Appendix C

Measuring Flow in a Storm Sewer to Estimate an SSO Volume/Flow Rate

To determine flow rate and volume of wastewater discharged to a storm sewer, two approaches may be used.

One is the "drop/bucket" method. This method is limited to flow rates of approximately 20 gallons/minute or less, and requires a free discharging storm sewer with adequate space below the pipe invert to position a plastic bucket of known volume (2-5 gallons). As the bucket captures the discharge, a stopwatch is used to time its filling. Dividing the volume of the bucket, in gallons, by the elapsed time to fill the bucket, in minutes, yields the flow rate in gallons/minute.

The second method utilizes a piece of 0.5-inch polyvinyl chloride (PVC) pipe 3 feet in length and wrapped with fluorescent-colored tape at one foot gradations, and the following procedure:

1. The PVC pipe is lowered from the manhole rim and anchored in the storm sewer manhole's line of flow with an attached 0.5 pound fishing line weight.
2. To determine the velocity of flow, a floatable marker is dropped into the flow at the upstream end of the PVC pipe and its time of travel along the length of the PVC pipe is timed with a stopwatch. Note that the marker should be of a material and size that will not clog any downstream pumps. The PVC pipe's 3 feet in length divided by the elapsed time, in seconds, for the marker to travel that length yields the velocity in feet/second. (The use of electrical or mechanical velocity meters are likely not practical because this method is only for relatively low velocity/low flow scenarios of less than 0.75 feet/second.)
3. The depth of flow is the depth from the water surface to the manhole invert as measured remotely from the manhole rim using a string and a 0.5 pound fishing weight. The string should be white and absorbent so the flow depth is apparent, i.e., the moisture stain on the string, when retrieved.
4. Using the storm sewer pipeline diameter and grade obtained from storm sewer maps, the measured water depth, and flow velocity, the flow rate can be calculated.

Source: City of Riverside, California Wastewater Division