Technical specifications

Raw wastewater is entered the treatment plant at inlet structure by two corrugate PE pipes DN1000 and DN600. This structure is equipped with Inlet structure sluice gate and bypass sluice gate for transferring of wastewater to W.W treatment plant or bypass line. A side weir is provided for overflow bypass the surplus max flow to bypass line (corrugate PE pipes DN1000). The bypass line is combined by treated wastewater at chlorination outlet manhole and transferred to river by gravity. The raw waste water is entered to Manual coarse screen with 40mm bar space and mechanical fine screen with bar space 6 mm. one Manual screen with bar space 20 mm is considered as mechanical fine screen stand by.

Collected screening before manual coarse screen is transferred to rubbish mobile container manually. Collected screening from mechanical fine screen is entered to screen screw compactor. The screens are compacted and transferred to rubbish mobile container.

The screened wastewater is entered to grit and grease removal chamber by concrete channel. Each grit chamber can be isolated by grit chamber inlet sluice gate. The adopted grit chambers are aerated chambers type combining grit and scum removal in the same unit. In aerated grit chamber air is introduced along one side of a rectangular tank. The heavier grit particles that have higher settling velocities settle to bottom of the tank. The organic attached on the solids is detached by aeration. The grit slurry accumulated on tank bottom is pumped to grit side channel by grit bridge pump installed on grit chamber scraper and transferred to collecting grit well by gravity. In classifier the collected grit is separated from water and transferred to Grit rubbish mobile container.

By forces aeration, the grease and scum is floated to liquid surface of grease removal part then skimmed to metal oil storage tank removal grit by surface skimmer. Collected scum is discharged to truck by grease removal crane. Grit chamber scraper utilizes a dual function consisting of grit bridge pump movement and scum skimming. The required air is supplied by grit removal blowers.

The selected biological process is an advanced sequencing batch reactor (ASBR) that allows continuous inflow of wastewater into the treatment tanks during all phases of the cycle. The cycle in this process consists of three phases React-Settle-Decant. The cycles operate continuously in each tank to meet the treatment goals of the plant.

Pretreated wastewater is carried to a channel that discharges it into ASBR distribution box for its distribution to the 4 advanced SBR reactors.

ASBR distribution box is equipped by ASBR distribution inlet penstocks for isolation of each ASBR tank.

The inlet flowrate to ASBR tanks is measured by a flow meter installed in inlet channel to ASBR distribution box. pH / temperature, NH4 and COD analyzers are installed in central part of ASBR distribution box for monitoring the inlet wastewater characteristics. The pretreated wastewater is distributed to ASBR tanks by 4 pipes

path DN500. Each ASBR tank is equipped with ASBR prezone mixers and ASBR main zone mixers.
The adopted aeration system is diffused aeration with fine disc diffusers and ASBR blowers. One pressure switch is installed in air header line of each group of basins. Each basin is equipped by a set of ASBR diffusers. Mixing and aeration are done periodically during reaction phase. After finishing the react time the mixing and aeration are stopped and settle phase is started.
Clarified effluent is removed from the basins during the decant phase of the operational cycle with decanters mechanisms. The decanter is parked above top water level (TWL) during the reaction and settling phases of the cycle.
ASBR tanks are equipped with ASBR tank decanters. Each decanter is equipped by one low and one high position switch. Decanted wastewater is transferred to chlorine contact tank for chlorination by concrete channel. During decant phase the excess sludge is transferred to buffer tank for storage and transfer to sludge treatment plant by excess sludge pumps.
Biologically treated wastewater is transferred to chlorine contact tank by concrete channel. The effluent disinfection is conducted with addition of chlorine gas as disinfectant agent. Chlorine contact tanks provide required contact time between wastewater and chlorine solution for effective disinfection. Disinfected wastewater after passing through chlorine contact tank entered to suction well of filter feed pump, filter backwash pump and sample pump and then is transferred to chlorine contact tank outlet manhole by channel. The treated wastewater is transferred from this manhole to delivery point by pipe. The outlet flow rate is measured by Outlet parshall flume and another flow meter installed in outlet channel. The treated water quality is measured by a COD, NO3, pH/Temperature and PO4 analyzer installed in suction well
The produced excessed sludge in ASBR tanks is transferred to buffer tank by excessed sludge pumps for storage. Because Gravity belt thickeners are worked intermittently (8 hours per day) the excessed sludge must be stored in buffer tank. Buffer tank is equipped with a submersible mixer.
The sludge is fed to gravity belt thickener by GBT feed pump installed in buffer tank. The volume reduction obtained by sludge concentration is beneficial for reducing the capacity of aerobic tanks and equipment required. Gravity belt thickeners are selected for sludge thickening in wastewater treatment plant. The development of gravity belt thickeners stemmed from the application of belt presses from sludge dewatering. The equipment developed for thickening consists of a gravity belt that moves over rollers driven by a variable speed drive unit. The sludge is conditioned with polymer and fed into a feed/distribution box at one end, where the sludge is distributed evenly across the width of moving belt. The water drains through the belt as the concentrating sludge is carried toward the discharge end of the thickener. The thickened sludge is transferred to aerobic digester by gravity (with 5% sloped pipe) and supernatant and wash water drain is transferred to supernatant tank by gravity.

Aerobic digestion is one of the processes defined to meet requirements for class B biosolid. The adopted aeration system is diffused aeration with fine diffusers and aerobic digester blowers. Each basin is equipped by a set of digester diffusers.

Digested sludge is transferred to belt filter press. In belt filter presses, conditioned sludge are first introduced on a gravity drainage section where it is allowed to thicken. In this section a majority of the free water is removed by gravity. Following gravity drainage, pressure is applied in a low-pressure section, where the sludge squeezed between opposing porous cloth belts. On some units, the low pressure section is followed by a high-pressure section where the sludge is subjected to shearing forces as the belt pass through a series of rollers. A belt filter press system consists of sludge feed pumps, polymer feed equipment, belt filter press, sludge cake conveyor and support systems (wash water pumps and air compressors).

Drying beds are considered as standby for belt filter presses. In drying beds, sludge is placed on the bed in a 200 to 300 mm layer and allowed to dry. Sludge is dewatered by gravity drainage through the sludge mass and supporting sand and by evaporation from the surface exposed to the air. Most of the waters leaves the sludge by drainage. Drying beds are equipped with lateral drainage lines. The dewatered sludge is stored in Long term storage tank and drainage is transferred to supernatant tank by gravity. Collected supernatant and drainage from thickening and dewatering building, drying beds with over flow of buffer tank and aerobic digesters in supernatant tank are transferred to inlet channel of ASBR distribution box by Supernatant pumps.