



*In service of sustainable and
affordable water management*

 **BDL**
Environmental Consulting Ltd.

BDL Kft. – In service of sustainable and affordable water management

The BDL Environmental Ltd. is an excellent, reliable, professional partner in all aspects of water management. We conduct our activities with special devotion and a deep commitment to professionalism in the fields of drinking water purification, wastewater treatment, stormwater collection and treatment, environmental remediation, and sustainable asset and utility managements alike.

We are present from the beginning of investments aimed at protecting our waters. Our strength lays in strong systematic approaches, and in offering complex personalized solutions to specific environmental issues. The determination of the development directions, the preparation of tender plans and the conceptual designs, classic civil engineering designing, water utility planning, the use of sustainable, durable, quality materials and equipment, the management of the investment project, the construction designer 's supervision and the coordination of installations are all important parts of our work.

Over the past decades, we have contributed significantly to the development and betterment of the aquatic environment in Hungary and in the neighboring countries, as well as the improvement and expansion of the Hungarian water utility services. We carry out our work with commitment both in Hungary, in Europe and outside of Europe.

Our main activities

BDL Ltd. has contributed significantly to the development and betterment of the aquatic environment in Hungary and in the neighboring countries, as well as the improvement and expansion of the Hungarian **water utility services**, over the past decades. We are present with our water and wastewater treatment solutions in and **outside of Europe**.

One of our main activities is classical **civil engineering-design** and implementation; within that we specialize in the **design and implementation of water utilities**.

We not only design water utility network systems, but we also carry out the planning and development of the networks **point-like, plant -like** facilities. We furthermore, often participate in the expansion, modification and **reconstruction** of existing networks and facilities.

We provide economically affordable, sustainable solutions; we offer **network modeling, concept designs**, and the use of **global innovative technologies** and methods. We carry out our work in an environmentally friendly manner.

Our Projects include the whole range of:

- Drinking water purification (extraction, purification and preparation)
- Municipal and industrial wastewater treatment,
- Stormwater management,
- Dynamic cost comparison and cost-benefit analyses of projects in the field of water utility assessments, and
- Multi-criterion water utility asset evaluation and asset management consultancy.

We have great professional references in the field of **environmental remediation**, we contributed, to overall long-term sustainability, with the design and implementation of several unique water management systems.

Due to our **multi-criterion integrated utility asset evaluation methodology**, it is possible to create sustainable and responsible bases for asset management and to optimize the utility service tariffs.

- We have assessed the state of the utilities of hundreds of municipalities
- We have created an integrated utility asset database of more than 10,000 km of water and sewer systems

The engineering and business knowledge and broad experience of our staff and partners, covers the full

technical fields related to design (technology, civil engineering, control engineering and automation), and the complex financial and economic knowledge associated with water utility services, investment planning and implementations.

Scientific Integrity

As part of our diverse professional activities, our Company created the **unit cost indicators**, for the **EU-funded** improvements and reconstruction, encompassing the entire water utility infrastructure. These indicators are now, after extensive professional and social negotiations, being effectively utilized in the preparation and planning phases of public utility improvements.

In accordance with the **European guidelines**, we already apply in the design process, the preparation of established professional decisions through **the utilization of the Dynamic Cost Analysis** (Dynamic Cost Comparison Calculation/DCC) method, developed with our active contribution, by putting principles related to the development of waterworks into practice.

We focus on the importance of a **system approach** to the problems threatening our waters, and the **complexity and comprehensiveness** of their management. We not only consider economic aspects, our development solutions take into account the environmental values of the ecosystem, its characteristics, so that we can provide unique, customer-specific solutions.

On International Waters

As a member of the **Hungarian Water Cluster**, with about 22 other corporate members, we rely on the expertise and resources of around 2000 colleagues

- In accordance with EU requirements and EU standards, economically affordable, condition specific, optimal water management solutions (http://vizipariklaszter.hu/hungarian_references.pdf)

Our colleagues in the different segments of the water industry possess an outstanding **professional and innovative knowledge**, which have been known and recognized in many parts of the world. Our CEO, Mr. Karoly Kovacs is the Vice President of the European Water Association (EWA) and the Eurasian ASEM Water Academic Development Committee. Mr. Kovacs, as the President of the Hungarian Water Cluster and the Hungarian Wastewater Association, has been working for several years for the world-wide recognition of the Hungarian professional knowledge, in which the international organization leadership posts are important milestones.

We carry out our activities

In accordance to the following directives:

WFD – Water Framework Directive (2000/60/EC)

CEN – European Committee for Standardization

TEGoVA – European Group of Valuers' Associations

In cooperation with:

EWA – European Water Association

ASEM Water Academic and Development Committee

DWA – German Water Association

Based on the guidelines in the below mentioned documents:

Guide to Cost-benefit Analysis of Investment Projects (**EU CBA Guidelines**) EUROPEAN COMMISSION, Directorate General Regional Policy (July 2008)

Dynamic Cost Comparison Calculations for selecting least-cost projects in Water Supply and Wastewater Disposal, DCC – Appraisal Manual for Project Designers, EWA-DWA, 2011

Contact us, if you are looking to partner with an innovative company, with excellent references on national and international levels, familiar with the demands and opportunities of the market, and as the member of several international organizations, with a global perspective.

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*The main objective of our company is to protect the quantity and quality of our waters, and the conservation, and improvement of the aquatic environmental conditions. Our **water purification** projects (iron, manganese, heavy metals, arsenic, etc) are conducted **in accordance** with the **standards of the domestic and EU legislations (WFD)**. We pay special attention to **the expansion**, the conversion and **reconstruction of existing facilities**, we carry out our activities in a sustainable and cost-effective manner.*

Among our previous successful projects, in addition to water purification assignments, we also designed and managed the construction of **river surface water intake facilities**, water treatment structures, and the mechanical engineering of the above.

Applied units of water purification technologies:

- Coagulation
- Flocculation
- Clarification
- Sand filtration
- Membrane cleaning
- Ultrafiltration
- Nanofiltration
- Reverse osmosis

Full range of engineering, construction and investment preparatory tasks:

- Technical Condition and Environmental Assessment (eco-audit)
- Concept design
- Conceptual authorization
- Management of licensing processes
- Preparation of tender documents and construction plans
- Coordination implementation (production, transport , technical supervision)
- Test operation documentation and supervision (management, remote control and supervision)

References

***Water-purification
and service system construction in Vietnam
Drinking Water Treatment
Flocculation – Flotation and Sand Filtration***



*surface water intake from river •
22 000 m3/day capacity •
clarification • sand filtration • drinking water network*

The aim of the Central Vietnam, Quang Binh province water treatment project is the construction of water intake and water management structures to provide the region with healthy drinking water. More than 100 000 people live in the service area, on the northern and southern bank of the Gianh River.

BDL Ltd. as a member of the project owner, Hungarian Water Cluster, is contributing to the development of the water treatment plant with its professional knowledge, design and construction experience. The project consists of a 22 000 m3/day capacity surface water intake point with required screens and pumping station, built on the bank of Rao Nan River, which serves as the main water base.

The water intake station is going to serve a 10 000 m3/day capacity water treatment plant, constructed in the first phase and a 12 000 m3/day capacity water treatment plant, erected in the second phase of the project.

In the first phase of the Gianh River project, the 10 000 m3/d capacity, water treatment plant (WTP)

will be developed, aimed to deliver potable water to the southern area of the river.

The water purification technology used here:

- Coagulation
- Flocculation
- Clarification
- Sand filtration
- Water storage

Our engineers had to design the water intake point and treatment plant in a block manner in order to take full advantage of the mountainous terrain and space available.

The delivery of the machines and installation work is done by Pureco Ltd., with the assistance of Hungarian sub-contractors. The majority of the products delivered to the site are Hungarian products.

Currently at the project location ground works and site excavation are in progress.



Drinking water treatment plant located in Kiskore

*Water purification
Removing iron, manganese and arsenic
Load capacity: 636-1050 m³/d*

The city's water purification plants based on the aquifers under the city were installed in 1968. Its primary mission was to meet the drinking water needs during the construction of the barrage of Kisköre and later to supply Kiskore town with potable water. The old water treatment technology did not meet the new regulatory requirements, thus the modernization of the facility was needed. During the implementation of the project, an adequate technology was developed with a cleaning **capacity of 1050 m³/d**, in accordance to the existing water rights permit. The removal of arsenic and manganese is managed by the reconstruction of the 1960s outdated and run-down water works equipment.

The necessary removal of iron, manganese and ammonia, present in the raw water, was grouped around the arsenic removal technologies. As part of the modernization some parts of the aging water network was replaced; water wells have been renovated and on a 1208 linear meters the water network has been the re-constructed. During the project a 170 m² floor area technical building was erected.

Completed tasks:

- Perform all the tasks necessary to implement the water treatment project necessary for Kiskore settlements water quality improvement: create water rights permit plan, develop detailed design documentation,
- Preparation and development of approval, architectural construction and structural plans of buildings and structures,
- Designing electrical and control engineering construction plan,
- Acquisition of approvals and permits necessary for the construction,
- Development of Sample Operational Plan, the management, assessment, delivery of final report of the test run, the creation of the final operation maintenance manual, manufacturing and installation works
- The manufacturing and installation of the wall profiles, covers and railings in accordance with the construction plans
- The manufacturing, procurement and installation electrical and control engineering instrumentation, in accordance with the construction plans



RAIN WATER MANAGEMENT

03

We believe that rain water is one of our most important natural treasures. The collection, cleaning, storage and re-use of rain water contribute to one of our most important targets: the preservation of the quality and quantity of our precious waters.

In the spirit of this, we prepare civil; mechanical; electrical and control engineering plans for stormwater management projects and their engineering facilities, stormwater drainage and management plans for industrial parks, highways and other major investments.

We provide a full range of services from stormwater management concept plans for settlements and river basins, to the management of the implementation of the project. It is important for us to recycle rainwater, and to reuse it for irrigation and for fire water systems if possible.

Our innovative, patented solutions in the field of stormwater management are exceptional and unmatched. In addition to the products, the installation methods are also environment-friendly, economical and efficient.

We are proud to have designed several pre-treatment facilities during which we were able to develop our own range of devices and equipment that have been installed and successfully operational

References >



The plan for BUDAKESZI urban stormwater managment stormwater management

*Natura 2000 nature protection area • wetland • dynamic modeling
A major issue with regards to stormwater drainage is the natural aquatic environment it is going to be placed into.*

In case of BUDAKESZI the following aspects influenced the decision for the development of a sustainable, technologically sound and environment-conscious stormwater drainage, treatment and recycling solution. The reasons were:

- Natura 2000 nature protection area designation,
- The Pilis Park Forest is in the affected area,
- Bodzás ditch is a prime locally protected natural area.

The expansion of the stormwater receiving Bodzás - ditch into a stormwater reservoir, and wetland, was not only beneficial from a stormwater management point of view, but it contributed substantial to the local nature and bird conservation efforts. It also gave an impetus to the educational (developing nature trail) and tourism activities.

As part of the project, we modeled the stormwater drainage (ditches, storm drains, structures, reservoirs, emergency reservoirs, infiltration, etc.) and their runoff in Budakeszi city and its administrative area. A great advantage of dynamic modeling is the unlimited number of rainfall events and the course of their direct and indirect effects that can be rapidly modeled on the drainage system.

During our work we have prepared Budakeszi's urban stormwater drainage water permits conceptual plans, which were based on the assessment of current technical conditions, the evaluation of these and their documentation in a uniform system.

We furthermore provided calculations and determinations for extended and significant rainfall events. This was achieved by modeling major basin runoffs, by the demarcation of sub-basins, by providing soil infiltration coefficients and the relative water level specific to the sub-basins, with the hydraulic and hydrological data of the natural recipients, and with the creation of the necessary logical and syntactic relations, and finally in order to speed up the model calculation we applied certain simplifications, and amalgamations.

Budapest Airport – stormwater treatment stormwater managment stormwater management

*ENVIA TRP sludge and oil separator system • minimizing maintenance needs
integrable technical solutio • weather proof system • extreme implementation
circumstances • ENVIA TRP • steel flex pipe technology*

Due to the Budapest Airport's environmentally conscious attitudes over the past few years, several improvements have been made in order to protect the natural environment around the airport. In the frame of this initiative the stormwater treatment of the airport's runways, taxiways, other traffic and technical areas , paved walkways, roads, parking areas with polluted river channels was developed, and an accident emergency system was created. The operator assigned the development of the concept to Pureco Ltd.

Our experts were looking for a solution to minimize maintenance needs and reduce the operating costs, in addition to it being integrable into the existing drainage system. Upon determining the technical content, state of the art, weather -resistant, durable materials with longevity were selected, with a further advantage of favorable construction costs.



As part of the solution, rainwater pipes that were close to each other were combined and received shared treatment plants. through licensing, to the product supplies and logistics, was needed. The experts of Pureco Ltd. used a PURECO/SPIRE steel pipe in the sizes of D1200 and D1500 for the above mentioned merger, due to the extreme nature of the construction conditions (groundwater, excavation stability). The use of steel pipes, as distributor shafts (in 1600 mm diameter), contributed to the rapid and cost effective execution. In order to clean the contaminated stormwater; nearly thirty open trench ENVIA TRP sludge and oil separation equipment were installed, with a total of 5,800 l/s cleaning capacity.

Pureco Ltd. is proud of this successfully completed project- due to the diversity of the project the knowledge, experience and collaboration of several other divisions of the company, from design, through licensing, to the product supplies and logistics, was needed.



WASTE WATER TREATMENT

04

Our company possesses a wide range of experiences and professional references in the field of municipal and industrial wastewater treatment. We consider it important that in addition to designing a wastewater treatment technology that meets the requirements, we also concentrate on cost-effectiveness, the selection of optimal solutions, the intensification and reconstruction of existing facilities.

Municipal wastewater treatment technologies:

- Mechanical cleaning (mechanical grid, sand trap, grease trap, pre-decanting, equalization)
- Biological treatment (activated sludge technology, SBR, fixed -film systems, membrane technology)
- Tertiary treatment
- Wastewater sludge treatment sludge dewatering, conditioning)

For a higher efficiency:

- The BIOCOS (Combined Biological System) technology is the improved version of the aerobic activated sludge process, combining the benefits of traditional flow systems and the SBR basin (compared to conventional sludge separation processes it is significantly better, with a minimal mechanical demand, reduced energy consumption and maintenance requirements).

Industrial wastewater treatment (paper industry, food industry, textile industry, chemical industry, oil industry) **technologies:**

- Mechanical cleaning (mechanical grid, sand trap, grease trap, pre-decanting, equalization)
- Physical- chemical purifying (Flotation - DAF, coagulation, flocculation)
- Biological treatment (aerobic and anaerobic)
- Membrane technologies (micro, ultra, nano

filtration, reverse osmosis)

- Wastewater sludge treatment (sludge dewatering, conditioning)

Full range of engineering, construction and investment preparatory tasks:

- Technical Condition and Environmental Assessment (eco-audit)
- Concept design
- Conceptual authorization
- Management of licensing processes
- Preparation of tender documents and construction plans
- Coordination implementation (production, transport , technical supervision)
- Test operation documentation and supervision (management, remote control and supervision)

At the beginning of the planning and design process, we always conduct a specific technical, short-term and long-term economic and profitability analysis, in order to select the best suited solution in accordance with the customer's needs.

We support the economic aspects and decision of the project with Life-cycle cost analysis, in order to provide our clients with unique and specific solutions. We take part in university education and training in the field of water and environmental engineering.

References

Tata WWTP

Municipal wastewater treatment
Simultaneous denitrification activated sludge

6.000 m3/d • 28.938 PE • twin layout • fine bubble diffuser biological treatment

We have developed the complete construction plans, the design necessary for the water rights- and permit modification, and carried out further engineering services in the Tata sewage treatment plant and Fényes street pumping site development project.

The technology consists of two parallel treatment stages:

The main parts:

- Mechanical cleaning,
- Anaerobic basins,
- Simultaneous de-nitrification basins,
- Secondary sedimentation.

The ‘sludge’ stage includes the removal of excess sludge, concentration, homogenization and a mechanical centrifuge dewatering.

In the frame of the investment, a new twin layout, fine bubble diffuser biological treatment unit was installed, with a 2x3300 m3 aerated space.

The old structures were replaced by new technology units, a sludge thickening unit, and the third sedimentary equipment.

The Fényes street pump has been redesigned as well, thus the rough pre-cleaning of the incoming waste water can start

here. In connection with the completion of the project the whole sludge line has been developed, the sludge centrifuge and its servicing parts have been installed, and a new advanced process control system has been constructed as well.



Load

BOD	1736	kg/d	354	g/m3
total-N	418	kg/d	85	g/m3
TSS	1966	kg/d	401	g/m3
total-P	70,3	kg/d	14,3	g/m3

Limits

CODcr	<	125	g/m3
BOD	<	25	g/m3
total-N	<	15	g/m3
NH4-N	<	20	g/m3
total-P	<	2	g/m3
TSS	<	35	g/m3
pH	<	6-9,5	g/m3
TPH	<	10	g/m3



Rózsaszentmárton WWTP

*Municipal waste water treatment
Simultaneous denitrification activated sludge*

210 m3/d • 2 124 PE • twin layout • fine bubble diffuser biological treatment

We have developed the complete construction plans, the design necessary for the water rights- and permit modification, and carried out further engineering services in the Rózsaszentmárton (East-northern part of Hungary), by the stream of Ágó. We have modernised the extant sewage treatment plant with the technology of deep blow that consisted of:

- decomposition of organic materials and ammonia
- nitrification, variable denitrification
- phosphorus elimination
- phase separation.

In the frame of the investment we have designed a sewage treatment plant with the capacity of 210 m3/d. In addition a sewer system of 36 km is being built, the technology is mainly gravitational, 6 local and 21 domestic pumping system is installed. This means 94% sewerage.

In connection with the completion of the project hazard of ground water is reducing as the town of Rózsaszentmárton can be found in a sensitive area in terms of water quality protection.

Load				
BOI5	127,4	kg/d	606	g/m3
CODcr	254,8	kg/d	1212	g/m3
t-N	23,5	kg/d	112	g/m3
TSS	150	kg/d	714	g/m3
t-P	3,87	kg/d	18,4	g/m3

Limits			
CODcr	<	75	g/m3
BOI5	<	25	g/m3
total-N	<	50	g/m3
NH4-N	<	10	g/m3
total-P	<	5	g/m3
TSS	<	35	g/m3
active chlorine	<	2	g/m3
number of coliform	<	10	g/m3



Wastewater Treatment Plant in Iraq, Al-Dour – Salah Aldeen

***Municipal waste water treatment
Mechanical and biological treatment, sludge management***

9 308 m³/d capacity • 46 542 PE

Our tasks are:

technological and hydraulic calculations
general and technological description
temporary handling instruction valid during trial
operations
trial operation plan
list and description of facilities
Block Flow Diagram (BFD) with mass balance chart
Process Flow Diagram (PFD)

P&ID of the process
list of machineries
equipment data charts
process verification report
general layout plan
plant layout with hydraulic connections
catalogue of connection points
design and data supply about the facility-seg-
ments connection



Sewage Capacity Development for Pet Food Hungaria Ltd. in Sopronhorpács

***Industrial waste water treatment
Flotation***

*flotation equipment and technology • industrial waste water treatment
stainless material • short construction period • simple to maintain
• optimal sludge manageme*

The trial run has started at the water treatment premises of the pet food manufacturer, where the treatment and purification of 100m3 of industrial waste, generated per day, happens.

In the development the flotation equipment is designed to separate floating and undissolved materials in water or process fluids.

The use of high quality, corrosion resistant materials is space efficient, the construction time is minimal, it is easy to operate, the collection and delivery of deposited materials is automated, and in order to achieve the optimal slurry deposition the water height is adjustable.

Parameter	Influent	Effluent
Flow	m3/d 1 000	
CODt	mg/l 7 000	≤ 120
BOD5	mg/l 3 700	≤ 25
TSS	mg/l 3500	≤ 35
Efficiency on CODt	% 98	

During the development a 40 m3 buffer pool, a 40 m3 of wastewater-, a 20m3 flotation sludge-, a 30m3 excess sludge storage tank and an 80 m3 pool was designed to store the treated water. Pet Food Ltd. furthermore renovated the drinking water supply on site, the internal roads, pavements and sidewalks. The electrical technology and control engineering works were completed on schedule as well.

Laboratory measurements during the test verify the degree of purification.

**Urban water
treatment plant in Yekaterinburg**
industrial waste water treatment
PURBAN®

WWTP near residential area • 15 000 m3 treated water per day
100 000 PE • recycled treated water in a thermal power plant • MBR

BDL Ltd. and Pureco Ltd., in cooperation with Pólus Ltd., are cooperatively executing the design and construction of the municipal wastewater treatment plant in Yekaterinburg (Russia) – near the Akademiceskaya residential area.



This residential area has been developing in the last decade with a significant speed and currently its own separate wastewater treatment is not resolved. Presently only a rough mechanical treatment plant is located within the designated area, where as part of this greenfield investment the future water treatment plant will be situated.

For the future expansion of the residential area the management if it's increased wastewater flow is essential. The current 4-5000 m3/day flow is estimated to increase to a 15 000 m3/day on the long term. The plant load maximum after the expansion will be 100 000 PE.

The treated water will either be placed into a living aquatic recipient and/or will be recycled in a thermal power plant.

The reason for the strict water quality requirements on one hand is that the Patrushia stream flows through the lake system of Yekaterinburg, on the other hand the thermal power plant's treated water quality criteria are rigorous as well.

The development of a solution for the aeration technology, adjusted to the local conditions (-35°C in winter and in summer +32°C air temperature), the reclamation of the thermal energy from the treated water, and the fully - enclosed indoor design are among some of the responsibilities of our experts.

The wastewater treatment plant project is executed in two implementation phases, with four technology lines - based on the following main technological steps:

- Mechanical cleaning (mechanical grid, sand and grease trap)
- Biological treatment (MBR system , with an extra carbon source administration option)
- Third cleaning stage (RO)

The detection of residual contamination accumulated in groundwaters, the exploration of the extent of contamination, the mitigation and elimination of residual environmental damages from the past are all part of the tasks of environmental remediation activities.

Not only the professional design and construction of the water delivery systems can protect our irreplaceable resources, the drinking water sources and groundwaters, but we also have to take care of the protection and purification of said water resources.

We have exceptional references in the field of environmental remediation, we have contributed to the sustainability of our water resources with the design and implementation of several unique water management systems.

BDL Ltd. is offering a comprehensive set of services for soil and groundwater contamination elimination, encompassing engineering, consultancy and construction works. Our aim is to return a “clean” environment to our clients after the contamination assessment, demarcation and reclamation.

Remediation procedures

- Exploration of soil and groundwater contamination
- Exploratory drilling
- Development of sampling and monitoring wells
- Exsitu and insitu soil and groundwater management
- Extraction and disposal of waste
- Contaminated soil pre-treatment , treatment
- Reclamation works

Design and consultancy

- Technical Condition assessment
- Fact-finding
- Compilation of technical response plans
- Monitoring works
- Accredited sampling and analysis
- Consulting
- Official administration
- Licensing procedures



The remediation of the leather factory at Simontornya

toxic metals in ground water • drainleakage system • 1157 m2 infiltration area

As a result of the factory's 150 years of operation, a large amount of pollutants drained into the ground waters: brine protein, lime and sulfur solutions, solutions containing calcium salt, chromium (VI) and chromium based tanning material, aliphatic hydrocarbons and toxic metals from paints, solvents and treatment agents.

Our company, based on the preparatory studies, licensee plans, field measurements and laboratory experiments, developed a complex water treatment process, created its construction plans, built it and is currently operating the water management system.

Main technical parameters:

- The amount of contaminated groundwater in total: 232.500 m³
- The amount of groundwater that is crucial to be purified: 168.200 m³
- Establishment of 10 extraction wells Q = 500-600 m³/d total capacity
- 500 m³/day capacity continuously operating water pre-treatment system
- 4 pieces, in total of 1,934 meters in length, drainleakage system
- 1,157 m² infiltration area,
- 6.94 l/s continuous flow of purified water to infiltrate.

At the border of the remediation area, under the surface, a dam system has been constructed, where from 10 wells they are continuously extracting the groundwater, which is then transported on lines to a central treatment plant, and after the treatment it is released back into the ground through the infiltration system.

As a result of the project, the threat to the nearby water source is neutralized, the people living in and around Simontornya can live in a cleaner environment, and on the remediated area can welcome new businesses thus creating new jobs in the region.

Pollutants	Avarege concentration in raw water	Limits	Measure/unit
Arsenic	57,5	24	µg/l
Bromine	1540	1000	µg/l
Chrom (in total)	154	100	µg/l
Nickel	23	23,00*	µg/l
Sulphate	875	875*	mg/l
Nitrate	350	50	mg/l
Chloride	2405	1000	mg/l
Phospate	15,4	15,4*	mg/l
Ammonium	395	5	mg/l
Natrium	2110	1000	mg/l

Recsk polluted groundwater remediation

remediation
neutralization, clarification, sedimentation

- *Cleaning contaminated mining groundwater*

From the middle of the 1800s century, precious metals ores have been mined in Recsk. As a result of the depletion of the near-surface deposits production gradually declined, and in 1979 stopped entirely.

Due to the mining activities there was a significant amount of heavily toxic, metal polluted water flowing out of the mine, this and the lack of any kind of water purification or treatment, and earlier emergency cases lead to the current situation, where the surface waters (Bikk stream and Balátastream) and the sediment reservoirs in the area are seriously polluted.

In addition to the above mentioned, there are further environmental threats; the pollution caused by the flotation tailings ponds generated during the ore processing, abandoned and not remediated waste dumps, waters rich in strongly acidic, metals and toxic metals (Ag, As, Ba, Cd, Co, Cr, Cu, Fe, Hg) caused by the tailings ponds.

Remediation work began in late summer 2012. Our engineers created, next to the existing technology and engineering plans, the water treatment plant's architectural, structural and electrical management designs, and carried out the industry-specific construction works as well.



UTILITY ASSET EVALUATION

As part of the remediation process, the water purification was achieved in three stages: the reception of the contaminated water at the point of origin, the transportation to the treatment location, and the cleaning process and output.

In order to manage the polluted groundwater a host pit, neutralization tanks, a lamella sedimentation, thickening and conditioning tank, a centrifuge, and a slaked lime producer were constructed.

The sludge, generated during the treatment of the polluted water, will be reused after dewatering.

The purified water produced by the neutralization, sedimentation and clarification is recycled as well, to cover the water need of the treatment plant.

The water treatment system, as a result of a complex design and development process, was built, and following a successful test operation, was handed over. Laboratory tests confirmed the efficiency of the purification process.



- Foreign markets – Request for an ISO audit

During our work so far we have established a complete, multi-criterion, integrated utility asset database for several hundred municipalities over 10,000 km of water and sewage systems and its connecting major works. This database contains the digital utility mapping file for each municipality and sector, and is suited to support the implementation of sustainable utility asset management, thus maintaining a livable environment.

Developed by our Utility Asset Evaluation department, the multi-criterion, Integrated Utilities Assessment Database (TIKA) software received, in 2012,

the Eco Aqua Trade Award from the Hungarian Water Utility Association, which covers all water utility providers, several water industrial companies and educational institutions.

Our service is professional, **flexible and multi-criterion**; all our work is carried out with added value and is based on our exceptional experience and knowledge in the field. Our team is prepared and ready to face the challenges brought to us by our customers.

The sustainable maintenance of the water utilities is in the context of asset management, and the coverage for this is provided by the depreciation of the assets.

The evaluation of the **water utilities** is the bases for a **predictable operation**. The **Structured utility asset database**, established as a result of the utility asset evaluation process, with this operators, municipalities; utility owners are given an objective view of the value of the utility assets, their real economic and technical state. Based on these the operators and owners are capable of efficient and a sustainable asset management and better operational decision-making.

Multi-criterion integrated utility assessment levels:

0. Geodetic survey, creation of utility base maps
1. Public utility registry, digitizing public utility maps
2. Identifying, defining Object Groups, establishing the asset inventory
3. Assessment of Technical Condition
4. Assessment of depreciation indicators
5. Calculation of replacement costs
6. Determination of asset value – utility evaluation
7. Consultancy with regards to the asset management and water utility tariffs



References

The **multi-criterion integrated utility evaluation and assessment** of the City of Pécs, and the development of the public utility asset inventory. The completed inventory is suited for the accounting registration of the total of the assets, thus supporting a sustainable asset and tariff management. Inhabitants: 160.000.

Length of the network: 1,501 km

Wastewater Treatment Plant(s) capacity: 80,500 m³/d

The **multi-criterion integrated evaluation and assessment** of the sewage network and wastewater treatment plant of the City of Tatabánya, and the development of the public utility asset inventory. On the basis of utility assessment preparation of long-term Replacement Plan. Inhabitants: 70.000.

Length of the network: 295 km

Wastewater Treatment Plant(s) capacity: 16,000 m³/d

The **multi-criterion integrated evaluation and assessment** of the sewage network and wastewater treatment plant of the City of Érd and its region, and the development of the public utility asset inventory. On the basis of utility assessment preparation of long-term Replacement Plan. Inhabitants: 84.000.

Length of the network: 152 km

Wastewater Treatment Plant(s) capacity: 8,000 m³/d

DYNAMIC COST ANALYSIS

*In addition to our utility evaluation activities, we have contributed to the development of the **Dynamic Cost Comparison Calculations Guidelines (DCC)** issued by the Hungarian Wastewater Association. The DCC Guidelines provides an efficient way to perform **option analysis** for the various investment projects, in order to improve the cost efficiency and sustainability of the water utility developments, as well as to improve the decision making process. In addition, the Annex of the Guidelines support the assessments of costs.*

The aim of the DCC is to select the optimum technical solutions, with the overall lowest cost, in water supply and wastewater treatment projects. Its application allows for established professional decision-making during the water utility investment's option analysis, it also creates an excellent basis for the subsequent design and implementation phases (economic and financial analysis, procurement etc.) as well.

The **DCC method is completely consistent with the domestic and EU legislations and methodological recommendations**, its calculation process as well as the presentation of the results is schematic, so the results can be easily understood, it is transparent and straightforward for engineers, economists and policy-makers alike.

The DCC method, instead of the current design process characterized by short-term financial outlook, **supports the sustainability aspects of cost-effectiveness**, thus it complies with the new EU public

procurement directives, which came into force in April, 2014. The DCC method supports the selection of the optimal bid, instead of the one with the lowest investment cost, and helps with the exact determination of the **life cycle costs**.

With the implementation of the DCC method valid and established answers can be given to the changing regulatory requirements of the preparations and implementations of water infrastructure investments.

Our DCC references:

The **evaluation of the possible ways of providing industrial water** from the North Pest Wastewater Treatment

International Knowledge Transfer Project on Dynamic Calculation Cost Comparison (DCC) method, Client: Hungarian Wastewater Association
Project sponsored by the German Federal Environmental Foundation (DBU)

Dedicating our activities for the protection of the environment, aiming to design and preserve a liveable and pure nature, we offer solutions in the field of sustainable and integrated water management.

We have selected our most important, and interesting references out of several hundred. In case you cannot find what you were looking for among these, please do not hesitate to contact us at: info@bdl.hu

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