CHAPTER 120
LAND APPLICATION OF WASTEWATER

121. REFERENCES

Land treatment systems should be designed in accordance with:

a. Land Treatment of Municipal Wastewater (1981) EPA 625/1-81-013;

b. Land Treatment of Municipal Wastewater: Supplement on Rapid Infiltration and Overland Flow (1984) EPA 625/1-81-031a;

c. Natural Systems for Wastewater Treatment (1990) Water Environment Federation Manual of Practice FD-16, or;

d. Other appropriate references.

122. OVERLAND FLOW SYSTEMS

Some of the major design criteria from the referenced publications are summarized below. No attempt has been made to be all-inclusive. The referenced publications should be consulted for detailed design and O & M guidance.

122.1 Storage/Pretreatment

___ A holding pond before the overland flow slope shall be provided to allow for operational flexibility. The minimum detention time shall be 5 days. Otherwise the pond must comply with Section 55, Flow Equalization.

___ Overland flow shall not be used to treat effluents from facultative, aerobic, partially aerated, HCR, or pretreatment lagoons unless algae removal is provided.

___ Secondary settling prior to land application should be considered.

122.2 Sizing of Application Field

___ One of the rational design procedure described in the referenced publications may be used. Otherwise, the following empirical design ranges may be used.

122.2.1 Slope Length

___ The slope length should be about 150 feet or longer.

122.2.2 Loading Rate

___ Both the application and hydraulic loading rate criteria in the following table must be satisfied. The low end of the ranges should be used when the effluent limits are strict.

Preapplication Treatment	Application Rate, gph per foot of slope width	Hydraulic Loading Rate, in/day
Aerated Lagoon (1 day detention)	6.4 - 11.3	0.8 - 3.3
Primary Sedimentation	5.6 - 9.7	1.0 - 3.5
Secondary	8.9 - 13.7	1.2 - 3.9

122.2.3 Application Period

___ The application period should be 8-12 hrs/day.

122.2.4 Application Frequency

___ The application frequency should be 5-7 days/week.

122.2.5 Continuous Application

___ Overland flow systems shall not be sized based on continuous application; however, it is permissible to operate a system continuously as long as all permit limits are met.

122.3 Application Field Construction

___ The soil/groundwater study requirements for earthen impoundments found in Section 101.1.4 also apply to land treatment projects.

___ Slope should be 2-8% with a cross slope of no more than 0.5%.

___ The P/S should require that surface elevations not differ from the design elevations by more than 0.05 ft. (15 mm). There should be no swales or depressions.

___ A maximum clod size on the prepared surface prior to seeding should be specified.

___ The P/S should forbid driving equipment on the finished slope unless the equipment has high flotation tires to minimize rutting.

122.4 Distribution System

___ The distribution system shall have enough flexibility to allow application of wastewater to parts of the slope while other parts are allowed to dry for maintenance.

___ The distribution system shall be designed so as to minimize the likelihood of damage by equipment during routine maintenance.

122.4.1 Surface Distribution

___ Slotted or perforated pipe may be used. The openings must be uniformly machined.

___ A sawtooth weir that is similar to a clarifier weir may be used.

___ The pipe or weir should be adjustable to allow leveling and must allow uniform application along its length.

___ The surface distribution system must discharge on to a gravel bed or some other device which will minimize erosion and ensure uniform sheet flow.

122.4.2 Spray or Sprinkler Distribution

___ There must be sufficient downslope distance beyond the spray pattern to allow for adequate treatment.

122.5 Vegetation Selection and Establishment

___ The P/S should require that the slope be finished and planted as early in the growing season as practicable, so as to allow the maximum time for the cover to be established.

___ The P/S should require that the slope be watered with about one inch of water every three days or twice a week after seeding or sodding until the cover is firmly established; and then watered as needed thereafter to maintain the cover in good condition.

___ Watering shall be done carefully to prevent erosion; there should be no runoff. Wastewater, stream water (if permitted), or potable water may be used.