1.85 WATER AND WASTEWATER TREATMENT ENGINEERING
IDEAS FOR DESIGN PROJECTS

Many of these suggested assignments require a conceptual design. A conceptual design should include an estimate of the flow to be treated, the water quality of the water or wastewater, specification of the unit processes to be included in the treatment system, the size of the treatment units (i.e., dimensions, flow capacities, etc.), a "ballpark" estimate of the system cost, and an estimate of the water quality that would result from the system.

Obtain and critically review a "classic" paper from the water, wastewater, or water quality literature. The paper should date from 1970 or before.

Prepare a conceptual design for a wastewater treatment system for a small town. You will be provided with a description of and population estimates for the town.

Prepare a conceptual design for a pretreatment system for an industrial wastewater such that the resulting wastewater can be discharged to the municipal sanitary sewer. You will be provided with a description of an industrial source according to your interest.

The wastewater from your dentist's office contains a variety of metals. Prepare a conceptual design for a small wastewater pre-treatment system for a typical dentist's office.

A residential subdivision of 30 five-bedroom homes is proposed to be cited in a sensitive coastal area in Massachusetts. The developer proposes to treat wastewater using an on-site treatment and disposal system that consists of septic tanks at individual homes and a common leaching field for the entire development.
Project Alternative 1: Prepare a design for the septic tanks and leaching field that meets the Massachusetts Title 5 regulations.
Project Alternative 2: The local authorities will permit the subdivision to be constructed, but only if the developer provides supplemental treatment to remove nitrogen. Compare at least three alternative "package" systems for nitrogen removal and provide recommendations on which system should be selected.

Assume the Commonwealth of Massachusetts has decided to apply the Stormwater Policy retroactively to pre-existing development. MIT must now design a stormwater treatment system for the runoff from the Kresge parking lot. Estimate stormwater flows from the lot. Identify and compare alternative treatment systems for stormwater runoff and recommend an appropriate model and size for the Kresge lot.

The Water Supply District of Acton, Massachusetts is planned to treat water from the Kennedy and Marshall Wells to remove iron and manganese. Prepare a conceptual design for the treatment system.

Contaminated ground water withdrawn from the Wells G&H Superfund Site in Woburn, Massachusetts requires treatment for removal of volatile organic compounds. Prepare a conceptual design to treat the water to meet drinking-water MCLs.

Assume the City of Cambridge will no longer supply MIT with drinking water. Prepare a conceptual design for a treatment system to allow MIT to drink Charles River water.

A design or analysis project of your own choosing.