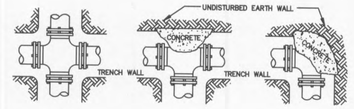
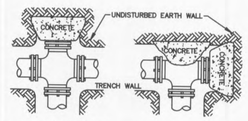




HORIZONTAL THRUST BLOCKING (BLOCKING HEIGHT GREATER THAN PIPE O.D.) (BLOCKING WIDTH BETWEEN 1 & 2 TIMES HEIGHT)						
REQUIRED SQ. FT. OF UNDISTURBED EARTH WALL FOR REACTION BACKING						
	TYPE OF FITTINGS					
PIPE SIZE	TEE & PLUG	BENDS				
		90°	45°	22½°	11¼°	

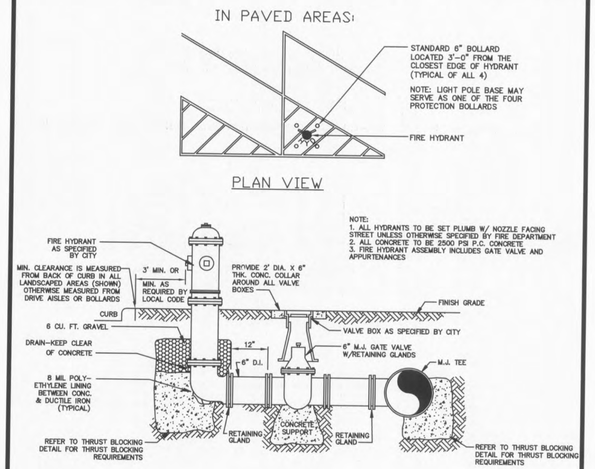
NOTES:

1. DO NOT COVER BELLS OR FLANGES WITH CONCRETE
2. WRAP ALL FITTINGS WITH VISQUEEN.
3. BACK ALL TEES ACCORDING TO SIZE OF BRANCH.
4. BACKING FUTURE LINE EXTENSIONS SHALL BE SUCH THAT LATER REMOVAL IS POSSIBLE.
5. ALL BENDS WHERE FITTINGS ARE USED, BOTH HORIZONTAL OR VERTICAL SHALL BE BACKED.
6. REACTION BACKING TABLE IS BASED ON _____ P.S.I. AND SOIL BEARING PRESSURE OF _____ lb./sq.ft. ADDITIONAL BACKING MAY BE REQUIRED IN SOME AREAS AS DIRECTED BY ENGINEERS.
7. ALL CONCRETE SHALL BE 2500 P.S.I.
8. 18" AND LARGER REQUIRES SPECIFIC ANTI-THRUST DESIGN.

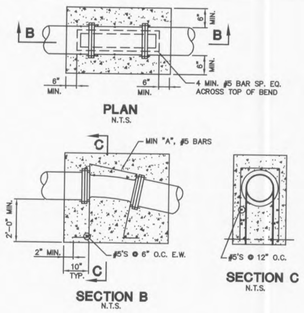
HORIZONTAL THRUST BLOCKING

N.T.S.

DTTHBLHR | 12/21/04



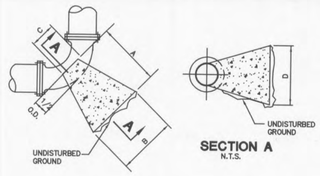
02/23/06 | DTFIRHYD



DETAIL-UPWARD THRUST

CONCRETE REQUIRED TO RESIST UPWARD THRUST

BEND	SIZE	VOLUME (CU. YD.)	"A" NO. OF VERT. BARS REQ'D
11 1/4°	6"	0.3	2
	8"	0.6	2
	12"	1.4	3
	16"	2.4	3
	20"	3.8	3
22 1/2°	6"	0.7	2
	8"	1.2	2
	12"	2.7	2
	16"	4.8	3
	20"	7.4	3
45°	6"	1.2	2
	8"	2.2	2
	12"	4.8	2
	16"	6.8	3
	20"	13.7	3
90°	6"	1.8	2
	8"	3.1	2
	12"	7.0	3
	16"	12.4	3
	20"	19.4	4



DETAIL-HORIZONTAL THRUST

N.T.S.

DIMENSIONS FOR CONCRETE BLOCKING HORIZONTAL THRUST

BEND	SIZE	A (FT)	B (FT)	C (FT)	D (FT)	VOLUME (CU. YD.)
11 1/4°	6"	1.0	1.0	7"	1.0	0.03
	8"	1.0	1.25	7"	1.0	0.04
	12"	1.0	2.0	11"	2.0	0.10
	16"	2.0	3.0	15"	2.0	0.30
	20"	2.0	3.0	19"	3.0	0.50
22 1/2°	6"	1.0	1.5	7"	1.0	0.04
	8"	1.0	2.0	7"	2.0	0.10
	12"	2.0	3.0	11"	2.0	0.30
	16"	2.0	4.0	15"	3.0	0.80
	20"	3.0	5.0	19"	3.0	1.00
45°	6"	1.5	2.0	7"	1.5	0.11
	8"	2.0	3.0	7"	2.0	0.30
	12"	2.0	4.0	11"	3.0	0.70
	16"	3.0	5.0	15"	4.0	1.40
	20"	4.0	6.0	19"	5.0	2.00
90°	6"	1.75	2.5	7"	2.0	0.20
	8"	2.0	3.0	7"	3.0	0.40
	12"	4.0	6.0	11"	4.0	2.10
	16"	4.0	7.0	15"	5.0	3.10
	20"	5.0	8.0	19"	7.0	5.30
TEE BRANCHES PLUGS & CAPS	6"	1.80	2.0	7"	1.75	0.13
	8"	2.0	3.0	7"	2.0	0.30
	12"	2.0	4.0	11"	4.0	0.80
	16"	3.0	5.0	15"	5.0	1.80
	20"	4.0	7.0	19"	6.0	3.80

DETAIL-DOWNWARD THRUST

N.T.S.

DIMENSIONS FOR CONCRETE BLOCKING FOR BENDS-DOWNWARD THRUST

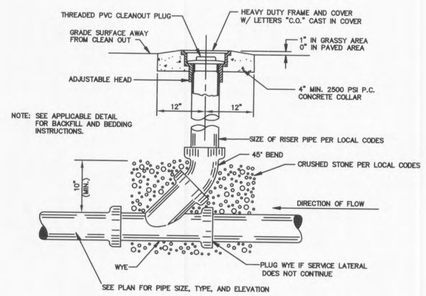
BEND	SIZE	A (FT)	B (FT)	C (FT)	D (FT)	VOLUME (CU. YD.)
11 1/4°	6"	1.0	1.0	7"	1.0	0.03
	8"	1.0	1.25	7"	1.0	0.04
	12"	1.0	2.0	11"	2.0	0.1
	16"	2.0	3.0	15"	2.0	0.3
	20"	2.0	3.0	19"	3.0	0.5
22 1/2°	6"	1.0	1.5	7"	1.0	0.04
	8"	1.0	2.0	7"	2.0	0.1
	12"	2.0	3.0	11"	2.0	0.3
	16"	2.0	4.0	15"	3.0	0.8
	20"	3.0	5.0	19"	3.0	1.0
45°	6"	1.5	2.0	7"	1.5	0.1
	8"	2.0	3.0	7"	2.0	0.3
	12"	2.0	4.0	11"	3.0	0.7
	16"	3.0	5.0	15"	4.0	1.4
	20"	4.0	6.0	19"	5.0	2.0
90°	6"	1.75	2.5	7"	2.0	0.2
	8"	2.0	3.0	7"	3.0	0.4
	12"	4.0	6.0	11"	4.0	2.1
	16"	4.0	7.0	15"	5.0	3.1
	20"	5.0	8.0	19"	7.0	5.3

GENERAL NOTES:

1. THRUST BLOCK DIMENSIONS ARE BASED ON 2000 POUNDS PER SQUARE FOOT SOIL BEARING PRESSURE AND 250 POUNDS PER SQUARE INCH TEST PRESSURE. ACTUAL INSIDE DIAMETER OF DUCTILE IRON PIPE. CLASS 52 USED AS STANDARD.
2. SOIL CONDITION SHALL BE VERIFIED BY THE ENGINEER BEFORE THRUST BLOCK IS CONSTRUCTED, WHERE SOIL BEARING PRESSURE IS LESS THAN 2000LB/FT 2 THRUST BLOCK BEARING AREA SHALL BE INCREASED APPROPRIATELY.
3. ALL CONCRETE SHALL BE CLASS A 4000 PSI.
4. UPWARD THRUST DETAIL IS ONLY ACCEPTABLE FOR SPECIFIC CASES. COORDINATE WITH GOVERNING AUTHORITY.

THRUST BLOCKS

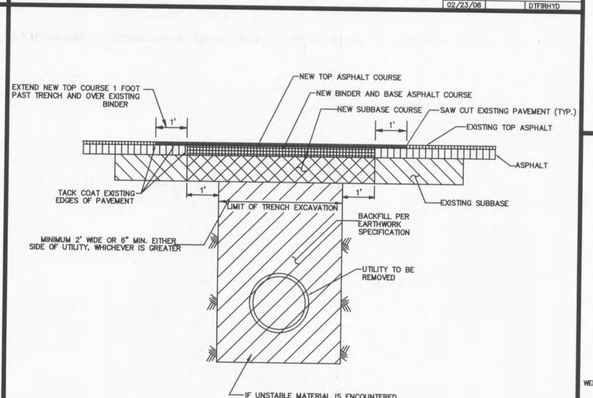
N.T.S.



SANITARY SEWER CLEAN-OUT

N.T.S.

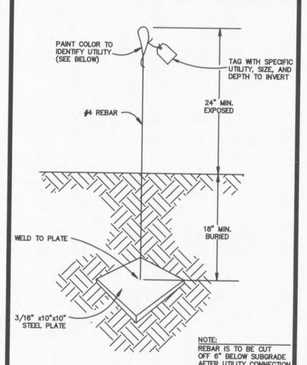
DTSSCOUT | 12/04/01



REMOVING UTILITY IN EXISTING PAVEMENT TRENCH DETAIL

N.T.S.

DT-UTDMTRENCH | 12/21/04



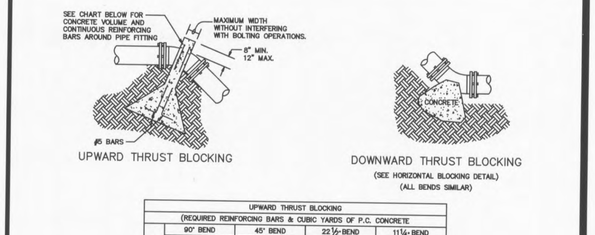
USE AT CAPPED END OF ALL UTILITY SERVICE CONNECTIONS TO/FROM SAM'S CLUB, WAL*MART STORES & SUPERCENTERS

UTILITY	COLOR
SEWER	GREEN
WATER	BLUE
STORM DRAIN	WHITE
ELECTRICAL	RED
GAS	YELLOW
TELCO/CATV	ORANGE
FUTURE SITE LIGHTING	PINK
FIBER OPTIC (GAS STATION)	PURPLE

DETAIL: P.O.C. LOCATION

N.T.S.

DTPOCLOC | 12/21/04



UPWARD THRUST BLOCKING (REQUIRED REINFORCING BARS & CUBIC YARDS OF P.C. CONCRETE)												
	90° BEND			45° BEND			22½° BEND			11¼° BEND		
PIPE SIZE	CONC. C.Y.	REINF QTY.	REINF SIZE	CONC. C.Y.	REINF QTY.	REINF SIZE	CONC. C.Y.	REINF QTY.	REINF SIZE	CONC. C.Y.	REINF QTY.	REINF SIZE

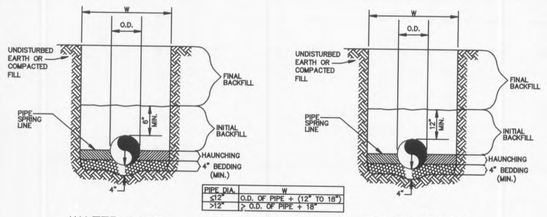
NOTES:

1. DO NOT COVER BELLS OR FLANGES WITH CONCRETE
2. WRAP ALL FITTINGS WITH VISQUEEN.
3. BACK ALL TEES ACCORDING TO SIZE OF BRANCH.
4. BACKING FUTURE LINE EXTENSIONS SHALL BE SUCH THAT LATER REMOVAL IS POSSIBLE.
5. ALL BENDS WHERE FITTINGS ARE USED, BOTH HORIZONTAL OR VERTICAL SHALL BE BACKED.
6. REACTION BACKING TABLE IS BASED ON _____ P.S.I. AND SOIL BEARING PRESSURE OF _____ lb./sq.ft. ADDITIONAL BACKING MAY BE REQUIRED IN SOME AREAS AS DIRECTED BY ENGINEERS.
7. ALL CONCRETE SHALL BE 2500 P.S.I.
8. 18" AND LARGER REQUIRES SPECIFIC ANTI-THRUST DESIGN.

VERTICAL THRUST BLOCKING

N.T.S.

DTTHBLVR | 12/04/01



GENERAL NOTES

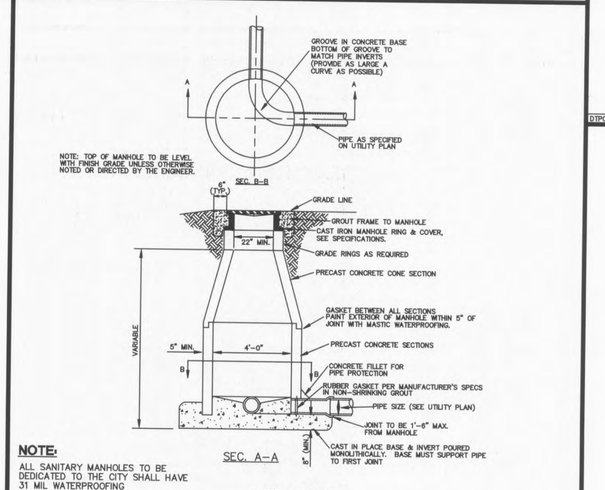
1. BEDDING SHALL BE CLASS I-A WORKED BY HAND. IF GROUNDWATER IS ANTICIPATED, THEN BEDDING SHALL BE CLASS I-B COMPACTED TO 85% STANDARD PROCTOR.
2. HAUNCHING SHALL BE WORKED AROUND THE PIPE BY HAND TO ELIMINATE VOIDS AND SHALL BE CLASS I-A OR CLASS I-B OR CLASS II COMPACTED TO 85% PROCTOR.
3. INITIAL BACKFILL SHALL BE CLASS I-A WORKED BY HAND, OR CLASS I-B OR CLASS II COMPACTED TO 85% STANDARD PROCTOR.
4. INITIAL BACKFILL NOT UNDER PAVED AREAS CAN BE CLASS III COMPACTED TO 90% STANDARD PROCTOR.
5. FINAL BACKFILL SHALL BE CLASS I, II, OR III COMPACTED AS NOTED IN NOTES 3. AND 4.
6. FINAL BACKFILL NOT UNDER PAVED AREAS CAN BE CLASS IV-A COMPACTED TO 95% STANDARD PROCTOR.
7. ALL MATERIALS ARE CLASSIFIED IN ACCORDANCE WITH ASTM D 2321-89.
8. ALL MATERIALS SHALL BE INSTALLED IN MAXIMUM 8" LOOSE LIFTS IN ACCORDANCE WITH ASTM D 698. CLASS III AND IV-A MATERIALS SHALL BE COMPACTED NEAR OPTIMUM MOISTURE CONTENT.
9. FILL SALVAGED FROM EXCAVATION SHALL BE FREE OF DEBRIS, ORGANICS AND ROCKS LARGER THAN 3".
10. ALL TRENCH EXCAVATIONS SHALL BE SLOPED, SHORED, SHEETED, BRACED, OR OTHERWISE SUPPORTED IN COMPLIANCE WITH OSHA REGULATIONS AND LOCAL ORDINANCES. (SEE SPECIFICATIONS)

UTILITY TRENCH AND BEDDING

N.T.S.

MODIFIED WAL-MART DETAIL

DTUTLTRN | 12/21/04

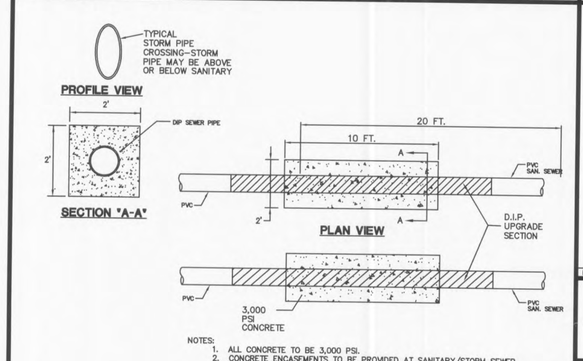


NOTE:
ALL SANITARY MANHOLES TO BE DEDICATED TO THE CITY SHALL HAVE 31 MIL WATERPROOFING

PRE-CAST SANITARY SEWER MANHOLE

N.T.S.

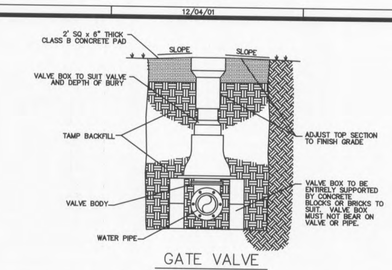
DTMANPRE | 12/21/04



NOTES:
1. ALL CONCRETE TO BE 3,000 PSI.
2. CONCRETE ENCASEMENTS TO BE PROVIDED AT SANITARY/STORM SEWER CROSSINGS LESS THAN 3.0 VERTICAL FEET, WHETHER SANITARY IS ABOVE OR BELOW STORM.

CONCRETE ENCASEMENT FOR SANITARY SEWER PIPE CROSSINGS

N.T.S.



DTGATEVL | 12/21/04

PLANNING AND DEV. DEPT. FILE NO.: 00-109.02
DATE OF PLANNING APPROVAL: 09/06/2007

UTILITY PLAN DETAILS

Wolverton & Associates
Consulting Engineers + Land Surveyors
6745 Sugarloaf Parkway • Suite 100 • Duluth, Georgia 30097
Phone: (770) 447-8999 • Fax: (770) 447-9070
www.wolverton-assoc.com

STATE OF MISSOURI
DAVID MARK WOOLRIDGE
NUMBER PE-2003021199
PROFESSIONAL ENGINEER
5-30-2008

PROPOSED EXPANSION TO WAL-MART #2616-04
O'FALLON POINTE CENTRE
O'FALLON, MISSOURI 63366
BY: WAL-MART REAL ESTATE BUSINESS TRUST
BENTONVILLE, AR.

REVISIONS	BY

DRAWN BY: CER
CHECKED BY: DMW
DATE: 05/30/2008
SCALE: NOT TO SCALE
JOB No.: 06-107
SHEET NUMBER: DE-3A
EDDS : 6170

06-107-DET SHEETS.DWG