

PROJECT NAME: Lincolnton Water Supply Dist.
DATE: _____
TYPE: _____
LOCATION: _____
TOTAL # SHEETS: 15
A/E FIRM: Draper Aden
OF SETS: _____

TOWN OF FINCASTLE



BOTETOURT COUNTY, VIRGINIA

WATER SUPPLY AND DISTRIBUTION SYSTEM

**DRAPER - ADEN ASSOCIATES,
INC.**

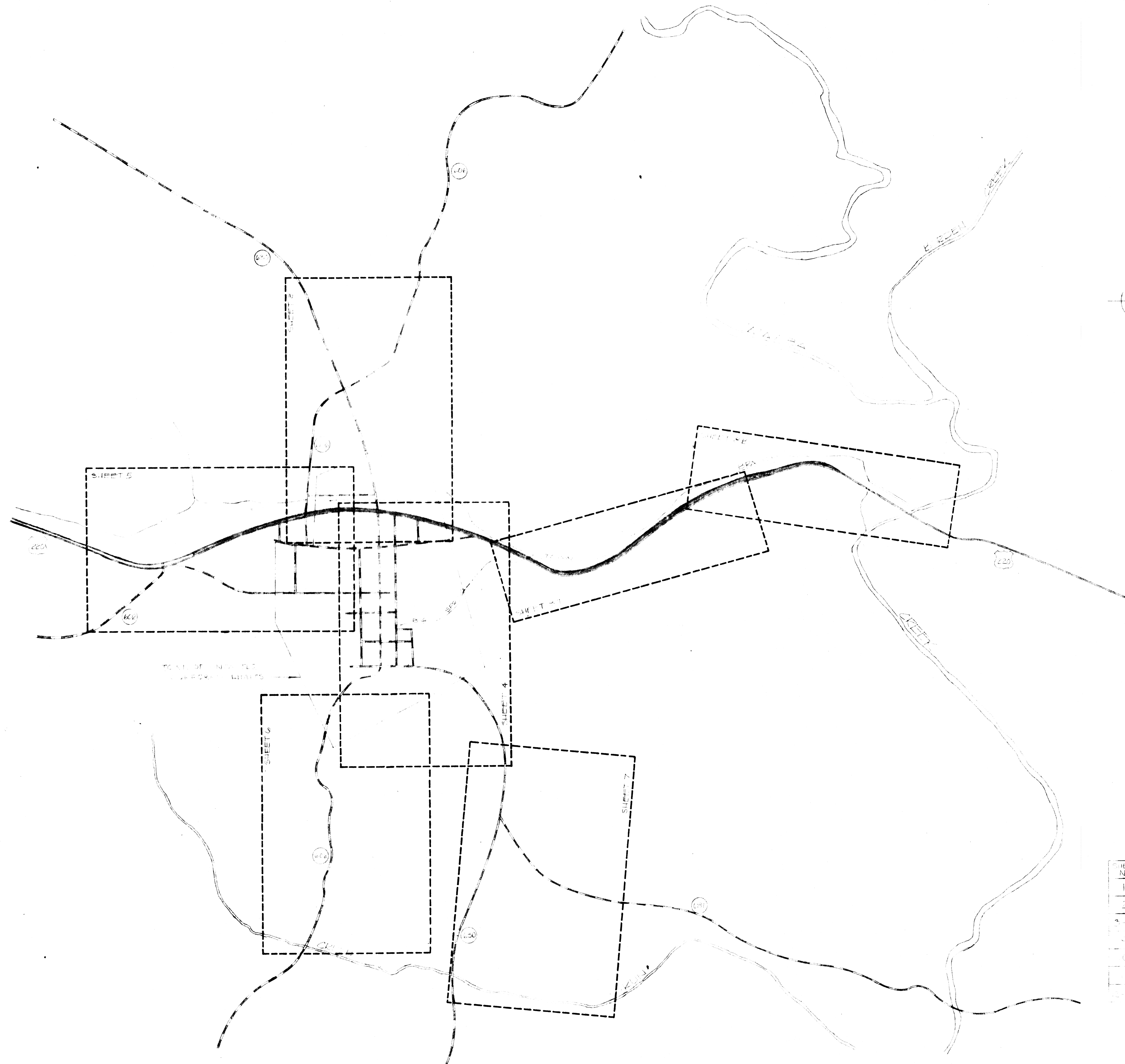
ENGINEERS

SURVEYORS

PLANNERS

BLACKSBURG, VIRGINIA

JOB NUMBER 75-193



SHEET NO.	DESCRIPTION
1	COVER SHEET
2	INDEX AND KEY SHEET
3-5	DISTRIBUTION SYSTEM PLANS
6	HYDRAULIC DATA & PROFILES
7-15	PROFILES

DRAPER - ADEN ASSOCIATES, INC.
ENGINEERS · SURVEYORS · PLANNERS
BLACKSBURG, VIRGINIA

DESIGNED
DRAWN
CHECKED
DATE
DJR
LSM
DJM
09-03-76

TOWN OF FINCASTLE
WATER SUPPLY & DISTRIBUTION SYSTEM
BOTETOURT COUNTY, VIRGINIA

INDEX & KEY SHEET

REVISIONS :

SCALE : 1"=667' (APPX.)

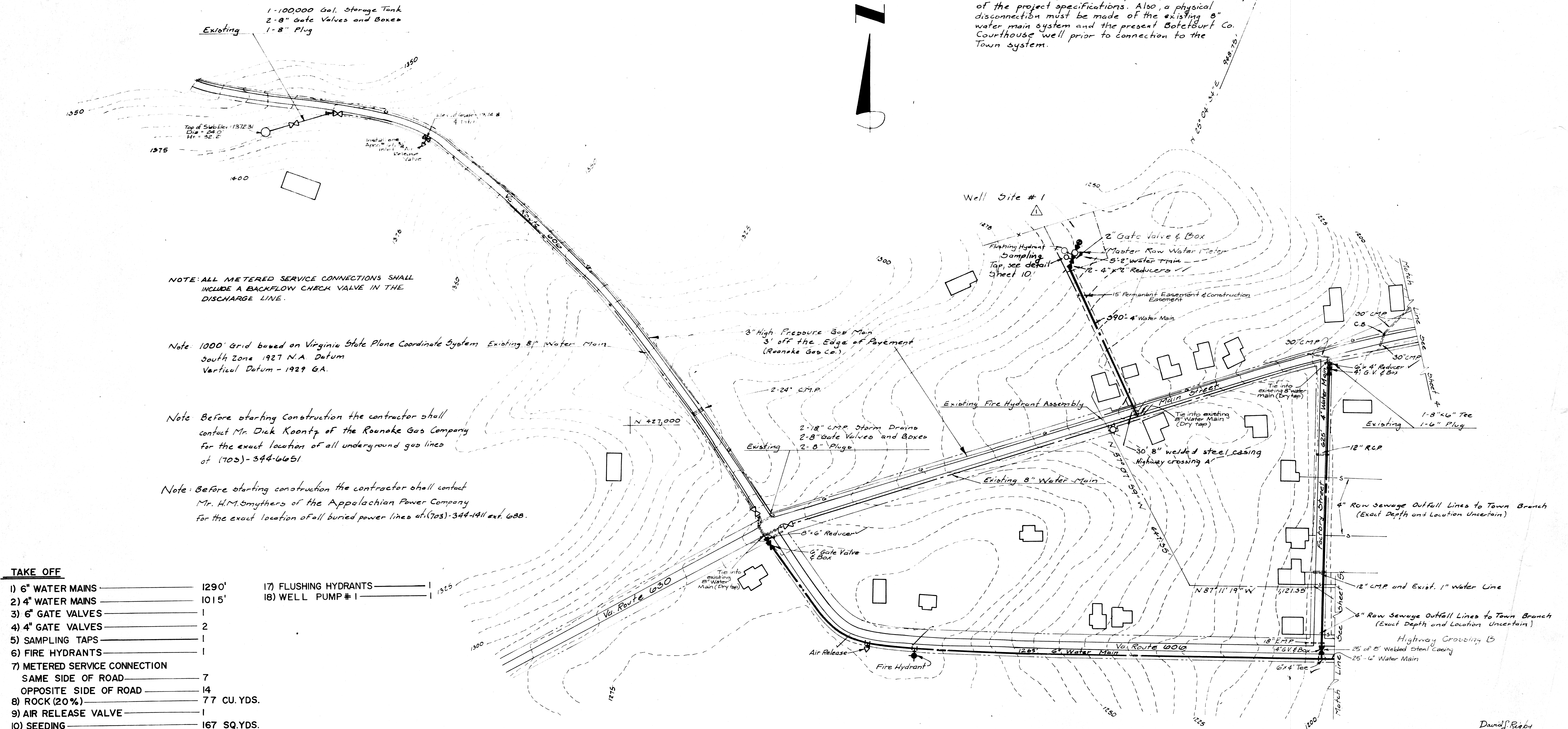
PLAN N° T 75-193

SHEET
2 OF 15

NOTE: IN ALL INSTANCES THE CONTRACTOR SHALL ATTEMPT TO JACK AND BORE THE HIGHWAY CROSSINGS. ONLY AFTER THE JACKING AND BORING HAS FAILED AND THE CONTRACTOR HAS OBTAINED APPROVAL FROM THE VA. DEPT. OF HIGHWAYS AND TRANSPORTATION MAY THE ROADS BE OPEN CUT. CUT PAVEMENT WILL BE RETURNED TO ORIGINAL CONDITION TO THE SATISFACTION OF THE HIGHWAY DEPT. EVEN IF IT MEANS REPAVING THE ENTIRE ROADWAY. Payment for paving will be included in the cost of the road crossing and will be limited to a cut 18" wide across the roadway. If more paving is required it will be paid for separately.

NOTE: ROCK QUANTITIES ARE THE ENGINEER'S ESTIMATE ONLY. THEY ARE TO BE USED BY THE CONTRACTOR AS AN AID TO PRICING THE LINEWORK.

Note: The existing 100,000 Gal. tank and 8" water main shall be drained prior to use and disinfected in accordance with Section VII, "Disinfection and Tests," of the project specifications. Also, a physical disconnection must be made of the existing 8" water main system and the present Botetourt Co. Courthouse well prior to connection to the Town system.



TAKE OFF

1) 6" WATER MAINS	1290'	17) FLUSHING HYDRANTS	1
2) 4" WATER MAINS	1015'	18) WELL PUMP #1	1
3) 6" GATE VALVES	1		
4) 4" GATE VALVES	2		
5) SAMPLING TAPS	1		
6) FIRE HYDRANTS	1		
7) METERED SERVICE CONNECTION			
SAME SIDE OF ROAD	7		
OPPOSITE SIDE OF ROAD	14		
8) ROCK (20%)	77 CU. YDS.		
9) AIR RELEASE VALVE	1		
10) SEEDING	167 SQ. YDS.		
11) CONCRETE LEFT IN TRENCH	1/3 CU. YDS.		
12) HIGHWAY CROSSINGS	A, B		
13) MASTER METERS	1		
14) PAVEMENT REPLACEMENT	8 SQ. YDS.		
15) 2" WATER MAIN	5'		
16) 2" GATE VALVE	1		

DRAPER - ADEN ASSOCIATES, INC.
ENGINEERS - SURVEYORS - PLANNERS
BLACKSBURG, VIRGINIA

DESIGNED DJR
DRAWN DJR
CHECKED DJR
DATE 09-03-76

TOWN OF FINCASTLE
WATER SUPPLY & DISTRIBUTION SYSTEM
BOTETOURT COUNTY, VIRGINIA

REVISIONS:
Well Site 10/21/76

SCALE: 1" = 100'
CONTOUR INTERVAL = 5'

PLAN N° T-75-193

SHEET
3 OF 15

Note: Rock quantities are the Engineer's estimate only. They are to be used by the Contractor as an aid to pricing the line work.

Note: Reference - Virginia Department of Highways
Project 0220-011-101, PE-101
" " " " C-504
" " " " RW-204
Sheets: 047

Note: Before starting construction the contractor shall contact Mr. Dick Koontz of the Roanoke Gas Company for the exact location of all underground gas lines at (703) 344-6651.

Note: Before starting construction the contractor shall contact Mr. H.M. Smythers of the Appalachian Power Company for the exact location of all buried power lines at (703) 344-1411 ext. 688.

Note: All metered service connections shall include a backflow check valve in the discharge line.

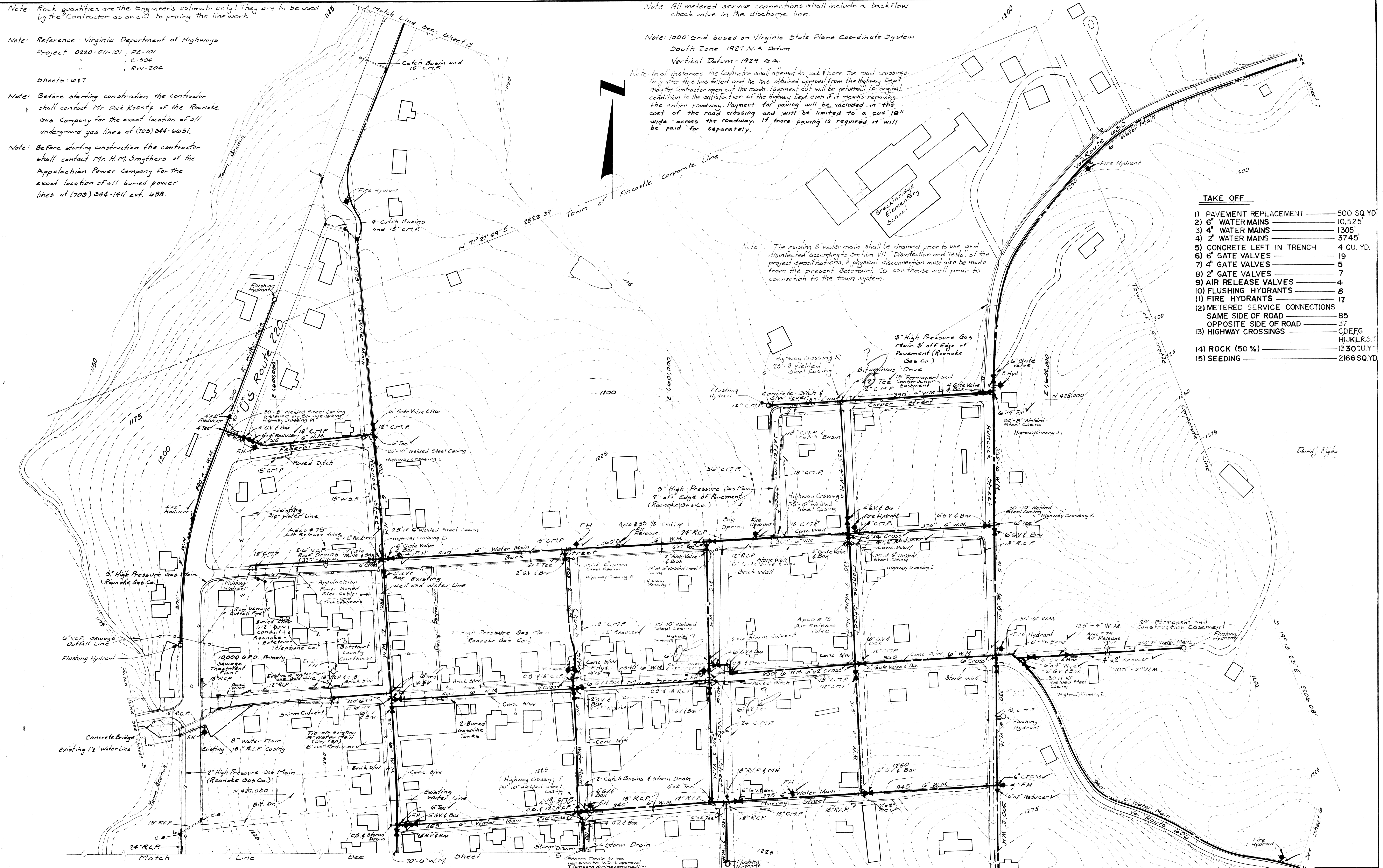
Note: 1000' Grid based on Virginia State Plane Coordinate System
South Zone 1927 N.A. Datum
Vertical Datum - 1929 G.A.

Note: In all instances the Contractor shall attempt to jack & bore the road crossings. Only after this has failed and he has obtained approval from the Highway Dept. may the Contractor open cut the roads. Pavement cut will be returned to original condition to the satisfaction of the Highway Dept. even if it means repaving the entire roadway. Payment for paving will be included in the cost of the road crossing and will be limited to a cut 18" wide across the roadway. If more paving is required it will be paid for separately.

Note: The existing 8" water main shall be drained prior to use and disinfected according to Section VII "Disinfection and Tests" of the project specifications. A physical disconnection must also be made from the present Botetourt Co. courthouse well prior to connection to the town system.

TAKE OFF

1) PAVEMENT REPLACEMENT	500 SQ. YD.
2) 6" WATER MAINS	10,525'
3) 4" WATER MAINS	1305'
4) 2" WATER MAINS	3745'
5) CONCRETE LEFT IN TRENCH	4 CU. YD.
6) 6" GATE VALVES	19
7) 4" GATE VALVES	5
8) 2" GATE VALVES	7
9) AIR RELEASE VALVES	4
10) FLUSHING HYDRANTS	8
11) FIRE HYDRANTS	17
12) METERED SERVICE CONNECTIONS	
SAME SIDE OF ROAD	85
OPPOSITE SIDE OF ROAD	37
13) HIGHWAY CROSSINGS	C, D, E, F, G
14) ROCK (50%)	H, I, J, K, L, R, S, T
15) SEEDING	1230 CU. YD.
	2166 SQ. YD.

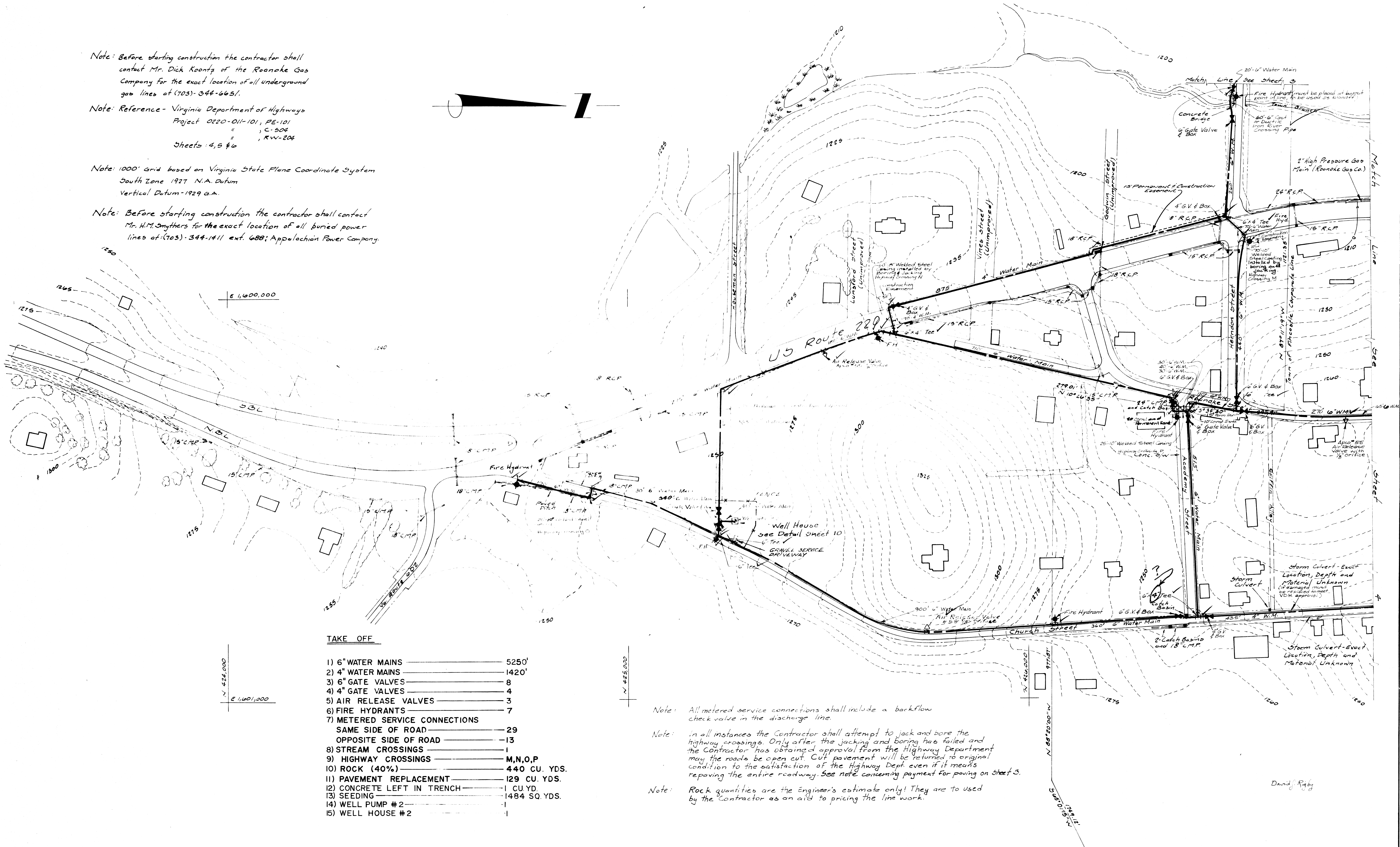


Note: Before starting construction the contractor shall contact Mr. Dick Koontz of the Roanoke Gas Company for the exact location of all underground gas lines at (703)-344-6651.

Note: Reference - Virginia Department of Highways
Project 0820-011-101, PE-101
" " " " C-504
" " " " RW-204
Sheets: 4, 5 & 6

Note: 1000' grid based on Virginia State Plane Coordinate System
South Zone 1927 N.A. Datum
Vertical Datum - 1929 G.A.

Note: Before starting construction the contractor shall contact Mr. H.M. Smythers for the exact location of all buried power lines at (703)-344-1411 ext. 688; Appalachian Power Company.



TAKE OFF

1) 6" WATER MAINS	5250'
2) 4" WATER MAINS	1420'
3) 6" GATE VALVES	8
4) 4" GATE VALVES	4
5) AIR RELEASE VALVES	3
6) FIRE HYDRANTS	7
7) METERED SERVICE CONNECTIONS	
SAME SIDE OF ROAD	29
OPPOSITE SIDE OF ROAD	13
8) STREAM CROSSINGS	1
9) HIGHWAY CROSSINGS	M, N, O, P
10) ROCK (40%)	440 CU. YDS.
11) PAVEMENT REPLACEMENT	129 CU. YDS.
12) CONCRETE LEFT IN TRENCH	1 CU. YD.
13) SEEDING	1484 SQ. YDS.
14) WELL PUMP #2	1
15) WELL HOUSE #2	1

Note: All metered service connections shall include a backflow check valve in the discharge line.

Note: In all instances the Contractor shall attempt to jack and bore the highway crossings. Only after the jacking and boring has failed and the Contractor has obtained approval from the Highway Department may the roads be open cut. Cut pavement will be returned to original condition to the satisfaction of the Highway Dept. even if it means repaving the entire roadway. See note concerning payment for paving on sheet 3.

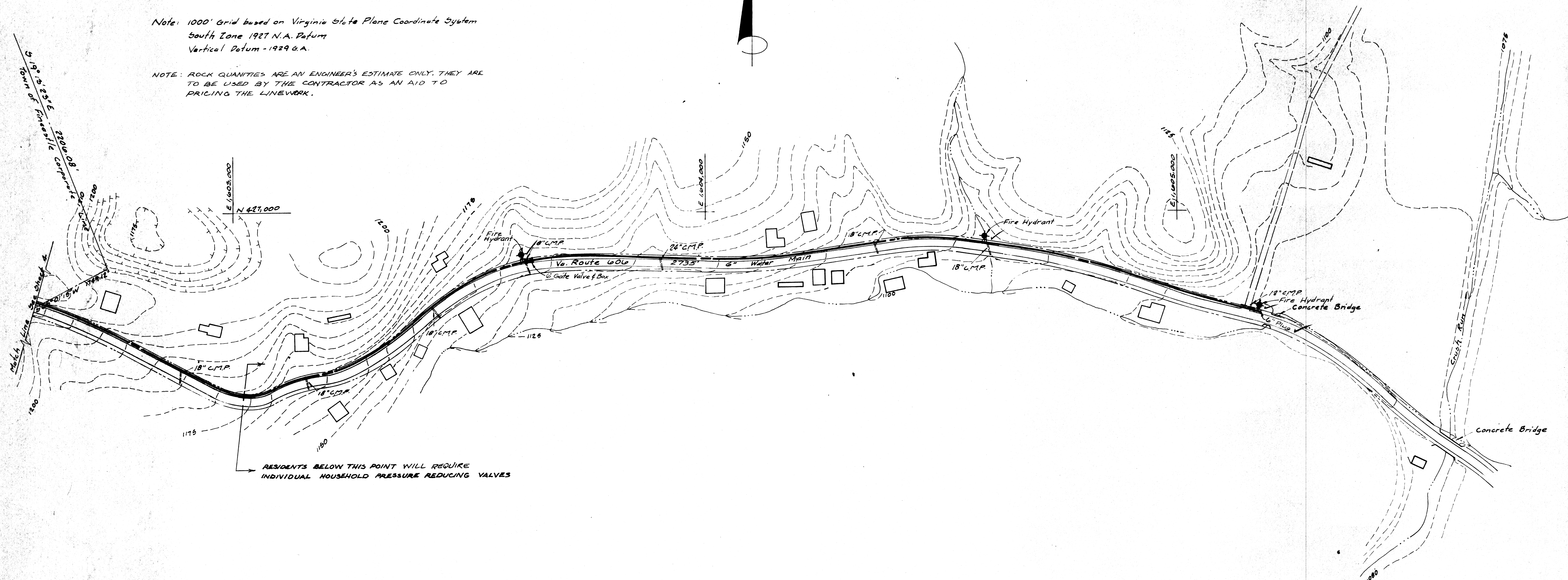
Note: Rock quantities are the Engineer's estimate only! They are to be used by the Contractor as an aid to pricing the line work.

Note: All metered service connections shall include a backflow check valve in the discharge line.

Note: Before starting construction the contractor shall contact Mr. H.M. Smythers of the Appalachian Power Company for the exact location of all buried power lines at: (703)-344-1411 ext. 688.

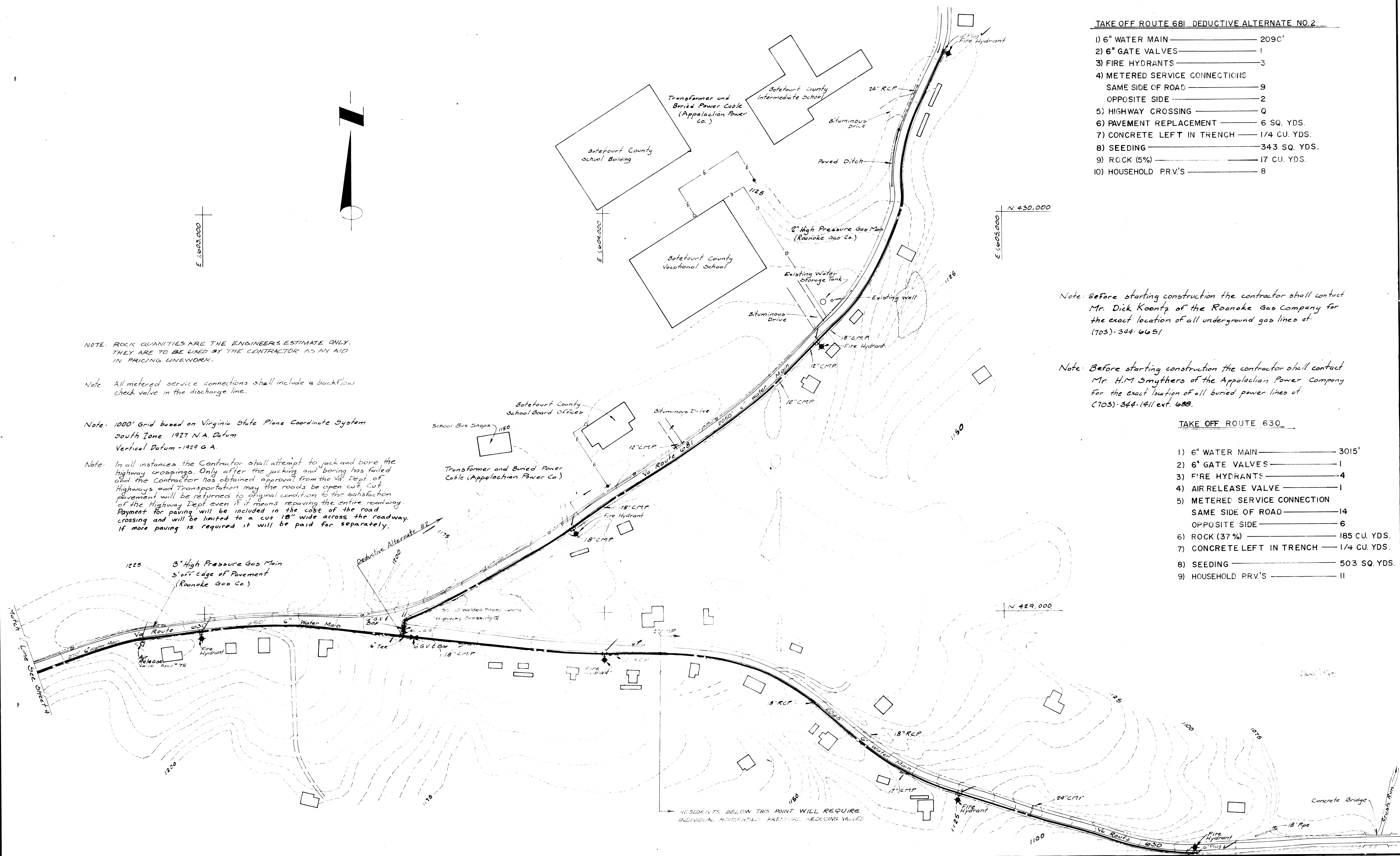
Note: 1000' Grid based on Virginia State Plane Coordinate System South Zone 1927 N.A. Datum Vertical Datum - 1929 G.A.

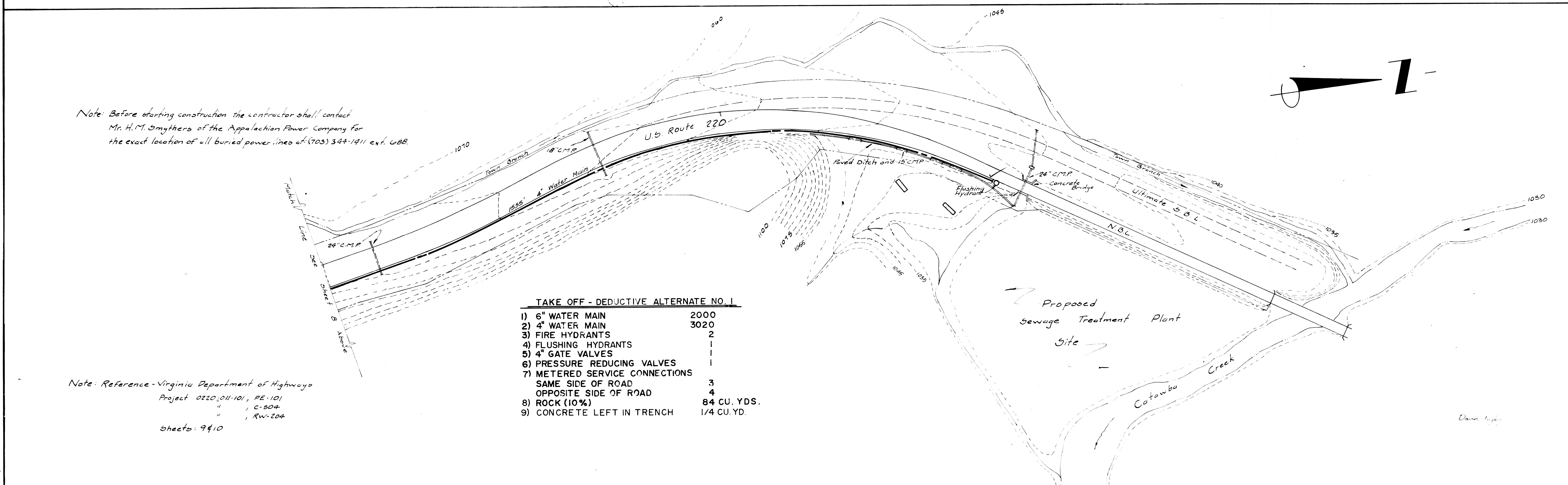
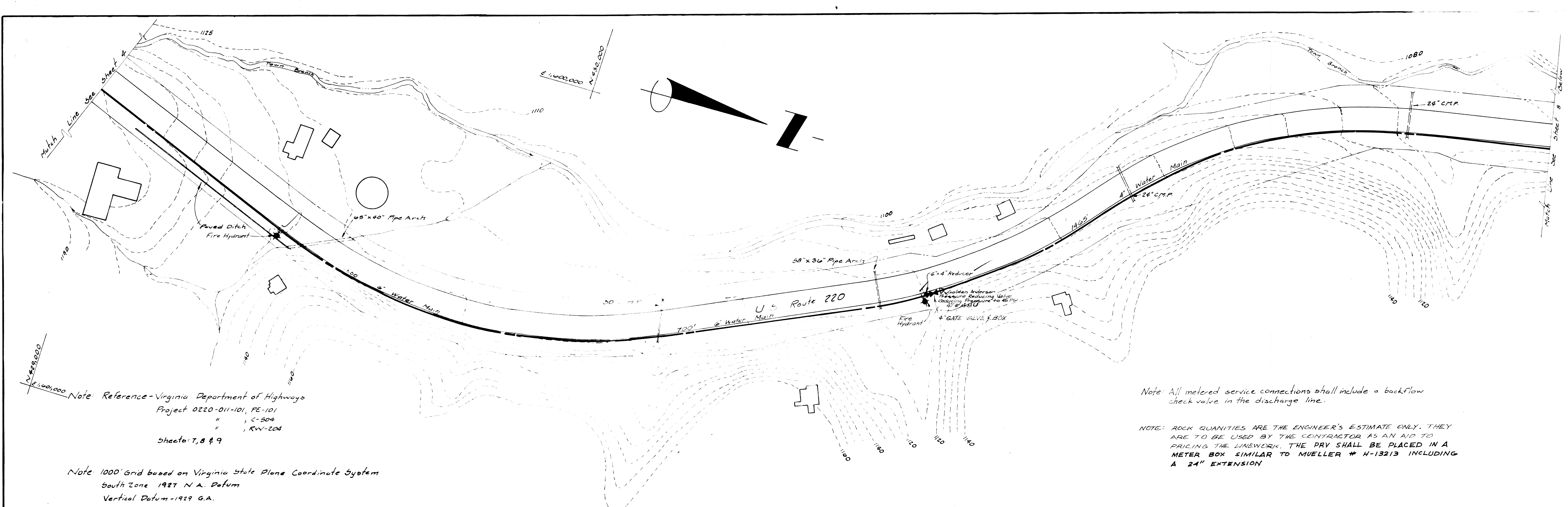
NOTE: ROCK QUANTITIES ARE AN ENGINEER'S ESTIMATE ONLY. THEY ARE TO BE USED BY THE CONTRACTOR AS AN AID TO PRICING THE LINework.



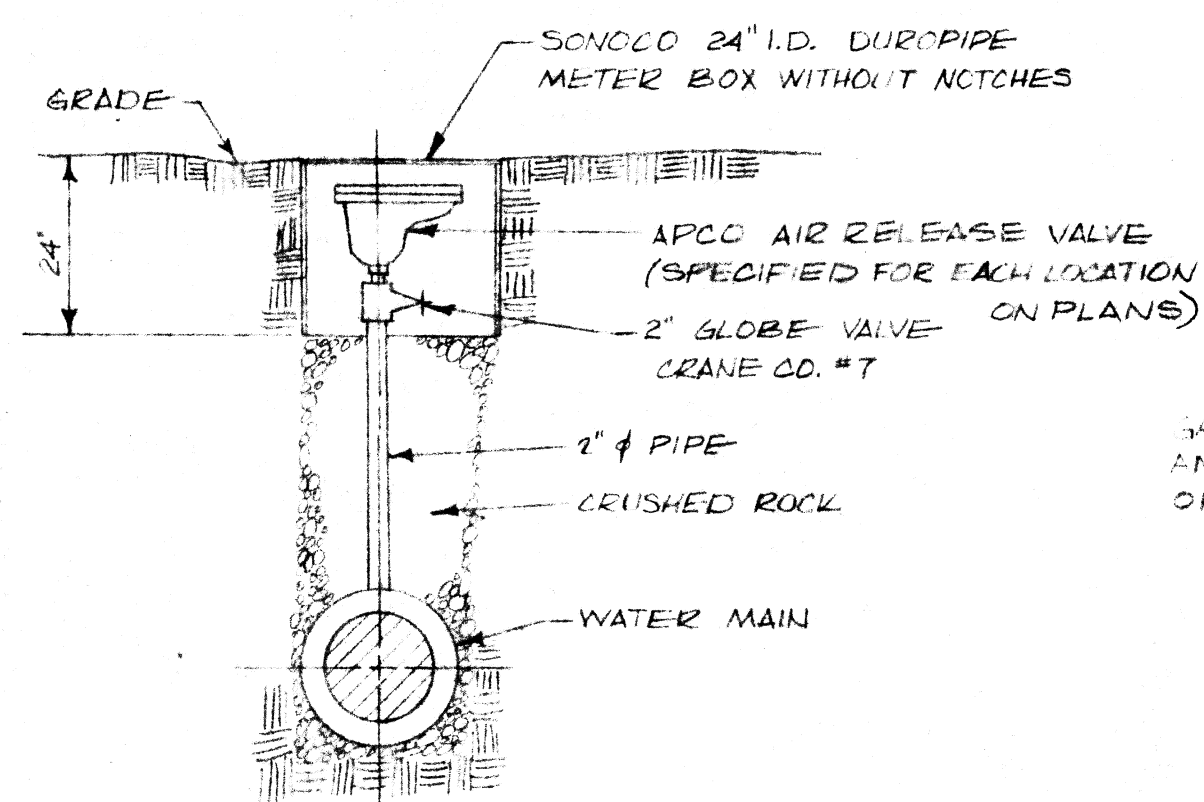
TAKE OFF

1) 6" WATER MAIN	2735
2) 6" GATE VALVES	1
3) FIRE HYDRANTS	3
4) METERED SERVICE CONNECTIONS	
SAME SIDE OF ROAD	7
OPPOSITE SIDE OF ROAD	12
5) ROCK (20%)	91 CU. YDS.
6) SEEDING	456 SQ. YDS.
7) CONCRETE LEFT IN TRENCH	1/4 CU. YDS.
8) HOUSEHOLD P.R.V.'S	17

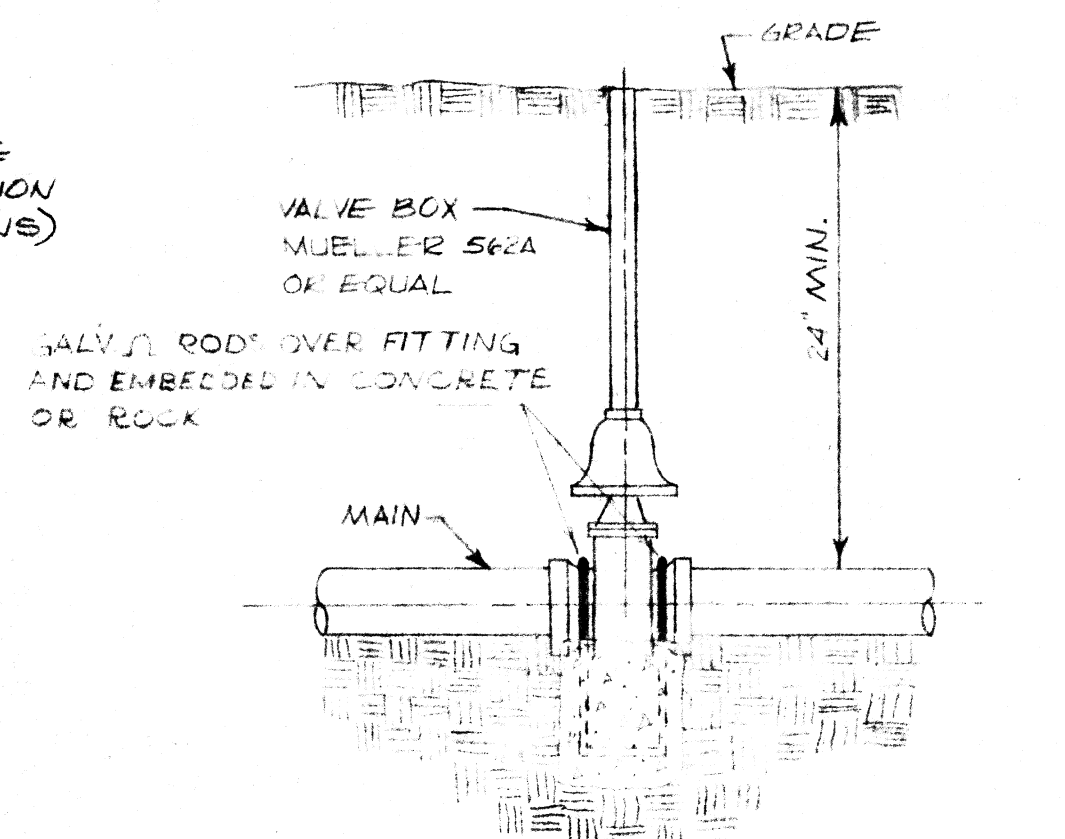




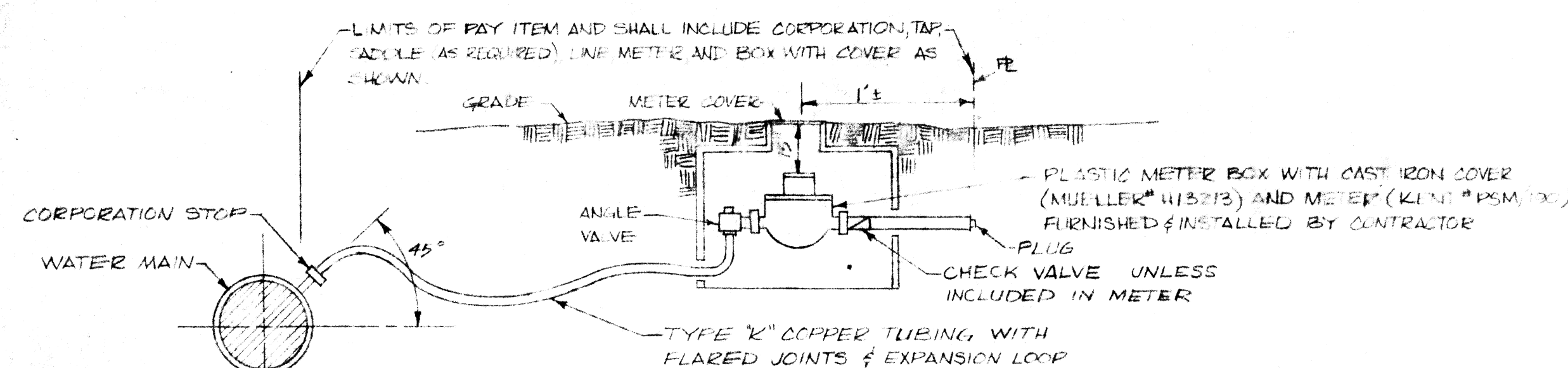
TAKE OFF - DEDUCTIVE ALTERNATE NO. 1	
1) 6" WATER MAIN	2000
2) 4" WATER MAIN	3020
3) FIRE HYDRANTS	2
4) FLUSHING HYDRANTS	1
5) 4" GATE VALVES	1
6) PRESSURE REDUCING VALVES	1
7) METERED SERVICE CONNECTIONS	
SAME SIDE OF ROAD	3
OPPOSITE SIDE OF ROAD	4
8) ROCK (10%)	84 CU. YDS.
9) CONCRETE LEFT IN TRENCH	1/4 CU. YD.



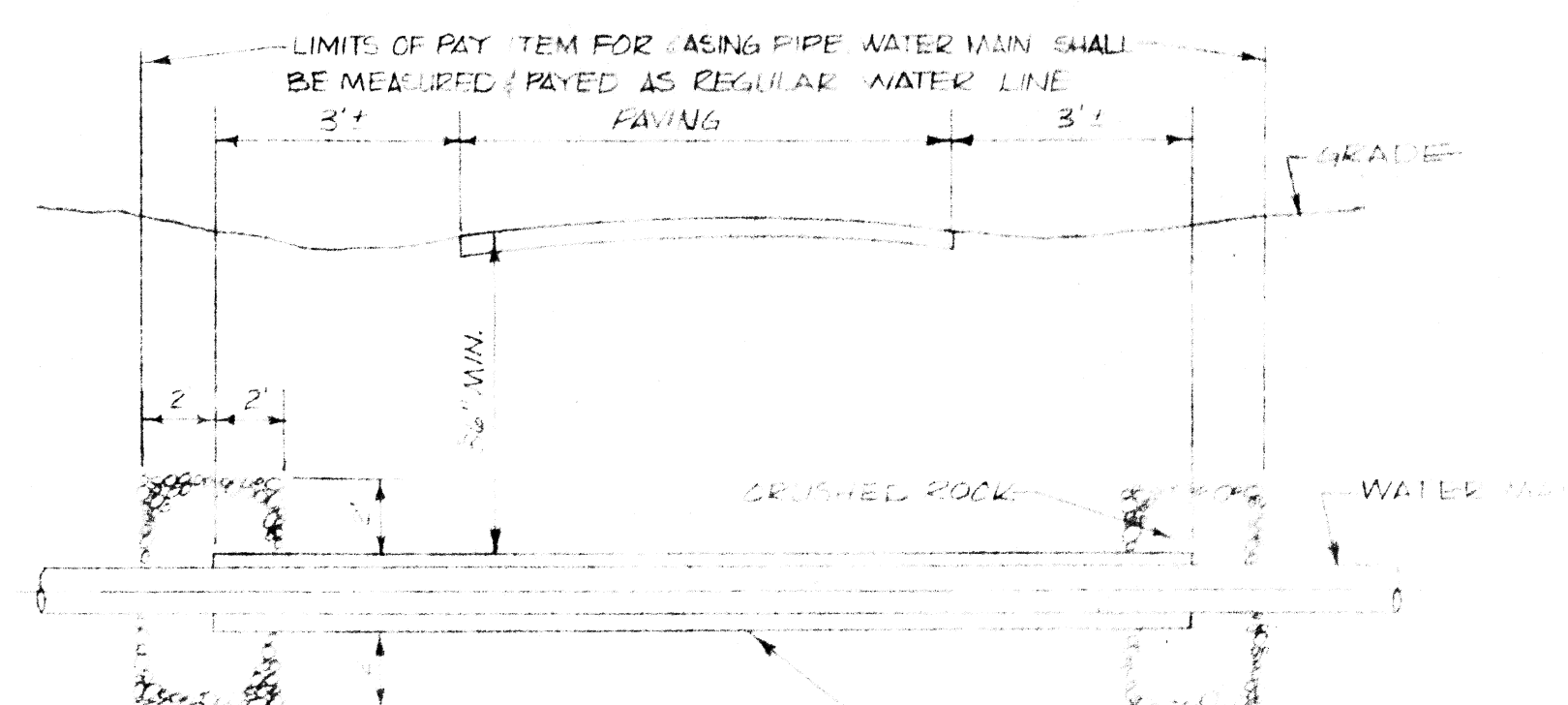
AUTOMATIC AIR RELEASE VALVE



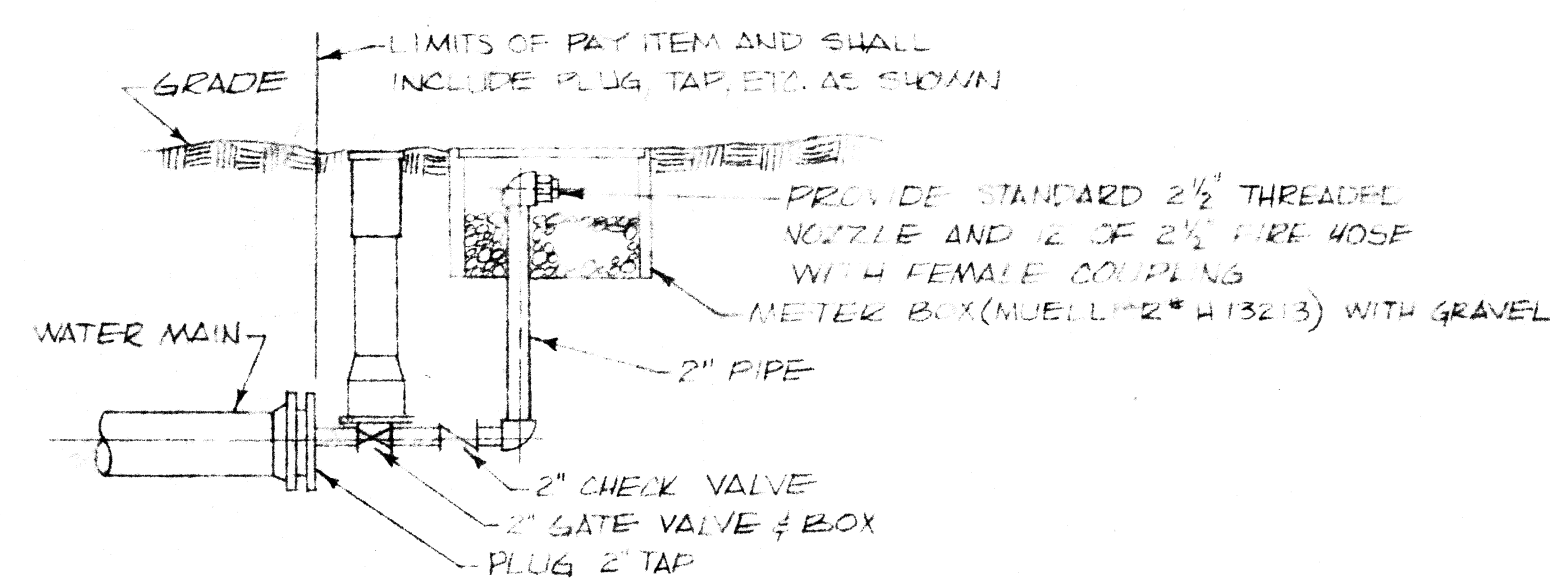
TYPICAL VALVE INSTALLATION



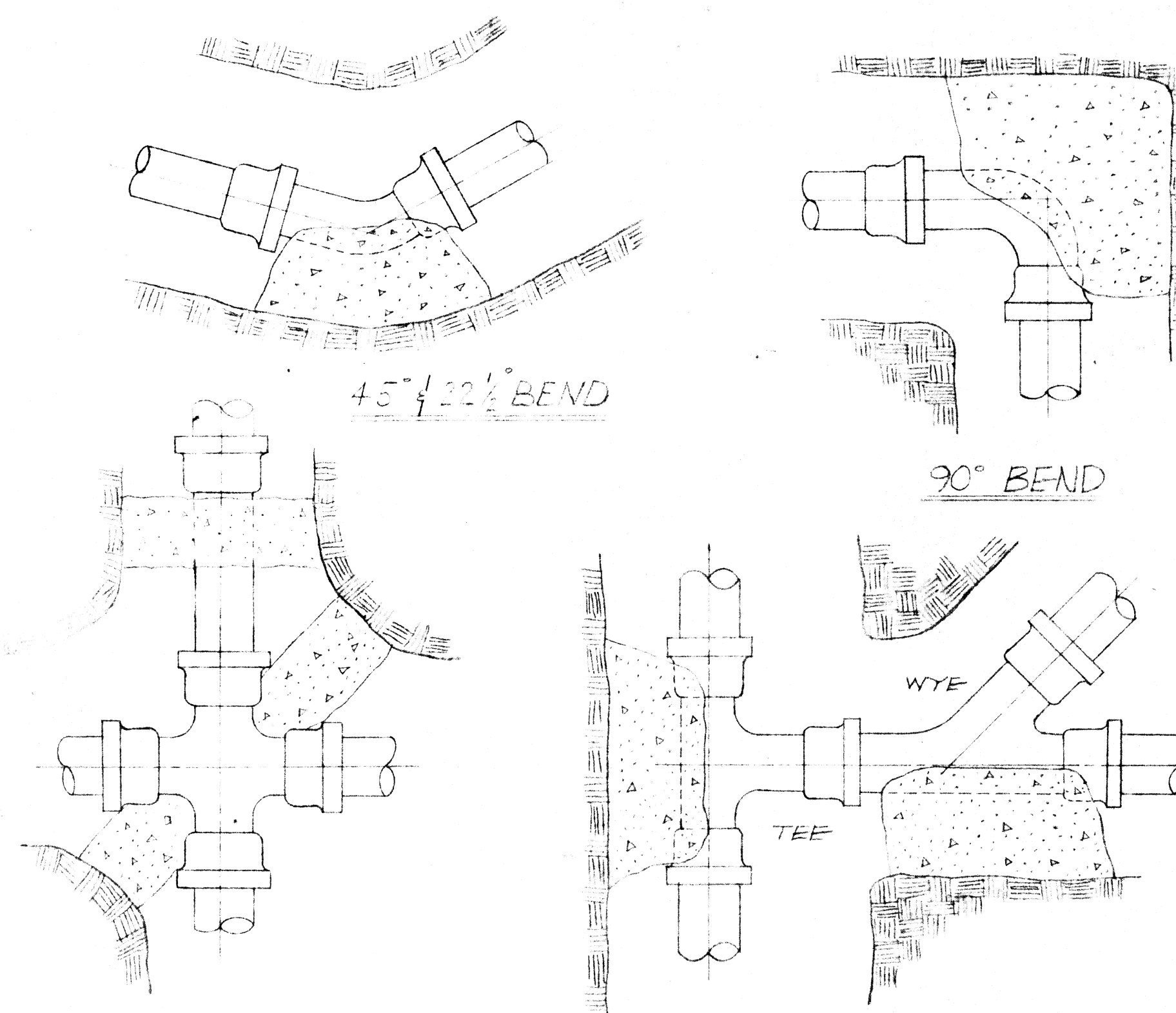
TYPICAL 5/8\"/>



TYPICAL HIGHWAY CROSSING



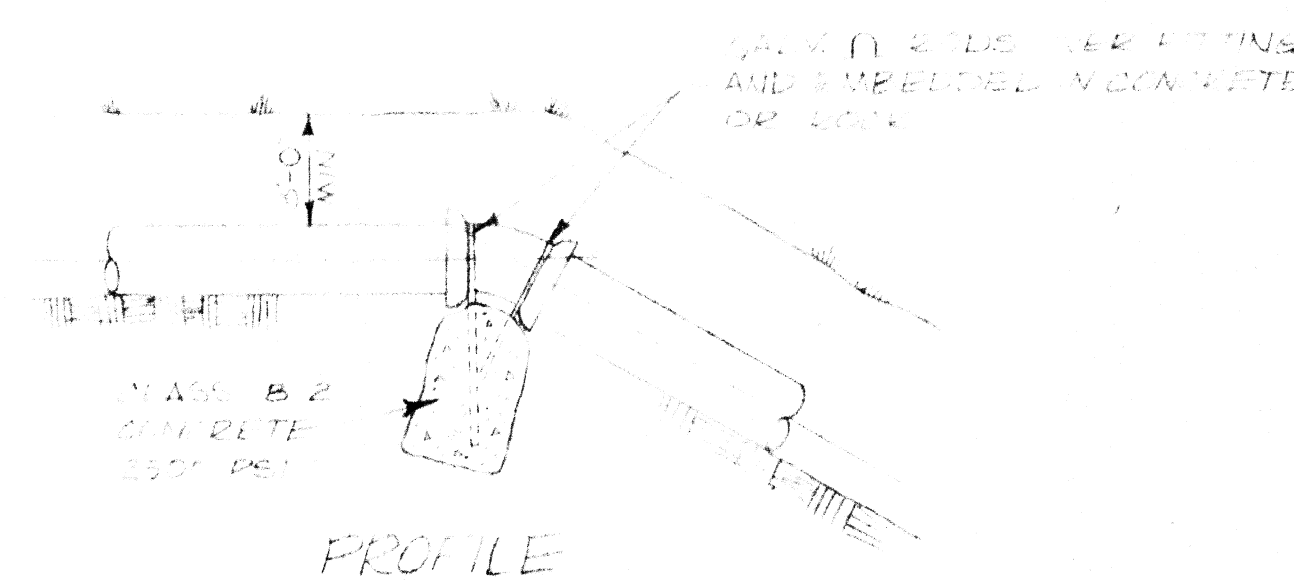
FLUSHING HYDRANT



THRUST BLOCK DETAILS

PIPE DIA.	TEE & WYE 90°		45° & 22 1/2° BEND		22 1/2°	
	A	B	A	B	A	B
4"	12"	12"	12"	12"	12"	12"
6"	2'	12"	12"	2'	12"	12"
8"	15"	24"	12"	8"	12"	12"

THRUST BLOCK SIZES



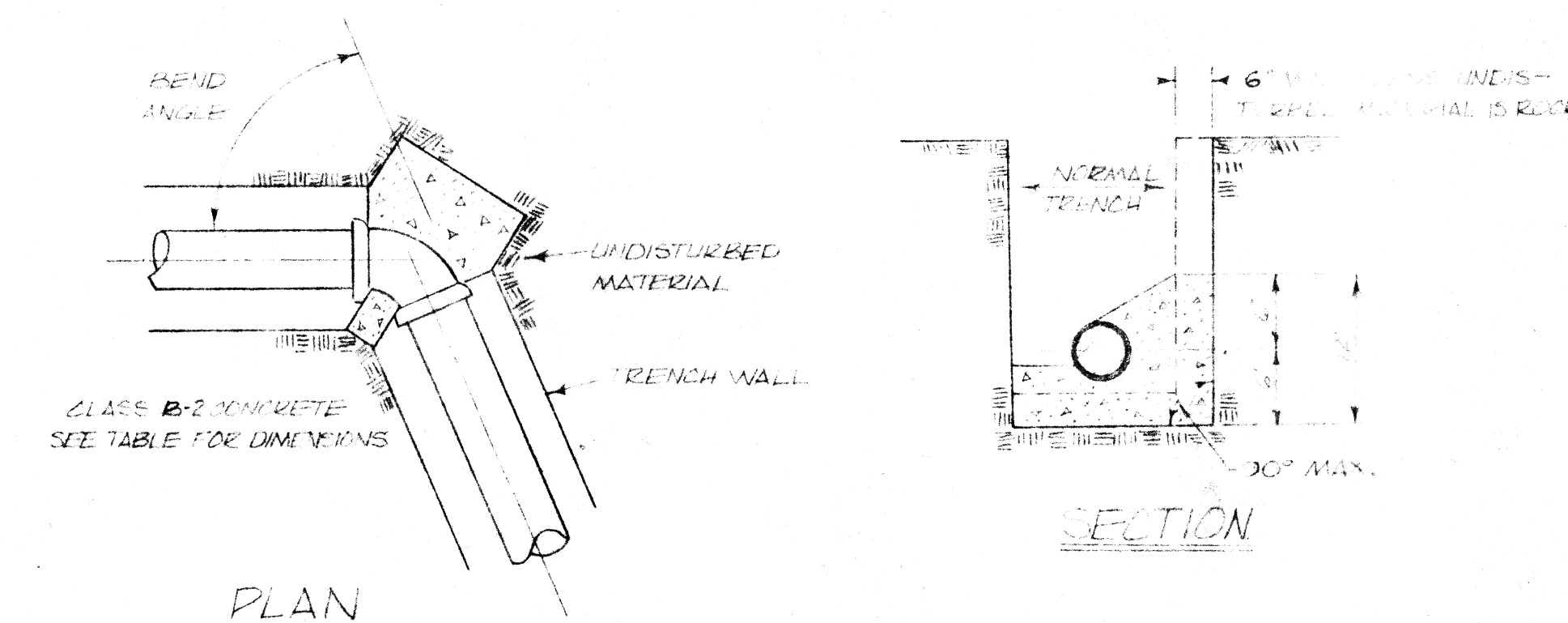
PROFILE

FITTING SIZE	ROD SIZE	NO. RODS	EMBEDMENT
4" x 8"	6"	2	30"

FITTING SIZE	VOLUME OF THRUST BLOCKS IN CU. YDS.			
	90°	45°	22½°	11¼°
4	0.7	0.3	0.1	—
6	1.3	0.5	0.3	—
8	2.3	1.1	0.5	0.2

1. KEEP CONCRETE CLEAR OF JOINT & JOINT ACCESSORIES.
2. THRUST BLOCKS FOR VERTICAL UP BENDS SHALL BE THE SAME AS FOR HORIZONTAL BENDS.

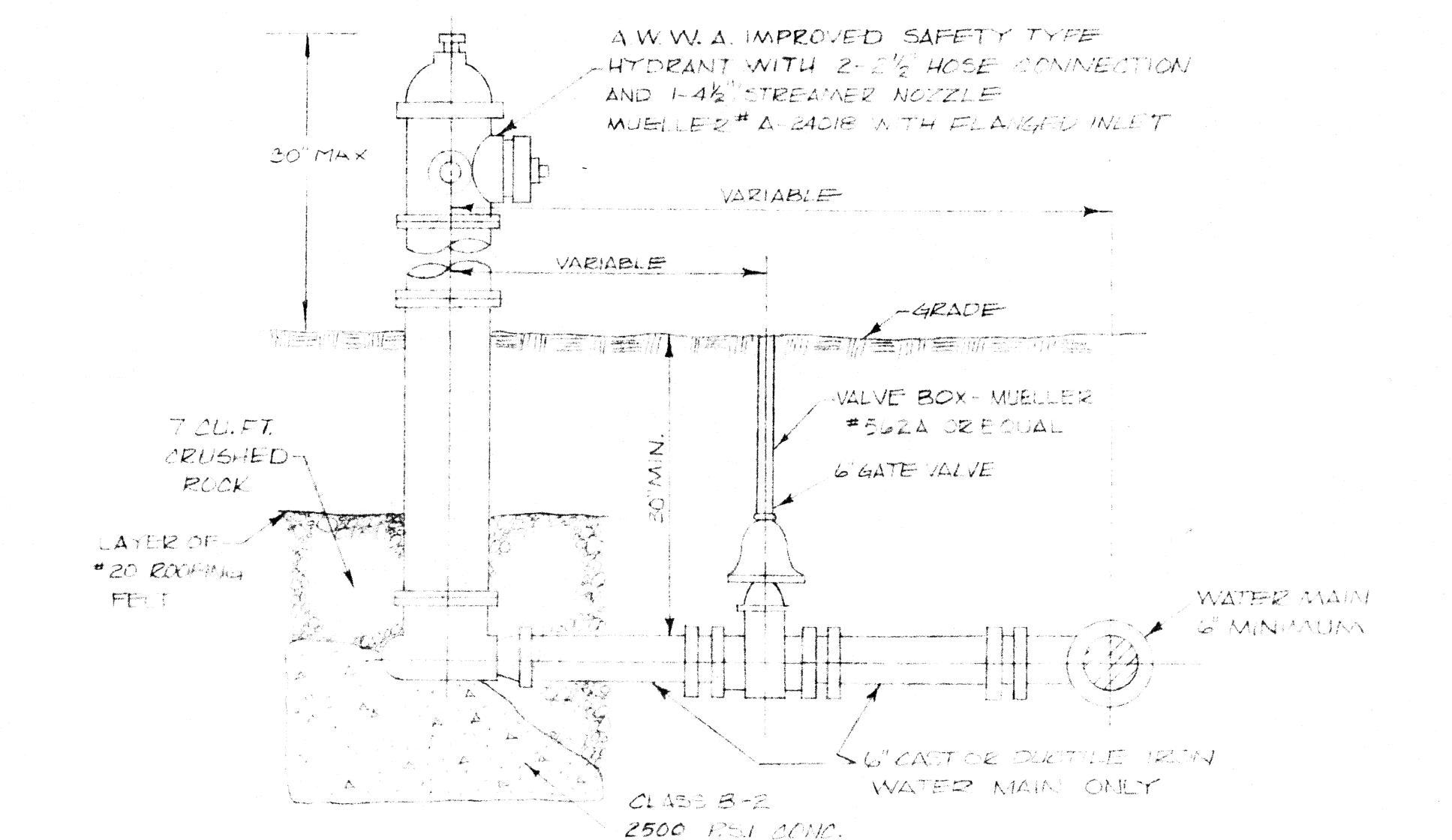
VERTICAL THRUST BLOCK DETAIL



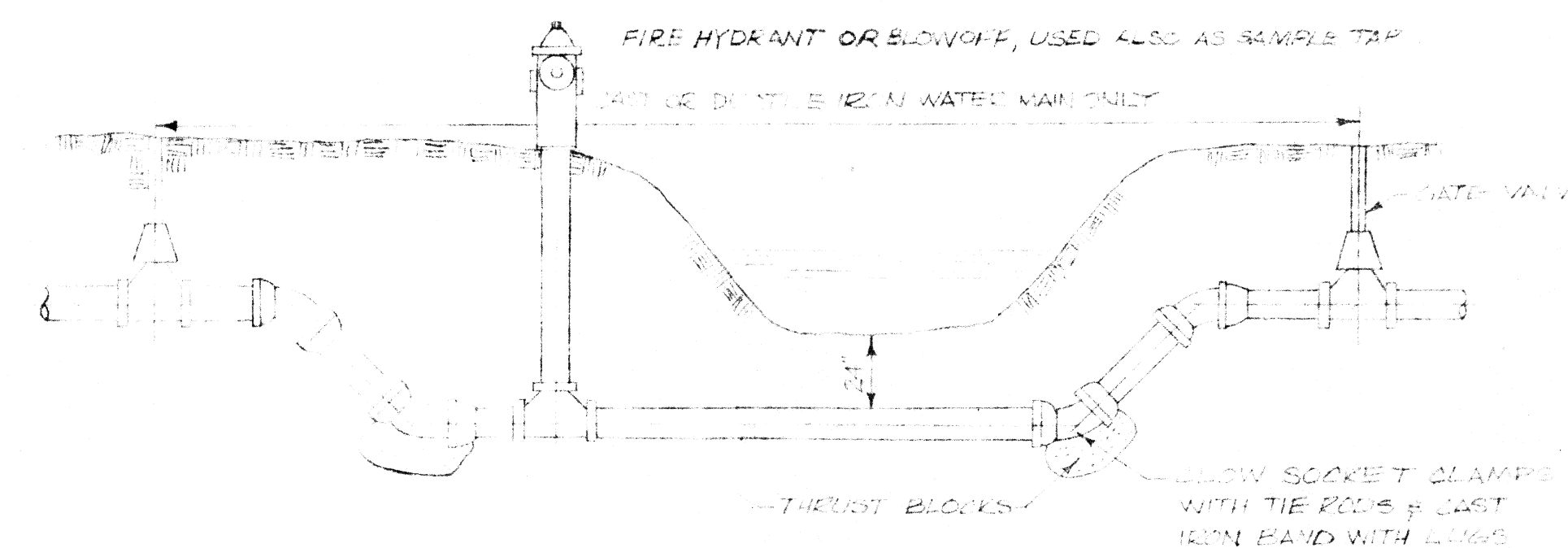
PLAN

NOTES:
1. AREA OF THRUST BLOCKS ARE BASED ON 1500 TO 4000 P.S.F. LATERAL BEARING PRESSURE AND A TEST PRESSURE WITHIN PIPE OF 150 P.S.I.
2. THRUST BLOCKS ARE REQUIRED AT ALL BENDS OF MORE THAN 45°.
3. BEARING SURFACE OF THRUST BLOCKS MUST BE NORMAL TO RESULTANT THRUST OF PIPE & BEAR ON SUITABLE UNDISTURBED MATERIAL.
4. KEEP CONCRETE CLEAR OF JOINT & JOINT ACCESSORIES.

HORIZONTAL THRUST BLOCK DETAIL



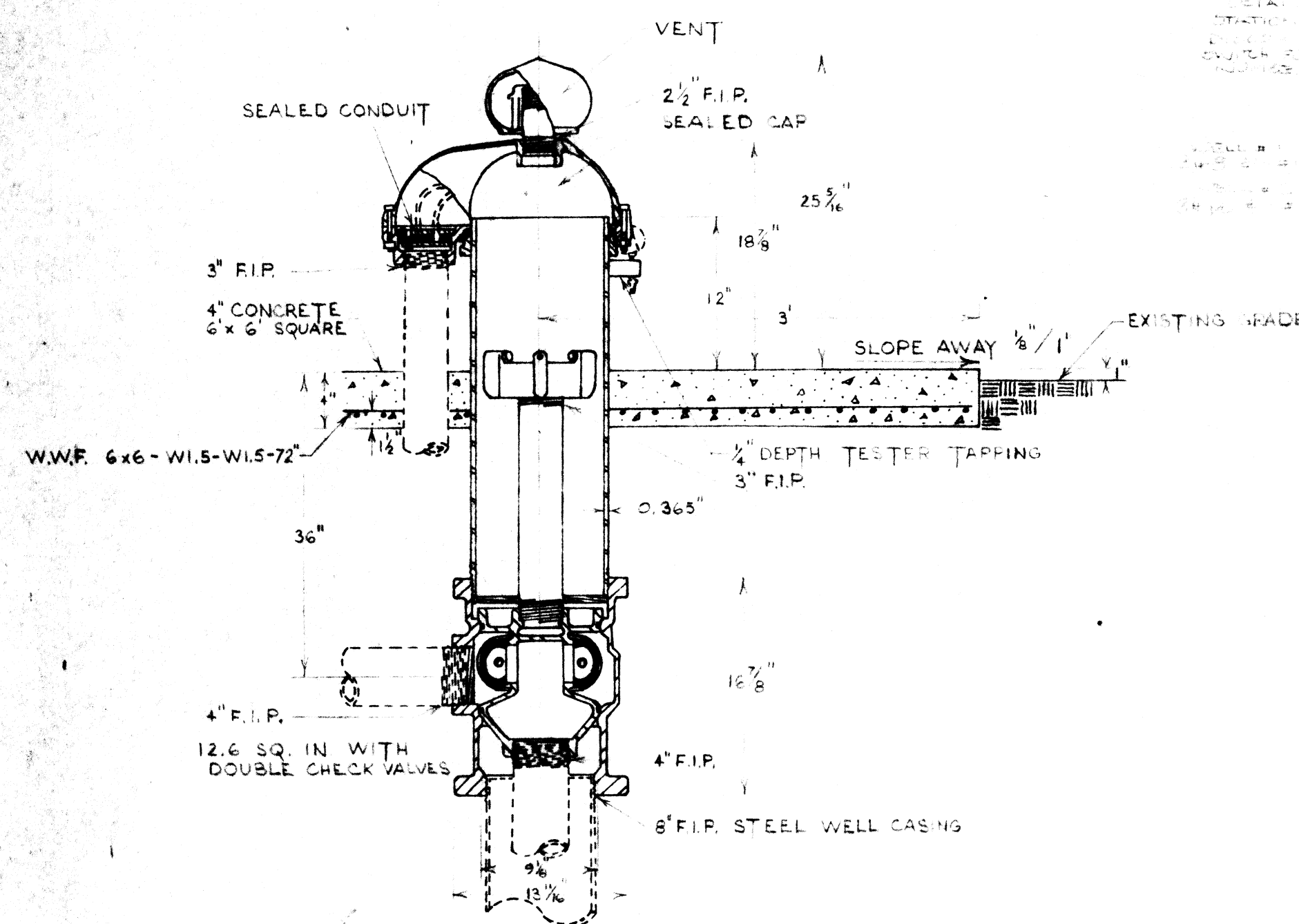
TYPICAL FIRE HYDRANT ASSEMBLY



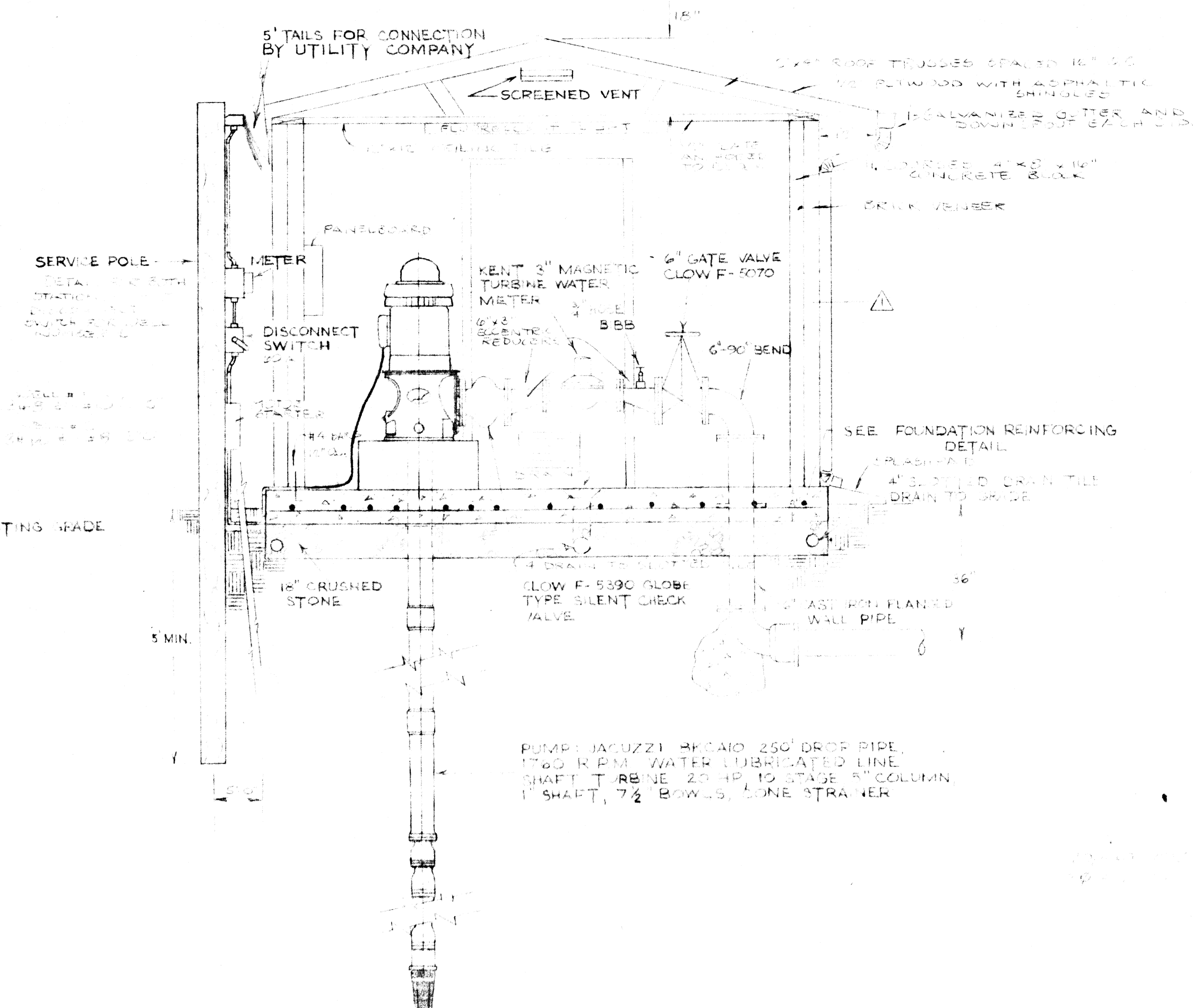
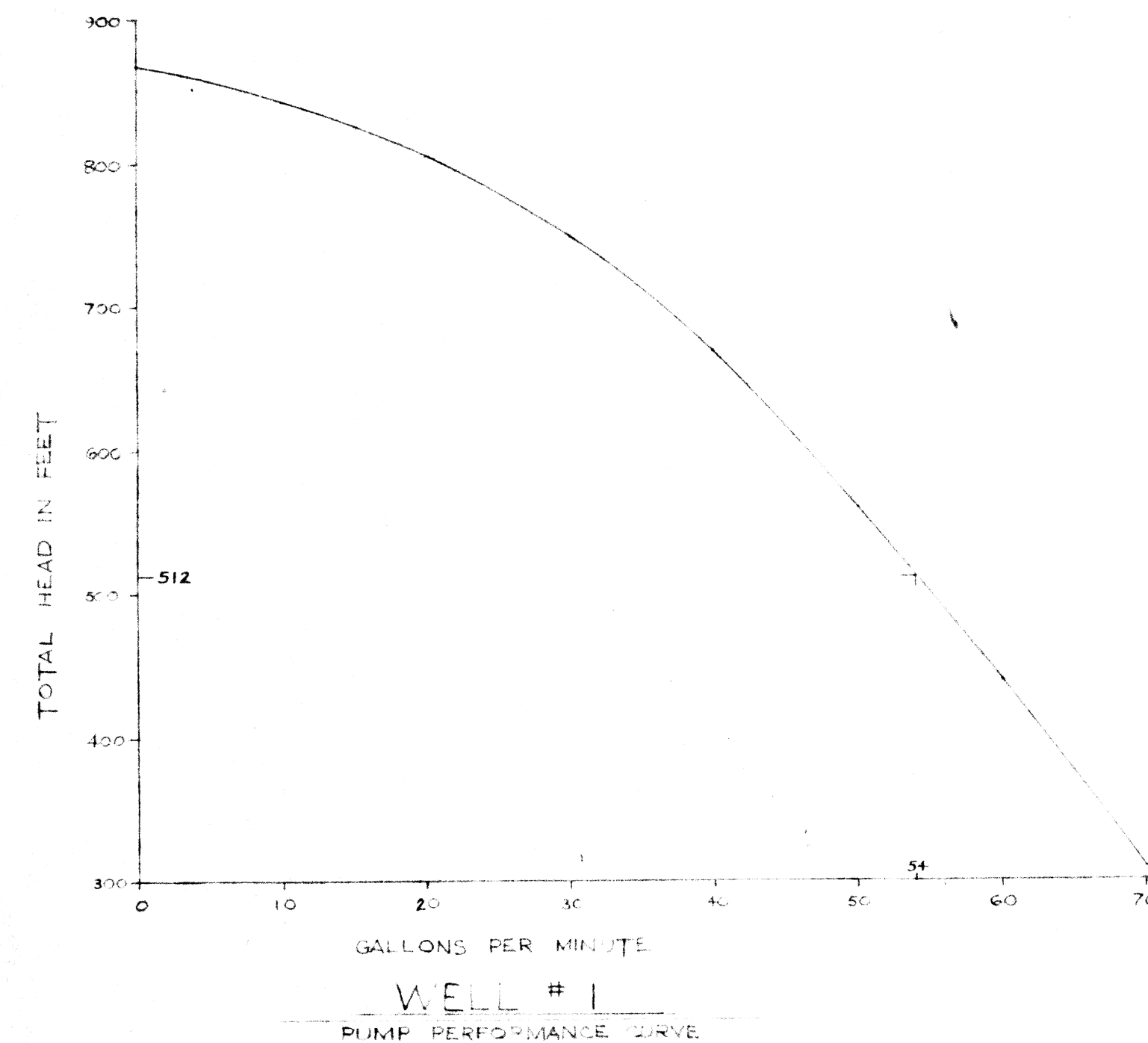
NOTE: WHERE PERMANENT IS ENCOUNTERED IN THE STREAM BED THE TOP OF THE WATER MAIN MAY BE LAID SIX (6) INCHES BELOW THE NORMAL STREAM BED WITH THE PIPE EMBEDDED IN CONCRETE. ALL TENDS SHALL BE PAID AT UNIT BID PRICES.

TYPICAL CREEK CROSSING

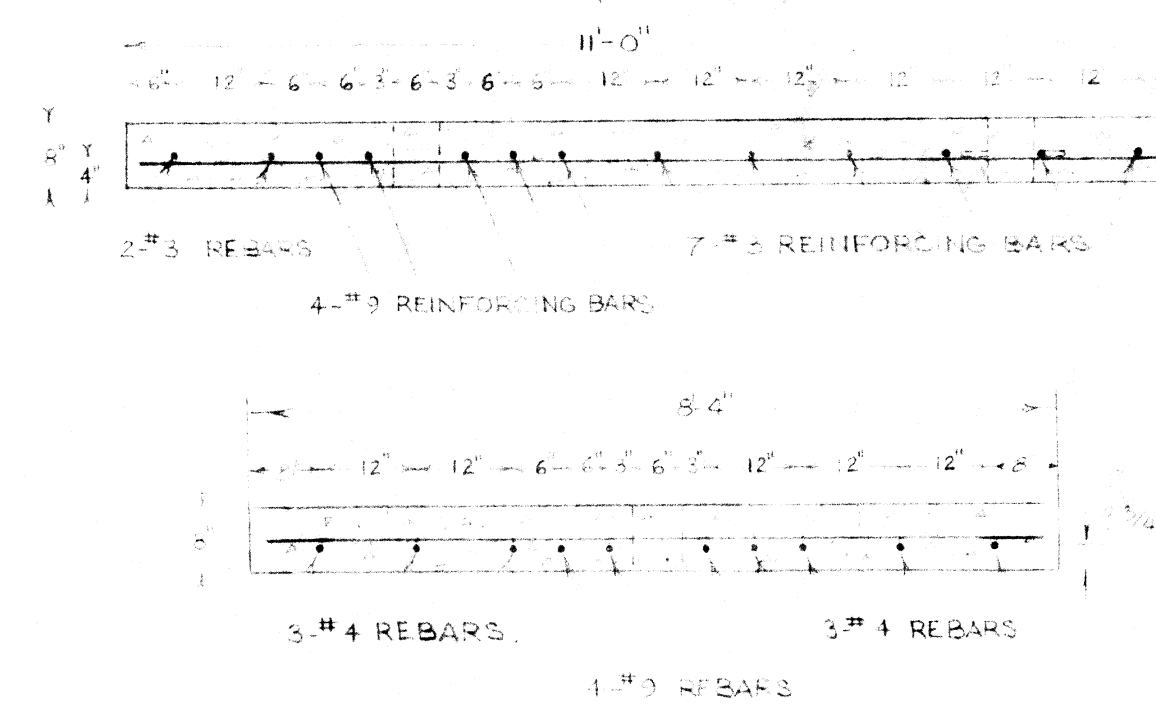
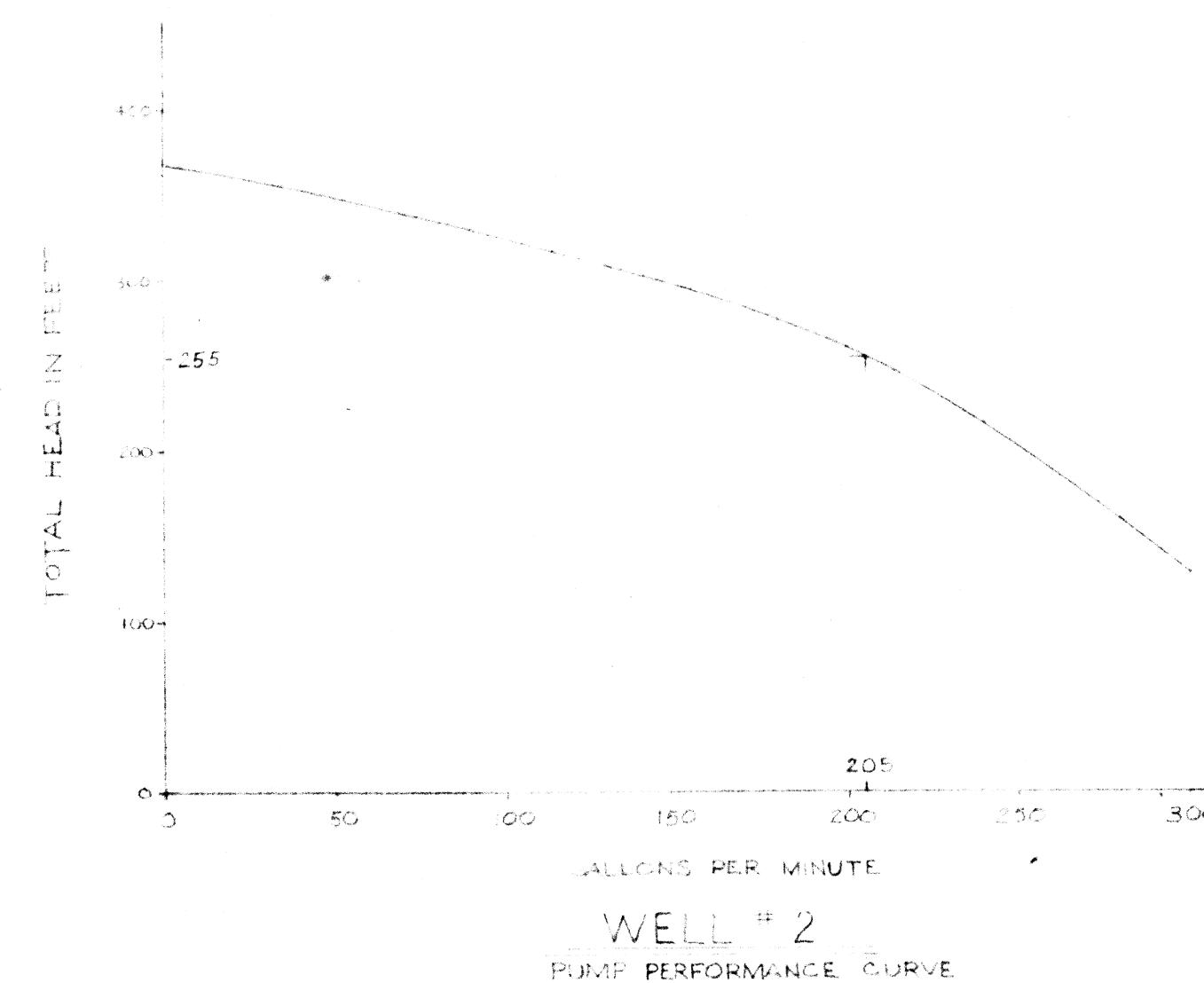
MONITOR P.S. WELL HEAD FOR 8" WELL CASING AND SUBMERSIBLE PUMP. MODEL NO. 3PS-810TB-V-E4-T4



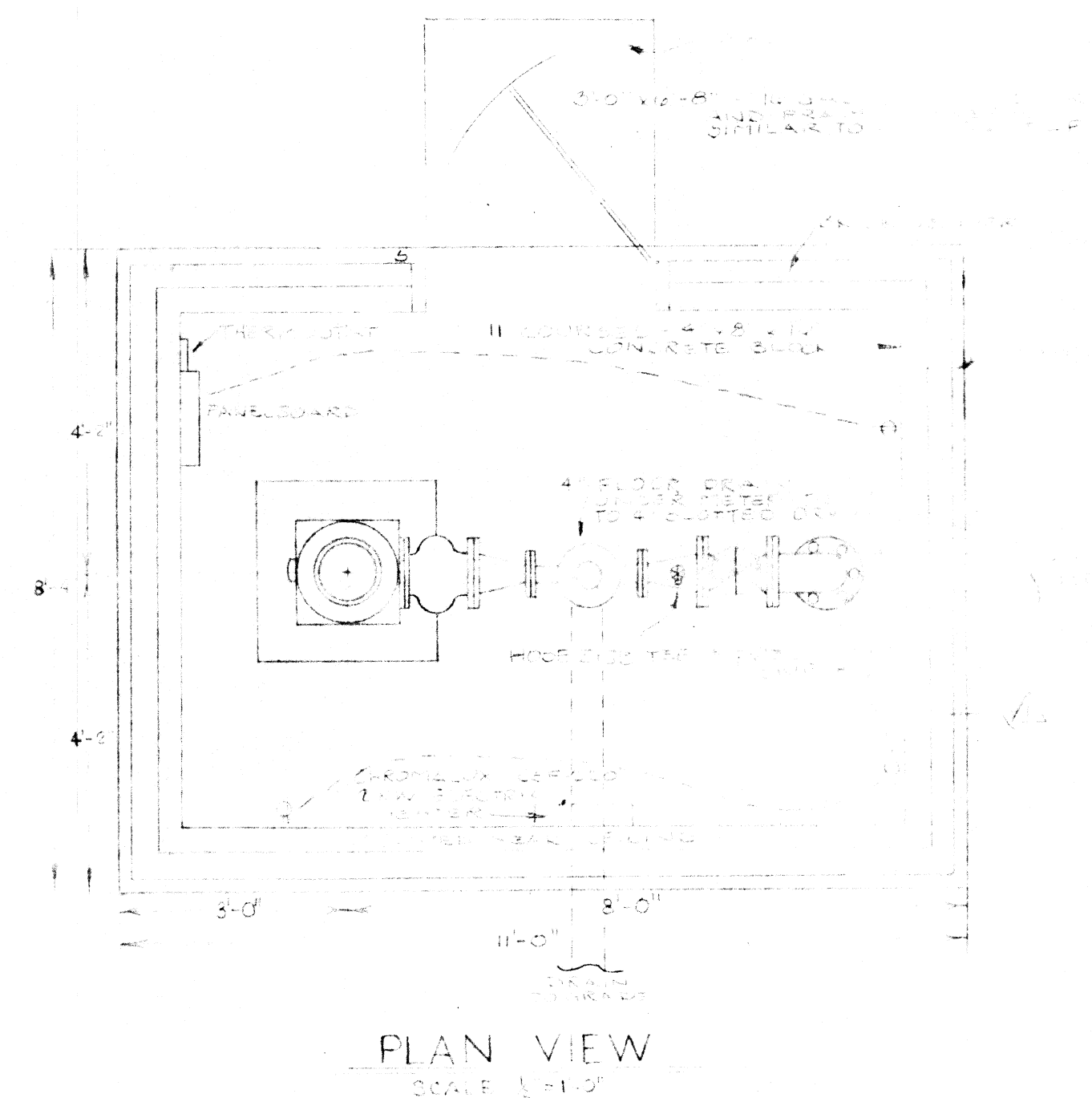
#1 - WELL HEAD DETAIL
NOT TO SCALE



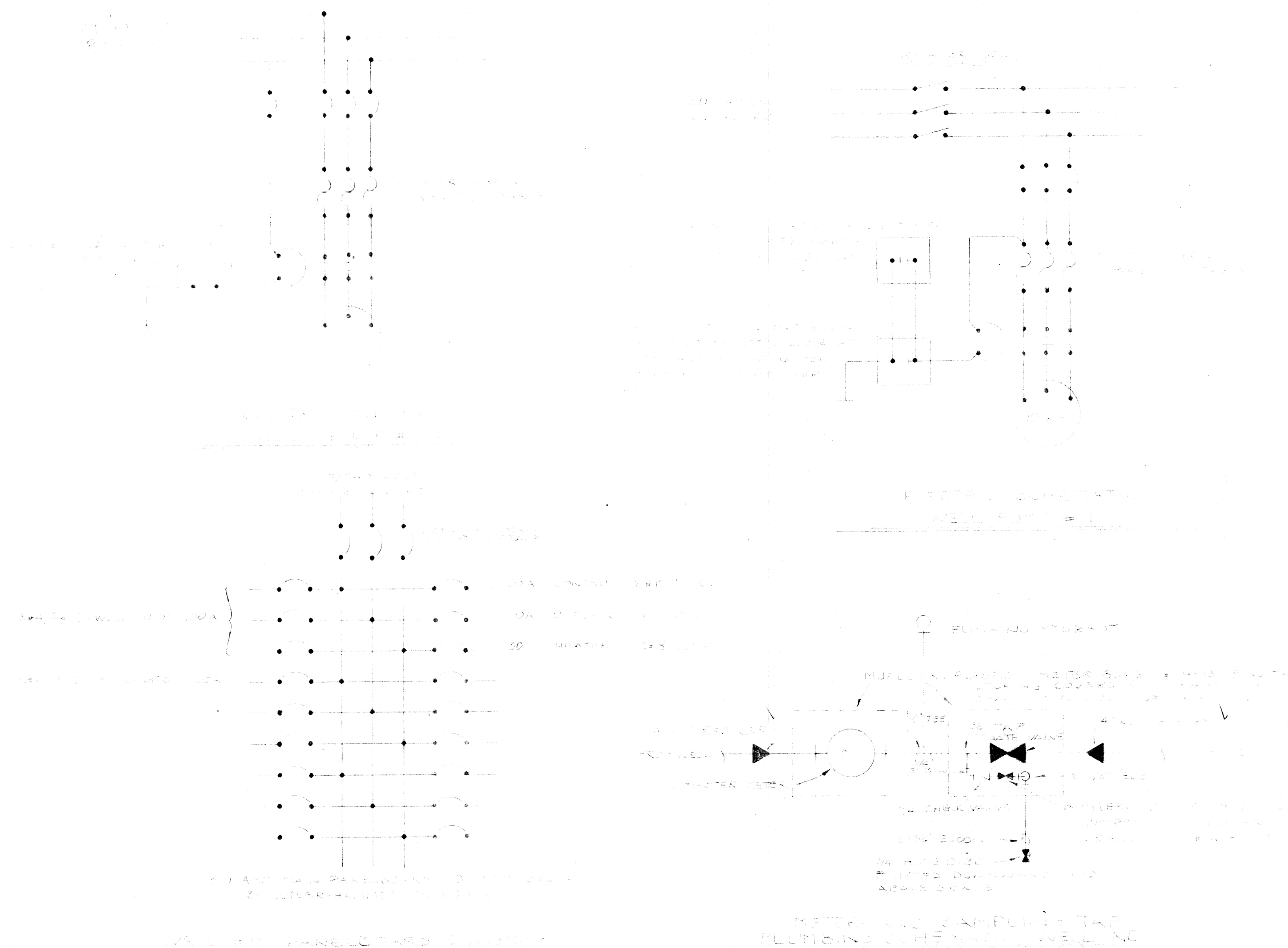
#2 - WELL HOUSE DETAIL
SCALE 1/2\"/>

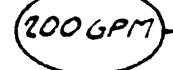


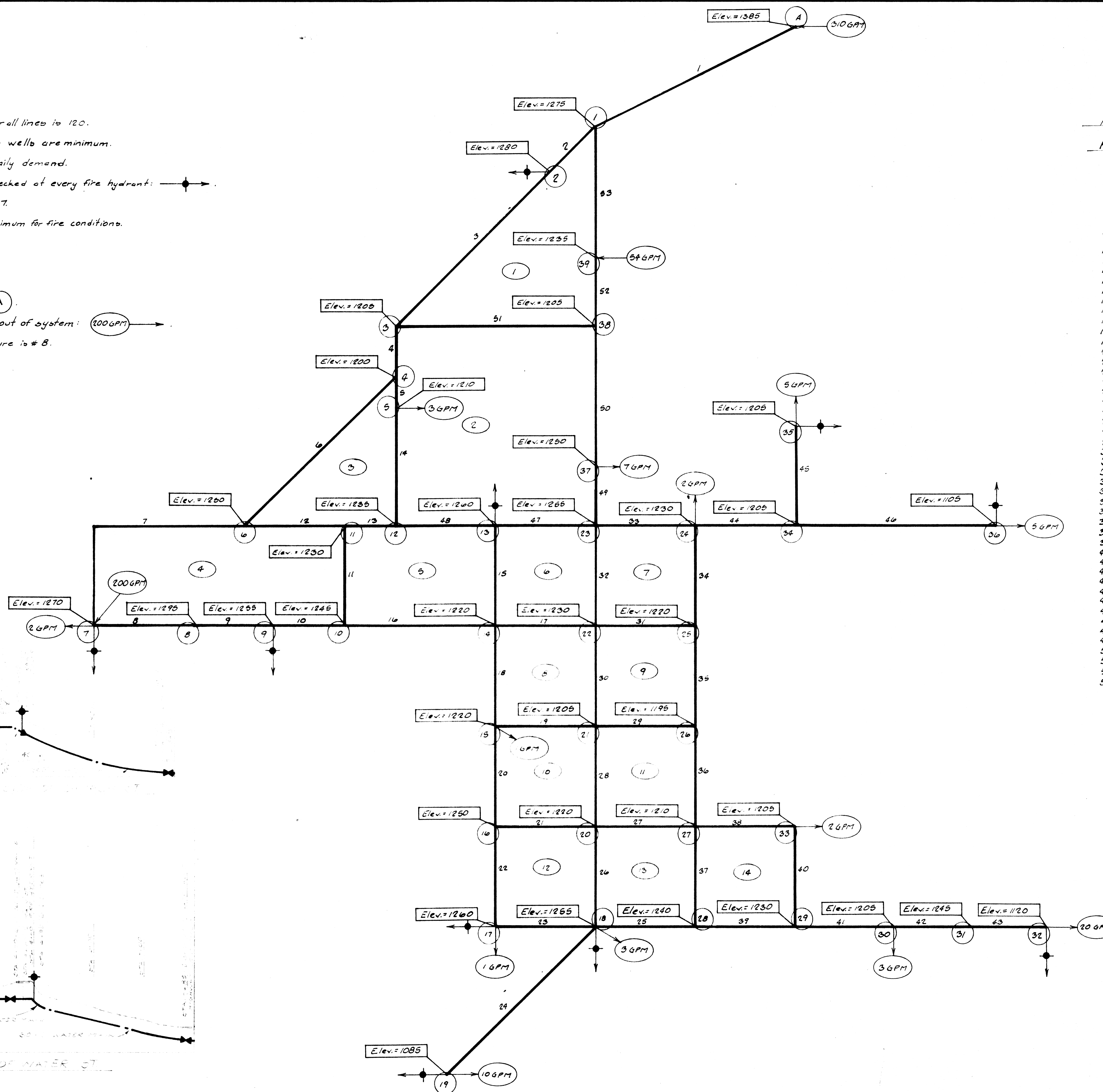
FOUNDATION REINFORCING DETAILS
SCALE 1/2\"/>



PLAN VIEW
SCALE 1/4\"/>

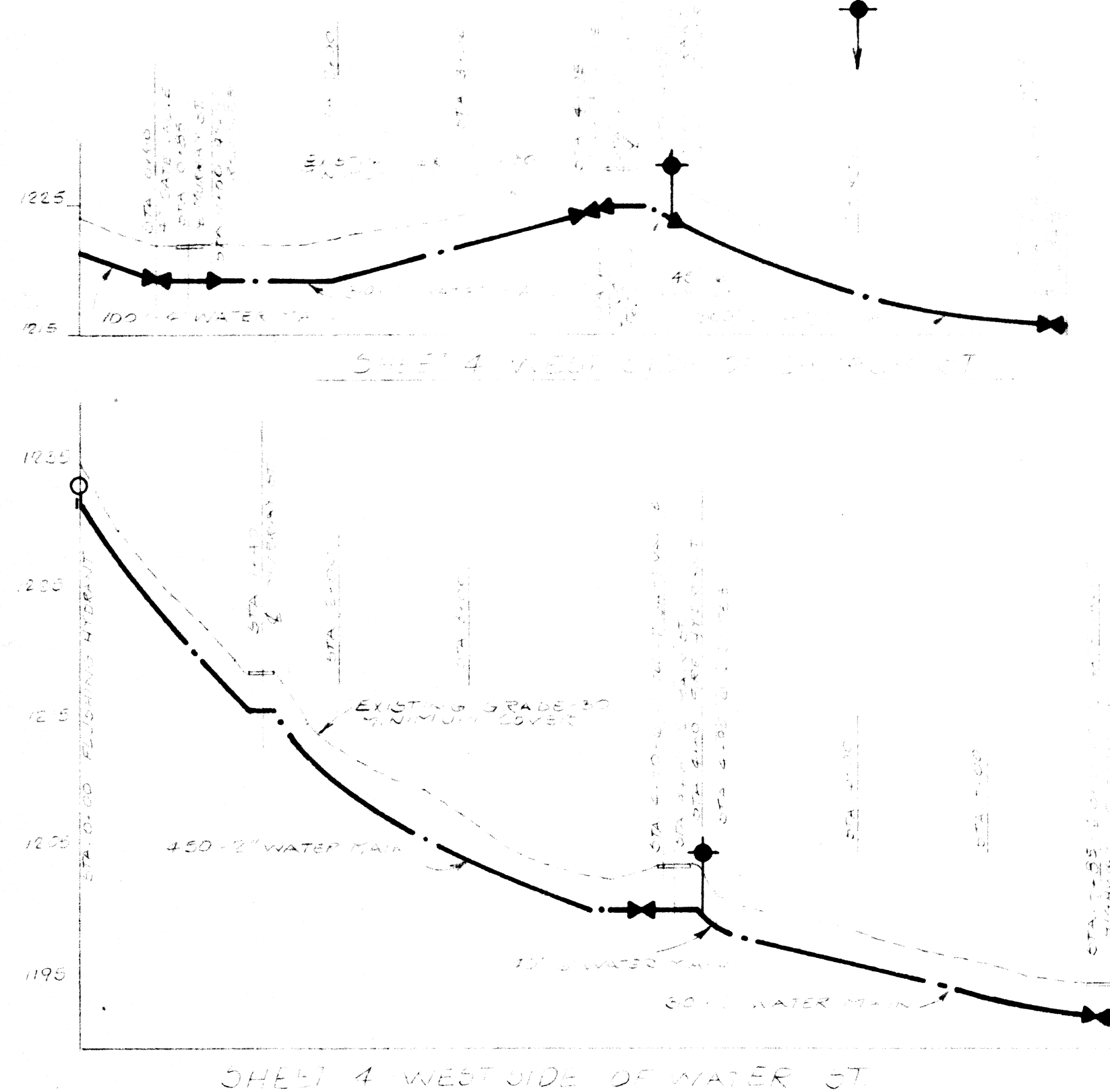


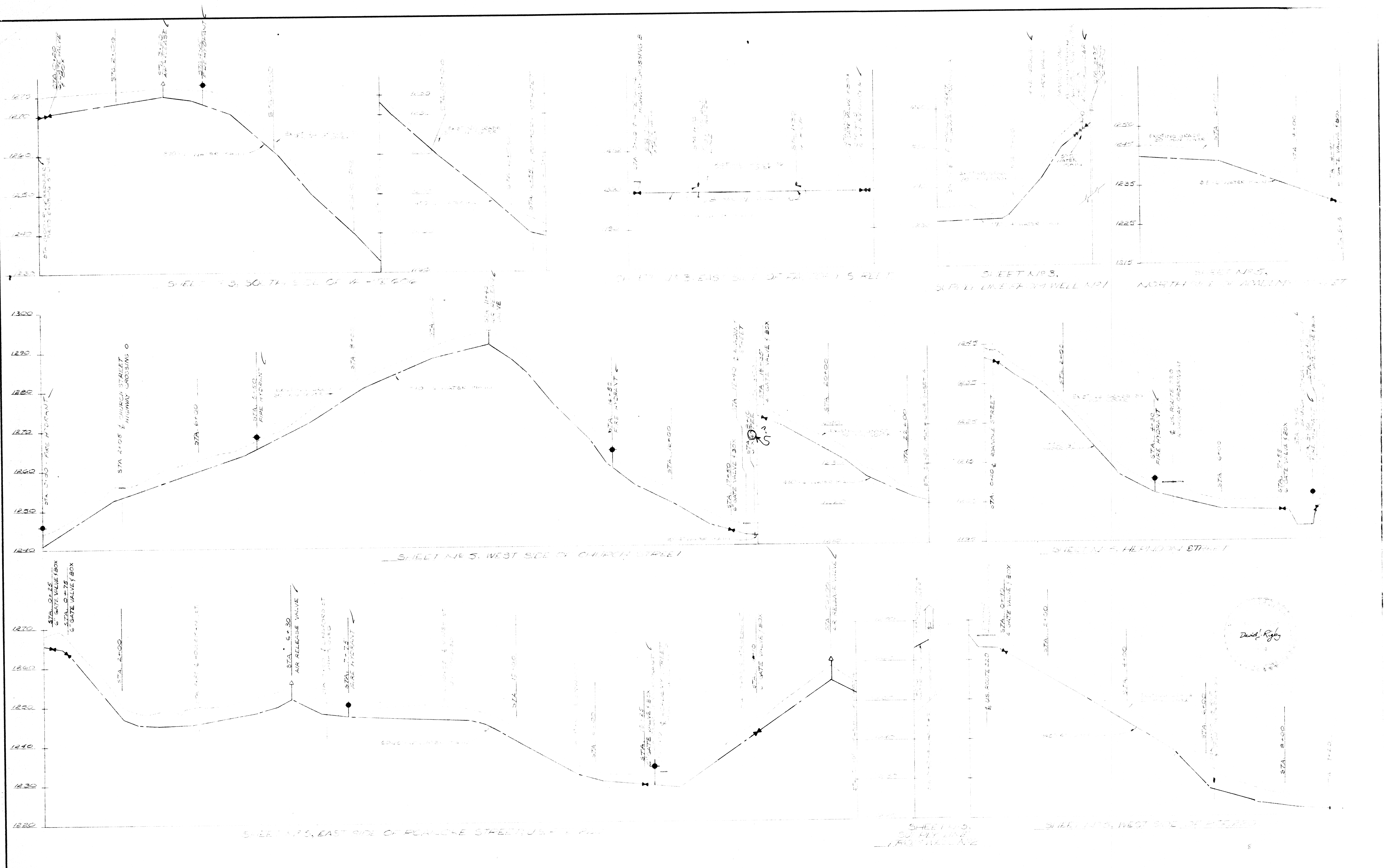
- Notes:
1. Roughness coefficient for all lines is 120.
 2. Flows into system from wells are minimum.
 3. Flows out are average daily demand.
 4. A 500 GPM fire was checked at every fire hydrant: 
 5. Critical fire is at junction 7.
 6. Reservoir elevation is minimum for fire conditions.
 7. Junctions: (1).
 8. Loops: (1).
 9. Pipes: 1.
 10. Terminal Energy Point: (A).
 11. Location of flows into or out of system: (200 GPM) 
 12. Critical junction for pressure is # 8.

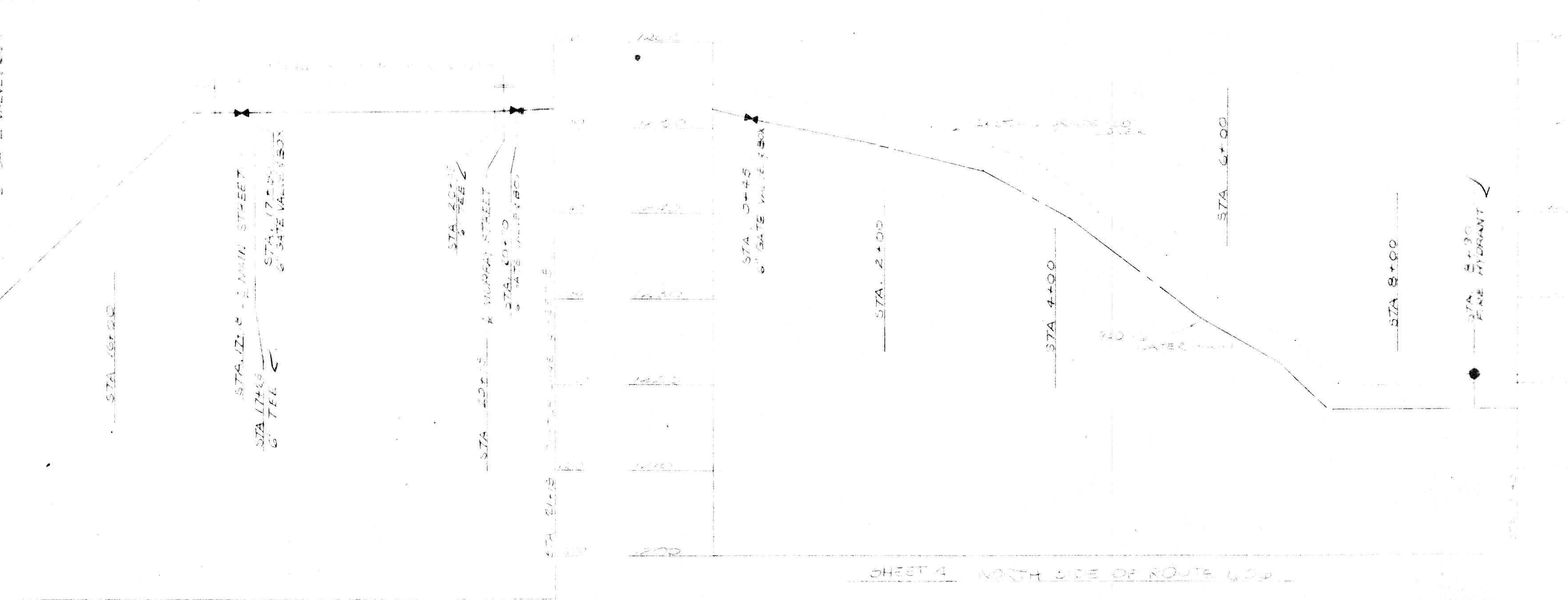
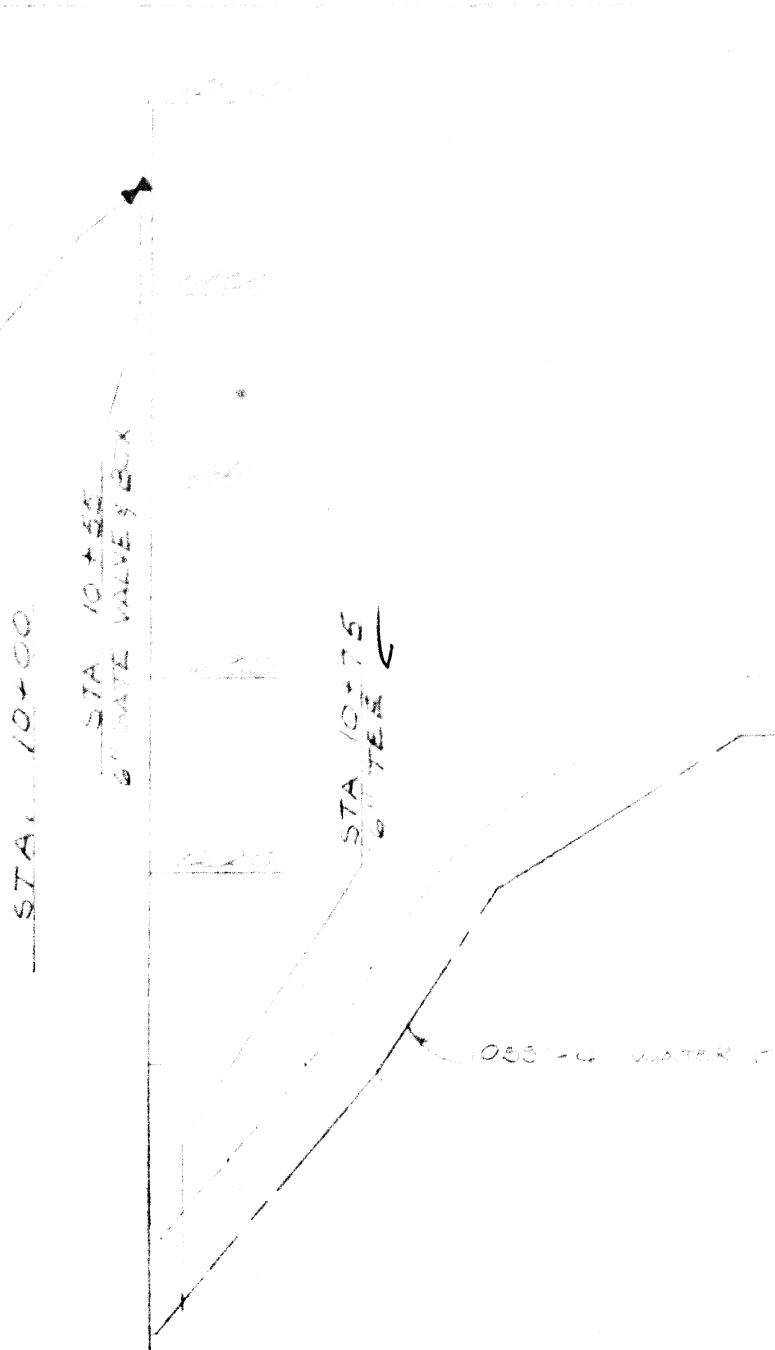
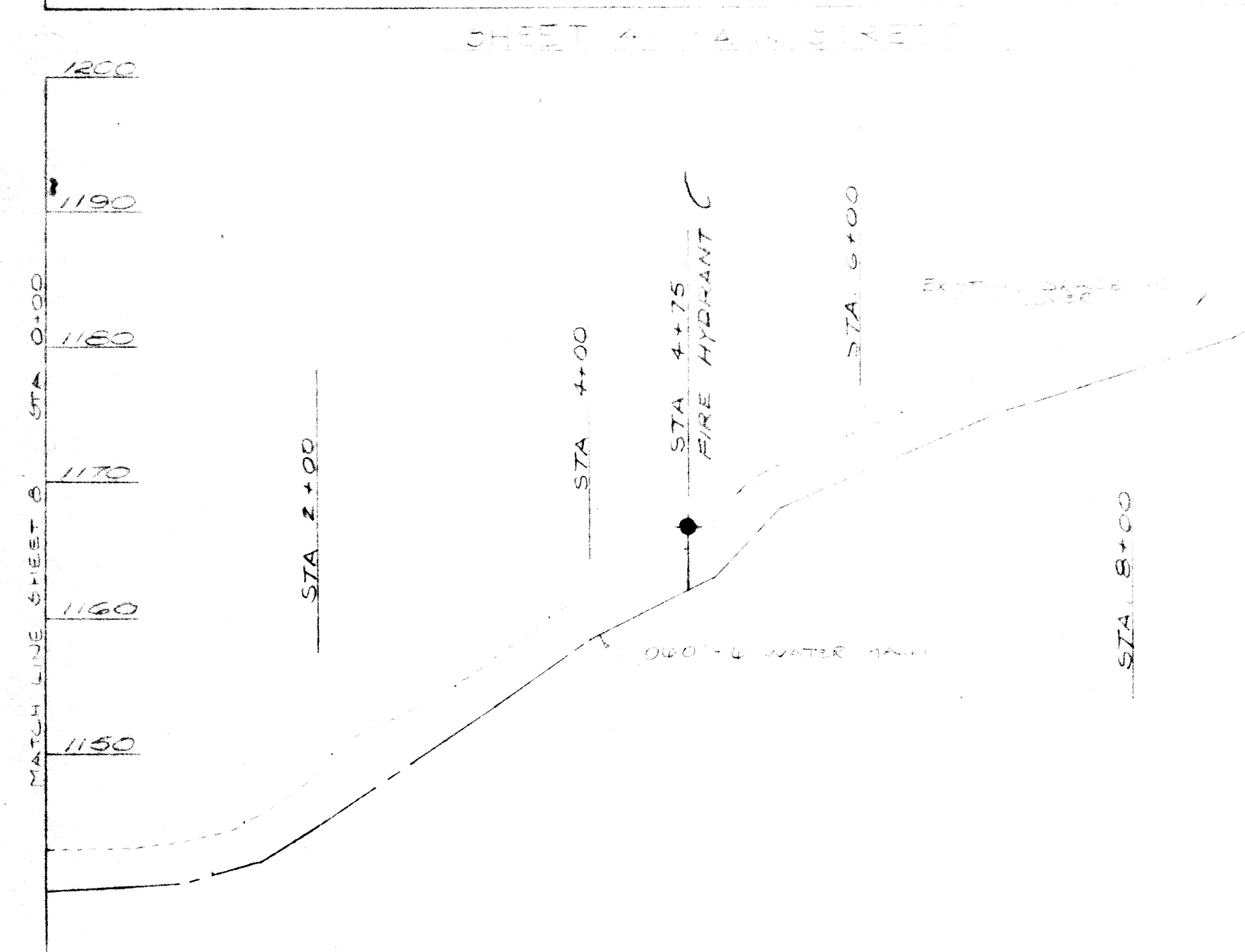
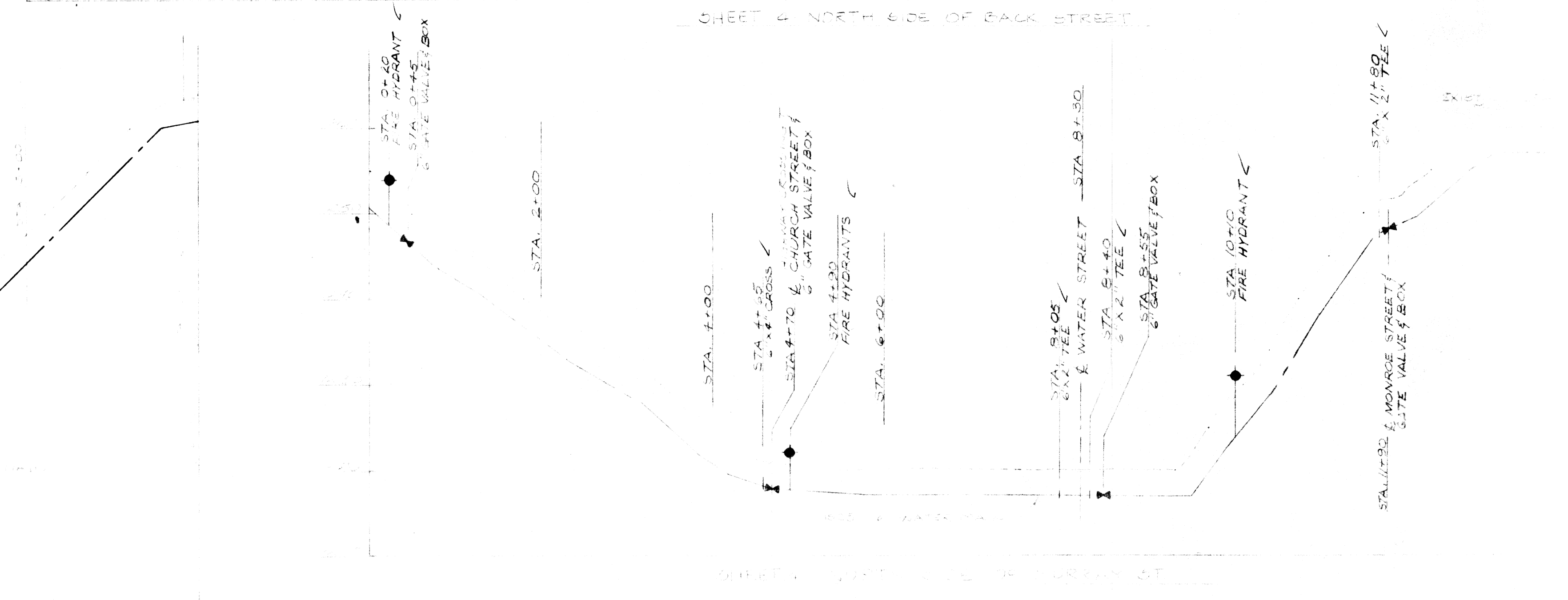
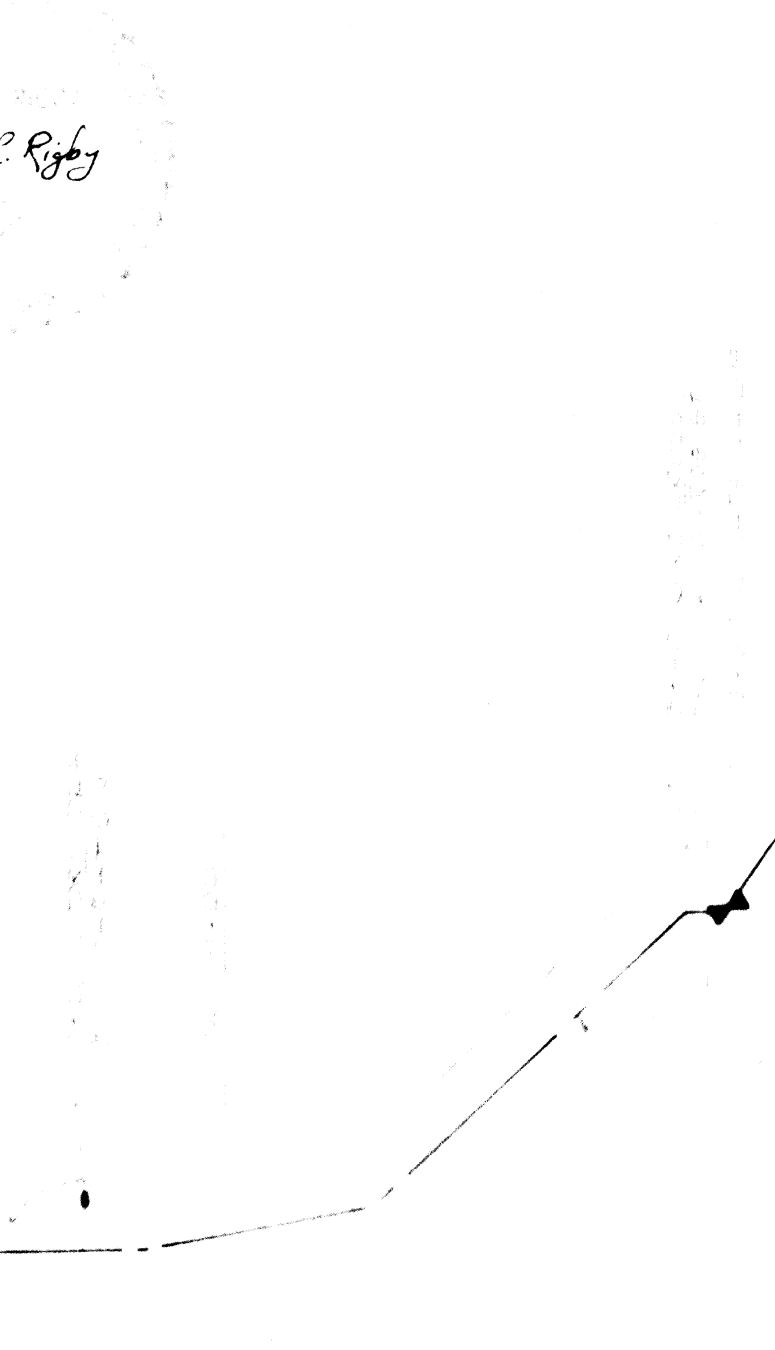
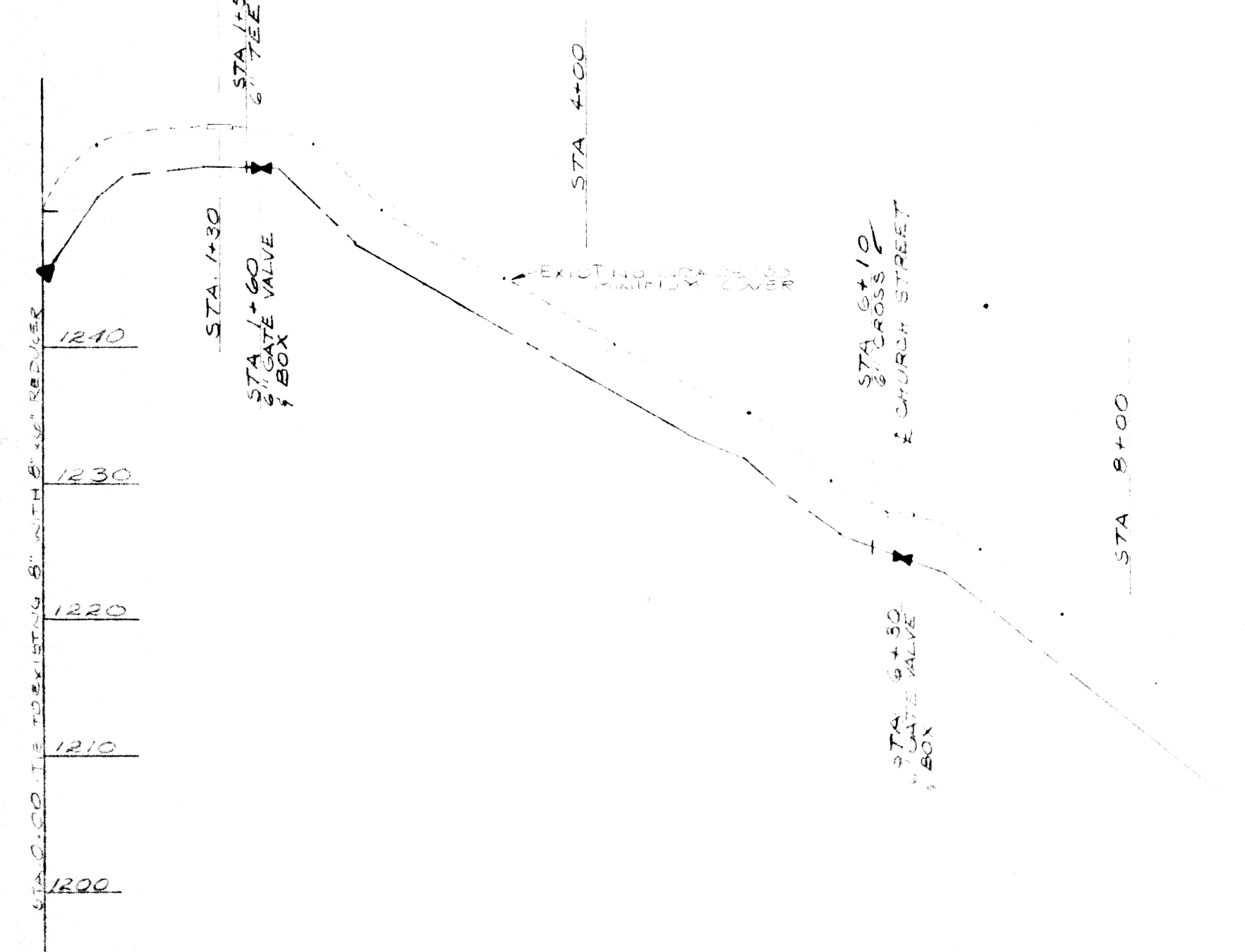
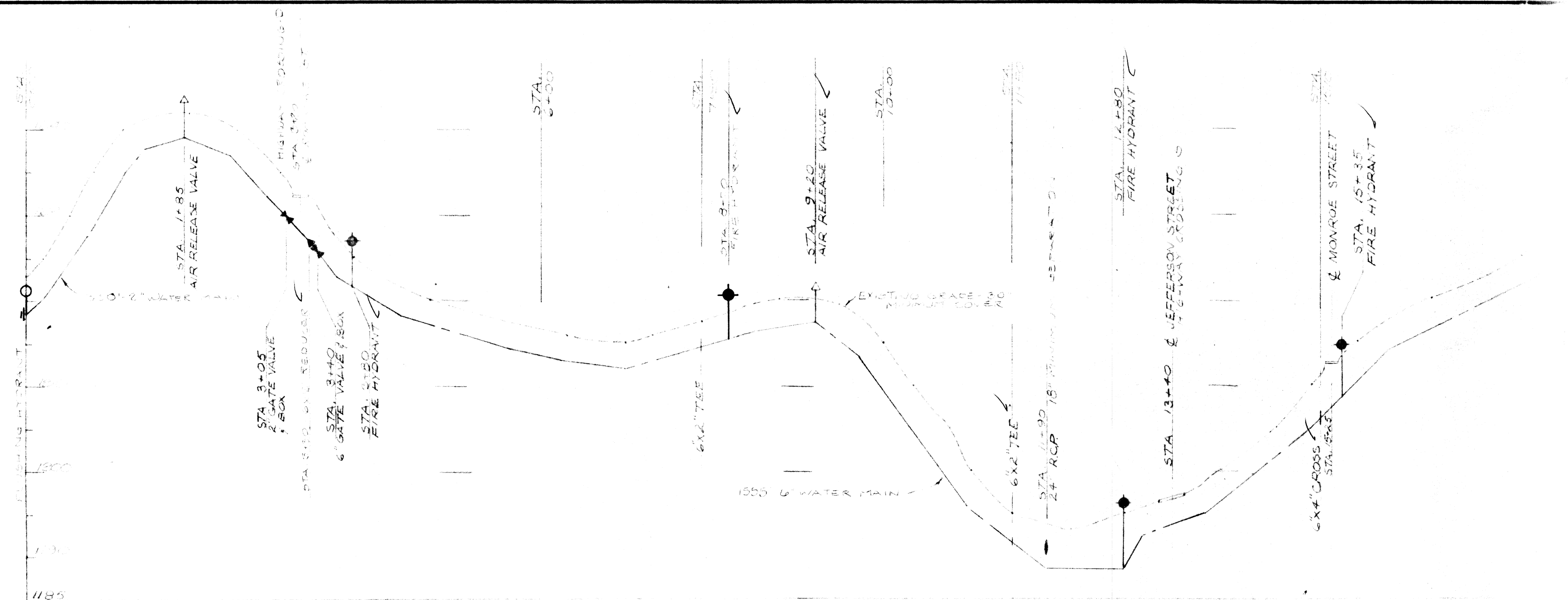
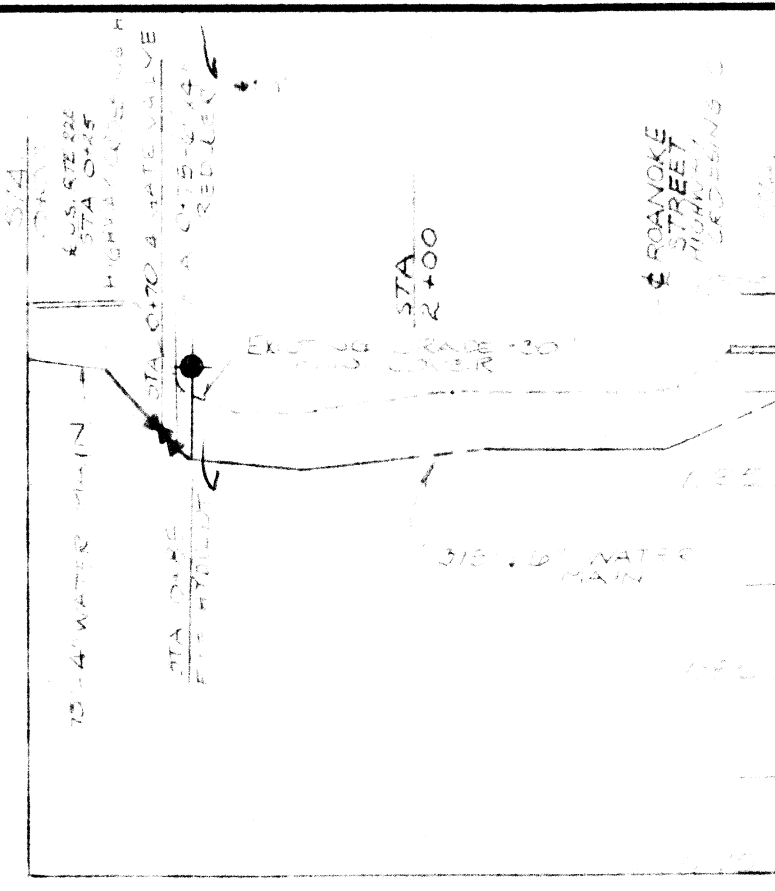
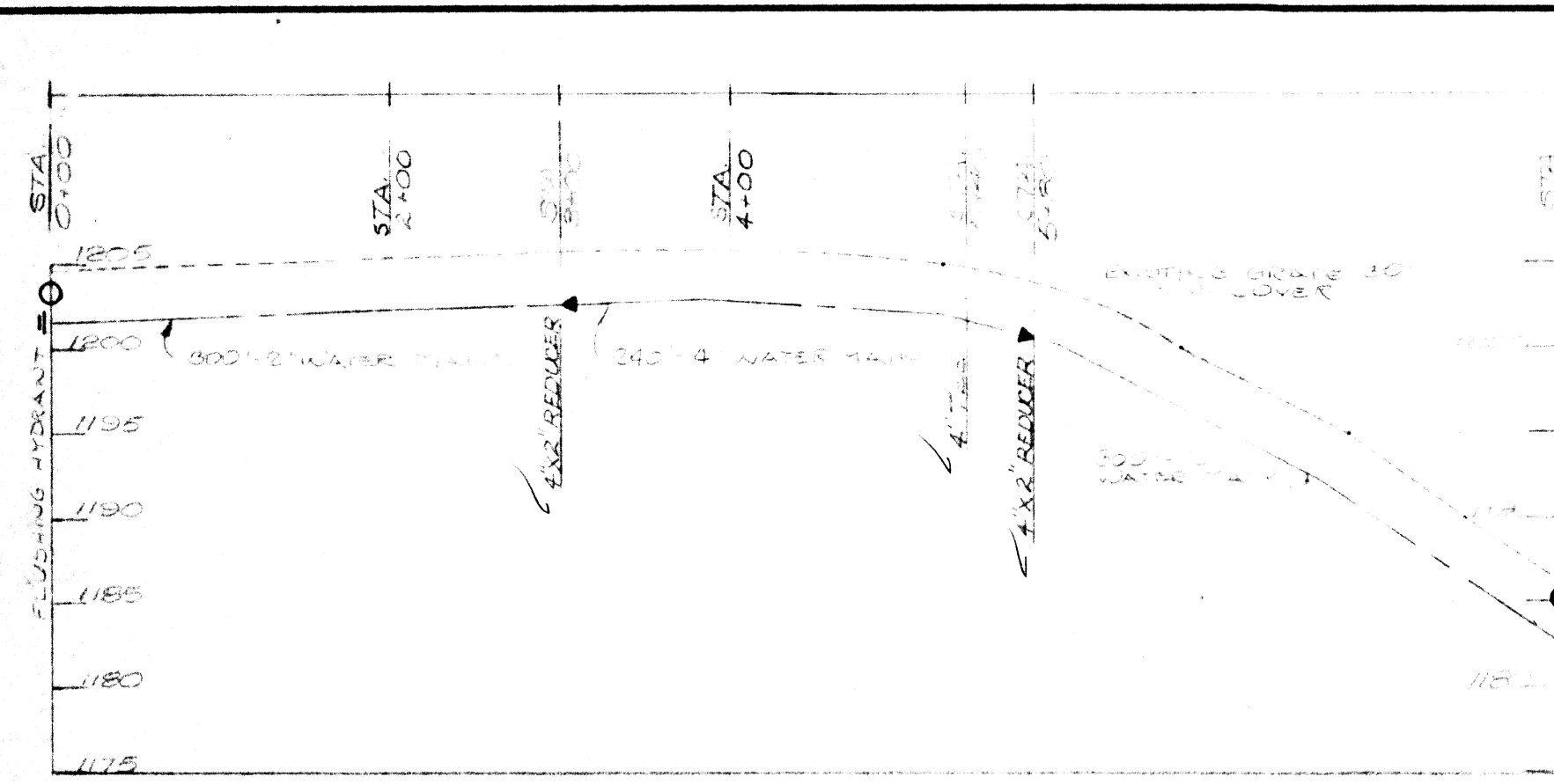


Results of Hardy-Cross Computer Run - Fire at Junction 7

Pipe	Flowrate	Junction	Pressure
1	510.0	1	46.1
2	121.4	2	48.7
3	121.4	3	76.9
4	185.7	4	77.3
5	104.9	5	72.8
6	50.8	6	54.6
7	189.5	7	44.9
8	-142.5	8	34.7
9	-142.5	9	52.3
10	-142.5	10	57.0
11	-87.9	11	43.7
12	-108.7	12	41.8
13	-196.6	13	51.2
14	101.9	14	48.5
15	8.7	15	48.5
16	-54.6	16	55.6
17	-5.6	17	51.3
18	-40.3	18	53.4
19	-4.9	19	127.1
20	-36.4	20	48.6
21	-3.6	21	75.2
22	-32.9	22	44.4
23	-33.9	23	53.6
24	10.0	24	44.4
25	-12.6	25	48.7
26	-34.1		
27	0.6		
28	-58.2		
29	1.1		
30	-44.2		
31	1.2		
32	-51.0		
33	46.9		
34	34.9		
35	36.1		
36	37.2		
37	28.8		
38	9.0		
39	16.0		
40	-7.0		
41	28.0		
42	20.0		
43	20.0		
44	10.0		
45	5.0		
46	5.0		
47	-103.4		
48	-44.7		
49	-201.3		
50	-208.3		
51	-54.3		
52	-242.6		
53	188.6		







DRAPER - ADEN ASSOCIATES, INC.
ENGINEERS - SURVEYORS - PLANNERS
BLACKSBURG, VIRGINIA

DESIGNED DJR
DRAWN OGB, EAT
CHECKED DJR
DATE 10-15-76

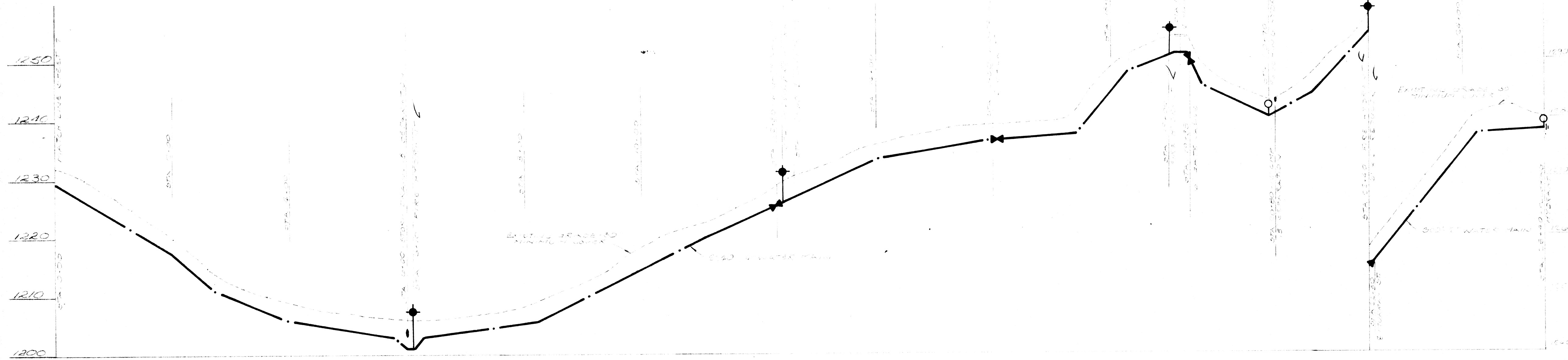
TOWN OF FINCASTLE
WATER SUPPLY & DISTRIBUTION SYSTEM
BOTETOURT COUNTY, VIRGINIA

PROFILES

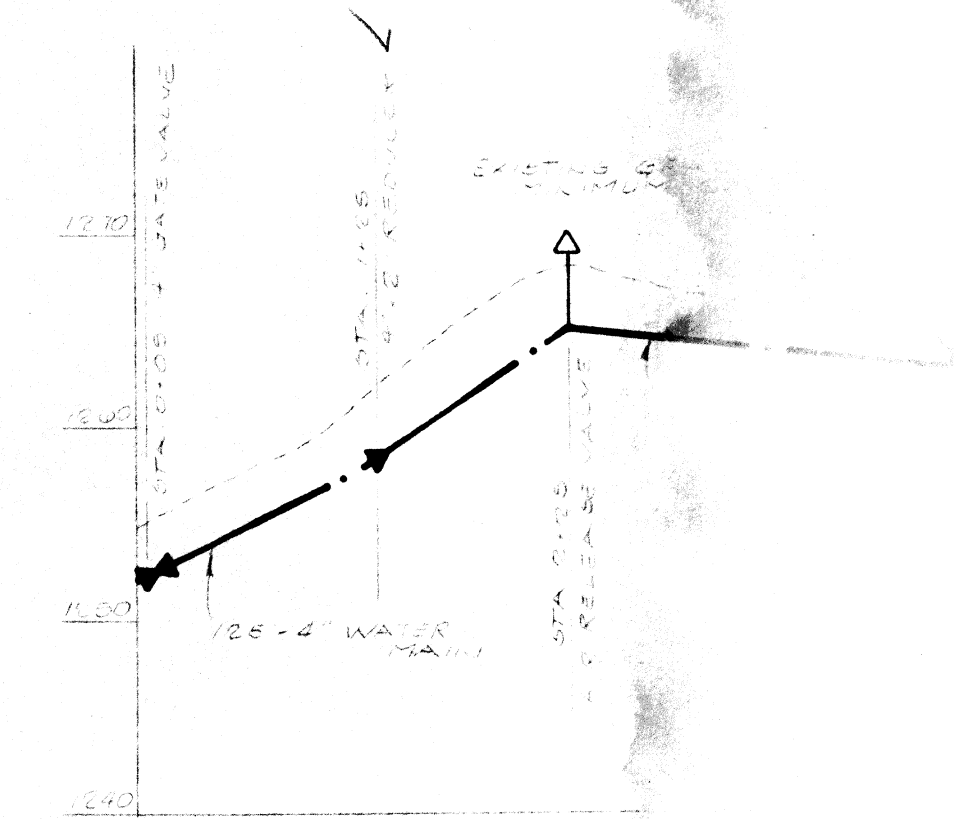
REVISIONS:

SCALE: 1"=100' HORIZONTAL
1"=10' VERTICAL
PLAN No T-75-193

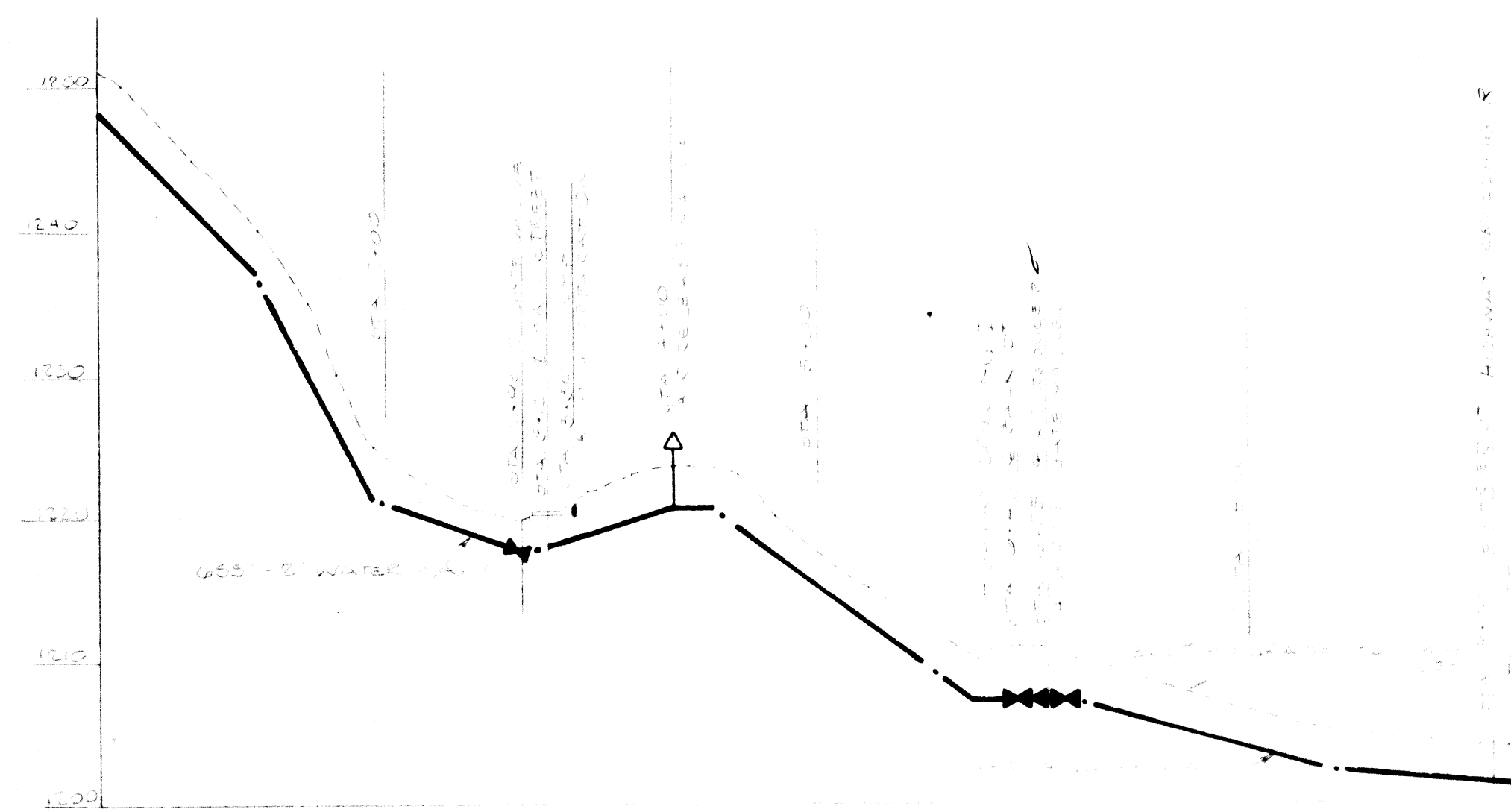
SH
13 C



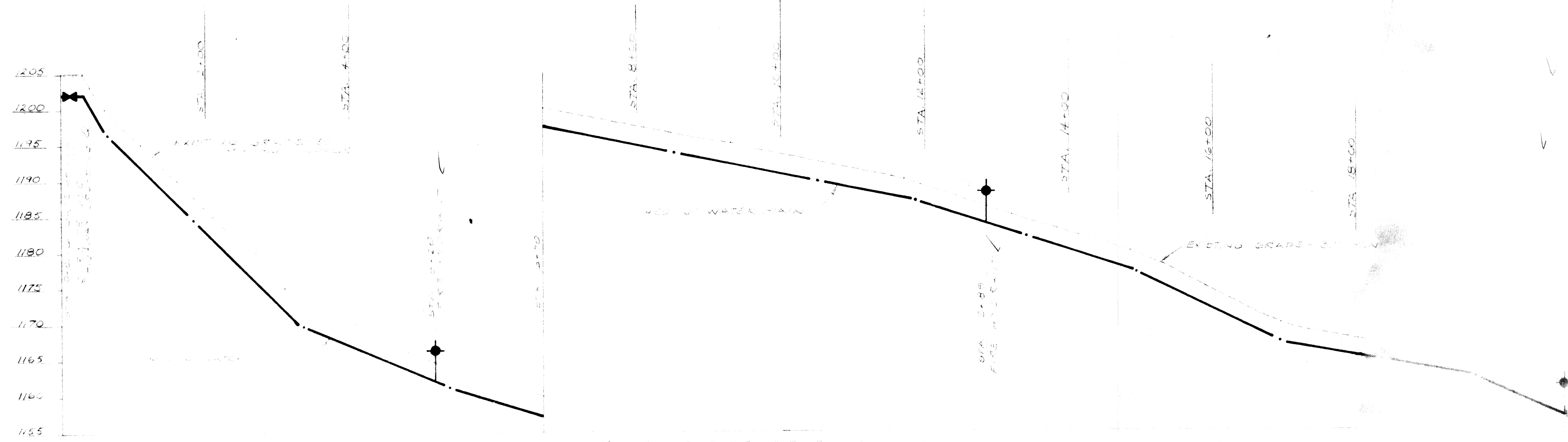
SHEET 2, EAST SIDE OF HANCOCK ST AND ROUTE 650



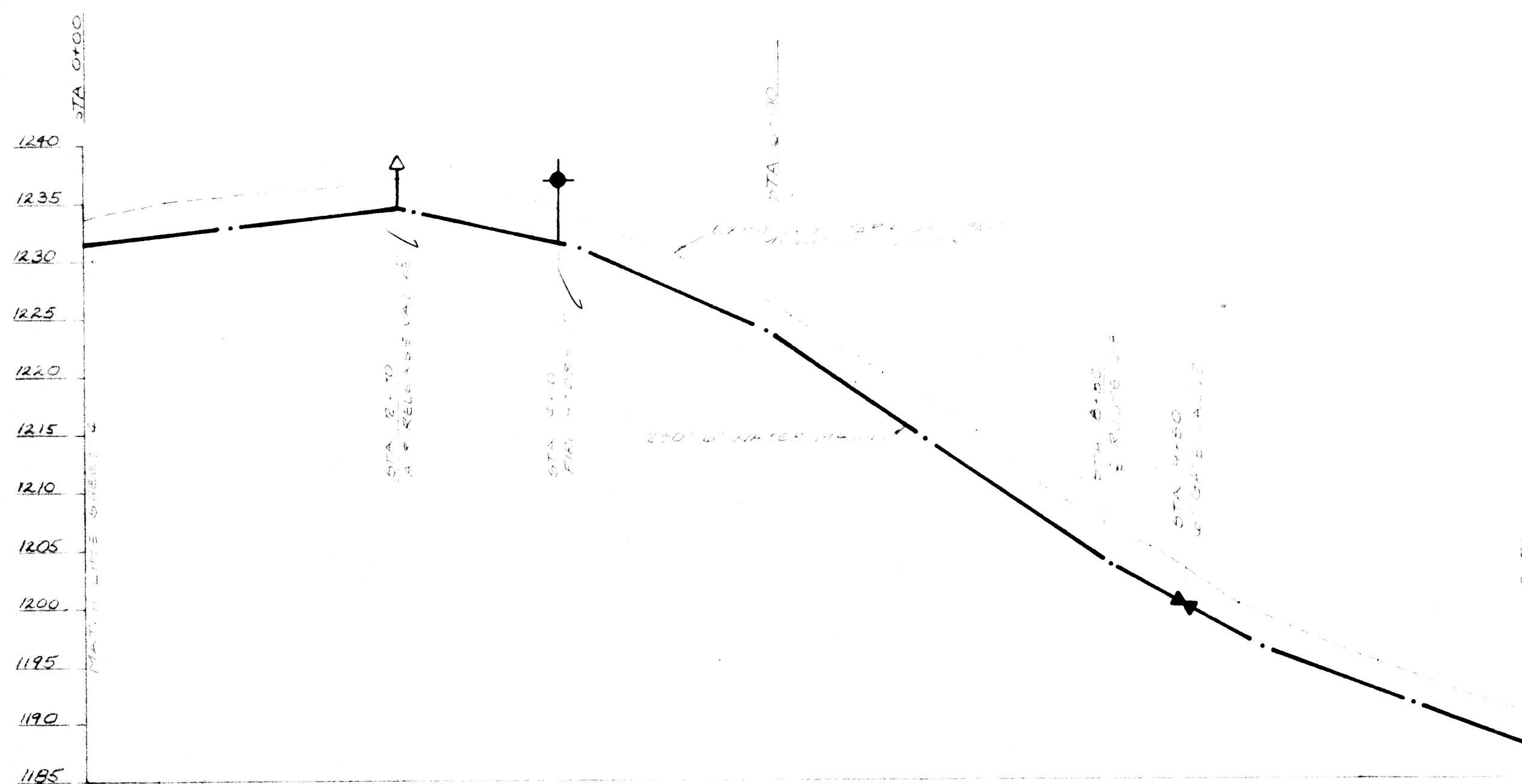
SHEET 4, SOUTH SIDE OF ROUTE 650



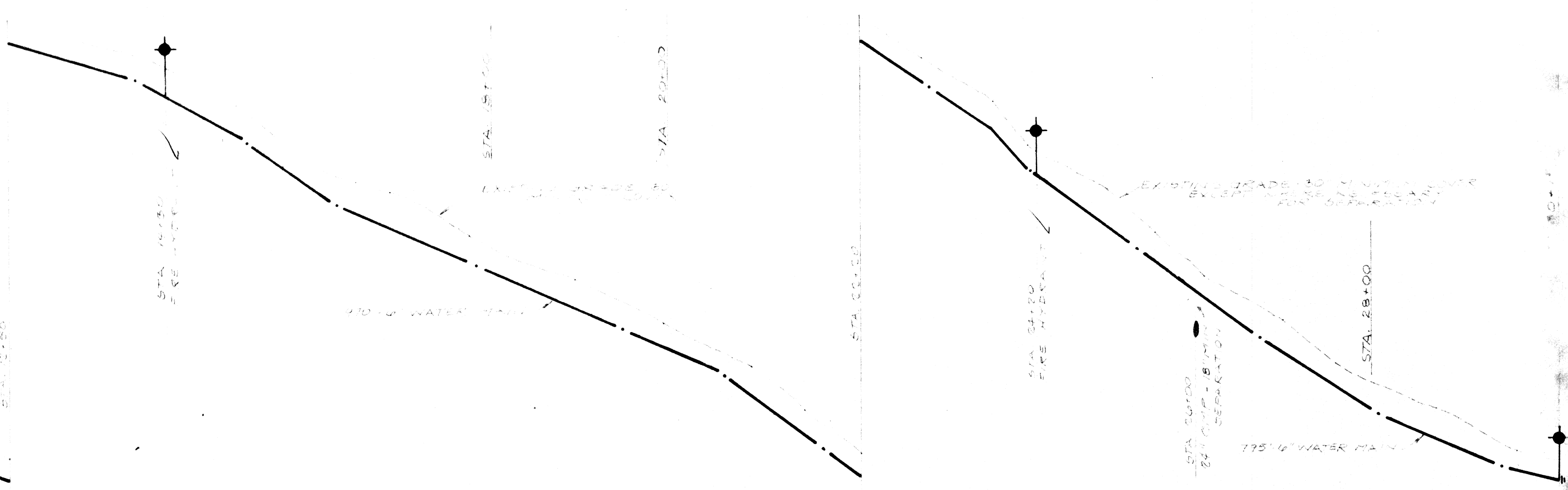
SHEET 3, EAST SIDE OF ROUTE 650



SHEET 5, EAST SIDE OF ROUTE 650



SHEET 6, SOUTH SIDE OF ROUTE 650



DRAPER - ADEN ASSOCIATES, INC.
ENGINEERS - SURVEYORS - PLANNERS
BLACKSBURG, VIRGINIA

DESIGNED
DRAWN
CHECKED
DATE

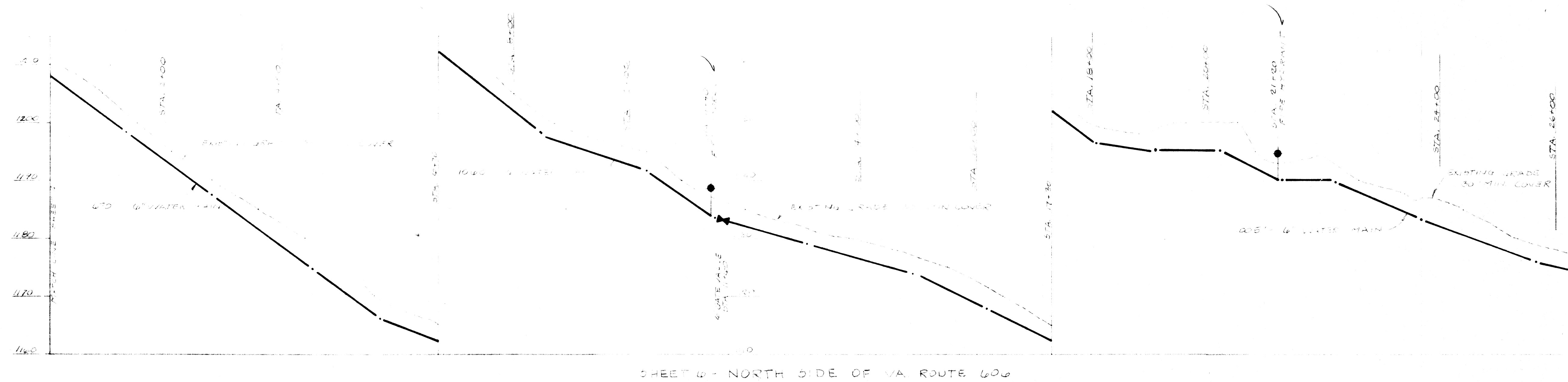
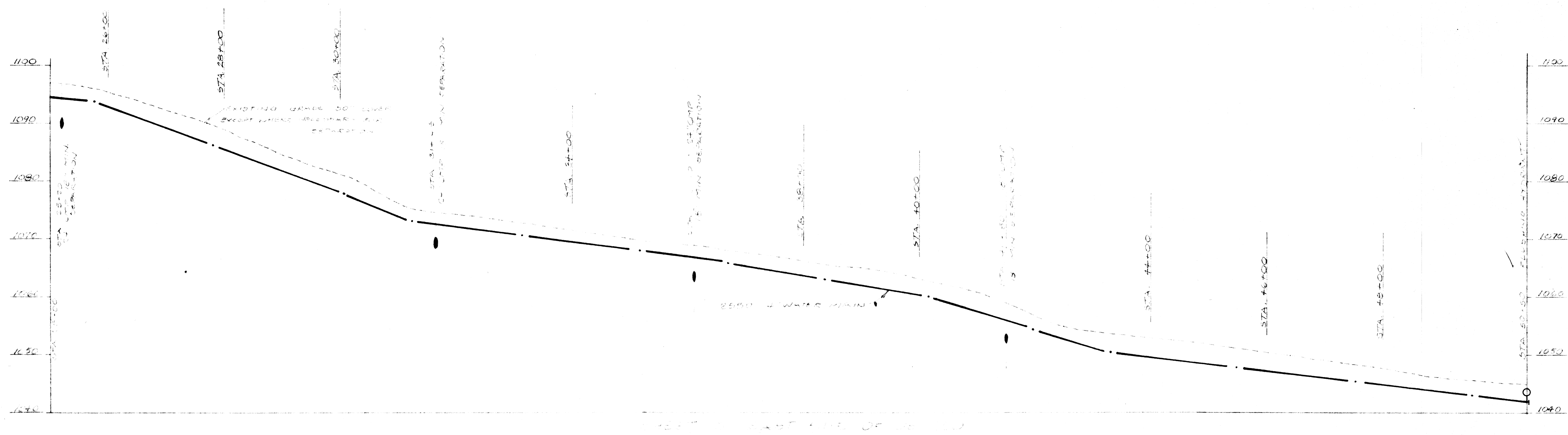
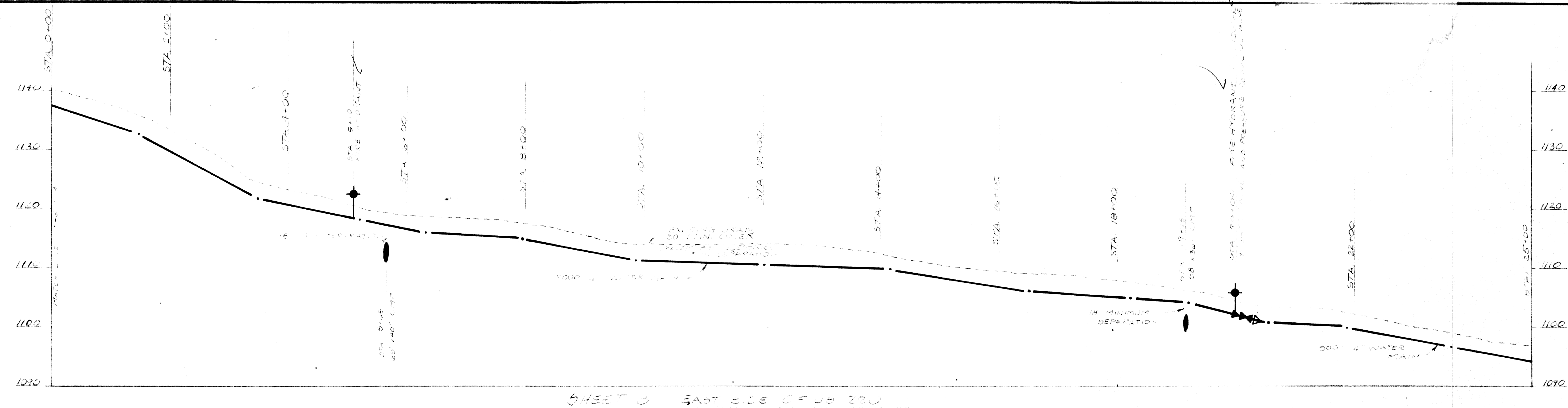
TOWN OF FINCASTLE
WATER SUPPLY & DISTRIBUTION SYSTEM

PROFILES

REVISIONS:

SCALE: 1"=100' HORIZONTAL
1"=10' VERTICAL

PLAN NO T-75-193



DRAPER - ADEN ASSOCIATES, INC.
ENGINEERS - SURVEYORS - PLANNERS
BLACKSBURG, VIRGINIA

DESIGNED DJR
DRAWN DJR
CHECKED DJR
DATE 10-14-76

TOWN OF FINCASTLE
WATER SUPPLY & DISTRIBUTION SYSTEM
BOTETOURT COUNTY, VIRGINIA

PROFILES

REVISIONS:

SCALE: 1"=100' HORIZONTAL
1"=10' VERTICAL

PLAN Nº T-75-193