

Wastewater Treatment Plant in Baix Llobregat - Barcelona

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Location	Baix Llobregat (Barcelona)
Customer	Depurbaix
Starting Construction date	1st of July 2000
Construction period	30 months
Capacity	420,000 m³/day
Population	2,275,000 e.i.

The Baix Llobregat treatment station covers an area of 42 Ha.

Inlet pumping is carried out by two sets of axial flow underwater pumps. Each waste pump consists of four 6,562.5 m³/h, 8.14 m water column, 250 kW submersible pumps.

The biological system is adapted to different nitrification scenarios depending on the temperature and has an intermediate pump that gives the following advantages:

- Geotechnical (lower pre-load)
- Operational (cheaper)
- Aesthetic (reduced effect on the environment)

In the following table it is shown the properties of initial raw water at the inlet of the Waste Water treatment Plant and the effluent water parameters obtained:

	Input	Outlet
DBO ₅	325 mg/l	< 25 mg/l
DQO	725 mg/l	< 125 mg/l
SS	325 mg/l	< 35 mg/l
NTK	5 mg/l	
Phosphorous	5 mg/l	

The work carried out to the water line at the waste water treatment station are: connections for water inlet to the waste water treatment station, solids pit, water pumping and screening, sand and grease removal, excess flow relief, primary decanting, intermediate pumping and biological reactor.

- Water connections: The water is led via two collectors, the A street collector and the right bank interceptor collector that runs from the end of the sludge line to the connection and inlet catch pit.

The connection catch pit is joined to the four solids pits. The relief is produced by an overflow 32 m long connected to a caisson measuring 5 x 3 m that leads the overflow to the River Llobregat. The same outfall wall contains two sluice gates for the general bypass.

- Solids pit, pumps, raw sewage and screening: After their connection with the inlet catch pit, the inlet collectors flow into the solids pit at the -2.50 level. There are four solids pits in two groups of two. Each group of pits has a 500 l double scoop on a gantry crane which also

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serves the entire screening and pumping building.

Coarse screening takes place in six 1.50 m wide channels each equipped with a self-cleaning screen with a pass of 75 mm. Upstream of these screens there are rail type bars to prevent the entry of very large solids from the solids pit to the coarse screening. The detritus is collected in two press screws that communicate with two screws that slope towards containers.

Pumping is carried out with two sets of axial flow underwater pumps. Each set of wastes pumps consists of (4+1) 6,562 m³/h, 250 kW underwater pumps.

Screening is carried out in eight channels 1.50 m wide that are isolated by powered sluice gates measuring 1.50 x 2 m located upstream and downstream of each channel. These contain self-cleaning step screen type fine screens with a pass of 6 mm, preceded by coarse self-cleaning 25 mm grilles.

- Sand and grease removal: The water leaving the screening area is led by two access channels to the sand removers which are isolated by powered sluice gates measuring 1.00 x 1.00 m.

There are six double sand and grease removal lines, each 2 x 5 m wide and 35 m long, operating at a hydraulic load of 25 m³/m²/h at maximum flow. Air is supplied to them by eight rotary piston blowers (two in standby), each supplying a flow of 1,400 m³/h.

The sand and grease removers are equipped with a 10 m wide gantry running the length of the two channels, on the edges of which the sand removal pumps are located. Each pump sucks up the sand from the bottom of the removers and pumps it to four central channels which lead the sand/water mix to four sand sorters which evacuate the sand to two 5,000 litre containers. The flow of the sand pumps located beside the gantries is 60 m³/h.

Grease is collected by surface scrapers that push the grease stored on the side of the sand and grease removers, to a collection channel behind it.

The grease and floating matter is sent from the grease channel to four grease and floating matter separators, which also treat the floating matter from primary decanting, depositing this entire residue in a 5,000 litre container.



The grease separators are of the endless chain type with surface scrapers while the sand sorters are of the screw type.

- Flows relief: Side overflows are installed in the channel before the flow gauge (two per channel), each 5.00 m long, to handle the difference between the maximum allowable flow in the waste water treatment station (14.58 m³/s) and the maximum flow in primary and biological treatment (9.72 m³/s).

- Primary decanting: There are 12 primary decanters in two groups of six.

The primary decanters are rectangular with scrapers and measure 20 m wide x 60 m long.

Sludge is removed from the decanters from the six hoppers in each decanter using six 80 mm diameter pipes connecting to the sludge pumps to thickening. There are pump sets for every two decanters.

The amount of sludge removed is 81,900 kg/day. With this amount of sludge and the expected average concentrations of 5 g/l, the daily volume of primary sludge produced is 16,380 m³. This sludge is pumped to the thickeners by centrifugal underwater pumps ((1+1) for each two decanters) which with a flow of 115 m³/h each, can remove all the sludge produced in a day within 24 hours.

-Intermediate pumping: This consists of (4+1) underwater screw pumps each able to lift 8,750 m³/h to 3 m water column, with a power of 132 kW.

-Biological reactor: Consists of eight biological reactors, four per line, with a mass loading of 0.4 kg DBO/kg SSLM/d. The main reactor has a piston flow configuration and the selectors are arranged as three in series.

- Secondary decanting: The secondary decanters (14) are arranged seven per line with a decanter depth of 4 m. They are circular suction decanters 49 m long with a retention time of five hours.

- Pumping to marine outfall: Carried out by eight underwater pumps each with a capacity of 6,562 m³/h, which operate only when the flow is very high. Normally, the system discharges to the sea by gravity.