

## Miscellaneous Water Standards/Notes

1. Water transmission shall be a minimum of 8" in diameter, shall include installation of shutoff valves and fire hydrants, and shall be free from dead-end mains, unless authorized by the City.
2. Any water service line replacement/up-sizing must include replacing the service within the City right-of-way up to the water main trunk line. Also, complete restoration of the parkway, including topsoil, seed, and any sidewalk repair, must be completed to the satisfaction of the City.
3. For any water service line repairs, the homeowner is responsible from the ROW to the house. The City will make repairs from ROW to the trunk line.
4. Water mains and fittings shall be ductile cast iron, cement lined, with push on joints class 52 conforming to latest ANSI/ AWWA C151/ A21.51-86, C111, and C104.
5. Fire hydrant leads shall be 6" diameter.
6. All ductile iron water main shall include installation of polyethylene encasement conforming to ANSI/ AWWA C105/ A21.5 and ASTM A674 standards.
7. A building permit is required for all water main/service installations.



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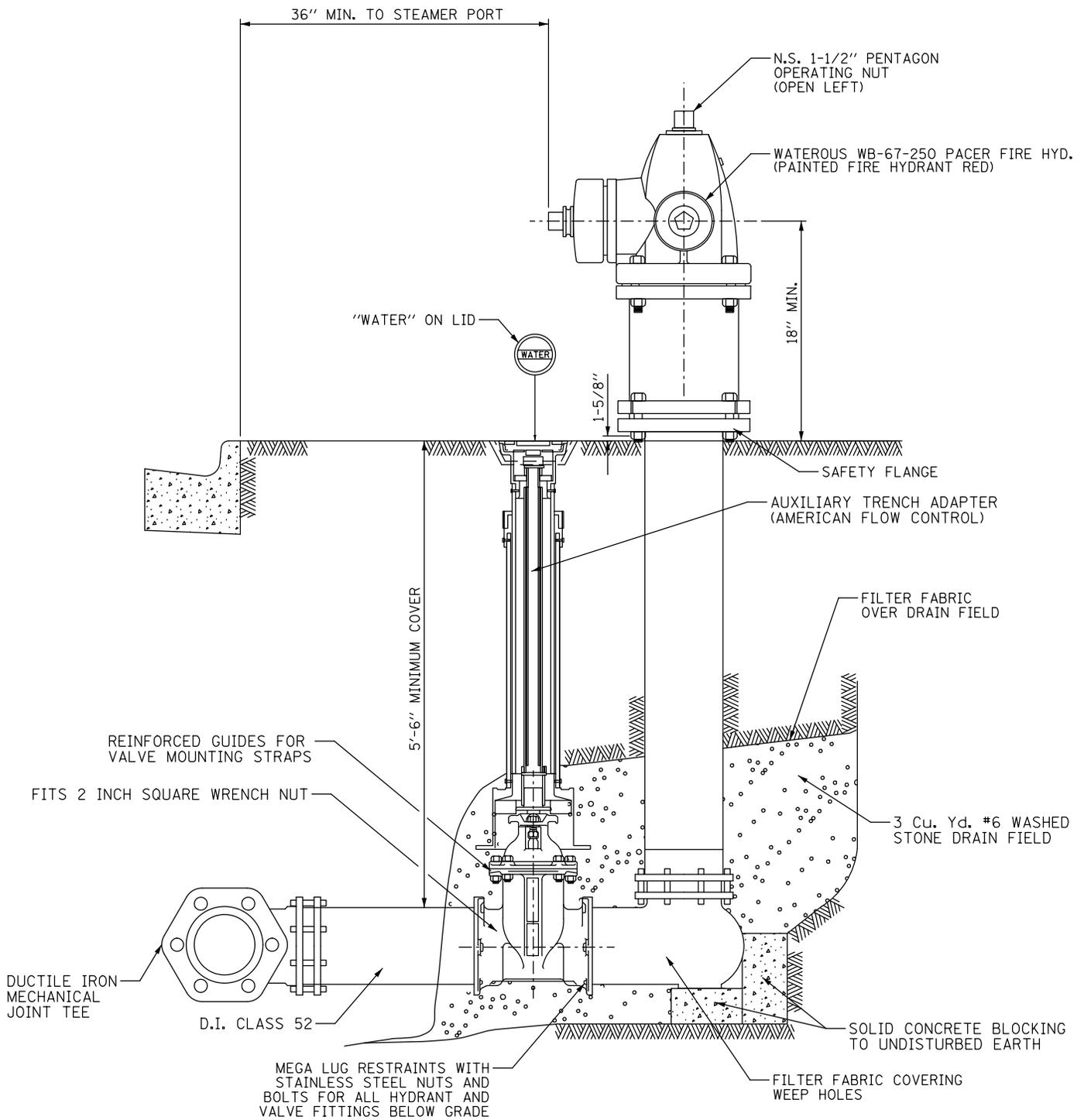
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## MISCELLANEOUS WATER NOTES

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**W-0**



1. ALL MECHANICAL JOINT FITTINGS TO BE ASSEMBLED WITH STAINLESS STEEL TEFLON COATED NUTS AND BOLTS.
2. MECHANICAL JOINT RESTRAINT SHALL BE SERIES 2000PV.



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**TYPICAL FIRE HYDRANT**

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PRE-CAST CONCRETE ADJUSTING RINGS (IF NEEDED) - (NO MORE THAN 2)  
 MAX. ALLOWABLE ADJUSTMENT UTILIZING RINGS IS 8". TOP 2" OF ADJUSTMENT RINGS MUST BE VULCANIZED RUBBER (MFG=EJ INFRA-RISER). IF GREATER ADJUSTMENT IS NEEDED, IT MUST BE ACCOMPLISHED UTILIZING 5' DIA. PRE-CAST BARREL SECTION.

EAST JORDAN 1020/1022 MANHOLE FRAME, TYPE "B" SELF-SEALING SOLID LID W/"WATER" IMPRINT (OR EQUIVALENT EAST JORDAN IRON WORKS FRAME AND LID)

CONTINUOUS 3/8" POLYURETHANE ADHESIVE  
 BITUMINOUS GASKET MATERIAL

5'-6" MINIMUM COVER

MANHOLE STEPS @ 16" ON CENTER

5" MIN.

WATEROUS 2500 RESILIENT WEDGE VALVE

BITUMINOUS GASKET MATERIAL

GASKET TYPE WATER STOP COLLAR REQUIRED (ASTM C-923)

D.I. CLASS 52

MEG-A-LUG WITH STAINLESS STEEL NUTS AND BOLTS

SOLID CONCRETE BLOCK

1. ALL MECHANICAL JOINT FITTINGS TO BE ASSEMBLED WITH STAINLESS STEEL TEFLON COATED NUTS AND BOLTS.
2. MECHANICAL JOINT RESTRAINT SHALL BE SERIES 2000PV FOR USE WITH C-900 PVC PIPE OR D.I. PIPE CLASS 52.
3. VALVES 4" OR LARGER MUST BE ENCLOSED IN A VALUE VAULT.



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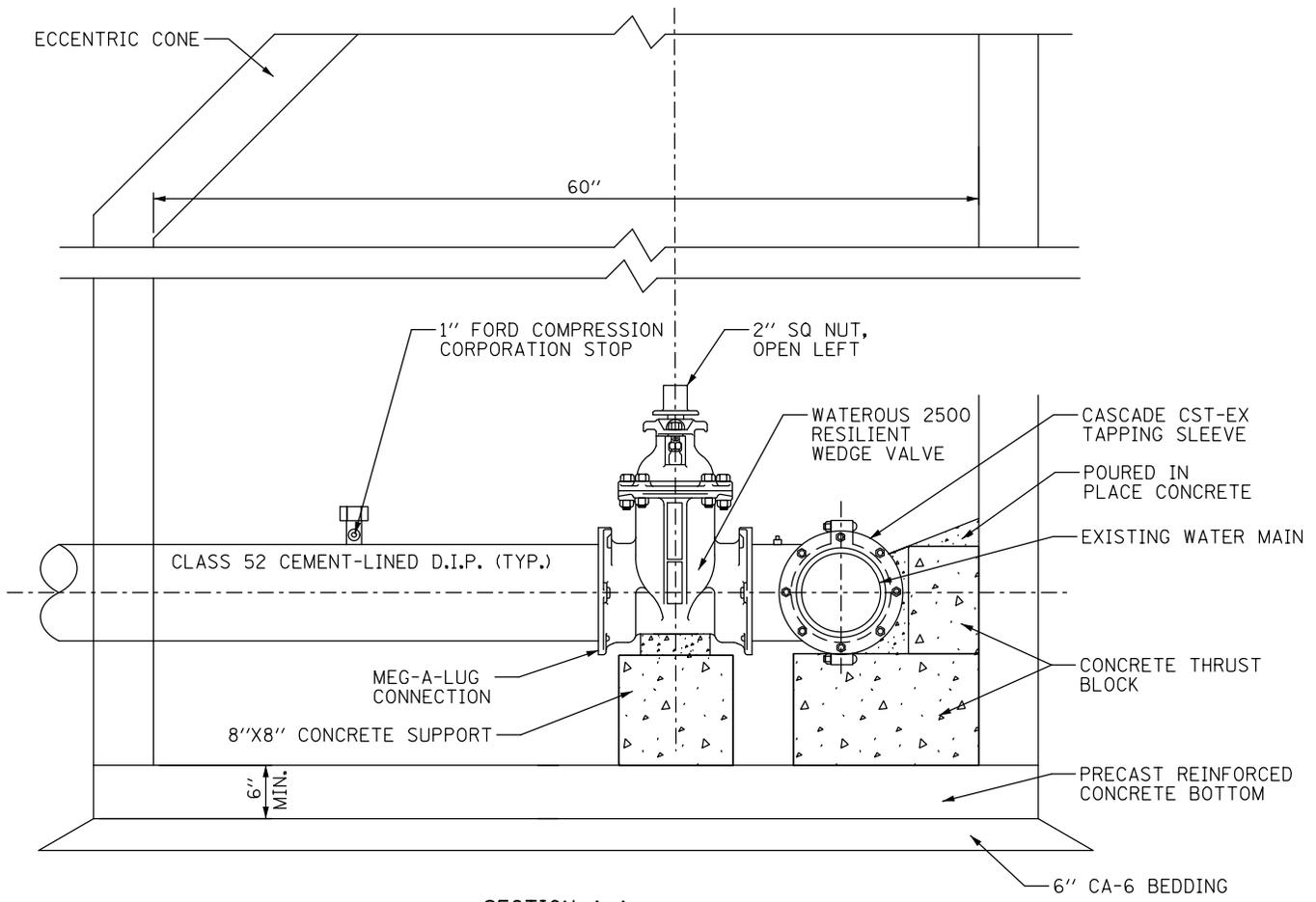
**ENGINEERING DETAILS**

**TYPICAL VALVE VAULT  
 (5' I.D.)**

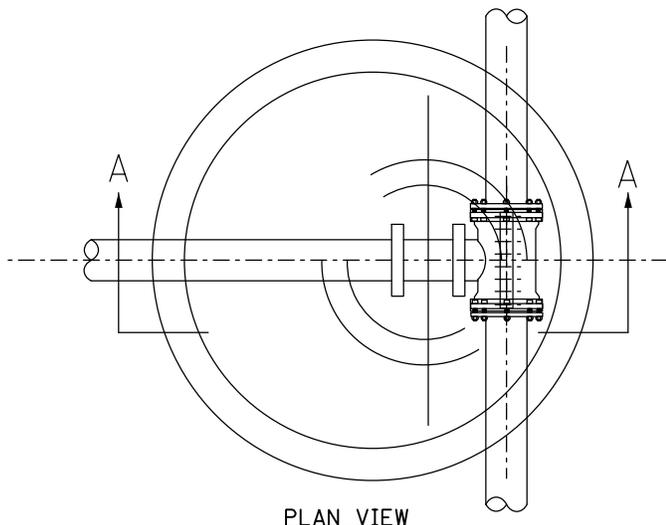
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SECTION A-A



PLAN VIEW

NOTES:  
 C.I. MANHOLE FRAME AND COVER EAST JORDAN 1050 WITH STANDARD DUTY, NON-ROCKING TYPE LIDS (EAST JORDAN 1020 MAY BE USED IN GRASSY AREAS). ADJUSTING RING HEIGHT NOT TO EXCEED 8" (RUBBER ADJUSTING RINGS ALLOWED-NO MORE THAN 2) ALL JOINTS ARE TO BE MADE WATERTIGHT WITH EXTERNAL SEALING BANDS PER ASTM C-877 WITH MECHANICAL STRAPS (MAC WRAP OR EQUAL). STANDARD VALVE VAULT SPECIFICATIONS REQUIRE ECCENTRIC CONES (SEE SEPARATE DETAIL).

ALL PRECAST CONCRETE STRUCTURES MUST CONFORM TO AASHTO M199.



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**WATER MAIN PRESSURE CONNECTION DETAIL**

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FINISHED GRADE

① SELECT TRENCH BACKFILL

GRANULAR TRENCH BACKFILL TO BE USED UNDER EXISTING OR PROPOSED PAVEMENT, CURB AND GUTTER, SIDEWALK OR WITHIN 2' OF ANY EXISTING OR PROPOSED CURB AND GUTTER OR SIDEWALK, SHALL BE MECHANICALLY COMPACTED CA-6, (NON-LIMESTONE)

MECHANICALLY COMPACTED BACKFILL OF EXCAVATED MATERIALS IN OTHER LOCATIONS IF APPROVED BY THE ENGINEER. REFER TO TRENCH BACKFILL SPECIAL PROVISIONS FOR MATERIALS AND COMPACTION REQUIREMENTS.

② PIPE BEDDING AND INITIAL TRENCH BACKFILL

#6 WASHED STONE FROM 6" BELOW TO 12" ABOVE TOP OF PIPE

③ UNSUITABLE MATERIALS

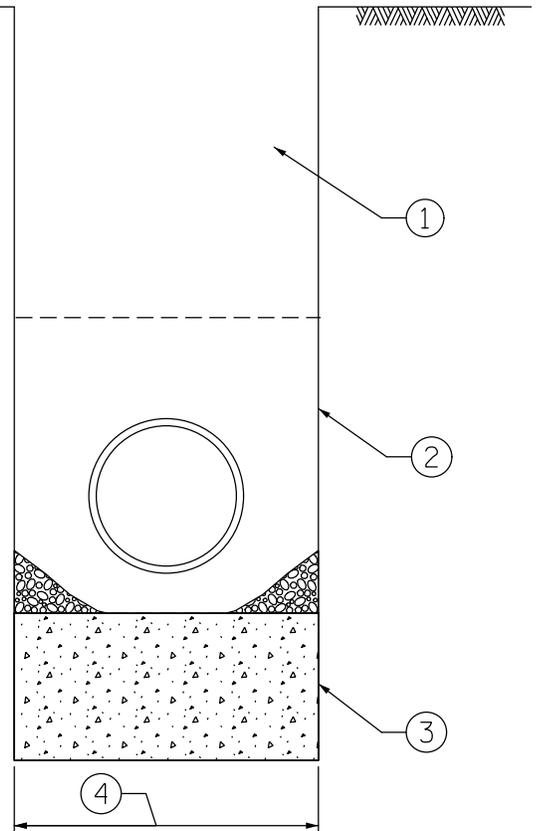
IF ENCOUNTERED - SHALL BE REMOVED WHERE DIRECTED BY THE ENGINEER AND REPLACED WITH SUITABLE AND COMPACTED MATERIAL.

④ TRENCH WIDTH

MINIMUM = PIPE O.D. +12"  
 MAXIMUM = PIPE O.D. +36"

NOTES:

1. ALL CA-6 MATERIAL TO BE IDOT APPROVED.



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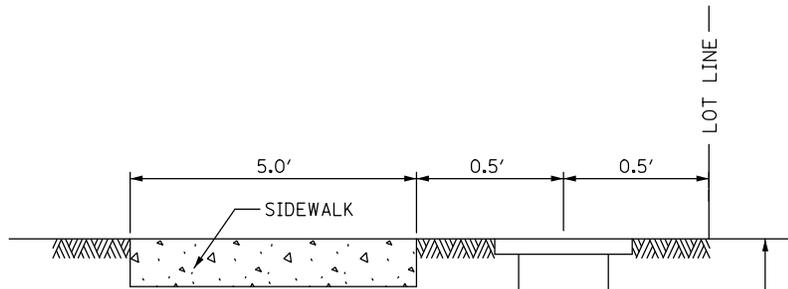
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**TYPICAL WATER MAIN  
 TRENCH CROSS SECTION**

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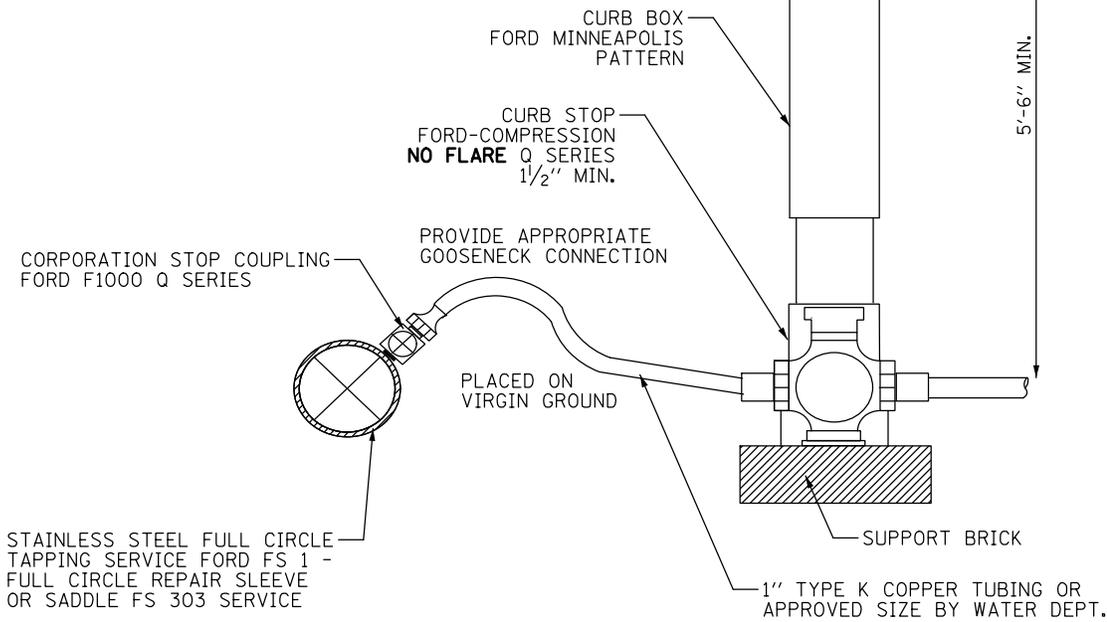
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NOTES:

1. 12" FREE COPPER INSIDE OF BUILDING MUST BE MAINTAINED.
2. WATER METER MUST BE SET WITHIN 18" OF ENTERING BUILDING.
3. TAP MUST BE 3' FROM ANY OTHER CONNECTION OR FITTING.



NOTES:

1. NO COUPLINGS PERMITTED BETWEEN CORPORATION AND CURB STOP.
2. NO COUPLINGS PERMITTED BETWEEN CURB STOP AND BUILDING.
3. NO LIMESTONE BACKFILL SHALL COME IN CONTACT WITH COPPER OR BRASS.
4. B-BOXES MUST BE LOCATED IN A GRASSY NON-PAVED AREA.



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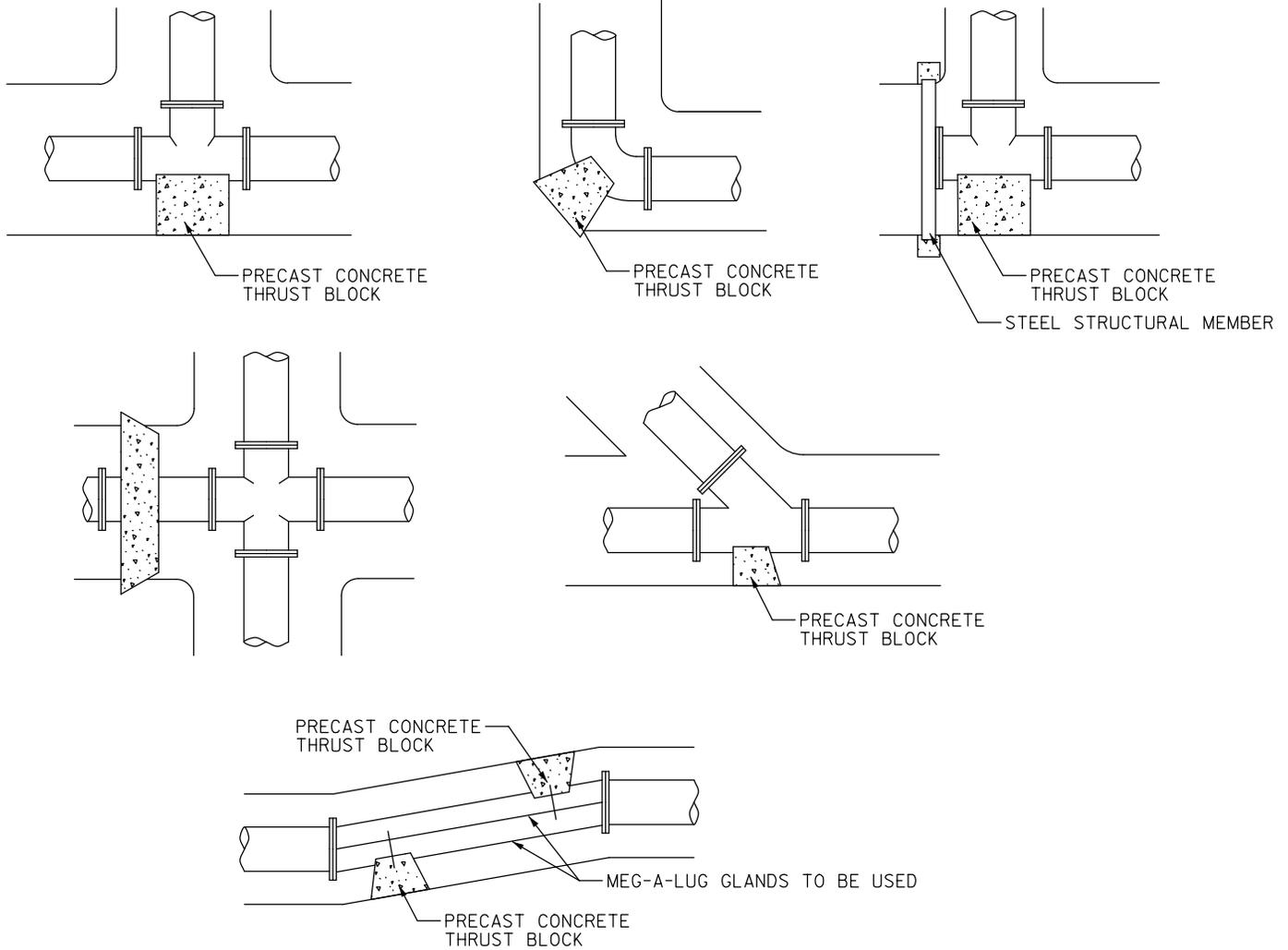
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**WATER SERVICE CONNECTION**

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BEARING AREA (SQ. FT.)

PIPE SIZE	TEE/PLUG	90 DEG.	45 DEG.	22 1/2°	11.25°
6	4	2	1	1	1
8	6	4	3	1	1
10	7	5	3	2	1
12	8	6	4	3	2
14	12	9	6	4	3
16	15	12	7	5	3
18	18	15	9	5	4
24	40	30	15	10	5

ALL BLOCKING MUST BEAR ON UNDISTURBED EARTH.

ALL BENDS OR ELBOWS GREATER THAN AND INCLUDING 11.25° SHALL HAVE THRUST BLOCKING.

WOOD SHIMS NOT ALLOWED.



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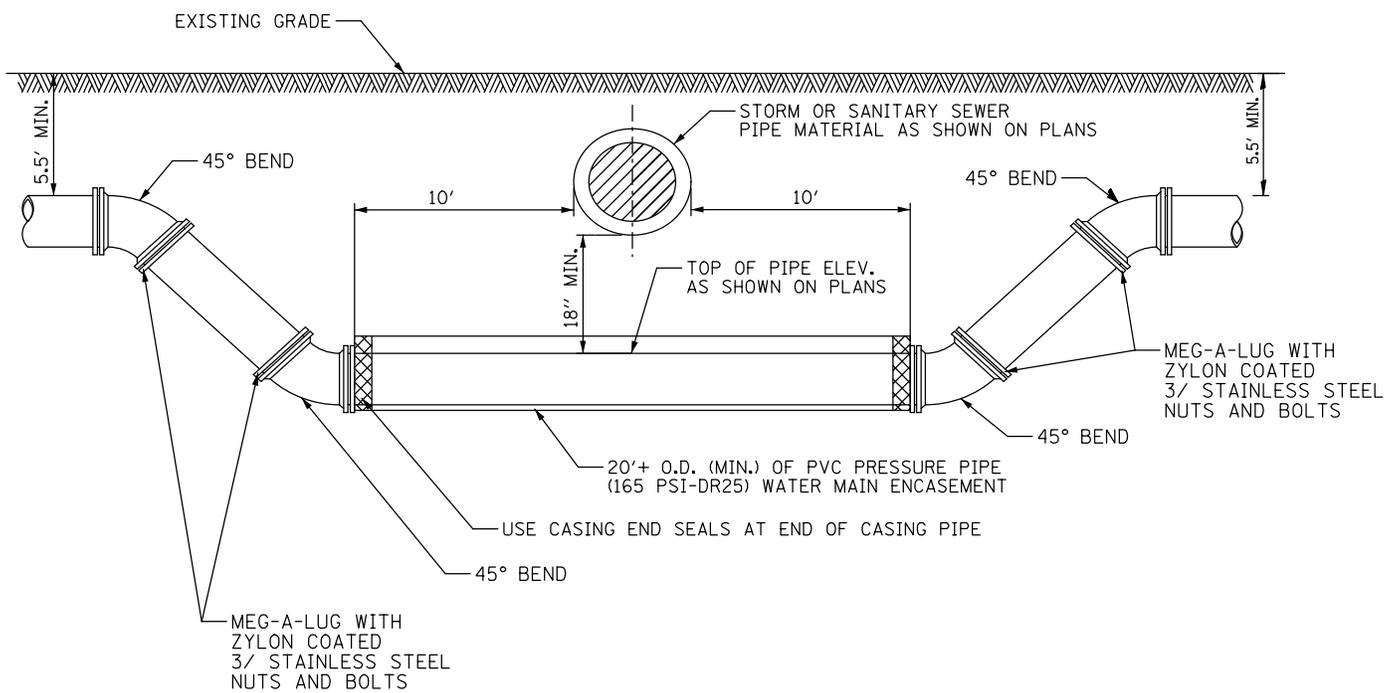
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**THRUST BLOCK DETAIL**

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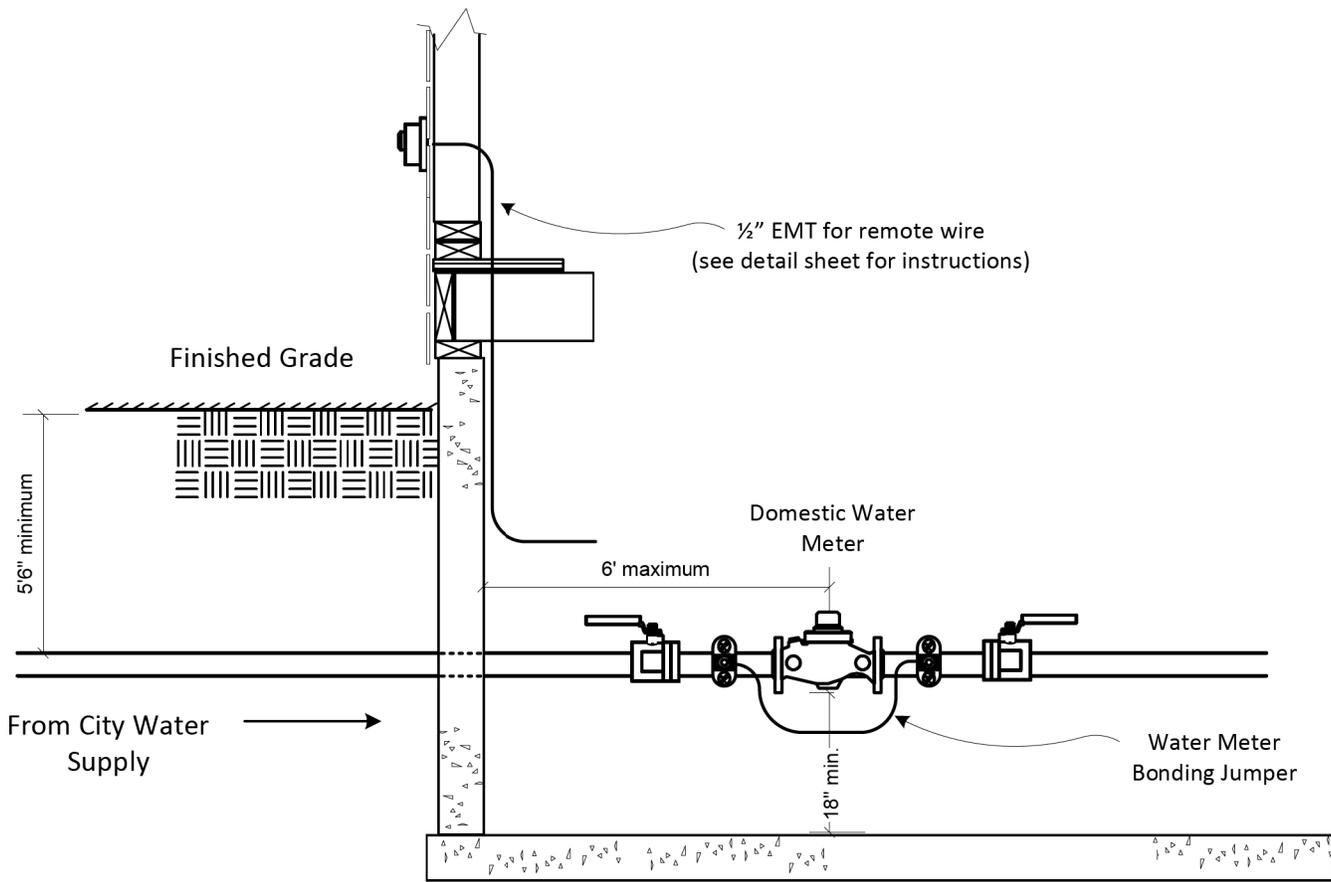
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**WATER MAIN LOWERING DETAIL**

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1. The water connection property owner is responsible for all labor, equipment, material, tools and transportation to complete the work..
2. The water customer, at their expense, must provide all suitable pipe connections. For water meters up to 2", two (2) full port ball valves, one immediately on the inlet side and one on the outlet side for the means of isolated the water meter is required.
3. The meter setting must have an electrical bonding jumper connected on the inlet and outlet sides of the piping. (See NEC requirements for proper cable size)
4. Minimum service size is 1" Type "K" copper tubing.
5. The meter setting must be accessible with a minimum clearances of 18" on all sides and 36" directly in front to allow servicing the meter.

Meter Information

3/4" iPERL meter length - 9", meter spread - 14 1/2"  
 1" iPERL meter length - 10 3/4". Meter spread 16 1/4"



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**ENGINEERING DETAILS**

**WATER METER**

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# Standards for Water Meter Remote Wiring and Conduit Installation



1. This standard covers the work to be undertaken for water meter remote wire and conduit installation. The property owner is responsible for providing all labor, equipment, material, tools and transportation to complete the work as described in this document.
2. All indoor conduit and all associated bends and fittings shall have a minimum inside trade size diameter of ½" and shall be electrical metallic tubing (EMT) type conduit.
3. The remote wire conduit shall be installed from a point, in the same room as the water meter, within 3 feet of the water meter, to a point on the outside wall of the building at a distance between 24" and 42" above finished grade.
4. Where the conduit terminates at the outside wall of the building, the conduit shall extend through the wall and terminate flush with the finished surface of the outside wall. The outside reader will be installed over the conduit end and sealed against the weather.
5. The conduit shall be installed to a point on the front wall of the building, or within 6 feet of the front wall of the building if placed on the side wall of the building.
6. The point on the outside wall of the building where the conduit terminates shall be accessible at all times. The remote reader location will be determined and approved by the Water Operations Division. The location must be accessible to a meter reader year-round, must not be located within a fenced-in area, must not be located in an area that creates a hazard for the meter reader due to situations including, but not limited to;
  - Dogs or other potentially dangerous animals
  - Bushes or other obstructions
  - Ice or snow accumulations
7. All conduit installations must comply with the NEC requirements.
8. Where the conduit terminates at the outside wall of the building, a clear space of a minimum of 16" x 16" shall be provided on the surface of the wall suitable for mounting the remote readout device or transmitter.
9. The route the conduit takes from the water meter to the termination point on the outside wall must be the shortest, most direct route.
10. Only the remote meter wire shall be permitted to be installed inside the conduit.
11. All wire installed on the exterior of any building or structure, including wire exiting any water meter vault, shall be protected with a galvanized rigid metal electrical conduit specifically designed for exterior use and the path of the raceway approved by the City.
12. The City shall supply the remote meter wire. The owner shall provide a pull string (Greenlee 430 Poly Fishing Line or equivalent) within the conduit leaving an excess of at least 3 feet of string at both ends. Both ends of the fishing line must be clearly tagged with the words "Water Meter". The fishing line must be a continuous single piece without splices.



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# Water Main Testing Specifications

## Pressure and Leakage Test

1. Testing Procedures
  - a. All pressure leakage testing shall be tested against installed pipe, fittings, valves, joints, and fire hydrants up to nozzles.
2. Valve Operations
  - a. City of Rolling Meadows Water Division personnel are the only individuals authorized to operate any water valves for pressurizing or flushing the system.
3. Taps for Testing
  - a. Contractor/developer is required to provide a minimum one (1)-inch service taps or size required for adequate flushing in manholes for test gauges, flushing needs, and for disinfection at each end of the pipe test section.
  - b. Service tap shall be a direct tap.
  - c. Contractor shall schedule an appointment with the City of Rolling Meadows Water Division for the witnessing/inspection of all taps. A 24-hour notice is required.
  - d. Contractor shall remove copper tube with whip assembly from manholes upon completion of testing and chlorination procedures. Corporation stop must be removed and replaced with a stainless steel full circle repair clamp.
4. Air Removal
  - a. Before applying the specified test pressure, air shall be expelled completely from the section of piping under test. Air removal will be done in conjunction with the flushing procedures of the water main (see Flushing Requirements.)
5. Allowable Leakage
  - a. Testing allowance shall be defined as the maximum quantity of makeup water that is added into a pipeline undergoing hydrostatic pressure testing, or any valved section thereof, in order to maintain pressure within  $\pm 5$  psi of the specified test pressure (after the pipeline has been filled with water and the air has been expelled\*). No pipeline installation will be accepted if the quantity of makeup water is greater than determined by the following formula:



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In inch-pound units,

$$L = \frac{SD\sqrt{P}}{148,000}$$

Where:

$L$  = testing allowance (makeup water), in gallons per hour

$S$  = length of pipe tested, in feet

$D$  = nominal diameter of the pipe, in inches

$P$  = average test pressure during the hydrostatic test, in pounds per square in (gauge)

These formulas are based on a testing allowance of 10.49 gpd/mi/in. of nominal diameter at a pressure of 150 psi. Values of testing allowance at various pressures are shown in the table below. When testing against closed metal-seated valves, an additional testing allowance per closed valve of 0.0078 gal/hr/in. of nominal value size shall be allowed. When hydrants are in the test section, the test shall be made against the main valve in the hydrant.

### ALLOWABLE LEAKAGE PER 1,000 FT OF PIPELINE

Avg. Test Pressure psi	Nominal Pipe Diameter—in.																	
	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	54	60	64
450	0.43	0.57	0.86	1.15	1.43	1.72	2.01	2.29	2.58	2.87	3.44	4.30	5.16	6.02	6.88	7.74	8.60	9.17
400	0.41	0.54	0.81	1.08	1.35	1.62	1.89	2.16	2.43	2.70	3.24	4.05	4.86	5.68	6.49	7.30	8.11	8.65
350	0.38	0.51	0.76	1.01	1.26	1.52	1.77	2.02	2.28	2.53	3.03	3.79	4.55	5.31	6.07	6.83	7.58	8.09
300	0.35	0.47	0.70	0.94	1.17	1.40	1.64	1.87	2.11	2.34	2.81	3.51	4.21	4.92	5.62	6.32	7.02	7.49
275	0.34	0.45	0.67	0.90	1.12	1.34	1.57	1.79	2.02	2.24	2.69	3.36	4.03	4.71	5.38	6.05	6.72	7.17
250	0.32	0.43	0.64	0.85	1.07	1.28	1.50	1.71	1.92	2.14	2.56	3.21	3.85	4.49	5.13	5.77	6.41	6.84
225	0.30	0.41	0.61	0.81	1.01	1.22	1.42	1.62	1.82	2.03	2.43	3.04	3.65	4.26	4.86	5.47	6.08	6.49
200	0.29	0.38	0.57	0.76	0.96	1.15	1.34	1.53	1.72	1.91	2.29	2.87	3.44	4.01	4.59	5.16	5.73	6.12
175	0.27	0.36	0.54	0.72	0.89	1.07	1.25	1.43	1.61	1.79	2.15	2.68	3.22	3.75	4.29	4.83	5.36	5.72
150	0.25	0.33	0.50	0.66	0.83	0.99	1.16	1.32	1.49	1.66	1.99	2.48	2.98	3.48	3.97	4.47	4.97	5.30
125	0.23	0.30	0.45	0.60	0.76	0.91	1.06	1.21	1.36	1.51	1.81	2.27	2.72	3.17	3.63	4.08	4.53	4.83
100	0.20	0.27	0.41	0.54	0.68	0.81	0.95	1.08	1.22	1.35	1.62	2.03	2.43	2.84	3.24	3.65	4.05	4.32

\*If the pipeline under test contains sections of various diameters, the testing allowance will be the sum of the testing allowance for each size.

†Calculated on the basis of Eq 1.

#### 6. Acceptance of Installation

- a. Acceptance shall be determined as the basis of allowable leakage or the procedures established by the City of Rolling Meadows Public Works Department. If any test of laid pipe discloses leakage greater than that



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specified, repairs or replacements shall be accomplished in accordance with the Specifications.

- b. All visible leaks are to be repaired regardless of the amount of leakage.
- c. Dye or any other form of coloring the water will not be introduced into the water main for the purpose of locating leaks.

### Disinfection of Water Mains

#### 1. Flushing Water Main

- a. Sections of pipe to be disinfected shall first be flushed to remove any solids or contaminated material that may have become lodged in the pipe. Fire hydrants in these sections will be flushed using either the two and a half (2 ½)-inches nozzle or the pumper nozzle to develop a velocity of at least 2.5 feet <sup>3</sup>/sec in the main.
- b. All fire hydrants will be flushed and operated in the section of water main to be tested and disinfected.
- c. City of Rolling Meadows Water Division personnel are the only individuals authorized to operate any water valves.
- d. All valves that are closed will have a tap with copper tube and whip assembly installed in the vault for the purpose of flushing, and disinfecting the water main to the furthest end point of each section being tested.

#### 2. Requirement of Chlorine

Before being placed into service, all new mains and repaired portion of, or extensions to existing mains shall be chlorinated so that the initial chlorine residual is not less than 50 mg/l and that a chlorine residual of not less than 25 mg/l remains in the water after standing 24 hours in the pipe. Mains must be flushed of chlorinated water within 24 hours of disinfection.

Continuous flushing method using sodium hyperchlorite Azone 15@ 12%/12.5 must be used.

#### 3. Point of Application

The preferred point of application of the chlorinating agent is at the beginning of the pipeline extension or any valved section of it, and through a corporation stop inserted in the pipe.

- a. The contractor will install corporation cocks with a copper tube gooseneck assembly for the purpose of disinfecting and as sample collection point at each branch, dead end, or a location which has a closed valve. Fire hydrants will be disinfected as part of this procedure.
- b. At a point not to exceed two (2)-feet downstream from the beginning of the new main the water entering the new main will receive a dose of chlorine fed at a constant rate such that the water will have not less than 25 mg/1 free chlorine.



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- c. Water from the existing distribution system shall be made to flow at a constant rate into the new main.
- d. The City of Rolling Meadows Water Division personnel must witness the disinfection process. An appointment with 24-hour prior notice must be scheduled with City of Rolling Meadows Water Division.
- e. In the process of chlorinating newly laid pipe, all valves, fire hydrants, or other appurtenances shall be operated while the pipe line is filled with the chlorinating agent and under normal operating pressures.

**Disinfection of Water Services (Larger Than Two (2)-Inches)**

For the purpose of clarifying this section, water service in this section refers to one (1) or more of the following installations that terminate inside of a building under construction.

- The service line being installed is for the purpose of a combination domestic and fire protection use.
- The service line being installed is for the purpose of branching into multiple domestic services inside of a meter room.
- The service line is the section of main being tested from the City of Rolling Meadows right-of-way valve to a location inside of the building.
- There are no fire hydrants installed on the service line.

**1. Meter Rooms/Building Installations**

- a. The service line will be disinfected to the inside valve of the meter room prior to any branch service being connected.
- b. The meter room will have a permanent heating system installed and in working condition prior to the disinfection.
- c. One (1) sample point will be provided at the source and one (1) sample point will be provided at the inside valve provided the length of pipe does not exceed 1,000-feet.
- d. The contractor will supply a copper tube gooseneck assembly at each of the sample points and provide methods to divert the flushing water.
- e. The City of Rolling Meadows in Water Division personnel must witness the disinfection process. An appointment with 24 hours prior notice must be scheduled with City of Rolling Meadows Water Division.

**2. Domestic/Fire Service Mains/Meter Room**

- a. The service line will be disinfected up to the inside valve on both the fire branch and the domestic branch.
- b. The Fire Service Main Branch will have a valve of equal size to the riser section installed prior to chlorination.



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- c. The building, meter room, or location of the incoming service line will have a permanent heating system installed and in working condition prior to the disinfection.
- d. One (1) sample point will be provided at the source and one (1) sample point will be provided at the inside valve provided the length of pipe does not exceed 1,000-feet and provide a method to divert the flushing water.
- e. The contractor will supply a copper tube goose neck assembly at each of the sample points.
- f. The City of Rolling Meadows Water Division personnel must witness the disinfection process. An appointment with 24 hours prior notice must be scheduled with City of Rolling Meadows Water Division.

**De-chlorination Requirements**

Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipe using the fire hydrant(s) and/or all the copper gooseneck assemblies. The flushing shall replace the highly chlorinated water with water that has a chlorine residual of less than 1mg/1 or equal to the residual from the supply service.

- The discharging of chlorinated water must be expelled to the surrounding ground surface.
- The contractor/developer must comply with all of the I.E.P.A. Rules, Regulations, and Standards for de-chlorinating water as part of the discharging.
- The contractor/developer is responsible for the equipment and materials to de-chlorinate the water at each point it is discharging.
- The City of Rolling Meadows Water Division personnel are the only individuals authorized to operate the valves.
- The City of Rolling Meadows Water Division personnel must witness the de-chlorination procedures when flushing the water mains. An appointment with 24-hour prior notice must be scheduled with City of Rolling Meadows Water Division.

**Sampling and Testing**

Sample collection for bacterial testing will start immediately after flushing the disinfection water from the system and prior to any portion of the water main being placed into service. Samples will be collected at all sample points designated by the City of Rolling Meadows Water Superintendent. Sampling procedures must follow the I.E.P.A. Standards for construction of new water mains.

- 1. Locations and Spacing
  - a. Samples will be collected from the service, along the water main, as required, and at the end of the line.



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- b. Samples will be collected from fire hydrants at points not to exceed 1,000-feet of linear water main, or as directed by the City of Rolling Meadows.
- c. A sample will be collected from the copper goose-neck assembly point that is located no further than five (5)-feet downstream from the beginning of the new water main.

2. Collection Requirements

- a. The contractor is required to collect all samples at the location(s) designated by the City of Rolling Meadows Water Superintendent.
- b. City of Rolling Meadows Water Division personnel are the only individuals authorized to operate any water valves and must witness all samples at time of collection. 24-hour prior notice must be scheduled with the City of Rolling Meadows Water Division.
- c. A chain of custody form will be used to identify sample location, chloride residual, time of collection, etc. All collection samples will be sealed with a tamper proof label.
- d. The contractor is required to take the collected samples to a certified laboratory approved by the City of Rolling Meadows Water Superintendent.
- e. The City of Rolling Meadows Water Division has the right to collect quality control samples at the same time contractor collects samples. The charges for the quality control samples will be charged to the contractor.
- f. Samples must be collected on two consecutive days with at least 24-hours of separation between the collection times.
- g. Each sample collected will be tested for quality and must show the absence of coliform organisms.

3. Satisfactory Sample Results

If all the samples tested meet the Bacteriological Quality Standards and are certified as satisfactory by the testing lab:

- a. The contractor may have the lab email the results directly to the City of Rolling Meadows Water Division;
- b. The contractor must provide original copies of the certified results to the City of Rolling Meadows Water Superintendent within seven (7) business days of the date on the test results; and
- c. The contractor must contact the City of Rolling Meadows Water Division to schedule an appointment to have the water main placed into service within 72 hours of the satisfactory test results being certified and only as approved by the Water Superintendent. All original chain of custody forms must be returned before activation.



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 3600 Kirchoff Road  
 Rolling Meadows, Illinois 60008  
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#### 4. Unsatisfactory Sample Results

If any one of the samples tested fails to meet the Bacteriological Quality Standards and is deemed unsatisfactory, then all the samples collected on the same date for the tested section of pipe, will be considered unsatisfactory.

- d. Unsatisfactory samples from the first day of collection will be discarded. A new first day collection must be collected with a new second day to be collected consecutively.
- e. Unsatisfactory samples from the second day of collection will be discarded. First day samples will also be discarded and the contractor must schedule new first and second day samples.

The contractor will have up to three (3) chances of first day and two (2) chances of second day bacterial testing to obtain satisfactory results on all the samples collected and tested.

- f. Should the contractor fail to obtain satisfactory results after the allotted attempts, the watermain section being tested is to have the original disinfection procedures repeated until satisfactory results are obtained.

#### Flow Test

After completion of all water mains and installation of all fire hydrants within a subdivision, a flow test shall be performed at the point in the subdivisions farthest away from the existing City water main. The flow test shall provide information regarding static pressure, residual pressure and flow rate, and the information shall be supplied to the City.



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