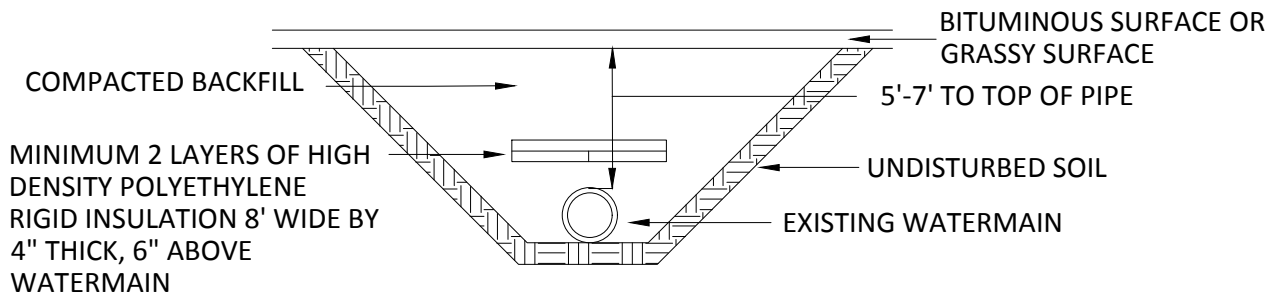


NOTE:
SEAMS SHALL BE
STAGGERED IF MORE
THAN ONE LAYER IS
INSTALLED.

TYPICAL INSTALLATION



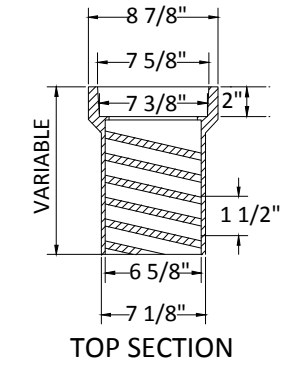
TYPICAL SECTION



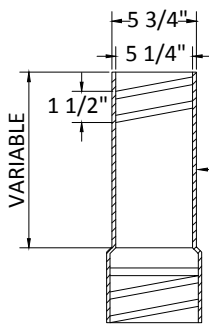
STANDARD DETAILS
INSULATED WATERMAIN

Revised
1/2019

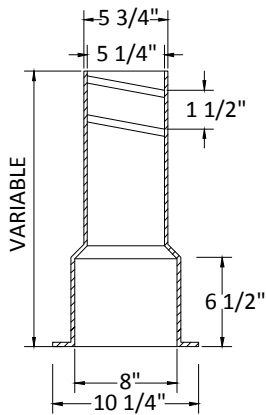
Standard
Plate No.
WAT-1



TOP SECTION



EXTENSION PIECES



BOTTOM SECTION

EXTENSION LENGTHS:
 NO. 58- 14"
 NO. 59- 18"
 NO. 60- 24"

NOTES:
 NO INSIDE ADJUSTMENT SECTIONS ALLOWED.

VALVE AN BOX SHALL BE STRAIGHT, ALLOWING A 4" PVC PIPE TO SLIDE DOWN THE BOX AND OVER THE GATE OPERATING NUT.

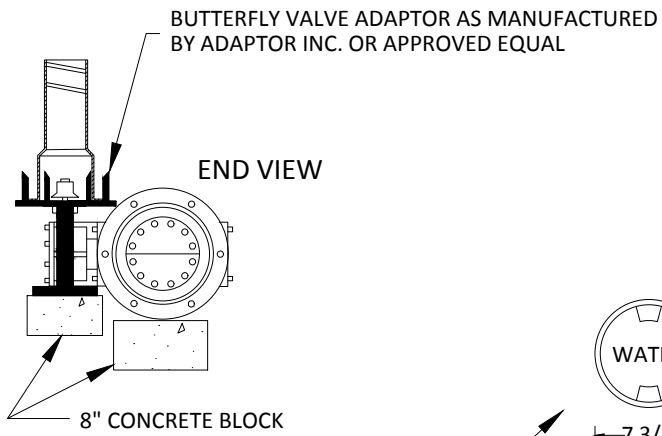
OPERATING ROD EXTENSION SHALL BE INSTALLED ON ALL VALVES DEEPER THAN 9'.

MARK ALL VALVE WITH STEEL POST AND GATE VALVE SIGN AND LOCATE 2.0' TO THE SIDE THAT TRAFFIC IS APPROACHING. (OFF STREET AREAS ONLY) SIGN TO FACE TRAFFIC. SEE STANDARD PLATE GEN-5.

OPERATING ROD EXTENSION SHALL BE TERMINATED AT A OF 5 FEET BELOW STREET GRADE.

VALVE BOXES SHALL NOT BE LOCATED IN CURB AND GUTTER OR WITHIN 12" AWAY FROM LIP OF CURB AND GUTTER.

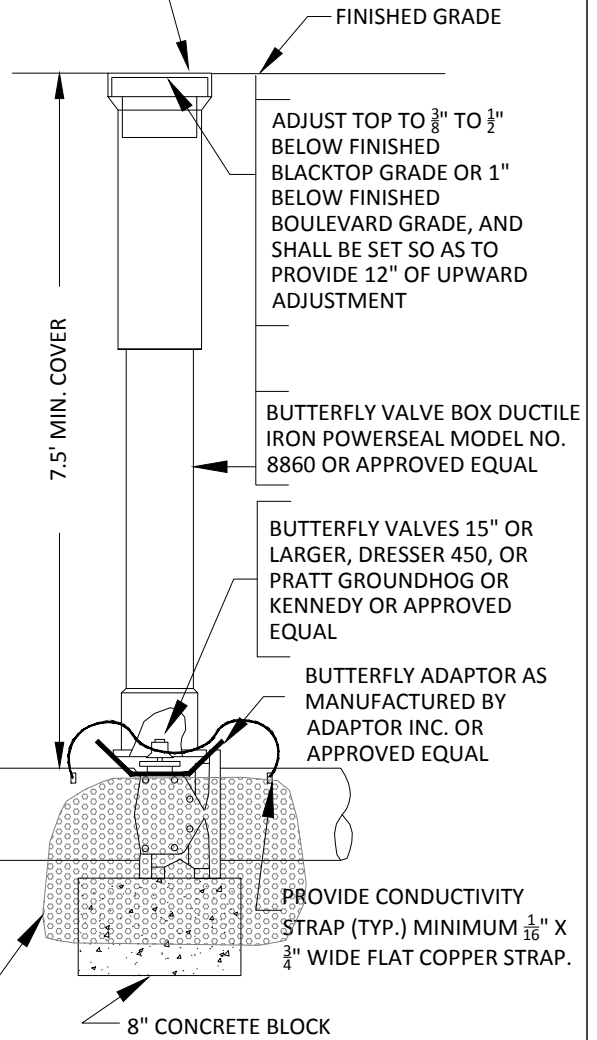
FITTINGS SHALL BE FUSION EPOXY COATED. NUTS AND BOLTS SHALL BE COR-BLUE OR APPROVED EQUAL.



END VIEW



DROP LID



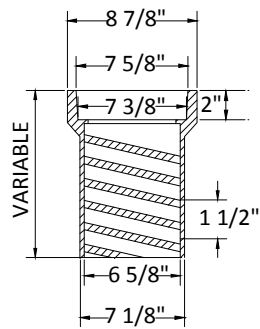
0.5 CY 1 1/2" WASHED ROCK



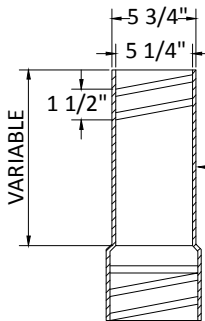
STANDARD DETAILS
 BUTTERFLY VALVE AND BOX
 TYPICAL INSTALLATION

Revised
 1/2019

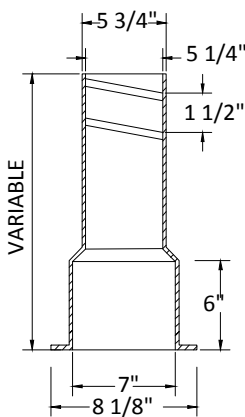
Standard Plate No.
 WAT-2



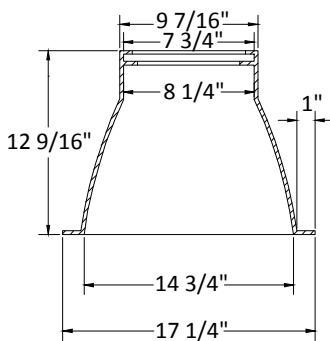
TOP SECTION



EXTENSION PIECES



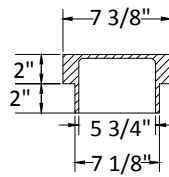
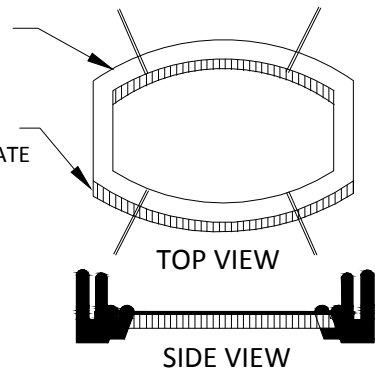
MIDDLE SECTION



ROUND BASE

GATE VALVE ADAPTOR:
1/4" STEEL WITH
PROTECTIVE COATING

1/2" RUBBER GASKET
INSTALLED BETWEEN GATE
VALVE AND ADAPTOR



DROP LID

POWERSEAL VALVE BOX DROP LID OR
MUELLER COVER
NO. H-10361 OR APPROVED EQUAL
LABELED 'WATER'

NOTES:
NO INSIDE ADJUSTMENT SECTIONS
ALLOWED.

VALVE AN BOX SHALL BE STRAIGHT,
ALLOWING A 4" PVC PIPE TO SLIDE
DOWN THE BOX AND OVER THE
GATE OPERATING NUT.

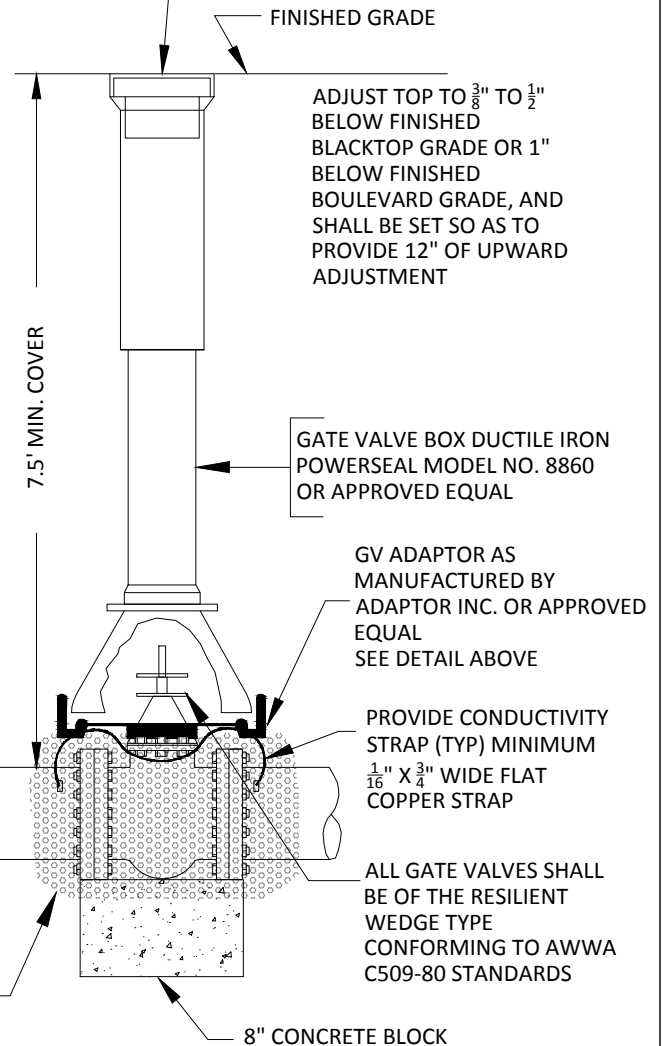
OPERATING ROD EXTENSION SHALL
BE INSTALLED ON ALL VALVES
DEEPER THAN 9'.

MARK ALL VALVE WITH STEEL POST
AND GATE VALVE SIGN AND
LOCATE 2.0' TO THE SIDE THAT
TRAFFIC IS APPROACHING. (OFF
STREET AREAS ONLY) SIGN TO FACE
TRAFFIC. SEE STANDARD PLATE
GEN-5.

OPERATING ROD EXTENSION SHALL
BE TERMINATED AT A OF 5 FEET
BELOW STREET GRADE.

VALVE BOXES SHALL NOT BE
LOCATED IN CURB AND GUTTER OR
WITHIN 12" AWAY FROM LIP OF
CURB AND GUTTER.

FITTINGS SHALL BE FUSION EPOXY
COATED. NUTS AND BOLTS SHALL
BE COR-BLUE OR APPROVED
EQUAL.



ADJUST TOP TO 3/8" TO 1/2"
BELOW FINISHED
BLACKTOP GRADE OR 1"
BELOW FINISHED
BOULEVARD GRADE, AND
SHALL BE SET SO AS TO
PROVIDE 12" OF UPWARD
ADJUSTMENT

GATE VALVE BOX DUCTILE IRON
POWERSEAL MODEL NO. 8860
OR APPROVED EQUAL

GV ADAPTOR AS
MANUFACTURED BY
ADAPTOR INC. OR APPROVED
EQUAL
SEE DETAIL ABOVE

PROVIDE CONDUCTIVITY
STRAP (TYP) MINIMUM
1/16" X 3/4" WIDE FLAT
COPPER STRAP

ALL GATE VALVES SHALL
BE OF THE RESILIENT
WEDGE TYPE
CONFORMING TO AWWA
C509-80 STANDARDS

0.5 CY 1 1/2"
WASHED ROCK

8" CONCRETE BLOCK



STANDARD DETAILS
GATE VALVE AND BOX
TYPICAL INSTALLATION

Revised
1/2019

Standard
Plate No.
WAT-3

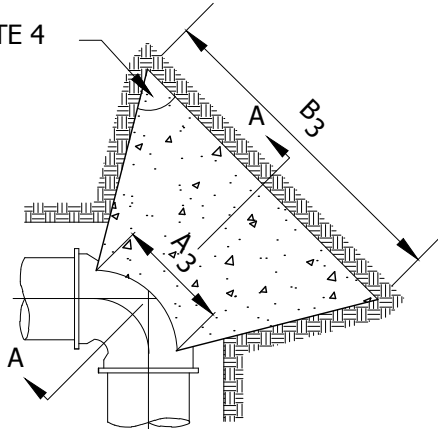
NOTES:

1. SHAPE OF BACK OF BUTTRESS MAY VARY AS LONG AS Poured AGAINST FIRM UNDISTURBED EARTH.
2. DIMENSION C1,C2,C3 SHOULD BE LARGE ENOUGH TO MAKE ANGLE ϕ EQUAL TO OR LARGER THAN 45°.
3. DIMENSION A1,A2,A3 SHOULD BE AS LARGE AS POSSIBLE WITHOUT INTERFERING WITH MJ BOLTS.
4. ϕ = 45° MINIMUM.
5. PLACE POLYETHYLENE BETWEEN CONCRETE & PIPE.

BUTTRESS DIMENSIONS

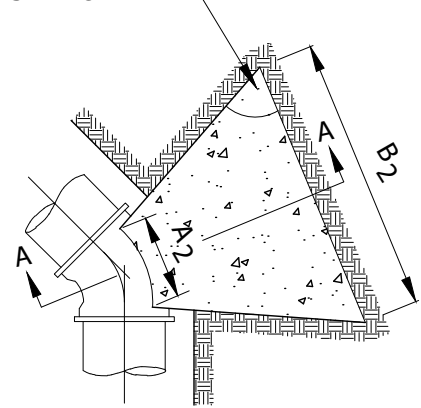
PIPE SIZE	22 1/2° BEND		45° BEND		90° BEND	
	B ₁	D ₁	B ₂	D ₂	B ₃	D ₃
6"	1'-5"	1'-5"	1'-5"	1'-5"	2'-1"	1'-6"
8"	1'-5"	1'-5"	2'-1"	1'-6"	2'-8"	2'-0"
12"	1'-10"	1'-10"	3'-4"	2'-0"	4'-9"	2'-6"
16"	3'-0"	2'-0"	3'-10"	3'-0"	6'-2"	3'-6"
20"	3'-6"	2'-8"	5'-6"	3'-4"	8'-4"	4'-0"
24"	4'-4"	3'-0"	6'-10"	3'-10"	9'-8"	5'-0"
30"	-	-	9'-3"	6'-0"	17'-0"	6'-0"

ϕ - SEE NOTE 4



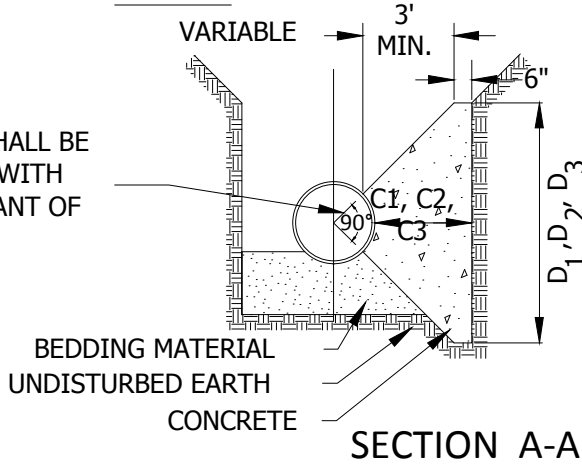
**PLAN 90°
BENDS**

ϕ - SEE NOTE 4



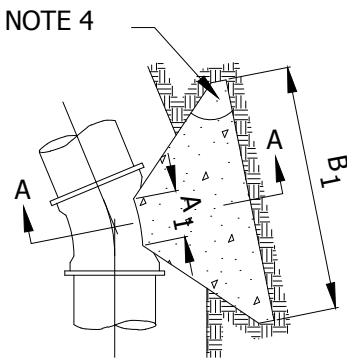
**PLAN 45°
BENDS**

CONCRETE SHALL BE IN CONTACT WITH THIS QUADRANT OF PIPE



SECTION A-A

ϕ - SEE NOTE 4



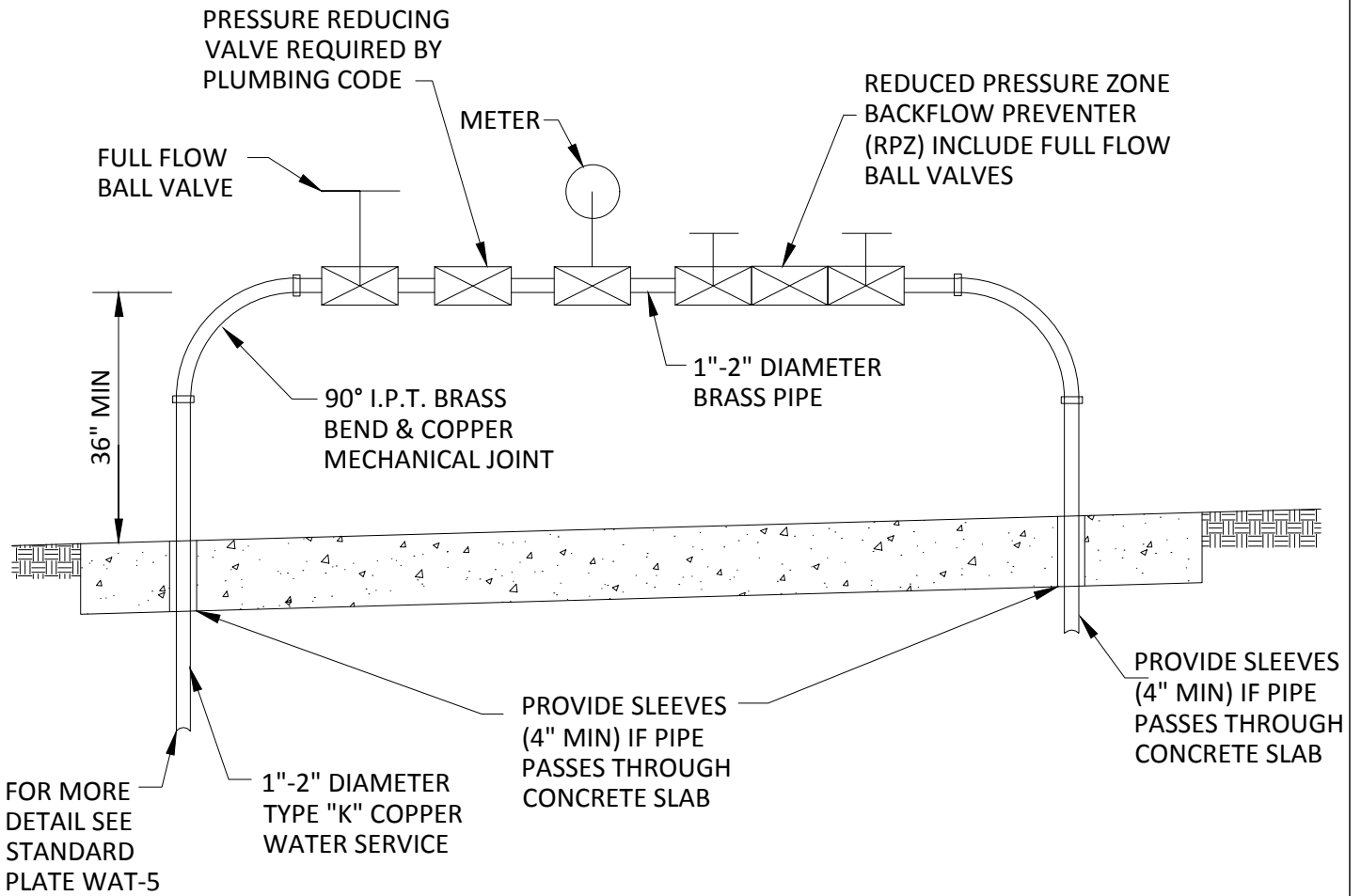
**PLAN 22 1/2°
BENDS**



STANDARD DETAILS
CONCRETE THRUST BLOCKING

Revised
1/2019

Standard Plate No.
WAT-5



NOTES:

1. ANNUAL TESTING OF RPZ REQUIRED.
2. REQUIRED EQUIPMENT MUST BE ENCLOSED AND SUPPORTED.
3. SLEEVES FOR PIPES IN CONCRETE SLABS SHALL BE PVC OR APPROVED EQUAL, AND MINIMUM OF ONE NOMINAL SIZE LARGER IN DIAMETER THAN THE PIPE.
4. SEE STANDARD PLATE _____ FOR CURB STOP AND WINTERIZING CURB STOP DETAIL.



STANDARD DETAILS
IRRIGATION SYSTEM METER
INSTALLATION REQUIREMENTS

Revised
 1/2019

Standard
 Plate No.
WAT-6

WATEROUS IMPROVED PACER SYTLE
WB67-250
2-2.5" HOSE CONNECTION
1-4.5" STEAMER CONNECTION
RED (WATEROUS ENAMEL NO. V1814-R)

HYDRANT FLAG AS SPECIFIED
CONNECT TRACER WIRE TO SNAKE PIT MAGNETIZED TRACER BOX - CONCRETE DRIVEWAY BOX BY COPPERHEAD INDUSTRIES, OR EQUAL.

TOP NUT
3.0'
TOP CURB

METAL CHAINS

BREAKOFF FLANGE WITH BREAKABLE RED COUPLINGS

BACKFILL TO BE TAMPED

CONNECT TRACER WIRE TO MAIN TRACER WIRE

8' MIN.

1.5 CUBIC YARD MIN. 1 1/2" WASHED ROCK. COVER WITH POLYETHYLENE.

4"X4" VERTICAL BLOCK
4"X4" THRUST BLOCK

PLUG DRAIN HOLE WHERE GROUND WATER IS PRESENT

8" CONCRETE BLOCK

GATE VALVE AND BOX WITH EXTENSION ROD
GATE VALVE ADAPTOR AND 1 1/2" ROCK (SEE WAT - 4)

TIE ALL JOINTS WITH MEGALUGS (MIN. 4 REQ.)

TRACER WIRE:
#12 AWG COPPER CLAD STEEL
MINIMUM 30 MIL HDPE INSULATION
MINIMUM BREAK LOAD:
450 LB (OPEN TRENCH)
1,150 LB (DIRECTIONAL DRILL)

NOTES:

1. ALL HYDRANTS LEADS MUST BE VALVED.
2. HYDRANT TO BE 5'-6' BEHIND BACK OF CURB OR 3' BEHIND BIT. TRAIL.
3. NO HYDRANTS SHALL BE LOCATED BETWEEN P.C. OR P.T. OF INTERSECTION RADII.
4. HYDRANT TO BE WATEROUS W-67-250 PACER W/16' BREAKOFF, #5 NUT, 8' BURY, OPENS LEFT.
5. 2 HYDRANT FLAGS PER FIRE HYDRANT ARE REQUIRED (NO SPLINTER PROOF FIBER GLASS AS PRODUCED BY EZ-PRODUCTS IN HUGO, MN OR APPROVED EQUAL).
6. HYDRANT TO BE TIED TO TEE WITH APPROVED RESTRAINING DEVICES, MEGA LUGS OR AS APPROVED BY THE CITY ENGINEER.
7. INTERNAL INSERT TOP SECTIONS ARE NOT ACCEPTABLE (FOR G.V. BOX).
8. HYDRANTS SHALL BE MARKED WITH APPROVED "OT OF SERVICE" TAGS WHEN INSTALLED.
9. "PUMP AFTER USE" PLATES TO BE INSTALLED WHEN "DRAIN HOLES" IN VALVE SEAT ARE OMITTED IN GROUND WATER SITUATIONS.
10. ALL GATE VALVES SHALL BE IN ROADWAY.
11. 6" GATE VALVES TO BE INSTALLED A MINIMUM OF 7' FROM CENTER OF HYDRANT ON ALL HYDRANT LEADS OR AS CLOSE TO HYDRANT TEE AS POSSIBLE.
12. A ONE-PIECE HEAVY DUTY OPERATING VALVE ROD IS REQUIRED ON HYDRANTS THAT ARE EXTENDED 24" OR MORE.
13. WHEN INSTALLING A HYDRANT ROD EXTENSION THE NONBREAKABLE COUPLING SLEEVES GO ON THE BOTTOM AND THE BREAKABLE SLEEVES GO ON THE TOP OF THE EXTENSION ROD. VERIFY "TOP AND BOTTOM" OF BREAKOFF SECTION.
14. THE WB-67-250 PACER REQUIRES THE OIL RESERVIOR BE FILLED WITH FOOD GRADE MINERAL OIL.
15. TOUCH UP HYDRANT PAINT (WITH AFC WATEROUS RED) AFTER TURF ESTABLISHMENT AS DIRECTED.
16. FITTINGS SHALL BE FUSION EPOXY COATED. NUTS AND BOLTS SHALL BE COR-BLUE OR APPROVED EQUAL.



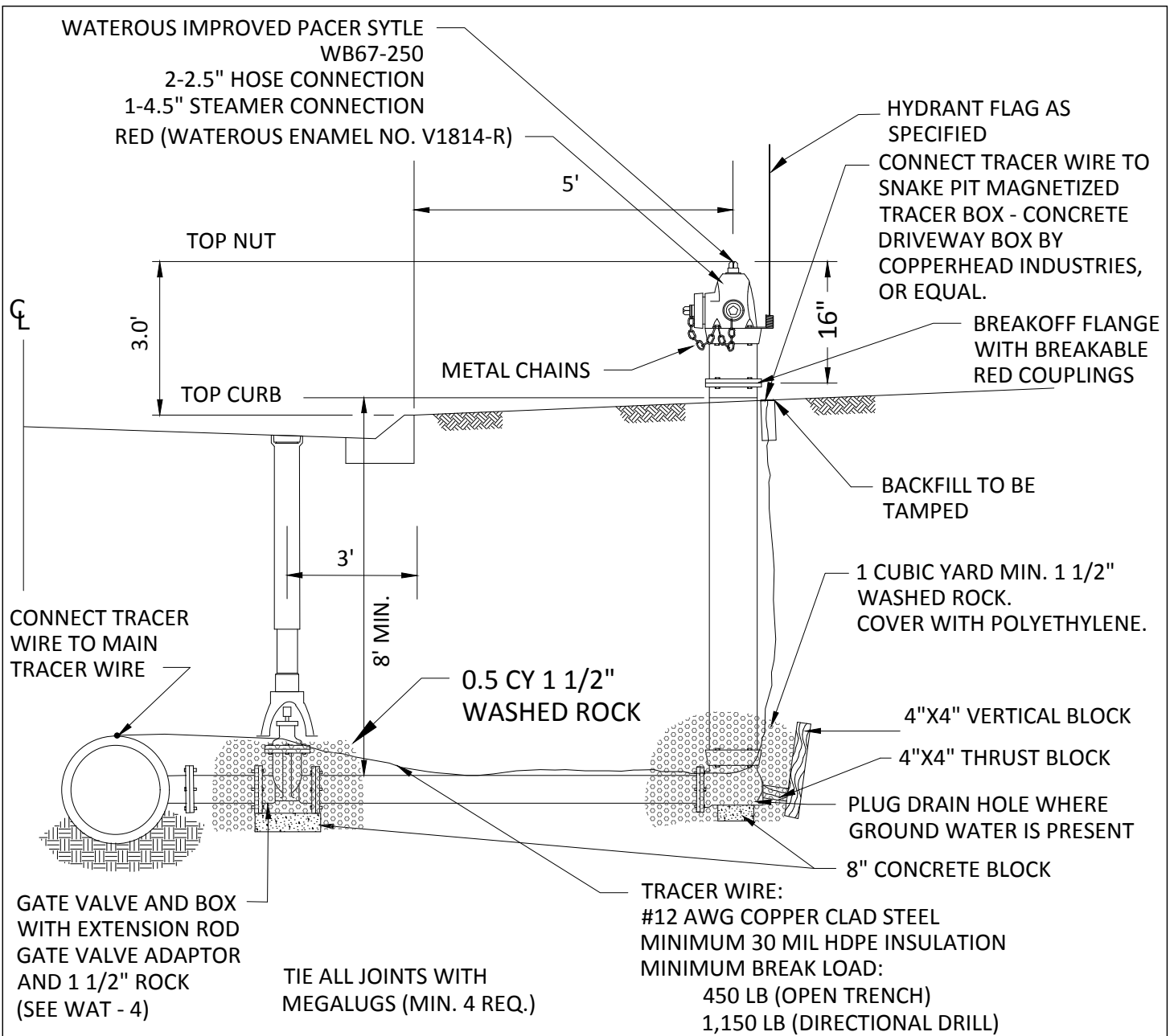
STANDARD DETAILS
HYDRANT AND GATE VALVE
IN BOULEVARD

Revised

Standard Plate No.

1/2019

WAT-7



NOTES:

1. ALL HYDRANTS LEADS MUST BE VALVED.
2. HYDRANT TO BE 5'-6' BEHIND BACK OF CURB OR 3' BEHIND BIT. TRAIL.
3. NO HYDRANTS SHALL BE LOCATED BETWEEN P.C. OR P.T. OF INTERSECTION RADII.
4. HYDRANT TO BE WATEROUS W-67-250 PACER W/16' BREAKOFF, #5 NUT, 8' BURY, OPENS LEFT.
5. 2 HYDRANT FLAGS PER FIRE HYDRANT ARE REQUIRED (NO SPLINTER PROOF FIBER GLASS AS PRODUCED BY EZ-PRODUCTS IN HUGO, MN OR APPROVED EQUAL).
6. HYDRANT TO BE TIED TO TEE WITH APPROVED RESTRAINING DEVICES, MEGA LUGS OR AS APPROVED BY THE CITY ENGINEER.
7. INTERNAL INSERT TOP SECTIONS ARE NOT ACCEPTABLE (FOR G.V. BOX).
8. HYDRANTS SHALL BE MARKED WITH APPROVED "OUT OF SERVICE" TAGS WHEN INSTALLED.
9. "PUMP AFTER USE" PLATES TO BE INSTALLED WHEN "DRAIN HOLES" IN VALVE SEAT ARE OMITTED IN GROUND WATER SITUATIONS.
10. ALL GATE VALVES SHALL BE IN ROADWAY.
11. 6" GATE VALVES TO BE INSTALLED A MINIMUM OF 7' FROM CENTER OF HYDRANT ON ALL HYDRANT LEADS OR AS CLOSE TO HYDRANT TEE AS POSSIBLE.
12. A ONE-PIECE HEAVY DUTY OPERATING VALVE ROD IS REQUIRED ON HYDRANTS THAT ARE EXTENDED 24" OR MORE.
13. WHEN INSTALLING A HYDRANT ROD EXTENSION THE NONBREAKABLE COUPLING SLEEVES GO ON THE BOTTOM AND THE BREAKABLE SLEEVES GO ON THE TOP OF THE EXTENSION ROD. VERIFY "TOP AND BOTTOM" OF BREAKOFF SECTION.
14. THE WB-67-250 PACER REQUIRES THE OIL RESERVIOR BE FILLED WITH FOOD GRADE MINERAL OIL.
15. TOUCH UP HYDRANT PAINT (WITH AFC WATEROUS RED) AFTER TURF ESTABLISHMENT AS DIRECTED.
16. FITTINGS SHALL BE FUSION EPOXY COATED. NUTS AND BOLTS SHALL BE COR-BLUE OR APPROVED EQUAL.



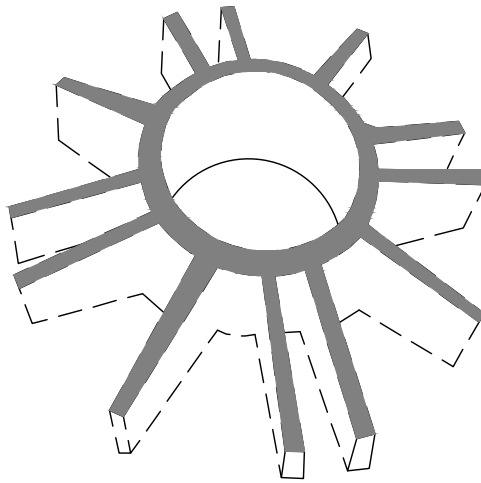
STANDARD DETAILS
HYDRANT AND GATE VALVE
IN PAVEMENT

Revised

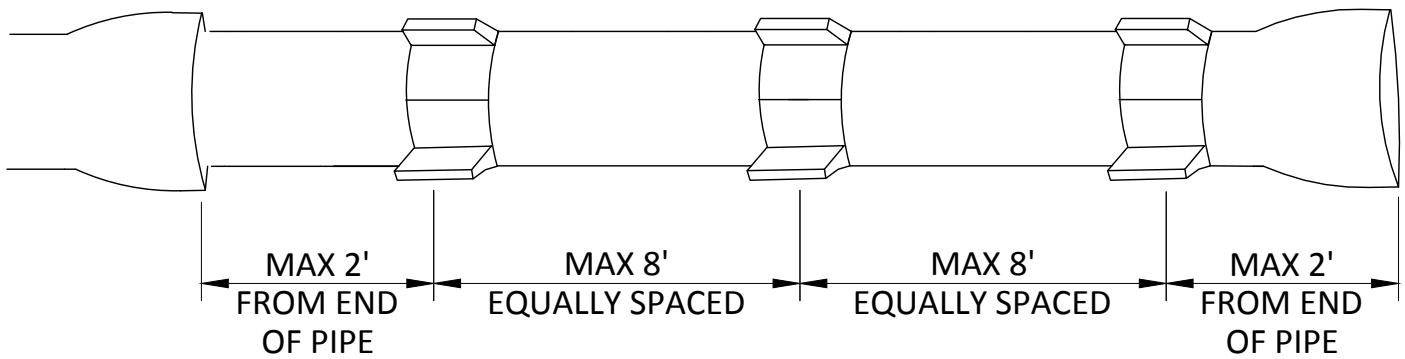
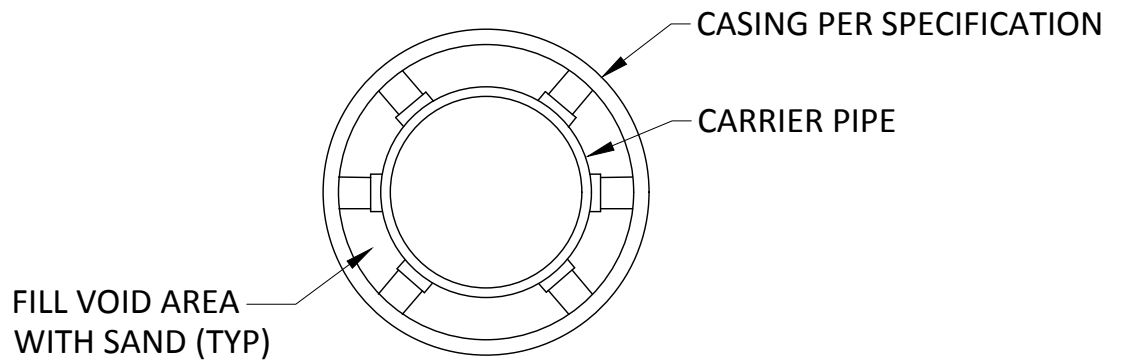
1/2019

Standard
Plate No.

WAT-8



PHOENIX PLASTIC CASING SPACER
OR APPROVED EQUAL



**WATER MAIN/FORCE MAIN PIPE SUPPORT
IN CASING, PLASTIC SPACERS**

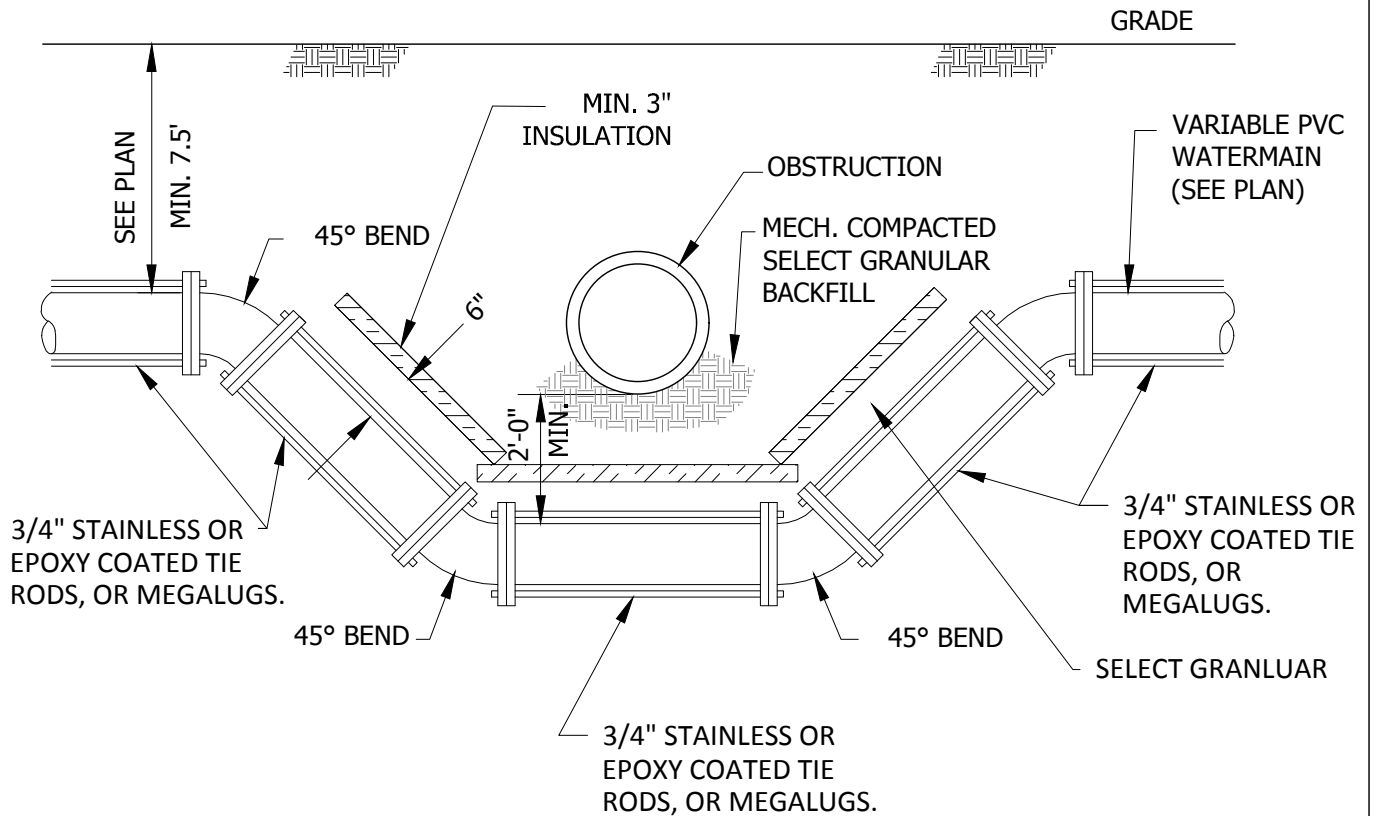
NOT TO SCALE



STANDARD DETAILS
PIPE CASING
TYPICAL INSTALLATION

Revised
1/2019

Standard
Plate No.
WAT-9



NOTE:

1. ALL FITTINGS SHALL BE FUSION BONDED EPOXY COATED DUCTILE IRON TO MEET OR EXCEED ANSI/AWWA C550 AND C116/A21.16 REQUIREMENTS.
2. MEGALUGS WILL NOT BE ALLOWED ON ANY CIP WATER MAIN.
3. SELECT GRANULAR WILL BE REQUIRED BETWEEN INSULATION, WATER MAIN, AND OBSTRUCTION.
4. ALL BENDS SHALL HAVE MEGALUGS OR TIE RODS WITH BLOCKING IN ACCORDANCE WITH STANDARD PLATE WAT-03.
5. COPPER TRACER WIRER SHALL BE USED ON PVC WATER MAIN.
6. ALL WATER MAIN BOLTS SHALL BE CORE-BLUE OR APPROVED EQUAL.



STANDARD DETAILS

WATERMAIN OFFSET

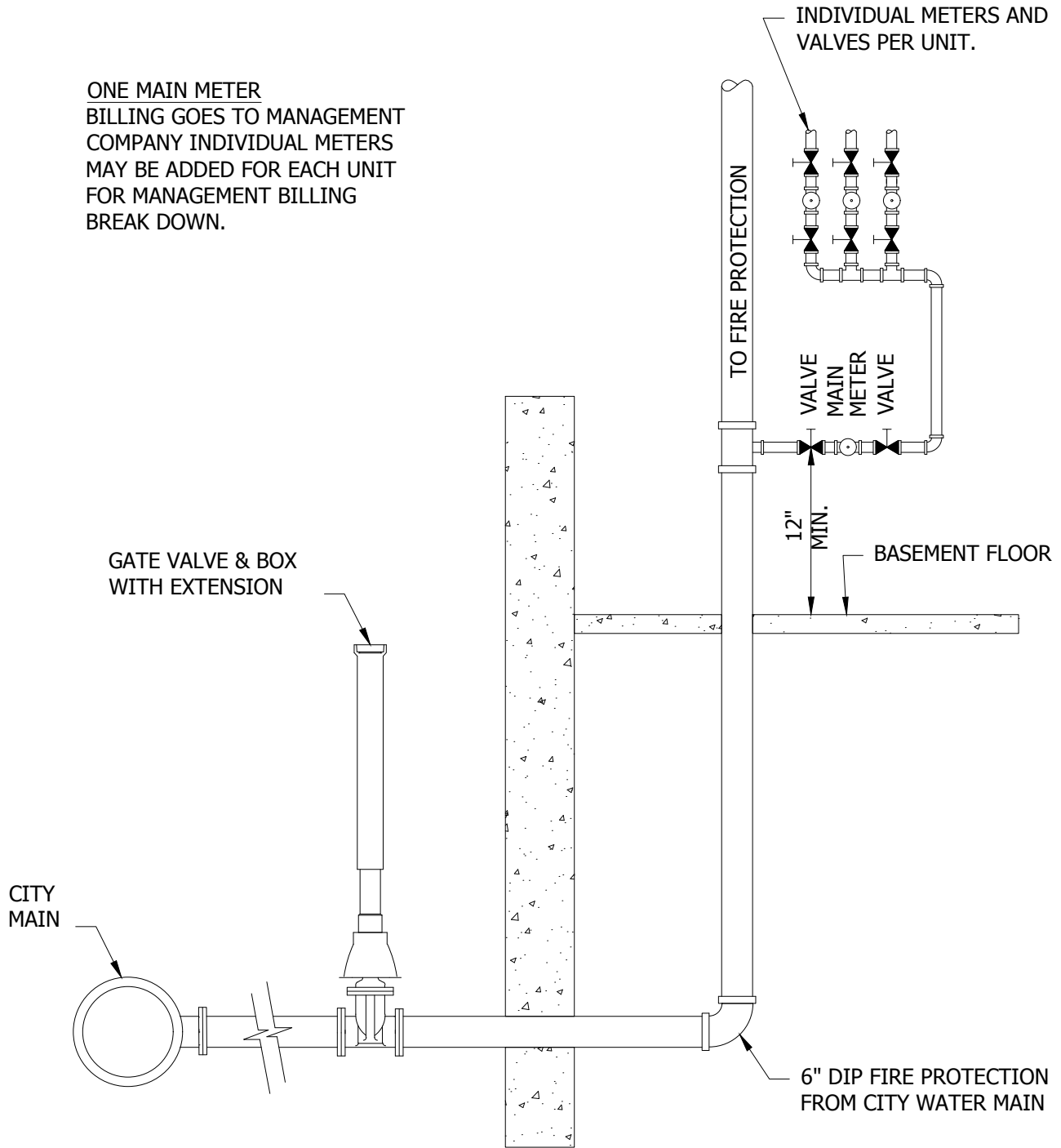
Revised

1/2019

Standard
Plate No.

WAT-10

ONE MAIN METER
 BILLING GOES TO MANAGEMENT
 COMPANY INDIVIDUAL METERS
 MAY BE ADDED FOR EACH UNIT
 FOR MANAGEMENT BILLING
 BREAK DOWN.



NOTE: ALL METERS MUST BE LOCATED IN A CENTRAL ROOM AT POINT WHERE WATER SERVICE ENTERS BUILDING. IRRIGATION LINES MUST ALSO HAVE SEPARATE METER IF LINE IS CONNECTED PRIOR TO MAIN.

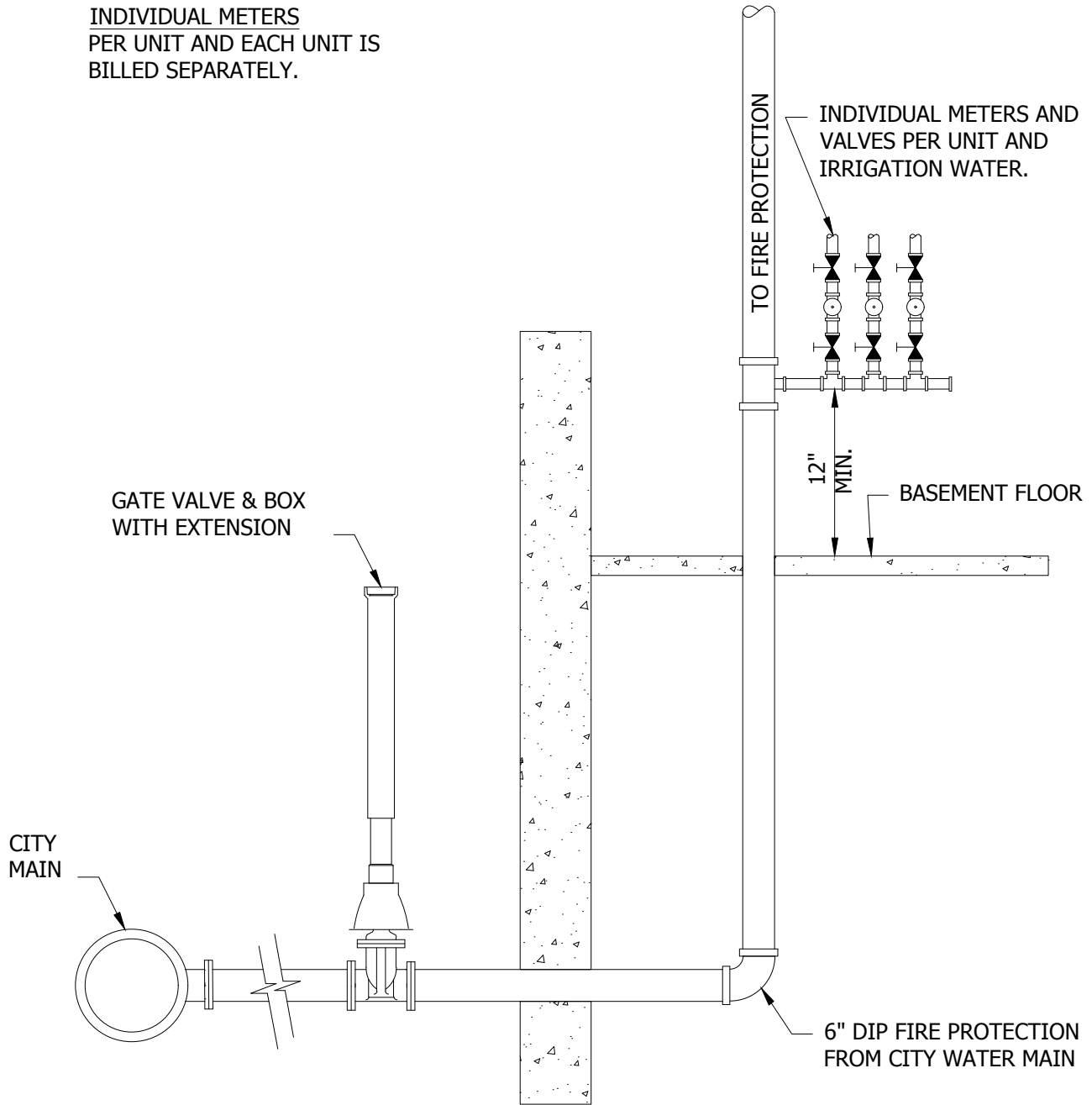


STANDARD DETAILS
MULTIPLE UNITS USING
MAIN WATER METER

Revised
 1/2019

Standard
 Plate No.
WAT-11

INDIVIDUAL METERS
PER UNIT AND EACH UNIT IS
BILLED SEPARATELY.



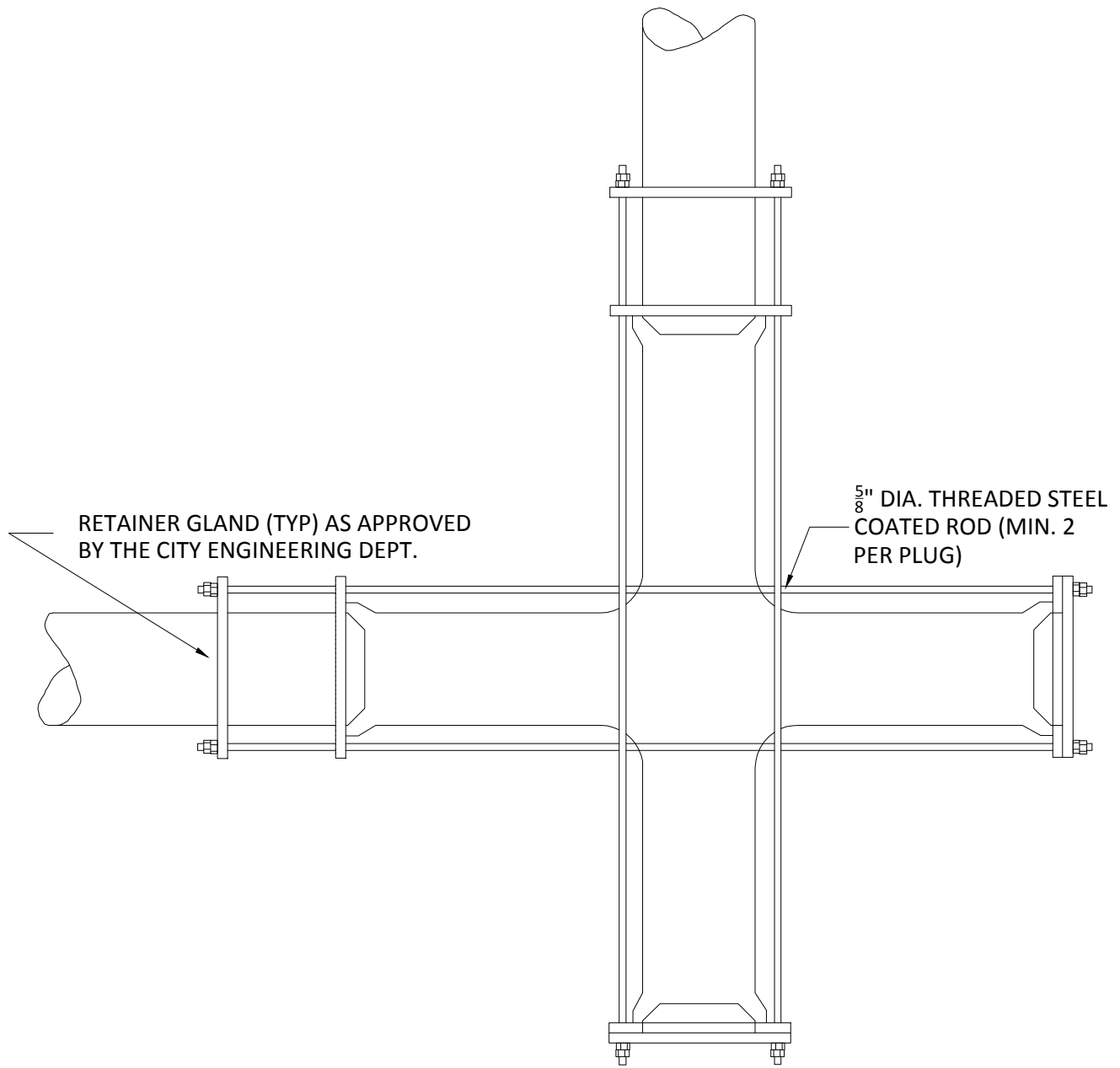
NOTE: ALL METERS MUST BE LOCATED IN A
CENTRAL ROOM AT POINT WHERE
WATER SERVICE ENTERS BUILDING.
IRRIGATION LINES MUST ALSO HAVE
SEPARATE METER IF LINE IS
CONNECTED PRIOR TO MAIN.



STANDARD DETAILS
MULTIPLE UNITS USING
INDIVIDUAL WATER METERS

Revised
1/2019

Standard
Plate No.
WAT-12



NOTES:

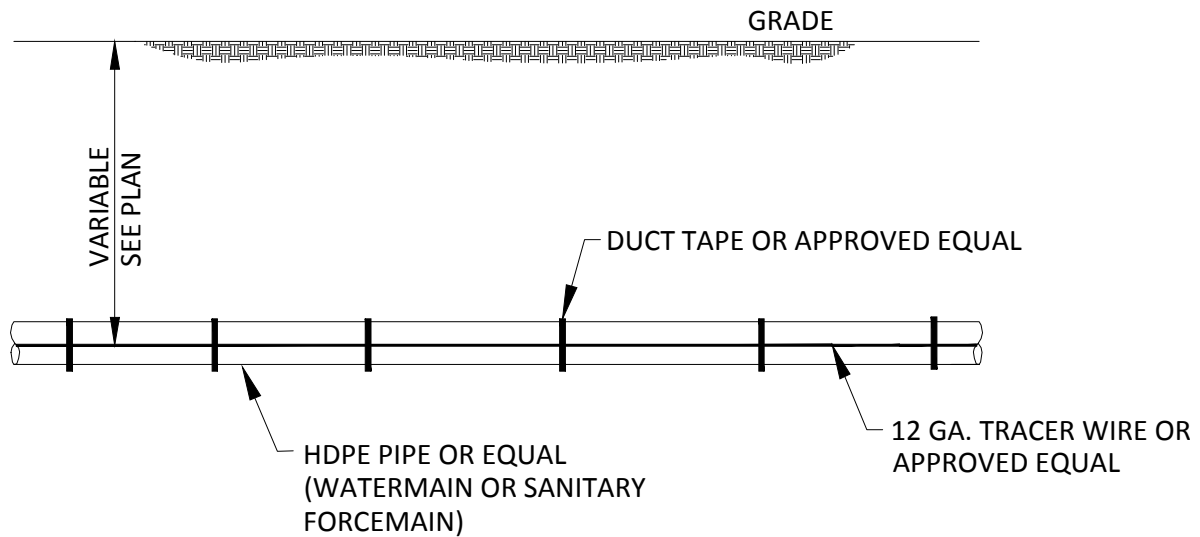
1. TIEING BACK IS TO BE CONSIDERED INCIDENTAL TO INSTALLATION OF WATERMAIN. NO COMPENSATION WILL BE PAID THEREFORE.
2. TIEING BACK OF THE PLUG IS TO BE DONE IN ADDITION TO NORMAL BLOCKING AGAINST UNDISTURBED SOILS.



STANDARD DETAILS
WATERMAIN PLUG
TYPICAL TIE BACK

Revised
 1/2019

Standard
 Plate No.
WAT-13



NOTES:

1. FOR ALL HDPE PIPE OR EQUAL, INSTALL A TRACER WIRE OF 12 GA. MINIMUM DIAMETER. APPLIES TO WATERMAIN OR SANITARY FORCEMAIN ONLY.
2. ATTACHE TRACER WIRE SECURELY TO PIPE WITH DUCT TAPE OR EQUAL.
3. TRACER WIRE TO BE BROUGHT TO SURFACE AT GATE VALVE LOCATIONS AND AIR RELEASE MANHOLES.



STANDARD DETAILS
HDPE PIPE
WATERMAIN OR SANITARY FORCEMAIN

Revised
 1/2019

Standard
 Plate No.
WAT-14