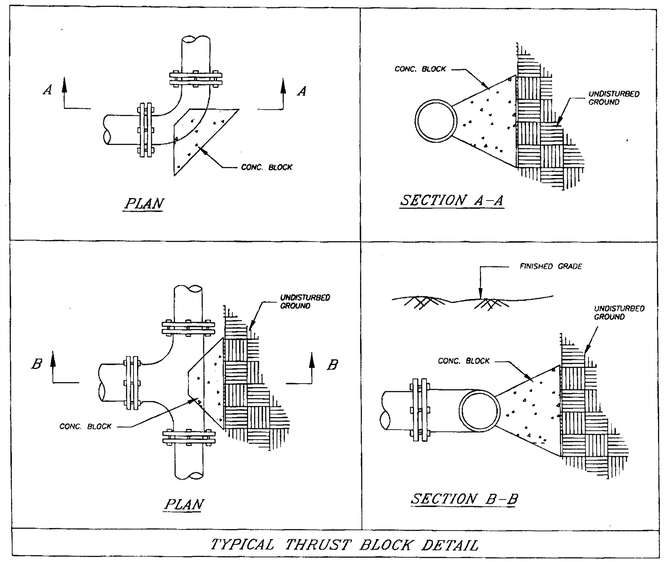



TYPICAL THRUST BLOCK DETAIL

| CONCRETE THRUST BLOCKS, MINIMUM AREA OF BEARING | | | | | | |
|---|---|---|---|---|---|---|
| Pipe Size | 90° Bend | | 45° Bend | | Tees, Plugs, Caps, & Hydrants | |
| in. | $ft^2$ | $m^2$ | $ft^2$ | $m^2$ | $ft^2$ | $m^2$ |
| 4 | 2 | 0.19 | 2 | 0.19 | 2 | 0.19 |
| 6 | 5 | 0.46 | 3 | 0.28 | 4 | 0.37 |
| 8 | 8 | 0.74 | 5 | 0.46 | 6 | 0.56 |
| 10 | 13 | 1.21 | 7 | 0.65 | 9 | 0.84 |
| 12 | 18 | 1.67 | 10 | 0.93 | 13 | 1.21 |

| CONCRETE THRUST BLOCKS, MINIMUM AMOUNT OF CONCRETE | |
|---|---|
| **Size of Fitting** | **Cubic Yards** |
| 3"-8" | ¾ |
| 10"-12" | 1 ½ |

| THRUST @ 225 PSI WATER PRESSURE FOR FITTINGS | | | |
|---|---|---|---|
| **Pipe** | **90° Bend** | **45° Bend** | **Dead End** |
| 4 | 2,559 | 1,385 | 1,810 |
| 6 | 5,288 | 2,862 | 3,739 |
| 8 | 9,097 | 4,923 | 6,433 |
| 10 | 13,685 | 7,406 | 9,677 |
| 12 | 19,353 | 10,474 | 13,685 |

Water Pressure > 100 psi MULTIPLY Table by Ratio of Pressure ...150 psi/100 psi = 1.5 Factor 2007 NFPA 24

Minimum Thrust Block Size

$A_b = (h)(b) = T\ (S_f) / S_b$

(h) = block height, (b) = block width

T = thrust force table,

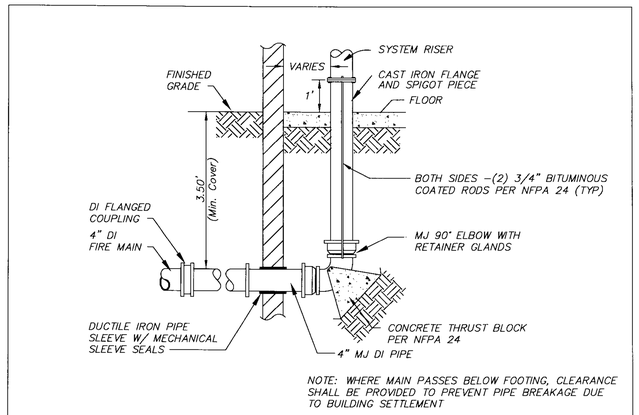
$S_f$ = safety factor (1.5)

$S_b$ = soil bearing from table

| SOIL | BEARING $lb/ft^2$ |
|---|---|
| SOFT CLAY | 1,000 |
| SAND | 4,000 |
| SAND CLAY | 6,000 |
| HARD CLAY | 9,000 |

| ROD NUMBER – DIAMETER COMBINATIONS | | | | |
|---|---|---|---|---|
| **Pipe Size** | **5/8 in.** | **3/4 in.** | **7/8 in.** | **1 in.** |
| 4 | 2 | | | |
| 6 | 2 | | | |
| 8 | 3 | 2 | | |
| 10 | 4 | 3 | 2 | |
| 12 | 6 | 4 | 3 | 2 |

Table derived using pressure of 225 psi (15.5 bars) and design stress of 25,000. 2007 NFPA 24 Table 10.8.3.1.2.2



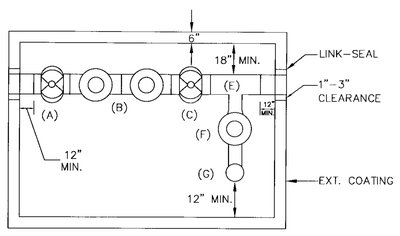

FIRE PROTECTION SYSTEM RISER

NO SCALE

FIRE PROTECTION NOTES:

1. ALL RODS, NUTS, BOLTS, WASHERS, CLAMPS AND OTHER RESTRAINING DEVICES SHALL BE PROTECTED FROM CORROSION WITH A BITUMINOUS COATING.
2. METHOD OF PIPE RESTRAINT SHALL BE CONCRETE THRUST BLOCKING IN ACCORDANCE WITH DETAILS ON THIS DRAWING.
3. MINIMUM DEPTH OF COVER FOR FIRELINE IS 3.5' MEASURED FROM THE TOP OF PIPE TO FINISHED GRADE.
4. LOW VOLTAGE FIRE ALARM CIRCUITS, 24 VDC, CANNOT BE RUN IN CONDUIT COMMON WITH VAC CIRCUITS EXCEEDING 50 VOLTS.
5. A METAL SIGN SHALL BE PERMANENTLY INSTALLED AND READILY VISIBLE AT THE FIRE DEPARTMENT CONNECTION. THE SIGN SHALL HAVE LETTERS SIX INCHES IN HEIGHT. THE LETTERS SHALL BE OF RED REFLECTIVE MATERIAL ON A WHITE REFLECTIVE BACKGROUND. THE VERBIAGE MAYBE "FDC" OR "FIRE DEPT CONNECTION" IN ACCORDANCE WITH THE INTERNATIONAL FIRE CODE (2009 EDITION) SECTION 912. WHEN THE FDC PROTECTS MULTIPLE ADDRESSES WITHIN A COMPLEX, BUT NOT ALL OF THE ADDRESS, THE SPECIFIC ADDRESSES BEING PROTECTED SHALL BE SHOWN ON THE FDC SIGN. MINIMUM LETTER SIZE SHALL BE TWO INCHES.
6. NO LANDSCAPING SHALL BE PLACED WITHIN A THREE FOOT RADIUS OF ANY FIRE HYDRANT, FIRE DEPARTMENT CONNECTION FOR FIRE PROTECTION SYSTEMS OR FIRE SUPPRESSION SYSTEM CONTROL VALVE. LANDSCAPING SHALL BE OF A TYPE THAT WILL NOT ENCROACH IN THE THREE FOOT RADIUS AT MATURITY.
7. THREADS FOR FDC AND HYDRANTS SHALL BE CONSISTENT WITH PRINCE GEORGE COUNTY FIRE DEPARTMENT EQUIPMENT

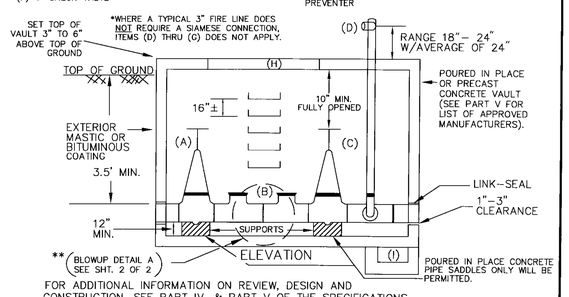
## PRINCE GEORGE COUNTY DEPARTMENT OF PUBLIC UTILITIES




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" CHECK VALVE
* (G) 4" – 90° BEND
(H) JD–2AL 4' X 4' BILCO DOOR, OR AS MANUFACTURED BY VA. SPRINKLER COMPANY, OR APPROVED EQUAL.
(I) SUMP WHERE WATER TABLE IS A PROBLEM OR GRAVITY DRAIN WHERE WATER TABLE IS NOT A PROBLEM.
** (J) BYPASS LINE W/DETECTOR METER & BACKFLOW PREVENTER

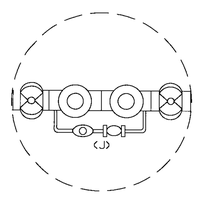
*WHERE A TYPICAL 3" FIRE LINE DOES NOT REQUIRE A SIAMESE CONNECTION, ITEMS (D) THRU (G) DOES NOT APPLY.




FOR ADDITIONAL INFORMATION ON REVIEW, DESIGN AND CONSTRUCTION, SEE PART IV, & PART V OF THE SPECIFICATIONS.

| DATE JAN. 2008 | 3" OR LARGER DOUBLE CHECK ASSEMBLY AND VAULT | DRWG. NO. FIR–1 |
|---|---|---|
| REVISIONS | | SHT. 1 OF 2 |

## PRINCE GEORGE COUNTY DEPARTMENT OF PUBLIC UTILITIES




BLOWUP DETAIL A

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:

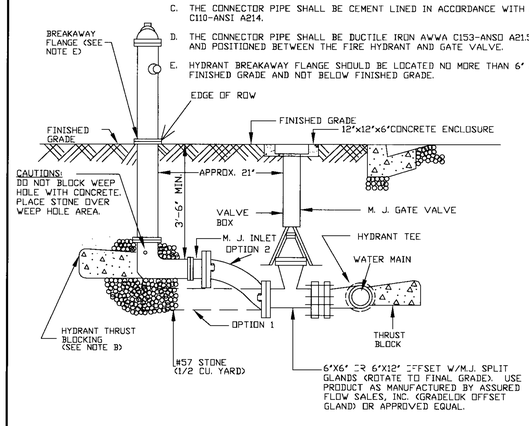
1. WHEN THE ENGINEER IS PROPOSING PRIVATELY MAINTAINED FIRE HYDRANTS TO BE INSTALLED OFF A PRIVATELY MAINTAINED (FIRE SUPPRESSION) WATER LINE,
2. AFTER THOROUGH EVALUATION AND CONSULTATION WITH OTHER COUNTY DEPARTMENTS AND UTILITIES STAFF, THE ENGINEER MAY BE REQUESTED TO SHOW THAT CERTAIN FIRE HYDRANT 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).

| DATE JAN. 2008 | GUIDELINES FOR THE USE OF DOUBLE DETECTOR CHECK | DRWG. NO. FIR–1 |
|---|---|---|
| REVISIONS | | SHT. 2 OF 2 |

## PRINCE GEORGE COUNTY DEPARTMENT OF PUBLIC UTILITIES

OPTION 1: IF GRADE ADJUSTMENT IS NOT REQUIRED:
A. CONNECTOR PIPE MAY BE APPROVED D.I. OR P.V.C. PIPE.
B. ALL JOINTS FROM HYDRANT TEE TO HYDRANT ARE TO BE RESTRAINED WITH APPROVED JOINT RESTRAINT DEVICES AND THRUST BLOCKING BEHIND THE HYDRANT

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. ALL JOINTS FROM HYDRANT TEE TO HYDRANT ARE TO BE RESTRAINED WITH APPROVED JOINT RESTRAINT DEVICES AND THRUST BLOCKING BEHIND THE HYDRANT
C. THE CONNECTOR PIPE SHALL BE CEMENT LINED IN ACCORDANCE WITH AWWA C110-ANSI A214.
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.




NOTE:

(A). HYDRANT ISOLATION VALVE TO BE LOCATED AS CLOSE TO THE HYDRANT AS POSSIBLE
(B) MINIMUM COVER AT DITCH MUST BE 3'6" OR GREATER.

| DATE JAN. 2008 | TYPICAL FIRE HYDRANT DETAIL | DRWG. NO. FIR–2 |
|---|---|---|
| REVISIONS | | |

COMMONWEALTH OF VIRGINIA
KATHLEEN N. HALPAUS
Lic. No. 45244
8/21/13
PROFESSIONAL ENGINEER

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YOUR VISION ACHIEVED THROUGH OURS.

| DATE | REVISION DESCRIPTION |
|---|---|
| 12-14-12 | COUNTY COMMENTS |
| 3-6-13 | COUNTY COMMENTS |
| 8-21-13 | AMMENDMENT TO APPROVED PLAN |

| | |
|---|---|
| DATE | 28 SEPT. 2012 |
| DRAWN BY | K.HALPAUS |
| DESIGNED BY | K. HALPAUS |
| CHECKED BY | D. JOHNSON |
| SCALE | NONE |

TIMMONS GROUP

PUDDLEDOCK PLACE APARTMENTS
BI AND DISTRICT - PRINCE GEORGE COUNTY - VIRGINIA
FIRE PROTECTION NOTES AND DETAILS

| JOB NO. | 33180 |
|---|---|
| SHEET NO. | C1.2 |

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