

CITY OF CEDAR FALLS'
SUPPLEMENTAL SPECIFICATIONS
TO
THE 2015 EDITION OF
THE SUDAS STATEWIDE URBAN DESIGN AND SPECIFICATIONS
PROGRAM

January 15, 2015

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DIVISION 1 – GENERAL PROVISIONS AND COVENANTS

SECTION 1010- DEFINITIONS

1010, 1.03 – Definitions and Terms: Add the following:
Bid Security and Proposal Guaranty will have the same meaning.

SECTION 1020- PROPOSAL REQUIREMENTS AND CONDITIONS

1020, 1.08 – Taxes: Delete Subsection A – Sales and Use Tax, in its entirety.

1020, 1.16 - Add New Subsection as Follows:

1.16 – Non-Collusion Affidavit of Prime Bidder

The Proposal Guaranty and Non-Collusion Affidavit shall be placed in a separate envelope and attached to the envelope containing the Form of Proposal.

1070, 3.02 – Insurance Requirements: Add the following:

A. The insurance shall be provided by an insurance company or companies, “admitted” or “non-admitted” to do business in the State of Iowa, having an A.M. Best rating of no less than “A-, VII.” Additional Insured Endorsements (CG 20 10 07 04 & CG 20 37 07 04) shall be submitted to the Jurisdiction in addition to the Certificate of Liability Insurance, Designated Construction Project General Aggregate Limit (CG 25 03 03 97), Governmental Immunities Endorsement, and Cancellation and Material Changes Endorsement.

C. 5. The Umbrella/Excess Insurance limit shall not be less than \$3,000,000 and shall be written on a per occurrence basis. If the Umbrella/Excess is not written on a follow form basis it shall have the same endorsements as required of the primary policy(ies).

1080, 1.13 – Add New Subsection as Follows:

F. Failure to provide minimum coverage shall not be deemed a waiver of these requirements by the City of Cedar Falls. Failure to obtain or maintain the required insurance shall be considered a material breach of this agreement. Failure of the Contractor to maintain the required insurance shall constitute a default under this Contract for cause and/or purchase said insurance at Contractor’s expense.

DIVISION 2 – EARTHWORK

SECTION 2010 – EARTHWORK, SUBGRADE, AND SUBBASE

2010, 2.04 – Foundation Materials, D – Subbase, 2 – Granular Subbase: Add the following:

c. When a granular subbase is specified only virgin crushed stone shall be used.

2010, 3.08 – SUBBASE, D – Final Elevation: Delete paragraph 4 and replace with the following:

4. The Contractor shall not use subbase for hauling and other traffic on the completed subbase if subbase is less than 12”.

2010, 3.09 – Field Quality Control, B – Moisture Content and Density: Add the following:

3. Suitable soils having a moisture content above optimum shall be scarified and air dried by the Contractor to within acceptable limits. Soils with moisture content above 8% over optimum or unsuitable soils shall be either removed or used in the construction based on the direction of the Jurisdictional Engineer. The work described above shall be considered subsidiary to items for which payment is being made.

DIVISION 3 – TRENCH AND TRENCHLESS CONSTRUCTION

SECTION 3010 – TRENCH EXCAVATION AND BACKFILL

3010, 2.02 – Bedding Material, A – Class I Material: Add the following:

5. One-inch (1-inch) or One and one-half-inch (1 ½-inch) clean crushed stone may be substituted for the Class 1 Bedding Material.

3010, 3.05 – Pipe Bedding and Backfill, A – General: Add the following:

6. RCP storm sewer bedding material shall be Class I material per SUDAS Section 3010, 2.02, A. Material shall be placed per Figure 3010.102, Class R-1.

7. Sanitary sewer bedding shall be Class I material per SUDAS Section 3010, 2.02, A. Material shall be placed per figure 3010.103, Class F-3.

DIVISION 4 – SEWERS AND DRAINS

SECTION 4010 – SANITARY SEWERS

4010, 2.01 – Sanitary Sewers (Gravity Mains): Add the following:

All gravity sewer main fifteen-inch (15”) or smaller in diameter shall be Polyvinyl Chloride Composite Pipe (truss type PVC) per SUDAS 4010, 2.01, E.

4010, 2.01 – Sanitary Sewers (Gravity Mains): Delete subsections D - Closed Profile Polyvinyl Chloride Pipe and H - Vitrified Clay Pipe as these materials are not allowed in the City of Cedar Falls.

SECTION 4020 – STORM SEWERS

4020, 2.01 – Storm Sewers, A. Reinforced Concrete Pipe (RCP): Delete “with cold applied bituminous or” from paragraph. Cold Bituminous jointing is not allowed.

4020, 2.01 – Storm Sewers, B. Reinforced Concrete Arch Pipe (RCAP): Delete “with cold applied bituminous or” from paragraph. Cold Bituminous jointing is not allowed.

4020, 2.01 – Storm Sewers, B. Reinforced Concrete Elliptical Pipe (RCEP): Delete “with cold applied bituminous or” from paragraph. Cold bituminous jointing is not allowed.

4020, 2.01 – Storm Sewers: Delete subsections G – Corrugated Metal Pipe (CMP), H – Spiral Rib Pipe, I – Coated Corrugated Metal Pipe, J – Corrugated Metal Arch Pipe (CMAP) and K – Spiral Rib Arch Pipe as these materials are not allowed for use in storm sewer construction within the City of Cedar Falls.

4020, 2.01 – Storm Sewers, L. Jointing Material for Concrete Pipe: Delete subsection 1. Bituminous Jointing Material. Cold bituminous jointing is not allowed.

4020, 3.04 – Pipe Jointing, A. General: Add the following subsection: 3. The final joint of a segment of pipe that enters a manhole or intake structure shall be wrapped.

4020, 3.04 – Pipe Jointing, B. Reinforced Concrete Pipe (RCP), Reinforced Concrete Arch Pipe (RCAP), and Reinforced Concrete Elliptical Pipe (RCEP): Add the following:
RCP Pipe 18-inch and smaller jointing material is not required.

SECTION 4030 – PIPE CULVERTS

4030, 2.01 – Pipe Culverts, A – Roadway Pipe Culverts: Delete paragraph and replace with:

All storm sewer pipe materials specified for use in right-of-way in Section 4020 may be used within right-of-way as a roadway pipe culvert except; G – Corrugated Metal Pipe (CMP), H – Spiral Rib Pipe, I – Coated Corrugated Metal Pipe, J – Corrugated Metal Arch Pipe (CMAP) and K – Spiral Rib Arch Pipe as these materials are not allowed for use in pipe culvert construction within the City of Cedar Falls.

SECTION 4040 – SUBDRAINS AND FOOTING DRAIN COLLECTORS

4040, 2.02 – Type 1 Subdrains (Longitudinal Subdrain), C – Corrugated Polyethylene Tubing and Fittings (Corrugated PE): Delete paragraph 1 and replace with the following:

1. Comply with AASHTO M 252, Type S, corrugated exterior and smooth interior.

4040, 2.05 – Subdrain Outlets: Delete subsections B – Corrugated HDPE and C – PVC as these materials are not allowed for use in subdrain outlet construction within the City of Cedar Falls

4040, 2.08 – Storm Sewer Service Stubs: Delete and replace with Use materials complying with Section 4040, 2.01 and City of Cedar Falls Standard Detail CFD.02, Typical Subdrain Trench.

4040, 3.01 – Subdrains: Delete reference to Figure 4040.231 and Figure 4040.233 and replace with City of Cedar Falls Standard Detail CFD.02, Typical Subdrain Trench and City of Cedar Falls Standard Detail CFD.01, Subdrain Outlet Structure.

4040, 3.01 – Subdrains, A: Add subsection 7. At the contractor's option, a reducing coupler may be used. The subdrain may be extended a minimum of 1'-0" into the CMP and the opening fully sealed with grout.

4040, Figure 4040.231 – Subdrains: Delete and replace with City of Cedar Falls Standard Detail CFD.02, Typical Subdrain Trench.

4040, Figure 4040.233 – Subdrain Outlets: Delete and replace with City of Cedar Falls Standard Detail CFD.01, Subdrain Outlet Structure.

SECTION 4050 – PIPE REHABILITATION

4050, 1.02 – Description of Work, A – Pipe Lining: Delete subsections 2 – Deformed/Reformed Polyethylene and 3 – folded/formed polyvinyl chloride as these materials are not allowed for use in pipe lining construction within the City of Cedar Falls.

4050, 2.06 – Deformed/Reformed high Density Polyethylene Pipe Lining (DRP-HDPE): Delete section as this material is not allowed for use in pipe lining construction within the City of Cedar Falls

4050, 2.07 – Folded/Formed Polyvinyl Chloride Pipe Lining (FFP-PVC): Delete section as this material is not allowed for use in pipe lining construction within the City of Cedar Falls

4050, 3.01 – Examination, B – Video Inspection: Add the following:

3. Upon request from the Jurisdiction, provide a copy of the video inspection in digital format, either a compact disk (CD) or a digital video disk (DVD).

4050, 3.07 – DRP-HDPE or FFP-PVC Lining Installation: Delete section as these materials are not allowed for use in pipe lining construction within the City of Cedar Falls

DIVISION 5 – WATER MAINS AND APPURTENANCES

Delete division in its entirety. Replace with Attachment B – Municipal Water Utility of the City of Cedar Falls, Iowa, Water Main Materials and Installation of Water Mains and their Appurtenances.

DIVISION 6 – STRUCTURES FOR SANITARY AND STORM

SECTION 6010 – STRUCTURES FOR SANITARY AND STORM SEWERS

6010, 2.10 – Castings (Ring, Cover, Grate and Extensions), C – Casting Types: Add the following note:

All storm sewer castings shall be stamped to produce raised lettering with 'DUMP NO WASTE – DRAINS TO RIVER' or any similar message assuring N.P.D.E.S. compliance.

All sanitary sewer castings shall be stamped to produce raised lettering with 'City of Cedar Falls Sanitary Sewer'. All sanitary sewer manhole castings shall be SW-601 type A castings.

All storm sewer manhole castings shall be SW-602 type E castings.

6010, 2.12 – Invert, A – Cast-in-place Base: Add the following:

All poured in place bases shall have #4 rebar at 12" OC each way placed at the center of the slab and the base rebar shall be bent to extend a minimum of 9" into the wall sections. All poured in place walls shall have a minimum of #4 rebar at 12" OC each way unless indicated differently in the standard figures.

6010, 2.12 – Invert, B – Precast Base Section: Add the following:

Precast bases are allowed only if the entire structure is precast.

6010, 3.01 – General Requirements for the Installation of Manholes and Intakes: Add the following subsection:

M – Depth and Size Requirements:

1. Manhole structures at the maximum depth of 25 feet shall have a diameter of 72 inches
2. Manhole structures less than 25 feet deep but 15 feet deep or greater shall have a diameter of 60 inches.
3. Manhole Structures less than 15 feet deep shall have a diameter of 48 inches.

6010, Figure 6010.306 – Chimney Seals for Sanitary Sewer Manholes:

Two-piece internal chimney seals shall be required for manhole construction within the City of Cedar Falls.

DIVISION 7 – STREETS AND RELATED WORK

SECTION 7010 – PORTLAND CEMENT CONCRETE PAVEMENT

7010, 1.08 – Measurement and Payment: Add the following note:

When any of the types of additional protection described in 3.05 A.1. Cold Weather is necessary, additional payment will be made as extra work at the rate of \$1.00/SY of surface protection.

Payment will be limited to protection necessary within the contract period/ Protection necessary after November 15 will be paid for only when the Jurisdictional Engineer authorizes the work.

7010, 2.01 – Materials, D – Coarse Aggregate for Concrete: Delete subsection 1 and replace with the following note:

1. Crushed stone particles with Class 3 durability complying with Iowa DOT Section 4115 and Materials I.M. 409, Source Approvals for Aggregates.

7010, 3.02 – Pavement Construction, C – Surface Fixture Adjustment: Add the following note:

4. Manhole frames and valve boxes within area to be paved shall be “Stringlined” such that the maximum vertical adjustment is one-half-inch (0.5”). If the fixture sets within the cross slope area the fixture shall be “string-lined” and shimmed with cross slope to stay within the maximum allowed vertical adjustment of one-half-inch (0.5”).

SECTION 7020 – HOT MIX ASPHALT PAVEMENT

SECTION 7030 – SIDEWALKS, SHARED USE PATHS, and DRIVEWAYS

7030, 1.08 – Measurement and Payment, B – Removal of Curb, 1 – Measurement:

Remove “Grinding” as it is not an acceptable form of curb removal in the City of Cedar Falls.

7030, 3.01 – Removals, Subsection E:

Remove “Grind” as it is not an acceptable type of curb removal.

7030, 3.04 – PCC Sidewalks, Shared Use Paths, and Driveways, F – Jointing, 4 – Isolation Joints:

Add the following note:
d. Expansion joints shall be constructed at intervals not greater than 50 feet in sidewalk. Unless otherwise specified by the Jurisdictional Engineer.

DIVISION 8 – TRAFFIC SIGNALS

SECTION 8010 – OVERVIEW

8010, 2.01 – Underground, C. Wiring and Cable: Delete subsections 4. Communications Cable and replace with the following:

4. Communication Cable: Shall be fiber optic. Specification shall be furnished by the City of Cedar Falls.

8010, 2.01 – Underground, E. Bonding and Grounding: Delete subsections 2. Bonding Jumper or Connecting Wire and replace with the following:

2. Bonding Jumper or Connecting Wire: Provide # 6 A.W.G. green stranded copper wire connected by approved clamps.

8010, 2.02 – Detection: Add the following note:

Unless otherwise specified, the City of Cedar Falls will use inductive loop detectors; they shall be performed and placed under the road surface. The sawing of inductive loop detectors into the

surface of the existing road surface will be accepted, unless specifically excluded by the City engineer, Wireless magnetometer sensors may be substituted for inductive loops. Sensys Networks is the only acceptable wireless magnetometer system. .

8010, 2.02 – Detection, A. Inductive Vehicle Loop Detector: Add the following notes:

Loop detectors shall be a two channel rack mounted NEMA TS2 design.

8010, 2.02 – Detection, C. Video Detection Camera System, 1. Video Detection System and Processors, a: Add the following note:

Processor to be card rack mounted only. The system shall have a 2-year warranty.

8010, 2.04, A. NEMA Controller, Cabinet, and Auxiliary Equipment: Add the following note:

Comply with the latest NEMA TS2 standards.

8010, 2.04, A. NEMA Controller, Cabinet, and Auxiliary Equipment, 2. Cabinet: Add the following note:

j. Cabinet shall have a 16 position back panel and be fully populated with the appropriated pluggable devices.

8010, 2.05 – Poles, Heads, and Signs: Add the following note:

All green, yellow, red, red arrow and don't walk indications shall utilize L.E.D. displays. Display power consumption shall not be greater than 20 watts per indication. Solid displays shall utilize diffusion lens technology to create uniform light distribution to the lens face.

8010, 2.05 – Poles, Heads, and Signs, A. Vehicle Traffic Signal Head Assembly, 8. LED Modules: Add the following:

All LED ball, arrow and countdown pedestrian modules shall be Intertek ETL labeled verifying compliance.
Any green ball indication module shall have a clear lens.
All arrow indications shall be omni-directional.

Warranty shall be for a period of five (5) years. Any failures shall be replaced by the supplier of the contractor within 48 hours at notification. This warranty includes workmanship, materials and manufacturing defects. Performance shall be warranted for a period of five (5) years. This shall include repair or replacement of an LED signal module that falls below 50% of the minimum intensity level within the first one year of operation.

Certification: The Engineer shall be furnished with a certification from the manufacturer of the signal head that the equipment furnished under this specification complies with all provisions of this specification. If there are any items which do not comply with this specification, a list of those exceptions must be detailed on the certification.

8010, 3.01 – Underground, C. Wiring and Cable: Delete subsection 6 and replace with the following:

6. Provide a minimum of six (6) feet of additional cable at each handhole and four (4) feet of cable slack in each pole and controller base. Coil cable slack in handhole and place on the hooks.

DIVISION 9 – SITE WORK & LANDSCAPING

DIVISION 10 – DEMOLITION

SECTION 10,010-DEMOLITION OF BUILDING STRUCTURES

10,010, 3.14 – Add New Subsection as Follows:

3.14 – Extermination

The contractor shall, before commencing any salvage and removal on any item, exterminate rodents and other pests thereon when required by the Jurisdictional Engineer. Extermination is to be performed in the manner prescribed by law and as approved by the Iowa Department of Health.

DIVISION 11 – MISCELLANEOUS

DIVISION 12 – GENERAL

1210 – Street Signs

The City of Cedar Falls requires that all street name signs be of the following specifications.

Typeface

1. All signs shall use Upper and Lower case Clearview® font letters and numbers.
2. Standard street corner name signs (4", 6" and 8" font) shall use the Clearview® 2-W font without a border.
3. Standard mast arm signs (12" font) and advanced street name (8" font) signs shall use the Clearview® 3-W font with a border.
4. The following are the recommended font sizes for the posted speed limits.

Posted Speed	Font Size in Capital Letter
25 mph or less	4 inches
26-39 mph	6 inches
Over 40 mph and multi-lane	8 inches
Overhead (mast arm)	12 inches

Ordinal and Related Directional Identifiers

1. The ordinals and related directional identifiers shall be .666x (2/3 of the capital letter height). The top of the initial capital letter of the ordinal aligning with the top of the initial capital letter of the street name. The ordinal being mixed case with an initial capital letter.
2. The cardinal direction shall be the same size as the primary legend.

Baseline and Legend Alignment

1. The typographic baseline shall be elevated on the panel and not vertically centered. The top being .4X and the bottom having .6X of the alignment space.
Providing a consistent baseline alignment for signs with ascenders and descenders in a balanced layout.

Letter Space

1. The letter space shall use the default setting in the ClearviewHwy® family for optimal spacing of the letters. No tightening of spacing shall be used without the consent of the City of Cedar Falls.

Sign Blank Size

1. The minimum height of a blank is 1:1.667 ratio of the letter size without a border. The optimal is 1:2 ratio of the letter size.
2. The optimal for a sign with a border is a 1:2.1875 ratio.

Sign Post

1. Sign post shall be Telspar per CFD.05

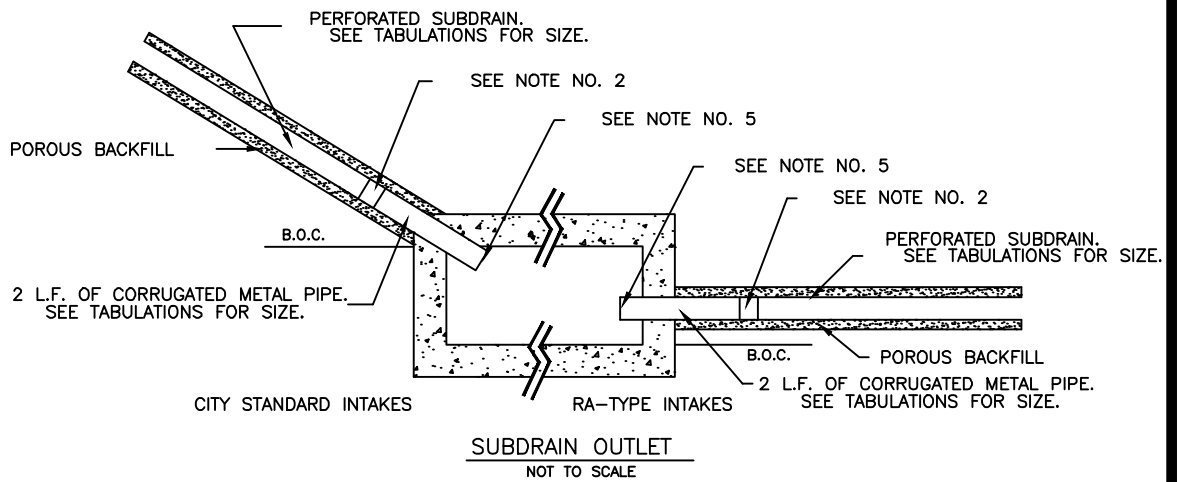
1220 – Pavement Markings/Symbols

The City of Cedar Falls requires that all pavement markings/symbols shall be painted according to IDOT Specification 2527.02D2b Waterborne Paint unless otherwise specified in the contract documents.

ATTACHMENT A

STANDARD DETAILS

2015



GENERAL NOTES:

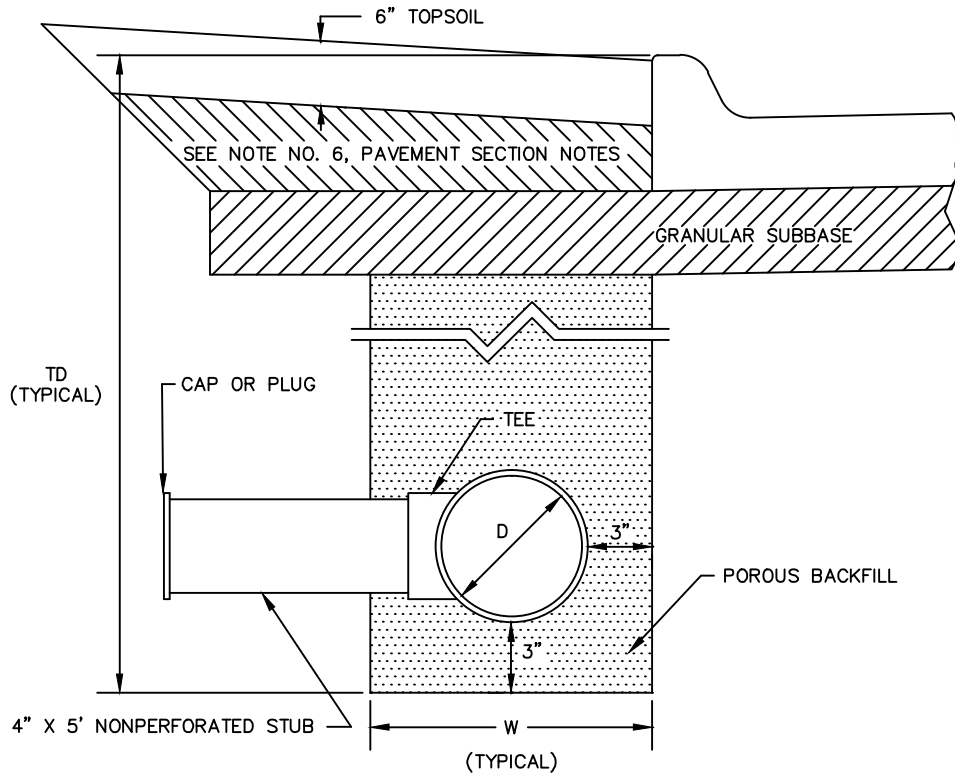
1. MATERIAL AND CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS.
2. REDUCING COUPLER (AT CONTRACTOR'S OPTION, THE SUBDRAIN MAY BE EXTENDED INTO THE C.M.P. A MINIMUM OF 1'-0" AND THE OPENING FULLY SEALED WITH GROUT.
3. SUBDRAIN OUTLET TO BE GROUTED ON THE INSIDE AND OUTSIDE OF THE INLET WALL.
4. ALL CORRUGATED METAL INLETS MUST HAVE RODENT GUARDS.
5. REMOVABLE MESH CAP ($\frac{1}{4}$ " HARDWARE CLOTH) OR $\frac{1}{2}$ " MESH GALVANIZED SCREEN FASTENED SECURELY, BUT NOT PERMANENTLY, TO OUTLET PIPE. OUTLET PIPE SHOULD EXTEND INTO INTAKE SO THAT MESH CAP IS REMOVABLE.



DEPARTMENT of DEVELOPMENTAL SERVICES
 ENGINEERING DIVISION
 CITY of CEDAR FALLS, IOWA
 220 CLAY ST.
 CEDAR FALLS, IOWA 50613
 (319) 273-8806

CITY OF CEDAR FALLS
 STANDARD DETAIL CFD.01
 SUBDRAIN OUTLET STRUCTURE

DRAWN BY:	JCH
CHECKED BY:	MH
DATE:	1-9-14
SHEET:	CFD.01



TYPICAL SUBDRAIN TRENCH & TAP (IF APPLICABLE)

NOT TO SCALE

NOTES

1. SEE SUBDRAIN TABULATION FOR D AND TD.
2. SUMP PUMP TAP SHOWN FOR INFORMATIONAL PURPOSES.
3. USE 1" CLEAN FOR BACKFILL IN SUBDRAIN TRENCH ON PIPES 15 INCH IN DIA. AND LARGER WITH A GRADATION AS FOLLOWS;

SIEVE SIZE	% PASSING BY WEIGHT
1"	90%
3/4"	55%
1/2"	5%

TD— TYPICAL DEPTH FROM BOTTOM OF TRENCH TO TOP OF CURB IS 4'-3"

D— TYPICAL PIPE DIAMETER IS 6"

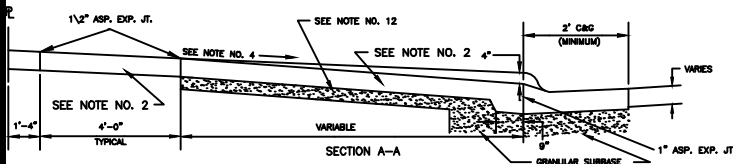
W— TYPICAL TRENCH WIDTH IS 12"



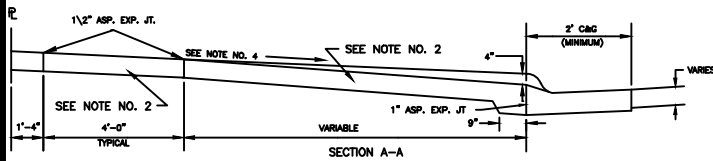
DEPARTMENT of DEVELOPMENTAL SERVICES
 ENGINEERING DIVISION
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 220 CLAY ST.
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CITY OF CEDAR FALLS
 STANDARD DETAIL CFD.02
 TYPICAL SUBDRAIN TRENCH

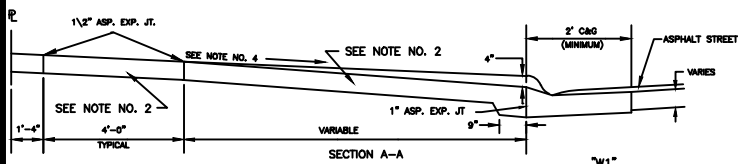
DRAWN BY:	JCH
CHECKED BY:	MH
DATE:	1-9-14
SHEET:	CFD.02



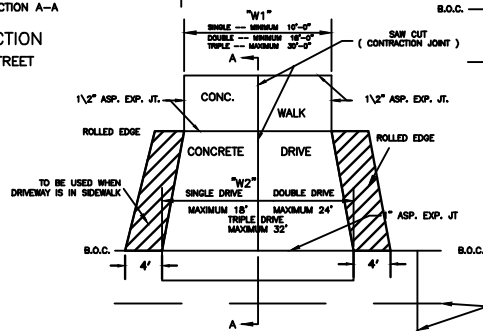
TYPICAL CROSS-SECTION
WITH GRANULAR SUBBASE



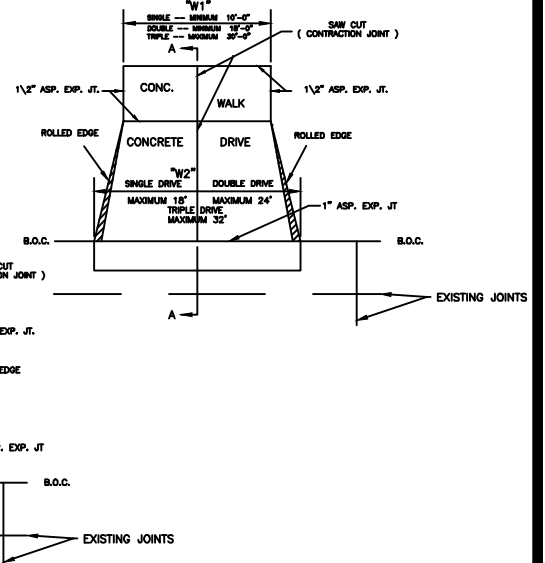
TYPICAL CROSS-SECTION
ON PORTLAND CEMENT CONCRETE STREET



TYPICAL CROSS-SECTION
ON ASPHALT OVERLAY STREET



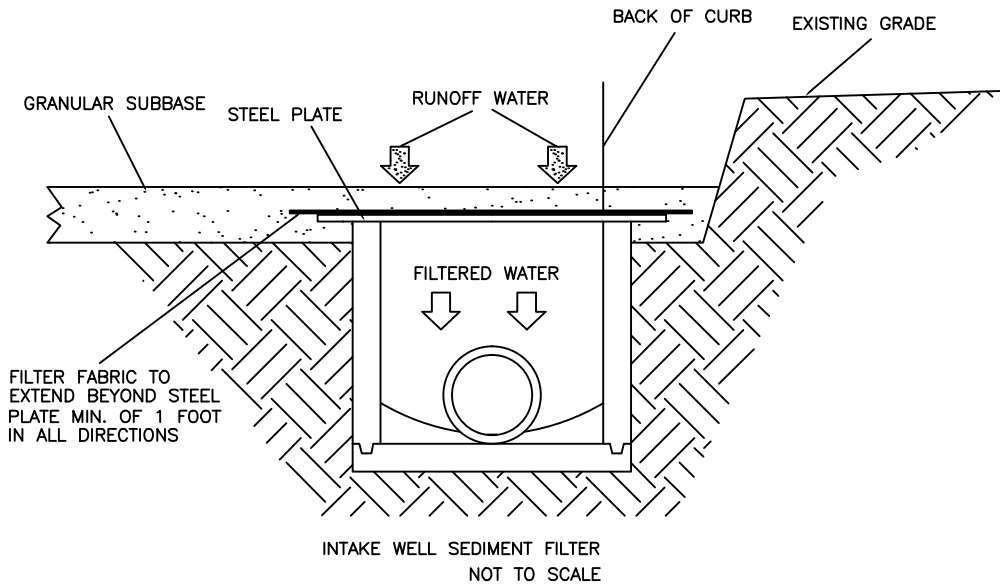
- NOTES:
1. CONSTRUCTION DETAILS SHOWN HEREIN ARE FOR URBAN TYPE DRIVEWAYS AND ALLEYS.
 2. 6" PLAN P.C. CONC., CLASS "C".
 3. SLOPE OF WALK TO BE 1/4" PER FOOT. VARIATIONS TO BE DETERMINED BY CITY ENGINEER.
 4. MAXIMUM SLOPE 10% ABOVE GUTTER.
 5. SAW CUTS TO BE FULL THICKNESS OF THE EXISTING STREET TO PERMIT ADEQUATE REMOVAL OF CURB AND GUTTER.
 6. ALL NEW OR EXISTING CURB OPENINGS WHICH INVOLVE CURB RECONSTRUCTION WITH AN END WHICH IS LESS THAN TWO (2) FEET FROM AN EXISTING TRANSVERSE JOINT AND/OR A LONGITUDINAL JOINT WHICH IS EIGHTEEN (18) INCHES OR LESS FROM AN EXISTING LONGITUDINAL JOINT SHALL BE RECONSTRUCTED TO THE RESPECTIVE JOINT(S).
 7. EXPANSION JOINT AT BACK OF PAVEMENT, FACE AND BACK OF WALK SHALL BE LEFT DOWN ONE HALF (1/2) INCH AND SEALED WITH JOINT FILLER MATERIAL CONFORMING TO SECTION 4136 OF THE BASE SPECIFICATIONS.
 8. DRIVEWAY WIDTH (W1) AT THE OWNER'S PROPERTY LINE SHALL NOT BE LESS THAN TEN (10) FEET FOR A SINGLE DRIVE AND NOT LESS THAN EIGHTEEN (18) FEET FOR DOUBLE DRIVES.
 9. CURB OPENING (W2) FOR A SINGLE DRIVE SHALL NOT EXCEED EIGHTEEN (18) FEET. FOR A DOUBLE DRIVE SHALL NOT EXCEED TWENTY-FOUR (24) FEET. (W2) WIDTH MAY EXCEED (W1) WIDTH BY NO MORE THAN SIX (6) FEET. TRIPLE DRIVEWAY CURB CUTS CAN BE THIRTY TWO (32) FEET MAXIMUM AND MUST HAVE TWELVE (12) INCH FLARES ON EACH SIDE.
 10. DETAILS SHOWN HEREIN ARE TYPICAL ONLY AND ARE NOT INTENDED TO DEPICT ANY SPECIFIC INSTALLATIONS. REFER TO PROJECT PLANS FOR REQUIREMENTS OF INDIVIDUAL LOCATIONS.
 11. CONTRACTION JOINT LOCATIONS TO BE DETERMINED IN FIELD.
 12. 4" CLASS 10 EXCAVATION, REPLACED WITH 4" GRANULAR SUBBASE TIED INTO PAVEMENT SUBBASE.



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CITY OF CEDAR FALLS
STANDARD DETAIL CFD.03
TYPICAL DRIVEWAY DETAIL

DRAWN BY: JCH
CHECKED BY: MH
DATE: 12-16-14
SHEET: CFD.03



GENERAL NOTES:

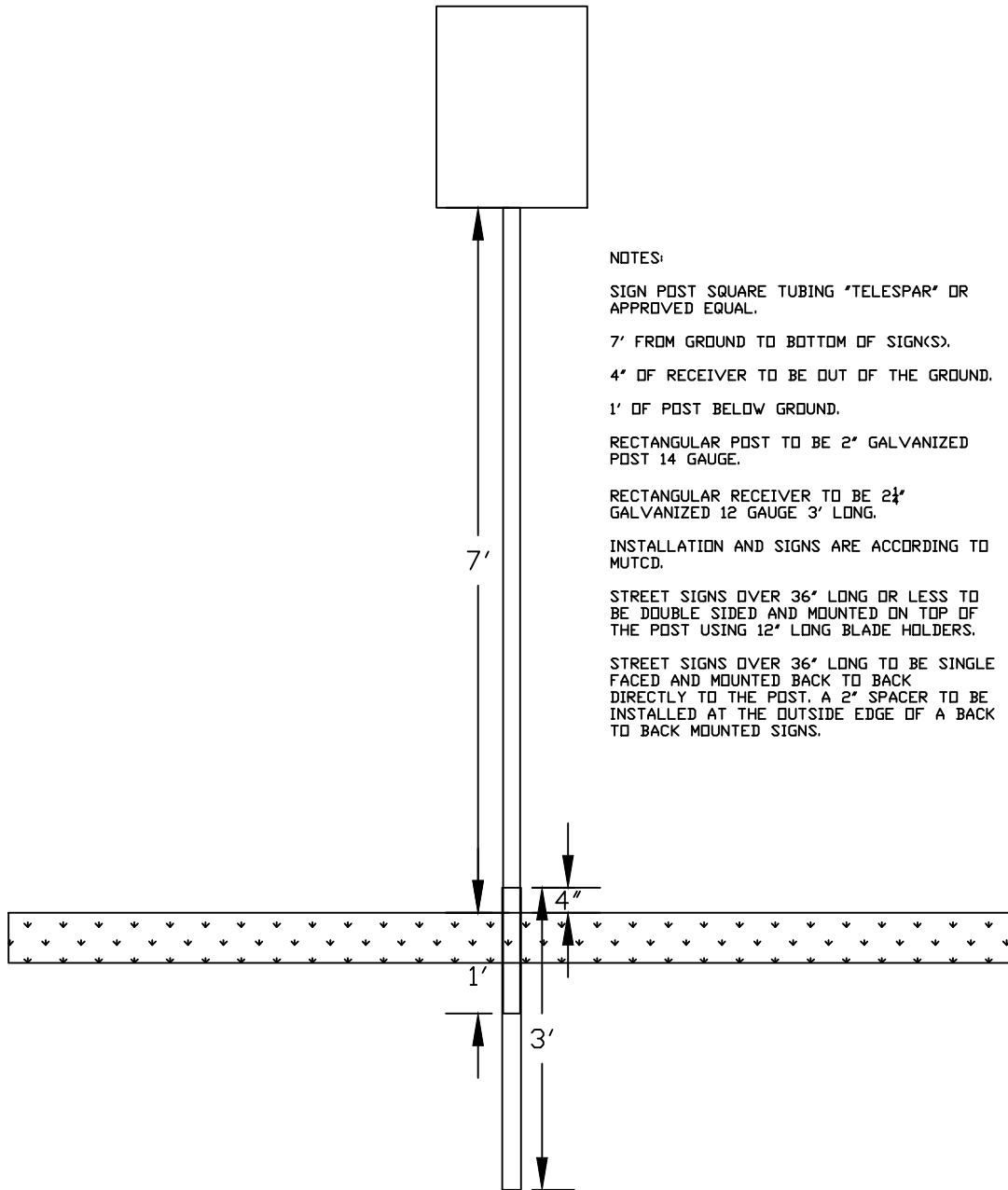
1. SEDIMENT FILTERS ARE TO BE PLACED TO PREVENT THE INFILTRATION OF MATERIAL CAUSED BY THE EROSION OF THE SURROUNDING SOIL INTO THE STORM WATER SYSTEM.
2. FILTER FABRIC USED FOR SEDIMENT FILTERS SHALL CONFORM WITH IOWA DOT STANDARD SPECIFICATION 4196.01A, SILT FENCING.
3. PRICE BID FOR INTAKE SEDIMENT FILTERS SHALL INCLUDE PLACEMENT, REMOVAL, AND CLEANING OF INTERIOR OF INTAKES AND STREET SURFACE AS DIRECTED BY THE ENGINEER.



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CITY OF CEDAR FALLS
STANDARD DETAIL CFD.04
SEDIMENT INTAKE FILTER

DRAWN BY:	JCH
CHECKED BY:	MH
DATE:	12-16-14
SHEET:	CFD.04



NOTES:

SIGN POST SQUARE TUBING 'TELESPAR' OR APPROVED EQUAL.

7' FROM GROUND TO BOTTOM OF SIGN(S).

4' OF RECEIVER TO BE OUT OF THE GROUND.

1' OF POST BELOW GROUND.

RECTANGULAR POST TO BE 2" GALVANIZED POST 14 GAUGE.

RECTANGULAR RECEIVER TO BE 2 1/4" GALVANIZED 12 GAUGE 3' LONG.

INSTALLATION AND SIGNS ARE ACCORDING TO MUTCD.

STREET SIGNS OVER 36" LONG OR LESS TO BE DOUBLE SIDED AND MOUNTED ON TOP OF THE POST USING 12" LONG BLADE HOLDERS.

STREET SIGNS OVER 36" LONG TO BE SINGLE FACED AND MOUNTED BACK TO BACK DIRECTLY TO THE POST. A 2" SPACER TO BE INSTALLED AT THE OUTSIDE EDGE OF A BACK TO BACK MOUNTED SIGNS.



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CITY OF CEDAR FALLS
 STANDARD DETAIL CFD.05
 SQUARE TUBING POST AND SIGN DETAIL

DRAWN BY:	JCH
CHECKED BY:	MH
DATE:	12-16-14
SHEET:	CFD.05

ATTACHMENT B

**MUNICIPAL WATER UTILITY
OF THE CITY OF CEDAR FALLS, IOWA**

WATER MAIN MATERIALS

AND

**INSTALLATION OF WATER MAINS
AND THEIR APPURTENANCES**

STANDARDS

FOR IMPROVEMENTS

TO THE CEDAR FALLS

MUNICIPAL WATER DISTRIBUTION SYSTEM

2007

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MATERIAL STANDARDS

1. PIPE STANDARDS

A. DUCTILE IRON PIPE, CENTRIFUGALLY CAST, FOR WATER OR OTHER LIQUIDS

Ductile iron pipe shall be push-on joint or mechanical joint, centrifugally cast conforming to Specification ANSI/AWWA C151/A21.51, latest revision, plain end to be gage push-on. Pipe thickness shall be Class 52 for 12" size and smaller, Pressure Class 350 for sizes 14" through 20", and Pressure Class 250 for 24" size and larger. Push-on pipe joints shall be provided with either conductive gaskets or serrated silicon bronze wedges, and mechanical joints shall be provided with conductive-tip gaskets for electrical thawing. An exterior asphaltic coating shall be applied to all pipe conforming to Specification ANSI/AWWA C151/A21.51, current revision.

All ductile iron pipe shall be interior cement-mortar lined conforming to Specification ANSI/AWWA C104/A21.4, latest revision.

All pipe shall be marked with: name or manufacturer, date pipe was produced, size, class and spigot insertion depth gauge.

B. POLYETHYLENE (PE) PRESSURE PIPE AND FITTINGS FOR WATER DISTRIBUTION

Polyethylene (PE) pressure pipe shall be ductile iron pipe outside diameter equivalent and shall conform to Specification ANSI/AWWA C901, C906, ASTM D2683, ASTM D3261, ASTM D3350, F714 and NSF 61, latest revisions, standard polyethylene code designation, PE 3408, laying conditions conforming to pipe manufacturers recommendations with five feet six inches (5'-6") of cover. Pipe thickness shall be SDR 11.

All pipe shall be marked with: name of manufacturer, nominal size and O.D. base, material code designation, dimension ratio, pressure class, AWWA C906, production code date, material test category and the National Sanitation Foundation (NSF) seal.

Pipe jointing shall be by thermal heat fusion, flanges, mechanical connections that are designed for polyethylene (PE) and electrofusion following the pipe and joint assembly method manufacturer's instructions.

2. FITTING STANDARDS

A. DUCTILE IRON

Ductile iron fittings 3-inch through 24 inch shall be mechanical joint type, ductile iron, rated for 350 psi working pressure and shall conform to Specification ANSI/AWWA C110/A21.10, latest revision, with the joints conforming to Specification ANSI/AWWA C111/A21.11, latest revision, with the bolt holes bored straddle vertical centerline. Fittings shall receive an exterior asphaltic coating. Fittings, except sleeves, plugs, and caps, shall receive cement mortar linings with petroleum asphaltic coat conforming to Specification ANSI/AWWA C104/A21.4, latest revision.

Cast markings shall be: pressure rating, nominal diameter, manufacturer's identification, country where cast, the letters "DI" or the word "Ductile, and degrees or fraction of bends.

All fittings shall be furnished complete with accessories including conductive tip gaskets and corrosion resistant bolts.

B. DUCTILE IRON COMPACT FITTINGS

Fittings 3-in. through 24-in. shall be mechanical joint type, ductile iron, rated for 350 psi working pressure, compact bodied and shall conform to Specification ANSI/AWWA C153/A21.53, latest revision, with the joints conforming to Specification ANSI/AWWA C111/A21.11, latest revision, with the bolt holes bored straddle vertical centerline and plain end gage push-on. Fittings, except sleeves, plugs, and caps, shall receive an exterior asphaltic coating and shall receive cement mortar linings with petroleum asphaltic seal coat conforming to Specification ANSI/AWWA C104/A21.1, latest revision.

Cast marking shall be: pressure rating, nominal diameter, manufacturer's identification, country where cast, the letters "DI" or the word "Ductile", and the degrees or fraction of bends.

All fittings shall be furnished complete with accessories including conductive tip gaskets and corrosion resistant bolts.

C. HIGH DENSITY POLYETHYLENE FITTINGS

Polyethylene fittings shall be PE3408 SDR11 butt fusion fittings complying with all appropriate requirements of ASTM D3261, AWWA C901, AWWA C906, or CSA B137.1. HDPE fittings shall be marked on the body or hub in accordance with ASTM D2683, ASTM D3261, AWWA C906 or ASTM F1055, depending on fitting type and the standard that applies. Electrofusion fittings shall comply with ASTM F1055.

3. GENERAL ACCESSORY STANDARDS

A. FIRE HYDRANTS

Fire hydrants shall be dry-barrel, traffic model type conforming to Specification ANSI/AWWA C502, latest revision. Hydrants shall have a minimum main valve opening of 5 1/4", 6' bury, three ports, aluminum color, mechanical joint, 1 1/2" point to flat National Standard pentagon tapered operating nut, open counter clockwise against pressure, pumper thread 4 1/2" National Standard, 5 3/4" O.D. with four threads per inch; two 2 1/2" hose ports with thread 3 3/16" O.D. six threads per inch. Hydrants shall be marked with manufacturer's identification, size of main valve opening and year of manufacture.

Approved fire hydrants are the Mueller Centurion 200 #A423, Mueller #107, Waterous Pacer (#WB-67) DR, Clow Medallion, American Darling B-84 B and Kennedy Guardian.

B. RESILIENT-SEATED GATE VALVES

Resilient-seated gate valves shall have a fusion-bonded powder epoxy coating both interior and exterior that conforms to AWWA Specification C550 and be NSF 61 approved, and shall be manufactured in accordance with ANSI/AWWA Specification C509, latest revision, and shall be designed for 200 psig water working pressure for 12" NPS and smaller and 150 psig water working pressure for 16" NPS and larger. Valves shall be suitable for approximately level settings on buried water distribution pipe lines. Valves shall have mechanical joint ends and a clear water way equal to the full nominal diameter of the valve. Drawing descriptions shall have precedence over this section.

Valves shall open left (counter-clockwise) with a two inch (2") operating nut as approved by OWNER.

Valves shall be marked with manufacturer's identification, class (maximum working water pressure), size and year of manufacture.

C. BUTTERFLY VALVES

Butterfly valves shall have a fusion-bonded powder epoxy coating both interior and exterior that conforms to ANSI/NSF Standard 61, and shall be manufactured in accordance with AWWA Specification C504, latest revision, and shall be Class 150B short body valves with "O" ring shaft seals and mechanical joint ends conforming to Specifications ANSI/AWWA C111/A21.11. The valves shall have geared manual operators with 2" operating nuts and open left (counter-clockwise). Maximum non-shock shut off pressure shall be 75 psi. Valves shall be suitable for buried water distribution pipe lines. Records of tests are to be furnished to OWNER as specified in AWWA Specifications C504, latest revision.

Valves shall be cast marked with valve size, manufacturer's identification, class and year of manufacture.

D. POLYETHYLENE VALVES

Polyethylene Valves shall be Nordstrom® Poly-water Valve No. 66111 or approved equal. Valve opening shall be full bore flow valve with Plexco® Bluestripe™, PE3408, SDR11, pipe ends. Valves shall comply with the relevant fittings clauses of AWWA C906 and be NSF 61 approved for potable water.

E. VALVE BOXES

Cast iron valve boxes shall be Tyler 6860, Item D with No. 6 round base; or Tyler 6850, Item 666-S with Adaptor Inc., Valve Box Adaptor II (type is dependent on manufacture and size of valve) or approved equal.

Plastic 5 ¼" DIA. valve box shall be Armor™ Access Boxes No.111140-03 with plastic No. 6 base. Plastic valve boxes shall only be used with polyethylene water valves.

F. TAPPING SLEEVE

Tapping sleeves shall consist of two sections of heavy welded stainless steel which bolt together on the pipe and seal against a concave wedge gasket around the tap opening. The outlet half shall have a stainless steel recessed flat faced flange to mate with standard tapping valves. The outer half shall also have a ¾ inch NPT test plug. Tapping sleeve shall be supplied with stainless steel heavy hex nuts, stud bolts and washers and coated to prevent galling.

G. MECHANICAL JOINT RESTRAINT

The mechanical joint restraint shall consist of individually actuated wedges that increase their resistance to pull-out as pressure or external forces increase. Torque limiting twist-off nuts shall be used to insure proper actuation of the restraining wedges.

They shall have a rated working pressure of 350 psi in sizes 16-in. and smaller, and 250 psi in sizes 18-in. through 24-in.

H. THREADED ROD

Threaded rod used for thrust restraint shall be ¾" low carbon steel rods which conform to ASTM A307. The minimum yield strength shall be 36,000 psi and the tensile strength shall be at least 60,000 psi. All rods shall be zinc coated.

I. T-HEAD BOLTS AND NUTS

All t-head bolts and nuts shall be Cor-Blue T-Bolts and Nuts manufactured in conformance with ANSI/AWWA C111/A21.11, current revision and be corrosion resistant, or an approved equal

J. TRACER WIRE

Tracer wire shall be No.12 insulated solid copper single strand, type THHN and buried along polyethylene water main and services and ductile iron main.

Splices or junctions in tracer wire shall be made with split-bolt and wrapped with waterproof dielectric wrap.

K. TRACER WIRE TEST STATION

Test stations shall be installed at all hydrants and any other location identified in the plans. The test stations shall be Little Fink® Cathodic Protection Test Station, Trace-O-Flex by Carsonite, or approved equal.

L. MAGNESIUM ANODE

A three-pound (3 lb) magnesium anode shall be installed on the tracer wire at the locations indicated on the plans.

4. CASING

A. CASING

Casing shall be load bearing, steel pipe, conduit or tunnel with welded joints that complies with federal and state requirements for stress levels.

Unless otherwise noted in the contract documents, the casing pipe shall be Schedule 40 pipe with minimum yield strength of 36,000 psi.

B. CASING SPACERS AND END SEALS

Casing spaces shall be a product specifically designed to provide support around the periphery of the ductile iron pipe in the casing.

To provide support around the periphery of the ductile iron pipe should the pipe twist as it is pushed through the casing, the spacers shall be of a projection type that has a minimum number of projections around the circumference totaling the number of diameter inches. For example, 8" pipe shall have a minimum of 8 projections and 12" pipe shall have a minimum of 12 projections.

End seals shall be a wrap around end seal specifically designed to seal between the casing O.D. and the carrier O.D.

Spacers must provide sufficient height to permit clearance between bell joint and casing wall. In order to avoid the transfer of earth and live loads to the carrier pipe, the space between the carrier and casing pipes should not be filled completely.

Casing spacers shall be projection type totally non-metallic spacers constructed of preformed sections of high density polyethylene.

Approved casing spacers are the following:

- A. RACI Type F60
- B. Cascade Waterworks Mfg. Company
- C. Smith-Blair, Inc. or
- D. ENGINEER approved equal

Wooden skids are not acceptable.

5. MATERIALS TEST AND INSPECTIONS REPORT

A manufacturer's sworn statement verifying that all required foundry tests and completed for all materials must be provided upon request.

INSTALLATION STANDARDS

1. SCOPE

These standards cover the installation procedures for Cedar Falls Municipal Water Utility approved mains and their appurtenances for water distribution. These procedures comply with ANSI/AWWA Specifications, the Recommended Standards for Water Works, commonly known as the Ten States Standards, and the Iowa Administrative Code. To the extent of any conflict between Standards, the Ten States Standards, Iowa Administrative Code 43.3(2), and 43.3(7) to 43.3(9) shall prevail.

2. MATERIALS INSPECTION

A. VALVE INSPECTION

Inspection of the valves to verify they are in working order and they meet the specifications should be conducted after they are unloaded.

OPERATION

Valves 12" and larger should be cycled through one complete opening and closing cycle in the position in which they are to be installed. This process will confirm:

- Ease of operation
- Complete travel of the shutoff mechanism direction
- Correct direction of opening
- Required number of turns

Smaller valves may also be cycled, or they can be tested after installation.

SPECIFICATIONS

The initial inspection also should verify compliance with specifications, including the following:

- Size and Pressure Class
- Direction of opening
- Size and shape of operation nut
- Number of turns to open and close
- Type of end connections

SHIPPING DAMAGE

- Inspection should also include test for shipping damage such as:
 - Scoring of the seated surfaces
 - Bent stems
 - Cracked parts
 - Missing parts or accessories
 - Missing lubrication on the exterior actuators

All materials shall be inspected by OWNER prior to installation, complying with ANSI/AWWA Standard C600, Section 5.1, current revision. All rejected materials shall be promptly removed from the site.

B. HYDRANT INSPECTION

Hydrants should be inspected at the time of delivery to verify compliance with specifications and to check for damage during shipment.

OPERATION

The hydrant should be cycled to full open and full closed positions to ensure that no internal damage or breakage has occurred during shipment and handling. All external bolts should be checked for tightness.

SPECIFICATIONS

- Size and shape of operating nut
- Direction to open
- Depth of bury
- Size and type of inlet connection
- Size of main valve
- Outlet nozzle sizes and configuration
- Nozzle threads are to Cedar Falls standards

STORAGE

The fire hydrant valve should be closed and the outlet nozzle caps replaced to prevent entry of foreign matter. Hydrants should be stored with the inlets facing down. Whenever possible, hydrants in storage should be protected from weather and the elements.

3. MATERIAL UNLOADING, HANDLING AND STORAGE

All materials shall be unloaded, handled and stored in accordance with ANSI/AWWA Standard C600, Section 6.1, current revision, and materials manufacturer's instructions.

Polyethylene pipe shall be unloaded, handled and stored in accordance with Chapter 2 of PPI's "Handbook of Polyethylene Pipe", latest addition.

All pipe, fittings, valves, hydrants, and accessories shall be loaded and unloaded by lifting with lift hoists or skidding in order to avoid shock or damage. Under no circumstances shall this material be dropped. Pipe handled on skidways shall not be rolled or skidded against other pipe.

Unloading of materials shall be done by lifting with a fork truck, a crane, or other suitable lifting device. Pipe shall never be rolled off the truck. When pipe is being unloaded one at a time, or in single layers, the restraining bands or straps shall be removed only from the layer being unloaded.

Slings, hooks, or pipe tongs shall be padded, and the padding shall be used to prevent damage to the exterior surface or internal lining of the pipe, fitting, or related product.

If stored, materials shall be kept safe from damage. The interior of all pipe, fittings, and other appurtenances shall be kept from dirt or foreign matter at all times.

4. MAINTENANCE OF WARNING SIGNS, BARRICADES AND LIGHTS

All contractors doing work for the Cedar Falls Utilities shall, at his own expense and without further or other order, provide, erect and maintain at all times during the progress and suspension of the his work and until completion and final acceptance thereof, suitable and requisite barriers, sights or other adequate protection and shall provide, keep and maintain such traffic control devices or flag persons as may be necessary or as may be ordered by the City Engineer or the Cedar Falls Utilities to ensure the safety of the public as well as those engaged on the project. All barricades and obstructions shall be protected at night by warning signs and signal lights which shall be kept burning from sunset to sunrise. All traffic control required for this project shall comply with the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) 2003 Edition, latest revision.

5. ALIGNMENT AND GRADE

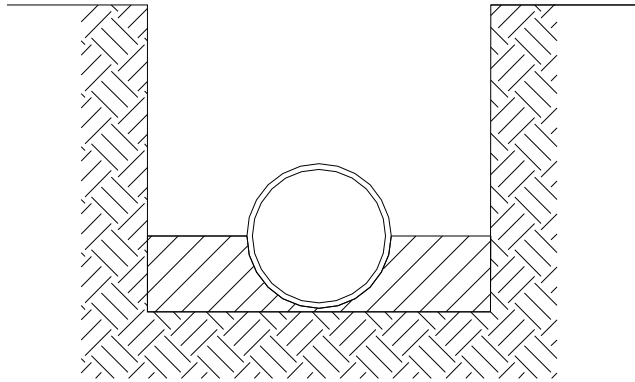
The water mains shall be installed on lines and grades established by the contract documents for the project. Fitting, valves, and hydrants shall be installed at the required locations unless field conditions warrant otherwise, and these changes are approved in accordance with the contract documents.

Where the grade is not shown or specified, the main shall follow the general grade of the street or ground. The distance from the top of pipe to the final ground surface shall be a minimum of 5'-6".

6. TRENCH CONSTRUCTION

Unless otherwise noted in the contract documents, the laying conditions for the pipe and fittings shall be type 2 which is a flat bottom trench of undisturbed earth and backfilled lightly consolidated to centerline of pipe.

TYPE 2 TRENCH



Flat-bottom trench, backfill lightly consolidated to centerline of pipe

The trench shall be excavated to the required alignment, depth, and width specified or shown in the contract documents and shall conform to all federal, state, and local regulations for the protection of the workers.

Discharge from trench dewatering pumps shall be directed away from the trench to prevent trench instability and shall be in accordance with federal, state and local point-discharge requirements.

Excavated material shall be placed in a manner that will not obstruct the work nor endanger workers or the public nor obstruct sidewalks, driveways, roadways, or other structures. Excavated material shall be placed in compliance with federal, state and local regulations.

Pavement and road surfaces shall be removed as part of the trench excavation. The amount removed shall depend on the width of trench required for the installation of the pipe and the dimensions of the area into which valves, hydrants, and other structures will be installed. The dimensions for pavement removed shall not exceed the dimension of the opening required for the installation by more than 6 inches (6") in any direction, unless otherwise stipulated in the contract documents. Sighting shall be used to ensure the breakage of pavement along straight lines.

The width of the trench at the top of the pipe shall equal the single-pass capabilities of normally available equipment. The width shall permit the pipe to be laid and joined properly and to allow the backfill to be placed in accordance with the contract documents. Trench widths shown may be used as a guideline.

Nominal Pipe Size	Trench Width
3" and 4"	28"
6"	30"
8"	32"
10"	34"
12"	36"
16"	40"
20"	44"

When required, trenches shall be wider to permit the placement of supports, sheeting, bracing, and appurtenances as required by the safety requirements.

Holes for the bells shall be provided at each end joint, and they shall be no larger than necessary to allow joint assembly and to ensure that the pipe barrel will lie flat on the trench bottom.

The trench bottom shall be true and even to provide support the full length of the pipe barrel.

If the trench passes over a previous excavation, the trench bottom shall be sufficiently compacted to provide support equal to that of the native soil in a manner that will prevent damage to the existing installation.

Excavation of the trench shall be in conformance with ANSI/AWWA Standard C600, Section 4.3, current revision.

Not more than two hundred lineal feet (200') of trench shall be dug in advance of the completed pipe installation operation.

7. VALVE OPERATION

All contractors shall make arrangements with the Municipal Water Utility to open and close water distribution valves as required.

8. SHORING

Excavation in unstable materials shall be braced according to the rules and regulations of the Occupational Health and Safety Administration (OSHA). The width of excavation shall be increased when shoring is employed.

If space permits, the sides of any excavation may be sloped back to prevent cave-ins. Such sloping shall start no lower than the top of the pipe and go to the ground surface.

9. DUCTILE IRON PIPE (DIP) INSTALLATION

Care shall be taken to prevent foreign materials, dirt, debris, tools, clothing, and animals from getting in the pipe before, during, and after installation.

A. FIELD CUTTING DIP

Pipe shall be cut at right angles to the axis of the pipe with power cutting tools driven either by hydraulic, electric, or air motors, or by gasoline engines. Tools which can damage the pipe will not be permitted.

When cut pipe ends are to be used in place of manufactures spigot ends, the cut end shall be filed or ground to produce a slight bevel of about 30 degrees from the vertical. No sharp edges shall be permitted which can cut the gaskets during assembly.

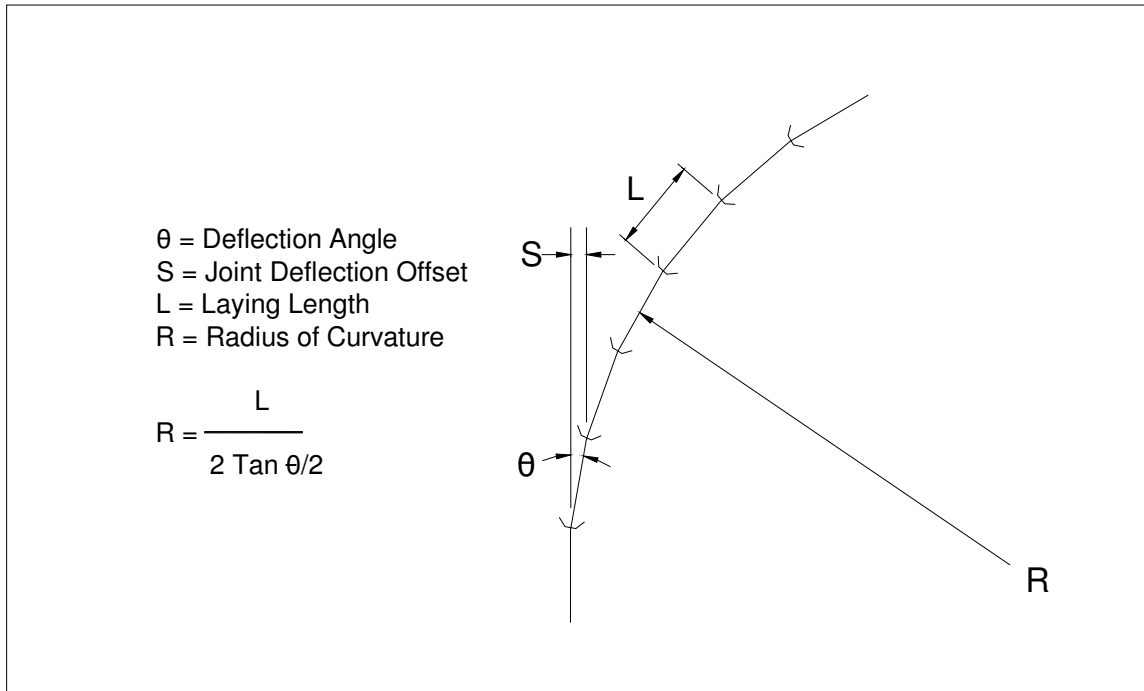
B. PUSH JOINT DUCTILE IRON PIPE ASSEMBLY

Clean mating surfaces. Insert a single rubber gasket with the small bulb of rubber to the outside of the bell. Lubricate the spigot, insert spigot in the bell, and push home to complete the joint.

After the joint is assembled, use a feeler gauge to verify the gasket is in its retaining groove. If the gasket is out of the groove, the pipe shall be pulled apart, the gasket removed and disposed of, a new gasket inserted, and the pipes reassembled as directed above.

If a deflection is required, the pipe shall be deflected after the pipe spigot is pushed home. The maximum permissible deflection per length of pipe shall not exceed recommendations listed below.

Nominal Pipe Size (in.)	Deflection Angle - θ (degrees)	Maximum Offset - S (in.)		Approx. Radius of Curve - R Produce by succession of joints	
		Length = 18'	Length = 20'	Length = 18'	Length = 20'
4	5	19	21	205'	230'
6	5	19	21	205'	230'
8	5	19	21	205'	230'
10	5	19	21	205'	230'
12	5	19	21	205'	230'
16	3	11	12	340'	380'
20	3	11	12	340'	380'

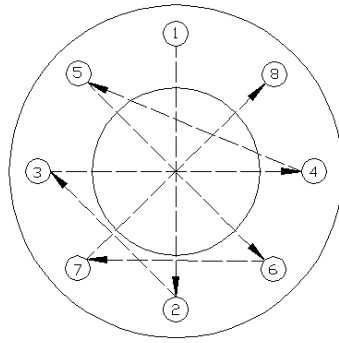


Pipeline Curve Geometry

C. MECHANICAL JOINT DUCTILE IRON PIPE ASSEMBLY

Mechanical joints shall be assembled as follows:

1. Clean the bell and spigot.
2. Lightly coat both the bell and spigot with joint lubricant.
3. Slip the ductile iron gland over the spigot. The lip extension of the gland shall extend toward the end of the spigot.
4. Slip a rubber gasket over the spigot with the thick edge of the gasket toward the gland.
5. Insert the spigot into the bell.
6. Press the gasket into place into bell. Installed properly, the gasket will be evenly located around the entire joint.
7. Slide the gland into position for bolting. Align the bolt holes in the gland and the bell.
8. Insert the bolts and screw on the nuts finger tight.
9. Tighten bolts and nuts by using the crossover method shown below. Tighten the bolts and nuts across the connection from each other in order until the joint is uniformly tight (do not tighten the bolts and nuts in rotation). This crossover method will load both pipe and valve evenly and eliminate any concentrated stresses.



10. Tighten the bolts with a torque limiting wrench to the valves listed below.

Bolt Diameter (inches)	Torque (foot-pounds)
5/8	45-60
3/4	75-90
1	85-100
1 1/4	105-120

If a deflection is required, the pipe shall be deflected after step 8 and before step 9 of the assembly procedures. The maximum permissible deflection per length of pipe shall not exceed recommendations listed below.

Nominal Pipe Size (in.)	Deflection Angle - θ (degrees & minutes)	Maximum Offset - S (in.)		Approx. Radius of Curve - R Produce by succession of	
		Length = 18'	Length = 20'	Length = 18'	Length = 20'
4	8-18	31	35	125'	140'
6	7-07	27	30	145'	160'
8	5-21	20	22	195'	220'
10	5-21	20	22	195'	220'
12	5-21	20	22	195'	220'
16	3-35	13.5	15	285'	320'
20	3	11	12	340'	380'

D. TRACER SYSTEM

Tracer wire shall be No. 12 insulated solid copper single strand, type THNN and applied to all buried Ductile Iron Pipe. Tracer wire installation should conform to the Iowa Statewide Urban Design and Specifications. Any conflicts between these standards and the Iowa Statewide Urban Design and Specification, these standards are to take precedence.

Splices or junctions in tracer wire shall be made with split-bolts connectors covered with waterproof dielectric wrap and shall be inspected by OWNER prior to backfill.

At all fire hydrants, the tracer wire shall be installed in a one and one quarter inch (1 ¼") conduit with a support bracket bolted to the fire hydrant. The conduit shall have a blue Little Fink® Cathodic Protection Test Station Cap or an approved equal.

A three-pound (3 lb) magnesium anode shall be installed at the locations indicated on the plans.

Care shall be taken to not damage the insulation or kink the wire. Damaged insulation shall be removed and the bare wire shall be coated with waterproof dielectric protective wrap. Kinked wire shall not be used

Prior to any final contractor payment, the OWNER will verify that the tracer wire is continuous and allows for the proper tracing of the water main. If locations where the tracer wire is not continuous is identified, the contractor, at not additional cost to the owner, shall make necessary repairs.

10. POLYETHYLENE (PE) PIPE INSTALLATION

PE pipe shall not be installed in soils contaminated with or may be contaminated with organic chemicals (gasoline, diesel, oil, etc.).

The installation of polyethylene (PE) pipe shall be in conformance with ANSI/AWWA Standard C906, ANSI D2774, F1668 and F1962, current revisions and recommended manufacturer's instruction.

A. POLYETHYLENE (PE) PIPE JOINT ASSEMBLY

The assembly of polyethylene (PE) pipe joints shall be in conformance with ANSI/AWWA Standard 0906, Section 4.5, current revision, and recommended pipe and joint assembly method per manufacturer's instructions. Approved PE joint assembly methods include heat fusion, flanges, electrofusion, and mechanical connections that are designed for polyethylene (PE).

All butt fusion misalignments, and bad electrofusions shall be cut out from the pipe and the two cut ends butt fused together.

Unless otherwise specified in the contract documents, all polyethylene pipe shall be thermally butt fused per manufactures published recommendations and procedures. General joining procedures are:

1. Clean: Each pipe end shall be clean and dry.
2. Secure: Each pipe end that is to be fused together shall be held in a position using the clamps of the butt fusion machine to prevent lateral movement.
3. Pipe ends shall be faced to establish clean, parallel mating surfaces. This shall be done using machines specifically designed for this purpose. If properly faced, there will not be any gap between pipe ends when brought together.

4. Pipe shall be aligned so that the outside diameters of both pipe ends are even along the whole circumference of the pipe.
5. The pipe ends shall be heated per the pipe manufacture's recommended temperature, interface pressure, and time duration. Pipe ends shall be heated with equipment specifically designed for this purpose.
6. The pipe ends shall be joined together by bring both heated ends together to from a properly mixed homogeneous joint. Pipe manufacture's recommended joining procedure shall be followed.
7. The molten joint shall be held immobile under pressure until adequately cooled. Cooling times shall comply with the pipe manufacture's recommendations.

B. PE PIPE CUTTING

PE Pipe shall be cut perpendicular to the axis of the pipe using a guillotine cutter, run-around cutter, coarse-tooth handsaw, or chain saw. Only chainsaws that will be designated solely for the use of cutting polyethylene water pipe shall be used. Chainsaws shall be used without chain lubricant to prevent contamination of the water main. Saw chips/dust shall be completely removed from the water pipe.

C. PE PIPE SURFACE DAMAGE

Damage, including scratches, gouges, cuts, etc., which exceeds 10% of the pipe wall thickness shall be cut from the pipeline and the two cut ends butt fused together.

D. TRACER SYSTEM

Tracer wire shall be No. 12 insulated solid copper single strand, type THNN and applied to all buried Polyethylene (PE) pipe. Tracer wire installation should conform to the Iowa Statewide Urban Design and Specifications. Any conflicts between these standards and the Iowa Statewide Urban Design and Specification, these standards are to take precedence.

Splices or junctions in tracer wire shall be made with split-bolts connectors covered with waterproof dielectric wrap and shall be inspected by OWNER prior to backfill.

At all fire hydrants, the tracer wire shall be installed in a one and one quarter inch (1 ¼") conduit with a support bracket bolted to the fire hydrant. The conduit shall have a blue Little Fink® Cathodic Protection Test Station Cap or an approved equal.

A three-pound (3 lb) magnesium anode shall be installed at the locations indicated on the plans.

Care shall be taken to not damage the insulation or kink the wire. Damaged insulation shall be removed and the bare wire shall be coated with waterproof dielectric protective wrap. Kinked wire shall not be used

Prior to any final contractor payment, the OWNER will verify that the tracer wire is continuous and allows for the proper tracing of the water main. If locations were the tracer wire is not continuous is identified, the contractor, at not additional cost to the owner, shall make necessary repairs.

11. HORIZONTAL DIRECTIONAL DRILLING (HDD)

Horizontal directional drilling (HDD) is an acceptable method of construction for polyethylene pipe (PE).

HDD shall be performed using equipment and methods designed for such work, which includes drilling machines, drill rods, drilling fluids, reamers, cutting heads, and expanders. A break-a-way unit, shear pin, or weak link shall be placed between the pipe and the reamer to protect the pipe from over stressing.

For mains less than 10", the bore hole diameter shall not exceed 1.5 times the outside diameter of the main. For mains 10" or larger, the bore hole shall not exceed 1.3 times the outside diameter of the main. The radius of curvature shall not exceed that of the pipe manufactures recommendations for the specific pipe size, material, dimension ratio (DR), etc.

12. VALVE AND FITTING INSTALLATION

The installation of valves and fittings shall be in conformance with ANSI/AWWA Standards C504, Section A.5; C509, Section A.5; C600, C906 and AWWA Manual M44, current revisions, and ASTM Standards D2774, current revisions, and recommended valve and fitting manufacturer's instructions.

Visually inspect each valve/fitting and remove any foreign materials in the interior portion. Foreign material left in the valve can damage internal working parts. Support piping systems and align components to minimize bending at the valve/fitting connections.

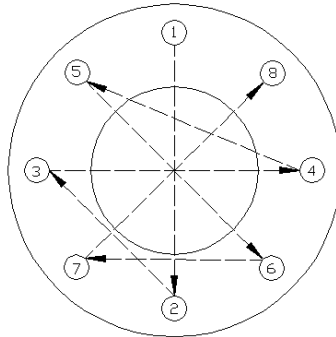
Install valves in the closed position to prevent any foreign materials from entering the valve.

Place the valve/fitting on firm footing in the trench to prevent settling.

Valves 12" and larger, should be provided with special support, such as treated timbers, crushed stone, concrete pads, or sufficiently tamped trench bottom so that the pipe will not be required to support the weight of the valve.

Install the valve/fitting in alignment with the pipe to prohibit excessive strain on the connection to the pipe. Preventing any strain on the connection is critical in flanged installations. Flange fracture can result from unequal strains set up by improper makeup and tightening of the joints. See the following figure for proper technique for installing and tightening flanged valves.

1. Support and Align valves/fittings
2. Clean dirt and grit particles from all parts
3. Insert bolts and nuts and tighten by hand
4. Tighten bolts and nuts by using the crossover method shown below. Tighten the bolts and nuts across the connection from each other in order until the joint is uniformly tight (do not tighten the bolts and nuts in rotation). This crossover method will load both pipe and valve evenly and eliminate any concentrated stresses.



The valve box should be installed so as not to transmit shock loads or stress to the valve. Center the valve box over the operating nut of the valve. The box cover should be flush with the surface of the finished area. The operating nut should be accessible from the top opening of the box with a valve key.

If the valve must be buried in an unusually deep trench, install an extension on the valve box and make a notation in the valve records that a long key will be required for operations.

13. HYDRANT INSTALLATION

Hydrant installation shall be in conformance with ANSI/AWWA Standard C600, and AWWA Manual M17, current revision. General hydrant installation is as follows:

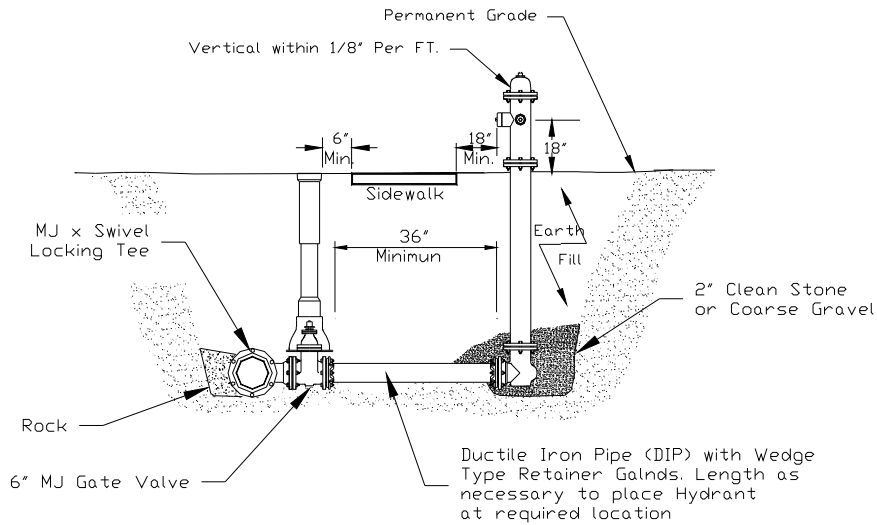
1. Install hydrants as plumb as possible.
2. Hydrants shall be located at 300' intervals and on property lines whenever possible.
3. Hydrants shall be installed a minimum of 2' from the face of the curb to the point on the hydrant nearest to the curb to avoid damage from or to vehicles.
4. Hydrants shall be installed a minimum of 18" from the edge of a sidewalk or bike path to the point on the hydrant nearest to the sidewalk or bike path.
5. Install the hydrant with the pumper outlet nozzle facing the street in order to provide a quick connection to the fire pumper.

6. Install the hydrant so that the outlet nozzles are a minimum of 18" above the ground line to allow for attachment of hoses and operation of the hydrant wrench. There should be no obstructions that prevent or retard hydrant operation or hinder removal of outlet nozzle caps.

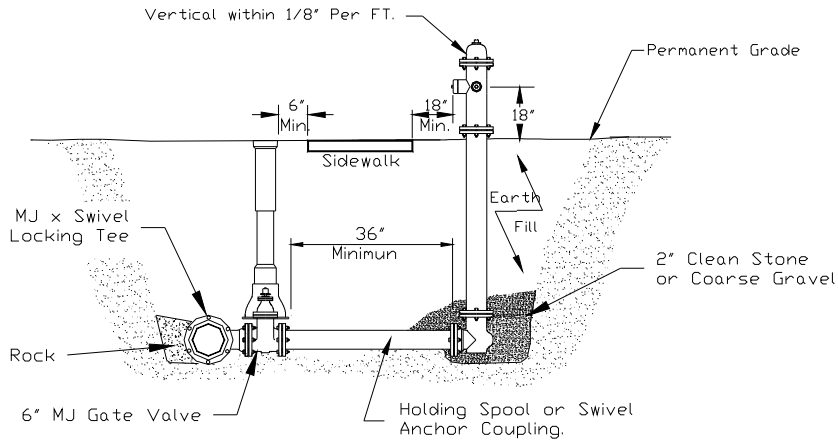
7. A 6" hydrant valve shall be installed between the hydrant and the supply main to permit isolation of the hydrant for maintenance purposes. The hydrant valve shall be restraint so that the hydrant may be removed without shutting down the main.

8. Provide for thrust restraint for the hydrant assembly as shown in CFU drawing A-114.


Hydrant Installation using Locking Tee, Ductile Iron Pipe, and Wedge Type Retainer Glands



Hydrant Installation using Locking Tee and Holding Spool or Anchor Coupling



Thrust Blocking not required

 ELECTRIC, GAS, WATER & COMMUNICATIONS CEDAR FALLS UTILITIES CEDAR FALLS, IOWA			TITLE: TYPICAL HYDRANT INSTALLATION USING LOCKING TEE				
CHKD:	APPR:	DWN: JAB	DATE: 10/24/01	SCALE: NONE	REV:	SHT: 1	DWG: A114

9. When sitting a hydrant, use a firm footing, such as stone slabs or a concrete base on firm ground, to prevent settling and strain on the hydrant lead joints.

10. If concrete thrust blocking is poured, exercise care not to plug or block the drain holes.

11. When installing break-away hydrants, use extra care to ensure that there is adequate soil resistance to avoid transmitting shock to the hydrant's lower barrel and hydrant inlet. In loose or poor loading-bearing soil install a concrete collar about 6" thick, with a diameter of 2' around the hydrant lower barrel at or near the ground line.

12. Provide for drainage from hydrants. Excavate the area around the hydrant base, then place ½ cu yd of clean 2" rock to a level 6" above the drain outlets. The rock should extend at least 1' on all sides of the hydrant. To keep the drainage pit from clogging, the stone should be covered with 8-mil polyethylene or similar waterproof material before backfilling.

13. Where groundwater rises above the drain port or when the hydrant is located within ten feet (10') of a sanitary sewer or storm drain, or where drainage is not permitted by the Iowa Department of Natural Resources, the drain port shall be plugged and water pumped from the hydrant when freezing may occur.

The hydrant bonnet, weather shield and operating nut shall be painted according to the following marking scheme:

Flow (gpm at 20psi)	Color
Greater than 1000	Green
500-1000	Yellow
Less than 500	Red

Hydrants installed as part of new main construction shall be disinfected by opening and closing the main valve during the disinfection of the main. The hydrant shall be flushed after disinfection of the main to remove the high concentration of chlorine solution.

Hydrants installed on an existing main shall be disinfected by spraying a solution of 300 mg/L chlorine into the inlet and through the outlet nozzle openings. See the Water System Specialist or the Water System Operator for the chlorine solution. The chlorine solution shall be flush from the hydrant immediately after installation.

Operate all hydrants to flush out any foreign materials that may have been left in the newly laid mains or hydrant leads.

Tighten the outlet-nozzle caps. Back them off slightly so they will not be excessively tight, but tight enough to prevent their removal by hand.

14. CASING PIPE AND SPACERS

Casing spacers shall be installed between the ductile iron pipe inside the encasement pipe and the casing pipe.

Casing spacers shall fasten *tightly onto* the ductile iron pipe so that the spacers do not move during installation.

Casing spacers *shall* be equally placed at intervals along the length of pipe, with the exception of the bell and spigot portion required for joint assembly.

Installation of spacers shall be in strict accordance with manufacturer recommendations.

A. 6" PIPE

1. Use three (3) spacers for each length of pipe.
2. Each spacer will require two (2) type F elements and one (1) type G element. Therefore, each length will require six (6) type F elements and three (3) type G elements.
3. Use 1.6" high spacers.
4. Use 12" casing pipe.

B. 8" PIPE

1. Use three (3) spacers for each length of pipe.
2. Each spacer will require three (3) type F elements and one (1) type G element. Therefore, each length will require nine (9) type F elements and three (3) type G elements.
3. Use 1.6" high spacers.
4. Use 16" casing pipe.

C 12" PIPE

1. Use three (3) spacers for each length of pipe.
2. Each spacer will require five (5) type F elements. Therefore, each length will require fifteen (15) type F elements.
3. Use 1.6" high spacers.
4. Use 20" casing pipe.

D. 16" PIPE

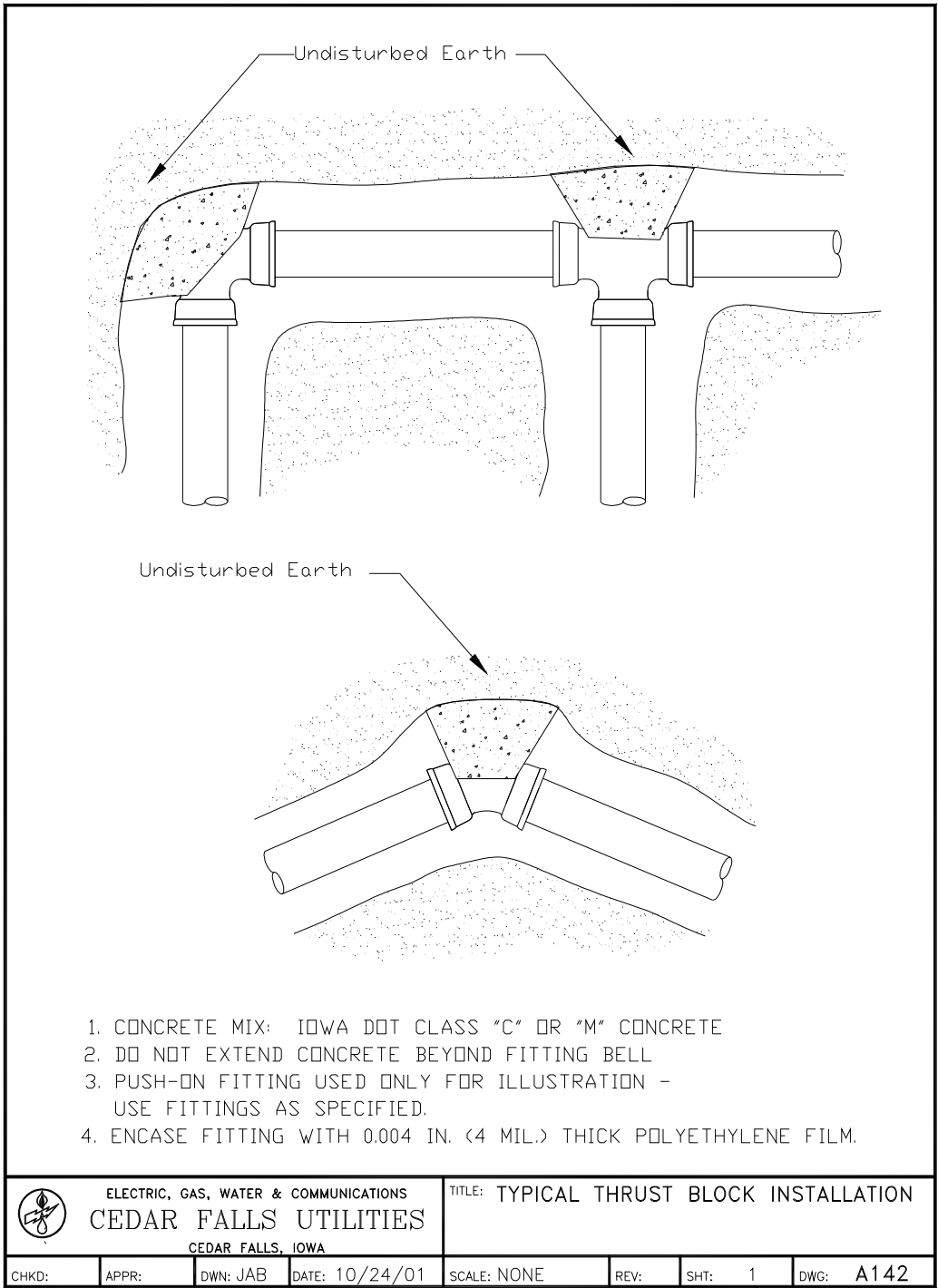
1. Use three (3) spacers for each length of pipe.
2. Each spacer will require seven (7) type F elements. Therefore, each length will require twenty-one (21) type F elements.
3. Use 1.6" high spacers.
4. Use 24" casing pipe.

E. 20" PIPE

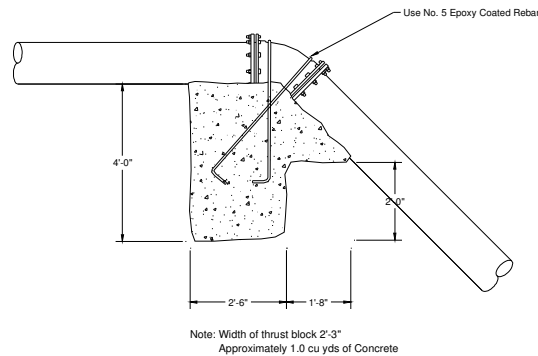
1. Use three (3) spacers for each length of pipe.
2. Each spacer will require five (5) type E elements and one (1) type H element. Therefore, each length will require fifteen (15) type E elements and three (3) type H elements.
3. Use 1.6" high spacers.
4. Use 30" casing pipe.

15. CONCRETE THRUST RESTRAINT

Thrust restraint of hydrants, fittings, or pipe shall be in conformance with ANSI/AWWA Standard, C600, Section 4.3.8, current revision and CFU drawing A142.



Thrust blocks shall be a minimum thickness of 12". Vertical and horizontal thrust blocks shall be made of concrete having a compressive strength of not less than 2,000 psi after 28 days and shall conform to Iowa DOT Class "C" or "M" concrete.. The blocks shall be placed between solid ground and the fitting(s) to be anchored. The blocking



Vertical (Gravity) Thrust Block

shall be located so as to contain the resultant thrust force in such a way that the pipe and fitting joints will be accessible for repair.

Install 0.004 in. (4 mil.) thick polyethylene film around pipe or fitting(s) to be anchored.

16. MECHANICAL THRUST RESTRAINT

Mechanical joint restraint shall not be used on sections of pipe that are less than 2 ½ times the pipe diameter or 30" in length, whichever is greater. Sections of pipe less than the required length but needing restraint can either be rodded or concrete thrust blocking may be used.

Mechanical thrust restraints shall be installed following the manufactures recommendations.

17. BACKFILLING

The backfilling of the trench shall be in conformance with ANSI/AWWA C600, Section 4.3.5, current revision.

All backfill material shall be free from cinders, ashes, refuse, vegetable or organic material, boulders, rocks or stones, frozen soil, or other unsuitable material. From 12 in. (12") above the top of the pipe to grade material containing stones up to 8 inches (8") in their greatest dimension may be used. Excavated material consisting of loam, clay, sand, gravel, or other suitable material may be used as backfill.

All rock greater the 8" in diameter, pieces of concrete or masonry, or other debris and subterranean structures shall be removed to provide a clearance below and on each side of the all pipe, valves, and fittings of at least 6 in. (6").

When frozen material exists in the trench, backfilling is prohibited. Authorization by the Cedar Falls Municipal Water Utility may permit backfilling with soil free of frozen material in freezing weather

All pipe shall be installed to a depth to provide five and one half feet (5 ½') of earth cover from the permanent grade set by the City Engineer. Pipe installed under pavement shall receive six feet (6') of earth cover measured from the permanent pavement grade.

Special care shall be used in placing the backfill the full width of the trench, filling each side of the pipe simultaneously, to avoid damaging or moving the pipe. Backfill for polyethylene (PE) materials shall be placed by hand to a depth of one foot (1') above the top of the pipe.

Complete compaction of all backfill is required in twelve-inch (12") layers. Tests will be conducted to assure compliance with 95% Standard Proctor density.

When pipe-laying is not in progress, the open ends of the pipe shall be closed by a watertight plug. The plug shall be fitted with a means for venting. The plug shall remain in place until the trench is pumped completely dry. Any air and water pressure in the line shall be released prior to removal of the plug.

All topsoil removed during excavation shall be stored and replaced. Any additional topsoil required must be authorization and approved by the Cedar Falls Municipal Water Utility.

18. FLUSHING

Foreign materials left in the pipelines during construction often results in valve or hydrant-seat leakage during pressure tests. The pipe lines shall be kept clean during installation. The new pipelines shall be flushed prior to hydrostatic testing. Flushing shall be accomplished by partially opening and closing valves and hydrants several times under expected line pressure, with flow velocities adequate to flush foreign material out of the valves and hydrants.

19. HYDROSTATIC TESTING

After the pipe has been laid, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure of 150 psi at the point of testing. Each valved section of pipe shall be slowly filled with water, and the specified test pressure (based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge) shall be applied using a pump connected to the pipe. Valves shall not be operated in either the opened or closed direction at differential pressures above the rated pressure. The system should be allowed to stabilize at the test pressure before conduction the hydrostatic test.

Before applying the specified test pressure, air shall be expelled completely from the section of piping under test. Corporation cocks shall be installed at all high points to expel the air as the line is filled with water. After the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and the pipe plugged.

Any damage or defective pipe, fittings, valves, hydrants, or joints that are discovered following the pressure test shall be repaired or replaced with reliable material, and the test shall be repeated until satisfactory results are obtained.

A. DUCTILE IRON PIPE TESTING

Test Restrictions:

1. The test pressure shall not be less than 1.25 times the working pressure of the pipe line at the highest point along the test section.
2. Test pressure shall not exceed pipe or thrust-restraint design pressure.
3. The hydrostatic test shall be of at least a 2-hour duration.
4. Test pressure shall not vary by more than ± 5 psi for the duration of the test.

Pressurization

Testing allowance shall be defined as the quantity of makeup water that must be supplied into the newly laid pipe or any valved section thereof to maintain pressure within 5 psi of the specified test pressure after the pipe has been filled with water and the air has been expelled. Testing allowance shall not be measured by a drop in pressure in a test section over a period of time.

No pipe installation will be accepted if the amount of makeup water is greater than that determined by the following formula:

In inch-pounds 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 inch (gauge)

This formula is based on a testing allowance of 11.65 gpd/mi/inch of nominal diameter at a pressure of 150 psi.

When testing against closed metal-seated valves, an additional test allowance per closed valve of 0.0078 gal/h/inch of nominal valve size shall be allowed.

When hydrants are in the test section, the test shall be made against the main valve in the hydrant.

Acceptance of installation shall be determined on the basis of testing allowance. If any test of laid pipe discloses a testing allowance greater than the specified, repairs or replacement shall be accomplished in accordance with the specifications.

All visible leaks are to be repaired regardless of the allowance used for testing.

Pressure and leak tests shall be in conformance with ANSI/AWWA Standard C600, Section 5.2, current revision with the following amendment:

B. POLYETHYLENE (PE) PIPE TESTING

Polyethylene (PE) pipe test procedure consists of initial expansion, and test phases. During the initial expansion phase, the test section is pressurized to the test pressure, and sufficient make-up water is added each hour for three (3) hours to return to test pressure. For the test phase, the test pressure is reduced by 10 psi. If the pressure remains steady (within 5% of the target value) for an hour, no leakage is indicated.

Polyethylene (PE) pipe shall be tested at 150 psi, the total test time including initial pressurization, initial expansion, and time at test pressure, must not exceed eight (8) hours. If the pressure test is not completed due to leakage, equipment failure, etc., the test section shall be de-pressurized, and allowed to relax for at least eight (8) hours before retesting.

20. DISINFECTION

The application of calcium hypochlorite shall be applied in granular form at a rate required to produce a minimum concentration of 25 mg/L of free chlorine for a 24 hour period. The hypochlorite shall be applied to each length of pipe.

The water will be tested for chlorine residual after the 24 hour period. Additional chlorine will be added at hydrant locations if 25 mg/L of free chlorine is not remaining after the 24 hour period. After a minimum of 24 hours the water will be retested. This procedure will be repeated until the desired chlorine residual is present.

After the 24 hour retention period, the heavily chlorinated water shall be flushed from the main until the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the system. The new system should be flushed as soon as possible because prolonged exposure to high concentrations of chlorine might damage the asphaltic seal coating.

If there is any possibility that the heavily chlorinated water discharge will cause damage to the environment, then a neutralizing chemical shall be applied to the water to be wasted

to thoroughly neutralize the residual chlorine. Dechlorination shall be in conformance with ANSI/AWWA Standard C651, Subsection 4.5.2.

Two bacteriological samples will be collected by the Cedar Falls Municipal Water Utility or qualified contractor for testing. The two samples shall be taken 24 hours apart. Satisfactory results are requisite for authority to place the main into service.

When disinfecting polyethylene pipe the solutions must not exceed 12% active chlorine.

21. SEPARATION OF WATER MAINS AND SEWERS

A. HORIZONTAL SEPARATION OF WATER MAINS AND GRAVITY SEWERS

Water main must be laid at least ten feet (10') horizontally from any gravity sewer, unless:

the bottom of the water main is at least eighteen inches (18") above the top of the sewer; and

the water main is placed in a separate trench or in the same trench on an undisturbed earth shelf at a minimum horizontal separation of three feet (3') from the sewer.

When it is impossible to obtain the required the three feet (3') horizontal clearance and the vertical separation of eighteen inches (18") between the water and sewer lines, arrangements shall be made for the replacement of the sewer with water main materials meeting a minimum pressure rating of 150 psi or equivalent and shall be pressure tested to ensure water tightness. However, a linear separation of at least 2 feet shall be provided.

B. SEPARATION OF WATER MAINS AND FORCE SEWER MAINS

Water main must be laid at least ten feet (10') horizontally from any sanitary sewer force mains. There shall be an eighteen-inch (18") vertical separation at crossings as required in Section 21 C.

C. SEPARATION OF WATER MAINS AND SEWER CROSSINGS

Water main crossing sewers shall be laid to provide a separation of at least eighteen inches (18") between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer with the preference to the water main located above the sewer.

One full length of water pipe crossing a sewer shall be located so both joints are as far as possible from the sewer. Water and sewer pipes must be

adequately supported and have water tight joints. A low permeability soil shall be used for backfill material within ten feet (10') of the point of crossing.

D. EXCEPTION

The reviewing authority must specifically approve any variance from the requirements of Sections 21 A, B, and C when it is impossible to obtain the specified separation distances. Where sewers are being installed and Sections 21 A, B and C cannot be met, the sewer material shall be waterworks grade 150 psi pressure rated pipe or equivalent and shall be pressure tested to ensure water tightness.

22. SEPARATION OF WATER MAINS AND SEWER MANHOLES

Water main shall not pass through or come in contact with any part of a sewer manhole.

23. HIGHWAY AND RAILROAD CROSSINGS

Casing installations shall be in conformance with ANSI/AWWA Standard C600, Section 4.5, current revision, the Iowa Department of Transportation Policy for Accommodating Utilities on the Primary Road System and in the case of railroad crossings, conform with the regulations established by the railroad company.

24. UNDERWATER CROSSINGS

Unless otherwise specified in the contract documents, the pipe for underwater crossings shall be ductile iron pipe with restraint joints or ball and socket pipe which will deflect up to 15 degrees.

A minimum of 5' of cover is required from the top of the pipe to the bed of the water crossing.

All trenches shall be backfilled with crushed rock, gravel or material approved by the Engineer. The water main shall be securely anchored to prevent movement. Shutoff valves shall be located outside the floodway. Stream bank erosion shall be prevented by sodding, seeding, or other methods approved by the Cedar Falls Municipal Water Utility.

25. SERVICE TAPS

Connection of tap service lines to the water main shall be made with the tap being at an angle of not more than 22 degrees from the horizontal (the ten o'clock or two o'clock position). A double wrap of Teflon tape shall be placed on the corporation stop threads prior to installation on the main.

A. Taps on Cast Iron or ductile iron pipe

On cast iron or ductile iron pipe, when water service taps are required close to each other, the taps shall be staggered around the circumference of the pipe a minimum of 12 inches apart, measured horizontally, and not in a straight line.

Stainless steel double strap service saddle is required on all water mains that are Pressure Class 350 or Class 50 CIP DIP pipe less than 12 inch in diameter.

Water mains that are 12 inch in diameter or larger, or that are Class 52 pipe may be direct tapped.

B. POLYETHYLENE (PE) PIPE

Water service taps on PE pipe shall be made by electrofusion using Frialen VA Service Saddle. The service saddle comes standard with 2" threaded outlets. The same saddle can be used for service lines 5/8", 1", 1 1/2" and 2" by using an adapter bushing for the smaller diameter services. Standard threaded corporations are required. (Not the AWWA tapered thread)

C. CORPORATIONS

On ductile iron and cast iron mains, all corporations shall be AWWA tapered thread x flared or compression type connections unless otherwise noted in the contact documents.

On PE mains, using the service saddle, all corporations shall be standard thread x flared or compression type connections unless otherwise noted in the contract documents.

D. WATER SERVICE PIPES

Water service connections of 3 inches or larger inside diameter shall be by tapping in sleeve or by removal of a section of pipe and the installation of a mechanical joint tee.

Water service pipe of less than 3 inches in inside diameter shall conform to the requirements of ASTM B 88 for Seamless Copper Water Tube, Type K, soft annealed temper pipe.