Ten State Standards

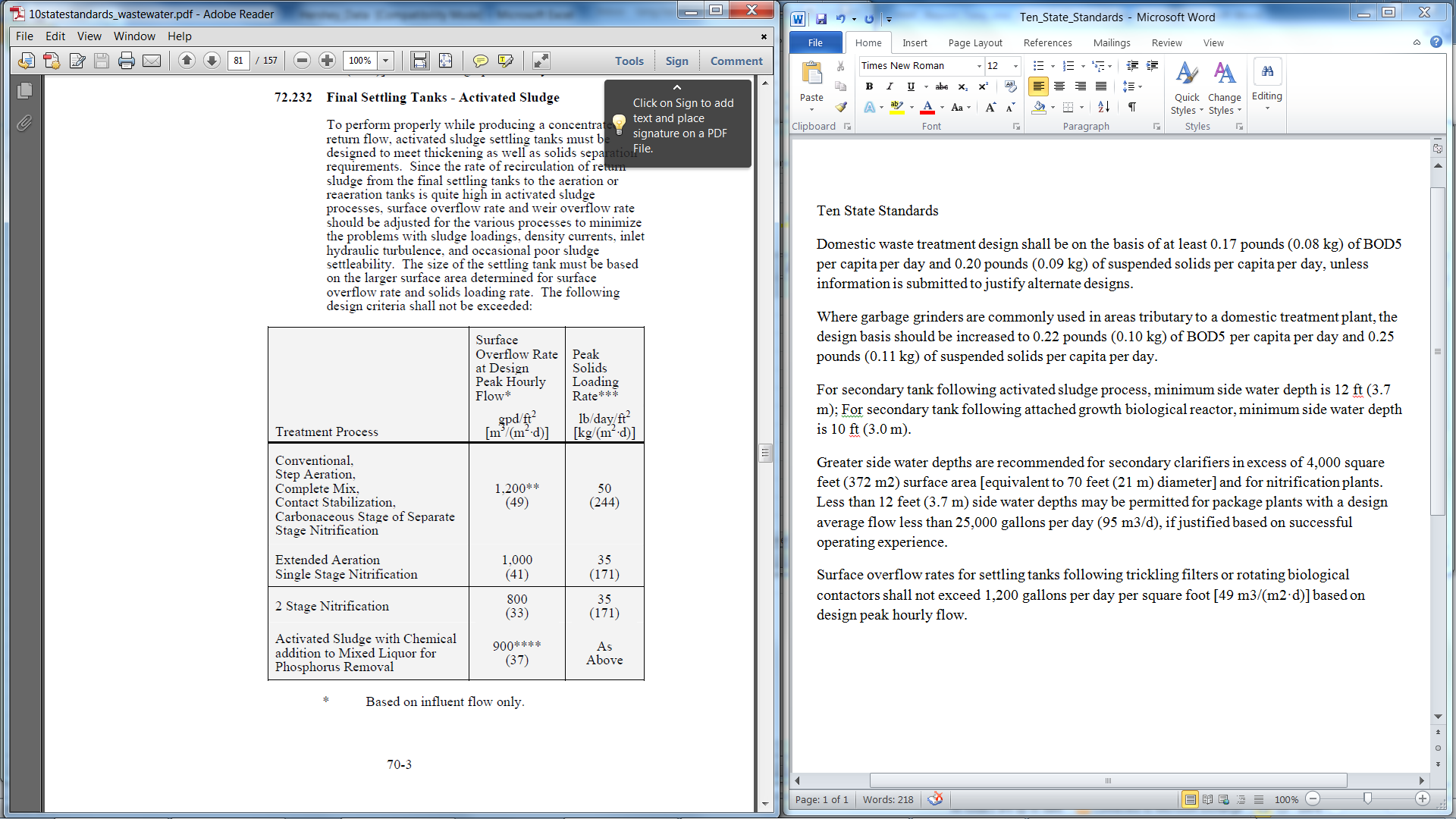
Domestic waste treatment design shall be on the basis of at least 0.17 pounds (0.08 kg) of BOD5 per capita per day and 0.20 pounds (0.09 kg) of suspended solids per capita per day, unless information is submitted to justify alternate designs.

Where garbage grinders are commonly used in areas tributary to a domestic treatment plant, the design basis should be increased to 0.22 pounds (0.10 kg) of BOD5 per capita per day and 0.25 pounds (0.11 kg) of suspended solids per capita per day.

For secondary tank following activated sludge process, minimum side water depth is 12 ft (3.7 m); For secondary tank following attached growth biological reactor, minimum side water depth is 10 ft (3.0 m).

Greater side water depths are recommended for secondary clarifiers in excess of 4,000 square feet (372 m2) surface area [equivalent to 70 feet (21 m) diameter] and for nitrification plants. Less than 12 feet (3.7 m) side water depths may be permitted for package plants with a design average flow less than 25,000 gallons per day (95 m3/d), if justified based on successful operating experience.

Surface overflow rates for settling tanks following trickling filters or rotating biological contactors shall not exceed 1,200 gallons per day per square foot [49 m3/(m2·d)] based on design peak hourly flow.

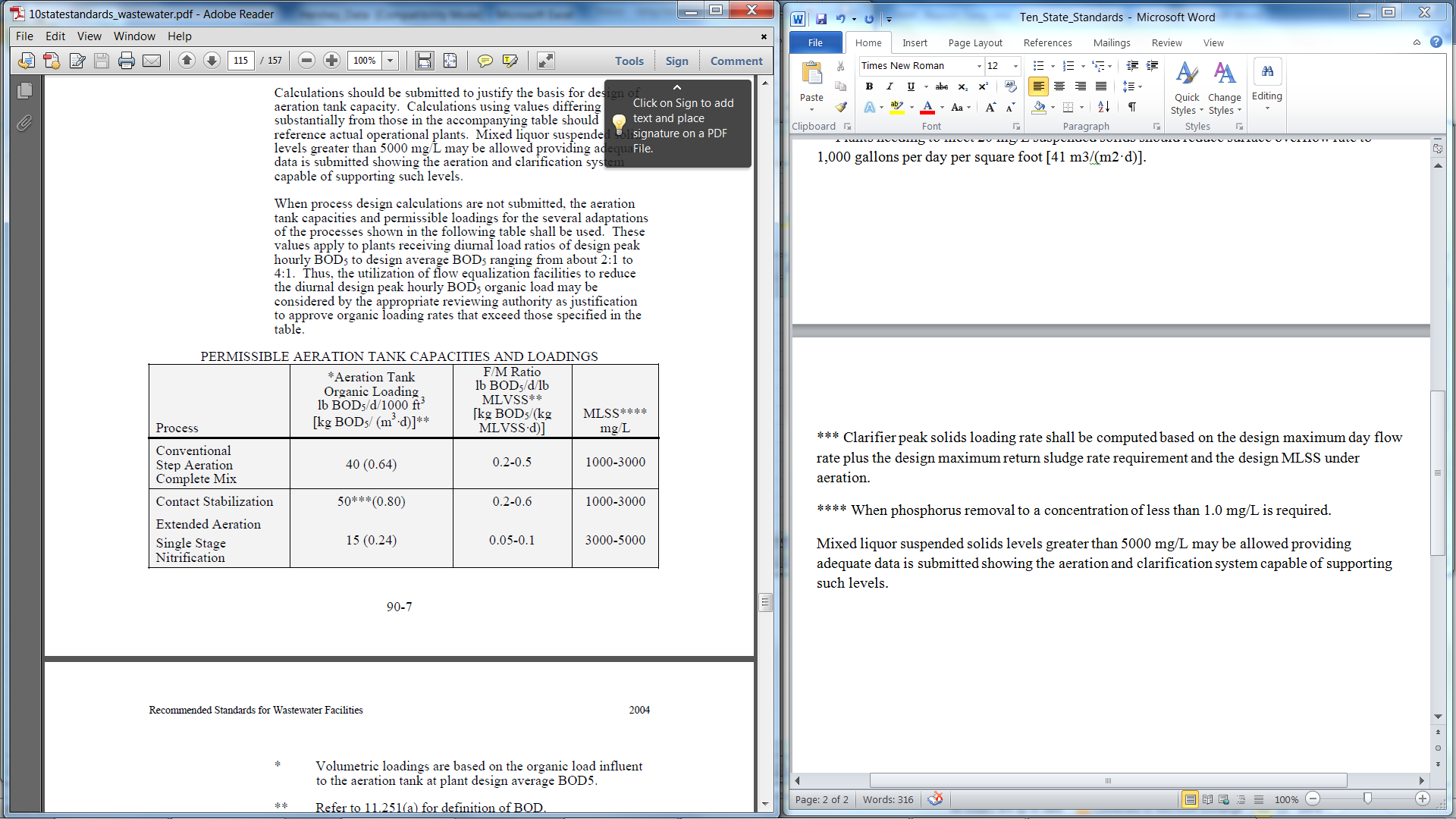


\*\* Plants needing to meet 20 mg/L suspended solids should reduce surface overflow rate to 1,000 gallons per day per square foot [41 m3/(m2·d)].

\*\*\* Clarifier peak solids loading rate shall be computed based on the design maximum day flow rate plus the design maximum return sludge rate requirement and the design MLSS under aeration.

\*\*\*\* When phosphorus removal to a concentration of less than 1.0 mg/L is required.

Mixed liquor suspended solids levels greater than 5000 mg/L may be allowed providing adequate data is submitted showing the aeration and clarification system capable of supporting such levels.



The dimensions of each independent mixed liquor aeration tank or return sludge reaeration tank shall be such as to maintain effective mixing and utilization of air. Ordinarily, liquid depths should not be less than 10 feet (3 m) or more than 30 feet (9 m) except in special design cases. An exception is that horizontally mixed aeration tanks shall have a depth of not less than 5.5 feet (1.7 m).

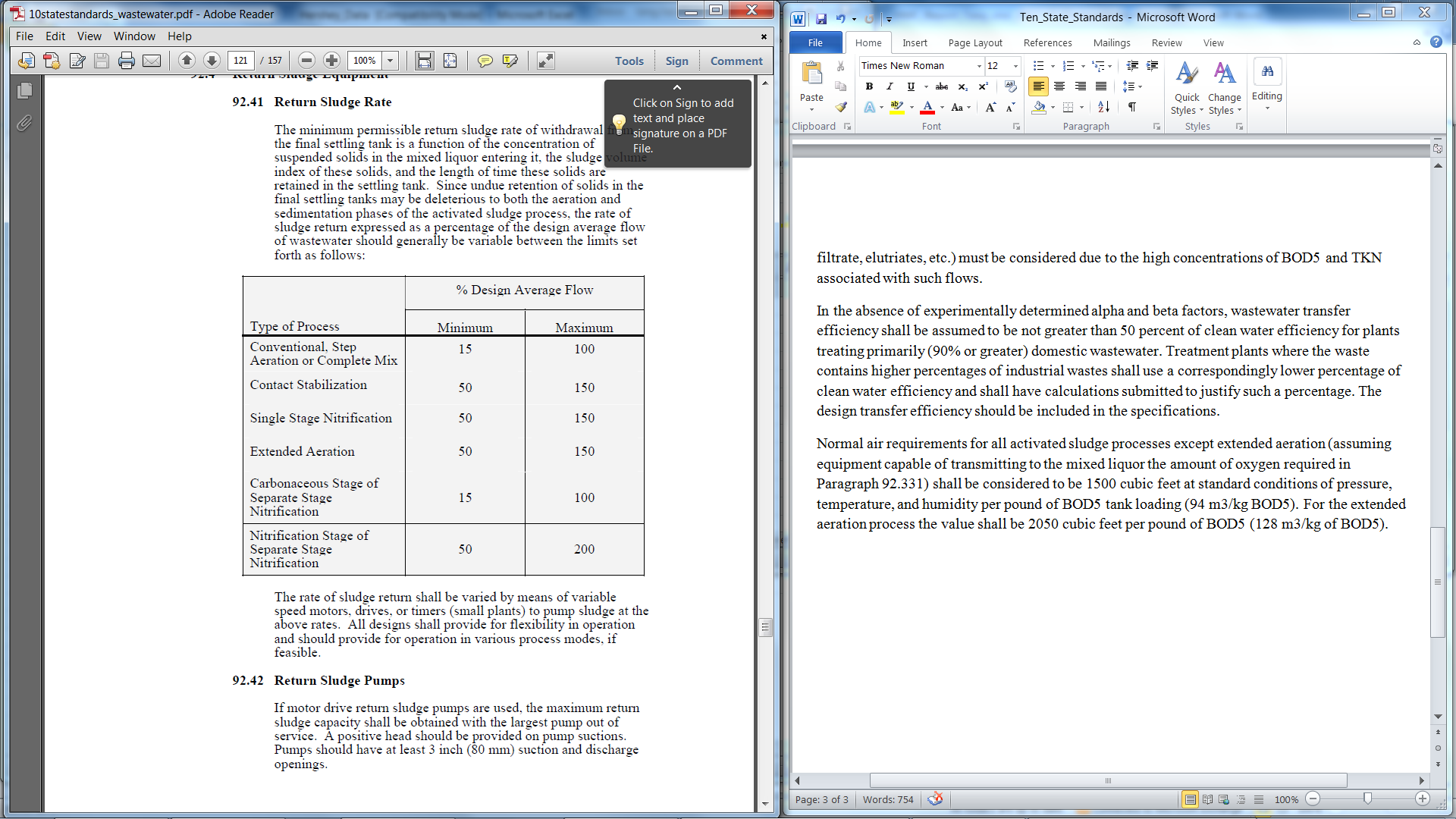
All aeration tanks should have a freeboard of not less than 18 inches (460 mm). However, if a mechanical surface aerator is used, the freeboard should be not less than 3 feet (0.9 m) to protect against windblown spray freezing on walkways, etc.

Aeration equipment shall be capable of maintaining a minimum of 2.0 mg/L of dissolved oxygen in the mixed liquor at all times and provide thorough mixing of the mixed liquor. In the absence of experimentally determined values, the design oxygen requirements for all activated sludge processes shall be 1.1 lb O2/lb design peak hourly BOD5 (1.1 kg O2/kg design peak hourly BOD5) applied to the aeration tanks, with the exception of the extended aeration process, for which the value shall be 1.5 to include endogenous respiration requirements.

Where nitrification is required or will occur, such as within the extended aeration process, the oxygen requirement for oxidizing ammonia must be added to the above requirement for carbonaceous BOD5 removal and endogenous respiration requirements. The nitrogenous oxygen demand (NOD) shall be taken as 4.6 times the diurnal peak hourly TKN content of the influent. In addition, the oxygen demands due to recycle flows (i.e., heat treatment supernatant, vacuum filtrate, elutriates, etc.) must be considered due to the high concentrations of BOD5 and TKN associated with such flows.

In the absence of experimentally determined alpha and beta factors, wastewater transfer efficiency shall be assumed to be not greater than 50 percent of clean water efficiency for plants treating primarily (90% or greater) domestic wastewater. Treatment plants where the waste contains higher percentages of industrial wastes shall use a correspondingly lower percentage of clean water efficiency and shall have calculations submitted to justify such a percentage. The design transfer efficiency should be included in the specifications.

Normal air requirements for all activated sludge processes except extended aeration (assuming equipment capable of transmitting to the mixed liquor the amount of oxygen required in Paragraph 92.331) shall be considered to be 1500 cubic feet at standard conditions of pressure, temperature, and humidity per pound of BOD5 tank loading (94 m3/kg BOD5). For the extended aeration process the value shall be 2050 cubic feet per pound of BOD5 (128 m3/kg of BOD5).



Sequencing batch reactors (PDF file page 122-124)

Disinfectant dosage

Trickling filter effluent, 10 mg/L  
Activated sludge plant effluent, 8 mg/L  
Tertiary filtration effluent, 6 mg/L  
Nitrified effluent, 6 mg/L

One hundred fifty pound (68 kg) cylinders are typically used where chlorine gas consumption is less than 150 pounds per day (68 kg/d). Cylinders should be stored in an upright position with adequate support brackets and chains at 2/3 of cylinder height for each cylinder.

The use of one-ton (907 kg) containers should be considered where the average daily chlorine consumption is over 150 pounds (68 kg).