LIFE ADSORB PROJECT - GENESIS

Purifying rainwater from the Parisian ring road

Order to preserve the quality of the Seine, it has become necessary to treat pollutants (macropollutants and micropollutants) from a busy road, a section of the Paris ring road. The chosen purification solution is a vertical reed bed filter located in the heart of the Bois de Boulogne.



(https://life-adsorb.eu/sites/default/files/styles/img__1280x768__image_scale__crop_main/public/media/images/rejet-en-seine.png?h=47391b18&itok=zr4YyUvv)

Discharge of water from the ring road into natural waters
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Why treat rainwater from the ring road ?

The storm overflow is used to collect rainwater that falls and then runs off onto the roadway of a section of the Paris ring road.

This water is particularly polluted by suspended particles forming very fine sand. On these small particles are aggregated carbonaceous organic matter (macropollutants), metallic elements and chemical residues (micropollutants) from vehicles, the roadway and atmospheric pollution. In addition to this fraction, there is a polluting fraction made up of the same pollutants but which does not adhere to the particles; this is called dissolved pollution.




(https://life-adsorb.eu/sites/default/files/styles/img__1280x768__image_scale__crop_main/public/media/images/le-boulevard-peripherique-parisen-est-souvent-sature_1.jpg?itok=3piD7UMt)

Parisian ring road saturated
©20 MINUTES - (ILLUSTRATION) — DJEBARA/CONCEPT PHOTO/SIPA

A regulatory obligatin for treatment

Until 2020, the rainwater from the section of the périphérique (ring road) collected by the storm overflow was discharged directly into the Seine without prior treatment whenever it rained.

The regulations from the SDAGE (Water Development and Management Master Plan) of the Seine-Normandy basin require that beyond a certain pollution threshold, rainwater must be treated before being discharged into the Seine.

In 2015, the state services requested the City of Paris to propose a solution for treating this water.

Why choose a reed bed filter rainwater treatment

The depollution solution based on a reed bed filter (FPR), initially widely used in wastewater treatment, is now increasingly chosen for treating rainwater. This choice is supported by previous projects that helped establish the basic rules for the feasibility and proper management of such a solution.

During the design of the LIFE ADSORB project, the partners relied on the feedback from three particular projects.

The three projects that served as a basis for development are:

- The ANR SEGTEUP project (extensive systems for the management and treatment of urban rainwater, Final Deliverable of the program - (SEGTEUP "Systèmes extensifs pour la gestion et le traitement des eaux urbaines de temps de pluie" (https://www.graie.org/segteup/spip.php?article45)),
- The ADEPTE project (assistance for sizing rainwater management through extensive treatment) from the call for proposals "Innovative projects in the field of ecological engineering" within the framework of the national biodiversity strategy 2011-2020 by the Ministry of Ecology, Sustainable

framework of the national biodiversity strategy 2011-2020 by the Ministry of Ecology, Sustainable Development, and Energy,

- And finally, the Danish LIFE TREASURE project (2006-2009).

The summary document from SEGTEUP (2011-2014), published in 2013, on the best management practices for vertical flow reed bed filters for managing urban rainwater discharges (separate and combined rainwater systems) provided the essential elements for the design and sizing of the LIFE ADSORB project, raising awareness of reed beds as a new urban space and support for environmental policies.

The ADEPTE project (2014-2019) compiled the state of the art for extensive techniques for managing urban rainwater discharges. It provided operational data on the performance of reed beds with respect to major parameters and certain priority substances found in urban rainwater discharges in different climatic contexts. The objective was to improve knowledge of the technical acceptance conditions for such structures, to define precise sizing rules for these structures to meet quantified treatment performance goals. The ADEPTE project led to the development of a sizing assistance software called ORAGE, designed for water and sanitation professionals. The LIFE ADSORB project will develop an additional module for the ORAGE software to optimize the treatment of micropollutants.

The LIFE TREASURE project (2006-2010) provided initial elements for selecting the adsorbent material in the filter based on the expected characteristics.

A preliminary study

In addition, a preliminary study conducted by the LIFE ADSORB project partners made it possible to test different materials in the laboratory with regard to their capacity to adsorb metals and organic molecules, ultimately choosing the Rainclean material from the company FUNKE.