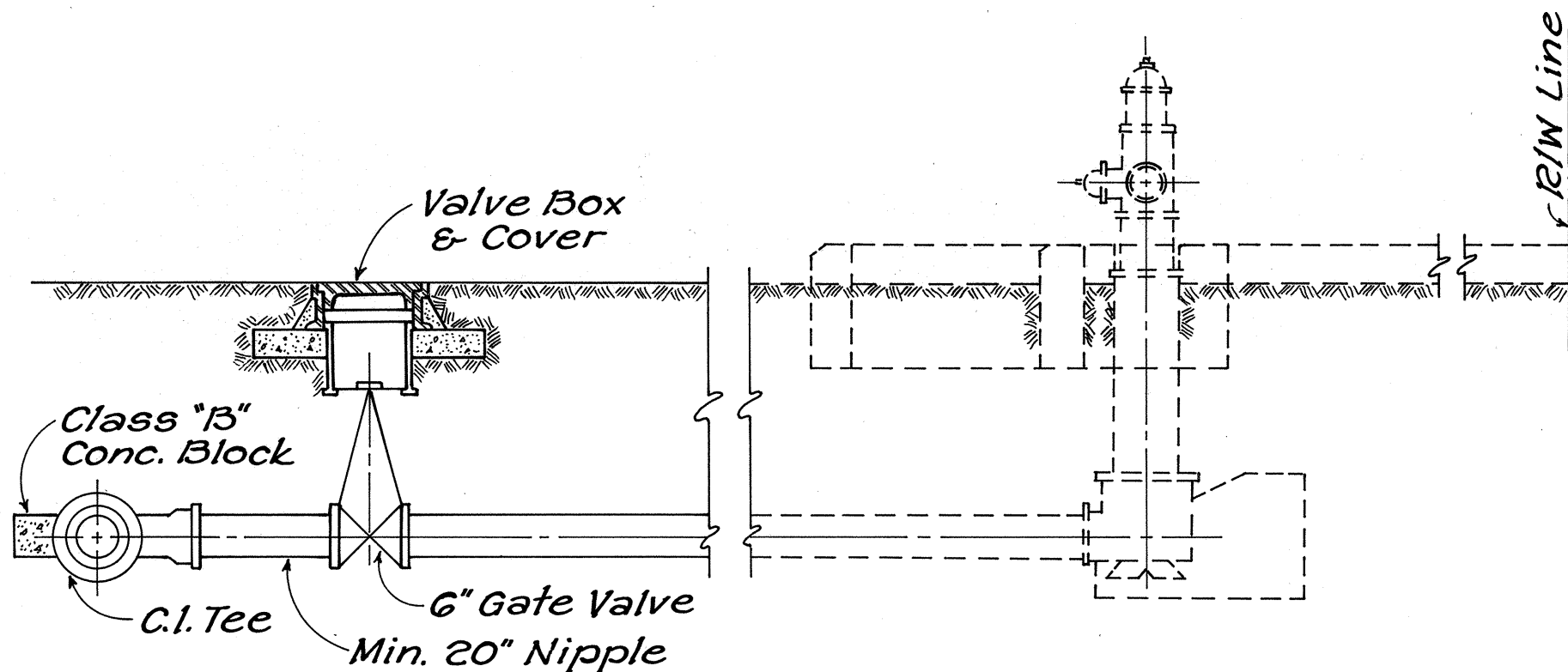


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-011-2(17)	1986	87	142

WATERLINE NOTES:

- All work shall conform to the Department of Water Supply "Standards for Water System" dated March 1965, as amended and the Hawaii Standard Specifications for Road and Bridge Construction, 1985.
- The Contractor shall inform the D.W.S. Engineer 72 hours prior to the beginning of any waterline work and one week prior to any connection, chlorination, shut-off, or relocation work.
- All work and material furnished by the D.W.S. shall be paid for in accordance with Utility Agreement No. 872.
- All existing waterline, waterline appurtenances and other utility locations shown on the plans are obtained from the latest reliable sources. The Contractor shall be responsible to verify the exact location of all utilities in the field and shall bear all cost for damages done unto them during the contract period.
- All hookups to existing waterlines shall be done by D.W.S. personnel. The Contractor shall provide all excavation, backfill, road repair, traffic control and equipment to lift materials.
- Where water shut-off of more than 3 hours becomes necessary, the Contractor, at his own cost, shall provide temporary bypass line, size of which shall be determined by the D.W.S. Engineer. The D.W.S. Engineer also reserves the right to require bypass lines regardless of the expected water shut-off period, if it is deemed necessary.
- Minimum horizontal clearance between waterlines and other utilities shall be 8 feet for road right-of-ways of 50' or less and 10' for road right-of-ways of more than 50'; minimum vertical clearance between waterline and other utilities shall be 6', provided concrete jackets are used and 1' if no concrete jackets are used. In all applicable instances, the waterlines shall be at a grade higher than other utilities.
- The waterline shall be tested at a minimum of 225 PSI at the low point of the line by the Contractor under D.W.S. Supervision.
- The Contractor shall be responsible for the chlorination of the water system and shall bear all cost. The persons engaged to do the chlorination work must be licensed by the State of Hawaii and approved by the Department of Health.
- Furnishing and installing other materials as called for in the plans that are not included in the proposal schedule shall be considered incidental to installing the new 16-inch Ductile Iron Pipe Water Line.

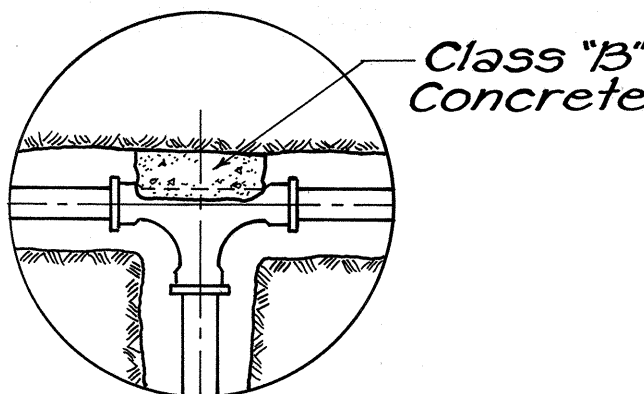


DETAILS OF FIRE HYDRANT INSTALLATION

NOT TO SCALE

Pipe Size	Tees, Bend Ends			
	a	b	c	d
4"	2.5	1.5	1.0	1.0
6"	5.0	2.5	2.0	1.5
8"	9.0	4.5	3.5	2.0
10"	14.0	7.0	5.5	3.5

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

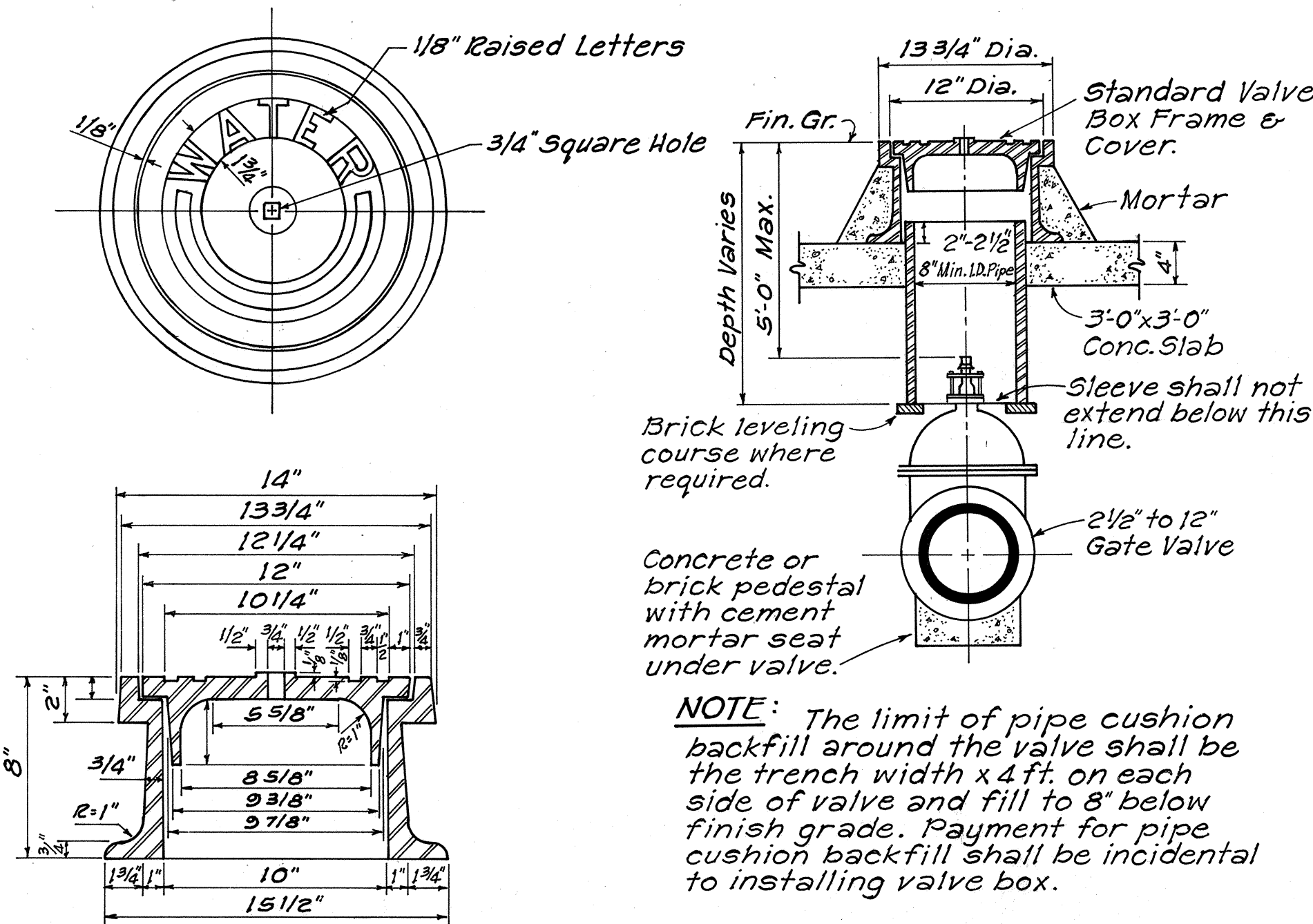


PLAN
N.T.S.

CONDITION OF SOIL

a = Sand	1,500	Lbs. Per Sq. Ft.
b = Sand & Gravel	2,000	" " " "
c = Sand, Gravel & Cemented Clay	3,000	" " " "
d = Shale	6,000	" " " "

CONCRETE THRUST BLOCKS FOR WATER MAINS



CAST IRON FRAME & COVER

Scale: 2" = 1'-0"

CAST IRON VALVE FRAME & COVER

NOT TO SCALE

DATE	_____
DESIGNED BY	_____
CHECKED BY	_____
QUANTITIES BY	_____
NOTE BOOK	_____
PLAN	_____
ORIGINAL	_____

REAPPROVED:

H. William Sewak 8-13-85
MANAGER, DEPARTMENT OF WATER SUPPLY DATE

APPROVED:

H. William Sewak 4-21-80
MANAGER, DEPARTMENT OF WATER SUPPLY DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
WATERLINE NOTES
AND DETAILS
VOLCANO ROAD
KEAAU AGRICUTURAL SUBDIVISION
TO SLAUGHTER HOUSE ROAD
F.A.P. No. F-011-2(17)
Scale: As Noted Date: August 1985
SHEET No. OF SHEETS