

**Country**

France

Client

Lille Métropole
Communauté Urbaine

Date

2006-2010

Cost of works

€19m exc. VAT

Sogreah's services

- ▶ Design services (preliminary and detailed designs, assistance with works contract, inspection of working designs)
- ▶ Hydraulic, mathematical and physical scale modelling
- ▶ Assistance to the Owner
- ▶ Assistance to the project manager during the works phase

Context

The assessment study and sewerage master plan for the Lille urban area carried out in 2002 recommended the creation of a 70 000 m³ storage basin immediately upstream of Les Bateliers pumping station with a view to reducing:

- pollution in the Deule, the river that collects discharges that do not transit via the pumping station,
- flooding in the Lille urban area, with a target of no more than 12 overflows into the Deule each year.

In parallel with the creation of a storage basin, it is planned to build a new pumping station to replace the existing one, which is showing

signs of age, and to offer a higher pumping capacity in keeping with the future Marquette treatment plant scheduled to come into operation in 2012.

Description

- Two adjoining 50 m dia. diaphragm wall tanks; depth of the floor of the structure: 27 m.
- 23 m dia. diaphragm wall pumping station with 15 m high supporting section, comprising the feeder canal, two 2 m³/s pumping tanks and technical equipment rooms.
- ND 1400 mm feeder pipes running to the pumping station, excavated over a distance of 115 m with a micro-tunnel boring machine and pressure grouting.

- ND 2300 mm feeder pipes running to the basins, excavated over a distance of 50 m with a tunnel boring machine and pressure grouting.
- Basin feeder weir.
- Vortex drop shaft for each basin, sized for a discharge of 15 m³/s supplying each basin.
- Installation of the various items of equipment for the basins and station.



Constraints

Sogreah designed these structures taking into account the following constraints:

- Extent: the structures are situated in a confined area comprising the existing site and an adjoining football field.
- Planning: the site is a listed area.
- Continuity of service: the existing Bateliers pumping station must be kept in operation throughout the works.
- Operation: the basin must be divided into compartments and includes a set of equipment to ensure the safety of operating staff and keep their presence inside the basin to a minimum.

- Pollution control (targets in terms of SS, COD, BOD₅, TKN, Pt reduction, etc.).
- Geotechnical conditions, due to the height of the water table.
- Underground high-speed train line running close to the project area
- Civil works: in view of the volume to be stored (70 000 m³).

Equipment

- Ventilation / deodorising system to avoid having to treat toxic gases such as CH₄ and H₂S.
- System of valves for isolating the basins and tanks.
- Screening system.

- Pumping systems for emptying the basin and lifting water transiting to the future pumping station.
- Stirrers.
- Tilting bucket system for cleaning the basins.
- Instrumentation system for measuring flow rates, water depths and gas concentrations in the various structures.

A **numerical model** was built by Sogreah using the CANOE software to check the hydraulic operation of the Bateliers system and determine the flow rates associated with each structure. Supply to the structure will be validated by a physical scale model in Sogreah's laboratory.