

§23-APPENDIX A-1 STANDARDS FOR THE DESIGN OF PRIVATE SEWERS OR PRIVATE DRAINS

(a) *Standards for the design of private sewers or private drains.* All private sewers or private drains shall be designed in accordance with the standards and requirements of this rule and the department's most recent drainage design criteria. All design flow computations shall be made in accordance with the most recent zoning designations established by the city.

(b) *Sewer size.* The minimum Private sewer or Private drain sizes shall be 10" diameter for sanitary sewers or drains, 12" diameter for storm sewers or drains, and 15" diameter for combined sewers or drains. The following diameters shall be used for sewers up to 18": 10", 12", 15", 18". After 18", private sewer or private drain diameters shall increase in 6" increments to a maximum of 72".

(c) *Manning's Coefficient.* The Manning Coefficient 'n' for extra strength vitrified clay pipes, or precast reinforced concrete pipes, precast concrete box sewers, and ductile iron pipes, shall be $n = 0.013$. For poured-in-place box sections, the Manning's Coefficient shall be $n = 0.015$.

(d) *Depth of proposed private sewers or private drains.* The minimum depth of cover to the outer top of private sewers or private drains shall be 4.0 feet for storm sewers or drains, 10.0 feet for sanitary and combined sewers or drains, and 5.0 feet for force mains. In situations where the depth of cover to the outer top must be reduced, an absolute minimum of 3.5 feet for storm sewers or drains and 8.5 feet for sanitary and combined sewers or drains shall be maintained at all times. The maximum depth to the invert of the pipe shall not be greater than 18.0 feet.

(e) *Clearance.* The minimum net vertical clearance between the invert of storm sewers or drains and the inner top of sanitary sewers or drains shall be 2 feet. At street intersections where there are no site connections, the minimum net clearance between the outside of storm sewers or drains and the outside of sanitary sewers or drains shall be 6 inches.

(f) *Slopes and velocities.* Wherever possible, the slope of the private sewer or private drain should be approximately parallel to the ground surface. The slope of private sewers or private drains shall be computed, based upon mapped street lengths, to the nearest 0.01% generally and to the nearest 0.001% on very flat slopes. The minimum velocity for pipes flowing full shall be 3.0 feet per second (fps) for storm sewers or drains and combined sewers or drains. The minimum velocity for sanitary sewers or drains flowing full shall be 3.0 fps until a design flow of 0.7 cubic feet per second (cfs) is attained. After this quantity of flow has been reached, sanitary sewers or drains shall be designed according to the standard criteria for pipes flowing full with a minimum velocity of 2.5 fps. Maximum velocity for pipes flowing full shall be 15 fps. In no case shall the slope exceed 10%. In the case of very steep slopes, drop

manholes shall be provided so that the maximum velocity is within the allowable limits. The depth of drop in drop manholes shall be measured from the invert of the higher sewer or drain to the spring line of the lower sewer or drain. Specially constructed drop pipe manholes shall be used in situations where the drop is 4.0 feet or greater. Velocities shall be computed to the nearest 0.01 fps for velocities under 10 fps and to the nearest 0.1 fps for velocities greater than 10 fps.

(g) *Design capacity and depth of flow.* The Manning's formula shall be used to compute the capacity of proposed Private sewers or Private drains. The maximum design depth of flow in the sewer or drain shall be full for all circular and elliptical sewers or drains and 95% full for flat-top monolithic sections with a minimum freeboard of 3".

(h) *Sewer elevation at junctions.* Wherever possible, inside top elevations of private sewers or private drains should be matched at all junctions and manholes. For free discharge storm sewer or drain outlets, the inner top of the outlet sewer or drain shall be above the mean high water elevation. For free discharge sanitary sewers or drains, the inner top of the sanitary sewer or drain shall be no lower than the inner top of the intercepting sewer into which it outlets. Information pertaining to the mean high water elevation can be obtained from the records of the nearest tidal station. All parkways, highways, expressways, and the similar roadways within the area encompassed by the drainage plan shall be considered in the design. The drainage system within such areas and the sewer system into which it outlets shall be designed in accordance with the department's latest design criteria. Manhole losses shall not be considered in the design of private sewers or private drains. These losses are accounted for in the matching of inner tops and by designing the pipe flowing full. All private sewers or private drains shall be designed for open channel gravity flow.

[RETURN TO MAIN DEP RULES, STANDARDS AND FEE SCHEDULE PAGE](#)