

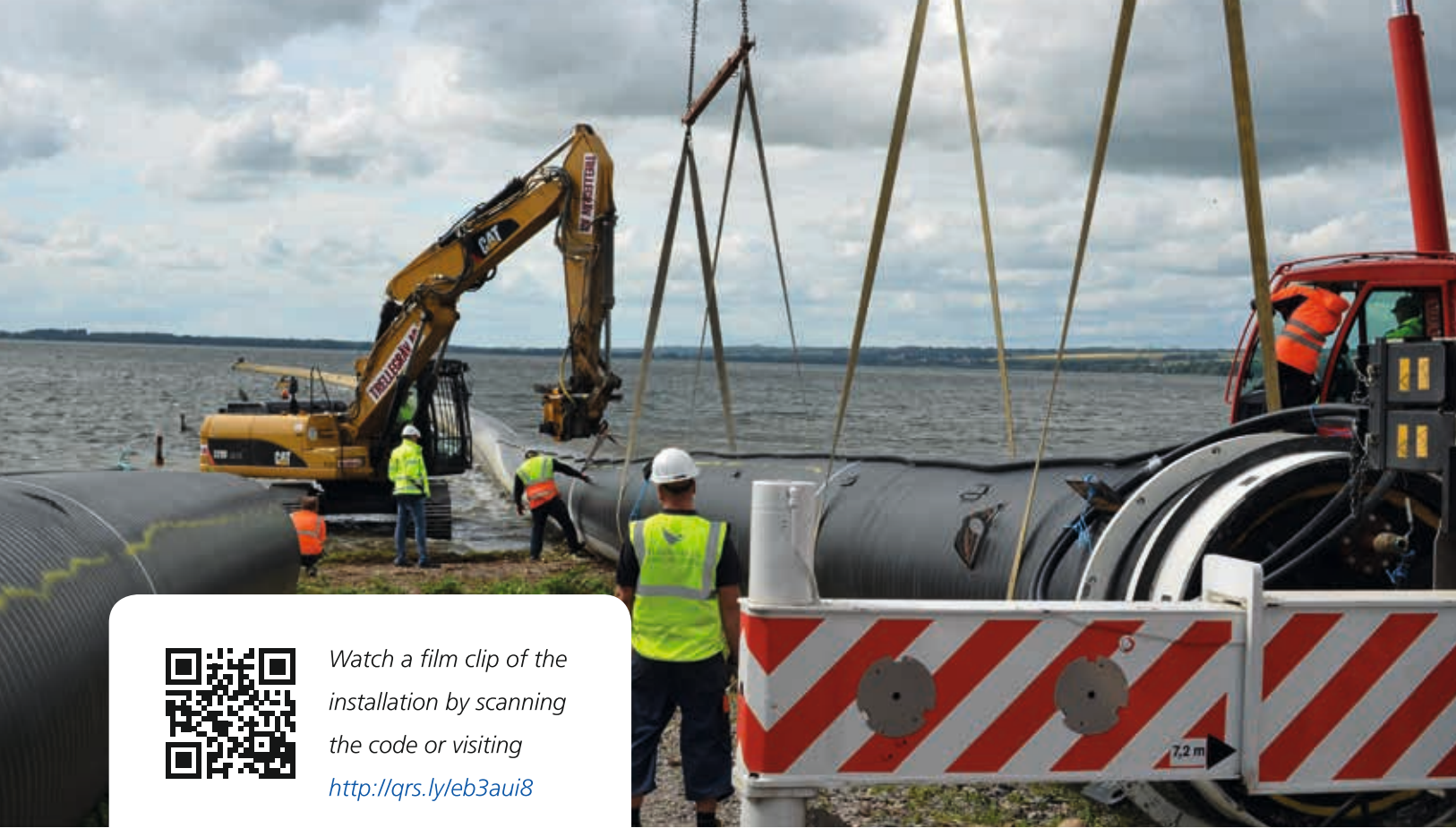
THE KWH PIPE CUSTOMER JOURNAL » ISSUE 16 » WWW.KWHPIPE.COM

# pipe world

**WEHOLITE ENSURES  
A TROUBLE-FREE PROJECT**  
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**PLASTIC PIPE WITHSTANDS  
PROCESS WATER**  
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**WEHOPUTS PROTECTS  
THE BALTIC SEA**  
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Watch a film clip of the installation by scanning the code or visiting <http://qrs.ly/eb3au18>

# Water is our natural element

A public utility in southern Sweden, responsible for providing potable water to 850,000 people, needed to replace the marine intake for one of its two water treatment plants. KWH Pipe provided a long-lasting solution that could be quickly installed: a 245 metre DN/ID 1,400 mm structured-wall Weholite PE-HD pipe. The pipes were welded and weighted in a suitable location and later towed by boat to the installation site.

Weholite is a unique product that can be weighted by filling the hollow profile walls of the pipe with non-hardening cement mortar, which ensures that the pipes retain their natural flexibility.

This method eliminates the need for external weights, allowing the trench to be smaller, which lowers installation costs. Weholite's built-in advantages in combination with KWH Pipe's experience in the design and installation of marine pipelines create an unbeatable package. Contact us now for more information!

- Polyethylene is a corrosion-resistant material
- Pipe diameters up to DN/ID 3.5 metre
- Internal pressure up to 2 bar
- Water proof system
- Pipe sections can be towed by boat to the installation site
- Durable product with a long lifetime
- Cost-efficient solution



## INVEST IN THE FUTURE

**T**he downturn in the economy during the last five years has put both the public and private sectors in a position whereby it might not be possible to hold on to old ways of doing business. While companies have adapted and bounced back, or at least recovered somewhat recently, governments and municipalities will have to tighten their belts for years to come. With different sectors of society competing for government funding, where and how is the taxpayers' money best spent?

There is an undeniable connection between a country's competitiveness and its infrastructure. Infrastructure includes all of the building blocks – its roads, power transmission lines, airports, mass transit systems, ports, bridges, power plants, water delivery systems, sewage treatment, etc. – that fuel a given society's economic and social development. Investing in infrastructure improves not only a country's economy and employment situation but also the quality of life by helping to avoid environmental problems and any negative impact on local health.

For many years, the western world has had an infrastructure deficit – we haven't been replacing aging infrastructure at a sustainable rate. Water and sewage issues might not be headline-grabbing news in the same way as a bridge collapse, but investing in a safe and reliable potable water network, appropriate sewage treatment and storm water management can prevent human suffering and future economic losses.

As infrastructure is built or rehabilitated, life-cycle cost analysis should be performed for all infrastructure systems to account for initial construction, operation, maintenance, environmental, safety and other costs. Life-cycle cost analysis, on-going maintenance, and planned renewal will result in more sustainable and resilient infrastructure systems and further ensure that they can meet the needs of future users. That is the best way to utilise our limited public finances.

The low life-cycle costs of plastic piping systems make them the most cost-efficient alternative for closing the infrastructure deficit. Furthermore, a life-cycle assessment study on behalf of The European Plastic Pipes and Fittings Association (TEPPFA) has shown that plastic pipes offer a high degree of sustainability from an environmental point of view. Change cannot be achieved overnight, but KWH Pipe is proud to deliver piping solutions that make our societies a better place.

**Jan-Erik Nordmyr**  
President & CEO, KWH Pipe Ltd.



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## HEAT EXCHANGER AND PIPE SYSTEM



## Utilisation of geothermal energy on a large scale

Renewable energy is a hot topic and one of the most sustainable forms of is geothermal energy. An innovative PE-HD heat exchanger for capturing energy stored in aquifers has been launched in Finland. The land of a thousand lakes and freezing cold winters is the natural place for the new product, as its polyethylene material and large capacity make it possible to capture energy even from

+0.5°C water without freezing. From +8°C water, it is possible to produce 1 MW of heat, which is enough to heat 300 normal-sized flats or 100 medium-sized single houses.

KWH Pipe customises the heat exchangers according to customer specifications. The turnkey delivery comprises design, production, installation and commissioning. ■

## Ensuring a potable water supply with a quick solution

When a concrete potable water tank failed and was contaminated by rainwater and runoff, KWH Pipe was able to provide relief quickly. The 500 m<sup>3</sup> tank was situated on high ground and served as a water tower for a community in Central Finland. It was built according to the norms of the 1970s, which meant that there was no way of bypassing the tank. Therefore, the owner, Jyväskylän Energia, needed a temporary tank that would ensure a potable water supply while the old concrete tank was being emptied and inspected. After reviewing several alternatives, the speedy assistance offered by KWH Pipe sealed the deal.

The DN/ID 3-metre and 25-metre long temporary tank was made of Weholite, which is manufactured from hygienic high-density polyethylene and highly suitable for potable water applications. The tanks can be manufactured in virtually any size that is feasible to transport and they can, if necessary, be constructed as multiple modules. The main benefit is that the tanks are factory assembled, which minimises installation time on-site and thereby saves money. ■





## Plastic inspection chambers don't have to be round

In Sweden, KWH Pipe has launched an inspection chamber that is out of the ordinary. The new product is box-shaped and can be delivered from the factory as a ready-to-install solution or be assembled at the installation site. This technology can be used to construct pumping stations, valve chambers, ventilation chambers, detention tanks and more.

KWH Pipe customises the individual chambers according to customer specifications to include hatches, pipe supports, ladders, etc., and to accommodate traffic loads, groundwater pressure and soil loads. The PE-HD product is of course corrosion-free and waterproof and it offers weldable pipe connections. ■

## APPOINTMENTS

### Finland



**Ms Miia John** has been appointed product manager for WehoPuts wastewater treatment plants as of 21 May 2012. She previously worked as district manager for building products in Southeastern Finland.



**Ms Johanna Nordenswan** has been appointed purchaser at the Vaasa factory as of 25 June 2012. She previously worked in the accounting department.

### North America



**Mr Dan Pavlovic** has been appointed applications engineer as of 22 October 2012. He previously worked as applications engineer, Danfoss NA.



**Mr Summit Lalwani** has been appointed technical service technologist as of 19 November 2012. He is in charge of all drafting and design requirements.

### Sweden



**Mr Jean Saarinen** has been appointed sales & after-sales manager at WehoPuts wastewater treatment plants as of 1 December 2012. He previously worked with technical support for the same products.

## Weholite license to Brazil



KWH Pipe and Armco Staco S.A Industria Metalurgica of Rio de Janeiro, Brazil, have announced

the granting of an exclusive license to Armco Staco for the manufacture and marketing of Weholite pipe in Brazil. In addition to KWH Pipe's own production of Weholite, there are licensees in the UK, Iceland, Oman, Libya, South Africa, Malaysia, Japan, Chile, and now Brazil. Armco Staco, in existence for almost 100 years and with operations in Rio de Janeiro, Sao

Paulo, Jacarei and Resende, is the largest manufacturer of corrugated steel drainage pipe and highway safety steel guard rails in Latin America. 2011 turnover was US\$ 150 million.

Weholite production operations for Armco Staco will be carried out at newly constructed facilities now underway in Resende, Brazil. The Weholite product line, invented by KWH Pipe in the 1980s, consists of High Density Polyethylene Pipe, fittings and fabricated assemblies. Among the unique features of the structured wall HDPE Weholite pipe is its availability in inside diameters through 3,500 mm. Armco Staco plans an initial

offering through 3,000 mm ID. The pipe is used extensively worldwide in low pressure/gravity service applications with potable water, stormwater, sewage and various other liquids. Weholite fabricated assemblies are designed for special functions, such as manholes, detention tanks and even individual family-sized sewage treatment units for remote regions.

The Weholite product is expected to be available from Armco Staco during the second half of 2013. ■

### INQUIRIES MAY BE MADE

in Brazil to: [fbeltrao@armcostaco.com](mailto:fbeltrao@armcostaco.com).  
Tel: +55 21 2472 9110

# MAINTAINING THE HIGHEST STANDARDS POSSIBLE

For the past 15 years, KWH Pipe has assisted the Polish mining conglomerate KGHM Polska Miedz S.A. in modernising Europe's largest tailings pond.

**B**etween the towns of Lubin and Głogów in southwest Poland, among the somewhat monotonous landscape of the Wielkopolska Lowland, rises a vast flat-topped hill. Inside of it can be found Europe's largest tailings pond, one of the largest facilities of this kind in the world.

The Żelazny Most (Iron Bridge) tailings pond stretches over a 1,400-hectare area and is surrounded by a 14-kilometre dam. It is the sole deposition site for flotation tailings from the mines and ore enrichment facilities of KGHM Polska Miedz S.A., one of Poland's largest companies, whose mining and smelting activity is the backbone of the region's economic development.

For years, KGHM has been among the world's largest producers of copper and silver. In 2012, the company became a global giant after buying a Canadian mining company with ore deposits in Canada, the





United States and Chile. In Poland, the company's activities centre around Europe's largest copper ore deposit, with the mining area spanning 470 km<sup>2</sup>. The company operates three mines (Lubin, Rudna, and Polkowice), three ore enrichment facilities and auxiliary divisions.

### Highest standards of service

The Żelazny Most tailings pond is the key link in the production of copper concentrate. Copper ore contains only a small percent of the precious metal. This means that more than 90 per cent of the mined rock constitutes waste, which has to be removed in the technological process. Tailings from the flotation process, whereby valuable minerals are separated from the ore, have the form of slurry, which is eventually pumped to the tailings pond. Here, sedimentation takes place – solids are separated from water – and the reclaimed water is returned to

the ore enrichment plants. The scale of these processes is enormous: the annual tailings deposits at Żelazny Most are estimated at 20 to 26 million tonnes. In 2012, the total volume of waste was 522 million m<sup>3</sup>.

Operating and modernising of such a complex industrial facility is quite challenging. The pond is located in a moderately populated area, and laws aimed at protecting the local environment from the detrimental effects of the mining industry are stringent. KGHM is fully committed to making sure that the operation of Żelazny Most is as safe and problem-free as possible. The company invests large amounts of money in day-to-day monitoring, cutting-edge equipment and technologies, as well as scientific research pertaining to the pond's expansion.

Strict procedures involving the application of new technological solutions to the existing infrastructure mean that KGHM's prospective partners must meet the highest standards of service. For the past 15 years, KWH Pipe has supplied KGHM with high-quality polyethylene piping systems that transport water and slurry. In addition, KWH Pipe offers technical assistance at all stages – including design, welding and installation – drawing on its vast expertise in implementing challenging engineering projects.

### Time for a change

**Krzysztof Wrzosek** of Hydroprojekt Warszawa, the head designer for Żelazny Most, explains that when the facility was built in the 1970s, the use of polyethylene in industrial applications was still relatively limited. Consequently, the piping system connecting the ore enrichment facilities with the tailings pond was designed and built with traditional and at that time popular materials such as concrete and steel. As long as the system operated without problems, there was no need for change. Only later, when portions of the pipeline began to show the usual wear and tear, there was a need for modernisation.

The division of KGHM responsible for managing water and waste flow from the three ore enrichment facilities and the daily operations of Żelazny Most is Zakład Hydrotechniczny (Tailings Management Division). It acts as KWH Pipe's direct partner and investor for all joint projects. In 1997, KWH Pipe delivered its first drainage piping (WehoDuo, WehoPipe and Weholite) to the tailings pond. The drainage pipes and chambers are located in the dam and its immediate vicinity. Together with ditches running along the dam's perimeter, they intercept approximately 80 per cent of the infiltrating water, playing a vital role in protecting the local water resources. **Edyta Zalewska**, industry sales director at KWH Pipe Poland, who has worked with KGHM from the beginning, points out that KWH Pipe's products are perfectly suited to the difficult conditions at the facility. The challenges to the pipework include substantial earth loads resulting from periodical extension work on the dam as well as difficult installation conditions. The excellent product properties, such as resistance to damage resulting from differential soil settlement, low weight, flexibility and butt fusion welded monolithic joints allow for exceptional reliability and a long life for the pipeline system. Edyta Zalewska is delighted that the "superpipe", as she calls WehoPipe, proved a success with the investor and helped KWH Pipe secure new orders. ►

KWH PIPE'S POLYETHYLENE PIPING HAS BEEN USED IN THE TOUGHEST CONDITIONS AS FAR AS INSTALLATION TERRAIN, CLIMATE AND TRANSPORTED MEDIA ARE CONCERNED.



In 2000, KWH Pipe delivered DN/OD 800 mm pipes to replace a corroded final section of a steel pipeline transporting reclaimed waters from the tailings storage unit at the Rudna mine. KWH Pipe also helped with the design and installation of the pipeline. It supervised the welding work and took part in submerging the pipeline at a crossing along the Odra River.

The following year, KWH Pipe participated in a renovation of an old steel slurry pipeline with DN/OD 800 mm pipes by means of long relining. Thanks to WehoPipe's smooth outer surface, monolithic joints, flexibility and low weight, an 1,100 metre long section of DN/OD 710 mm pipe was pulled into the steel casing – a standing Polish record. The project earned the contractor, PeBeKa S.A. Lubin, a subsidiary of KGHM, the coveted Limbur trophy for Project of the Year 2002 in the "Renovation" category.

### The tougher – the better

Following several years of successful cooperation, KWH Pipe noted a significant increase in deliveries of slurry pipelines to Zakład Hydrotechniczny. It was an important step for KWH Pipe, which had been delivering piping systems for mining applications for many years and which boasts about their high quality and excellent properties, e.g. resistance to damage by abrasive media and differential soil settlement. KWH Pipe's polyethylene piping has been used in the toughest conditions as far as installation terrain, climate and transported media are concerned. In 1976, a pipeline produced by KWH Pipe was installed at the Tara zinc mine in Ireland – and it has not worn out yet.

In the past several years, KWH Pipe has provided dozens of kilometres of slurry and water pipelines for European, North American and Asian mines, many of which operate in extreme climatic conditions.

In 2008, KWH Pipe took part in an interesting modernisation project involving an existing polyethylene pipeline, which had to be replaced due to an increase in slurry production. The DN/OD 500 mm pipeline was replaced by a new 2.5 km double DN/OD 900 mm pipeline and installed above ground level on existing steel supports. When KGHM inspected the dismantled, 10 year-old pipeline, it found that the pipe bore little signs of use. **Paweł Pill** of KWH Pipe Poland, project manager in the Industrial Sales Department, who was present at the inspection, confirms that the pipeline was as good as new, with no visible signs of wear.

"Even the inner welding beads were intact while in the same period of time the steel and concrete pipelines experienced numerous glitches," he says, adding that the investor was pleasantly surprised by the discovery. This proved that polyethylene is the optimal choice for conveying highly abrasive mining waste at KGHM. The next project also confirmed PE-HD's superiority over traditional materials in terms of durability and installation.

### Achieving the impossible


In 2009, Zakład Hydrotechniczny undertook the replacement of a 5-kilometre section of an old Betras slurry pipeline. Prior to the installation, ZH carried out tests with a ductile cast iron pipeline lined with concrete. During trial operations, the socket joints sustained damage from the slurry. As a result, the investor opted for a polyethylene pipeline, where the pipes are joined by means of butt-fusion welding, resulting in permanent monolithic joints.

As the designing, testing and tendering process took so much time, the contractor had only 3 months to dismantle the old pipeline and replace it with a 2.5 km double DN/OD 1,000 mm PN16 pipeline. "We've achieved the impossible," says Edyta Zalewska about the successful installation. Thanks to KWH Pipe's timely and problem-free deliveries and the contractor's efforts, the deadline was met despite harsh winter conditions. Low weight and butt-fusion welding once again made the work much easier and quicker. Installation was completed at the end of November, and on 10 December the pipeline was back in operation.

"I'm impressed," says installation manager **Marek Juraszczyk** of Tolos contractors commenting on his cooperation with KWH Pipe. He especially praises the excellent organisation of deliveries as well as on-site assistance. KWH Pipe's service team brought in additional welding machines and took part in the welding work, which helped keep the installation up to speed.

KGHM Polska Miedź S.A. is a company operating on a huge scale, and as such it expects efficiency, innovation and top technological solutions. The projects carried out over the years by KWH Pipe and Zakład Hydrotechniczny confirm the highest quality and versatility of the PE-HD technology. KWH Pipe has proven itself to be a reliable partner, ready to listen and assist in making even the most demanding engineering projects work. Soon the company will face exciting new challenges, as it recently won a tender for new pipeline deliveries to KGHM over the next three years. ■





# Awareness of designer wastewater solutions is growing

**Design can play a deciding role, even when talking about wastewater solutions. Design in this context means customised solutions and complementary technical and on-site support.**

**A**ccording to the American business magazine Forbes, New York and other coastal cities need a climate adaptation plan like the one made for the Danish capital Copenhagen in 2011.

In the plan for Copenhagen, the municipality has indicated the challenges that the future climate may present for the city. On the basis of these challenges, the plan proposes specific solution models that will not only make the city more resistant to torrential rains and rising water levels, but also greener.

Among other things, the plans for large underground stormwater basins have been emphasised.

In February 2012, the Ministry of the Environment created a task force for climate adaptation to help the country's municipalities with the creation of climate adaptation plans.

**PLASTIC PIPE IS A GOOD SOLUTION WHEREVER THERE IS A NEED TO STORE OR DETAIN WATER. IT IS OFTEN THE FASTEST, EASIEST AND CHEAPEST SOLUTION.**

But the municipality of Egedal was already aware of the challenge. In the municipality-owned independent utility company, Egedal Forsyning, the climatic challenges of increased rainfall caused the company to refocus on activities that can help meet the growing challenges in this area. There is an expectation that more emphasis will be put on cooperating with other utility companies, both informal cooperation via the establishment of working groups for sharing experiences and knowledge

as well as exploring the possibilities for closer forms of cooperation.

This type of informal cooperation meant that at the end of October, Egedal Forsyning and KWH Pipe invited other utility companies to come and see how a stormwater management project can be solved in practice.

“Our stormwater basin at Engvej was refurbished in 2010 as a part of the so-called Skenkel Lake project, which aims to reduce the leaking of pollutants into the newly restored lake. This refurbishment also meant that the basin contains stormwater and sanitary sewage more often than before, which can create discomfort for people living close to the basin”, says project manager **Frank Hjulskov** of Egedal Forsyning.

“For this reason, we have developed a project to install a 1,000 m<sup>3</sup> underground stormwater detention tank south of the open basin.



KWH Pipe has the production capacity for large, customised solutions, and can also do the assembly and welding at the work site. KWH Pipe follows up on their deliveries throughout the entire process, assuming responsibility for the successful completion of the project.

At the same time, the basin inlet is being rebuilt so that grates, etc., are hidden or covered. All in all, the refurbishment will considerably improve the environment – both with regard to the quality of the water as well as the smell and aesthetics”, Frank Hjulskov comments.

The construction work was carried out in the autumn of 2012 – over a period of approximately 3 months.

### Plastic instead of concrete

Egedal Forsyning is responsible for the sanitary sewage for all of Egedal municipality and for servicing sewers, basins and pumping stations throughout the municipality. Egedal Forsyning delivers water to the area of the former municipality of Ølstykke and receives and processes the wastewater from all of Egedal municipality. Part of the wastewater from the former municipality of Ledøje-Smørum is treated at the Måløv WWTP, which Egedal Forsyning co-owns.

From the former municipalities of Ølstykke

and Stenløse, wastewater is led to facilities in Ølstykke, Stenløse, Knardrup and Slagslunde, respectively. The wastewater from the original municipality of Ledøje-Smørum is led to a collectively owned municipal facility in the municipality of Ballerup, where it is treated at Måløv WWTP.

“Like so many others, we are relying on combined sewer systems, meaning that storm-water and sanitary sewage are mixed together. This of course creates a challenge: when there is heavy rainfall, large amounts of water need to be treated. We needed a detention basin, and in order to avoid such nuisances as smell for the local residents, it was necessary to create a closed system. We chose a pipe system, which gave us the most volume for the money. We decided to get a plastic system because it was the least expensive. Part of our consideration was our expectation that, to some extent, plastic pipes can be self-cleaning, due to the fact that they have a smooth surface”,

Frank Hjulskov explains.

When asked why they chose a solution from KWH Pipe, Frank Hjulskov answers:

“We did not choose KWH Pipe. We set up functionality requirements in our tender, and KWH was able to match both the requirements and the price. In principle, KWH Pipe’s solution was the cheapest. I can add that the schedule has been observed; in fact, we might even be ahead of it. So, yes, so far I am satisfied with the cooperation and the delivery.”

### A CO<sub>2</sub> effect as well

The consulting company Grontmij A/S serves as advisor on the project. Project manager **Michael Marcussen** has the following things to say about choosing plastic solutions:

“I am convinced that we will see more and more of this. It’s a good solution wherever there is a need to store water, and it’s often a faster, easier and cheaper solution than one made of concrete. Of course, both closed solutions



The large plastic solutions that were used for the Egedal project were transported on 18 trucks. If a concrete solution had been in use, the logistics would have involved a significantly larger number of trucks, and that naturally would have had an impact on the CO<sub>2</sub> emissions of the project.

## EGEDAL FORSYNING

consists of Egedal Forsyning og Service (Utility and Maintenance), Egedal Spildevand (Wastewater) and Egedal Vandforsyning (Water), all of which are owned by Egedal municipality. The company supplies water to the original municipality of Ølstykke and receives and treats wastewater from all of Egedal municipality.

Egedal Spildevand takes care of transporting wastewater from all of the approx. 42,000 citizens of Egedal municipality. Wastewater from the Stenløse and Ølstykke areas is treated at the company's four WWTPs: at the two main facilities in Stenløse and Ølstykke WWTP as well as at the two smaller facilities in Slagslunde and Knardrup. The wastewater from most of the original municipality of Smørum is treated at the multi-municipal Måløv WWTP. The company also handles the vacuum truck service in Egedal municipality, which includes 668 properties that are not connected to a WWTP.

matter to the local environment in terms of minimising odour nuisances compared to the old earthwork basins. In this instance, it was necessary to keep the old basin, due to the increased risk of flooding.”

Michael Marcussen confirms Frank Hjulskov's expectation that polyethylene based pipe systems can be self-cleaning:

“Compared to a concrete basin with a flat bottom, plastic pipes have a self-cleaning effect. A tilted pipe system doesn't have the same cleaning requirement. A flat-bottomed concrete basin has to be fitted with flushing systems, so also in this respect, the plastic solution has an economic benefit over concrete”, Michael Marcussen emphasises. He continues:

“To be fair, it should be mentioned that a rectangular concrete basin has a larger cubic metre capacity than a pipe system. So, if a large volume is desired, and it is possible to place the basin in an area without dense habitation, then this parameter should be included in the calculations.”

From an overall perspective, it makes sense to ask Michael Marcussen whether the choice between plastic and concrete solutions can have an impact on CO<sub>2</sub> emissions:

“Assuming that the plastic solution provider has a production system that focuses on reducing CO<sub>2</sub> emissions, then I'd say that the advantage is on the side of the plastic solutions. The large plastic solutions used on this project were transported on 18 trucks. If a concrete solution had been in use, the logistics would have involved a significantly larger number of trucks”, Michael Marcussen says.

### Design solutions

The contractor for the project is Druedalsvejens Entreprenør Forretning. Representative **Keld Nielsen** confirms that the project is on time:

“Of course, we've been lucky with the weather. If there had been a lot of rain, it would have affected the schedule. But it also helps that we have good subcontractors. Things have worked out as planned.”

Director **Michael Larsen** of Druedalsvejens Entreprenør Forretning adds:

“We won the tender because we were the least expensive. When we gave our proposal, we first contacted another plastic solution provider, but we decided to go with KWH Pipe because they could deliver the pipe in the desired measurements and because their

deliveries come with both technical support and active involvement on the construction site. For instance, KWH Pipe did the welding of the pipes themselves.”

Project manager **Jan Lunding** of KWH Pipe states: “We are happy to deliver designer solutions. Part of this has to do with the fact that we supply more than just products. We make the calculations and lay down the prerequisites. We have a great deal of know-how in this area and in co-operation with the advisor, we draw up the project and fill out the frameworks.”

Jan Lunding adds: “We like to be involved in the whole process, and we have an advantage over others in our designer solutions and in our presence on the work site. For example, we can see several days ahead of time when a particular bend will be needed. And of course we put that into production, so that no delays carry over into the project. I also think that we're one step ahead in terms of large solutions. We have the production capacity for large, customised solutions, and because we can also do the assembly and welding at the work site, we follow up on our deliveries throughout the entire process, assuming responsibility for the successful completion of the project.” ■

# Giant Weholite outfall installed along the Saigon River

**A 3-metre Weholite outfall discharge pipe carries the treated wastewater from the Ho Chi Minh wastewater treatment plant to the Saigon River.**

**M**ay 2012 saw the installation of a Weholite DN/ID 3,000 mm outfall discharge pipe – the biggest diameter of Weholite currently available in Southeast Asia – at the wastewater treatment plant in Ho Chi Minh City, the largest city in Vietnam. With a wastewater treatment capacity of 141,000 m<sup>3</sup> per day, the Ho Chi Minh wastewater treatment plant, located in the Binh Hung ward, Binh Chanh district, is the first large-scale wastewater treatment plant in the country.

## Lightweight, flexible and easy to install

“The Weholite outfall discharge pipe selected for the Ho Chi Minh City environmental sanitation project has a superb chemical resistance and is the material of choice for harsh chemical environments. Made of flexible PE-HD, the Weholite pipe has a longitudinal stiffness of SN6 kN/m<sup>2</sup> and a longer life span than pipes made of concrete or steel, which would have been an alternative choice for this application. Owing to its flexibility and light weight, Weholite can be installed by using only light lifting equipment. This made it three to four times quicker to install than other pipe options,” says **Mr Krisnat Busapavanij**, export sales manager at Wiik & Hoeglund Public Co., Ltd, KWH Pipe’s subsidiary in Southeast Asia.

The Weholite pipe was supplied with 5-port diffusers ready-welded on the top side of the pipe. The diffusers were made of DN/OD 1,600 mm WehoPipe PE-HD pipe.

## Delivery by truck and river barge

If the customer so desires, KWH Pipe offers the Weholite piping system as a comprehensive solution involving not only the pipe, but also project design, manufacturing, welding and installation supervision. That is why the



delivery process started with a project implementation plan drawn up by KWH Pipe's Project Services department.

"The Weholite pipe was manufactured at Wiik & Hoeglund's factory, located in Rayong province near Pattaya, Thailand. Because of the large size of the pipe, special arrangements were needed for delivering it from Thailand to Vietnam," Mr Busapavanij points out.

The first leg of the pipe's journey from Rayong to Ho Chi Minh City was made in flat-rack containers transported by trucks. The pipe was supplied together with mild steel flange connections made of galvanised high-grade hot-dipped steel. The flanges, which were manufactured in Thailand by a reliable company carefully selected by KWH Pipe, were delivered in the same type of containers as the pipe.

Next, the Weholite pipes were welded together to the final length at an onshore welding site approximately 50 kilometres from Ho Chi Minh City. The welding work was carried out by Wiik & Hoeglund and supervised by KWH Pipe's Project Services staff from Finland.

After that, a single length of Weholite pipe, complemented by reinforced concrete collar attachments and mild steel flange connections at both ends of the pipe, was delivered by barge sailing along the Saigon River to the Ho Chi Minh wastewater treatment plant.

Once safely on site in the Binh Hung ward, the Weholite pipe and its fittings were lifted by barge cranes from the river barge into the well-prepared underwater trench. The pipe was installed and joined to the onshore shaft with flange connections by divers employed by the installation contractor, Van Phong Dieu Hanh Nha Thau Tai TPHCM (Lien Doanh TMEC & CHEC), which won the bidding arranged by Ho Chi Minh City. The contractor is a joint venture partly owned by China Harbour Engineering Co Ltd (CHEC), a major player in the region. Finally, installation was completed with a final backfill using sand and gravel.



Made of flexible PE-HD, the Weholite pipe has a longitudinal stiffness of 5N6 kN/m<sup>2</sup> and a longer life span than pipes made of concrete or steel.



WITH A PLASTIC PIPE THERE IS NO RISK OF CORROSION, WHICH INCREASES THE PIPE'S LIFESPAN.

### Difficult installation conditions

"The installation conditions were difficult because of the quickly flowing Saigon River (with its flow speed of 1.5 metres per second) and the soft riverbed," says Project Manager **Christian Vestman** of KWH Pipe.

According to Mr Vestman, the benefits of using Weholite for the construction of the outfall discharge pipe were threefold. First, the possibility to thermally weld pipe lengths made the pipe able to withstand greater forces. A lightweight plastic pipe welded to a single length was a far better solution here than dozens of short, 1.5-metre lengths of concrete pipe joined together by flange or sleeve connections. Because of their weight, they would quickly have sunk into the riverbed, creating leaks in the pipe. Second, owing to the PE-HD pipe's flexibility and light weight, the contractor was able to install it quickly, using only light lifting equipment. Finally, with a plastic pipe there is no risk of corrosion, which increases the pipe's lifespan.

### Door opener to further business in Vietnam

"After the successful delivery of the Weholite outfall to the Ho Chi Minh wastewater treatment plant, Wiik & Hoeglund has an opportunity to expand its core business in Vietnam in many industrial sectors, including wastewater treatment, oil refineries and power plants. Wiik & Hoeglund has a good relationship with CHEC, a strong regional player with many projects in Vietnam, through its local representative, Mr Yang Lei," Krisnat Busapavanij concludes. ■

# Remote-controlled valves are a visionary choice

KWH Pipe's Jan-Erik Svarvén (left) and Lahti Energia's Kaj Åberg and Jarkko Kovanen think that remote-controlled valves are the first of their kind in Finland.

**Lahti Energia, an energy company in Southern Finland, utilises the most modern technology in its district heating network. Customised, remote-controlled special valves increase the usability and reliability of the network.**

**T**here are a total of four hydraulically controlled valves, equipped with remote control, that are connected to Lahti Energia's district heating network.

**Kaj Åberg**, a network designer for Lahti Energia's district heating, opines that the valves are the first of their kind in Finland.

"The main benefit offered by these valves is their remote control. During my time, I myself worked for 12 years in the control room. I know what a workday is like when one must drive to the site and climb down

into the underground valve chamber in order to adjust the valves. Remote control makes the use of valves considerably easier and less troublesome."

"Remote control offers undisputable benefits, also when fast action is needed. Agility is the card to play, for example when a big leak has been spotted in the network. Fast action can prevent water from being lost in huge amounts," Åberg points out.

The intention is to deploy the remote control feature of the new valves during this year.

## Reliable operation and easy maintenance

Two DN250/500 and two DN400/710 valve modules, including shut-off and drain valves, were installed during the renovation of the district heating network. The valves were installed near the Kymijärvi power plants of Lahti Energia.

**Jarkko Kovanen**, the network manager for Lahti Energia's district heating, tells that thanks to the renovation and new valves, the run options for the network have become more diverse.

"With the help of the valve solution, the transferability of counterpressure energy is made more efficient. Moreover, we can control the network's flows and pressure levels even more accurately. The new valves increase the reliability of operations and make maintenance easier."



Lahti Energia's Kaj Åberg and KWH Pipe's Jan-Erik Svarvén point out that remote control makes operation easy and trouble-free.



According to Kovanen, it is important, for example, to be able to divide the network into smaller sections in problem situations – that is, to close the area with the damage and to operate the rest of the network normally.

"And, as was pointed out, remote controlling

makes operating faster. For example, during weekends, evenings and nights, the state of the network can be controlled through a monitor."

"In the future, we can also increase automation, which will make the operators' work easier," Kovanen mentions.

### Compact-size solution

According to Jarkko Kovanen, an added benefit is that the hydraulic device is compact in size.

"Our past solution made use of a concrete chamber – a massive dugout – now the chamber is considerably smaller. Also, the control unit is above the ground."

"For example electrical installations can be done on the surface, which contributes to work safety. Inside the chamber, there are no parts that could get damaged in a fault situation, only the hydraulic equipment."

At the time of the interview, winter was approaching the Lahti region. What might

happen when that big thermostat outside is given a fair adjustment for cold?

Kaj Åberg does not believe that the freezing winter weather will bring problems since the hydraulics technology is very reliable indeed.

"Sweden, our neighbouring country, has accumulated a lot of good experience with similar valves. Our weather conditions are very similar."

### Customisation as needed

Sales manager **Jan-Erik Svarvén** from KWH Pipe tells that the valves have been precisely customised in accordance with the wishes of Lahti Energia.

"The shut-off valves needed special seals, among other things, because the valves are also used in their intermediate positions. In addition, pressure sensors can be employed with the valves."

"Product customisation is an important part of our operations. We want to understand the needs as well as possible and offer solutions designed to perfectly suit the customer," Jan Erik Svarvén emphasises.

### Animated fifty-year-old

The first customer joined the Lahti district heating network fifty years ago: thus, this was a great year of celebration at Lahti Energia. Today's district heating network covers the whole city of Lahti, and about 90 per cent of Lahti people live in buildings connected to district heating.

Lahti Energia generates district heating through cogeneration at the Kymijärvi power plant, where natural gas, coal, energy waste and wood are used as fuel. In addition, a newly completed Kymijärvi II plant, the company's new source of pride, contributes to the generation of district heating. It is a new generation gasification power plant that utilises recycled fuel.

The Lahti district heating network has 650 km of pipes and its maximum output is 500 megawatts. In addition to Lahti, the main pipeline network covers the nearby municipality of Hollola. The company also has separate networks in two other nearby municipalities.

"KWH Pipe is our main supplier. Our network is large, and various supplies are thus constantly needed," Kaj Åberg tells.

### Pioneer of new technology

Kaj Åberg remarks that this year the company will start building a main pipe in the nearby municipality of Nastola. Would there be a need for similar valves along this long span?

"I don't know how suitable they would be for that kind of project. But the need may arise somewhere else. To start with, we are now accumulating experience with this pilot project at our convenience," Åberg says.

Jarkko Kovanen states that Lahti Energia wants to be a pioneer and take the whole field forward.

"I believe that these kinds of valve solutions will be used in the future." ■



# Better bathing water

**New stormwater drainage systems improve bathing water quality in Kilmarnock and Irvine, Scotland.**

**T**he bathing water in Irvine Bay, Scotland has for many years suffered from poor water quality. Overflows from combined sewers (CSO) constituted a large part of the problem. To remedy the situation, the Meadowhead & Stevenston project was designed to significantly reduce the overflow from combined sewers in the towns of Kilmarnock and Irvine from spilling into the local river system in the event of heavy storms.

In order to meet the European Directive on Bathing Water, Scottish Water commissioned this project to ensure that their assets meet the required water quality standards. The project is set to improve surface water quality for more than 80,000 people.

## 10 million litres of water

KWH Pipe and Asset International were selected to supply a 10,000 m<sup>3</sup> stormwater attenuation tank and 200 metres of associated

pipework with a 2.1-metre nominal diameter.

“The long established partnership between KWH Pipe, the Scottish Water framework supplier for large diameter polyethylene pipework systems, and Asset International, the UK licensee for the manufacture of Weholite products, has led to the successful installation of what is the largest ever Weholite storage tank supplied and installed anywhere in the world”, said **George Merry**, managing director of KWH Pipe (UK) Ltd.

The tank is capable of holding 10 million litres of water, and features sixteen 96 metre-long legs of DN/ID 2.6 metre-diameter pipes, comprising approximately 2 km of pipework in total. A tank of this scale is large enough to contain the stormwater flow in the event of a large amount of rainfall. Contractors Morrison Black & Veatch designed the system with an off-line storm storage tank, which allows flows to be pumped forward to Meadowhead Treatment Works once the storm

has abated. After screening, the flow is then passed by gravity to a long sea outfall.

## Several potential solutions

There is a long history of potential solutions proposed for this section of the project. One of the alternatives was to construct a large diameter tunnel to provide in-line storm storage. This concept was deemed far too risky due to the extensive historically worked coal mine seams that underlie large areas of Kilmarnock. These mine workings are believed to date back to 1815, and most are uncharted, with their exact location and condition being unknown. This presented significant engineering challenges in terms of potential settlement beneath the tunnel and the risk of water and gas ingress during the tunnelling works. This option was eventually ruled out on the basis that it was too expensive to treat all of the mine workings in order to construct the tunnel.

The last option developed prior to the eventual Weholite solution involved construction of a rectangular, reinforced concrete, open-topped stormwater storage tank located on higher ground. However, the landowner objected to the sale of this land on the basis that the open tank significantly affected his potential to develop properties in the area.



The final agreed solution had many benefits over the previous options. The underground stormwater attenuation tank has been constructed within the flood plain of the River Irvine, on land that had no development potential for the landowner. A buried tank leaves very little visual impact and allows the landowner to return much of the land to agricultural use. For the Scottish Environmental Protection Agency, a buried tank was preferred since it does not take up any of the flood plain storage capacity. There is also no requirement for Planning Permission for the tank itself, as it is a below-ground structure.

### Installation in three months

Compared with traditional reinforced concrete construction, Weholite was a more competitive alternative. Because of its location in a flood plain, time of construction was of the essence. Construction was scheduled in the drier spring and summer months to avoid the risk of the site flooding caused by the adjacent river. From initial excavation to completion of backfilling, Weholite was installed in three months. The previously envisioned 100 m long x 60 m wide x 10 m deep concrete tank was scheduled to take 14 months to construct, which would significantly have increased the risk of flooding and delayed the progress.

Choosing Weholite also meant a smaller footprint on-site since the tank could be installed by a team comprising two excavators, three pipelayers, one engineer and two pipe welders. A reinforced concrete tank would have required up to 30 men, scaffolding, formwork, concrete, reinforcement, etc. With Weholite, site work was kept to a minimum as all of the manifold sections were constructed in the factory. Other designer solutions included a number of access shafts on the tank and at the bends on the approach pipes for inspection purposes. This negated the need to construct concrete inspection chambers, which offered significant time and cost savings.

### A trouble-free process

A number of things directed Morrison Black & Veatch to Weholite. First, the fact that it had a smooth invert without the need for further treatment. Second, Weholite offered an installation service, which meant that the same engineers who had manufactured the pipes were the ones installing them. Having their



knowledge and expertise on-site ensured that the product met the contractor's specifications. It also meant that the whole installation process was pretty much trouble-free.

Scottish Water's senior project manager **Alastair Graham** said, "The design solution offered by Morrison Black & Veatch using Weholite plastic pipes was instrumental in moving this part of the project forward into the delivery phase. The construction of the storage tank has been impressive in the speed and ease of installation. The tank meets our need for stormwater storage in this important environmental improvement project."

George Merry of KWH Pipe said, "The KWH Pipe and Asset partnership worked closely with Morrison Black & Veatch, the Scottish Water delivery partner, from conceptual design through to installation, testing and inspection. We provided a unique service, which saw the completed tank tested in accordance with CESWI guidelines, giving MBV the confidence of a 100% watertight tank."

Project manager **Steve Mason** of Morrison Black & Veatch continues: "Ultimately, both Morrison Black & Veatch and our client, Scottish Water, were delighted with the end product. We were assisted greatly along the way with the expertise of the technical and sales staff as well as the professionalism and enthusiasm of the on-site installation team. This ensured a good working relationship and the right first-time approach."

**Simon Thomas**, managing director at Asset, added, "The Meadowhead project continues to showcase our effective urban water management solutions, which have been deployed in a number of UK and European towns and cities in recent years."

"As flooding in our urban environments continues to become more and more of a focus, we will continue to develop our systems in order to meet any and all eventualities." ■

## VIDEOS

The installation of the stormwater attenuation tanks at Meadowhead took roughly three months. A 3 m, 45 s long, time-lapse video showcases the ease of installation. Go to <http://qrs.ly/yv321a7> or scan the code with your mobile phone or tablet to watch the video!



Watch a video about Dominic Moynihan, project manager at contractor Morrison Black & Veatch, describing the project by visiting <http://qrs.ly/ob321ak> or scanning the code below.



# Weholite – a five-star technology

A battery of Weho tanks will soon help provide drinking water for the guests at the East European Congress and Sports Centre Arłamów in southeast Poland. The project earned KWH Pipe Poland the prestigious Grand Prix at the recent INFRAEKO 2012 conference.

The Arłamów holiday resort became infamous in the 1980s as the secret playground of the Polish communist elite. It had been a popular destination with Polish prime ministers and party secretaries, leaders of Eastern Europe and even foreign royals. Its most famous guest, however, was Solidarity leader **Lech Wałęsa**, who was interned there at the beginning of 1982 after the introduction of martial law. With the fall of communism in 1989, Arłamów's golden era came to an end and the compound became municipal property. In the mid-1990s, the local government sold the hotel, utility buildings and surrounding woodland to a private investor.

The picturesque resort, which is surrounded by 23,000 hectares of Bieszczady highland, is currently open to all visitors and remains a popular destination for summer and winter vacations. It is not surprising that several years ago, the new owner laid out plans for the redevelopment of the complex into a state-of-the-art sports and conference centre. The project, worth an estimated 70 million euros, includes modernisation of the old hotel building and incorporating it into the newly built Congress and Sports Centre. When finished, the resort will include a five-star hotel for 400 guests, an indoor swimming pool, a spa, outdoor thermal pools, a sports arena, a bowling alley, tennis courts, a football pitch, a small golf course, an equestrian centre and other facilities. The centre is expected to open in June 2013.

## Searching for solutions

The new complex was designed by the MWM Architects studio, run by **Wacław Matłok** and **Maciej Łobos**, who commissioned a specialist subcontractor to prepare blueprints for the water and sewage system. **Tomasz Maciaszek**, director of investment for the East European Congress and Sports Centre Arłamów, says that the issue of expansion tanks for drinking water and a fire sprinkler water tank was “causing problems” from the start. Wacław Matłok, the centre's chief architect, explains that the complex has no access to municipal water and sewerage networks as it is located in the heart of the woods. As a result, the new centre will rely on water from wells – water which needs to be stored in expansion tanks. After the investor was denied permission to install the tanks on greenfield land, the designers decided to place them in the new hotel building 13 metres beneath ground level, directly above strip footings.

The new location required that the tanks have special characteristics. The key was finding tanks that would be large enough to serve their purpose and fit into the limited



space at hand. The tanks were supposed to be lightweight, easy to install and operate, resistant to damage and hygiene-certified. In search of the ideal product, **Andrzej Zabratyński**, designer of the centre's water and sanitary system, turned to KWH Pipe, one of the leading producers of plastic piping systems in Poland. KWH Pipe is an expert in providing comprehensive solutions for challenging engineering projects. As a company with years of experience, it has participated in hundreds of water supply and sanitary projects. "We have not cooperated before", explains Andrzej Zabratyński. "We found out about KWH Pipe while looking for producers and distributors of PE tanks for drinking water. After learning more about KWH Pipe's past experience and innovative engineering projects in the sanitary sector, we decided the company and its products meet our requirements and we started working together."

### Weholite means trouble-free

Weho tanks, which are manufactured by KWH Pipe, are part of the advanced Weholite piping system. The key feature of Weholite technology is the structured wall, which provides a highly stable and safe pipe. Thanks to its low weight, the system is quick and easy to install while its elements – pipes, fittings and tanks – can be manufactured in a variety of forms, shapes and capacities without compromising their reliability and durability both during installation and in long-term use. Elements of Weholite can be easily customised to fit specific water and soil conditions of a project. They are resistant to both corrosion and a broad range of chemicals.

Weho tanks are available in inner diameters ranging from 1,000 to 3,000 mm and in virtually any capacity. Single-body tanks are available in sizes up to 150 m<sup>3</sup> (max sizes vary from country to country); larger ones are manufactured and transported in sections and assembled on-site. This allows for the construction of tanks up to several thousand cubic metres in size with optimum use of the terrain. Extrusion welding guarantees a leak-proof and highly reliable monolithic construction. **Wacław Matłok** and **Andrzej Zabratyński** emphasise the benefits of Weholite's wall structure, which ensures that the tanks are completely tight and the whole battery is exceptionally durable. Importantly, single tanks can be disconnected for cleaning or technical check-ups while the rest of the battery functions normally, eliminating the risk of water shortages.

### Challenging installation conditions

The installation was a challenge due to the tanks' location in the hotel building. The tough terrain was another challenge, as it made access to the construction site extremely difficult. **Tomasz Maciaszek** explains that before making the final decision to buy Weho tanks, he and his team considered several scenarios for transporting large capacity tanks on-site, including an air lift. Lightweight, single-body Weho tanks traditionally transported by trucks made the whole operation easier, though it was still necessary to build a service road.



In all, five Weho tanks were delivered to the East European Congress and Sports Centre Arłamów, including four expansion tanks for drinking water with a total capacity of 300 m<sup>3</sup> and one fire sprinkler water tank with a 75 m<sup>3</sup> capacity, all with ring stiffness SN6. The tanks were delivered to the installation site in October 2011 by five trucks with pilot cars and installed within several hours. Installation work began at 7 a.m., and by 1 p.m. the tanks were lowered onto gravel bedding directly above strip footings. Soon after, the KWH Pipe service team welded inspection risers onto the tanks. After the installation work was completed, the space between the tanks was backfilled with aggregate and compressed to make way for the construction of the ceiling, which will bear ventilation rooms and an indoor swimming pool. **Zenon Lustyk**, KWH Pipe's technical consultant for the project, says the installation went smoothly. In fact, the investor was surprised at the speed of the work.

The successful installation of PE tanks at the East European Congress and Sports Centre is another example of the versatility of polyethylene pipes and of Weholite in particular. This cutting edge technology provides solutions for the most challenging engineering projects in a wide range of applications. The designers of the Arłamów centre describe cooperation with KWH Pipe as "exemplary", while the investor emphasises the "excellent" logistical support from the company during delivery and on-site. Such praise is yet another testimony to KWH Pipe's vast engineering know-how and experience. As icing on the cake for this project, KWH Pipe Poland was awarded the Grand Prix in the category "Best product solution, technology, implementation or completed investment" at the recent industry conference "Municipal infrastructure and water management" INFRAEKO 2012. ■



## Plastic pipe withstands mill's process water

When Stora Enso's mills sought a new solution for the transport of process water, the forest industry corporation selected Weholite pipes manufactured from polypropylene. Unlike the concrete channels previously used, polypropylene pipes can withstand hot water that contains chemicals without suffering from corrosion.

Stora Enso's Imatra mill, located in southeast Finland, annually produces one million tonnes of packaging paper and board. The Imatra mill's two production units produce raw materials for cartons, in which juice and milk are packaged. Board is also used to produce paper cups, as well as cigarette and candy packages. Board for the graphics industry is used to produce cards, covers and luxury packages.

The process water required in the manufacture of board and paper has thus far run through concrete channels to the treatment process facility, after which the water has been discharged into Lake Saimaa. The hot water that contains chemicals has worn down and eroded the concrete structures so much that a new solution had to be found for transporting the process water.

The project was assigned to Efora, an en-

terprise jointly owned by Stora Enso and ABB. The company specialises in providing the industry with maintenance and other services that secure smooth running and uninterrupted operations at mills.

### Three options

According to project manager **Pasi Tiilikainen**, there were three options for replacing the former concrete channels.

"We considered coating the concrete channels with four to six millimetre thick stainless steel. We could also have used GRP piping, but after we conducted calculations, we settled on Weholite pipes manufactured from polypropylene."

Polypropylene pipes manufactured by KWH Pipe have also previously been installed at Stora Enso's mills, and, to date, the experiences gained have been positive.

The use of stainless steel would have been the most expensive of these options. According

to Mr Tiilikainen, the two different plastic pipe options were in the same price range, but the timetables offered tipped the scale in KWH Pipe's favour.

"Time is the key factor that made the difference. The best solution for Stora Enso was the one that caused the shortest possible interruption in the mill," Mr Tiilikainen states.

Installation of the Weholite pipe caused practically no interruption in operations, as the installation was completed during the mill's annual week-long maintenance stoppage in September.

"Our third criterion in this selection process was related to work methods. A clear advantage of the Weholite pipe was that it could be slid into the already existing concrete channel, whereas this was not possible with the GRP pipe. Instead, the concrete channel would have had to be opened for installation of the GRP pipe to be possible."

## Work spread out over two years

As Stora Enso is dividing the project costs over the course of two years, the project will be completed in two stages. However, the greater reason for this is the mill's timetable: operations are interrupted least when installation work is carried out during the mill's annual maintenance stoppage.

The first stage of the project was completed in a timeframe of just over two weeks this past September.

"The first week was spent carrying out preparation work, and installation work was completed the second week," Mr Tiilikainen explains.

During the first stage, seventy metres of pipe, with a diameter of 1.6 metres, was installed at the mill. The pipe was slid into the existing concrete channel. Additionally, two segment bends were installed in preparation for the project's second stage, which will take place this coming autumn.

At that time, a further 120 metres of pipe will be added to the system and buried underground. As the pipeline will curve back and forth, completion of the installation work will require the addition of five or six segment bends.

KWH Pipe's site manager **Kimmo Sjöman** oversaw the preparation and installation work

during the first stage of the project at Imatra.

"We had two men working on preparation work during the first week and four men completing installation the second week. Additionally we had two excavators, a front loader and a lorry with a winch on hand for the installation work," Mr Sjöman recounts.

## PP pipe withstands high temperatures

Weholite pipe is manufactured by spiral welding PE or PP profiles. Polypropylene pipe is suited for use in instances where the pipe must withstand high temperatures.

**Anders Andtbacka**, product manager for KWH Pipe, says that PP pipe can withstand temperatures of up to 80°C. The temperature of process water at the Imatra mill rises at most to 60°C.

"Polyethylene and polypropylene pipes are of equal standing with regard to their mechanical characteristics and resistance to the effects of chemicals," Mr Andtbacka explains.

Polypropylene pipe is slightly stiffer than polyethylene pipe. This is an advantage in some situations and a disadvantage in others. And this was the case at Imatra:

"We specifically wanted a stiff pipe at the Imatra site, because, at points, the piping runs

close to the earth's surface and is therefore subject to traffic load," Mr Andtbacka says.

According to Mr Sjöman, sliding the stiff pipe into a square tunnel was somewhat difficult, as there was little space and the pipe did not bend easily. The outside diameter of the pipe was 1.8 metres. The pipe was slid into a square tunnel that was 2 x 2 metres in size. According to Mr Sjöman, the hole into which the pipe was fitted had to be made a bit larger than originally planned, but otherwise the work progressed as intended.

"It was a tight fit, but we were successful," Mr Sjöman recounted.

During the slip lining procedure, a wire was attached to one end of the pipe, which made it possible to pull the pipe into the tunnel. Excavators then pushed the piping into the concrete channel.

According to Mr Sjöman and Mr Tiilikainen, the installation was completed successfully and within the agreed timeframe. However, there were small setbacks during commissioning, when a small leak was observed in an inspection chamber. The cause of this leak was fixed by sealing up the welding seams.

Everything is ready for the project's second stage, which will be carried out next autumn. ■



# WehoPuts protects the Baltic Sea

The WehoPuts 300 wastewater treatment plant handles the wastewater on the naturally rugged island of Furillen off the coast of Sweden. At a later stage, another similar plant will accompany the first. Together, these two plants will manage the wastewater for some 600 properties.

The small island of Furillen is located at the northeast end of Gotland Island off the coast of Sweden. It is possible to access the smaller island by land from Gotland. For nearly 70 years, a limestone quarry utilised the area's limestone deposits on Furillen Island. After the quarry was shut down, the island was used for quite some time by the Swedish Armed Forces, and as a result the island's nature and coast have remained nearly untouched.

In 1999, photographer **Johan Hellström**, who had fallen in love with Furillen's nature and shot many photographs there, bought a great part of the island and began the process of transforming

the quarry's factory into the design hotel Fabriken Furillen. Hellström also sells properties for both year-round and holiday use on the island. Gotland is known foremost as a holiday spot, with a population that increases tremendously during the summer.

## Two wastewater treatment plants in the future

KWH Pipe has delivered a WehoPuts 300 wastewater treatment plant to Furillen, which will manage wastewater from the hotel as well as other properties. In the future, as the number of properties grows, another WehoPuts 300 treatment plant will



KWH Pipe has now delivered the first WehoPuts wastewater treatment plant to Furillen and in the future another treatment plant will be built in conjunction with the present one.

was that it was delivered as an installation ready unit. Installation was simple and was completed in a matter of hours, after which the plant was activated at the push of a button.

“The entire concept is clear cut and has been thought out to the last detail. Everything has functioned just as promised. The biggest challenges have been related to permit processing and the different types of piping systems at the properties. Other issues that have caused some problems included the point at which purified water is discharged and varying soil conditions,” Mr Ericsson explains.

At the same time that hotel owner Johan Hellström and project manager Hans Ericsson have overseen the progress of the WehoPuts 300 installation project, they have been planning an extension to the hotel and construction of new properties on Furillen.

“Once we get these plans approved, we will start planning the procurement of the next WehoPuts 300 treatment plant,” Mr Ericsson says.

### A need for wastewater treatment plants in Sweden

Legislation on wastewater management in sparsely populated areas is not quite as straightforward in Sweden as it is, for example, in its neighbouring country, Finland, where the government has set a definite deadline for the completion of wastewater renovation projects in sparsely populated areas. Although both countries apply the European Commission’s Urban Waste Water Directive, Sweden’s environmental authority, Naturvårdsverket, has issued a recommendation that each municipality independently decide on its own wastewater management. For this reason, practices differ throughout the country.

In 2012, nearly 15,000 wastewater renovation projects were carried out in Sweden’s sparsely populated areas, but there are many areas in which wastewater management is still handled the old-fashioned way, with a three chambered septic tank and absorption field. ■

THE ENTIRE CONCEPT IS CLEAR CUT AND HAS BEEN THOUGHT OUT TO THE LAST DETAIL. EVERYTHING HAS FUNCTIONED JUST AS PROMISED.

be built in conjunction with the present one.

KWH Pipe previously supplied one WehoPuts treatment plant to the island, which treats wastewater for one summer house. However, the authorities on Gotland don’t favour the use of treatment plants that only treat wastewater from one property. For this reason, the new wastewater treatment plant has initially been scaled to serve 300 users and will later serve 600.

The naturally rugged island of Furillen’s first WehoPuts 300 wastewater treatment plant was commissioned early in the summer of 2012.

**Jean Saarinen**, who is responsible for KWH Pipe sales in the area, visited the island at the end of October. Mr Saarinen and his client, project manager **Hans Ericsson**, run through the user experiences from the summer.

“At the same time as we discussed the project and inspected the discharge pipe that runs out to sea, we also went through matters related to the winter operations of the plant,” Mr Saarinen says.

“When winter arrives, it is a good idea to shut down some of the wastewater treatment plant’s process tanks, as there are far fewer users than in the summer.”

The Furillen project has been an interesting experience for Mr Saarinen because he has worked on the project right from its installation stage and has been able to follow the plant’s commissioning.

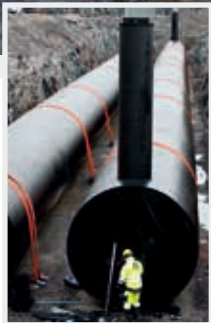
Hans Ericsson, who also has a property that is connected to the new WehoPuts system, has been satisfied with the treatment plant’s operations.

“The treatment plant has functioned like clockwork,” says a delighted Mr Ericsson.

### A complete delivery

According to Mr Ericsson, the key factor that attributed to the selection of the WehoPuts 300 wastewater treatment plant for the island

# We make it the way you want it



*A customised Weho tank will save money from the day it's installed. The ingenious wall structure ensures a long lifetime.*

Tanks are made of structured-wall Weholite PE-HD pipe that will not corrode, crack or rust. Weho tanks are manufactured for infrastructure, industrial and agricultural applications. They are just as suitable for indoor, underground or above ground installation.

## Applications

- Potable water tanks
- Buffer tanks with or without built-in pumping stations
- Stormwater detention tanks
- Combined Sewer Overflow tanks
- Chemical storage tanks and many more

