Stormwater Management

For water not to harm but help...

In a populated landscape more and more built-up areas arise. This leads to an increased amount of stormwater that is conveyed by sewer systems away from the urbanized areas to the river and then to the sea. It disturbs the natural water regime of the landscape, which brings along several major issues.

TEMPERATURE INCREASE

During water evaporation, quite a significant amount of heat is taken up from the air. We can feel it on hot summer days, when it is much more pleasant to be at a pond or in a forest than in the city as it is much colder there. It is because in the city, there are many sealed and therefore dry surfaces without water that could evaporate and take up the heat from the air. The same applies to the agricultural land that is farmed in an inappropriate way leaving the soil trodden and the surface runoff from the fields high.

WEAKENING OF THE SMALL WATER CYCLE

The small water cycle is the closed circulation of water in which most of the water evaporated from land falls in the form of precipitation over this same land (a similar process occurs over the sea). If the runoff from an area increases, the amount of water that evaporates and returns to the small water cycle decreases. This results in a decrease of total precipitation and a disruption of the thermal and water regimes of the landscape. Most stormwater falling on built-up areas is conveyed by sewers to rivers and away from the land.This leads to a destruction of the small water cycle. Instead of regular, less intense precipitation, we can see long periods of drought and subsequent heavy storms (precipitation coming from the ocean, i.e. from the large water cycle). In cities where most surfaces are sealed, there is actually no small water cycle whatsoever.

FLOODS

As the built-up areas expanse significantly, volume of water conveyed to rivers during the rain increases as well. This has a considerable impact on the frequency and intensity of floods, as we have seen recently. That is why it is crucial not to further reduce the retention capacity of the landscape: unsealed areas having a certain retention capacity slow down the stormwater runoff into rivers and thereby reduce the risk of floods.

We will advise you

We are happy to advise you on how you can contribute to the improvement of the water regime and also how to create a rainwater harvesting system of your own.

Use our expert advice for free:

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WE COUNT ON WATER (POČÍTÁME S VODOU)

...is a project aiming at raising awareness about stormwater management (SWM) funded from the Swiss-Czech Cooperation Programme and by the Ministry of the Environment of the Czech Republic. The project took place between June 2013 and March 2016.
The project supports the introduction of the stormwater management system and the restoration of the water regime of the landscape approaching its natural state as close as possible.

The project involves the following activities:

- workshops with stormwater management experts all over the Czech Republic
- excursions showing the best management practices abroad
- publishing a new book "Stormwater Management in the Czech Republic"
- expert advice for public administration and the general public
- promotion of the Strategy of the Introduction of SWM in Prague 12 Metropolitan District
- creation of an online database of maps showing the best SWM practices
- launch of an online tool supporting the decision making process regarding building approvals
- "WE COUNT ON WATER" conference.

počítáme s vodou

FOR WATER NOT TO HARM BUT HELP

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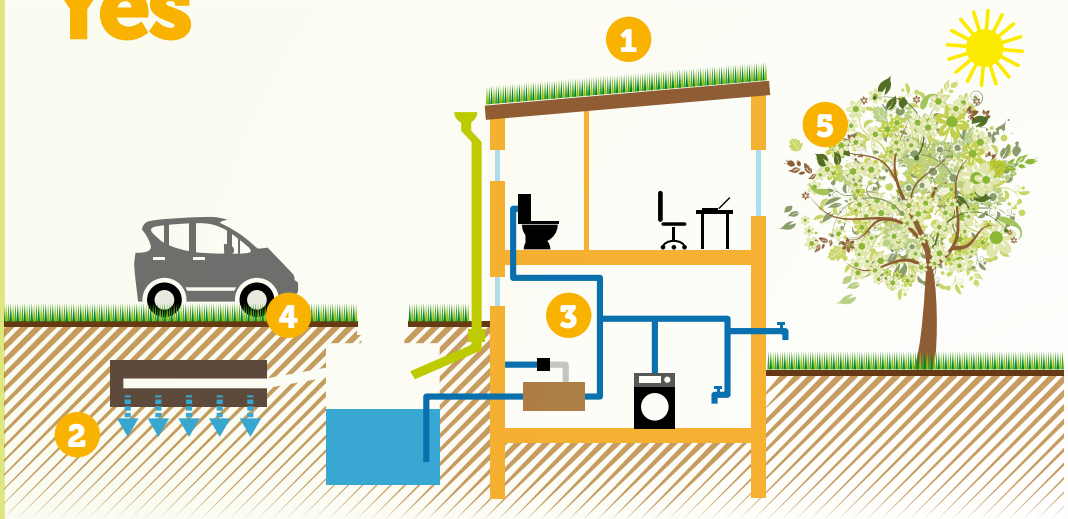
How to live with water

Yes



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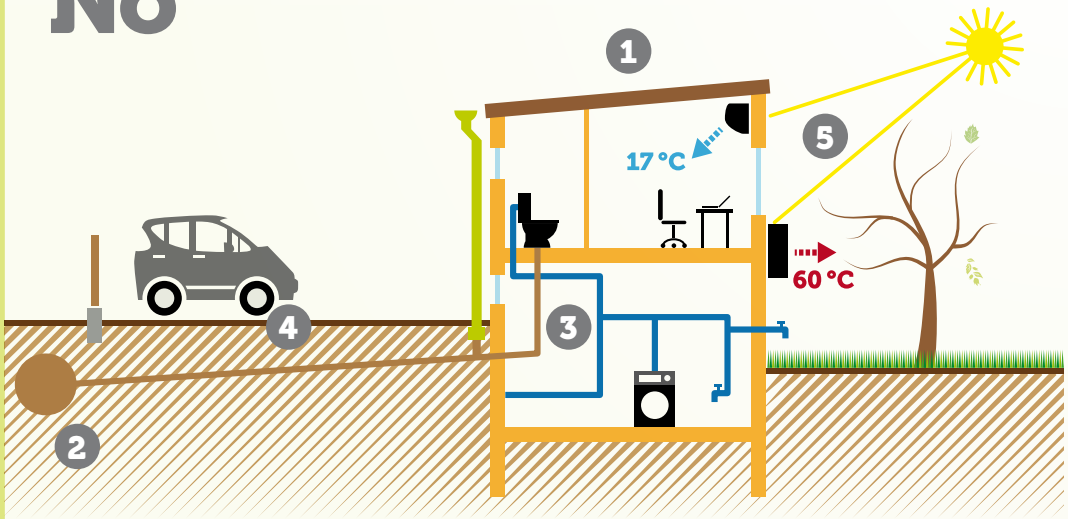

1 TRADITIONAL X GREEN ROOF

Traditional roofing materials, such as asphalt, plastic or metal shingles, ceramic or concrete tiles, have the disadvantage that all water falling on them has to be immediately conveyed, usually to the sewer system. Moreover, on hot summer days these roofs heat up to high temperatures radiating heat and increasing the surrounding temperature. By contrast, green or vegetated roofs are able to retain a significant amount of water. This water can then evaporate instead of running off immediately. By evaporating, the water cools down the surrounding air, the roof looks good and the inhabitants can find a nice resting place there. Vegetated roofs have several other advantages: **photosynthesis takes place on them** releasing oxygen and consuming carbon dioxide. Furthermore, **green roofs also filter pollutants out of the air** and **provide habitat for plants and animals**, which is otherwise rather scarcein the cities.

2 DRAINAGE X INFILTRATION

Draining stormwater from sealed surfaces by sewers into rivers results in a significant drop in groundwater level. By contrast, stormwater infiltration helps recharge the groundwater. Stormwater can be infiltrated in several ways. The picture shows an **infiltration trench**. It is in fact an **underground reservoir**, from which water gradually soaks into the ground. It can be made of gravel or permeable plastic elements. Other options include **infiltration swales**, from which water can evaporate as well, or **infiltration shafts**.

3 HOUSEHOLD DRINKING WATER X HOUSEHOLD STORMWATER

Nowadays it is common to use drinking water to cover all water consumption needs in a household. However, did you know that 50 % of the water consumed can be replaced by stormwater? It can not only be used for garden watering and cleaning, but also for toilet flushing and washing. For garden watering, stormwater is more suitable than treated fresh water. It is because stormwater is poor in salts, and using it therefore doesn't lead to soil salinization. Using stormwater for washing is also beneficial. Stormwater is soft, which makes it easier for laundry detergents to dissolve, leading to their lower consumption. Moreover, stormwater doesn't cause limescale to build up, which significantly extends the life of the washing machine. **For stormwater to be used in the household, it is advisable to create an underground reservoir with an overflow to an infiltration system.**

4 IMPERMEABLE X PERMEABLE SURFACES

Not only in urban settings, but also in gardens there are often many sealed, impermeable surfaces. In addition to issues related to the rapid runoff from these areas, they don't create a very healthy and pleasant environment for the inhabitants of the house either. In summer they heat up, increasing the surrounding temperature. Moreover, water has to be conveyed from these areas. In gardens, most impermeable surfaces can be replaced by permeable ones. Paths can be **covered with gravel** or pavers with wide grass joints. For parking lots, it is advisable to use **grass pavers** or to pave only narrow strips for the car wheels. These areas also tend to look much better than those covered by uniform paves or concrete.

5 AIR CONDITIONING X FULL GROWN TREES

Machine cooling (air conditioning) can not only be found in administrative buildings. More and more often, people buy it for their homes. The biggest disadvantage is the high energy consumption. An efficient, natural protection against the summer heat can be provided by healthy, full grown trees. Trees absorb a great amount of solar radiation. A small part of the energy obtained is used for photosynthesis; however, most of the energy is used for the evaporation of water from the leaf surfaces, decreasing the surrounding temperature significantly. The cooling capacity of a full grown, broad-leaved tree is comparable to that of a small air conditioning unit. Trees also provide shadow that is more natural and pleasant for people than the sharp shadows of window blinds.