

April 20, 2005/Amended Oct. 24, 2012

## **City of Fife**

### **Policy on Fire Systems Connected to the Water Distribution System**

Fire Systems connected to the City of Fife's water distribution system shall be designed, located, and constructed with the approval of the applicable Fire Marshal/Building Official, and the Water Division's representative. Said fire system shall be designed and constructed by a contractor certified to do so by the governing agencies.

Fire systems shall have an appropriately sized resilient seated gate valve installed at the connection point to the water distribution main for the purpose of isolation of the fire line.

Fire lines (3") three inches and larger shall be constructed of Ductile Iron pipe from the isolation valve to the backflow prevention assembly conforming to AWWA C-151, and shall be a minimum of Thickness Class 50. It shall be cement mortar lined to conform to AWWA C-104. Ductile Iron pipe and fittings shall be encased in polyethylene film with a minimum thickness of 8 mil. Film shall meet and be installed in accordance with AWWA C-105.

Fire lines smaller than (3") three inches shall be constructed of drinking water grade copper pipe from the isolation valve to the backflow prevention assembly.

A State of Washington Dept. of Health approved backflow prevention assembly, appropriate for the degree of hazard as assessed by the Water Division's cross connection inspector, shall be properly installed on the fire line. The backflow prevention assembly shall be installed as close to the right-of-way line as logistically possible, except when the water distribution main supplying the fire line is located on private property. In cases of water distribution mains already on private property the backflow prevention assembly shall be located as close to the supplying water main as logistically possible. Backflow prevention assemblies may be installed at another location which has received prior approval from the City's Water Division. Backflow prevention assemblies on fire lines shall be either a Double Check Detector Assembly (DCDA) or a Reduced Pressure Detector Assembly (RPDA).

It shall be the property owner/developers responsibility to protect above ground backflow prevention assemblies (RPDA's) from all hazards, including but not limited to freezing, vandalism, traffic, etc. Backflow prevention assemblies located in vaults or enclosures shall meet the minimum installation clearances and recommendations of the manufacturers involved and the PNWS-AWWA's Cross Connection Control Manual, most recent edition. If a standard exists in the City of Fife's Water Meter & Water Main Installation Standards then it is to be the primary standard followed for installation.

All fire lines shall be, at a minimum, tested to the same bacteriologic and pressure test requirements of the City's water distribution mains. All backflow prevention assemblies shall be tested and satisfactorily pass such testing upon installation and at least annually thereafter. Additional testing shall be performed as required by applicable codes. All maintenance and testing is the property owner/developers responsibility, including submittal of test and maintenance reports to the City's Water Division.

Fire systems which utilize a booster pump shall be of a design which incorporates a soft start/soft stop type motor, and shall incorporate other surge protection features as the City's Engineer deems necessary to protect the water distribution system. The City may, at its sole discretion, require a hydraulic analysis of the surrounding distribution system to determine potential impacts of such systems; this analysis would be at the property owners/developers expense.

Fire systems which utilize a booster pump shall either incorporate a testing loop to permit required testing of the pump without discharging water, or shall install a fire service meter of appropriate size as to measure the full volume discharged by the fire pump. Fire service meters shall be manufactured by Sensus, and be an Omni F2 Fire line Meter with strainer. Meter shall generally be installed in conformance to City of Fife Water Standard W5, except that the by-pass line shall be unmetered and of the same size as the mainline fire meter. Fire line meters, when installed, shall be located immediately before the required backflow prevention assembly.

Flow through type fire systems are not permitted in the City of Fife's Water System.

April 20, 2005

**City of Fife**  
**Policy Regarding Use of Polyethylene Pipe and/or Tubing in the Water Distribution System.**

Polyethylene Pipe and/or Tubing shall be Iron Pipe Size complying with SIDR 7 and have a 200 psi working pressure rating. It shall conform to the latest revision of standards ASTM D-2239 and ASTM D-1248 and AWWA C-901, and shall be referred to as Polyethylene Pipe or PE.

Polyethylene pipe shall only be used for water service lines on domestic and irrigation services (2") two inches and smaller. PE sizes permitted to be used shall be (3/4") three-quarter inch, (1") one inch, (1 1/2") one and one-half inch, and (2") two inch.

PE shall be permitted to be used for permanent blow off assemblies and Air/Vacuum Relief Valves. Blow off assemblies and Air/Vacuum Relief Valves shall be isolated from water mains prior to and during required pressure testing using the required corporation stop or resilient seated gate valve, to insure an accurate test.

PE shall not be permitted to be used for fire lines or other water distribution purposes which require pressure testing.

Water service lines (2") two inches and smaller shall not be tapped onto water mains until after water mains have satisfactorily passed pressure testing.

April 20, 2005

**City of Fife**  
**Policy on Premise Isolation of Domestic Water Services**

The City of Fife has established a cross connection control policy of premise isolation.

All new commercial (non-residential, fire, or irrigation) water services shall have a Washington State Department of Health approved Reduced Pressure Backflow Assembly (RPBA) properly installed immediately after the water meter. No connections are permitted to be installed or allowed to continue to exist between the water meter and the RPBA, and all piping shall be of drinking water grade material. The assembly shall be installed per the applicable detail for RPBA's as found in the most recent edition of the City of Fife's "Water Meter and Water Main Installation Standards". The AWWA – PNWS "Cross Connection Control Manual Accepted Procedure and Practice" most recent edition shall be used as a reference for installation requirements not addressed by applicable City of Fife standards. The assembly shall be tested after installation and annually thereafter by a Washington State Certified Backflow Assembly Tester to assure its proper function. A copy of the test report shall be submitted to the City of Fife's Water Division following all testing and/or repair. If the assembly fails to pass inspection or testing it shall be repaired using original manufacturers parts if still available to maintain its state approval status or be replaced with another state approved assembly. All assemblies shall be retested following any repair or replacement. The RPBA shall be protected from freezing, vandalism, and traffic and be readily accessible for inspection, testing, or repair. All pipe, fittings, assemblies, and protective enclosures on the customers side of the water meter setter are the property and responsibility of the property owner to maintain and/or replace as may become necessary.

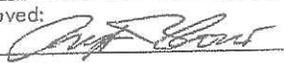
Existing commercial water services shall be required to comply with the premise isolation policy as described for new commercial water services based on the following criteria:

1. Initial inspection of a facility determines the need for immediate backflow prevention based upon a current or potential hazard.
2. Inspection of an existing facility with existing backflow prevention determines that the level of protection provided is inadequate for the degree of potential hazard present.
3. The existing facility, with or without existing backflow prevention, undergoes building and/or plumbing improvements beyond that reasonably considered routine maintenance or repair.
4. The existing backflow prevention at a facility (in-plant or non-RPBA premise isolation) cannot be repaired and requires replacement.

# CITY OF FIFE

## WATER METER & WATER MAIN INSTALLATION

# STANDARDS

Approved:  11/20/2007  
City Engineer Date

City of  
Fife



Dwg No:

W0

TITLE PAGE

WATER STANDARD DETAIL

# GENERAL WATER NOTES:

1. Fire sprinkler systems may only be installed by contractors licensed to do so.
2. All water mains stubbed for future connection or extension shall have a 4" x 4" marker post installed at the cap or plug to denote its exact location, when required by the inspector. The post shall be painted blue and shall have the word "STUB" stenciled in black paint upon it. The post shall extend 3' feet above finished grade.
3. Grounding of customer electricity to water service lines shall not be permitted.
4. New water services shall have meters installed behind the sidewalk, at the right-of-way lines. Where there are multiple meters serving a single property, meters shall be located adjacent to one another, unless written permission is received from the Water Division. New housing developments shall have meters located adjacent to one another whenever possible. Such that two adjacent homes would have their meters next to each other, one on each side of a common lot line. Residential meters sharing a common lot line shall be within 36" of one another, measured centerline of meter to centerline of meter. A 2" PVC conduit shall span between adjacent meters extending a min. of 1" inside meter boxes.
5. All water meters shall have separate service taps, and shall not be connected to dead-end water mains where looping mains are available, or mains directly supplying fire systems without prior approval of the city engineer.
6. Water service 2" or smaller shall not be tapped onto new mains until purity and pressure testing is passed.
7. The use of deduct meters shall not be allowed, without written permission of the water division. Any deduct meters permitted must be of the same manufacture and type as normally required by the City. Maintenance and repair, or replacement of the deduct meter shall be at the customers expense. The City may require the meter be tested at a schedule which would be consistent with AWWA recommendations, and any expenses related to that testing would be the customers responsibility.
8. It is the customers responsibility to notify the City in advance when replacing a deduct meter, so that a final reading can be taken to assure proper credit for usage.
9. All commercial water service installations shall be accomplished through the use of a qualified contractor. City personnel will only install services of a residential nature. A residential customer may still elect to have a qualified contractor install a residential meter service.
10. The City, at its sole discretion, may require the installation of water quality sampling stations by developers extending or replacing water mains at points deemed appropriate by the City. Sampling stations shall be the Eclipse #88 Sampling Station as manufactured by Kupferle Foundry Company. See detail for specifications and installation requirements.
11. Vertical thrust control of water mains shall be accomplished through use of mechanical restraints and mechanically jointed pipe, properly designed by a licensed engineer. Mechanical restraints shall be megalug restraints as manufactured by EBAA Iron Inc., or approved equaL All mechanically restrained joints shall be shown on as-built plans.

Approved:  12/3/2012  
 City Engineer Date

**City of  
Fife**



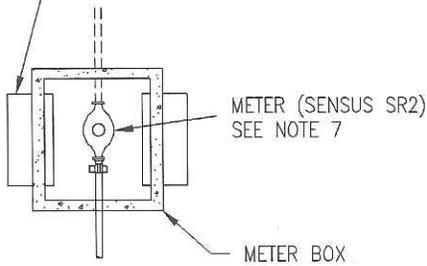
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**GENERAL NOTES**

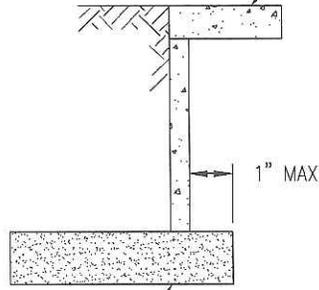
**WATER STANDARD DETAIL**

PLACE 2-16"x8"x4" SOLID CONCRETE BLOCKS UNDER METER BOX ONE EACH SIDE



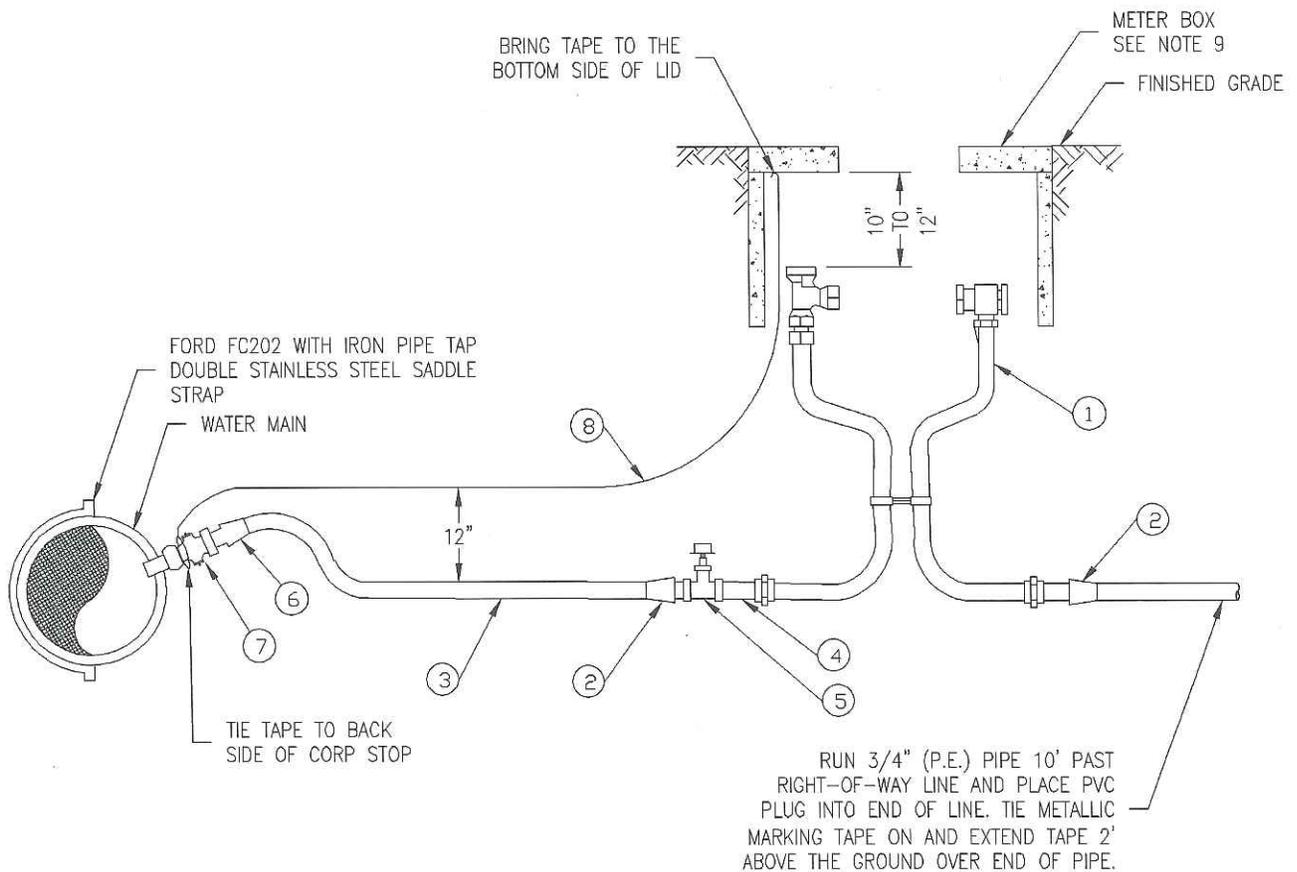
PLAN

METER BOX



SOLID CONCRETE BLOCK

BLOCK DETAIL



PROFILE

SHEET 1 OF 2

Approved: *[Signature]* 12/31/2012  
 City Engineer Date

WATER STANDARD DETAIL

City of Fife



Dwg No: **W1**

**5/8" OR 3/4" WATER SERVICE CONNECTION**

LEGEND:

- ① COPPERSETTER WITH CHECK VALVE  
FORD VH72-18W-11-33
- ② PACK JOINT COUPLING  
FORD C86-33 (FOR P.E. PIPE)
- ③ 3/4" (P.E.) PIPE (200 PSI AND SHALL MEET ASTM 1248 AND 2239, SIDR 7) I.D. IS IRON PIPE SIZE
- ④ 3/4" BRASS NIPPLE 3" LONG
- ⑤ 3/4" STRAIGHT CURB STOP (BALL SERVICE VALVE FORD B II-333)
- ⑥ PACK JOINT COUPLING FORD C16-33 (FOR P.E. PIPE)
- ⑦ CORP STOP FORD 3/4" F500.
- ⑧ METALLIC (DETECTABLE MARKING) TAPE

NOTES:

- 1. CONTRACTOR SHALL SUPPLY AND INSTALL METER.
- 2. ALL MATERIALS AND FITTINGS SHALL BE AS SPECIFIED.
- 3. WATER METER SHALL BE LOCATED IN PLANTING STRIP OR ADJACENT TO RIGHT-OF-WAY AS DIRECTED BY THE CITY.
- 4. ALL COUPLINGS SHALL USE PIPE INSERT STIFFNER.
- 5. WATER SERVICE LINE SHALL HAVE UNIFORM COVER OF 36" BELOW FINISHED GRADE WITHIN RIGHT-OF-WAY.
- 6. METALLIC (DETECTABLE MARKING) TAPE SHALL BE COLOR CODED BLUE AND SHALL BE IMPRINTED CONTINUOUSLY OVER ITS ENTIRE LENGTH IN PERMANENT BLACK INK THE MESSAGE "WATER LINE BURIED BELOW" AND THE WORD "CAUTION" PROMINENTLY SHOWN, TAPE SHALL BE 2" MINIMUM WIDTH.
- 7. METER TO BE SENSUS SR2 5/8" x 3/4" OR 3/4", REGISTER TO BE TOUCH-READ/PIT LID (TR/PL) TO READ IN 100 CUBIC FEET (C.F.). METER TO HAVE ICE REGISTER. NO SUBSTITUTIONS PERMITTED.
- 8. METER BOX LID SHALL HAVE 1 3/4" HOLE DRILLED IN IT, AND HAVE SENSUS MODEL 520M WITH LEAK DETECTION SINGLE PORT FLEXNET SMARTPOINT TRANSMITTER PROPERLY INSTALLED THROUGH IT, PER MANUFACTURERS RECOMMENDATIONS. METER REGISTER TOUCHREAD PIT/LID COUPLER SHALL BE PROPERLY CONNECTED TO TRANSMITTER. (MODEL 520M WITH LEAK DETECTION DUAL PORT TRANSMITTER MAY BE USED WITH PRIOR APPROVAL.)
- 9. IN AREAS SUBJECT TO VEHICLE TRAFFIC, METER BOX FOR 5/8" OR 3/4" METER SERVICE SHALL BE FOGTITE B-10T, WITH CAST IRON LID.
- 10. AREAS NOT SUBJECT TO VEHICLE TRAFFIC MAY USE THE CHRISTY METER BOX N30 WATER METER BOX WITH THE FL-30P FIBRELYTE LID WITH 1 3/4" TR/PL HOLE.

UNLAWFUL INSTALLATIONS

IT SHALL BE UNLAWFUL TO INSTALL, CHANGE, BYPASS, ADJUST, REMOVE, OR ALTER ANY METERING DEVICE OR ANY PIPING ARRANGEMENT CONNECTED THERE SO AS TO SHOW ANY QUANTITY OF WATER USED ON THE PREMISES TO BE LESS THAN THE ACTUAL QUANTITY.

WATER SERVICE TO BE LEFT OFF UPON INSTALLATION. ONLY CITY WATER PERSONNEL MAY TURN ON SERVICE, AND THIS MAY ONLY BE DONE FOLLOWING A CROSS-CONNECTION INSPECTION.

SHEET 2 OF 2

Approved:



11/3/2012

City Engineer

Date

City of  
Fife

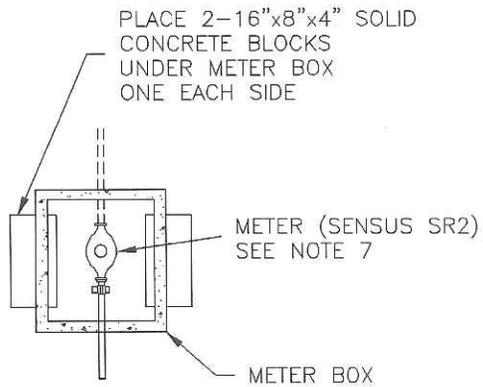


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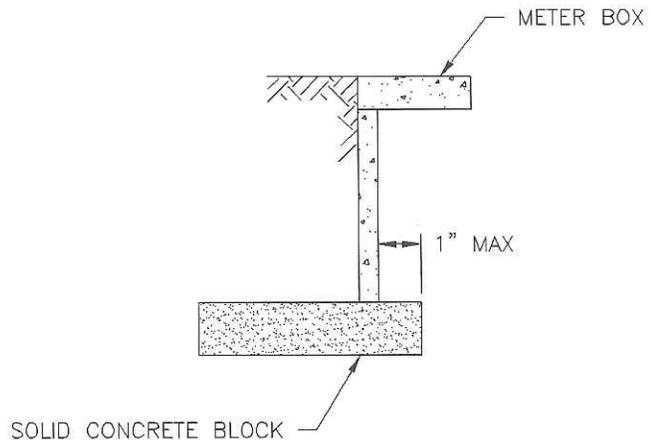
**W1**

**5/8" OR 3/4" WATER  
SERVICE CONNECTION**

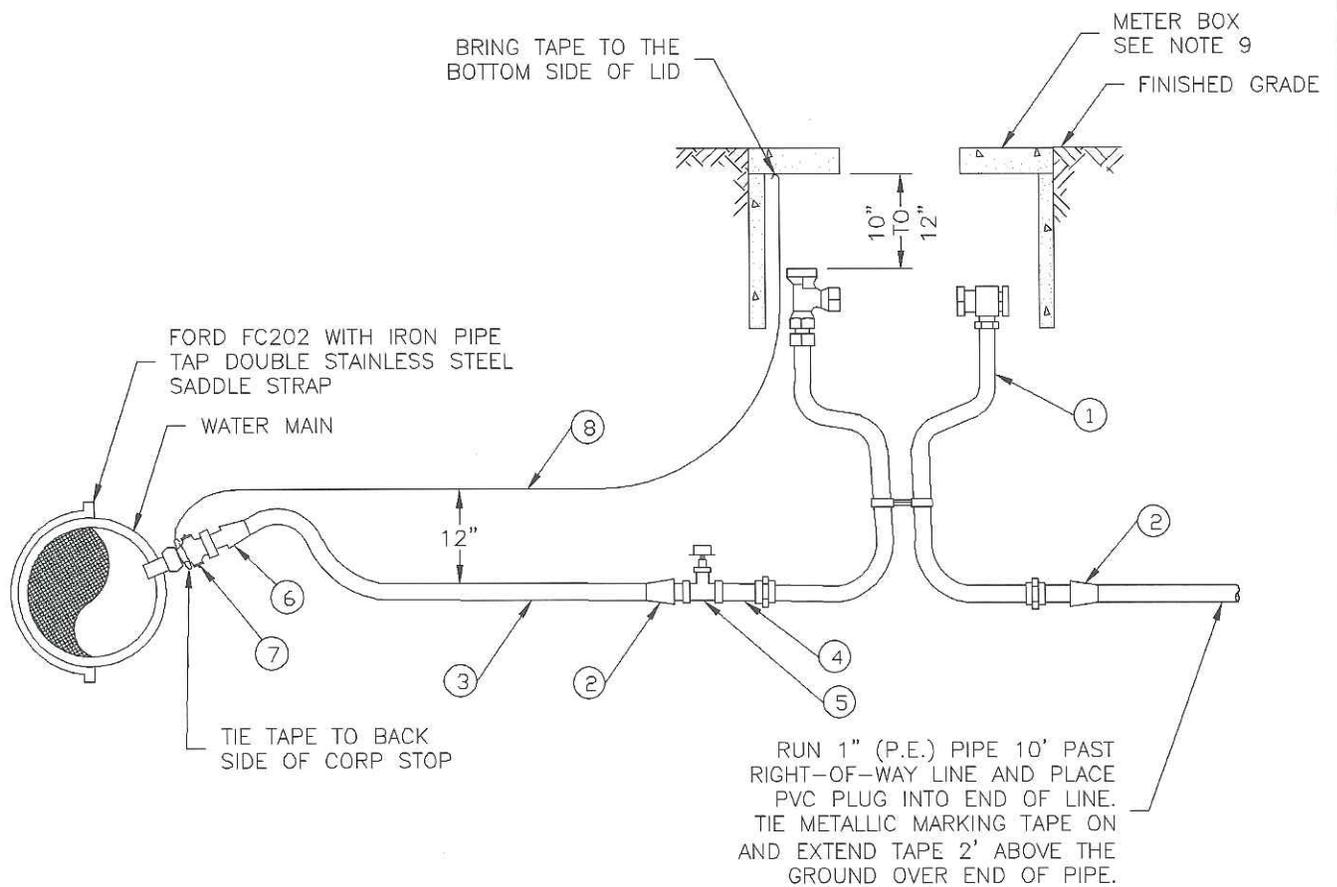
**WATER STANDARD DETAIL**



PLAN



BLOCK DETAIL



PROFILE

SHEET 1 OF 2

Approved: *[Signature]* 12/3/2012  
 City Engineer Date

WATER STANDARD DETAIL

City of Fife



Dwg No:

W2

1" WATER SERVICE CONNECTION

LEGEND:

- ① COPPERSETTER WITH CHECK VALVE  
FORD VH74-18W-11-44
- ② PACK JOINT COUPLING  
FORD C86-44 (FOR P.E. PIPE)
- ③ 1" (P.E.) PIPE (200 PSI AND SHALL MEET ASTM 1248 AND 2239, SIDR 7) I.D. IS IRON PIPE SIZE
- ④ 1" BRASS NIPPLE 3" LONG
- ⑤ 1" STRAIGHT CURB STOP (BALL SERVICE VALVE FORD B II-444)
- ⑥ PACK JOINT COUPLING FORD C16-44 (FOR P.E. PIPE)
- ⑦ CORP STOP FORD 1" F500.
- ⑧ METALLIC (DETECTABLE MARKING) TAPE

NOTES:

- 1. CONTRACTOR SHALL SUPPLY AND INSTALL METER.
- 2. ALL MATERIALS AND FITTINGS SHALL BE AS SPECIFIED.
- 3. WATER METER SHALL BE LOCATED IN PLANTING STRIP OR ADJACENT TO RIGHT-OF-WAY AS DIRECTED BY THE CITY.
- 4. ALL COUPLINGS SHALL USE PIPE INSERT STIFFNER.
- 5. WATER SERVICE LINE SHALL HAVE UNIFORM COVER OF 36" BELOW FINISHED GRADE WITHIN RIGHT-OF-WAY.
- 6. METALLIC (DETECTABLE MARKING) TAPE SHALL BE COLOR CODED BLUE AND SHALL BE IMPRINTED CONTINUOUSLY OVER ITS ENTIRE LENGTH IN PERMANENT BLACK INK THE MESSAGE "WATER LINE BURIED BELOW" AND THE WORD "CAUTION" PROMINENTLY SHOWN, TAPE SHALL BE 2" MINIMUM WIDTH.
- 7. METER TO BE SENSUS SR2 1", REGISTER TO BE TOUCH-READ/PIT (TR/PL) LID TO READ IN 100 CUBIC FEET (C.F.). METER TO HAVE ICE REGISTER. NO SUBSTITUTIONS PERMITTED.
- 8. METER BOX LID SHALL HAVE 1 $\frac{3}{4}$ " HOLE DRILLED IN IT, AND HAVE SENSUS MODEL 520M WITH LEAK DETECTION SINGLE PORT FLEXNET SMARTPOINT TRANSMITTER PROPERLY INSTALLED THROUGH IT, PER MANUFACTURERS RECOMMENDATIONS. METER REGISTER TOUCHREAD PIT/LID COUPLER SHALL BE PROPERLY CONNECTED TO TRANSMITTER. (MODEL 520M WITH LEAK DETECTION DUAL PORT TRANSMITTER MAY BE USED WITH PRIOR APPROVAL.)
- 9. IN AREAS SUBJECT TO VEHICLE TRAFFIC, METER BOX FOR 1" METER SERVICE SHALL BE FOGTITE B-10T, WITH CAST IRON LID.
- 10. AREAS NOT SUBJECT TO VEHICLE TRAFFIC MAY USE THE CHRISTY METER BOX N30 WATER METER BOX WITH THE FL-30P FIBRELYTE LID WITH 1 $\frac{3}{4}$ " TR/PL HOLE.

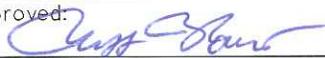
UNLAWFUL INSTALLATIONS

IT SHALL BE UNLAWFUL TO INSTALL, CHANGE, BYPASS, ADJUST, REMOVE, OR ALTER ANY METERING DEVICE OR ANY PIPING ARRANGEMENT CONNECTED THERE SO AS TO SHOW ANY QUANTITY OF WATER USED ON THE PREMISES TO BE LESS THAN THE ACTUAL QUANTITY.

WATER SERVICE TO BE LEFT OFF UPON INSTALLATION. ONLY CITY WATER PERSONNEL MAY TURN ON SERVICE, AND THIS MAY ONLY BE DONE FOLLOWING A CROSS-CONNECTION INSPECTION.

SHEET 2 OF 2

Approved:



12/31/2012  
Date

City Engineer

City of  
Fife

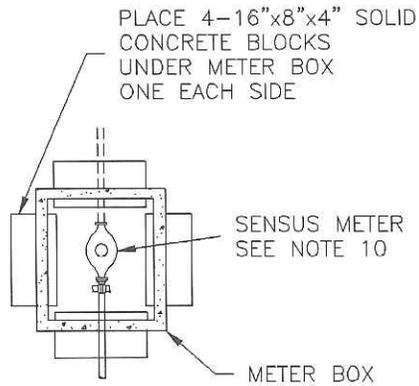


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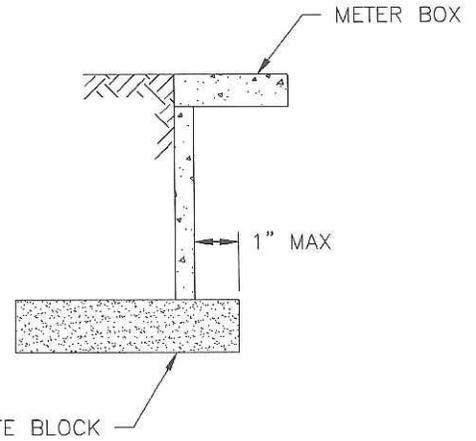
**W2**

**1" WATER  
SERVICE CONNECTION**

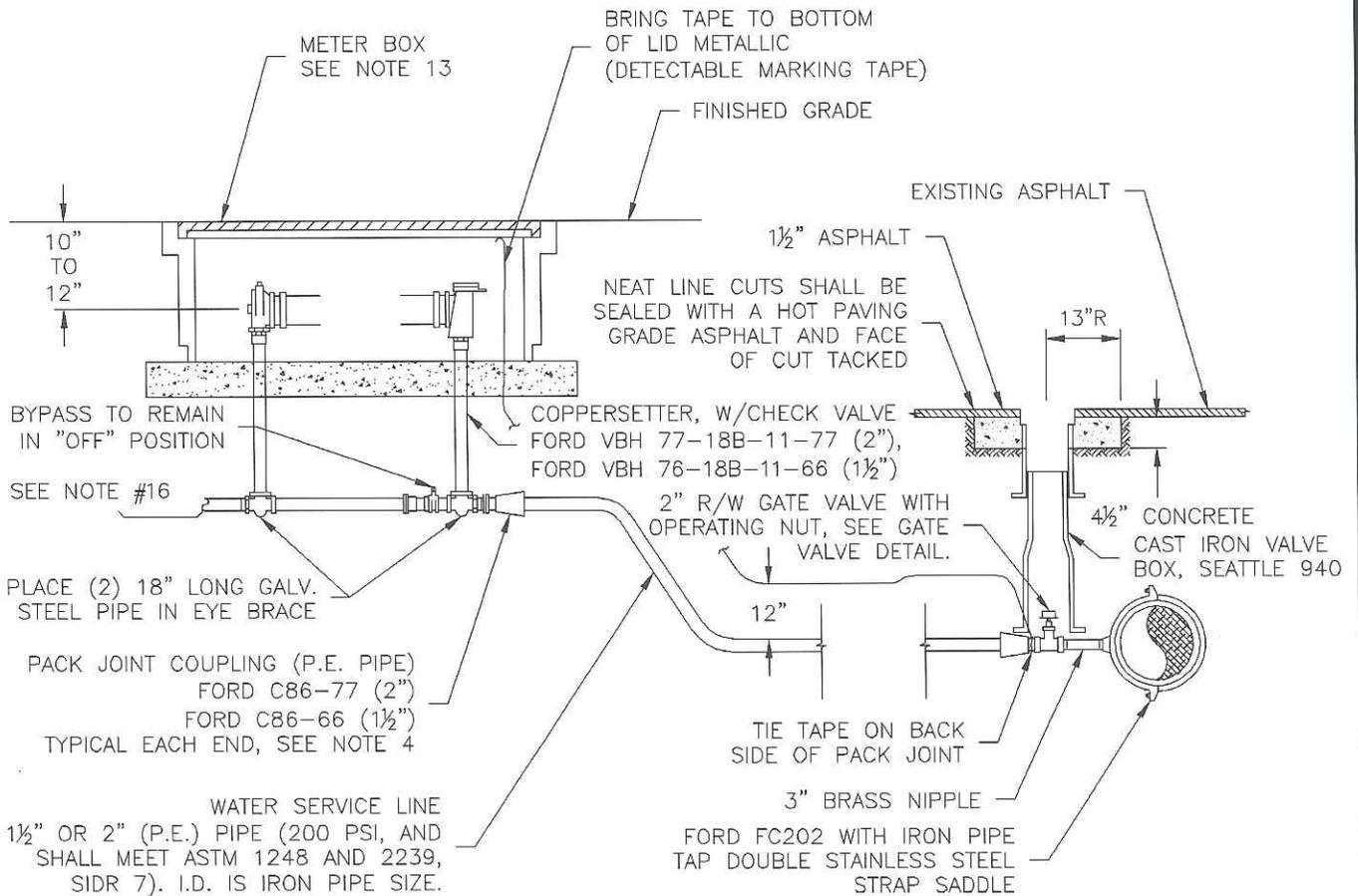
**WATER STANDARD DETAIL**



PLAN



BLOCK DETAIL



PROFILE

SHEET 1 OF 2

Approved: *[Signature]* 12/3/2012  
 City Engineer Date

WATER STANDARD DETAIL

City of Fife



Dwg No:

W3

1 1/2" AND 2" POSITIVE  
 DISPLACEMENT WATER  
 SERVICE CONNECTION

NOTES:

1. CONTRACTOR SHALL SUPPLY AND INSTALL METER.
2. ALL MATERIALS AND FITTINGS SHALL BE AS SPECIFIED.
3. WATER METER SHALL BE LOCATED IN PLANTING STRIP OR ADJACENT TO RIGHT-OF-WAY AS DIRECTED BY THE CITY.
4. ALL COUPLINGS SHALL USE PIPE INSERT STIFFNER.
5. WATER SERVICE LINE SHALL HAVE UNIFORM COVER OF 36" BELOW FINISHED GRADE WITHIN RIGHT-OF-WAY.
6. METALLIC (DETECTABLE MARKING) TAPE SHALL BE COLOR CODED BLUE AND SHALL BE IMPRINTED CONTINUOUSLY OVER ITS ENTIRE LENGTH IN PERMANENT BLACK INK THE MESSAGE "WATER LINE BURIED BELOW" AND THE WORD "CAUTION" PROMINENTLY SHOWN, TAPE SHALL BE 2" MINIMUM WIDTH.
7. FOR A 1½" WATER SERVICE A 2" GATE VALVE AND TAP SHALL BE USED AND BRASS INSERT BUSHING SHALL BE USED TO REDUCE THE 2" OPENING DOWN TO 1½".
8. VALVE BOXES SHALL BE TWO-PIECE, ADJUSTABLE, CAST IRON WITH EXTENSION PIECES (IF NECESSARY), AS MANUFACTURED BY VANRICH #940 SEATTLE OR APPROVED EQUAL. THE WORD "WATER" SHALL BE CAST IN RELIEF ON THE TOP.
9. VALVE BOX LID EARS SHALL RUN PARALLEL TO THE WATER LINE IT SERVES.
10. METER TYPE AND SIZE SHALL BE DETERMINED BY THE CITY. METERS SHALL BE SENSUS, OMNI C2 OR T2, BASED UPON ANTICIPATED USE.
11. METER REGISTER SHALL BE TOUCH-READ/PIT LID (TR/PL) TYPE AND MANUFACTURED BY SENSUS. NO SUBSTITUTIONS. METER TO READ IN 100 CUBIC FEET. METER TO HAVE ICE REGISTER.
12. METER BOX SHALL HAVE TRAFFIC LID. TRAFFIC LID SHALL HAVE 1¾" HOLE DRILLED IN THE LID (NOT IN HINGED READER PORTION OF LID), AND SHALL HAVE SENSUS MODEL 520M WITH LEAK DETECTION SINGLE PORT FLEXNET SMARTPOINT TRANSMITTER PROPERLY INSTALLED THROUGH IT, PER MANUFACTURERS RECOMMENDATIONS. METER REGISTER TOUCHREAD PIT/LID COUPLER SHALL BE PROPERLY CONNECTED TO TRANSMITTER. (MODEL 520M WITH LEAK DETECTION DUAL PORT TRANSMITTER MAY BE USED WITH PRIOR APPROVAL.)  
. TRAFFIC LID SHALL HAVE RECESSED HINGE READER LID.
13. METER BOX SHALL BE:
  - 1½" METER - FOG-TITE #2
  - 2" METER - FOG-TITE #3

UNLAWFUL INSTALLATIONS

IT SHALL BE UNLAWFUL TO INSTALL, CHANGE, BYPASS, ADJUST, REMOVE, OR ALTER ANY METERING DEVICE OR ANY PIPING ARRANGEMENT CONNECTED THERE SO AS TO SHOW ANY QUANTITY OF WATER USED ON THE PREMISES TO BE LESS THAN THE ACTUAL QUANTITY.

WATER SERVICE TO BE LEFT OFF UPON INSTALLATION. ONLY CITY WATER PERSONNEL MAY TURN ON SERVICE, AND THIS MAY ONLY BE DONE FOLLOWING A CROSS-CONNECTION INSPECTION.

14. VALVE BOXES LOCATED IN LANDSCAPED AREAS SHALL HAVE SAME DIAMETER CONCRETE COLLAR, HOWEVER THICKNESS SHALL BE 6" OF CONCRETE. NO ASPHALT SHALL BE APPLIED.
15. 10 GAUGE WIRE FROM MAINLINE TAP TO METER BOX, TAPED AT 6" INCREMENTS, AND EXPOSED 6" MINIMUM IN BOX.
16. INSTALL AND EXTEND A 1½" OR 2" BRASS NIPPLE A MINIMUM OF 1 FOOT FROM THE SETTER OUTLET ON CUSTOMER SIDE.

SHEET 2 OF 2

Approved:



10/3/2012

City Engineer

Date

WATER SERVICE DETAIL

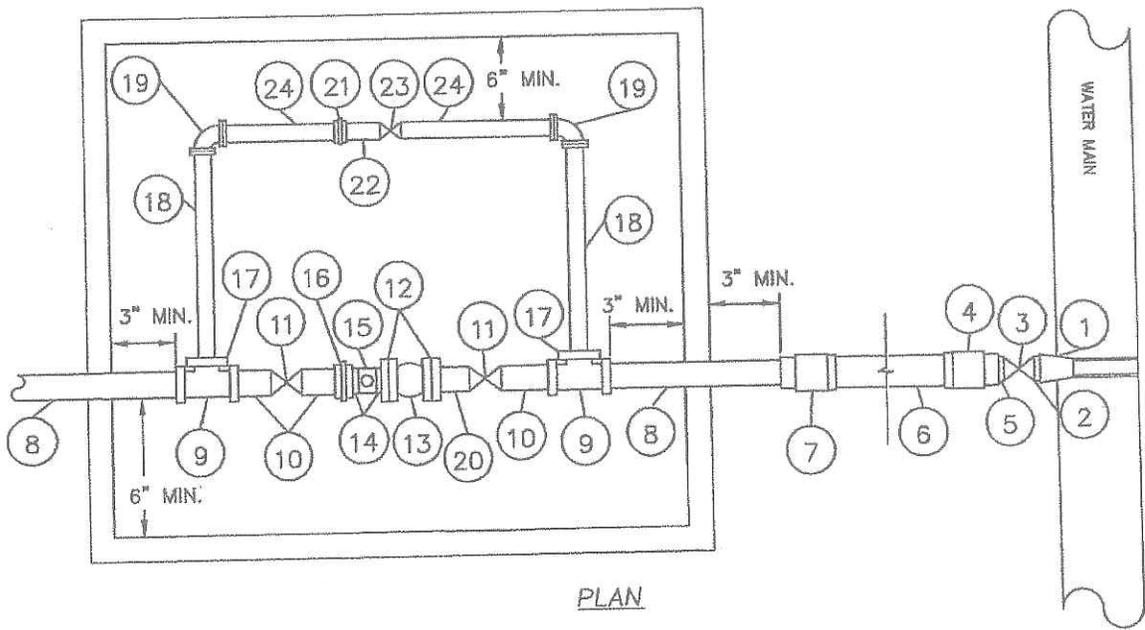
City of  
Fife



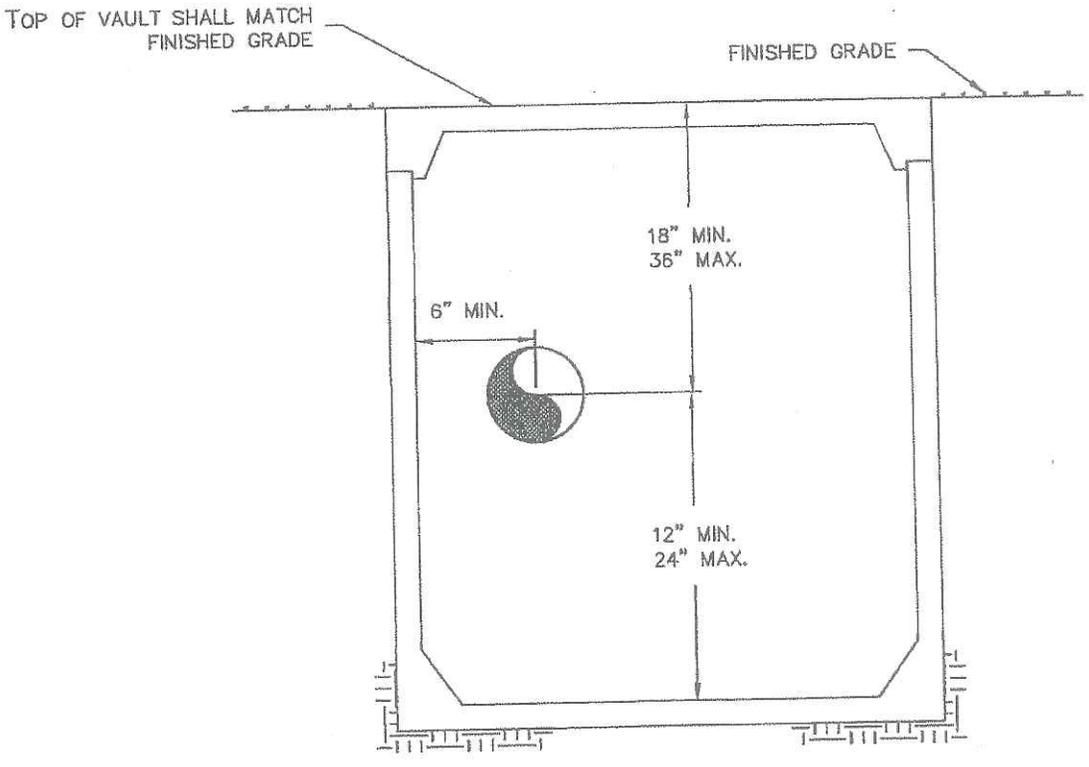
Dwg No:

W3

1 1/2" AND 2" POSITIVE  
DISPLACEMENT WATER  
SERVICE CONNECTION



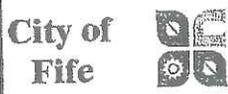
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PROFILE

SHEET 1 OF 2

Approved: *[Signature]* 11/20/2007  
 City Engineer Date  
 WATER STANDARD DETAIL



Dwg No: W4  
 1 1/2" AND 2" METER DETAIL  
 COMPOUND AND TURBINE

**LEGEND:**

1. DOUBLE STAINLESS STEEL STRAP SADDLE 2" IP X APPROPRIATELY SIZED MAIN.
2. BRASS NIPPLE, 2" X 3".
3. 2" GATE VALVE WITH 2" OPERATING NUT AND VALVE BOX ASSEMBLY - SEE SECTION ON WATER VALVES AND MAINS FOR DETAILS.
4. PACKJOINT COUPLING FOR PE PIPE, FORD C86-77 (2"), C86-66 (1½"). PIPE INSERT STIFFNER TO BE USED.
5. BRASS BUSHING, 2" X 1½". NOT REQUIRED FOR 2" SERVICE.
6. 1½" OR 2" POLYETHYLENE PIPE (200 PSI); SHALL MEET ASTM 1248 AND 2239, SIDR 7; I.D. IS IRON PIPE SIZE.
7. PACKJOINT COUPLING FOR PE PIPE, FORD C16-77 (2"), C16-66 (1½"). PIPE INSERT STIFFNER TO BE USED.
8. 1½" OR 2" THREADED PIPE, CUT TO LENGTH (BRASS).
9. 1½" OR 2" BRASS TEE.
10. BRASS NIPPLE, 2" X 3" OR 1½" X 3".
11. 1½" FULL PORT RESILIENT SEATED BALL VALVES OR 2" GATE VALVE, RESILIENT SEATED FULLY OPENING WITH HAND WHEEL.
12. 1½" OR 2" BRASS FLANGED METER COUPLING.
13. 1½" SENSUS TURBINE METER WITH TOUCHREAD/PITLID REGISTER TO READ IN 100 CUBIC FEET OR 2" SENSUS TURBINE METER WITH TOUCHREAD/PITLID REGISTER TO READ IN 100 CUBIC FEET OR 2" SENSUS SRH SRII COMPOUND METER WITH TOUCHREAD/PITLID REGISTER TO READ IN 100 CUBIC FEET.
14. BRASS NIPPLE, 2" X 4" OR 1½" X 4".
15. BRASS TEE, 1½" OR 2" WITH BRASS PLUG, 1½" OR 2".
16. BRASS UNION, 1½" OR 2".
17. BRASS BUSHING, 2" X 1½" OR 1½" X 1".
18. BRASS NIPPLE, 1½" X 12" OR 1" X 12".
19. BRASS 90 DEGREE ELBOW, 1½" OR 1".
20. BRASS NIPPLE, 2" X 10" OR 1½" X 8".
21. BRASS UNION, 1½" OR 1".
22. BRASS NIPPLE, 1½" X 6" OR 1" X 6".
23. 1" OR 1½" FULL PORT RESILIENT SEATED BALL VALVES.
24. BRASS NIPPLE, 1½" OR 1", AS APPROPRIATE. CUT TO LENGTH AND THREADED.
25. METALLIC DETECTABLE MARKING TAPE SHALL BE TIED TO BACKSIDE OF PACKJOINT (MAIN SIDE) AND STUBBED THROUGH VAULT WALL WITH PIPING, LEAVING 12" MINIMUM EXPOSED IN VAULT. MARKING TAPE SHALL BE COLOR CODE BLUE AND SHALL BE IMPRINTED CONTINUOUSLY OVER ITS ENTIRE LENGTH IN PERMANENT BLACK INK THE MESSAGE "WATER LINE BURIED BELOW" AND THE WORD "CAUTION" PROMINENTLY SHOWN, TAPE SHALL BE A 2" MINIMUM WIDTH. MARKING TAPE TO BE 12" ABOVE BURIED WATER LINE.

\* A MINIMUM OF ONE 2" ADJUSTABLE GALVANIZED PIPE SUPPORT WILL BE USED.

METER VAULT SHALL HAVE A MINIMUM OF ONE 3'-0" X 3'-0" DIAMOND PLATE HINGED LOCKING DOORS, REMOVABLE, WITH HINGES LOCATED AT REAR SIDE. DOORS SHALL HAVE A H-20 LOAD RATING IN AREAS SUBJECT TO VEHICLE TRAFFIC. DOORS SHALL BE SPRING LOADED WITH OPEN POSITION LOCK. VAULT SHALL BE SIZED TO MEET CLEARANCE REQUIREMENTS.

**VAULT NOTES:**

1. HOLES FOR PIPES SHALL BE EITHER CAST AT THE TIME OF MANUFACTURE OR CORE DRILLED.
2. AFTER ALL PIPING HAS BEEN INSTALLED AND ALIGNED PROPERLY, THE HOLES SHALL BE FILLED WITH CEMENT CONCRETE GROUT AND HAVE A BROOM OR SMOOTH FINISH.
3. VAULT AND LID MUST PROVIDE SUFFICIENT ACCESS FOR MAINTENANCE. VAULT SHALL HAVE RUNGS, GALVANIZED LADDER, OR APPROVED EQUAL FOR SAFE ACCESS. METALLIC LADDERS OR RUNGS SHALL BE PAINTED WITH 10 MILS (APPROXIMATELY 2 COATS) OF DUPONT 25p EPOXY MASTIC OR APPROVED EQUAL. LADDERS SHALL BE SECURED TO THE WALLS OF THE VAULT BY BOLTING AS RECOMMENDED BY LADDER MANUFACTURER. RUNGS SHALL BE CEMENTED INTO VAULT WALLS. LADDERS OR RUNGS SHALL BE LOCATED ON THE FRONT SIDE OF THE VAULT (POSITIONED SO AS NOT TO INTERFERE WITH PIPING WITHIN VAULT), SEE DETAIL FOR ORIENTATIONS, UNLESS LOCATION IS SPECIFIED BY THE CITY INSPECTOR.

SHEET 2 OF 2

Approved: *[Signature]* 11/23/2007  
 City Engineer Date  
 WATER STANDARD DETAIL

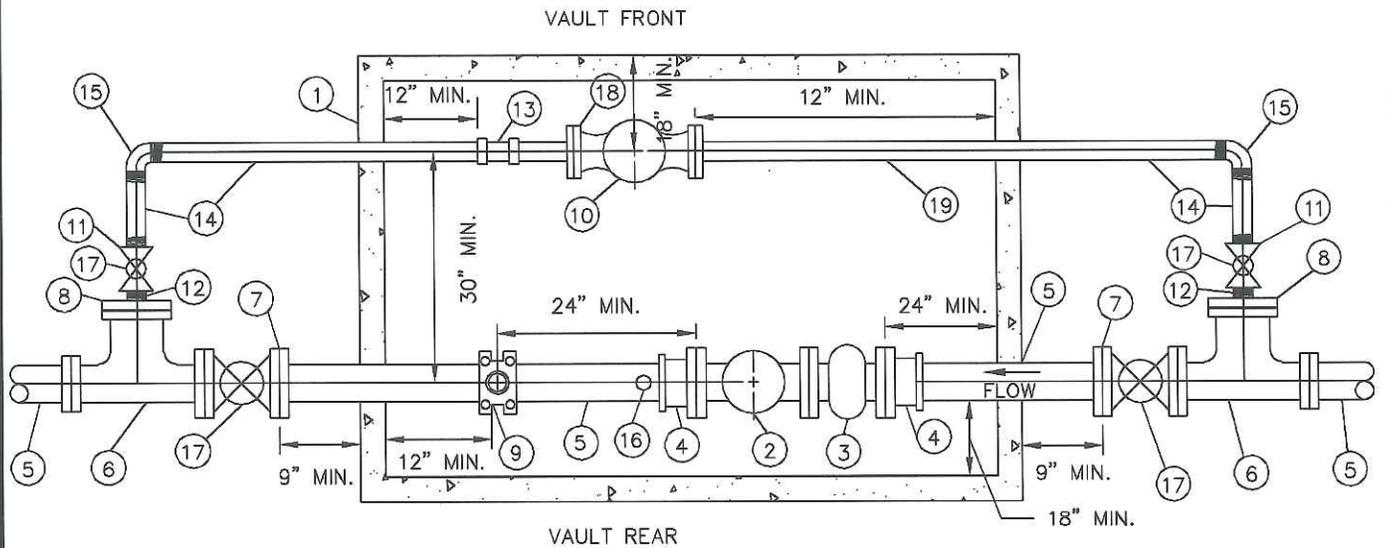
City of  
 Fife



Dwg No:

W4

1 1/2" AND 2" WATER  
 METER AND VAULT DETAIL



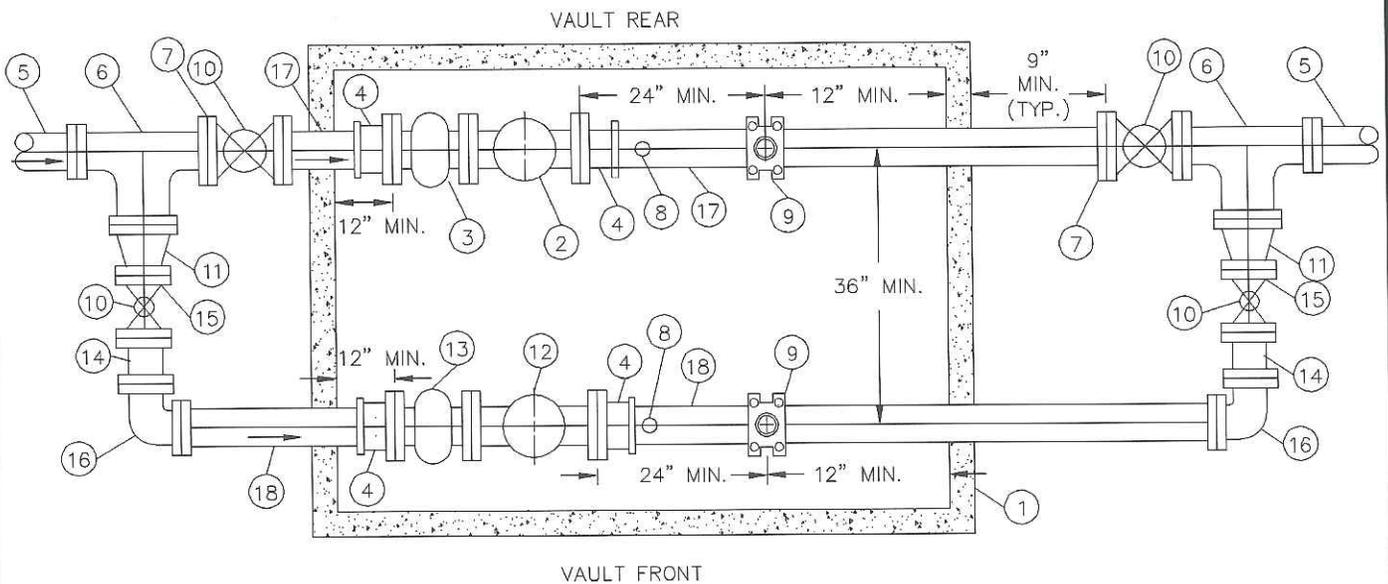
NOTES:

1. VAULT SHALL BE PRE-CAST CONCRETE, SIZED TO MEET CLEARANCE REQUIREMENTS. IT SHALL HAVE A GALVANIZED VAULT LADDER. LID SHALL HAVE REMOVABLE DIAMOND PLATE HINGED LOCKING DOORS, MINIMUM SIZE TO BE 3'-0" X 6'-0". HINGES TO BE LOCATED AT REAR. DOORS TO BE SPRING LOADED WITH OPEN POSITION LOCK AND SHALL HAVE A H-20 RATING.
  2. 3" SENSUS FLANGED WATER METER WITH TR/PL ICE REGISTER: 100 CUBIC FT OMNI T2 OR C2 AS REQUIRE BY CITY WATER DIVISION.
  3. SENSUS FLANGED STRAINER: SIZE AS PER METER.
  4. SENSUS #912 FLANGED COUPLING ADAPTER: SIZE AS PER METER.
  5. DUCTILE IRON PIPE (CLASS 53): SIZE PER METER.
  6. DUCTILE IRON TEE (FL X FL X FL): SIZE AS PER METER (INCORPORATED IN OMNI METERS).
  7. RESILIENT WEDGE GATE VALVE (FL X FL) WITH 2" OPERATING NUT (SEE VALVE AND VALVE BOX STANDARD): SIZE AS PER METER.
  8. BLIND FLANGE WITH 2" THREADED OUTLET.
  9. FORD FC202 DOUBLE STRAP SADDLE WITH 2" IP TAP WITH 2" BRASS PLUG: SIZE AS PER METER.
  10. 2" SENSUS FLANGED OMNI T2 METER WITH TR/PL ICE REGISTER IN 100 CUBIC FEET.
  11. 2" RESILIENT WEDGE GATE VALVE (THRD. X THRD.) WITH 2" OPERATING NUT: SEE VALVE AND VALVE BOX STANDARD.
  12. 2" X 3" BRASS NIPPLE.
  13. 2" COMPRESSION COUPLING, SENSUS #522 OR APPROVED EQUAL.
  14. 2" BRASS NIPPLE (THRD. X THRD.): CUT TO LENGTH REQUIRED.
  15. 2" BRASS 90° ELBOW.
  16. ADJUSTABLE PIPE SUPPORT, GALVANIZED: SIZE PER PIPE.
  17. VALVE BOX AND LID: SEE VALVE AND VALVE BOX STANDARD.
  18. 2" BRASS FLANGED METER COUPLING.
  19. METALLIC (DETECTABLE MARKING) TAPE SHALL BE TIED TO BACKSIDE OF PACKJOINT (MAIN SIDE) AND STUBBED THROUGH VAULT WALL WITH PIPING, LEAVING 12" MINIMUM EXPOSED IN VAULT. MARKING TAPE SHALL BE COLOR CODE BLUE AND SHALL BE IMPRINTED CONTINUOUSLY OVER ITS ENTIRE LENGTH IN PERMANENT BLACK INK THE MESSAGE "WATER LINE BURIED BELOW" AND THE WORD "CAUTION" PROMINENTLY SHOWN. TAPE SHALL BE A MINIMUM OF 2" IN WIDTH. MARKING TAPE TO BE 12" ABOVE BURIED WATER LINE.
- \* ALL DI PIPING AND FITTINGS WITHIN THE VAULT SHALL BE PAINTED WITH PARKER PAINT (MARATHON ENAMEL), COLOR TO BE TAHOE BLUE. METERS, STRAINERS, AND BRASS PIPING NOT TO BE PAINTED.
20. VAULT LID SHALL HAVE A 1 3/4" HOLE DRILLED IN DIAMOND PLATE VAULT DOOR. SEE SHEET 4 OF 4.

Approved: *Carl Stans* 12/3/2012  
 City Engineer Date  
 WATER STANDARD DETAIL



Dwg No: **W5**  
**3"**  
**METER AND VAULT DETAIL**



4" AND LARGER METERS

Approved: *[Signature]* 12/3/2012  
 City Engineer Date

**City of  
Fife**



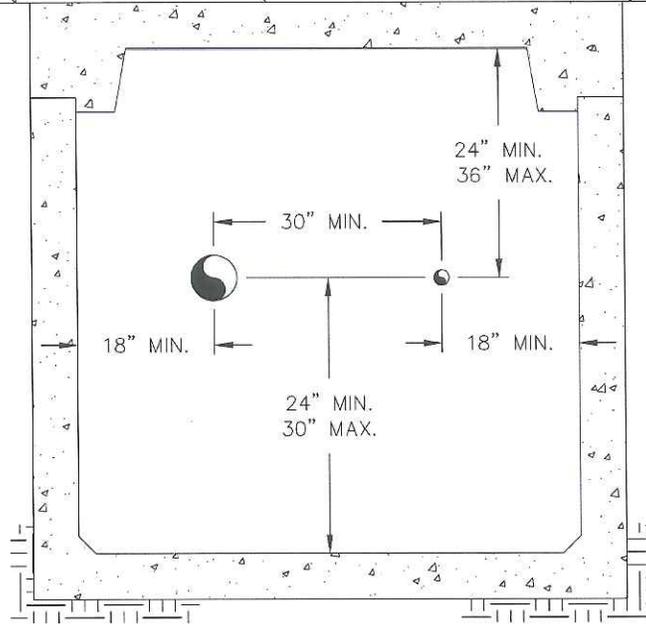
Dwg No: **W5**  
**4" AND LARGER  
 METER AND VAULT DETAIL**

TOP OF VAULT SHALL MATCH FINISHED GRADE

FINISHED GRADE

**LARGE METER VAULT NOTES:**

1. HOLES FOR PIPES SHALL BE EITHER CAST AT THE TIME OF MANUFACTURE OR CORE DRILLED.
2. AFTER ALL PIPING HAS BEEN INSTALLED AND ALIGNED PROPERLY, THE HOLES SHALL BE FILLED WITH CEMENT CONCRETE GROUT AND HAVE A BROOM OR SMOOTH FINISH.
3. VAULT AND LID MUST PROVIDE SUFFICIENT ACCESS FOR MAINTENANCE. VAULT SHALL HAVE RUNGS, GALVANIZED LADDER OR APPROVED EQUAL FOR SAFE ACCESS. METALLIC LADDERS OR RUNGS SHALL BE PAINTED WITH 10 MILS (APPR. TWO COATS) OF DUPONT 25p EPOXY MASTIC OR APPROVED EQUAL. LADDERS SHALL BE SECURED TO THE WALLS OF VAULT BY BOLTING AS RECOMMENDED BY THE MANUFACTURER. RUNGS SHALL BE CEMENTED INTO VAULT WALLS. LADDERS OR RUNGS SHALL BE LOCATED ON THE FRONT SIDE OF VAULT (POSITIONED SO AS NOT TO INTERFERE WITH PIPING WITHIN THE VAULT), SEE DETAIL FOR ORIENTATION, UNLESS ANOTHER LOCATION IS SPECIFIED BY THE CITY INSPECTOR. VAULT AND LID MUST PROVIDE SUFFICIENT ACCESS FOR MAINTENANCE. GALVANIZED VAULT LADDER REQUIRED.



**LEGEND:**

1. VAULT SHALL BE PRE-CAST CONCRETE, SIZED TO MEET CLEARANCE REQUIREMENTS. IT SHALL HAVE A GALVANIZED VAULT LADDER. LID SHALL HAVE REMOVABLE DIAMOND PLATE HINGED LOCKING DOORS, MINIMUM SIZE TO BE 3'-0" X 6'-0". HINGES TO BE LOCATED AT REAR. DOORS TO BE SPRING LOADED WITH OPEN POSITION LOCK AND SHALL HAVE A H-20 RATING.
  2. SENSUS FLANGED WATER METER (PRIMARY) WITH TR/PL ICE REGISTER REGISTERING 100 CUBIC FEET: SIZE AND TYPE AS REQUIRE BY CITY WATER DIVISION BASED ON ANTICIPATED FLOW.
  3. SENSUS FLANGED STRAINER: SIZE AS PER METER (INCORPORATED IN OMNI METERS).
  4. SENSUS #912 FLANGED COUPLING ADAPTER: SIZE AS PER METER.
  5. DUCTILE IRON PIPE (CLASS 53): SIZE PER METER.
  6. DUCTILE IRON TEE (FL X FL X FL) - SIZE AS PER PRIMARY METER. MAY SUBSTITUTE FLANGED DUCTILE IRON REDUCING TEE SIZED BY PRIMARY METER ON RUNS AND BYPASS METER ON SIDE AND ELIMINATE REDUCER (NOTE #11).
  7. RESILIENT WEDGE GATE VALVE (FL X FL) WITH 2" OPERATING NUT (SEE VALVE AND VALVE BOX STANDARD): SIZE AS PER PRIMARY METER.
  8. ADJUSTABLE PIPE SUPPORT, GALVANIZED: SIZE PER PIPE.
  9. DOUBLE STAINLESS STEEL STRAP SADDLE WITH 2" IP TAP WITH 2" BRASS PLUG: SIZE AS PER METER FORD FC202.
  10. VALVE BOX AND LID: SEE VALVE AND VALVE BOX STANDARD.
  11. DUCTILE IRON CONCENTRIC REDUCER (FL X FL) - PRIMARY METER SIZE X BYPASS METER SIZE.
  12. SENSUS FLANGED WATER METER (BYPASS) WITH TR/PL ICE REGISTER REGISTERING 100 CUBIC FEET - SIZE AND TYPE AS REQUIRED BY CITY WATER DIVISION BASED ON ANTICIPATED FLOW.
  13. SENSUS FLANGED STRAINER - SIZE AS PER BYPASS METER (INCORPORATED IN OMNI METERS).
  14. DUCTILE IRON PIPE SPOOL (FL X FL), CLASS 53 - SIZE AS PER BYPASS METER, LENGTH AS REQUIRED.
  15. RESILIENT WEDGE GATE VALVE (FL X FL) WITH 2" OPERATING NUT - SEE VALVE AND VALVE BOX STANDARD - SIZE AS PER BYPASS METER.
  16. DUCTILE IRON 90 DEGREE ELBOW (FL X FL) - SIZE AS PER BYPASS METER.
  17. DUCTILE IRON PIPE (FL X PE), CLASS 53 - SIZE AS PER PRIMARY METER, LENGTH AS REQUIRED.
  18. DUCTILE IRON PIPE (FL X PE), CLASS 53 - SIZE AS PER BYPASS METER, LENGTH AS REQUIRED.
- METALLIC (DETECTABLE MARKING) TAPE SHALL BE TIED TO BACKSIDE OF GATE VALVE (MAIN SIDE) AND STUBBED THROUGH VAULT WALL WITH PIPING, LEAVING 12" MINIMUM EXPOSED IN VAULT. MARKING TAPE SHALL BE COLOR CODE BLUE AND SHALL BE IMPRINTED CONTINUOUSLY OVER ITS ENTIRE LENGTH IN PERMANENT BLACK INK THE MESSAGE "WATER LINE BURIED BELOW" AND THE WORD "CAUTION" PROMINENTLY SHOWN. TAPE SHALL BE A MINIMUM OF 2" IN WIDTH. MARKING TAPE TO BE 12" ABOVE BURIED WATER LINE.

\* ALL DI PIPING AND FITTINGS WITHIN THE VAULT SHALL BE PAINTED WITH PARKER PAINT (MARATHON ENAMEL), COLOR TO BE TAHOE BLUE. METERS, STRAINERS, AND BRASS PIPING NOT TO BE PAINTED.

Approved:  12/27/2012  
 City Engineer Date  
**WATER STANDARD DETAIL**



Dwg No: **W5**  
**GENERAL LARGE WATER METER AND VAULT DETAIL**

**NOTES**

1. Meter size and type shall be based upon gallon per minute (g.p.m.) demand, and type of usage, as determined by Water Division based on information supplied by developer.
2. The following chart shall be used as a reference for determining meter size and necessary bypass meter size.

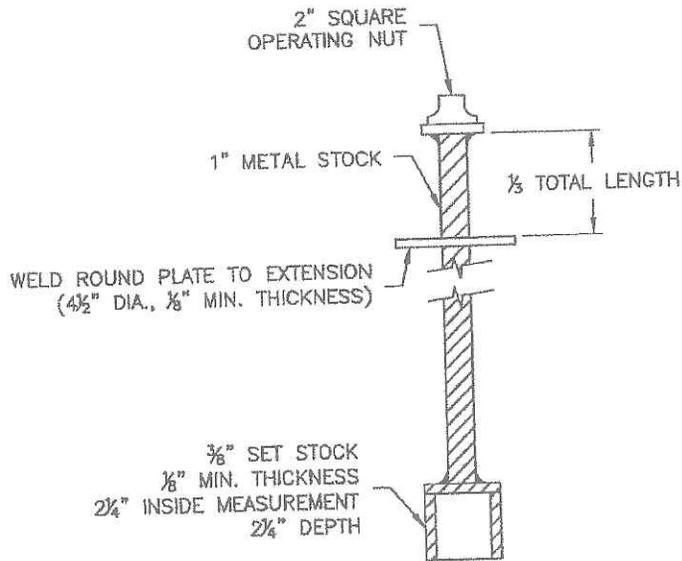
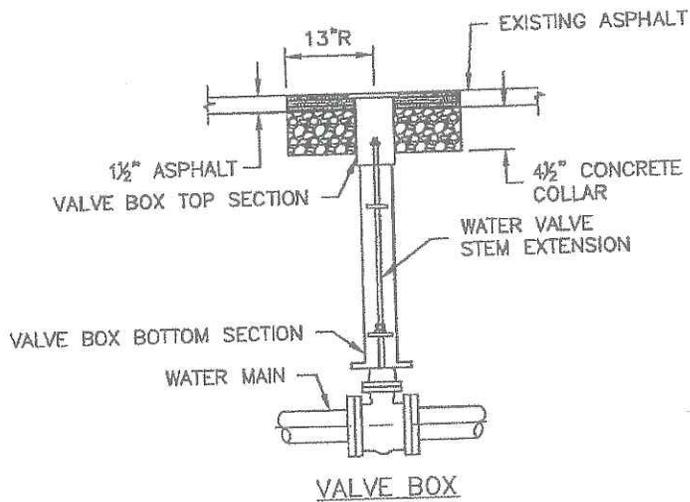
FLOW (g.p.m.)	METER SIZE/TYPE	BYPASS METER SIZE/TYPE
1/2 - 400	3" OMNI C2	2" OMNI T2
1.5 - 500	3" OMNI T2	2" OMNI T2
3/4 - 800	4" OMNI C2	3" OMNI T2
2 - 1000	4" OMNI T2	3" OMNI T2
1 1/2 - 1600	6" OMNI C2	4" OMNI T2
2 1/2 - 2000	6" OMNI T2	4" OMNI T2
4 - 3500	8" OMNI T2	6" OMNI T2

3. The use of multiple small meters in lieu of an appropriately sized single meter shall not be permitted.
4. All meters are to be manufactured by Sensus Technology.
5. All meters shall use a Touch Read/ Pit Lid register that reads in 100 cubic foot increments.
6. Vault lid shall have 1 3/4" hole drilled in diamond plate vault door, approximately 8" - 12" from hinges, and shall have Sensus model 520M single port FlexNet smartpoint transmitter properly installed through it, per manufacturers recommendations. Meter register touchread PIT/LID coupler shall be properly connected to transmitter. (Model 520M dual port transmitter shall be used for installations with both a main and a by-pass meter.)
7. All meter registers to be Sensus ICE.
8. FlexNet smartpoint transmitters shall be Model 520M with leak detection in single or dual port design.

Approved:  12/3/2012  
 City Engineer Date  
**WATER STANDARD DETAIL**



Dwg No: **W5**  
**GENERAL LARGE WATER METER INFORMATION**



VALVE OPERATING EXTENSION

SHEET 1 OF 3

Approved: *[Signature]* 11/20/2007  
 City Engineer Date

City of  
 Fife



Dwg No: **W6**  
**WATER VALVES**

**WATER STANDARD DETAIL**

# NOTES

1. Valve operating nut extensions are required when the valve nut is more than three (3) feet below finished grade. Extensions are to be a minimum of one (1) foot long, only one extension to be used per valve.
2. All valve operating nut extensions are to be made of steel, sized as noted and painted with 10 mils (approximately 2 coats) of Dupont 25p Epoxy Mastic or approved equal.
3. Valve boxes shall be two piece, adjustable, cast iron with extension pieces (if necessary), as manufactured by the Vanrich #940 Seattle or approved equal. The word "Water" shall be cast in relief in the top. Valve box lid ears to be parallel to water line.
4. Neat line cuts shall be sealed with a hot paving grade asphalt and face of cut tacked.
5. Water mains shall be ductile iron pipe constructed and tested in accordance with Division 7 of the latest edition of APWA Standard specifications for Road, Bridge, and Municipal Construction.
6. Section 7-09.2 of the Standard Specifications shall be supplemented by the following:
  - a. Ductile iron pipe shall conform to AWWA C 151, thickness class 50, except where otherwise specified, and the exterior shall be coated with coal tar varnish. Pipe shall be cement mortar lined to a minimum thickness of 2/32 inch for 3 inch through 12" pipe, and in all sizes conform to AWWA C 104. The cement shall conform to ASTM C 150.
  - b. Joints shall be Tyton push-on joints, or approved equal, or mechanical joint type per AWWA C 111 except where flanged joints are required to connect to valves or other equipment.
  - c. Bolts and nuts for flanges located outdoors above ground or in open vaults in structures shall be Type 316 stainless steel conforming to ASTM A 193, Grade B8M for bolts, and ASTM A 194, Grade 8M for nuts. Bolts and nuts larger than one and one-quarter (1 1/4) inches shall be steel, ASTM A 307, Grade B, with cadmium plating, ASTM A 165, Type NS.
  - d. Bolts used in flange installation sets shall conform to ASTM B 193, Grade B7. Nuts shall comply with ASTM A 194, Grade 2H.
  - e. Ductile iron pipe and fittings shall be encased in polyethylene film with a minimum thickness of 8 mil. Film shall meet and be installed in accordance with AWWA C105.
  - f. Metallic detectable marking tape shall be used on all mains, services, and blow-offs (see meter specifications for details).
7. Section 7-12.2 of the Standard Specifications shall be supplemented by the following:
  - a. Gate valves shall be used for twelve (12) inch mains and smaller. Butterfly valves shall be used for mains greater than twelve (12) inches.
    - i. Gate Valves: Gate valves shall conform to the latest revision AWWA C509 or C515 for cold water, resilient wedge, 200 psi minimum working pressure. They shall be D.I. or iron bodied, bronze-mounted, non rising stem, counter clockwise opening, mechanical joint and/or flanged ends (except 6 inch valves on fire hydrant lines which shall be mechanical joint by flanged). Valve stems shall be provided with O-ring seals and shall be as manufactured by the Mueller Company or approved equal. Operator shall have standard AWWA two inch (2") square nut.
    - ii. Butterfly Valves: Butterfly valves shall be HP 250 as manufactured by Pratt or approved equal. Butterfly valves shall meet or exceed AWWA C504, and shall have a 250 psi minimum working pressure rating and shall open counter clockwise. Operator shall have standard AWWA two inch (2") square nut. Butterfly Valves shall have mechanical joint and/or flanged ends.
    - iii. Backfill & Bedding: Pipes will be bedded in 6" of sand minimum. Pipe shall be backfilled with sand to the top of the pipe and be compacted to 90 percent of maximum dry density. Conditions may dictate use of other backfill or bedding material, use of other material requires prior approval of City Engineer.
    - iv. Water Line Separation From Sewer: A minimum horizontal separation of ten feet between gravity sanitary sewers and any existing potable water lines shall be maintained, measured edge to edge. When crossing over sewer lines a minimum of 3' vertical separation shall be maintained.
    - v. Thrust control shall be by means of concrete thrust block or megalug connectors.
8. When installing, extending, or replacing a water main; Line valves shall be installed no further apart than 600 feet. Valves shall also be required where mains intersect on the following minimum basis:
  - Teed lines - 3 valves minimum
  - Crossed lines - 4 valves minimum
 Valve arrangement shall be determined by City Water Department.
9. Hydrant, fire line, and service connections need not have more than one valve, unless specified otherwise by the City Water Department or these specifications.
10. All materials and fittings shall be as specified or an approved equal.

SHEET 2 OF 3

Approved:  12/3/2012  
 City Engineer Date

**City of  
Fife**



Dwg No:

**W6**

**WATER VALVES**

**WATER STANDARD DETAIL**

10. All materials and fittings shall be as specified or an approved equal.
11. Tapping sleeves, when allowed by city, shall be Smith and Blair #622 or approved equal, with epoxy coating and stainless steel bolts and nuts for corrosive environments.
12. All materials and fittings shall be new and unused.
13. Fire lines shall have a valve at the main. Fire line valve boxes shall have a locking valve box lid, manufactured by Ampro, which utilizes a "red" pentagonal nut for the locking mechanism designed for the Vanrich 940 valve box.
14. Water mains shall have a minimum horizontal separation of 3' and vertical separation of 6" from other utilities, measured edge to edge, unless prior written approval is received from the city. Exception: see note #7A.4 above regarding sanitary sewer.
15. Water mains installed in casings require the casing be a minimum of (6") six inches larger than the outside diameter of the bells on the Ductile Iron Pipe. Chokes or skids shall be strapped to the Ductile Iron Pipe at regular intervals sufficient enough to evenly support the water main and keep it centered in the casing. Very long crossings may require the space between the main and casing be partially filled with sand, to prevent movement of the pipe. An isolation valve on the main shall normally be required at each end of the casing.
16. The standard location for water mains shall be within public streets and roads and shall be a standard distance (see chart below) from the center line of such streets and roads on the south and east side of street center lines. Exceptions to these requirements may be made in order to avoid cutting and replacing pavement or to avoid conflicts with other existing underground facilities, as determined by the City Engineer. As nearly as practical, mains shall be installed in the same relative location on a particular street with the distance from the center line of the street being varied as little as possible. Mains shall not be installed in alleys. The installation of mains within easements across privately owned property is to be done only when absolutely necessary, such as the avoidance of dead end conditions. Such easements, when required, shall be a minimum of 15 feet in width centered upon the main, and the conditions of the easement shall include provisions that the property included in the easement shall not be used for any purpose which would interfere with the unrestricted use for water main purposes. Under no circumstances will permission for the construction of a building or structure of any type within the easement be granted.

Water Main Locations	
2 Lane Road . . . .	8 Feet From Center Line
3 Lane Road . . . .	14 Feet From Center Line
4 Lane Road . . . .	20 Feet From Center Line
5 Lane Road . . . .	26 Feet From Center Line

17. Distribution system mains shall be looped wherever possible. The installation of permanent dead-end mains and dependence of relatively large areas on single mains is to be avoided. Water mains shall be sized so as not to permit pipe line water velocity to exceed (9) nine feet per second during peak hour use while meeting fire flow demand, under those conditions water pressure must remain at or above 20 psi.
18. Hazardous water line crossings shall be valved on each side. These crossings include, but are not limited to: creeks, rivers, railroads, freeways, major highways, etc.
19. Water mains shall have a uniform 36" of cover, unless prior written approval from the City Engineer is granted.
20. The installation of an appropriately designed flexible expansion joint, shall be required at points in the water system (determined by the City Engineer) determined to be either critical to the integrity, or at high risk of failure when exposed to sudden or gradual motion. Flexible expansion joints shall be Flex-Tend as manufactured by EBAA Iron Inc., or approved equal.
21. It shall be the responsibility of the developer to provide the City with accurate as-built construction plans, upon the completion of the project and prior to issuance of any certificate of occupancy. As-built plans submitted to the city for review and acceptance shall include one set of mylars, two sets of blue line plans, and on CD-Rom in both PDF and CAD format. Mylars and blue line plans shall be 24" x 36" in dimension.
22. All mechanically restrained joints shall be shown on as-built plans.
23. Valve boxes located in landscaped areas shall have the same diameter concrete collar, however thickness shall be 6" of concrete. No asphalt shall be applied.
24. When water mains are required to cross private property an easement and bill of sale are required.

SHEET 3 OF 3

Approved: 		Dwg No: <b>W6</b>
City Engineer _____ Date _____		<b>WATER VALVES</b>
<b>WATER STANDARD DETAIL</b>		

# POLYETHYLENE ENCASEMENT

*Effective, Economical Protection  
for Ductile Iron Pipe  
In Corrosive Environments*

**DIPRA**  
**DIPRA**  
**DIPRA**  
**DIPRA**

SHEET 1 OF 5

Approved: *Scott Flouret* 11/20/2007  
City Engineer Date

WATER STANDARD DETAIL

City of  
Elle



Dwg No:

**W7**

**POLYETHYLENE ENCASEMENT  
INSTALLATION INSTRUCTIONS**

### Proper Installation of Polyethylene Encasement

As with any corrosion-protection system, proper installation is important to polyethylene encasement's success. Care taken during installation is as important as the installation method itself. The few known failures of polyethylene-encased Gray and Ductile Iron pipe have generally been due to improper installation or poor workmanship.

The ANSI/AWWA C105/A21.5 Standard outlines three methods of installing polyethylene sleeving. Methods A and B use polyethylene tubes, and Method C uses polyethylene sheets.

Method A uses one length of polyethylene tube, overlapped at the joints, for each length of pipe. Because installation is faster and easier, most utilities and contractors choose some form of Method A.

Method B uses a length of polyethylene tube for the barrel of the pipe and a separate length of polyethylene tube or sheet for the joints. The national standard does not recommend Method B for bolted-type joints unless an additional layer of polyethylene is provided over the joint area as in Methods A and C.

In Method C, each section of pipe is completely wrapped with a flat polyethylene sheet.

### ANSI/AWWA C105/A21.5 Installation Methods



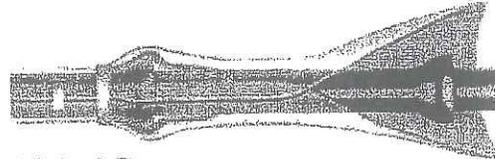
#### Method A

In this method, which is preferred by most utilities and contractors, one length of polyethylene tube, overlapped at the joints, is used for each length of pipe.



#### Method B

A length of polyethylene tube is used for the barrel of the pipe and separate lengths of polyethylene tube or sheets are used for the joints. Note: Method B is not recommended for bolted-type joints unless an additional layer of polyethylene is provided over the joint area as in Methods A and C.



#### Method C

Each section of pipe is completely wrapped with a flat polyethylene sheet.

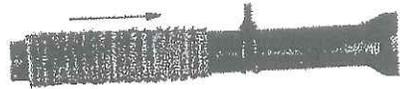
Approved: *[Signature]* 11/20/2007  
 City Engineer Date  
**WATER STANDARD DETAIL**

City of  
**Fife**



Dwg No: **W7**  
**POLYETHYLENE ENCASEMENT  
 INSTALLATION INSTRUCTIONS**

*Method A  
for Normal Dry Trench Conditions*



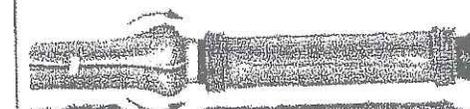
**Step 1.**  
Cut a section of polyethylene tube approximately two feet longer than the pipe section. Remove all lumps of clay, mud, cinders, or other material that might have accumulated on the pipe surface during storage. Slip the polyethylene tube around the pipe, starting at the spigot end. Bunch the tube accordion-fashion on the end of the pipe. Pull back the evertanging end of the tube until it clears the pipe end.



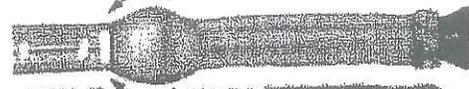
**Step 2.**  
Dig a shallow bell hole in the trench bottom at the joint location to facilitate installation of the polyethylene tube. Lower the pipe into the trench and make up the pipe joint with the precasting section of pipe.



**Step 3.**  
Move the cable to the bell end of the pipe and lift the pipe slightly to provide enough clearance to easily slide the tube. Spread the tube over the entire barrel of the pipe. Note: Make sure that no dirt or other bedding material becomes trapped between the wrap and the pipe.



**Step 4.**  
Make the overlap of the polyethylene tube by pulling back the bunched polyethylene from the preceding length of pipe and securing it in place. Note: The polyethylene may be secured in place by using tape, string, plastic tie straps, or any other material capable of holding the polyethylene encasement snugly against the pipe.



**Step 5.**  
Overlap the secured tube end with the tube end of the new pipe section. Secure the new tube end in place.



**Step 6.**  
Take up slack in the tube along the barrel of the pipe to make a snug, but not tight, fit. Fold excess polyethylene back over the top of the pipe.



Secure the fold at several locations along the pipe barrel approximately every three feet.



**Step 8.**  
Repair all small rips, tears, or other tube damage with adhesive tape. If the polyethylene is badly damaged, repair the damaged area with a sheet of polyethylene and seal the edges of the repair with adhesive tape.



Check the fit of the tube at the joint. Backfill should be free of cinders, rocks, boulders, nails, sticks, or other materials that might damage the polyethylene. Avoid damaging the polyethylene when using tamping devices.

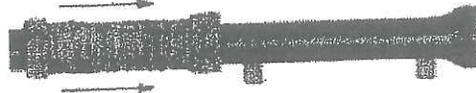
Approved: *[Signature]* 11/20/2007  
 City Engineer Date  
 WATER STANDARD DETAIL

City of  
 Fife

Dwg No: W7  
 POLYETHYLENE ENCASEMENT  
 INSTALLATION INSTRUCTIONS

### Alternate Method A for Wet Trench Conditions

In wet, sloppy trench conditions, the pipe should be completely covered by the polyethylene tube before it is lowered into the trench. This alternate method is illustrated below.



**Step 1.**  
Cut the polyethylene tube to a length approximately two feet longer than that of the pipe section. Slip the tube over the pipe.



**Step 2.**  
Spread the tube over the entire barrel of the pipe, pushing back both ends of the tube until they clear both pipe ends. Make sure the tube is centered on the pipe to provide a one-foot overlap at each end.



**Step 3.**  
Take up slack in the tube to make a snug, but not tight, fit. (See previous page.) Circumferential wraps of tape or plastic tie straps should be placed at 2-foot intervals along the barrel of the pipe to help minimize the space between the polyethylene and the pipe. Wrap a piece of tape or plastic tie strap completely around the pipe at each end to seal the polyethylene, leaving ends free to overlap the adjoining sections of pipe.



Lower pipe into the trench and make up the pipe joint. Be careful not to damage the polyethylene when handling or jointing the pipe. Complete the installation following dry condition Steps 4, 5, (taking care to seal ends of overlap by wrapping tape or plastic tie straps completely around the pipe at each end), 8, and 9 on previous page. Note: When lifting polyethylene-encased pipe, use a fabric-type sling or a suitably padded cable or chain to prevent damage to the polyethylene.

If you have any problems or questions about installing polyethylene encasement, contact DWPRA or one of its member companies.

### Appurtenances

**Pipe-shaped appurtenances**  
Cover heads, reducers, offsets, and other pipe-shaped appurtenances in the same manner as the pipe.

**Odd-shaped appurtenances**  
Wrap odd-shaped appurtenances, such as valves, tees, and crosses with a flat sheet or split length of polyethylene tube by passing the sheet under and then over the appurtenance and bringing it together around the body of the appurtenance. Make seams by bringing the edges of the polyethylene together, folding over twice, and taping them down.

**Joints**  
Overlap joints as in normal installation; then tape the polyethylene securely in place at valve stems and other penetrations. When bolted-type joints are used, care should always be taken to prevent bolts or other sharp edges of the joint configuration from penetrating the wrap.

**Branches, blowoffs, air valves**  
To provide openings for branches, blowoffs, air valves, and similar appurtenances, make an X-shaped cut in the polyethylene and temporarily fold back the film. After installing the appurtenance, tape the slack securely to the appurtenance and repair the cut and any other damaged areas in the polyethylene with tape.

**Service taps**  
The preferred method of tapping polyethylene-encased Ductile Iron pipe involves wrapping two or three layers of polyethylene adhesive tape completely around the pipe to cover the area where the tapping machine and chain will be mounted. Then install the corporation stop directly through the tape and polyethylene. After the tap is made, inspect the entire circumferential area for damage and make any necessary repairs.

Approved: *[Signature]* 11/20/2007  
City Engineer Date  
WATER STANDARD DETAIL

City of  
Fife



Dwg No:

W7

POLYETHYLENE ENCASUREMENT  
INSTALLATION INSTRUCTIONS

POLYETHYLENE ENCASEMENT is inexpensive, easy to install on-site, and requires no additional manpower or equipment. And since it is a passive method of protecting Ductile Iron pipe in corrosive soils, it does not require the continual monitoring, maintenance, or supervision by trained personnel necessary with cathodic protection systems.

Although the polyethylene encasement should prevent contact between the pipe and surrounding backfill and bedding material, it is not intended to be completely airtight or water tight. All lumps of clay, mud, cinders, or other materials that might be on the pipe surface should be removed prior to installation of the polyethylene encasement. Care should be taken to prevent soil or bedding material from becoming trapped between the pipe and the polyethylene.

The polyethylene film should be fitted to the contour of the pipe to effect a snug, but not tight, encasement with minimum space between the polyethylene and the pipe. Sufficient slack should be provided in contouring to prevent stretching the polyethylene when bridging irregular surfaces, such as bell-spigot interfaces, bolted joints, or fittings, and to prevent damage to the polyethylene during backfilling operations. Overlaps and ends should be secured with polyethylene-compatible adhesive tape or recommended strapping.

For installation below the water table or in areas subject to tidal actions, it is recommended that both ends of the polyethylene tube be sealed as thoroughly as possible by wrapping circumferentially with polyethylene-compatible adhesive tape or recommended strapping at each joint overlap.

As with all protection methods, proper installation is vital to the success of polyethylene encasement. The actual installation sequence, however is less important than the quality and care taken during installation.

SHEET 5 OF 5

Approved:

City Engineer

WATER STANDARD DETAIL

*[Signature]* 11/24/2017

Date

City of  
Fife



Dwg No:

W7

POLYETHYLENE ENCASEMENT  
INSTALLATION PROCEDURES

# HYDROSTATIC PRESSURE TEST

All water mains and appurtenances shall be tested in section of convenient length under a hydrostatic pressure equal to 150 psi in excess of that under which they will operate or in no case shall the test pressure be less than 200 psi. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished and operated by the Contractor.

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Contractor shall furnish and install temporary blocking and remove it after testing.

The mains shall be filled with water and allowed to stand under pressure a sufficient length of time to allow the escape of air and allow the lining of the pipe to absorb water. The city will furnish the water necessary to fill the pipelines for testing purposes at a time of day when sufficient quantities of water are available for normal system operation.

The test shall be accomplished by pumping the main up to the required pressure, stopping the pump for 120 minutes, and then pumping the main up to the test pressure again. During the test, the section being tested shall be observed to detect any visible leakage. A clean container shall be used for holding water for pumping up pressure on the main being tested. This makeup water shall be sterilized by the addition of chlorine to a concentration of 50 mg/L.

The quantity of water required to restore the pressure shall be accurately determined by pumping through a positive displacement water meter with a sweep unit hand registering 1 gallon per revolution. The meter shall be approved by the City Inspector.

Acceptability of the test will be determined as follows: The quantity of water lost from the main shall not exceed the number of gallons per hour as determined by the formula:

$$L = \frac{ND\sqrt{P}}{7,400}$$

SHEET 1 OF 5

Approved: *Chris Lovat* 11/20/2007  
City Engineer Date

City of  
Fife



Dwg No:

W8

HYDROSTATIC  
PRESSURE TEST

WATER STANDARD DETAIL

- In which
- L = Allowable leakage, gallons/hour
  - N = No. of joints in the length of pipeline tested
  - D = Nominal diameter of the pipe in inches
  - P = Average test pressure during the leakage test, psi

There shall not be an appreciable or abrupt loss in pressure during the 120 minute test period.

Gauges used in the test shall be accompanied with certifications of accuracy from a laboratory approved by the City Inspector.

Any visible leakage detected shall be corrected by the Contractor regardless of the allowable leakage specified the Contractor shall, at no expense to the City locate and repair the defects and then retest the pipeline.

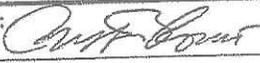
All tests shall be made with the hydrant auxiliary gate valves open and pressure against the hydrant valve. After the test has been completed, each gate valve shall be tested by closing each in turn and relieving the pressure beyond. This test of the gate valve will be acceptable if there is no immediate loss of pressure on the gauge when the pressure differential across the valve does not exceed the related working pressure of the valve.

Sections to be tested shall normally be limited to 1,500 feet. The City Inspector may require that the first section of pipe, not less than 1,000 feet in length, installed by each of the Contractor's crews, be tested in order to qualify the crew and the material. Pipe laying shall not be continued more than an additional 1,000 feet until the first section has been tested successfully.

Prior to calling out the City Inspector to witness the pressure test, the Contractor shall have all equipment set up completely ready for operation and shall have successfully performed the test to assure himself that the pipe is in a satisfactory condition.

Defective materials or workmanship, discovered as a result of hydrostatic field test, shall be replaced by the Contractor at no expense to the City. Whenever it is necessary to replace defective material or correct the workmanship, the hydrostatic test shall be replicated at the Contractor's expense until a satisfactory test is obtained.

SHEET 2 OF 5

Approved:  11/20/2007  
 City Engineer Date

City of  
Fife



Dwg No:

W8

HYDROSTATIC  
PRESSURE TEST

WATER STANDARD DETAIL

## TESTING EXTENSIONS FROM EXISTING MAINS

When an existing water main is extended with new pipe to a new valve and the distance from the existing pipe to the new valve is 18 feet or less, the section of new pipe installed between the new valve and the end of the existing main shall be made with pretested, pre-chlorinated pipe, and no hydrostatic test will be required. When the required hydrostatic tests are conducted in the new main section beyond the installed new valve in the closed position, the normal pressure of the existing main may be present against the other side of the new valve.

Where the distance between the end of an existing water main pipe extension to the new valve is more than 18 feet, the connection of the new pipe to existing pipe shall not be made until after hydrostatic tests have been made to the required pressure in both directions against the new valve. This shall be accomplished by a temporary cap or plug installed on the end of the new pipe, beyond the new valve, as close as possible to the existing pipe for testing purposes.

The short length of pipe between the temporary cap or plug end with the new valve in the closed position, with no hydrostatic pressure active on the opposite side of the valve, shall be subjected to the required test pressure. The same test shall be made against the other side of the new valve when that section of pipe is tested with no hydrostatic pressure active in the short section of pipe toward the existing main. The final connection to the existing main shall be made with pretested pre-chlorinated pipe.

## TESTING SECTION WITH HYDRANTS INSTALLED

When hydrants are included with the section of main pipe to be tested, the testing shall be conducted in three separate tests as follows:

Test No. 1 – Water main gate valves and hydrant auxiliary gate valves closed, with the hydrant operating stem valves and hose ports wide open.

Test No. 2 – Water main gate valves and hydrant operating the stem valves tightly closed but the hydrant auxiliary gate valves and hose ports wide open.

SHEET 3 OF 5

Approved:  11/20/2007  
City Engineer Date

City of  
Fife



Dwg No:

W8

**HYDROSTATIC  
PRESSURE TEST**

**WATER STANDARD DETAIL**

Test No. 3 – Each hydrant shall be tested to the pressure indicated in Section 7–11.3(11) with the hydrant auxiliary gate valve and hose ports closed and the hydrant operating stem valve wide open. Twenty–five pounds per square inch shall be in the supply main beyond the hydrant auxiliary gate valve when testing a hydrant singly.

### TESTING HYDRANTS INSTALLED ON EXISTING MAINS

For hydrants installed and connected to an existing main, the hydrant connection including hydrant tee, connection pipe, and auxiliary gate valves, shall be installed with pretested materials.

Before the hydrant connection is made to the existing main, the hydrant installation shall be subjected to the hydrostatic Test No. 3 as specified in Section 7–11.3(11)B. Hydrants installed and connected to an existing main shall have a satisfactory bacteriological sample obtained before the hydrostatic test.

### BACTERIOLOGIC TESTING OF NEW MAINS

Before placing in service any new mains, extensions to existing mains, or portions of repaired main shall be chlorinated to a minimum of 50 mg/1 available chlorine, calculated on the volume of the water which the main and appurtenances will contain.

$$(3.14)(\text{rad.}^2)(\text{length}) = \text{Volume}$$

Treated water shall be retained in the pipe at least 24 hours. There shall remain a free chlorine residual of 25 mg/1 minimum after 24 hours, at pipe extremities and at other representative points.

Following chlorination, all treated water shall be flushed from the newly–laid pipe until the replacement water throughout its length shows, upon test, the absence of chlorine. In the event chlorine is normally used in the source of supply, then the tests shall show a residual not in excess of that carried in the system. A sample tap shall be located ahead of the flushing hose for sanitary sampling. Following flushing the water in the main will again be isolated, and retained for not less than 48 hours. At the conclusion of the retention period a bacteriologic sample will be taken by the city or its appointed representative to a state certified laboratory for analysis. Multiple

SHEET 4 OF 5

Approved: 	Date: 11/20/2007		Dwg No: <b>W8</b>
City Engineer			<b>HYDROSTATIC PRESSURE TEST</b>
<b>WATER STANDARD DETAIL</b>			

samples may be required at the city's discretion. Upon notification of a samples satisfactorily passing analysis, the city may grant permission to place main and appurtenances on line.

In the event an unsatisfactory bacteriologic report is returned, the disinfection, flushing, and testing process must be repeated until a satisfactory result is attained. All costs and materials associated with disinfection, flushing, and testing shall be at no additional cost to the city, as it is considered a part of the construction of the water main.

The contractor shall be responsible for disposal of treated water flushed from mains and shall neutralize the wastewater for protection of aquatic life in the receiving water before disposal into any natural drainage channel.

The contractor shall be responsible for disposing of disinfected solution to the satisfaction of the State and Local authorities. If approved by the responsible sanitary sewer utility; i.e. - City, County, etc., may be discharged to said sanitary sewer. When discharging to any receiving water, and especially when discharging to sanitary sewer, proper cross connection practices must be used.

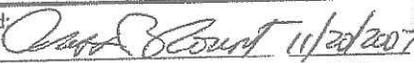
The contractor shall give at least 24 hours prior notice to the City when requesting a bacteriologic sample be taken. The contractor shall be present at the sampling site, which must be approved by the City, and have all necessary equipment set up and completely ready for use at the agreed time.

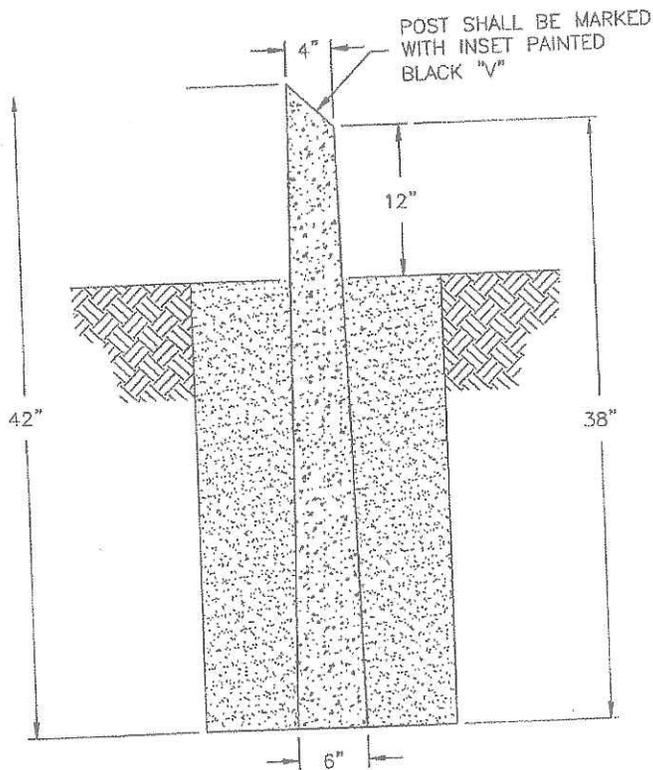
#### MAINTAINING SERVICE

Where existing services are to be transferred from old to new mains, the contractor shall plan and coordinate its work with that of the utility so that service will be resumed with the least possible inconvenience to customers.

To supply customers with water during the construction of a water main project where any section of the pipe has passed satisfactory hydrostatic and bacteriological tests, the City reserves the right to tap corporation cocks into the section of new pipe and install service connections at such locations as the City may elect. The installation of any such service connection by the City shall not be construed by the contractor as an acceptance by the City of any part of the work required under the Contract.

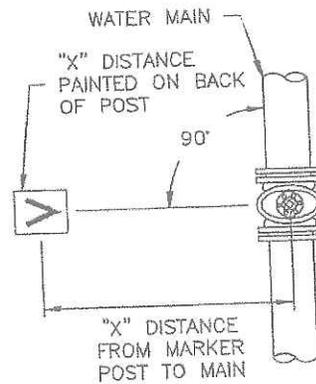
SHEET 5 OF 5

Approved: 	City of <b>Fife</b> 	Dwg No: <b>W8</b>
City Engineer _____ Date _____		<b>HYDROSTATIC PRESSURE TEST</b>
<b>WATER STANDARD DETAIL</b>		



**NOTES:**

- 1) PRECAST REINFORCED POST TO BE PAINTED BLUE.
- 2) DISTANCE FROM MARKER POST TO WATER MAIN SHALL BE PAINTED ON THE BACKSIDE OF MARKER POST IN WHITE WITH A 2" HIGH NUMBER.
- 3) VALVE MARKER POST SHALL BE REQUIRED WHEN A WATER VALVE IS LOCATED IN AN UNPAVED AREA.
- 4) POST SHALL BE REQUIRED FOR BLOW-OFF ASSEMBLIES IN SAME CONDITIONS AS WATER VALVES.



**VALVE MARKER - POST**

Approved: *Curt Stout* 11/20/2007  
 City Engineer Date

City of  
 Fife



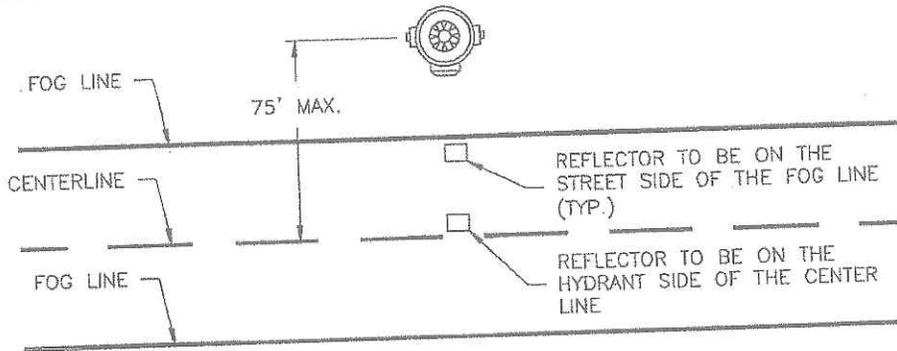
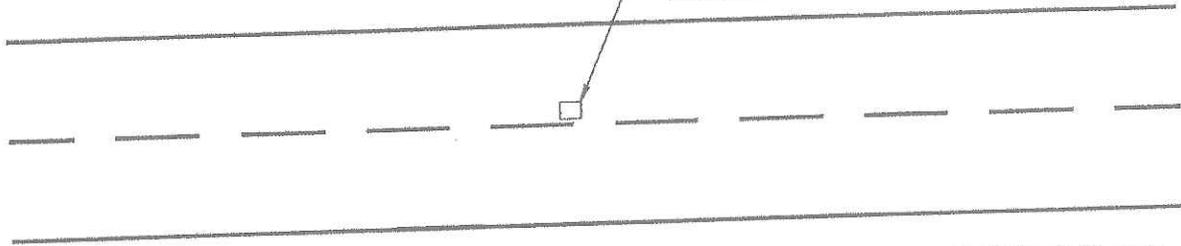
Dwg No: **W9**

**VALVE MARKER**

WATER STANDARD DETAIL

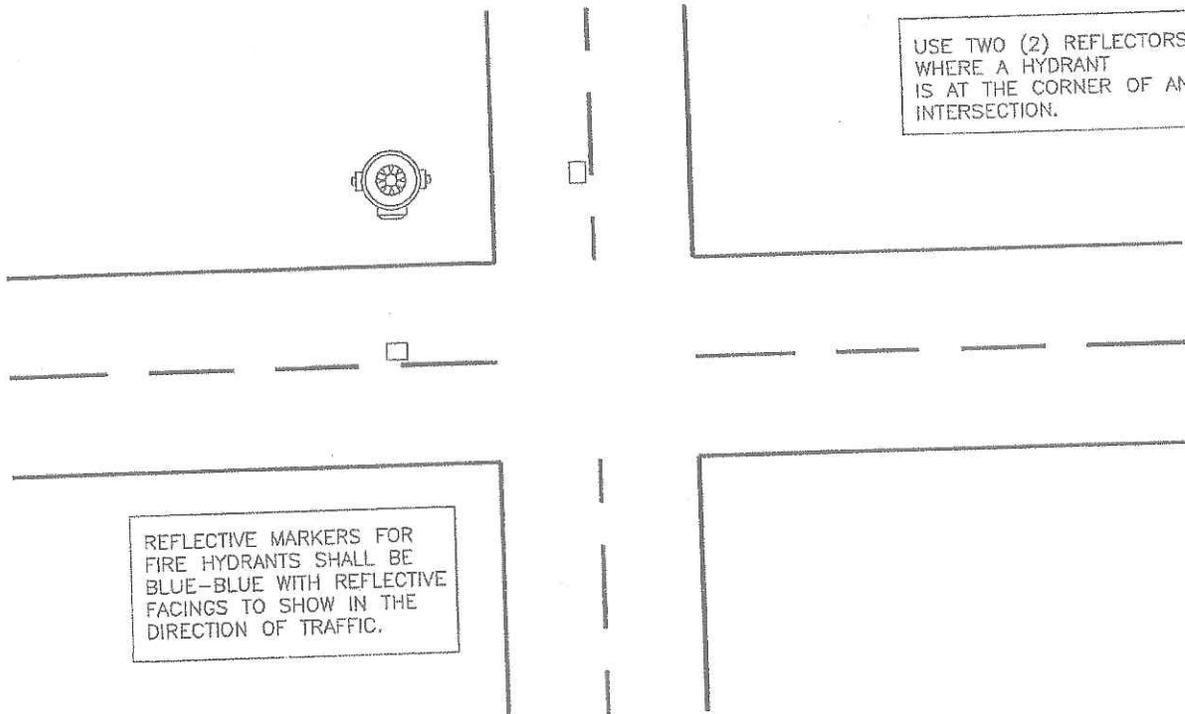


USE ONE REFLECTOR WHEN  
HYDRANT IS LESS THAN TWENTY  
FEET (20') FROM EDGE OF  
PAVEMENT



ALL REFLECTORS SHALL  
BE IN LINE WITH THE  
HYDRANT AND SHALL  
BE A DISTANCE OF  
4" FROM THE LINE BEING  
USED.

USE TWO (2) REFLECTORS  
WHERE THE HYDRANT IS  
MORE THAN 20' FROM THE  
CENTERLINE. HYDRANTS  
SHALL BE WITHIN 75' OF  
CENTERLINE.



USE TWO (2) REFLECTORS  
WHERE A HYDRANT  
IS AT THE CORNER OF AN  
INTERSECTION.

REFLECTIVE MARKERS FOR  
FIRE HYDRANTS SHALL BE  
BLUE-BLUE WITH REFLECTIVE  
FACINGS TO SHOW IN THE  
DIRECTION OF TRAFFIC.

SHEET 2 OF 2

Approved: *[Signature]* 11/27/2007  
City Engineer Date

City of  
Fife

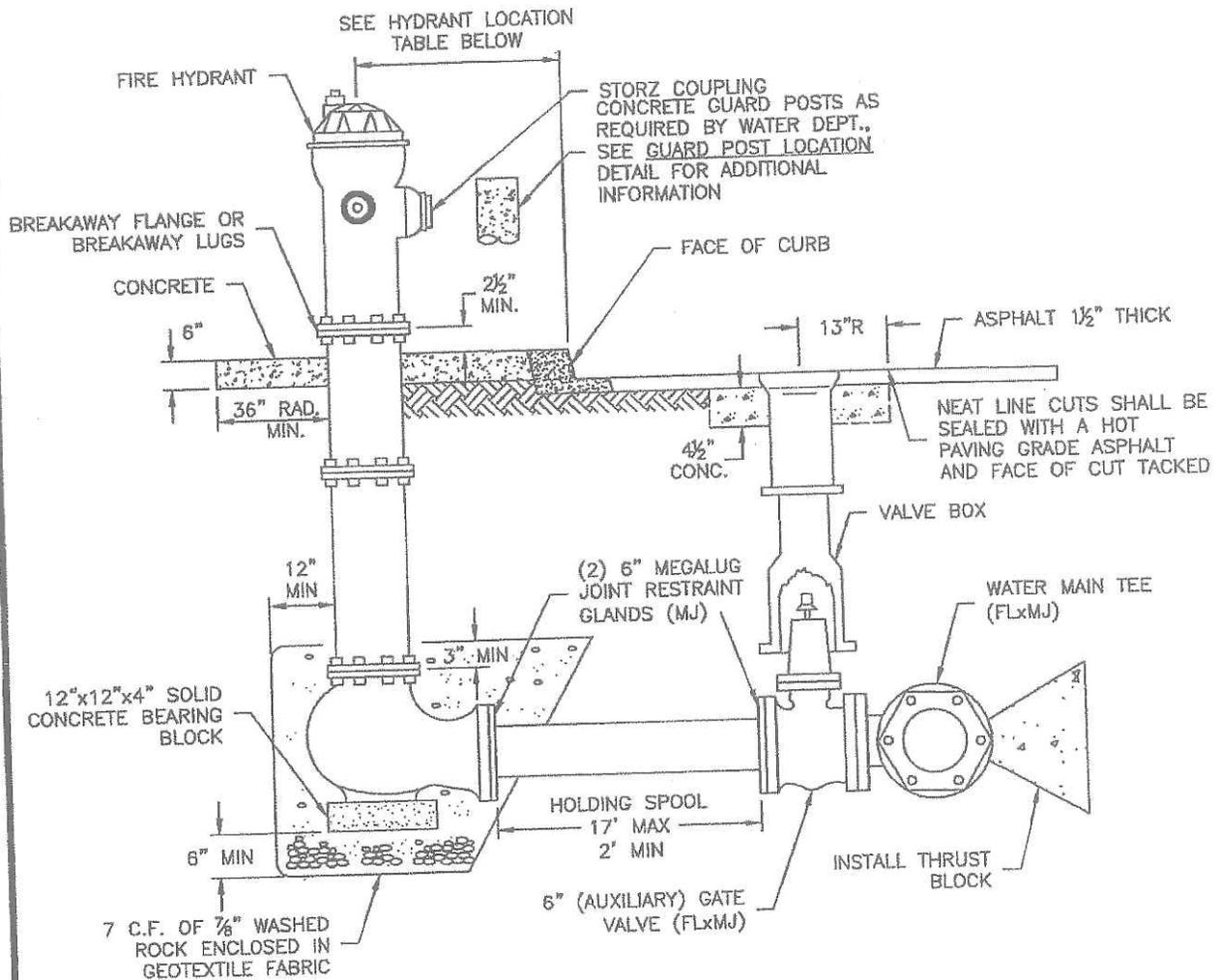


Dwg No:

W9

HYDRANT MARKERS

WATER STANDARD DETAIL



HYDRANT LOCATION TABLE	
CONDITION	FACE OF CURB TO HYDRANT CENTERLINE
NO SIDEWALK (SW) AT CURB	3'
5' SW AT CURB	7'
SW GREATER THAN 5' AT CURB	1'-6" BEHIND CURB

SHEET 1 OF 5

Approved: *Carol Lovant* 11/29/2007  
 City Engineer Date

City of  
 Fife

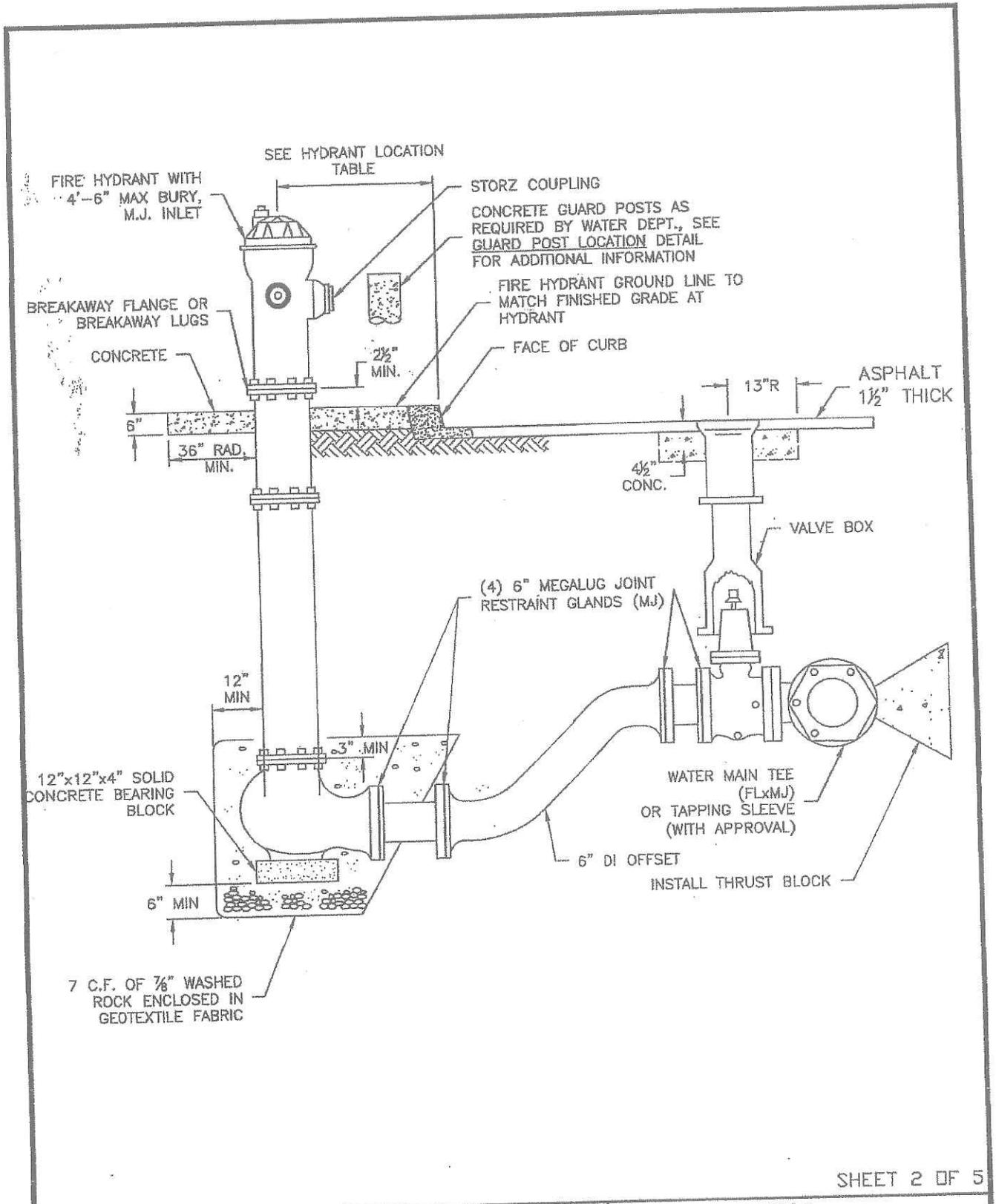


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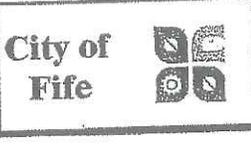
W10

FIRE HYDRANT ASSEMBLY

WATER STANDARD DETAIL

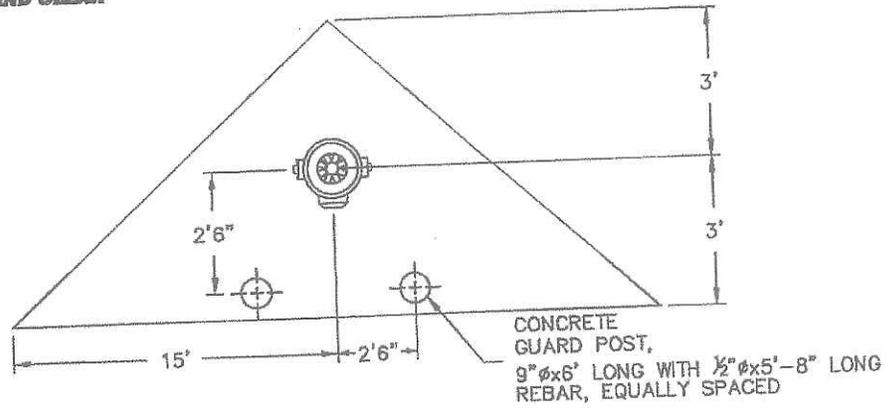


Approved: *Cary Lovat* 11/20/2007  
 City Engineer Date  
 WATER STANDARD DETAIL

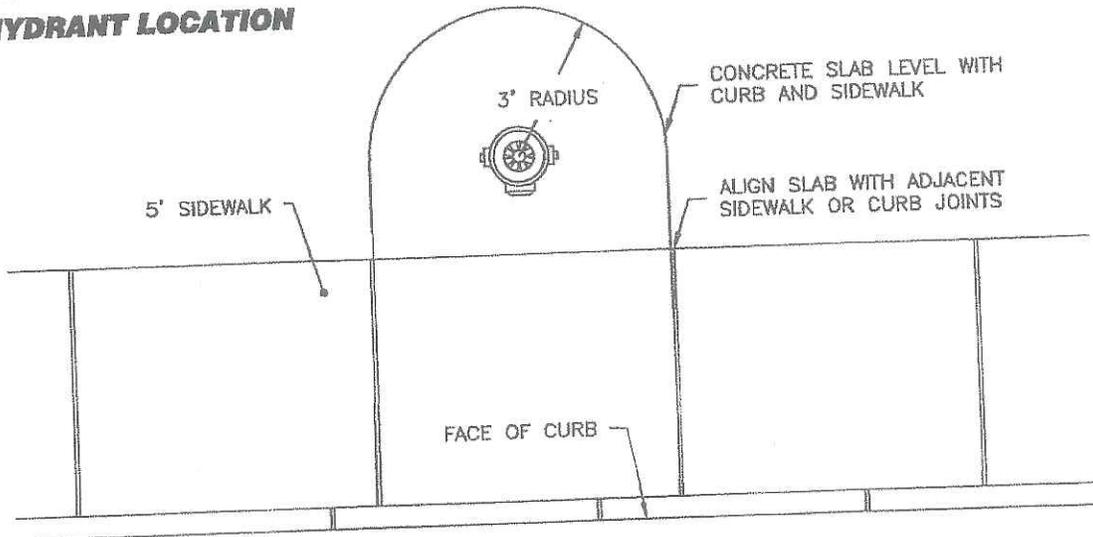


Dwg No: **W10**  
**FIRE HYDRANT ASSEMBLY (WITH OFFSET)**

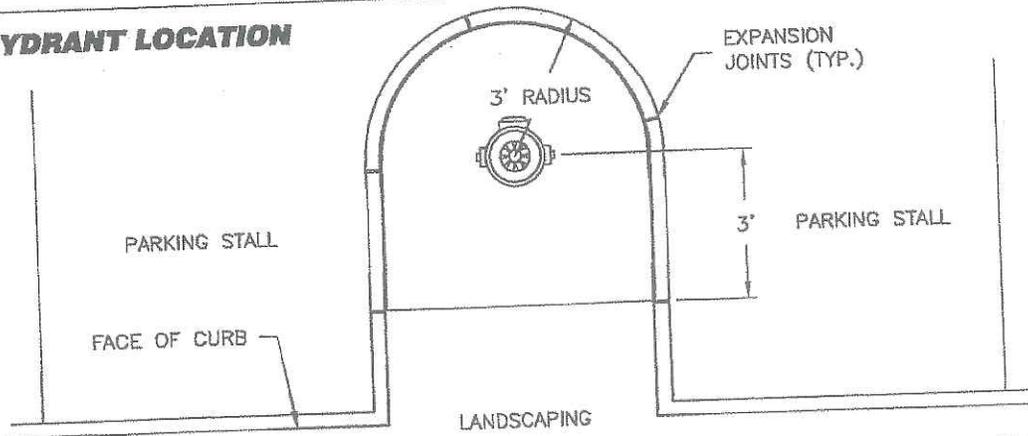
**GUARD POST LOCATION**  
 (WHEN REQUIRED) AND CLEAR  
 FIELD OF VIEW



**HYDRANT LOCATION**

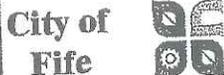


**HYDRANT LOCATION**



SHEET 3 OF 5

Approved: *[Signature]* 11/20/2007  
 City Engineer Date  
 WATER STANDARD DETAIL



Dwg No: W10

**FIRE HYDRANT ASSEMBLY  
 LOCATION**

## NOTES:

1. All materials and fittings shall be as specified.
2. Water mains shall have a uniform cover of 36", unless approved by the city.
3. Fire hydrant and concrete guard posts shall be painted only with Parker Paint -Marathon Enamel Colors possible: Brilliant White, Brilliant Green, Cardinal Red, or Safety Orange. Hydrant barrel and guard posts shall be painted Brilliant White. Hydrant dome shall be painted Brilliant Green, unless specified otherwise by the City Water Department.
4. Fire hydrants shall be of a traffic design and shall have two 2 1/2" hose ports (National Standard Thread) with caps and one 4" pumper port (National Standard Thread) with a 5" "storz" coupling and blind cap installed on the steamer port, (steamer port shall face the street), 1 1/2" pentagonal operating nut (counter-clockwise opening) O-ring type stuffing box, automatic barrel drains and 5 1/4" main valve opening. Hydrants shall be designed in a manner that will prevent barrel breakage when struck by a vehicle. Hydrants shall conform to the latest revision of AWWA specifications number C502 for fire hydrants for ordinary water service. Fire hydrants shall include the entire assembly complete, including hydrant, gate valve and box, connecting piping, fittings and accessories.
5. Valve boxes located in landscaped areas shall have same diameter concrete collar, however thickness shall be 6" of concrete. No asphalt shall be applied.
6. **Fire hydrants shall be Clow Medallion, Mueller Super Centurion 250, , M&H 929, no substitutions permitted.**
7. Valve boxes shall be two-piece, adjustable, cast iron with extension pieces (if necessary), as manufactured by the Vanrich #940 Seattle or approved equal. The word "WATER" shall be cast in relief in the top. Valve box lid ears shall face in direction of water line.
8. Gate valves shall conform to the latest AWWA specifications for cold water, resilient wedge, 200 psi working pressure. They shall be D.I. or iron-bodied, bronze mounted, non-rising stem, counter-clockwise opening mechanical joint by flanged. Valve stems shall be provided with O-ring seals and shall be as manufactured by the Mueller Company or approved equal.
9. The holding spool shall use mega-lug connectors at all joints.
10. The contractor shall place a 6oz. geotextile fabric which completely encloses the washed rock area.
11. The number and placement of fire hydrants to be determined by the City Fire Marshal in consultation with local fire Department and City Water Division, and in all cases in compliance with the most recent edition of the uniform building code.
12. All materials and fittings to be new and unused.
13. Hydrant shall have a maximum 4' 6" bury. Where the main is too large or too deep to provide for the 4' 6" bury an appropriate offset shall be used. Offset shall be ductile iron MJ x MJ, and use mega-lug restraints at all joints.

SHEET 4 OF 5

Approved:  12/3/2012  
City Engineer Date

City of  
Fife



Dwg No:

W10

**FIRE HYDRANT ASSEMBLY**

WATER STANDARD DETAIL

all joints.

14 Clearances Around Hydrant:

-Hydrant shall stand plumb and be set to the finished grade. The bottom of the lowest outlet of the hydrant shall be no less than (18") above the finished grade and no more than (24") above the finished grade, and the bottom of the barrel flange shall be a minimum of (2½") above finished grade, or ground line (if marked) to match finish grade. There shall be (36") of clear area around the hydrant for operation of a hydrant wrench. Finished grade shall remain constant within (10') feet of hydrant.

-Hydrant should have a clear field of view starting at a point 15' to either side of hydrant and proceeding at a minimum of 60' along the road to a point no less than 3' behind hydrant.

-The pumper (steamer) port shall face the street. Where the street cannot be clearly defined or recognized, the port shall face the most likely route of approach and the location of the fire truck while pumping, as determined by the City in consultation with the local fire protection district.

-All gates, fences, etc. within (12') twelve feet of hydrant shall be of a type and design, acceptable to the City and the local fire protection district.

-All hydrants shall be readily accessible and unobstructed for use by fire fighters and their equipment, under normal and emergency (fire) conditions.

-Any landscaping lying in that area as listed above for the clear field of view shall be a non-climbing ground cover only.

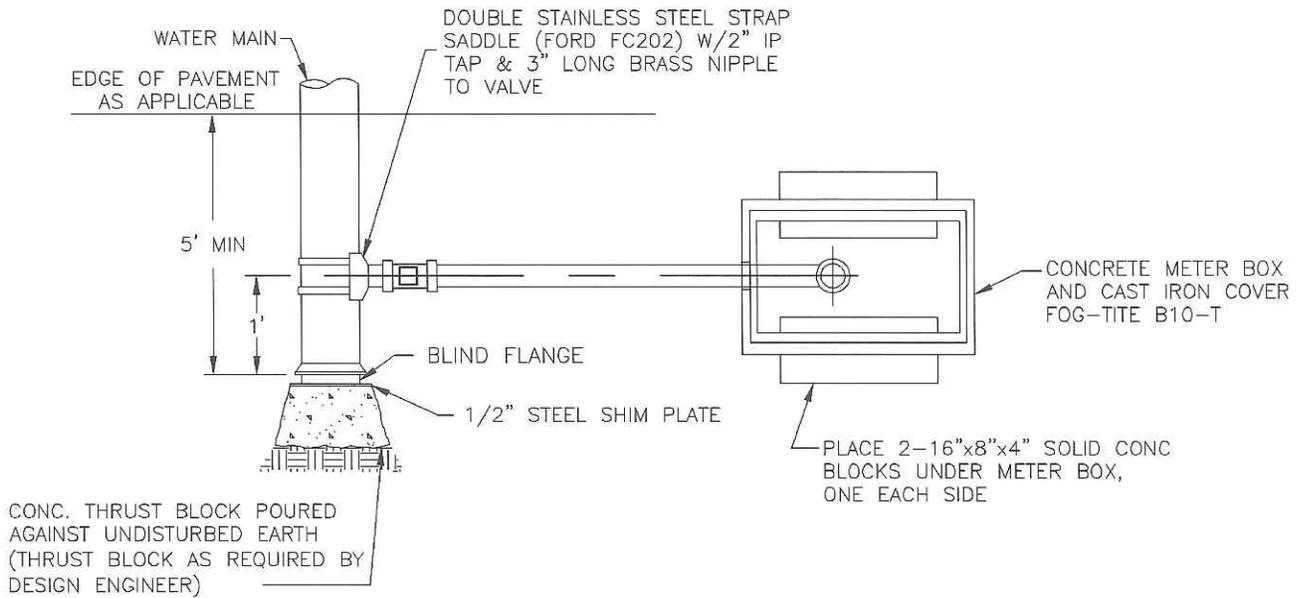
15. A minimum of 3' 0" clear space shall be maintained around the circumference of the hydrant barrel. When hydrant is within planter area, adequate side and rear clearances from curb lines must be met by this minimum. Concrete slab will be poured curb to curb in parking lot islands and a minimum of 3' around fire hydrant. Bollards may be required.

16. Concrete slab shall have a 6" thickness unless specified otherwise by city.

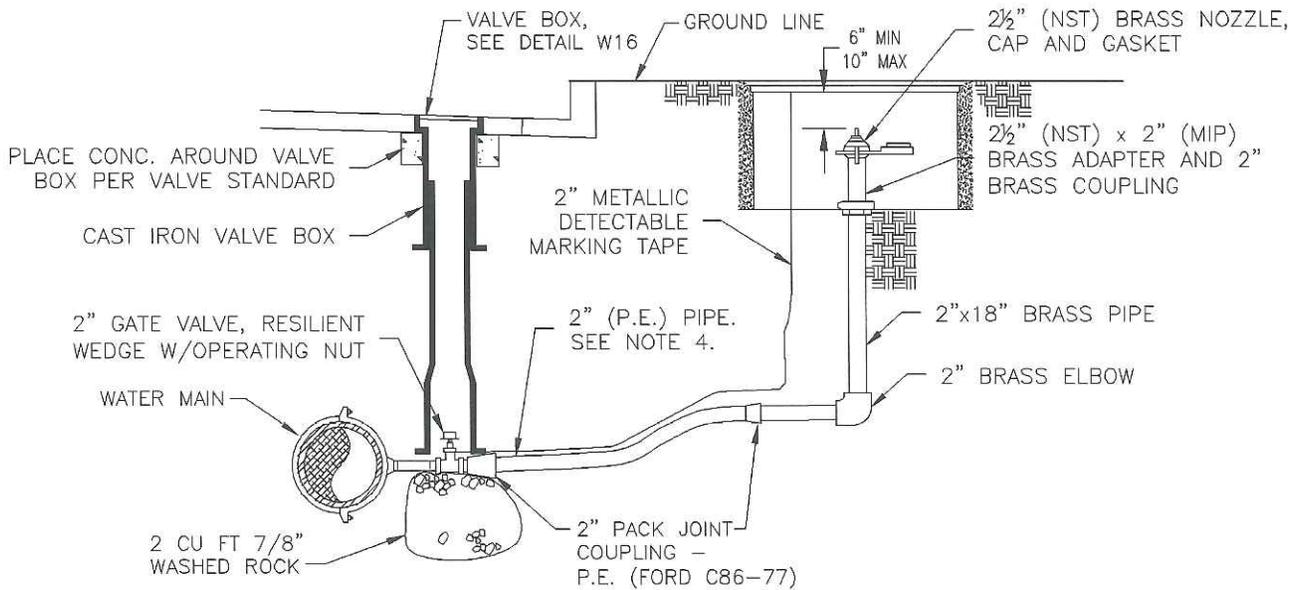
17. Hydrant shall not be located in sidewalk.

SHEET 5 OF 5

Approved:  11/20/2007	City of Fife 	Dwg No: <b>W10</b>
City Engineer _____ Date _____		<b>FIRE HYDRANT ASSEMBLY</b>
<b>WATER STANDARD DETAIL</b>		



PLAN



ELEVATION

**NOTES:**

1. LOCATE BOX IN PLANTING STRIP OR ADJACENT TO RIGHT-OF-WAY LINE.
2. ALL MATERIAL AND FITTINGS SHALL BE AS SPECIFIED.
3. COUPLINGS SHALL USE PIPE INSERT STIFFNERS.
4. 2" (P.E.) PIPE SHALL BE 200 PSI, AND SHALL MEET ASTM 1248 AND 2239, SIDR 7. I.D. IS IRON PIPE SIZE

Approved: *[Signature]* 12/3/2012  
 City Engineer Date

**City of  
Fife**

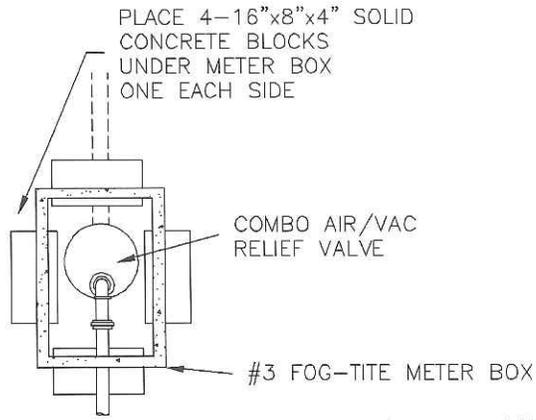


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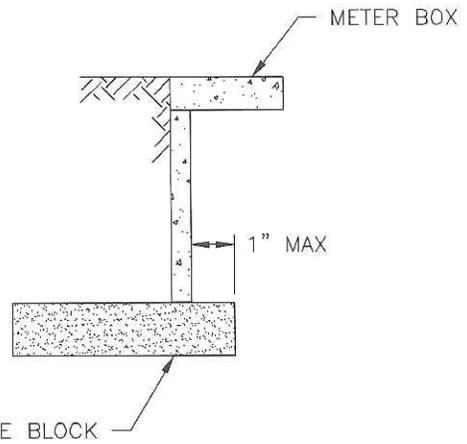
**W11**

**2" BLOW OFF  
ASSEMBLY**

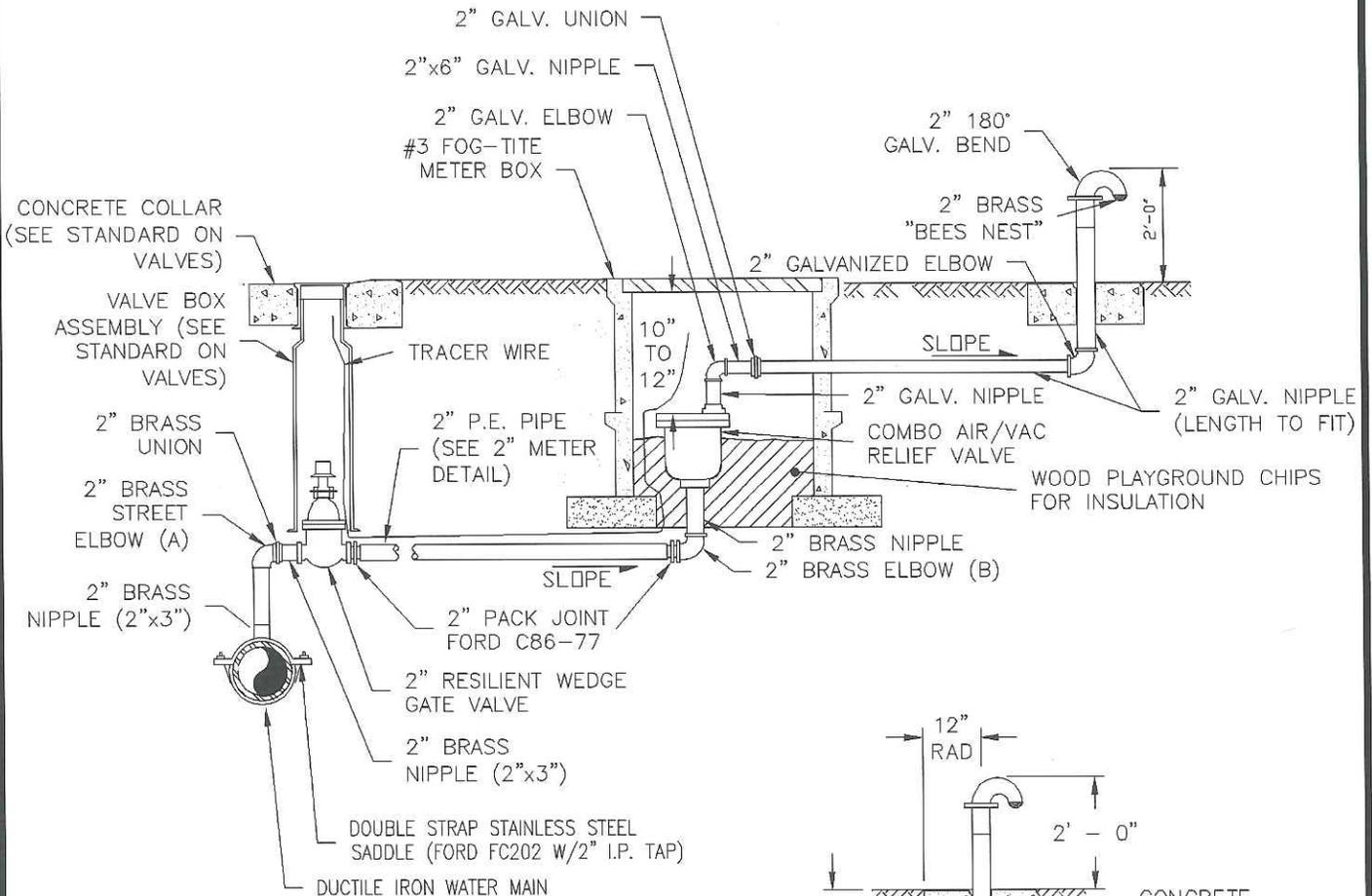
**WATER STANDARD DETAIL**



PLAN

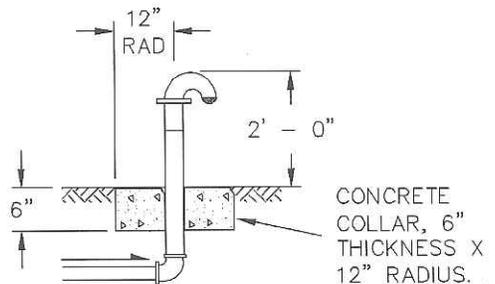


BLOCK DETAIL



NOTES:

1. PIPING BETWEEN BRASS ELBOWS A AND B SHALL HAVE GRADUAL SLOPE OF 5% SUCH THAT ELBOW B IS HIGHER THAN ELBOW A.
2. #10 COPPER TRACER WIRE REQUIRED FROM VALVE BOX TO AIR/VAC



CONCRETE COLLAR, 6" THICKNESS X 12" RADIUS.

Approved: *[Signature]* 11/3/2012  
 City Engineer Date

City of  
 Fife

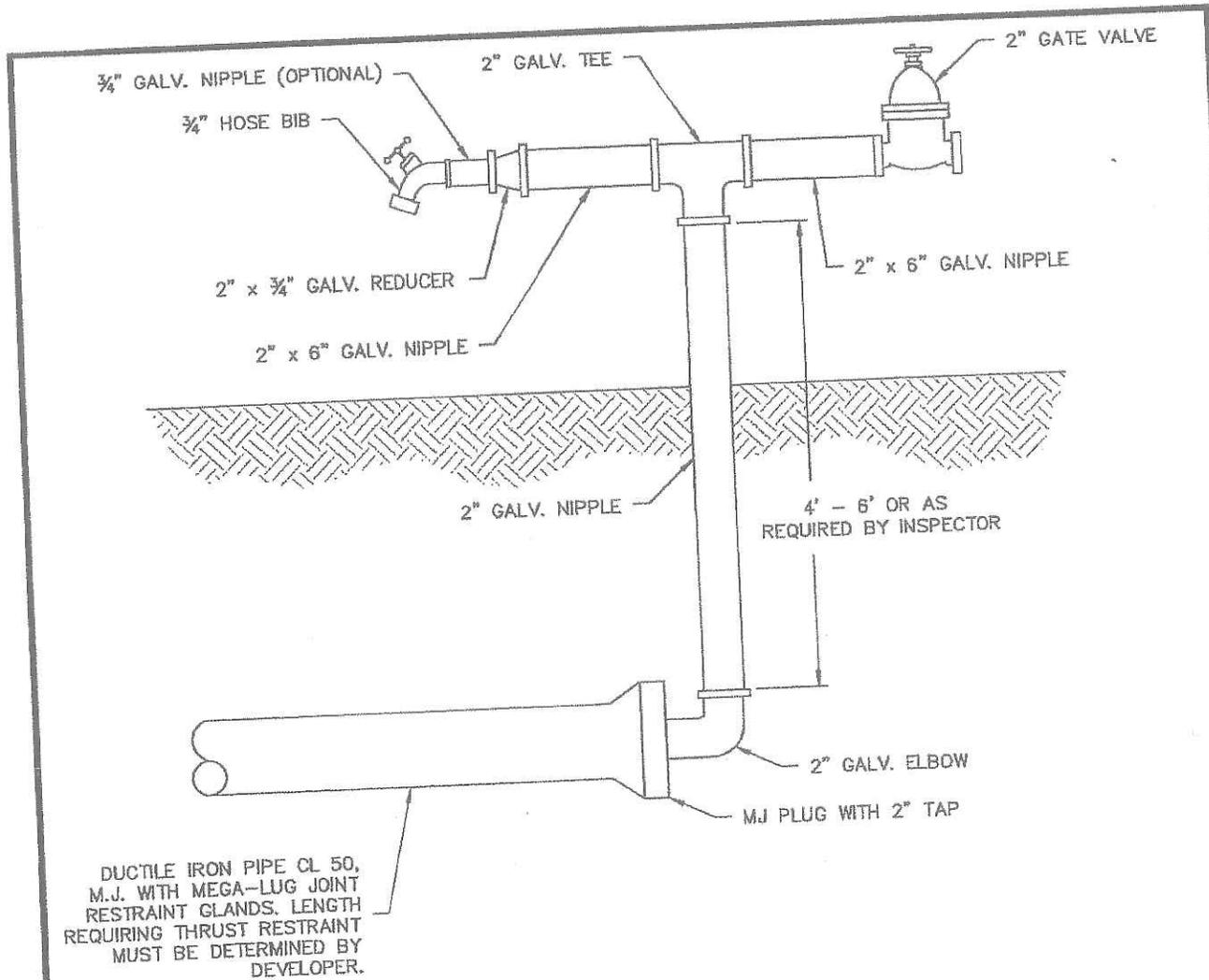


Dwg No:

W12

2" AIR/VACUUM  
 RELIEF VALVE DETAIL

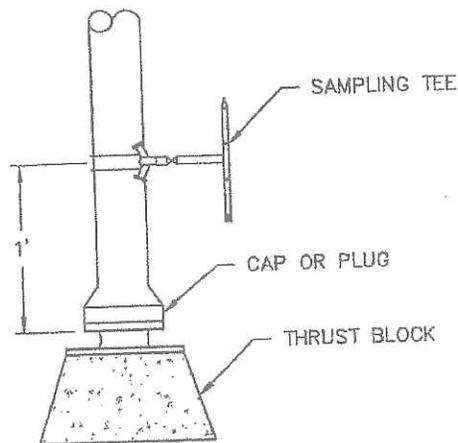
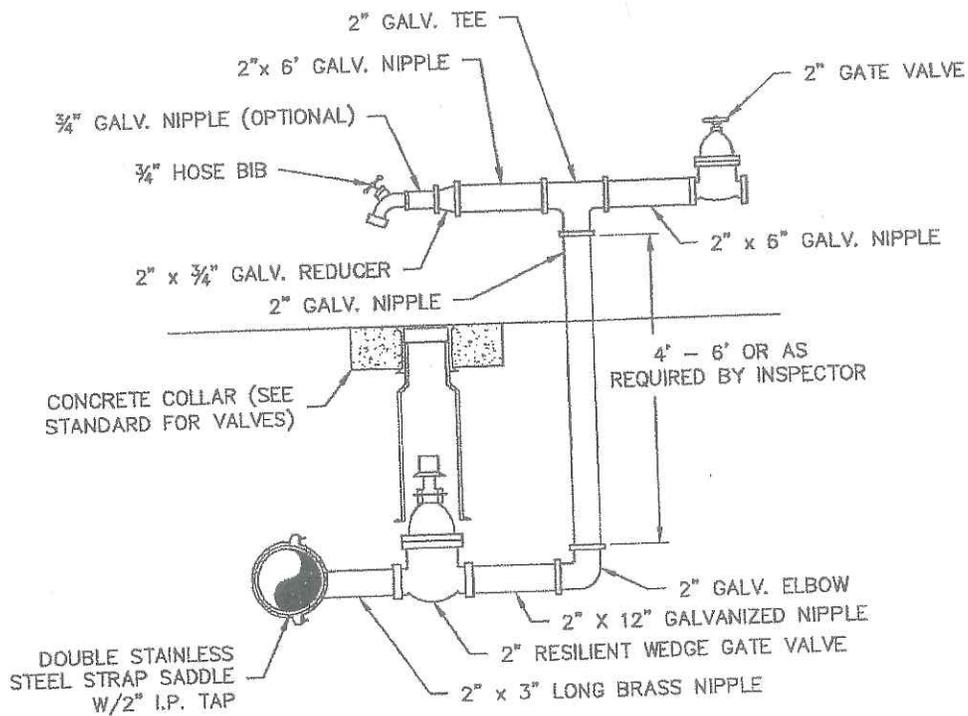
WATER STANDARD DETAIL



- NOTES:
1. AFTER REMOVAL OF SAMPLING TREE 2" BRASS PLUG MUST BE INSTALLED IN M.J. PLUG
  2. THRUST RESTRAINT MUST BE DETERMINED PRIOR TO INSTALLATION
  3. WATER MAIN SIZED ISOLATION VALVE REQUIRED WITHIN 20 FEET OF SAMPLING TREE ASSEMBLY

SHEET 1 OF 2

Approved: <i>[Signature]</i> 11/20/2007 City Engineer Date <b>WATER STANDARD DETAIL</b>	<b>City of Fife</b> 	Dwg No: <b>W13</b> <b>PRESSURE TEST, DISINFECTION, AND SAMPLING TEE (ALT. A)</b>
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NOTES:

1. FOLLOWING SATISFACTORY TESTING, SAMPLING TREE SHALL BE REMOVED FROM 2" GATE VALVE AND A PERMANENT BLOW-OFF ASSEMBLY SHALL BE INSTALLED IN ITS PLACE (SEE DETAIL ON BLOW-OFF ASSEMBLY FOR REQUIREMENTS).

SHEET 2 OF 2

Approved: *[Signature]* 11/20/2007  
 City Engineer Date

WATER STANDARD DETAIL

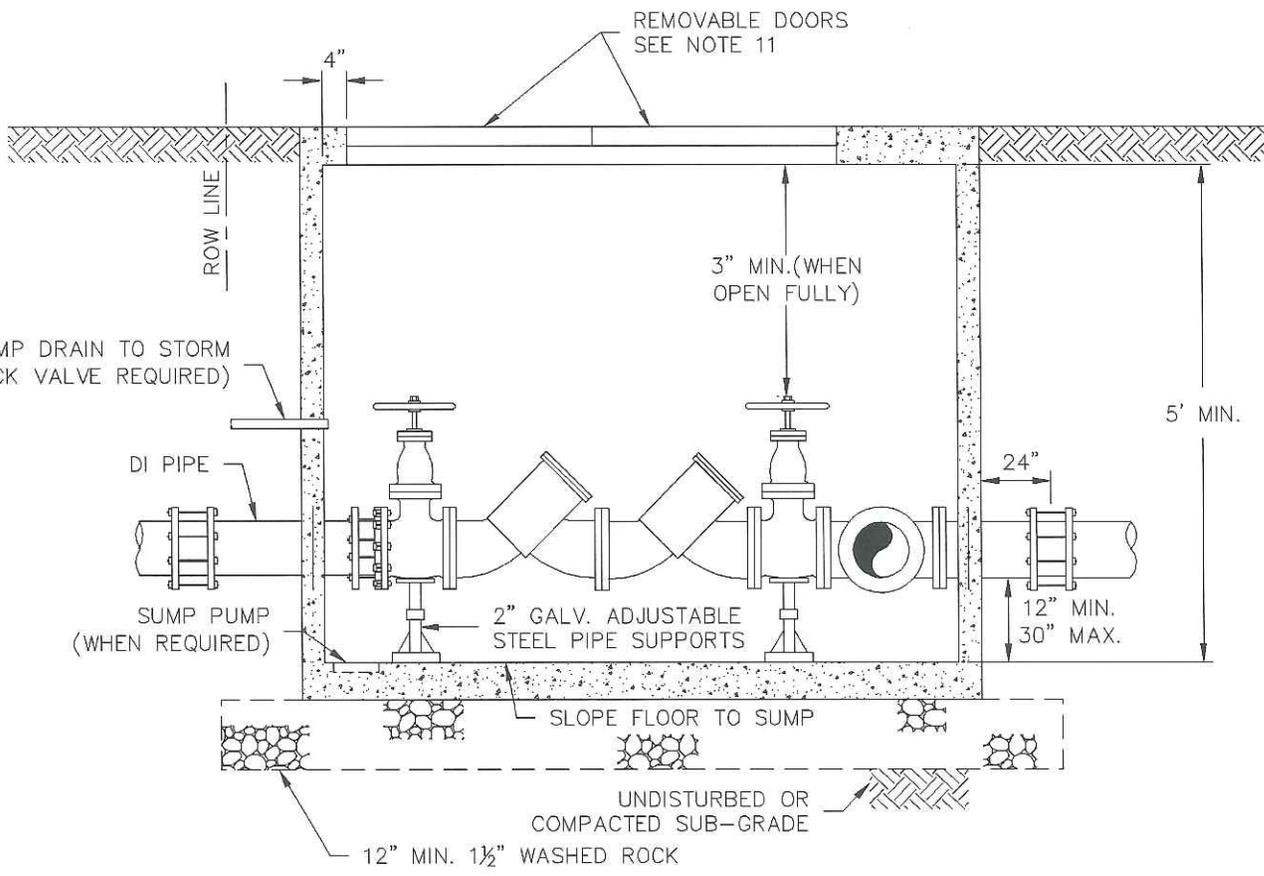
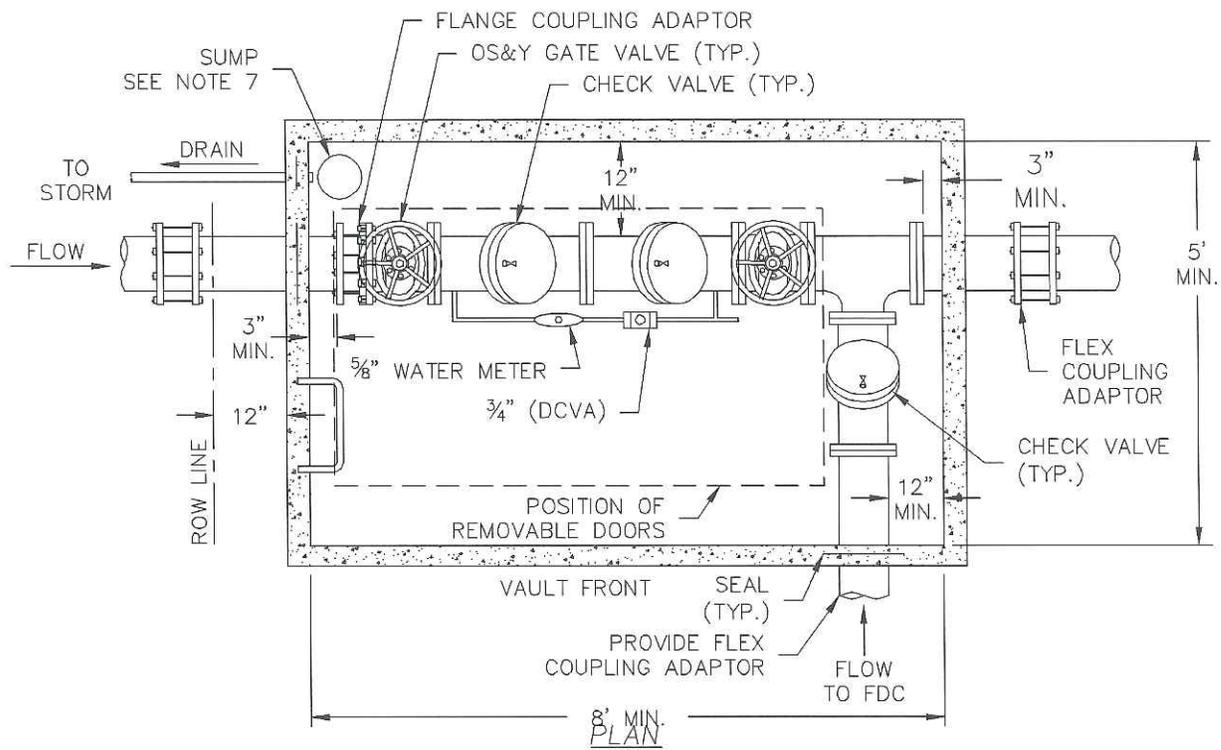
City of  
 Fife



Dwg No:

W13

PRESSURE TEST,  
 DISINFECTION, AND  
 SAMPLING TEE (ALT. B)



PROFILE

Approved: *[Signature]* 12/3/2012  
 City Engineer Date  
 WATER STANDARD DETAIL



Dwg No: **W14**  
**DOUBLE DETECTOR CHECK VALVE ASSEMBLY**

LEGEND:

1. INSTALLATION OF THESE APPROVED ASSEMBLIES SHALL BE IN ACCORDANCE WITH THE ACCEPTED PROCEDURE AND PRACTICE IN CROSS-CONNECTION CONTROL MANUAL, OF THE CROSS-CONNECTION COMMITTEE PACIFIC N.W. SECTION OF THE AWWA, MOST RECENT EDITION.
2. BACKFLOW ASSEMBLY MUST BE SELECTED FROM WASHINGTON STATE DEPARTMENT OF HEALTH LIST OF BACKFLOW PREVENTION ASSEMBLIES APPROVED FOR INSTALLATION IN WASHINGTON STATE, MOST RECENT EDITION.
3. IMMEDIATELY UPON INSTALLATION OF AN APPROVED BACKFLOW ASSEMBLY (AND YEARLY THEREAFTER), THE DEVICE SHALL BE TESTED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER, WHO SHALL PROMPTLY FORWARD THE TEST RESULTS TO: CITY OF FIFE WATER DIVISION.
4. DOUBLE CHECK DETECTOR ASSY. (DCDA) SHALL HAVE OS&Y GATE VALVES, AND SHALL HAVE SUPERVISED TAMPER SWITCHES ON OS&Y GATE VALVES AND POST INDICATOR VALVES,
5. ALL ELECTRICAL SHALL BE INSPECTED BY A WASHINGTON STATE ELECTRICAL INSPECTOR.
6. SUMP PUMP (IF REQUIRED BY THE CITY ENGINEER) SHALL BE ¼" H.P., AND SHALL BE WIRED PER WASHINGTON STATE ELECTRICAL CODE TO PROTECT MAINTENANCE PERSONNEL FROM SHOCK.
7. DDCVA MUST BE PURCHASED AND ASSEMBLED AS A UNIT. NO MODIFICATIONS TO ASSEMBLY ARE ALLOWED.
8. DCDA SHALL BE AN APPROPRIATELY SIZED FEBCO 806YD OR ANOTHER APPROVED EQUAL WHICH UTILIZES A SENSUS SR2 METER ON THE DETECTOR.
9. VAULT SHALL BE PRE-CAST CONCRETE SIZED TO MEET MINIMUM CLEARANCE REQUIREMENTS.
10. REMOVABLE DOORS SHALL BE A MINIMUM OF 3'0" x 6'0" DIAMOND PLATE HINGED LOCKING DOORS, WITH HINGES LOCATED AT REAR SIDE. DOORS SHALL HAVE AN H-20 LOAD RATING IN AREAS THAT ARE SUBJECT TO VEHICLE TRAFFIC. DOORS SHALL BE SPRING LOADED WITH OPEN POSITION LOCK.
11. DETECTOR ASSEMBLY WATER METER SHALL BE A SENSUS SR2 METER SUPPLIED BY THE BACKFLOW MANUFACTURER. IT SHALL HAVE A ICE REGISTER OF A TOUCHREAD/PITLID (TR/PL) DESIGN TO REGISTER IN 100 CUBIC FEET. THE VAULT DOOR SHALL HAVE A 1¾ HOLE DRILLED IN IT, AND HAVE A SENSUS MODEL 520 M WITH LEAK DETECTION SINGLE PORT FLEXNET SMARTPOINT TRANSMITTER PROPERLY INSTALLED THROUGH IT, PER MANUFACTURERS RECOMMENDATIONS. METER REGISTER TR/PL TOUCHCOUPLER SHALL BE PROPERLY CONNECTED TO THE TRANSMITTER.
12. PIPE SUPPORTS AND METALLIC LADDERS OR RUNGS SHALL BE PAINTED WITH 10 MILS (APPROXIMATELY 2 COATS) OF DUPONT 25P EPOXY MASTIC OR APPROVED EQUAL.
13. VAULT SHALL HAVE A GALVANIZED LADDER, RUNGS, OR APPROVED EQUAL OF APPROPRIATE LENGTH TO ALLOW PROPER ACCESS.
14. DOUBLE DETECTOR CHECK VALVE ASSEMBLIES OF SIZES OTHER THAN 6" SHALL USE SIMILAR DESIGN, WITH APPROPRIATE ADJUSTMENTS IN SIZE OF MATERIALS AND VAULT.
15. DOUBLE DETECTOR CHECK VALVE ASSEMBLY SHALL BE LOCATED NOT MORE THAN (1) ONE FOOT BEYOND THE RIGHT-OF-WAY LINE, UNLESS PRIOR WRITTEN APPROVAL IS RECEIVED FROM THE CITY ENGINEER. IN NO CASE MAY THE BACKFLOW ASSEMBLY BE LOCATED WITHIN THE BUILDING.

SHEET 2 OF 2

Approved:  12/3/2012  
City Engineer Date

City of  
Fife

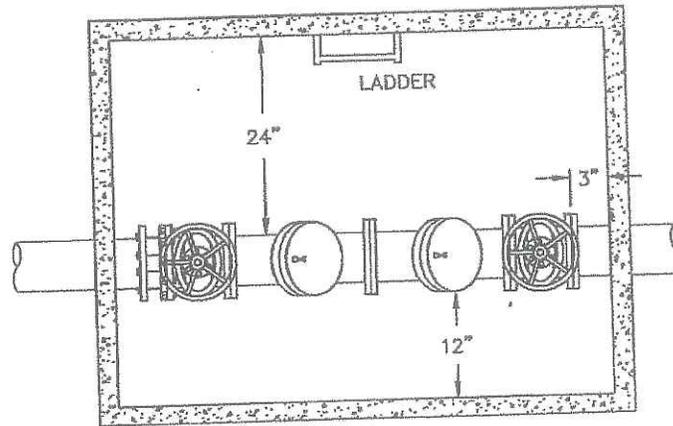


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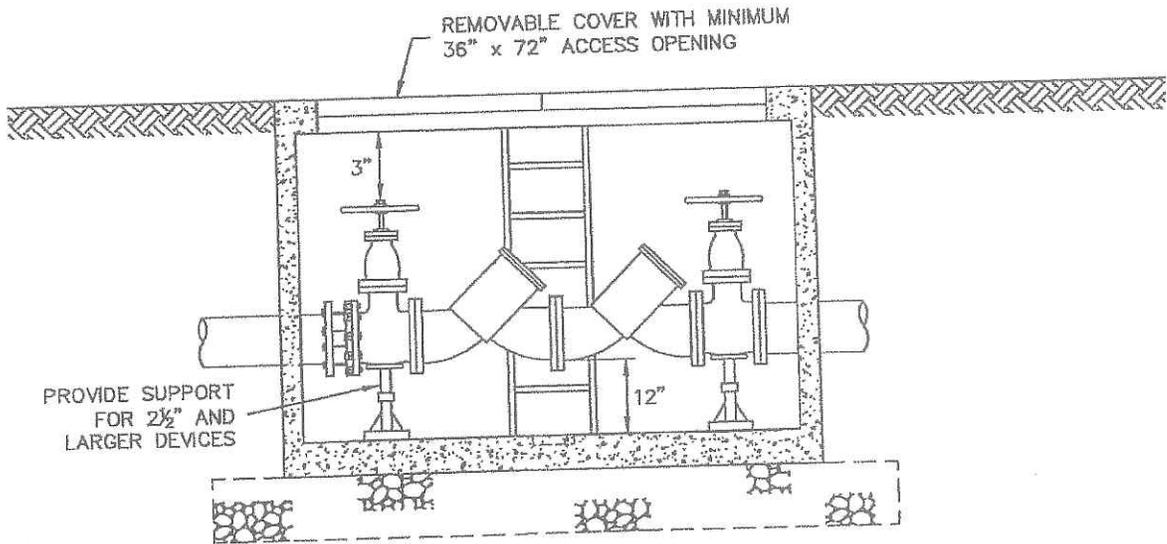
**W14**

**6" DOUBLE DETECTOR  
CHECK VALVE ASSEMBLY**

WATER STANDARD DETAIL



VAULT REAR  
PLAN



PROFILE

NOTE:  
BOTTOM AND SIDE CLEARANCES ALSO APPLY  
WHEN DEVICES ARE INSTALLED INSIDE BUILDING

Approved: *[Signature]* 11/20/2007  
City Engineer Date

WATER STANDARD DETAIL

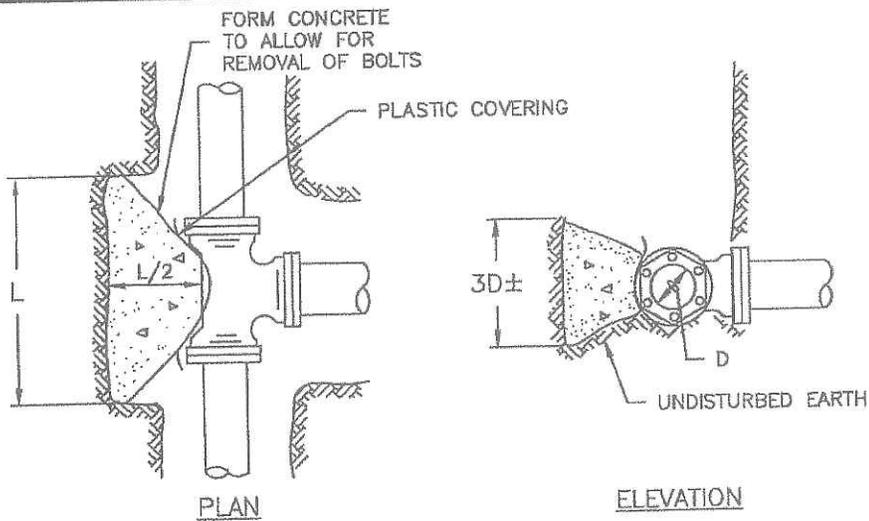
City of  
Fife



Dwg No:

W15

MINIMUM CLEARANCES  
FOR DCVA INSTALLATION

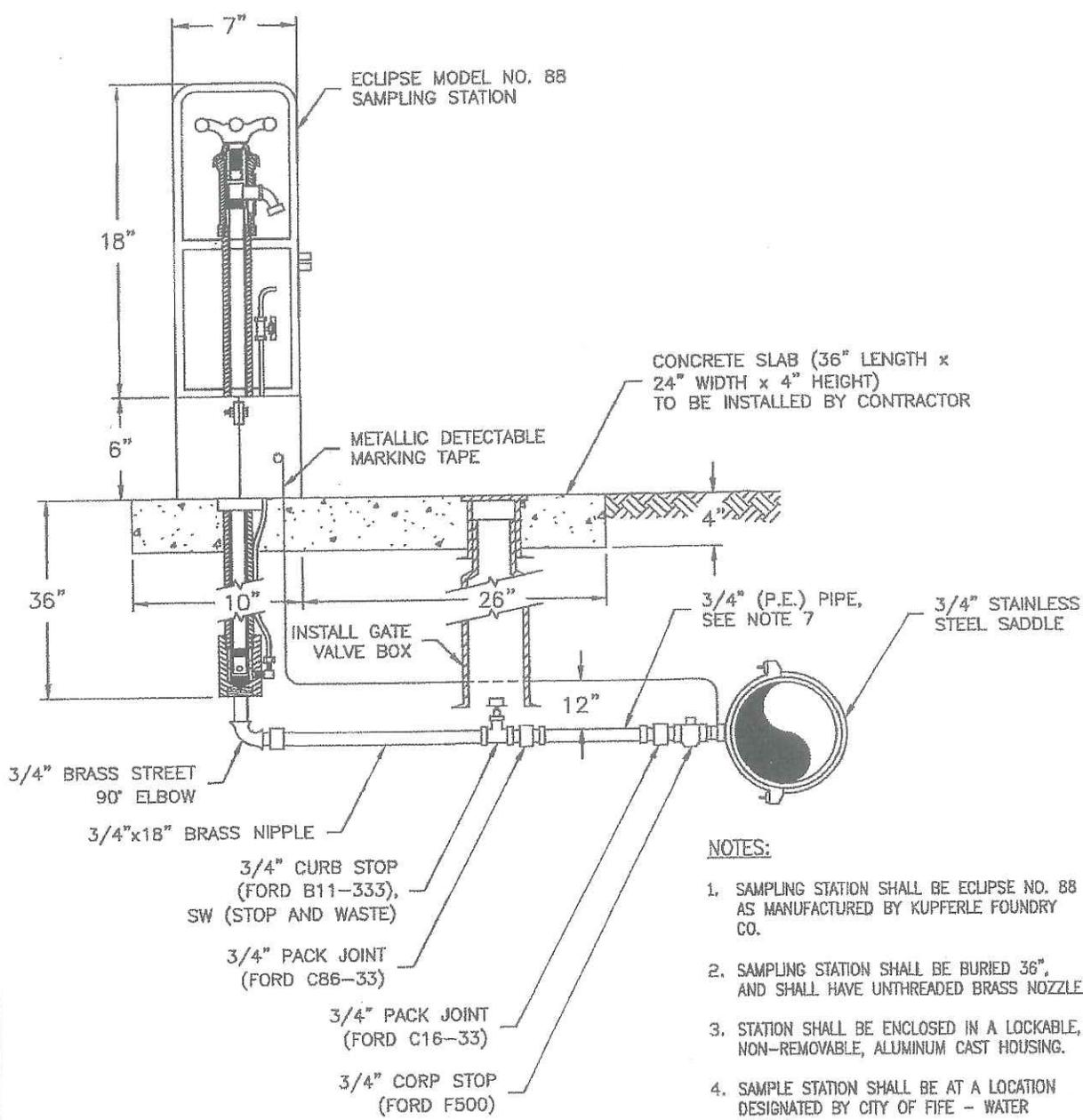


TOTAL POUNDS					
PIPE SIZE	P.S.I.	TEE/DEAD ENDS	90° BENDS	45° BENDS	22½° BENDS
3"	200	1,610	2,270	1,230	628
4"	200	2,350	3,300	1,800	919
6"	200	4,750	6,700	3,630	1,850
8"	200	7,910	11,200	6,050	3,090
10"	200	12,300	17,400	9,450	4,810
12"	200	17,200	24,400	13,200	6,720
14"	200	23,300	32,900	17,800	9,030
16"	200	30,300	42,800	23,200	11,800
18"	200	38,300	54,100	29,300	14,900
20"	200	47,400	67,000	36,300	18,500
24"	200	68,200	96,400	52,200	26,600
30"	200	106,000	150,000	81,100	41,400
36"	200	152,000	215,000	116,000	59,300

**NOTES**

- THE FOLLOWING PRECAUTIONS MUST BE OBSERVED WITH CONSTRUCTION THRUST BLOCKS:
  - BLOCKS MUST BE POURED AGAINST UNDISTURBED SOIL.
  - THE PIPE JOINT AND BOLTS MUST BE ACCESSIBLE.
  - CONCRETE SHALL BE CURED FOR MIN. OF 5 DAYS AND SHALL HAVE A COMPRESSIVE STRENGTH OF 2,000 LBS AT 28 DAYS.
  - BLOCKS MUST BE POSITIONED TO COUNTERACT THE DIRECTION OF THE RESULTANT THRUST FORCE.
  - PLASTIC WRAP BETWEEN PIPE AND CONCRETE THRUST BLOCK SHALL BE PROVIDED
- ALL PIPES SHALL BE PROPERLY BEDDED, SEE STANDARD BEDDING DETAILS.
- TO DETERMINE THRUST AT PRESSURES OTHER THAN 200 PSI SHOWN, MULTIPLY THRUST OBTAINED IN THE TABLE BY THE RATIO OF THE PRESSURE BY 100.  
 EXAMPLE: THRUST ON A 12", 90° BEND AT 125 PSI  
 $19,500 \times 125/100 = 24,375$  LBS.
- TO DETERMINE THE VOLUME OF THE THRUST BLOCK:  
 EXAMPLE: (150 LB/C.F. WEIGHT OF CONCRETE)  
 $24,375 / 150$  LB/C.F. = 162.50 C.F.  
 $162.50$  C.F. / 27 C.Y./C.F. = 6.02 C.Y. OF CONCRETE
- TO DETERMINE THE BEARING AREA OF THE THRUST BLOCK IN SQUARE FEET (S.F.) SEE TABLE 1, BEARING VALUE OF SOIL:  
 EXAMPLE:  $24,375$  LBS / 2,000 LBS/S.F. OF AREA

Approved: <i>[Signature]</i> 1/20/2007	City of <b>Fife</b>		Dwg No: <b>W16</b>
City Engineer _____ Date _____			<b>HORIZONTAL THRUST BLOCKING</b>
<b>WATER STANDARD DETAIL</b>			



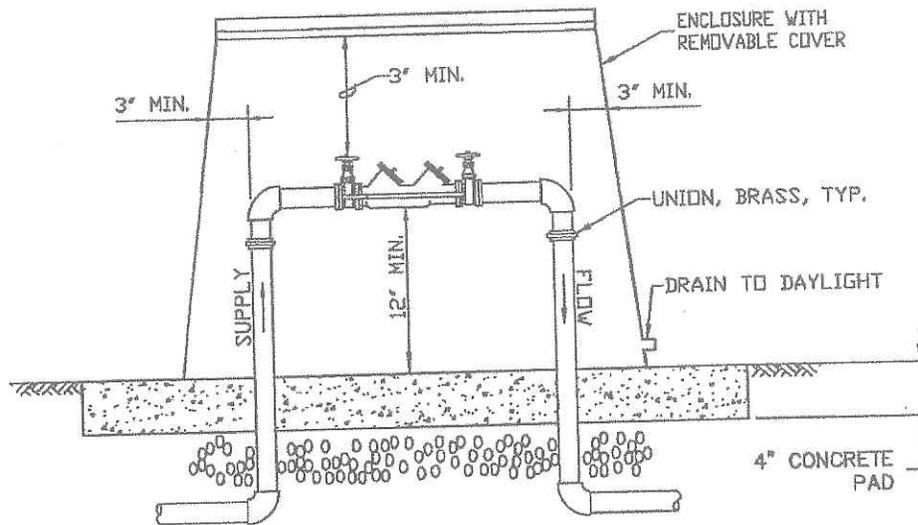
**NOTES:**

1. SAMPLING STATION SHALL BE ECLIPSE NO. 88 AS MANUFACTURED BY KUPFERLE FOUNDRY CO.
2. SAMPLING STATION SHALL BE BURIED 36", AND SHALL HAVE UNTHREADED BRASS NOZZLE.
3. STATION SHALL BE ENCLOSED IN A LOCKABLE, NON-REMOVABLE, ALUMINUM CAST HOUSING.
4. SAMPLE STATION SHALL BE AT A LOCATION DESIGNATED BY CITY OF FIFE - WATER DIVISION.
5. ALL PACK JOINTS SHALL USE PIPE INSERT STIFFNERS.
6. ALL MATERIALS SHALL BE AS SPECIFIED OR EQUAL APPROVED BY THE CITY.
7. 3/4" (P.E.) PIPE SHALL BE 200 PSI AND SHALL MEET ASTM 1248 AND 2239, SIDR 7. I.D. IS IRON PIPE SIZE.

Approved: *[Signature]* 11/29/2007  
 City Engineer Date  
**WATER STANDARD DETAIL**

**City of Fife**

Dwg No: **W17**  
**SAMPLING STATION**



**NOTES:**

1. RPBA MUST BE ON MOST RECENT EDITION OF "BACKFLOW PREVENTION ASSEMBLIES APPROVED FOR INSTALLATION IN WASHINGTON STATE" AS PUBLISHED BY THE WASHINGTON STATE DEPT. OF HEALTH (DOH).
2. ALL BACKFLOW PREVENTERS SHALL BE INSTALLED IN THE ORIENTATION FOR WHICH THEY ARE APPROVED BY DOH.
3. RPBA'S SHALL NOT BE INSTALLED IN A LOCATION SUBJECT TO FLOODING.
4. THE RELIEF VALVE PORT SHALL NOT BE EXTENDED OR PLUGGED.
5. IT IS THE PROPERTY OWNER/OCCUPANTS RESPONSIBILITY TO PROTECT BACKFLOW PREVENTERS FROM FREEZING, VANDALISM, AND FIRE HAZARDS.
6. RPBA'S INSTALLED IN AN ENCLOSURE SHALL HAVE A DAYLIGHT DRAIN INSTALLED AT THE ENCLOSURES BASE CAPABLE OF CARRYING AWAY THE FULL DISCHARGE FLOW OF THE RELIEF VALVE WHEN VENTING.
7. ALL RPBA'S SHALL HAVE A MINIMUM 12" OF CLEARANCE BETWEEN THE BOTTOM OF THE RELIEF PORT AND THE GROUND LEVEL; IT SHALL ALSO HAVE A MINIMUM OF 3" OF CLEARANCE IN ALL OTHER DIRECTIONS, UNLESS GREATER CLEARANCE IS NECESSARY FOR TESTING AND MAINTENANCE.
8. THE MAXIMUM HEIGHT OF INSTALLATION SHALL NOT EXCEED 5' FOR ASSEMBLIES UNLESS THERE IS A PERMANENTLY INSTALLED PLATFORM MEETING OSHA STANDARDS TO FACILITATE SERVICING THE ASSEMBLY.
9. RPBA'S INSTALLED FOR THE PURPOSE OF PREMISE ISOLATION SHALL BE INSTALLED IMMEDIATELY AFTER THE METER.
10. TEST COCKS SHALL HAVE BRASS OR PLASTIC PLUGS INSTALLED IN THEM TO PREVENT DEBRIS FROM ENTERING.

SHEET 1 OF 2

Approved: *[Signature]*   
 City Engineer Date

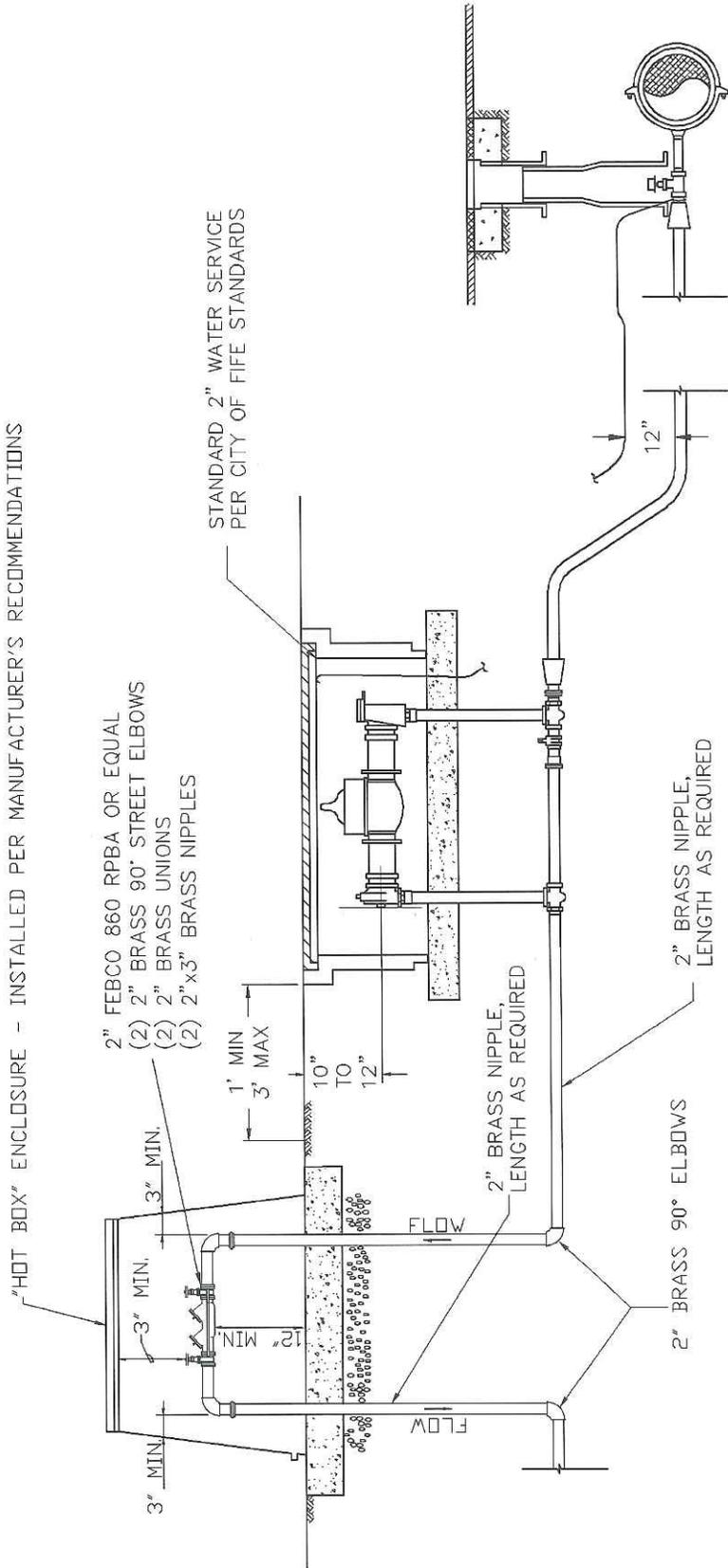
City of **Fife**



Dwg No: **W18**

**RPBA ASSEMBLY  
2" AND SMALLER**

**WATER STANDARD DETAIL**



"HOT BOX" ENCLOSURE - INSTALLED PER MANUFACTURER'S RECOMMENDATIONS

- 2" FEBCO 860 RPBA OR EQUAL
- (2) 2" BRASS 90° STREET ELBOWS
- (2) 2" BRASS UNIONS
- (2) 2"x3" BRASS NIPPLES

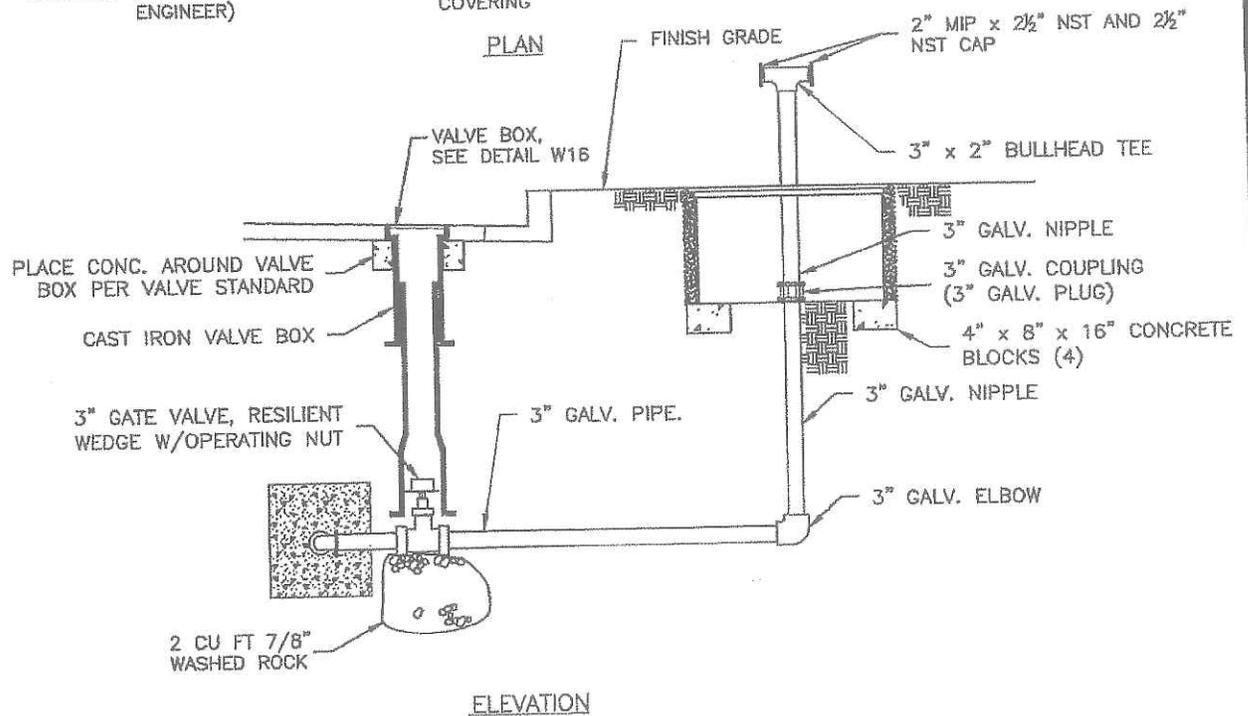
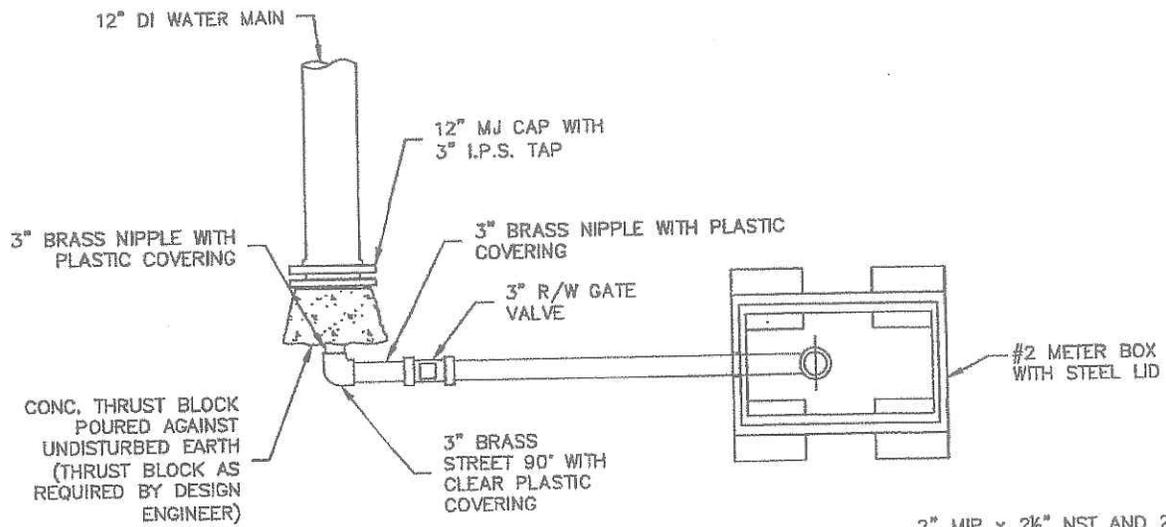
STANDARD 2" WATER SERVICE PER CITY OF FIFE STANDARDS

1. ALL BRASS PIPE AND FITTINGS DOWNSTREAM OF METER SETTER MAY BE SUBSTITUTED WITH COPPER EQUIVALENTS.
2. INSTALLATIONS SMALLER THAN 2" SHALL USE SIMILAR DESIGN, WITH APPROPRIATE ADJUSTMENTS IN SIZE OF MATERIALS AND ENCLOSURES.
3. THE 3" MAX. DISTANCE BETWEEN THE METER BOX AND THE HOT BOX ENCLOSURE MAY BE EXCEEDED WITH THE PRIOR WRITTEN APPROVAL OF THE WATER DIVISION.
4. THERE SHALL NOT BE ANY POINTS OF CONNECTION PERMITTED BETWEEN THE WATER METER AND THE RPBA.

Approved: *Chris Brown* 12/3/2012  
 City Engineer Date  
 WATER STANDARD DETAIL



Dwg No: **W18**  
**RPBA ASSEMBLY**  
**2" AND SMALLER**



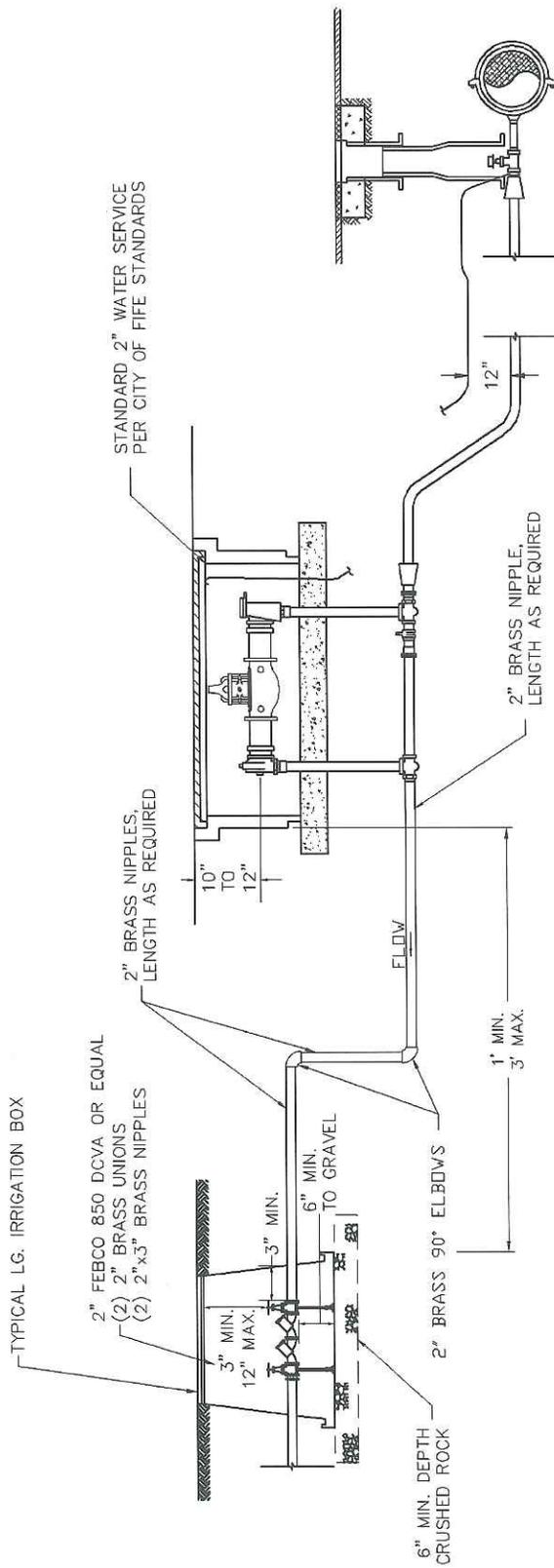
**NOTES:**

1. LOCATE BOX IN PLANTING STRIP OR ADJACENT TO RIGHT-OF-WAY LINE.
2. ALL MATERIAL AND FITTINGS SHALL BE AS SPECIFIED OR AN APPROVED EQUAL.
3. COUPLINGS SHALL USE PIPE INSERT STIFFNERS.

Approved: *[Signature]*  
 City Engineer Date  
**WATER STANDARD DETAIL**

**City of Fife**  


Dwg No: **W19**  
**3" BLOWOFF ASSEMBLY**



1. ALL BRASS PIPE AND FITTINGS DOWNSTREAM OF THE METER MAY BE SUBSTITUTED WITH COPPER EQUIVALENTS.
2. INSTALLATIONS SMALLER THAN 2" SHALL USE A SIMILAR DESIGN, WITH APPROPRIATE ADJUSTMENTS IN SIZE OF MATERIALS AND ENCLOSURES.
3. THE 3' MAX DISTANCE BETWEEN THE METER BOX AND THE BACKFLOW BOX MAY BE EXCEEDED WITH THE PRIOR WRITTEN APPROVAL OF THE WATER DIVISION.
4. THERE SHALL NOT BE ANY POINTS OF CONNECTION PERMITTED BETWEEN THE WATER METER AND THE DCVA.

Approved: *[Signature]* 12/3/2012  
 City Engineer Date  
**WATER STANDARD DETAIL**



Dwg No: **W20**  
**2" DCVA ASSEMBLY**

$\Delta \times 2\frac{1}{2}" \times 2\frac{1}{2}"$  DOUBLE CLAPPER TYPE FREE  
STANDING FIRE DEPARTMENT CONNECTION  
WITH PIN-LUG SWIVEL, PLUG, AND CHAIN  
(A-SIZE TO BE DETERMINED BY FIRE  
SPRINKLER DESIGN)

8"x4"x $\frac{1}{4}"$  THICK DURABLE  
IDENTIFICATION PLACARD WITH  
1" LETTERS STATING "AUTO SPRINKLER"  
AND ADDRESS

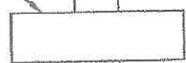
SCHEDULE 40 GALVANIZED PIPE TO BE  
PAINTED MARATHON ENAMEL BRILLIANT  
RED ABOVE FINISHED GRADE

$\frac{3}{4}"$  BALL DRIP VALVE INSTALLED  
BELOW FREEZE LINE, WITH A  
SINGLE STRAP SADDLE

SCHEDULE 40 GALVANIZED PIPE  
WRAPPED WITH "3M" 6-MIL POLY WRAP  
TAPE OR EQUIVALENT BELOW FINISHED  
GRADE (POLY WRAP TO BE CONTINUOUS  
WITH NO HOLES OR ABRASIONS)

FLxMJ BEND WITH MEGA-LUG

D.I. PIPE TO BUILDING



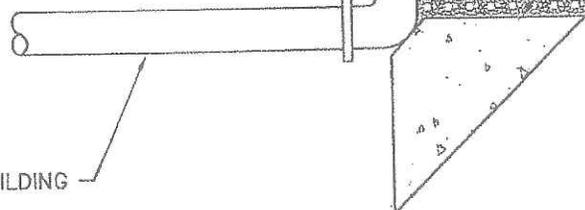
36"

FINISHED GRADE

$\frac{7}{8}"$  WASHED ROCK  
AROUND BALL DRIP  
VALVE

FILTER FABRIC AROUND  
WASHED ROCK

CONCRETE THRUST  
BLOCKING WITH PLASTIC  
BARRIER AROUND PIPE



Approved: *[Signature]* 11/29/2007  
City Engineer Date

WATER STANDARD DETAIL

City of  
Fife



Dwg No:

W21

FIRE DEPARTMENT  
CONNECTION DETAIL