

**Proposed Amendment to Chapter 10 (Sewage and Solid Waste Disposal)
of
the Public Facilities Manual**

Amend Chapter 10 (Sewage and Solid Waste Disposal) List of Plates to read as follows:

Standard Designation	Plate No.	Description	Section
N/A	1-10	Peak Flow Curve 0.0 to 1.0 MGD	10-0102.4B
N/A	2-10	Peak Flow Curve 1.0 and Greater MGD	10-0102.4B
DPW-15	3-10	Typical 4' ID Precast Concrete Manhole	10-0102.5D(7)
DPW-16	4-10	Typical 5' and 6' Diameter Precast Concrete Manhole with 4' Stack	10-0102.5D(7)
DPW-17	5-10	Precast Concrete <u>Cut-In</u> Manhole Doghouse Base	10-0102.5D(7)
DPW-18	6-10	Precast Concrete Manhole Flat Top	10-0102.5D(7)
DPW-20A	7-10	<u>Manhole Adjustment Rings</u> Typical Alternate 4' ID Block or Brick Manhole for Existing Pipes of 21" Maximum	10-0102.5D(7)
DPW-21	8-10	Standard Roadway Frame	10-0102.5D(7)
DPW-21A	9-10	Standard Roadway Manhole Cover	10-0102.5D(7)
DPW-22	10-10	Watertight/Locking Manhole Frame	10-0102.5D(7)
DPW-23	11-10	Watertight Manhole Cover	10-0102.5D(7)
N/A	12-10	Bolted Manhole Cover	10-0102.5D(7)
DPW-24	13-10	Manhole Step Detail	10-0102.5D(7)
DPW-19	13A-10	Precast Concrete Manhole Reducer	10-0102.5D(7)
DPW-25B	14-10	Typical <u>45'</u> <u>ID</u> Manhole with Inside Drop Connection	10-0102.5E
DPW-6	15-10	Typical Trench Construction Pipe Bedding – Alternate "A" (Contractor's Option)	10-0103.7
DPW-6	16-10	Typical Trench Construction Pipe Bedding – Alternate "B" (Contractor's Option)	10-0103.7
DPW-7	17-10	Typical Trench in Rock	10-0103.7
DPW-10	18-10	<u>House Service</u> Lateral (Spur)	10-0104.5
DPW-11	19-10	<u>House Service</u> Lateral Construction Detail	10-0104.5
RG-1	20-10	Hole in Pipe Above Springline	10-0104.7E(1); 10-0104.7C
RG-2	21-10	Hole in Pipe Below Springline	10-0104.7E(2)
RG-2	22-10	Pipe with Crack or Shear	10-0104.7E(3)
RG-3	23-10	Crushed Section of Pipe and Slipped or Leaking Joint	10-0104.7E(4); 10-0104.7E(5)
N/A	24-10	Sewer Test Plug	10-0105.5B
DPW-12	25-10	Highway Crossing Jacking and Boring/Tunnel Details	
DPW-13	26-10	Highway Crossing Jacking and Boring/Tunnel Details	
DPW-14	27-10	Steel Casing Pipe/Tunnel Detail	
DPW-15	28-10	Trash and Recycling Pad for Two Dumpsters	10-0306.6

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0102 (General and Hydraulic), Subsection 10-0102.3 (Tributary Population), by revising Paragraph 10-0102.3B to read as follows:

- A. Trunk (main) and subtrunk (submain) sewers must be designed on the basis of the adopted Comprehensive Plan densities and/or zoning, whichever is greater, unless the Board approves otherwise. Design analysis must be provided for all trunk and subtrunk sewers as defined by the Virginia Sewage Collection and Treatment Regulations and when required by DPWES, Wastewater Management, for collecting sewers.

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), by revising Table 10.1 (Average Design Flows for Development Types) to read as follows:

Table 10.1 Average Design Flows for Development Types	
Type of Development	Design Flow (GPD)
Residential:	
General, <u>Mixed-use and Planned Developments</u>	100/person
Single family detached	370 350/residence
Single family attached	300 280/unit
Multifamily	300 280/unit
Commercial:	
General	2,000/acre
Motel	130/unit
Office	30/employee
	0.20/net ft ²
Industrial:	
General	10,000/acre
Warehouse	600/acre
Varies with type of industry	
School Site:	
General	16/student

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0102 (General and Hydraulic), Subsection 10-0102.4 (Sewage Flow), by revising Paragraph 10-0102.4B to read as follows:

- B. Sewers must be designed to carry a peak flow when full as determined from applying the appropriate peak flow factor to the average flow. (See Plates 1-10 and 2-10.) No separate allowance for infiltration will be required. Other peak

flow factors may be approved by the Director based on factors such as long-term flow metering data, age of the sewer, and types of development within the sewer shed.

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0102 (General and Hydraulic), Subsection 10-0102.5 (Location of Sewers and Manholes), Paragraph 10-0102.5A, by revising Subparagraphs 10-0102.5A(1), (6), and (7) and adding Subparagraph 10-0102.5A(8) to read as follows:

1. In order to reduce the number of manholes in curvilinear streets, manholes must be located within the pavement area but beyond the allowable spread of stormwater gutter flow except where reverse curb and gutter is used, and a minimum of 6 feet of clear separation from edge to edge between the sanitary sewer manholes and ~~water~~, storm and gas pipes must be provided.
6. Design of sanitary sewer lines should honor natural drainage patterns or topography and must be of sufficient depth to provide gravity flow to serve the basement/lowest floor of dwellings and buildings. Manhole depths may not exceed 16 feet and pipe depths may not exceed 18 feet without approval of the Director. When extenuating circumstances are thought to exist by the applicant to allow manhole depths greater than 16 feet, such as crossing under natural or man-made features (e.g., highways, railroads or bodies of water) or making connections to proposed or existing systems in which the applicant considers good engineering practice to dictate a modification of this standard, specific approval must first be obtained from the Director. In considering such a modification requests, the Director may consider safety concerns, maintenance considerations, soil conditions, construction material to be used, and the availability of other feasible alternatives. The Director may require a larger diameter manhole or larger easement on a case by case basis.
7. The installation of sanitary sewer is ~~PVC and reinforced concrete pipe may not be permitted at depths exceeding 18 feet~~ without approval by the Director in accordance with § 10-0102.5A(6). Ductile iron pipe or ~~PVC DR 14~~ is required where sewer depths exceed 18 feet and must be installed from manhole to manhole.
8. Manholes installed on existing sewers must be cut-in in accordance with Plate 5-10.

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0102 (General and Hydraulic), Subsection 10-0102.5 (Location of Sewers and Manholes), by revising Paragraph 10-0102.5C to read as follows:

- C. Sanitary sewers should not be located closer than 15 feet from existing or proposed buildings and 5 feet from the loading plane of building foundations. Proposed sanitary sewers may not be located under retaining walls.

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0102 (General and Hydraulic), Subsection 10-0102.5 (Location of Sewers and Manholes), Paragraph 10-0102.5D, by revising Subparagraphs 10-0102.5D(3) and (5) to read as follows:

D. Manholes for access to sewers must be provided:

1. At all intersections of sewers that are 27 inches in diameter or smaller; and
2. At all points of change in alignment; and
3. At all changes in grade and diameter; and
4. At points of industrial discharge if required by [DPWES](#) to facilitate observation and sampling; and
5. Within 10 feet (centerline to centerline) of any connection to a 30-inch diameter sewer or larger, and any connection to an 8-inch diameter lateral or larger; and
6. At the terminal of the line; and
7. At intervals not exceeding 400 feet on all sewers 15 inches in diameter or less and not exceeding 500 feet apart on all sewers larger than 15 inches in diameter (see [Plates 3-10](#) through [13-10](#)).

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0102 (General and Hydraulic), Subsection 10-0102.5 (Location of Sewers and Manholes), by revising Paragraph 10-0102.5E and Subparagraphs 10-0102.5E(1) and 10-0102.5E(1)(b) to read as follows:

- E. When it is necessary to drop the elevation of the sewer at a manhole due to unusual circumstances such as bad soil, rock, high water table, utility conflicts or excessive depths, an 5-foot diameter manhole with an inside drop connection is required. (See [Plate 14-10](#)). Any drop connection for a sewer line diameter of 15 inches or greater requires a special design to be approved

by [DPWES](#). The maximum difference in elevation permitted between the influent and effluent lines in a standard manhole will be 6 inches.

1. Typical 5 foot ~~4-foot~~ Manhole with Inside Drop Connection – Special Notes:
 - a. Chamfer on all pipe sizes to be at a 15-degree angle.
 - b. ~~Vertical stacks 10 inches and larger in diameter require a minimum 5-foot diameter manhole.~~

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0102 (General and Hydraulic), Subsection 10-0102.5 (Location of Sewers and Manholes), by revising Paragraph 10-0102.5I to read as follows:

- I. All sanitary sewer manholes or appurtenances subject to infiltration of surface water must be provided with a County standard watertight manhole frame and cover, which must be shown on the plans. Should actual field conditions require it, however, alterations may be permitted. Wherever manholes are constructed in unmaintained areas, those manholes must be raised above the finished grade by at least one foot and grade the surrounding area to drain away from the manhole.

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0102 (General and Hydraulic), Subsection 10-0102.11 (Abandonment and Removal of Existing Sewer), Paragraph 10-0102.11D, by revising Subparagraph 10-0102.11D(1) to read as follows:

- D. The Director may approve the abandonment in place of unused sanitary sewer lines and manholes. Sanitary sewer lines and manholes to be abandoned in place in lieu of being removed must be treated as follows:
 1. All sewer lines must be filled with grout and the ends plugged with masonry or other method approved by the Director.

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0103 (Structural), by deleting Subsection 10-0103.7 (Maximum Permissible Depth) and Table 10.5 to read as follows:

~~10-0103.7 — Maximum permissible depth. The maximum permissible depth of cover for sewer pipes of various classifications allowed must be determined by [Table 10.5](#) (See [Plates 15-10](#) through [17-10](#)).~~

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0103 (Structural), Subsection 10-0103.8 (Permitted Materials), by revising Paragraph 10-0103.8A to read as follows:

- A. Permitted sanitary sewer pipe materials include: ~~Reinforced Concrete Pipe,~~ Ductile Iron (minimum thickness class 51), Polyvinyl Chloride (minimum PVC DR 25 ~~SDR-35~~). For pipe materials required where sewer depths exceed 18 feet, refer to [§ 10-0102.5A\(7\)](#).

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0103 (Structural), Subsection 10-0103.8 (Permitted Materials), Paragraph 10-0103.8C (Special Installation Details – PVC Pipe), by revising Subparagraphs 10-0103.8C(1) through (7) to read as follows:

1. Pipe and Fitting Material: PVC sewer pipe and fittings must be ~~SDR-35 DR 25~~ wall thickness conforming to [ASTM Standard D 3034-89](#) in sizes 8 inches through 15 inches and [ASTM Standard F 679-89](#) in sizes 18 inches through 27 inches and comply with the requirements in [AWWA C900-16](#) for PVC water distribution pipe.
2. Joints: PVC pipe and fitting joints must be gasketed conforming to [ASTM Standard D3212-92](#). Integral bell joint systems must conform to [ASTM D3139](#). Gaskets must conform to [ASTM Standard F 477-90](#).
3. Fittings: PVC fittings of 8 inches in sizes from 4" to 12" must be molded in one piece meeting [ASTM D1784](#) and [AWWA C907](#). Fittings in sizes 10 inches through 27 inches must be fabricated in accordance with [ASTM Standard D 3034-89](#).
4. Installation: PVC pipe and fittings must be installed in accordance with [AWWA C605](#) [ASTM Standard D-2321](#), except as modified in the PFM.
5. Pipe Stiffness: Minimum pipe stiffness must be 46 psi at maximum 5 percent deflection when tested in accordance with [ASTM D-43.6](#).
6. In Place PVC Pipe Deflection Testing: Where soil conditions, installation procedures, or TV inspections warrant, manhole to manhole deflection testing may be required at the request of the County. Maximum allowable pipe deflection is 7-1/2 percent.
7. Deflection tests must be accomplished by the use of a multi-arm "go/no go" mandrel. Exact method of testing procedure shall ~~shall~~ must be as per [ASTM D3034-85b](#).

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0103 (Structural), Subsection 10-0103.8 (Permitted Materials), by adding Paragraph 10-0103.8D and Subparagraph 10-0103.8D(1) to read as follows:

D. Special Installation Details – DIP Pipe

1. Ductile Iron Pipe (DIP) must be centrifugally cast for water distribution in accordance with the latest [ANSI A21.51/AWWA C 151](#). Joints must be push-on bell and spigot type in accordance with the latest [ANSI A21.11/AWWA C 111](#). All proposed DIP must have an approved lining to resist corrosion.

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0104 (Preparation of Plans), by revising Subsection 10-0104.2 (Construction Drawings) and Paragraphs 10-0104.2B and E to read as follows:

10-0104.2 Construction Drawings. ~~Six prints of the p~~ Plans and design analysis for all sewers of the sanitary sewer installation to be installed in a subdivision as prepared by a PE or LS, must be submitted to the [Site Development and Inspections Division, LDS](#), for approval. Such plans must be in conformance with the foregoing design criteria and show the following information:

- B. A general layout must be provided, showing streets, lots, easements and sanitary sewer location, on-site and off-site. Scale is to be used which will allow all information to be shown on one sheet.
- E. The horizontal scale for profiles must be the same as that used for the plan, but in no case be smaller than 1 inch = 100 feet. The vertical scale may not shall in no case be smaller than 1 inch = 10 feet.

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0104 (Preparation of Plans), Subsection 10-0104.2 (Construction Drawings), Paragraphs 10-0104.2L (Sanitary Sewer General Notes), by revising Subparagraphs 10-0104.2L(7), (9), and (11) to read as follows:

7. Ram-Nek ~~Pioneer 301-Mastic~~ Plastic Gasket, or approved equal, must be used under all types of manhole frames not subject to HS-20 loading.
9. Products which meet or exceed the performance of Ram-Nek ~~Pioneer 301~~ Plastic Gasket must be used on the outside of the joint on all manholes between the manhole frame and cone section to provide a water-tight seal.
11. Concrete, polypropylene or high-density polyethylene adjustment rings must be used when adjustment to the precast manhole top elevation

exceeds 2 inches per Plate 29-10. External chimney seals must be provided when using adjustment rings. Non-shrink grout with full bearing metal or masonry shims may be allowed for final slope adjustment. Total adjustment must not exceed 12 inches.

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0104 (Preparation of Plans), Subsection 10-0104.7 (Certificate to Operate), by revising Paragraph 10-0104.7B to read as follows:

- B. Structural ~~repairs~~ damages to pipe (i.e., holes, crushed or slipped joints), ~~required~~ discovered as a result of TV inspection, will require replacement of the affected pipe segment. ~~must be made in accordance with the guidelines prepared by Wastewater Management, (WWCD) and § 10-0104.7C et seq.~~ Location and type of repair must be noted on the WWCD copy of the TV report (PVC SDR 35 ~~is covered by manufacturer's specifications~~).

Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0104 (Preparation of Plans), Subsection 10-0104.7 (Certificate to Operate), by deleting Paragraphs 10-0104.7C through 10-0104.7F(4) as follows:

~~C. Repair Situations:~~

- ~~1. Hole in pipe above spring line~~
- ~~2. Hole in pipe below spring line~~
- ~~3. Pipe with shear crack or full break~~
- ~~4. Crushed section or sections of pipe~~
- ~~5. Slipped or leaking joints~~

~~D. Repair Definitions:~~

- ~~1. Hole in pipe above spring line. A hole in that portion of the pipe located in the area above the centerline of said pipe, and not to exceed 3 inches as measured in any direction.~~
- ~~2. Hole in pipe below spring line. A hole in that portion of the pipe located in the area below the centerline of said pipe.~~
- ~~3. Pipe with shear crack or full break. A structural defect in a pipe from a hairline crack to a full break induced by ground settlements or compressive hoarding and in a general vertical plane.~~

4. ~~Crushed section or sections of pipe. A partial or total structural collapse of the pipe, a portion of pipe with an area exceeding that defined as a hole (see [§ 10-0104.7D\(1\)](#)).~~
5. ~~Slipped or defective joints. An open joint, misalignment of joint, damaged joint or dropped joint.~~

E. ~~General Repair Guidelines for Asbestos Cement (AC) and Concrete Pipe~~

1. ~~Hole in pipe above spring line. A repair of this nature by the use of a clamp as specified by the County under the criteria of application will be an acceptable means of repair (See [Plate 20-10](#)).~~
2. ~~Hole in pipe below spring line. A repair of this nature will be done by the replacement of such pipe as required (see [Plate 21-10](#)).~~
3. ~~Pipe with shear crack or full break. Repair of a shear crack or full break in a pipe by the use of a clamp as specified by the Director under the criteria of application will be an acceptable means of repair (see [Plate 22-10](#)).~~
4. ~~Crushed section or sections of pipe. Repair of crushed section or sections of pipe will be done by the replacement of such pipe (see [Plate 23-10](#)).~~
5. ~~Slipped or leaking joints (see [Plate 23-10](#)).~~
 - a. ~~Repair of slipped joints may be done by a mechanical means such as jacking, in order to properly realign same. Such excavation will be carried out as required to afford the proper protection to the line while the repair is being made.~~
 - b. ~~Repair of leaking joints may be made by an approved grouting method as specified by the Director.~~
6. ~~When a stainless steel band (clamp) is used for any repairs or collar replacement, it must be no less than 12 inches in width.~~
7. ~~When repairing a sewer line by replacing a section of the pipe, stainless steel bands must be used. The gap in the joint connection may not exceed $\frac{3}{4}$ inch.~~

F. ~~Location of Repairs~~

1. ~~Location of sanitary sewer pipe repairs will be reported to the [Wastewater Collection Division, DPWES](#), to be made part of the as-built records.~~

- ~~2. Location of each repair will be measured from the manhole on each side of the repair.~~
- ~~3. The type of repair situation will be noted.~~
- ~~4. When pipe is required to be removed and replaced, the length and number of repair clamps used will be noted.~~

Amend Chapter 10 Plates by revising Plate 3-10 (Typical 4'-0" ID Precast Concrete Manhole), Plate 4-10 (Typical 5'-0" & 6'-0" Diameter Precast Concrete Manhole With 4'-0" Stack), Plate 10-10 (Watertight/Locking Manhole Frame), Plate 14-10 (Typical 5' ID Manhole With Inside Drop Connection), Plate 15-10 (Typical Trench Construction Pipe Bedding – Alternate "A" (Contractor's Option)), Plate 16-10 (Typical Trench Construction Pipe Bedding – Alternate "B" (Contractor's Option)), Plate 17-10 (Typical Trench In Rock), Plate 18-10 (Service Lateral (Spur)), and Plate 19-10 (Service Lateral Construction Detail), by deleting Plate 5-10 (Precast Concrete Manhole Doghouse Base), Plate 7-10 (Typical Alternate 4'-0" ID Block Or Brick Manhole For Existing Pipes Of 21" Maximum), Plate 20-10 (Hole In Pipe Above Springline), Plate 21-10 (Hole In Pipe Below Spring Line), Plate 22-10 (Pipe With Crack Or Shear), Plate 23-10 (Crushed Section Of Pipe And Slipped Or Leaking Joint), Plate 25-10 (Jacking And Boring/Tunnel Details), and Plate 26-10 (Jacking And Boring/Tunnel Details), and by adding Plate 5-10 (Precast Concrete Cut-In Manhole) and Plate 7-10 (Manhole Adjustment Rings) as follows: