

5. Appendices

5.1 Appendix A - Water Meter Sizing

- A. Determine the number and type of water fixtures needed and list on following form as appropriate.
- B. Determine the combined fixture value. Multiply the fixture values times the number of fixtures to obtain the Total Fixture Value for each type. Add all total fixture values and place answer in the space provided on the form.
- C. All other demands not listed in the sizing form shall be substantiated with data furnished by the Applicant's Engineer or his agent. If it is necessary to have a fixed demand or an irrigation demand, Applicant's Engineer or his agent must include information, in the appropriate location, on the water meter sizing form.
- D. In completing the water meter sizing form, all water demands necessary for the building(s) or its intended use must be included. When fixed flows are to be combined with flows determined by fixture values, the following procedures shall be utilized. Convert fixture values to flow using figure 4.4 or 4.5 from AWWA M22. Add the fixed flow with the flow determined from fixture values to determine total flow. Using figure 4.4 or 4.5 from AWWA M22, convert the total flow back to fixture units. Size the meter based on the County's meter sizing policy.
- E. The meter size necessary to serve a structure shall be determined on the basis of a fixture count. The fixture count to meter size equivalency is as follows:

<u>Meter Size</u>	<u>Fixture Count Value</u>
5/8"	0 - 50
1"	51 - 100
1-1/2"	101-250
2"	251 - 600
3" and larger	By Professional Engineer.

Meters three inches (3") and larger shall be sized by a licensed Professional Engineer. Meter sizing shall be in accordance with the requirements AWWA M22.

Water and Sewer Design and
Construction Manual
October, 2018

Department of Utilities, Spotsylvania County, Virginia
Fill in all spaces

Customer _____ Address _____

Building Address _____ Type of Occupancy _____

Development Name _____ Tax Map No. _____ Parcel No. _____

Applicant _____ Signature _____

Title/Company _____ Daytime Phone # _____

I certify that the information on this form is true and correct.

Applicant's Signature: _____

<u>Fixture</u>	<u>Fixture Value @ 35 psi</u>		<u>No. of Fixtures</u>	<u>Fixture Value</u>
Bathtub	8	x	_____	= _____
Bedpan Washers	10	x	_____	= _____
Combination Sink and Tray	3	x	_____	= _____
Dental Unit	1	x	_____	= _____
Dental Lavatory	2	x	_____	= _____
Drinking Fountain	1	x	_____	= _____
	- Cooler	1	x	_____
	- Public	2	x	_____
Kitchen Sink	- 1/2" Connection	3	x	_____
	- 3/4" Connection	7	x	_____
Lavatory	- 3/8" Connection	2	x	_____
	- 1/2" Connection	4	x	_____
Laundry Tray	- 1/2" Connection	3	x	_____
	- 3/4" Connection	7	x	_____
Shower Head (Shower Only)	4	x	_____	= _____
Service Sink	- 1/2" Connection	3	x	_____
	- 3/4" Connection	7	x	_____
Urinal	- Pedestal Flush Valve	35	x	_____
	- Wall Flush Valve	12	x	_____
	- Trough (2 Ft. Unit)	2	x	_____
Wash Sink (Each Set of Faucets)	4	x	_____	= _____
Water Closet	- Flush Valve	35	x	_____
	- Tank Type	3	x	_____
Dishwasher	- 1/2" Connection	4	x	_____
	- 3/4" Connection	10	x	_____
Washing Machine	- 1/2" Connection	5	x	_____
	- 3/4" Connection	12	x	_____
	- 1" Connection	25	x	_____
Hose Connection (Wash Down)	- 1/2"	6	x	_____
	- 3/4"	10	x	_____
Hose (50 Ft. Wash Down)	- 1/2"	6	x	_____
	- 5/8"	9	x	_____
	- 3/4"	12	x	_____
Other: _____	_____	x	_____	= _____
Combined Fixture Value Total	= _____			

5.2 Appendix B – Utilities Site Plan Checklist

The Applicant must submit a copy of this checklist, included with the County’s Site Plan Application, with a certification that the plans reflect all applicable items on the checklist. The Utilities checklist is not all-inclusive, merely representative of items that are routinely improperly submitted or otherwise selected by the Department of Utilities for your convenience. Use of the checklist does not relieve the Applicant from complete compliance with all of the standards and requirements shown in this Manual, whether or not reflected on the checklist.

DATE: _____

CHECKED BY: _____

PROJECT NAME: _____

PROJECT LOCATION: _____

PLANS PREPARED BY: _____

<u>Reference</u>	<u>Completed</u>	<u>Item</u>
1.3	_____	Site Plan complies with County Water/Sewer Master Plan
1.3	_____	Infrastructure Master Plan for development/subdivision
1.5	_____	Adjoining properties have access to utilities either by easement or by water/sewer main extension to the property line
2.1	_____	Water / sewer main size and material indicated on plan and profile
2.2.6.4	_____	Ensure restraints are shown on the profile view
2.2.7.7	_____	Check static pressure of nearest hydrant, state if PRVs will be required
2.2.7.3	_____	Calculate fire flow availability at site maintaining 20 PSI in zone or influence area
2.2.4.6	_____	No blow-off or air release valve if possible use fire hydrants
2.2.2	_____	Waterline depths of cover
2.3.2	_____	Sewer line depths and lateral depths versus pipe type
1.7	_____	Utility easement shall be “20' Public Utility Easements”
1.7	_____	All joint combined water and sewer easements shall be noted as “35' Public Utility Easements”
	_____	“Public Utility Easements” are separate from other utilities.
	_____	No private force-mains shall be in public utility easements or State R.O.W.
2.1	_____	Existing line sizes and location shown
2.1	_____	Proper connections to existing utilities
Article II	_____	Sprinkled buildings have Dedicated Hydrant, FDC and PIV shown
2.1	_____	Water service location, size and material indicated
2.1	_____	Proposed meter(s) location and size indicated
4.3.12, 4.3.13	_____	Proposed meter barrel/vault size shown
2.2.4	_____	Correct barrel/vault detail provided

Article II		Fire hydrants (600' - 800' max spacing residential, see Article 2 for others).
Article II		Fire hydrants (300' – 500' max spacing commercial, see Article 2 for others).
Article II		Adequate access to hydrant for emergency apparatus - avoid location of fire hydrants along shoulders
2.2.7.4		Water mains shall be looped whenever feasible
2.2.7.4		Avoid dead end lines or place demand (meter) towards end of line
2.1		Services provided to all existing and proposed lots or parcels.
2.1		All valves, tees, bends, hydrants, etc. are labeled and stationed
2.2.4.3		Valves spaced less than 800' intervals
3.4.2.11		Valve boxes outside pavement shall have tops set to the finish grade with concrete collars
2.3.4		Cleanouts in paved areas need to be traffic rated
2.2.4.3		Tees must have at least 2 gate valves provided
2.2.4.3		Crosses must have at least 3 gate valves provided (Crosses Not Preferred)
3.4.2.14		Deflection of waterline does not exceed design radius
2.1		Bend dimensions are clearly shown (degree or inches) and restrained
2.2.7.6		3/4" minimum service line for single family ("K" Copper)
2.2.1		Water lateral and sewer lateral minimum 10' separation.
2.2.6.2.1		All water mains either 12 inches (12") and greater in diameter or under paved areas shall be constructed of Ductile Iron Pipe
4.3.1.1, 4.4.2.2		The minimum pressure class for C-900 PVC is DR14
2.2.4.6		Flushing hydrants provided at all low points
2.2.4.6		Air release hydrants provided at high points
2.1		Scale provided, plan and profile (horizontal/vertical)
2.3.1		Special protection for water mains located under sewer mains
2.2.6.3		Special protection for water mains near known corrosive soil areas
2.2.7		Hydraulic Report submitted and meets requirements
3.4.2.4, 4.3.7		Water meter services using a corporation stop or gate valve (No corporation stops over 1")
5.1		Meter sizing worksheets submitted, match construction drawings
2.1		Sewer services stationed and labeled
2.1		Existing sewer main shown and labeled
2.1		Existing sewer manhole connection indicated
2.1		Upstream manhole rim elevation needs to be lower than finish floor elevation
2.1		Manholes shown and properly numbered
2.3.3		Sewer line "Invert In" and "Invert Out" shall be at 90 degrees or greater
3.3.3.1		Sanitary manhole - stub provided for future extension (Including Easement)
2.2.6.4		Retrained waterline plug and valve provided for future extension (Including Easement)

2.3.3		Commercial properties under Sewage Use/Pretreatment Ordinances have a monitoring manhole or grease trap when needed
		Open drains shall not discharge into sanitary sewer (roof required for dumpster pads)
		Floor drains for automotive shops shall have oil/water separator and sand traps.
2.3.7		Pump station - requires specific approval. Considered complex
		No common force-mains allowed
2.1		Each parcel has separate water and sewer services
		Maximum separation between manholes, 400' if 15" or less, 600' if > 15"
2.3.3		Manholes in floodplains have watertight lids
2.3.3		Manholes over 16-ft in depth shall be 60-inch (60")
2.3.3		Sanitary house connection/lateral min. 4" with a clean out at property line
2.3.4		Cleanouts need to be provided at edge of easements and property lines
2.3.4, 3.3.3.3		Laterals between the main and our cleanout shall have a minimum slope of 2.08%
2.3.4		Minimum basement elevation shown
2.1		Sewer line size and material indicated, including percent slope.
2.1		No sewer line shall exceed 18% slope (Less than 11% desired)
2.3.1		PVC - minimum depth 48"
		DIP - required: low cover (2.3.2), boring (2.3.1), conflicts (2.3.1), and stream crossings (2.3.1).
2.3.1, 2.3.2		Stream crossings are consistent with Standards Detail for Stream Crossings
2.3.1		Minimum slopes met (refer to specifications - 8" - 0.4%; 10" - 0.28%)
2.3.6		No sewer line shall be upsized to reduce slope requirements
2.3.6		Drop connections must be identified (Required for drops larger than 2-ft)
2.3.3		Two or more drop connections require a 60-inch manhole
2.3.3		Inverts given for all lines, stubs and manholes (minimum 0.1' and Rim elevation indicated)
2.1		Stormwater pipe clearance, material, and separation
2.3.1, 2.2.1		Check cover on existing utilities
2.2.2, 2.3.1		Laterals must be a minimum of SDR 26 or PVC Schedule 40
2.3.4		The average and maximum day usage (GPD) needs to be shown on the plans for each building.
2.2.7.1		The length of both water (each size) and sewer needs to be shown on the title page.
2.2.7.1		Note if CTC/CTO will be required
1.4		Updated water and sewer notes added to plan sheet
5.3		

Certification:

Date: _____

Engineering Firm: _____

Engineer's Name: _____

(Printed)

(Signature)

5.3 Appendix C – Spotsylvania County Standard Water and Sewer Notes

1. All public water and sewer utility infrastructure included with this approved plan shall comply with the 2018 version of the Spotsylvania County Department of Utilities Water and Sewer Design and Construction Standards Manual.
2. When the Spotsylvania County Water and Sewer Design and Construction Standards contain a project category in the approved materials and manufacturers list, only those products specifically listed may be used.
3. All changes to the approved construction plans must be approved in advance by the Utility Department.
4. All water lines up to 10" diameter may be Class 200 C900 (SDR 14) Poly-Vinyl Chloride (PVC) pipe or zinc coated ductile iron. All water lines 12" and larger or where indicated shall be Class 52 Zinc Coated Ductile Iron, conforming to ANSI-A21.51 (AWWA C151). Zinc Coated Ductile Iron pipe shall have cement mortar lining and seal coating in accordance with ANSI A21.4 (AWWA C104). Bituminous outside coating shall be in accordance with ANSI/AWWA C104. All pipes regardless of material shall have 10-gauge solid copper insulated tracer wire installed adjacent to the pipe. See [Section 3.2.3.9](#) in the Design and Construction standards for more details.
5. Pipe Fittings shall conform to ANSI/AWWA A21.10/C110 for standard size fitting or ANSI/AWWA A21.52/C153 for compact fittings. All joints shall be either mechanical joint or push-on joint conforming to ANSI/AWWA A21.11/C111. Fittings shall be cement mortar lined with a seal coat in accordance with ANSI/AWWA A21.4/C104. All fittings shall have a minimum pressure rating of 250. Lr on profiles indicates length of restrained pipe at fitting.
6. The contractor shall verify all dimensions and elevations in the field before starting construction and notify the Engineer of any discrepancies.
7. There shall be a 10' horizontal separation between water lines and/or sewer lines and a vertical separation of 18" between the bottom of the water main and the top of the sewer main. This applies to building sewer laterals as well.
8. All bacteriological samples of water lines shall be taken by Utility Department personnel. A minimum of 48 hours' notice is required to schedule these samples.
9. All water line and sewer line select backfill, structural backfill, and pipe bedding material shall be compacted to 95% VTM-1 dry density. All controlled fill in trenches under pavement or where otherwise specified shall be compacted to 95% VTM-1 dry density. Compaction reports shall be required to be submitted prior to first acceptance.
10. No existing water main is to be tampered with by tapping, opening, or closing valves without a Utility Department inspector present on the job site.
11. No new water lines are to be filled or flushed without a Utility Department inspector present.

12. Ductile Iron pipe shall be Zinc Coated and V-Bio Polywrapped.
13. The contractor is responsible for daily as-built plans on all construction. All laterals and appurtenances shall be referenced from the nearest manhole.
14. All manholes shall be waterproofed on exterior surface by the manufacturer in accordance with Spotsylvania County Specifications.
15. Sewer connection to existing sanitary manholes shall be made by core drilling manhole and installing a rubber boot to create a watertight connection.
16. "Doghouse" manholes are not allowed unless approved by the Utility Department. See [Section 2.3.3](#).
17. A Cleanout cover assembly in accordance with the standard details shall be installed on each sewer lateral cleanout.
18. An air test is required on new sanitary sewer lines. A vacuum test is required on new manholes.
19. All gravity sanitary sewer mains shall be PVC sewer pipe type PSM poly-vinyl chloride unless noted otherwise on the plans. Pipe and fittings shall meet ASTM designation D-3034-73. Minimum designation used shall be SDR-35. Class A bedding shall be used on depths exceeding 24 feet.
20. All gravity sanitary sewer laterals shall be PVC sewer pipe type PSM poly-vinyl chloride unless noted otherwise on the plans. Pipe and fittings shall meet ASTM designation D-3034-73. Minimum designation used shall be SDR-26 or SCH 40.
21. All sanitary sewer laterals shall be installed at a minimum grade of $\frac{1}{4}$ " per foot (2.08%) unless approved by the Engineer and/or Owner.
22. The contractor shall be responsible for installing all sewer laterals to each lot as shown on the construction plans under the inspection and approval of the Department of Utilities.
23. Contact the Utility Department Cross/Connection and Backflow Coordinator for requirements for backflow prevention.
24. The developer/Owner is responsible for responding to Miss Utility Requests until water and sewer lines are accepted. Any damage to water and sewer mains must be repaired prior to acceptance.
25. The contractor shall be responsible for contacting the Spotsylvania County Utilities Department prior to any water line tie-in or shut off with a minimum of 72 hours' notice.
26. Any construction or installation of public utilities performed on a major holiday, as "major holiday" is defined in the County Human Resource Policy, on a weekend, or on any day before 7:00 a.m. or after 5:00 p.m. ("Off Hours") shall require two (2) days advance written notice and approval by the Department.
27. All bolts, nuts and hardware shall be coated with FluoroKote #1 process or be equivalent and shall be installed on fittings.

5.4 Appendix D – Utilities Project Tracking - CONSTRUCTION

Project: _____

County Site Plan Number: _____

County Plat Review Number: _____

	<u>Water (Date)</u>	<u>Sewer (Date)</u>
Applicant		
Site plan approval	_____	_____
Schedule pre-construction conference	_____	_____
Post infrastructure bond (if needed)	_____	_____
Provide submittals for materials	_____	_____
Execute Reimbursement Agreement for Utilities Under the Pavement Program	_____	_____
Utilities		
Conduct pre-construction conference	_____	_____
Applicant		
Pressure test lines	_____	_____
Submit compaction reports	_____	_____
Submit compaction reports for Utilities Under the VDOT Roadway Program	_____	_____
Disinfect completed system, flush & collect bacteriological samples	_____	_____
CCTV sewer lines	_____	_____
Submit capital cost data	_____	_____
Record Easement deed/plat	_____	_____
Submit as-built drawings	_____	_____
Request first acceptance in writing	_____	_____
Utilities		
Inspect for first acceptance	_____	_____

Review CCTV sewer lines _____

Submit to DEQ or VDH/ODW (if req'd.) _____

Applicant

Correct operational deficiencies _____

Utilities

Issue First Acceptance Letter _____

Utilities/Planning Department

Reduce infrastructure bond (100% to 10%) _____

Applicant

Pave roads & adjust valves & manholes _____

Correct remaining deficiencies _____

Submit construction completion certificate
to VDH (if necessary) _____

Request final acceptance in writing _____

Utilities

Grant final acceptance _____

Inspect for defects (12 months max.) _____

Applicant

Correct defects _____

Utilities

Release infrastructure bond (10% to 0%) _____

Comments:

5.5 Appendix E – Contact Information Form

Spotsylvania County Utility/Public Works Department

Contact Information Sheet

Project: _____

Owner: _____

Developer: _____

Contractor: _____

5.6 Appendix F – First Acceptance Request – RESIDENTIAL

Date

Developer/Owner/Contractor

Address and contact info

County of Spotsylvania
Department of Utilities/Public Works
600 Hudgins Road
Fredericksburg, VA 22408

RE: Request for Residential Project First Acceptance

Project name -_Section XX, Lots XX-XX

To the County:

We have completed installation of the sanitary sewer and water for [Project name]. Listed below are quantities and cost data. Water analysis test results were completed and accepted by county personnel on DATE. As-built drawings were submitted on DATE. Please issue first acceptance for this Project.

Sanitary Sewer: \$xxxxxxxx

1840' – X" [Material] Pipe
8 ea. – Manholes
60 ea. – Service Laterals
Add additional items if needed

Water Line: \$xxxxxxxx

2480' – X" [material] Pipe
4 ea. – Fire Hydrants
60 ea. - Domestic water services
Add additional items if needed

Company official signature & name

5.7 Appendix G - First Acceptance Request – COMMERCIAL

Date

Developer/Owner/Contractor

Address and contact info

County of Spotsylvania
Department of Utilities/Public Works
600 Hudgins Road
Fredericksburg, VA 22408

RE: Request for Commercial Project First Acceptance - **Project name**

To the County:

We have completed installation of the sanitary sewer and water for **[Project name]**. Listed below are quantities and cost data. Water analysis test results were completed and accepted by county personnel on **DATE**. As-built drawings are forthcoming from the engineer. Please issue first acceptance for this Project.

<u>Sanitary Sewer:</u>	\$xxxxxxx
1840' – 8" SDR35 Pipe	
8 ea. – Manholes	
60 ea. – Service Laterals	
<u>Water Line:</u>	\$xxxxxxx
2480' – 8" PVC C900 Pipe	
4 ea. – Fire Hydrants	
60 ea. - Domestic water services	

Please let us know if you have any questions.

Company official signature & name

5.8 Appendix H – Final Acceptance Request

Date

Developer/Owner/Contractor

Address and contact info

County of Spotsylvania
Department of Utilities/Public Works
600 Hudgins Road
Fredericksburg, VA 22408

RE: Request for Project Final Acceptance - **Project name**

To the County:

We have completed final paving for **[Project name]** and are requesting a final inspection of the water and sewer infrastructure. Upon approval, please issue final acceptance for this Project.

Company official signature & name

5.9 Appendix I – Reimbursement Agreement

REIMBURSEMENT AGREEMENT

THIS AGREEMENT, made this ___ day of _____, 20__, by and between _____, a Virginia _____ *[if applicable, fill in corporation, limited liability company, or partnership]* (hereinafter referred to as the "Owner"), and the COUNTY OF SPOTSYLVANIA, VIRGINIA, a political subdivision of the Commonwealth of Virginia (hereinafter referred to as the "County"):

WHEREAS, the Owner is improving a certain parcel of land located in Spotsylvania County, shown on the County Tax Map as _____, hereinafter referred to as the "Property," which is to be developed as a development known as “_____” (herein "the Project"); and,

WHEREAS, the site plans by _____ *[fill in name and title of engineer]*, titled “_____” and dated _____ (hereinafter referred to as the "Plans"), include ___ feet of sewer line, ___ feet of water line, and all necessary appurtenances, some of which shall be located under paved public rights-of-way; and,

WHEREAS the Plans were approved by the Spotsylvania County Department of Utilities on _____,

WHEREAS, as part of the development of the Project, the Owner has submitted an application for and received a permit to construct the public facilities shown on the Plans, as the same were last revised and approved, to serve the Project; and,

WHEREAS, the Virginia Department of Transportation (“VDOT”) maintains certain paved public-rights-of-way that have been dedicated to the Commonwealth of Virginia or County