



STORM BULLETIN 9

SEDIMENT STORAGE CAPACITY

- **The Required sediment storage capacity** can be estimated using the following four criteria:
 - The annual rate at which stormwater washes sediment from the pavement
 - The annual efficiency for removing sediment from the stormwater
 - The bulk density of the settled sediment
 - The most cost-effective pump-out frequency
- **The annual sediment wash-off rate** for an acre of pavement ranges from 400#/yr for shopping centers to 1000 #/yr for freeways and industrial areas.
- **Assuming the sediment sludge** is 40% by volume mineral and 5% by weight organic results in an estimated wet sludge density of 100#/ft³.
- **The most cost-effective pump-out frequency** is a trade-off between the cost of the increased sediment storage volume versus the cost of the increased pump-out frequency. This is site specific since variables include the size of the pump-out truck and the local landfill costs. Increasing the water surface area of the sedimentation system will increase both sediment removal efficiency and sediment storage capacity.
- **A reasonable design criteria for sediment sludge storage capacity** is to assume an annual sediment sludge accumulation rate of 0.40 cubic yards per acre of pavement. This is based on the following analysis:
 - Pavement (impervious) area = 1.0 acres
 - Mineral Suspended Sediment (MSS) wash-off rate = 800#/yr
 - Organic Suspended Sediment (OSS) wash-off rate = 100#/yr
 - Total Suspended Solids (TSS) wash-off rate = 800# + 100# = 900#/yr
 - Sediment sludge = 40% vol. sediment
 - MSS removal efficiency (calculated for specified treatment system and sizing guideline) = 80%
 - OSS removal efficiency (assumption) = 80%
 - TSS removal efficiency (calculated) = 80%
 - Sediment accumulation rate = 800# x 0.80 = 640#/yr/acre pavement
 - Sediment sludge bulk density (assumption) = 4050#/yd³
 - Sediment sludge accumulation rate = 640#/yr/acre pavement/4050#/yd³/0.40 = 0.40 yd³/yr-acre pavement



environment²¹
Global Stormwater Solutions

P.O. Box 55 | East Pembroke | NY 14056
Phone: 1-800-809-2801 | Fax: 1-800-809-2801

www.env21.com | enveng@env21.com

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Technology That Separates

- Ten year sediment sludge storage capacity = $0.40 \text{ yd}^3/\text{yr-acre pavement} \times 10 \text{ yrs.} = 4 \text{ yd}^3/\text{acre}$ of pavement.
- Sediment sludge accumulation rate can also be expressed in terms of total impervious area (pavement + roofs).
- For a retail/commercial site a suggested value is $0.30 \text{ yd}^3/\text{yr-acre}$ impervious area.