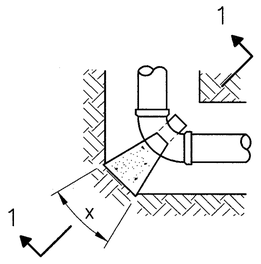
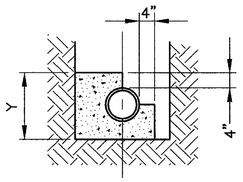
SIZING SCHEDULE BEARING FACE (X Y) IN SQ. FT. CONCRETE VOLUME IN CU. YD.			
PIPE SIZE	22 1/2° BEND SOIL BEARING CAPACITY		
	1000 P.S.F.	3000 P.S.F.	5000 P.S.F.
4	1.40 0.14	0.46 0.09	0.26 0.06
6	2.80 1.15	0.93 0.10	0.56 0.07
8	4.80 0.20	1.60 0.13	0.96 0.09
10	7.90 0.53	2.63 0.34	1.96 0.22
12	11.30 0.62	3.76 0.40	2.26 0.26
14	15.30 0.74	5.10 0.48	3.06 0.31
16	19.80 1.17	6.60 0.76	3.96 0.49



PLAN FOR BENDS



SECTION 1 – 1

ALL CONCRETE BLOCKING MUST HAVE ITS ENTIRE FACE (X & Y) BEARING SURFACE AGAINST UNDISTURBED SOIL AND ALL VERTICAL NON–BEARING SURFACES SHALL BE FORMED SO AS TO KEEP CONCRETE FROM JOINTS. BLOCKING DESIGN BASED ON COMBINED WORKING PRESSURE PLUS WATER HAMMER OF 240 PSI AND FOR BEARING CAPACITY FOR SAND – 1000 PSF, SAND AND GRAVEL – 3000 PSF, SHALE – 5000 PSF.

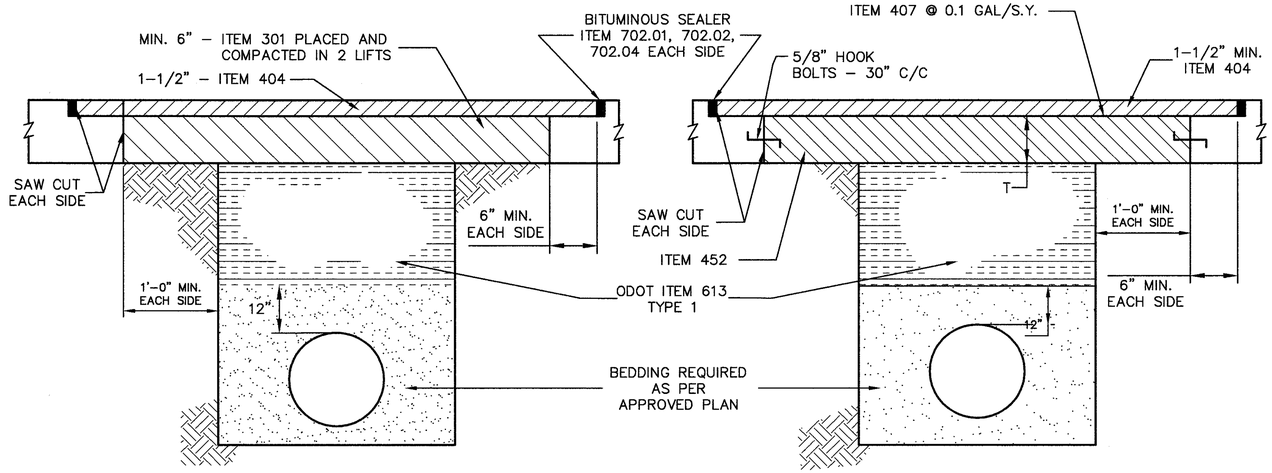
THRUST BLOCKING DETAIL

NO SCALE

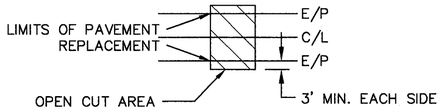
TYPICAL SECTION FOR CUTTING OF COUNTY ROADS

LAKE COUNTY, OHIO
JAMES R. GILLS, P.E., P.S.
LAKE COUNTY ENGINEER

A RIGHT–OF–WAY USEAGE PERMIT SHALL BE OBTAINED FOR ALL UTILITY INSTALLATIONS WITHIN THE RIGHT–OF–WAYS OF COUNTY ROADS A MINIMUM OF 48 HOURS BEFORE CONSTRUCTION



ASPHALTIC ROADS

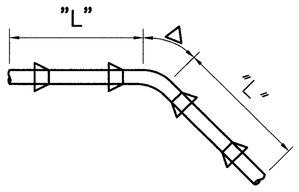


CONCRETE ROADS WITH ASPHALT OVERLAY

T = 8" MINIMUM OR EQUAL TO EXISTING PAVEMENT AND 6" MINIMUM FOR DRIVEWAY AND PARKING AREAS.

NO SCALE FEBRUARY 8, 2002

WATER MAIN JOINT RESTRAINT TABLE					
	MINIMUM DISTANCE 'L' (FEET)				
	BEND (Δ)	HORIZONTAL	VERT. UP	VERT. DOWN	REMARKS
20"	11 1/4°	6	11	7	EACH SIDE OF BEND
	22 1/2°	12	21	13	EACH SIDE OF BEND
	45°	25	44	28	EACH SIDE OF BEND
	90°	60	-----	-----	EACH SIDE OF BEND
	20"x 12" RED.	59	-----	-----	EACH SIDE OF BEND
12"	11 1/4°	4	4	7	EACH SIDE OF BEND
	22 1/2°	8	7	13	EACH SIDE OF BEND
	45°	16	18	28	EACH SIDE OF BEND
	90°	39	-----	-----	EACH SIDE OF BEND
	12"x 12" TEE	65	-----	-----	BRANCH
8"	8"x 8" TEE	19	-----	-----	BRANCH
16"	16"x 12" RED.	116/87	-----	-----	SMALL DIA./LARGE DIA.



RESTRAINED JOINTS NOTES:

1. RESTRAINED JOINTS SHALL BE USED AT ALL BENDS OR DIRECTIONAL CHANGES IN PIPE ALIGNMENT EQUAL TO OR GREATER THAN 11–1/4 DEGREES.
2. JOINTS SHALL BE RESTRAINED TO THE FIRST JOINT PAST THE LENGTH SPECIFIED IN THE FOLLOWING TABLE USING MEGA–LUGS, OR APPROVED EQUIVALENT.
3. THE CONTRACTOR SHALL DEVELOP THE RESTRAINED JOINT PIPING SYSTEM TO MINIMIZE MAKE–UP AND CLOSURES. MAKE–UP AND CLOSURE JOINTS SHALL BE PLACED AS FAR FROM THE BEND OR FITTING AS POSSIBLE.
4. COST FOR RESTRAINED JOINTS SHALL BE INCLUDED IN THE BID PRICE PER LINEAL FOOT OF WATER MAIN.
5. WHEN TYING INTO EXISTING MAINS AND LENGTH OF RESTRAINT CAN NOT BE PROVIDED, INSTALL CONCRETE BLOCKING ACCORDING TO OVER AND SAG BEND THRUST BLOCKING DETAILS. COST OF CONCRETE BLOCKING SHALL BE INCLUDED IN THE BID PRICE PER LINEAL FOOT OF WATER MAIN.

CALCULATED | CHECKED

WATER MAIN IMPROVEMENT DETAILS

LAK – 20 – 18.72

315
441

H:\1998\98404\DWG\WATERDET.DWG – PLOT SCALE = 1:1