

APPENDIX 8

EXCERPTS FROM STATE HEALTH REGULATIONS

Table 8.1
Sewage Flows

Discharge Facility	Design Units	Flow gpd	BODs #/day	S.S. #/day	Flow Duration Hour
Dwellings*	per person total	75	0.2	0.2	24
— Food Preparation		15			
— Toilet Facilities		20			
— Bathing Facilities		20			
— Hand Washing Facilities		5			
— Laundering		15			
Schools with showers and cafeteria	per person	16	0.04	0.04	8
Schools without showers and with — or without cafeteria	per person	10	0.025	0.025	8
Boarding Schools	per person	75	0.2	0.2	16
Motels at 65 gals/person (rooms only)	per room	130	0.26	0.26	24
Trailer Courts	per person	75	0.2	0.2	24
Restaurants	per seat	50	0.2	0.2	16
Interstate or through highway — restaurants	per seat	100-180	0.7	0.7	16
Interstate Rest Areas	per person	5	0.01	0.01	24
Service Stations	per vehicle serviced	10	0.01	0.01	16
Factories & Office Buildings	per person per 8 hr. shift	15-35	0.03-0.07	0.03-0.07	Operating Period
Shopping Centers	per 1000 ft. ² of ultimate floor space	200-300	0.1	0.1	12
Hospitals	per bed	300	0.6	0.6	24
Nursing Homes	per bed	200	0.3	0.3	24
Homes for the Aged	per bed	100	0.2	0.2	24
Doctors Office in Medical Center	per 1000 ft. ²	500	0.1	0.1	12
Laundromats, 9 to 12 # machines	per machine	500	0.3	0.3	16
Community Colleges	per student and faculty	15	0.03	0.03	12
Swimming Pools	per swimmer	10	0.001	0.001	12
Theaters, Drive-In Type	per car	5	0.01	0.01	4
Theaters, Auditorium Type	per seat	5	0.01	0.01	12
Picnic Areas	per person	5	0.01	0.01	12
Camps, Resort Day and Night — With limited plumbing	per camp site	50	0.05	0.05	24
Luxury Camps with flush toilets	per camp site	100	0.1	0.1	24
Dump Station	per camp site	50	0.05	0.05	24

*For all dwelling units the design shall be based on two (2) persons per bedroom

Commonwealth of Virginia Sewerage Regulations, Section 21.04.02-03

Peak Flow

1. ~~Laterals and Sub Mains~~

- a. ~~Lateral — a sewer that has no other common sewers discharging into it.~~
- b. ~~Sub main — a sewer that receives flow from one or more lateral sewers.~~
- c. ~~Minimum peak design flow shall be 400 percent of the average design flow. When deviations from the foregoing minimum peak design flow rates are proposed, a description of the procedure used for sewer design shall be included with the plans, along with justification for the deviation.~~

2. ~~Mains (trunks) and Intereceptors~~

- a. ~~Main or trunk — a sewer that receives sewage flow from one or more sub-main sewers.~~
- b. ~~Interceptor — a sewer that receives sewage flow from a number of gravity mains, trunk sewers, sewage force mains, etc.~~
- c. ~~Minimum Peak Design Flow shall be 250 percent of the average design flow. When deviations from the foregoing minimum peak flows are proposed, a description of the procedure used for sewer design shall be included with the plans, along with justification for the deviation.~~

Streams, Estuaries, Lakes and Reservoirs

1. — The tops of all sewer lines entering or crossing streams shall be at a sufficient depth below the natural bottom of the streambed to protect the sewer line. In general, one foot of suitable cover shall be provided where the stream is located in rock and three feet of suitable cover in other material. Less cover will be considered if the proposed sewer line crossing is encased in concrete and will not interfere with future improvements to the stream channel. Reasons for requesting less cover shall be submitted with the plans. In paved channels, the top of the sewer lines should be placed below the bottom of channel pavement. Sewers shall not be located within the 25-year flood plain. Water tight manhole lids shall not be used.

2. — Sewers entering or crossing the streams shall be constructed of watertight pipe. The pipe and joints shall be tested in place, shall exhibit "Zero" infiltration or leakage, and shall be designed, constructed and protected against anticipated hydraulic and physical, longitudinal, vertical and horizontal loads and erosion and impact. Sewers laid on piers across ravines or streams shall be allowed only when it can be demonstrated that no other practical alternative exists.

Such sewers on piers shall be constructed in accordance with the requirements for sewers entering or crossing under streams. Construction methods and materials of construction shall be such that sewers will remain watertight and free from change in alignment or grade.

Hampton Roads Regional Sewage Flow Projection Data

V 2.0 April 21, 2008

Discharge Facility	Contributing Design Units	Flow gpd/Unit	Flow Duration hours	Peak Factor
Dwellings	Per Residential Unit	310	24	2.5
Schools	Per Person	10	8	3
Boarding Schools	Per Person	75	16	3
Motels & Hotels	Per Room	130	24	3
Trailer courts, Apartments, Condos, Townhomes, & Time Shares	Per Unit	310	24	2.5
Restaurants (including fast food)	Per Seat	30	16	3
Service Stations	Per Gross SF	0.4	16	3
Shopping Centers	Per Gross SF	0.2	12	3
Hospitals	Per Bed	300	24	3
Nursing Homes/Assisted Living	Per Bed	160	24	3
Doctor's offices in medical centers	Per Gross SF	0.25	12	3
Laundromats	Per Machine	500	16	3
Community colleges	Per Student & Faculty	10	12	3
Theaters (auditorium type)	Per Seat	2.5	12	3
Picnic areas	Per Person	5	12	3
Camps, resort day & night w/limited plumbing	Per Site	50	24	3
Luxury camps w/flush toilets	Per Site	100	24	3
Warehouse	Per Gross SF	0.05	24	3
Convenient Store	Per Gross SF	0.3	24	3
Office Building	Per Gross SF	0.1	12	3

Fitness Center	Per Gross SF	0.1	16	3
Religious Assembly	Per Seat in Main Assembly Room	2.5	6	3
Heavy Industrial	Per Gross SF	0.35 ⁽¹⁾	16	3
Light Industrial	Per Gross SF	0.1 ⁽¹⁾	16	3

(1) The stated flow per day per unit is provided as a guide and should only be used if known data for similar heavy or light industrial facilities is not available.

For undeveloped property zoned *other than residential*, average daily flows may be projected at a rate of 1,000 gpd per acre. Consideration should be given to designated wetlands and Chesapeake Bay Preservation Act Resource Protection Areas which should be excluded from the gross acreage. A peaking factor of 3 shall be used.

For undeveloped property zoned *residential*, average daily flows may be projected at a rate of 310 gpd per unit based on the zoning density. A peaking factor of 2.5 shall be used.

Flow duration should be taken into account for the design of on-site infrastructure and when discharging into Publicly owned force mains, but need not be considered for downstream publically owned gravity collections systems. Additionally, the SCAT Regulations require a peaking factor of 4 be applied to the average daily flow when designing laterals and submains. For example in designing an *on-site sewer lateral* or an *on-site/private pump station* for a shopping center that has a gross square footage of 7,500 SF the flow duration should be applied as follows:

$$7,500 \text{ SF} \times 0.20 \text{ gpd/SF} = 1,500 \text{ gpd}$$

$$1,500 \text{ gpd} / (12 \text{ hr duration day} \times 60 \text{ min/hr}) = 2.08 \text{ gpm}$$

$$2.08 \text{ gpm} \times 4 \text{ (peak factor per SCAT Regulations)} = 8.32 \text{ gpm}$$

Sound engineering judgment must be used in all applications of these flow projection guidelines.

(09/08)