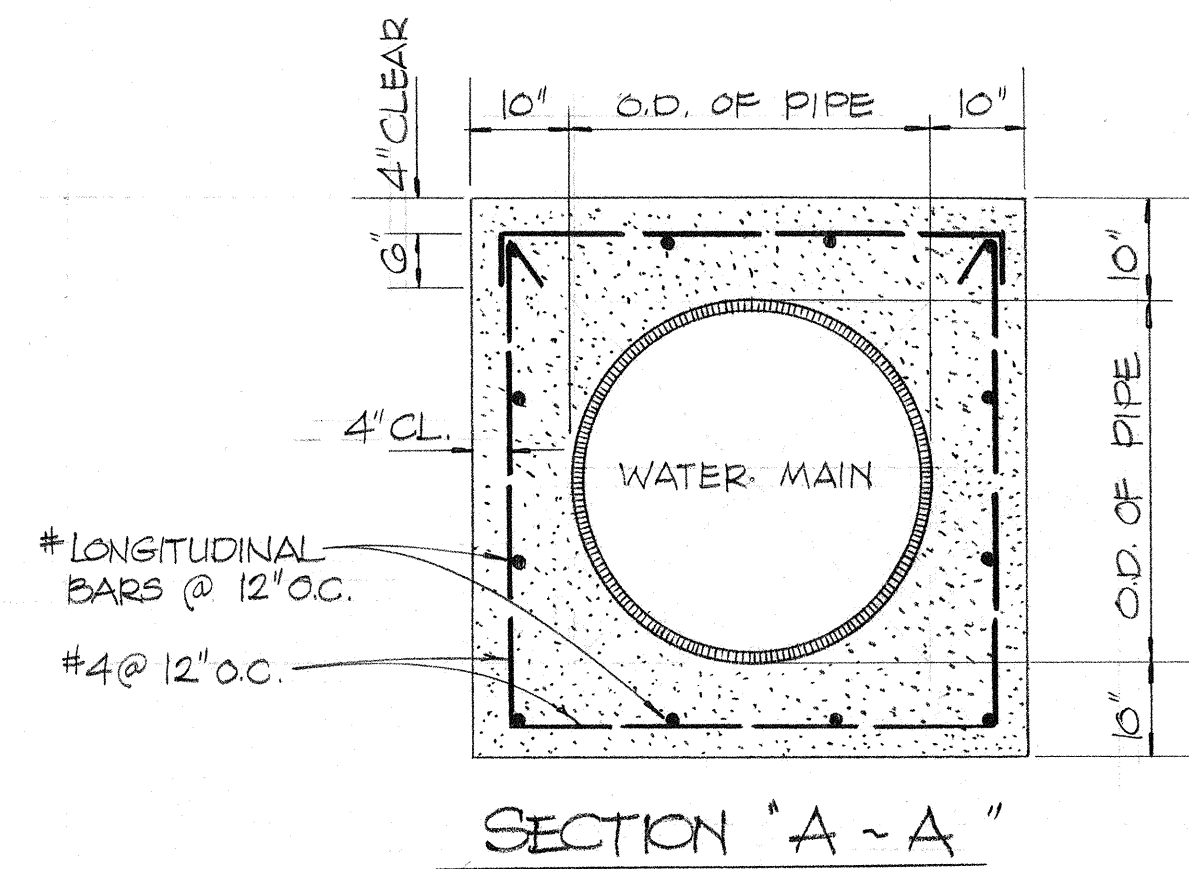
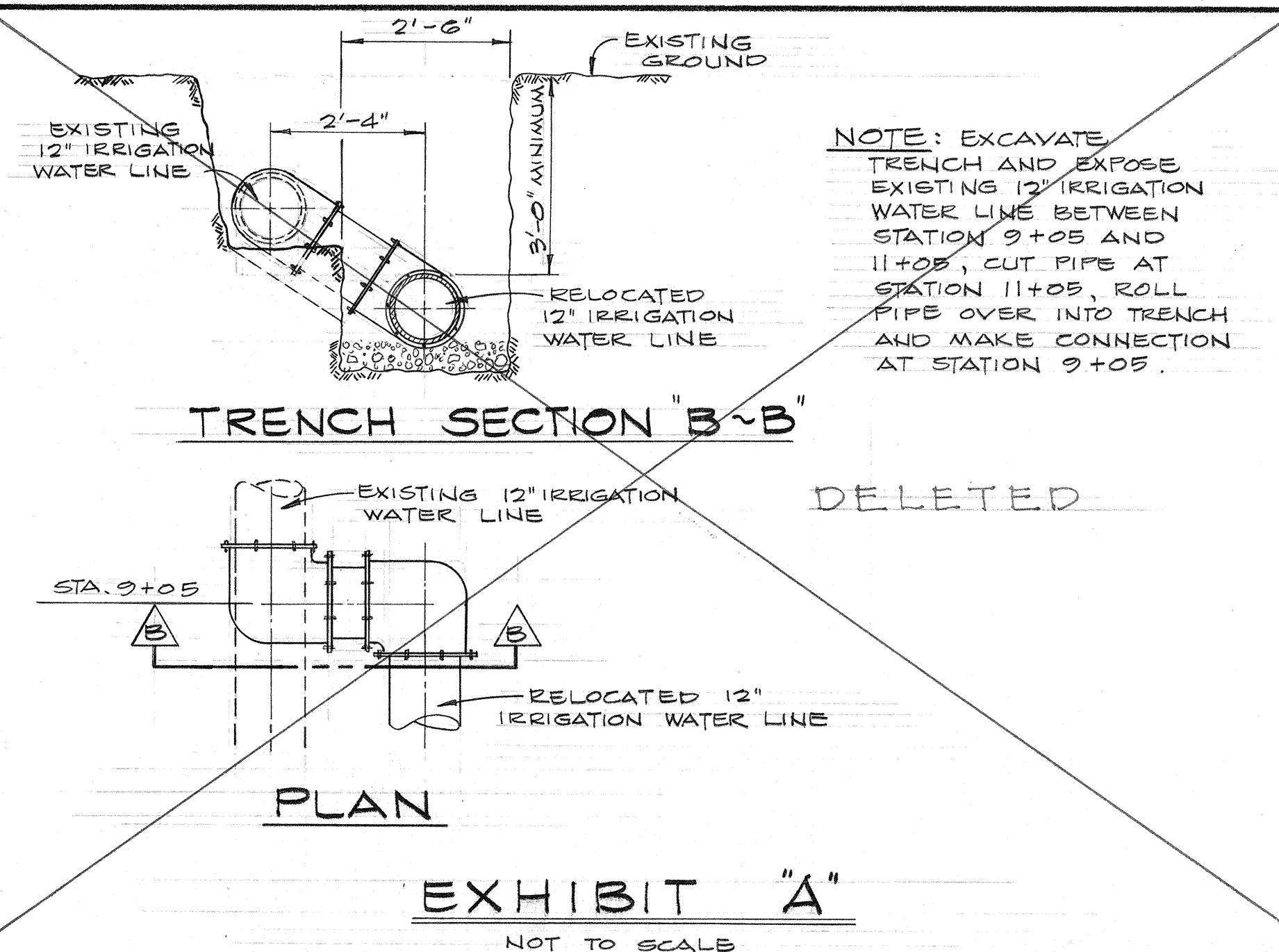
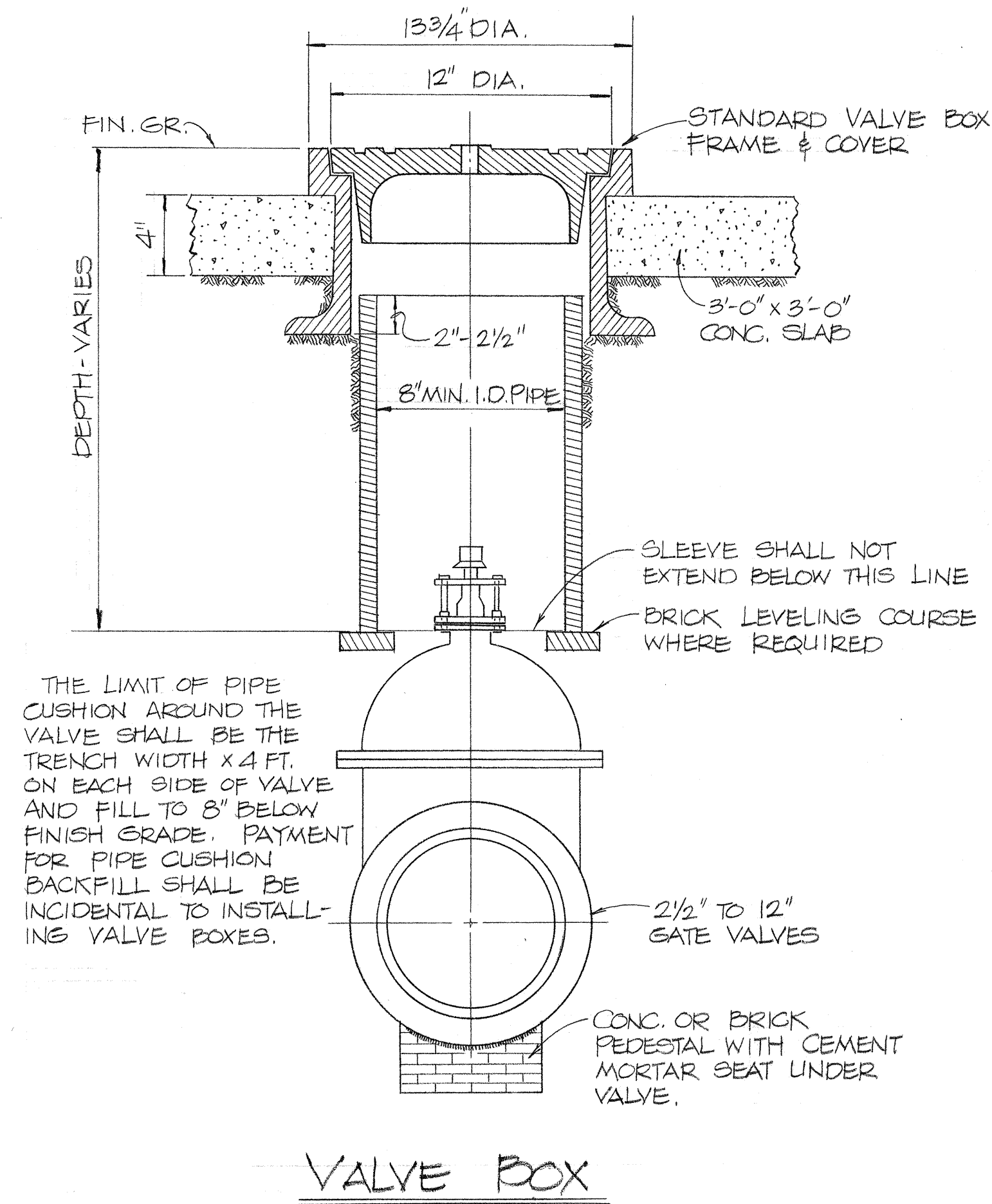
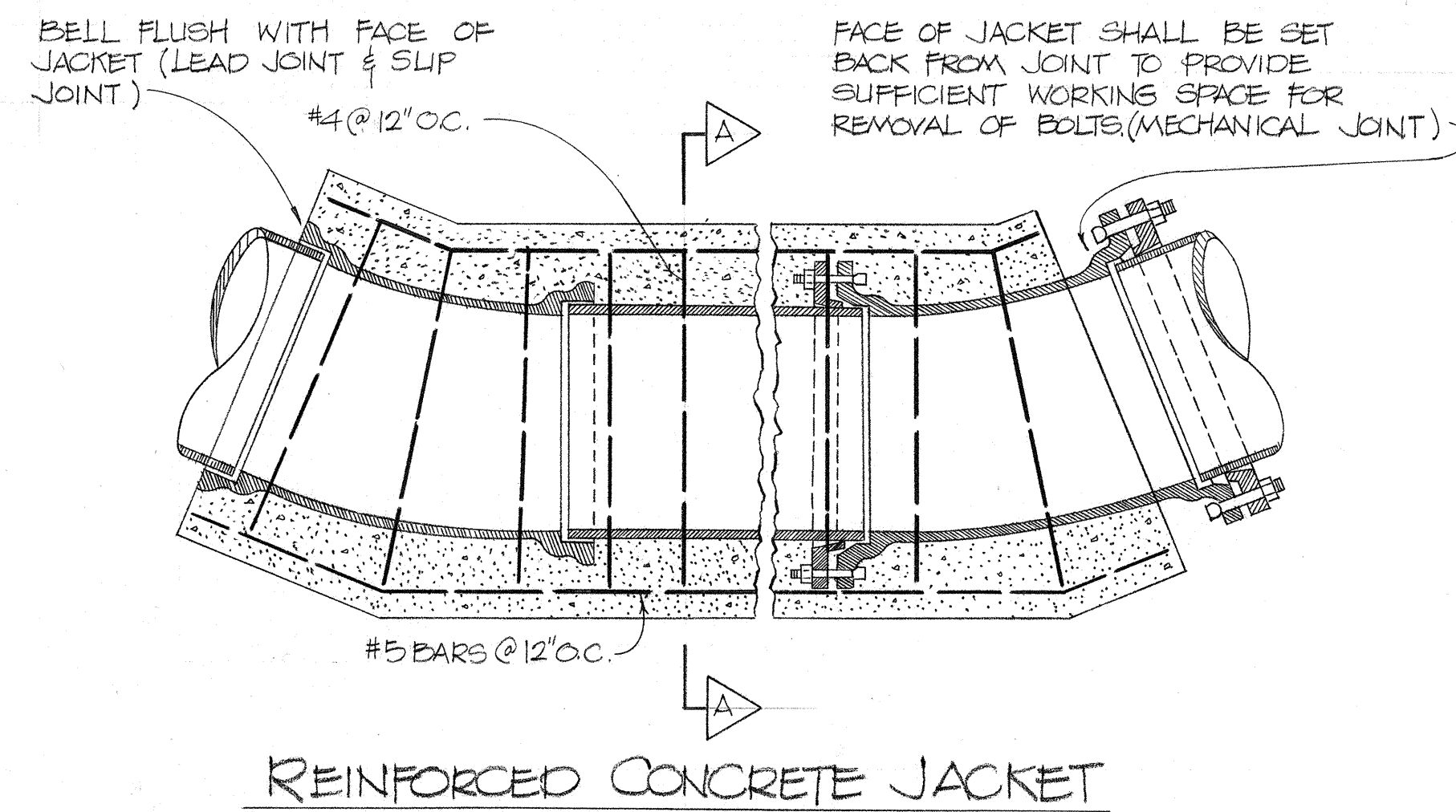


STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAW.	19EC-01-71	1971	38	62

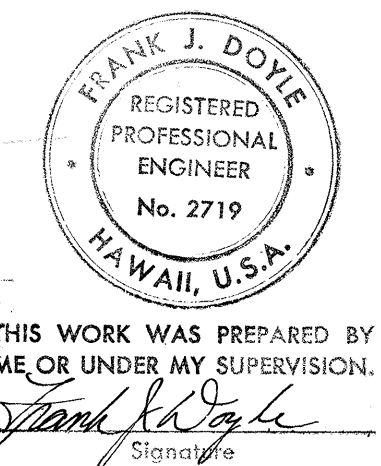


NOTE:
2 1/2" DEPTH OF LEAD FOR LEAD JOINT PIPE REQUIRED AT ALL EMBEDDED JOINTS. WHEREVER CONSTRUCTION JOINTS ARE REQUIRED 6" RUBBER OR NEOPRENE WATERSTOPS SHALL BE INSTALLED. WATERSTOP SHALL BE OF THE TYPE SPECIFIED AND MANUFACTURED BY THE SERVICIZED PRODUCTS CORP., GATE RUBBER CO. OR APPROVED EQUAL.



APPROVED: DATE 9/30/71

Robert H. Chuck
MANAGER-CHIEF ENGINEER
DIV. OF WATER AND LAND DEVELOPMENT
DEPT. OF LAND AND NATURAL RESOURCES



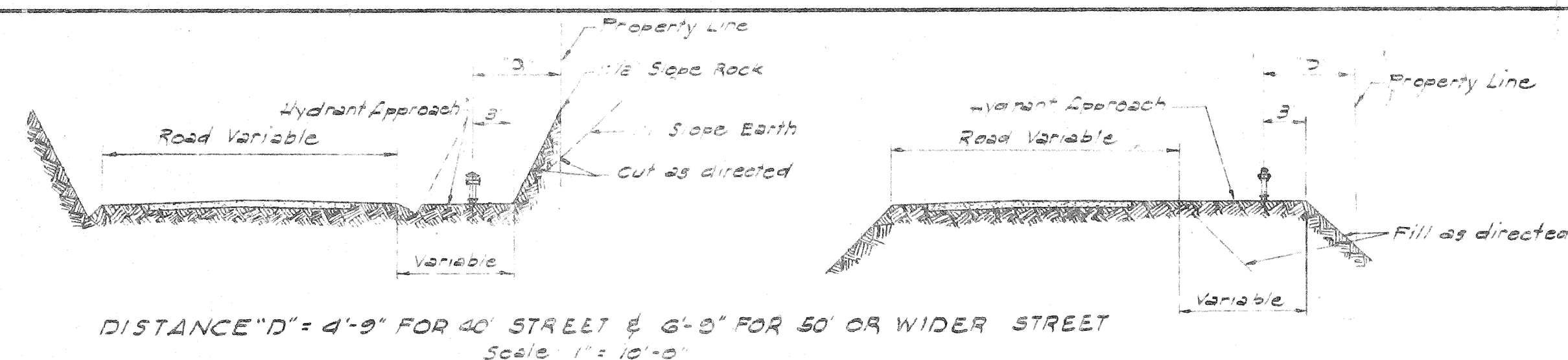
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

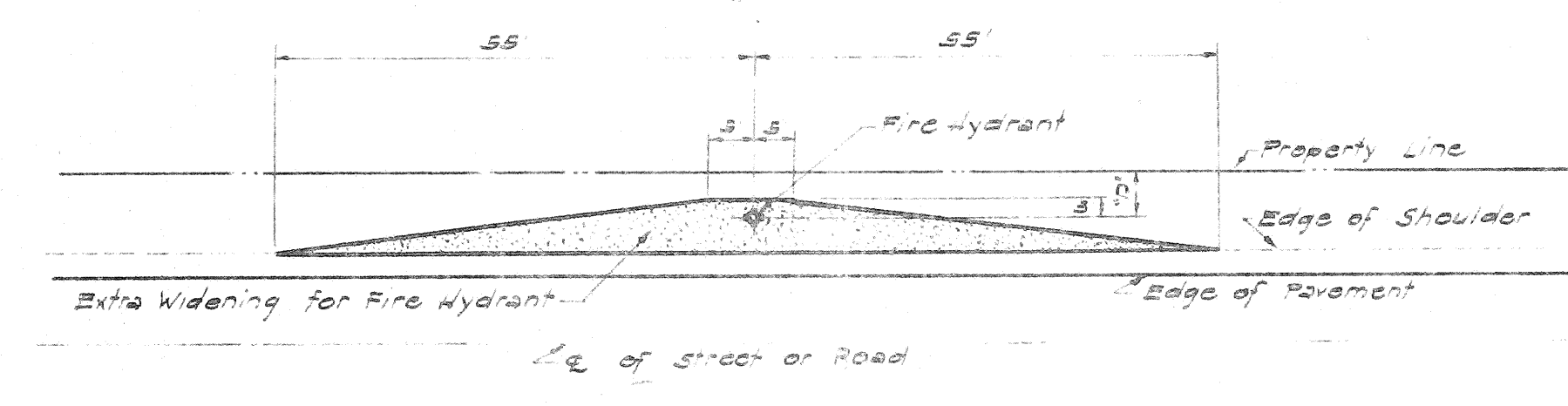
WATER DETAILS

KAILUA - KAWAIHAE ROAD
ANAEHOOMALU TO HAPUNA
PROJ. NO. 19 EC-01-71

SHEET No. 1 OF 3 SHEETS



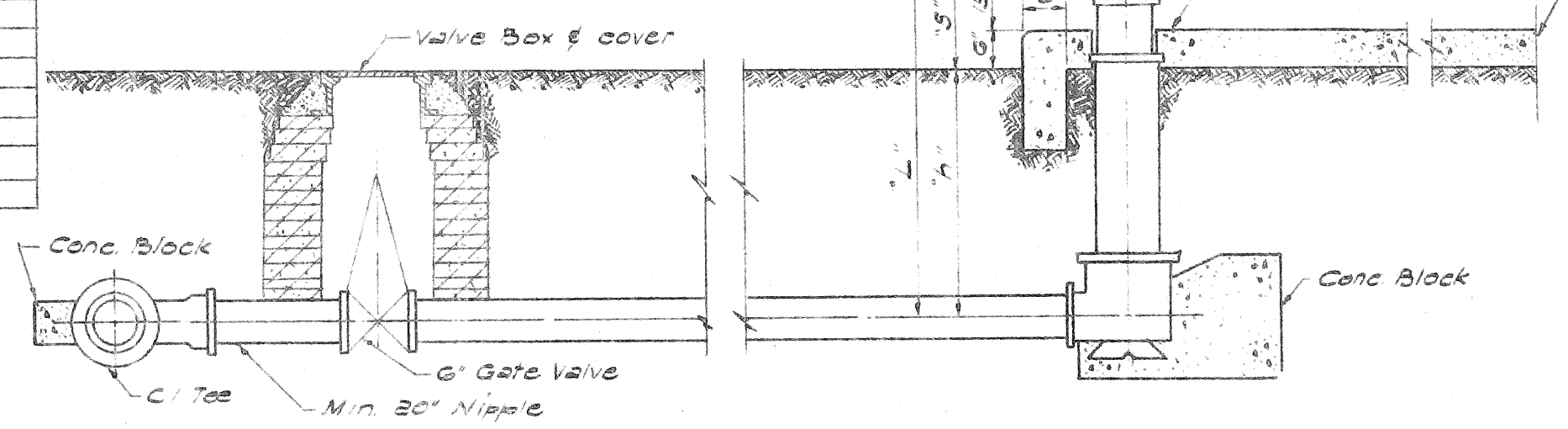
DISTANCE "D" = 4'-9" FOR 40' STREET & 6'-9" FOR 50' OR WIDER STREET
Scale: 1" = 10'-0"



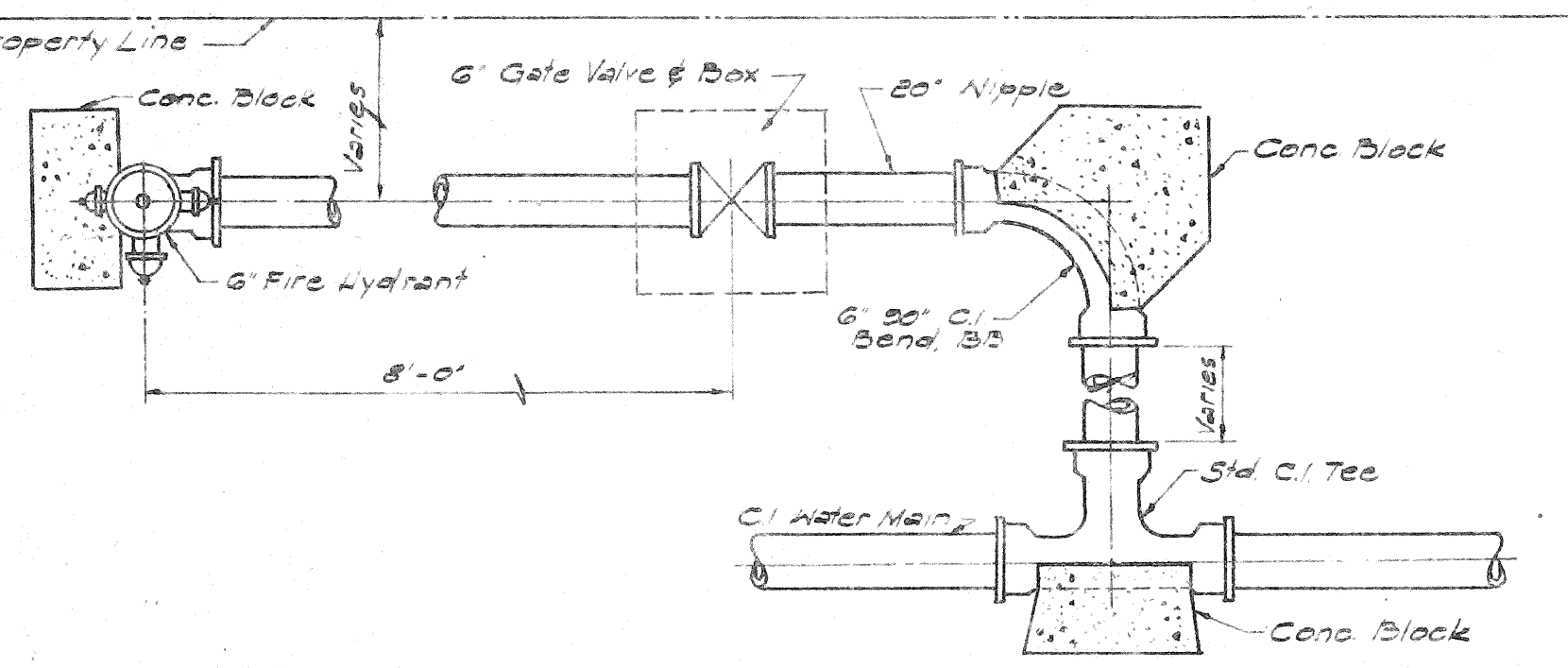
HYDRANT APPROACHES AT CUTS & FILLS

TABLE OF HYDRANT LENGTH MEASURED FROM E. OF PIPE TO E. OF STEAMER OUTLET

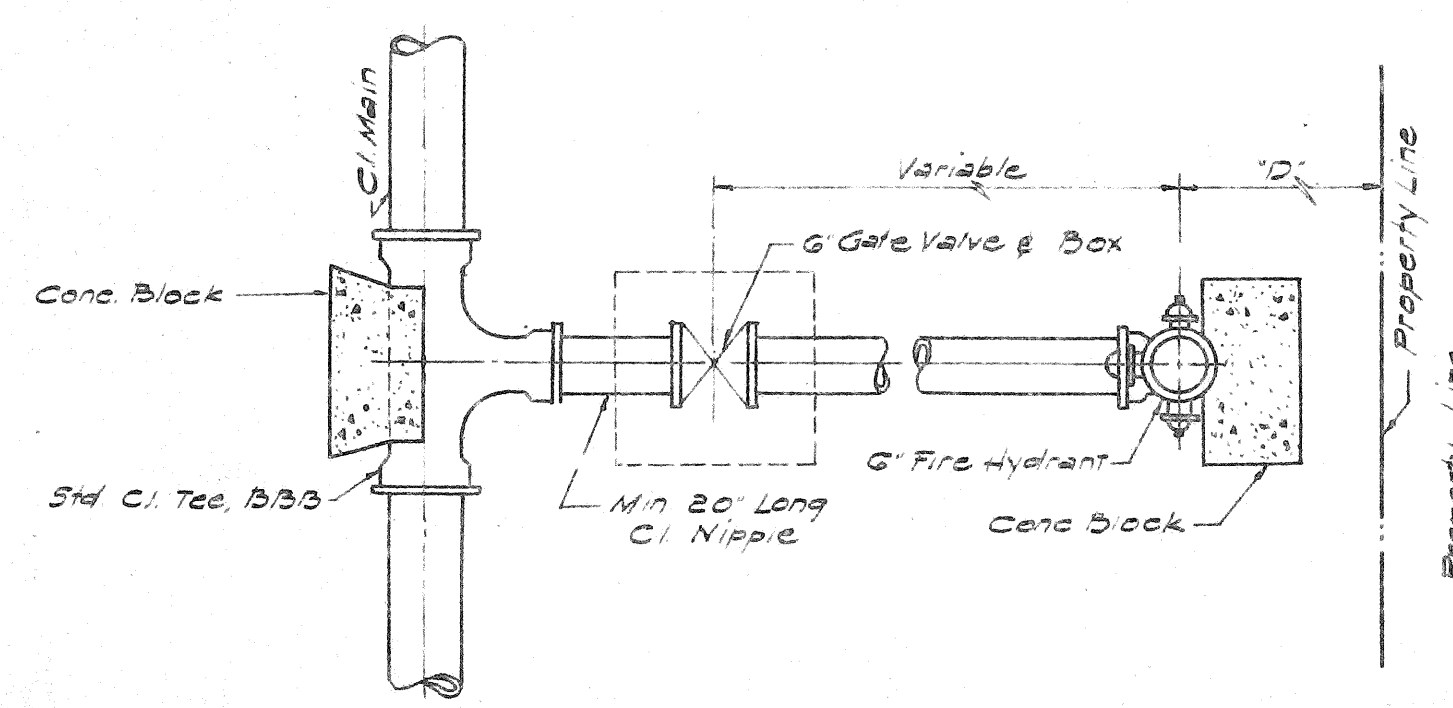
DI. OF PIPE IN INCHES	"4"	"5"	"6"
4"	26"	21"	47"
5"	33"	21"	56"
6"	39"	21"	56"
8"	41"	21"	62"
10"	43"	21"	62"
12"	50"	21"	71"
14"	52"	21"	79"



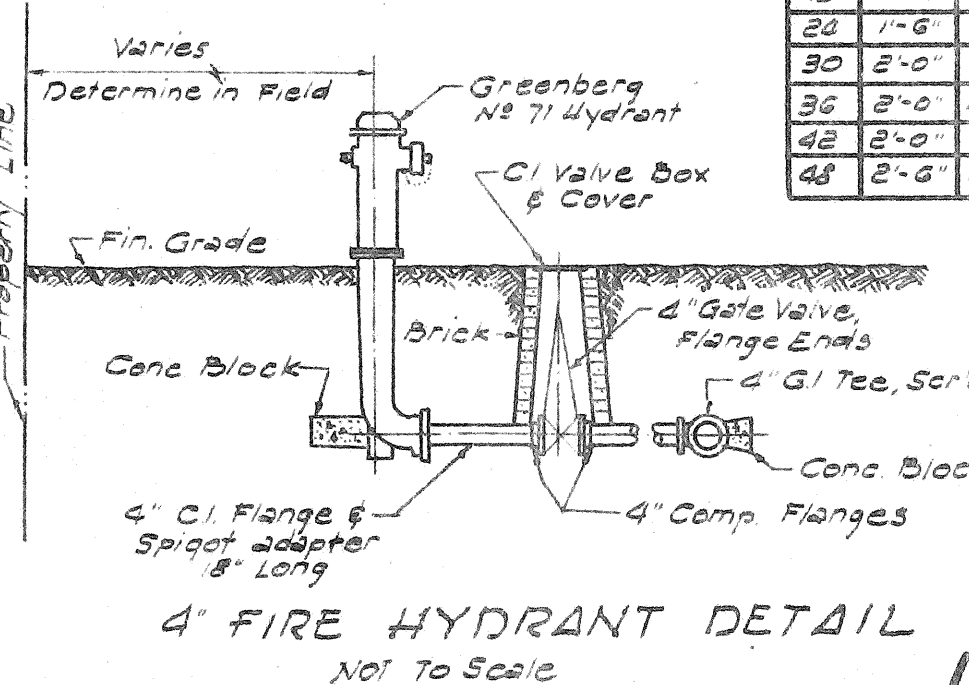
DETAILS OF FIRE HYDRANT INSTALLATION
Scale: 1" = 1'-0"



FIRE HYDRANT LAYOUT "A"
Scale: 1/2" = 1'-0"



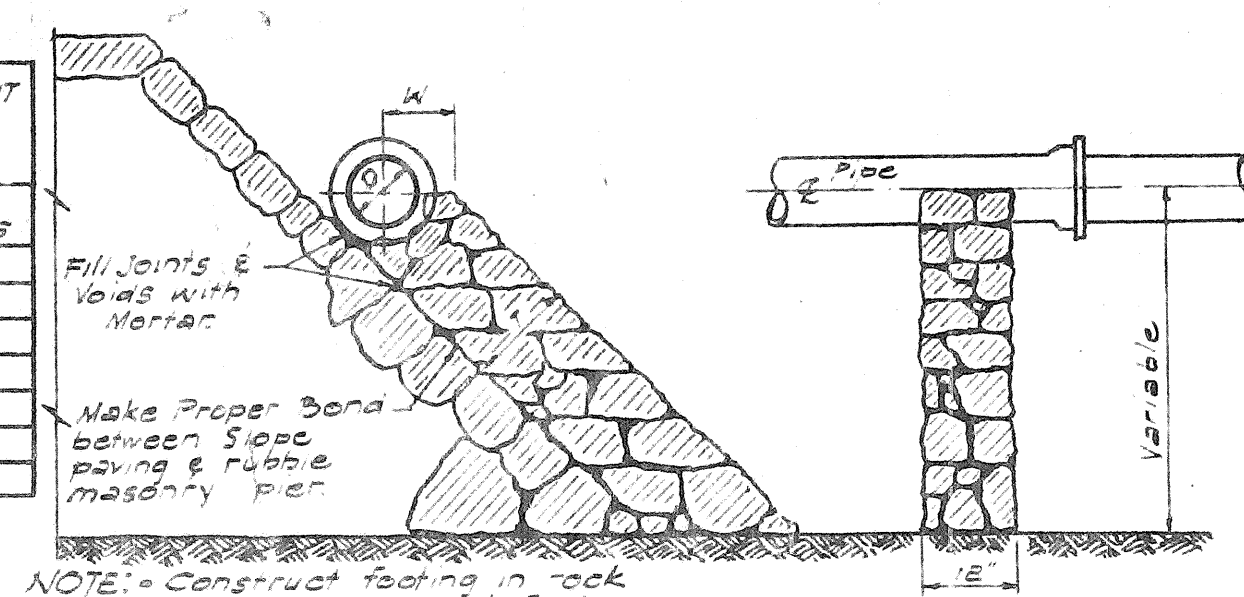
FIRE HYDRANT LAYOUT "B"
Scale: 1/2" = 1'-0"



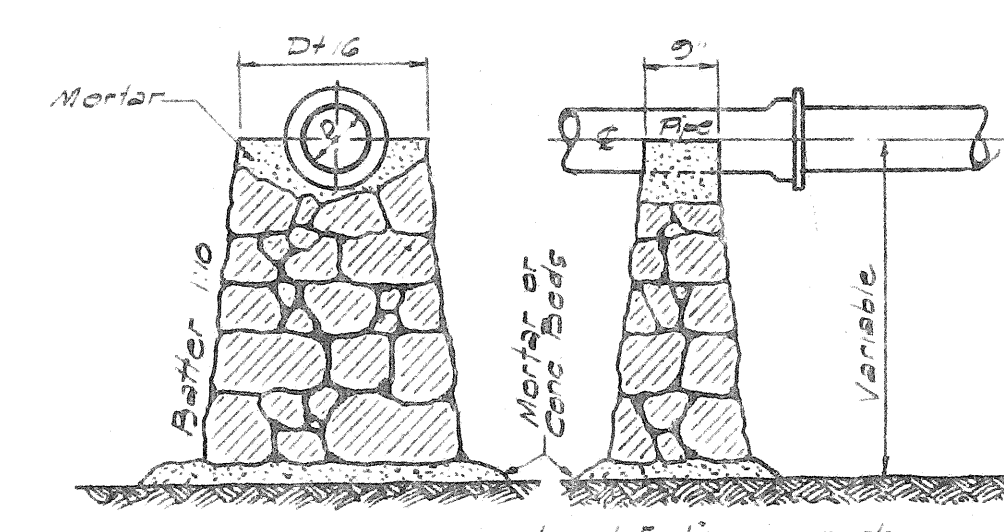
4" FIRE HYDRANT DETAIL
NOT TO SCALE

DIMENSIONS OF CEMENT MASONRY SLOPING SUPPORT

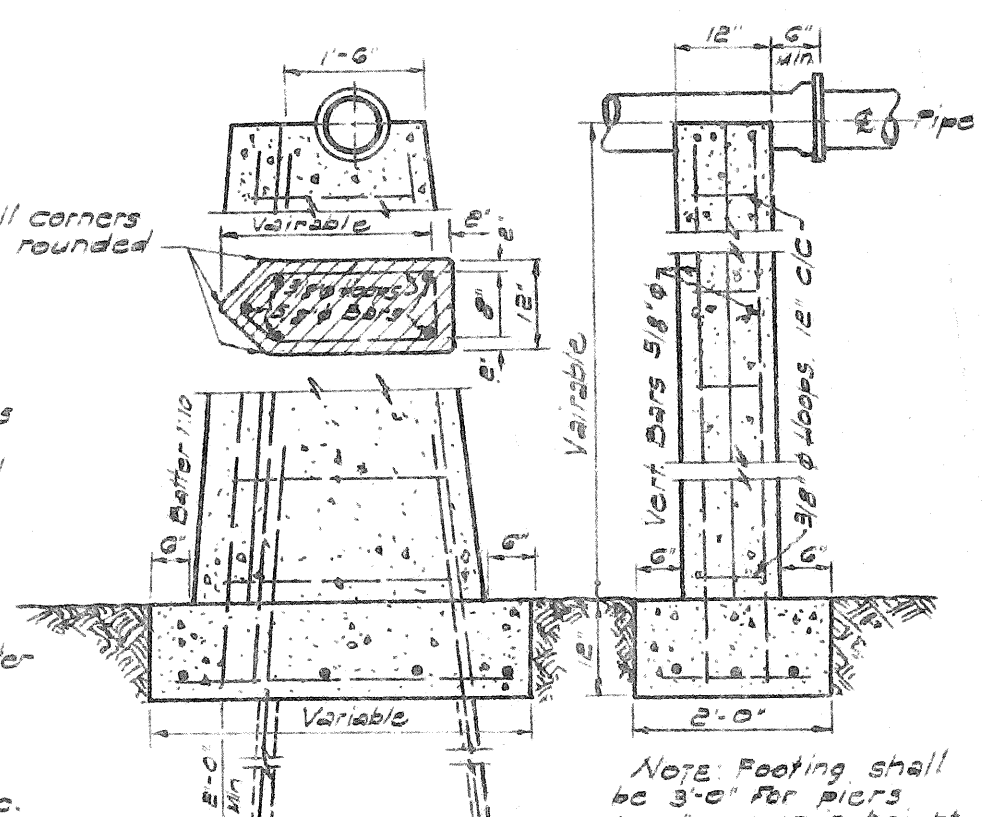
PIPE DIA. IN INCHES	W INCHES	T INCHES
4	5	8
6	7	10
8	9	12
10	11	14
12	13	16
14	15	18
16	17	20



TYPICAL DETAIL OF CEMENT MASONRY SLOPING SUPPORTS ON SIDE SLOPE OF ROAD EMBANKMENT
Scale: 1/2" = 1'-0"



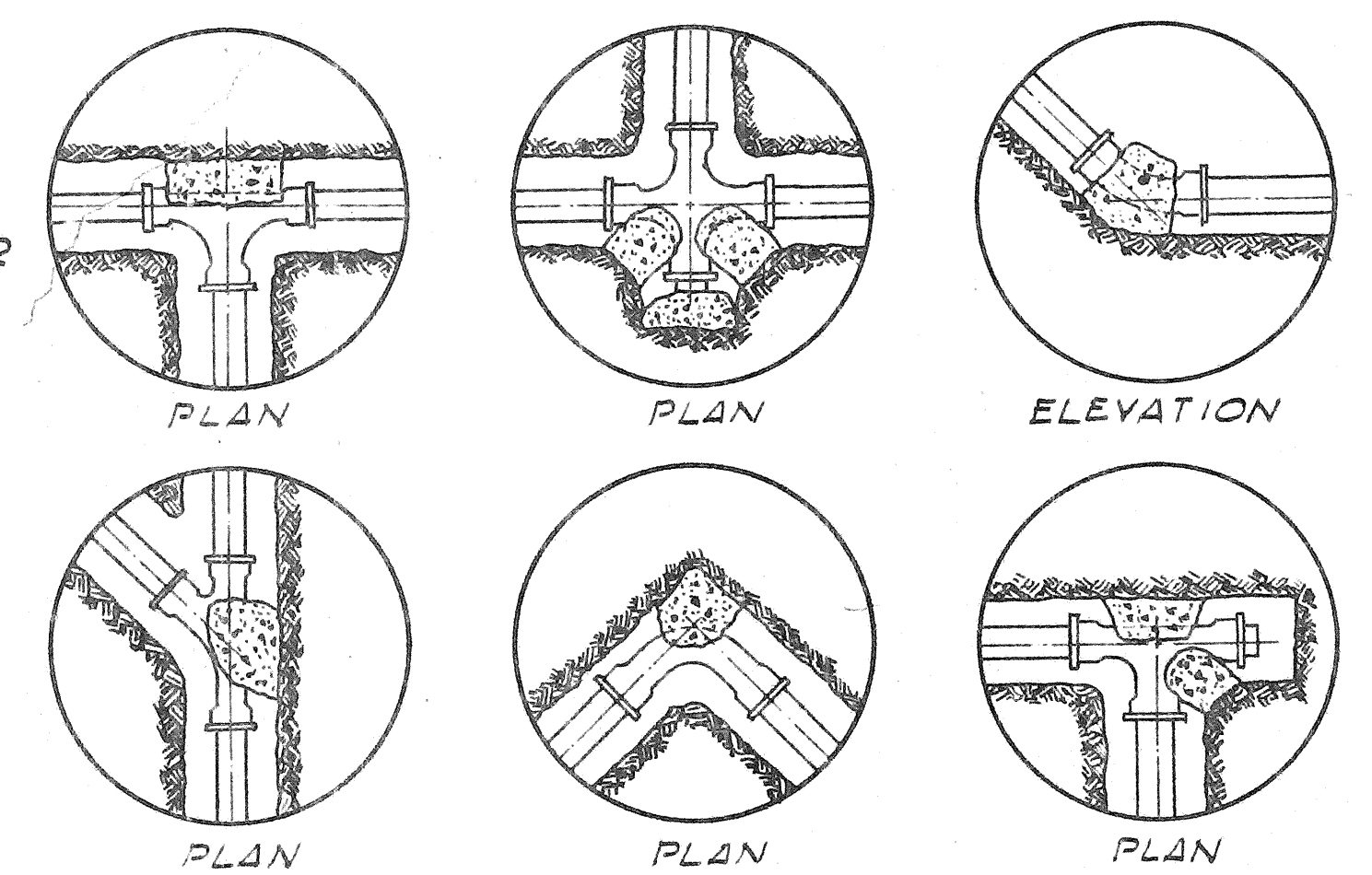
TYPICAL DETAIL OF MASONRY PIER
Scale: 1/2" = 1'-0"



TYPICAL DETAIL OF REINFORCED CONCRETE PIER
Scale: 1/2" = 1'-0"

TABLE FOR HEADWALL DIMENSIONS

DATA FOR CONC. HEADWALL				Steel for one headwall			
D	B	L	W	Cu. Yd.	Cu. Yd.	No. of Bars	Length
18	1'-6"	6'-0"	4'-0"	0.98	1.00	4	3'-4"
24	1'-6"	7'-0"	4'-0"	1.25	1.35	4	3'-4"
30	2'-0"	9'-0"	5'-0"	1.98	2.17	4	3'-4"
36	2'-0"	10'-0"	5'-0"	2.45	2.74	4	3'-4"
42	2'-0"	12'-0"	6'-0"	3.87	4.26	6	3'-4"
48	2'-0"	13'-0"	6'-0"	4.66	5.14	6	3'-4"



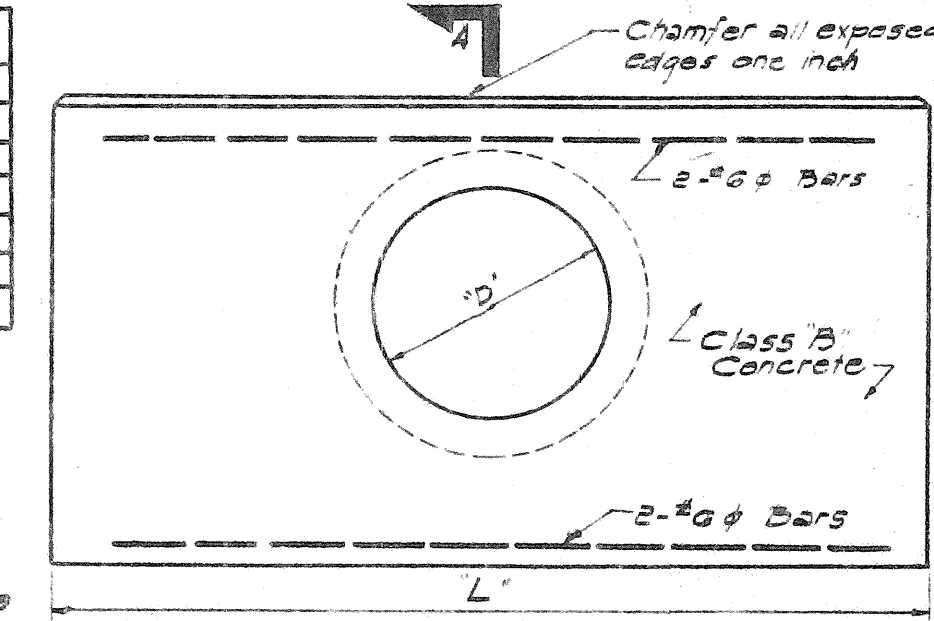
CONCRETE THURST BLOCKS FOR WATER MAINS
Class B Concrete

Table of areas in square feet of thrust block in vertical contact with soil of varying bearing values, water pressure 150 pounds per square inch

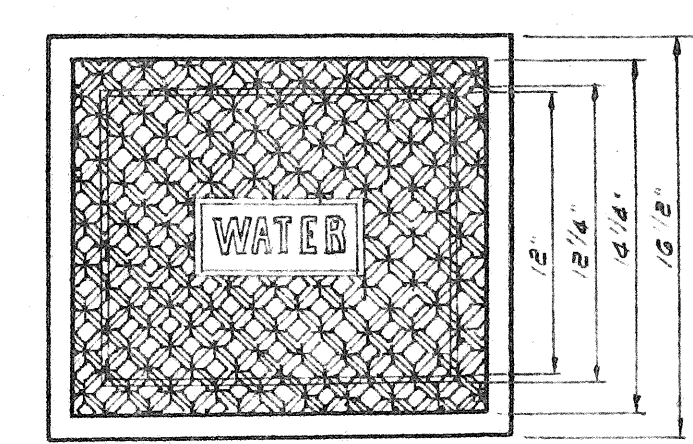
Pipe Size	Tees, Bend Ends				90° Bend				45° Bend				22 1/2° Bend				
	a	b	c	d	a	b	c	d	a	b	c	d	a	b	c	d	
4"	23	15	10	10	35	20	15	10	20	10	10	10	10	10	10	10	10
6"	32	25	20	15	70	35	25	20	40	20	15	10	20	10	10	10	10
8"	40	45	35	20	120	60	45	30	70	35	25	15	40	20	15	10	10
10"	48	70	55	35	200	100	75	50	110	55	40	30	60	30	20	15	10

CONDITION OF SOIL

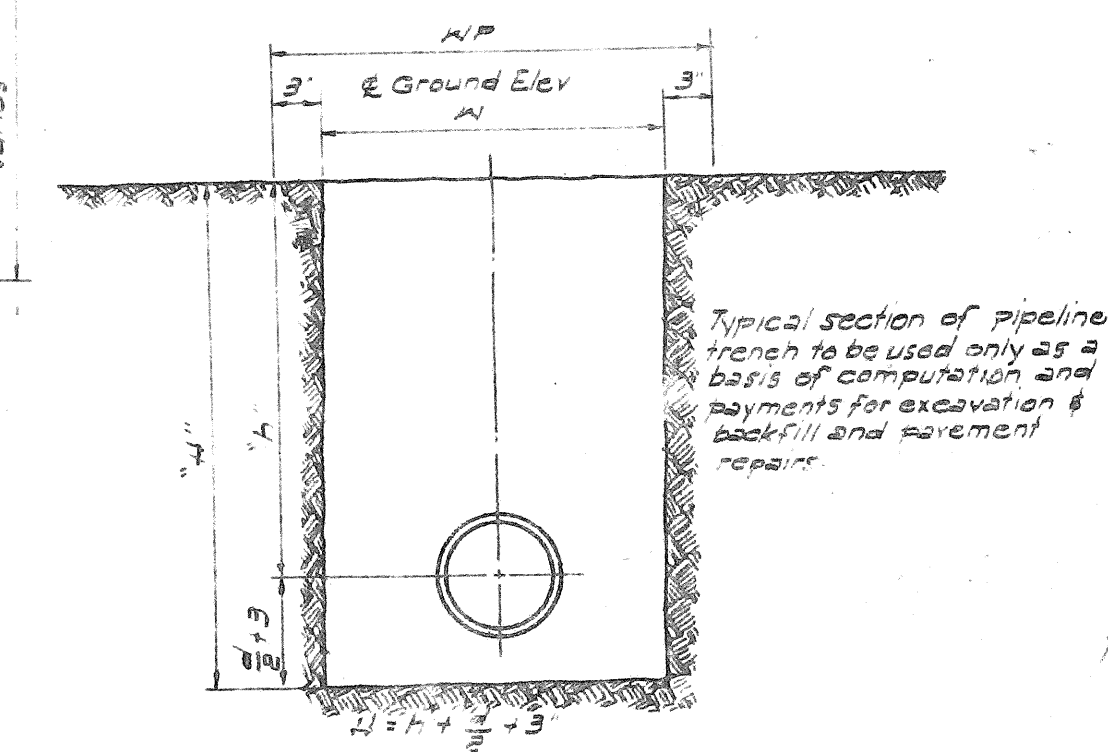
	1500 Lbs	Per Sq. Ft.
a Sand	1500	
b Sand & Gravel	2000	
c Sand Gravel & Cemented Clay	3000	
d Shale	4000	



DETAIL OF CONCRETE HEADWALL
Scale: 1/2" = 1'-0"



TYPICAL TRENCH DETAILS
Scale: 1 1/2" = 1'-0"



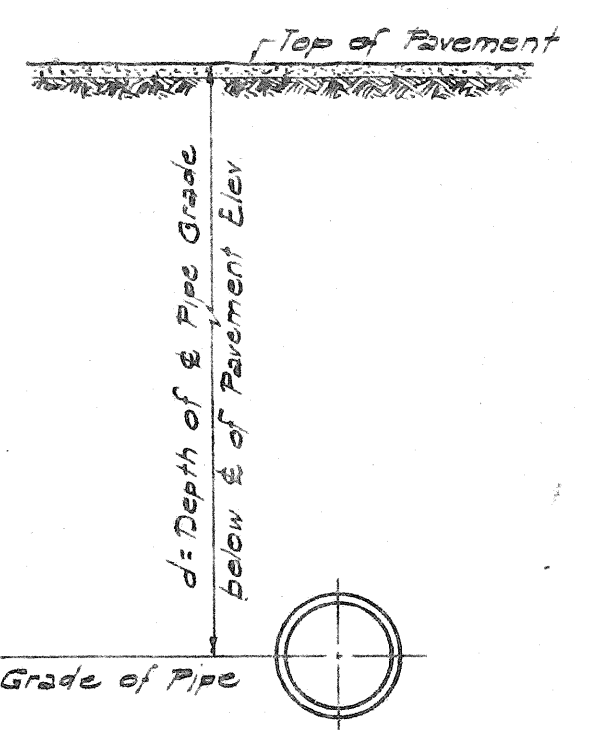
VOLUME:
A₁ = Area of 18" end section
A₂ = Area of 24" end section
W = Height of trench in elev. of ground & bottom of trench levels
h = h₁ - h₂ = 3'
d = Dia. of pipe
h = Height of trench level to & pipe
D = Distance between end sections
A = W x h
W = Width of trench for the particular size of pipe
WP = W x A = allowable width for pavement repairs
For construction requirements for trenches, Bell Holes, cradles, and face of sheeting, see Specifications, which require trench to be clean within from face of sheetings to face of sheetings

TRENCH WIDTHS FOR VARIOUS SIZE OF PIPE

Size of Pipe (d)	Width of Trench (W) width of Trench (W)
4"	24"
6"	24"
8"	24"
10"	28"
12"	30"
14"	32"
16"	34"

TABLE OF W BASED UPON DIA. OF PIPE & D2 OF LUDLOW LIST ANKVA VALVES

Dia. of Pipe in inches	D2 in inches	W in inches
4	16 1/4	26
6	22 1/4	33
8	25 1/4	36
10	30 1/2	41
12	34 1/4	44
14	39	49
16	41	51

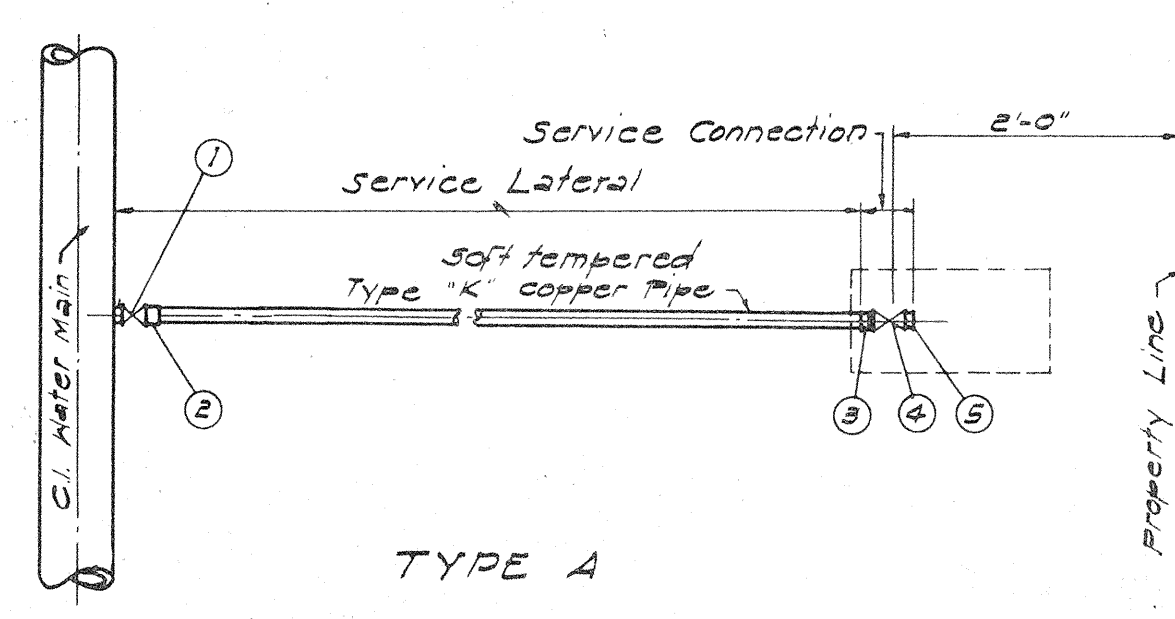


STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

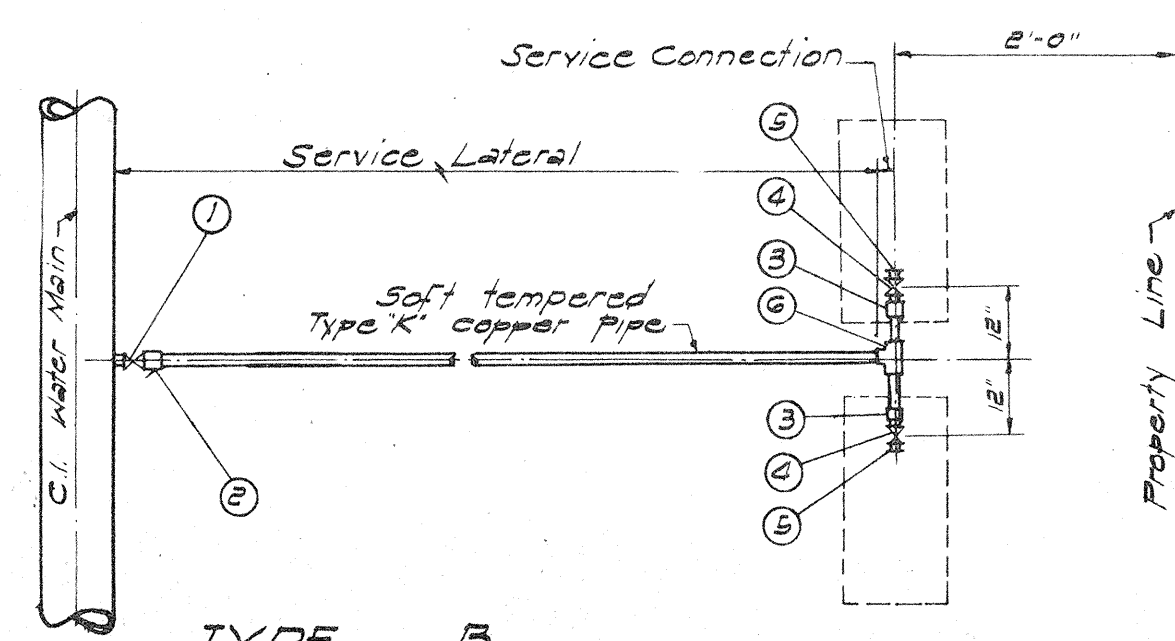
DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII

STANDARD DETAILS

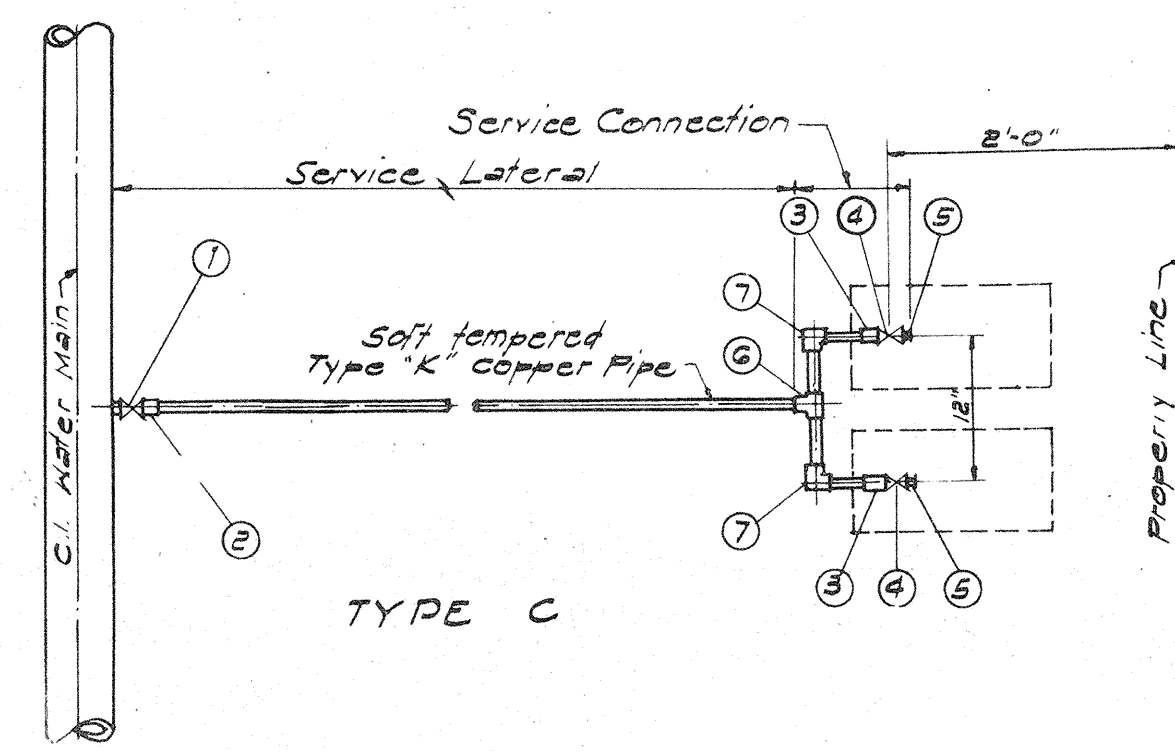
SCALE: AS SHOWN
DATE: JANUARY, 1963
APPROVED: *A. Reigino*
MANAGER-ENGINEER, DEPT. OF WATER SUPPLY



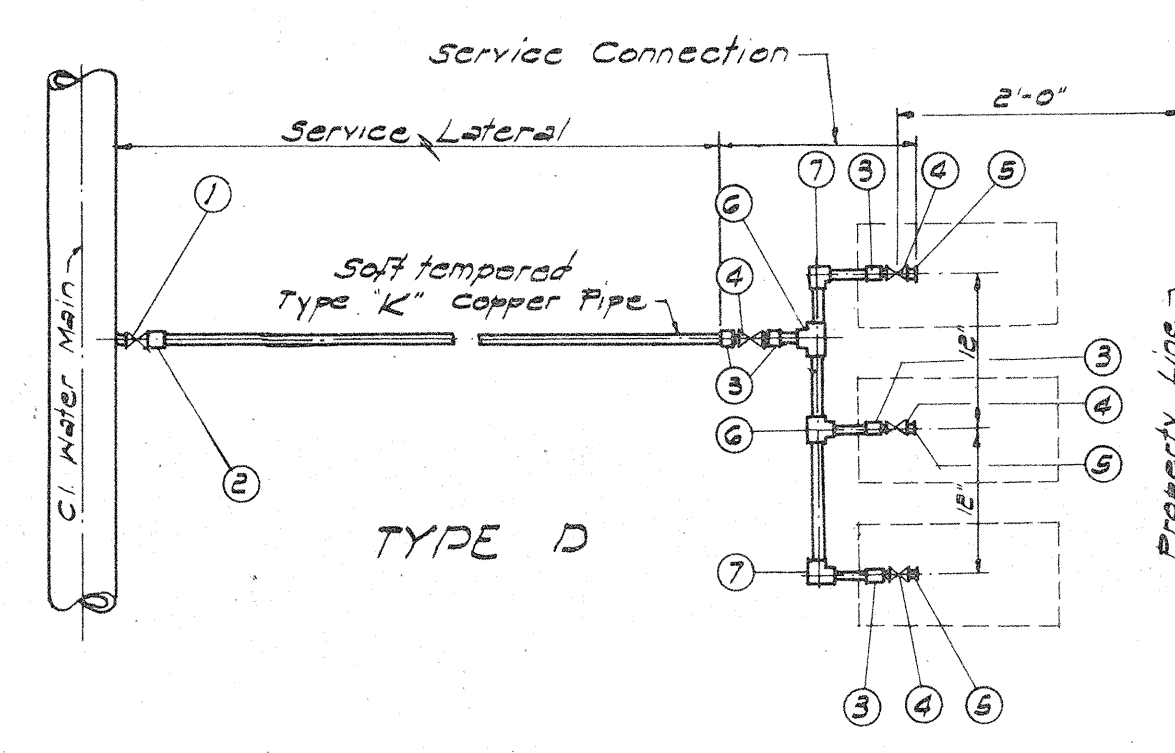
TYPE A



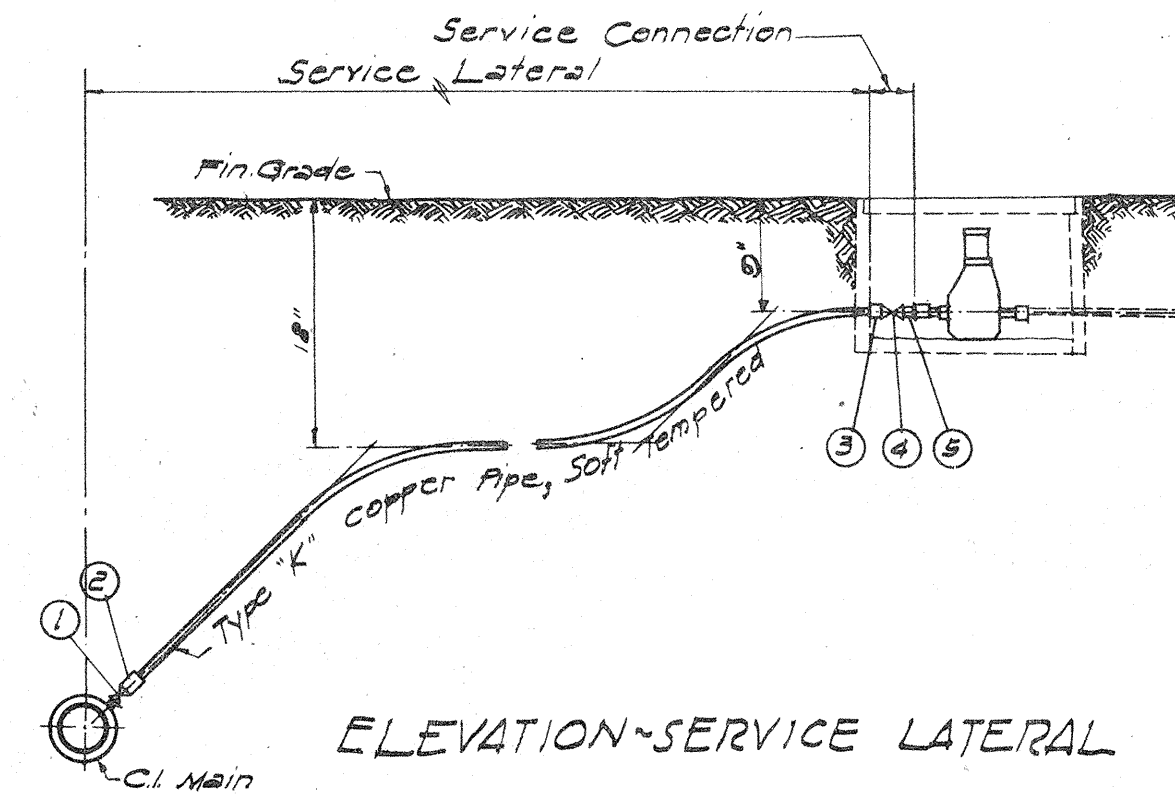
TYPE B



TYPE C

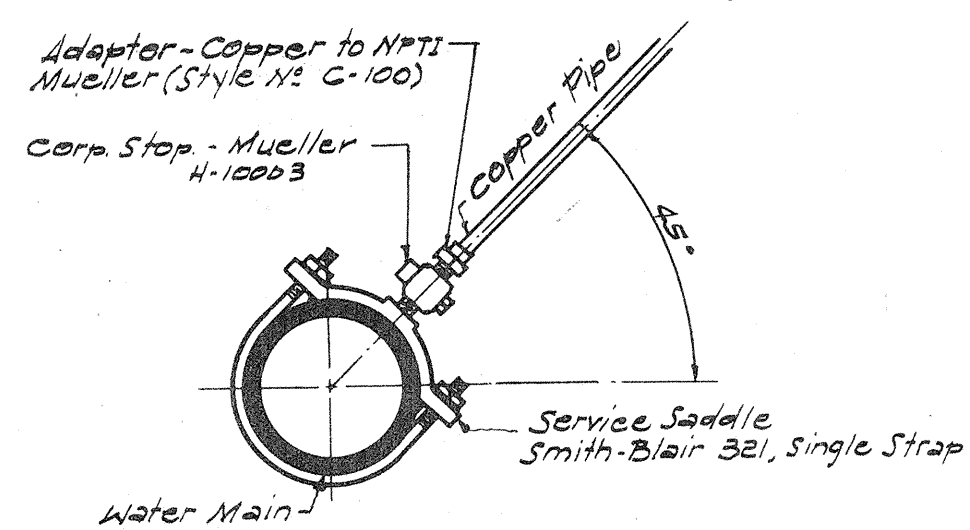


TYPE D



ELEVATION-SERVICE LATERAL

NOTE:
The contractor shall excavate the area at the end of the service connection for the installation of the meter box. This area shall be of sufficient depth, length and width to receive the standard Board of Water Supply meter box.

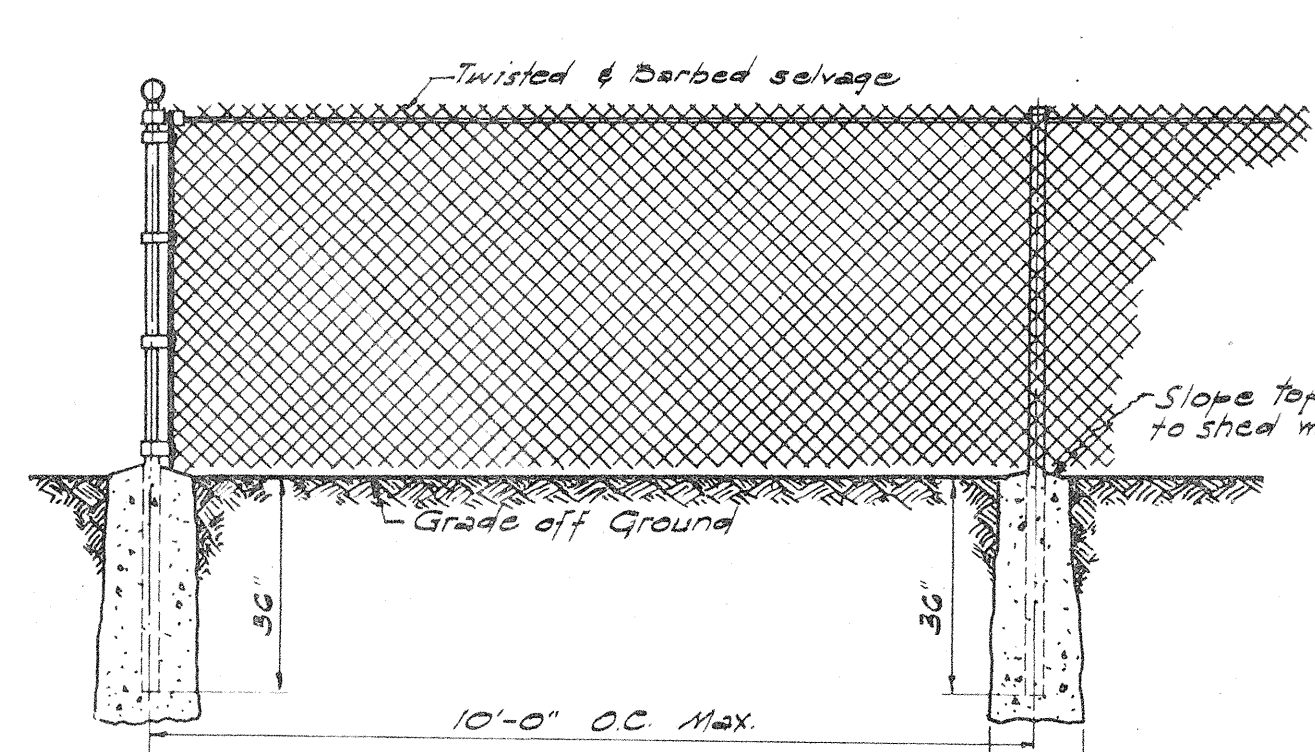
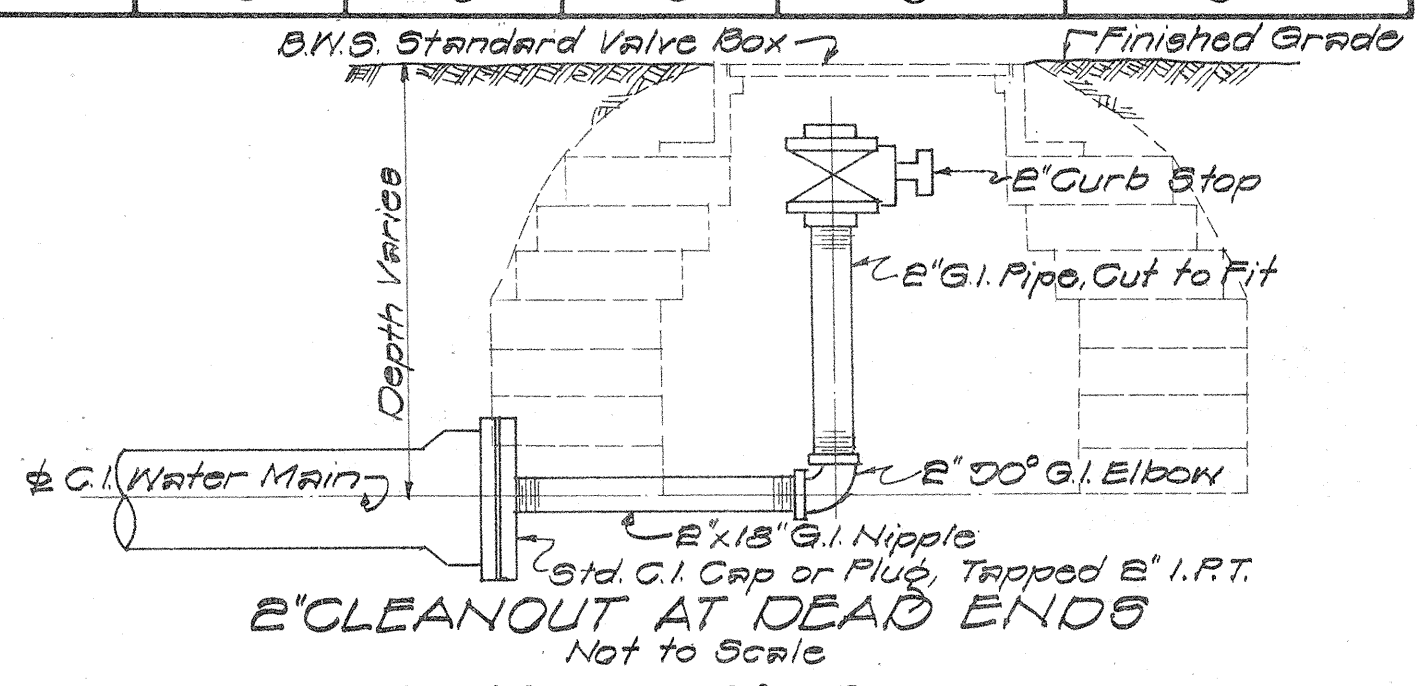


TYPICAL DETAIL - INSTALLATION OF SERVICE SADDLE
Not to Scale
Note: Service Saddle required for 4" & 6" G.I. Pipe and for all sizes of Asbestos Cement Pipe.

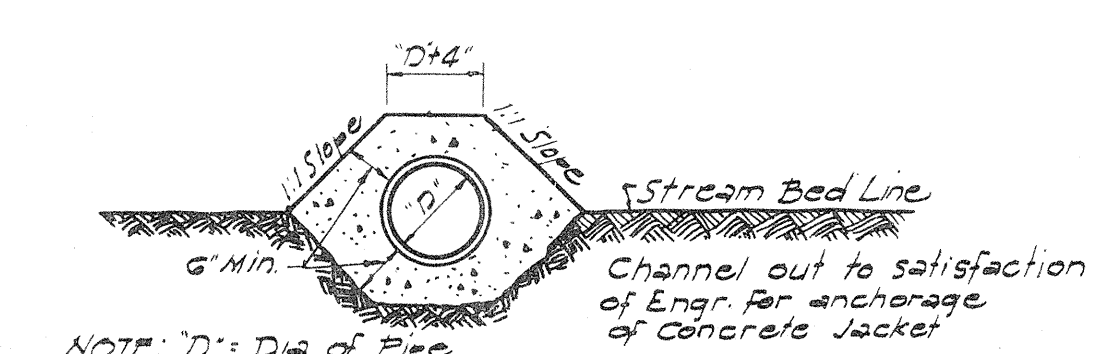
SERVICE LATERAL & SERVICE CONNECTION MATERIAL SCHEDULE													
TYPE	SIZE	SERVICE LATERALS				SERVICE CONNECTIONS							
		Corp. Stop Mueller H-10003	Adapter Style C-102 Copper to NPT	Copper Pipe Type 'K'	Adapter Style C-101 Copper to NPT	Curb Stop Mueller H-10203	Drass Bushing	Red Tee, Style T-300 Copper to Copper	30° Elbow, Style E-200 Copper to Copper				
		SIZE QUANT.	SIZE QUANT.	SIZE QUANT.	SIZE QUANT.	SIZE QUANT.	SIZE QUANT.	SIZE QUANT.	SIZE QUANT.	SIZE QUANT.	SIZE QUANT.	SIZE QUANT.	SIZE QUANT.
A	1"	3/4"x1" 1	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"
	1 1/4"	1"x1 1/4" 1	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
	1 1/2"	1 1/4"x1 1/2" 1	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"
	2"	1 1/2"x2" 1	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"
B	1 1/4"	1"x1 1/4" 1	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
	1 1/2"	1 1/4"x1 1/2" 1	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"
	2"	1 1/2"x2" 1	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"
	2 1/2"	2"x2 1/2" 1	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"
C	1 1/4"	1"x1 1/4" 1	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
	1 1/2"	1 1/4"x1 1/2" 1	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"
	2"	1 1/2"x2" 1	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"
	2 1/2"	2"x2 1/2" 1	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"
D	1 1/2"	1 1/4"x1 1/2" 1	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"
	2"	1 1/2"x2" 1	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"
ITEM NO.		1	2	3	4	5	6	7	8	9	10	11	12

METER SCHEDULE		
TYPE	NO. OF METERS	METER SIZE
A	1	5/8", 1", 1 1/2", 2"
B	2	5/8", 1", 1 1/2"
C	2	5/8", 1", 1 1/2"
D	3	5/8"

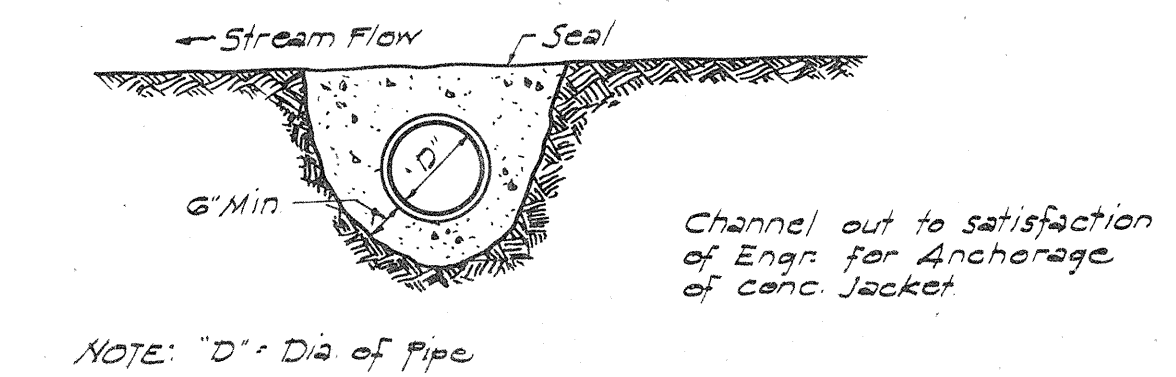
USE DETAILS WHERE APPLICABLE



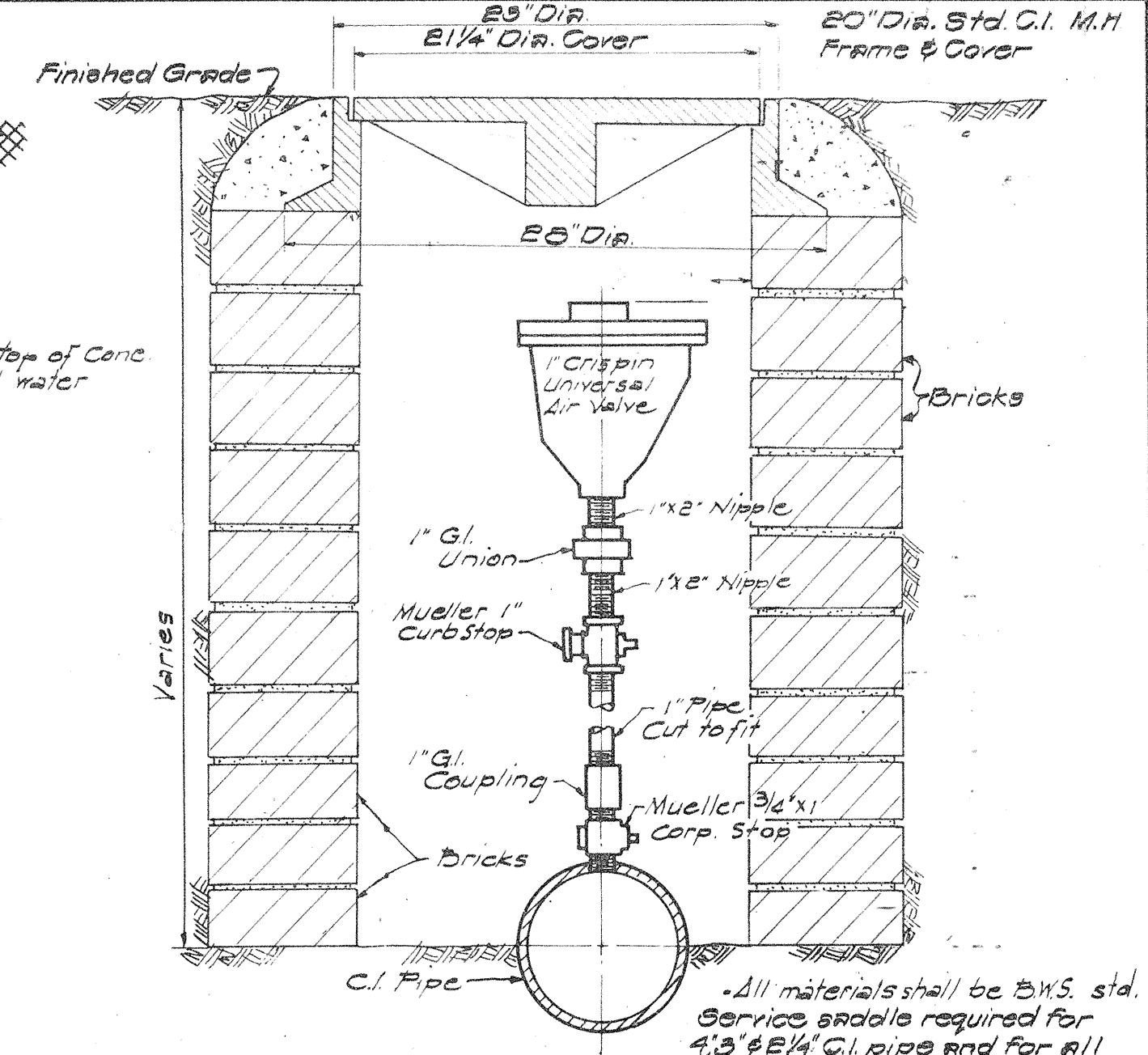
DETAIL - 5' HIGH FENCE



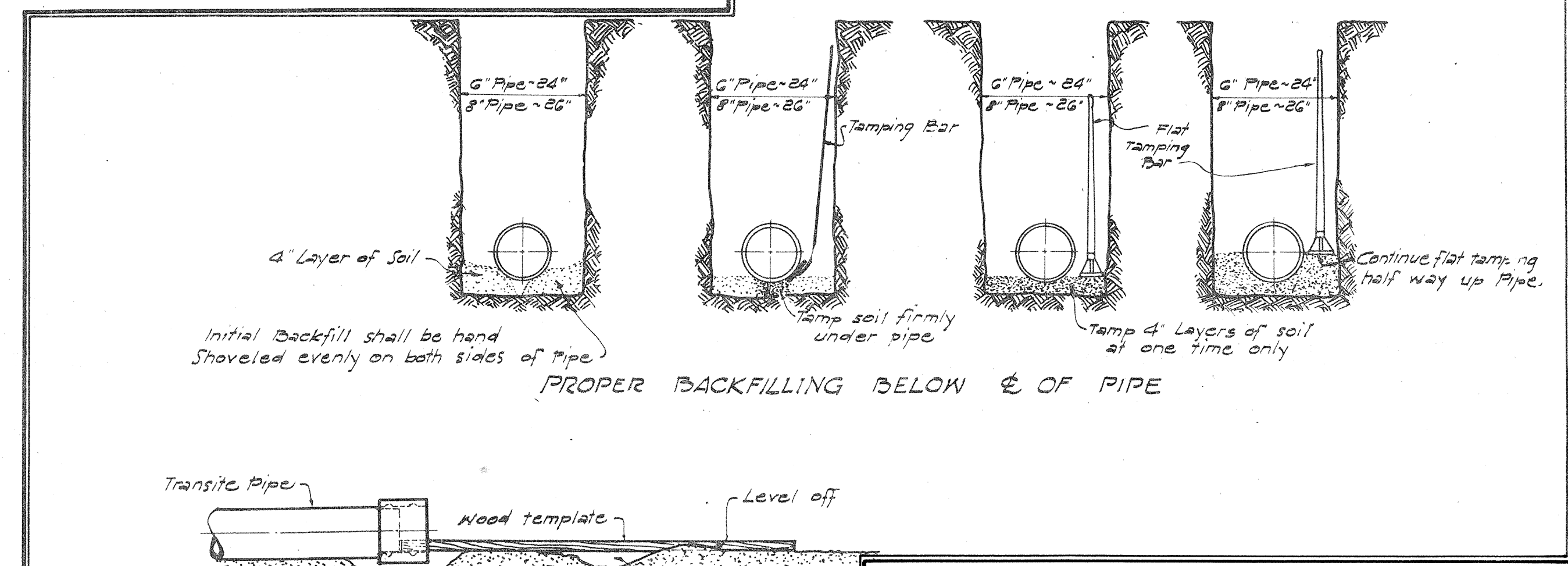
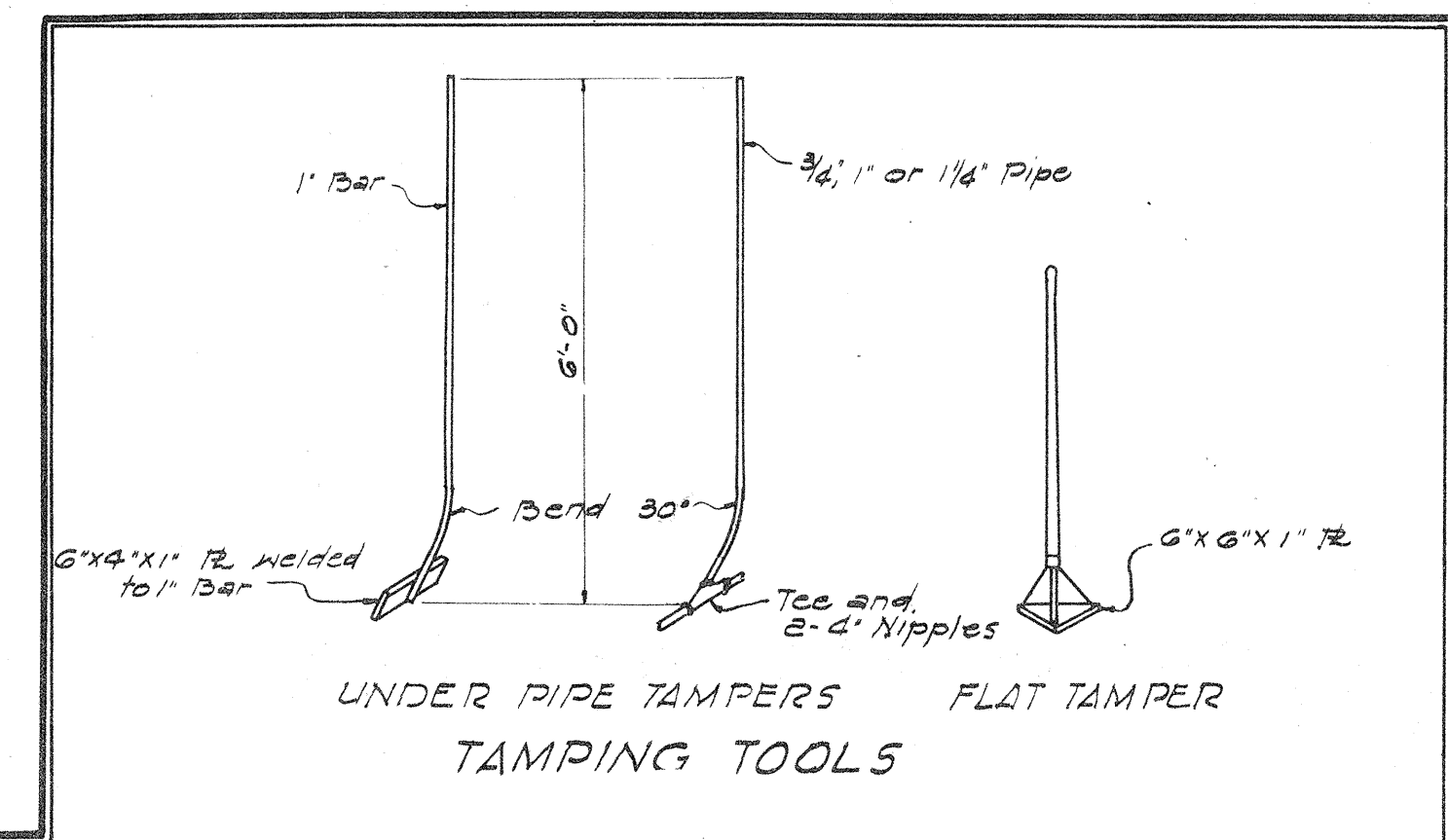
TYPICAL DETAIL OF CONCRETE JACKET FOR PROTECTION OF PIPE ABOVE STREAMBED
Scale: 1/2" = 1'-0"



TYPICAL DETAIL OF CONCRETE JACKET FOR PROTECTION OF PIPE BELOW STREAMBED
Scale: 1/2" = 1'-0"



AIR VALVE & BOX
Not to Scale



DETAILS-TRANSITE PIPE INSTALLATION
NOT TO SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BOARD OF WATER SUPPLY
COUNTY OF HAWAII

STANDARD DETAILS

SCALE: AS SHOWN DATE: JANUARY, 1963

APPROVED: *[Signature]*
MANAGER-ENGINEER, BOARD OF WATER SUPPLY