

# Wastewater Treatment Plant in Cangas del Narcea - Asturias

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The purpose of this wastewater treatment plant is to treat the wastewater from Cangas del Narcea. In addition to the two treatment lines built at the plant, the installation is completed with auxiliary installations that include deodorization, service water and compressed air systems.

Location	Corias - Asturias
Customer	Dirección General de Calidad Ambiental y Obras Hidráulicas. Consejería de Medio Ambiente Asturias Government
Construction period	30 months
Capacity	5.040 m <sup>3</sup> /day
Population	12.000 eq-inhabitants

The plant is located in Corias and is sized for a flow of 5,040 m<sup>3</sup>/day to serve a population of 12,000 equivalent inhabitants.

The following table shows the levels of pollution at the starting and outlet flow:

	Input	Outlet
DQO	360 mg/l	<60 mg/l
DBO <sub>5</sub>	180 mg/l	<12 mg/l
SS	200 mg/l	<15 mg/l
NTK	27 mg/l	<5 mg/l
Pt	5 mg/l	
NH <sub>4</sub>		<2 mg/l
NO <sub>3</sub>		<8 mg/l

### Water line

The water line begins at the raw water pumping station located on the left bank of the Narcea River. Both intakes, the Cangas with a 600 mm diameter and La Regla with 200 mm diameter, discharge into the solids pit fit with trash rack, clamshell grab and overhead crane to remove the heavy material that settles out there.

This connects to the raw water pumping unit built with a capacity for 645 m<sup>3</sup>/h capacity at 33 m.w.c. This station has four submersible pumps and a waterhammer prevention system deodorization unit and an electric generator.

The water is pumped 445 meters across the river and dumped into the feed unit where there is an emergency overflow weir and elimination channels for fines with two automatic, self-cleaning screens and a waste conveyor-compactor worm that takes the solids retained to a metal container. Next, is the grit removal and degreasing unit with two rectangular 7 meter long by 3 meter wide tanks with pre-aeration to demulsify the grease with blowers and diffusers. There is the equipment necessary to remove and wash the sand and concentrate floating elements as well as motorized gates for isolation. Finally, the flow is measured in a 6 inch Parshall type channel.

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At the outlet from the preliminary treatment stage, there is an overflow weir which, in case of exceeding flow, leads it to the storms tank. This consists of gravity, circular unit with 13 meter diameter and 3 meter working height, providing a unitary volume of 418 m<sup>3</sup>. The clarifier mechanism is a rotating bridge with surface skimming for scum and floating removal, and sludge bottom scraper. It has an independent sludge purging system with automatic valves that leads sludge to the emptying pump chamber, and through submergible equipment is pumped to the head of the treatment. Clarified water is led to the outlet at the Narcea River.

The biological treatment consists of two aeration channels, carrousel type, with a total length of 52.35 meters by 12.30 meters wide and with a working height of 3.50 meters, providing a unitary volume of 2,168 m<sup>3</sup>. Each channel is formed by two semi-canals and two half-circle at each end. In each reactor is installed a network of fine bubble diffusers to supply the oxygen required for the process. The air is supplied by three powered blowers of 1,900 m<sup>3</sup>/h, one on stand-by, in sound-proof chamber. A frequency variator has also been installed to control the flow. The conveyance speed along the channels is maintained by means of two flow accelerators with 2,300 mm diameter.

Secondary decantation consists of two gravity type circular decanters with 17 meter diameter and 3.50 meter working height, providing a unit volume of 839 m<sup>3</sup> each. These units have peripheral operation in the moving bridge and sludge and floating materials scrapers. They are provided with independent sludge purging systems with automatic valves that lead sludge to two pump chambers. The sludge is recycled by submerged pumps to the biological treatment unit from one of the chambers and to the sludge thickening unit from the other.

Once the water is clarified, it passes to an outlet pit, with weir that allows, a certain amount of treated water, to be stored for the plant's service water.

Next, by means of a 400 mm diameter pipe, the treated water is dumped into the Narcea River.

### Sludge line

The sludge line has a circulation pumping system conveying the material to the biological reactors and a pumping of exceeding sludge to the thickening unit, both with submerged pumps and automatic valves. The sludge thickening process is done by means of a mechanical rotating disk thickener working from the centre and with a 12 m<sup>3</sup>/h capacity and preliminary flocculation reactor.

To control the sludge flow coming from the thickening unit there is a storage chamber equipped with a submerged mixer, to prevent settling. From the previous chamber the sludge is sucked by helicoidal screw pumps and conveyed to the dehydration unit.

The dehydration of the digested sludge is carried out with a 4 m<sup>3</sup>/h centrifuge after having been conditioned with polyelectrolyte. Next, by means of a helicoidal screw pump, it is evacuated to a 10 m<sup>3</sup> storage hopper from where it is hauled away from the plant.

### Auxiliary installations

The plant is completed with auxiliary installations such as deodorization unit and service water and compressed air systems.

The raw water pumping station and the preliminary treatment building were built with prefabricated structure and enclosing walls providing a quality finish and quick installation.