

# ANGYALFÖLD PUMPING STATION

## ENVIRONMENTAL STATEMENT 2011.



Approved:

  
György Palkó  
General Manager

Budapest, July 2011.

**”When man has poisoned all soil, water and air,  
he'll realize that money is not edible.”**



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## **Introducing the Budapest Sewage Works Ltd.**

The Budapest City Sewage Works, the predecessor in title to the Budapest Sewage Works Ltd, was founded on April 11, 1946. Our Company became a joint-stock company on 1 December, 1993, then a closed joint-stock company on May 16, 2006.

Our Company strives to ensure a safe provision of services, the minimization of the chance of malfunctions, and the rectification thereof in the swiftest manner. We also ensure compliance with the set requirements constituting laws, patents, technical instructions, and licenses.

BSW Ltd's scope of activity includes collecting and treating sewage and rainwater from the capital and its suburbs, transferring it to receptors within the capabilities of the available public water utilities, operating and maintaining facilities involved in channeling and treating wastewater, as well as monitoring the wastewater ejected into public sewers.

The channeling of Budapest's sewage and rainwater is made possible by a number of pumping stations and pumping stations, the most notable of which are found in Békásmegyer, Zsigmond Square, Kelenföld, Albertfalva, Angyalföld, Ferencváros, and Vas Gereben Street.

A canal network the size of several thousand kilometers serves the collection and channeling of the capital city's wastewater and, during times of considerable precipitation, rainwater. To ensure a safe operation of the canal network, the sewers' technical and operational conditions are regularly checked using modern industrial TV equipment. Failures and breakdowns are solved by taking into account the canal cross section's technical parameters, utilizing traditional excavation methods or modern technology that does not require an excavation. For the sake of the uninterrupted channeling of sewage and rainwater, the cleaning of public sewers and sink water traps is carried out with large-capacity sewer-cleaning machinery.

Due to the increase in car traffic, the capital carries out the reconstruction of its canal network by increasingly relying on pipe lining technology that does not require an extraction. In order to facilitate the closing of the public utility gap, the construction of new sewers is also taking place at a noteworthy rate.

To safely operate the canal networks, a knowledge of the sewers' state and the expected quality of the wastewater channeled within is essential, hence the Budapest Sewage Works Ltd. Regularly checks and services the sewers and structures it operates.

Maintenance constitutes cleaning according to a schedule, and, on occasion, reparations and the clearing of obstructions.

In order to allow the sniffed wastewater from areas without sewage to be received according to modern standards, sniffed wastewater-receiving stations are operated in a number of Budapest locations.

45% of the wastewater produced in the capital during dry seasons is treated at the North-Pest and the South-Pest plants, the combined nominal capacity of which is 235.000 m<sup>3</sup>/d. Both plants feature biological and nutrient removal stages.

With relation to sludge treatment technology, processes capable of processing waste with high organic material content are utilized at the North- and South-Pest Wastewater Treatment Plants.

To utilize the biogas produced during the decomposition of organic material in the sludge, gas engines and furnaces are operated at the two wastewater plants.

The Budapest Sewage Works has been responsible for flood-protection since its establishment in 1946, and it has been one its core activities since the 1998 reorganization. Since the Danube is the receiver of the canal network and smaller watercourses, our Company was a

natural choice for the task.

In accordance with the contract with the Municipality of Budapest, our tasks include practical protective activities and the management of flood-protection works and small watercourses “within capabilities”, meaning no inundation can occur in an area with flood-protection works as long as the load is within the tolerance range corresponding to their size.

<i>Description</i>	<i>Unit</i>	<i>2008.</i>	<i>2009.</i>	<i>2010.</i>
<b>Capacities on December 31</b>				
<i>Length of sewage network</i>	km	5.334	5.352	5.383
<i>Number of sewer connections</i>	pcs	176.84 4	177.905	178.725
<i>Biological treatment capacity</i>	thm <sup>3</sup> /day	280	280	280
• <i>South-Pest plant</i>	thm <sup>3</sup> /day	80	80	80
• <i>North-Pest plant</i>	thm <sup>3</sup> /day	200	200	200
<i>Nutrient removal capacity</i>	thm <sup>3</sup> /day	80	80	280
<b>Annual Performance</b>				
<i>Collected Sewage and Rainwater</i>	thm <sup>3</sup>	226.55 8	209.928	204.204
• <i>Discharged via Free Outlet</i>	thm <sup>3</sup>	22.226	22.382	2.023
• <i>Pumping and treatment plants</i>	thm <sup>3</sup>	204.33 2	173.055	136.309
• <i>Discharged to BKSZT</i>	thm <sup>3</sup>	-	14.491	101.872
<b>Billed Sewage</b>				
<i>Total</i>	thm <sup>3</sup>	130.74 4	123.316	116.070
• <i>Households</i>	thm <sup>3</sup>	86.051	83.099	80.709
• <i>Industrial, Corporate, etc.</i>	thm <sup>3</sup>	42.898	38.099	33.780

We at the Budapest Sewage Works Ltd. Consider it our mission to assume full responsibility of Budapest's public utility services. Through its activities, the Budapest Sewage Works Ltd. is becoming Hungary's largest environmental management company and public utility provider. Through their work, our employees aim to meet the demands and expectations of the communities served in an innovative and customer-friendly manner, in accordance with 21<sup>st</sup> century technical, social and personal standards, ensuring a service of high quality.

## Organizational and Legal Position of the Company

The General Assembly of the City of Budapest transferred shares representing 25% + one vote of the Company's asset and specific operating and management control rights to a consortium formed by Berliner Wasser Betriebe (B.W.B.) and Compagnie Générale des Eaux (C.G.E.) for a period of 25 years. The contract was signed on November 19, 1997. Utilizing the option set forth in the Share Purchase Agreement, C.G.E. and B.W.B. established the Sewage Operating Holding Ltd. at the end of 1998.

In the meantime C.G.E. changed its name to Vivendi. On June 6, 2000, B.W.B transferred its shares to Berlinerwasser Holding AG.

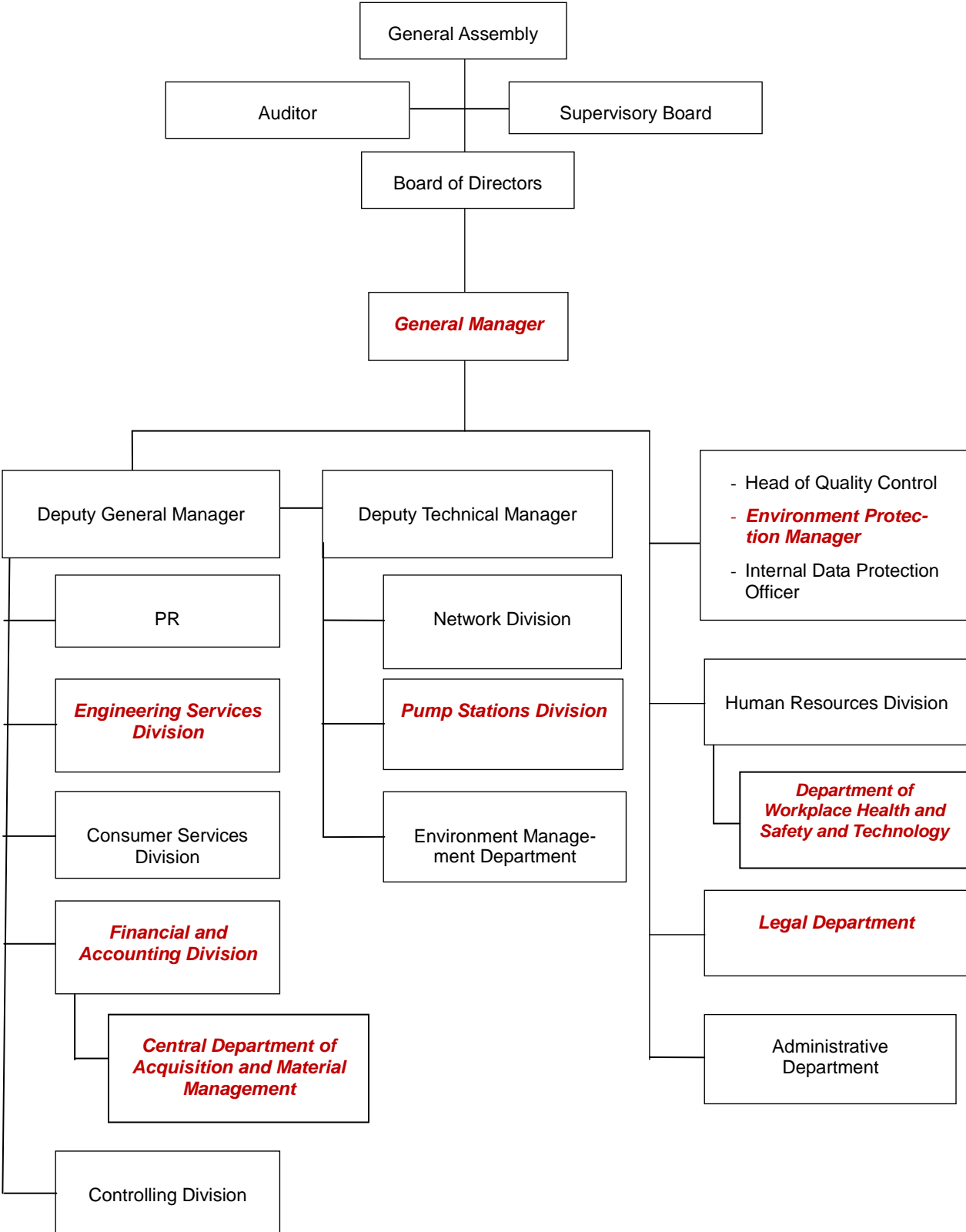
On March 26, 2002, Vivendi transferred its shares -noting the intermediate ownership of Vivendi Universal- to Vivendi Environment, currently called Veolia Environment S.A.

### Owners:

The Municipality of Budapest  
Berlinwasser Holding AG  
Veolia Environnement S.A.  
Csatorna Holding Vagyonkezelő Zrt.  
3 main small investors

**Name of Company** : Budapest Sewage Works Ltd.  
**Address** : H-1087 Budapest, Asztalos Sándor Str. 4.  
**Postal address** : 1426 Budapest 72. Pf. 114.  
**Phone** : +36 1 455-4100  
**Fax** : +36 1 455-4232  
**E-mail** : vezig@fcsm.hu

# Organizational Structure



## Management Systems

In order to increase the efficiency of its core activities and better serve its consumers, in 2001 the Budapest Sewage Works Ltd. established its Quality Assurance and Environmentally Conscious Management System in accordance with MSZ EN ISO 9001:2000 and MSZ EN ISO 14001:1997 standards. The System was certified by auditing organization Lloyd's. The document is valid as of June 11, 2001.

In 2004 the system was certified once again, then in 2005 the Environmentally Conscious Management System was modified in accordance with the ISO 14001:2004 standard.

The Environmentally Conscious Management System was introduced at the South-Pest and North-Pest Wastewater Treatment Plants in 2001. The expansion of ECMS took place with the involvement of the Angyalföld Pumping Station in 2008, the Békásmegyer and Pók Street Pumping Stations in 2009 and finally the Csomád Sludge Landfill Plant in 2010.

In 2010, the Company's Integrated Management System was expanded via the introduction of the Workplace Health & Safety Management System, which was established in accordance with the MSZ 28001:2008 standard.

The areas of application for the Integrated Management System are the following:

- Sewer operation
- Flood- and drainage protection
- Environmental management; Investments in the field of
- sewerage, wastewater treatment and flood protection
- Operating an Environment Protection management system at the North-Pest and South-Pest Wastewater Treatment Plants, the Angyalföld, Békásmegyer and Pók Street Pumping Stations, as well as the Csomád Landfill Plant.

The certificates issued in 2010 are valid until 2013.

The Sampling Group (registered under NAT-7-0016/2007 by the National Accreditation Board) and the Laboratory Group (registered under NAT-1-1333/2007) carry out their work in accordance with the MSZ EN ISO/IEC 17025:2005 standard and the related accreditation practices. Their accredited status is maintained by the NAB until November 26, 2011.

In the second half of 2010, our Company took steps in further developing ECMS by commencing the integration of the Angyalföld Pumping Station into the environmental protection management system certified by EMAS according to the 1221/2009/EC regulation.

## Data Sheet

Organization	Budapest Sewage Works Ltd.		
Units taking part in EMAS	Angyalföld Pumping Station		
Address:	H-1139 Budapest, Vizafogó Str. 4.		
Plant manager	István Kőszegi managing chief engineer		
Number of employees	11		
Environmental Protection Manager	Magdolna Makó	Phone	1-455-41-28
		E-mail	makom@fcsm.hu
Organizational units taking part in EMAS	Engineering Services Division, Environment Protection Division, Pump Stations Division Legal Department		
Additional data	Activity	Sewage channeling and treatment	
	TEÁOR classification / NACE code	3700 Sewage collecting and treatment	
	Date of certification	july 22., 2011.	
Homepage	www.fcsm.hu		
Attestor	Florian Mitterauer	Accreditation document number:	AT-V-0022
		Area of accreditation:	



## Quality-, Environmental- and Workplace Health & Safety Policies

BSW Ltd. is one of the country's largest public water utility companies. At the same time, due to its rainwater and sewage collection and flood protection activities, it is also one of the largest environmental protection services.

Our core activity is the collection and treatment of sewage and rainwater in Budapest and the surrounding settlements, as well as the protection against flood and drainage damages, all of which are carried out in accordance with the latest laws and regulations.

We aim to improve the quality and safety of our services while preventing environmental pollution and keeping the health and safety of our workers a priority, and to increase the number of consumers involved in the collection and treatment of sewage and rainwater. To this end, we pledge to organize our activities according to systems based on the

ISO 9001:2008 quality control standard,

ISO 14001:2004 environment-centric management standard,

EMAS - certified environmental protection management practice based on the 1221/2009/EC regulation, and the

MSZ 28001:2008 workplace health & safety management standard.

Our Company's management considers the following as key points to meeting the aforementioned goals:

1. In cooperation with owners, we aim to provide quality- and environment-centric solutions during the carrying out of reconstructions necessitated by wastewater collection and treatment.
2. The work of employees is the basis for all processes, so we consider it important to prevent injuries and health impairment among workers, as well as constantly analyze and improve workplace health protection and safety management. We strive to provide safe working conditions for our workers and minimize the risk of potential workplace hazards. To this end, we define the hazards and dangers involved in our activities, and assess the risk of their occurrence. We apply technical and organizational measures to prevent accidents and emergencies, and constantly monitor adherence to workplace safety regulations.
3. We will reinforce the sense of responsibility for the protection of our environment on all levels of the Company.
4. It is our goal to prevent pollution and keep the extent to which wastewater collection and treatment is a burden on the environment as small as possible. We are constantly optimizing wastewater treatment technologies, so that the discharged wastewater is an ever smaller burden on the environment. We aim to increase the volume of biologically treated wastewater and the efficiency of the treatment process in accordance with the EU's expectations in environmental protection.
5. Throughout the wastewater treatment process -besides quality control conducted in laboratories- we constantly analyze environmental effects and take steps to reduce environmental impact and prevent and reduce pollution.
6. We examine and estimate the environmental and workplace health & safety-related impact of all new technologies to be introduced. We strive to make new technologies environmentally friendlier, safer, and less dangerous to health than older technologies.

7. We guarantee our wide-reaching cooperation with authorities.
8. We consider energy- and material-efficiency, as well as workplace safety when acquiring equipment.
9. We introduce our quality, environmental and workplace health & safety policies to our suppliers and subcontractors, and have them embrace these policies, which we always take into account when signing contracts.
10. We aim to guarantee a serene environment to the public through the use of modern sewer-cleaning equipment and technologies.
11. We facilitate communication with our consumers via a modern, well-established system, and improve satisfaction through surveying.

To meet these goals, the management of FCSM Ltd. is determined to meet the requirements of applicable legislation and other regulations, and to continually improve the efficiency of the integrated management system.

FCSM Ltd. aims to achieve an improvement in the quality and quantity of its services along with the establishment of a healthy environment, to ensure the satisfaction of its consumers, employees, and the people of Budapest and its vicinity.

Budapest, March 1, 2011.



György Palkó  
General Manager



## CERTIFICATE

This is to certify that the Quality, Environmental and Occupational Health & Safety Integrated Management System of:

**Fővárosi Csatornázási Művek Zrt.  
Budapest, Hungary**

has been approved by Lloyd's Register Quality Assurance to the following Quality, Environmental and Occupational Health & Safety Management System Standards:

**ISO 9001:2008, MSZ EN ISO 9001:2009  
ISO 14001:2004, MSZ EN ISO 14001:2005  
OHSAS 18001:2007, MSZ 28001:2009**

The Quality, Environmental and Occupational Health & Safety Integrated Management System are applicable to:

**Operation of sewage works. Flood and excess water control activities. Environmental management. Project management of sewer systems, waste water treatment and control. Operation of Environmental Management System at the Észak-pest and Dél-pest Waste Water Treatment Plants, the Angyalföld Pump Station, Békásmegyer Pump Station and the Pók utca Pump Station and the Csomád Sludge Depony.**

Approval	Original QMS, EMS Approval:	11 <sup>th</sup> June 2001
Certificate No: VNA0005278	Original OHSAS Approval:	04 <sup>th</sup> June 2010
	Current Certificate:	04 <sup>th</sup> June 2010
	Certificate Expiry:	03 <sup>rd</sup> June 2013



Issued by: Lloyd's Register EMEA Mft. for and on behalf of Lloyd's Register Quality Assurance Limited



This document is subject to the provision on the reverse

Váci út 15., Budapest, H-1132 Hungary. Registration number: 01-17-00252

This approval is carried out in accordance with the LRQA assessment and certification procedures and monitored by LRQA. The use of the UKAS Accreditation Mark indicates Accreditation in respect of those activities covered by the Accreditation Certificate Number 001.

## Angyalföld Pumping Station

Address:	Budapest XIII., Vizafogó Str. 4.
Lot number:	25884/4
Limits:	Northern and Western sides Bp. XIII. Vizafogó Street
	Southern side Unbuilt plot of FCSM Zrt. residential and sports estate
	Eastern side Road to TÁRÉRT Rt.
Plant area:	4 acres / 4.889 m <sup>2</sup>
Built-up density:	11%



The pumping station was set up between 1936 and 1944. Its current state was finalized, after a number of reconstructions, in 2001. Up until 1998, the pumping station operated as an end point pumping station; since 1998, it has been passing water to be treated to the North-Pest Wastewater Treatment Plant through twin discharge pipes.

The pumping station manages incoming wastewater from the main collectors at Rákos Valley (Rozsnyai Street) and Újpest (northern and southern plants at Cserhalom Street and Váci Street), as well as the Jakab József Street collector.

The purpose of the pumping station is to pass the incoming water to the North-Pest Wastewater Treatment Plant within the dry season wastewater limit, above which it discharges the extraneous diluted water into the stream-channel, and the rainwater into the Danube via a bank connection, through pumping or gravity water intake, depending on the water level.

Thanks to the plant supervision control system and local automation, the plant operates automatically under normal operational conditions. Given the wastewater treatment process and the plant's other general tasks, as well as the necessity of quickly and efficiently rectifying extraordinary occurrences, an operating crew is working at the plant at all times.

An average of 60 – 70 000 m<sup>3</sup>/d of wastewater arrives at the pumping station in dry seasons.

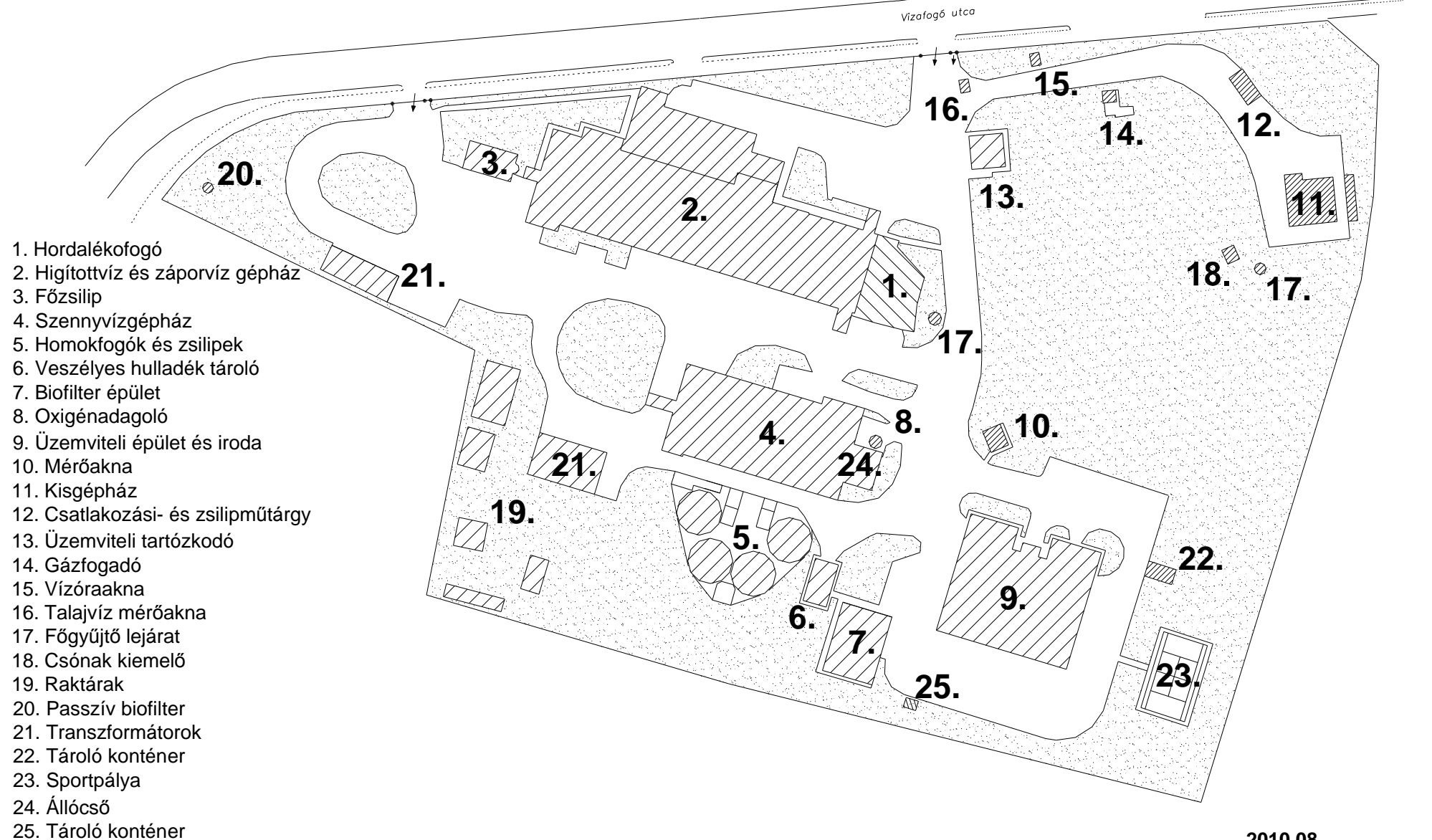


Our Company is dedicated to following and reinforcing operative laws.

The Angyalföld Pumping Station has no environmental inadequacies, and we have no knowledge of an official statement of condemnation or court order calling for environmental protection or natural preservation duties.

# Angyalföldi szivattyútelep

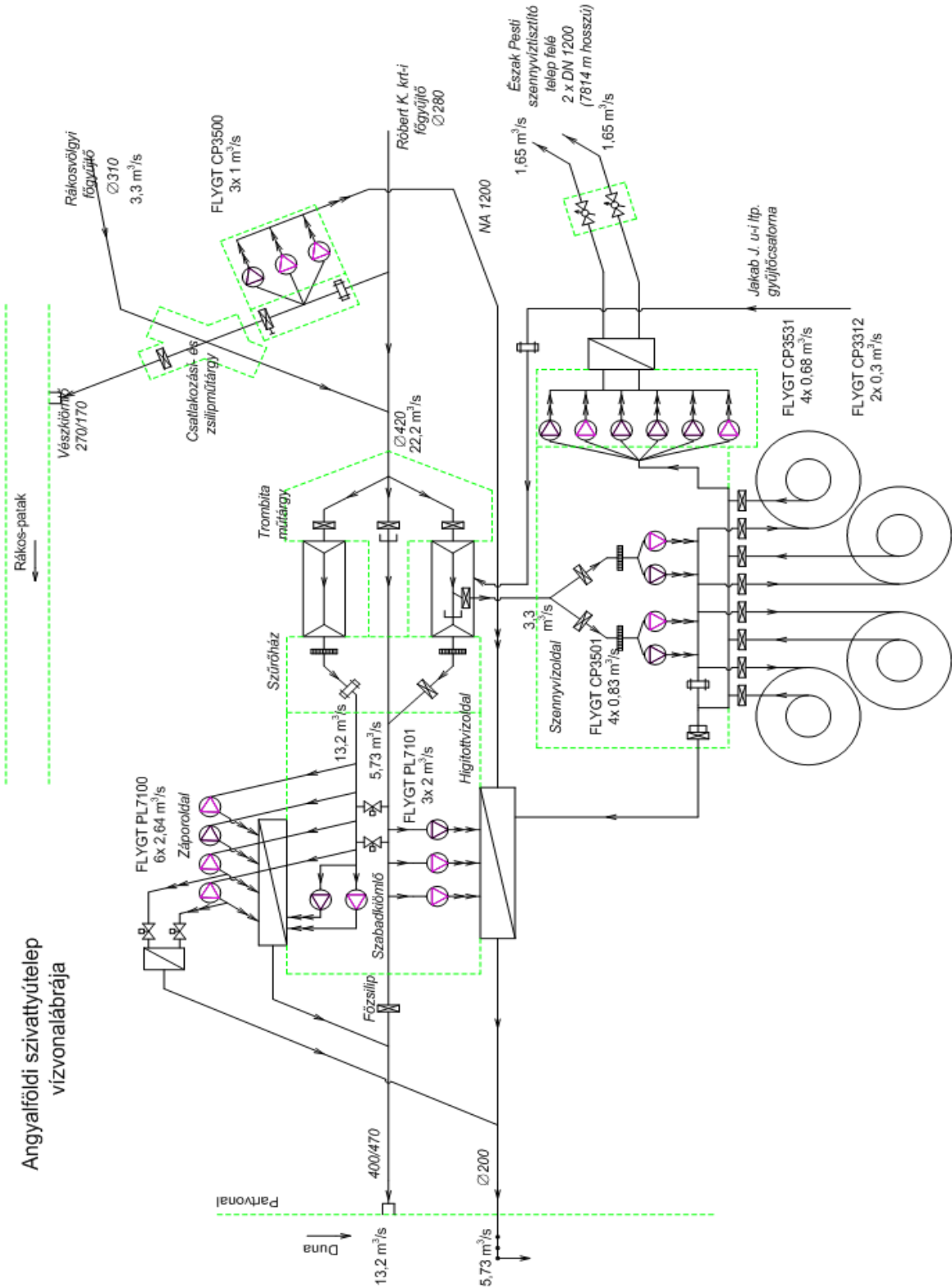
helyszínrajz



2010.08.

# The Technology of the Angyalföld Pumping Station

We used the water path schematics' markings for the technological description of the plant.



Sewage and rainwater is fed to the plant through a channel (4), 4.3m in diameter and with a half Paris form at its final section.

The Jakab József Street interceptor (3) connects directly to the wastewater side sediment catcher with a diameter of 100cm.

The incoming water is distributed by the distributing structure (6).

Northern side sluice ZS2 feeds it into the storm side sand trap (11.1) and filter screens R5 and R6, then through stop-log slab B2 into the pump area (11.3 and 11.4).

Sewage and diluted water are fed into the sediment catcher (7) through southern side sluice ZS1. The diluted water reaches filter screens R3 and R4 through fixed-crest weirs, and then passes through sluice ZS18 to the pump area (10.2). Wastewater is directed towards the wastewater side by a fixed-crest weir.

A hydraulic shovel removes the deposit from the sediment catchers. The deposit produced reaches a container through sludge thickener E4. The container is mounted on a container car with a shaker surface. The shaker surface serves the surfacing and separation of the watery fraction.

A 2x2m channel stems from the diluted water side deposit catcher (7). The channel is closed by hydraulic sluice ZS6, which protects the structure against inundation.

A meter is placed in the canal.

The channel separates into two (twin) branches of similar design. After closure by stop-log slabs B3 and B4, sluices ZS7 and ZS8, filter screens R1 and R2, and stop-log slabs B5 and B6, the water reaches the pump area (9.3). The screenings produced by filter screens R1 and R2 is carried into a cleaning press by a conveyor worm. After cleaning and compression it ends up in transporting containers. The filtered wastewater is fed into the upper distribution channel (9.4) by sluices SZ1-SZ4, through a discharge pipe and flap valves V10 -V-13. The water travels from the distribution channel (9.4) through the round sand trap (9.6) and the lower channel (9.4) into the pump area of the second pump group (9.7). Sluices SZ5-SZ10 feed collector pipes. Check valves V1-V6 are found on discharge pipe branches of sluices. The alternating operation of the two discharge pipes (9.12) leading to the treatment plant is guaranteed by sectioning valves. Vertical pipes are attached to the discharge pipes to prevent water hammer. A discharge manhole (9.12.2 and 9.12.5) with gate valves for dewatering and closing discharge pipes is found after the vertical pipes on the discharge pipe section leading up to Rákos River pipe bridge (9.12.1).

#### ***Dual-level distributary (9.4)***

Upper canal (9.4): channels water to the sand trap (9.6). If required, the water can be fed into the bed discharge pipe via the opening of stop-log slab B9 at the end point. The side fixed-crest weir is also an emergency overflow.

Lower canal (9.4): channels the water from the sand traps (9.6) into the pump area (9.7) of pump group II/A. If necessary, the water can be channeled into the bed discharge pipe via the opening of sluice ZS17 at the end point.

#### ***Sand traps (9.6)***

After the removal of the screenings, wastewater is channeled into 4 round sand trap structures (9.6), where gravitational sedimentation takes place. The sedimented deposit formed in the accumulator of the structure is pumped into a sand grading rig.

#### ***Diluted water engine house (10)***

The diluted water that passes through the fixed-crest weir in the southern sediment catcher (7) flows through mechanically cleaned filter screens R3-R4 and sluice ZS18 into the diluted water pump area (10.2), from where it is pumped into the pressure shaft (10.3), and then discharged into the channel line of the Danube through a bed discharge pipe (10.7).

### **Storm engine house (11)**

The water flows through the northern sediment catcher (11.1), filter screens R5-R6 and stop-log slab closure B2 into the storm pump area (11.3 and 11.4), from where it is pumped by pumps SZ14-SZ19 into the storm pressure shaft (11.8), and then it is discharged into the Danube through the free overflow channel (12) with a bank connection (12.2). When necessary, 2 pumps can also work in the direction of the bed discharge pipe (10.7). The diluted water and storm pump areas are connected by gate valves T1-T2.

On the diluted water and storm sides the education of the screenings is carried out by a shared conveyor worm.

### **Small engine house pump operation (13)**

Built for temporary water drainage before the plant reconstruction. Used during the malfunction of operating facilities. Its discharge pipe connects to the diluted water pressure shaft (10.3).

### **Free overflow options**

Drainage is possible at the Cserhalom Street collector by closing the canal and opening the free overflow.

Diameter: 1400mm (towards the plant)  
2000mm (towards the Danube)  
Operation: remote, mechanical

Tatai Street closure

Closing the canal and opening the free overflow at the Rákosvölgy main collector, free overflow into the Rákos River is possible through a side weir via the placement of stop-log slabs.

Diameter: 1400mm  
Installation: via mobile crane

Discharge orifice of the temporary pumping station

Dimensions: 2830x1800mm  
Operation: manual

### **Twin pipeline leading to the WWTP (9.12)**

The Rolca pipe diameter is 1140mm before the mixing manhole and 1650 mm after the mixing manhole. The total length of the discharge pipe is 4129m, 3465 m before the mixing manhole. Starting from the plant, it crosses the Rákos River and the Újpest Bay via pipe bridges. The pipe bridges (9.12.1), being high points, feature automatic air-relief valves.

The discharge pipes can be emptied by gravity at the plant in the gate valve and release shaft (9.9) as well as at Csavargyár Street and the mixing manholes (9.12.7), and by pumping at the bay via shafts (9.12.5) made specifically for this purpose. This requires a temporary source of energy and suction/washing vehicles.

The plant has one induction meter (9.11) for each discharge pipe.

### **Aerator system (9.10)**

Oxygen is added to the wastewater received by the North-Pest WWTP, in order to prevent the formation and reduce the number of considerably odorous gases in the wastewater.

Oxygen is fed through discharge pipes leading to the treatment plant.

Liquid oxygen reaches a gaseous state via the evaporator. A reductor reduces the gas pressure to the level suitable for aeration, and then the necessary amount is fed in with a regulator valve.

(The valve automatically regulates the amount based on the ratio of the wastewater's H<sub>2</sub>S concentration and rate of discharge.)

/Manual adjustment of the dosing is also possible/

### ***Deodorization (Biofilter)***

A lead off pipe network collects the polluted air of the wastewater-receiving and distributing facilities, sediment catchers, outer sand traps, the filter house and the grease separator.

Two ventilators suck up the polluted air and pass it on to the deodorizing biofiltration unit, from where it is discharged into the open air. The amount of vented polluted air is 24.000m<sup>3</sup>/h.

The efficiency of the biofilter's filter layer is maintained by regularly perfused liquid containing nutrients.

The nutrient-containing liquid is at first a thin, watery solution of caustic potash and phosphoric acid. Under continuous operation it is a thin, watery solution of phosphoric acid. Softened water is used in the solution, in order to prevent the formation of gypsum on the filter insert.

The operation of the perfusing pump is controlled by the biofilters' relative humidity- and thermometers.

The production of soft water is maintained by a twin-pipe volume-driven water softener.

The ventilation of the combined facility's underground parts is provided by a ventilation system constituting blower and suction heads, air-ducts, as well as inner circulation and fresh air mixing systems. The performance of the exhaust ventilation is 3000 m<sup>3</sup>/h.

The vented polluted air is discharged into the open air through a biologically active filter insert after wetting.

### ***Dosage of chemicals***

Dosage of chemicals is carried out at four points for the sake of waste management in the sewage facility: on the wastewater and diluted water sides, as well as the screenings and the deposit. Dosage is performed by an automatic piece of equipment with twin tanks and an overflow collector. Dosage pumps activate along with the particular machine unit.

Chemical added: Sodium hypochlorite.

### ***Plant management system***

The plant oversight and control system covers all technological processes as far as oversight is involved, and allows for remote intervention on a control level. PC display equipment displays the parameters of operation on monitors and logs all data and events.

## Notable Environmental Effects

The review of environmental factors and effect takes place under the leadership of the Company's Environmental Manager whenever needed, but at least once a year. We identify and assess (expected) environmental factors and effects during the planning and implementation phases of new or modified technologies, activities or investments.

For the assessment of environmental factors and the definition of notable effects, we take into account the potential effects of the different factors on the environment. We defined environmental factors so that it would be possible to accurately identify the materials and energy that they discharge into the environment, and weigh the risk of a potential damage.

We base the assessment of environmental effects on five main aspects:

1. Adherence to laws and other regulations
2. Risk: possibility of occurrence, severity of consequences
3. Consideration of interested parties
4. Company philosophy / image
5. Lack of information

Two works document the assessment of environmental factors and effects: the "List of Environmental Factors" and the "Register of Environmental Effects".

The most notable environmental effects to occur at the plant are as follows:

<b><i>Environmental effect</i></b>		<b><i>Prevention</i></b>
Emission of odors into the air	Direct	Use of biofilter, plantation of protective plant line
Polluting effects of sewage on the Danube, when the plant works on the channel line	Direct	Mechanical treatment of diluted water
Noise emission of machine equipment	Direct	Keeping the doors and windows of the engine-room closed, use of personal protective equipment
Power consumption of the plant	Indirect	Adherence to instruction manual
Management of technological waste	Direct	Adherence to operation manual
Management of hazardous waste	Direct	Adherence to operation manual
Management of hazardous materials stored in barrels and cans and their air- and ground-polluting effects during transloading.	Direct	Adherence to operation manual
Air polluting effects during the transportation of waste (CO <sub>2</sub> emission)	Indirect	

## Core Indicators 2010

Core indicators are given based on the wastewater and rainwater treated at the Angyalföld Pumping Station, with the exception of the amount of communal and selectively collected waste, which are provided based on the number of plant employees.

Basic Indicators	Figure A		Figure B	Figure R
<b>Energy-efficiency</b>	<b>13.309,404 GJ</b>		<b>35.545.048 m<sup>3</sup></b>	<b>0,0004 GJ/m<sup>3</sup></b>
Electricity	2.941.965 kWh	10.591,074 GJ		
Natural gas	78.650 m <sup>3</sup>	2707,802 GJ		
Gasoline	302 l	10,528 GJ		
<b>Water</b>	<b>9.281 m<sup>3</sup></b>		<b>35.545.048 m<sup>3</sup></b>	<b>0,0003 m<sup>3</sup>/m<sup>3</sup></b>
<b>Waste</b>	<b>25,93 t</b>		<b>11 person</b>	<b>2,36 t/fő</b>
Communal		13,32 t		
Selectively collected <sup>+</sup>		12,61 t		
<b>Technological</b>	<b>714,168 t</b>		<b>35.545.048 m<sup>3</sup></b>	<b>2,0x10<sup>-5</sup> t/m<sup>3</sup></b>
Screenings		338,2 t		
Sand trap		375,8 t		
Hazardous waste		0,168 t		
<b>Material usage</b>	<b>92,277 t</b>		<b>35.545.048 m<sup>3</sup></b>	<b>2,59x10<sup>-6</sup> t/m<sup>3</sup></b>
Oxygen		82,821 t		
Industrial salt		3,4 t		
Road salt		1,1 t		
Sodium hypochlorite		4,5 t		
Industrial cleaning supplies (Quad)		0,05 t		
Deodorizer (Odor-stroyer) (at a density of 1 g/cm <sup>3</sup> )		0,03 t		
Sulfuric acid (at a density of 1,58 g/cm <sup>3</sup> )		0,095 t		
Diluents (at a density of 0,8 kg/dm <sup>3</sup> )		0,008 t		
Paint (at densities 1,18, 1,2 and 1,3 g/cm <sup>3</sup> )		0,139 t		
Base coat		0,03 t		
Mechanical grease		0,005 t		
Motor oil (at a density of 0,87 g/cm <sup>3</sup> )		0,004 t		
Paper <sup>+</sup>		0,005 t		
<b>Emissions*</b>	<b>1230,08 t CO<sub>2</sub></b>		<b>35.545.048 m<sup>3</sup></b>	<b>3,46x10<sup>-5</sup> tCO<sub>2</sub>/m<sup>3</sup></b>
Electricity		1064,99 t CO <sub>2</sub>		
Natural gas		150,77 t CO <sub>2</sub>		
Heavy oil		0,81 t CO <sub>2</sub>		
Traffic**		13,51 t CO <sub>2</sub>		

<sup>+</sup>Estimate

\*We calculated the CO<sub>2</sub> emission values using data found in literature and the method found at the following website: [www.noco2.hu](http://www.noco2.hu)

\*\*Estimate, which includes the transportation of waste and materials. The chart does not include CO<sub>2</sub> emitted by workers' vehicles on the way to work.

Our own vehicles, as well as those used by companies in charge of transporting waste and materials, all have valid green cards.

Our Company is a member of the Hungarian Water Utility Association. Thanks to developments at our Company, and based on communication with other HWUA members, we can conclude that our environmental indicators are the same as those of other water utility providers, or better than the average.

## Water Usage

The Angyalföld Pumping Station is connected to the drinking water network of the Budapest Water Works Ltd. We utilize drinking water for industrial-technological and social purposes.

The amount of water used in 2010 was 9.031 m<sup>3</sup>.

## Water Emission

In case of storms, all storm and diluted water above 3,3 m<sup>3</sup>/s is discharged into the Danube through a bed discharge pipe after mechanical treatment.

In case of diluted water, the degree of dilution is ~3,5 – 4.

	Wastewater transported to the North-Pest wastewater treatment plant	Diluted water discharged into the Danube	Total
	m <sup>3</sup>		
January	1 968 581	463 000	2 431 581
February	1 871 750	269 040	2 140 790
March	2 115 900	118 879	2 234 779
April	1 962 800	298 520	2 261 320
May	2 379 014	2 026 045	4 405 059
June	2 743 891	1 867 040	4 610 931
July	2 396 877	471 036	2 867 913
August	2 093 307	932 716	3 026 023
September	2 453 006	795 348	3 248 354
October	2 269 171	400 268	2 669 439
November	2 280 744	729 000	3 009 744
December	2 617 335	21 780	2 639 115
	<b>27 152 376</b>	<b>8 392 672</b>	<b>35 545 048</b>

In 2010, the amount of diluted and storm water discharged into the Danube was 8.392.672 m<sup>3</sup>.

There was no pollution during the discharge into the Danube.

Közép-Duna-völgyi Környezetvédelmi, Természetvédelmi és Vízügyi Felügyelőség (authority) sets no limit value for the amount of storm water discharged into the Danube.

The energy usage of diluted water collection and treatment is included in the total energy usage of the plant, as this consumption data is not measured separately.

## Waste Management

One of the most common accompanying phenomena of human existence is the production of waste. At the Budapest Sewage Works Ltd, we strive to minimize the amount of waste produced during his activities and carry out our waste management duties in accordance with laws and regulations by authorities.

There's a new waste management system in place at the Company since 2009, which was warranted by cost-efficiency and the need for more effective environmental preservation. This system covers all organizational units of the Company and almost all kinds of waste produced.

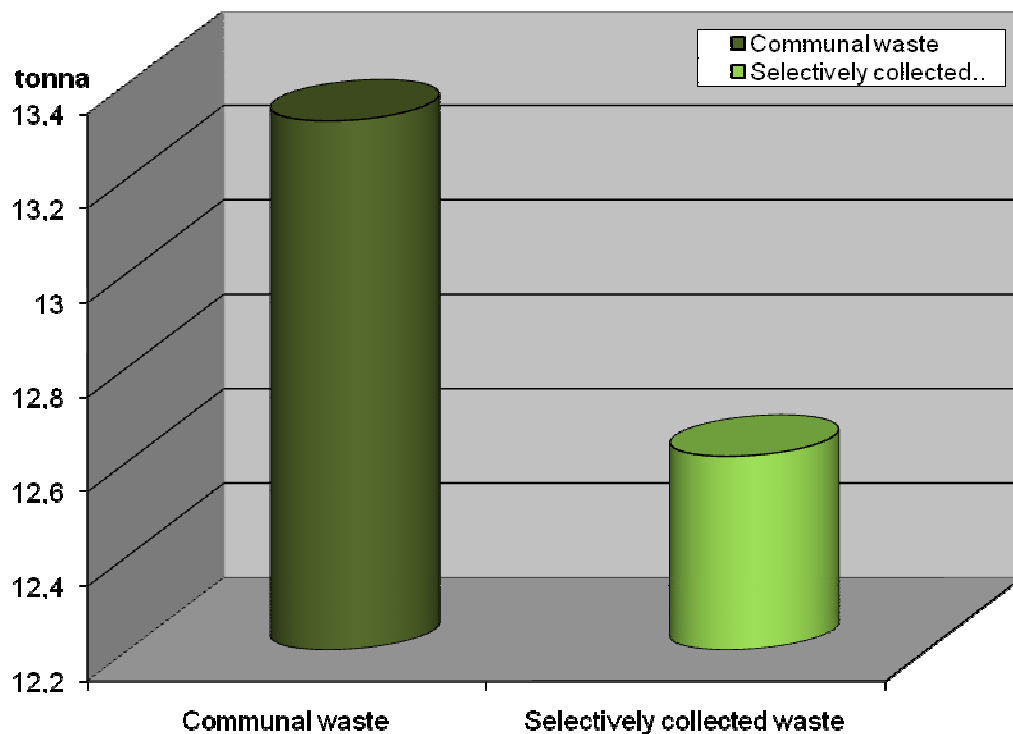
### Communal Waste

The makeup of communal waste produced at the Angyalföld Pumping Station matches that of the communal waste produced at our offices. Waste gets dumped in its entirety.

In 2006, our Company introduced the selective collection of paper and plastic waste at our Asztalos Sándor Street and Kerepesi Road sites, which practice was expanded later to all sites, including the Angyalföld Pumping Station, in 2009. Employees are given the opportunity to deposit used cooking oil too.

Waste designation	EWC code	Volume (m <sup>3</sup> /year)	Amount (t/year)
Communal waste	20 01 03	26	13,32
Selectively collected waste*	20 01 01 15 01 02	19,8	12,61

\*estimate



### **Technological Waste**

Waste produced during the wastewater treatment process (sludge, screenings, rock and stone trap deposit) is dumped after proper pretreatment.

Waste designation	EWC code	Volume (m <sup>3</sup> /year)	Amount (t/year)
Screenings	19 08 01	708	338,26
Sand trap deposit	19 08 02	391	375,85

### **Hazardous Waste**

We outsource the transportation and disposal of some of the waste produced during our Company's activity to companies with proper permits. The remaining hazardous waste (printer cartridges, toners, batteries) is handed over for recycling.

We have established industrial depots for the collection of hazardous waste.

*Volume and designation of hazardous waste produced at the Angyalföld Pumping Station*

<b>Waste designation</b>	<b>Amount (kg/year)</b>	<b>EWC code</b>
<i>Office waste</i>	3	08 03 17
<i>Used oil</i>	8	13 02 05
<i>Paint roll</i>	5	15 01 10
<i>Oil roll</i>	2	15 01 10
<i>Oily rag</i>	15	15 02 02
<i>Dry battery</i>	3	16 06 03
<i>Waste containing PCB and PCT*</i>	130	16 02 09
<i>Fluorescent lamp</i>	2	20 1 21

\* In compliance with regulations, condensers containing PCB were dismantled and transported by June 30, 2010.

### **Energy Consumption**

We use electricity directly or indirectly for the operation of the pumping station's technological equipment. Electricity is supplied by ELMŰ's Angyalföld and Kárpát Street substations from two independent looped networks.

In 2010, the plant's energy consumption was 2.941.965 kWh.

## Gas Consumption

The heating of the plant is provided by two 225 kW Viessmann Triplex RN and two 130 kW Viessmann Triplex TN-022 fan-less, gravitational, natural gas-fired boilers.

In 2010, the plant's gas consumption was 78.650 m<sup>3</sup>.

## Air Clarity Protection

Wastewater management and treatment inevitably results in the formation of odors, due to the presence of organic materials and other components. A variety of technologies is available for the cleaning of polluted air. At the Angyalföld Pumping Station, polluted air is cleaned with biofilters.

The goal of biological deodorization is the removal of pollutants in the air (mercaptans, ammonium, hydrogen sulfide).

Our Company regularly carries out air clarity tests and takes action to ensure sufficient air quality for those living in the vicinity of the plant.

In Angyalföld, a lead off pipe network collects the polluted air of the wastewater receiving- and distributing facility, sediment catchers, filter house, outer sand traps and the grease separation building.

Two fans vent the polluted air and send it to the deodorization biofilter units, from where it is discharged into the open air. The volume of vented polluted air is 24 000 m<sup>3</sup>/h.

The efficiency of the biofilter's filter layer is maintained by regularly perfused liquid containing nutrients. The nutrient-containing liquid is at first a thin, watery solution of caustic potash and phosphoric acid. Under continuous operation it is a thin, watery solution of phosphoric acid. Softened water is used in the solution in order to prevent gypsum formation on the filter insert.

The operation of the perfusing pump is controlled by the biofilters' relative humidity- and thermometers.

The production of soft water is maintained by a twin-pipe volume-driven water softener.

The ventilation of the combined facility's underground parts is provided by a ventilation system constituting blower and suction heads, air-ducts, as well as inner circulation and fresh air mixing systems. The performance of the exhaust ventilation is 3000 m<sup>3</sup>/h.

The vented polluted air is discharged into the open air through a biologically active filter insert after wetting.

The heating of the plant is provided by two 225 kW Viessmann Triplex RN and two 130 kW Viessmann Triplex TN-022 fan-less, gravitational, natural gas-fired boilers.

There were no complaints about odor effects at the plant.

Based on air clarity tests carried out in 2009, boiler emission values were as follows.

Measured source points:

- P1 Gas furnace vent (engine room furnace)
- P2 Gas furnace vent
- P4 Biofilter funnel 1
- P5 Biofilter funnel 2
- P6 Biofilter funnel 3

	Pollutant	Concentration for 3 tf% O <sub>2</sub> (mg/Nm <sup>3</sup> )	Limit value for 3 tf% O <sub>2</sub> (mg/Nm <sup>3</sup> )	Excess (mg/Nm <sup>3</sup> )
P1	Carbon monoxide	22,2	100	0
P1	Nitrogen oxides	99,9	350	0
P2	Carbon monoxide	12,7	100	0
P2	Nitrogen oxides	102,8	350	0

	Pollutant	Concentration for 3 tf% O <sub>2</sub> (mg/Nm <sup>3</sup> )	Limit value for 3 tf% O <sub>2</sub> (mg/Nm <sup>3</sup> )	Excess (mg/Nm <sup>3</sup> )
P4	Hydrogen sulfide	< 0,7*	5	0
P5	Hydrogen sulfide	< 0,6*	5	0
P6	Hydrogen sulfide	< 0,6*	5	0

\* emission was below 0,05 kg/h, thus the limit value need not be applied

Pollutant limit value s were not exceeded at the plant.

## Air Conditioning Equipment

Air conditioners are used against the overheating of the equipment in the switching areas of the pumping station. Leakage test is still not available. The measurements will be performed in 2011.

The energy consumption of these pieces of equipment is included in the total energy consumption of the plant, as their consumption values are not measured separately.

## Noise Effects

The pumping station's operation is accompanied by noise emission partly due to the technological operation itself, the incoming and outgoing transportation activities, and also because of the activity of the workers.

In the past 5 years, there have been no complaints about the plant's noise emission. The Angyalföld pumping plant meets all noise- and vibration protection criteria. The Közép-Dunavölgyi Környezetvédelmi, Természetvédelmi és Vízügyi Felügyelőség (authority) does not require noise level measurement at the plant.

# Chemical Dosage

Dosage of chemicals is carried out at four points for the sake of waste management in the sewage facility: on the wastewater and diluted water sides, as well as the screenings and the deposit. Dosage is performed by an automatic piece of equipment with twin tanks and an overflow collector. Dosage pumps activate along with the particular machine unit.

The disinfection of technological waste was carried out with lime hydrate in 2009, and in the second half of the year we switched over to disinfection with sodium hypochlorite.

	2009.	2010.
Lime hydrate	550	-
Sodium hypochlorite	1500	4500



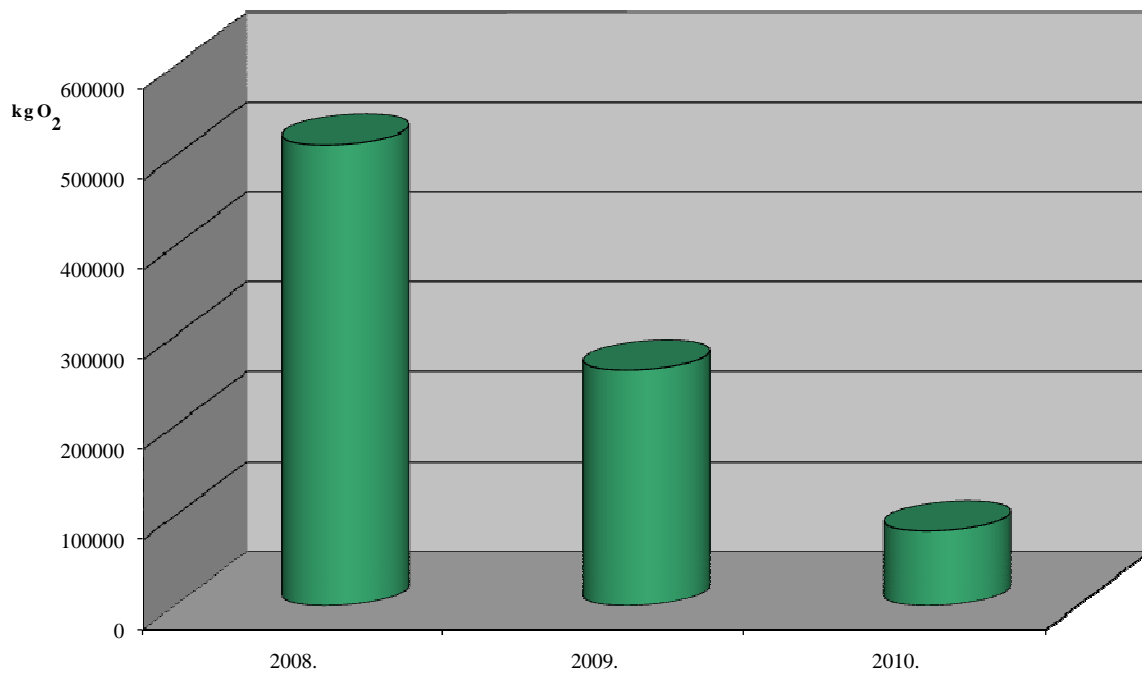
## Oxygen Dosing

Until 2008, oxygen dosing at the plant took place based on quantitative parameters, with manual adjustment. In 2008 we initiated an environmental program to optimize oxygen dosing based on the quantitative and quality parameters of the pipe transportation to the North-Pest WWTP.

The volume of oxygen to be dosed is dependent on the water's sulfide content. After multiple measuring tests, the area of the pumps ensuring the pipe transportation to North-Pest proved to be the most ideal measuring point for determining this value. Here, sulfide content is measured in a gas phase with a hydrogen sulfide detector.

Based on our current experience, the gas phase's sulfide value completely matches the sulfide value of the liquid phase. These measurements are the basis for the continuous quantitative adjustment of the automatic oxygen dosing.

Since the introduction of the measuring at the end of 2008, this has served as the basis for oxygen dosing, the efficiency of which is well illustrated by the following diagram.



## Materials and Chemicals Used

Designation	Unit	2010.
Industrial salt	kg	3.400
Road salt	kg	1.100
Sodium hypochlorite	kg	4.500
Industrial cleaning supplies (Quad)	kg	50
Deodorizer (Odorstroyer)	kg	30
Sulfuric acid (at a density of 1,58 g/cm <sup>3</sup> )	kg	95
Diluents (at a density of 0,8 kg/dm <sup>3</sup> )	kg	8
Paint (at densities of 1,18, 1,2 and 1,3 g/cm <sup>3</sup> )	kg	139*
Deep coat	kg	30
Motor oil	l	5
Gasoline	l	302
Mechanical grease	kg	5
Paper**	sheets	1000
Oxygen used (at a density of 1,14 kg/N m <sup>3</sup> )	kg	82.821

\* Road marking

\*\* Estimate

## Biodiversity

The built-up density of the Angyalföld Pumping Station is 11%

A tended park is found at the plant. A protective plant strip of thujas was created at the plant's southern fence. We have not encountered any endangered plants or animals at the plant.



## Environmental Programs

The Company defines goals and targets to carry out its environmental policies, and environmental protection programs to help their execution.

The definition of notable environmental factors serves as the basis for the assessment of environmental performance, the definition of environmental protection goals, targets and programs, and through the execution of these, the continuous improvement of environmental performance.

The definition of environmental goals and targets is carried out based on the following:

- environmental policies
- decisions based on business plans
- investment plans
- results of environmental factor and effect assessments
- legal and other requirements
- observations and needs of interested parties (owners, authorities, the public)

In case of all possible effects, the defined goals and targets ensure

- fulfillment of all the company's legal duties
- treatment appropriate for the relevance of goals and targets
- the monitoring of actual indicators to increase the efficiency of reviews

In order to meet environmental goals and targets, the Company management develops programs that include on an organizational or personal level:

- the tasks to be carried out
- the goal to be met
- the task schedule and (when necessary) deadline
- methodology of and persons responsible for final tests and reports mid-process (definition of process parameters)

## Environmental Programs for 2011-2012.

### Environmental Program 1.

<b>Goal</b>	<b>Decrease in the amount of organic waste to be transported for disposal</b>		
	<b>Task</b>	<b>Persons in charge</b>	<b>Deadline</b>
	Utilization of plant waste produced at the plant, decreasing the amount of organic waste to be transported for disposal by 5% via the establishment of a recycling facility at the plant.	István Kőszegi József Vincze László Varjas	Execution: 12.31.2012.

### Environmental Program 2.

<b>Goal</b>	<b>Decrease in the amount of liquid oxygen used</b>		
	<b>Task</b>	<b>Persons in charge</b>	<b>Deadline</b>
	Optimization of oxygen dosing to lesser water volumes Installation of new proportioning valve for more accurate regulation. Decrease in the amount of oxygen used by 5%.	István Kőszegi József Vincze László Varjas	Setup: 12.31.2011.

### Environmental Program 3.

<b>Goal</b>	<b>Decrease in electricity consumption</b>		
	<b>Task</b>	<b>Body in charge</b>	<b>Deadline</b>
	Replacement of ignition transformers of fluorescent lamps used for the lighting of buildings, thus decreasing the plant's electricity consumption by 5%.	Central Department of Acquisition and Material Management	Execution: 12.31.2012.

## Emergency Management

There have been no environmental emergencies at the Angyalföld Pumping Station since the introduction of the Environmentally Conscious Management System. The plant has a Plant Water Quality Damage Control Plan, approved by the Middle-Danube-Valley Inspectorate for Environment, Nature and Water under KTVF: 8879-2/2009. The materials and equipment necessary for damage control is available at the plant.

A fire protection protocol is in place at the plant.

Trainings for the prevention of emergencies have been conducted and are being conducted, with special attention to workplace safety, fire-protection and prevention techniques.



## Contact with Interested Parties

The economical operation and continuous improvement of entrusted assets and the maintaining of a mutually advantageous relationship with owners, consumers and authorities are top priorities of the Budapest Sewage Works Ltd.

Our Company is particularly interested in the strengthening of relationships with clients, and makes an effort to meet increasing demands. The considerable developments of recent years serve this purpose, as a result of which customer service activity has become measurably faster and more efficient.

Consumers may contact our Central Service 24/7 to rectify malfunctions and break-downs outside of public sewers (blockage) or buildings

The Budapest Sewage Works Ltd. and its professional investor, Veolia, consider it their duty and social responsibility to educate younger generations to understand, appreciate and support environmental management and the need to respect water. Every year, we open our gates to schoolchildren and show them how wastewater becomes clean water that can be released back into rivers. Through our open day events, comprising environmental studies classes, we regularly provide assistance to schools in environmentally conscious education.

Our goal is to help new generations protect one of our most essential natural resources: freshwater.

In partnership with the Hungarian Water Utility Association, our company launched in 2004 a series of conferences dealing with the environmental protection issues of the sector, covering both scientific and practical approaches. The conference is held every year in November. The themes of past conferences were as follows.

2004: New Technologies and Solutions

2005: Environmental Effects – Solutions in Environmental Protection

2006: The Science of Today – The Practice of Tomorrow

2007: Research – Innovation - Application

2008: From Sewerage to Environmental Management

2009: Environmental Management: Beyond Sewerage

2010: Environmental Challenges – Domestic Solutions

A proof of the conference's success is that an increasing number of professionals attend the event year-by-year, and almost all water utility providers are represented.

With support from our Company, on March 22, World Water Day 2004, the House of Waterside Wildlife opened its doors at the Budapest Zoo & Botanical Garden. The exhibition, which is planned to be made permanent, featured not only domestic endangered fish species, but a demonstration of the water cycle, starting from the springs, through the formation of water, to the treatment phase. Visitors could also find out about the Budapest Sewage Company's history and involvement in environmental protection. Environmental protection and an environmentally conscious education are top priorities of our Company. This is why we sponsored the establishment of the House of Waterside Wildlife at the Budapest Zoo.

## **Our Partners**

### **Residents**

### **Codifiers**

- Government of the Republic of Hungary
- Ministry of Rural Development

### **Authorities**

The activity of the Budapest Sewage Works Ltd. is overseen and monitored by regional and local authorities. The most notable authorities overseeing the Company's activity are the following:

- National Inspectorate for Environment, Nature and Water
- Middle-Danube-Valley Inspectorate for Environment, Nature and Water
- Middle-Danube-Valley Environment and Water Directorate General
- Public Administration Office of Budapest Capital
- Civil Protection Directorate General of Budapest Capital
- Budapest Fire Department
- National Directorate General for Disaster Protection
- Pest County Inspectorate for Consumer Protection
- National Accreditation Board

### **Owners**

- Municipality of Budapest
- Berlinwasser Holding AG
- Veolia Environnement S.A.
- Csatorna Holding Vagyonkezelő Zrt.
- 3 main small investors