



Huecas-Rielves Urban Wastewater Treatment Plants (Toledo province)

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Sanitation and wastewater treatment for five towns in Toledo province – Huecas, Rielves, Villamiel de Toledo, Noez and Totanés – with the design and construction of sewerage networks and four new wastewater treatment plants, guaranteeing the quality of water discharged into the Tagus.

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|------------|---|
| Location | River Tajo Basin Municipalities (Toledo) |
| Owner | Aguas de la Cuenca del Tajo |
| Capacity | 3,740 m³/day |
| Population | 14,664 eq-inhabitants |

The object of this contract was the design, construction and commissioning of works, installations and services providing sanitation for five towns in Toledo province, namely Huecas, Rielves, Villamiel de Toledo, Noez and Totanés. This involved the design and construction of sewers to collect and convey the area's wastewater from the points of origin to four new wastewater treatment plants located in the towns of Huecas, Villamiel de Toledo, Noez and Totanés. All additional structures such as access roads and electricity and drinking water supply lines were designed and built as required for the projected sanitation system to work properly.

Generally speaking the treatment process for the four plants included in this project is similar. The chief difference is that the Totanés waste water plant has compact pre-treatment instead of the screening, grit removal and skimming line at the other, higher-capacity plants.

After pre-treatment and flow regulation, a biological process of extended aeration begins, with the following benefits:

- Nitrogen is removed by nitrification/denitrification processes prompted by the oxic and anoxic conditions in the various areas of the biological reactor.
- There is no need for a sludge digester, as the biological reactor provided operates with an extended aeration system in which the sludge is stabilized inside the reactor.

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Flows

| POPULATION | N. equiv-inhabit. | Daily Average Flow | Maximum Flow in pre-treatment | Maximum Flow to Biologic | BOD5 (Average Concentration) | | S.S.T. (Average Concentration) | | N _{TOTAL} INLET | P _{TOTAL} OUTPUT |
|-------------------------|-------------------|--------------------|-------------------------------|--------------------------|------------------------------|--------|--------------------------------|--------|--------------------------|---------------------------|
| | | | | | INLET | OUTPUT | INLET | OUTPUT | | |
| | Hab. | m ³ /d | m ³ /h | m ³ /h | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l |
| Huecas - Rielves | 5,522 | 1,506 | 313.75 | 116.09 | 220 | < 25 | 275 | < 15 | < 15 | < 2 |
| Villamiel | 5,142 | 1,234 | 257.08 | 95.12 | 250 | < 25 | 315 | < 15 | < 15 | < 2 |
| Noez | 3,000 | 750 | 156.25 | 57.81 | 250 | < 25 | 280 | < 15 | < 15 | < 2 |
| Totanes | 1,000 | 250 | 52.08 | 19.27 | 250 | < 25 | 280 | < 15 | < 15 | < 2 |

In addition to the works described below, the project included a new sewer for Totanés town council, as a supplementary project to the main one given the need for all of the town's wastewater to be treated by the new plant.

There follows a summary of the treatment lines built:

Water Line

Inlet line and general bypass, which will allow excess flows that cannot be treated at the plant to be relieved.

- Coarse solids tank, in which the water is pre-screened so as to remove any gravel and coarse grit carried in it, chiefly in times of rain.
- Raising of the raw water with submersible centrifuge pumps.
- Screening with rotating or static screens (as appropriate) with 3 mm spacing.
- Grit and grease remover, with a combined system of aerated longitudinal channels and grit and grease collection.
- Flow measurement and regulation.
- Storm clarifier with pumping of retained water and return to the treatment process.
- Biological treatment, with extended aeration in a reactor configured, as applicable, as a concentric circular crown with the clarifier or as a carousel. This reactor has both anoxic and oxic areas. One or two biological treatment lines were built according to the plant's size.
- Phosphorous removal by chemical means with the addition of ferric chloride.
- Secondary settling in one or more units according to the facility's size.

- Treated water flow measurement.

Sludge Line

- Pumping of excess biological sludge produced in the process.
- Sludge recirculation, from the bottom of the clarifier to the reactor inlet, so as to return to the reactor any active sludge that has passed from it to the secondary clarifier.
- Gravity thickener with a conveyance system, covered and deodorized.
- Sludge dehydration using a drying centrifuge.
- Dehydrated sludge storage in a metal silo.

Auxiliary Installations

- Drinking and industrial water and compressed air networks, the corresponding furnishings, and a fire and lightning protection network.
- The electrical switchboards are centralized in the motor control room (CCM) inside the control and pre-treatment building.
- The control system used is based on local PLCs, with autonomous operation and a SCADA supervision system.
- The offices, control room, toilets, workshop, pre-treatment, sludge treatment and switchboard room are housed inside a two-storey building.
- Odor removal system with active carbon for the building (sludge pre-treatment and treatment area) and the sludge thickener.
- Outside the plant enclosure are a transformer center and an emergency generator in case of mains failure.