

ESTAÇÃO DE TRATAMENTO DE ÁGUA DA ASSEICEIRA

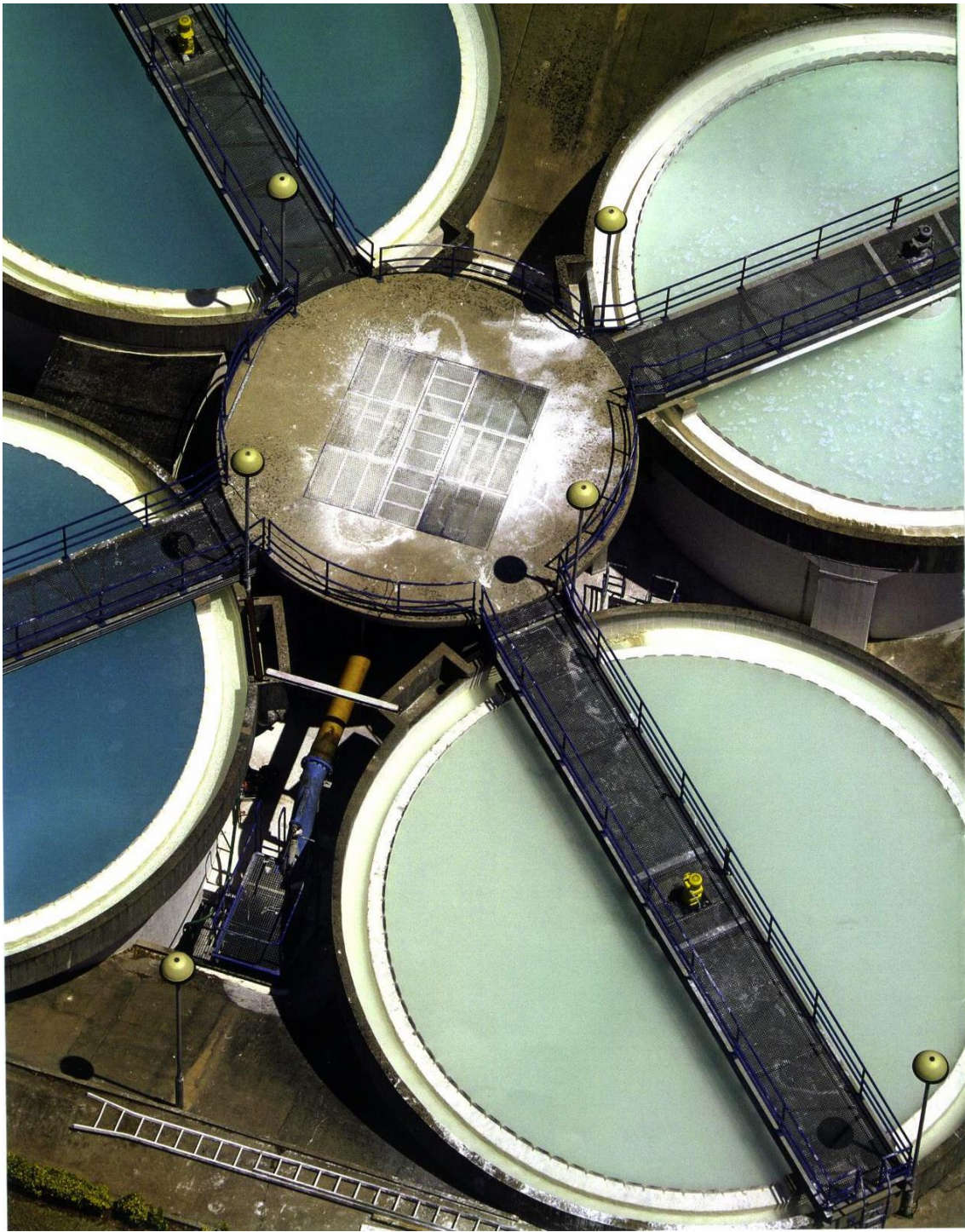
Asseiceira Water Treatment Plant

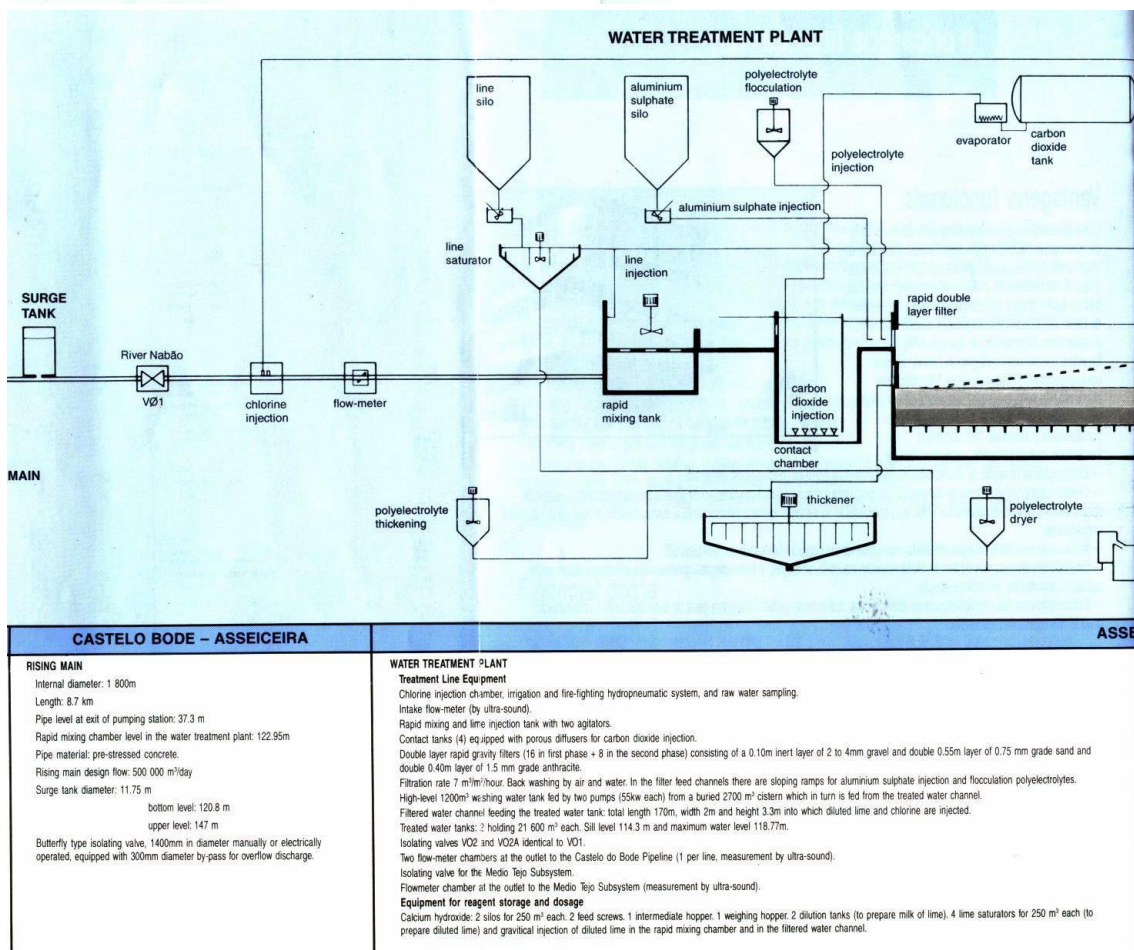
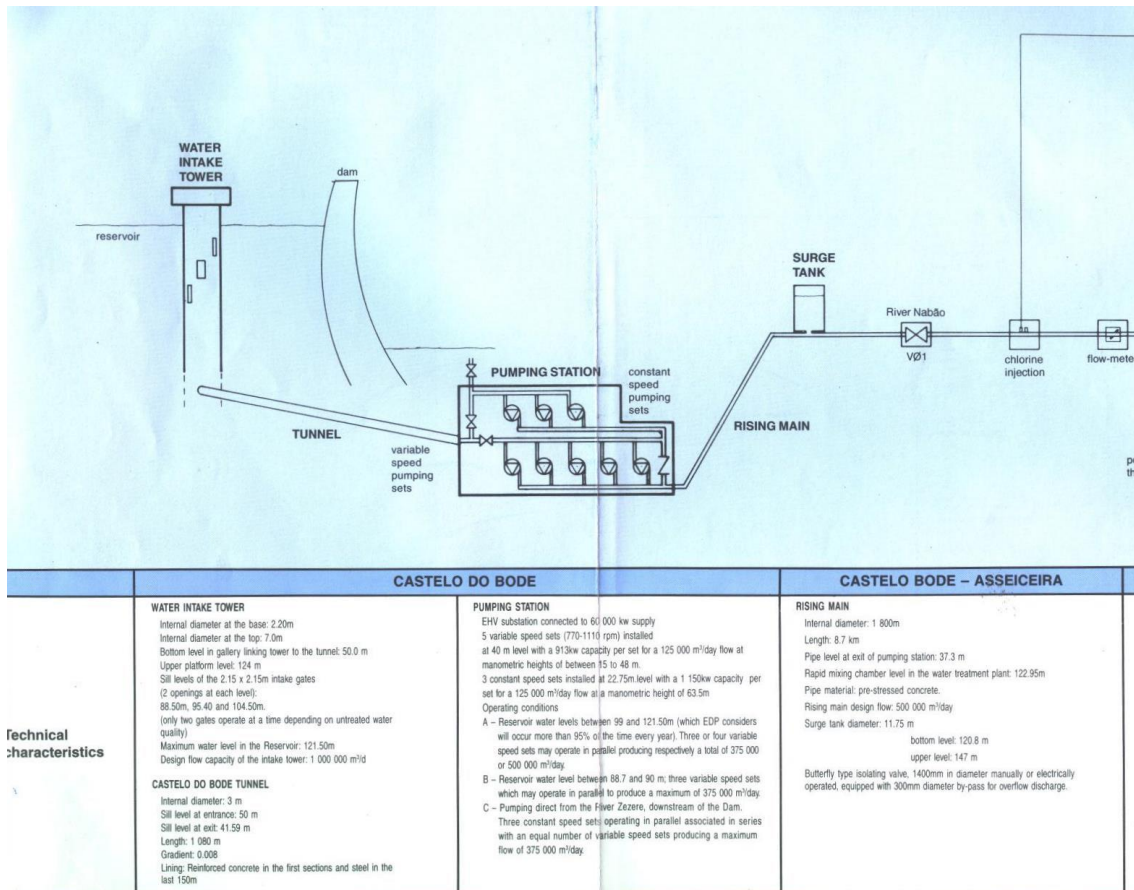


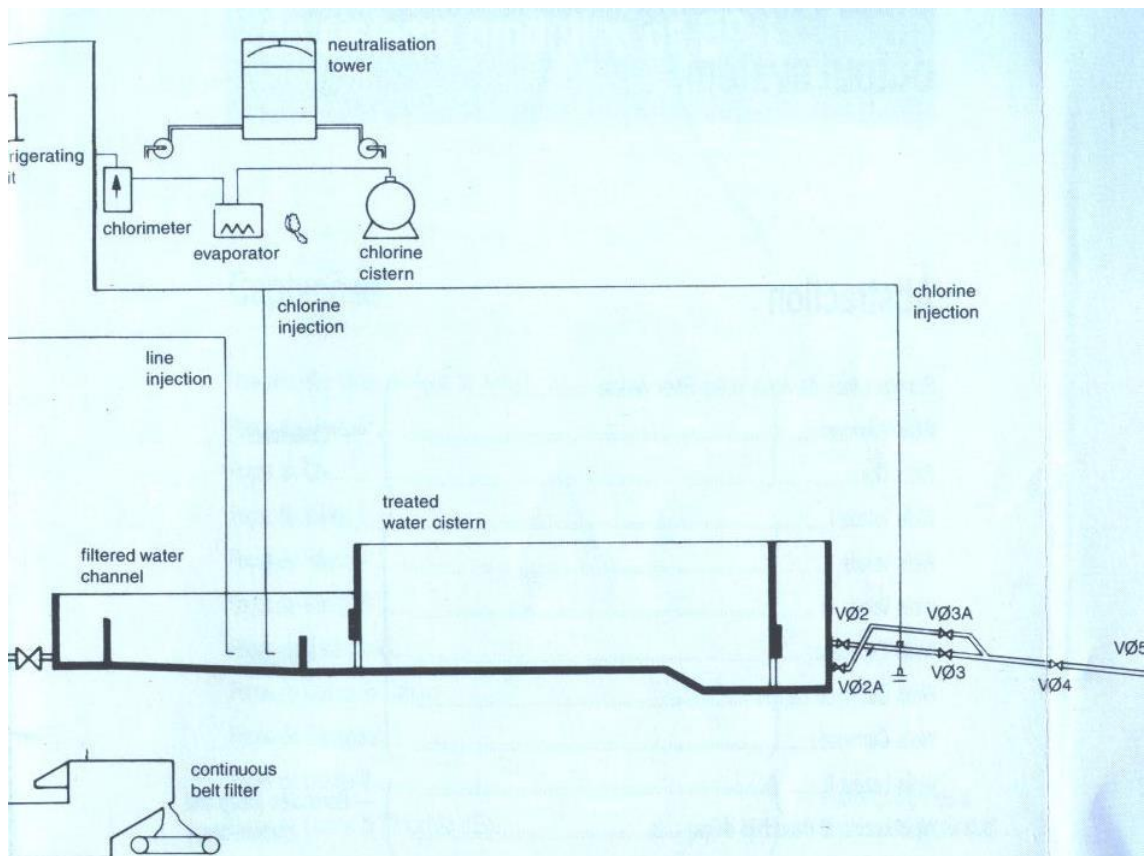
Trabalhos de construção de uma cisterna de água tratada, com capacidade de 40 000 m³, inseridos no âmbito das obras de ampliação do subsistema de Castelo do Bode.

The site for a new treated water cistern with a capacity of 40 000 m³, being constructed as part of the extension works on the Castelo do Bode sub-system.









ASSEICEIRA

Calcium oxide: 1 silo for 250 m³, 1 feed screw, 1 equipment to quench boiling lime, 1 dilution tank (to prepare milk of lime). Remaining equipment same as for the preceding reagent.

Solid Aluminium Sulphate: 1 silo for 250 m³, 1 feed screw, 1 weighing hopper, 2 dilution tanks and 2 injection pumps in the channels feeding the filters.

Liquid Aluminium Sulphate: 3 tanks for a total 65 m³. Flowmeter associated with the regulating valves and two 625kg/h injection pumps in the remineralised water channel.

Chlorine: store for five 4500kg chlorine tanks two 400kg/h evaporators, 3 sets of 2 chlorimeters with a respective capacity of 40kg/h, 40kg/h and 20kg/h, 6 water pumps for chlorinate water injection.

Carbon dioxide: storage in liquid state at -20°C and 20 bars in four 50ton tanks each electric evaporator and 1 800kg/h evaporator/permutator.

Flocculation polyelectrolyte: two 9 m³ tanks and 2 dosage pumps.

Thickening polyelectrolyte: two 3 m³ tanks equipped with agitator and 3 dosage pumps.

Polyelectrolyte dryer: twenty three 3 m³ tanks equipped with agitator and 2 dosage pumps.

Sludge treatment equipment

17 and 18m diameter thickeners equipped with bridge scraper.

Continuous belt filters: 2 equipped with flocculators and dry matter collectors.

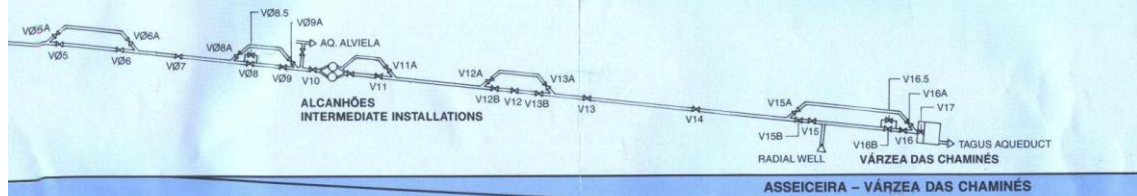
Operation and control equipment

The Castelo do Bode Subsystem is prepared to be operated and controlled from a central control room equipped with 2 Digital Alpha 2 100 200 computers linked to more than 20 automatic controls installed at the Castelo do Bode Pumping Station, the Asseiceira Water Treatment Plant and in the Castelo do Bode Pipeline.

CASTELO DO BODE SUBSYSTEM OPERATION DIAGRAM

OUTPUT — 500 000 m ³ /d	125 000 m ³ /d — 5 200 m ³ /h — 1.4 m ³ /s	1. st PHASE
	250 000 m ³ /d — 10 416 m ³ /h — 2.9 m ³ /s	
	375 000 m ³ /d — 15 625 m ³ /h — 4.3 m ³ /s	
	500 000 m ³ /d — 20 325 m ³ /h — 5.7 m ³ /s	2. nd PHASE

PIPELINE - INTERMEDIATE SECTION



reagent	TREATMENT Pre-chlorination at a rate varying from 0.5 to 1.5gr/m ³ . Remineralisation and aggressivity correction by adding 30gr/m ³ calcium hydroxide followed by 40gr/m ³ carbon dioxide and then, to correct the water balance, 10gr/m ³ of calcium hydroxide. Coagulation/Flocculation over the filters with between 7 and 14gr/m ³ of aluminium sulphate, or between 10 and 30gr/m ³ of liquid aluminium sulphate and/or polyelectrolyte at rates varying from 0.2 to 0.5gr/m ³ . Chlorine disinfection varying from 0.5 to 1.5gr/m ³ . Estimated daily consumption of reagents required for a 375 000m ³ output: chlorine 1 125 tons; calcium hydroxide 15 tons; carbon dioxide 15 tons; aluminium sulphate 3.75 tons.	PIPELINE - INTERMEDIATE SECTION (ASSEICEIRA TREATMENT PLANT - VARZEA DAS CHAMINÉS) The intermediate section comprises two stretches separated by intermediate installations consisting of one tank in the first stage. Internal pipeline diameter: 1 800mm Lengths: first stretch 33 km and last stretch 34.8 km Bottom level of the intermediate installations tank: 73.75m Maximum water level in this tank: 79.75m Tank capacity: 2 x 9 500 m ³ Reception chamber sill level in Varzea das Chaminés:26.8 m Maximum water level in this chamber: 36 m Pipe material: pre-stressed concrete and reinforced concrete mixed at site in four stretches in a tunnel. Main pipeline design flow: 375 000 m ³ /day rising to 500 000 m ³ /day when using both lines (2 lines in parallel by gravity). The 6 duplicated sections total 28 670m and are as follows: Asseiceira, Almonda, Alveia, Curral das Egas, Asseica-Fontanhas and Vila Real/Avenas. The intermediate section comprises "Special Works" which include reinforced concrete and pre-stressed concrete civil engineering structures to support the pipeline where it crosses low-lying ground subject to flooding. These structures are found along a total length of 4 961 m consisting of the following places: Vale de Azambuja, Ribeira de Avenas, Vale Real, Vale de Asseica, Ribeira das Fontanhas, Ribeira do Curral das Egas, Rio Alveia, Rio Almonda and Rio Nabalo. The latter structure is situated on the rising main section. The intermediate section is also equipped with 32 isolating valves similar to the above-mentioned type V01 except V08 and V016 which are provided with a by-pass system with Monovar-type valves to allow for localised head losses, thereby facilitating operation under various programmes below 375 000m ³ /day. To operate at 500 000m ³ /day all of the isolating valves would be open.
chlorinated		
	WATER QUALITY In addition to eliminating zooplankton and phytoplankton and any pathogenic micro-organisms by pre-chlorination, coagulation, filtration and disinfection, water quality depends mainly on remineralisation and aggressivity correction by increasing the concentration of Calcium from 3mg/l to about 20mg/l, total hardness which should rise approximately to 4°; and aggressivity which should be corrected by altering the Langelier index from -1.3 to just above zero.	
than 20		