

		RUN SIZE DIAMETER									
		4	6	8	10	12	14	16	18	20	24
BRANCH SIZE DIAMETER	4	*	*	*	*	*	*	*	*	*	*
	6		*	*	*	*	*	*	*	*	*
	8			*	*	*	*	*	*	*	*
	10				10	*	*	*	*	*	*
	12					28	12	4	*	*	*
	14						45	31	17	3	*
	16							62	49	37	11
	18								78	67	44
	20									95	74
	24										127

* - FOR THIS CONDITION NEED ONLY RESTRAIN THE BRANCH OUTLET OF THE TEE.

RESTRAINED LENGTHS, "L" (IN FEET)

1. RESTRAIN THE TWO MECHANICAL JOINTS ON THE RUN SIDES OF THE TEE. THERE SHOULD BE A FULL 20' LENGTH OF PIPE INSTALLED ON EACH SIDE OF THE RUN.
2. ALL JOINTS WITHIN THE LENGTH "L" ON THE BRANCH MUST BE RESTRAINED. USE RETAINER GLAND AT MECHANICAL JOINTS AND HARNESS ON PUSH-ON PIPE PER CITY SPECIFICATION.
3. FOR TEST PRESSURES AND LAYING CONDITIONS SEE SECTION ON GENERAL NOTES FOR USE OF RESTRAINED JOINT LENGTHS.

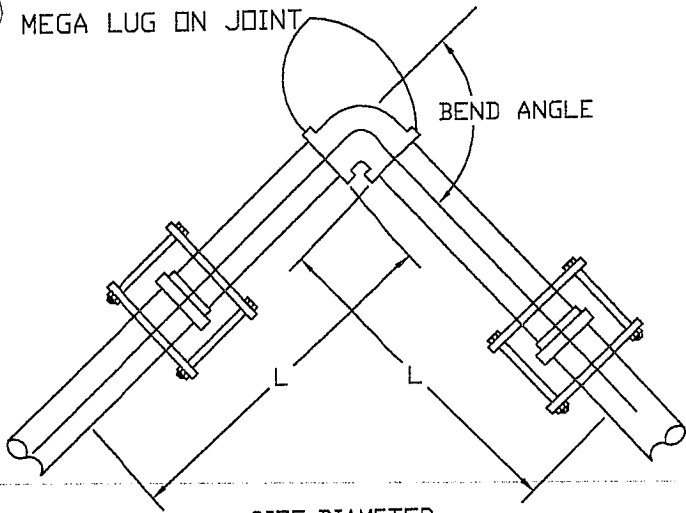
CITY OF ST. GEORGE ENGINEERING DEPARTMENT

REVISIONS		
DATE	DESCRIPTION	BY

**STANDARD TEE PVC
RESTRAINING SYSTEM DETAIL**

STANDARD DWG. NO.	
307	1 OF 1
APPROVED:	
DATE:	BY: LBB

MEGA LUG ON JOINT



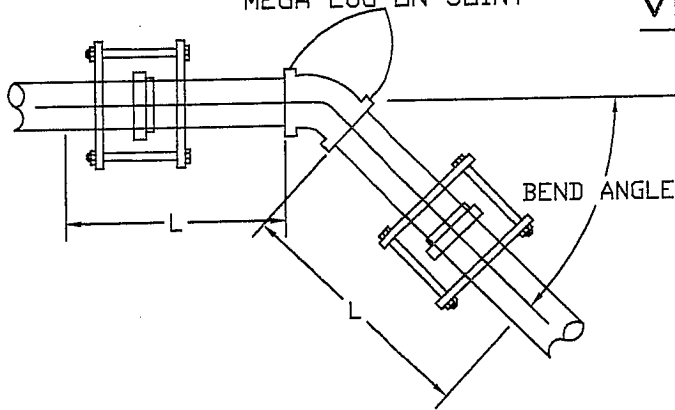
HORIZONTAL BEND

1. ALL JOINTS WITHIN LENGTH "L" MUST BE RESTRAINED. USE RETAINER GLAND AT MECHANICAL JOINTS AND HARNESS WITH PUSH-ON PIPE PER CITY SPECIFICATION.
2. FOR TEST PRESSURES AND LAYING CONDITIONS SEE SECTION ON GENERAL NOTES FOR USE OF RESTRAINED JOINT LENGTHS.

		SIZE DIAMETER								
		4	6	8	10	12	14	16	18	20
BEND ANGLE	11.25	2	3	4	4	5	6	7	7	8
	22.5	4	6	7	9	10	12	13	15	16
	45	8	12	15	18	21	24	28	30	33
	90	20	28	37	44	52	59	67	73	81

RESTRAINED LENGTHS, "L" (IN FEET)

MEGA LUG ON JOINT



VERTICAL DOWN BEND

1. ALL JOINTS WITHIN LENGTH "L" MUST BE RESTRAINED. USE RETAINER GLAND AT MECHANICAL JOINTS AND HARNESS WITH PUSH-ON PIPE PER CITY SPECIFICATION.
2. FOR TEST PRESSURES AND LAYING CONDITIONS SEE SECTION ON GENERAL NOTES FOR USE OF RESTRAINED JOINT LENGTHS.

		SIZE DIAMETER								
		4	6	8	10	12	14	16	18	20
BEND ANGLE	11.25	6	8	10	12	14	15	17	20	20
	22.5	11	15	19	23	27	31	35	40	40
	45	23	31	40	48	56	64	72	80	80

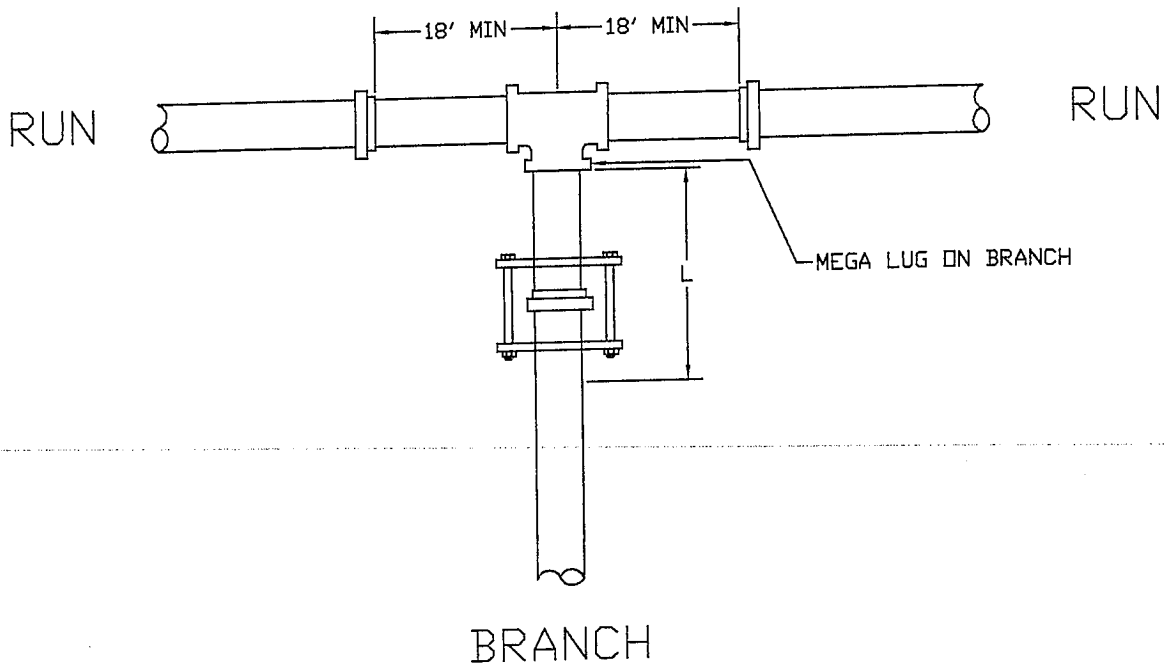
RESTRAINED LENGTHS, "L" (IN FEET)

CITY OF ST. GEORGE ENGINEERING DEPARTMENT

REVISIONS		
DATE	DESCRIPTION	BY

**STANDARD BENDS FOR PVC
RESTRAINING SYSTEM DETAIL**

STANDARD DWG. NO.	
308	1 OF 1
APPROVED:	
DATE:	BY: LBB



		RUN SIZE DIAMETER									
		4	6	8	10	12	14	16	18	20	24
BRANCH SIZE DIAMETER	4	*	*	*	*	*	*	*	*	*	*
	6		*	*	*	*	*	*	*	*	*
	8			*	*	*	*	*	*	*	*
	10				10	2	*	*	*	*	*
	12					19	12	4	*	*	*
	14						28	22	15	8	*
	16							37	31	26	13
	18								46	41	30
	20									55	45
	24										72

* - FOR THIS CONDITION NEED ONLY RESTRAIN THE BRANCH OUTLET OF THE TEE.

RESTRAINED LENGTHS, "L" (IN FEET)

1. RESTRAIN THE TWO MECHANICAL JOINTS ON THE RUN SIDES OF THE TEE. THERE SHOULD BE A FULL 18' LENGTH OF PIPE INSTALLED ON EACH SIDE OF THE RUN.
2. ALL JOINTS WITHIN THE LENGTH "L" ON THE BRANCH MUST BE RESTRAINED. USE RETAINER GLAND AT MECHANICAL JOINTS AND HARNESS ON PUSH-ON PIPE PER CITY SPECIFICATION.
3. FOR TEST PRESSURES AND LAYING CONDITIONS SEE SECTION ON GENERAL NOTES FOR USE OF RESTRAINED JOINT LENGTHS.

CITY OF ST. GEORGE ENGINEERING DEPARTMENT

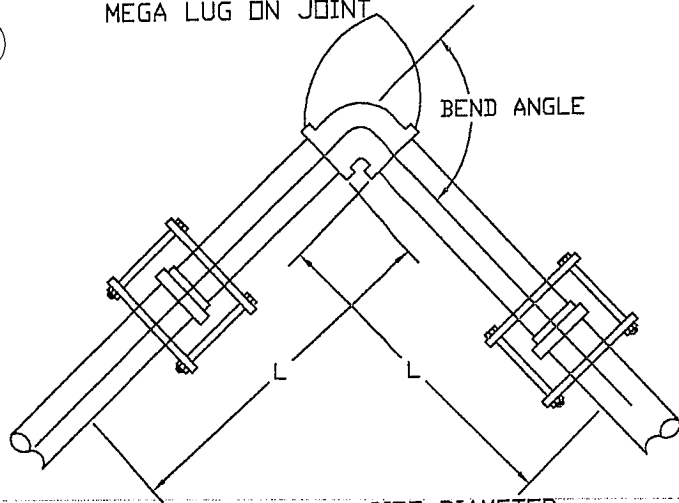
REVISIONS		
DATE	DESCRIPTION	BY

**STANDARD TEE DUCTILE IRON
RESTRAINING SYSTEM DETAIL**

STANDARD DWG. NO.	
309	1 OF 1
APPROVED:	
DATE:	BY: LBB

MEGA LUG ON JOINT

HORIZONTAL BEND



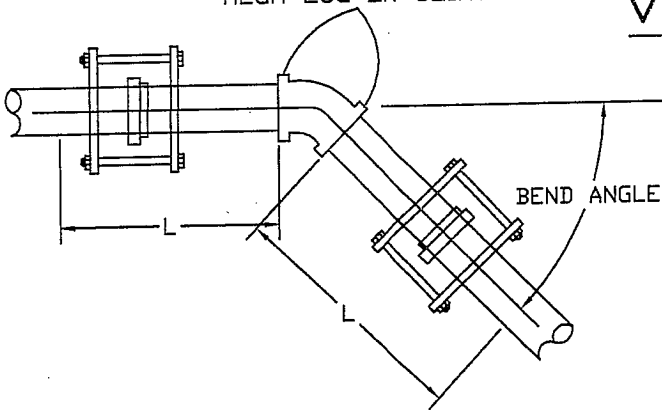
1. ALL JOINTS WITHIN LENGTH "L" MUST BE RESTRAINED. USE RETAINER GLAND AT MECHANICAL JOINTS AND HARNESS WITH PUSH-ON PIPE PER CITY SPECIFICATION.
2. FOR TEST PRESSURES AND LAYING CONDITIONS SEE SECTION ON GENERAL NOTES FOR USE OF RESTRAINED JOINT LENGTHS.

		SIZE DIAMETER							
		4	6	8	10	12	14	16	20
BEND ANGLE	11.25	3	2	3	3	4	4	5	6
	22.5	3	4	7	7	8	9	10	12
	45	6	9	12	14	16	19	21	26
	90	15	21	28	34	40	45	51	62

RESTRAINED LENGTHS, "L" (IN FEET)

MEGA LUG ON JOINT

VERTICAL DOWN BEND



1. ALL JOINTS WITHIN LENGTH "L" MUST BE RESTRAINED. USE RETAINER GLAND AT MECHANICAL JOINTS AND HARNESS WITH PUSH-ON PIPE PER CITY SPECIFICATION.
2. FOR TEST PRESSURES AND LAYING CONDITIONS SEE SECTION ON GENERAL NOTES FOR USE OF RESTRAINED JOINT LENGTHS.

		SIZE DIAMETER							
		4	6	8	10	12	14	16	20
BEND ANGLE	11.25	3	5	7	8	8	10	11	13
	22.5	6	10	11	14	16	18	22	25
	45	14	18	24	28	33	38	43	53

RESTRAINED LENGTHS, "L" (IN FEET)

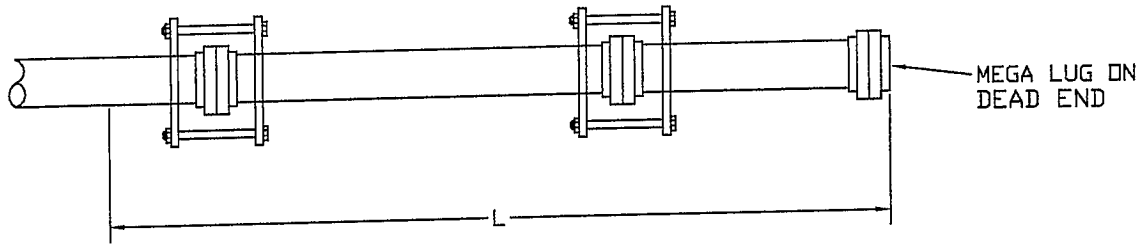
CITY OF ST. GEORGE ENGINEERING DEPARTMENT

REVISIONS		
DATE	DESCRIPTION	BY

**STANDARD BENDS FOR DUCTILE IRON
RESTRAINING SYSTEM DETAIL**

STANDARD DWG. NO.	
310	1 OF 1
APPROVED:	
DATE:	BY: LBB

STANDARD DEAD END FOR DUCTILE IRON



1. ALL JOINTS WITHIN LENGTH "L" MUST BE RESTRAINED. USE RETAINER GLAND AT MECHANICAL JOINTS AND HARNESS WITH PUSH-ON PIPE PER CITY SPECIFICATION.
2. FOR TEST PRESSURES AND LAYING CONDITIONS SEE SECTION ON GENERAL NOTES FOR USE OF RESTRAINED JOINT LENGTHS.

PIPE SIZE IN INCHES

4	6	8	10	12	14	16	18	20
23	33	45	52	62	71	80	89	98

RESTRAINED LENGTHS, "L" (IN FEET)

RESTRAINED JOINT LENGTHS USAGE GENERAL NOTES

RESTRAINED LENGTH CALCULATIONS ARE BASED ON THE FOLLOWING DESIGN TYPICALLY USED WITH BACKFILL IN ST. GEORGE.

1. THREE (3) FEET MINIMUM DEPTH OF COVER.
2. A SAFETY FACTOR OF 1.5
3. SOIL TYPE SANDY CLAY
4. TYPE 5 TRENCH COMPACTION FROM FOUR (4) INCHES MINIMUM UNDER THE PIPE TO THE CENTER LINE OF THE PIPE, AND COMPACTED GRANULAR OR SELECTED MATERIAL FROM THE CENTER LINE OF THE PIPE TO THE TOP OF THE PIPE (90 PERCENT STANDARD PROCTOR DENSITY, AASHTO T-99).
5. 200 PSI TEST PRESSURES FOR FOUR (4) THROUGH SIXTEEN (16) INCH SIZE PIPES.

IF ACTUAL CONDITIONS DIFFER FROM THOSE LISTED ABOVE OR THE REQUIRED RESTRAINED LENGTH CANNOT BE MET, THE RESTRAINED JOINT LENGTH SHALL BE DETERMINED BY THE WATER AND POWER ENGINEER.

CITY OF ST. GEORGE ENGINEERING DEPARTMENT

STANDARD DWG. NO.

REVISIONS		
DATE	DESCRIPTION	BY

**STANDARD DEAD END FOR DUCTILE IRON
RESTRAINING SYSTEM DETAIL**

311	1 OF 1
APPROVED:	
DATE:	BY: LBB