The Town of Leesburg in Virginia — DESIGN AND CONSTRUCTION STANDARD

ARTICLE 2-122-4.D

WATERMETER AND WATER SERVICE LINES SIZING WORKSHEET

Town Reviewer: ____________ Date: ____________
Project Name: ____________ LMIS No.: ____________
Design Engineer: ____________ Type of Occupancy: ____________

STEP

1. Total Water Supply Fixture Units from Worksheet: 445
2. Maximum Probable Flow from IPC Appendix E**: 142 gpm
3. Water meter Size: 3" inch
4. Pressure Loss Through Water meter from DCSM or Manufacturer's Literature: 7 psi
5. Pressure Loss Through Back-flow Preventer from DCSM Drawing WD-6, 7, 8 or 9; or Manufacturer's Literature: 11 psi
6. Pressure Loss Through Any Special Fixtures (PRV*, filters, etc.): ____ psi
7. Total Pipe Friction Losses from Worksheet, WD-19: 6.8 psi
8. Total Pressure Losses from Appurtenances (sum of steps 4,5,6, and 7): 24.8 psi
9. Peak Hour Pressure at Town Water System Node 11-13: 57 psi
10. Elevation at Town Water System Node 11-13: 5 feet
11. Elevation at Highest Fixture: 8 feet
12. Static Pressure Loss ((Step 11-Step 10) x 0.4335): 4.3 psi
13. Pressure at Highest Fixture (Step 9 - Step 8 - Step 12): 28 psi

Step 13 must be: ☐ ≥ 8 psi if flushometer-, or flush-tank water closets are used.
☒ ≥ 15 psi if flushometer valve water closets are used.

The system must be redesigned if Step 14 is below the minimum required pressure.
The system design is: ☒ acceptable.
☐ not acceptable because ____________

* A Pressure - Reducing Valve is required if the building is located within the:

☐ Main Pressure Zone and any static pressure at the water main is greater than 80 psi.
Static Pressures at Node ___ for: Avg. Day: ___ psi; Max. Day: ___ psi; Peak Hour: ___ psi

☐ Western Pressure Zone and the lowest fixture elevation is less than 353 feet.
Lowest Fixture Elevation: ______ feet

☐ Route 643 Pressure Zone and the lowest fixture elevation is less than 386 feet.
Lowest Fixture Elevation: ______ feet

A Pressure - Reducing Valve is: ☐ required.
☒ not required.

**Use appropriate table from most current International Plumbing Code (IPC) Appendix "E".

REVISIONS NO.	DATE
1	
2	10/16/07
3	04/27/10

WATER SERVICE LINES AND WATER METER SIZING WORKSHEET — DRAWING WD-18 — PAGE 68

The Town of Leesburg in Virginia — DESIGN AND CONSTRUCTION STANDARD

ARTICLE 2-122-4.D

WATER SUPPLY FIXTURE UNIT WORKSHEET

Town Reviewer: ____________ Date: ____________
Project Name: ____________ LMIS No.: ____________
Design Engineer: ____________ Type of Occupancy: ____________

Fixture or Group	Type of Supply Control	Occupancy	Load Values, in Water Supply Fixture Unit Values: Cold	Hot	Total	Quantity of Fixtures in Building	Water Supply Fixture Units
Full Bath	Flush Tank	Private	2.7	1.5	3.6		
Full Bath	Flush Valve	Private	6.0	3.0	8.0		
Dishwashing Machine	Automatic	Private	—	1.4	1.4		
Dishwashing Machine	Automatic	Restaurant	—	4.0	4.0	1	4
Drinking Fountain	3/8" Valve	Public	0.25	—	0.25	6	1.5
Hose Bib	1/2" Outlet	Private	3.0	—	2.0		
Kitchen Sink	Faucet	Private	1.0	1.0	1.4		
Kitchen Sink	Faucet	Restaurant	3.0	3.0	4.0	24	96
Lavatory	Faucet	Private	0.5	0.5	0.7		
Lavatory	Faucet	Public	1.5	1.5	2.0	19	38
Urinal	Flush Valve	Public	5.0	—	5.0	6	30
Washing Machine (8 lb)	Automatic	Private	1.0	1.0	1.4		
Washing Machine (8 lb)	Automatic	Public	2.25	2.25	3.0		
Washing Machine (15 lb)	Automatic	Public	3.0	3.0	4.0		
Water Closet	Flush Valve	Private	6.0	—	6.0		
Water Closet	Flush Tank	Private	2.2	—	2.2		
Water Closet	Flush Valve	Public	10.0	—	10.0	25	250
Water Closet	Flushometer Tank	Public or Private	2.0	—	2.0		
Whirlpool Bath	Faucet	Private	2.0	2.0	4.0		
Mop Sink	Faucet	Private	2.25	2.25	3.0	9	27
Hose Washer	Automatic Valve	Public	2.25	2.25	3.0	2.5	6.5
Ice Maker	Automatic	Private	1.5	—	1.5	1	1
[illegible]	Automatic	Private	1.0	—	1.0	1	1
						TOTAL	445

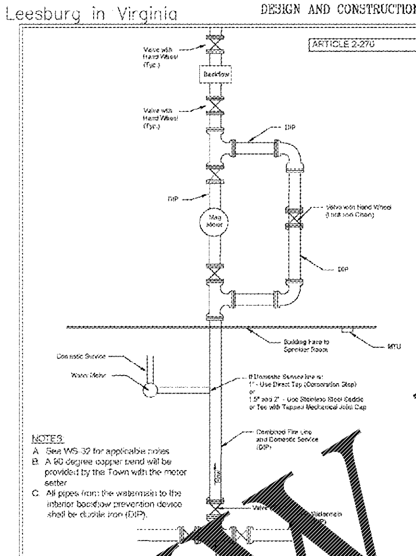
Use Table of Load Values from most current International Plumbing Code (IPC) Appendix "E" for additional fixtures not listed herein.

REVISIONS NO.	DATE
1	
2	10/16/07
3	04/27/10

WATER SUPPLY FIXTURE UNIT WORKSHEET — DRAWING WD-17 — PAGE 69

The Town of Leesburg in Virginia — DESIGN AND CONSTRUCTION STANDARD

ARTICLE 2-270



NOTES:
A. See WS-32 for applicable notes.
B. A 90 degree copper bend will be provided by the Town with the meter setter.
C. All pipes from the watermain to the interior backflow prevention device shall be ductile iron (DIP).

Not To Scale

REVISIONS NO.	DATE
1	
2	
3	

COMBINED FIRE LINE AND DOMESTIC (1", 1.5" OR 2") SERVICE CONNECTION — DRAWING WS-30 — PAGE 30b

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The Town of Leesburg in Virginia — DESIGN AND CONSTRUCTION STANDARD

ARTICLE 2-270

NOTES:
A. Use ductile iron (DIP) mechanical joint piping and mega-lug restraints for all joints below grade from the main to the building. All pipes inside the building to the backflow prevention devices shall also be ductile iron (DIP).
B. Meters will be ordered by Town of Leesburg and paid for by the developer.
C. Backflow prevention device: Double check / double gate valve or RPZ shall be located inside the mechanical room for meters larger than 2". Meters 2" and smaller include the required backflow device.
D. Contractor to provide conduit through building wall for the wire required for wall mounted MTU.
E. All valves shall be epoxy coated resilient wedge gate valves.
F. Meter and backflow devices should be installed horizontally and no higher than 4' from the finished floor. Vertical installations can be accomodated with mag meter and some brands of backflow devices. Consult with manufacturer for design of vertical installation. In all cases, there must be ample space provided from surrounding walls and fixtures for maintenance.
G. Details WS-30 and WS-31 are schematic and all applicable plumbing codes must be met in addition to the Town's requirements for a combined fire line and domestic service connection.

Not To Scale

REVISIONS NO.	DATE
3	04/27/10

NOTES FOR COMBINED FIRE LINE AND DOMESTIC SERVICE CONNECTION — DRAWING WS-32 — PAGE 30d

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The Town of Leesburg in Virginia — DESIGN AND CONSTRUCTION STANDARD

ARTICLE 2-122-4.D

WATER DISTRIBUTION PIPE FRICTION LOSSES

Town Reviewer: ____________ Date: ____________
Project Name: ____________ LMIS No.: ____________
Design Engineer: ____________ Type of Occupancy: ____________

Pipe Section Point to Point[1]		Pipe Diameter (inch)	Type of Pipe	International Plumbing Code Reference	Flow Demand (gpm)	Friction Loss (psi/100)	Pipe Section Length (FT)	Equivalent Length for Fittings[2] (FT)	Total Equivalent Pipe Length (FT)	Friction Loss (psi)
Main	Tap	12"	Cop. Stee	Appendix E	140	0.55	630	158	788	0.4
Tap	Meter	8"	Copper - K	Appendix E	140	0.1	40	10	50	0.05
Meter										
Cold Water Distribution Piping									Subtotal	0.45
		3"	K		140	0.8	560	125	675	5
		2½"	K		40	0.6	270	43	313	1.3
Hot Water Distribution Piping									Subtotal	6.3
									Subtotal	
									Total	6.7

1. See attached distribution piping diagram, scaled.
2. Total from appropriate table from most current International Plumbing Code Appendix "E" or 25% of pipe section length.

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1	
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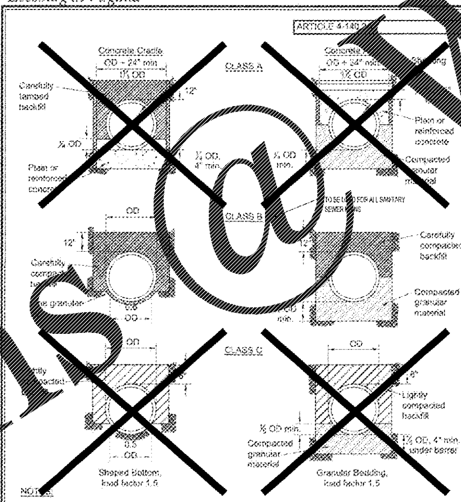
WATER DISTRIBUTION PIPE FRICTION LOSSES WORKSHEET — DRAWING WD-19 — PAGE 71

The Town of Leesburg in Virginia — DESIGN AND CONSTRUCTION STANDARD

ARTICLE 4-140.2



NOTES:
A. In rock trench, excavate at least 6" (15 cm.) below the bell of the pipe except where concrete cradle is used.
B. Compacted granular material for D.I.P. and P.V.C. pipe is VDOT crushed stone No.57.

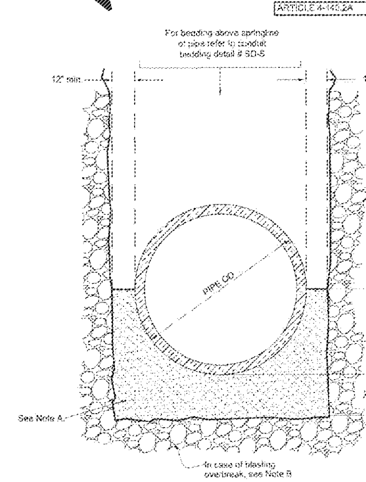
Not To Scale

REVISIONS NO.	DATE
1	

CONDUIT BEDDING SEWER LINES — DRAWING SD-5 — PAGE 41

The Town of Leesburg in Virginia — DESIGN AND CONSTRUCTION STANDARD

ARTICLE 4-140.2A



NOTES:
A. Crushed stone VDOT size No. 57 in accordance with VDOT specifications.
B. Blasting overbreak to be removed and replaced with compacted crushed stone.

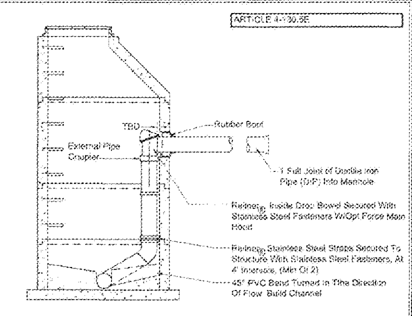
Not To Scale

REVISIONS NO.	DATE
1	
3	04/27/10
4	XX/XX/XX

TYPICAL SEWER MAIN TRENCH IN ROCK — DRAWING SD-8 — PAGE 45

The Town of Leesburg in Virginia — DESIGN AND CONSTRUCTION STANDARD

ARTICLE 4-130.6E



NOTES:
A. The interior drop pipe shall be the same diameter and the incoming service for 4" pipe and shall be 6" for pipes 8" or 10" in diameter.
B. The diameter of the vertical stack shall not be less than 6".
C. Use 4' manhole for pipes up to 8". 10" and larger pipes will require a 5' manhole.
D. The elbow at the bottom of the stack may be either a 45° or 90° turn placed in the direction of flow in the manhole with a bench constructed to conform to the manhole bench.
E. See SS-7 for manhole detail.

Not To Scale

REVISIONS NO.	DATE
1	

INSIDE DROP CONNECTION — DRAWING SS-6 — PAGE 35

REVISIONS	BY
1 REVISED PER COUNTY AND TOWN COMMENTS	Z
2 REVISED PER COUNTY AND TOWN COMMENTS	G
3 REVISED PER COUNTY AND TOWN COMMENTS	GRP

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