1. The average design flow at a wastewater treatment plant facility is 1.5 m3/s. The bar rack is mechanically cleaned with an average clear spacing of 2.5 cm. Estimate the average quantity of screenings that will be collected at each day.
2. A bar rack precedes a grit chamber. The outlet of the grit channel is controlled by a proportional weir such that the depth of flow in the channel is proportional to the rate of flow. A 91 cm intercepting sewer brings the flow to the screen chamber. The depth of flow and velocity in the sewer at peak design flow of 0.5 m3/s are 58 cm and 1 m/s, respectively. The bar rack has 46 bars. Each bar is 6.0 mm wide and clear spacing is 3.0 cm. The floor of the bar rack is horizontal and 8 cm below the invert of the intercepting sewer. Calculate the depth and velocity in the bar rack chamber upstream and downstream of the rack and through rack. Also, calculate the head loss when the rack is clean and 20 % clogged.
3. A rectangular bar rack chamber is 1.8 m wide. The water depth downstream of the rack is 1.3 m. The wastewater drops into a wet well. The chamber bottom is elevated to maintain a nearly constant depth near the outfall. The bar screen is designed for a flow of 1.35 m3/s. Calculate the height of the raised floor above the bottom of the channel (zc). Draw the longitudinal section.
4. Design a proportional weir for velocity controlled in the bar-screen chamber. The screen chamber is 1.80 m wide and the depth of flow downstream of the bars is 1.30 cm when the peak design flow of 1.35 m3/s is passing through the chamber. The crest of the weir is at the bottom of the chamber. The proportional weir is located at the edge of the wet well so that there is a free fall into the wet well.