## PART II

**STANDARD DETAILS**

CHESTERFIELD COUNTY, VIRGINIA

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Flow Test Information Form
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Flow Test Information Form
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<tr>
<td>Manhole Sizing and Minimum Angle Table</td>
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Pressure Reducing Valve & Vault

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Concrete Pedestal Support for Tapping Sleeves 16” & Above

Sump Pump
### Blocking Detail

#### Horizontal Bends

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<tr>
<th>PIPE SIZE</th>
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<th>22 1/2 BEND</th>
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**NOTE:**

1. Blocking dimensions are shown at a minimum.
2. Blocking dimensions are based on a static pressure of 150 PSI and an allowable soil bearing capacity of 2000 PSF.
3. Where soil bearing capacity is less than or greater than 2000 PSF, blocking design calculation are to be shown on the plans.
4. Fittings to be wrap in 4 mil polyethylene to protect nuts, bolts, or other.
<table>
<thead>
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<th>F</th>
<th>G</th>
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NOTE: SEE APPLICABLE NOTES AS SHOWN ON BLK-1.
REINFORCING FOR 16" DIA. & LARGER PIPE #6 @ 6" E. W.

4" L

EQ EQ

4 MIL POLYETHYLENE

CARRY CONCRETE TO UNDISTURBED EARTH OR FIRM SUBGRADE

PLAN

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| 30"  | 8'-0"| 6'-8"| 2'-0"

NOTE: BLOCKING BASED ON PRESSURE OF 150 P.S.I. AND ALLOWABLE SOIL BEARING CAPACITY OF 2000 P.S.F. CONCRETE TO BE 3000 P.S.I.

NOTE: SEE APPLICABLE NOTES AS SHOWN ON BLK-1.
CARRY CONCRETE TO UNDISTURBED EARTH OR FIRM SUBGRADE.

<table>
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NOTE: BLOCKING BASED ON PRESSURE OF 150 PSI AND ALLOWABLE SOIL BEARING CAPACITY OF 2000 PSF. CONCRETE TO BE 3000 PSI.

NOTE: SEE APPLICABLE NOTES AS SHOWN ON BLK-1.

DATE
JAN. 1996
REVISIONS
NOV. 2006
DRWG. NO.
BLK-4

ELEVATION

SECTION A-A

NOTE: BLOCKING DETAIL LOWER VERTICAL BENDS
EMBED REINFORCING BARS MIN. 36 DIAMETERS INCLUDING HOOK PAINT EXPOSED REINF. BARS WITH 2 COATS OF BITUMINOUS PAINT.

WHERE 4 REINFORCING BARS USED, PLACE 2 SYMMETRICALLY PLACED REINFORCING BARS AT BENDS AND OTHER 2 BARS AS SHOWN IN DETAIL.

NOTE: BLOCKING BASED ON PRESSURE OF 150 PSI AND ALLOWABLE SOIL BEARING CAPACITY OF 2000 PSF. CONCRETE TO BE 3000 PSI.
### CHESTERFIELD COUNTY
**DEPARTMENT OF PUBLIC UTILITIES**

<table>
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<th>DIAMETER</th>
<th>CASING PIPE</th>
<th>MINIMUM WALL THICKNESS</th>
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REINFORCED CONCRETE CASING PIPE SHALL BE ASTM C-76, CLASS III. STEEL CASING PIPE SHALL BE ASTM A-139, GRADE B.

**NOTES:**

A. Slopes through bores shall not be based on minimum grade unless it is the only slope available.

B. Increasing thickness of casing must be considered where bore lengths exceed 125'.

C. When using steel casing, a minimum of 0.500" thickness is required where ground cover over pipe exceed 15'.

D. Contractor shall make an effort to bore in the appropriate direction based on existing soil conditions. Engineer must show location and size of bore pit; and location and size of permanent and construction easement.

E. Where restraining devices are required for the carrier pipe, the casing pipe shall be increased as necessary.

* Where pipe is restrained, approved restrained joint pipe may be used in a 24"casing pipe to avoid having to install a 30"casing pipe.
CASING DETAIL NOTES:

1. CASING SPACERS FOR GRAVITY SEWER LINES MAY BE USED ONLY WHEN THE SLOPE OF THE FINISHED WELDED CASING PIPE HAS BEEN COMPLETED AND CHECKED AND IS EQUAL TO THE SLOPE OF THE CARRIER PIPE.

2. THREE CASING SPACERS SHALL BE ATTACHED TO EACH JOINT OF CARRIER PIPE WITH ONE AT THE CENTER AND ONE NOT MORE THAN 24" FROM EACH END.

3. ONE CASING SPACER SHALL BE LOCATED NOT MORE THAN 12" FROM EACH APPROVED STAINLESS STEEL CASING SPACER.

4. CARRIER PIPE SHALL BE POSITIONED AND RESTRAINED WITHIN CASING TO COMPLY WITH GRADE REQUIREMENTS BY AN APPROVED STAINLESS STEEL CASING SPACER.

5. STEEL CASING SHALL HAVE A MINIMUM YIELD STRENGTH OF 35,000 PSI AND SUFFICIENT CORROSION PROTECTION.

6. LINES TO BE ENCASED UNDER STATE ROADS/RAILROADS WILL COMPLY WITH COUNTY AND ANY APPLICABLE VDOT/AMERICAN RAILROAD ENGINEERING SPECIFICATIONS, WHICHER EVER IS MORE STRINGENT.

7. WHEN INSTALLING CARRIER PIPE, CONTRACTOR SHALL PUSH SO THAT PIPE JOINTS ARE ALWAYS BEING COMPRESSED.

8. REINFORCED CONCRETE CASING PIPE SHALL BE ASTM C-76, CLASS III STEEL CASING PIPE SHALL BE ASTM-139, GRADE B.

9. CARRIER PIPE WITHIN BORES FOR SANITARY SEWER INSTALLATION SHALL BE DUCTILE IRON (CLASS 52) AND IS TO BE USED FROM MANHOLE TO MANHOLE.

10. CASING PIPE SHALL BE SEALED BY USE OF WRAPAROUND END SEALS OR WRAP ENDS OF CARRIER PIPE WITH TAR PAPER AND INSTALL 4" THICK BRICK AND MORTAR PLUG IN THE ANNULAR SPACE WITH A 1" WEEP HOLE.
RESERVED
FOR FUTURE USE
CASING DETAIL NOTES:

1. CARRIER PIPE SHALL BE CENTERED WITHIN CASING BY AN APPROVED STAINLESS STEEL CASING SPACER.

2. CASING PIPE SHALL BE SEALED BY USE OF WRAPAROUND END SEALS OR WRAP ENDS OF CARRIER PIPE WITH TAR PAPER AND INSTALL 4" THICK BRICK AND MORTAR PLUG IN THE ANNULAR SPACE A 1" WEEP HOLE.

3. THREE CASING SPACERS SHALL BE ATTACHED TO EACH JOINT OF CARRIER PIPE WITH ONE AT THE CENTER AND ONE NOT MORE THAN 24" FROM EACH END.

4. ONE CASING SPACER SHALL BE LOCATED NOT MORE THAN 12" FROM EACH END OF CASING PIPE.

5. VALVES OR OTHER CONTROL/MAINTENANCE EQUIPMENT ATTACHED TO WATERLINE/SEWER FORCE MAINS SHALL BE LOCATED A MINIMUM FOUR PIPE LENGTHS FROM THE END OF THE CASING, OR AS APPROVED BY THE COUNTY.

6. STEEL CASING SHALL HAVE A MINIMUM YIELD STRENGTH OF 35,000 PSI AND SUFFICIENT CORROSION PROTECTION.

7. LINES TO BE ENCASED UNDER STATE ROADS/RAILROADS WILL COMPLY WITH COUNTY AND ANY APPLICABLE VDOT/AMERICAN RAILROAD ENGINEERING SPECIFICATIONS WHICHEVER IS MORE STRINGENT.

8. WHEN INSTALLING CARRIER PIPE, CONTRACTOR SHALL PUSH SO THAT PIPE JOINTS ARE ALWAYS BEING COMPRESSED.

9. REINFORCED CONCRETE CASING PIPE SHALL BE ASTM C-76, CLASS III STEEL CASING PIPE SHALL BE ASTM-139, GRADE B.

10. ALL WATERLINES IN CASING SHALL BE A MINIMUM CLASS 51 DUCTILE IRON WITH M.J. BELLS AND AN APPROVED MECHANICAL JOINT RESTRAINT DEVICE AT EACH M.J. CONNECTION, MINIMUM 3 JOINTS OUTSIDE EACH END OF CASING SHALL BE M.J. DUCTILE IRON WITH RESTRAINED JOINTS. AS AN ALTERNATIVE, APPROVED RESTRAINED JOINT PIPE MAY BE USED.
NOTE: NOT ALLOWED ON WATER LINE PROJECTS.

PIPE ENCASEMENT DETAIL
### PEAKING FORMULA (from average flows to peak flows)

<table>
<thead>
<tr>
<th>Location</th>
<th>Line No</th>
<th>Manhole Number</th>
<th>Area (Acres)</th>
<th>No of Lots</th>
<th>Avg. Daily Flow</th>
<th>Increm. Flow M.G.D.</th>
<th>Total Flow M.G.D.</th>
<th>Slope</th>
<th>Reach</th>
<th>Invert</th>
<th>Height</th>
<th>Capacity of Pipe (Full)</th>
<th>M.G.D.</th>
<th>Velocity</th>
<th>Vacutary Relief</th>
<th>Head Loss</th>
<th>Elevation of Invert</th>
<th>Remarks</th>
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**NOTE:**

SIZE: MIN. 11"X17" DISPLAYED AS PART OF PLANS
ON A 24"X36" SHEET OF PAPER INDEXED AS PART OF PLANS.
NOTES:

1. ALL MATERIALS FOR SEWER AND WATER SYSTEMS SHOWN SHALL BE SUPPLIED AND INSTALLED IN ACCORDANCE WITH THE LATEST SPECIFICATIONS OF CHESTERFIELD COUNTY APPLICABLE AT THE TIME OF NOTICE TO PROCEED.

2. FOR SEWER AND WATER INSTALLATION WITHIN EXISTING VDOT R/W; UTILITY CONTRACTORS MUST NOTIFY VDOT WHEN INSTALLATION BEGINS SO THAT DENSITY CAN BE TESTED ON TRENCH BACKFILL (95% ASTM. D-698 @ OPTIMUM MOISTURE +/− 2%).

3. THE INSTALLATION OF A SEWER BACKFLOW DEVICE IS REQUIRED FOR ALL SERVICE CONNECTIONS WHERE THE MINIMUM FINISHED FLOOR ELEVATION OF THE HOUSE IS LOWER THAN THE NEAREST DOWNGRADE AND/OR UPGRADE MANHOLE TOP ELEVATIONS. THIS DEVICE WILL BE INSPECTED BY THE BUILDING INSPECTION DEPARTMENT.

4. ALL WATER SERVICE CONNECTIONS BELOW THE ELEVATION CONTOUR OR WHERE THE PRESSURE IS GREATER THAN 80 P.S.I. WILL REQUIRE INDIVIDUAL PRESSURE REGULATORS AS REQUIRED BY BOCA CODE.

5. VERTICAL DATUM IS BASED ON MEAN SEA LEVEL (USCG & GS DATUM). HORIZONTAL CONTROLS ARE BASED ON VIRGINIA STATE PLANE COORDINATE GRID, SOUTH ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).

6. CONTRACTOR SHALL PROPERLY NOTIFY ALL PROPERTY OWNERS TWO (2) WEEKS PRIOR TO THE START OF ANY CONSTRUCTION (INCLUDING LAND CLEARING). NOTIFICATION SHALL BE IN THE FORM OF A LETTER SIMILAR TO THE "SAMPLE" REFLECTED IN THE COUNTY’S LATEST WATER AND SEWER SPECIFICATIONS (NOT–1).

REQUIRED INFORMATION FOR TITLE PAGE

APPLICANTS NAME _______________________
ZONING AND CASE#________________________
NUMBER OF LOTS _________________________
TAX MAP NUMBER _________________________
DATE OF PLANNING _______________________
COMMISSION APPROVAL ___________________
NOTES:
1. THIS INFORMATION IS REQUIRED TO BE IN THIS LOCATION.
2. IF INFORMATION A IS SHOWN IN THE ENGINEER'S TITLE BLOCK, THIS AREA CAN BE USED FOR OTHER PURPOSES.
3. THE TABLE OF COORDINATES MAY BE IN TYPED FORMAT, (LOCATION OPTIONAL)
4. REMAINING SPACE TO INCLUDE REQUIRED NOTES (SEE DES-2), LEGEND, GENERAL NOTES AND OTHER PERTINENT INFORMATION.
NOTE:
The sketch reflects "sample" data not related to an actual project!

TABLE

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<th>FLOW CONDITION</th>
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DATE: JUNE 2000
REVISIONS: MARCH 2002

FLOW TEST RESULTS FOR RESIDENTIAL SUBDIVISIONS

DEPARTMENT OF PUBLIC UTILITIES

FAX NUMBER

PROJECT NAME

UTILITIES PROJECT #

DATE

MAILING ADDRESS

FAX NUMBER

PROJECT NAME

DATE

MAILING ADDRESS

FAX NUMBER

SKETCH
### Table

| Date       | J-5415 | P-10000 | L=548' | d=16" | P-10002 | L=300' | d=8" | J-10002 | E=256.0' | D=0.00gpm | P-10003 | L=400' | d=8" | P-10005 | L=500' | d=8" | J-10005 | E=250.0' | D=0.00gpm | P-10001 | L=422' | d=16" | J-5418 | J-10000 | E=254.0' | D=0.00 gpm | P-10004 | L=350' | d=8" |
|------------|--------|---------|--------|-------|---------|--------|------|---------|----------|-----------|---------|--------|------|---------|--------|------|---------|----------|-----------|---------|--------|------|--------|---------|----------|---------|--------|------|
| MARCH 2002 |        |         |        |       |         |        |      |         |          |           |         |        |      |         |        |      |         |          |           |         |        |      |        |         |          |         |        |      |

### Note:

*ISO FLOWS = Flow indicated at bottom of ISO Calculation Sheet: in this case ISO required flow is 2000 gpm, required hydrants is 2, however, 4 required due to spacing.*
As per your request, this office has completed a computer simulated fire flow test for the above referenced Project. The test was conducted at [location]. The test results for maximum day demand are attached on the next page.

Static pressure at maximum day domestic is [pressure] psi.

The maximum design flow is [flow] gpm, to maintain the required minimum pressure of 20 psi throughout the pressure zone.

The elevation of the test was [elevation] feet.

This project is located in the [Pressure Zone] Pressure Zone.

This test was conducted with the following parameters:

- tank at [height] feet.
- tank at [height] feet.
- pumps (ON/OFF).
- pumps (ON/OFF).

These flow test results were based upon information available to the County at the time tests were performed. The variability of the water system due to changes in usage, demand, and operating conditions precludes guarantee by the Utilities Department that on-site expectations regarding pressures and flows will be exacting.

This information is being provided to you as a public service. WE DO NOT GUARANTEE ITS ACCURACY. By using it in any way, you are agreeing to release the County, its employees and officials from responsibility for any consequence(s) if it proves to be inaccurate.

Sincerely,

(NAME)
(Title)

cc: Frank Kinnier Fire Administration
Hydrant Curve for
Junction J-xxxx at Steady hrs

Available Flow (gpm)

Residual Pressure (psi)
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

SEDIMENTATION BARRIER (SED-1)
NOT TO SCALE

STRAW BALE SILT BARRIER (S.B.-1)
NOT TO SCALE
CONSTRUCTION OF A STRAW BALE BARRIER

1. EXCAVATE THE TRENCH.
2. PLACE AND STAKE STRAW BALES.
3. WEDGE LOOSE STRAW BETWEEN BALES.
4. BACKFILL AND COMPACT THE EXCAVATED SOIL.
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

APPROX. 150'
AS INDICATED ON THE PLANS.

PROPOSED UTILITY LINE

STRAW BALES

RUNOFF FLOW DIRECTION

#5 REBARS EMBEDDED 2"
MIN. (2 PER BALE)

STRAW BALES

STOCKPILES EARTH

EXISTING GROUND

DIG IN 4"

PROPOSED UTILITY LINE
NOTES:

1. DAMS ARE TO BE PLACED UPSTREAM AND DOWNSTREAM OUTSIDE THE LIMITS OF RIP-RAP. DAMS ARE TO BE REMOVED AFTER COMPLETION OF CREEK CROSSING.

2. METHOD AND MATERIAL FOR CONSTRUCTION OF DAMS SHALL BE APPROVED BY THE COUNTY.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR PASSING ALL WATER WHICH IS PUMPED FROM AREA BETWEEN DAMS THROUGH A FILTERING MEDIUM AND DISCHARGED AT LEAST 25 FEET FROM CREEK BANK.

4. ALL CREEK BANKS DISTURBED DURING CONSTRUCTION WILL BE RIP-RAPPED WITH VDOT CLASS I RIP-RAP.

5. CONTRACTOR HAS THE OPTION TO SUBMIT FOR APPROVAL, AT THE PRE-CONSTRUCTION CONFERENCE, AN ALTERNATE METHOD FOR THE UTILITY LINE CROSSING OF THE CREEK. THIS ALTERNATE METHOD SHALL INCLUDE PROCEDURES TO PREVENT SOIL EROSION, IN ACCORDANCE WITH CHESTERFIELD COUNTY EROSION AND SEDIMENT CONTROL HANDBOOK AND SHALL BE APPROVED BY THE COUNTY’S ENVIRONMENTAL ENGINEERING DEPARTMENT.
NOTES:
A. WHERE THE PUBLIC MAIN EXISTS, ALL WORK SHALL BE PERFORMED BY THE COUNTY UTILITIES DEPARTMENT UPON MAKING PROPER APPLICATION FOR SERVICE.
B. ON ALL NEW WATER MAINS WHERE FIRE LINES ARE PROPOSED, DEVELOPER SHALL HAVE HIS UTILITY CONTRACTOR (ACCEPTABLE TO THE UTILITIES DEPARTMENT) INSTALL A SINGLE FIRE LINE UP TO THE BALL VALVE AND WATER METER BOX.
C. WHERE FIRE LINE TO BUILDING IS 100’ OR LESS FROM THE PUBLIC MAIN, THE FIRE LINE SYSTEM MAY BE INSTALLED ACCORDING TO THIS DETAIL, IF THE OWNER CHOOSES TO HAVE THE DOUBLE-CHECK ASSEMBLY INSTALLED IN A VAULT OUTSIDE OF BUILDING OR IF THE FIRE LINE EXCEEDS 100’, FIRE-2 DETAIL MUST BE USED.
D. ALL FIRE LINES MUST HAVE AT LEAST 3.5 FEET OF GROUND COVER.
E. USE BALL VALVES AS MANUFACTURED BY FORD, MCDONALD, OR APPROVED EQUAL.
F. CONNECTIONS FOR 1 1/2" AND 2" FIRE LINE SERVICES WILL BE SWEAT 95/5 (LEADLESS) SOLDER AND A SUITABLE FLUX; APPROVED COMPRESSION FITTINGS; OR A PRESS FITTING SYSTEM.

DATE
JAN 2003

REVISING
JAN 2004

TYPICAL PLAN VIEW OF PROPOSED 2"
OR SMALLER FIRE LINE SYSTEMS
FOR NON SINGLE FAMILY RESIDENTIAL
(WITHOUT DOMESTIC SERVICE LINE)

DPWG. NO.
FIR-1
(2012)

(100 FEET OR LESS)
NOTES:

A. TAPPING SLEEVE AND VALVE MAY BE USED ON EXISTING LINES WITH PRIOR APPROVAL.

B. WHERE THE FIR-1 DETAIL; FOR A 2" COMBINED FIRE/DOMESTIC WATER LINE DOES NOT PROVIDE ADEQUATE SERVICE BECAUSE OF THE METER SIZE AND/OR AVAILABLE WATER PRESSURE, THE FIR-1A MAY BE USED.
NOTE:

1. DOUBLE CHECK DEVICE SHALL BE INSTALLED IN A BOX AS NEAR TO THE WATER MAIN AS POSSIBLE WITHOUT PLACING BOX IN AREAS SUBJECT TO VEHICULAR TRAFFIC.

2. DOUBLE CHECK ASSEMBLY MUST BE U.L. LISTED OR F.M. APPROVED AND APPROVED BY CHESTERFIELD COUNTY’S DEPT. OF UTILITIES (SEE PART IV AND PART V OF THE SPECIFICATIONS).

3. FIRE SUPPRESSION LINE SHALL BE INSTALLED IN ACCORDANCE WITH THE SERIES OF FIR-1 DETAILS.

4. THE VAULT SHALL BE WATERTIGHT. THE VAULT SHALL BE COATED ON THE OUTSIDE FACE WITH A MASTIC OR BITUMINOUS COATING TO PREVENT INFILTRATION.

---

**PLAN**

- **A** OUTSIDE STEM AND YOKE GATE VALVE
- **B** DOUBLE CHECK DEVICE
- **C** OUTSIDE STEM AND YOKE GATE VALVE
- **D** SUMP PUMP WHERE WATER TABLE IS A PROBLEM OR GRAVITY DRAIN WHERE WATER TABLE IS NOT

---

**ELEVATION**

VAULT SHALL BE AS MANUFACTURED BY CARSON-INDUSTRIES, LTD. (M-SERIES MODEL G3048-18) OR APPROVED EQUAL (SIZE NECESSARY TO MEET MINIMUM VAULT STANDARDS).

- **A** OUTSIDE STEM AND YOKE GATE VALVE
- **B** DOUBLE CHECK DEVICE
- **C** OUTSIDE STEM AND YOKE GATE VALVE
- **D** SUMP PUMP WHERE WATER TABLE IS A PROBLEM OR GRAVITY DRAIN WHERE WATER TABLE IS NOT

---

BOX WITH CONCRETE BASE AND DOUBLE CHECK MUST BE SUPPORTED BY Poured IN PLACE CONCRETE PIPE SADDLES OR METAL PIPE STANDS (COATED WITH RUST RETARDANT) COATING.

---

DATE JAN. 1996

REVISIONS OCT. 2012

2" OR SMALLER

DOUBLE CHECK ASSEMBLY AND VAULT
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

PLAN

(A) OUTSIDE STEM AND YOKE GATE VALVE
(B) DOUBLE CHECK VALVE ASSEMBLY
(C) OUTSIDE STEM AND YOKE GATE VALVE
(D) 2 1/2" THREADED N.S.T. SIAMESE
CONNECTION FOR FIRE DEPARTMENT
W/AUTOMATIC BALL DRIP
*(E) REQUIRED (MAIN LINE SIZE) " X 4"
*(F) 4" FIRE PROTECTION CHECK VALVE
*(G) 4" - 90° BEND
*(H) 48"X48" APPROVED HATCH
*(I) SUMP PUMP SETUP REQUIRED
(SEE SUMP DETAIL WAT-19)
*(J) SAMPLING POINT
PREVENTER
*(K) LADDER

"WHERE A TYPICAL 3" FIRE LINE DOES
NOT REQUIRE A SIAMESE CONNECTION,
ITEMS (D) THRU (C) DO NOT APPLY.

6" MIN.
TOP OF GROUND

EXTERIOR
MASTIC OR
BITUMINOUS
COATING
3.5" MIN.

24" X 12"
MAX. MIN.

ELEVATION

16" ±

10" MIN.
FULLY OPENED

SUPPORTS

1" - 3"
CLEARANCE

POURED IN PLACE OR
PRECAST CONCRETE
VAULT (SEE PART V
FOR LIST OF APPROVED
MANUFACTURERS AND
SUPPLEMENTAL VAULT
SPECIFICATIONS).

POWER SUPPLY TO
OUTLET FOR SUMP
PUMP SHALL BE
EQUIPPED WITH
INTERIOR GFCI CIRCUIT
BREAKER

APPROVED
LINK-SEAL OR
FLEXIBLE SEAL

POURED IN PLACE CONCRETE
PIPE SADDLES OR METAL
PIPE STANDS COATED WITH
RUST RETARDANT COATING.

FOR ADDITIONAL INFORMATION ON REVIEW, DESIGN AND
CONSTRUCTION, SEE SUPPLEMENTAL VAULT SPECIFICATIONS IN PART V

DATE:
JAN. 1996

REVISIONS:
OCT. 2012

3" OR LARGER
DOUBLE CHECK ASSEMBLY AND VAULT
(Alternate 1)

DRWG. NO.
FIR-3
SHT. 1 OF 2
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

PLAN

(A) OUTSIDE STEM AND YOKE GATE VALVE
(B) DOUBLE CHECK VALVE ASSEMBLY
(C) OUTSIDE STEM AND YOKE GATE VALVE
(D) 2 1/2" THREADED N.S.T. SIAMESE CONNECTION FOR FIRE DEPARTMENT W/AUTOMATIC BALL Drip
(E) REQUIRED (MAIN LINE SIZE) 4" X 4"
(F) 4" FIRE PROTECTION CHECK VALVE

(G) 48"X48" APPROVED HATCH
(H) SUMP PUMP SETUP REQUIRED
(See Sump Detail WAT-19)
(I) SAMPLING POINT
(J) Ladder

WHERE A TYPICAL 3" FIRE LINE DOES NOT REQUIRE A SIAMESE CONNECTION, ITEMS (D) THRU (F) DO NOT APPLY.

EXTERIOR MASTIC OR BITUMINOUS COATING
3.5" MIN.

24" 12" MAX. MIN.

BLOWUP DETAIL 3A TO BE USED WHEN DETECTION REQUIRED

ELEVATION

Poured in place or precast concrete vault (See Part V for list of approved manufacturers and supplemental vault specifications).

APPROVED LINK-SEAL OR FLEXIBLE SEAL
1"-3" CLEARANCE

POURED IN PLACE CONCRETE PIPE SADDLES OR METAL PIPE STANDS COATED WITH RUST RETARDANT COATING.

FOR ADDITIONAL INFORMATION ON REVIEW, DESIGN AND CONSTRUCTION, SEE SUPPLEMENTAL VAULT SPECIFICATIONS IN PART V

3" OR LARGER
DOUBLE CHECK ASSEMBLY AND VAULT
(Alternate 2)

DATE: MARCH 2002
REVISIONS: OCT. 2012
DRWG. NO. FIR-3
SHT. 2 OF 2
USUALLY ON 4" AND LARGER FIRE SUPPRESSION SYSTEMS, THE SIAMESE CONNECTION IS LOCATED INSIDE THE DOUBLE CHECK ASSEMBLY VAULT. UNDER CERTAIN CONDITIONS, THE COUNTY WILL REQUIRE A DOUBLE DETECTOR CHECK ASSEMBLY AS OUTLINED BELOW:

1. WHEN THE ENGINEER IS PROPOSING PRIVATELY MAINTAINED FIRE HYDRANTS TO BE INSTALLED OFF A PRIVATELY MAINTAINED (FIRE SUPPRESSION) WATER LINE,

2. AFTER THOROUGH EVALUATION AND CONSULTATION WITH OTHER COUNTY DEPARTMENTS AND UTILITIES STAFF, THE ENGINEER MAY BE REQUESTED TO SHOW THAT CERTAIN FIRE HYDRANT LINES BE PRIVATELY MAINTAINED RATHER THAN PUBLICLY MAINTAINED, OR

3. UNDER UNUSUAL CIRCUMSTANCES, AND WHEN IT IS DEEMED APPROPRIATE BY COUNTY STAFF THAT A DOUBLE DETECTOR CHECK WOULD BE BENEFICIAL TO THE COUNTY. GENERALLY SPEAKING, THIS WOULD BE A CASE WHERE THERE IS A POTENTIAL FOR ABOVE-AVERAGE WATER LOSS (UNACCOUNTABLE WATER).
OPTION 1: IF GRADE ADJUSTMENT IS NOT REQUIRED:
A. CONNECTOR PIPE MAY BE APPROVED D.I. OR P.V.C. PIPE.
B. IF ALL JOINTS FROM HYDRANT TEE TO HYDRANT ARE RESTRAINED WITH APPROVED JOINT RESTRAINT DEVICE
   THRUST BLOCKING BEHIND HYDRANT NOT REQUIRED.

OPTION 2: IF GRADE ADJUSTMENT IS REQUIRED:
A. THE CONNECTOR PIPE SHALL BE OF THE OFFSET DESIGN SO THAT THE FIRE HYDRANT CAN BE ADJUSTED
   TO ENSURE PLACEMENT AT THE PROPER GRADE. WHEN THE CONNECTOR PIPE IS THE OFFSET DESIGN IT
   SHALL HAVE AN ANCHORING FEATURE AT BOTH ENDS SO THAT WHEN USED WITH M.J. SPLIT GLANDS
   A RESTRAINED JOINT IS PROVIDED.

B. IF ALL JOINTS FROM HYDRANT TEE TO HYDRANT ARE RESTRAINED WITH APPROVED
   JOINT RESTRAINT DEVICE, THRUST BLOCKING BEHIND HYDRANT NOT REQUIRED.

C. THE CONNECTOR PIPE SHALL BE CEMENT LINED IN ACCORDANCE WITH AWWA
   C110-ANSI A21.4.

D. THE CONNECTOR PIPE SHALL BE DUCTILE IRON AWWA C153-ANSO A21.53
   AND POSITIONED BETWEEN THE FIRE HYDRANT AND GATE VALVE.

E. HYDRANT BREAKAWAY FLANGE SHOULD BE LOCATED NO MORE THAN 6" ABOVE
   FINISHED GRADE AND NOT BELOW FINISHED GRADE.

CAUTIONS:
DO NOT BLOCK WEEP HOLE WITH CONCRETE.
PLACE STONE OVER WEEP HOLE AREA.

NOTE:
(A). ON ROADWAYS WITHOUT CURB AND GUTTER, VALVE SHOULD BE IN SHOULDER OF ROAD OR BETWEEN
   PAVEMENT AND DITCH. MINIMUM COVER AT DITCH MUST BE 3'6" OR GREATER.

(B). WHEN A HYDRANT TEE IS USED, RESTRAIN JOINT NOT NEEDED TO RESTRAIN VALVE TO TEE.
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#### Minimum Angle

- **42" Pipe** will be allowed in 72" MH where the calculation allows it. For example, straight thru or min. angle over 92° for two 42" pipes.

### Calculations

- D = Pipe Diameter
- W = Pipe Wall Thickness

Example:

\[
\text{MIN. ANGLE} = \arctan\left( \frac{(7+W1+W2)}{2} \right) \times \frac{360}{\text{MH Dia.}}
\]

**Note:** For combinations not given, the minimum angle may be derived by the above formula.

---

**Date:** Jan. 1996  
**Revisions:**  
**Drwg. No.:** MAN-1  
**Sht. 1 of 2**
EXAMPLE: 48" MANHOLE, EXISTING 24" IN, EXISTING 24" OUT, NEW 18" IN, ALL CONCRETE. MAN-1 TABLE INDICATES A MINIMUM ANGLE OF 80° BETWEEN THE EXISTING 24" (IN) AND THE NEW 18" (IN), RESULTING IN APPROXIMATE 6" OF INTERIOR MANHOLE WALL REMAINING BETWEEN THE 2 PIPES.

NOTES:

① MINIMUM ANGLE BETWEEN INFLUENT AND EFFLUENT PIPES IS 90°, EXCEPT BY SPECIAL DESIGN.

② EXCEPTIONS TO THE MINIMUM SEPARATION BETWEEN PIPES WILL BE CONSIDERED PER EACH, BY SPECIAL DESIGN.
NOTE: MANHOLE'S IN EXCESS OF 20' HEIGHT USE DETAIL MAN-3.

BELL END ON INCOMING PIPES
PLAIN END ON OUTGOING PIPES
2" CLEARANCE (MAX.)
SEALANT FLEXIBLE JOINT

8" OF #57 STONE BEDDING
NOTE: STONE BEDDING SHALL EXTEND TO THE OUTER BOUNDARY OF ALL UNDISTURBED AREAS SURROUNDING THE MANHOLE.

EXTENDED MONOLITHIC BASE OPTIONAL

NOTE: BENCH MAY BE CONC. BRICK AND MORTAR.

NOTE:
STANDARD PRECAST CONCRETE MANHOLE SEWERS 8” TO 24”
60", 72", 84", AND 96" I.D. MANHOLE - 1

C.I. FRAME & COVER

2" OR 3" APPROVED ADJUSTING RING

60", 72", 84", AND 96" I.D.

EXTENDED MONOLITHIC BASE OPTIONAL

#57 STONE BEDDING

BRICK AND MORTAR OR 3000# CONCRETE

MANHOLE CONSTRUCTION SHALL CONFORM TO ASTM C-478

DATE
JAN. 1996

REVISIONS
JAN. 2003

60", 72", 84" AND 96" I.D. MANHOLE - 1

DRWG. NO.
MAN - 3
60", 72", 84", and 96" I.D. Manhole - II

- 60", 72", 84", and 96" I.D. Sewer Pipe
- C.I. Frame and Cover
- Extended Monolithic Base Optional
- #57 Stone Bedding
- Brick and Mortar or 3000# Concrete

NOTE: Where stubs are provided for future connections, bench shall be so formed.
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

2" OR 3" APPROVED ADJUSTING RINGS

C.I. FRAME AND COVER

4" TO 12"

M.H. STEPS (TYP.)

48" I.D.

1-1/2±

MULTIPLES OF 12"-16" RISERS

MIN. 6" OR GREATER FOR 27" THRU 42" SEWER PIPE

11" OR GREATER FOR 48" AND 54" SEWER PIPE

9.4' OR GREATER FOR 27" THRU 42" SEWER PIPE

11.4' OR GREATER FOR 48" AND 54" SEWER PIPE

6" MIN.

BENCH MAY BE BRICK AND MORTAR OR 3000# CONCRETE

NOTE: WHERE STUBS ARE PROVIDED FOR FUTURE CONNECTIONS BENCH SHALL BE SO FORMED.

STANDARD PRECAST CONCRETE MANHOLE III
60", 72", 84", AND 96" I.D.

DATE: JAN. 1996
REVISIONS: JAN. 2003

DRWG. NO. MAN-5

EXTENDED MONOLITHIC BASE OPTIONAL

#57 STONE BEDDING

BENCH 3" SLOPE

I.D. SEWER PIPE

60", 72", 84" AND 96" I.D.

9.4' OR GREATER FOR 27" THRU 42" SEWER PIPE

6" MIN.

16" MAX.

48" I.D.
ACID-RESISTANT MANHOLES SHALL BE REQUIRED A MINIMUM OF 2500 FT. DOWNSTREAM OF FORCE MAIN DISCHARGE. CONSULTANTS MUST PROPERLY DESIGN THE SYSTEM THAT THE APPROPRIATE NUMBER OF MANHOLES ARE PROTECTED FROM FUTURE DETERIORATION.

LINING SHALL BE PVC FABRIC EQUAL TO AMERON OR HDPE/PPR AS MANUFACTURED BY AGRU & AMERICAST.

T-LOCK OR AGRU SURE-GRIP JOINTS SHALL BE WELDED ACCORDING TO LINER MANUFACTURER’S RECOMMENDATIONS.
NOTES:
1. REINFORCING TO MEET ASTM A-185 FOR MESH AND ASTM A-615 FOR REBARS.
2. MANHOLE MEETS ALL REQUIREMENTS OF ASTM C-478
3. CONCRETE IS 4000 PSI COMpressive strength minimum

1'-4" or 2' CONE (TYPE 1)
8 ea.-1/4" BARS LONGITUDINALS

8" 24" I.D. 8"

REINFORCED BARS

NOTES:

2. CONCRETE SHALL MEET OR EXCEED THE TEST 4000 PSI MINIMUM COMPRESSIVE 28 DAY STRENGTH.

3. APPROVED STEPS SHALL BE EQUAL, SPACED @ 16 INCHES O.C.

4. REINFORCING SHALL BE A MINIMUM .12 IN. /FT. (MINIMUM OF 8 EACH - 1/4" BARS ON BACK FACE; & MINIMUM OF 4 EACH - #3 BARS ON FRONT FACE AND W3.4 [5 GAL.] WIRING.)

5. A MAXIMUM OF TWO LIFT HOLES PER SECTION.
NOTE: THE EFFLUENT ELEVATION SHOWN AT A MANHOLE IS ESTABLISHED FROM THE INFLUENT ELEVATION OF THE MANHOLE IMMEDIATELY DOWNSTREAM. ELEVATIONS SHOWN APPLY AT THE C OF MANHOLES & ARE BASED ON THE HORIZONTAL DISTANCE, C TO C M.H. USING PERCENT OF GRADE INDICATED.
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

4" APPROVED ADJUSTING RINGS

4" MIN., 12" MAX.

C.I. FRAME & COVER

STANDARD PRECAST MANHOLE

MH. STEPS

SUPPORT PIPE ON 6" #57 STONE BEDDING

REVERSE WYE BRANCH OR STD. TEE

FLOW

BRICK DAM (UP TO 0.5 DIA.) OR GPK METHOD FOR PVC

UNDISTURBED EARTH

3" MIN.

3000 # CONC.

UNDISTURBED EARTH

8" OF STONE BEDDING

NOTE: WHERE "A" IS GREATER THAN 2'-0" USE STANDARD DROP CONNECTION. CONCRETE ENCASEMENT MAY BE ELIMINATED IF DUCTILE IRON PIPE AND FITTING ARE USED FOR DROP CONNECTION.
NOTE: INSTALL (4) FOUR 1/2" X 1 1/2" STAINLESS STEEL 3/4" HEXAGONAL HEAD BOLTS AT 90 DEGREES. COUNTERBORE THE COVER SO THAT THE HEAD OF THE BOLT IS FLUSH OR JUST BELOW THE TOP OF THE COVER. PENTAGON HEAD BOLTS ARE OPTIONAL FOR VANDAL RESISTANT - WATERTIGHT OR NON-WATERTIGHT APPLICATIONS.
A VERTICAL LINE EXTENDING FROM THE VALVE OPERATING NUT SHALL COME NO CLOSER THAN 2" FROM THE EDGE OF THE OPENING.

MONOLITHIC DOGHOUSE, PARGE INSIDE & OUT

UNDISTURBED EARTH

NOTE: BONNET NUT & BOLT TO BE FREE OF CONCRETE SO BONNET CAN BE READILY REMOVED.

APPROVED GASKET (TYPICAL)

BRICK SUPPORT

MONITOR JOINTS & PARGE

RISER IF NECESSARY

MIN. REINF. 0.12 IN. 2/FT.

STD. MH. FRAME & WATER COVER

BYPASS VALVE SHALL HAVE STD. VALVE BOX AND COVER. (SEE WAT-7 FOR INSTALLATION OF VALVE BOX.)

4" MIN., 12" MAX. WITH ECCENTRIC CONE

2" OR 3" APPROVED ADJUSTING RINGS.

3000 # CONC.

# 57 STONE

DATE JAN. 1996
REVISIONS JAN. 2003

STANDARD VALVE MANHOLE (16” AND LARGER)

DRWG. NO. MAN-13
STEP SHALL BE CAST IN PLACE

5" WALL

4.75" 5.25"

STEP SHALL BE MADE WITH 3/8" STEEL REINFORCING BAR ENCAPSULATED IN POLYPROPYLENE PLASTIC.
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

1' - 4" FLAT TOP CONE
(TYPE 2)
(A) All thru pipe shall be fitted with an SDR 35 P.V.C. removable cap which shall be held in place by the interference (friction) fit between the pipe and cap.

(B) All caps shall be secured to the drop fitting with two (2) feet of galvanized chain secured with two steel machine screws, nuts and washers.

(C) Chamfer on all pipe sizes to be at a 15 degree angle.

(D) Height of vertical stack will be determined by engineer, but will not be less than two feet.

(E) Drop stack to be 6" or 8" SDR 35 P.V.C. pipe connected to drop fitting with standard gasketed joint.

(F) Vertical stack will be strapped to manhole at pipe joints. Straps shall be made of stainless steel or approved material noncorrosive to sewer gases.

(G) Shape invert as needed to provide smooth transition from drop connection discharge point to spring line of manhole invert.

(H) Elbow at bottom of the stack will be a 90 degree bend positioned in the direction of the flow in manhole with bench constructed to conform to manhole bench.

(I) Manhole opening to be cored as described in Part III and Part IV of the latest County Water and Sewer Specifications.

(J) Drop stack shall not be installed within 60 degrees of the access steps.

(K) Inside drop connections may be used as an alternative to exterior drop connections under special circumstances, i.e. bad soils, high water table, utility conflicts, and excessive depths.
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

C.I. FRAME & COVER
4" MIN.
12" MAX. W/ ECCENTRIC CONE
2" OR 3" APPROVED ADJUSTING RINGS

C.I. FRAME & COVER
8"
8"

COUNTY MAIN SEWER LINE
PIPE

SAMPLING MANHOLE
PROCESSED AND DOMESTIC WASTE LINE

BUILDING

THE UTILITY INSPECTOR WILL INSPECT THE SAMPLING MANHOLE.

SCHEMATIC LAYOUT

NOTE: BENCH MAY BE CONC. OR BRICK AND MORTAR.

NOTE: STONE BEDDING SHALL EXTEND TO THE OUTER BOUNDARY OF ALL UNDISTURBED AREAS SURROUNDING THE MANHOLE.

DATE
JAN. 1996
REVISIONS
JAN. 2003

SAMPLING MANHOLE
DRWG. NO.
MAN-17
WATER METER FURNISHED & INSTALLED BY THE COUNTY.

PROPERTY LINE

1'-0"
(SEE NOTE #3)

STREET

SEE APPROPRIATE DETAIL FOR TYPE BOX REQUIRED.

METER BOX

18" MIN.

METER SETTER

CUSTOMERS SERVICE LINE

CRIMP END

ANGLE VALVE SHALL BE VERTICAL AND ACCESSIBLE.

UTILITIES SERVICE LINE

HAND TAMPERED UP TO SERVICE TUBING

ADAPTER

CORP. STOP

ENLARGED VIEW

WATER MAIN

SADDLE MUST BE USED IF TAP IS MADE IN PVC OR A/C PIPE. ALL DI TO BE DIRECT TAPPED WHERE APPLICABLE.

NOTES:

1. METERSETTER SHALL BE CENTERED IN METER BOX AND COPPER TUBING ON OUTLET SIDE OF SETTER SHALL EXTEND 18" OUTSIDE OF BOX ON CUSTOMER'S SIDE. THIS COPPER TUBING SHALL BE CRIMPED ON THE END TO KEEP DIRT FROM ENTERING LINE.

2. COPPER TUBING TO THE CORPORATION STOP MUST BE FLARED OR COMPRESSION.

3. METER BOX SHALL BE LOCATED 1' INSIDE OF PROPERTY LINE. METER BOX MAY BE MOVED A REASONABLE DISTANCE INSIDE PROPERTY LINE IN ORDER TO INSTALL ON REASONABLY LEVEL GROUND.

4. SERVICES SHALL BE INSTALLED PRIOR TO TESTING.

5. BYPASS SHALL NOT BE ALLOWED FOR 5/8" OR 1" RESIDENTIAL AND IRRIGATION METERS.

DATE:
JAN. 1996

REVISIONS:
NOV. 2018

TYPICAL WATER METER CONNECTION FOR 3/4" & 1" SERVICES (5/8" AND 1" METERS)

DRWG. NO.
MET-1
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

CAST IRON METER BOX (TYPE 1)
(FOR 1" METERS)

DATE
JAN. 1996

REVISIONS

DRWG. NO.
MET-3

3/8" 10 1/2"
8 1/2" 9 1/2"
11"
1 1/4"
22"
6 1/2"
3 1/2"
16 1/2"
1"
1"
12"
11"
26 1/2"
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

CAST IRON METER BOX (TYPE 2)
(5/8" METERS)
Note: All the edges must be rounded with a radius value equal to 0.187, as long as the thickness of the wall allows it. Otherwise, this value should be adjusted to the specified thickness.
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

NOTES:
1. SADDLES SHALL BE USED FOR ALL 1 1/2" AND 2" TAPS.
2. WATER SERVICE LATERALS FOR 1 1/2" AND 2" SERVICES WILL BE TYPE-K HARD COPPER.
   CONNECTIONS FOR 1 1/2" AND 2" SERVICES WILL BE SWEAT 95/5 (LEADLESS) SOLDER AND
   A SUITABLE FLUX; APPROVED COMPRESSION FITTINGS; OR A ProPress SYSTEM.
   ALL CONNECTIONS AT CORPORATION STOPS WILL BE APPROVED COMPRESSION FITTINGS.
3. TAPS SHOULD BE MADE AT THE SPRING LINE OF THE MAIN LINE.
4. FOR DETAIL OF VAULT, SEE MET-7.
5. YOKE MUST BE INSTALLED WITH A METER SPACER THAT WILL BE FURNISHED TO THE CONTRACTOR
   BY THE UTILITIES DEPARTMENT INSPECTOR. THE SPACER WILL BE REMOVED BY THE UTILITIES
   DEPARTMENT WHEN THE METER IS SET.
6. BY-PASS VALVE SHALL NOT BE ALLOWED FOR IRRIGATION OR RESIDENTIAL SERVICES.
   ALL 1 1/2" AND 2" METER SETTERS FOR DOMESTIC USE AT RESIDENTIAL HOMES, CONDOMINIUMS,
   APARTMENTS, TOWNHOUSES, EXT. SHALL NOT BE EQUIPPED WITH A BYPASS VALVE. SETTERS FOR
   IRRIGATION USES SHALL NOT BE EQUIPPED WITH A BYPASS VALVE. ALL OTHER 1 1/2" AND 2" METER
   SETTERS SHALL BE EQUIPPED WITH A BYPASS.

NOTE: BYPASS SHALL
BE LOCATED
ABOVE OR AT
FLOOR LEVEL
OF METER VAULT.

METER VAULT (SEE MET-7)
FLANGED ANGLE VALVE
VALVE SEE NOTE #6

NO VALVE BOX REQUIRED, EXCEPT UNDER PAVEMENT/CONCRETE.
CURB STOP OUTSIDE OF BOX MUST BE LOCATED WITHIN 1 FOOT EDGE
OF METER BOX.
NOTE:
5" REINFORCEMENT
TOP REQUIRED
WHEN LOCATED
IN PAVED AREA.

1 1/2" & 2" KNOCK DOWN METER BOX
NOTES:

1. The contractor shall not install the piping until the meter and associated appurtenances have been purchased from the utilities department and are on the project, so that the correct length of pipe is installed according to this detailed configuration. Strainer, meter and test tee are provided by the county.

2. Contractor is required to coordinate with the utility department operation center, the pick up of a county approved meter. All connection fees and/or other applicable charges or fees must be paid prior to picking up the water meter, test tee and strainer from the utilities department.

3. 3" or 4" Approved Joint Restraint Devices are required on all mechanical joint (M.J.) connections. All fittings shall be mechanical joint.

4. All fittings inside of the vault shall be flanged.

5. No check valve or PRV is allowed on the inlet side of the meter.

6. For details of vault, see MET-9 and MET-10.
RESERVED FOR FUTURE USE
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

PLAN VIEW

SECTION VIEW

NOTES

1. CLEAR FLOW VAULT SHIPPED ASSEMBLED WEIGHING APPROX. 12,000 LBS.

DATE: APRIL 2001
REVISIONS: JUNE 2002

ALTERNATE VAULT DETAIL FOR
3" and 4" WATER METERS
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

TOP VIEW

BOTTOM VIEW

END VIEW

NOTE: M & B CONCRETE PRODUCTS INC'S VAULT.

DATE: Sept. 2001
REVISIONS: March 2002
ALTERNATE VAULT DETAIL FOR 3" and 4" WATER METERS
DRWG. NO. MET-10
SHT. 2 of 2
NOTES:
1. 1 1/2" - 2" TAPS SHOULD BE MADE AT THE SPRING LINE OF THE MAIN LINE.
2. SADDLE MUST BE USED IF TAP IS MADE IN PVC OR A/C PIPE.
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

THREADED MJ TEE FOR SERVICE CONNECTION

SECTION A-A

PLAN VIEW

NOTES:
1. CONCRETE BLOCKING NOT REQUIRED BEHIND THE TEE
2. ALL TEES SHALL HAVE A 2" FEMALE I.P. THREAD OUTLET
3. USE A 2" x 1 1/2" BUSHING TO REDUCE DOWN OUTLET SIDE OF CORP. STOP FOR 1 1/2" SERVICES
4. CORP. STOP SHALL BE 2" M.I.P. x 2" F.I.P. or 2" M.I.P. x 2" COMPRESSION FITTING
5. APPROVED COMPRESSION COUPLINGS SHALL BE THE ONLY ACCEPTABLE METHOD FOR CONNECTING PIPE TO CORP. STOP.
EXISTING SURFACE

V.D.O.T. TYPE "B" OR APPROVED SAND

WATER - 42" MIN. SEWER - 72" MIN.

AGGREGATE MATERIAL TYPE 1, SIZE 21A OR 21B.

PROPOSED WATER OR SEWER LINE (4" STONE BEDDING REQUIRED FOR SEWER)

MINIMUM TRENCH WIDTH TO SUPPORT TRENCH BOX

* NOTE: CAPPING DONE ON SHOULDERS, GRAVEL AND DIRT ROADS.
NOTES:

1. ALL BACKFILL AND COMPACTING SHALL BE IN ACCORDANCE WITH CURRENT VDOT STANDARDS AND SPECIFICATIONS.

2. WHENEVER THE PAVEMENT IS PERMITTED TO BE CUT, NOT OVER ONE-HALF OF THE ROADWAY SHALL BE DISTURBED AT ONE TIME. THE FIRST OPENING SHALL BE COMPLETELY RESTORED TO SATISFACTORY, TRAVELABLE CONDITION BEFORE THE SECOND HALF CAN BE OPENED.

3. IF THE OPEN CUT AREA IS GREATER THAN 16 SQ. FT. THEN THE PERMITTEE SHALL MILL AND RESURFACE ALL (ASPHALT) CONCRETE ROADWAY; AND RESURFACE ALL OTHER ROADWAY WITH LIKE MATERIAL THAT IS EXISTING FOR A DISTANCE OF 25 FEET ON EACH SIDE OF THE DISTURBED AREA FROM EDGE-OF-PAVEMENT TO EDGE-OF-PAVEMENT OR AS INDICATED ON THE APPROVED PLANS.

4. A GEOTECHNICAL ENGINEER SHALL ASCERTAIN THE CAUSE AND CERTIFY THE METHOD FOR ALL PAVEMENT STRUCTURE FAILURES AND BE PRESENT DURING BACKFILL OPERATIONS TO CERTIFY THE AGGREGATE HAS BEEN INSTALLED AT (95%) COMPACTION RATE. WHERE THE PAVEMENT IS DISTURBED OR DEEMED WEAKENED IN ITS ENTIRETY OR SUCH PORTIONS OF IT AS DEEMED DESIRABLE BY VDOT SHALL BE RESTORED OR REPLACED IN A MANNER WHICH IS SATISFACTORY TO VDOT'S RESIDENT ENGINEER OR HIS/HER REPRESENTATIVE.
MAXIMUM TRENCH WIDTH SHALL BE 33" FOR SEWER UP TO 12" DIAMETER. USE OUTSIDE PIPE DIAMETER PLUS 18" FOR SEWER 15" AND LARGER.

CLASS A

MIN = 1/4" INSIDE DIA.

3000 # CONCRETE OR BETTER

CLASS B

3/4" AND SMALLER CRUSHER RUN GRAVEL

MIN = 1/4" INSIDE DIA.

THOROUGHLY TAMPED BACKFILL
TOP OF THE GROUND

COMPACTION PER COUNTY SPECIFICATIONS

TOP OF PIPE

#57 STONE BEDDING

DIAMETER OF PIPE

4" (6" IN ROCK)

TRENCH WIDTH PER COUNTY SPECIFICATIONS

INITIAL BACKFILL TO BE THOROUGHLY COMPACTED AND FREE OF CLODS, DEBRIS, ETC.

NOTE: FOR DEPTHS IN EXCESS OF 14 FEET, STONE TO EXTEND TO 12" ABOVE PIPE.

NOTE: CONTRACTOR MUST INSURE THE STONE IS PROPERLY COMPACTED, ESPECIALLY UNDER THE HAUNCHES OF THE PIPE.
2", 4" & 6" VENT W/ BIRD SCREEN (1/4" GALVANIZED IRON MESH)

18" MIN.

FLANGED D. I. PIPE

24"

NOTE: PLACE 3000 PSI CONCRETE ON UNDISTURBED EARTH

NOTE: WHERE MANHOLE IS LOCATED IN FLOOD PLAIN, AIR VENT SHALL BE SET AT LEAST 12" ABOVE 100 YEAR FLOOD ELEVATION.

NOTE: PAINT EXPOSED PORTION OF PIPE WITH GREEN RUST INHIBITIVE PAINT.
USE DUCTILE IRON PIPE IF LESS THAN 3.5' COVER AT DITCH LINE AND CONC. CAP (3000 PSI CONCRETE) WHERE LESS THAN 2' OF COVER AT DITCH LINE.

NOTE:

1. HOUSE CONNECTION SHALL BE LAID AT AN ANGLE NOT GREATER THAN 45° FROM HORIZONTAL.

2. WHERE MAIN LINE DEPTH IS GREATER THAN 12', CONTRACTOR SHALL LAAY CONNECTION AS SHOWN PROVIDED THE ELEVATION OF CONNECTION AT THE PROPERTY LINE IS SUCH THAT THE LOT IS SERVED PROPERLY.

3. FOR PVC PIPE BEDDING, SEE DETAIL SEW-1.
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

3000 PSI CONCRETE

12"

PLANS

12"

GROUND SURFACE

3.5" MIN.

BOTTOM OF TRENCH

ELEVATIONS

12" MIN.

12" MIN.

NOTES:
1.) CONCRETE TO BE POURED AGAINST UNDISTURBED EARTH.
2.) SPACING OF ANCHORS:
   SLOPES: 20%-30% - EVERY 2 LENGTHS OF PIPE
   30%-50% - EVERY 1 1/2 LENGTHS OF PIPE
   OVER 50% - EVERY LENGTH OF PIPE

DATE:
JAN. 1996

REVISIONS:
NOV. 2010

SEWER ANCHORAGE IN SLOPES
GREATER THAN OR EQUAL TO 20%

DRWG. NO.
SEW-5
NOTE: VENT SHALL BE AS SEW-3.

DISTANCE SHALL BE EQUIVALENT TO THE PIPE DIAMETER OR GREATER.
NOTE: INSERT-A-TEE CAN BE CONNECTED TO PVC, PERMA-LOC, SPIROLITE, SLIP LINER, DUCTILE IRON, THIN WALL MAIN LINES, CONCRETE (MAINLINES AND MANHOLES), CLAY, ALL THICK WALLED MAIN LINES. IT IS A THREE PIECE CONNECTION THAT IS COMPRESSION-FIT INTO THE CORED WALL OF THE MAIN LINE. IT CONSISTS OF SIDE SERVICES OF 4" THROUGH 12" AND FITS ALL MAIN LINE DIAMETER.
EXISTING GROUND ELEVATION

FILL 2' ABOVE TOP OF PIPE

SEWER PIPE

1' (UNLESS ROCK IS ENCOUNTERED)

MIN. 2'

** CLAY DAM (MIN. IMPERVIOUSNESS=10 CM²/SEC)
*ALTERNATE MATERIALS INCLUDE SOIL MIXED WITH CEMENT AND CONCRETE. (MATERIALS TO BE APPROVED BY ENGINEER PRIOR TO PLACING.)
TO BE DETERMINED
BY ENGINEER/INSPECTOR

MIN. 1'

SEWER PIPE

MIN. 1'

TRENCH LIMITS

MIN. 1'

CLAY DAM

CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES
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**NOTE**

1. THE TEST HEAD SHALL BE PLACED AT THE TOP OF THE MANHOLE IN ACCORDANCE WITH THE MANUFACTURER’S RECOMMENDATIONS.


3. THE MANHOLE SHALL PASS IF THE TIME FOR THE VACUUM READING TO DROP FROM 10 IN. OF MERCURY TO 9 IN. OF MERCURY MEETS OR EXCEEDS THE VALUES INDICATED IN TABLE 1.

4. IF THE MANHOLE FAILS THE INITIAL TEST, NECESSARY REPAIRS SHALL BE MADE BY AN APPROVED METHOD. THE MANHOLE SHALL THEN BE RETESTED UNTIL A SATISFACTORY TEST IS OBTAINED.
1. Cleanouts to be installed every 100’ and at every 90° bend or as specified by latest plumbing codes.

2. Traffic bearing caps required in traffic areas.

3. Plastic screw plug should be flush with finished grade.

4. Piping beyond cleanout to be installed per latest plumbing codes.

#57 stone bedding required to top of pipe (PVC).

Chesterfield County Department of Public Utilities

Cleanout Detail

Date: Jan. 2003

Revisions

Drwg. No. SEW-11
M.H. FRAME & COVER
M.H. STEPS
ANCHOR A.R.V. W/U-BOLT
GALVENIZED STRAP

2" AIR RELEASE
FINISHED GRADE
LEVER 2" BALL VALVE
ATTACH TO MANHOLE W/LAG ANCHORS
2" THREADED ADAPTOR
CONCRETE COVER
HPDE FORCE MAIN W/FUSED 2" RISER

CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

AIR RELEASE VALVE FOR FORCE MAINS

DATE: June 2004
REVISIONS:
DRING. NO. SEW-12
### WASTEWATER SYSTEMS 48 AND LARGER

<table>
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<th>PIPE DIAMETER</th>
<th>ALLOWABLE INFILTRATION/EXFILTRATION (GAL./HOUR/100 FT.)</th>
<th>(QT./MIN./100 FT.)</th>
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<td>MINIMUM TIME (MIN:SEC)</td>
<td>TIME FOR LENGTH (L) (SEC)</td>
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*The 3.5 psig test pressure shall be increased by adding the average vertical height in feet of ground water above the sewer pipe invert, divided by 2.31 but the maximum starting test pressure shall not exceed 9 psig.
MAXIMUM ALLOWABLE LEAKAGE FOR THE WATER MAIN WILL BE CALCULATED USING THE FOLLOWING FORMULA:

\[
L = \frac{SD\sqrt{P}}{148000}
\]

WHERE:

- \( L \) = MAXIMUM ALLOWABLE LEAKAGE, GALLONS/HOUR
- \( S \) = LENGTH OF PIPE IN TEST SECTION, IN FEET
- \( D \) = NOMINAL DIAMETER OF TESTED PIPE, IN INCHES
- \( P \) = TEST PRESSURE, POUNDS PER SQUARE INCH 150 PSI OR 1 1/2 THE WORKING PRESSURE WHICHEVER IS GREATER MEASURED AT THE HIGH POINT OF THE TEST SYSTEM.
PIPE DIAMETER (IN.) | MINIMUM TIME (MIN:SEC) | TIME FOR LENGTH (L) (SEC) | SPECIFICATION TIME FOR LENGTH (L) SHOWN (MIN:SEC)
--- | --- | --- | ---
18 | 2:24 | 1:44 | 100 FT 150 FT 200 FT 250 FT 300 FT 350 FT 400 FT 450 FT
21 | 3:00 | 1:80 | 2:28 | 3:00 | 4:30 | 6:00 | 7:30 | 9:00 | 10:30 | 12:00 | 13:30

*THE 3.5 PSIG TEST PRESSURE SHALL BE INCREASED BY ADDING THE AVERAGE VERTICAL HEIGHT IN FEET OF GROUND WATER ABOVE THE SEWER PIPE INVERT, DIVIDED BY 2.31 BUT THE MAXIMUM STARTING TEST PRESSURE SHALL NOT EXCEED 9 PSIG.

JOINT ACCEPTANCE TEST FOR CONCRETE SEWER LINES 27” AND LARGER IN DIAMETER

1. PRESSURIZE THE JOINT WITH AIR TO 3.5 PSI GREATER THAN THE PRESSURE EXERTED BY GROUND WATER ABOVE THE PIPE. ALLOW THE AIR PRESSURE AND TEMPERATURE TO STABILIZE BEFORE SHUTTING OFF THE AIR SUPPLY.

2. IF THE PRESSURE HOLDS, OR DROPS LESS THAN 1 PSI IN 5 SECONDS, THE JOINT IS ACCEPTABLE.

NOTE: FOR EVERY FOOT OF GROUND WATER ABOVE THE SPRING LINE ADD 0.43 PSI TO THE TEST PRESSURE. IF THE PRESSURE REQUIRED FOR THE TEST EXCEEDS 6 PSIG, USE THE INFILTRATION TEST.
1. IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO DESIGN THE PUBLIC WATER SYSTEM TO MINIMIZE THE NUMBER OF AIR RELEASE VALVES BY ELIMINATING HIGH POINTS WHERE REASONABLY FEASIBLE AND TO PROPERLY SIZE THE AIR RELEASE VALVE TAKING INTO CONSIDERATION ALL THE DESIGN FACTORS, AND KEEPING IN MIND THAT A 1" AIR RELEASE VALVE FOR 16" WATER LINES IS DESIRABLE. ORIFICE SIZE SHALL BE NOTED ON PLANS.

2. ALL COPPER FITTINGS WILL BE FLARE OR COMPRESSION TYPE.

3. SADDLE MUST BE USED IF TAP IS MADE IN PVC.

4. WHERE THE AIR RELEASE VALVE IS REMOTE FROM THE WATER LINE THERE MUST BE CONTINUOUS RISE IN THE COPPER SUPPLY LINE TO THE AIR RELEASE VALVE AND NO TRAP SHALL BE PERMITTED.

5. AIR RELEASE VALVE TO BE PLACED WHERE NOT SUBJECT TO FLOODING.
2'-3" 6" 8"

FINISHED GRADE

#57 STONE AGGREGATE
EXTENDED 4'-0" BOTH SIDES OF CENTERLINE OF M.H. ALONG WATER MAIN

2" MUELLER H-10046 CORP. STOP (2" MIP X FIP)
20" AND LARGER WATER MAIN WITH 4'-6" (MIN.) COVER

FINISHED GRADE

PLAN

4" D.I. PIPE CLASS 51

STANDARD SMALL PIPE HANGER AS BRACING. FASTEN TO M.H. WITH 1 1/4" WEJ-IT DRILLED-IN ANCHOR

4"-90° BEND

SCREENING BOLTED TO FLANGE

SMALL ORIFICE AIR VALVE (3/16") KINETIC TYPE

* PLACE SUFFICIENT BLOCKING OR COLLAR TO SUPPORT BEND.

ELEVATION

AIR RELEASE VALVE

4'-0" DIA. M.H.

PIPE HANGER SUPPORTS

1" X 12" BRASS NIPPLE

2" BALL VALVE WITH HANDLE

2" MUELLER H-10046 CORP. STOP (2" MIP X FIP)

#57 STONE AGGREGATE EXTENDED 4'-0" BOTH SIDES OF CENTERLINE OF M.H. ALONG WATER MAIN

ALL PIPING SHOULD BE BRASS.

SERVICE SADDLE REQUIRED

AIR RELEASE VALVE TO BE PLACED WHERE NOT SUBJECT TO FLOODING.

2" AIR RELEASE VALVE ASSEMBLY

2"x6" BRASS NIPPLE

2"x2"x1" BRASS TEE

2"x2" BRASS NIPPLE

2" BALL VALVE W/HANDLE

DATE JAN. 1996

REVISIONS

June 2004

DRWG. NO. WAT-2
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

AQUARIUS 103 CHESTERFIELD 2"
FLUSHING HYDRANT PART #CHSFLD30

INSTALLATION DETAIL MAINGUARD
# 78 BLOW-OFF HYDRANT (MODIFIED)

GROUND LINE

MAINGUARD 2" BLOW OFF HYDRANT
(SPECIFY DEPTH OF BURY)

UNDISTURBED EARTH OR THRUST BLOCK

#57 STONE
2" BRASS STREET "L"

2" BLACK IRON COUPLING FIPT FIPT

CHESTERFIELD TYPE
2" FIPT 2.5" MSFT
BRASS BUSHING WITH
CAP & CHAIN

2" BLACK IRON NIPPLE - 6" LONG
MIPT MIPT

0.5" BLACK IRON VALVE STEM WITH
0.75" PVC SLEEVE SCH. 20

BLIND CAP
APPROVED BLOCKING

WATER MAIN
APPROVED FLUSHING HYDRANT
BRASS OR BRONZE

UNION

6"X6"X2"TEE

WATER MAIN

* DISTANCE FROM HYDRANT TO PROPERTY LINE (R/W LINE)
NOTE:

1. THE LARGE BLOW-OFF SHALL BE DRAINED TO PREVENT FREEZING.

2. ALL PIPE AND FITTINGS SHALL BE FLANGED OR M.J. RESTRAIN JOINTS.

3. WEEP HOLE TO BE DRILLED 2' BELOW GROUND LEVEL TO SUFFICIENTLY ALLOW STAND PIPE TO DRAIN. BACKFILL WITH AT LEAST 1/2 CUBIC YARD OF #57 CLEAN STONE.
NOTES:
1. WHERE A DITCH EXISTS OR PROPOSED FLUSHING HYDRANT IS TO BE PLACED BETWEEN THE DITCH AND EDGE OF PAVEMENT ON LEVEL GROUND. IF THIS IS NOT POSSIBLE, THE UTILITY CONSTRUCTION INSPECTOR MUST BE CONSULTED. FLUSHING HYDRANT SHOULD BE 1’ IN FRONT OF PROPERTY PIN OR BEYOND DITCH, MINIMUM 3.5’ COVER UNDER DITCH.

2. IN THE EVENT THAT THE WATER SERVICES AND BOXES CANNOT BE ARRANGED AS REFLECTED IN THIS DETAIL, AT LEAST 10 FEET HORIZONTAL SEPARATION IS REQUIRED BETWEEN THE WATER METER BOX/SERVICE LINE AND FLUSHING HYDRANT.
NOTE: CONTRACTOR SHALL USE IN ACCORDANCE WITH FLUSHING SCHEDULE; SEE PART III & IV (SECTIONS ENTITLED "DISINFECTION SYSTEM" AND "SUPPLEMENTAL PROCEDURES FOR DISINFECTING, TESTING, AND FLUSHING) AND TABLE 1 ENTITLED "FLUSHING SCHEDULE."
USE STANDARD DESIGNED VALVE BOX OF THE APPROPRIATE LENGTH (HEIGHT) UTILIZING APPROVED MANUFACTURERS OF VALVE BOX APPURTEANCES.
MAX. DEFLECTION PER JOINT
= 1/2 MFRS. RECOMMENDED
AMOUNT, AS PER WAT-11.

LOWERED SECTION TO BE OF DUCTILE IRON MECHANICAL JOINT PIPE
WITH RESTRAINED JOINTS AT ANY INCLUDED JOINTS. THE ENGINEER
SHALL CALCULATE LENGTH OF RESTRAINED SECTION.

1. LOWERED SECTION TO BE OF DUCTILE IRON MECHANICAL JOINT PIPE
WITH RESTRAINED JOINTS AT ANY INCLUDED JOINTS. THE ENGINEER
SHALL CALCULATE LENGTH OF RESTRAINED SECTION.

2. THRUST BLOCKS FOR VERTICAL BENDS MAY BE DELETED WITH
RESTRAINED JOINTS.

3. UNDER VOIDS AND AROUND THE COUPLING OR THE ENDS OF THE A/C PIPE TO
SUPPORT ENDS WHILE INSTALLING THE SUPPORT COUPLINGS ONTO ENDS. IE. 4x4
SALT TREATED TIMBER SUPPORT MUST BE LEFT AS A PERMANENT STABILIZATION.
EQUIPMENT FOR APPROXIMATING HYDRANT FLOWS (per R.C. Dennett, Engr. Natl. Bd. of Fire Underwriters):

The equipment necessary consists of either a standard pitot tube or a hydrant cap tapped to take a pressure gage. If the hydrants used as a discharge point for flushing has two or more outlets a pressure gage on one outlet while another outlet is flowing will give approximately the same results as the use of a pitot tube.

<table>
<thead>
<tr>
<th>FLOWING PRESSURE IN</th>
<th>OUTLET PRESSURE MEASURED BY PITOT GAGE.</th>
</tr>
</thead>
<tbody>
<tr>
<td>lb/in ²</td>
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</tr>
<tr>
<td>1</td>
<td>150</td>
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<tr>
<td>2</td>
<td>210</td>
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<td>260</td>
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<td>39</td>
<td>1250</td>
</tr>
<tr>
<td>40</td>
<td>1280</td>
</tr>
</tbody>
</table>

*Computed with coefficient, C = 0.90, to nearest 10 gals. per min.
+From Natl. Bd. of Fire Underwriters.

OUTLET DIAMETER IN INCHES

<table>
<thead>
<tr>
<th>OUTLET PRESSURE</th>
<th>2 3/8</th>
<th>2 1/2</th>
<th>2 5/8</th>
<th>2 3/4</th>
<th>2 7/8</th>
<th>3</th>
<th>3 1/8</th>
<th>3 7/8</th>
<th>4</th>
<th>4 3/8</th>
<th>4 1/2</th>
<th>4 5/8</th>
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<tbody>
<tr>
<td>U.S. GALLONS PER MINUTE</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>
PUMP HAS TO HAVE CAPABILITY OF PUMPING WITH A GREATER PSI THAN THE PSI OF THE EXISTING SYSTEM.

ALL FITTINGS USED MUST BE RESISTANT TO DECHLORINATION CHEMICALS.

THE FIRE HOSE NEEDS TO BE DISCHARGED INTO AN AREA THAT WILL CAUSE NO ENVIRONMENTAL/EROSION PROBLEMS. THIS POINT WILL BE MONITORED TO MAKE SURE THAT THE DISCHARGING WATER IS DECHLORINATED.

THIS DETAIL IS A RECOMMENDED DESIGN CONCEPT. ALTERNATE METHOD(S) MAY BE SUBMITTED TO THE UTILITIES DEPARTMENT'S CONSTRUCTION SECTION FOR APPROVAL PRIOR TO SCHEDULED FLUSHING.
### CHESTERFIELD COUNTY
#### DEPARTMENT OF PUBLIC UTILITIES

<table>
<thead>
<tr>
<th>PIPE MATERIAL TYPE AND SIZE</th>
<th>MAXIMUM DEFLECTION AT EACH JOINT</th>
<th>DEFORMATIONS (INCHES EACH JOINT) 19' LAYING LENGTH</th>
<th>RADIUS (MINIMUM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DUCTILE IRON (PUSH-ON JOINT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6&quot; TO 12&quot;</td>
<td>2° 30'</td>
<td>9.5&quot;</td>
<td>413'</td>
</tr>
<tr>
<td>14&quot; TO 16&quot;</td>
<td>2° 00'</td>
<td>7.5&quot;</td>
<td>516'</td>
</tr>
<tr>
<td>18&quot; +</td>
<td>1° 30'</td>
<td>5.5&quot;</td>
<td>688'</td>
</tr>
<tr>
<td>DUCTILE IRON (MECHANICAL JOINT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td>3° 30'</td>
<td>13.5&quot;</td>
<td>291'</td>
</tr>
<tr>
<td>8&quot; TO 12&quot;</td>
<td>3° 00'</td>
<td>11.5&quot;</td>
<td>344'</td>
</tr>
<tr>
<td>16&quot;</td>
<td>2° 00'</td>
<td>7.5&quot;</td>
<td>516'</td>
</tr>
<tr>
<td>24&quot;</td>
<td>1° 30'</td>
<td>5.5&quot;</td>
<td>688'</td>
</tr>
</tbody>
</table>

Note: Any deflection not listed for iron pipe may be derived by:

\[
R = \frac{90°}{\frac{1}{2} \text{ Manufacturer's } X \frac{18'' \times 2}{\text{Max. Jt. Deflection}}} \text{ Deflection} = \tan \text{ joint deflection} \times 18' \times 12
\]

### PVC PIPE (C-900, C-905)

<table>
<thead>
<tr>
<th>PIPE NOM. DIA.</th>
<th>PIPE O.D.</th>
<th>RADIUS (MIN.)</th>
<th>PRESSURE RATING - DIMENSION RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>6.9&quot;</td>
<td>272.5'</td>
<td>150 psi DR 18</td>
</tr>
<tr>
<td>8&quot;</td>
<td>9.05&quot;</td>
<td>326.3'</td>
<td>150 psi DR 18</td>
</tr>
<tr>
<td>10&quot;</td>
<td>11.10&quot;</td>
<td>377.5'</td>
<td>150 psi DR 18</td>
</tr>
<tr>
<td>12&quot;</td>
<td>13.20&quot;</td>
<td>430.0&quot;</td>
<td>150 psi DR 18</td>
</tr>
<tr>
<td>14&quot;</td>
<td>15.30&quot;</td>
<td>482.5'</td>
<td>165 psi DR 26</td>
</tr>
<tr>
<td>16&quot;</td>
<td>17.40&quot;</td>
<td>535.0&quot;</td>
<td>165 psi DR 26</td>
</tr>
<tr>
<td>18&quot;</td>
<td>19.50&quot;</td>
<td>587.5&quot;</td>
<td>165 psi DR 26</td>
</tr>
<tr>
<td>20&quot;</td>
<td>21.60&quot;</td>
<td>640.0&quot;</td>
<td>165 psi DR 26</td>
</tr>
<tr>
<td>24&quot;</td>
<td>25.80&quot;</td>
<td>745.0&quot;</td>
<td>165 psi DR 26</td>
</tr>
</tbody>
</table>

Notes:
1. Any radius not listed for PVC pipe may be derived by: Do 300 + 100 (Do = outside diameter in feet)
2. Due to the difficulty of measuring deflections on curved pipe, no deflections are given. It is expected that curved water lines will be properly shown on the plans and staked in the field.
NOTES:

(A) WATERLINE PIPE AT CREEK CROSSINGS, RIVERS, SWALES, ETC. SHALL BE DUCTILE IRON (CLASS 51 OR HIGHER). IF WATERLINE IS OFFSET AROUND CREEK CULVERTS, ENTIRE RUN OF OFFSET SHALL BE DUCTILE IRON. ALL FITTINGS SHALL BE INSTALLED WITH AN APPROVED MECHANICAL JOINT RESTRAINT SYSTEM.

(B) NO JOINTS ARE TO BE INSTALLED UNDER THE CREEK, WHERE POSSIBLE.
NEW DUCTILE IRON PIPE

NOTE "C"

EXISTING A/C or CI PIPE

PROPOSED PIPELINE OR STRUCTURE

EXISTING A/C or CI PIPE

SEE NOTE E.

NOTE:
WHEN CONNECTING TO A/C WATERLINE, THE MACHINED END OF THE NEW PIPE MUST BE REMOVED PRIOR TO INSTALLATION OF THE CAST COUPLINGS.

A. WHEN CROSSING UNDER AN EXISTING CEMENT ASBESTOS (A/C) OR CAST (CI) WATER MAIN WITH A NEW PIPELINE OR STRUCTURE, WHERE SUCH CROSSING MAY RESULT IN A STRESS FAILURE TO THE EXISTING LINE, THE EXISTING LINE SHALL BE REPLACED WITH A SECTION OF DUCTILE IRON PIPE PRIOR TO CONSTRUCTION OF THE PROPOSED PIPELINE OR STRUCTURE.

B. WHENEVER A PROPOSED PIPELINE CROSSES UNDER AN EXISTING WATER MAIN, THE NEW TRENCH SHALL BE BACK FILLED COMpletely WITH CRUSHED STONE AND COMPACTED AS REQUIRED.

C. REPLACEMENT GUIDELINES BASED UPON TRENCH WIDTH CRITERIA:
CONTRACTOR SHALL USE EXTREME CAUTION WHEN CROSSING EXISTING WATER LINES. WHERE CROSSINGS CAN NOT BE ACCOMPLISHED WITHOUT EXCEEDING TRENCH WIDTH AS SPECIFIED BELOW, CONTRACTOR, AT HIS EXPENSE, SHALL REPLACE THE EXISTING A/C OR CI WATER LINE AS DEPICTED BELOW.

1. REPLACE EXISTING 4" – 6" A/C OR CI PIPE WHERE WIDTH OF NEW TRENCH CROSSING IS >2 FEET.
2. REPLACE EXISTING 8" A/C OR CI PIPE WHERE WIDTH OF NEW TRENCH CROSSING IS >4 FEET.
3. REPLACE EXISTING 10" – 16" A/C OR CI PIPE WHERE WIDTH OF NEW TRENCH CROSSING IS >6 FEET.

D. PIPELINE TO BE REPLACED SHALL EXTEND A MINIMUM OF 3 FEET BEYOND THE EDGES OF THE NEW TRENCH OR TO SUCH A POINT AS TO PROVIDE A MINIMUM OF 3 FEET OF UNDISTURBED EARTH BENEATH THE EXISTING PIPELINE.

E. UNDER VOIDS AND AROUND THE COUPLING OR THE ENDS OF THE A/C PIPE TO SUPPORT ENDS WHILE INSTALLING THE SUPPORT COUPLINGS ONTO ENDS. IE. 4x4 SALT TREATED TIMBER SUPPORT MUST BE LEFT AS A PERMANENT STABILIZATION.
RESILIENT SEAT VALVE (BUTTERFLY VALVE- 16” & OVER)

CONCRETE THRUST BLOCK (SEE BLK-1, BLK-2)

CHECK VALVE MATERIALS KEY
1. CONCRETE THRUST BLOCK (SEE BLK-1, BLK-2)
2. CLASS 52 D.I. PIPE
3. SWING CHECK VALVE (M.A.)
4. RESILIENT SEAT VALVE (BUTTERFLY VALVE- 16” & OVER) AND BOX (M.A.)
5. 90° BEND (M.A.)
6. ANCHORING TEE (M.A.)
7. CLASS 52 D.I. PIPE
8. RESILIENT SEAT VALVE (BUTTERFLY VALVE- 16” & OVER) AND BOX (M.A.)

NOTES
(A) PROVIDE APPROVED RETAINER GLANDS ON ALL M.J. FITTINGS AND VALVES
(B) ALL FITTINGS SHALL BE ASA A21.10 (AWWA C900)
(C) ALL GATE VALVES SHALL BE NON-RISING STEM
(D) MJ = MECHANICAL JOINT, A = ANCHOR BOLT

CHECK VALVE (DIRECT BURY)
NOTES:

ALL MATERIAL USED MUST MEET COUNTY’S APPROVED LIST OF PRODUCTS AS REFLECTED IN THE COUNTY’S LASTEST WATER AND SEWER SPECIFICATIONS AND PROCEDURES MANUAL.

IF SAMPLING STATION IS LOCATED WITHIN THE VDOT R/W WHERE ROADSIDE DITCHES EXIST, IT SHOULD BE INSTALLED BEHIND THE ROADSIDE DITCH.
NOTE:
CONTRACTOR MUST USE APPROPRIATE MATERIALS TO ADAPT TO THE SIZES OF THE ANGLE VALVES ON THE METER YOKES, DOUBLE CHECK ASSEMBLY BALL VALVES OR TEMPORARY SAMPLING LOCATIONS.

NOTES:
1. DIRECT THE SAMPLE POINT AWAY FROM THE METER BOX TO PREVENT ANY WATER FROM SEEPING INTO THE BOX.
2. INSULATE DURING WINTER MONTHS
3. THIS IS A TEMPORARY SAMPLING POINT AND MUST BE PROPERLY ABANDONED BEFORE LINES ARE ACCEPTED.
1. Use this detail when distance from top of operating nut of valve to finish grade exceeds 6" - 0".
2. All steel, welded valve extensions shall be coated with oil based enamel or other rust-preventive coating.
3. Specified length will be total length of adjustment, as shown.
4. The 2" square operating nut on top shall be welded to form a complete box with no openings.
5. 2-1/2" square socket on bottom shall be tapped on 4 sides for minimum 5/16" N.C. socket head set screws and screws shall be provided.
6. Center extension bar shall be 1-1/2" diameter round solid steel.
7. A 4-1/2" diameter x 1/4" steel centering disc shall be welded to the 1-1/2" steel rod, positioned 2" below the 2" square operating nut as shown.
<table>
<thead>
<tr>
<th>SIZE OF VALVE</th>
<th>LENGTH</th>
<th>VOLUME CU-FT</th>
</tr>
</thead>
<tbody>
<tr>
<td>16&quot;</td>
<td>30&quot;</td>
<td>0.63</td>
</tr>
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<td>1.00</td>
</tr>
<tr>
<td>36&quot;</td>
<td>54&quot;</td>
<td>1.13</td>
</tr>
</tbody>
</table>
1.5" CHECK VALVE UNION (TYP.)

1.5" x 1.25" INCREASER ATTACH TO VAULT WALL

1" REMOVABLE GRATE

1/3 HP SUMP PUMP

1.5" SCH. 80 PVC TO GRADE TERMINATE WITH FLAP VALVE.

1.5" GATE VALVE

PROVIDE HIGH WATER LEVEL ALARM TO VAULT WALL, LEVEL AT FLOOR ELEV.

NOTE:

A sump pump will be required if the vault or chamber is unable to be kept free of standing water.

Sump pumps must discharge to landscape. Connections to sewers (storm or sanitary) or catch basins are not permitted.