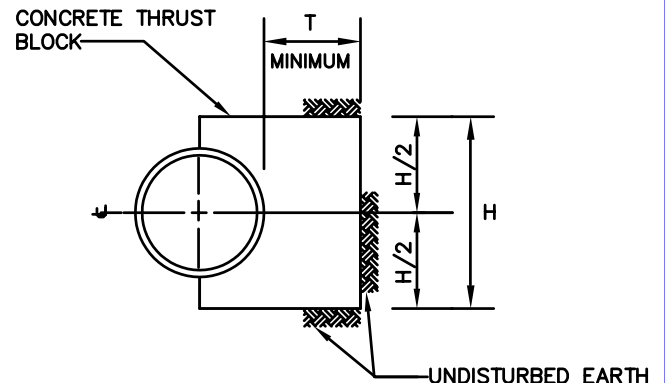
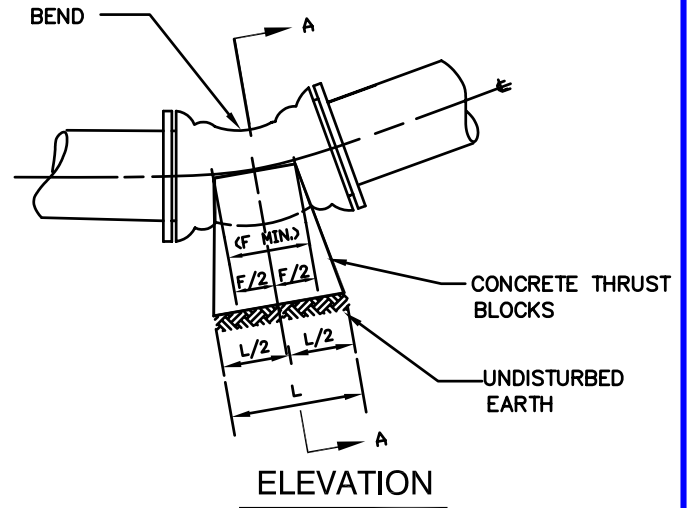


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BEND TYPE	PIPE DIAMETER	THRUST BLOCK DIMENSIONS			
		L	H	F	T
1/32	4"	1'-0"	1'-0"	0'-5"	1'-0"
	6"	1'-3"	1'-0"	0'-5"	1'-0"
	8"	1'-6"	1'-3"	0'-5"	1'-0"
	10"	1'-9"	1'-9"	0'-6"	1'-0"
	12"	2'-3"	2'-0"	0'-6"	1'-0"
	14"	3'-0"	2'-0"	0'-6"	1'-0"
1/16	16"	3'-6"	2'-0"	1'-0"	1'-6"
	4"	1'-6"	1'-6"	0'-5"	1'-0"
	6"	1'-9"	1'-6"	0'-5"	1'-0"
	8"	2'-0"	2'-0"	0'-5"	1'-0"
	10"	3'-0"	2'-0"	0'-10"	1'-0"
	12"	4'-0"	2'-0"	0'-10"	1'-6"
1/8	14"	4'-9"	2'-3"	1'-0"	2'-0"
	16"	5'-0"	3'-0"	1'-0"	2'-0"
	4"	1'-6"	1'-6"	0'-6"	1'-0"
	6"	3'-0"	1'-6"	0'-6"	1'-0"
	8"	4'-0"	2'-0"	0'-6"	1'-0"
	10"	5'-0"	2'-6"	0'-10"	2'-6"
1/4	12"	6'-0"	3'-0"	1'-0"	2'-6"
	14"	7'-0"	3'-6"	1'-0"	3'-0"
	16"	8'-0"	4'-0"	1'-0"	3'-6"
	4"	3'-0"	1'-6"	0'-6"	1'-0"
	6"	4'-6"	2'-0"	0'-6"	2'-0"
	8"	6'-0"	2'-6"	0'-6"	2'-6"
	10"	7'-0"	3'-6"	0'-10"	3'-0"
	12"	8'-0"	4'-0"	1'-0"	4'-0"
	14"	9'-0"	5'-0"	1'-0"	4'-0"
	16"	11'-6"	5'-0"	1'-0"	5'-6"



## BLOCKING DESIGN REQUIREMENT NOTES

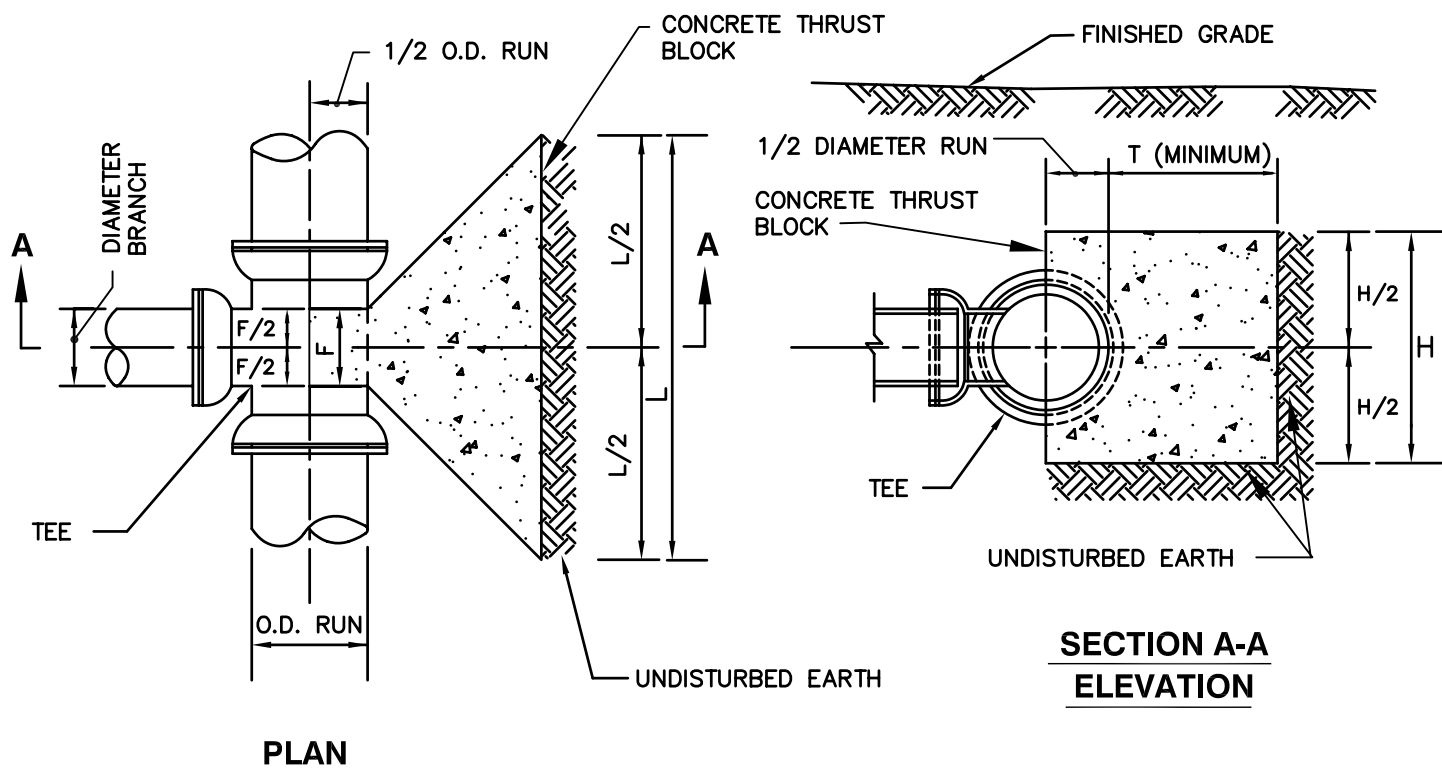
1. CONCRETE STRENGTH  $f'_c=3000$  psi AT 28 DAYS.
2. STANDARD THRUST BLOCKING IS BASED ON THE FOLLOWING ASSUMPTIONS AND LIMITATIONS, IF THESE CONDITIONS ARE NOT MET, SPECIAL DESIGN IS REQUIRED:
  - a) TEST PRESSURE (WORKING + SURGE) IS 250 psi OR LOWER.
  - b) DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
  - c) ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE BLOCK.
3. IF SOIL CONDITIONS ARE SOFT OR ORGANIC SPECIAL DESIGN IS REQUIRED.
4. FOR LARGER PIPE DIAMETER, SEE DRAWINGS FOR SPECIAL DETAILS.
5. ALL DIMENSIONS ARE MINIMUMS EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINT FITTINGS.

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*Paul R. Huggins*  
Chief Engineer

STANDARD DETAIL  
THRUST BLOCKS  
FOR  
HORIZONTAL BENDS

B  
1.0



	NOMINAL DIAMETER OF BRANCH						
	4"	6"	8"	10"	12"	14"	16"
L	2'-0"	3'-0"	4'-0"	6'-0"	7'-0"	8'-0"	9'-0"
H	1'-6"	2'-0"	3'-0"	3'-0"	3'-6"	4'-0"	4'-6"
T	1'-0"	1'-0"	1'-6"	2'-6"	3'-0"	3'-6"	4'-0"
F	0'-6"	0'-6"	0'-9"	0'-9"	1'-0"	1'-0"	1'-0"

**NOTE:**

1. SEE BLOCKING DESIGN REQUIREMENT NOTES, DETAIL B/1.0.

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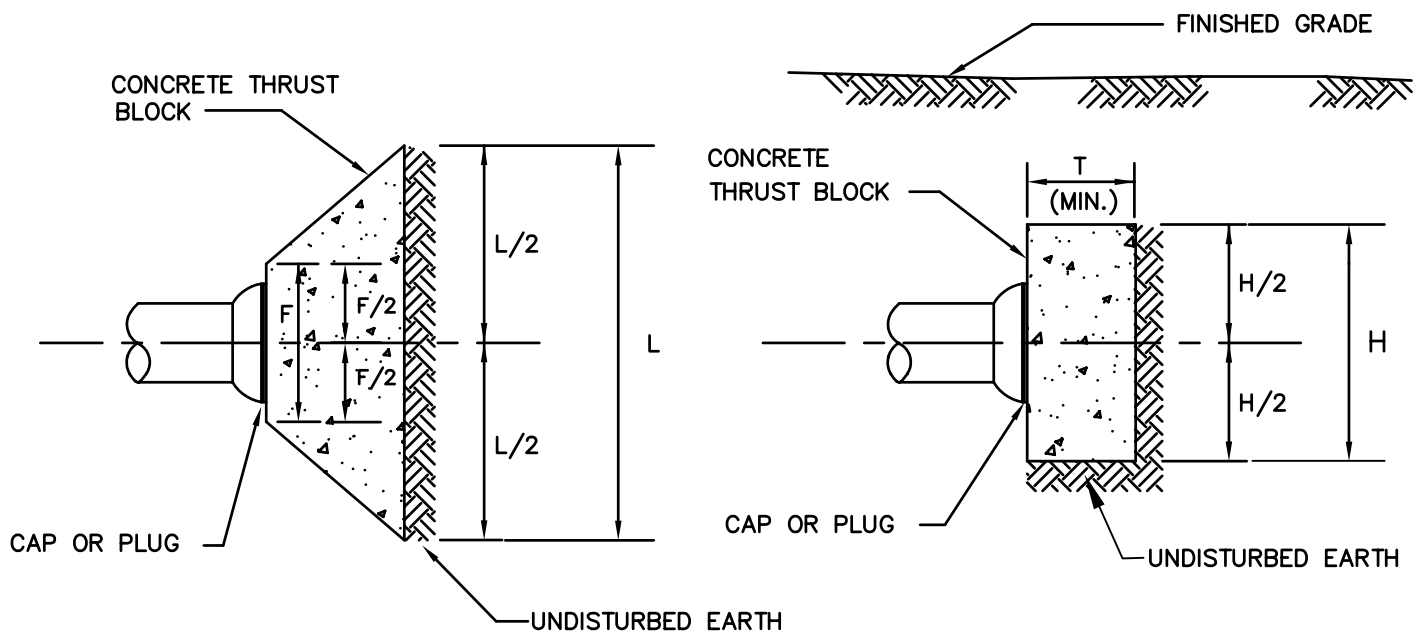
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*Richard P. Huggins*  
Chief Engineer

STANDARD DETAIL

THRUST BLOCKS FOR  
TEES AND TAPPING  
SLEEVES

B  
1.3



**PLAN**

**ELEVATION**

NOMINAL DIAMETER OF PLUG OR CAP							
	4"	6"	8"	10"	12"	14"	16"
L	2'-0"	3'-0"	4'-0"	6'-0"	7'-0"	8'-0"	9'-0"
H	1'-6"	2'-0"	3'-0"	3'-0"	3'-6"	4'-0"	4'-6"
T	1'-0"	1'-0"	1'-6"	2'-6"	3'-0"	3'-6"	4'-0"
F	1'-0"	1'-0"	1'-0"	1'-0"	1'-6"	1'-6"	2'-0"

**NOTE:**

1. SEE BLOCKING DESIGN REQUIREMENT NOTES, DETAIL B/1.0.

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Chief Engineer

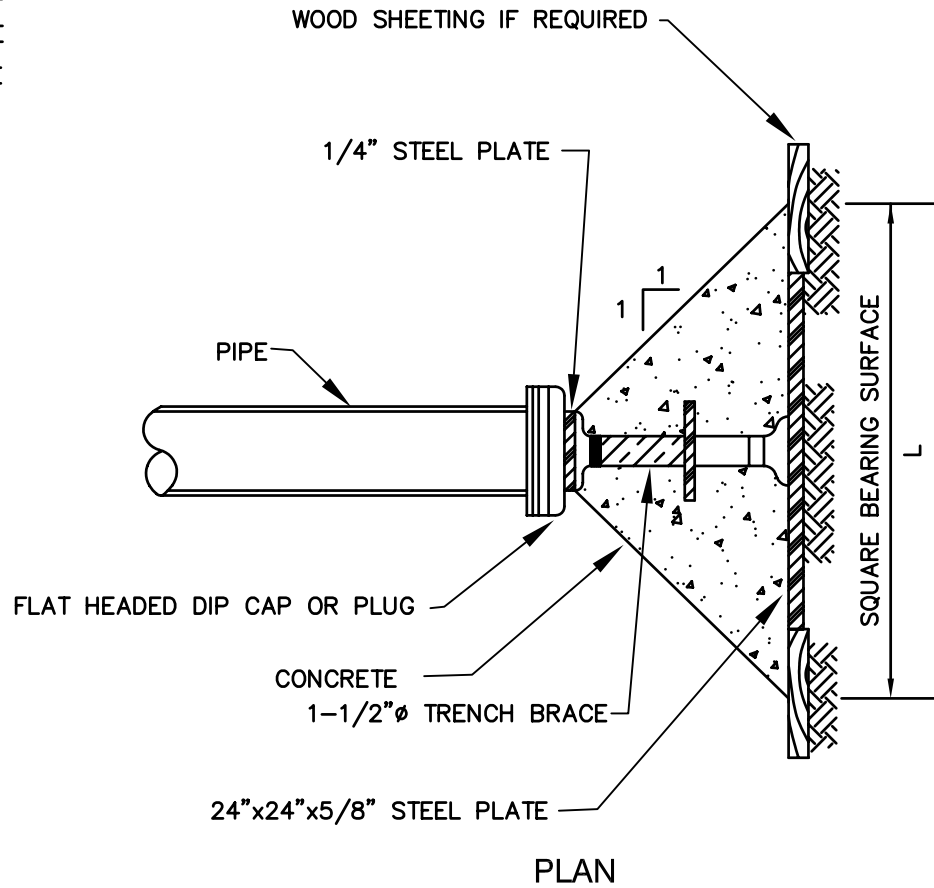
STANDARD DETAIL  
THRUST BLOCKS FOR  
PLUGS AND CAPS

B  
1.4

NOTES:

1. CONCRETE  $f'_c=3000\text{psi}$  AT 28 DAYS
2. STEEL PLATE—ASTM A-36
3. BEARING SURFACE SHALL BE AGAINST UNDISTURBED EARTH.
4. THIS DETAIL SHALL BE USED WHEN THE WATER MAIN HAS TO BE PLACED IN SERVICE IMMEDIATELY AFTER CONSTRUCTION, OR REPAIR. USE DETAIL B/1.4 FOR NORMAL CONSTRUCTION.

L = 3'-0" FOR 6" PIPE  
L = 2'-0" FOR 4" PIPE  
L = 1'-6" FOR 3" PIPE



PLAN

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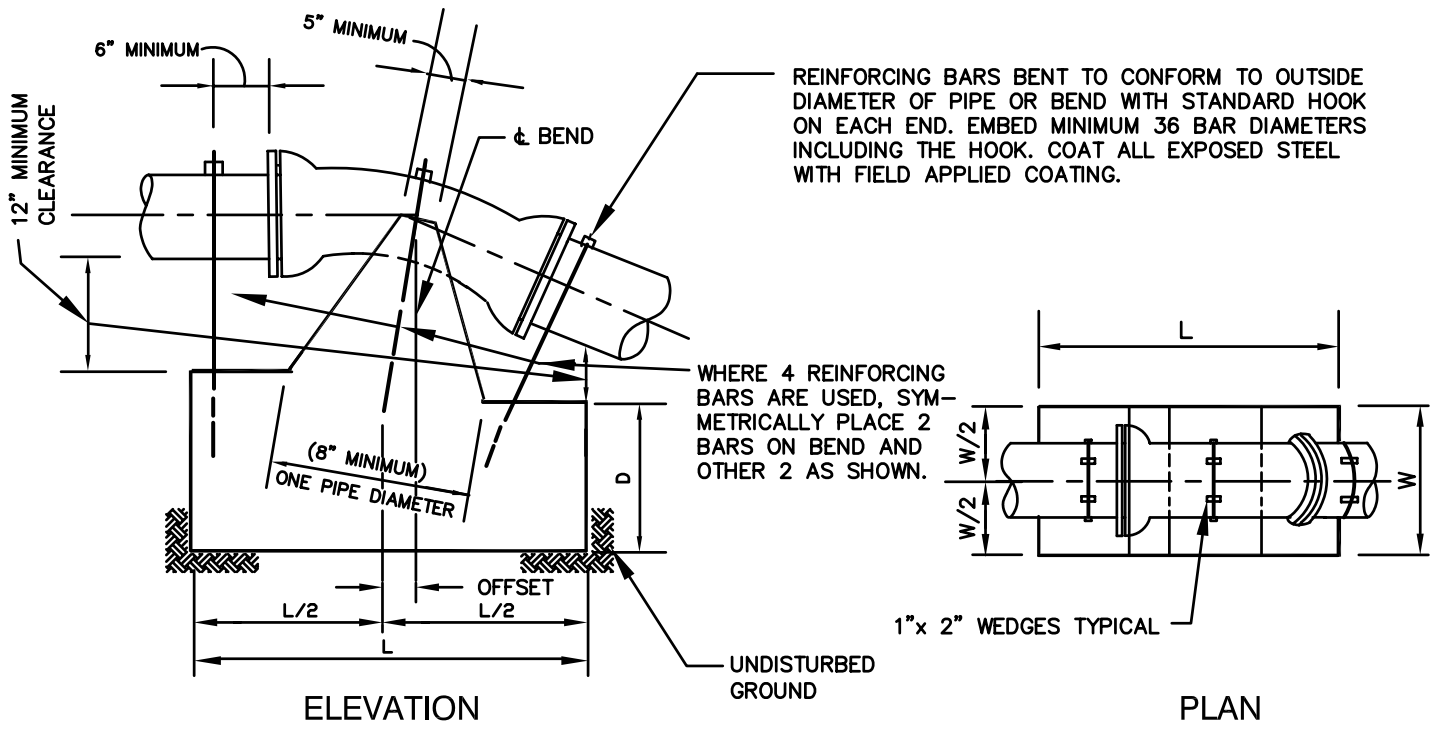
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Chief Engineer

STANDARD DETAIL

QUICK BLOCKING  
FOR 3", 4" AND 6"  
CAPS AND PLUGS

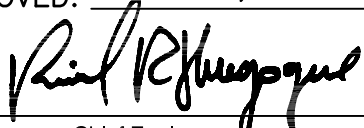
B  
1.5



BEND		SIZE						
		4"	6"	8"	10"	12"	14"	16"
1/32	L	1'-9"	2'-6"	3'-0"	3'-0"	3'-6"	4'-3"	5'-0"
	W	1'-9"	2'-3"	2'-9"	3'-3"	3'-9"	4'-3"	5'-0"
	D	1'-9"	2'-0"	2'-6"	3'-0"	3'-3"	3'-3"	3'-3"
	OFFSET	0'-6"	0'-6"	0'-6"	0'-6"	0'-6"	0'-6"	0'-6"
	Rebar	3-#7	3-#7	3-#8	3-#8	3-#8	3-#8	3-#8
1/16	L	2'-6"	3'-0"	3'-6"	4'-0"	5'-0"	5'-6"	6'-3"
	W	2'-3"	3'-0"	3'-6"	4'-0"	4'-6"	5'-3"	6'-0"
	D	2'-0"	2'-6"	3'-3"	3'-9"	4'-0"	4'-0"	4'-0"
	OFFSET	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	Rebar	3-#7	3-#7	3-#8	3-#8	4-#8	4-#8	4-#8
1/8	L	3'-0"	3'-9"	4'-9"	5'-6"	6'-6"	6'-9"	7'-6"
	W	2'-9"	3'-6"	4'-0"	5'-0"	6'-0"	6'-0"	7'-0"
	D	2'-6"	3'-3"	4'-0"	4'-0"	4'-0"	5'-3"	5'-3"
	OFFSET	1'-0"	1'-3"	1'-6"	1'-9"	2'-0"	2'-3"	2'-6"
	Rebar	3-#7	3-#7	3-#8	4-#8	4-#8	4-#10	4-#10

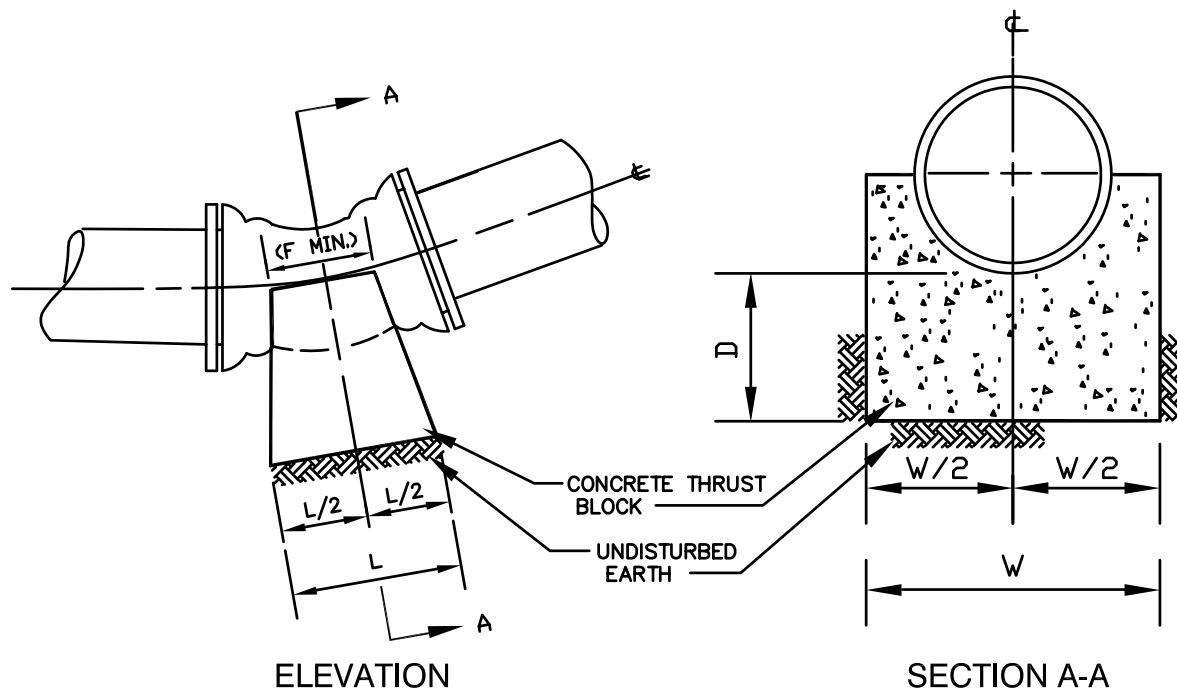
**NOTE:** 1. SEE BLOCKING DESIGN REQUIREMENT NOTES, DETAIL B/1.0.

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STANDARD DETAIL  
ANCHORAGE FOR  
1/32, 1/16 AND 1/8  
UPPER VERT. BENDS

B  
1.7

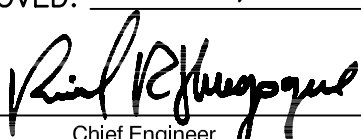


BEND		SIZE						
		4"	6"	8"	10"	12"	14"	16"
1/32	L	0'-6"	1'-0"	1'-6"	1'-9"	2'-0"	2'-3"	3'-0"
	W	1'-0"	1'-0"	1'-6"	1'-6"	2'-0"	2'-3"	2'-3"
	D	0'-9"	0'-9"	0'-9"	0'-9"	0'-9"	1'-0"	1'-0"
	F	0'-5"	0'-5"	0'-5"	0'-5"	0'-6"	0'-6"	0'-6"
1/16	L	1'-0"	1'-6"	2'-0"	2'-6"	2'-9"	3'-6"	4'-0"
	W	1'-0"	1'-6"	2'-0"	2'-6"	2'-9"	3'-0"	3'-3"
	D	0'-9"	0'-9"	0'-9"	1'-0"	1'-0"	1'-6"	1'-6"
	F	0'-5"	0'-5"	0'-5"	0'-6"	0'-6"	0'-6"	0'-6"
1/8	L	1'-6"	2'-0"	2'-9"	3'-6"	4'-0"	4'-0"	5'-0"
	W	1'-6"	2'-0"	2'-6"	3'-6"	3'-9"	5'-0"	5'-0"
	D	0'-9"	0'-9"	1'-0"	1'-6"	1'-6"	2'-0"	2'-0"
	F	0'-5"	0'-5"	0'-5"	0'-6"	0'-6"	0'-6"	0'-6"

**NOTE:**

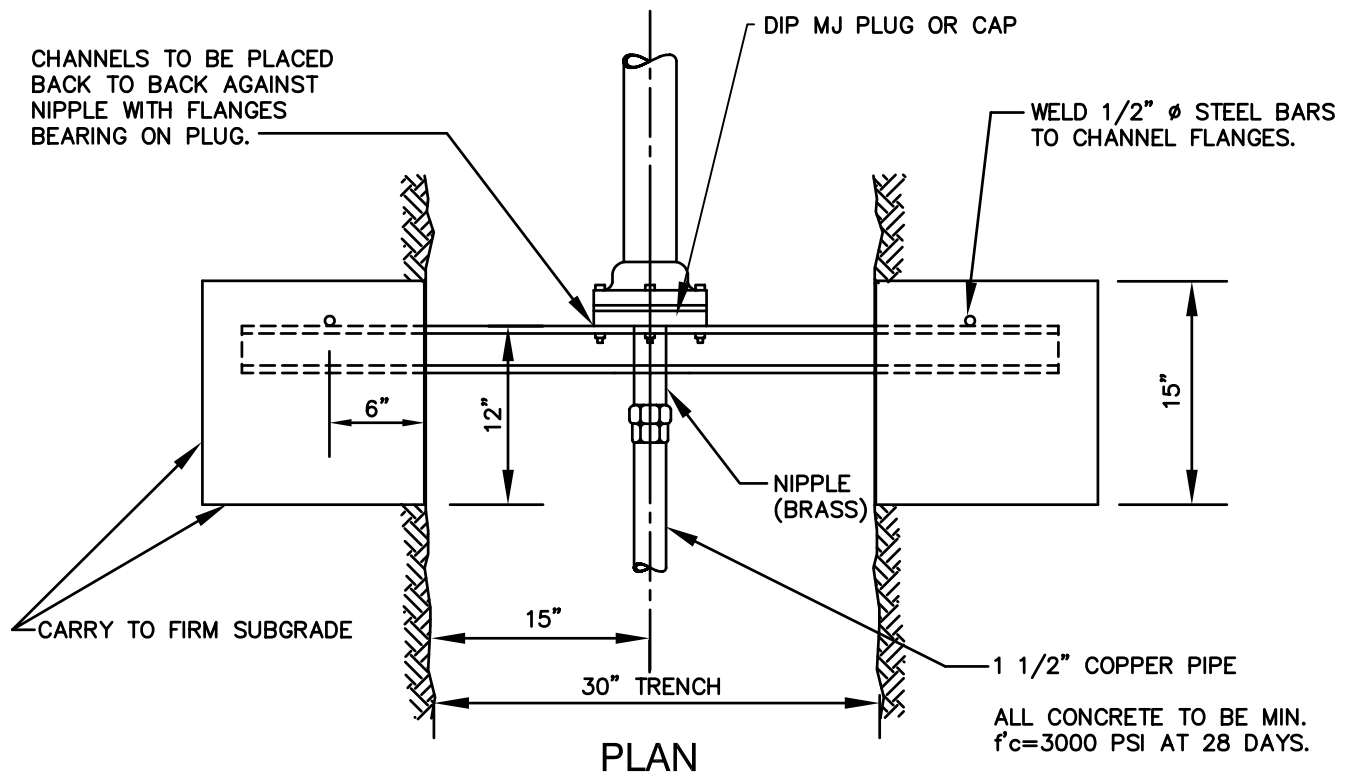
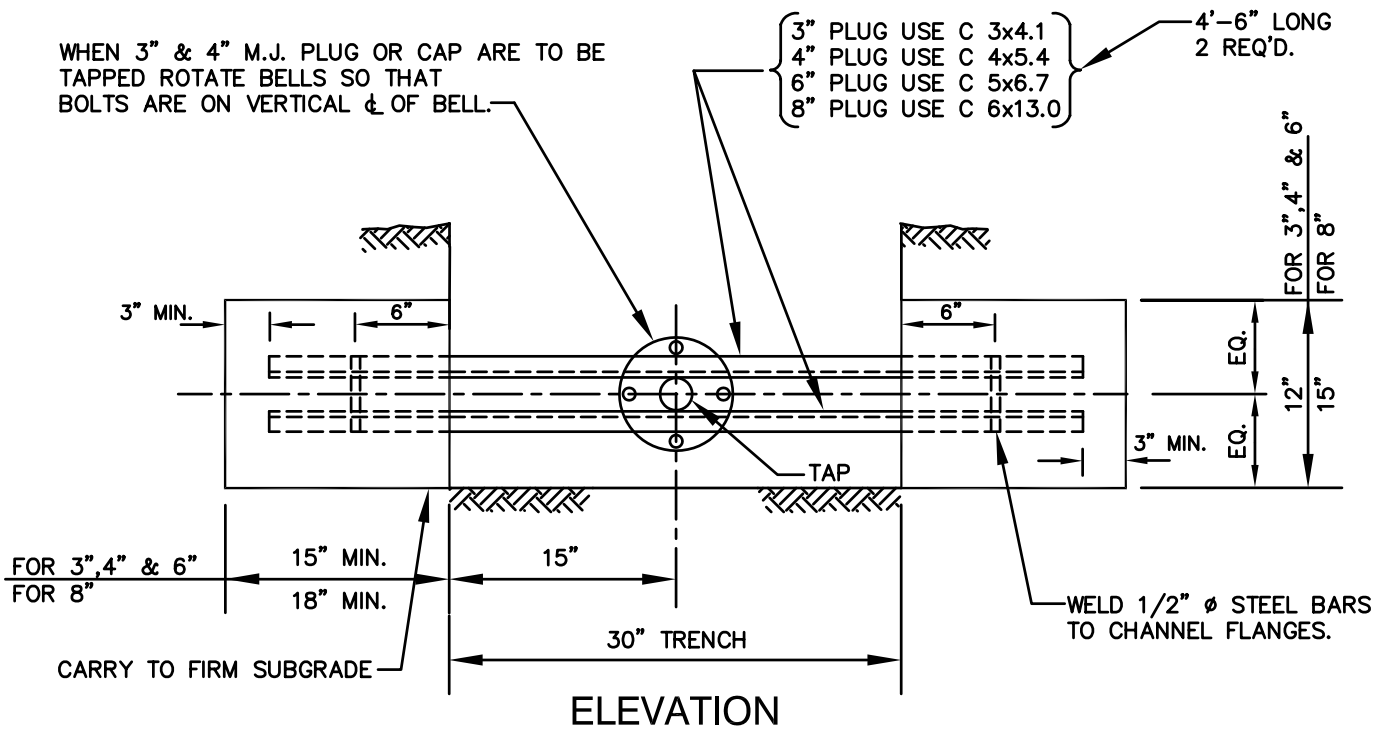
1. SEE BLOCKING DESIGN REQUIREMENT NOTES, DETAIL B/1.0.

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STANDARD DETAIL  
THRUST BLOCKS FOR  
11 1/4°, 22 1/2°, & 45°  
LOWER VERTICAL BENDS

B  
1.8



NOTE:

1. COAT NON-EMBEDDED PARTS OF CHANNELS WITH FIELD APPLIED COATING, SEE SPECIFICATIONS.
2. FOR DIP PIPE AND FITTINGS ONLY.

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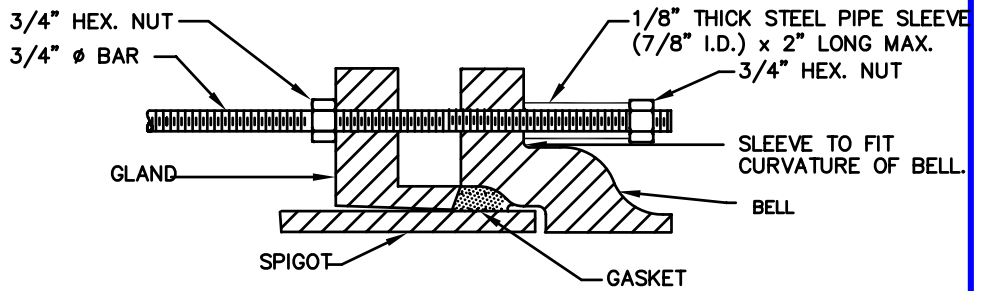
STANDARD DETAIL

BLOCKING FOR  
TAPPED PLUGS

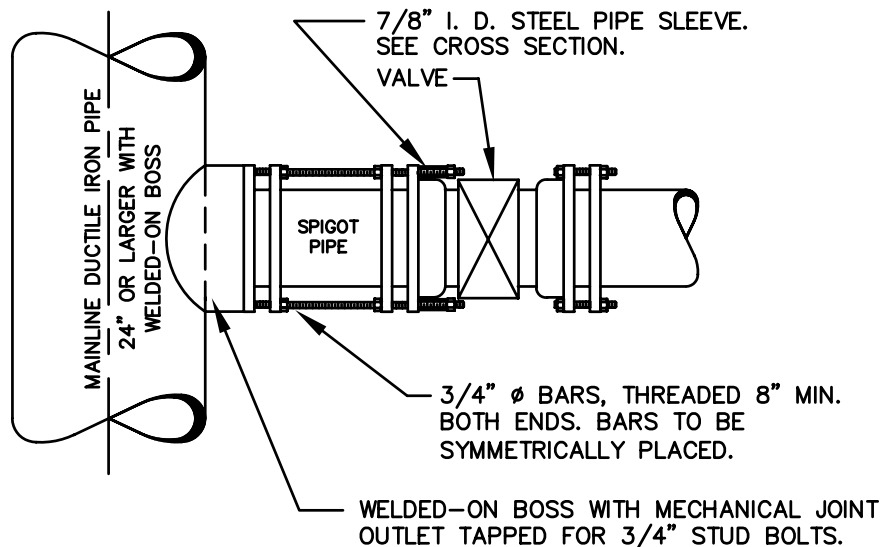
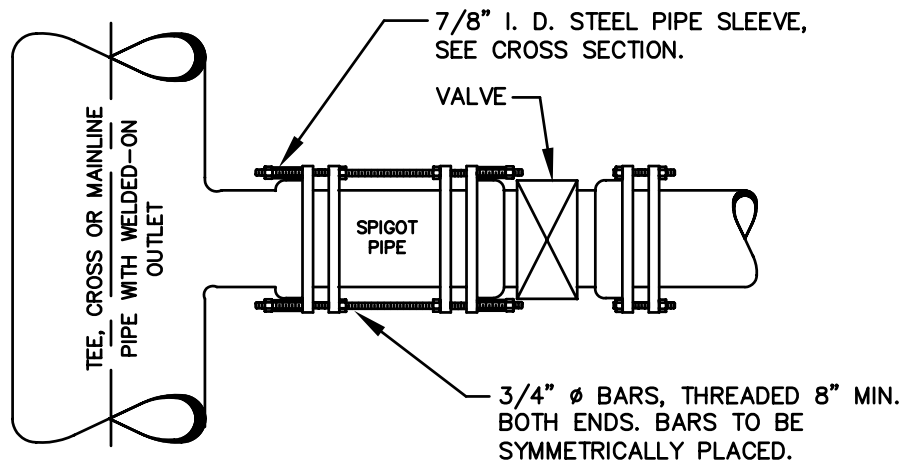
B  
1.9



VALVE SIZE	NUMBER OF 3/4" $\phi$ BARS REQUIRED	MAX. LENGTH OF SPIGOT PIPE
3"	2	24"
4"	2	24"
6"	2	27"
8"	2	27"
10"	4	27"
12"	6	27"
16"	8	36"
20"	12	36"
24"	16	36"
30"	20	42"



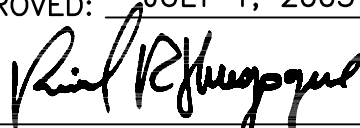
CROSS SECTION  
SLEEVE AND BAR ASSEMBLY



**NOTES:**

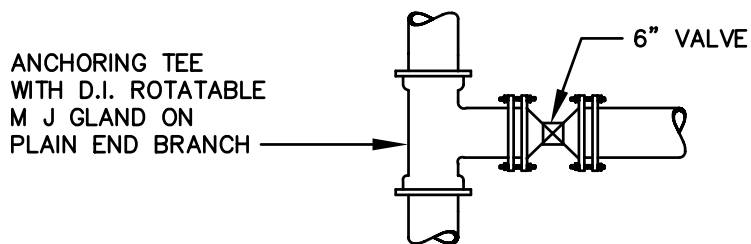
1. USE MECHANICAL JOINT FITTINGS ONLY.
2. COAT BARS AND APPURTENANCES WITH FIELD APPLIED COATING, SEE SPECIFICATIONS.
3. WHEN WELDED-ON BOSS OR WELDED-ON OUTLET IS USED ON 24" AND LARGER DUCTILE IRON PIPE, SEE DETAIL W/3.05.
4. FOR ALTERNATIVE METHOD OF STRAPPING VALVE TO MAIN, SEE DETAIL B/2.3.

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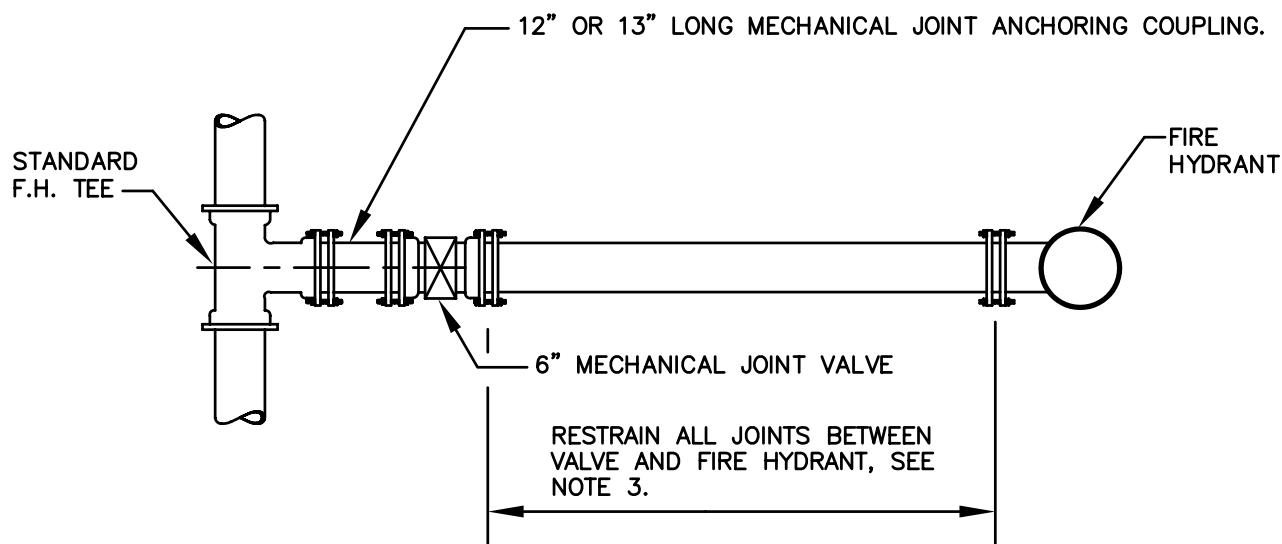
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STANDARD DETAIL  
METHOD OF STRAPPING  
VALVE TO MAIN

B  
2.0



## OPTION FOR USE OF ANCHORING COUPLING



## PLAN

### NOTES:

1. DO NOT BLOCK FIRE HYDRANT TEE OR FIRE HYDRANT.
2. RESTRAIN ALL JOINTS BETWEEN FIRE HYDRANT TEE AND VALVE, USING ANCHORING TEE OR ANCHORING COUPLING.
3. RESTRAIN ALL JOINTS FROM VALVE TO FIRE HYDRANT, SEE DETAILS B/2.2, B/2.2a, B/2.7 OR RESTRAINED JOINT GASKETS, SEE SPECIFICATIONS.
4. PLACE RESTRAINED JOINT PIPE TAPE ON TOP OF PIPE FROM FIRE HYDRANT TEE TO FIRE HYDRANT FOR RESTRAINED JOINT GASKETS ONLY, SEE SPECIFICATIONS.

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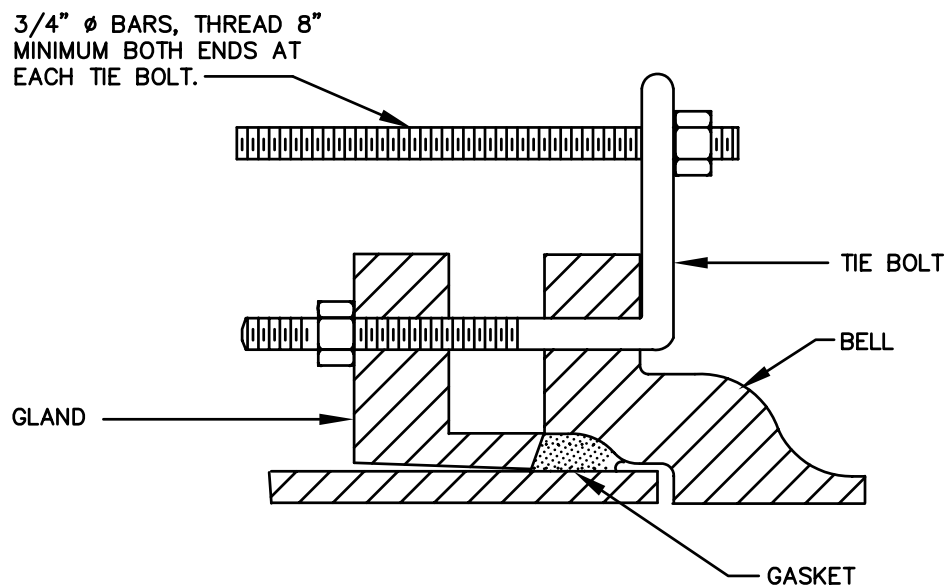
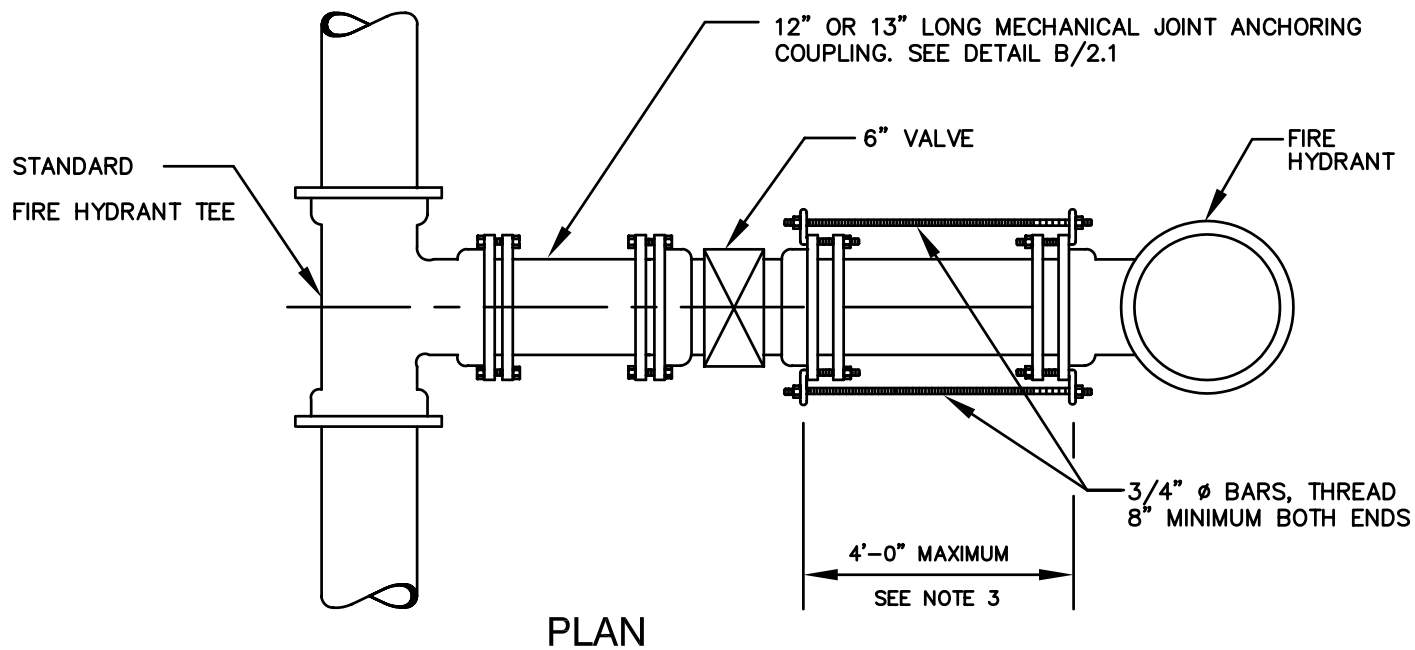
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STANDARD DETAIL

METHOD OF RESTRAINING  
FIRE HYDRANT TO MAIN

B  
2.1



NOTES:

1. USE DUCTILE IRON MECHANICAL JOINT FITTINGS ONLY.
2. COAT BARS AND APPURTENANCES WITH FIELD-APPLIED COATING, SEE SPECIFICATIONS.
3. IF DISTANCE BETWEEN VALVE AND FIRE HYDRANT IS LONGER THAN 4'-0", SEE DETAIL B/2.1, NOTES 3 AND 4.
4. FOR THE NUMBER OF REQUIRED TIE BOLTS, SEE DETAIL B/2.3.

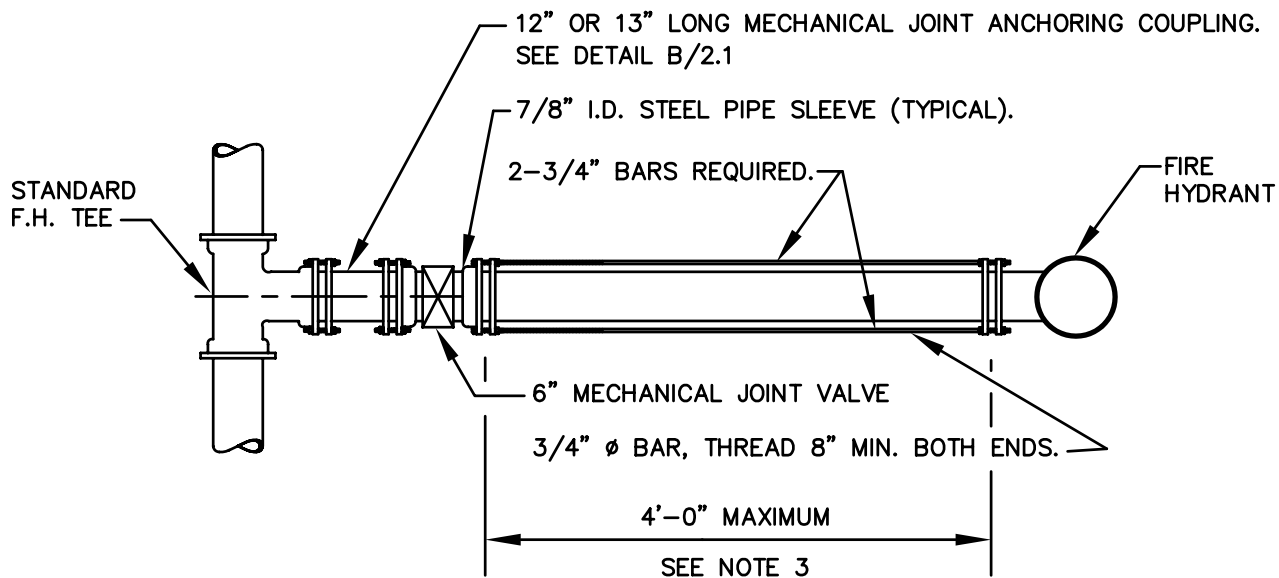
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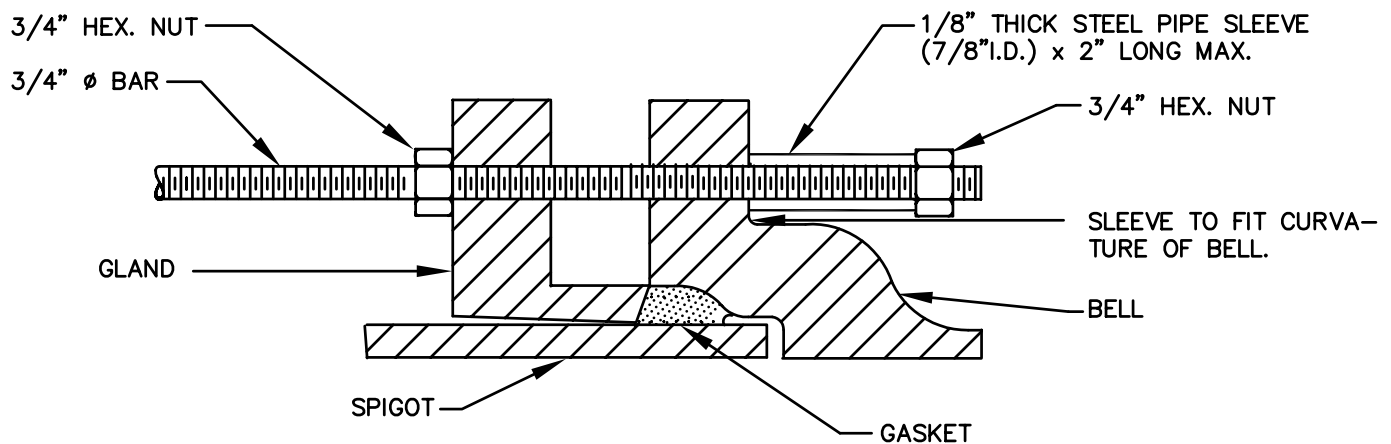
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STANDARD DETAIL  
ALTERNATE METHOD  
OF STRAPPING VALVE  
TO FIRE HYDRANT WITH  
TIE BOLTS.

B  
2.2



### PLAN



### CROSS SECTION SLEEVE AND BAR ASSEMBLY

#### NOTES:

1. USE DUCTILE IRON MECHANICAL JOINT FITTINGS ONLY.
2. COAT BARS AND APPURTENANCES WITH FIELD-APPLIED COATING, SEE SPECIFICATIONS.
3. IF DISTANCE BETWEEN VALVE AND FIRE HYDRANT IS LONGER THAN 4'-0", SEE DETAIL B/2.1, NOTES 3 AND 4.
4. FOR THE NUMBER OF REQUIRED TIE BOLTS, SEE DETAIL B/2.3.

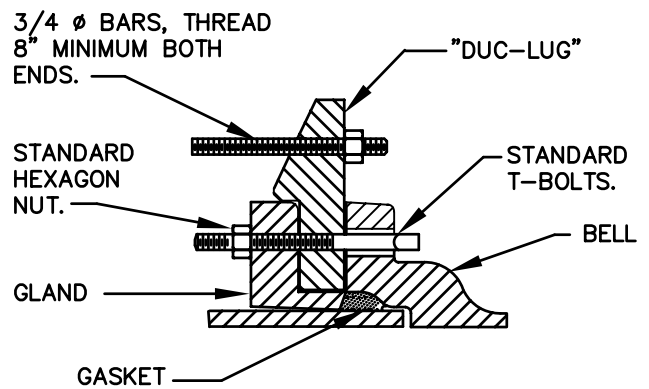
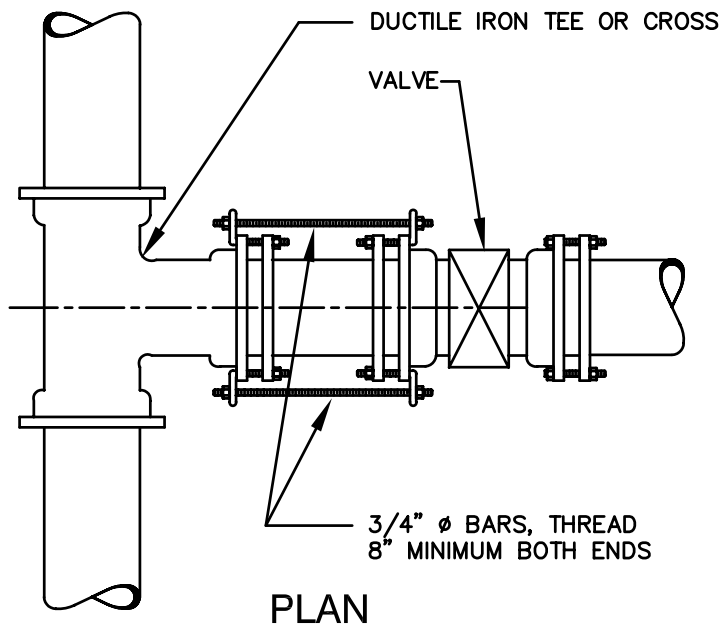
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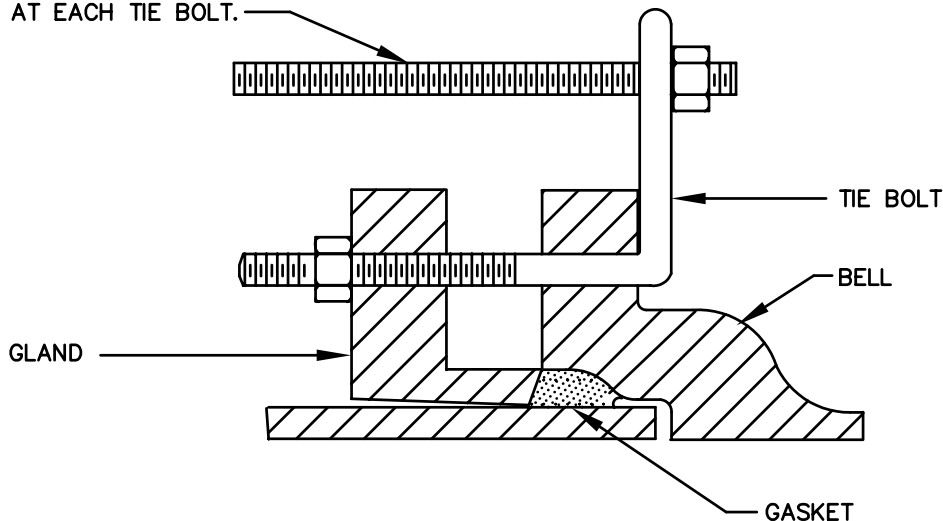
STANDARD DETAIL  
ALTERNATE METHOD  
OF STRAPPING VALVE  
TO FIRE HYDRANT WITH  
TIE BOLTS

B  
2.2a



CROSS SECTION  
DUC-LUG ASSEMBLY

EQUALLY SPACED 3/4"  $\phi$  BARS, THREAD 8" MINIMUM BOTH ENDS AT EACH TIE BOLT.



CROSS SECTION BOLT  
ASSEMBLY

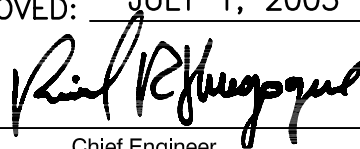
NO. OF TIE BOLTS PER JOINT.

PIPE SIZE	TIE BOLT SIZE	NUMBER OF BOLT REQUIRED
3	5/8"	2
4	3/4"	2
6	3/4"	2
8	3/4"	2
10	3/4"	4
12	3/4"	6
14	3/4"	6
16	3/4"	8
18	3/4"	10
20	3/4"	12
24	3/4"	16
30	3/4"	20

NOTES:

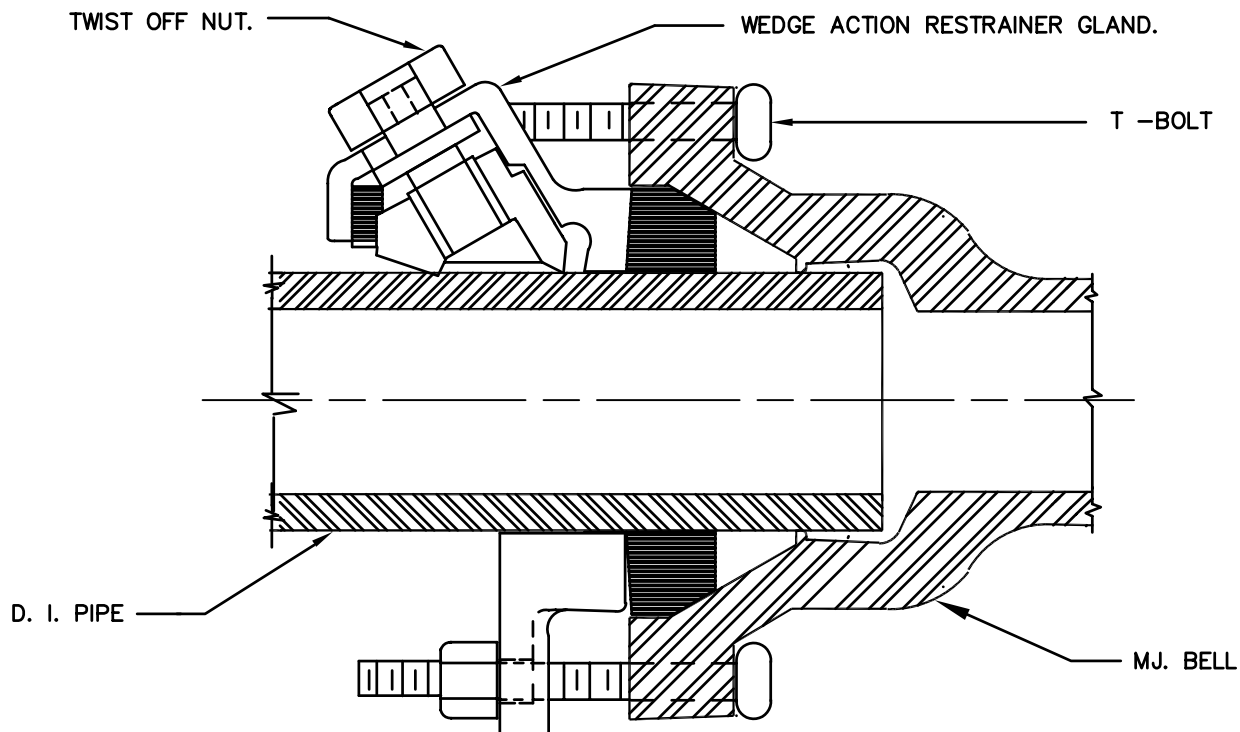
1. USE DUCTILE IRON MECHANICAL JOINT FITTINGS ONLY.
2. COAT BARS AND APPURTENANCES WITH FIELD APPLIED COATING, SEE SPECIFICATIONS.
3. IF WORKING PLUS SURGE PRESSURES ARE HIGHER THAN 250 PSI, SPECIAL DESIGN IS REQUIRED.
4. USE DUC-LUG ONLY WHEN VALVE BODY BELL HAS SLOTTED HOLES. TIGHTEN ALL JOINT T AND TIE BOLTS. THEN CHECK DUC-LUGS. LUGS MUST BE LOOSE, IF TIGHT REPLACE DUC-LUG.

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STANDARD DETAIL  
ALTERNATE METHOD  
OF STRAPPING VALVE  
TO MAIN WITH TIE BOLTS

B  
2.3



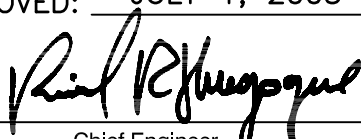
### SPECIFICATIONS

NOMINAL PIPE SIZE (INCHES)	NUMBER OF WEDGES	TOTAL PRESSURE (PSI)	NUMBER OF T BOLTS
3	2	350	4
4	2	350	4
6	3	350	6
8	4	350	6
10	6	350	8
12	8	350	8
14	10	350	10
16	12	350	12
18	12	250	12
20	14	250	14
24	16	250	16
30	20	250	20

### NOTES:

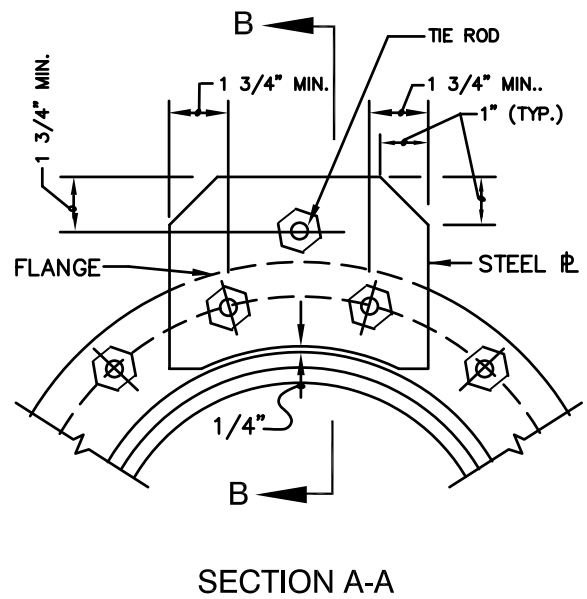
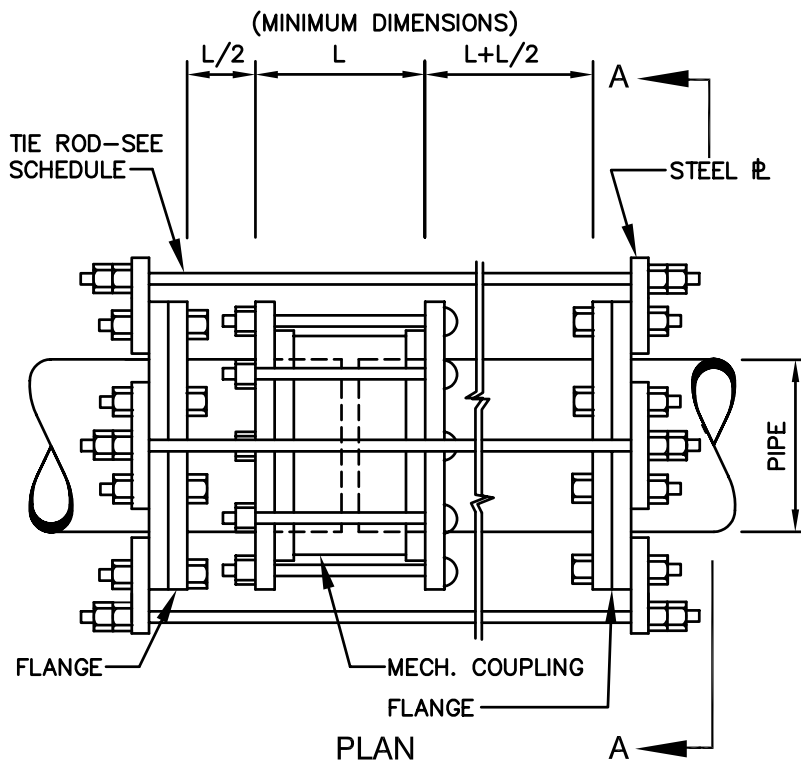
1. TOTAL PRESSURE EQUAL TO OPERATING PRESSURE + SURGE PRESSURE.
2. CONNECTIONS TO EXISTING PIPE: WHERE SIGNIFICANT CORROSION OR GRAPHITIZATION IS EVIDENT, NOTIFY ENGINEER PRIOR TO CONNECTING TO EXISTING PIPE.

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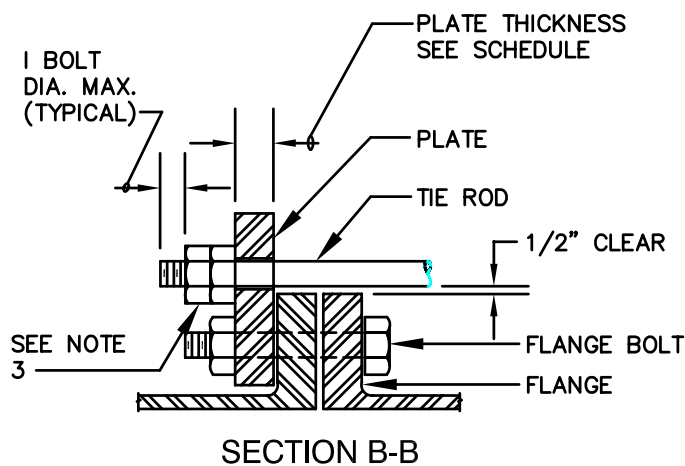
APPROVED: JULY 1, 2005  
  
Chief Engineer

STANDARD DETAIL  
WEDGE ACTION  
RESTRAINER GLAND

B  
2.7



## STRAPPING HARNESS DETAIL



### NOTES:

1. TIE RODS SHALL CONFORM TO ASTM A-588 SPECIFICATION.
2. STEEL PLATE SHALL CONFORM TO ASTM A-36 SPECIFICATION.
3. INSIDE NUT TO BE HAND TIGHT, AND TWO NUTS SHALL BE TIGHTENED AGAINST EACH OTHER.
4. STRAPPING DESIGN INCLUDES SURGE PRESSURE ADDED TO OPERATING PRESSURE IN P.S.I.
5. WHEN THE STRAPPING ASSEMBLY IS LOCATED NEAR THE FLANGED VALVE, PROVIDE A FLANGED SPOOL PIECE (1' MIN. LENGTH) BETWEEN THE VALVE AND ASSEMBLY IN ORDER TO AVOID STRAPPING DIRECTLY TO THE VALVE.

PIPE DIAM.	MAXIMUM OPERATING PRESSURE	NO. OF RODS	DIA. OF RODS IN	PLATE THICKNESS
4"	125	2	3/4"	3/4"
	250	2	3/4"	3/4"
6"	125	2	3/4"	3/4"
	250	2	3/4"	3/4"
8"	125	2	7/8"	1"
	250	2	7/8"	1 1/8"
10"	125	2	7/8"	1 1/8"
	250	3	7/8"	1 1/8"
12"	125	3	7/8"	1 1/8"
	250	4	7/8"	1 1/8"
14"	125	4	7/8"	1 1/4"
	250	4	1"	1 1/4"
16"	125	4	1"	1 1/4"
	250	4	1 1/8"	1 1/2"
18"	125	4	1"	1 1/2"
	250	6	1"	1 1/2"
20"	125	4	1"	1 1/2"
	250	6	1 1/8"	1 1/2"
24"	125	6	1"	1 1/2"
	250	6	1 1/8"	1 3/4"
30"	125	7	1 1/8"	1 3/4"
	250	7	1 1/2"	2"

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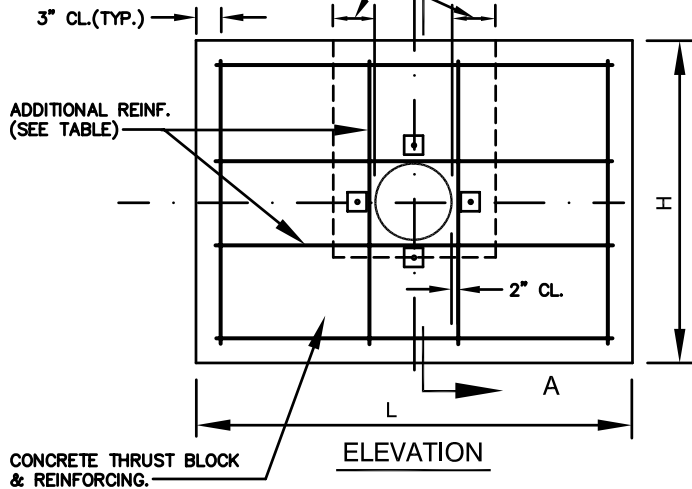
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*Richard P. Thompson*  
Chief Engineer

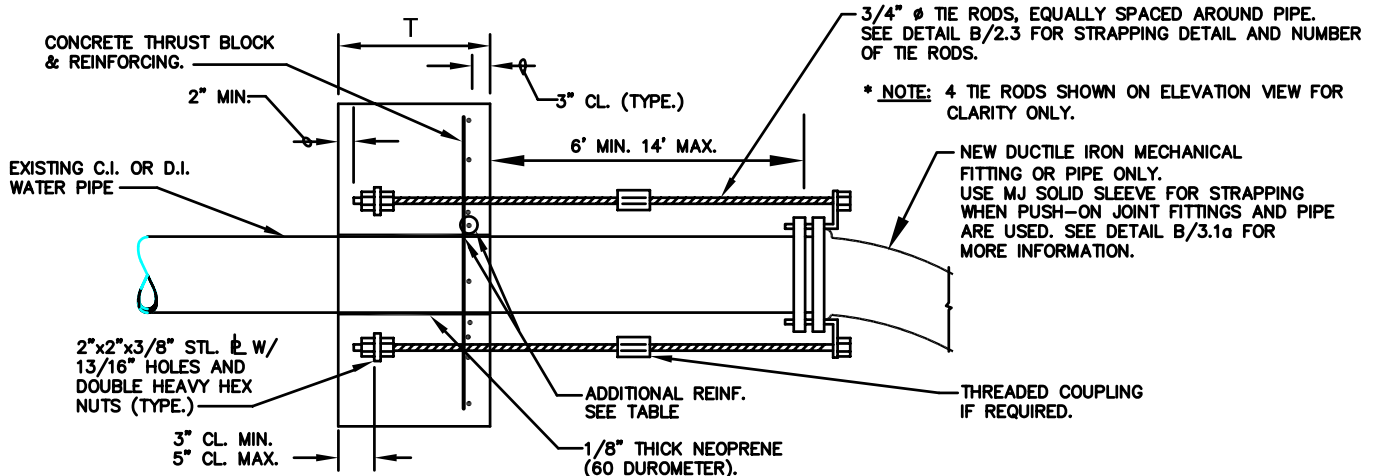
STANDARD DETAIL  
METHOD OF STRAPPING  
MECHANICAL COUPLING  
IN VAULTS AND FACILITIES

B  
3.0

MAX. CLEARANCE BETWEEN THE OUTSIDE  
OF EXISTING PIPE & TRENCH WALL=15"



PIPE DIAMETER INCH	THRUST BLOCK DIMENSIONS			THRUST BLOCK REINF.
	T	H	L	
4 AND 6	1'-2"	2'-6"	3'-6"	#5 @ 12" c/c E.W.+4#5 ADD'L REINF.
8	1'-2"	3'-0"	4'-0"	#5 @ 12" c/c E.W.+4#5 ADD'L REINF.
10	1'-4"	4'-0"	4'-0"	#5 @ 12" c/c E.W.+4#5 ADD'L REINF.
12	1'-4"	5'-0"	5'-0"	#5 @ 12" c/c E.W.+4#5 ADD'L REINF.
14	1'-4"	6'-0"	6'-0"	#5 @ 10" c/c E.W.+4#5 ADD'L REINF.
16	1'-6"	6'-0"	8'-0"	#5 @ 8" c/c E.W.+4#5 ADD'L REINF.
18	1'-6"	6'-0"	11'-0"	#5 @ 6" c/c E.W.+4#5 ADD'L REINF.



#### NOTES:

#### SECTION A-A

1. ALL CONCRETE SHALL BE  $f'_c=4000$  PSI @ 28 DAYS. PIPELINE SHALL NOT BE PRESSURIZED UNTIL CONCRETE STRENGTH REACHES 4000 PSI. AND TRENCH HAS BEEN BACKFILLED.
2. ALL REBARS SHALL BE ASTM A615 GRADE 60.
3. STEEL PLATES SHALL BE ASTM A36.
4. MAINTAIN 2" CLEAR BETWEEN ALL REBARS AND PIPE.
5. COAT ALL EXPOSED STEEL WITH FIELD APPLIED COATING.
6. BOLT CIRCLE FOR 3/4" TIE RODS @ THRUST COLLAR EQUAL BOLT CIRCLE @ TIE BOLTS.
7. TIE RODS SHALL BE PARALLEL TO AXIS OF PIPE.
8. TIE COUPLING, IF NECESSARY, SHALL BE STAR NATIONAL PRODUCTS SUPER STAR TIE COUPLING NO. SS10.
9. IF WORKING PLUS SURGE PRESSURES ARE HIGHER THAN 250 PSI, SPECIAL DESIGN IS REQUIRED.
10. SPECIAL DESIGN IS REQUIRED FOR MAINS LARGER THAN 18 INCH.
11. DEPTH OF FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0". IF SHALLOWER, SPECIAL BLOCK DESIGN IS REQUIRED.
12. ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF BLOCK. IF GROUNDWATER IS ABOVE BOTTOM OF BLOCK, SPECIAL BLOCK DESIGN IS REQUIRED.
13. SOFT OR ORGANIC SOIL CONDITIONS REQUIRE SPECIAL BLOCK DESIGN.
14. REPLACE ALL DISTURBED SOIL BETWEEN NEW FITTING AND CONCRETE COLLAR WITH CRUSHED STONE COMPACTED AS STRUCTURAL FILL.

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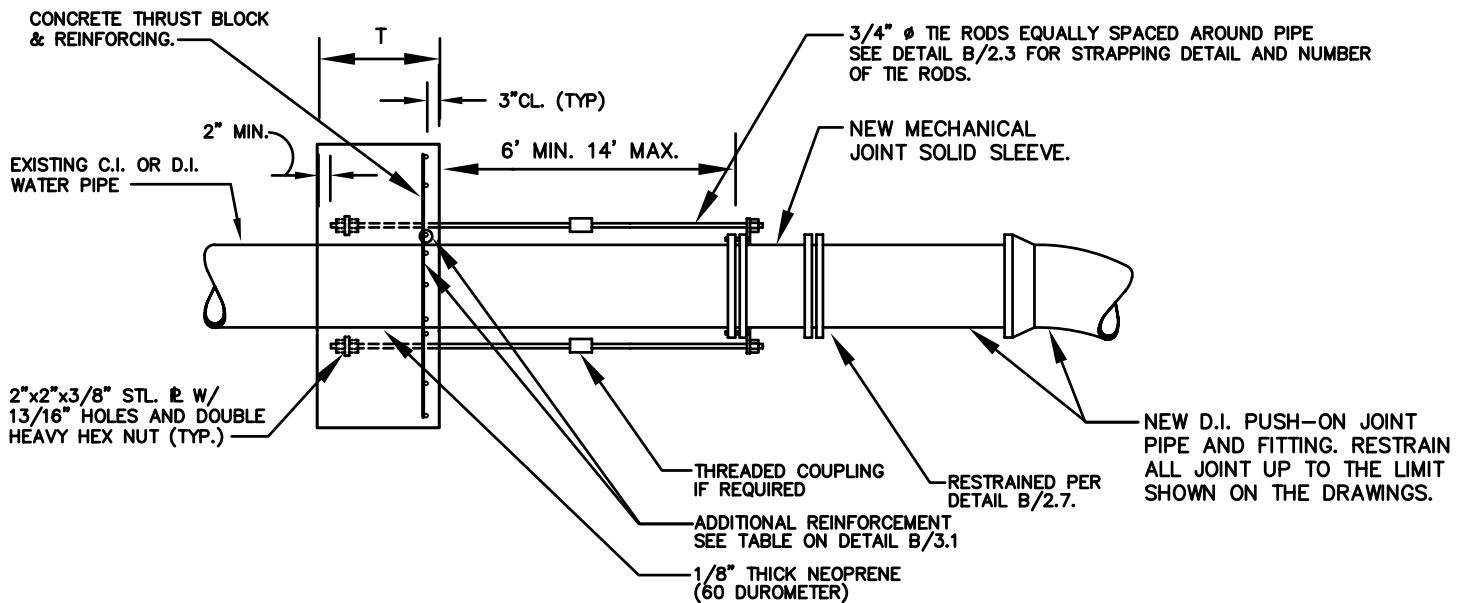
APPROVED: JULY 1, 2005

*Rafael R. Hernandez*  
Chief Engineer

STANDARD DETAIL  
QUICK HARNESSSED CONNECTION  
TO THRUST BLOCKING  
FOR DUCTILE IRON  
OR CAST IRON PIPE

B  
3.1





### SECTION A-A

#### NOTE:

1. FOR CONC. THRUST BLOCK INFORMATION AND NOTES SEE DETAIL B/3.1.

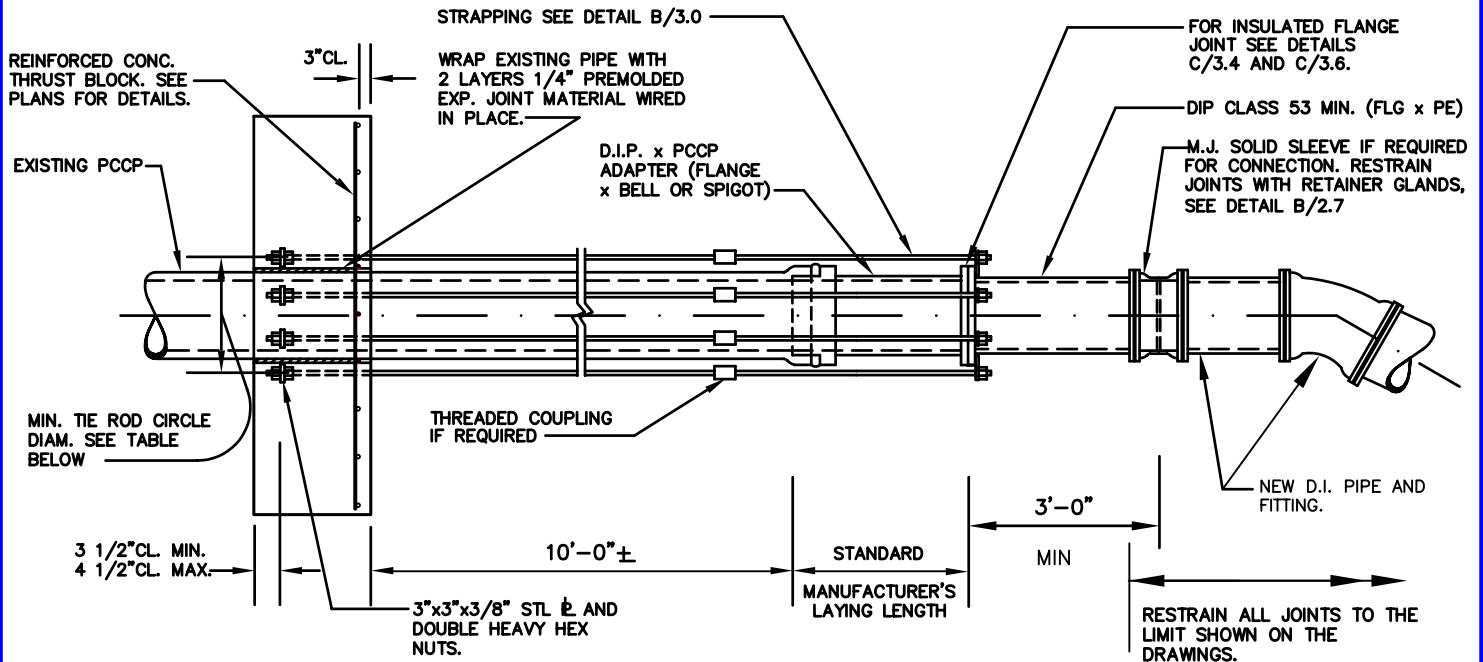
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*Richard R. Thompson*  
Chief Engineer

STANDARD DETAIL  
QUICK HARNESSSED CONNECTION  
TO THRUST BLOCKING  
FOR DUCTILE IRON  
OR CAST IRON PIPE

B  
3.1a



### ELEVATION

#### NOTES

1. DETAIL APPLIES FOR CONNECTING EXISTING PCCP TO NEW BONDED D.I. PIPE ONLY. FOR NON-BONDED DUCTILE IRON PIPE USE DETAIL B/3.1 WITH APPROPRIATE PCCP x M.J. D.I. PIPE ADAPTER.
2. ALL CONCRETE SHALL BE  $f'_c = 4000$  PSI @ 28 DAYS. PIPELINE SHALL NOT BE PRESSURIZED UNTIL CONCRETE STRENGTH REACHES 4000 PSI AND TRENCH HAS BEEN BACKFILLED.
3. ALL REBARS SHALL BE ASTM A615 GRADE 60.
4. STEEL PLATES SHALL BE ASTM A36.
5. MAINTAIN 2" CLEARANCE BETWEEN ALL REBARS AND PIPE.
6. TIE ROD CIRCLE DIAMETER @ THRUST BLOCK SHALL BE AS LISTED IN TABLE BELOW.
7. REPLACE ALL DISTURBED SOIL BETWEEN NEW FITTING AND CONCRETE COLLAR WITH CRUSHED STONE (MSHA GRADE #3 OR 4) COMPACTED AS STRUCTURAL FILL.
8. FIELD VERIFY EXISTING END CONDITIONS AT CONNECTING POINT AND PROVIDE APPROPRIATE PCCP TO DIP ADAPTER.
9. JOINT BETWEEN PCCP AND DIP x PCCP ADAPTER SHALL BE MORTAR-COATED AFTER ASSEMBLY.
10. SEE DETAILS C/3.0, C/3.4 AND C/3.6 FOR INSULATING FLANGE JOINT AND STRAPPING.
11. SEE DETAIL B/3.1 FOR CONCRETE BLOCK INFORMATION. SPECIAL DESIGN IS REQUIRED FOR MAINS LARGER THAN 18 INCH. FOR THRUST CALCULATIONS, JOINT DIAMETER OF PCCP SHALL BE USED.
12. SPECIAL QUICK HARNESSSED CONNECTION DESIGN REQUIRED FOR MAINS LARGER THAN 30 INCH.
13. FIELD COAT ALL EXPOSED STEEL, INSULATING FLANGE JOINT, BOLT ENDS, AND PIPE AS SHOWN ON DETAIL C/3.4.

PIPE DIAM.	MIN. TIE ROD CIRCLE DIAM. IN.
16	28
18	30-1/2
20	32
24	38
30	44

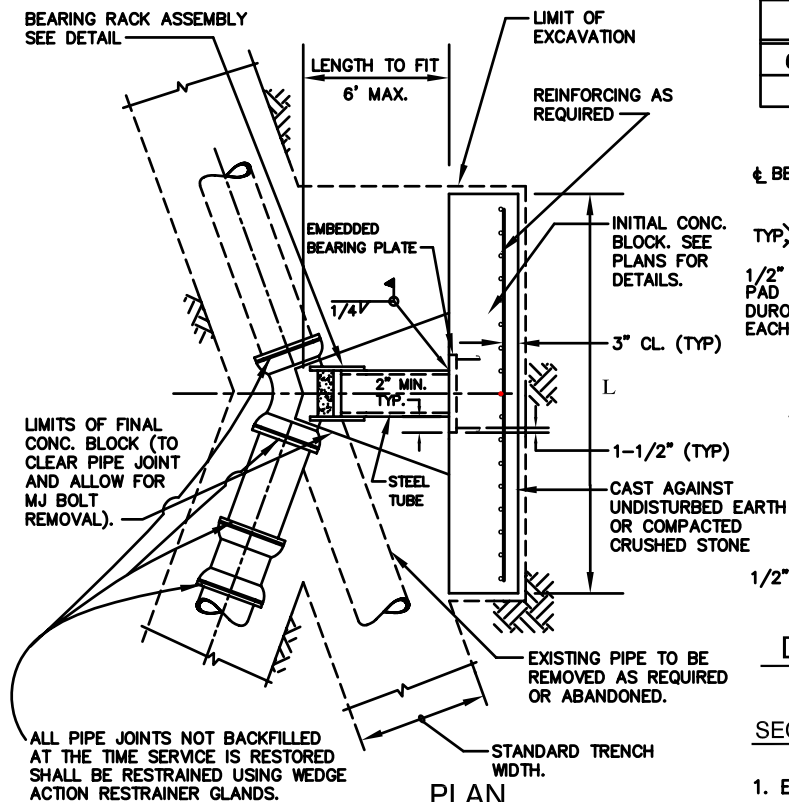
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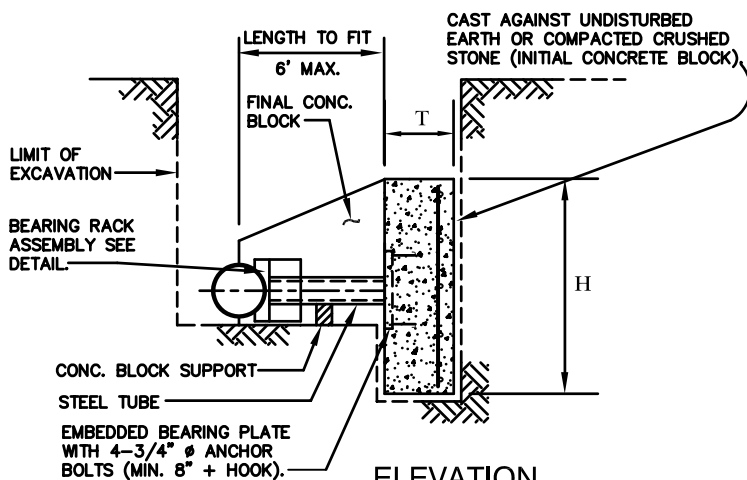
*Paul R. Hargrave*  
Chief Engineer

STANDARD DETAIL  
QUICK HARNESSSED CONNECTION  
TO THRUST BLOCKING  
FOR EXISTING PRESTRESSED  
CONCRETE CYLINDER PIPE

B  
3.1b



PLAN

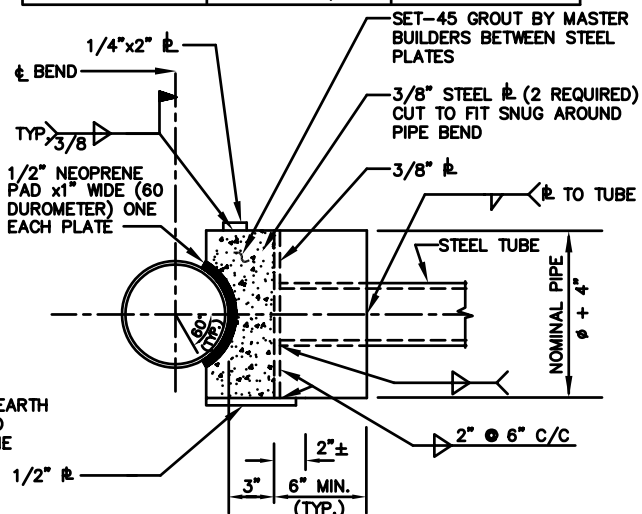


ELEVATION

NOTES:

1. ALL REINFORCING STEEL SHALL CONFORM TO ASTM A-615 GRADE 60.
2. STEEL TUBE SHALL BE ASTM A-500 GRADE B.
3. ALL STEEL PLATE SHALL CONFORM TO ASTM A-36.
4. WELDING SHALL BE 1/4" FILLET WELDS, USING E70XX ELECTRODES UNLESS OTHERWISE SHOWN ON THE DETAILS.
5. IF WORKING PLUS SURGE PRESSURES ARE HIGHER THAN 250 PSI, SPECIAL DESIGN IS REQUIRED.
6. FOR 4" THROUGH 16" PIPE, BLOCK DIMENSIONS L AND H SHALL BE AS PER DETAIL B/1.0; T=1'-0"; REINFORCED WITH #5@6" c/c EACH WAY (3 BARS MIN E.W.).
7. SPECIAL DESIGN IS REQUIRED FOR MAINS LARGER THAN 16 INCH AND FOR 90° BENDS.
8. DUCTILE IRON FITTINGS ONLY.

PIPE DIAM.	STEEL TUBE	BEARING PLATE
6" THRU 12"	TS 4x4x1/4	16"x16"x1"
16"	TS 8x8x1/4	20"x20"x1"



DETAIL - BEARING RACK ASSEMBLY

SEQUENCE OF CONSTRUCTION:

1. EXCAVATE AT LOCATION OF PROPOSED BEND AND BLOCK.
2. CAST INITIAL CONCRETE BLOCK AGAINST UNDISTURBED FACE OF EXCAVATION. CONCRETE SHALL OBTAIN A STRENGTH OF 4000 PSI BEFORE PROCEEDING WITH REMAINDER OF CONSTRUCTION SEQUENCE. TYPE III CEMENT CAN BE USED TO ACHIEVE EARLY REQUIRED STRENGTH.
3. DISCONTINUE SERVICE. INSTALL PROPOSED BEND AND CONNECT NEW WATER MAIN. ABANDON THE EXISTING WATER LINE AS REQUIRED.
4. ADJUST LENGTH OF THE STEEL STRUCTURAL TUBE AND FIELD WELD TO BEARING PLATE EMBEDDED IN INITIAL CONCRETE BLOCK AS SHOWN ON DETAIL. CENTERLINE OF STEEL TUBE SHALL BE ALIGNED WITH BEND CENTERLINE.
5. ATTACH NEOPRENE STRIPS TO BEARING SURFACE OF PIPE BEND.
6. ALIGN BEARING RACK AND POSITION AGAINST PIPE TO PROVIDE FIRM BEARING AGAINST NEOPRENE STRIPS ON PIPE BEND. WELD BEARING RACK ASSEMBLY TO BEAM AS REQUIRED.
7. FILL POCKET BETWEEN PIPE BEND AND BEARING RACK WITH SET-45 GROUT BY MASTER BUILDERS, ALLOW STRENGTH TO REACH  $f'_c=1000$  PSI PRIOR TO RESTORING SERVICE.
8. BACKFILL ADJACENT PIPES EACH SIDE OF BEND ABOVE SPRING LINE AS MUCH AS PRACTICAL PRIOR TO PRESSURIZATION.
9. RESTORE SERVICE.
10. CAST FINAL CONCRETE BLOCK AFTER TESTING IS COMPLETED. IF POSSIBLE, CAST FINAL BLOCK BEFORE RESTORING SERVICES.
11. BACKFILL EXCAVATION.

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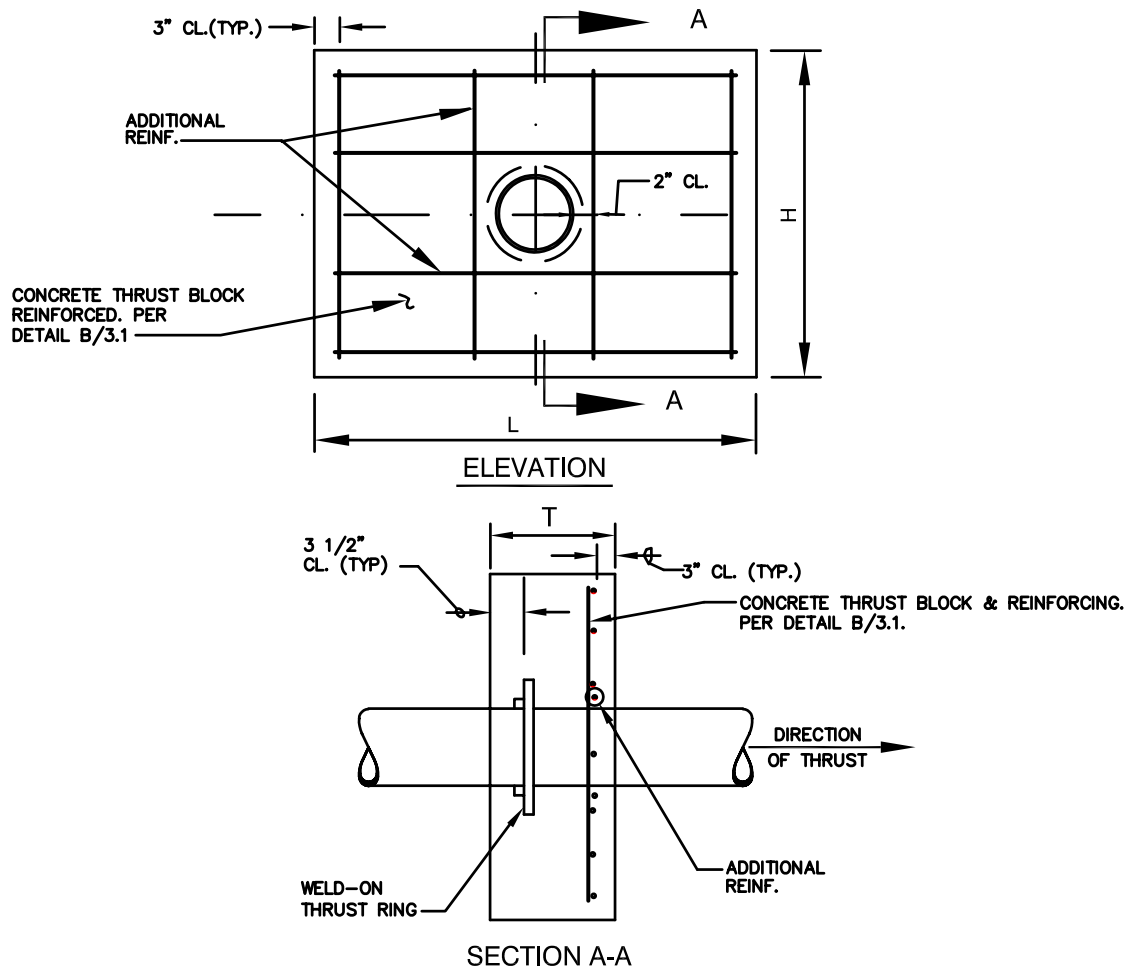
APPROVED: JULY 1, 2005

*Rafael R. Hernandez*  
Chief Engineer

STANDARD DETAIL

QUICK BLOCK  
DIRECT THRUST


B  
3.2



# NOTES:

1. SEE DETAIL B/3.1 FOR THRUST BLOCKING SIZE AND REINFORCING.
2. ALL CONCRETE SHALL BE  $f'_c=4000$  PSI @ 28 DAYS. PIPE LINE SHALL NOT BE PRESSURIZED UNTIL CONCRETE STRENGTH REACHES 4000 PSI. AND TRENCH HAS BEEN BACKFILLED.
3. ALL REBARs SHALL BE ASTM A615 GRADE 60.
4. MAINTAIN 2" CLEAR BETWEEN ALL REBARs AND PIPE.
5. WELD-ON THRUST RINGS AND PIPE TO WHICH THEY ARE ATTACHED SHALL BE DESIGNED BY THE PIPE MANUFACTURER FOR THRUST EQUIVALENT TO THE WATER MAIN PRESSURE OF 250 PSI MIN. THE AREA OF THE RING SHALL BE PROPORTIONED SUCH THAT THE BEARING STRESS ON THE CONC. DOES NOT EXCEED 1000 PSI.
6. THRUST RING SHALL BE LOCATED 2'-6" MINIMUM FROM END OF PIPE.
7. SPECIAL DESIGN IS REQUIRED:
  - a. IN CASE WHEN THRUST FORCE CAN ACT IN EITHER DIRECTION. ONLY WELD-ON THRUST RING DESIGNED FOR BI-DIRECTIONAL THRUST SHALL BE USED AND SHALL BE PLACED AT THE MID DEPTH OF THE CONC. THRUST BLOCK.
  - b. IF WORKING PLUS SURGE PRESSURES ARE HIGHER THAN 250 PSI.
  - c. FOR MAINS LARGER THAN 18 INCH.
  - d. IF DEPTH FROM FINISHED GRADE TO TOP OF PIPE IS SHALLOWER THAN 4'-0".
  - e. IF GROUNDWATER IS ABOVE BOTTOM OF BLOCK.
  - f. IF SOFT OR ORGANIC SOIL CONDITIONS EXIST.
8. REPLACE ALL DISTURBED SOIL ON THE THRUST SIDE OF THE BLOCK WITH CRUSHED STONE COMPACTED AS STRUCTURAL FILL.
9. DUCTILE IRON PIPE ONLY.

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Chief Engineer

STANDARD DETAIL  
CONCRETE THRUST BLOCK  
WITH WELD-ON THRUST RING  
ON DUCTILE IRON PIPE

B  
3.3