Žlutý kopec
Water Tanks

EN

TIC BRNO ↓

Vodojemy
Žlutý kopec
Water Tanks

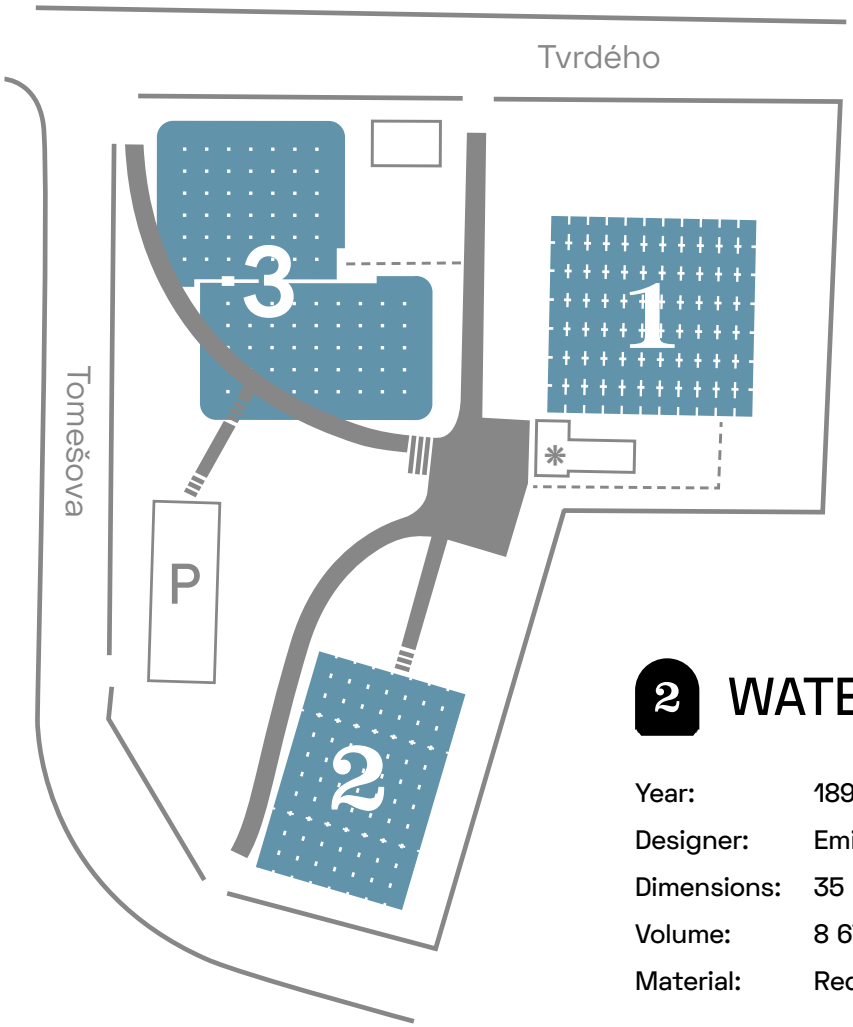
AFTER THE TOUR, PLEASE RETURN
THE BOOKLET TO THE WATER TANKS
TICKET OFFICE. THANK YOU!

3 WATER TANK NO. 3

Year:	1917
Designer:	Brno Municipal Waterworks, Pittel+Brausewetter
Dimensions:	Northern tank: 35 × 30 m, Southern tank: 45 × 30 m
Volume:	14 687 m³
Material:	Concrete

1 WATER TANK NO. 1

Year:	1874
Designer:	Thomas Docwra Company
Dimensions:	45 × 45 m, height 6,5 m
Volume:	9 688,20 m³
Material:	Red fired bricks



2 WATER TANK NO. 2

Year:	1894
Designer:	Emil Procházka
Dimensions:	35 × 55 m, height 6,5 m
Volume:	8 670 m³
Material:	Red fired bricks

* Ticket office
Entrance to the Water Tanks 1 and 3

Dear Visitors,

Welcome to the historic waterworks complex of the former municipal water tanks on Žlutý kopec. During your visit, we would like to tell you about the history and technical design of the three water tanks located beneath the ground at this site.

The text has been organised to accompany you chronologically through your visit. This means it is better to read the first two sections ('Historical Context' and 'Žlutý kopec Complex') before entering the underground space. A separate section is then devoted to each of the three water tanks – this we recommend reading in the tank itself.

HISTORICAL CONTEXT

The realisation of this extensive waterworks project began in **1869.** It involved building respective water tanks on the hills of Žlutý kopec and Špilberk, establishing a water treatment plant in Pisárky, and also installing an entire pipeline water supply network (18 km of cast iron pipes were laid prior to 1874). This project was drawn up by the London entrepreneur Thomas Docwra, whose company won the open tender issued in the 1860s by the Brno mayor **Christian d'Elvert.**

The reasons why it was necessary to find a new water source for Brno were various, but they all related to the city's rapid development during the 19th century. Thanks to the industrial revolution, steam trains were now operating to and from Brno, and the city's industry was booming – especially its textile factories. The latter industry consumed vast quantities of water, both utility and drinking water. Demand skyrocketed, and the capacity of existing water sources (wells and older pipelines) was no longer enough. The growth in Brno's population also had an impact: it is estimated that

the number of inhabitants more than trebled in the course of the 19th century, rising from 38,000 people to 130,000 by the century's end.

Another serious reason was the city's poor hygiene: citizens were frequently afflicted by cholera and typhoid. This was the period in which it was discovered that bacteria were living in the water and were the likely cause of these diseases and epidemics. Although people were initially sceptical towards this scientific discovery, attempts began to clean the water. Several methods were tried – specifically using sand and biological filters.

Water was to be filtered in the newly constructed water treatment plant in Pisárky, from where it would be carried by the so-called Pisárky Pipeline up to Žlutý kopec, where a series of water tanks would gradually be built. The very first water tank on Žlutý kopec was finished in **1871** and stood not far from today's waterworks complex. Right from the start, however, a technical fault caused water to leak and rendered the tank unusable. Eventually, this tank was sold to the Starobrno brewery on Mendel Square, which used it for storing ice. Construction subsequently began on another structure, finished in 1874, and this is today's Water Tank No. 1, found here in the complex.

ŽLUTÝ KOPEC COMPLEX

CARETAKER'S COTTAGE

Concurrently with the construction of the **1874** water tank, a small technical building was also built in approximately the centre of the complex. This building also housed the tank's caretaker. The presence of on-site staff was necessary for two reasons: to guard the complex and to check and operate the gate valve system in the chambers.

Today, the caretaker's cottage serves as a ticket office, although owing to dilapidation, the entire original structure was removed. In fact, the

contemporary replica building has been given an extension to provide modern amenities for employees and visitors, as well as an underground entrance to the water tanks.

TECHNICAL HUTS

An integral part of each water tank was its technical hut, from where the inflow and outflow of water was regulated. Depending on the system of control used by the tank, this hut was either a gate valve hut or a valve chamber.

The gate valve hut, located above Water Tank No. 2, contains three control wheels which connect to the gate valves using metal rods. These valves work like little sluice gates situated inside the pipe outlets from the water tank. By turning the control wheels, the gates are raised and lowered, allowing or interrupting the flow of water.

The valve chamber (above Water Tanks No. 1 and 3) is a more modern system that replaced the gate valve hut. The most significant change was putting the shut-off mechanism and pipes not in the water tank, but in a separate space, i.e. the valve chamber. This modification reduced the potential amount of water contamination.

Most interesting is the chamber in the valve hut of Water Tank No. 1, which we can see at the edge of the complex beside Tvrdého Street. On its gable is carved the year **1913**, and under it has been affixed the so-called 'enhanced' coat of arms of the City of Brno, which was used between 1646 and 1935. This chamber was erected that year because, from 1913, Water Tank No. 1 was connected to the new pipeline of potable water from Březová nad Svitavou. It continued storing drinking water until 1924, after which it switched to utility water. The earlier gate valve hut once stood beside the current valve chamber, but was later demolished.

The gate valve hut above Water Tank No. 2 is also not entirely original. It was rebuilt in 1938, and further cosmetic alterations were carried out as part of its modern renovation. The chamber for Water Tank No. 3 forms

part of this building and is hidden under the embankment. The original entrance, serving today as an emergency exit, can be seen from the driveway into the complex.

FIRST MODERN ENTRANCE – CREATING ACCESS

The water tanks were decommissioned in **1997** owing to their low-lying position. In **2019**, they were declared a cultural monument and gradually access was created for the public. The entire complex, including the newly created park, was **opened on 22 March, 2024, symbolically commemorating World Water Day.**

Tucked away behind the caretaker's cottage is an artistically executed entrance to Water Tank No. 1, through which the first visitors made their entrance in 2020. This entranceway was designed and created by the artist blacksmith Pavel Tasovský. Today it is used as an emergency exit; Water Tank No. 1 is now accessed through the ticket office.

Overall reconstruction of the historic waterworks complex of the former Žlutý kopec municipal water tanks in Brno was carried out in 2022–2023. The brief was to create access to all three water tanks while simultaneously ensuring their authenticity. The concept for ensuring accessibility to the original water tanks was therefore based on minimal intervention in their historic structures, combined with cleaning and conservation. New main entrances have been cut into each water tank and emergency staircases installed. The valve chambers (Water Tanks 1 and 3) and the gate valve hut (Water Tank 2) have been reconstructed. New structural features are differentiated from the original construction by the materials used and chosen colour scheme. This is seen, for example, in the use of exposed concrete and corten steel (weathered steel sheets), and use of black paint on new metal components inside and outside the tanks. Additionally, the new joinery elements of the interior and annex have been painted blue. The reconstruction was designed by **Ing. arch. David Prudík** in collaboration with Ing. arch. Terezie Havlíková, Ing. arch. Ondřej Seďa, Romana Štrynclová, and Ing. arch. Markéta Čermáková. The park was

designed by Ing. et Ing. Tomáš Jiránek, New Visit s.r.o. and its visual style created by Hrdina Pavlík Design Studio.

1 WATER TANK NO. 1

Construction of this water tank from **1874** was overseen by an English company led by the entrepreneur **Thomas Dowcra**, which may explain its unique architectural design. The tank's concrete base is shaped into concave gutters, and the roof support system uses walls and not the columns found in the other two tanks. The structure has been created **entirely from handmade bricks**. The floor plan is square in shape, measuring 45 × 45 m, with a height reaching 6.5 m, and water level generally at a height of 5.15 m. The capacity of the water tank is 9,500 m^3.

The journey made by the water that once filled this tank started at the settlement Kamenný mlýn ('Stone Mill'), which is located today in the municipal borough of Brno-Pisárky. Here, a weir was situated on the Svratka River, above which water was gravity-fed into two settling tanks. Over the course of 4–5 days, the largest impurities sank to the bottom of these tanks, after which the water was driven through so-called 'slow filters'.

This latter system was employed from **1829** and mimics the self-cleaning found in nature. The first purifying element was a sand filter, which even boasted a so-called filtration sand washer: a room with a water-driven washing drum. The most important part of the process, however, was an approximately 2 cm biological layer of microorganisms that also removed waterborne impurities. Water treated in this way was considered potable and so was pumped up to Žlutý kopec using certified steam pumps, whose task was to surmount the approx. 55 m difference in altitude.

The water tanks on Žlutý kopec formed a low-pressure zone that was unable to supply Špilberk opposite, since the fortress was 20 m higher. For this

reason, another pumping station with a steam driven pump was built above today's Pellicova Street. The water tanks on Špilberk have been preserved and are also open to visitors.

The required capacity of the water main was 200,000 buckets of water a day (11,300 m^3), which at the outset represented a two-day supply of water. After 20 years and the building of another tank, capacity was increased. Before long, however, requests were made to take even greater quantities of water from the Svratka. For the waterworks' owners down on the river, these requests were considered outlandish and given short shrift. The dispute escalated into legal proceedings, in which the town was accused of 'water trespass'.

In the corner of the tank are the inflow and outflow fittings. Above them, in the ceiling, was an opening, up to which originally led a ladder. This would once have enabled access from the valve chamber. Directly on the ceiling above these fittings is the inscription: 'repair 16.2.1925'. This refers to the renovation during which the original brick floor of the tank was covered with a thin layer of concrete.

2 WATER TANK NO. 2

This is the second water tank of the complex, built in **1894** according to a design of the Brno contractor **Emil Procházka.** Only a few years after the Pisárky waterworks were put into operation, the demand for water had risen once again. Twenty years on from construction of the first water tank, it was supplemented by another tank on Žlutý kopec, and indeed another on Špilberk.

The construction approach for all the water tanks was similar. After digging out a pit, the foundation floor was concreted over, and – using wooden formwork – the structure itself was created. The outside of the walls was clad in a half-metre layer of clay, which served as waterproofing. After completion,

a layer of earth, 1.5 m thick, was piled on top. The dimensions of this construction are 55 × 35 m, with a height of 6.5 m, and a water level generally rising to 5.15 m. The total capacity was approximately 8,500 m^3.

Apart from its concrete base, the structure is entirely **made of bricks, which were now machine-made.** The environmental conditions inside the water tank were somewhat extreme, which called for a special method of treating the bricks – they were fired twice at temperatures above 1,000 °C. When tapped, the finest of these bricks would ring out, and so earned the nickname 'ringers'. The bricks came from several different Brno brickworks, some of which stood close to Žlutý kopec, for example on Úvoz Street. All the bricks were initially red – like the ones we can see on the ceiling. Owing to the slow deposition of sediments, however, the walls gradually darkened. This black discolouration enables us to see clearly how high the water level reached.

In the ceilings of each passage we can see small openings. These served as ventilation and were especially important when filling the tank, since it was necessary for air, increasingly pressurised by the inflowing water, to escape – thereby preventing overpressure. The reverse applied when emptying the tank, when preventing underpressure was essential: this tank was built to breathe.

In the corner of the tank have been preserved the filling and draining fittings – the gate valves. The 'chimneys' which lead up from them worked as overflows, and their purpose was to equalise the water surface. Fixed into the wall beside these fittings are a series of metal rungs, leading to an opening in the ceiling. This was the original entrance to the water tank, located in the gate valve hut. It enabled maintenance workers, for example, to climb down inside the tank so they could carry out its regular mechanical cleaning.

The current visitor entrances and emergency exits were built during works in 2020–2024 to make the tanks accessible. Another modern intervention was the introduction of electric lighting; that aside, however, the space faithfully retains its historical authenticity.

At the turn of the 20th century, the Pisárky Pipeline was no longer adequate: its capacity, hygiene, and water quality were insufficient, and a new source of water needed to be found. A suitable location was identified 60 km north of Brno in underground springs in Březová nad Svitavou. Construction then started on the so-called Březová Pipeline, which you can learn more about in Water Tank No. 3.

3 WATER TANK NO. 3

The third and final water tank on Žlutý kopec was finished in **1917**. Its space creates a mystical impression, primarily thanks to its roaring echo, which is measured at a lingering 56 seconds. Its construction relied on a principle analogous to its brick cousins – wooden formwork was again built for the foundations, but this time the shuttering continued all the way up to create a uniformly **concrete** structure. The tank was designed and implemented by Městské vodárny (Municipal Water Corporation) in collaboration with the company **Pittel+Brausewetter**.

The water tank comprises two separate tanks and a small valve chamber containing filling and draining fittings. The first tank measures 45 × 30 m, while the second tank is slightly smaller, measuring 35 × 30 m; the height of both reservoirs is 6 m. The volume of Tank No. 3 is something in the range of 12–13,000 m^3.

Flowing into this water tank was water from the deep wells at Březová nad Svitavou. The construction of the Březová Pipeline (originally called Die Kaiser Franz Joseph I.-Trinkwasserleitung) was preceded by painstaking investigation of closer (and therefore cheaper) options. None were suitable however, with restricted capacity being the overriding problem.

In the years before 1906, 14 wells were dug to a depth of 21 m. The construction of an almost 60 km-long feeder pipe to the water tanks at Holé

hory (with volumes of 11,931 m³ and 14,670 m³) started in the spring of 1911, and the pipeline was completed just two years later, which, with respect to the construction technology of the time, was remarkably fast. The official opening of the pipe occurred on 4 October 1913 (part of the celebrations included tasting the new Březová water on Vegetable Market). The pipeline's route crossed railway lines seven times, and in three places tunnels had to be cut through rock (the longest tunnel being 614 m). In 1933, all the machinery was electrified and in 1975 a second pipeline was built, this time emptying into the tank on Brno's Palackého vrch – the city's biggest water tank with a capacity of 35,000 m³. The high quality of the original work is attested to by the pipeline's low level of leakage. The most recent tests conducted in 1999 demonstrated that the cast iron pipes would last at least another 50 years.

Following construction of the Březová Pipeline (with a network length of 980 km) the Pisárky Pipeline (and therefore the two brick-built tanks) were used exclusively for utility water (a network length of up to 55 km). The pipeline from the springs at Březová nad Svitavou and its two main water tanks, i.e. at Holé hory and Palackého vrch, still operate in Brno today.

ADDITIONAL INFORMATION

HISTORY OF BRNO'S OLDEST WATER TANKS

There is not much distance between the original city centre, i.e. Staré Brno (Old Brno), and today's equivalent, but there is one great difference between them: in Old Brno people had the Svratka River right on their doorstep. A secondary branch of the river, channelled in the form of a mill race, even flowed through today's Mendel Square, and a municipal lido existed in the area as late as the 1960s. Meanwhile, in the area of today's town centre, people tended to rely on wells, which could be contaminated by waste and cess pits, and which lacked the required capacity, for example to fight fires. The only indication that a water pipe system may

have functioned as early as the 14th century is a document referring to the existence of 'pipe fixers', tradesmen whose job may have included maintaining pipes for transporting water. That said, the first historically documented water pipe has been dated to the 15th century, and it was called the Svratecký Pipe.

SVRATECKÝ PIPE

In December **1415**, a contract was made to construct a water pipe from the Svratka River and six months later King Wenceslaus IV (son of Charles IV) granted the perpetual right to divert water from the river, across today's Denis Gardens (then called Puhlík), and over to the fountains on today's Freedom Square and Vegetable Market. The right to connect other pipes to the new water main was also granted to brewers and private homes. The pipe was the property of the patrician Václav Ház, who financed the construction, and of Prokop Peysek, who implemented it, with the town contributing to the pipe's upkeep.

A reminder of this water main are the still extant water tanks at Denis Gardens (those we see today were not commissioned until 1820; the original ones were made of wood). Water was diverted from behind today's Brno Exhibition Centre (more precisely from behind the Velodrome) since the stretch of river closer to the city was already polluted by the work of tradesmen. From there, water flowed through stone pipes as far as today's Nové sady, i.e. a distance of 2 km. The water was then pumped from Lamplův Mill (situated roughly where the modern spa stands on Kopečná Street) to the water tank above at Puhlík (originally, the pump was driven by water mills, but from 1853 power was supplied by steam).

Following the Napoleonic Wars, the system was overhauled and the stone outflow pipes running up from Lamplův to the tanks at Denis Gardens were replaced with cast iron pipes. The pipe connectors (which were made of lead) had been used as far back as during the Thirty Years' War, when some were even melted down to make musket balls. Later, pipes were made of iron, with sealed joints painted in tar.

WATER PIPE FROM CIMPL (KRAVÍ HORA)

A little spring at the foot of Kraví hora gave rise to a rivulet that became a new source of drinking water for Brno. This small stream flowed by gravity down to today's Šilingrovo Square, where once was located an opening in the city walls – the so-called Brno Gate – and the house of the 'waterman' (responsible for the proper functioning of the water mains). Directly below this building was a small tank with a volume of perhaps 5–6 m^3. Because the new water pipe cut across land belonging to Špilberk Castle, a permit had to be negotiated with the crown.

Water from the spring was carried into town through wooden pipes made of bored pine trunks, connected using iron clamps and collars. By the end of the 17th century, part of the pipeline was manufactured using glazed ceramics. These sections of pipe were protected against pressure from above by a cover constructed from fired bricks. The pipes were water-proofed with a coating made of marl (a mixture of clay and other minerals).

Although the water was safe to drink, the spring was intermittent. The pipe was definitively abandoned in 1853, when the earlier Svratecký Pipe was rebuilt and expanded.

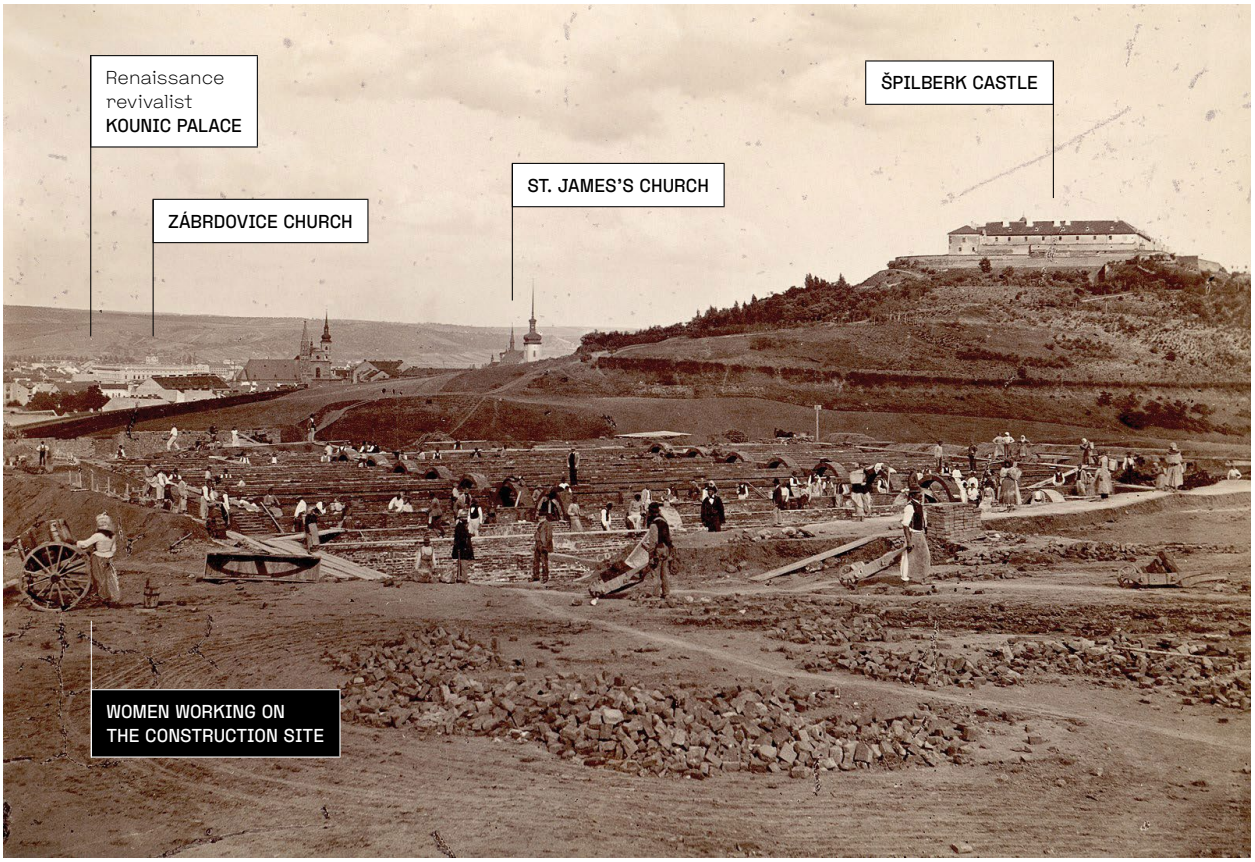
CHARTERHOUSE PIPE (KRÁLOVO POLE)

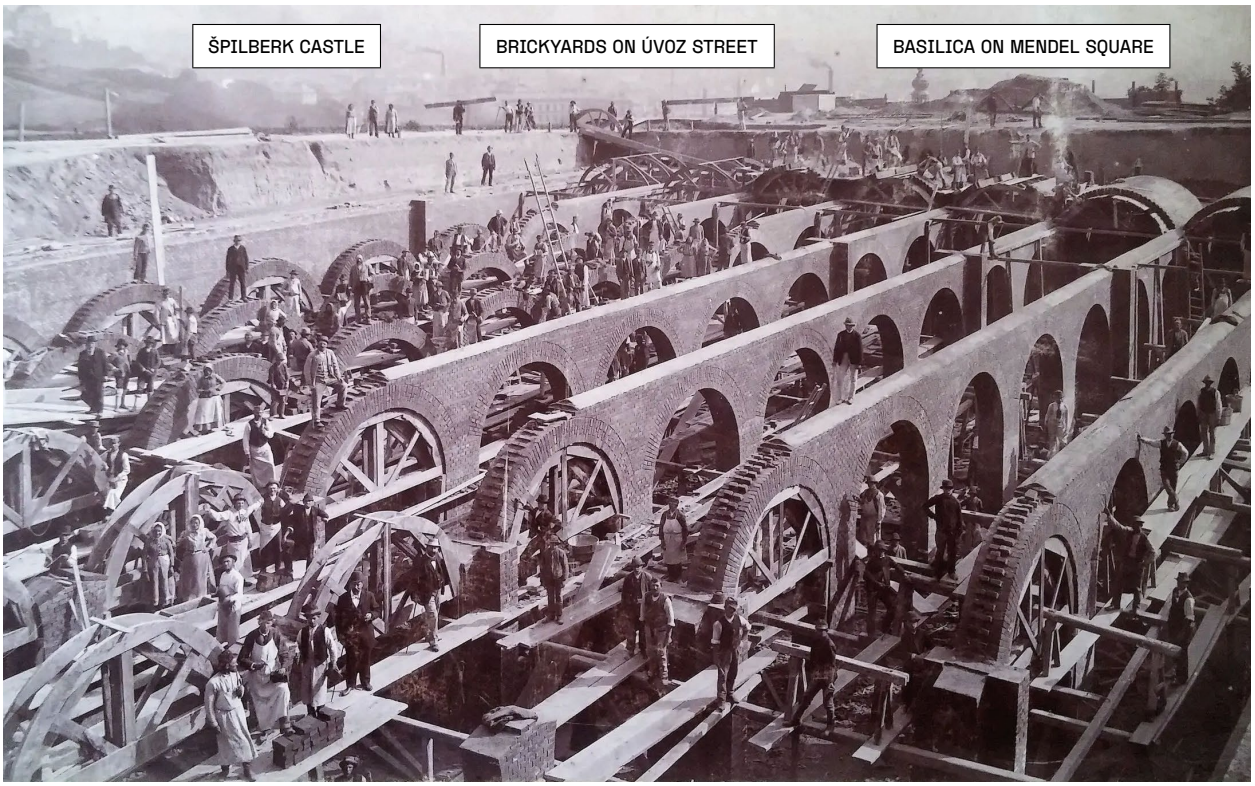
Because the previous water pipe (from Cimpl) was unreliable, it was necessary to find another source. In 1544 the town bought the Gaisperk Pond and its spring from the charterhouse convent in Královo pole. The contract was confirmed by King Ferdinand I himself. The buildings of this convent still exist, but the pond and its gardens have long gone. Water was carried by gravity along wooden pipes from the spring right up to the city.

This system was reliable: only during periods of drought would the permit to private consumers be suspended. Problems arose, however, during the reign of Emperor Joseph II, whose reforms eliminated the charterhouse along with many other religious orders. Gaisperk and its spring were suddenly in the hands of private owners, some of whom decided to limit

the transfer of water to the town. Thankfully, not all landowners were so mean-spirited. In 1832, the Countess of Schaffgotsch sanctioned the connection of the spring on her land (up on the heights of Kociánka) to the city's water network. This main operated up until the First World War; subsequently the source became so polluted that the pipe was shut off.

Today, we are reminded of this pipe by a water tank found below the Kociánka knoll. It was built in 1888 and has a volume of 150 m^3. More recently, the tank has served as a warehouse, as a space for clubs and associations, and now it houses the Krakonoš restaurant.


Renaissance revivalist KOUNIC PALACE
ZÁBRDOVICE CHURCH
ST. JAMES'S CHURCH
ŠPILBERK CASTLE
WOMEN WORKING ON THE CONSTRUCTION SITE


ŠPILBERK CASTLE
BRICKYARDS ON ÚVOZ STREET
BASILICA ON MENDEL SQUARE