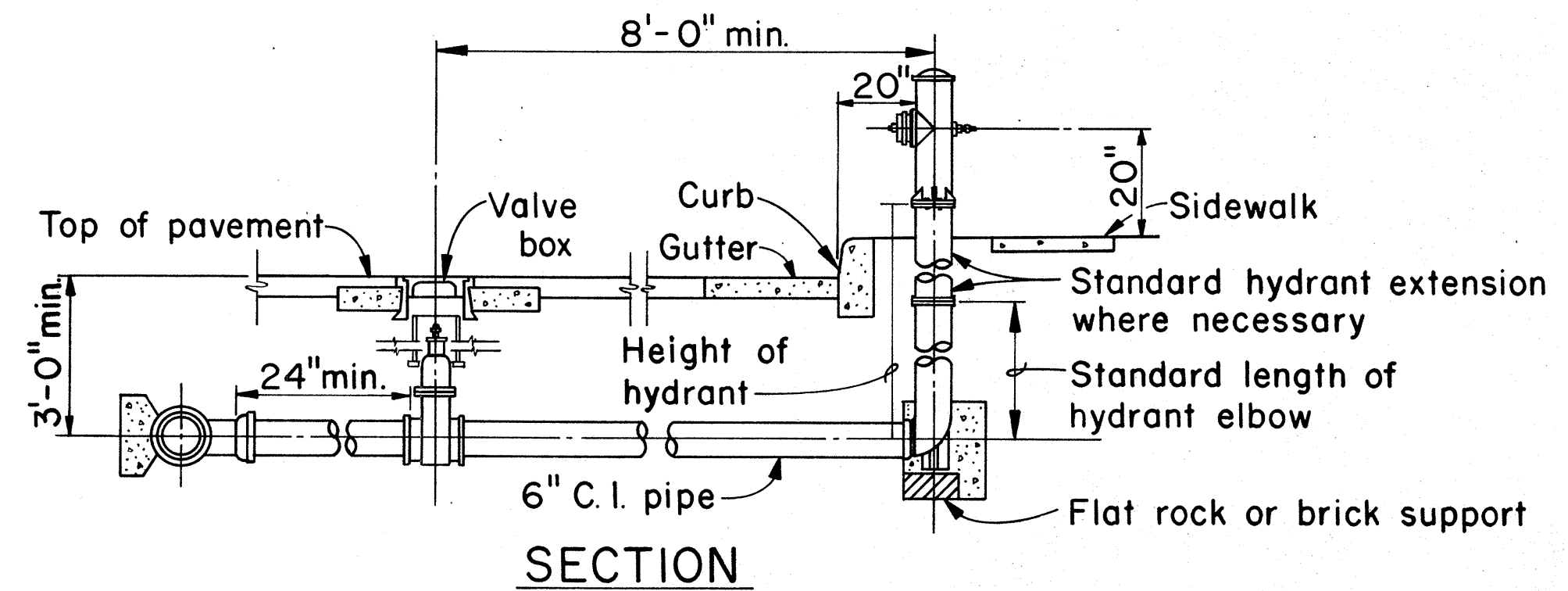
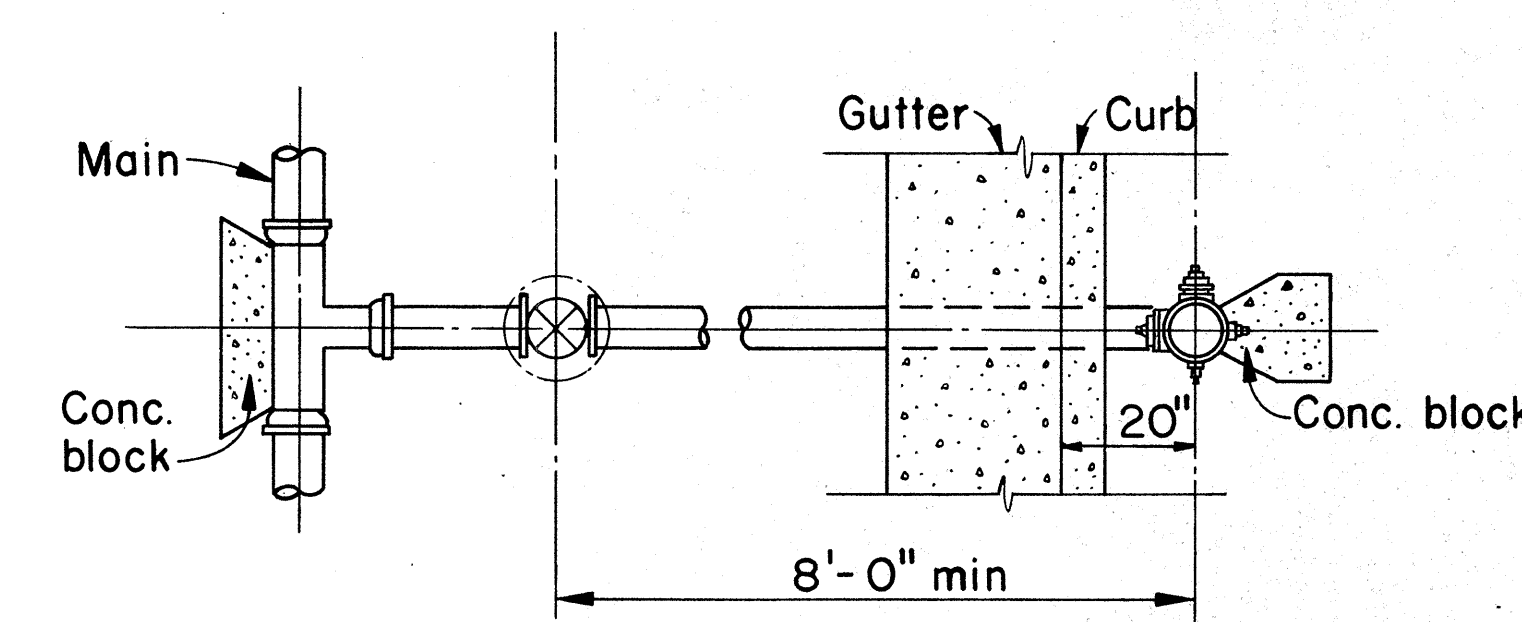


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H-1(26)-17	1976	75	124



SECTION



PLAN

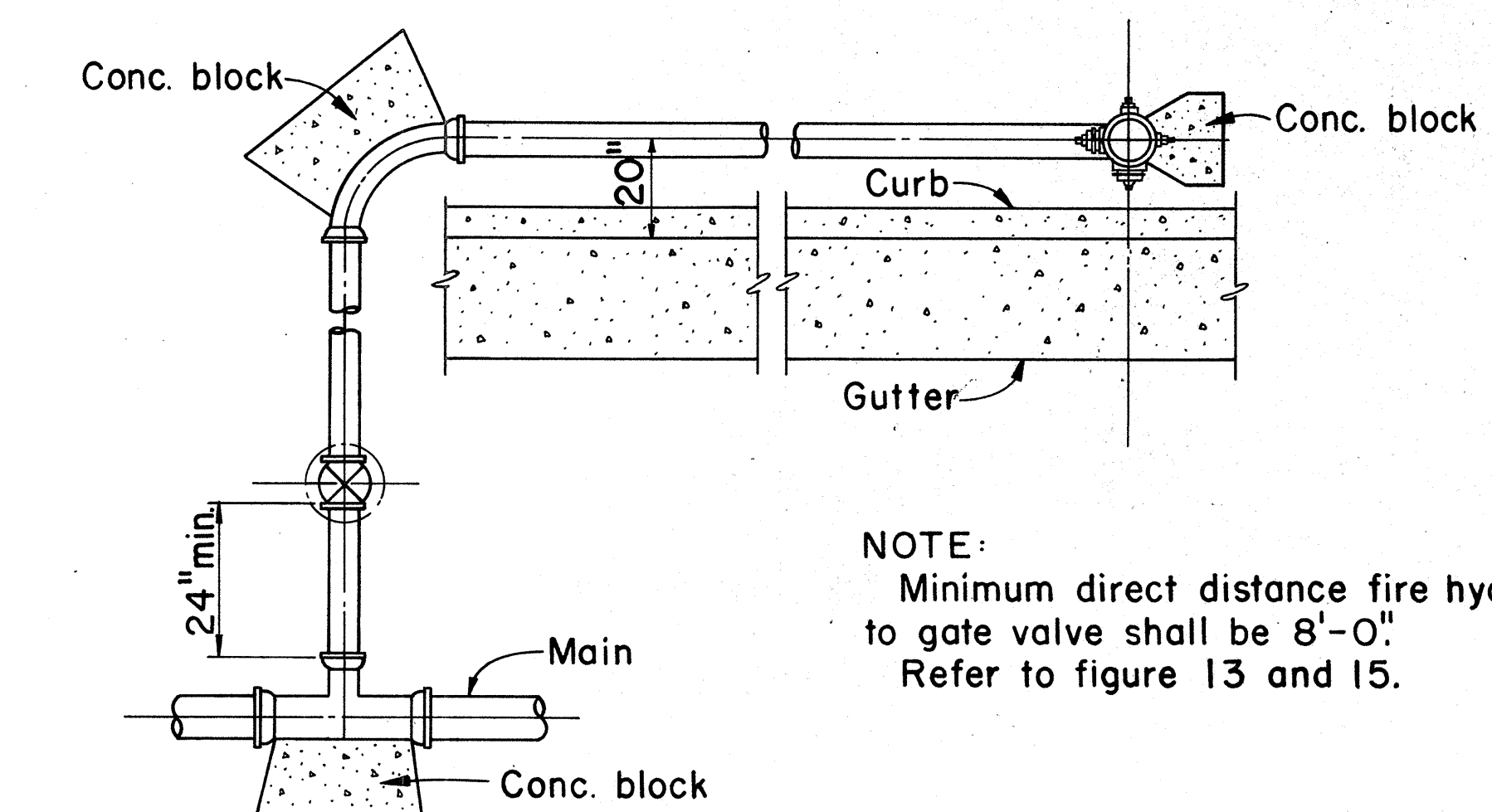
STANDARD LENGTHS FOR HYDRANT ELBOW	
	30"
	36"
	42"
	48"

Standard hydrant extensions are available in the following lengths:
6 to 30 inches long in increments of 6 inches.

NOTE:
Gaskets for flanged joints shall be 1/16" duck-inserted rubber packing Garlock No. 19.
Bolts shall be 5/8" diameter x 2 3/4" long steel machine bolts with cut threads, American Standard heavy hexagon heads, galvanized.
Nuts shall be American Standard heavy cold punched hexagon nuts, galvanized.

HYDRANT CONNECTION STRAIGHT RUN

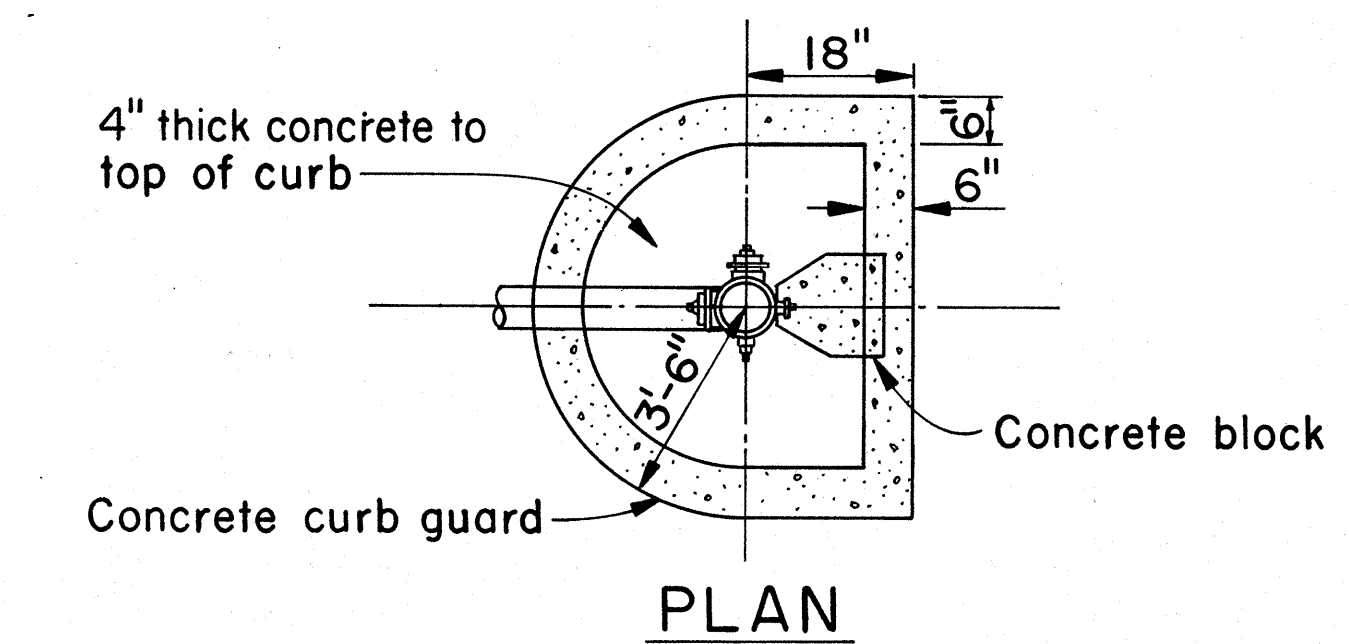
FIGURE 13



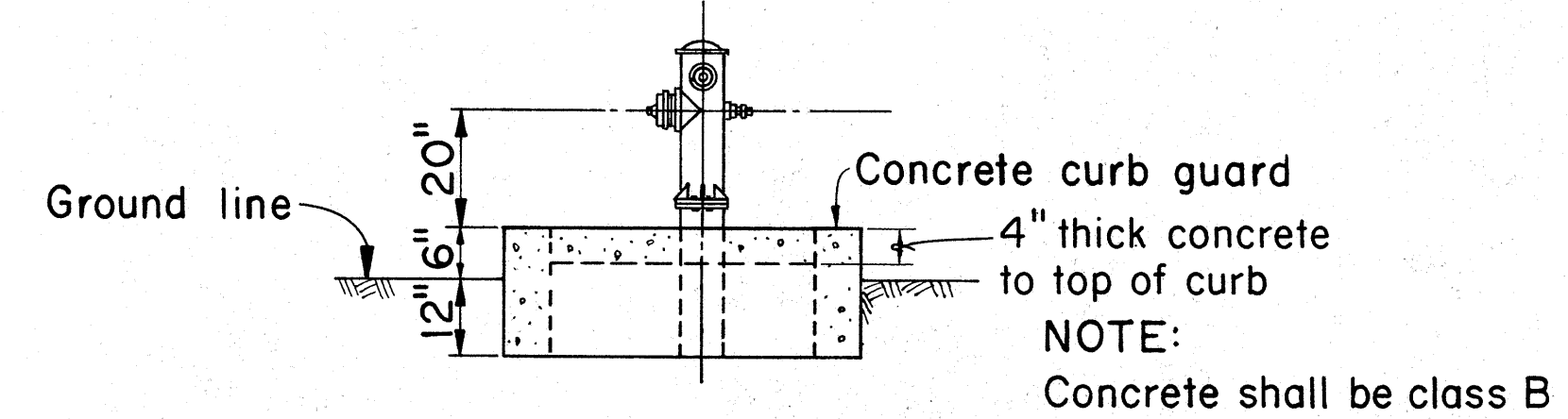
NOTE:
Minimum direct distance fire hydrant to gate valve shall be 8'-0". Refer to figure 13 and 15.

HYDRANT CONNECTION WITH ELBOW

FIGURE 14



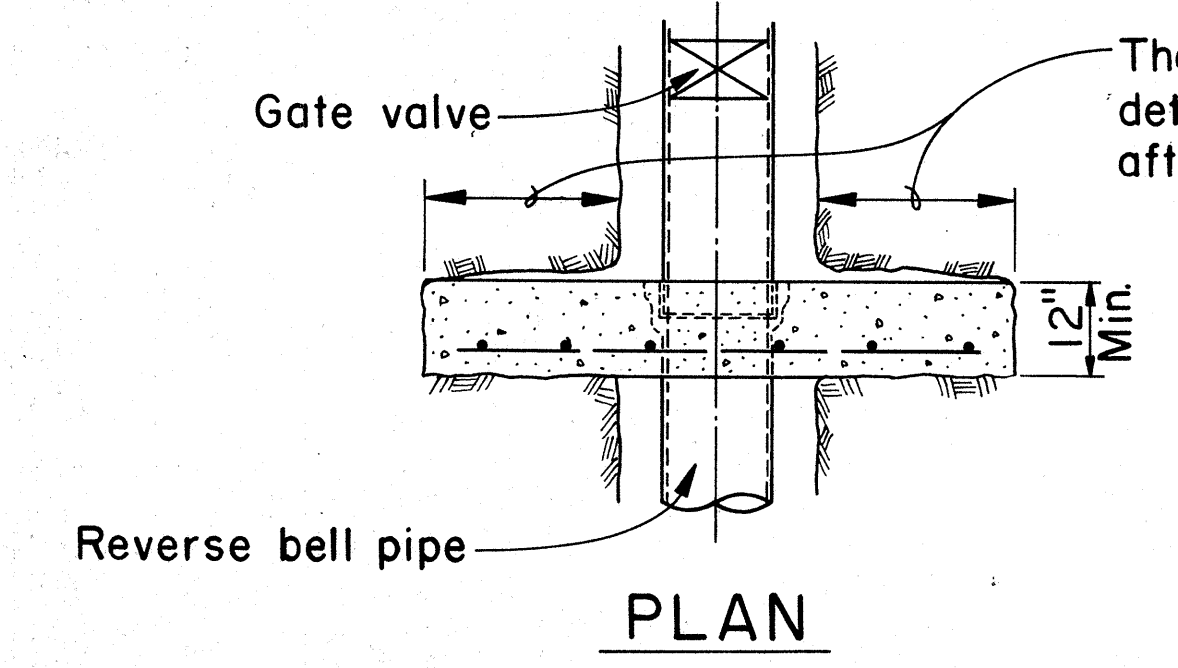
PLAN



ELEVATION

DETAIL OF CURB GUARD AT HYDRANT

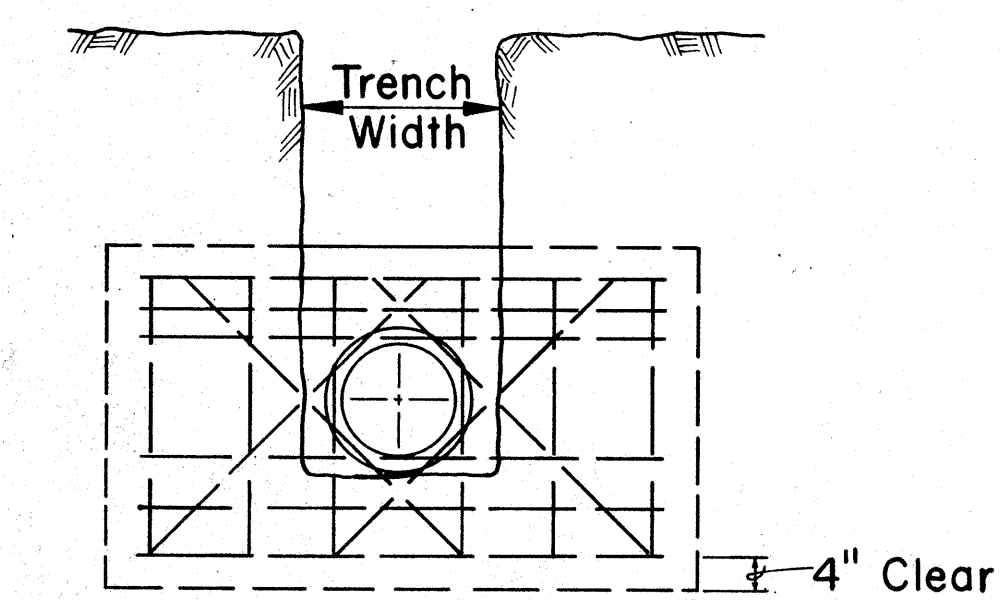
FIGURE 15



PLAN

These dimensions to be determined by engineer after trench is excavated.

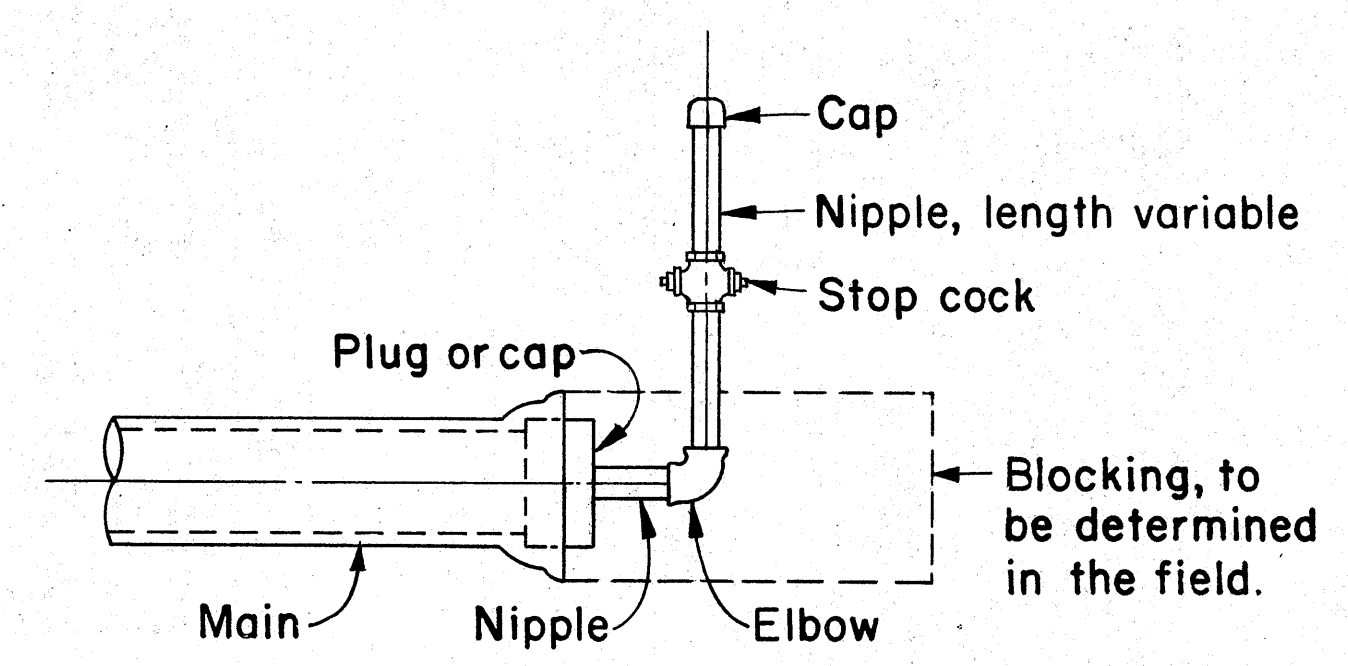
NOTE:
Size and spacing of bars will depend on working pressure. Detail of actual beam to be used shall be furnished during construction by the engineer who prepared the plans.



ELEVATION

CONCRETE REACTION BEAM

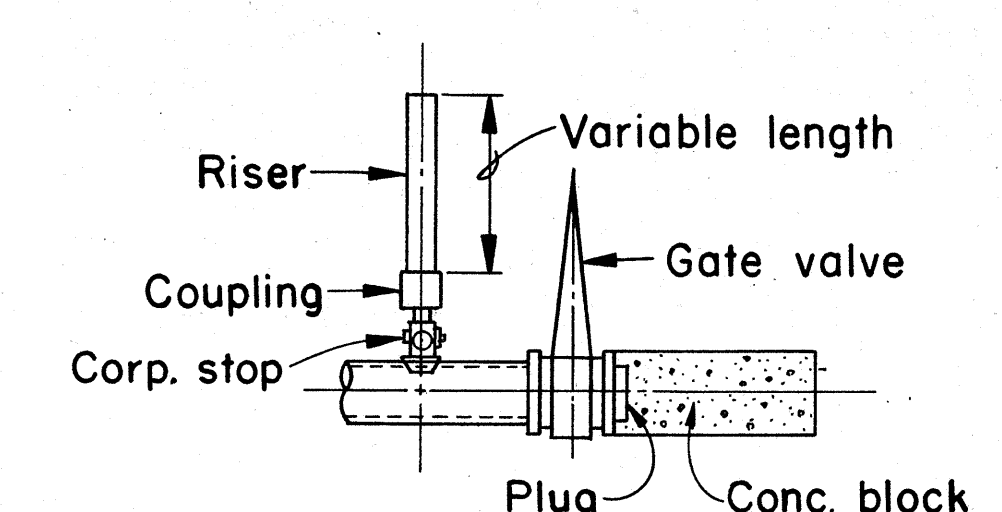
FIGURE 18



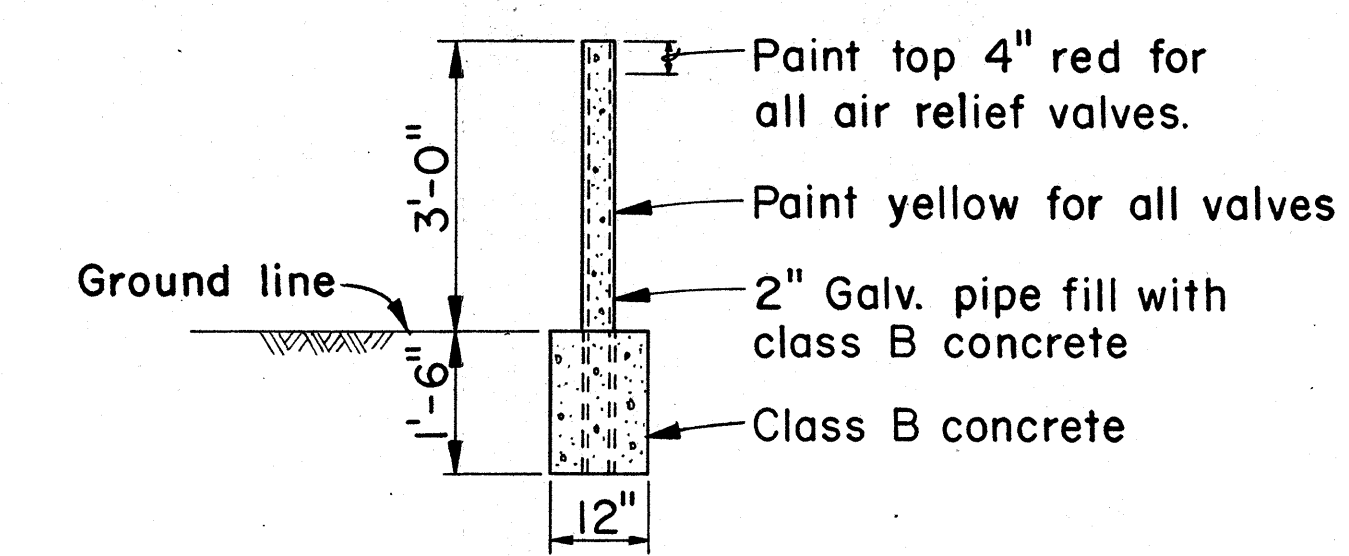
DETAIL OF TEMPORARY CLEANOUT

NOTES:
1. The sizes of cleanout unless otherwise shown on the plans or directed by the Engineer shall be:
8 inch and smaller mains - 2 1/2 inch cleanout
12 inch to 20 inch mains - 4 inch cleanout
24 inch and larger mains - 6 inch cleanout

2. Temporary cleanout shall include the plug or cap, concrete block, and all appurtenances as shown.



DETAIL OF RISER



DETAIL OF VALVE MARKER

CLEANOUTS, RISERS AND VALVE MARKERS

FIGURE 16

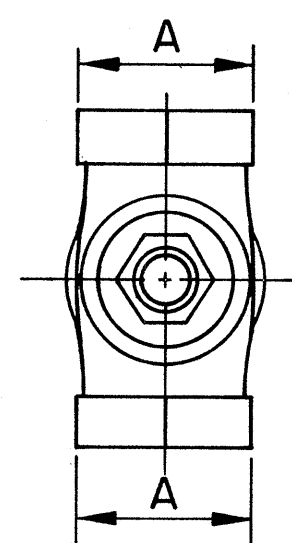
APPROVED:
[Signature]
ASSISTANT CHIEF ENGINEER
BOARD OF WATER SUPPLY
DATE: 12-4-73

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
BOARD OF WATER SUPPLY

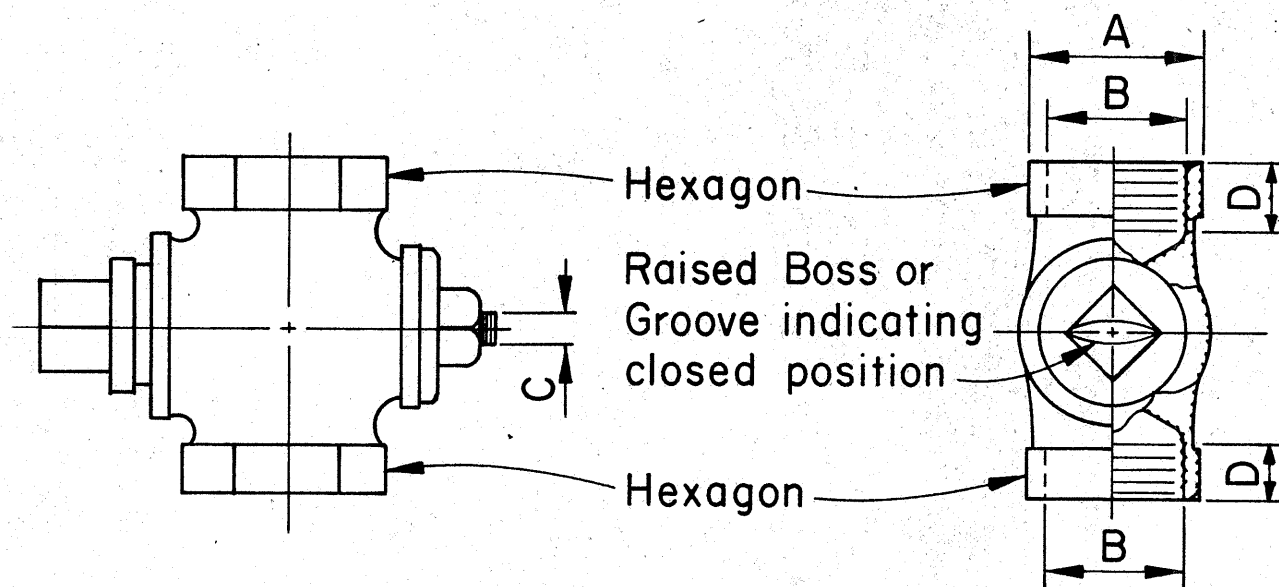
DATE: July 15, 1976
SHEET No. 2 OF 7 SHEETS

All dimensions are in inches. Thread dimensions must be as shown. Dimensions A, C and D may vary but shall not be less than the minimums shown in the accompanying table. Minimum acceptable weight of complete fitting may be 5% less than average weight. Metal composition shall conform to A.S.T.M. Designation B 62. The stopcock shall have either a raised boss on the head or a groove cut into the head to indicate the open and closed position of the stopcock. The net area (in square inches) of the opening through the stopcock shall be not less than that shown in the accompanying table (E). The taper of the plug of the stopcock shall be approximately 15/8 inches to the foot. Suitable markings on all stopcocks must be made to indicate the manufacturer.

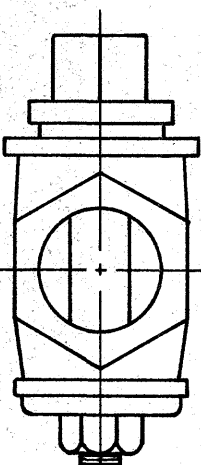
SIZE	Minimum A	Pipe Thread B	Minimum C	Minimum D	Average Weight of Complete Fitting lbs. oz.	Minimum E
1/2	1 1/8	1/2"	3/8	5/8	0 9	0.190
3/4	1 3/8	3/4"	9/16	5/8	1 2	0.428
1	1 5/8	1 "	5/8	5/8	1 10	0.746
1 1/4	2	1 1/4"	11/16	5/8	2 12	1.166
1 1/2	2 3/8	1 1/2"	3/4	3/4	4 0	1.679
2	2 7/8	2 "	7/8	7/8	6 11	2.922
2 1/2	3 5/8	2 1/2"	13/16	15/16	10 6	4.000



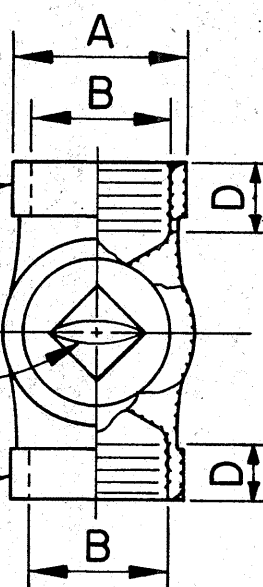
BOTTOM



SIDE



END



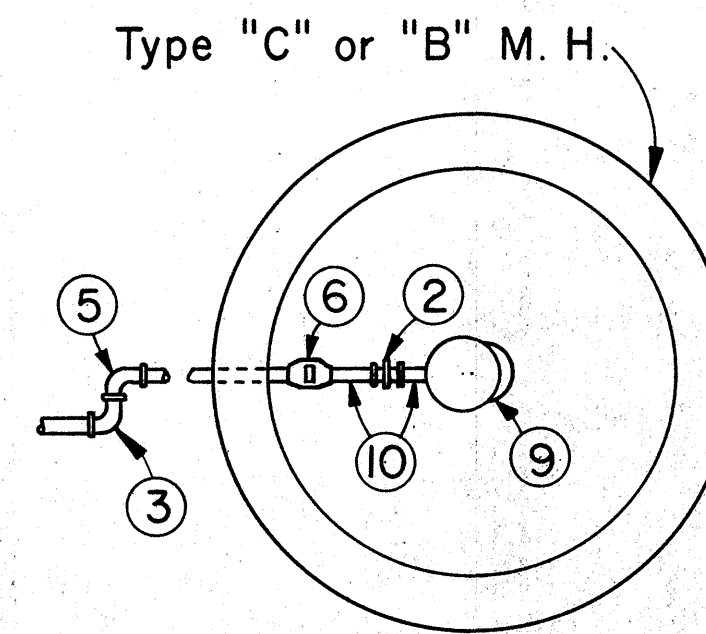
TOP

STOP COCK

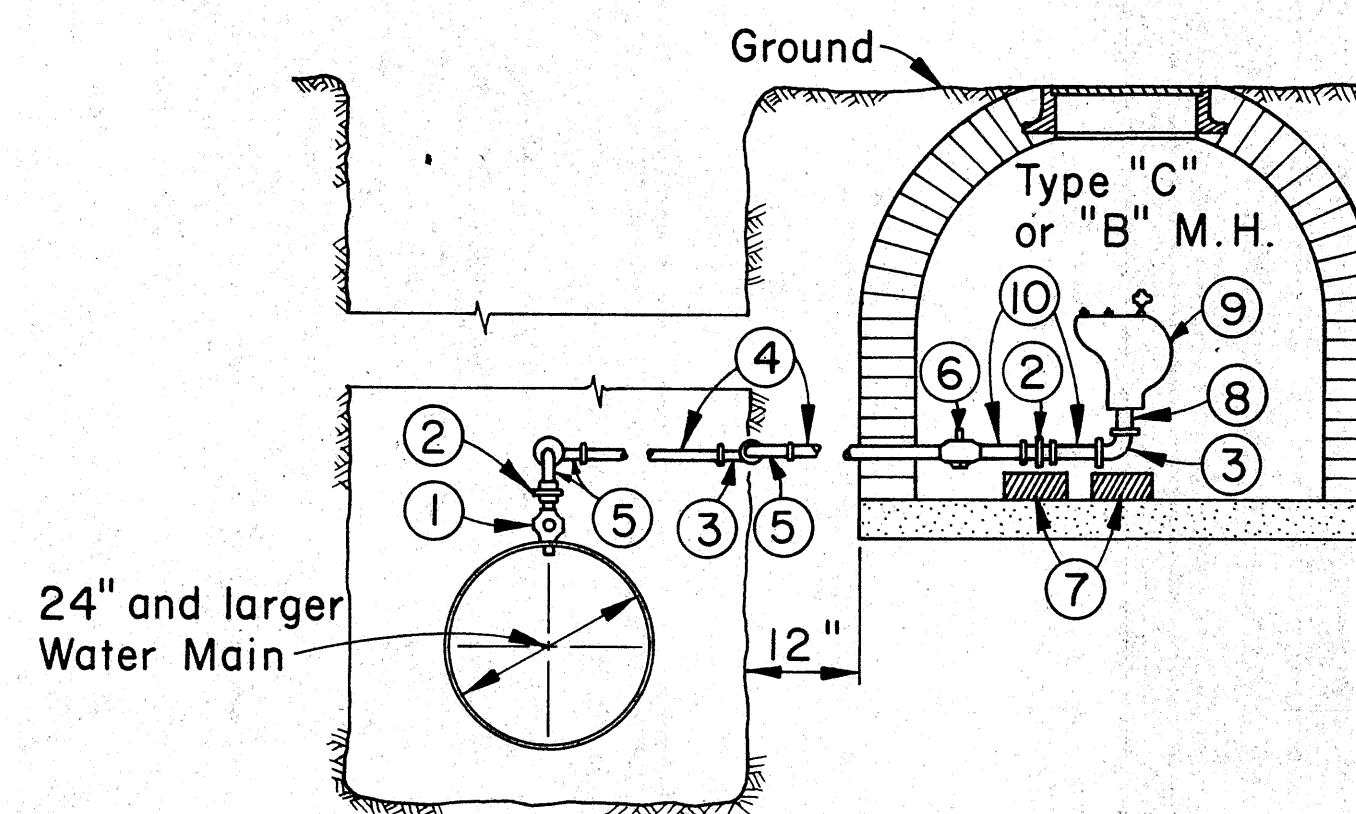
FIGURE 31

LIST OF MATERIALS

ITEM	NO. REQ.	DESCRIPTION
1	1	1 1/2" x 2" Corporation Stop
2	2	2" Union, bronze
3	3	2" 90° Elbow, bronze
4	2	2" Brass Pipe, cut to fit
5	3	2" Street Elbow
6	1	2" Stop Cock
7	2	Brick Support
8	1	2" Dia. x 4" Nipple, brass
9	1	2" Air Relief Valve
10	2	2" Dia. x 6" Nipple, brass



PLAN

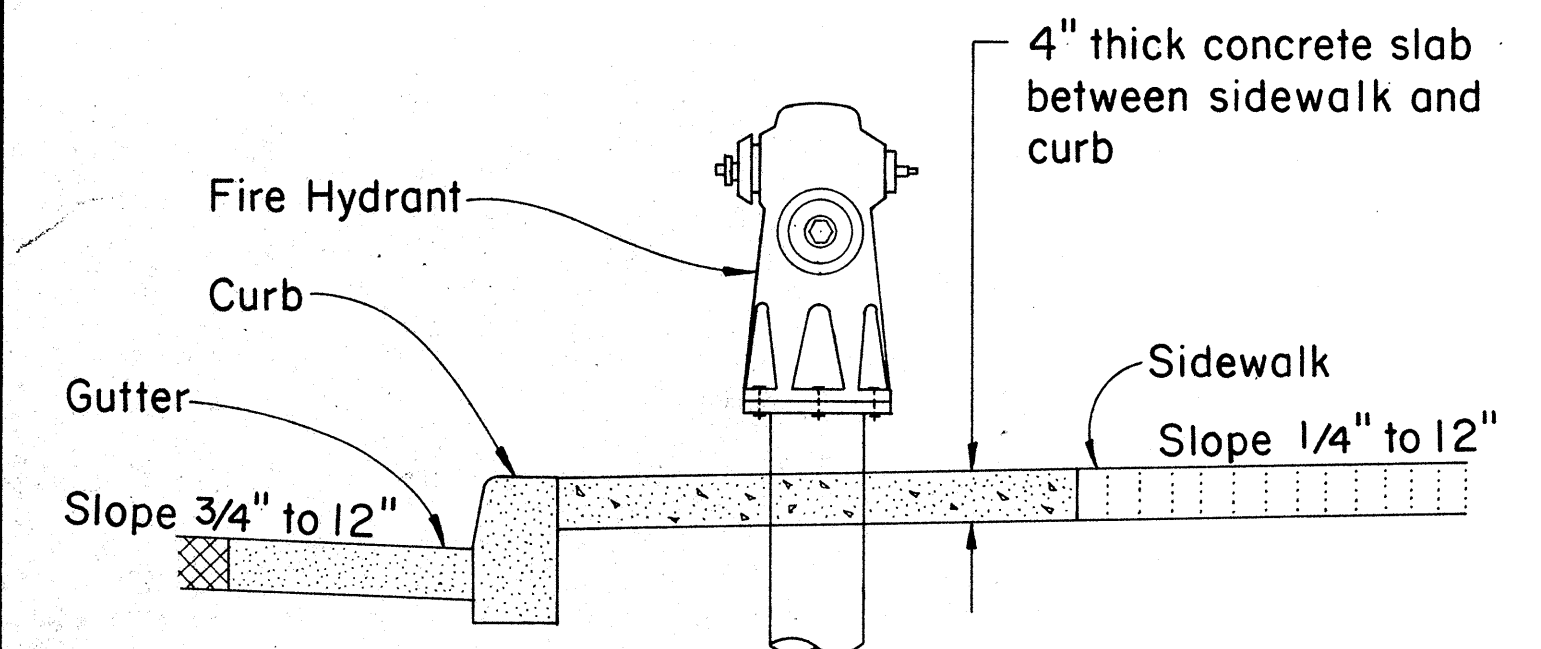


ELEVATION

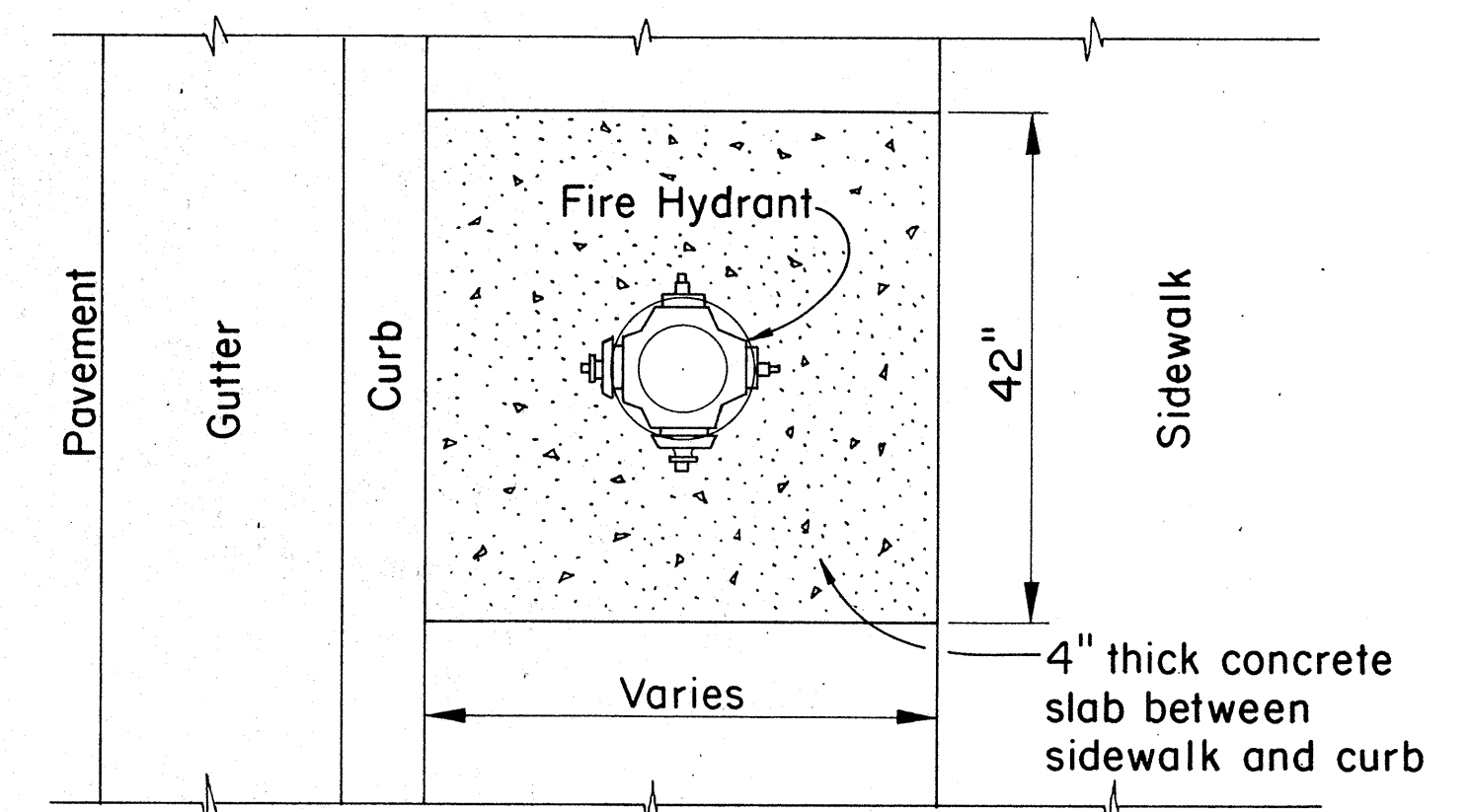
OFFSET MANHOLE FOR AIR RELIEF VALVE

FIGURE 33

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HH(136)17	1976	77	124



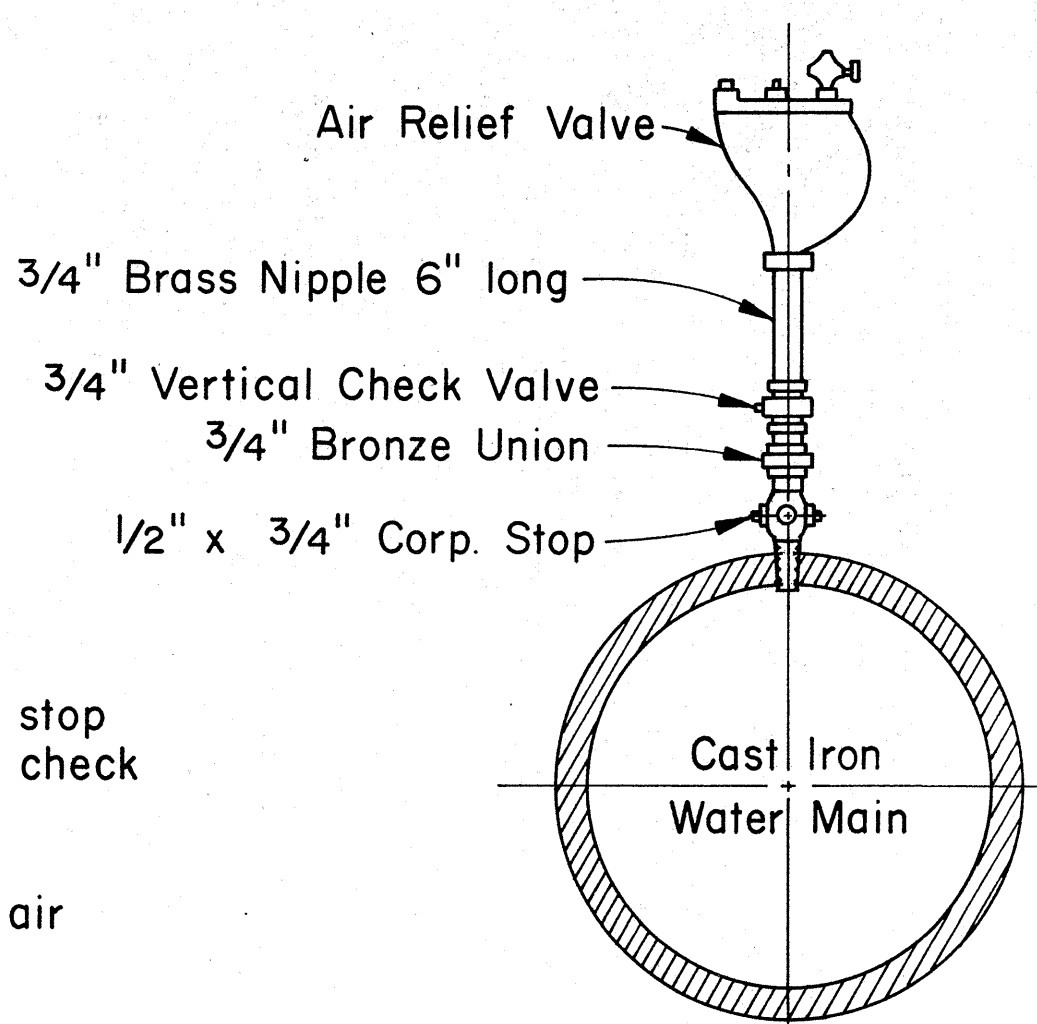
SECTION



PLAN

DETAIL OF FIRE HYDRANT CONCRETE PAD

FIGURE 34



NOTE:
For 2" air relief valve, size of corp. stop shall be 1 1/2" x 2". Union, vertical check valve and nipple shall be 2".

Vertical check valve required when air relief valve is immersed in water.

STANDARD CONNECTION FOR AIR RELIEF VALVE

FIGURE 32

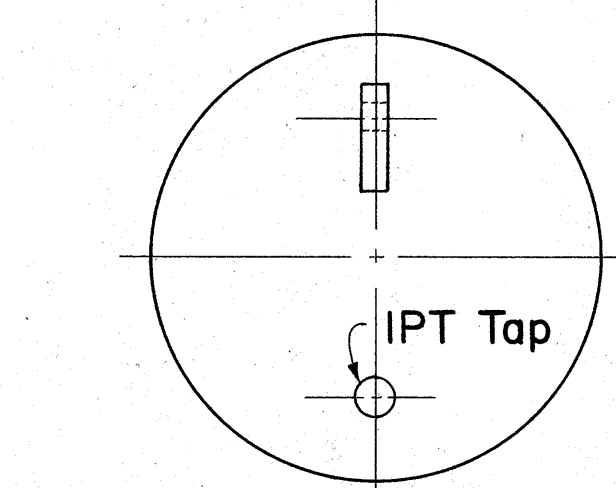
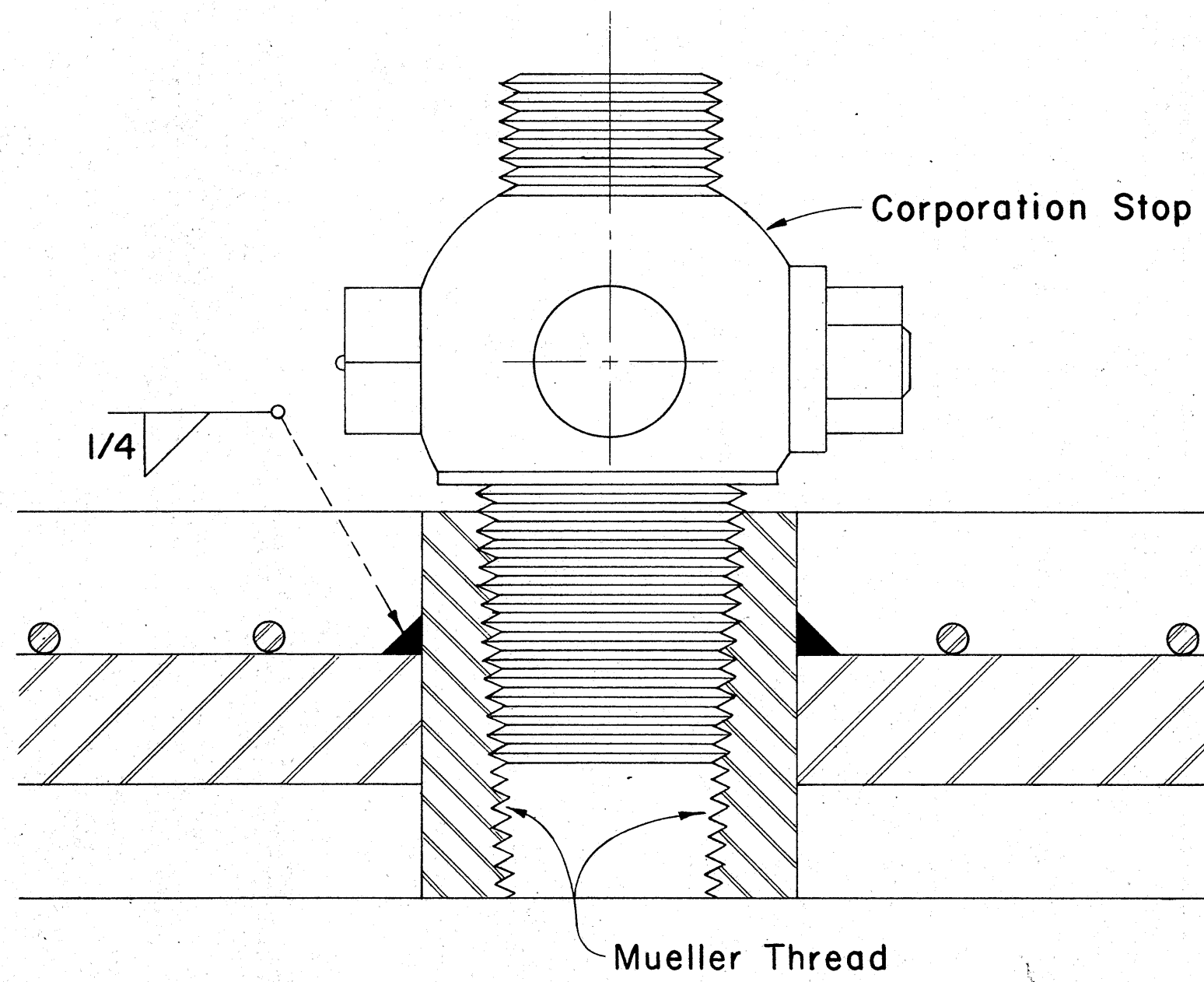
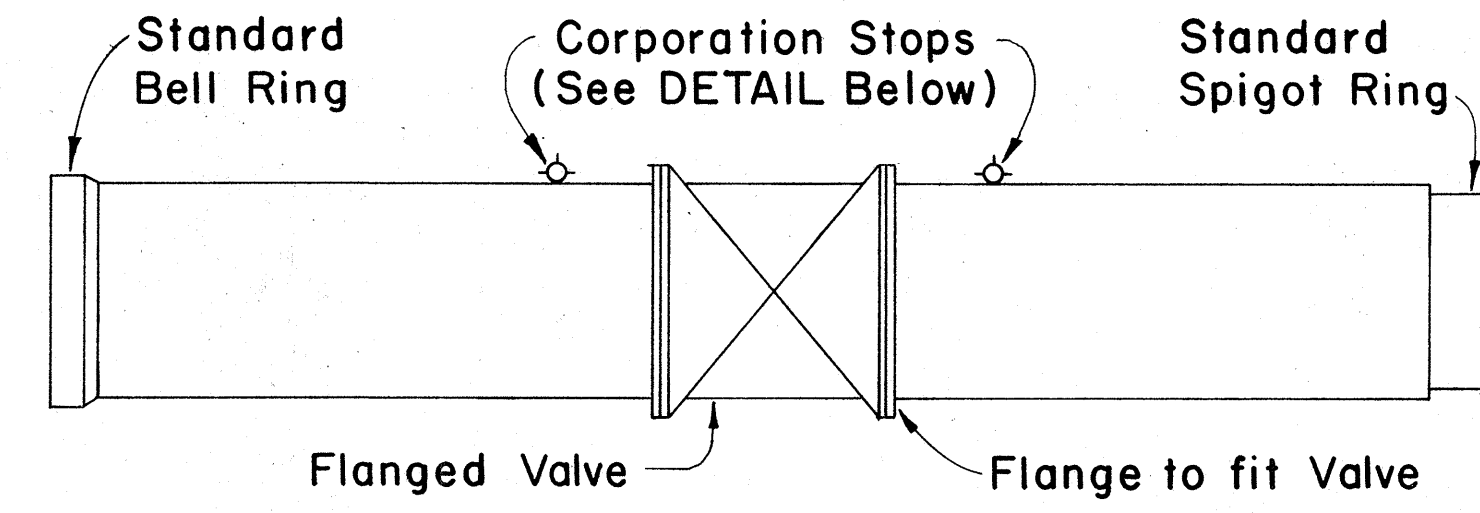
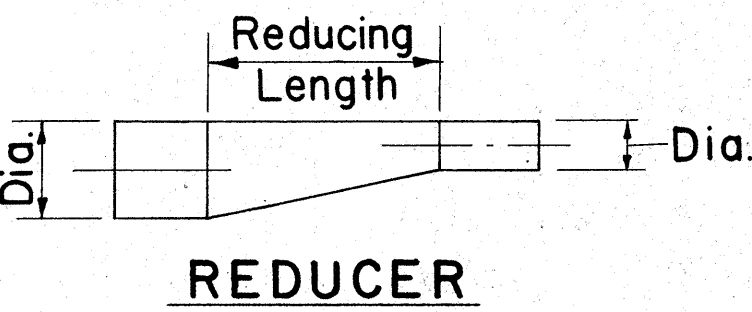
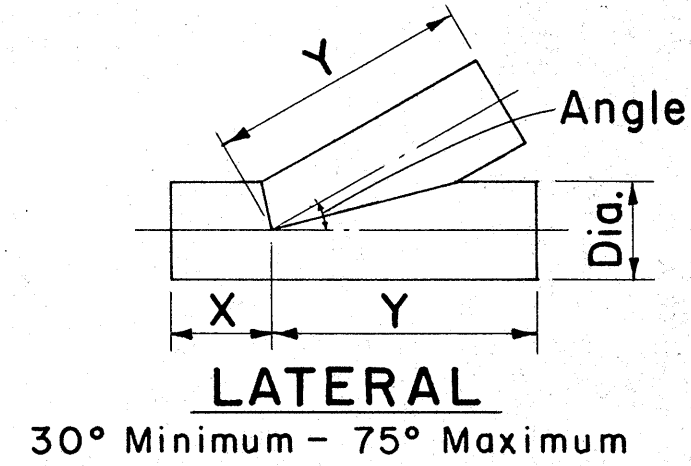
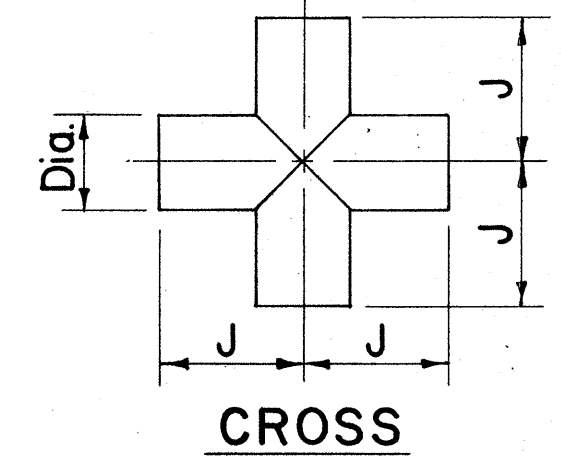
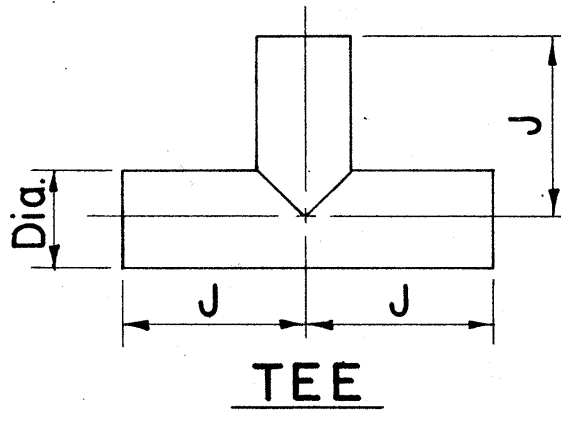
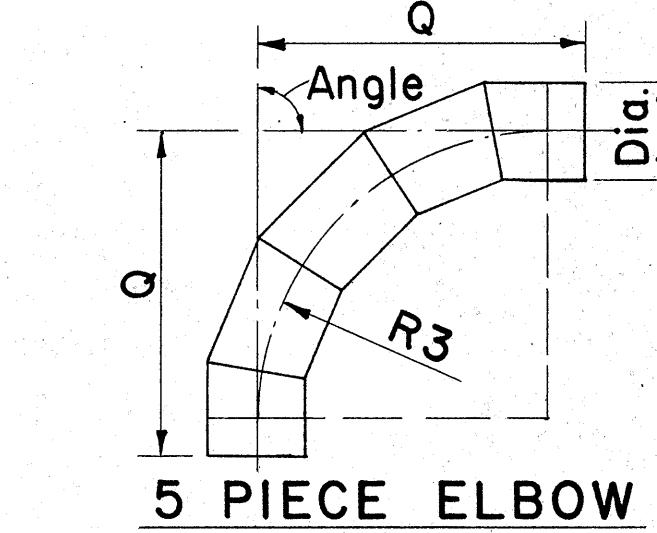
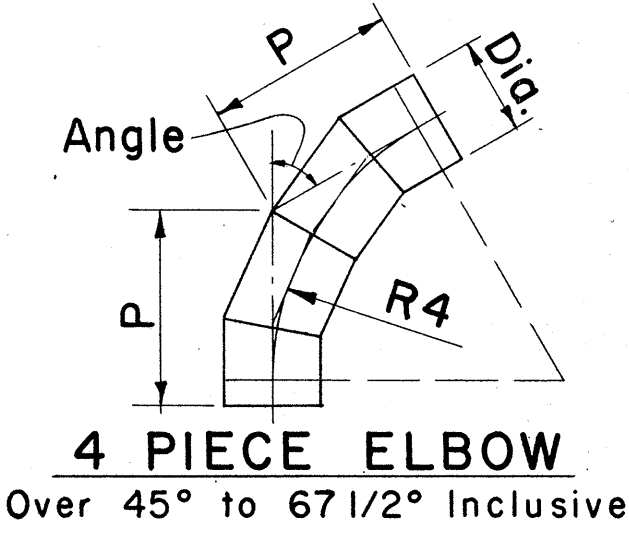
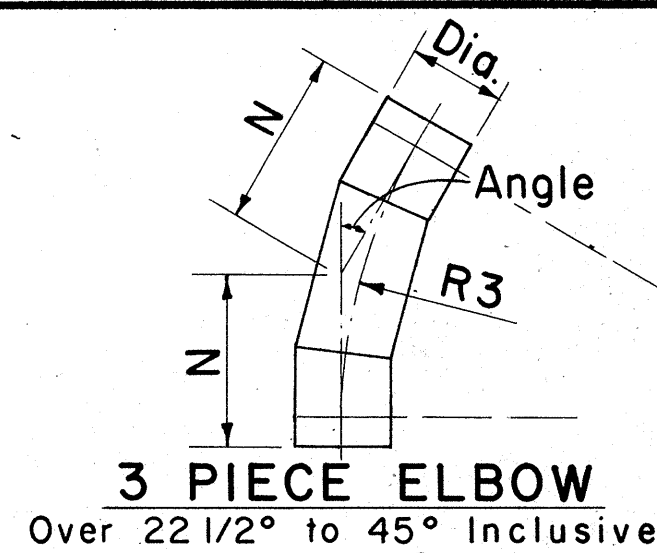
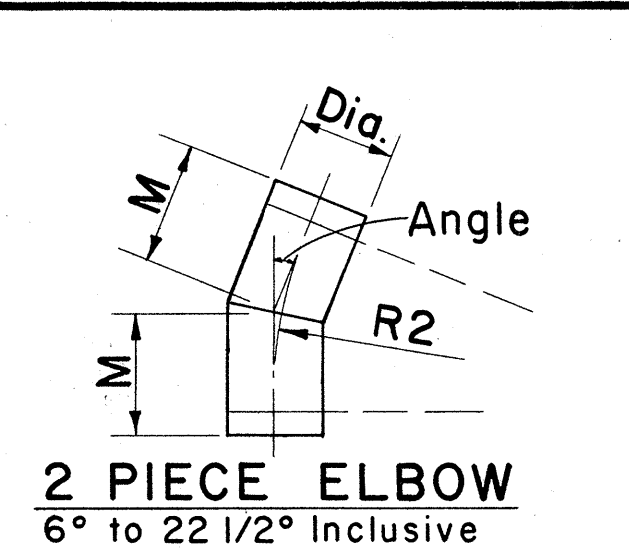
APPROVED:
S. Kawakawa
ASSISTANT CHIEF ENGINEER
BOARD OF WATER SUPPLY
DATE: 7/15/76

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
BOARD OF WATER SUPPLY

DATE: July 15, 1976

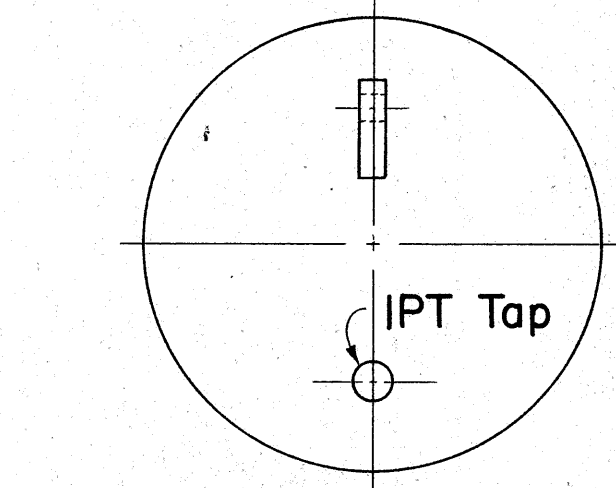
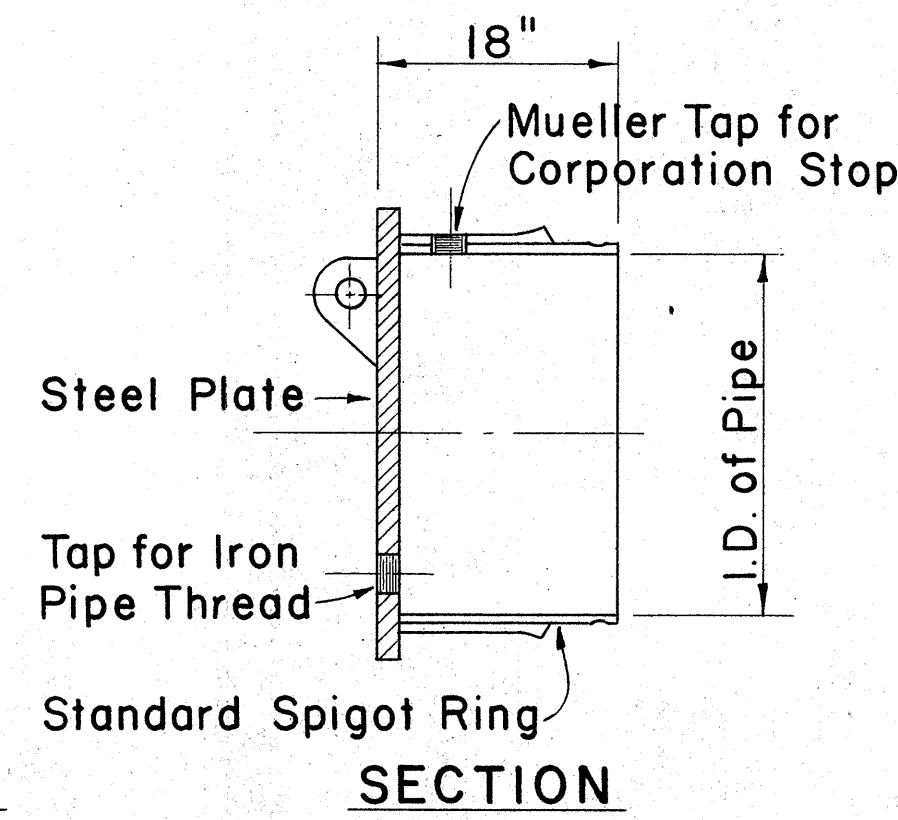
SHEET No. 4 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HI-1136-17	1976	78	124



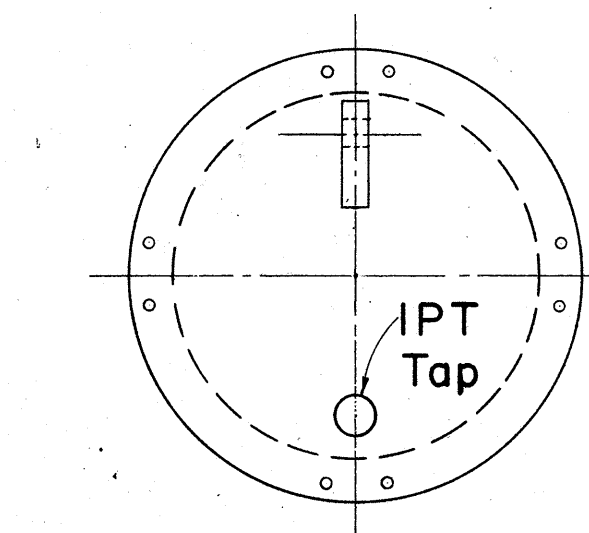
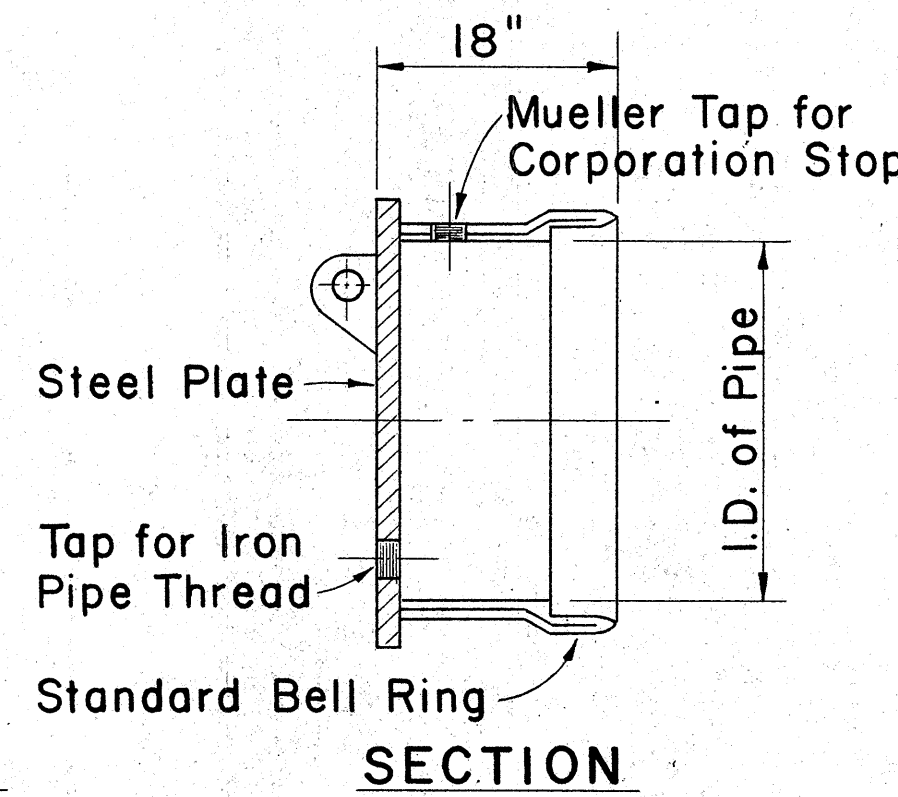
ELEV. OF STEEL PLATE

DETAIL OF PLUG

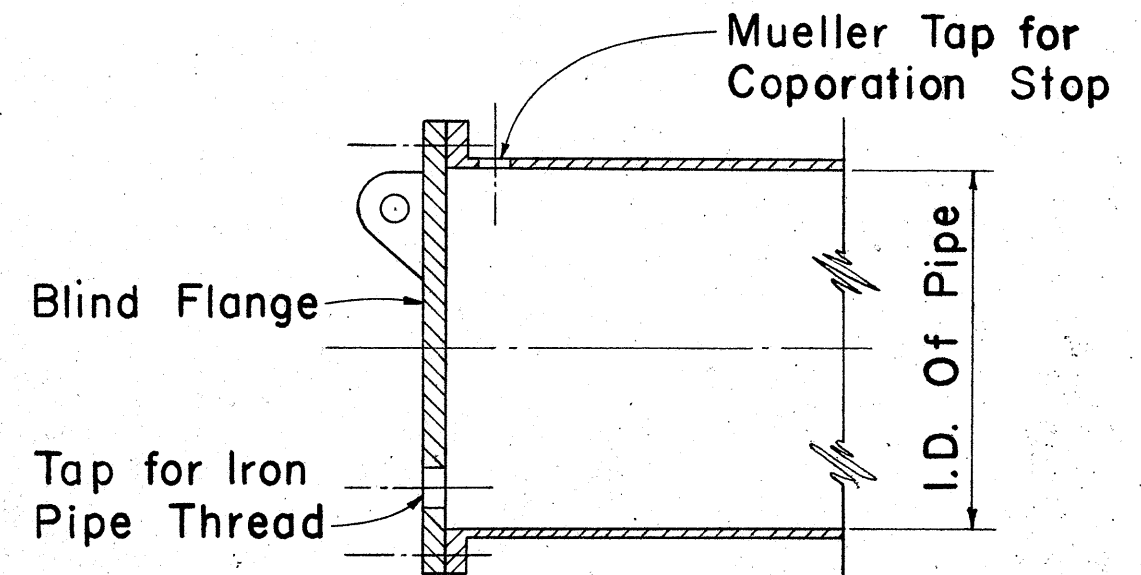


ELEV. OF STEEL PLATE

DETAIL OF CAP



ELEV. OF BLIND FLANGE



DETAIL OF BLIND FLANGE

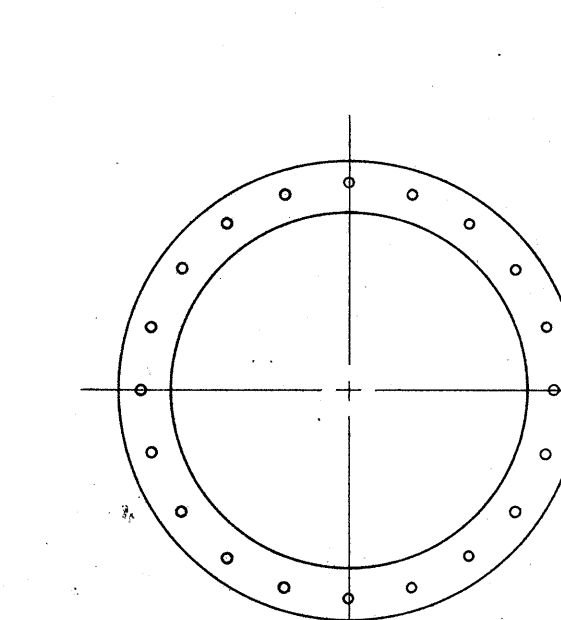
STANDARD FITTING DIMENSIONS													
DIAMETER	TEE		CROSS (Both Ways) J+J	LATERAL (30° to 75°)		ELBOWS (Center to End)							
	Run J+J	Outlet J		Run X+Y	Outlet Y	2 Piece (up to 22 1/2°)	3 Piece (22 1/2° to 45°)	4 Piece (45° to 67 1/2°)	5 Piece (67 1/2° to 90°)				
16"	34"	17"	34"	62"	52"	12"	60"	18"	44"	26"	39"	44"	40"
18"	36"	18"	36"	66"	56"	12"	60"	19"	47"	27"	41"	36"	32"
20"	38"	19"	38"	72"	60"	13"	65"	20"	49"	28"	42"	54"	50"
22"	40"	20"	40"	78"	66"	13"	65"	21"	51"	30"	45"	41"	37"
24"	42"	21"	42"	84"	72"	14"	70"	22"	54"	32"	48"	64"	60"
30"	60"	30"	60"	96"	84"	15"	75"	25"	61"	37"	51"	79"	75"
36"	66"	33"	66"	110"	96"	16"	80"	27"	66"	40"	60"	94"	90"
42"	72"	36"	72"	124"	108"	17"	85"	30"	71"	49"	69"	109"	105"

DIMENSIONS FOR ECCENTRIC REDUCER REDUCING SECTION

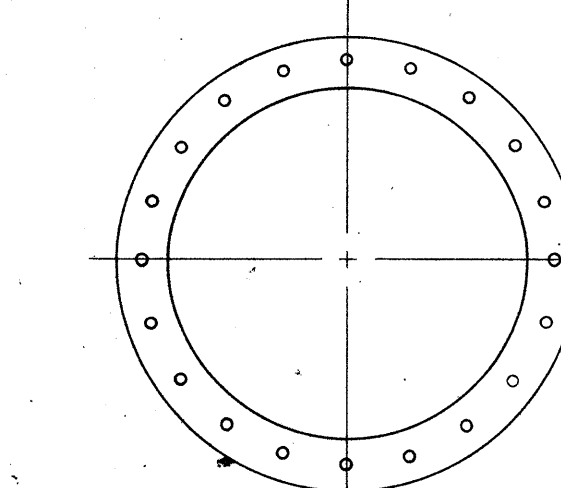
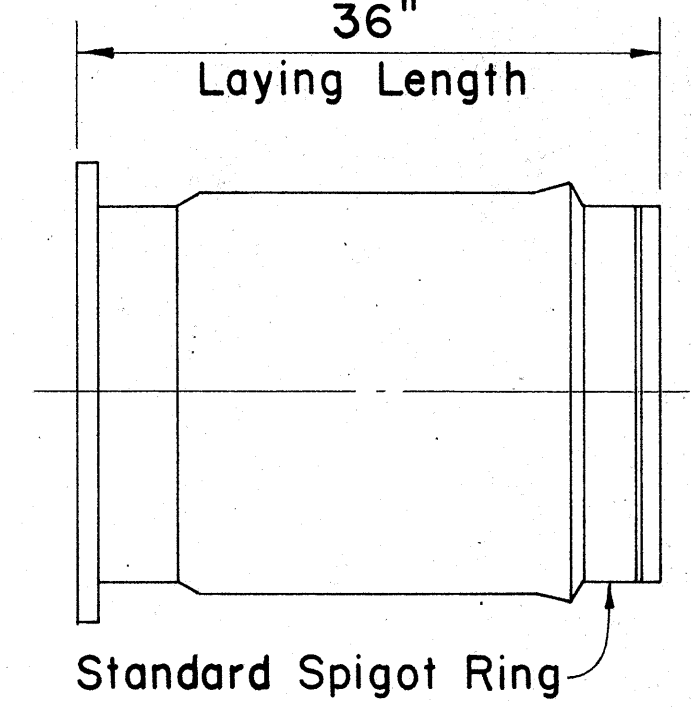
- 36" x 30" Eccentric Reducer - Length 66"
- 30" x 24" Eccentric Reducer - Length 66"
- 24" x 20" Eccentric Reducer - Length 26"
- 20" x 16" Eccentric Reducer - Length 26"
- 42" x 36" Eccentric Reducer - Length 66"
- 42" x 30" Eccentric Reducer - Length 66"

NOTE:

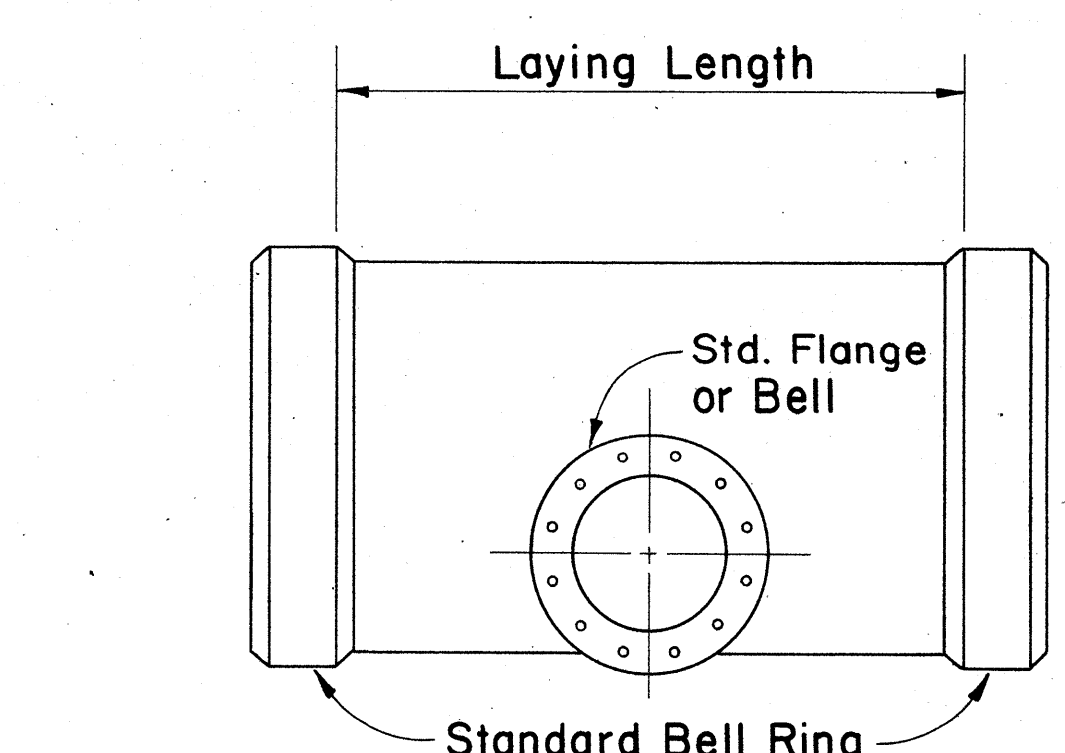
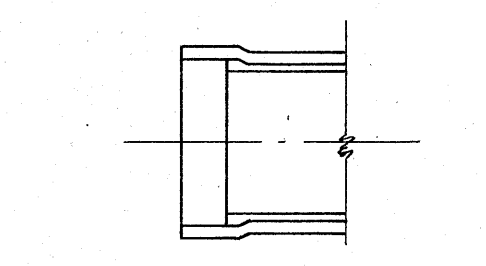
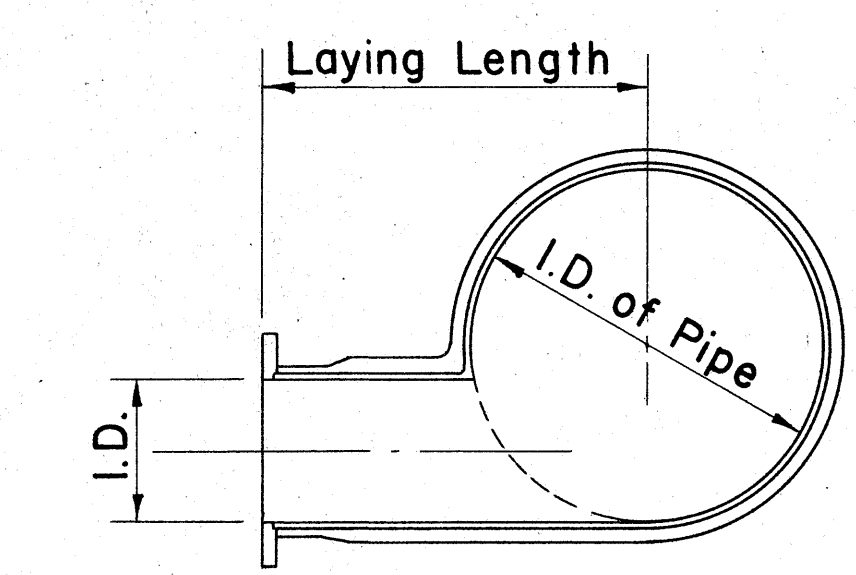
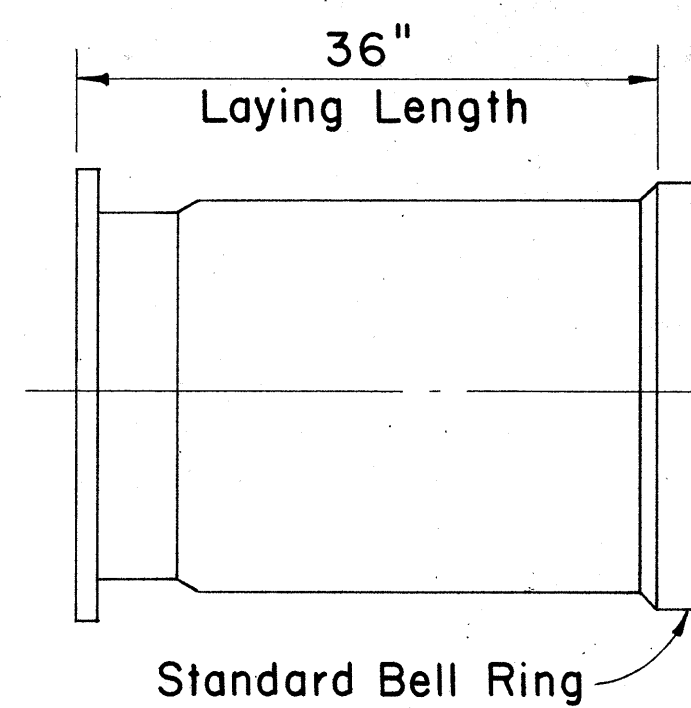
All dimensions shown are laying lengths.
All fittings and specials shall be fabricated independent from pipe sections and in accordance with the dimensions shown.
All fittings and specials shall be all bell unless otherwise noted.
All tees, wyes, crosses and reducers 16-inch in diameter and larger shall be reinforced with steel ribs or steel crotch plates welded continuously to the cylinder or by other methods to withstand the longitudinal crushing effect caused by the test pressure as called for in the plans.



See Specs. for Flange Class



See Specs. for Flange Class



TYPICAL DETAIL OF BLOW-OFF TEE

APPROVED:

ASSISTANT CHIEF ENGINEER
BOARD OF WATER SUPPLY
SHEET NO. 1 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOARD OF WATER SUPPLY
CITY & COUNTY OF HONOLULU

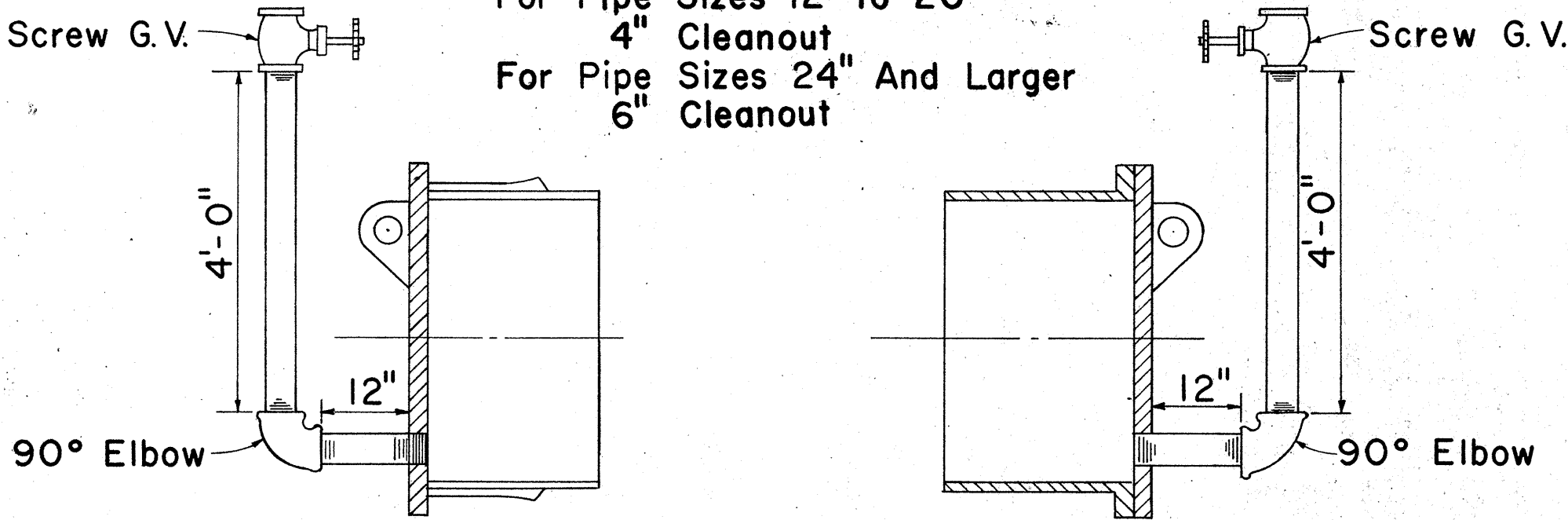
CONCRETE CYLINDER PIPE
MISCELLANEOUS DETAILS

Scale: No Scale Date: July 15, 1976

SHEET No. 5 OF 7 SHEETS

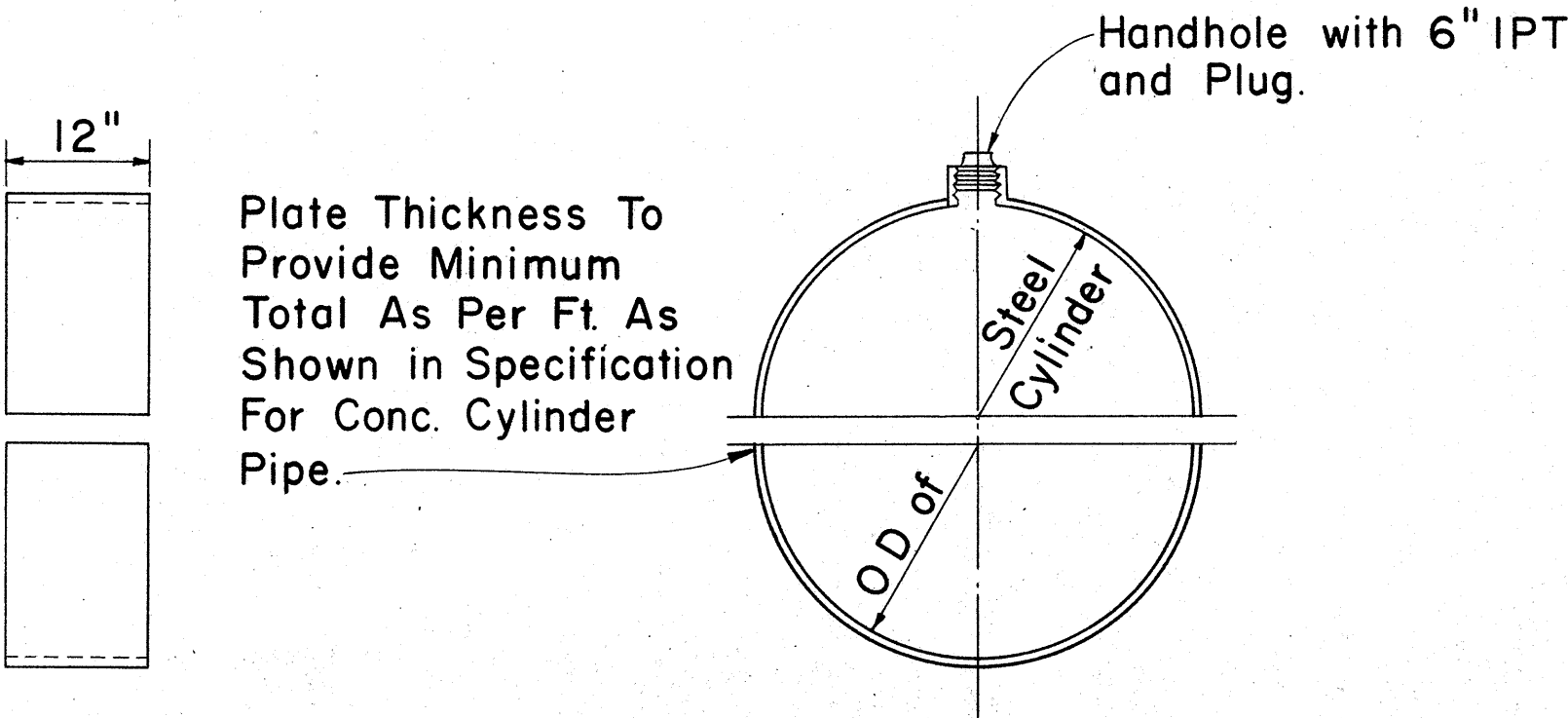
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(236)-17	1976	79	124

NOTE:
 For Pipe Sizes 8" And Smaller
 2 1/2" Cleanout
 For Pipe Sizes 12" to 20"
 4" Cleanout
 For Pipe Sizes 24" And Larger
 6" Cleanout

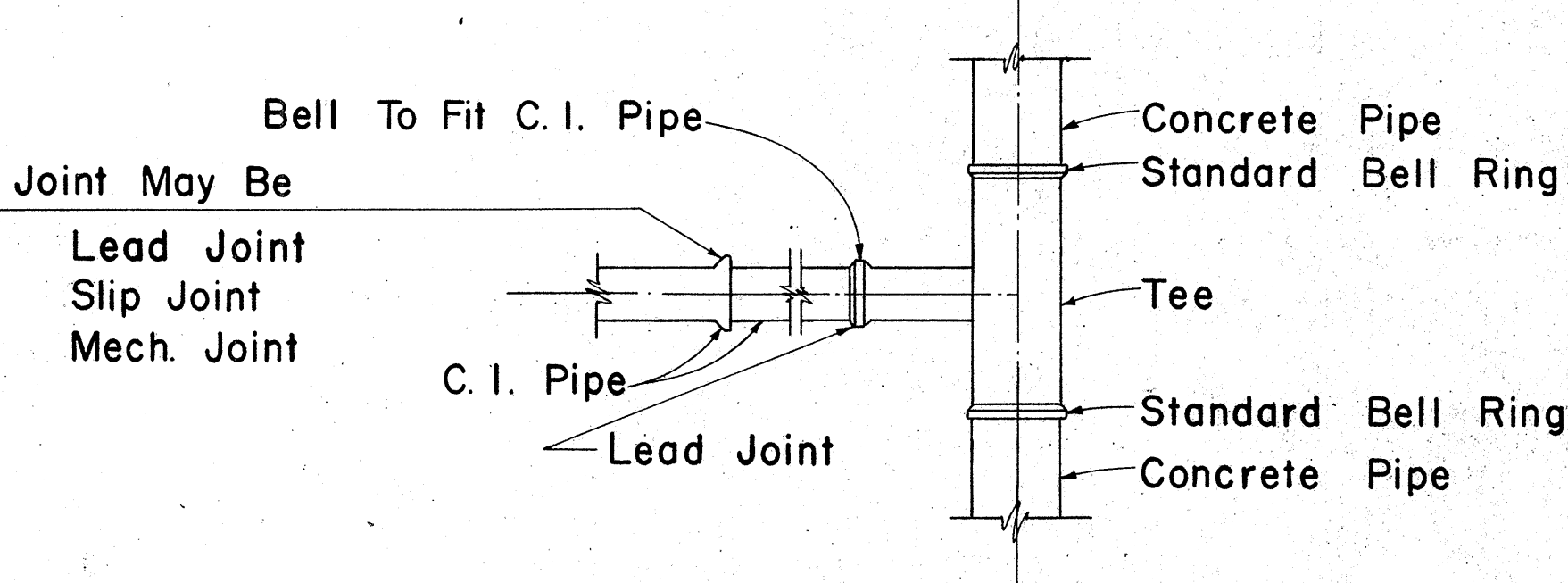


TYPICAL SECTION OF TEMPORARY CLEANOUT

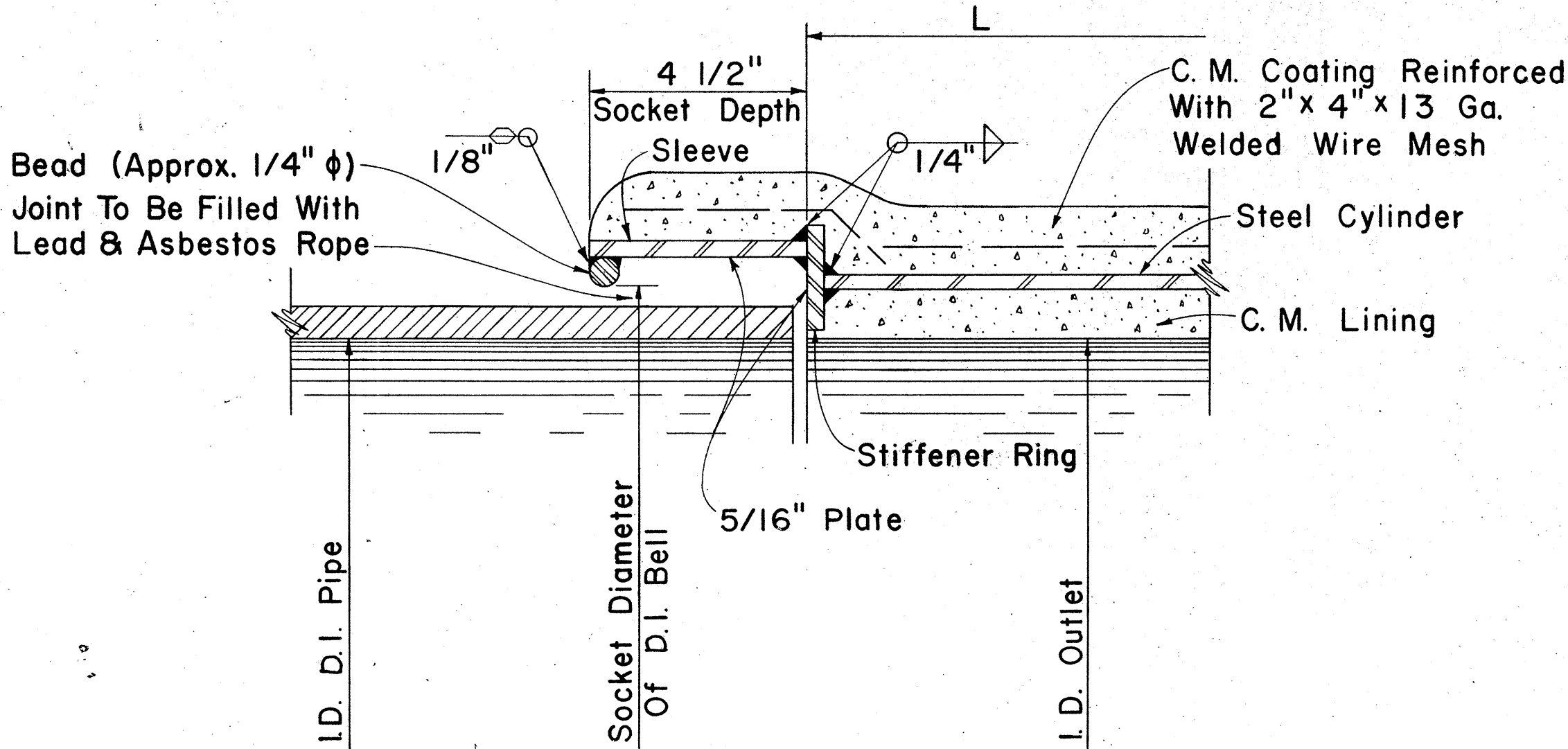
NOTE:
 For Pipe Sizes 24" And
 Larger 2 Handholes Required.



DETAIL OF SPLIT BUTT STRAP



TYPICAL CAST IRON PIPE CONNECTION
 TO CONCRETE CYLINDER PIPE



DETAIL OF D.I. ADAPTER

APPROVED :
 ASSISTANT CHIEF ENGINEER DATE
 BOARD OF WATER SUPPLY
 SHEET NO. 2 OF 2 SHEETS

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

BOARD OF WATER SUPPLY

CITY & COUNTY OF HONOLULU

CONCRETE CYLINDER PIPE

MISCELLANEOUS DETAILS

Scale: No Scale

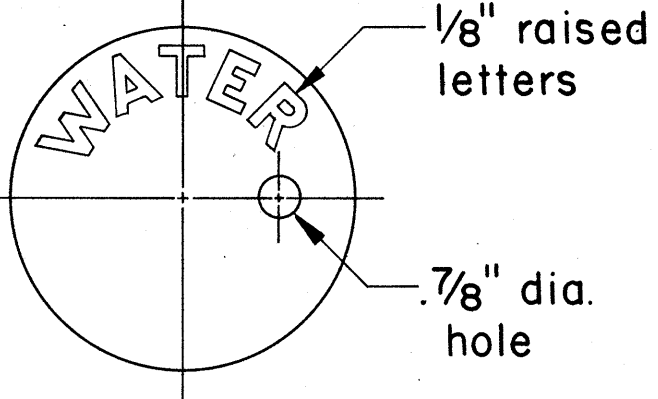
Date: July 15, 1976

SHEET No. 6 OF 7 SHEETS

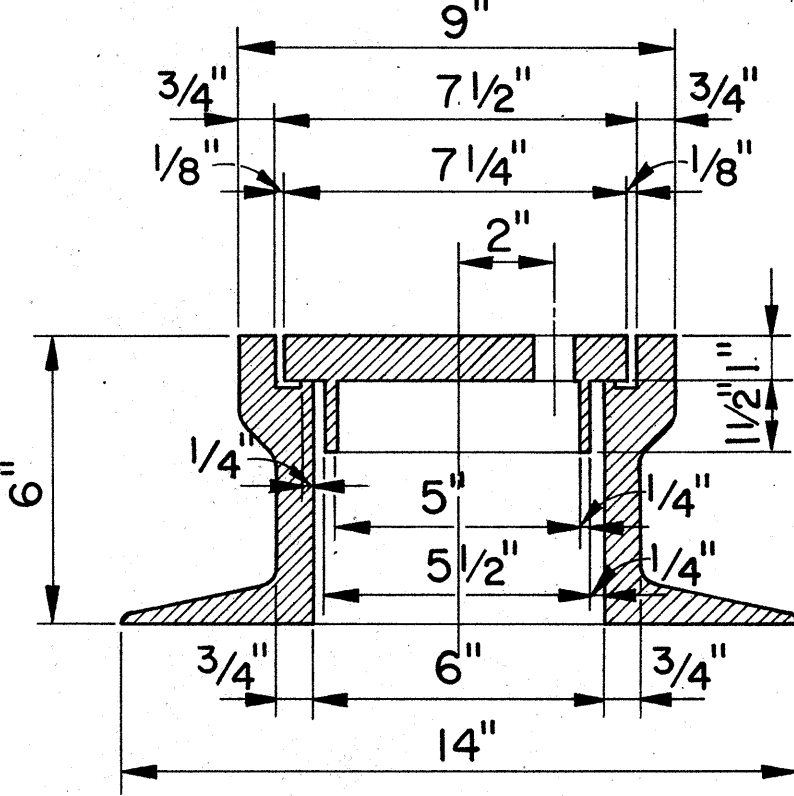
DATE	
SURVEY PLOTTED BY	
ORIGINAL PLAN	
DRAWN BY	
TRACED BY	
NOTED BY	
CHECKED BY	
No.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FHH-1136-17	1976	80	124

NOTE:
All castings shall be made accurately to the dimensions shown. Seat and cover shall be machined, not ground to secure flat and true surfaces. The cover shall not rattle in any position.



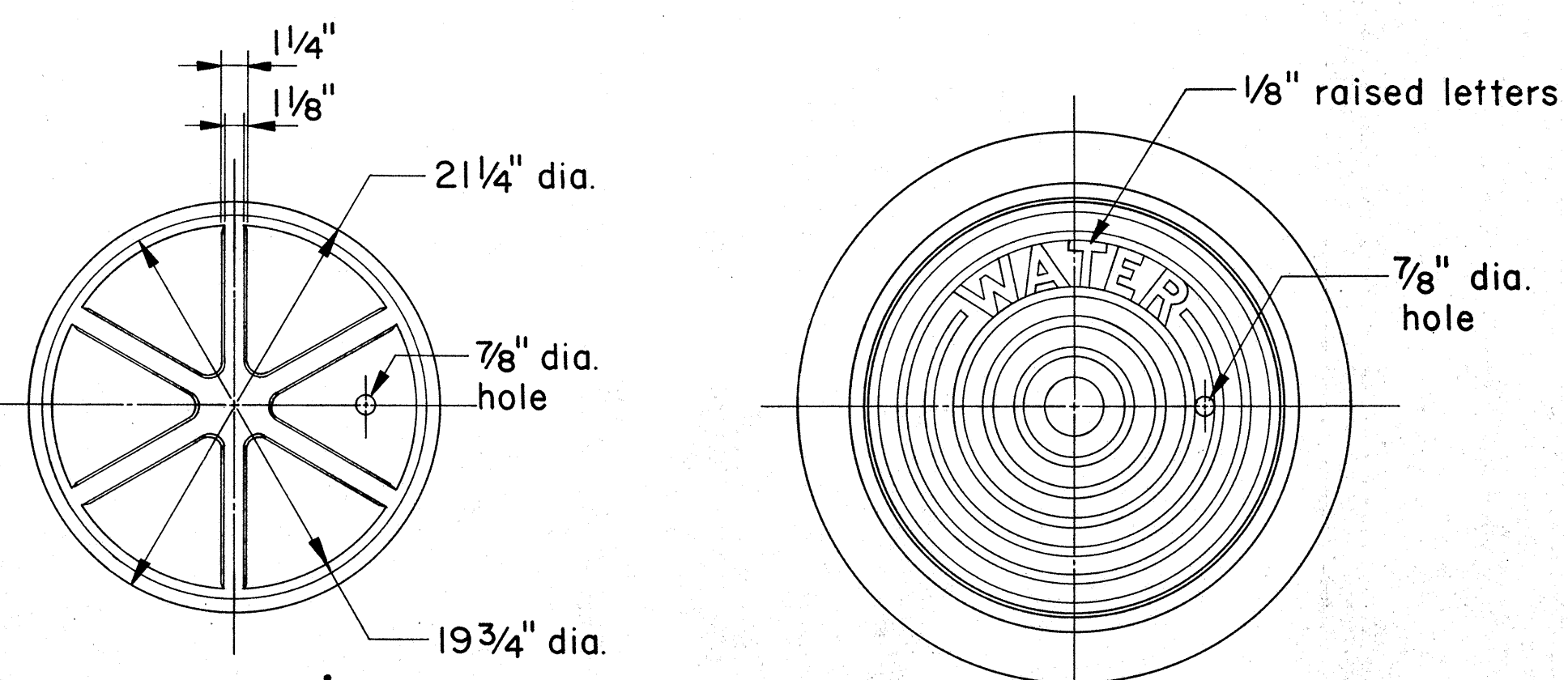
PLAN OF COVER



SECTION

MANHOLE FRAME AND COVER
CAST IRON, 6" SIZE

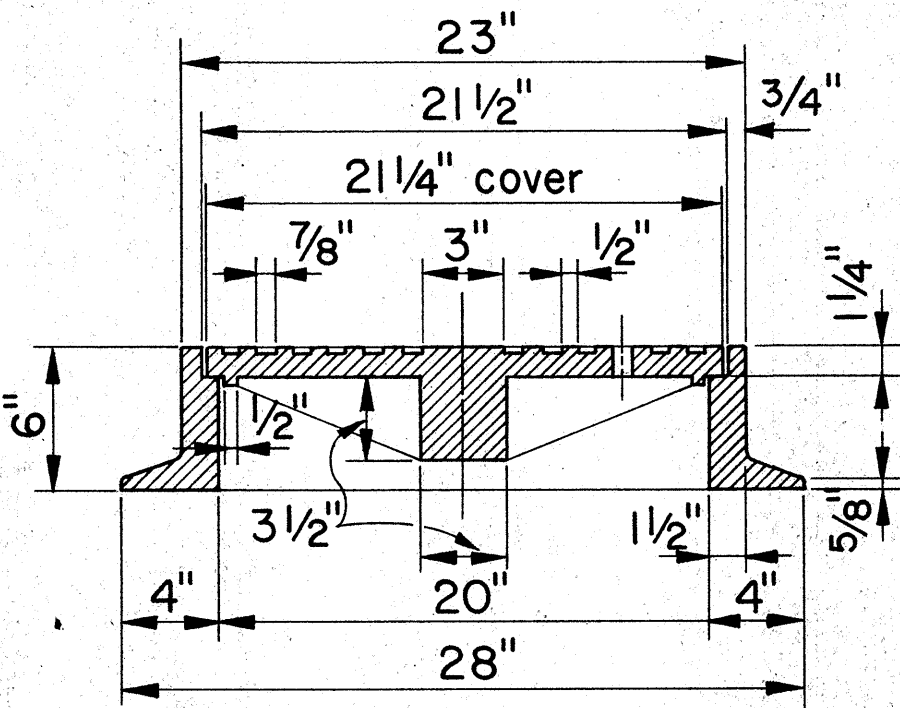
FIGURE 5



BOTTOM VIEW

PLAN OF TOP

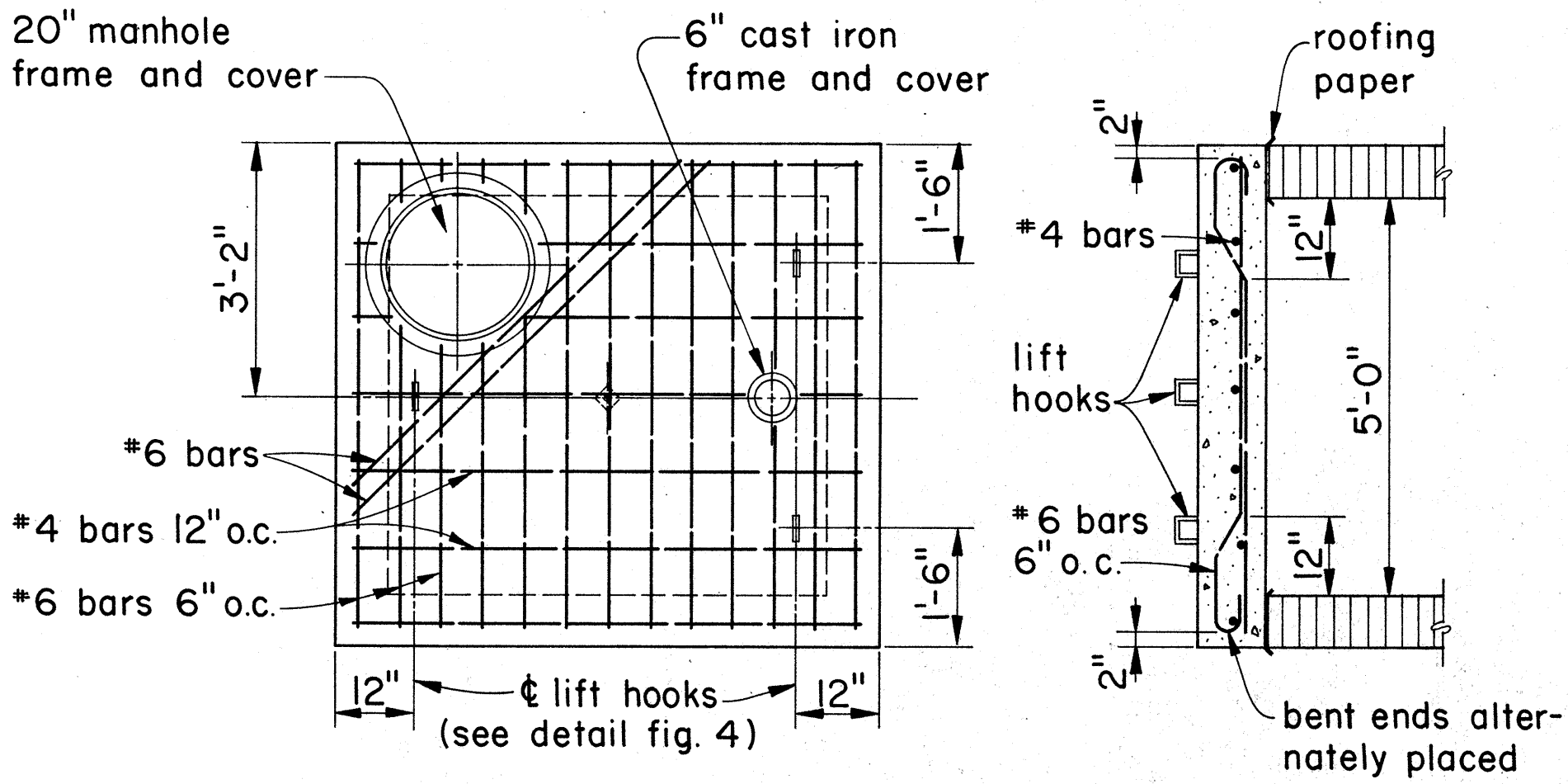
NOTE:
All castings shall be made accurately to the dimensions shown. Seat and cover shall be machined, not ground to secure flat and true surfaces. The cover shall not rattle in any position.



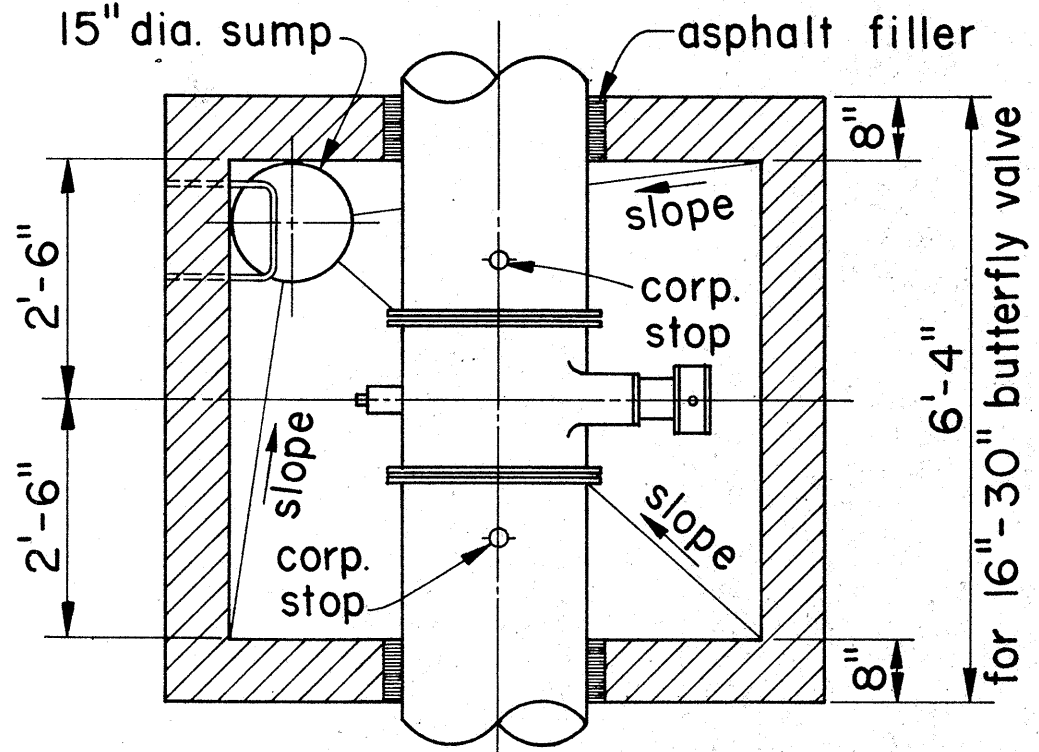
SECTION

MANHOLE FRAME AND COVER
CAST IRON, 20" SIZE

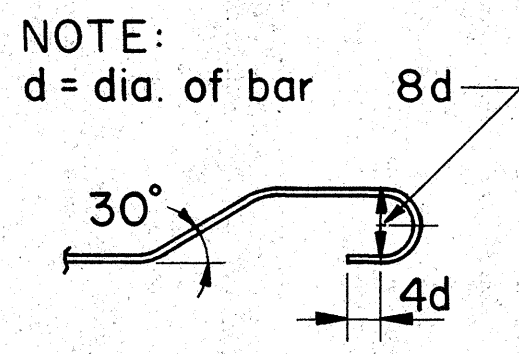
FIGURE 6



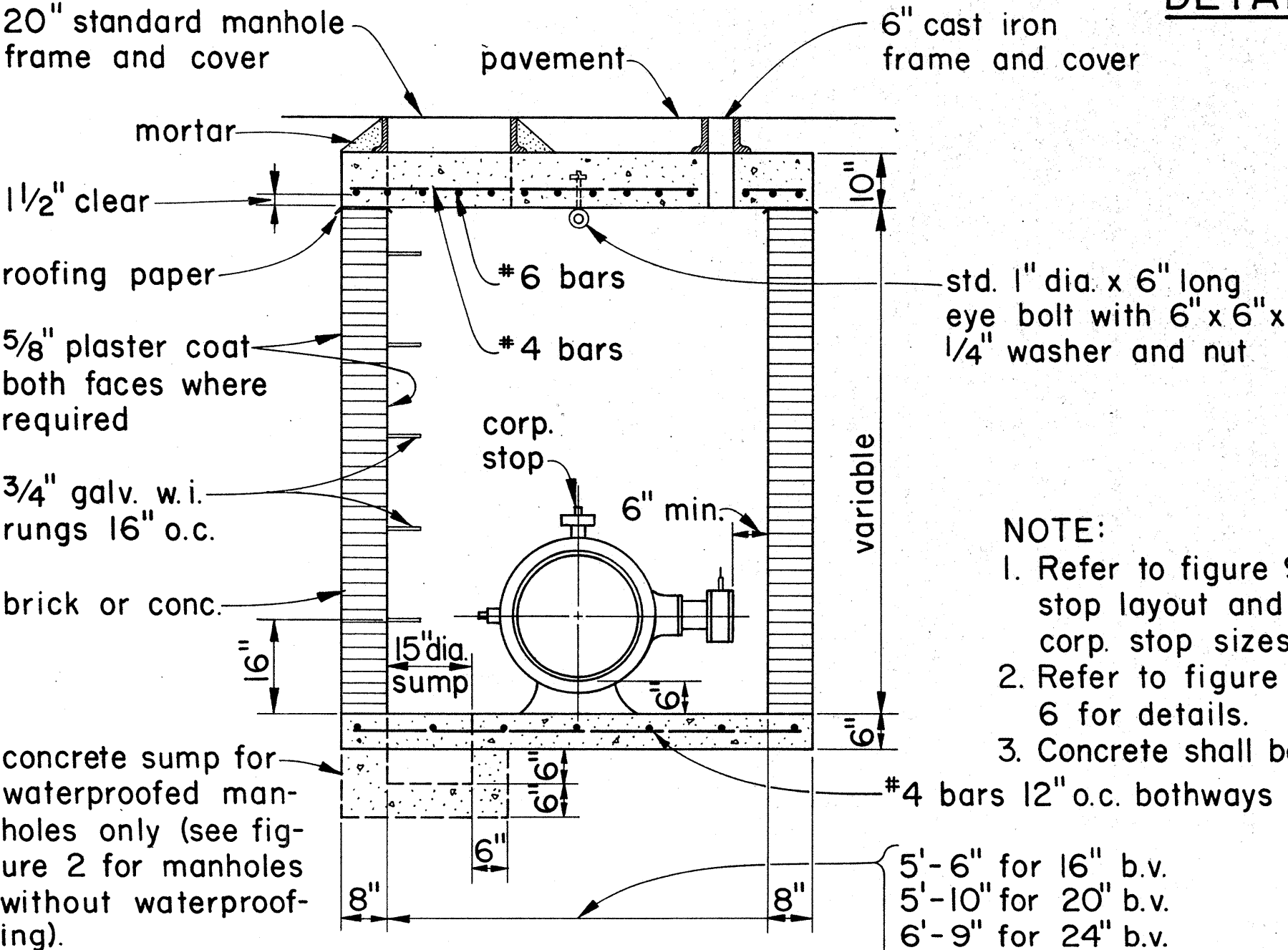
PLAN OF TOP SLAB



SECTION



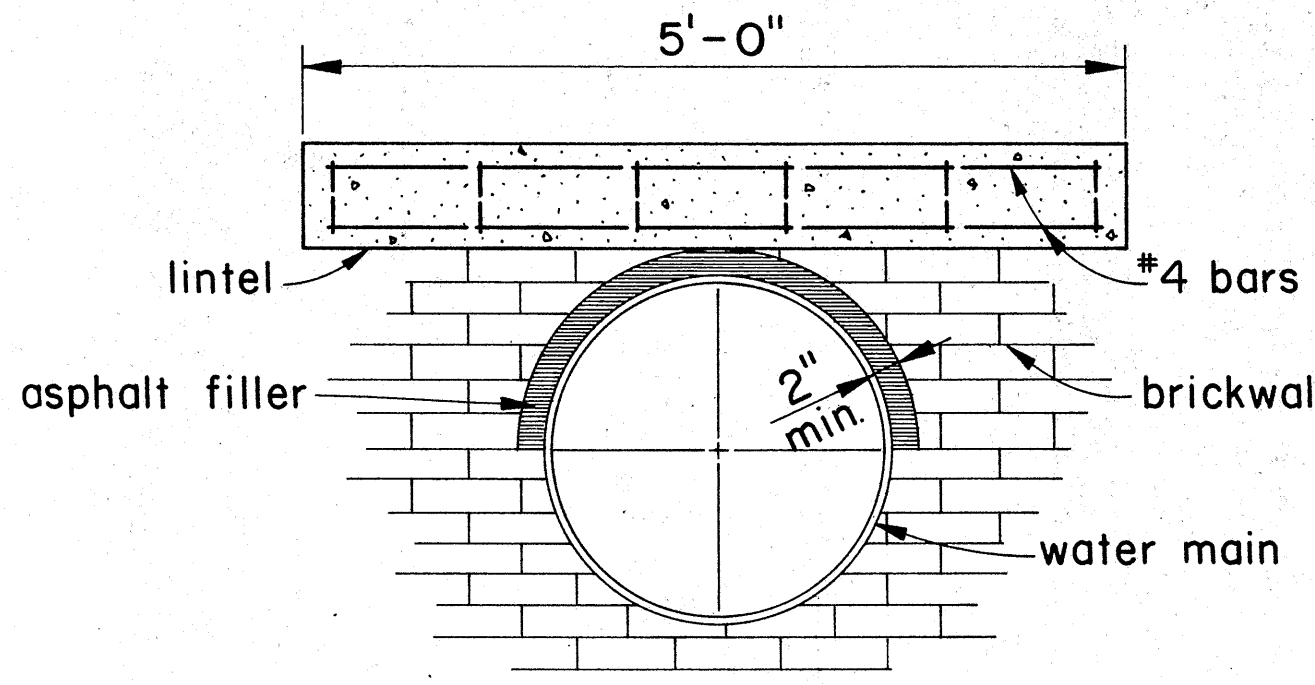
BAR BENDING
DETAIL



SECTION

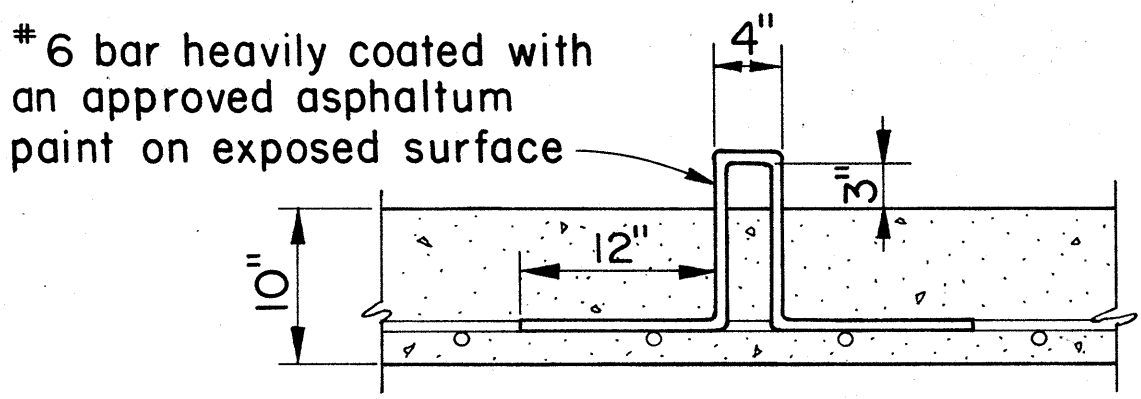
TYPE A MANHOLE
FOR BUTTERFLY VALVES

FIGURE 3

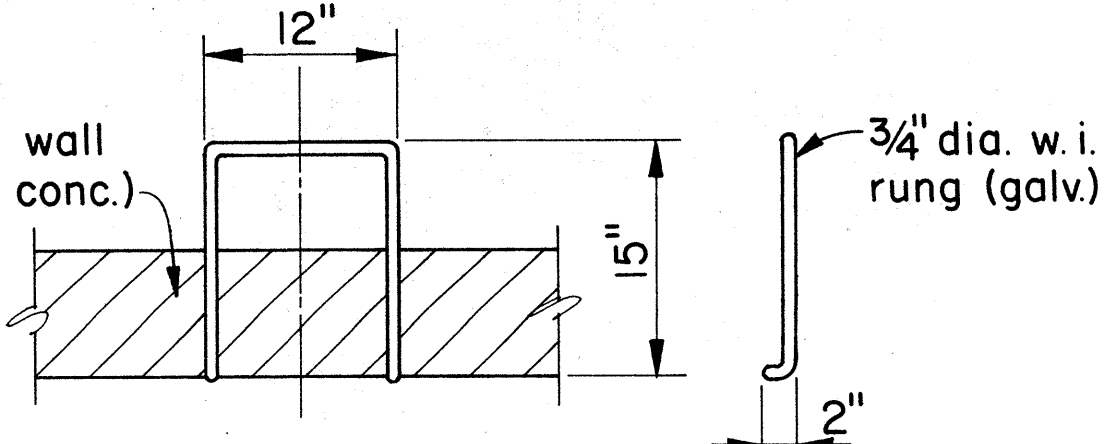


SECTION THRU LINTEL

NOTE:
Concrete shall be class B



LIFT HOOK DETAIL



DETAIL OF RUNG

TYPE A MANHOLE
DETAIL OF RUNG, LINTEL, FILLER, & LIFT HOOK

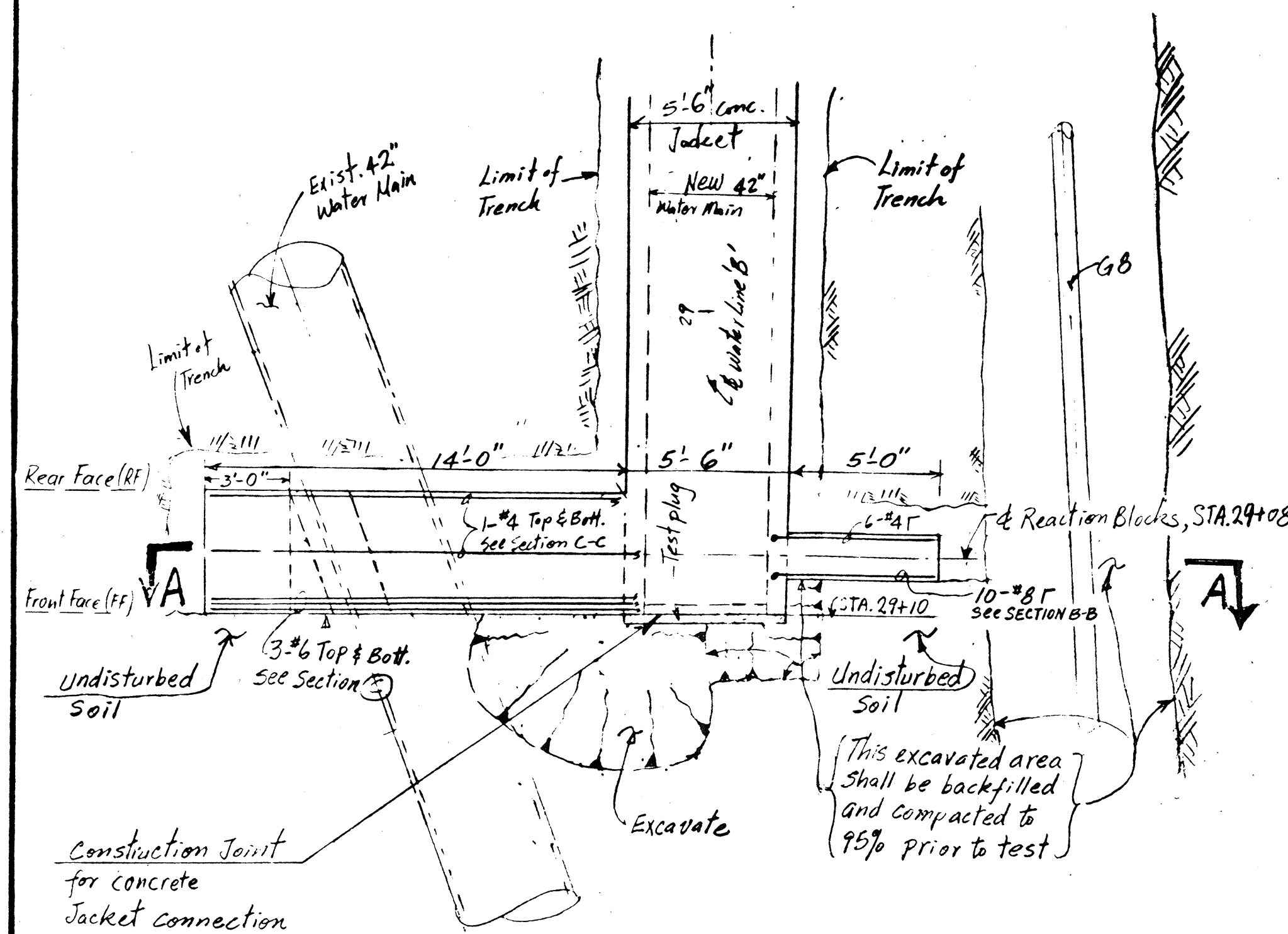
FIGURE 4

APPROVED:
[Signature] 1/24/73
ASSISTANT CHIEF ENGINEER
BOARD OF WATER SUPPLY

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
BOARD OF WATER SUPPLY

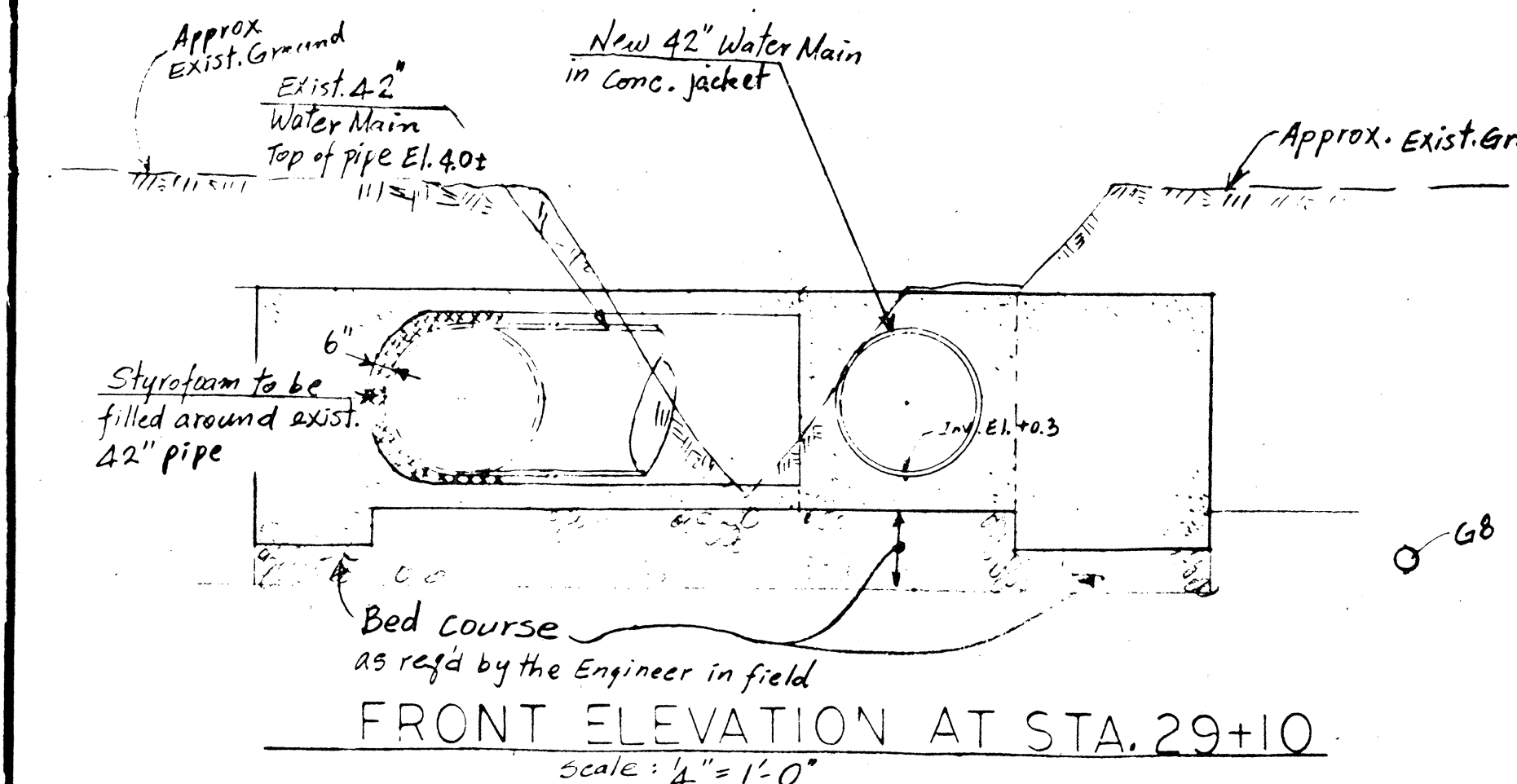
DATE: July 15, 1976
SHEET No. 7 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-HI-1(136):17	1976	805-	



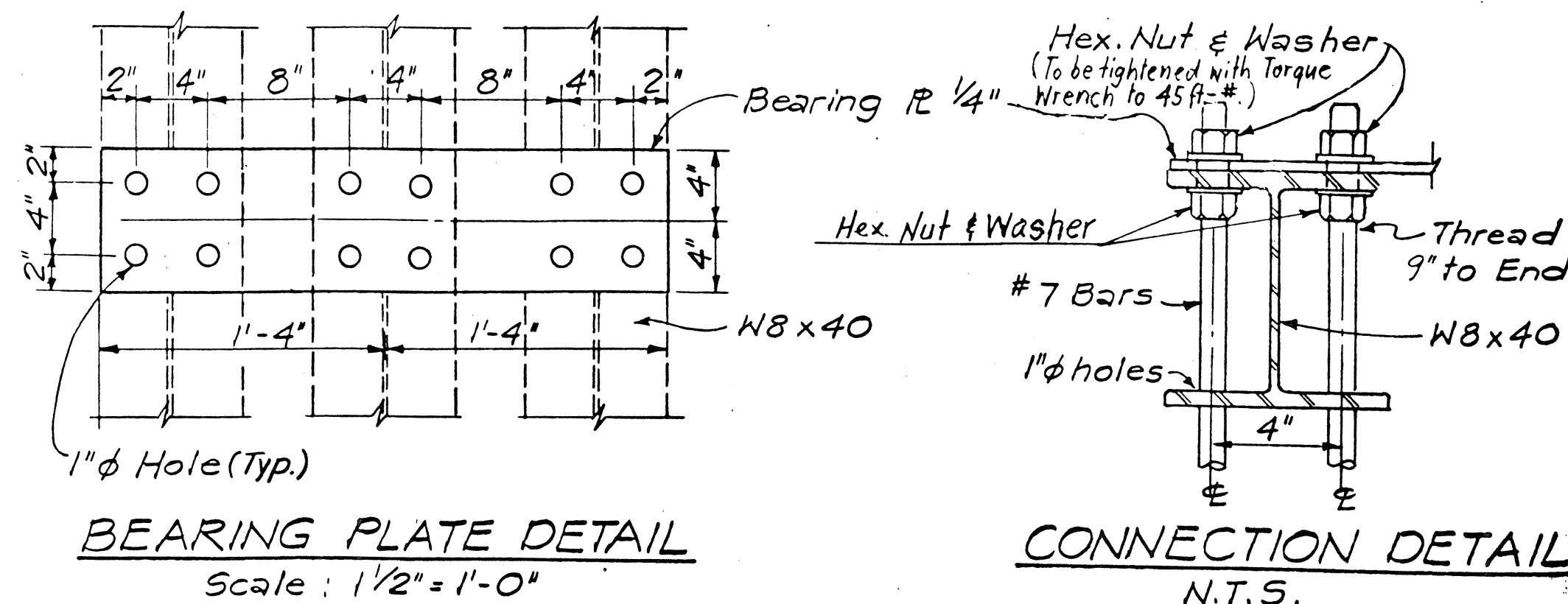
PARTIAL PLAN AT TEST PLUG

Scale: 1/4" = 1'-0"



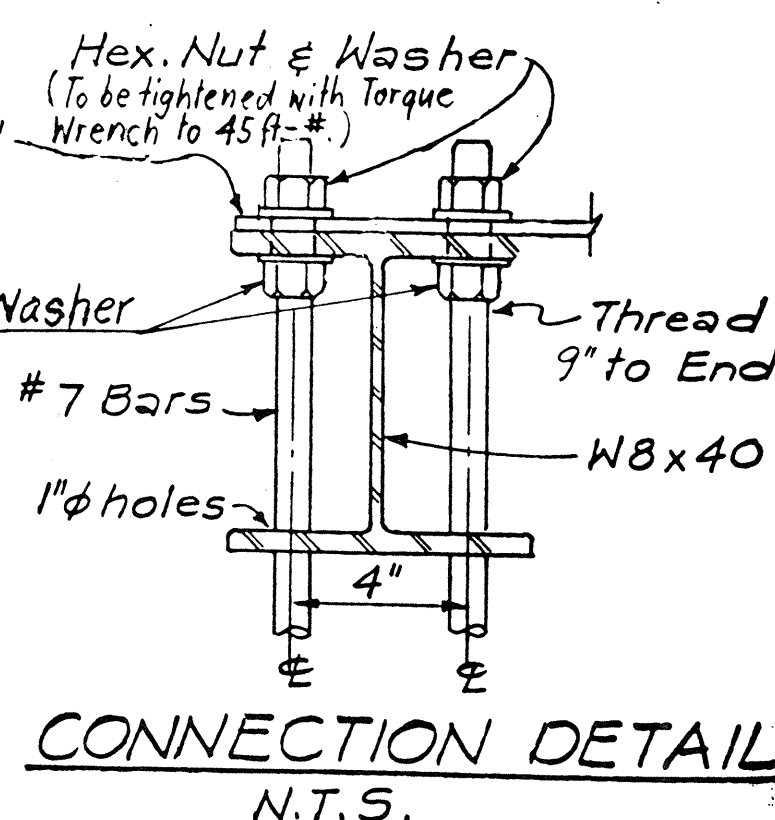
FRONT ELEVATION AT STA. 29+10

Scale: 1/4" = 1'-0"



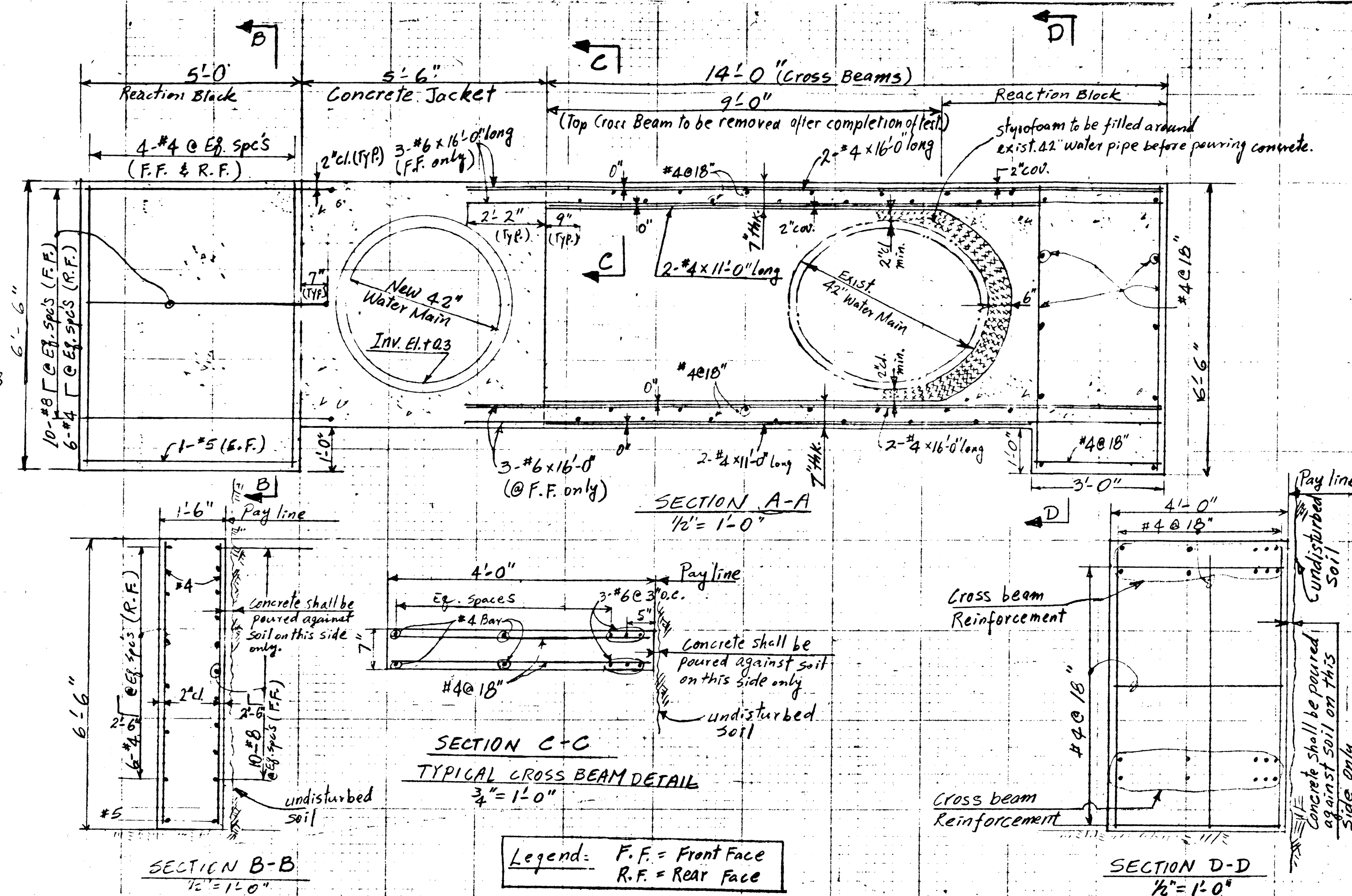
BEARING PLATE DETAIL

Scale: 1 1/2" = 1'-0"



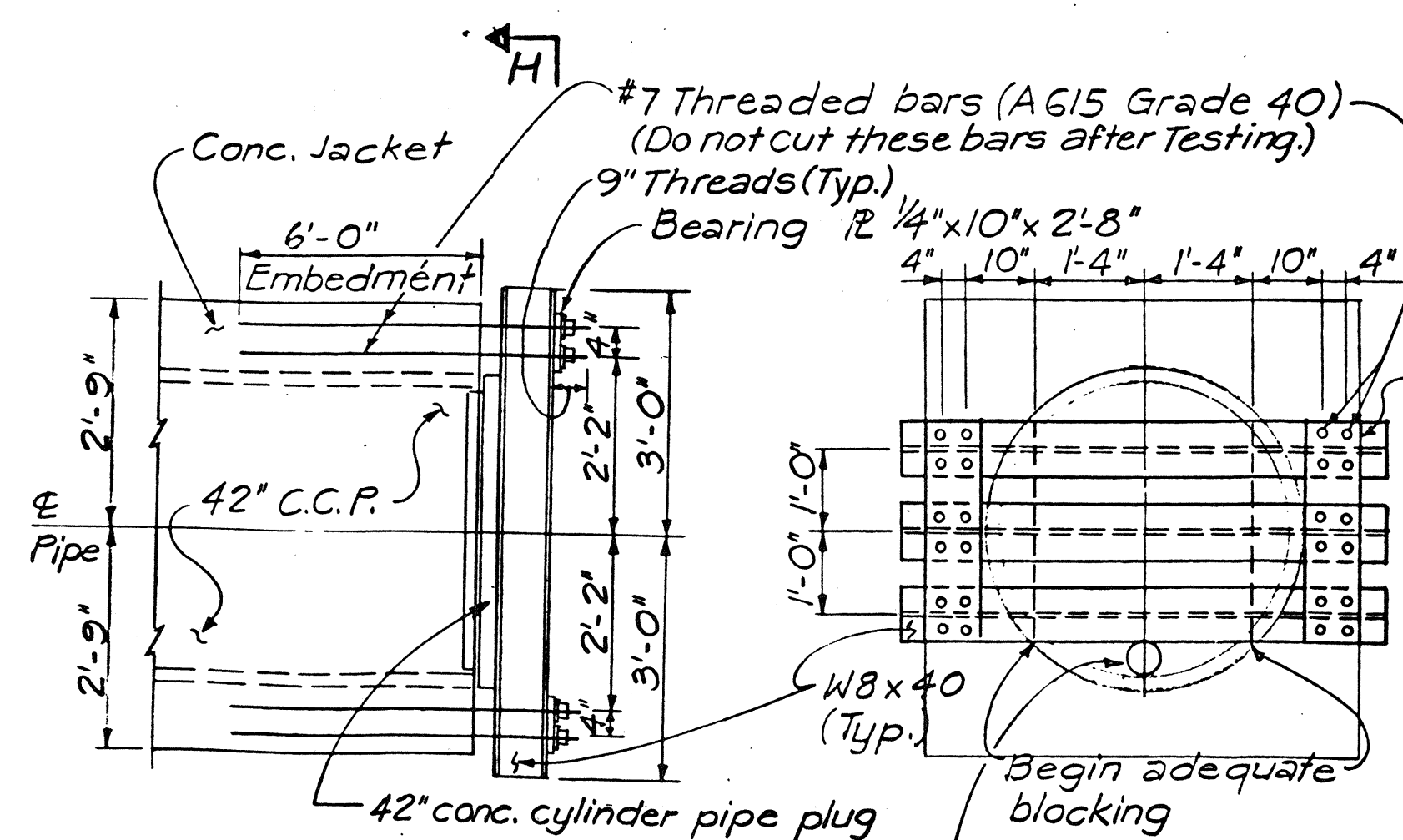
CONNECTION DETAIL

N.T.S.



TYPICAL CROSS BEAM DETAIL

Legend: F.F. = Front Face
R.F. = Rear Face

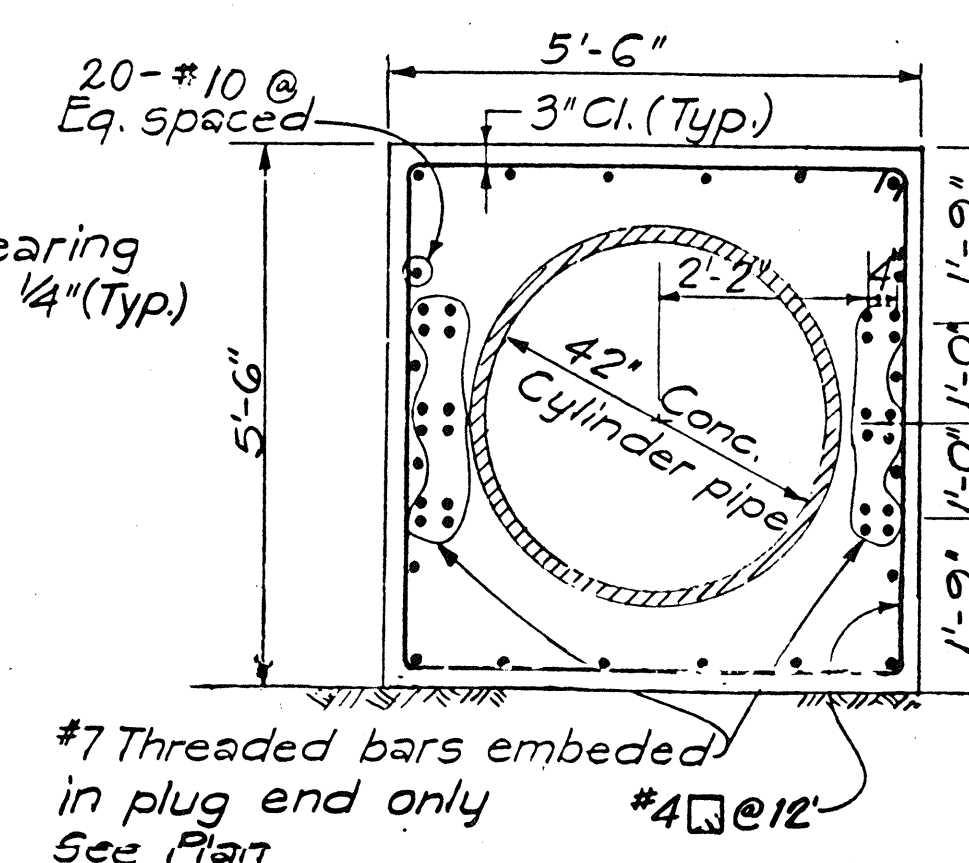


PARTIAL PLAN

Scale: 1/2" = 1'-0"

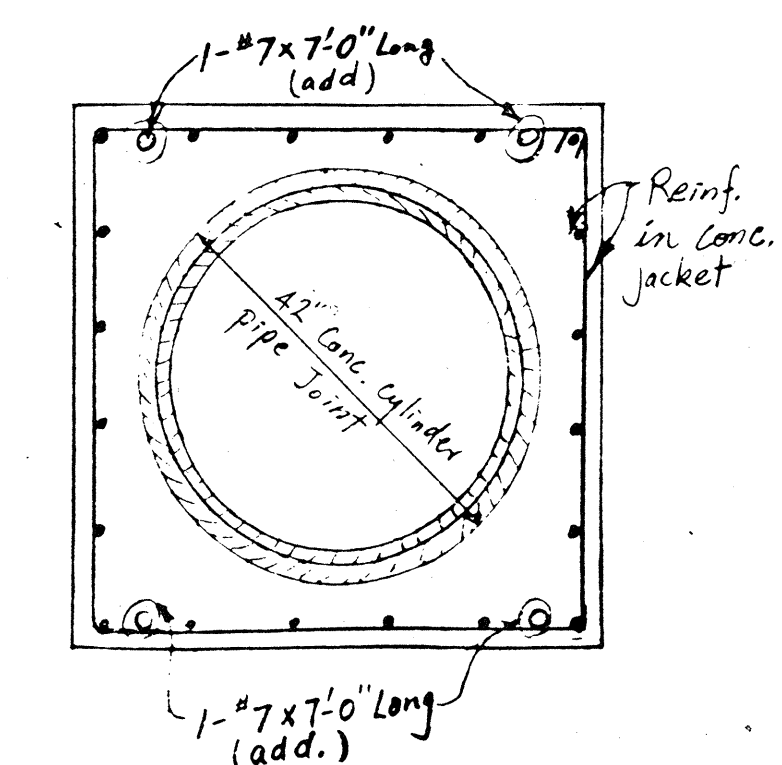
ELEVATION H-H

Scale: 1/2" = 1'-0"



TYPICAL SECTION FOR CONC. JACKET

FROM STA. 28+07 TO STA. 29+10
Scale: 1/2" = 1'-0"



TYPICAL CROSS SECTION AT PIPE JOINTS

Scale: 1/2" = 1'-0"

NOTES:

1. Before testing of the 42" Watermain, the Contractor shall place shim, if required, to insure contact between the plug and supporting steel beams.
2. All structural steel shall be ASTM A36 except as noted.
3. Longitudinal #10 bars at Sta. 29+10 shall project 3'-0" beyond the face of concrete jacket for connection to future jacket. Four bars which are in conflict with steel bracing may be cut at the face of concrete jacket.
4. Min. Lap for #10 bars in concrete jacket shall be 4'-6". splice of #10 bars shall be staggered.
5. All concrete shall be class A with a minimum ultimate 28-day cylinder compressive strength of 3000 psi.
6. All reinforcing steel shall be ASTM A615 Grade 40.
7. In constructing of reaction blocks, the Contractor shall keep the soil undisturbed as indicated on plan. The reaction blocks shall be excavated and poured neat at the undisturbed soil face.
8. The Contractor shall verify the location and elevation of existing 42" watermain pipe before spanning the cross beams over the pipe.
9. For construction joint in concrete jacket, see Fig. 17 on sheet No. 76 and Note B' this sheet.

DETAILS FOR 42" WATERMAIN TEST AT WATERLINE 'B' STA. 29+10

Note A: All Concrete, especially concrete jacket at plug end, shall be poured and vibrated according to the requirements in the Specifications.

Note B: Waterstop material in construction joint shall be placed in between #4 stir-up and edge of jacket. 3" minimum concrete cover shall be provided for waterstop material. The concrete jacket shall be widened to accommodate water stop.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
DETAILS FOR 42-INCH WATER MAIN TEST	
INTERSTATE ROUTE H-1 PROJECT NO. 1-HI-1(136):17	
SCALE: As shown	DATE:
SHEET NO.	OF SHEETS