



Sustainable urbanism



WATER-TREATMENT PLANT OF BEYNES IN FRANCE

The Plantins Water-treatment plant of Beynes is situated in the heart of a remarkable site, lined by a zone of archaeological excavations in the South, and agricultural grounds in the North. The architectural party aims at creating a dialogue with the surrounding rural space, by respecting the biological balance in position, and by integrating by its architectural and landscaped treatment the building of exploitation : volumes, heights and covers allow to harmonize the new constructions with the immediate environment.



A water-treatment plant with an optimized landscaped insertion

The motivation of the client is to want an innovative and exemplary water-treatment plant in the initiative of high environmental quality and it is in this objective that "AR ARCHITECTS" designed this project.

"AR ARCHITECTS" has a big experience in the field of the eco-construction, the eco-renovation, the eco-town planning and the arrangements. It is with this knowledge of the initiative HEQ®, used in each of these projects, that the agency "AR ARCHITECTS" knew how to bring, in this water-treatment plant, all the elements combined to make of this project an example of ecological construction.

***View since the rustic observatory
on the water-treatment plant***

The advantages of this water-treatment plant are not only beneficial to the environment but also for inhabitants and for the conservation of the landscape where she becomes integrated.

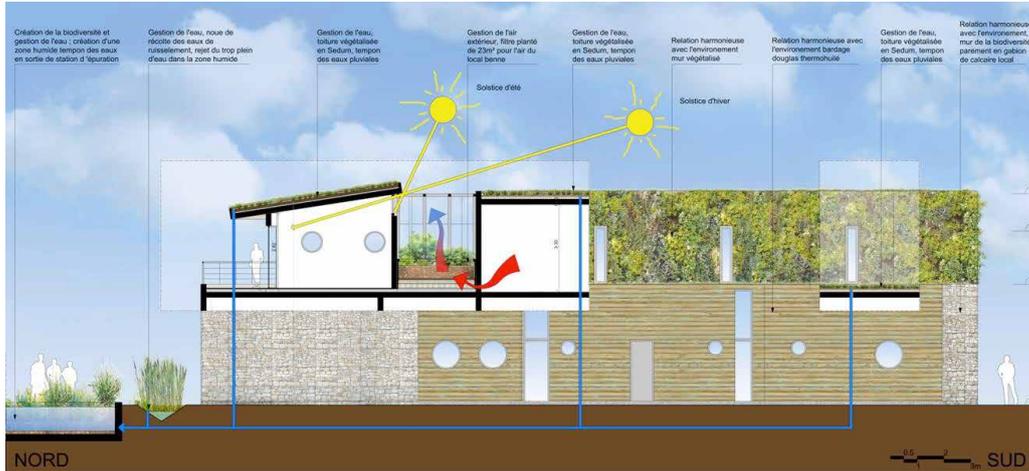


The places of exploitation were completely conceived to allow a simple and effective exploitation. The principle HEQ® to implement concerns the structure, the insulation, the biofiltration, and the energy consumptions. These places also take into account architectural prescriptions of the Specifications.

This construction in skeleton wood, associated with the natural and successful materials which we selected, allows a healthy, comfortable and long-lasting construction.

AR ARCHITECTS will take into account the objective to establish a dialogue with the surrounding rural space: the volumes, the heights and the covers allow to harmonize the new constructions with the immediate environment.

The technical building of exploitation establishes a real mark which comes to decorate the route of the water-treatment plant and to protect the biodiversity by the implementation of an ornamental lake.



Section of the principles HEQ® of the bioclimatic building of exploitation

The treated targets answering the approach of High environmental quality :

• Target 1 : harmonious relation harmonieuse of the building with its environment

The **architectural and landscaped treatment** of the building of exploitation, its volumes, heights and covers allow to **harmonize** the new constructions with the immediate environment. It is dressed in a **wooden bardage of Douglas** or adorned with a cover it **gabions**.

The **bioclimatic building**, accessible partially to the **public**, constitutes a real mark decorating the **educational itinerary** of the water-treatment plant.

• Target 4 : Management of the energy

Conception of the bioclimatic building exploitation eligible in the label THPE
Implementation of renewable energies:

- Heat pump WATER / WATER, recovery of the calories of the water of treatment and heating of the places of exploitation
- Thermal Solar panels for the domestic hot water
- Canadian Well with glycol water for the double ventilation flow

> Walls and skeleton

• Why the choice of the wood ?

The wood is a solid and healthy long-sustainable material, this is why it is omnipresent in this construction. The constructive system consists of walls in wooden skeleton of treated Douglas, of floors with joists wood and of a wooden skeleton. **The wood results from France**, the carbon assessment of the construction is so optimized.

• Outside dressing

Bardage wood of douglas thermo-oiled on a height of 4.55m.

A wall gabion cover on a height of 4.55m.
Integration of a green wall

• Outside joineries

The outside joineries will be realized in steel lacquered

• Internal joineries

The internal joineries will be realized in wooden of type pine of Landes.



DE HAUT EN BAS :
GABIONS,
BARDAGE BOIS DOUGLAS
ET ISOLATION PAR
OUATE DE CELLULOSE

MUR VÉGÉTAL



- BOITE À EAU
- CHAINES
- PUISARD

VUE DEPUIS LA TOITURE VÉGÉTALISÉE

View on the green wall

> Use of eco-materials

- Internal heat insulation by absorbent cotton of cellulose.
- Lining in Fermacell
- Outside cover in wooden Douglas
- Outside cover in wall gabions
- Outside cover in aluminium and coated in the lime

• Target 5 : Management of the water

An **ornamental pond** accompanies the building, the **rehabilitation** of an old hydraulic work in pond of retention, it collects **rainwaters** and of streaming and allows the creation of **ecological housing** environments and guarantees a **reserve of available water** for fire brigades.

> The itinerary of rainwaters

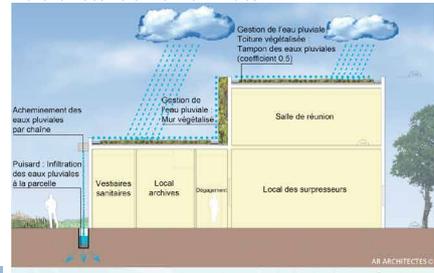
- **Of roof: infiltration of the rainwater in the plot of land**

The principle of the **plant wall**, the real alive fresco, bases on the vegetation of a vertical surface, by freeing itself from weighty problems of the substratum of culture.

Besides the aesthetic aspect, the green wall presents several **advantages** :

- Better thermal regulation of the building
- Sound insulation
- Improvement of the air quality (hygrometry, dusts, pollutants).

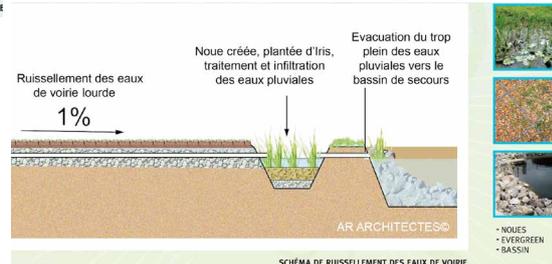
The horizontal equivalent is a **vegetated roof**. The vegetation of roofs is a tool today recognized for its virtues by term of **urban comfort**, in particular via the **retention of rainwater**.



Section of principal management of the rainwaters by vegetated roof

- **De voirie : infiltration de l'eau par dalles alvéolées**

The **zones of circulation** are equipped with honeycombed paving stones, "**evergreen**" allowing the **drainage** of rainwater and guarantee permanently a **clean and stable** space by rainy weather, so increasing **grassed** spaces.



Coupe de principe, ruissèlement des eaux pluviales de voiries lourdes et acheminement vers le bassin aquatique



View on honeycombed paving stones « evergreen »



View on the old pond of aeration recycled in wet zone and of plug of waters treated before rejection in the natural environment

Target 8 and 9 : Optimization of the hydrothermal comfort and the acoustic comfort

The thermal and acoustic comfort is guaranteed by the vegetated roof, and an insulation in agro-materials.

• Cible 11 : olfactory comfort

The **olfactory comfort** is assured by the implementation of a **plant biofilter** innovating allowing the treatment and the extraction of the used air.



View on the plant biofilter



View on the standing reed bed, for the treatment of liquid muds of water-treatment plant

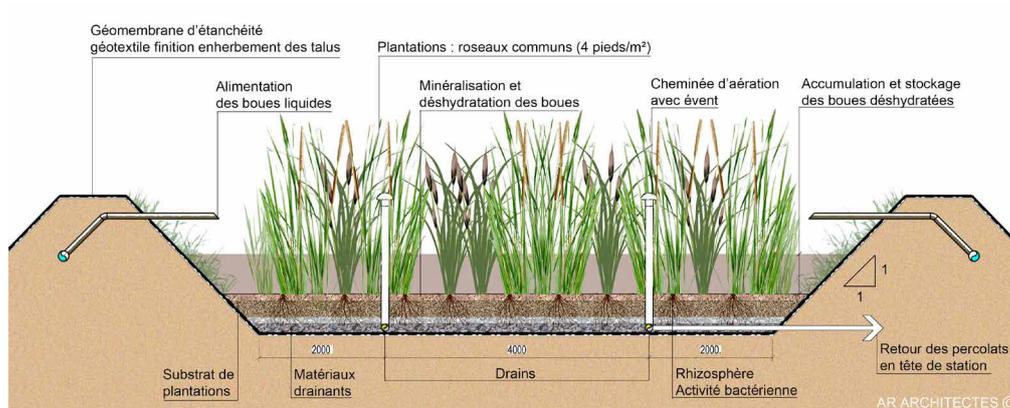


• Principle of the treatment of liquid muds of water-treatment plant

The process of rhizocompostage is based on the system of infiltration / percolation on a standing massif of reeds adapted to the water treatment and the residual muds of communities (domestic effluents).

This technique operates standing mineral filters of reeds, which maintain and optimize the development of an environment favorable to the dehydration, to the stabilization and to the mineralization of muds.

Muds of Plantins water-treatment plant :



Section on standing bed of reeds, 4000m² treat all the liquid muds of the water-treatment plant

• **Advantage**

The sector of treatment of muds by standing beds of reeds present as advantages :

- a low consumption in energy
- the absence of chemical reactives
- moderate costs of transport given the important reduction of the extracted volumes
- a decrease of the cost of elimination of muds
- the optimization time of storage

- the improvement of the quality of the end product (dry content, stability, structure)
- a dry content superior to 20%
- a time of average storage of 5 years in nominal situation.

Landscaped part

The whole water-treatment plant of Beynes becomes integrated into a plant case limiting the view of the works since the outside.

The building of exploitation benefits from a rich natural environment. The integration in the landscape is essential in the project, to respect the visual and biological balance inside the site, with a particular attention concerned the flora and fauna.

The hydraulic works are implanted East of the plot of land, the access to the site will be made since the West of the plot of land.

The zones of circulation, requiring a stabilization of the ground, are equipped with paving stones honeycombed, "evergreen" allowing the drainage of rainwater and guaranteeing permanently a clean and stable space by rainy weather, so increasing grassed spaces.

This process does not require excavation for its implementation and is very simple and fast to put. This surface will be covered with lawn resisting the frequent passages.

Colored meadows are planned in the landscaping, including various varieties of trees, wild flowers, not to pick nor to collect.

The philosophy of the agency AR architects is to propose in each of its architectural, landscaped and urban projects of the constructions and the industrial arrangements turned to the High environmental quality (HEQ®).



View on the technical facade: bardage drink, Aluminum and coated in the lime



View on the meeting room and the biofilter



View since the reception hall

- Client : City of Beynes
- Location : Beynes (78) - France
- Consultant designer :
- **NALDEO hydraulic engineering consulting firm and AR ARCHITECTES Architect and Landscape painter and HEQ® :**
- Companies of works :
DEGREMONT France Assainissement ZUB et WATELET TP
- Area : 465 m² SHON Plot 16 460 m²
- Capacity : 11 670 EH
- Cost : 4 784 K€ H.T
- Beginning of works : september 2009
- End of works : march 2013
- Official opening : April 2013