

based on the size of particle to be removed. All grit removal facilities should be provided with adequate automatic control devices to regulate detention time, agitation, and air supply.

53.44 Grit Washing

The need for grit washing should be determined by the method of final grit disposal.

53.45 Drains

Provision shall be made for isolating and dewatering each unit.

53.46 Water

An adequate supply of water under pressure shall be provided for cleanup.

53.47 Grit Handling

Grit removal facilities located in deep pits should be provided with mechanical equipment for hoisting or transporting grit to ground level. Impervious, non-slip, working surfaces with adequate drainage shall be provided for grit handling areas. Grit transporting facilities shall be provided with protection against freezing and loss of material.

54. PREAERATION

Preaeration of sewage to reduce septicity may be required in special cases.

55. FLOW EQUALIZATION

55.1 General

Flow equalization can reduce the dry-weather variations in organic and hydraulic loadings at any wastewater treatment plant. It should be provided where large diurnal variations are expected.

55.2 Location

Equalization basins should be located downstream of pretreatment facilities such as bar screens, comminutors, and grit chambers.

55.3 Type

Flow equalization can be provided by using separate basins or on-line treatment units, such as aeration tanks. Equalization basins may be designed as either in-line or side-line units. Unused treatment units, such as sedimentation or aeration tanks, may be utilized as equalization basins during the early period of design life.

55.4 Size

Equalization basin capacity should be sufficient to effectively reduce expected flow and load variations to the extent deemed to be economically advantageous. With a diurnal flow pattern, the volume required to achieve the desired degree of equalization can be determined from a cumulative flow plot over a representative 24-hour period.

53.2 Location

53.21 General

Grit removal facilities should be located ahead of pumps and comminuting devices. Coarse bar racks should be placed ahead of grit removal facilities.

53.22 Housed Facilities

53.221 Ventilation

Uncontaminated air shall be introduced continuously at a rate of 12 air changes per hour, or intermittently at a rate of 30 air changes per hour. Odor control facilities may also be warranted.

53.222 Access

Adequate stairway access to above- or below-grade facilities shall be provided.

53.223 Electrical

All electrical work in enclosed grit removal areas where hazardous gases may accumulate shall meet the requirements of the National Electrical Code for Class I, Group D, Division 1 locations.

53.23 Outside Facilities

Grit removal facilities located outside shall be protected from freezing.

53.3 Type and Number of Units

Plants treating wastes from combined sewers should have at least two mechanically cleaned grit removal units, with provisions for bypassing. A single manually cleaned or mechanically cleaned grit chamber with bypass is acceptable for small sewage treatment plants serving separate sanitary sewer systems. Minimum facilities for larger plants serving separate sanitary sewers should be at least one mechanically cleaned unit with a bypass. Facilities other than channel-type are acceptable if provided with adequate and flexible controls for agitation and/or air supply devices and with grit collection and removal equipment.

53.4 Design Factors

53.41 General

The design effectiveness of a grit removal system shall be commensurate with the requirements of the subsequent process units.

53.42 Inlet

Inlet turbulence shall be minimized.

53.43 Velocity and Detention

Channel-type chambers shall be designed to control velocities during normal variations in flow as close as possible to one foot per second (30 cm/s). The detention period shall be

52.1 General

Provisions for location shall be in accordance with those for screening devices, Section 51.12.

52.2 When Required

Comminutors shall be used in plants that do not have primary sedimentation or fine screens, and should be provided in cases where mechanically cleaned bar screens will not be used.

52.3 Design Considerations

52.31 Location

Comminutors should be located downstream of any grit removal equipment.

52.32 Size

Comminutor capacity shall be adequate to handle peak flow.

52.33 Installation

A screened bypass channel shall be provided. The use of the bypass channel should be automatic at depths of flow exceeding the design capacity of the comminutor.

Each comminutor that is not preceded by grit removal equipment should be protected by a 6.0 inch (15.2 cm) deep gravel trap.

Gates shall be provided in accordance with Section 51.134.

52.34 Servicing

Provision shall be made to facilitate servicing units in place and removing units from their location for servicing.

52.35 Electrical Controls and Motors

Electrical equipment in comminutor chambers where hazardous gases may accumulate shall meet the requirements of the National Electrical Code for Class I, Group D, Division 1 locations. Motors in areas not governed by this requirement may need protection against accidental submergence.

53. GRIT REMOVAL FACILITIES

53.1 When Required

Grit removal facilities should be provided for all sewage treatment plants, and are required for plants receiving sewage from combined sewers or from sewer systems receiving substantial amounts of grit. If a plant serving a separate sewer system is designed without grit removal facilities, the design shall include provision for future installation. Consideration shall be given to possible damaging effects on pumps, comminutors, and other preceding equipment, and the need for additional storage capacity in treatment units where grit is likely to accumulate.