

Shoulder Work on Undivided Highways

SPEED	SIGN SPACING (ft.)		TAPER LENGTH (ft.)		OPTIONAL BUFFER LENGTH (ft.) (B)	CHANNELIZER SPACING (ft.)	
	Undivided (S)	Divided (S)	Shoulder (T1)	Lane (T2)		Buffer/Work Areas	Buffer/Work Areas
0-35	200	-	70	-	120	35	50
40-45	350	-	150	-	220	40	100
50-55	500	-	185	-	335	50	100
60-70	1000	-	235	-	550	60	100

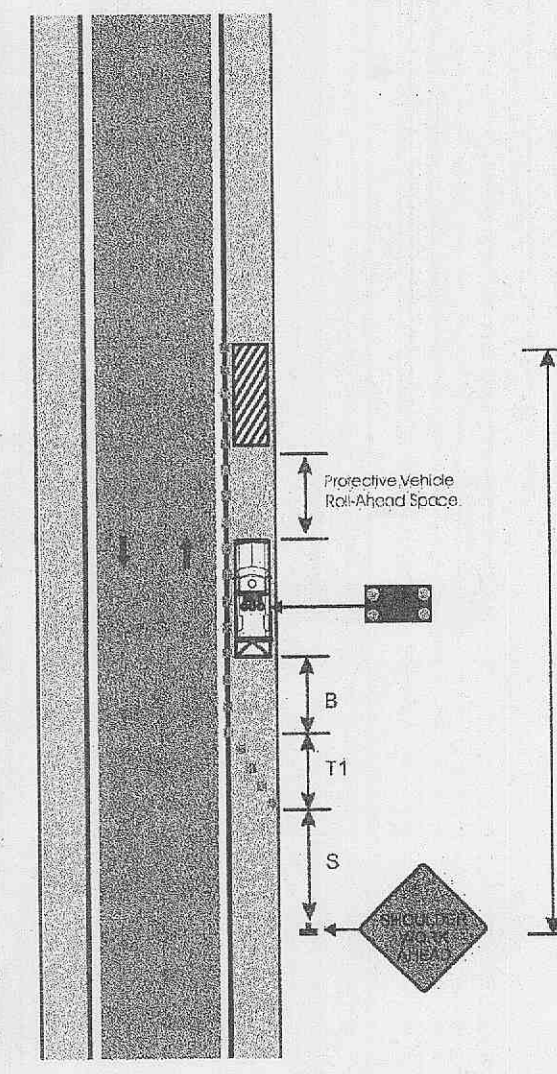
1 Shoulder taper length based on 10 ft. (standard shoulder width) offset. 2 Lane taper length based on 12 ft. (standard lane width) offset.

Lane Closure on Two-Lane Highways Using Flaggers

SPEED	SIGN SPACING (ft.)		TAPER LENGTH (ft.)		OPTIONAL BUFFER LENGTH (ft.) (B)	CHANNELIZER SPACING (ft.)	
	Undivided (S)	Divided (S)	Shoulder (T1)	Lane (T2)		Buffer/Work Areas	Buffer/Work Areas
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40-45	350	-	150	-	220	40	100
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60-70	1000	-	235	-	550	60	100

1 Shoulder taper length based on 10 ft. (standard shoulder width) offset. 2 Lane taper length based on 12 ft. (standard lane width) offset.

Notes:
In addition to shoulder work, this typical application is applicable to work beyond shoulder where vehicles and equipment are parked on the shoulder.
A protective vehicle shall be used while work is in progress. The protective vehicle should be equipped with a TMA and positioned at least 150 ft. in advance of the work space.
If encroachment onto driving surface occurs and there is not 10 ft. of driving surface available for the lane of traffic, that traffic lane shall be closed. Refer to appropriate lane closure typical applications.
If an arrow panel is used for an operation on the shoulder, the caution mode shall be displayed.
For short duration of mobile operations, signs, channelization devices and protective vehicles may be reduced or eliminated if a work vehicle with activated rotating lights or strobe lights is used. However, if limited sight distance exists in a stationary operation or workers are on foot, a protective vehicle should be used. This protective vehicle should be equipped with a TMA and truck mounted flashing arrow panel and positioned at least 150 ft. in advance of the work space or work vehicle as applicable. If a protective vehicle is used, a vehicle mounted sign shall be mounted at a recommended height of 48 in. above the road surface.
For work beyond shoulder, where vehicles and equipment are parked on the shoulder, the protective vehicle may be eliminated if a work vehicle with activated rotating lights or strobe lights is used.
Additional warning signs shall be erected at each intersection with another state highway within the work zone. Upon the discretion of the supervisor, additional warning signs may be erected at other intersections within the work zone.
Other appropriate signs may be used in lieu of SHOULDER WORK AHEAD sign.



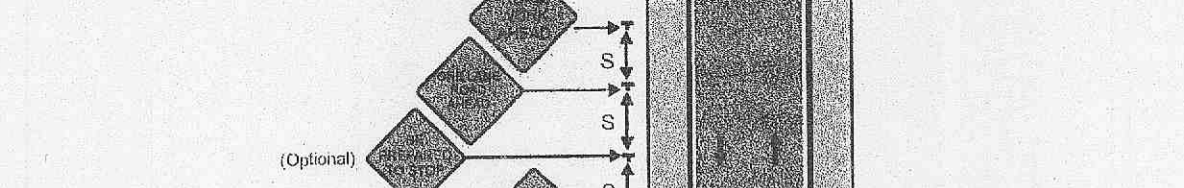
Lane Closure on Two-Lane Highways Using Flaggers

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	Undivided (S)	Divided (S)	Shoulder (T1)	Lane (T2)		Buffer/Work Areas	Buffer/Work Areas
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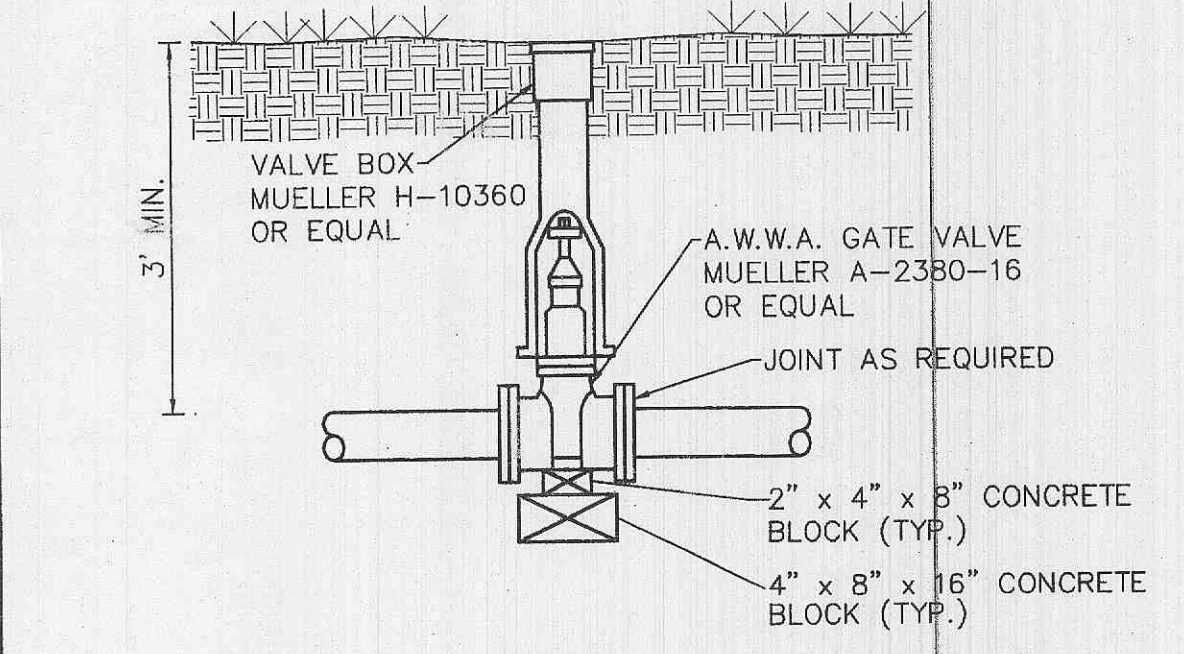
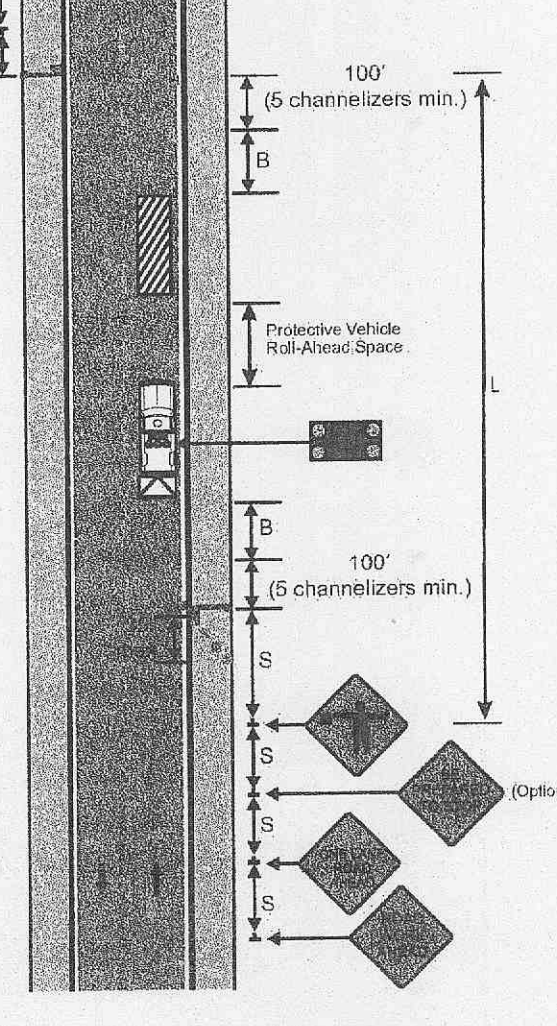
1 Shoulder taper length based on 10 ft. (standard shoulder width) offset. 2 Lane taper length based on 12 ft. (standard lane width) offset.

TYPE ROADWAY SIGN HEIGHT MAXIMUM WORK ZONE LENGTH (L)

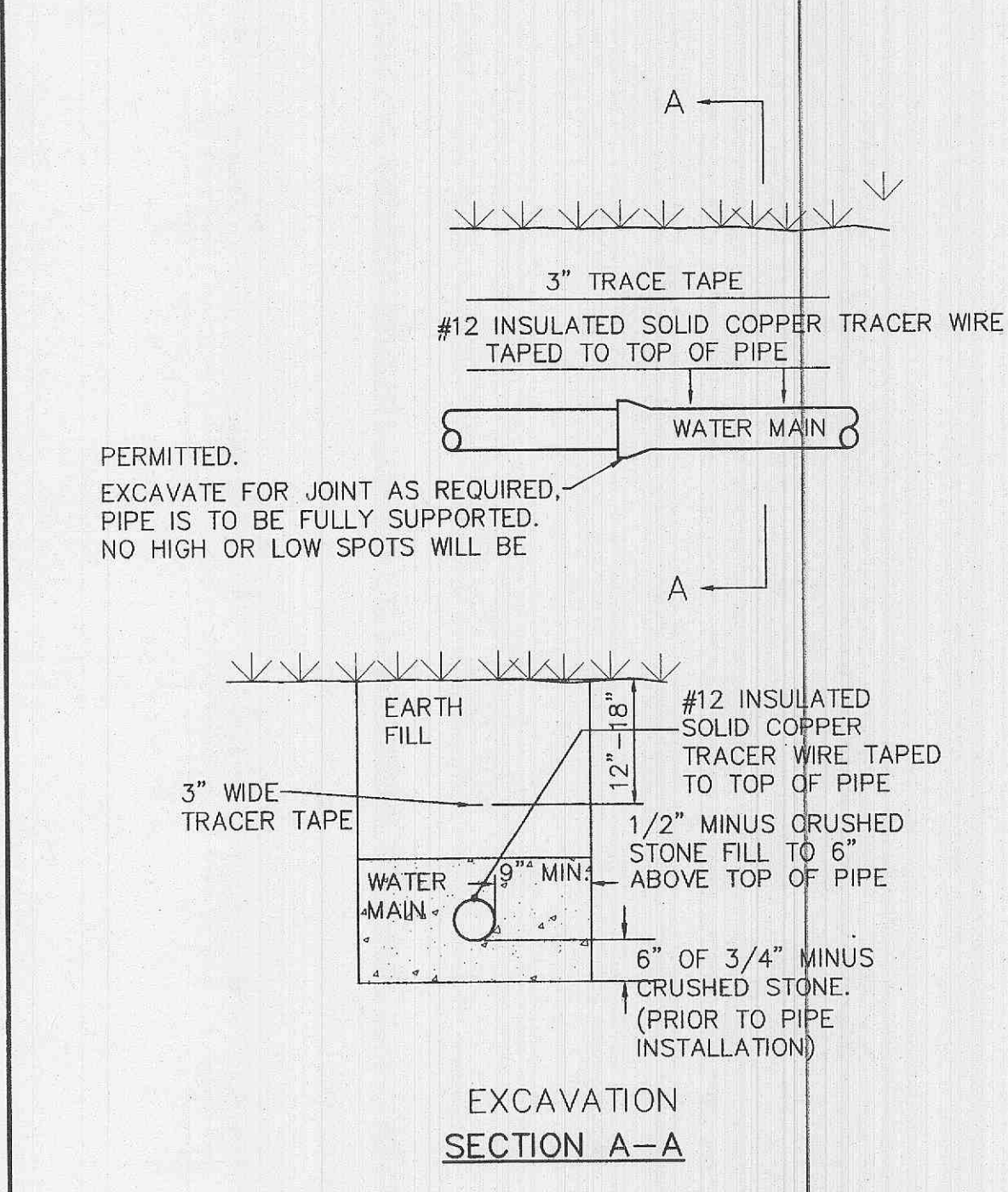
TYPE ROADWAY	Sign Height	Maximum Work Zone Length (L)
URBAN	7' Portable 8' Post	1 Mi.
RURAL UNDIVIDED	7' Portable 8' Post	3 Mi.



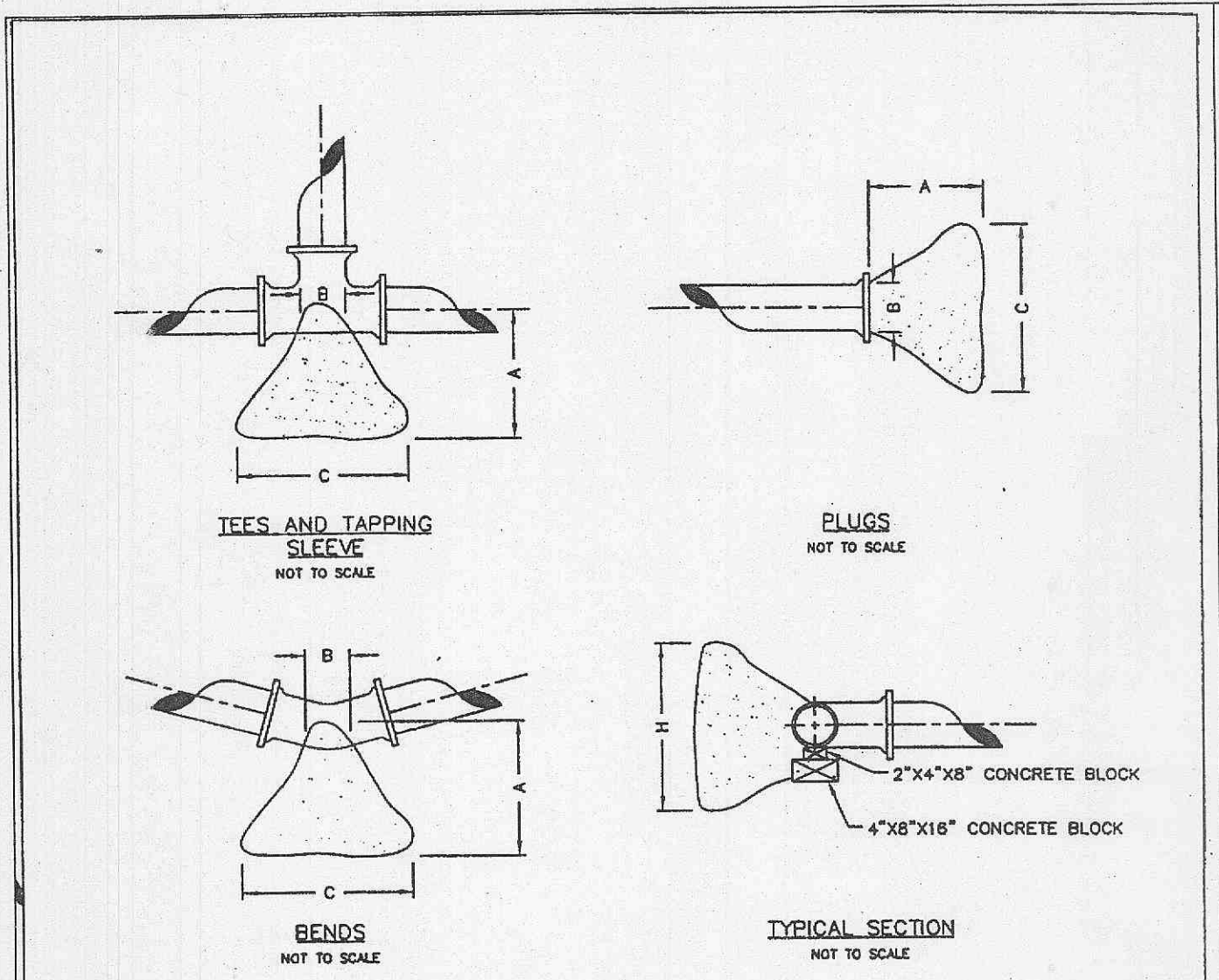
Notes:
A protective vehicle shall be used while work is in progress. The protective vehicle should be equipped with a TMA and flashing arrow panel and positioned at least 150 ft. in advance of the work space.
If a flashing arrow panel is used, the caution mode shall be displayed.
When a temporary road closure is needed, both directions may be stopped at the same time up to a maximum of 20 minutes.
Where operational conditions warrant, channelization devices may be eliminated.
For short duration operations, signs and channelizers may be reduced or eliminated. The protective vehicle may be eliminated if adequate sight distance exists and the work vehicle uses activated rotating lights or strobe lights.
For mobile operations where workers are on foot and move with the operation, channelizers may be reduced or eliminated.
Additional warning signs shall be erected at each intersection with another state highway within the work zone. Upon the discretion of the supervisor, additional warning signs may be erected at other intersections within the work zone.
For mobile operations, spacing between flagger and FLAGGER AHEAD signs shall not exceed one mile.



GATE VALVE W/THRUST BLOCK
NOT TO SCALE

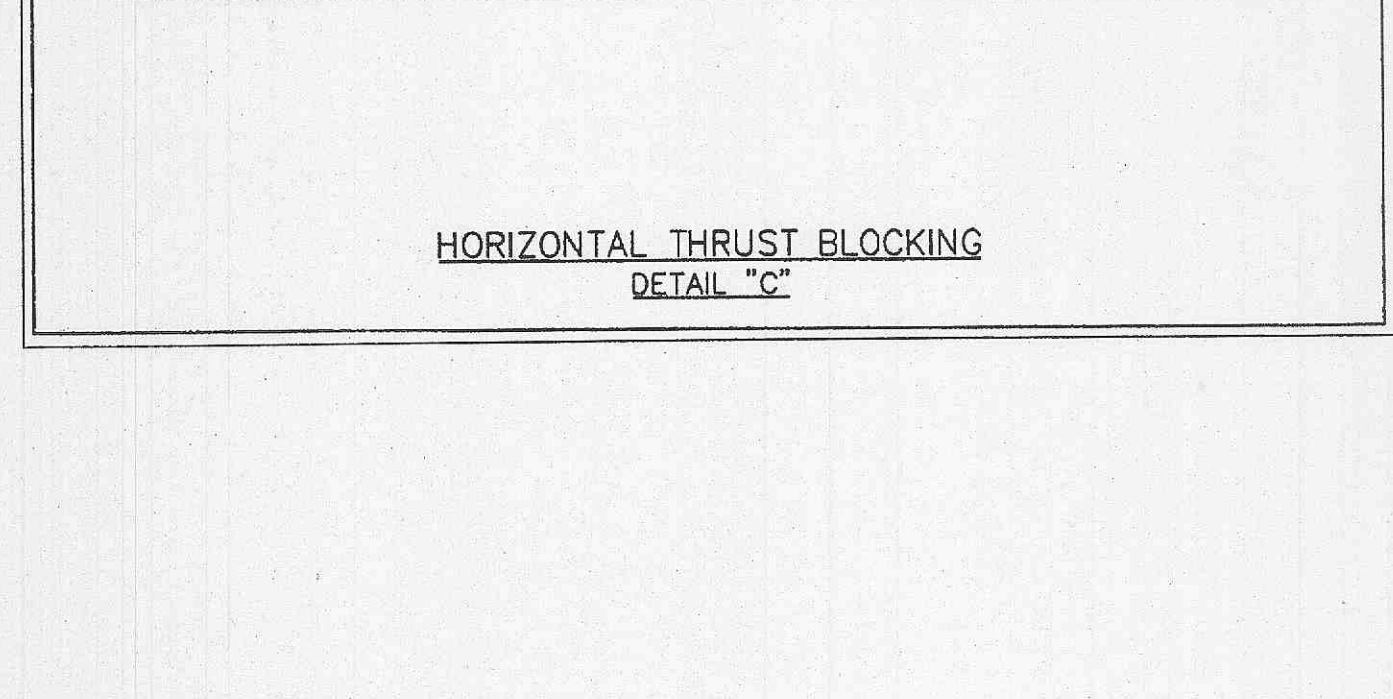


TYPICAL WATER MAIN INSTALLATION DETAILS
NOT TO SCALE

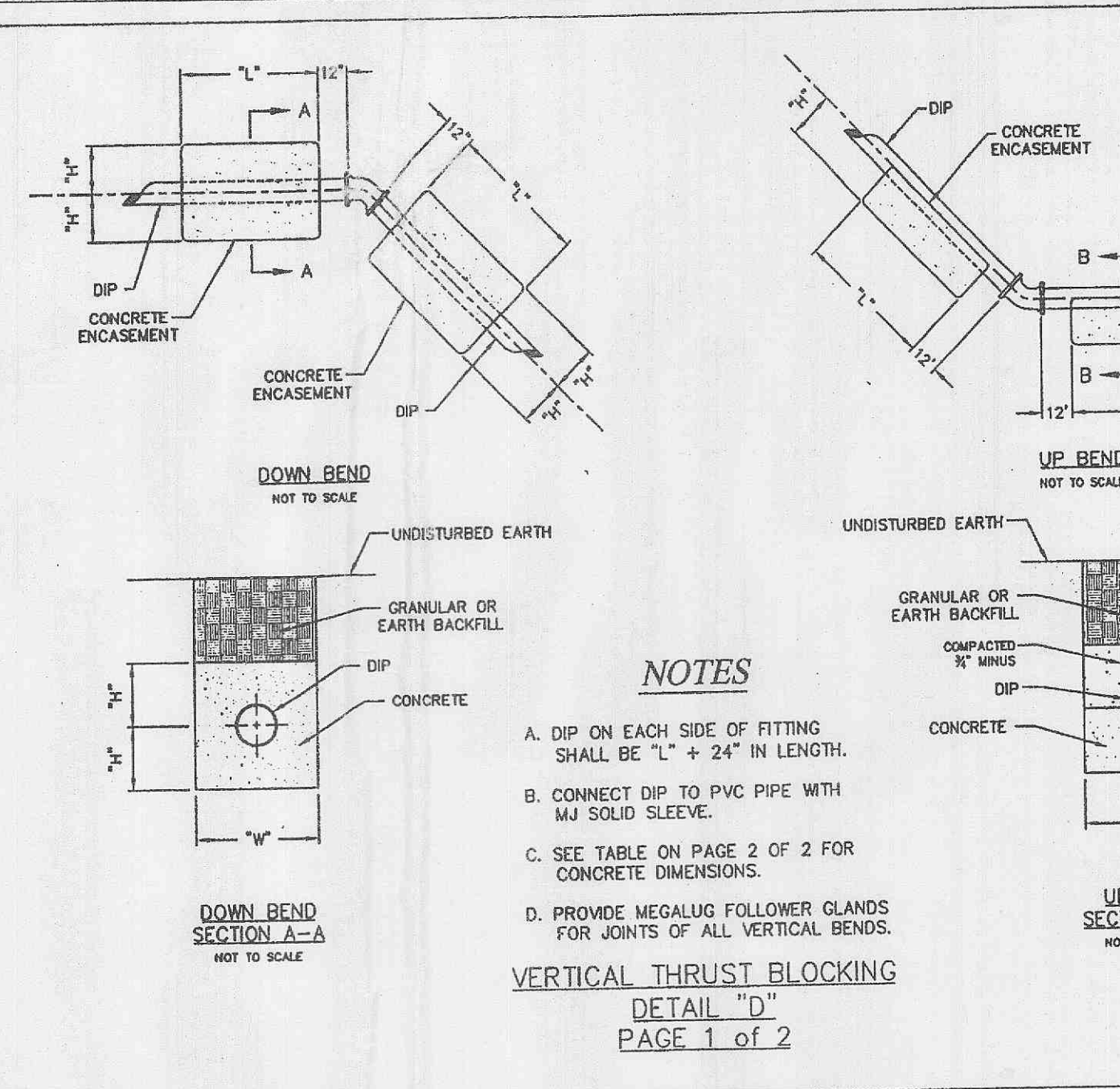


THRUST BLOCK DIMENSIONS - INCHES

PIPE DIA.	ALL FTGS.	TEE PLUG TAPPING		90 DEGREE BEND		45 DEGREE BEND		22-1/2 BEND		11-1/4 BEND	
		A	B	C	H	C	H	C	H	C	H
4	14	4	24	12	26	15	18	12	12	12	12
6	16	6	36	18	36	24	30	18	24	12	12
8	20	8	36	30	42	36	36	24	24	18	18
10	20	10	48	36	66	36	36	36	28	24	18
12	24	12	68	36	82	42	52	36	40	24	28



HORIZONTAL THRUST BLOCKING DETAIL C
NOT TO SCALE

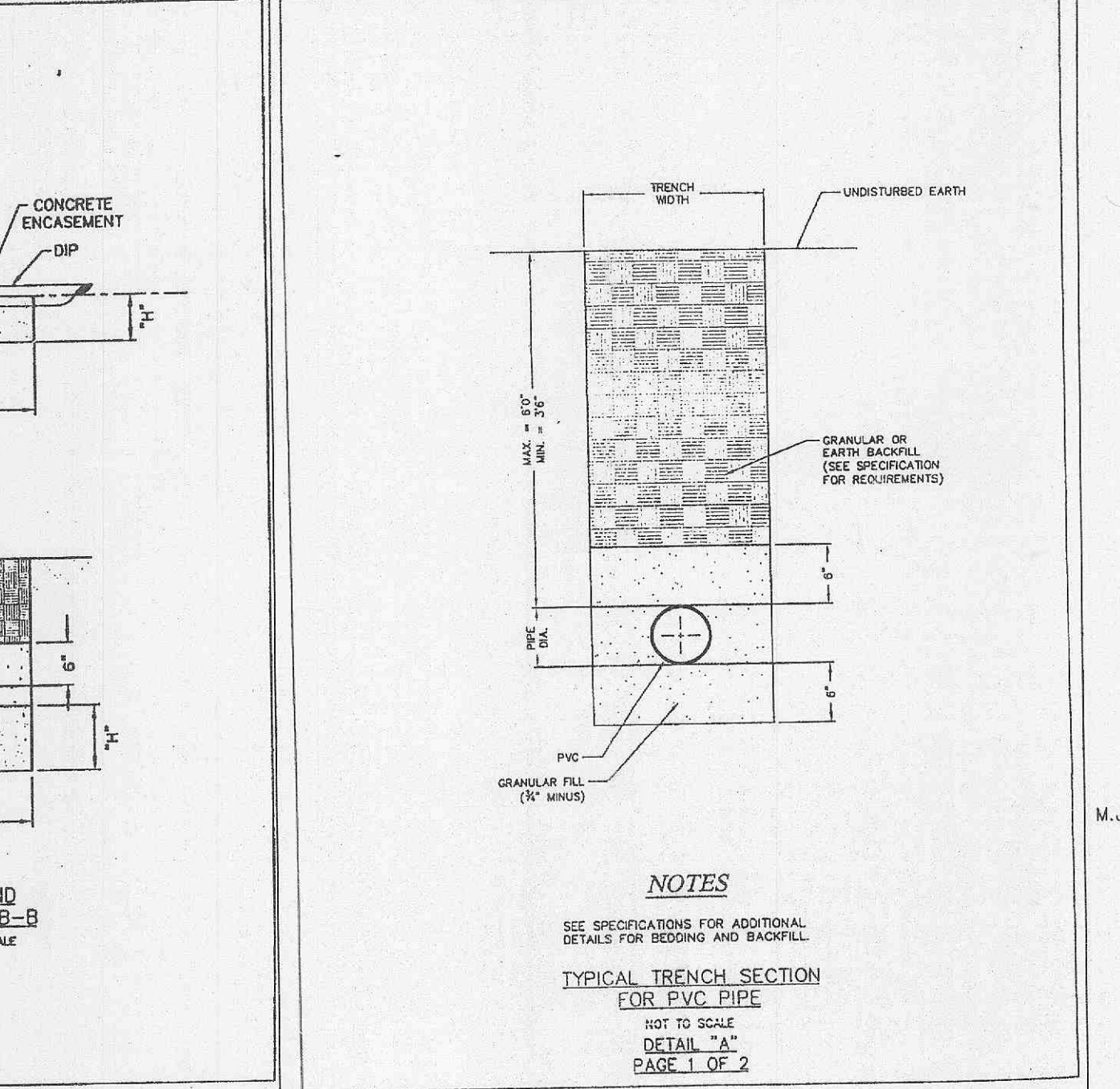


NOTES
A. DIP ON EACH SIDE OF FITTING SHALL BE "L" + 24" IN LENGTH.
B. CONNECT DIP TO PVC PIPE WITH MJ SOLID SLEEVE.
C. SEE TABLE ON PAGE 2 OF 2 FOR CONCRETE DIMENSIONS.
D. PROVIDE MEGALUG FOLLOWER GLANDS FOR JOINTS OF ALL VERTICAL BENDS.

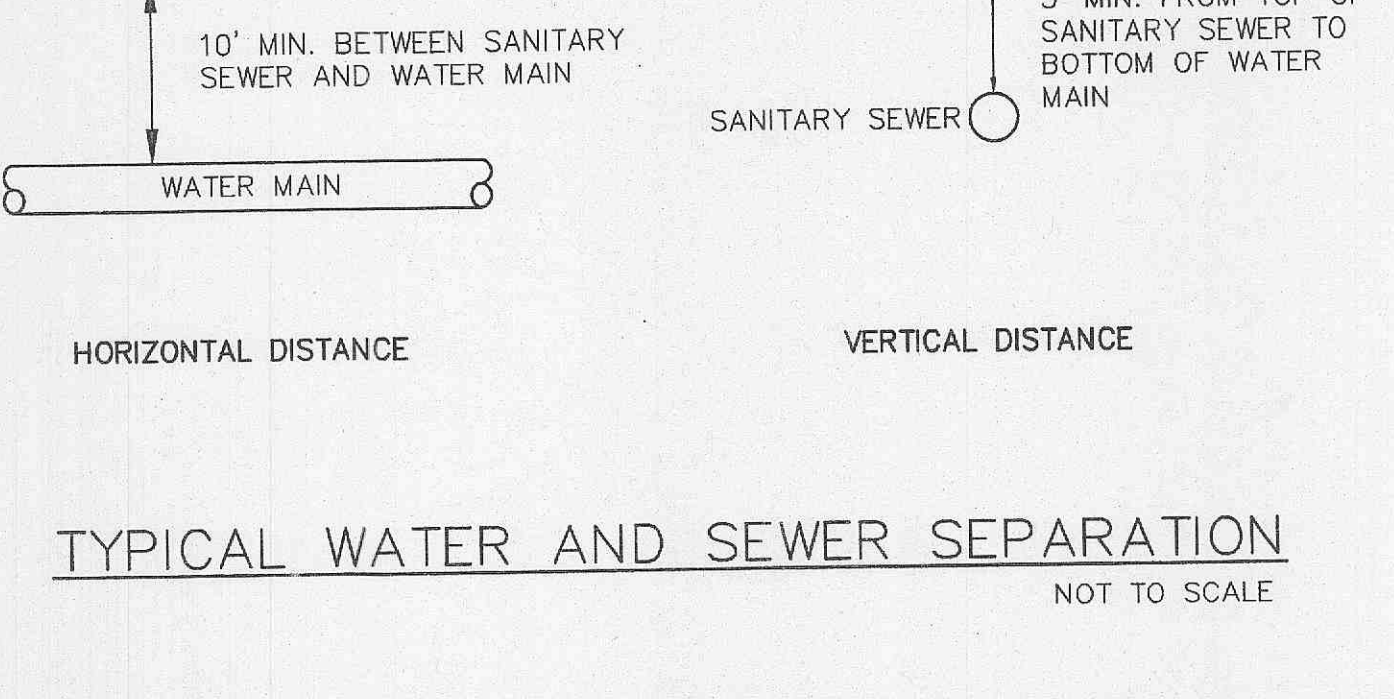
VERTICAL THRUST BLOCKING DETAIL D
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PIPE SIZE	DEGREE BEND	DOWN BENDS				UP BENDS			
		W	H	L	H	W	H	L	
4"	11 1/4°	18	12	15	12	12	12	12	
	22 1/2°	18	18	24	12	12	12	12	
	45°	18	18	30	12	12	12	18	
6"	11 1/4°	24	18	18	12	12	12	12	
	22 1/2°	24	18	24	12	12	12	12	
	45°	24	18	48	12	12	12	18	
8"	11 1/4°	24	18	24	12	12	12	18	
	22 1/2°	24	18	42	12	12	12	24	
	45°	24	18	48	18	12	12	24	
10"	11 1/4°	30	24	24	18	18	18	18	
	22 1/2°	30	24	42	18	18	18	24	
	45°	30	24	72	18	18	18	36	
12"	11 1/4°	30	24	30	18	18	18	18	
	22 1/2°	30	24	54	18	18	18	30	
	45°	30	36	72	24	18	18	36	

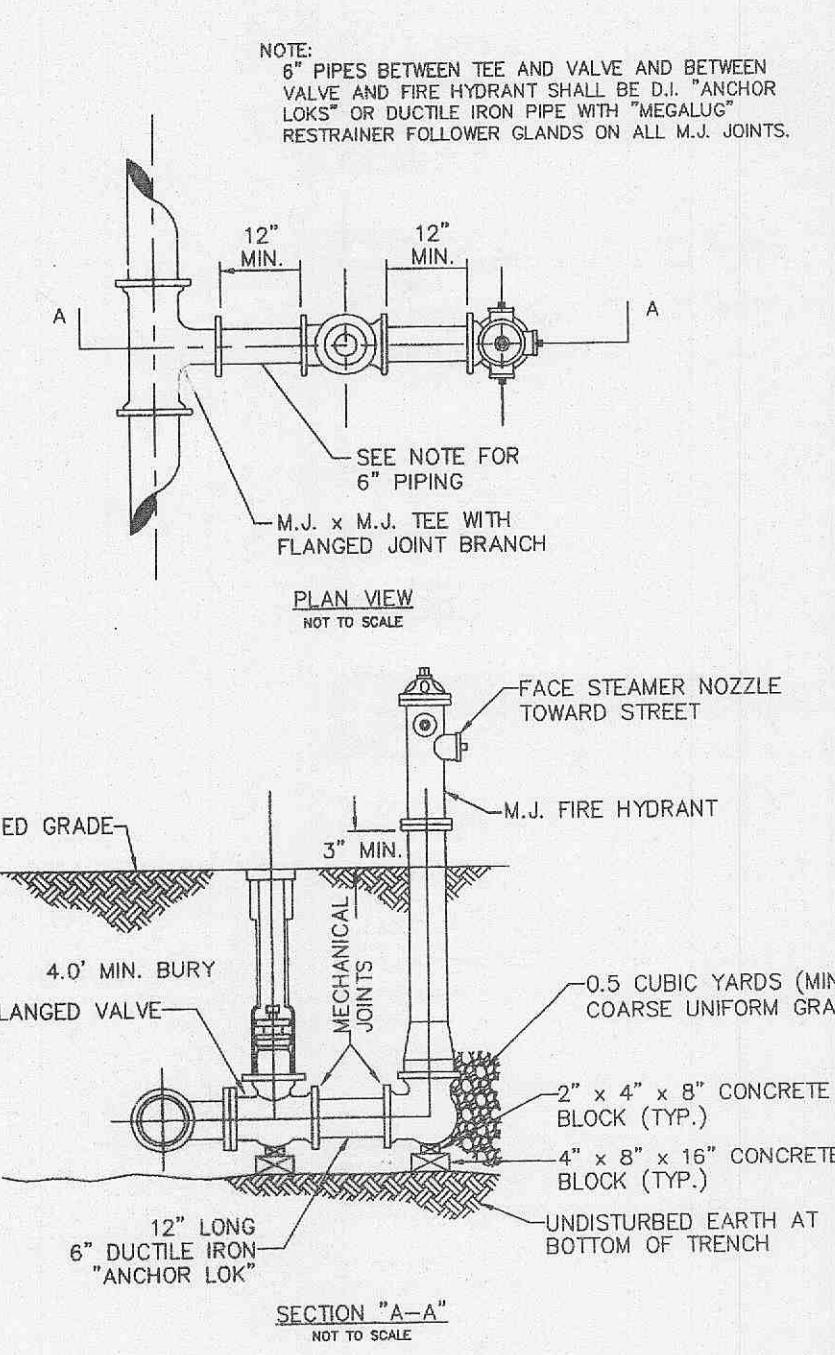
DIMENSIONS FOR VERTICAL BENDS (IN INCHES) DETAIL D
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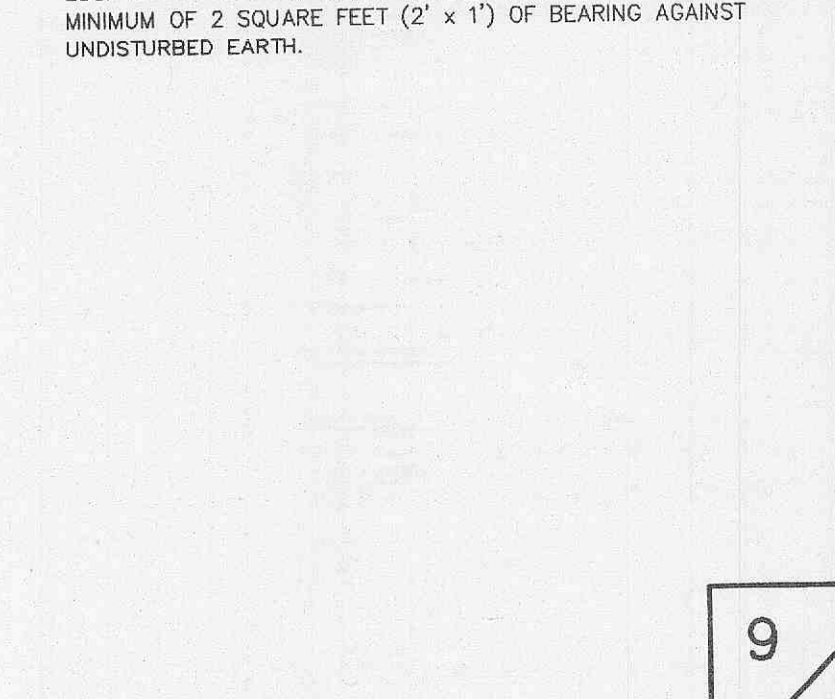
NOTES
SEE SPECIFICATIONS FOR ADDITIONAL DETAILS FOR BEDDING AND BACKFILL.



TYPICAL WATER AND SEWER SEPARATION
NOT TO SCALE



NOTES
THRUST BLOCKING WILL BE REQUIRED AT ALL FIRE HYDRANTS LOCATED AT CURB-DE-SACS. THRUST BLOCKING TO BE A MINIMUM OF 2 SQUARE FEET (2' x 1') OF BEARING AGAINST UNDISTURBED EARTH.



TYPICAL WATER AND SEWER SEPARATION
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