

PROJECT NAME: Waterline Ext. AB
DATE: September 1991
TYPE: AS-BUILTS
LOCATION: Troutville
TOTAL # SHEETS: 10
A/E FIRM: Lang & Assoc.
OF SETS: 1

WATERLINE EXTENSION

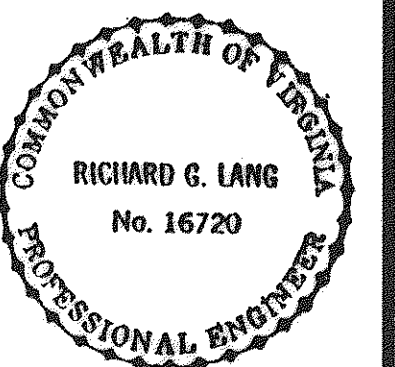
TROUTVILLE TO EXIT 44, I-81

BOTETOURT COUNTY, VIRGINIA

"AS-BUILTS"
SEPTEMBER 1991

PREPARED BY:

LANG ENGINEERING COMPANY
POST OFFICE BOX 565
DALEVILLE, VIRGINIA 24083

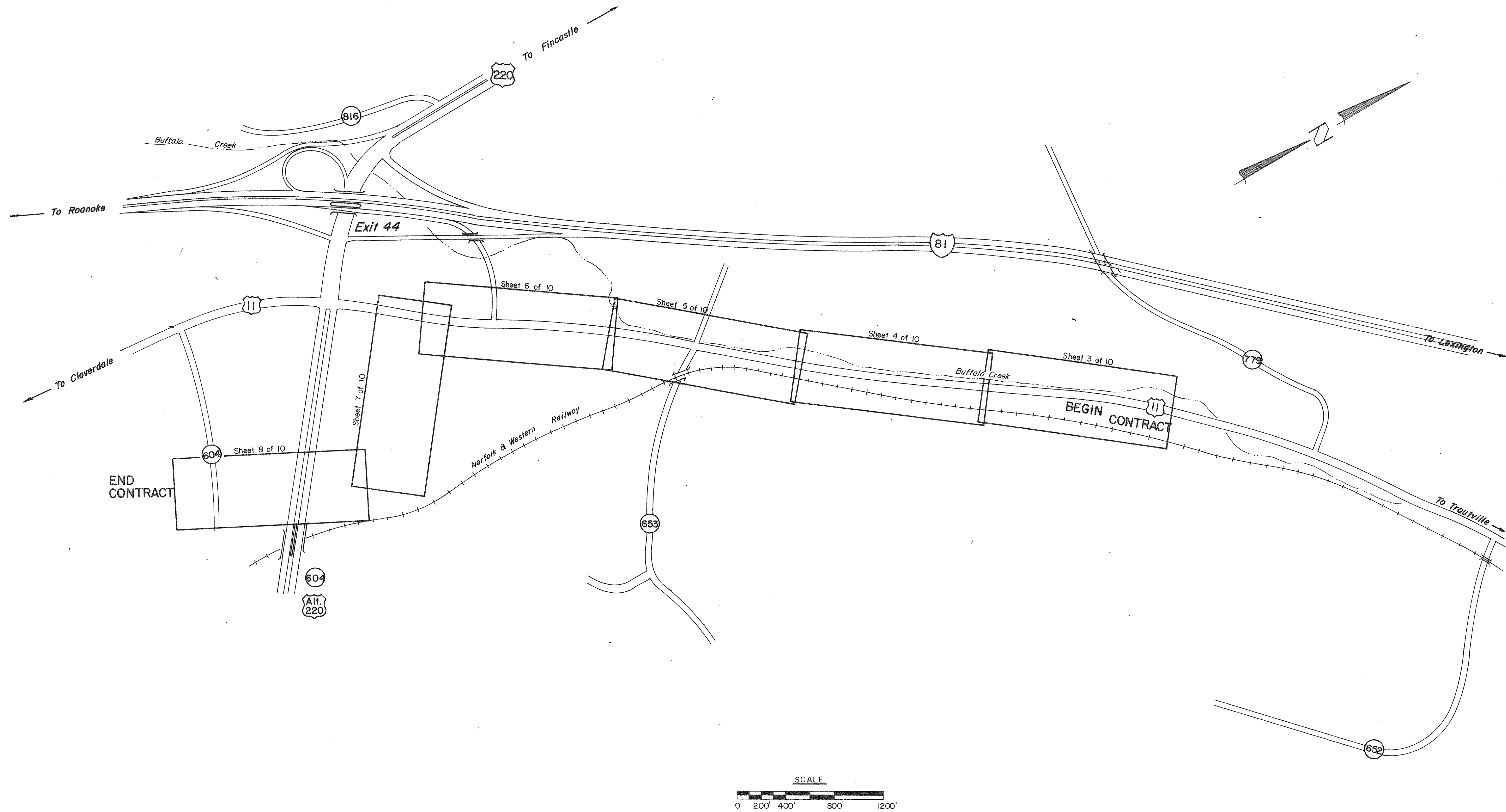


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SHEET 1: COVER SHEET
SHEET 2: INDEX SHEET
SHEET 3: WATERLINE PLAN/PROFILE
SHEET 4: WATERLINE PLAN/PROFILE
SHEET 5: WATERLINE PLAN/PROFILE
SHEET 6: WATERLINE PLAN/PROFILE
SHEET 7: WATERLINE PLAN/PROFILE
SHEET 8: WATERLINE PLAN/PROFILE
SHEET 9: STANDARD DETAILS
SHEET 10: STANDARD DETAILS

Date: September 1990

Job No.: 900515



NOTE: PLANS WERE PREPARED BASED UPON:

AERIAL TOPOGRAPHY MAPPING PREPARED BY PHOTOGRAMMETRIC DATA SERVICES, INC. OF STERLING, VIRGINIA, AS CONTRACTED BY MOUNTAIN TOP SURVEYORS, INC. OF DALEVILLE, VIRGINIA.

HORIZONTAL AND VERTICAL GROUND CONTROL SUPPLIED BY MOUNTAIN TOP SURVEYORS, INC. OF DALEVILLE, VIRGINIA.

AERIAL TOPOGRAPHY FLOWN AND MAPPED IN JULY 1990.

"AS-BUILTS"

INDEX MAP

DATE					
6	5	4	3	2	1
REVISIONS					

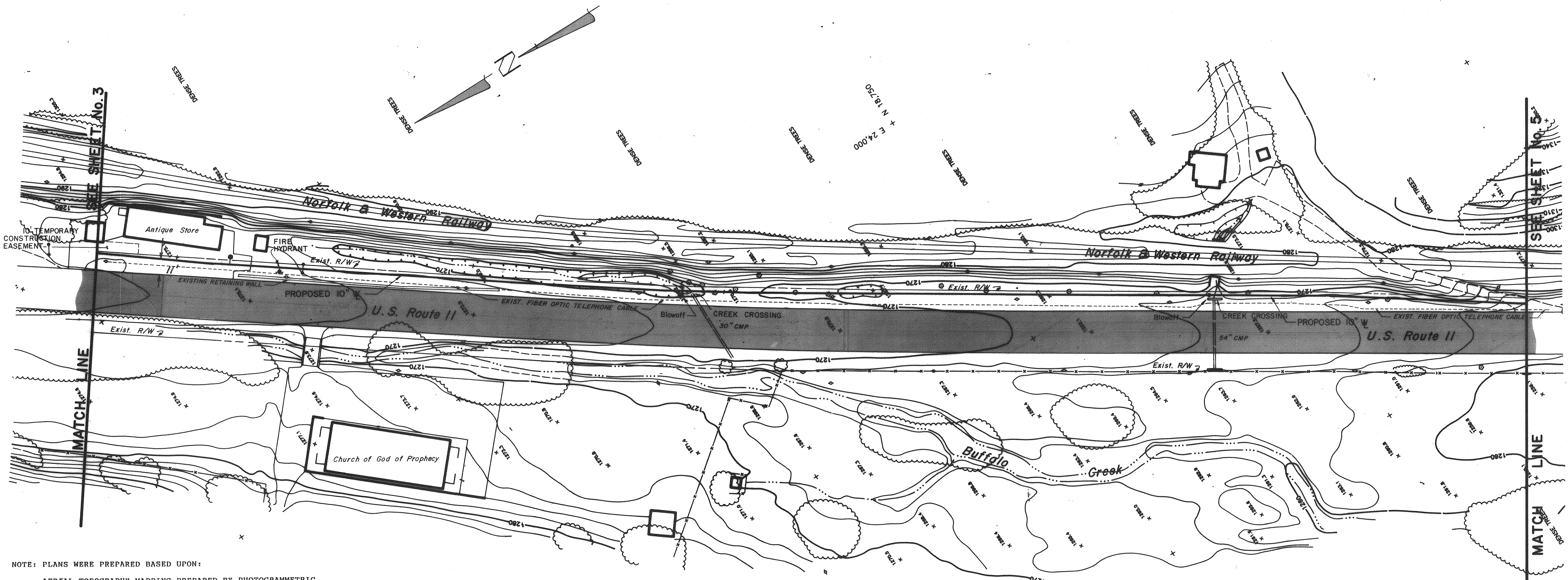
DATE September 1990	SCALE 1" = 400'	CHKD. RGL
JOB No. 900301		

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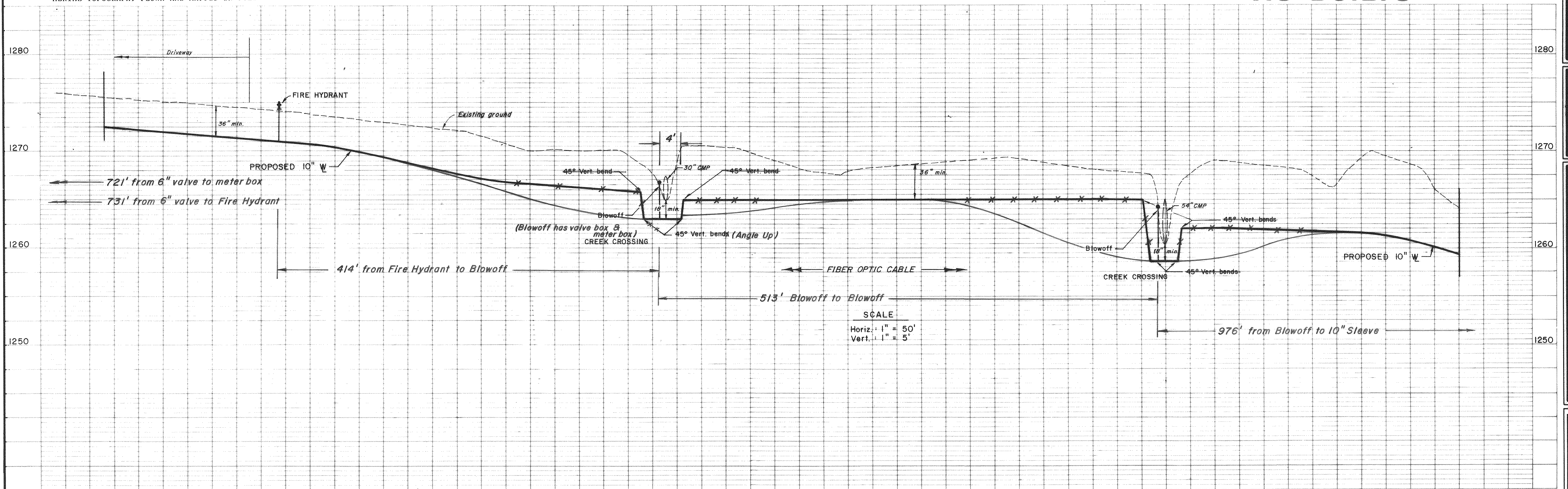
COMMONWEALTH OF VIRGINIA RICHARD G. LANG No. 16720 PROFESSIONAL ENGINEER

WATERLINE EXTENSION TROUTVILLE TO EXIT 44, I-81 BOTETOURT COUNTY VIRGINIA
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SHEET NO. 2 OF 10



"AS-BUILTS"



DATE	REVISIONS
SEPTEMBER 1990	1
SCALE 1" = 50'	2
JOB No. 900515	3
CHKD. RGL	4
	5
	6

DATE: SEPTEMBER 1990
 SCALE: 1" = 50'
 JOB No. 900515
 CHKD. RGL

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COMMONWEALTH OF VIRGINIA
 RICHARD G. LANG
 No. 16720
 PROFESSIONAL ENGINEER

WATERLINE EXTENSION
TROUTVILLE TO EXIT 44, I-81
BOTETOURT COUNTY VIRGINIA

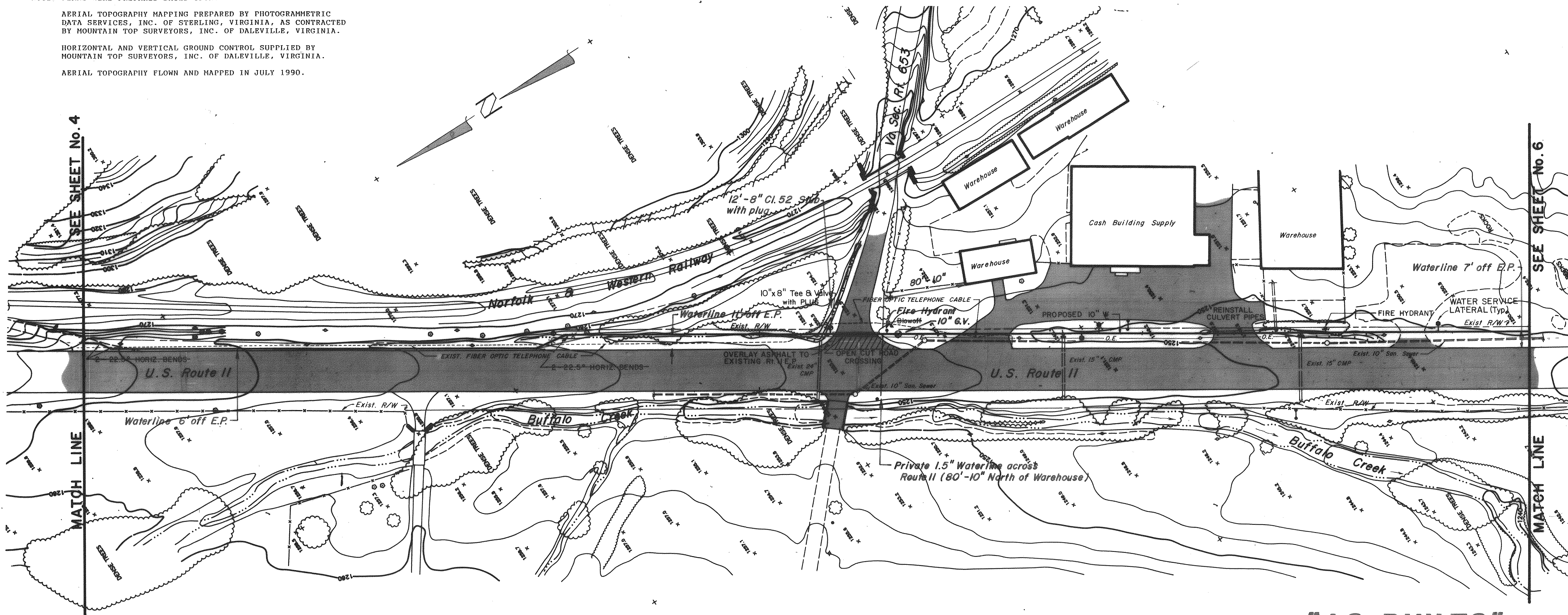
SHEET NO. 4
 OF 10

NOTE: PLANS WERE PREPARED BASED UPON:

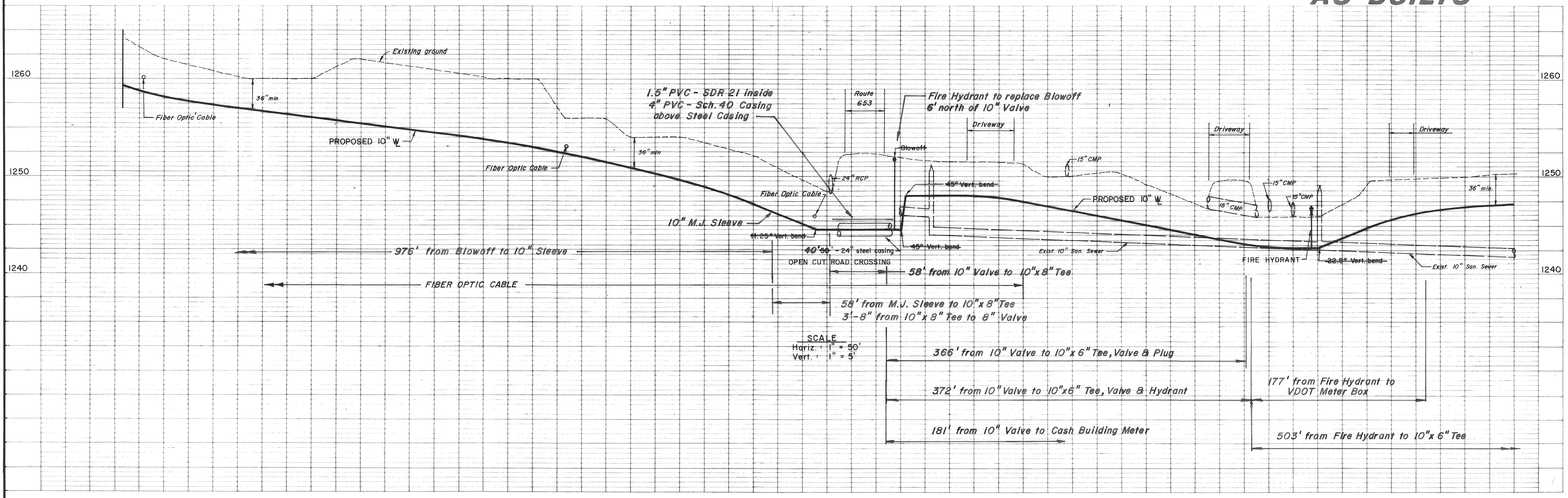
AERIAL TOPOGRAPHY MAPPING PREPARED BY PHOTOGRAMMETRIC DATA SERVICES, INC. OF STERLING, VIRGINIA, AS CONTRACTED BY MOUNTAIN TOP SURVEYORS, INC. OF DALEVILLE, VIRGINIA.

HORIZONTAL AND VERTICAL GROUND CONTROL SUPPLIED BY MOUNTAIN TOP SURVEYORS, INC. OF DALEVILLE, VIRGINIA.

AERIAL TOPOGRAPHY FLOWN AND MAPPED IN JULY 1990.



"AS-BUILTS"



DATE	SEPTEMBER 1990	SCALE	1" = 50'
REVISIONS	1	CHKD.	RGL
JOB No.	900515	DATE	SEPTEMBER 1990
BY	1	DATE	SEPTEMBER 1990
CHECKED	2	DATE	SEPTEMBER 1990
DESIGNED	3	DATE	SEPTEMBER 1990
DRAWN	4	DATE	SEPTEMBER 1990
PER VDOT REVIEW	5	DATE	SEPTEMBER 1990

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COMMONWEALTH OF VIRGINIA
RICHARD G. LANG
No. 16720
PROFESSIONAL ENGINEER

WATERLINE EXTENSION
TROUTVILLE TO EXIT 44, I-81
BOTETOURT COUNTY
VIRGINIA

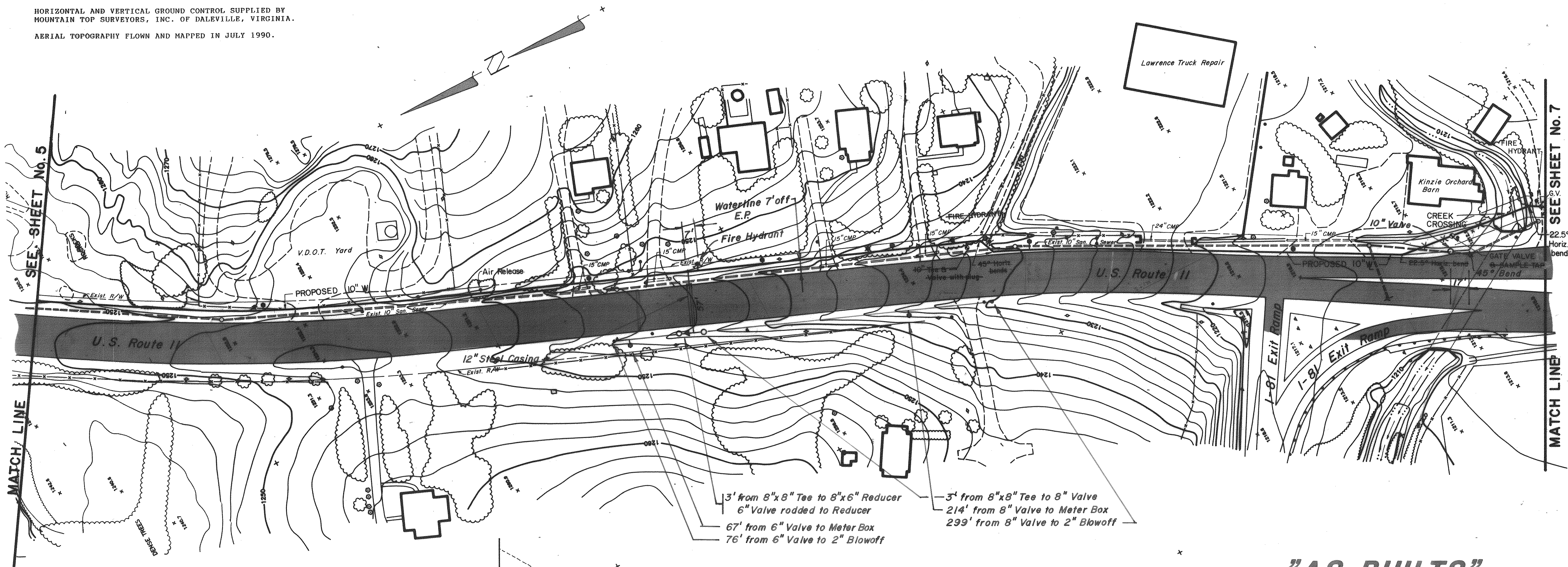
SHEET NO. 5
OF 10

NOTE: PLANS WERE PREPARED BASED UPON:

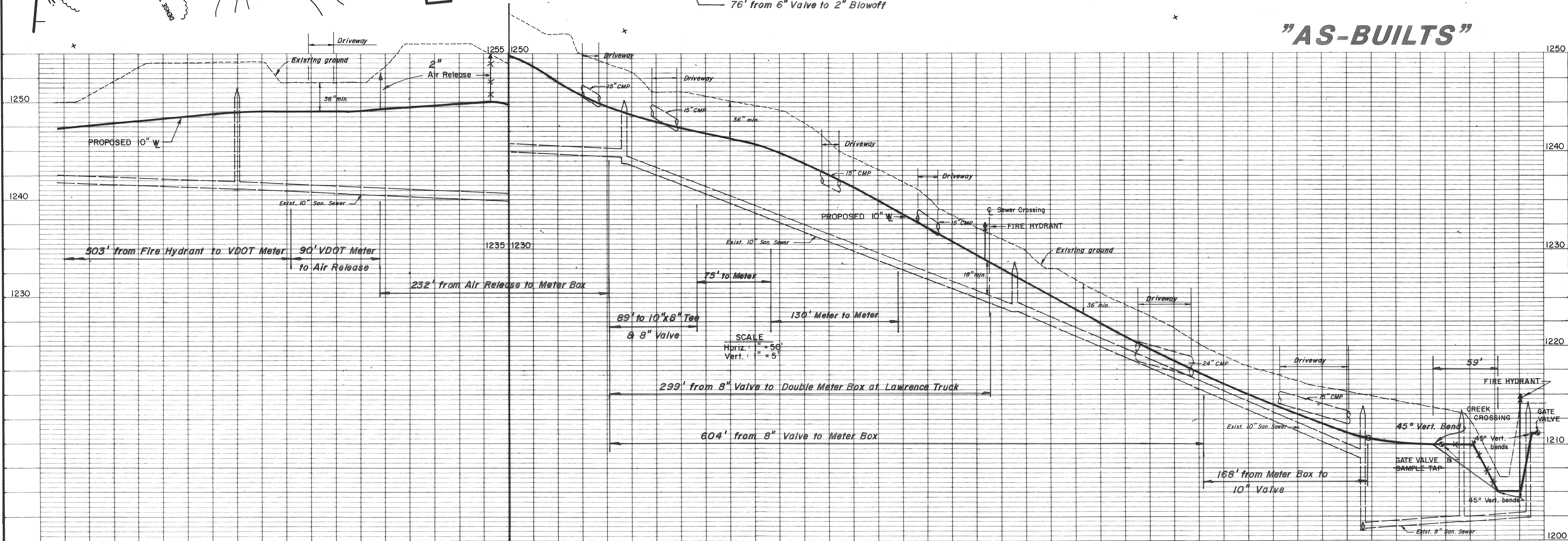
AERIAL TOPOGRAPHY MAPPING PREPARED BY PHOTOGRAMMETRIC DATA SERVICES, INC. OF STERLING, VIRGINIA, AS CONTRACTED BY MOUNTAIN TOP SURVEYORS, INC. OF DALEVILLE, VIRGINIA.

HORIZONTAL AND VERTICAL GROUND CONTROL SUPPLIED BY MOUNTAIN TOP SURVEYORS, INC. OF DALEVILLE, VIRGINIA.

AERIAL TOPOGRAPHY FLOWN AND MAPPED IN JULY 1990.



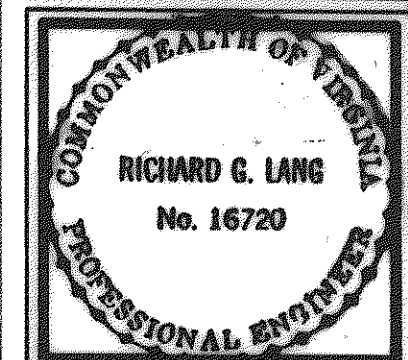
"AS-BUILTS"



DATE	SEPTEMBER 1990
REVISIONS	1 per V.D.H. review
6	
5	
4	
3	
2	
1	

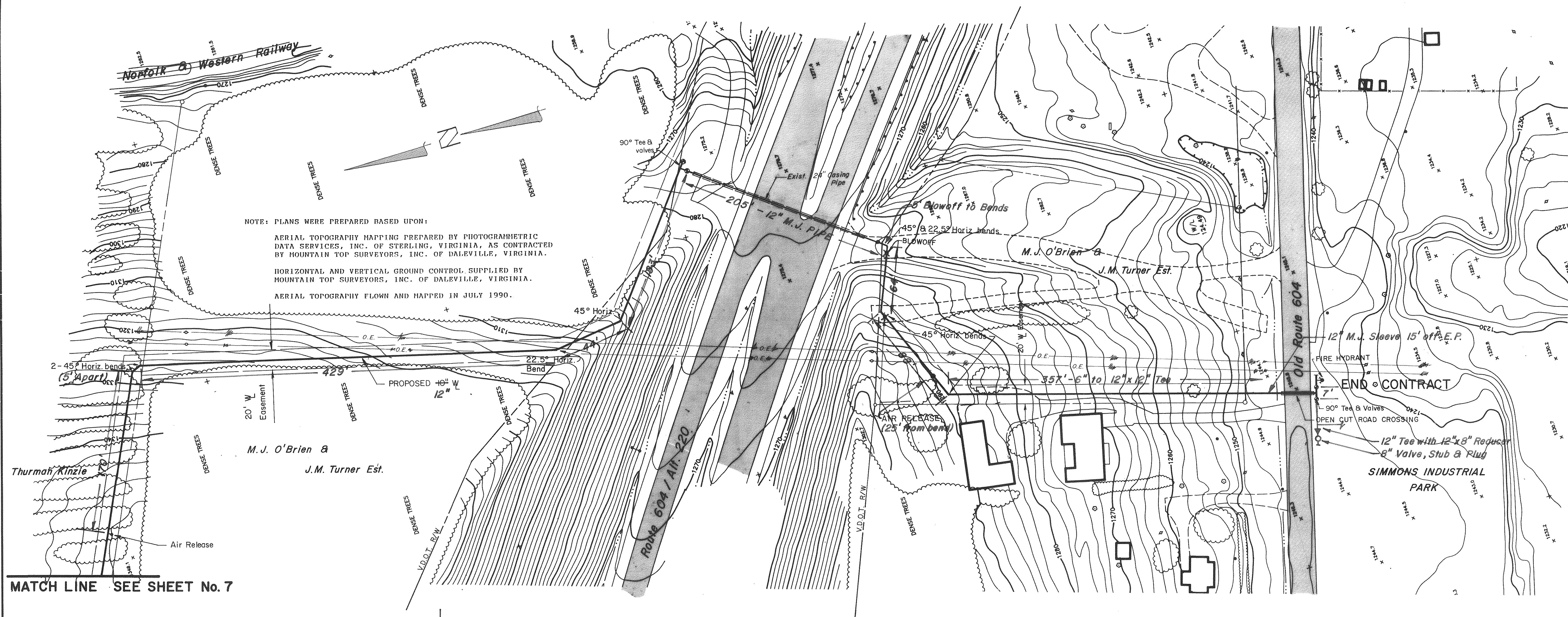
DATE	SEPTEMBER 1990	SCALE	1" = 50'
JOB No.	900515	CHKD.	RGL
			

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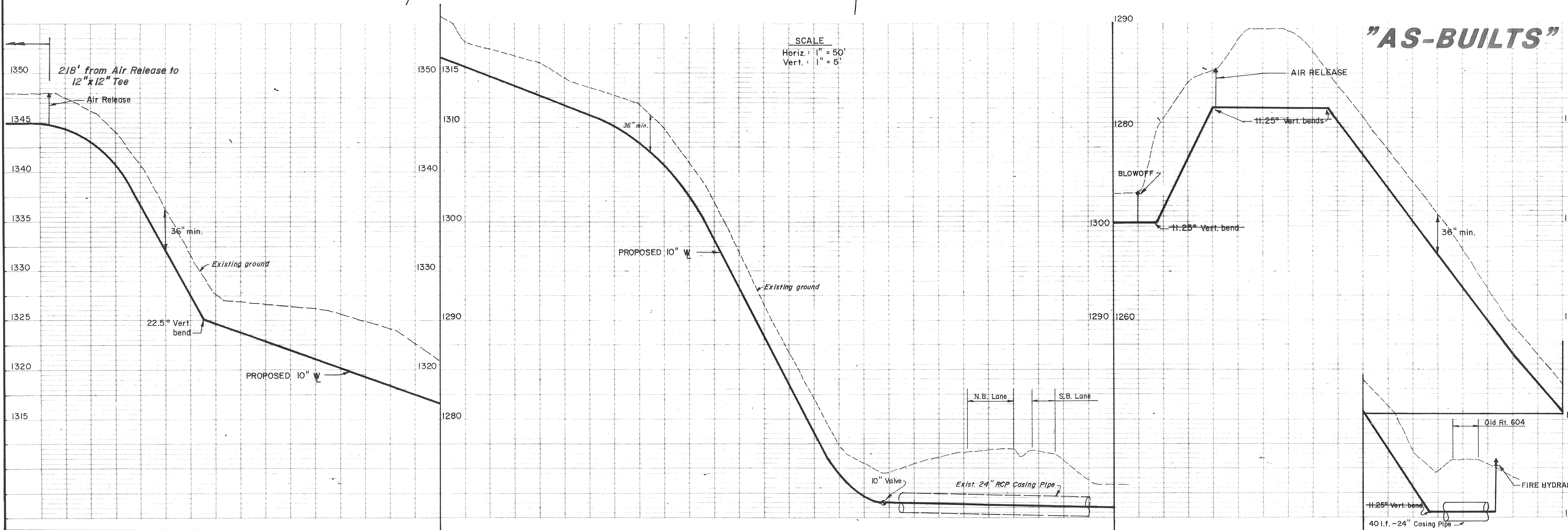


WATERLINE EXTENSION
TROUTVILLE TO EXIT 44, 1-81
BOTETOURT COUNTY VIRGINIA

SHEET NO. 6
OF 10



MATCH LINE SEE SHEET No. 7



DATE	6	5	4	3	2	1
REVISIONS						

DATE SEPTEMBER 1990 SCALE 1" = 50'

JOB No. 900515 CHKD. RGL

0 25' 50' 100' 200'

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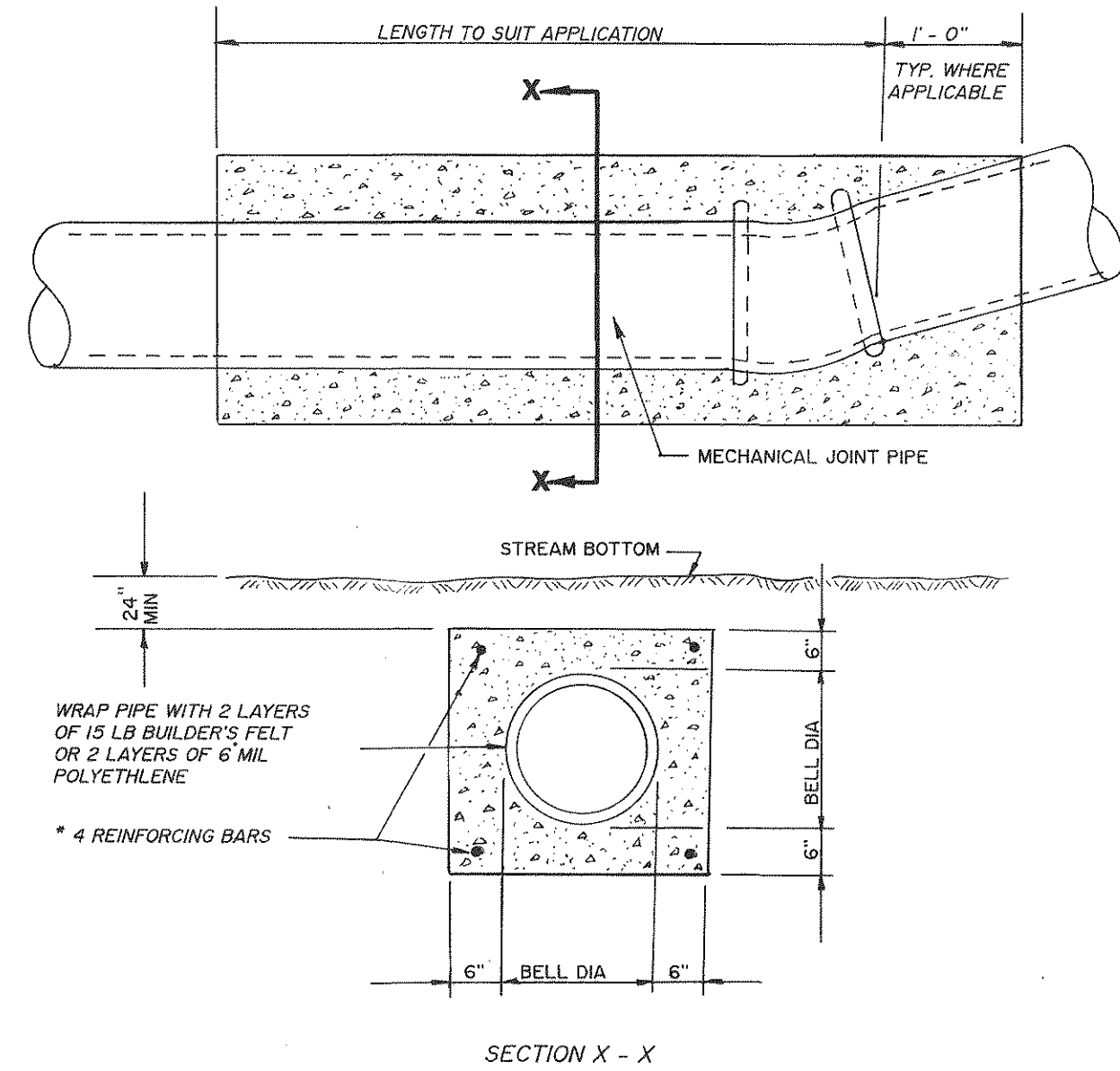
P.O. Box 565
Daleville, Va. 24083
(703) 992-5520

COMMONWEALTH OF VIRGINIA
RICHARD G. LANG
No. 16720
PROFESSIONAL ENGINEER

**WATERLINE EXTENSION
TROUTVILLE TO EXIT 44, I-81**

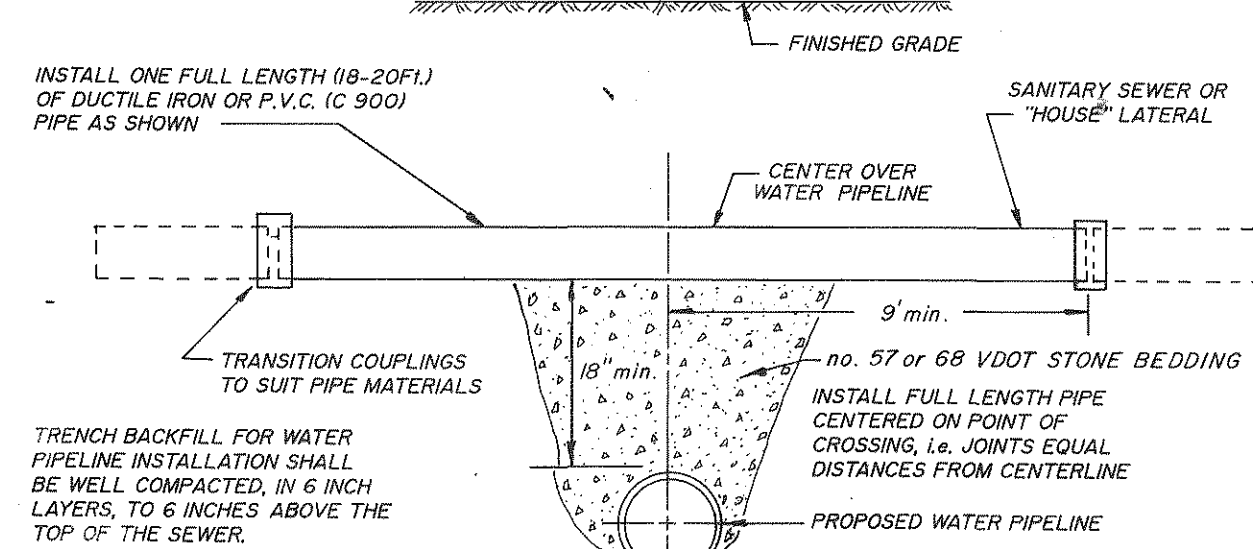
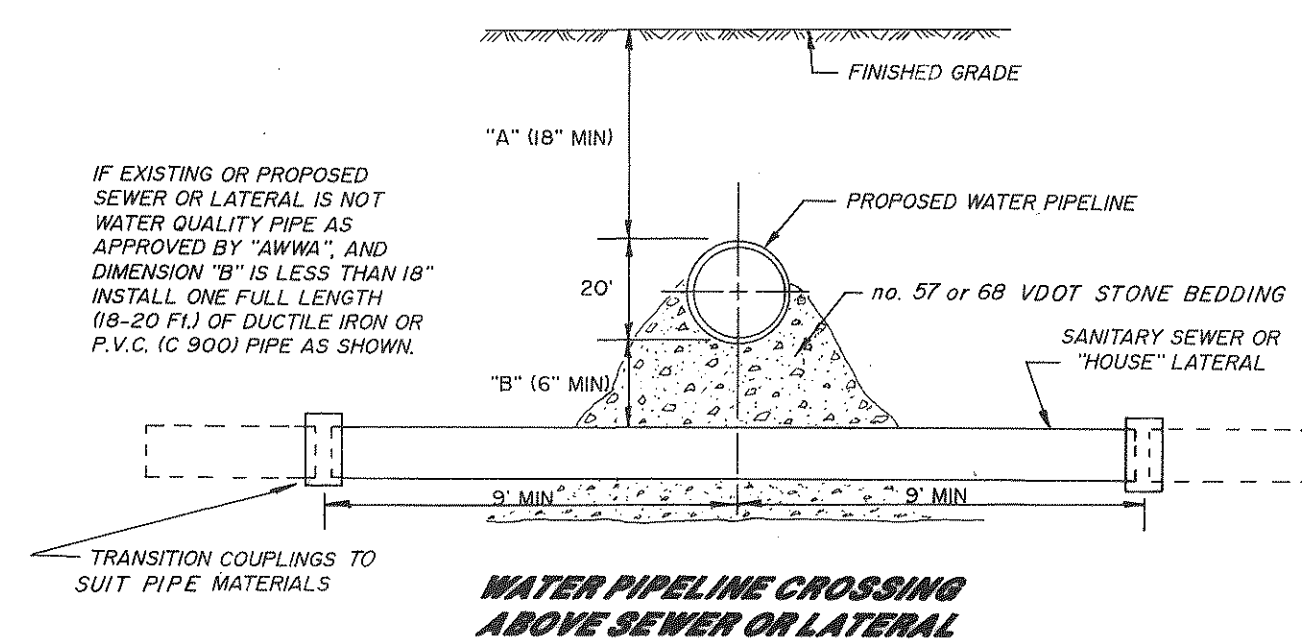
BOTETOURT COUNTY VIRGINIA

SHEET NO. 8
10 OF

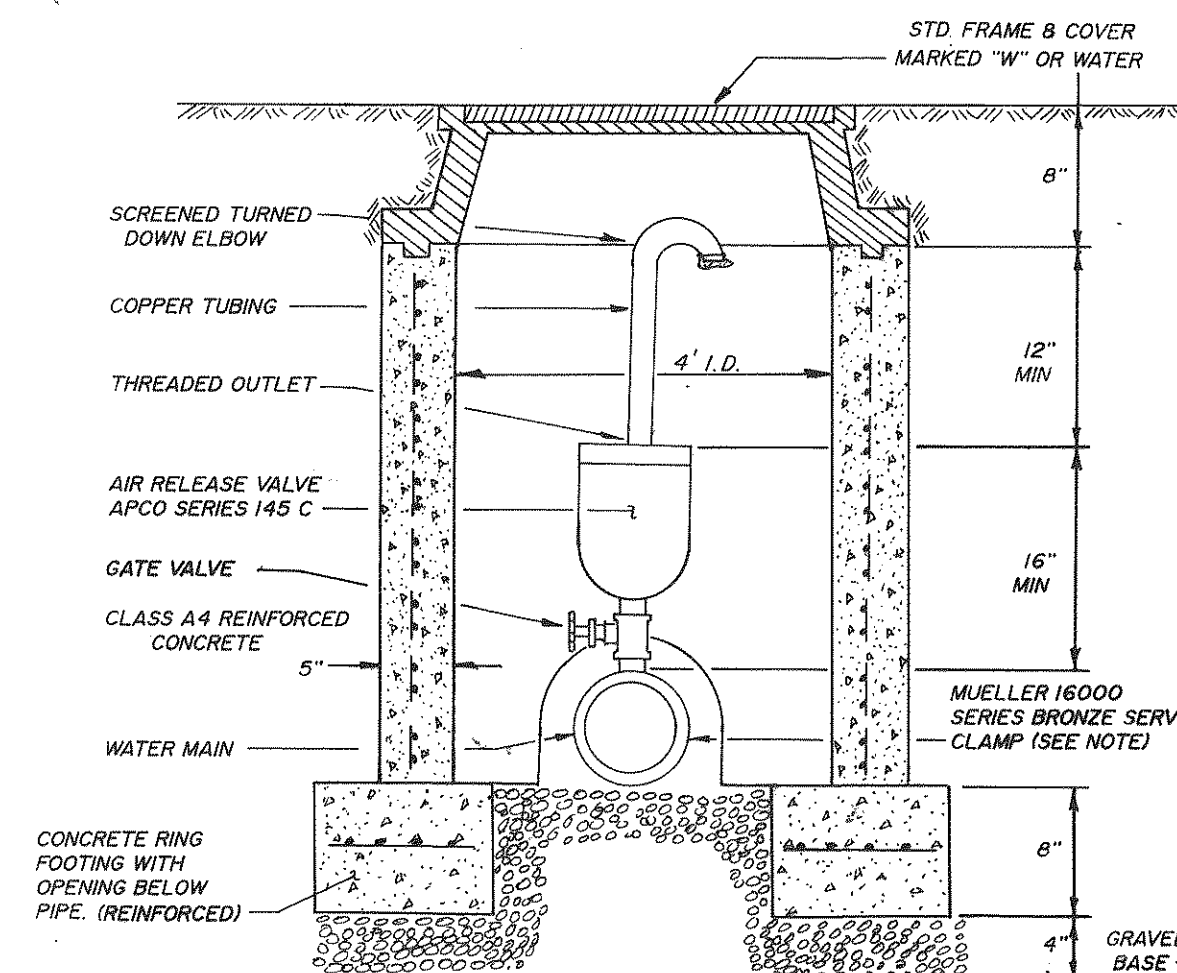
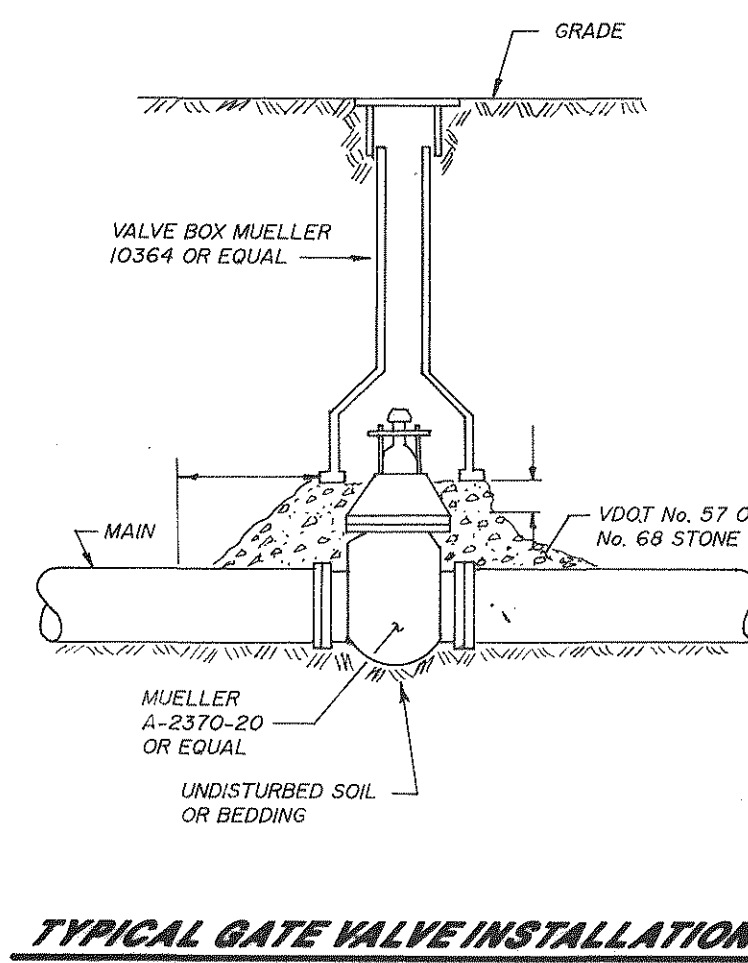
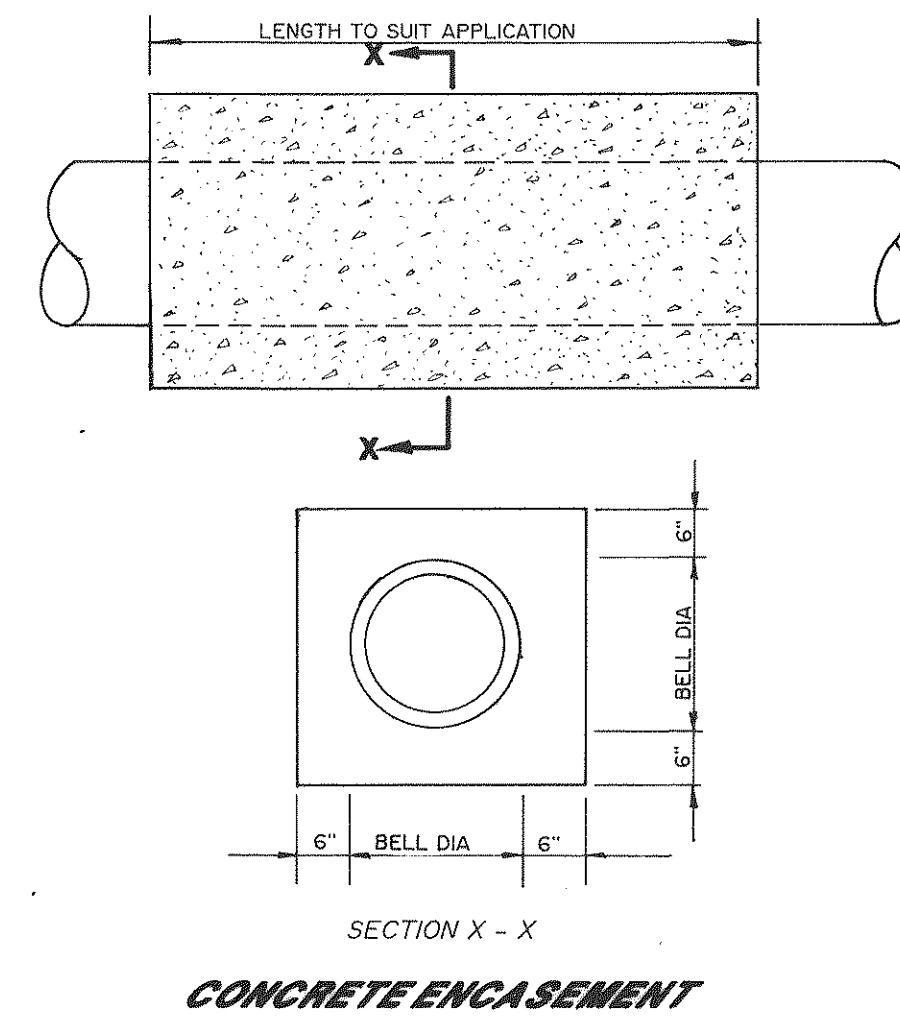


* MAY BE REDUCED TO 12" IF ENCASEMENT ELEVATION IS INTO BEDROCK MORE THAN 75% OF ITS DEPTH

TYPICAL STREAM CROSSING



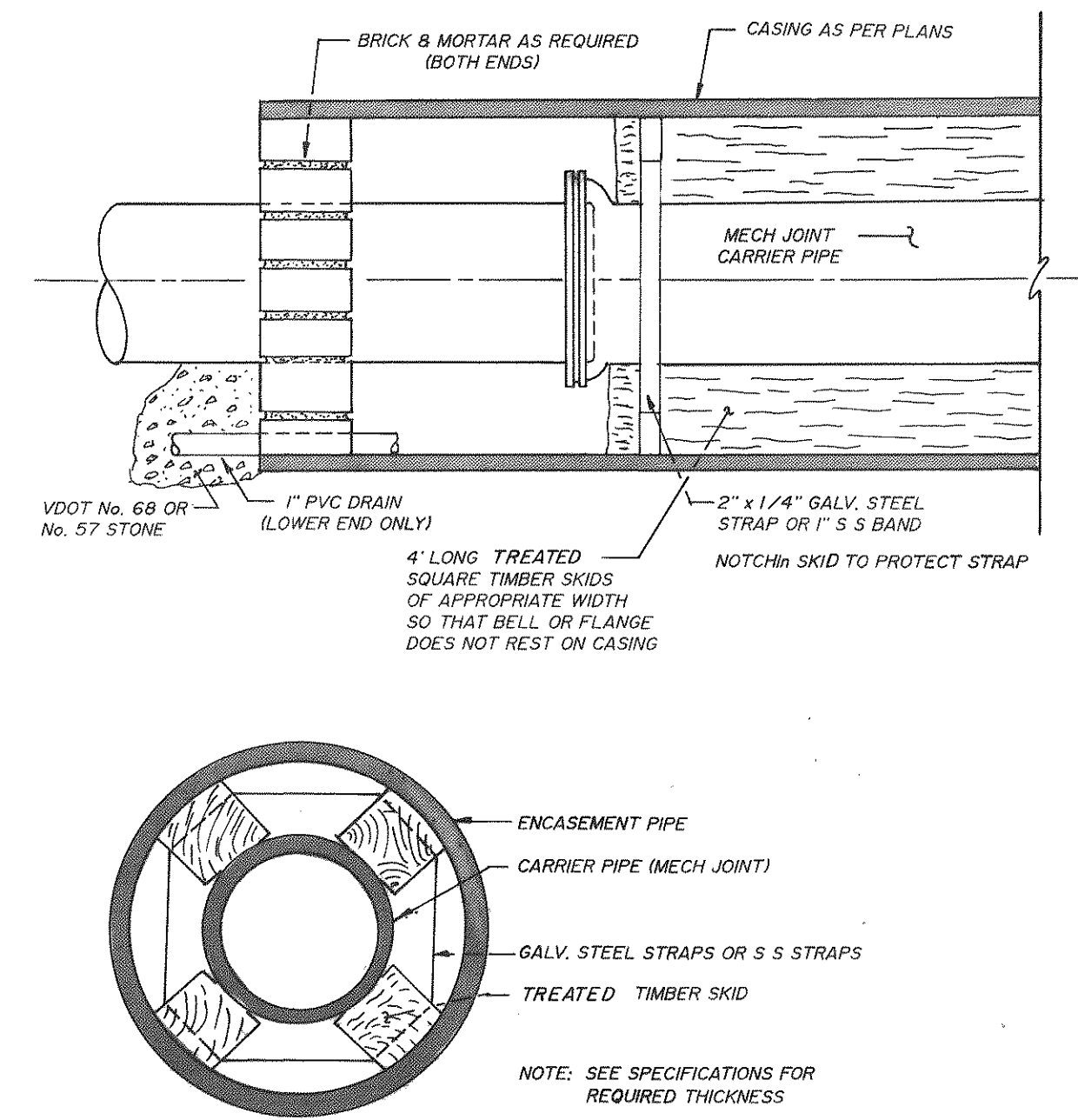
WATER PIPELINE CROSSING SANITARY SEWER OR "HOUSE" LATERAL



NOTE: SERVICE CLAMP REQUIRED FOR 1" TAPS IN MAINS 4" AND SMALLER IN DIAMETER, AND 2" TAPS IN MAINS 6" AND SMALLER IN DIAMETER.

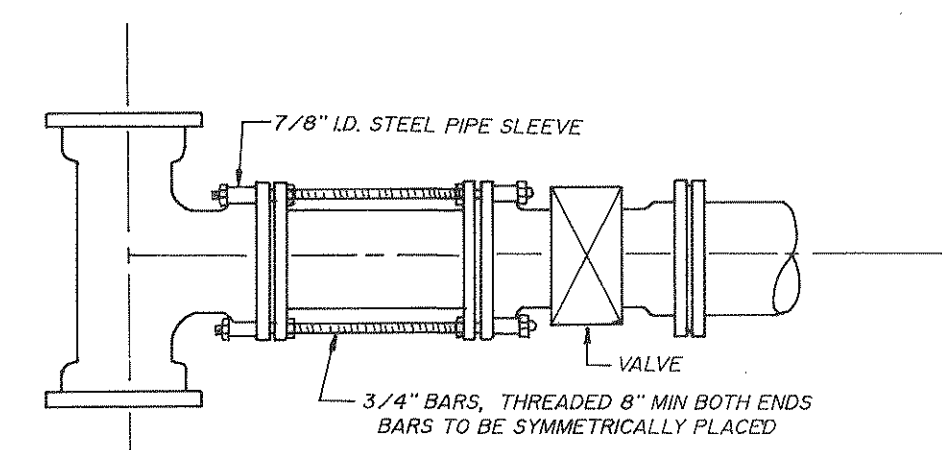
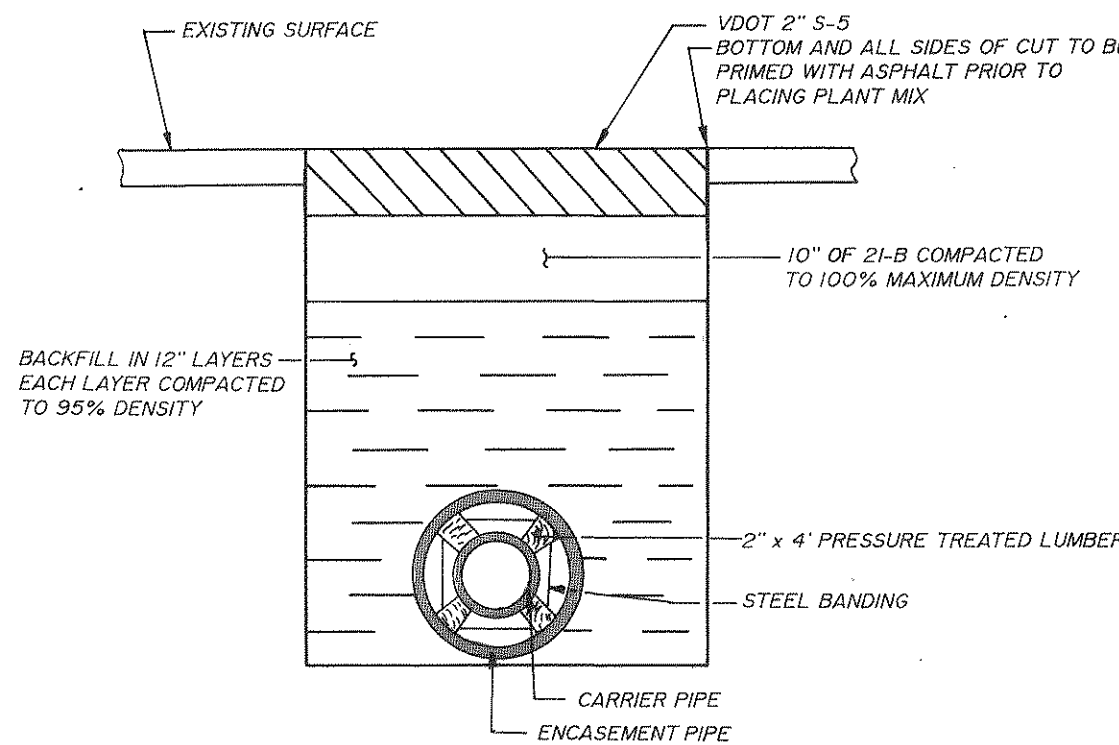
* OR AS REQUIRED TO OBTAIN SOLID FOOTING.

AUTOMATIC AIR RELEASE VALVE



NOTE: FOR DUCTILE IRON PIPE, SOAP-BASED LUBRICANT MAY BE USED TO EASE SLIDING OF SKID. FOR PVC PIPE, FLAX SOAP OR DRILLING MUD SHOULD BE UTILIZED FOR LUBRICATION.

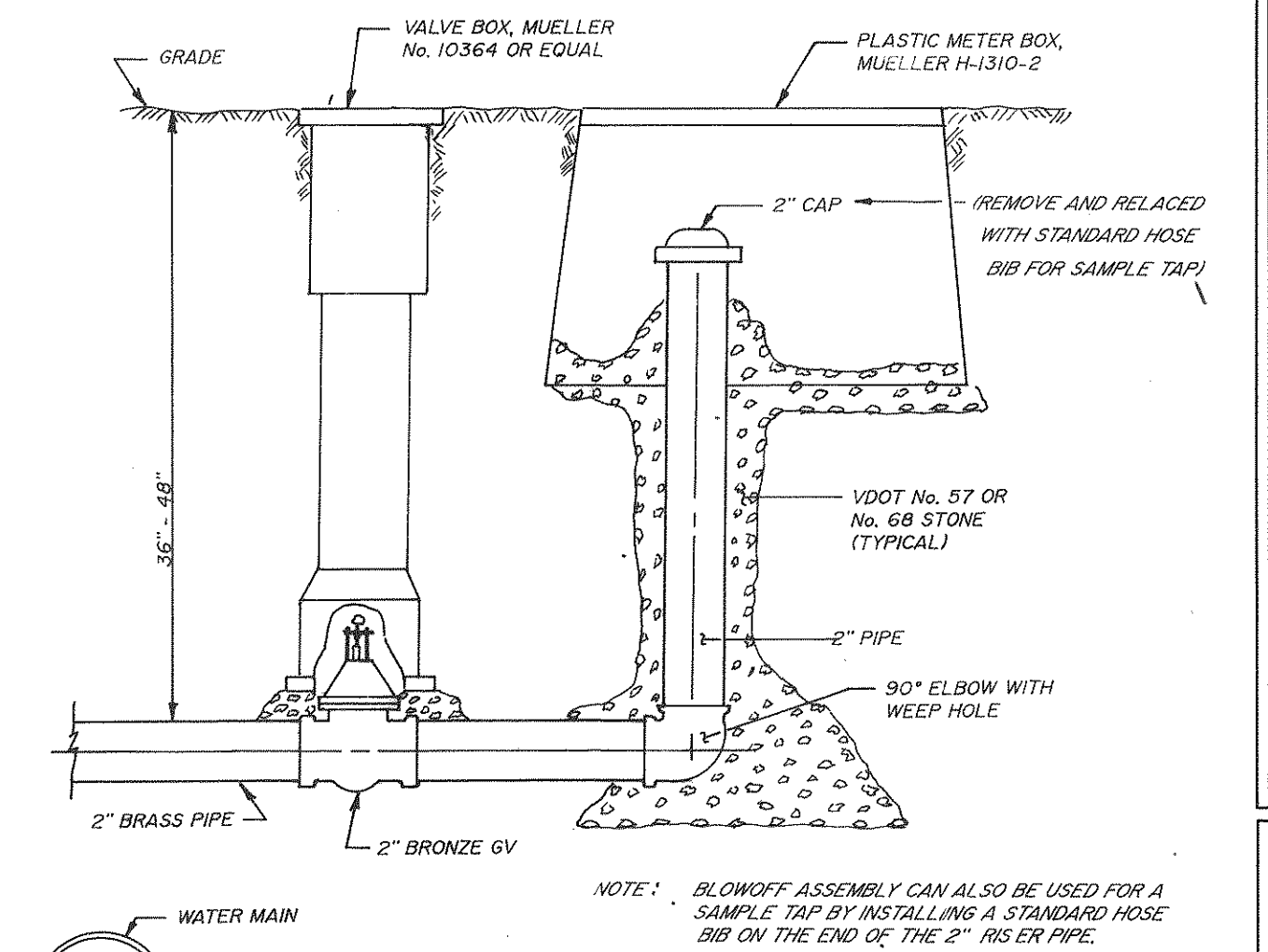
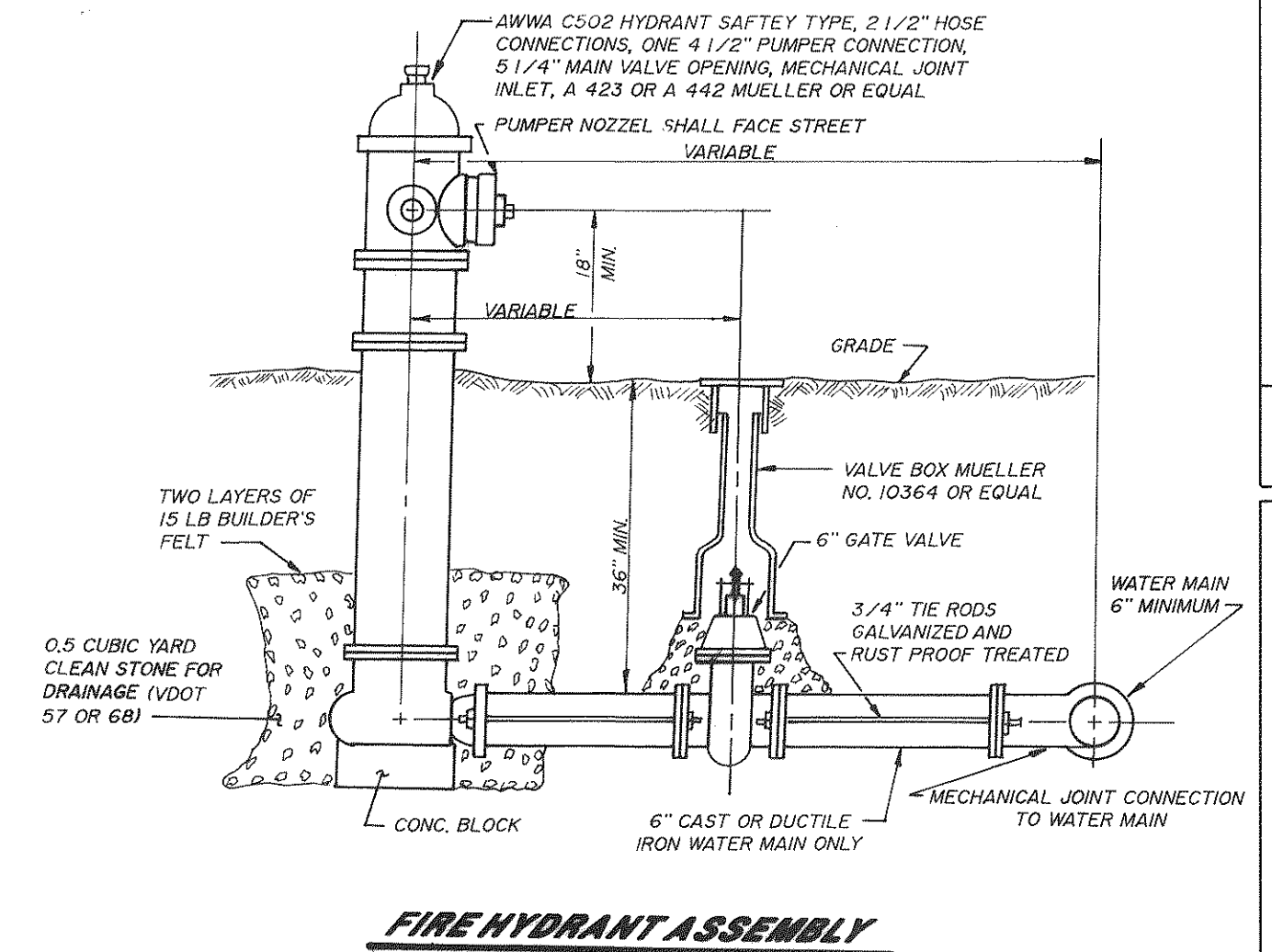
ENCASEMENT DETAIL



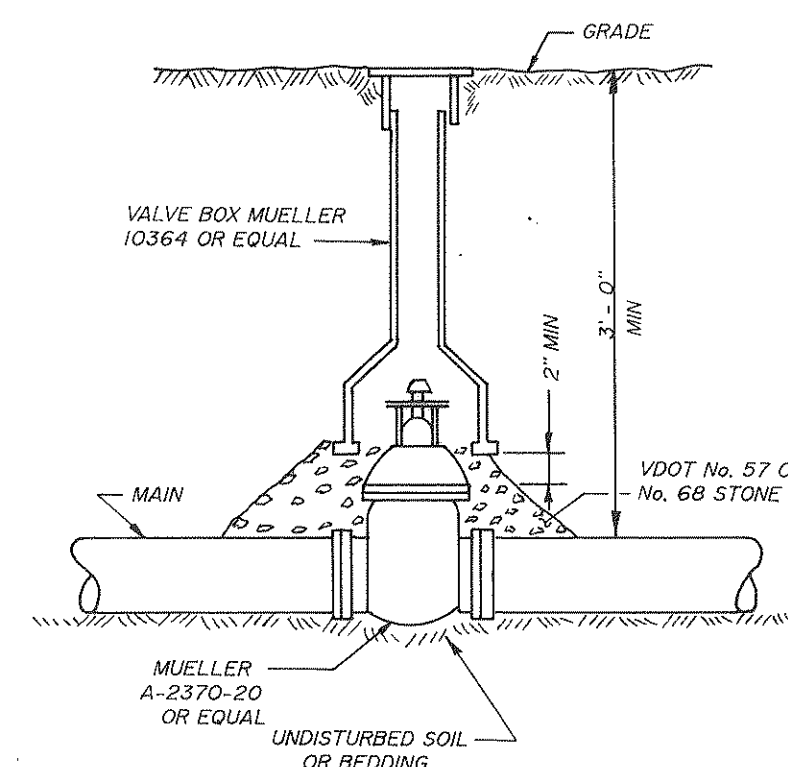
VALVE SIZE	NUMBER OF 3/4" BARS REQUIRED	MAX LENGTH OF SPIGOT PIPE
3"	2	24"
4"	2	24"
6"	2	27"
8"	2	27"
10"	4	27"
12"	6	27"
16"	6	36"
20"	12	36"
24"	16	36"
30"	20	42"

METHOD OF STRAPPING VALVE TO MAIN

NOTE: MINIMUM DISTANCE BETWEEN HYDRANT AND FACE OF CURB SHALL BE 24 INCHES, (WHERE APPLICABLE)



BLOWOFF ASSEMBLY & SAMPLE TAP



DATE

REVISIONS

DATE

SEPTEMBER 1990

SCALE

JOB No. 900515

CHKD. RGL

1 PER V.D.H. COMMENTS

11-6-90

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COMMONWEALTH OF VIRGINIA

RICHARD G. LANG

No. 16720

PROFESSIONAL ENGINEER

WATERLINE EXTENSION

TROUTVILLE TO EXIT 44, I-81

BOTETOURT COUNTY

VIRGINIA

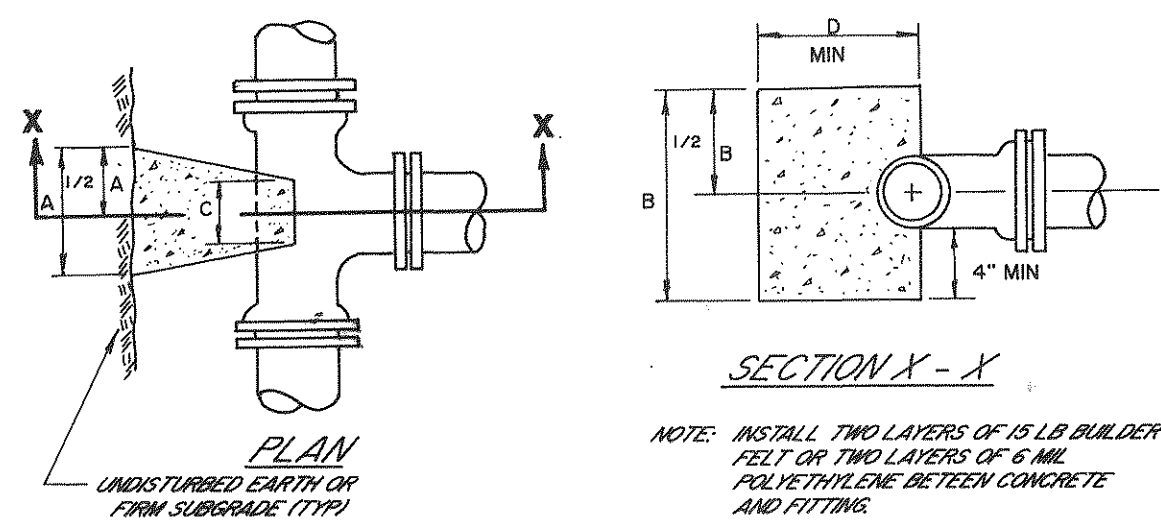
SHEET NO.

9

OF

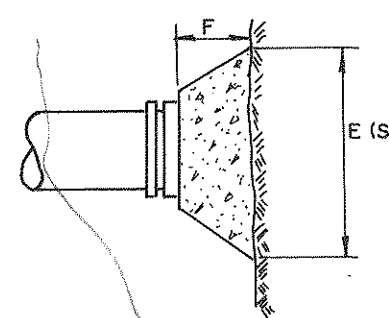
10

"AS-BUILTS"



TEE	BRANCH DIAMETER									
	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
A	12"	12"	16"	18"	25"	30"	40"	48"	60"	80"
B	12"	16"	20"	30"	32"	42"	56"	72"	80"	96"
C	8"	8"	12"	12"	12"	12"	16"	24"	24"	24"
D	6"	6"	8"	8"	10"	12"	14"	18"	20"	24"

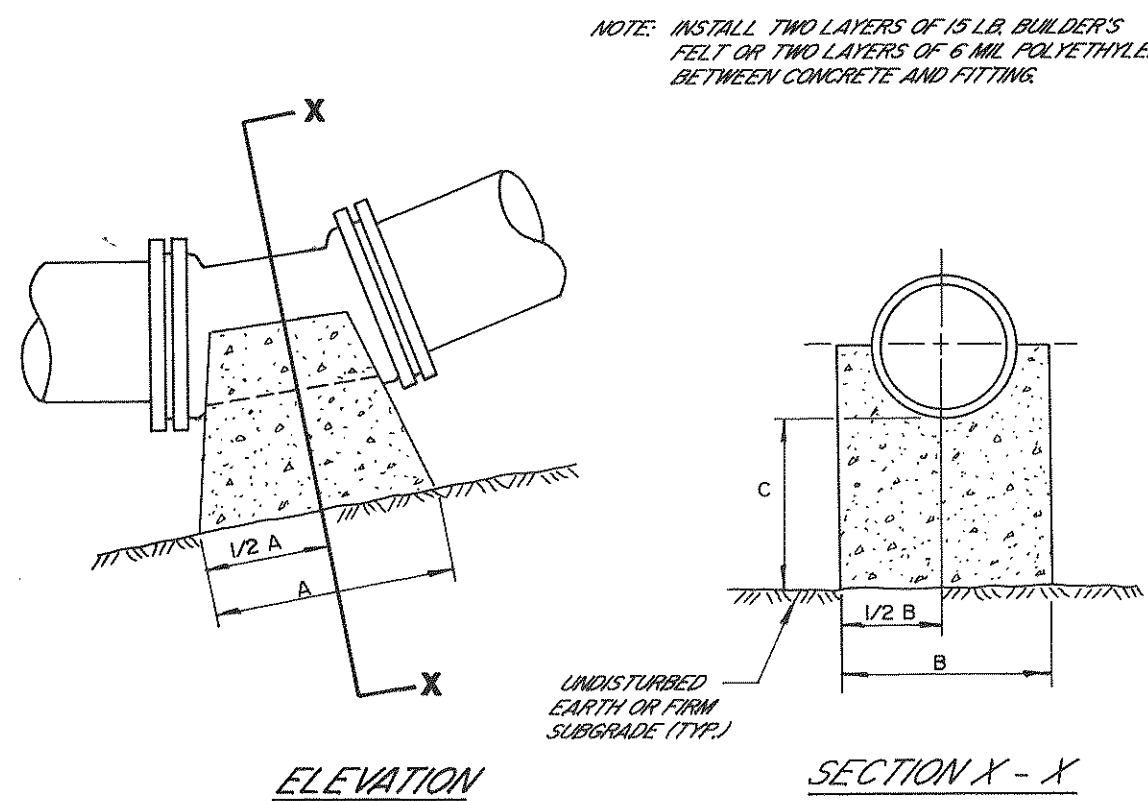
BASED ON NORMAL OPERATING PRESSURE UP TO 150 PSI



PLUG	PIPE DIAMETER									
	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
E	14"	16"	21"	29"	36"	41"	54"	64"	75"	86"
F	8"	8"	10"	10"	12"	14"	16"	18"	20"	24"

BASED ON NORMAL OPERATING PRESSURE UP TO 150 PSI

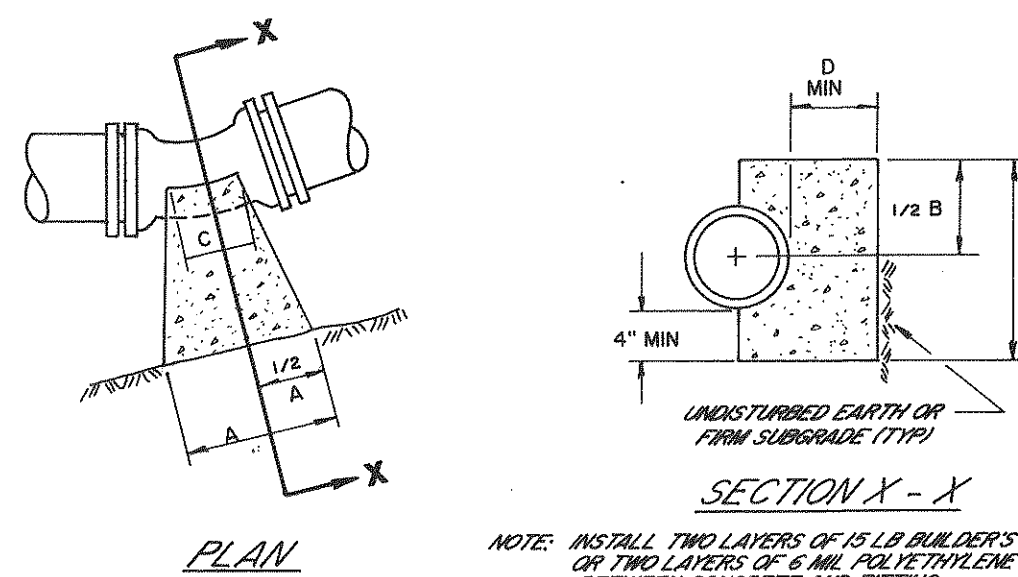
THRUST BLOCK DETAILS TEES, TAPPING SLEEVES, PLUGS, CAPS



BEND	PIPE DIAMETER									
	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
11 1/4"	A	6"	6"	6"	8"	8"	13"	15"	22"	32"
	B	12"	12"	14"	16"	18"	24"	28"	32"	40"
	C	8"	8"	8"	8"	8"	9"	10"	12"	14"
22 1/2"	A	6"	6"	10"	11"	15"	16"	25"	33"	43"
	B	12"	12"	14"	16"	18"	24"	28"	32"	40"
	C	8"	8"	8"	8"	9"	9"	12"	14"	16"
45°	A	10"	12"	14"	21"	29"	32"	48"	66"	98"
	B	12"	12"	14"	16"	18"	24"	28"	32"	48"
	C	8"	8"	8"	8"	12"	14"	18"	24"	36"

BASED ON NORMAL OPERATING PRESSURE UP TO 150 PSI

THRUST BLOCK DETAILS LOWER VERTICAL BENDS

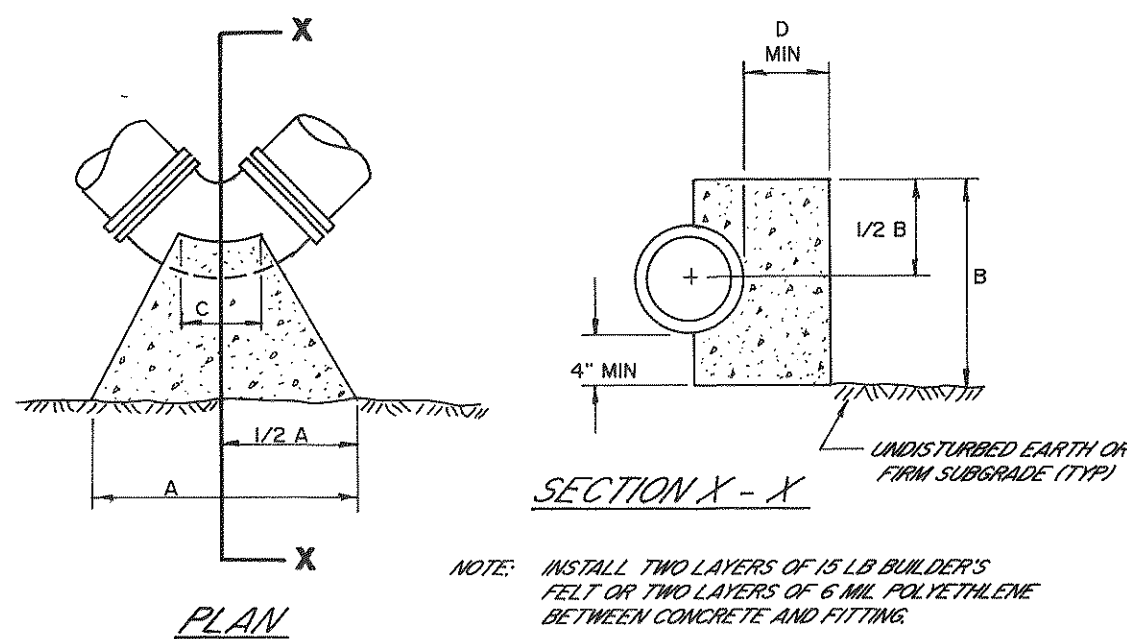


PIPE DIAM	11 1/4° BEND					22 1/2° BEND				
	A	B	C	D	E	A	B	C	D	E
3"	4"	12"	4"	6"	2"	6"	12"	6"	7"	2"
4"	4"	12"	4"	6"	2"	6"	12"	6"	7"	2"
6"	6"	14"	6"	7"	2"	8"	14"	6"	8"	2"
8"	8"	16"	8"	7"	2"	12"	16"	8"	8"	4"
10"	9"	18"	8"	8"	4"	15"	18"	8"	10"	4"
12"	12"	20"	12"	9"	4"	18"	20"	12"	12"	6"
16"	15"	24"	12"	9"	6"	24"	24"	12"	15"	6"
20"	30"	12"	10"	10"	6"	30"	30"	12"	18"	9"
24"	18"	36"	12"	12"	6"	36"	36"	12"	18"	9"
30"	24"	42"	16"	14"	9"	48"	42"	16"	21"	12"

BASED ON NORMAL OPERATING PRESSURE UP TO 150 PSI

E = ADDITIONAL LENGTH TO BE ADDED TO DIMENSION "A" FOR EACH ADDITIONAL 50 PSI PRESSURE UP TO 300 PSI

THRUST BLOCK DETAILS 11 1/4° - 22 1/2° BENDS

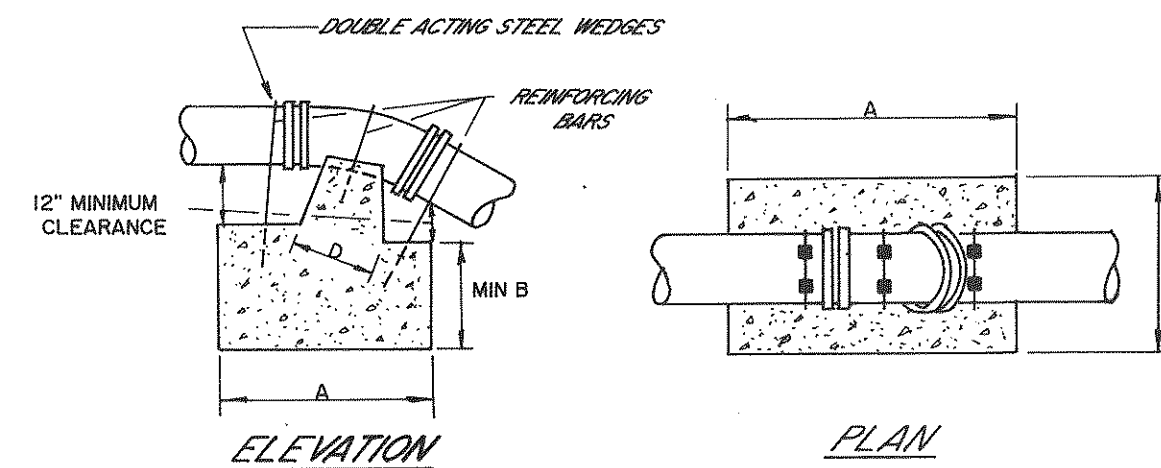


PIPE DIAM	45° BEND					90° BEND				
	A	B	C	D	E	A	B	C	D	E
3"	9"	12"	6"	6"	4"	12"	12"	6"	12"	6"
4"	9"	12"	6"	6"	4"	16"	12"	6"	12"	6"
6"	12"	14"	6"	4"	21"	14"	6"	18"	6"	6"
8"	18"	16"	8"	9"	6"	30"	16"	8"	18"	9"
10"	24"	16"	8"	10"	6"	36"	24"	10"	18"	9"
12"	30"	20"	12"	12"	9"	48"	24"	12"	18"	12"
16"	42"	30"	12"	15"	9"	60"	30"	16"	21"	12"
20"	56"	30"	12"	16"	16"	72"	40"	20"	21"	24"
24"	60"	36"	12"	21"	24"	84"	48"	24"	24"	30"
30"	72"	48"	16"	27"	24"	108"	60"	30"	24"	36"

BASED ON NORMAL OPERATING PRESSURE UP TO 150 PSI

E = ADDITIONAL LENGTH TO BE ADDED TO DIMENSION "A" FOR EACH ADDITIONAL 50 PSI PRESSURE UP TO 300 PSI

THRUST BLOCK DETAILS 45° - 90° BENDS



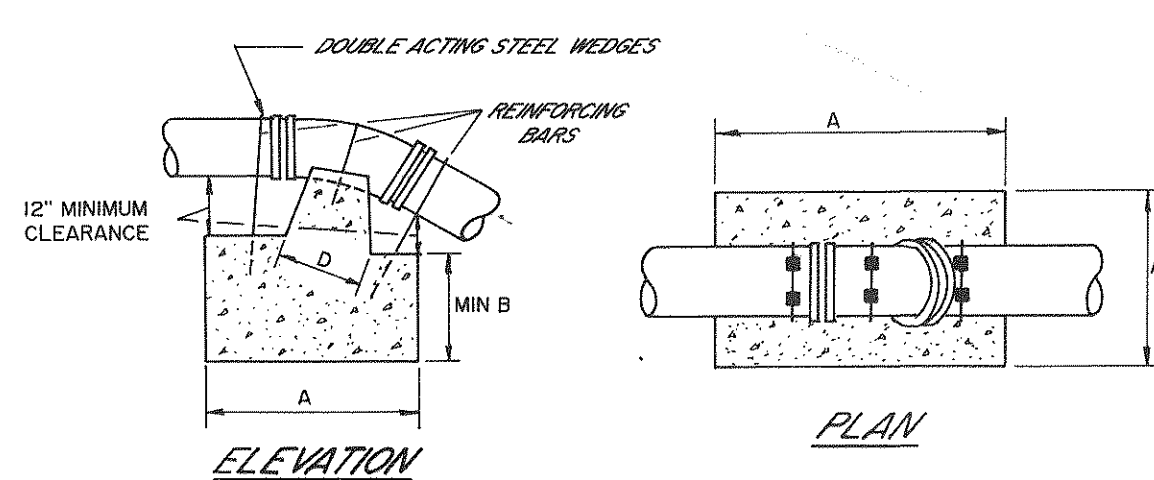
NOTES:
1. EMBED REINFORCING BARS MINIMUM OF 36" DIAMETERS INCLUDING HOOK
2. PAINT EXPOSED BARS WITH TWO COATS OF BITUMINOUS PAINT
3. WHERE 4 BARS ARE REQUIRED, PLACE 2 BARS SYMMETRICALLY AROUND FITTING
4. INSTALL TWO LAYERS OF 15 LB BUILDER'S FELT OR TWO LAYERS OF 6 MIL POLYETHYLENE

C = NUMBER AND SIZE OF REINFORCING BARS
D = DIMENSION OF PIPE DIAMETER

BEND	PIPE DIAMETER									
	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
11 1/4"	A	18"	18"	24"	24"	27"	30"	39"	54"	60"
	B	18"	18"	18"	24"	24"	27"	30"	30"	36"
	C	3 #5	3 #5	3 #5	3 #6	3 #6	3 #6	3 #6	3 #8	3 #8
22 1/2"	A	18"	24"	30"	33"	42"	48"	54"	66"	84"
	B	18"	18"	24"	27"	27"	30"	36"	42"	54"
	C	3 #5	3 #5	3 #5	3 #6	3 #6	4 #6	4 #6	3 #8	4 #8
45°	A	24"	30"	36"	42"	48"	54"	60"	90"	98"
	B	18"	24"	24"	30"	33"	36"	42"	48"	54"
	C	3 #5	3 #5	3 #5	3 #6	4 #6	4 #6	4 #8	4 #8	4 #9

BASED ON NORMAL OPERATING PRESSURE UP TO 150 PSI

THRUST BLOCK DETAILS UPPER VERTICAL BENDS



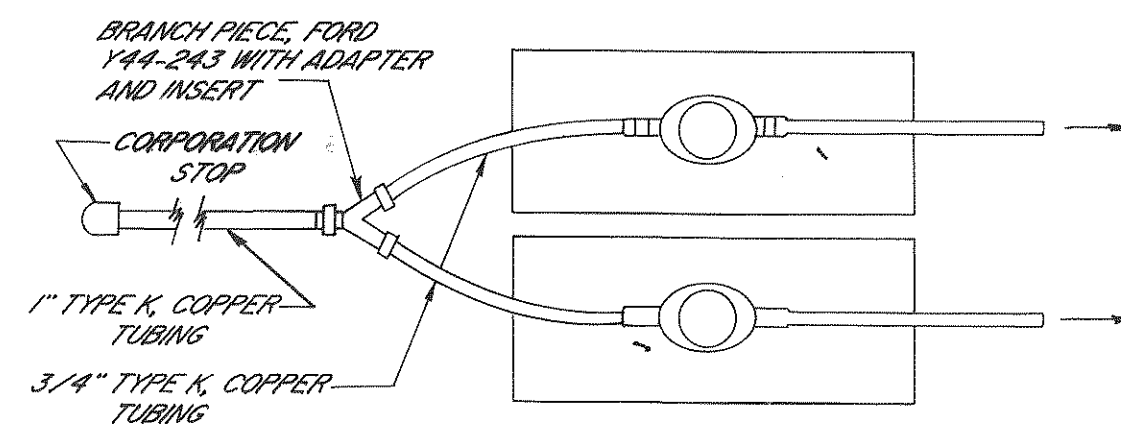
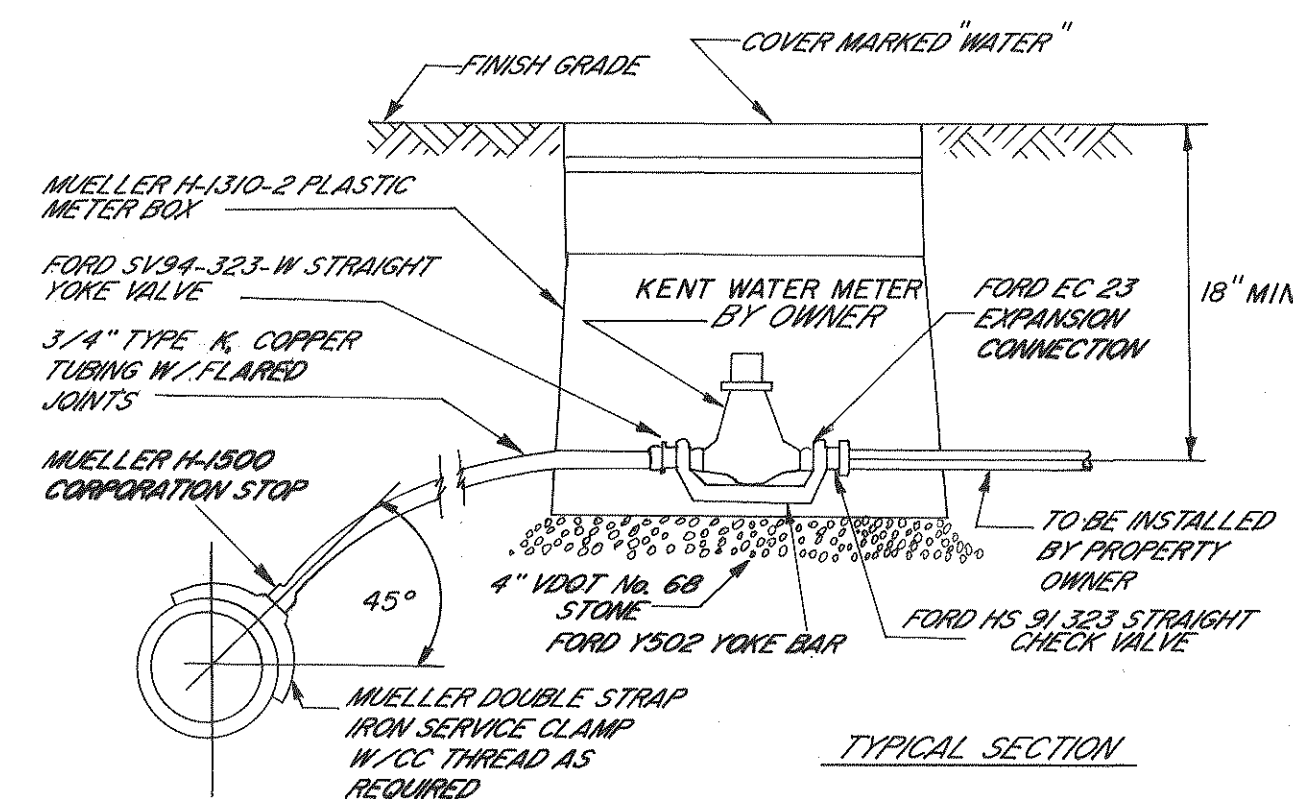
NOTES:
1. EMBED REINFORCING BARS MINIMUM OF 36" DIAMETERS INCLUDING HOOK
2. PAINT EXPOSED BARS WITH TWO COATS OF BITUMINOUS PAINT
3. WHERE 4 BARS ARE REQUIRED, PLACE 2 BARS SYMMETRICALLY AROUND FITTING
4. INSTALL TWO LAYERS OF 15 LB BUILDER'S FELT OR TWO LAYERS OF 6 MIL POLYETHYLENE

C = NUMBER AND SIZE OF REINFORCING BARS
D = DIMENSION OF PIPE DIAMETER

BEND	PIPE DIAMETER									
	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
11 1/4"	A	18"	18"	24"	24"	27"	30"	39"	54"	60"
	B	18"	18"	18"	24"	24"	27"	30"	30"	36"
	C	3 #5	3 #5	3 #5	3 #6	3 #6	3 #6	3 #6	3 #8	3 #8
22 1/2"	A	18"	24"	30"	33"	42"	48"	54"	66"	84"
	B	18"	18"	24"	27"	27"	30"	36"	42"	54"
	C	3 #5	3 #5	3 #5	3 #6	3 #6	4 #6	4 #6	3 #8	4 #8
45°	A	24"	30"	36"	42"	48"	54"	60"	90"	98"
	B	18"	24"	24"	30"	33"	36"	42"	48"	54"
	C	3 #5	3 #5	3 #5	3 #6	4 #6	4 #6	4 #8	4 #8	4 #9

BASED ON NORMAL OPERATING PRESSURE UP TO 150 PSI

THRUST BLOCK DETAILS UPPER VERTICAL BENDS



RESIDENTIAL SERVICE CONNECTION

DATE						
REVISIONS	6	5	4	3	2	1

DATE	SEPTEMBER 1990
SCALE	
JOB No.	900515
CHKD.	RGL

LANG ENGINEERING Co.
Consulting Engineers • Land Planners

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SHEET NO. 10
OF 10

"AS-BUILTS"