

## Sludge treatment

### 3a Sludge thickeners

Number: 3 (only one in use)  
Volume: 447 m<sup>3</sup>  
Diameter: 17 m  
Total surface area: 227 m<sup>2</sup>  
Depth: 2 m at periphery and 3.2 m at the centre

### 3b Digestions tanks

Number of tanks: 2  
Volume: 3 500 m<sup>3</sup> x 2  
Height: 16.3 m  
Dwell time: 14 days  
Temperature: 33° C

### 3c Sludge storage tanks

Number: 2  
Volume: 800 m<sup>3</sup> for dried sludge, 500 m<sup>3</sup> for rejects from centrifuges

### 3d Sludge drying

Number of centrifuges: 2  
Capacity: 2.20 m<sup>3</sup> /h  
Make: Alfa Laval  
Type: AVNX 4555  
Maximum DS<sub>content</sub>: Around 30%

### Silos for dried sludge

Number: 2  
Volume: 2 x 150 m<sup>3</sup>

## Miscellaneous

### 4 Gas burner

Recovered heat is added to the district heating network:  
Power capacity: 1 860 kW

### 5 Ventilation

Exhaust air from the pumping station for incoming supply and building for course cleaning and sand filter is filtered in a compost filter.



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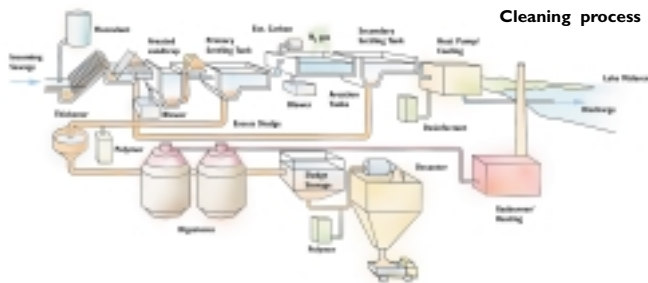
We will be pleased to help with good advice and ideas for a more efficient use of energy and better environmental solutions.



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*For better environmental recycling*

# THE VÄSTERÅS SEWAGE TREATMENT PLANT



# Kungsängen Sewage Treatment Plant

The Kungsängen Sewage Treatment Plant is situated on the Bay of Västerås (Lake Mälaren) about 2 km from the centre of the town. The works receive a good 20 million cubic litres of sewage annually.

The Kungsängen Sewage Treatment Plant was commissioned in the late 30s and has been extended in several stages. In the late 50s the plant was extended with the present sedimentation tank, in 1965 with an active sludge plant and in 1972 with

## Key figures

### Cleaning requirements

A decision by the Swedish National Franchise Board for Environmental Protection on the 28/11/97 stated that the following conditions should apply:

BOD<sub>5</sub>: 10 mg/litre (guideline figure) 15 mg/litre (limit)

P<sub>tot</sub>: 0.3 mg/litre (limit)

N<sub>tot</sub>: 15 mg/litre (limit)

Dimensioning values

Number of connections: 125 000 people

BOD<sub>5</sub> Load: 8 750 kg BOD<sub>5</sub>/day

Q<sub>dim</sub>: 3 690 m<sup>3</sup>/h

Q<sub>max</sub>: 4 800 m<sup>3</sup>/h (1.3 x Q<sub>dim</sub>)

## Mechanical and chemical stages

### 1a Inlet pumping station

Number of helical pumps: 4

Capacity: 4 540 m<sup>3</sup>/h

Make: Spaan

Control: Echo depth sounder

### 1b Coarse cleaning

Number of filter grids: 4

Column width: 3 mm

Make: Meva

Type: Monoscreen

chemical precipitation. The plant's capacity has since been improved during renovation work.

Incoming pumps and the building for grid cleansing and a sand trap were built in 1996 and exhaust air is filtered to reduce smell. In 1998 the new, biological cleaning stage was commissioned in order to comply with the stricter cleaning requirements for nitrogen and phosphorus which came into force in 1999.

### Flow measurement

The incoming flow is measured electro-magnetically after the cleaning grids.

### 1c Sand trap

Number of traps: 2

Total volume: 2 500 m<sup>3</sup>/h

Total surface area: 176 m<sup>2</sup>

Dwell-time at Q<sub>dim</sub>: 0.3h

Blower capacity: 2 x 960m<sup>3</sup>/h

### Pre-precipitation with iron sulphate

Approx. 10 g Fe/m<sup>3</sup>, fixed amount

### 1d Primary settling

Number of blocks: 3 in parallel

Number of basins: 3 x 6

Total volume: 5 225 m<sup>3</sup>

Total surface area: 2 200 m<sup>2</sup>

Dwell-time at Q<sub>dim</sub> and Q<sub>max</sub>: 1.4/1.1h

Surface loading at Q<sub>dim</sub> and Q<sub>max</sub>: 1.7/2.0 m<sup>3</sup>/m<sup>2</sup>, h

Scraper type: chain sludge scrapers

Block	Volume	Surface area	Percentage of incoming flow
1938	1.550 m <sup>3</sup>	470 m <sup>2</sup>	18,5
1957	1.200 m <sup>3</sup>	630 m <sup>2</sup>	24
1980	2.475 m <sup>3</sup>	1.100 m <sup>2</sup>	57,5



## Biological stage

### Pumping station

Frequency-controlled propeller pumps lift the water from pre-sedimentation to the biological stage

Number of pumps: 4

Height of lift: Approx. 3 m

Pump capacity: 9 900 m<sup>3</sup>/h

### 2a Biological aeration

Number of basins: 12

Zones per pool: 6

Total volume: 12 600 m<sup>3</sup>

Capacity biological stage: approx. 4 800 m<sup>3</sup>/h

Dwell-time: at Q<sub>dim</sub>: 3.4h

Zone	Volume	Accid content (set point value) in acid zones
1	275 m <sup>3</sup>	2,0 mg/l
2	250 m <sup>3</sup>	
3	275 m <sup>3</sup>	
4	250 m <sup>3</sup>	
5.1	525 m <sup>3</sup>	2,0 mg/l
5.2	525 m <sup>3</sup>	1,2 mg/l

### Compressors, blowers

Number of compressors: 4

Capacity: 4x6 000 m<sup>3</sup>/h

Power requirements: 130 kW

Rotation rate: 26 000 rpm

Make: HST

Type: Integral

### 2b Secondary -settling

Block A with 6 basins (new)

Block B with 12 basins (old)

Total volume: 9 210 m<sup>3</sup>

Total surface area: 2 610 m<sup>2</sup>

Capacity: 4 800 m<sup>3</sup>/h (1.3x Q<sub>dim</sub>)

Dwell-time at Q<sub>dim</sub> and Q<sub>max</sub>: 2.5/1.9h

Surface loading at Q<sub>dim</sub> and Q<sub>max</sub>: 1.4/1 m<sup>3</sup>/m<sup>2</sup>, h

Scraper type: Chain sludge scrapers

Basin	Volume	Surface area	Capacity
Block A	4.410 m <sup>3</sup>	1.260 m <sup>2</sup>	1.800 m <sup>3</sup> /h
Block B	4.800 m <sup>3</sup>	1.350 m <sup>2</sup>	3.000 m <sup>3</sup> /h