# Appendix 11-1 Extended Aeration Sewage Treatment and Sequencing Batch Reactor Sewage Treatment

# APPENDIX 11-1

## EXTENDED AERATION SEWAGE TREATMENT AND SEQUENCING BATCH REACTOR SEWAGE TREATMENT

### Extended Aeration Sewage Treatment

Conventional treatment of wastewater in an Active Sludge Plant (ASP) includes primary settlement and aeration of the wastewater, followed by final settlement of the biomass before discharge of the treated effluent. This type of treatment requires regular removal and discharge of sludge from the primary settlement tank, as well as surplus biomass from the final clarifier.

A more effective variation of ASP is the Extended Aeration technology. In this process, wastewater is screened and aerated in a large capacity reactor, over a long period of time, before progressing to a separate final settlement tank, for completion of the process. This means that there is no production of primary sludge and considerable savings of cost and time can be made by not having to remove it. A low level of excess biomass is also produces.

Extended Aeration is ideal for a modular arrangement, offering much greater flexibility in the design of the process and the layout of the site. This also means that there is a good response to variable flow and load, which would otherwise affect the operation of the system. The individual units are easy to install, operate and maintain, while it is possible to make considerable upgrades at later stages. Extended Aeration produces very high quality treated effluent.

### Sequence Batch Reactor Sewage Treatment

The sequencing batch reactor (SBR) is a "fill-and-draw" Activated Sludge system. In this system. wastewater is added to a single "batch" reactor, treated to remove undesirable components, and then discharged. They are suited for wastewater treatment applications characterized by low or intermittent flow conditions.

The SBR performs equalization, biological treatment and secondary clarification in a single tank using a timed control sequence. In an activated sludge system these processes would be accomplished using separate tanks.

Construction of a SBR system requires a small footprint than other systems because the SBR often eliminates the need for primary clarifiers; therefore, the SBR system is advantageous if space is limited at the proposed site.

The control system of an SBR operation is complex and includes automatic switches, automatic valves, and instrumentation. Since the heart of the SBR is the controls, these systems may require more maintenance and an increased level of sophistication usually equates to more items that can fail. This complexity may offset any potential low O & M costs which the SBR can achieve since it does not require some of the multitude of pumps of other systems.

The performance of SBR's is comparable to activated sludge systems, and operating flexibility is associated with SBR systems. An SBR can be set up to simulate any conventional sludge system. This flexibility can be modified for nutrient removal in the future, if it becomes necessary. This makes SBR's flexible to adapt to regulatory changes for effluent parameters such as nutrient removal. SBR's are also very cost effective if treatment beyond biological treatment is required, such as filtration.