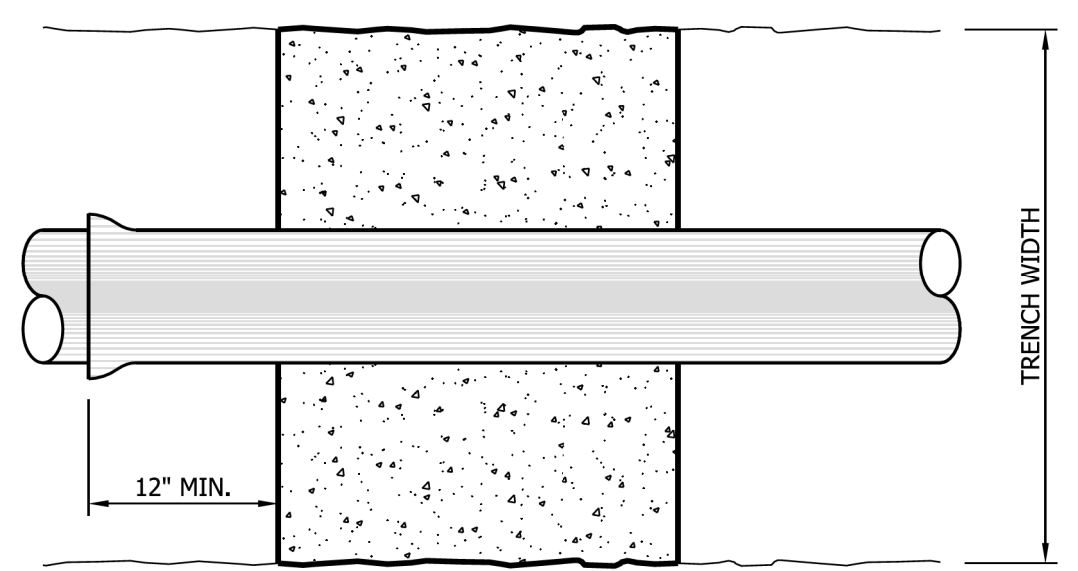


PROJECT REFERENCE NO.	SHEET NO.
U-4906	UC-31
DESIGNED BY: SHF	
DRAWN BY: SHF	
CHECKED BY: KCZ	
APPROVED BY: KCZ	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151 UTILITY CONSTRUCTION PLANS ONLY	

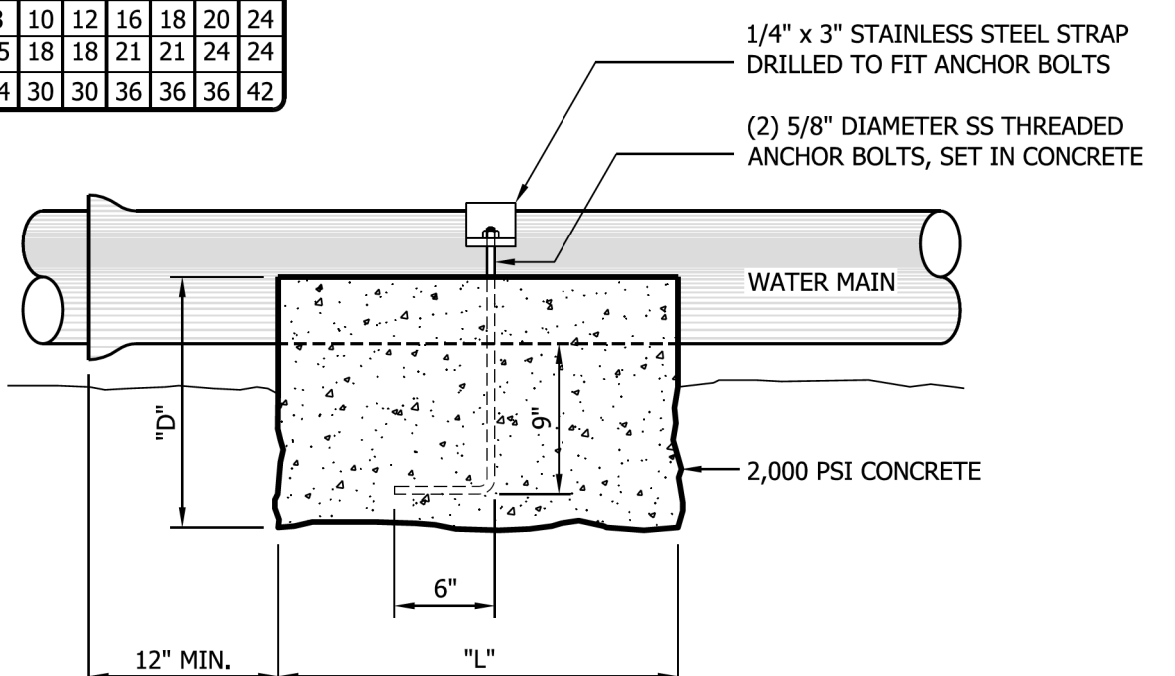
**UTILITY CONSTRUCTION**

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

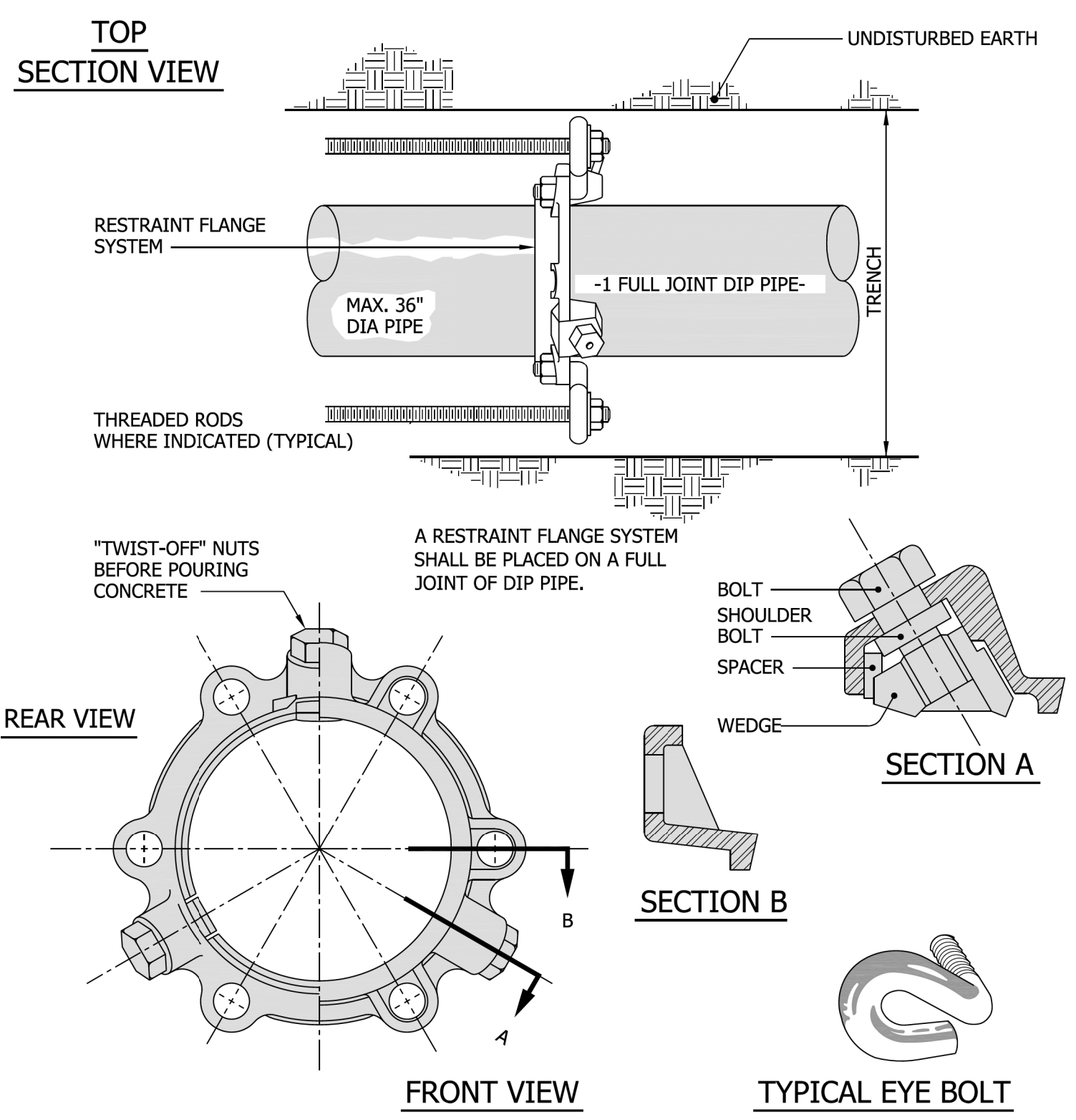
**Weston & Sampson**  
 WSE of North Carolina, PC  
 598 East Chatham Street Suite 137 Cary, NC 27511  
 Phone: 919.297.0220 Fax: 919.297.0221  
 NC License: C-4647



STRAIGHT PIPE	
SIZE	6 8 10 12 16 18 20 24
"D"	15 15 18 18 21 21 24 24
"L"	24 24 30 30 36 36 36 42

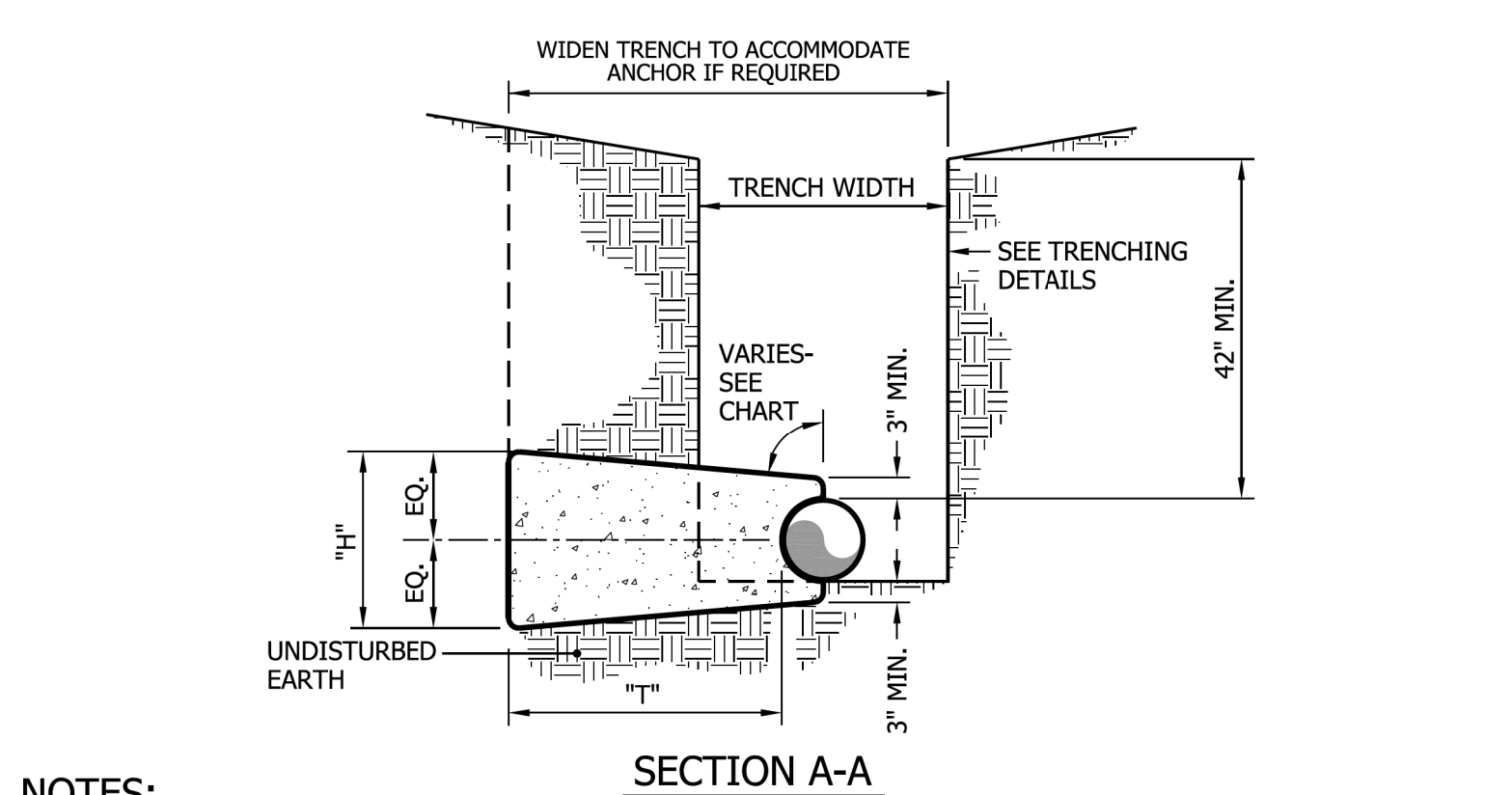
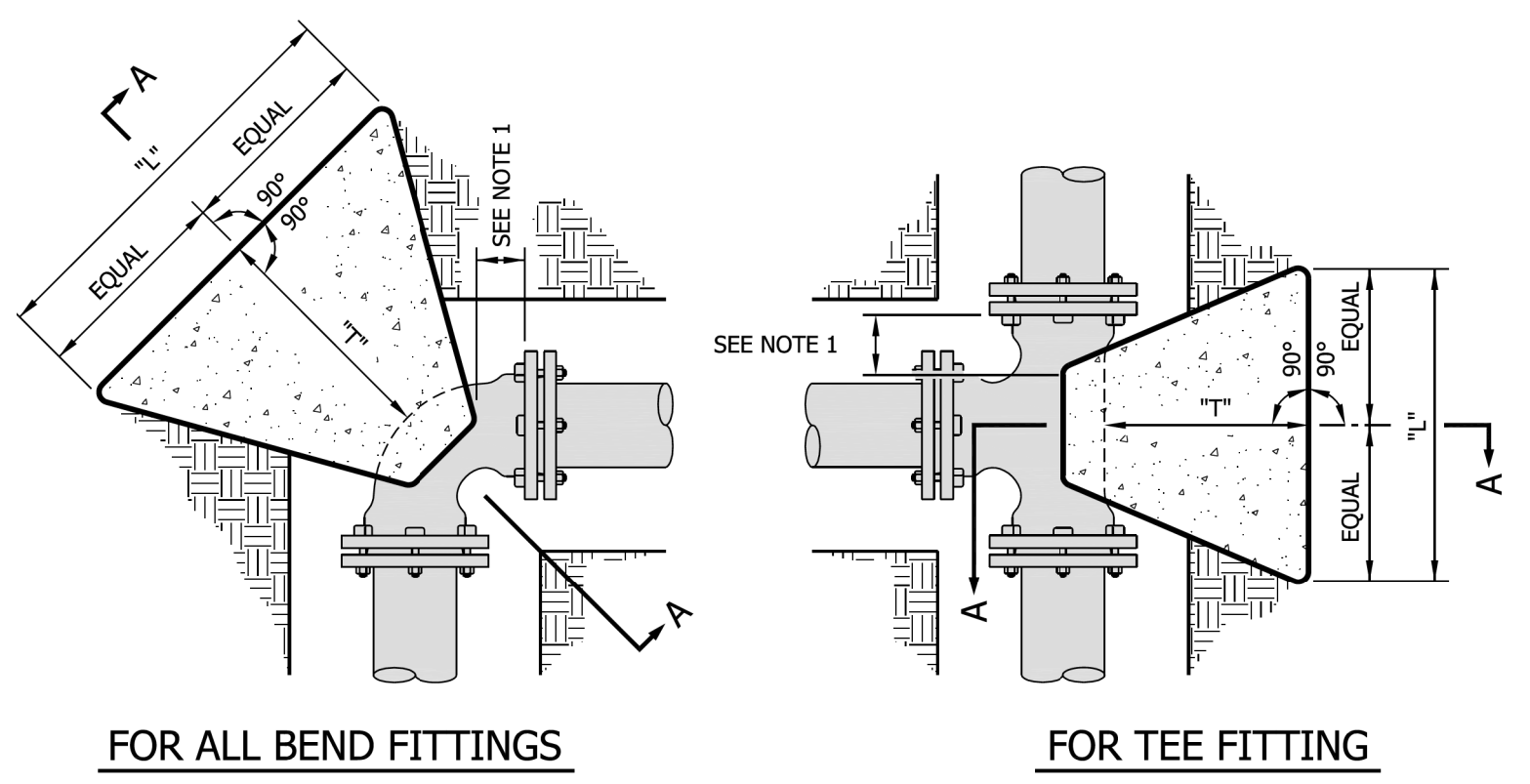


**STANDARD ANCHOR BLOCK DETAIL**  
NOT TO SCALE



- NOTES:  
 1. BACKFILL AND COMPACT IN 6" LAYERS.  
 2. PLACE RESTRAINT FLANGE ON ONE FULL JOINT OF PIPE.

**BLOCKING WITH RESTRAINT FLANGE SYSTEM**  
NOT TO SCALE



- NOTES:**
- CONCRETE BLOCKING IS TO BE FORMED TO ENSURE ACCESSIBILITY TO FITTINGS AND POURED AGAINST UNDISTURBED EARTH.
  - FITTINGS ARE TO BE COMPLETELY WRAPPED WITH PLASTIC, PRIOR TO POURING CONCRETE.
  - CONCRETE TO BE MINIMUM 3,000 PSI. @ 28 DAYS.
  - WHEN SACKRETE IS TO BE USED, IT SHALL BE PROPERLY MIXED PER MANUFACTURER SPECIFICATIONS.

**BLOCKING DETAIL FOR HORIZONTAL BENDS AND TEE**  
NOT TO SCALE

TEST PRESSURE = 150 P.S.I.

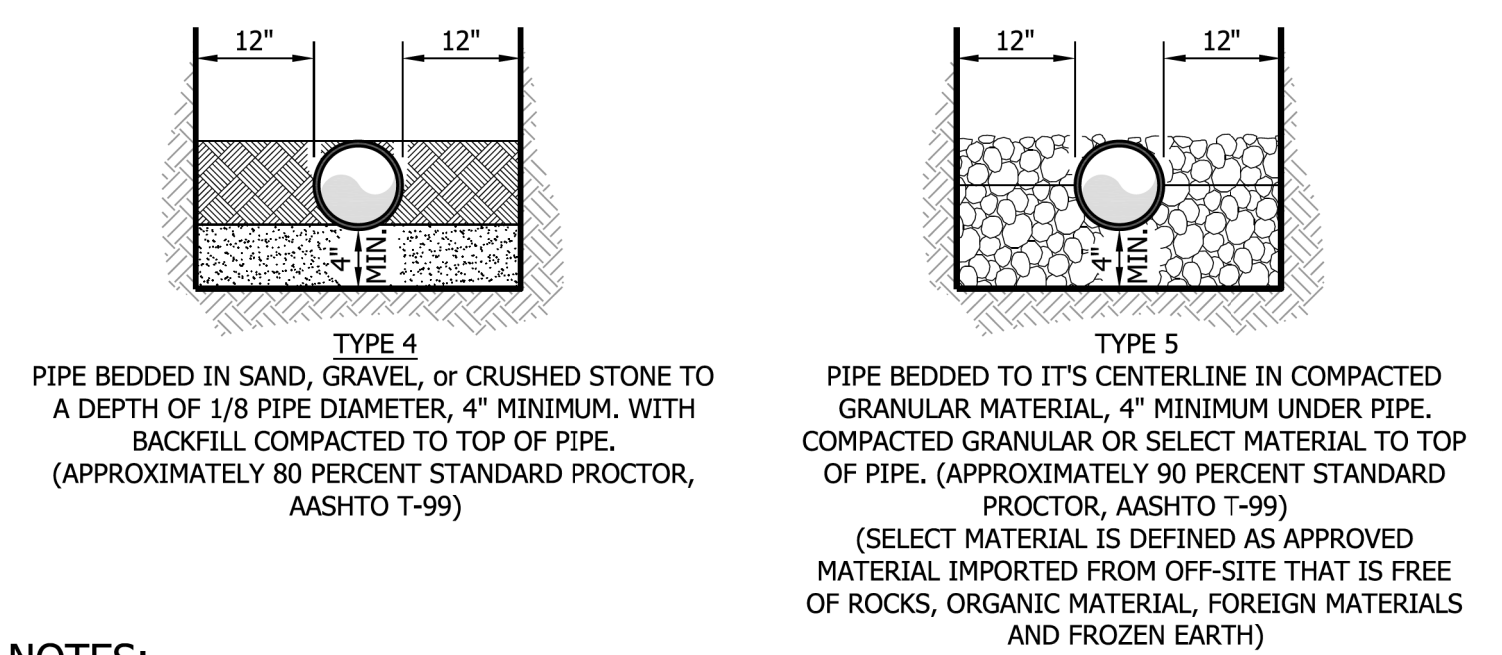
PIPE SIZE	TYPE FITTING	DIMENSIONS (Ft.)			VOLUME CONCRETE CU. YD.
		"L"	"H"	"T"	
<4 INCHES	11 1/4°	---	---	---	---
	22 1/2°	1.00	1.00	1.50	0.06
	45°	1.00	1.00	1.50	0.06
	90°	1.00	1.00	2.50	0.09
	TEE	1.00	1.00	2.00	0.07
4 INCHES	11 1/4°	1.00	1.00	2.50	0.09
	22 1/2°	1.00	1.00	2.50	0.09
	45°	1.00	1.00	2.50	0.09
	90°	1.50	1.50	2.50	0.15
	TEE	1.50	1.50	2.00	0.12
6 INCHES	11 1/4°	1.50	1.50	2.50	0.15
	22 1/2°	1.50	1.50	2.50	0.15
	45°	1.50	1.50	2.50	0.15
	90°	2.00	2.00	3.00	0.28
	TEE	2.00	2.00	2.50	0.23
8 INCHES	11 1/4°	2.00	2.00	2.50	0.23
	22 1/2°	2.00	2.00	2.50	0.23
	45°	2.00	2.00	2.75	0.25
	90°	3.00	2.00	3.00	0.39
	TEE	3.00	2.00	2.50	0.32
12 INCHES	11 1/4°	2.00	2.00	3.00	0.28
	22 1/2°	2.00	2.00	3.00	0.28
	45°	3.00	2.50	3.00	0.47
	90°	4.50	3.00	3.50	0.94
	TEE	4.50	3.00	3.00	0.81
16 INCHES	11 1/4°	2.00	2.00	3.00	0.28
	22 1/2°	2.00	2.00	3.00	0.39
	45°	4.00	3.00	3.50	0.84
	90°	6.50	3.50	3.50	1.54
	TEE	6.50	3.50	3.00	1.32

TEST PRESSURE = 200 P.S.I.

PIPE SIZE	TYPE FITTING	DIMENSIONS (Ft.)			VOLUME CONCRETE CU. YD.
		"L"	"H"	"T"	
<4 INCHES	11 1/4°	1.00	1.00	1.00	0.04
	22 1/2°	1.00	1.00	1.50	0.06
	45°	1.00	1.00	1.50	0.06
	90°	1.50	1.50	2.50	0.15
	TEE	1.50	1.50	2.00	0.12
4 INCHES	11 1/4°	1.00	1.00	2.50	0.09
	22 1/2°	1.00	1.00	2.50	0.09
	45°	1.50	1.50	2.50	0.15
	90°	1.50	1.50	2.50	0.15
	TEE	1.50	1.50	2.00	0.12
6 INCHES	11 1/4°	1.50	1.50	2.50	0.15
	22 1/2°	1.50	1.50	2.50	0.15
	45°	1.50	1.50	2.50	0.15
	90°	2.50	2.00	3.00	0.33
	TEE	2.50	2.00	2.50	0.28
8 INCHES	11 1/4°	2.00	2.00	2.50	0.23
	22 1/2°	2.00	2.00	2.50	0.23
	45°	2.00	2.00	2.50	0.23
	90°	4.00	2.00	3.00	0.50
	TEE	4.00	2.00	2.50	0.42
12 INCHES	11 1/4°	2.00	2.00	3.00	0.28
	22 1/2°	3.00	2.00	3.00	0.39
	45°	4.00	2.50	3.00	0.61
	90°	5.50	3.00	3.50	1.13
	TEE	5.50	3.00	3.00	0.97
16 INCHES	11 1/4°	2.00	2.00	3.00	0.28
	22 1/2°	4.00	2.00	3.00	0.50
	45°	5.50	3.00	3.50	1.13
	90°	7.50	4.00	3.50	2.01
	TEE	7.50	4.00	3.00	1.72

- CHART NOTES:**
- IF BLOCKING EXCAVATION IS IN LIGHTLY COMPACTED FILL AREAS, OR IN AREAS WHERE BOULDERS OR STUMPS HAVE BEEN REMOVED, BLOCKING SIZE MUST BE RE-SIZED FOR THE SPECIFIC LOCATION/CIRCUMSTANCE BY A NC LICENSED PROFESSIONAL ENGINEER.
  - BLOCKING SIZES SHOWN IN THESE TABLES ASSUME THE FOLLOWING:
    - BLOCKING IS CONSTRUCTED IN RESIDUAL SOILS AS SHOWN IN DETAIL
    - SOIL BEARING PRESSURE = 2000 PSF
    - VELOCITY OF FLOW = 15 FPS
  - THIS DETAIL NOT APPLICABLE TO REDUCING BENDS.
  - NEITHER THE WEIGHT OF THE CONCRETE BLOCKING NOR FRICTION BETWEEN CONCRETE BLOCKING AND SOIL WAS ADDED INTO BLOCKING SIZES COMPUTATION. THEREFORE, BLOCKING SIZE IS CONSERVATIVE.

**BLOCKING DETAIL FOR HORIZONTAL BENDS AND TEE**  
NOT TO SCALE



- NOTES:**
- FOR NORMAL PIPE SIZES 14 INCH AND LARGER, CONSIDERATION SHOULD BE GIVEN TO THE USE OF LAYING CONDITIONS OTHER THAN TYPE.
  - CONSIDERATION OF THE PIPE-ZONE EMBEDMENT CONDITIONS INCLUDED IN THIS FIGURE MAY BE INFLUENCED BY FACTORS OTHER THAN PIPE STRENGTH. FOR ADDITIONAL INFORMATION ON PIPE BEDDING AND BACKFILL, SEE ANSI/AWWA C600.

**WATER MAIN EMBEDMENT DETAILS**  
NOT TO SCALE

8/17/99  
 4/15/2020  
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DETAILS APPLY TO CITY OF JACKSONVILLE FACILITIES