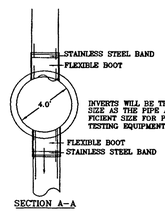
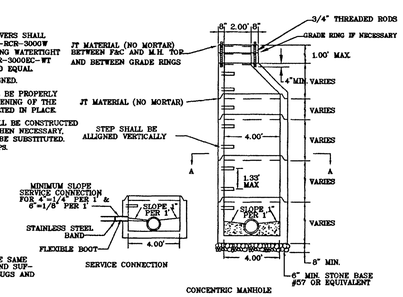
NOTES:

1. ALL MANHOLE FRAMES AND COVERS SHALL BE DEWEY BROTHERS, INC. MH-RCR-3000W IN NON-PAVED AREAS REQUIRING WATERTIGHT FRAME & COVERS AND MH-RCR-3000EC-WT IN PAVED AREAS, OR APPROVED EQUAL.
2. STEPS TO BE VERTICALLY ALIGNED.
3. THE FRAME AND COVER SHALL BE PROPERLY ALIGNED WITH THE 2 FOOT OPENING OF THE MANHOLE STRUCTURE AND BOLTED IN PLACE.
4. ALL SAMPLING MANHOLES SHALL BE CONSTRUCTED AS PER MANHOLE DETAILS. WHEN NECESSARY, THE FLAT TOP MANHOLE MAY BE SUBSTITUTED WITH ECCENTRIC OPENING AT STEPS.



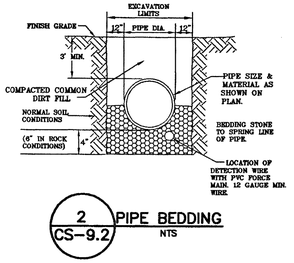
SECTION A-A



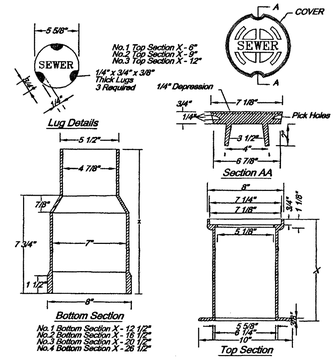
Pipe Diameter (in.)	Min. Time (min: sec)	Length for Min. Time (ft)	Time for Longer Length (sec)	Specified Time for Length (L) Shown (minsec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

MINIMUM SPECIFIED TIME REQUIRED FOR A 1.0 PSIG PRESSURE DROP FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015

1 CS-9.2 SANITARY MANHOLE
NTS



2 CS-9.2 PIPE BEDDING
NTS

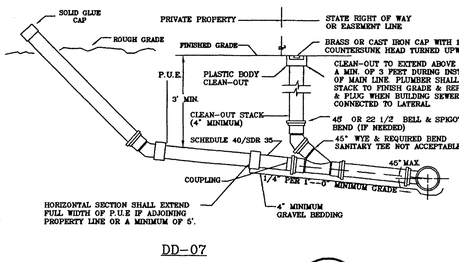


NOTE: A MINIMUM CLEARANCE OF 4 INCHES IS REQUIRED BETWEEN CLEANOUT CAP AND TOP OF COVER.

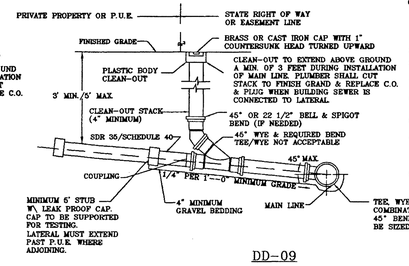
3 CS-9.2 CLEANOUT
NTS

GENERAL NOTES:

1. TRAFFIC BEARING BOX REQUIRED IN TRAFFIC AREAS.
2. ALL PIPE AND FITTINGS SHALL BE OF SIMILAR MATERIAL.
3. ALL PIPE SHALL BE OF SAME SIZE.
4. NO BENDS ARE ALLOWED IN THE LATERAL FROM THE MAIN TO THE CLEAN-OUT STACK WYE. (EXCEPT AS NOTED)
5. ALL MAIN LINE TAPS ON ACTIVE MAINS WILL BE PERFORMED BY ROANOKE COUNTY UTILITY DEPT.
6. PIPING BEHIND CLEANOUT TO BE INSTALLED PER BOCA CODE.
7. MINIMUM LATERAL SIZE:
   4" FOR RESIDENTIAL SERVICE
   6" FOR NON-RESIDENTIAL SERVICE
8. MINIMUM COVER FOR ALL SEWER LATERALS SHALL BE THREE (3') FEET



DD-07

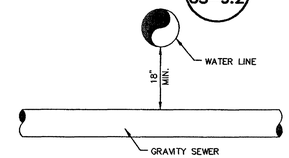


DD-09

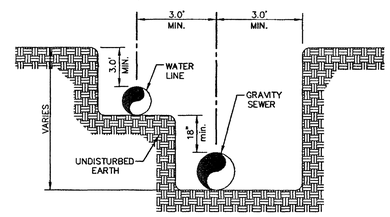
GENERAL NOTES:

1. THIS CONFIGURATION MAY ONLY BE USED IN SPECIAL CASES WHEN SPECIFICALLY DESIGNED BY THE PROJECT ENGINEER AND INDICATED ON SITE PLANS.
2. ALL PIPE AND FITTINGS SHALL BE OF SAME MATERAL.
3. ALL PIPE SHALL BE OF SAME SIZE.
4. NO BENDS ARE ALLOWED IN THE LATERAL FROM THE MAIN TO THE CLEAN OUT STACK WYE (EXCEPT AS NOTED).
5. ALL MAIN LINE TAPS ON ACTIVE MAINS SHALL BE PERFORMED BY ROANOKE COUNTY UTILITY DEPT.
6. PIPING BEHIND CLEANOUT TO BE INSTALLED PER BOCA CODE.
7. MINIMUM LATERAL SIZE:
   4" FOR RESIDENTIAL SERVICE
   6" FOR NON-RESIDENTIAL SERVICE
8. MINIMUM COVER FOR ALL SEWER LATERALS SHALL BE THREE (3') FEET.

4 CS-9.2 SANITARY SEWER LATERAL
NTS

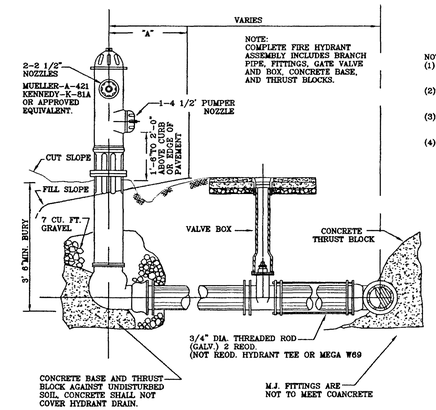


WATER/SEWER LINE CROSSING



WITH LESS THAN 10' HORIZONTAL SEPARATION

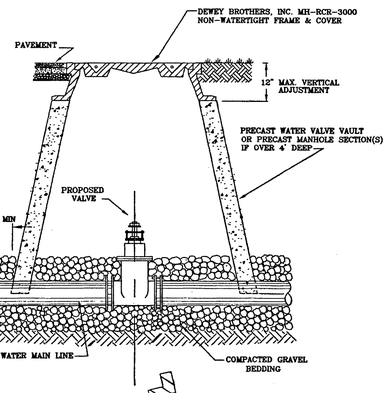
5 CS-9.2 PIPE SEPARATION
NTS

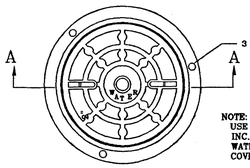


NOTE:
COMPLETE FIRE HYDRANT ASSEMBLY INCLUDES BRANCH PIPE, FITTINGS, GATE VALVE AND BOX, CONCRETE BASE, AND THRUST BLOCKS.

NOTES:
(1) MAIN BODY OF HYDRANT MUST BE SILVER AND HAVE RED CAPS AND BONNET.
(2) DISTANCE "A" WITH CURB AND GUTTER, 2' MIN., 4' MAX. FROM BACK OF CURB.
(3) DISTANCE "A" WITHOUT CURB AND CUTTER, 6' MIN., 12' MAX. FROM EDGE OF PAVEMENT.
(4) AREA AROUND HYDRANT AT A RADIUS OF 4' TO BE APPROXIMATELY LEVEL AND UNOBSTRUCTED.

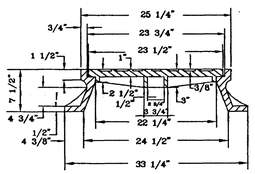
6 CS-9.2 FIRE HYDRANT
NTS





NOTE:
USE DEWEY BROTHERS INC. MH-RCR-2000 OR 2001 WATERTIGHT FRAME & COVER IN PAVED AREAS.

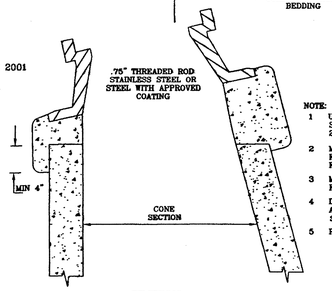
PLAN



SECTION A-A

MANHOLE FRAME AND COVER

PAVED 2001EC
UNPAVED 2001(ABOVE)

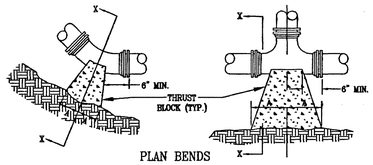


SECTION

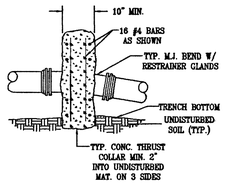
INSTALLATION DETAIL
FOR ALL FRAMES AND COVERS

NOTE:
1 USE MODERATELY STIFF MIX OF NON SHRINK CEMENT, SAND AND 1/2" AND LESS DIAMETER GRAVEL WITH 28 DAYS. STRENGTH AT 4,000 P.S.I.
2 MIX IS TO BE FORCED INTO ALL GROOVES AND UNDER FLANGE OF FRAME AND LEFT AT OR ABOVE TOP OF FLANGE.
3 MAX. OF 4 BRICK OR CONCRETE BLOCKS TO BE USED FOR GRADE CONTROL.
4 DO NOT BACKFILL AROUND FRAME AND COVER, FOR 48 HOURS AFTER CON. IS PLACED. THE USE OF HIGHEARLY STRENGTH CONCRETE WOULD REDUCE TIME TO (24HRS).
5 RESTRICT TRAFFIC LOAD FOR MIN. 24 HOURS.

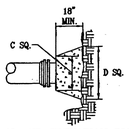
7 CS-9.2 GATE VALVE
NTS



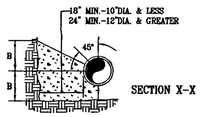
PLAN BENDS



SECTION OF VERTICAL BEND



PLAN AND ELEVATION PLUGS



SECTION X-X

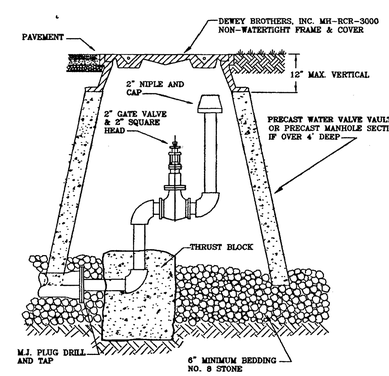
BENDS AND TEES

NOTES:
1. FOR VERT. BEND DOWN IN EXCESS OF 11 1/4" BEND, ANCHORAGE SHALL BE DESIGNED BY ENGINEER.
2. FOR VERT. BEND UPWARD, BLOCKING TO BE SIMILAR TO THAT FOR HORIZ. BEND.
3. GLANDS & BOLTS SHALL BE PROTECTED FROM CONC. BY PLASTIC SHEETING WHEN POURING THRUST BLOCKS.
4. ALL THRUST BLOCK & SUPPORT CONC. SHALL BE 4,000 PSI READY MIX CONC.
5. THRUST BLOCKS WITH "B" DIMENSION GREATER THAN 30" SHALL HAVE THE RESTRAINED PIPE INSTALLED WITH A MINIMUM OF 4' OF COVER.

PRESSURE = 200 psi
BEARING = 2000 psf
FACTOR OF SAFETY = 1.5

PIPE SIZE	90° BEND		45° BEND		22 1/2° BEND		11 1/4° BEND		TEE		PLUG	
	A	B	A	B	A	B	A	B	A	B	C	D
4"	8"	12"	8"	8"	6"	6"	6"	6"	11"	9"	10"	6"
6"	18"	12"	8"	10"	8"	8"	8"	8"	11"	10"	12"	18"
8"	18"	13"	10"	10"	8"	8"	8"	8"	11"	12"	12"	24"
10"	20"	16"	12"	14"	8"	12"	8"	12"	14"	16"	16"	30"
12"	20"	16"	12"	14"	8"	12"	8"	12"	14"	16"	16"	30"
16"	25"	20"	16"	18"	11"	13"	11"	13"	18"	20"	20"	36"
24"	82"	42"	62"	30"	44"	22"	22"	16"	82"	42"	82"	42"
30"	185"	42"	100"	42"	52"	42"	40"	30"	185"	42"	185"	42"

8 CS-9.2 THRUST BLOCK
NTS



9 CS-9.2 PERMANENT END OF LINE ASSEMBLY
NTS

LOWE'S
HOME CENTERS, INC.
P.O. BOX 1111 N. WILKESBORO, NC 28656

REVISIONS
◇ PRE-BID SET ISSUE DATE △ POST BID SET ISSUE DATE

DATE	DESCRIPTION

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Solutions for the Future
ENGINEERS • SURVEYORS
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3428 BRISTOL HWY.
JOHNSON CITY, TENNESSEE 37601
(423) 282-2687
(423) 854-4563 FAX
tbp@tysinger-engineering.com
http://www.tysinger-engineering.com

COMMONWEALTH OF VIRGINIA
GARY D. JENNINGS
LICENSE NO. 011665
PROFESSIONAL ENGINEER

LOWE'S
ENGINEERING AND CONSTRUCTION
HWY 268 EAST, EAST DOCK N. WILKESBORO, NC 28659
336.658.4000 (V) 336.658.3257 (F)

UTILITY DETAILS
LOWE'S OF:
ROANOKE
ROANOKE, VIRGINIA
PROJECT No. 0221701C | DRAWN BY: JES | CHECKED BY: TOP

ORIGINAL ISSUE DATE: APR 15 2003
PERMIT SET ISSUE DATE:
CONSTRUCTION SET ISSUE DATE:
DRAWING NUMBER:
CS-9.2
OF 11

2/8/03 NTS
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