environment 21
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Technology That Separates

STORM BULLETIN 6

SIZING STORMWATER TREATMENT SYSTEMS

- **Generic Design Values for Water Quality Event**
  Site-specific design parameter values are difficult to obtain. In many cases Site Engineers cannot obtain the site-specific values from design manuals or the local cognizant agency. So the following generic values are suggested for use by Site Engineers:
  - **A Sediment Size gradation** of 20 µ to 300 µ represents silt and sand deposits that would come from urban streets and parking lots. (Other drainage areas – arterial highways, residential streets, rural highways, industrial sites – may have a different deposit sizing and content.) Particle size is the most important design parameter. The cost of the treatment system may increase based on sizing for removal of clay, fine silt, and/or suspended organic solids.
  - **A Rainfall Intensity and Duration** of 0.80"/hr for 10 minutes (based on a 1979 EPA study of sediment wash-off from a paved street using simulated rainfall) occurs several times per year in the northeast United States. Intensities and durations in other areas of the world will obviously differ due to climate and weather.

- **Site-specific Design Values for Water Quality Event**
  - **The local agency responsible for watershed protection** may have established design parameters for use by Site Engineers.
  - **The National Pollutant Removal Performance Database (June, 2000 edition)** provides performance data for pollutant removal efficiency (i.e.,. 80% annual Total Suspended Solids (TSS) removal). But at this time there is no accepted standard for the composition of TSS so the applicability of this database is limited.
  - **Third Party Testing** performance data (e.g. 80% annual TSS removal) for pollutant removal efficiency is of limited use since there is no accepted standard for the composition of TSS. Also third party testing, though required by many agencies, is not readily available. Site-specific design parameters may be available from the agency performing the monitoring tests.

- **Water Quality Event Design Parameters**
  - The accepted practice for design of urban stormwater treatment systems allows for the unpredictable and variable nature of the annual spectrum of wash-off events. Meeting the design parameter values for the water quality event is assumed equivalent to obtaining 80% of the average annual TSS removal over a period of several years.
  - **Detailed analysis and computer modeling** are not justified for a process as unpredictable and variable as sediment wash-off from storm events. The water quality event design concept is a straightforward approach based on the following parameters applicable to all sites.
    - **The composition and size** of the particles determines the settling characteristic of the solids to be removed at 80% efficiency during the water quality event.

- **The rainfall intensity and duration** should be adequate to generate significant scour and wash-off of sediment from the tributary area.
- **The peak flow rate** should be calculated from the rainfall intensity and runoff characteristics of the specific tributary drainage area.
- **The runoff depth** should be calculated from the rainfall depth for the water quality event and runoff characteristics for the specific tributary area