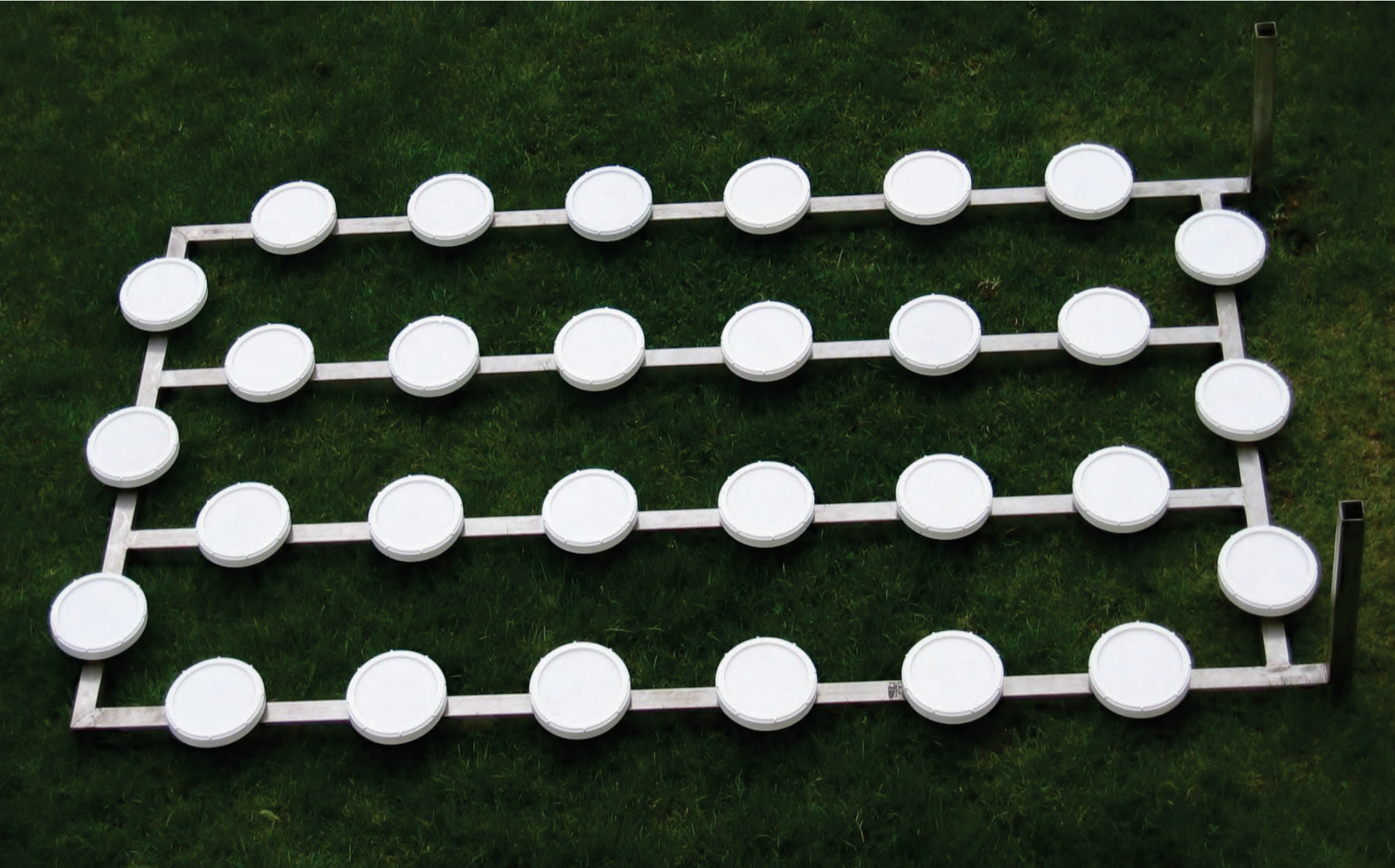
**VARIANT OF BIO-UNITS ARRANGEMENT FOR TERTIARY TREATMENT
IN BIOBLOCK SECONDARY SEDIMENTATION ZONE ($Q=15\ 000\ \text{m}^3/\text{day}$)**



**TERTIARY TREATMENT BIOREACTOR DESIGNED BY BELEKPOL
STARGARD, POLAND (Q=25 000 m³/day)**



LIFTING SECTION OF BELEKPOL AERATION SYSTEM



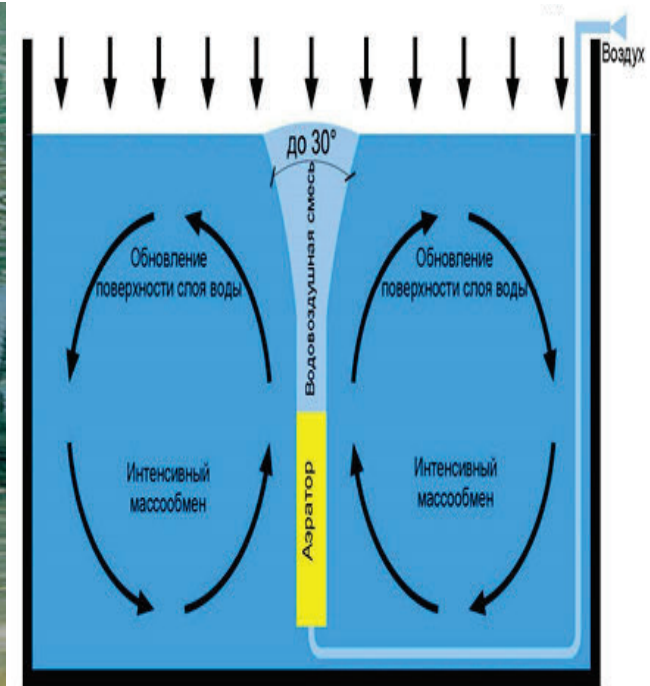
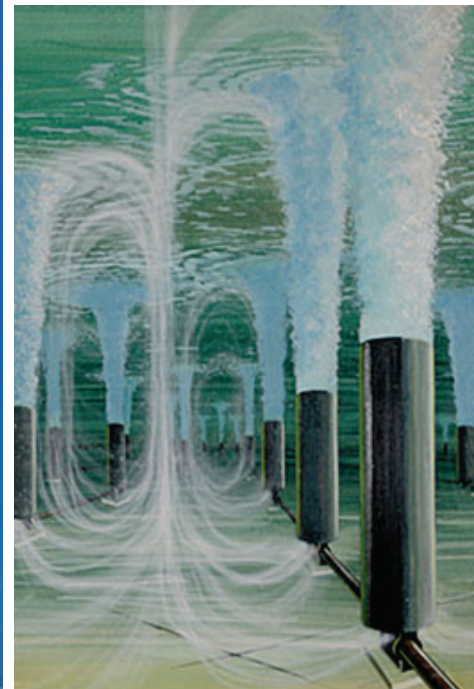
BELEKPOL AERATION SYSTEM



BELEKPOL AERATION SYSTEM



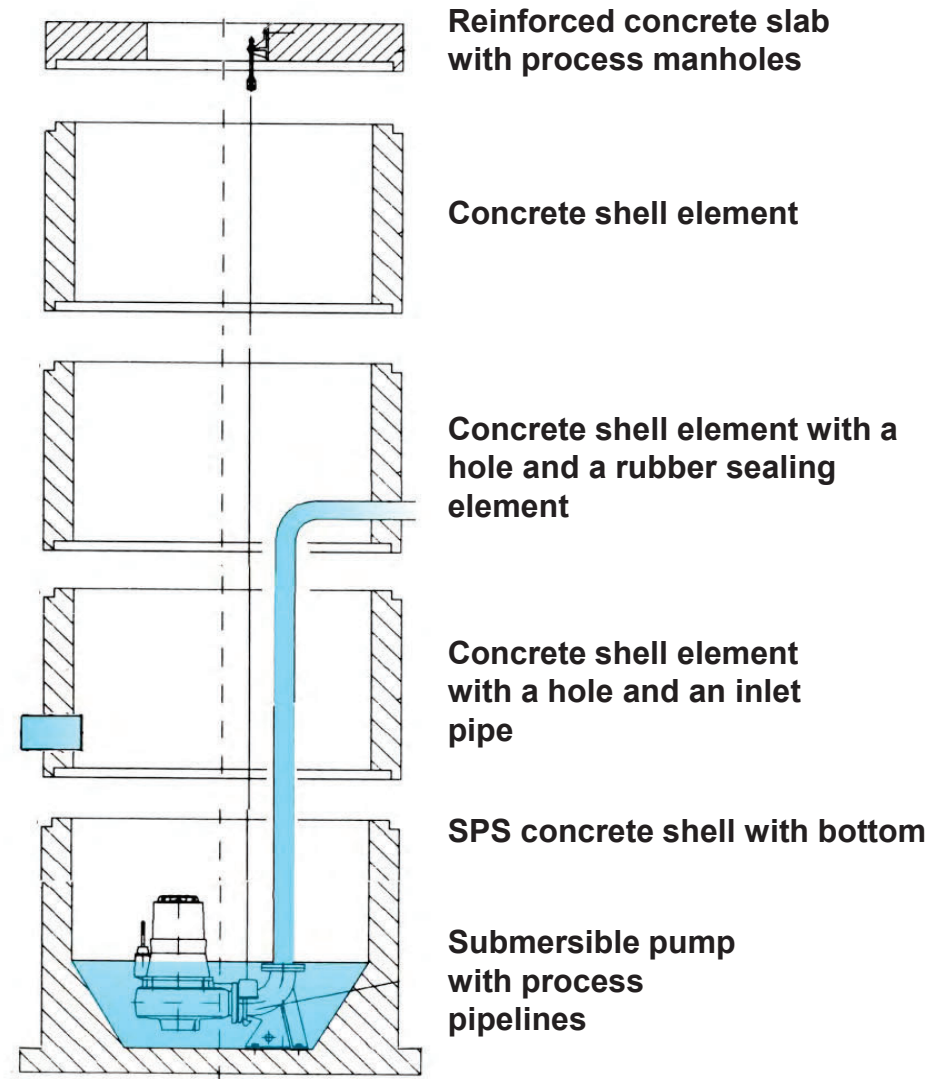
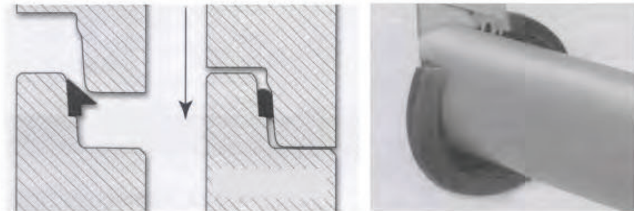
BELEKPOL DIFFUSER



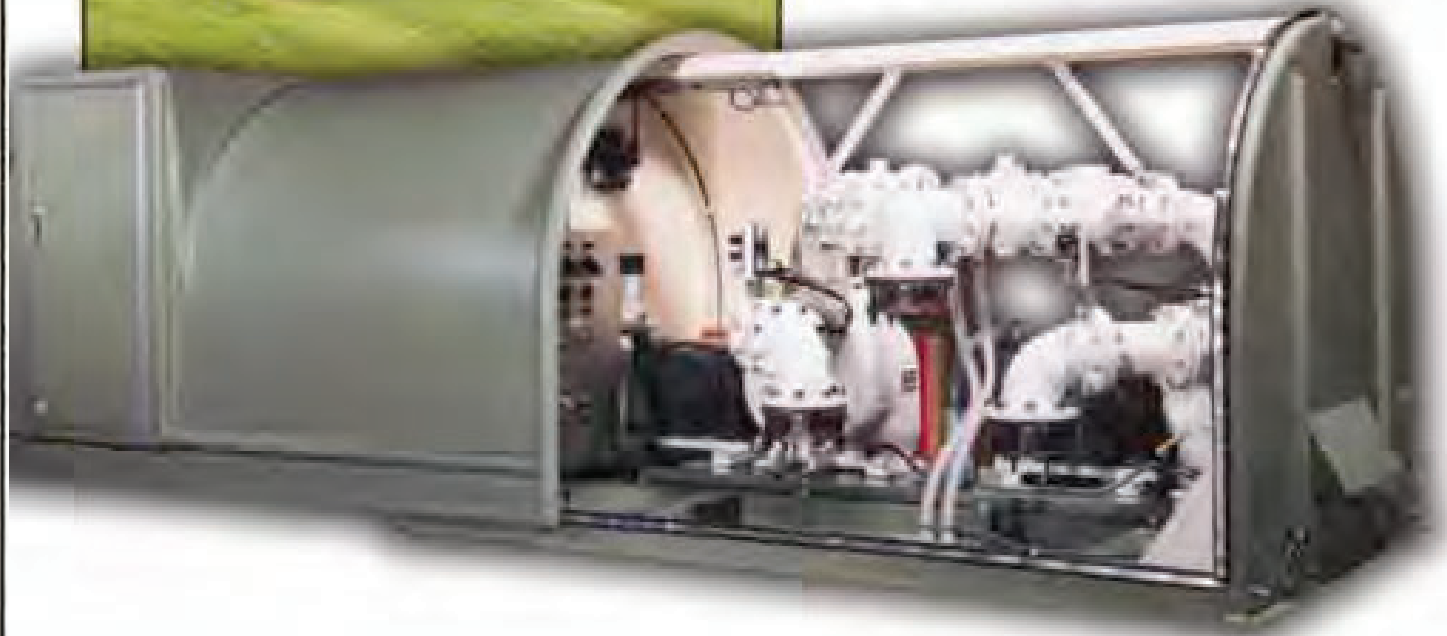
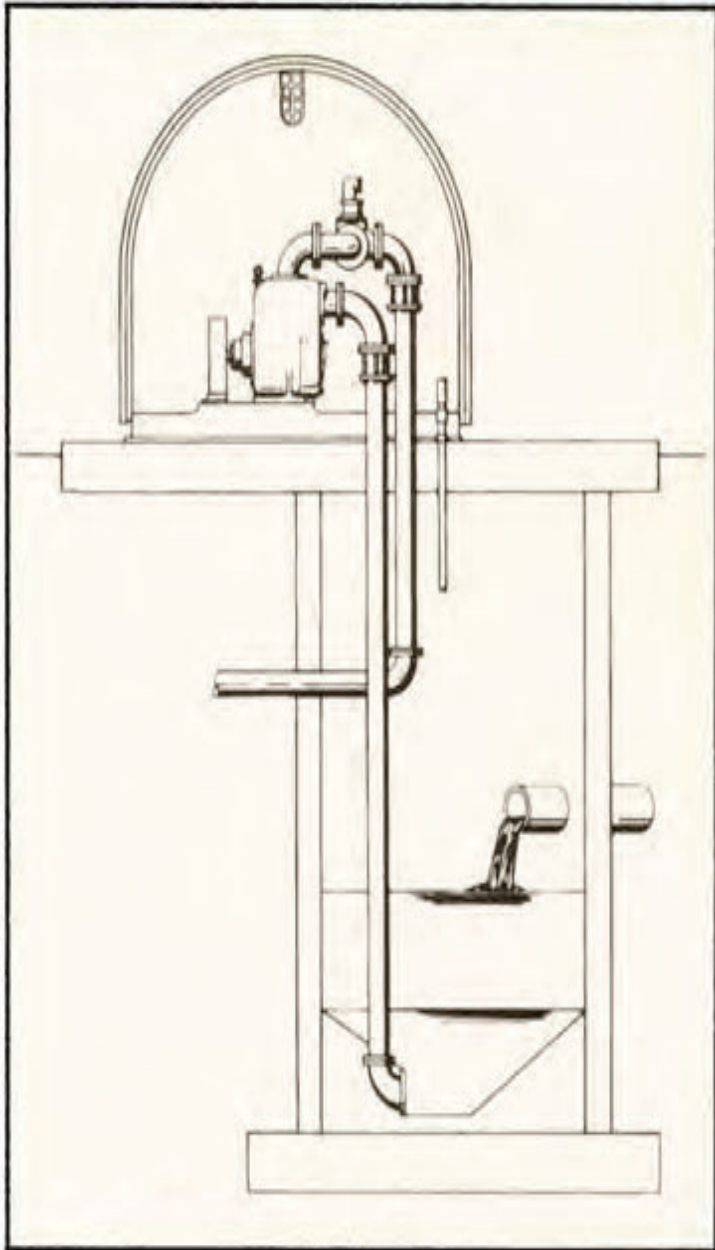
SEWAGE PUMPING STATIONS WITH SUBMERSIBLE PUMPS WITHOUT HALL



SPS SHELL MADE OF SPECIAL WATERPROOF PRECAST CONCRETE



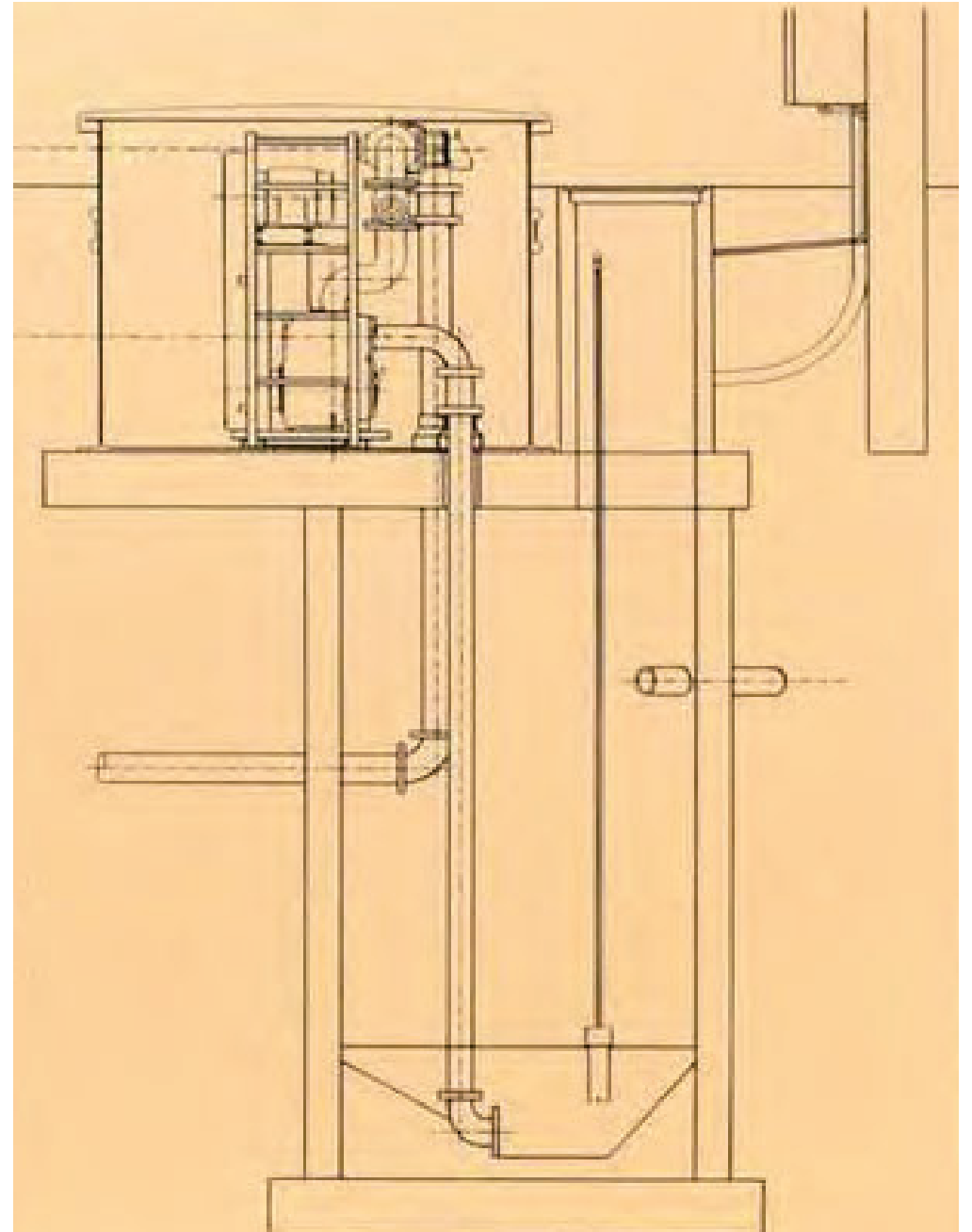
NEW GENERATION PUMPING STATION



BELEKPOL SLIDE-TYPE MODULAR PUMPING STATION WITH SELF-PRIMING PUMPS



BLOCK PUMPING STATION WITH SELF-PRIMING PUMPS



BELEKPOL FILTERING SCREENS



GRINDERS





LIST OF DEVELOPED AND IMPLEMENTED BY BELEKPOL PROJECTS OF WASTEWATER TREATMENT PLANTS
(technological inspection, design, construction, manufacturing, supply and installation of equipment, commissioning)

№	LOCATION	Capacity, m ³ /day	№	LOCATION	Capacity, m ³ /day	№	LOCATION	Capacity, m ³ /day
SITES IN THE REPUBLIC OF BELARUS			31	Byerastavitsa	2 600	60	Lebedyan	25 000
1	Minsk	1 200 000	32	Astravyets	3 000	61	Domodedovo (Konstantinovo)	3 000
2	Hrodna	390 000	33	Astravyets (for nuclear power station)	10 000	62	Neman (paper factory)	25 000
3	Vitebsk	160 000	34	Skidzyel	3 000	63	Novorossiysk (investment project)	150 000
4	Baranovichy	85 000	35	Korolyovo	400	64	Novomikhaylovsky (Krasnodar Territory)	10 000
5	Lida	70 000	36	Lahoysk	4 200	65	Lermontovo (Krasnodar Territory)	10 000
6	Slonim	40 000	37	Syanno	3 000	66	Adler (investment project)	100 000
7	Vawkavysk	20 000	38	Borovka	1 900	67	Vladivostok (investment project)	100 000
8	Beryozovka	10 000	39	Brest – airport	1 200	68	Krasnodar (investment project)	30 000
9	Zhodzina	42 000	40	Denschikovo	300	69	Sovetsk	25 000
10	Valozhyn	6 300	41	Kamenka	300	70	Grozny	100 000
11	Smalyavichy	7 400	42	Podyelni	100	71	Nizhniye Achaluki , Ingushetia	750
12	Pruzhany	10 000	43	Brest – customs	100	72	Nazran, Ingushetia	300
13	Braslaw	3 700	44	Vysochany (boarding school)	40	73	Nazran, Ingushetia	14 000
14	Nesvizh	9 000	45	Basmanovka	20	74	Anapa (Sukko)	3 000
15	Beshankovichy	2 600	46	Kobryn	6 000	75	Dzerzhinsky	20 000
16	Dokshytsy	1 500	47	Zaslavye	5 000	76	Zaraysk	10 000
17	Lepel	3 000	48	Novaya Rudnya	100	SITES IN THE REPUBLIC OF KAZAKHSTAN		
18	Liozna	2 000	49	Shklou	10 000	77	Kapshagay	30 000
19	Shumilina	4 000	50	Districts of Chernobyl Nuclear Power Station		78	Karakamer	2 000
20	Iwye	2 700	51	Marjina Horka	6 700	79	Arkalyk	6 000
21	Sharkayschchina	3 300	52	Minsk (Hatava leather factory)	3 000	80	Zhezkazgan	45 000
22	Verhknyadzvinsk	3 100	53	Uzda	5 000	SITES IN OTHER REGIONS		
23	Cheryyen	3 100	54	Talachyn	4 000	81	China, 200 MW TPP	10 000
24	Kapyl (dairy plant)	400	55	Barysaw	25 000	82	China, paper mill	50 000
25	Kapyl	4 000	SITES IN RUSSIA			83	Egypt	400; 700; 12000; 25000; 100000
26	Krupki	3 000	56	Istra (reconstruction)	15 000	84	Macedonia	2 300
27	Rahachow	10 000	57	Ryazan (leather factory)	6 000	85	Poland, Stargard	25 000
28	Chashniki	5 000	58	Istra	46; 150	86	Israel, Haifa	40 000
29	Malaryta	4 000	59	Kaliningrad	15 000	87	Fes, Morocco	10 000
30	Kobryn (meat packing plant)	750						



LIST OF DEVELOPED AND IMPLEMENTED BY BELEKPOL PROJECTS OF NEW AND RECONSTRUCTED SEWAGE PUMPING STATIONS
(technological inspection, design, construction, manufacturing, supply and installation of equipment, commissioning)

№	NAME	QTY, pcs
1.	Baranavichy SPS	1
2.	Beloozersk SPS	1
3.	Bervozovka SPS	3
4.	Byerstavitisa SPS	2
5.	Beshankovichy SPS	2
6.	Borovka SPS	2
7.	Braslaw SPS	2
8.	Brest SPS	2
9.	Basmanovka SPS	1
10.	Verhknyadzvinsk SPS	4
11.	Vawkavysk SPS	3
12.	Vysochany SPS	1
13.	Vitebsk SPS	16
14.	Gelendzhik SPS	1
15.	Grozny SPS	3
16.	Gorki SPS	12
17.	Dokshytsy SPS	2
18.	Zhlobin SPS	1
19.	Zhodzina SPS	2
20.	Zhdanovichy SPS	1
21.	Zaslavye SPS	2
22.	Iwye SPS	4
23.	Istra SPS	1
24.	Kamenka SPS	2
25.	Kaliningrad SPS	2
26.	Kapyl SPS	3

№	NAME	QTY, pcs
27.	Korolyovo SPS	1
28.	SPS in China	2
29.	Lahovsk SPS	2
30.	Orsha SPS	1
31.	Pruzhany SPS	2
32.	Zhurakovichi SPS	1
33.	Krasnodar SPS	2
34.	Krasnoselsky SPS	1
35.	Krasnoyarsk SPS	1
36.	SPS in Egypt	1
37.	Ryazan SPS	3
38.	Adler SPS	1
39.	Krupki SPS	15
40.	Macedonia SPS	7
41.	Marvina Horka SPS	2
42.	Maladzyechna SPS	4
43.	Lida SPS	11
44.	Lyuban SPS	1
45.	Lebedyan SPS	2
46.	Malaryta SPS	2
47.	Minsk SPS	26
48.	Moscow SPS, 160 m3/day	1
49.	Moscow SPS (Domodedovo Airport)	2
50.	Mogilyovo SPS	2
51.	Novaya Rudnya SPS	1
52.	Novorossiysk SPS	1

№	NAME	QTY, pcs
53.	Novaya Drut SPS (starch factory)	1
54.	Astravyets SPS	13
55.	Podvelniki SPS	2
56.	Pukhavichy SPS	1
57.	Saint Petersburg SPS	3
58.	Rakov SPS	1
59.	Raubichi SPS	2
60.	Slonim SPS	2
61.	Tuapse SPS	1
62.	Chashniki SPS	2
63.	Chist SPS	1
64.	Sharkavschchina SPS	3
65.	Shumilina SPS	2
66.	Shklou SPS	7
67.	Yaroslavl SPS	1
68.	Borisov SPS	3
69.	Lyudinovo SPS	2
70.	Novomikhaylovka SPS	3
71.	Ingushetia SPS	3
72.	Neman SPS	1
73.	Hatava SPS (leather factory)	2
74.	Nazran SPS	7
75.	Novomikhailovsky SPS	4
76.	Uzda SPS	2
77.	Zaraysk SPS	1
	TOTAL:	241



PRODUCT PORTFOLIO "BELEKPOL"

