

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(132)17	1983	172	192

1. **GENERAL SPECIFICATIONS:** HAWAII DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 1976, TOGETHER WITH SPECIAL PROVISIONS PREPARED FOR THIS CONTRACT.
2. **DESIGN SPECIFICATIONS:** A.A.S.H.T.O. 1977 STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES AND ITS SUBSEQUENT INTERIM SPECIFICATIONS.
3. **LOADS:**
- (A) **DEAD LOAD:** AN ALLOWANCE OF 18 P.S.F. FOR FUTURE WEARING SURFACE OF ASPHALT CONCRETE HAS BEEN PROVIDED FOR IN THE DESIGN.
- (B) **LIVE LOAD:** HS20-44 OR INTERSTATE LOADING.
4. **MATERIALS:**
- (A) ALL CONCRETE SHALL BE CLASS A UNLESS OTHERWISE NOTED. SEE NOTES ON APPROPRIATE SHEETS.
- (B) ALL REINFORCING STEEL SHALL BE A.S.T.M. A615, GRADE 40 UNLESS OTHERWISE NOTED.
- (C) ALL STRUCTURAL STEEL SHALL BE A.S.T.M. A-36, HOT DIP GALVANIZED, UNLESS OTHERWISE NOTED.
- (D) ALL ANCHOR BOLTS, WASHERS AND NUTS SHALL BE A.S.T.M. A-307, HOT DIP GALVANIZED AFTER FABRICATION, UNLESS OTHERWISE SPECIFIED.
- (E) FOR MATERIALS OF PRESTRESSED CONCRETE BEAMS & PILES SEE APPLICABLE PRESTRESSED CONCRETE NOTES.

5. **DESIGN STRESSES:** SHALL FOLLOW A.A.S.H.T.O. STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES IN ADDITION TO THOSE LISTED BELOW.

CONCRETE	CLASS A OR BD	ALL OTHERS (EXCEPT PRESTRESSED CONCRETE BEAMS AND UNLESS OTHERWISE NOTED ON THE PLANS)
F'C	3000 P.S.I.	5000 P.S.I.
FC	1200 P.S.I.	2000 P.S.I.
N	9	7

- FOR PRESTRESSED CONCRETE BEAMS, SEE PRESTRESSED CONCRETE NOTES.
6. **REINFORCEMENT:**
- (A) THE MINIMUM COVERING MEASURED FROM THE SURFACE OF THE CONCRETE TO THE FACE OF ANY REINFORCING BARS SHALL BE AS FOLLOWS:
- A.1. DECK SLABS (FOR BOX GIRDERS, T-BEAMS, PRESTRESSED BEAMS)
- A. TOP BARS = 1 1/2"
- B. BOTTOM BARS = 1 1/4"
- A.2. **BOX GIRDERS**
- A. 1 1/4" TO STIRRUP FROM OUTSIDE FACES
- B. 1" TO STIRRUP FROM INSIDE FACES.
- A.3. FOR PRESTRESSED CONCRETE BEAMS SEE PRESTRESSED CONCRETE BEAM DETAILS.
- A.4. ABUTMENTS, PIERS AND RETAINING WALLS = 2"
- A.5. COLUMNS = 2" TO TIES
- A.6. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH = 3".
- A.7. ~~CONCRETE EXPOSED TO SEA WATER = 4".~~ N.I.C.

- (B) REINFORCING BARS SHALL BE DETAILED IN ACCORDANCE WITH A.C.I. MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE HIGHWAY STRUCTURES UNLESS OTHERWISE NOTED.
- (C) MINIMUM CLEAR SPACING BETWEEN PARALLEL BARS SHALL BE 1 1/2 TIMES THE DIAMETER OF BARS (FOR NON BUNDLED BARS), BUT IN NO CASE SHALL THE CLEAR DISTANCE BETWEEN THE BARS BE LESS THAN 1 1/2 TIMES THE MAXIMUM SIZE OF THE COARSE AGGREGATE.
- (D) ALL DIMENSIONS RELATING TO REINFORCING BARS (EG. SPACING OF BARS, ETC.,) ARE TO CENTERS OF BARS UNLESS OTHERWISE NOTED.
- (E) REINFORCING BARS SHALL BE SECURELY TIED AT ALL INTERSECTIONS AND LAP SPLICES EXCEPT WHERE THE SPACING OF INTERSECTIONS IS LESS THAN ONE FOOT IN EACH DIRECTION, IN WHICH CASE ALTERNATE INTERSECTIONS SHALL BE TIED.
- (F) VERTICAL COLUMN BARS SHALL BE ARRANGED IN SUCH A MANNER AS TO AVOID INTERFERENCE WITH PIER CAP BARS ABOVE AS DIRECTED BY THE ENGINEER.

7. **BEARING PADS**
- (A) CONCRETE PAD FOR GIRDER: BEARING AREA DEVIATION FROM PLANE SHALL NOT EXCEED 1/16-INCH. THE PAD SHALL BE CONSTRUCTED HIGHER THAN SHOWN ON PLANS AND SHALL THEN BE GROUND DOWN TO THE REQUIRED ELEVATION. PAD SHALL BE MONOLITHIC WITH STRUCTURE.
- (B) ELASTOMERIC PADS: BOTTOM OF BRIDGE BEARING PADS SHALL BE SECURED TO THE CONCRETE SEATS, TO PREVENT DISPLACEMENT, WITH ADHESIVES APPROVED BY THE ENGINEER.

8. **CONSTRUCTION METHODS.**
- (A) SEE STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS.
- (B) IN GENERAL TOP OF CONCRETE DECK SLAB SHALL BE CONSTRUCTED TO FOLLOW THE ROADWAY VERTICAL AND HORIZONTAL CURVES.
- (C) FALSEWORK FOR PIER CAPS SHALL BE SUPPORTED BY THE PIER COLUMNS AND/OR PILE CAPS. IN NO INSTANCE SHALL FORM SUPPORTS BE CARRIED TO MUDSILLS, ETC. ON GRADE.
- (D) GIRDER CONCRETE SEATS RECEIVING ELASTOMERIC PADS SHALL BE POURED MONOLITHICALLY WITH SUPPORTING STRUCTURE.
- (E) SPREAD FOOTINGS SHALL BE EXCAVATED AND POURED NEAT AGAINST UNDISTURBED GROUND. IN CASE OF OVER EXCAVATION, SPACE BETWEEN FOOTING AND GROUND SHALL BE FILLED WITH CONCRETE AT THE CONTRACTOR'S EXPENSE AND AS DIRECTED BY THE ENGINEER. THE MINIMUM QUALITY OF THE FILL CONCRETE SHALL BE CLASS D.
- (F) IN THE INSTALLATION OF ANCHOR BOLTS FOR BRIDGE BEARINGS, LIGHTING STANDARDS AND EXPRESSWAY BRIDGE SIGN STRUCTURES, THE CONTRACTOR SHALL PROVIDE RIGID TEMPLATES TO MAINTAIN THE PROPER LOCATIONS AND SHALL PROTECT SUCH ANCHOR BOLTS AT ALL TIMES DURING THE PERIOD OF CONSTRUCTION. METHODS SHALL BE APPROVED BY THE ENGINEER.
- (G) EXCEPT AS OTHERWISE NOTED, ALL VERTICAL DIMENSIONS ARE MEASURED PLUMB.

9. **GENERAL**
- (A) ALL ITEMS NOTED INCIDENTAL WILL NOT BE PAID FOR SEPARATELY.
- (B) THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITY LINES AND NOTIFY THE RESPECTIVE OWNERS BEFORE COMMENCING THE WORK OF EXCAVATION OR THE DRIVING OF PILES, INCLUDING ANY TEMPORARY PILING OR SHEETING.
- (C) FOR CONCRETE FINISH SEE STANDARD SPECIFICATIONS AND FOR ARCHITECTURAL TREATMENT OF COLUMNS, SEE DETAILS.
- (D) CONSTRUCTION JOINTS MAY BE RELOCATED OR ADDITIONAL ONES ADDED SUBJECT TO THE APPROVAL OF THE ENGINEER.
- (E) UNLESS OTHERWISE NOTED, ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 3/4" x 3/4".
- (F) STANDARD DETAIL DRAWINGS REFER TO ALL STRUCTURES IN GENERAL, EXCEPT FOR MODIFICATIONS AS MAY BE REQUIRED FOR SPECIAL CONDITIONS. FOR SUCH MODIFICATIONS REFER TO THE CORRESPONDING DETAILED DRAWINGS.
- (G) FOR ELECTRICAL CONDUIT LOCATION DETAILS SEE ELECTRICAL DRAWINGS.

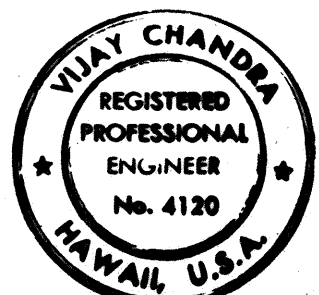
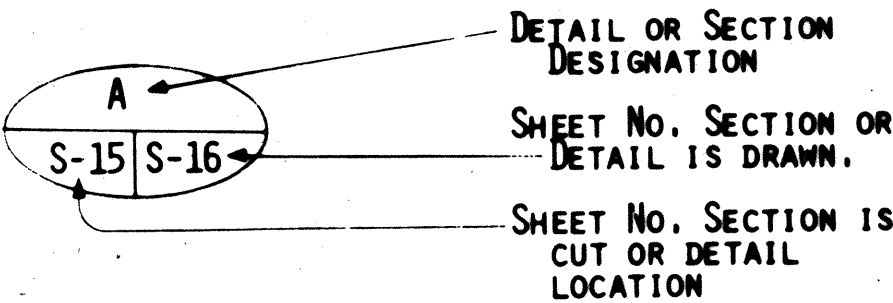
10. **FOUNDATION:**
- (A) DESIGN LOAD * FOR PILE TYPE A=115 TONS.
- (B) FOR BORING LOGS AND THEIR LOCATION SEE SHEET NOS. B-1, B-2, ETC.
- (C) THE PILE TIP ELEVATIONS SHOWN ON THE PLANS ARE BASED ON BORING DATA.
- (D) IN DRIVING EACH GROUP OF PILES, THE CONTRACTOR SHALL START FROM CENTER OF THE GROUP AND PROCEED OUTWARDS, EXCEPT FOR TEST PILES AND LOAD TEST PILES.
- (E) THE CONTRACTOR SHALL VERIFY THE TYPE OF SURFACE SOIL BEFORE STARTING TO DRIVE ANY PILE. WHERE THERE IS A SURFACE CRUST, A TEMPORARY STEEL SLEEVE SHALL BE USED TO PROTECT THE BITUMEN COATING ON PILES. THE SLEEVE SHALL EXTEND THROUGH THE DEPTH OF THE CRUST. THE SLEEVE SHALL BE REMOVED AFTER THE PILE IS DRIVEN AND THE ANNULAR SPACE AROUND THE PILE SHALL BE BACKFILLED AS SPECIFIED IN THE SPECIAL PROVISIONS. (FOR DETAILS SEE SHEET NO. SD-11)
- ~~(F) SQUARE PILES ARE TO BE SO ALIGNED THAT FRONT AND REAR FACES OF PILES ARE PARALLEL TO CENTERLINE OF PIER.~~ N. I. C.
- (G) LOAD TEST PILES INDICATED IN FOUNDATION PLAN SHALL BE FURNISHED 13' LONGER THAN REGULAR PILES.
- (H) TEST PILES INDICATED IN FOUNDATION PLAN SHALL BE FURNISHED 5' LONGER THAN REGULAR PILES.

* DESIGN LOAD FOR PILES EXCLUDES PILE WEIGHT AND ESTIMATED DOWNDRAW.

11. **REFERENCES:**
- (A) FOR PRESTRESSED CONCRETE NOTES, SEE DRAWINGS FOR PRESTRESSED BEAM DETAILS.
- (B) FOR SIGN STRUCTURE NOTES, SEE DRAWING NO. ES-1.
- (C) FOR ADDITIONAL PILE NOTES SEE DRAWING NO. SD-10.
12. THE CONTRACTOR SHALL VERIFY THE LOCATIONS AND DIMENSIONS OF SUBSTRUCTURES BUILT BY OTHERS PRIOR TO FABRICATION OF THE GIRDERS WHICH WILL BE SUPPORTED BY THESE STRUCTURES.

13. **SYMBOLS AND ABBREVIATIONS**

(E) OR (EXP.)	- EXPANSION	O.C.	- ON CENTERS
(H)	- HINGE	O/S	- OFFSET
ALT.	- ALTERNATE	STR.	- STRAIGHT OR STRINGER
AZ.	- AZIMUTH	STIRR.	- STIRRUP
CL	- CENTERLINE	TYP.	- TYPICAL
BL	- BASELINE	(T) OR T.	- TOP
E.F.	- EACH FACE	(B) OR B.	- BOTTOM
B.F.	- BOTH FACES	BRG.	- BEARING
F.F.	- FAR FACE	T.O.D.	- TOP OF DECK
N.F.	- NEAR FACE	W.P.	- WORKING POINT
C.J.	- CONSTRUCTION JOINT	a	- AT
CL.	- CLEAR	Ø OR DIA.	- DIAMETER
EL., ELEV.	- ELEVATION	P	- PLATE
E.P.	- EDGE OF PAVEMENT		
EB	- EAST BOUND		
FIN. GR.	- FINISHED GRADE		
WB	- WEST BOUND		
INV.	- INVERT		
JT.	- JOINT		
N.T.S.	- NOT TO SCALE		
N.I.C.	- NOT IN CONTRACT		



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Vijay Chandra
Signature

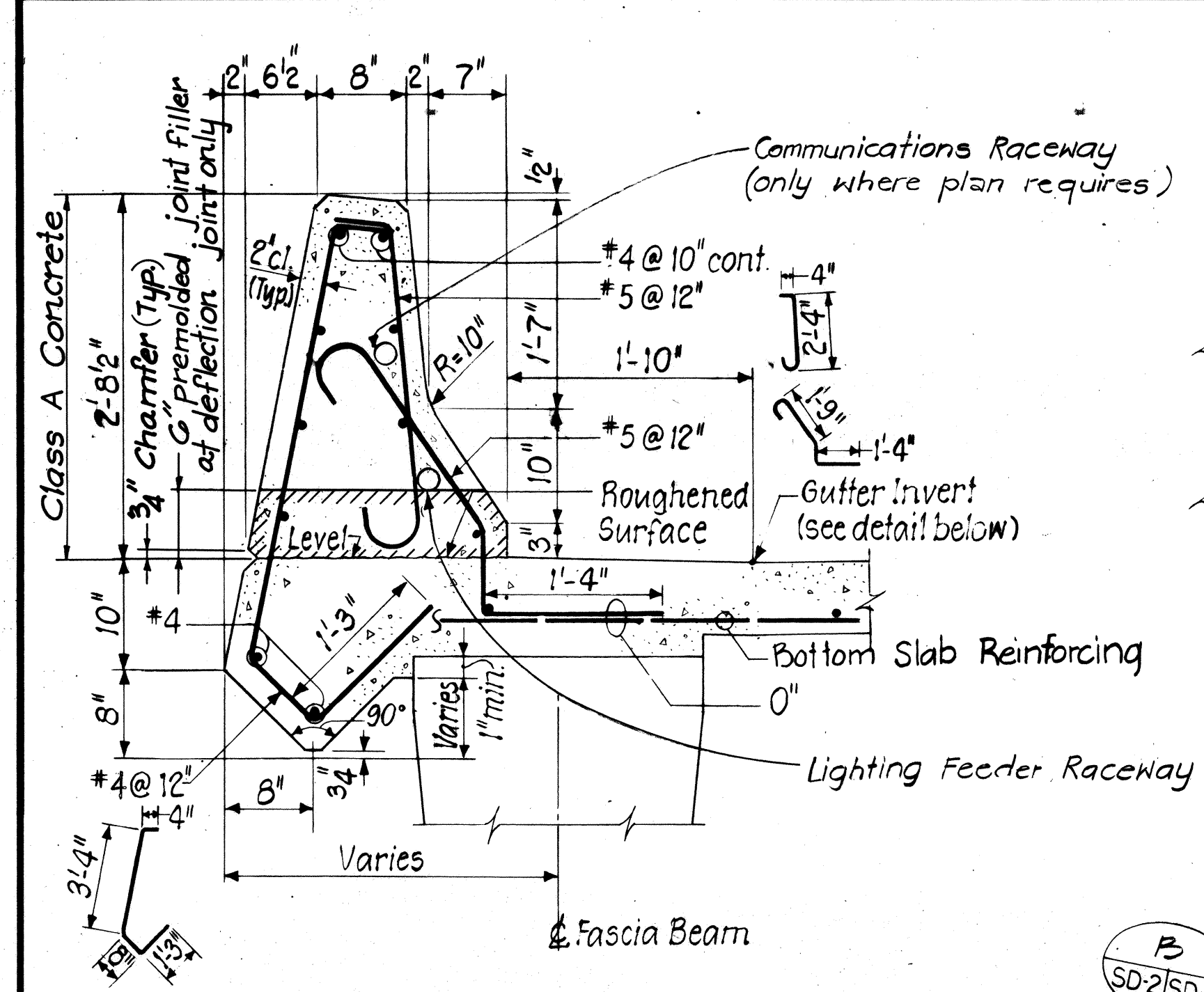
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL NOTES

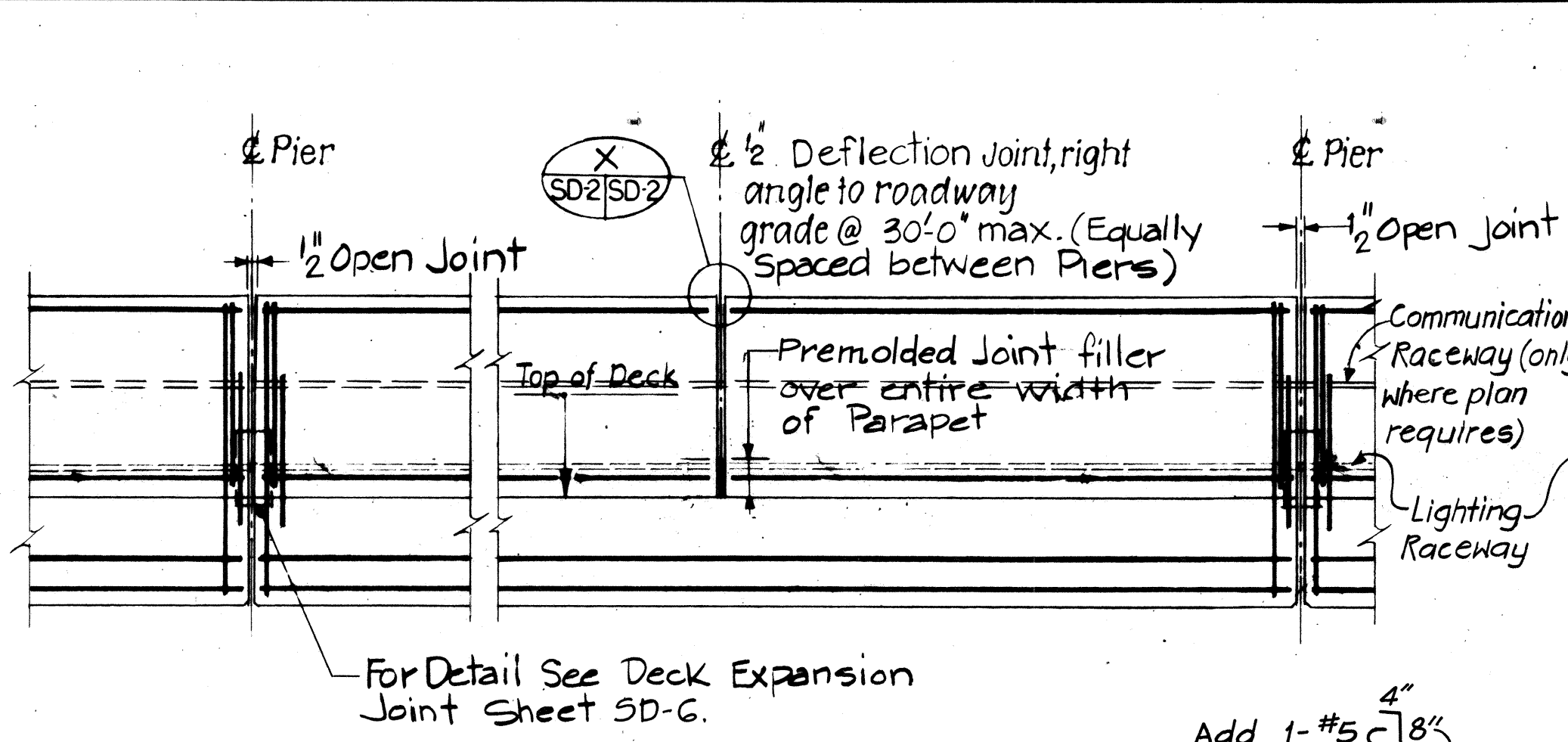
KEEHI INTERCHANGE
F.A.I. PROJECT NO. I-HI-1(132):17
SCALE: DATE: 6/15/81

SHEET No. SD-1 OF SD-14 SHEETS SD-1

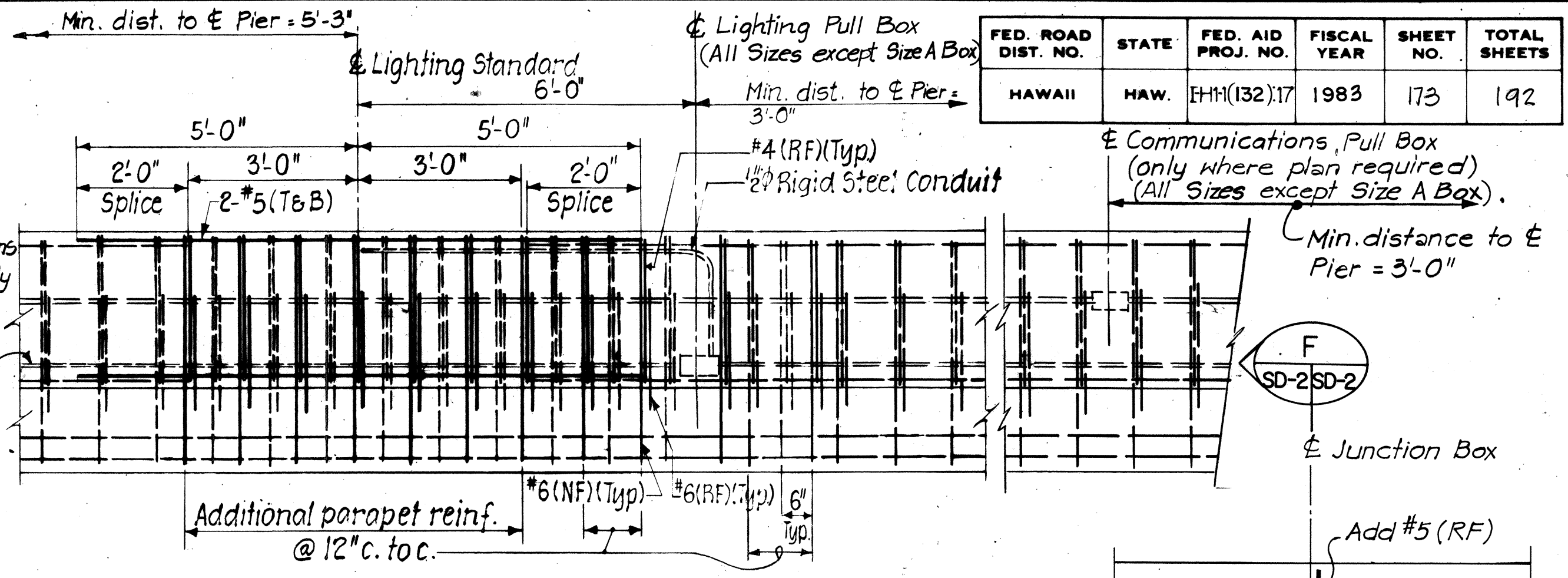
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FHM(132)17	1983	173	192



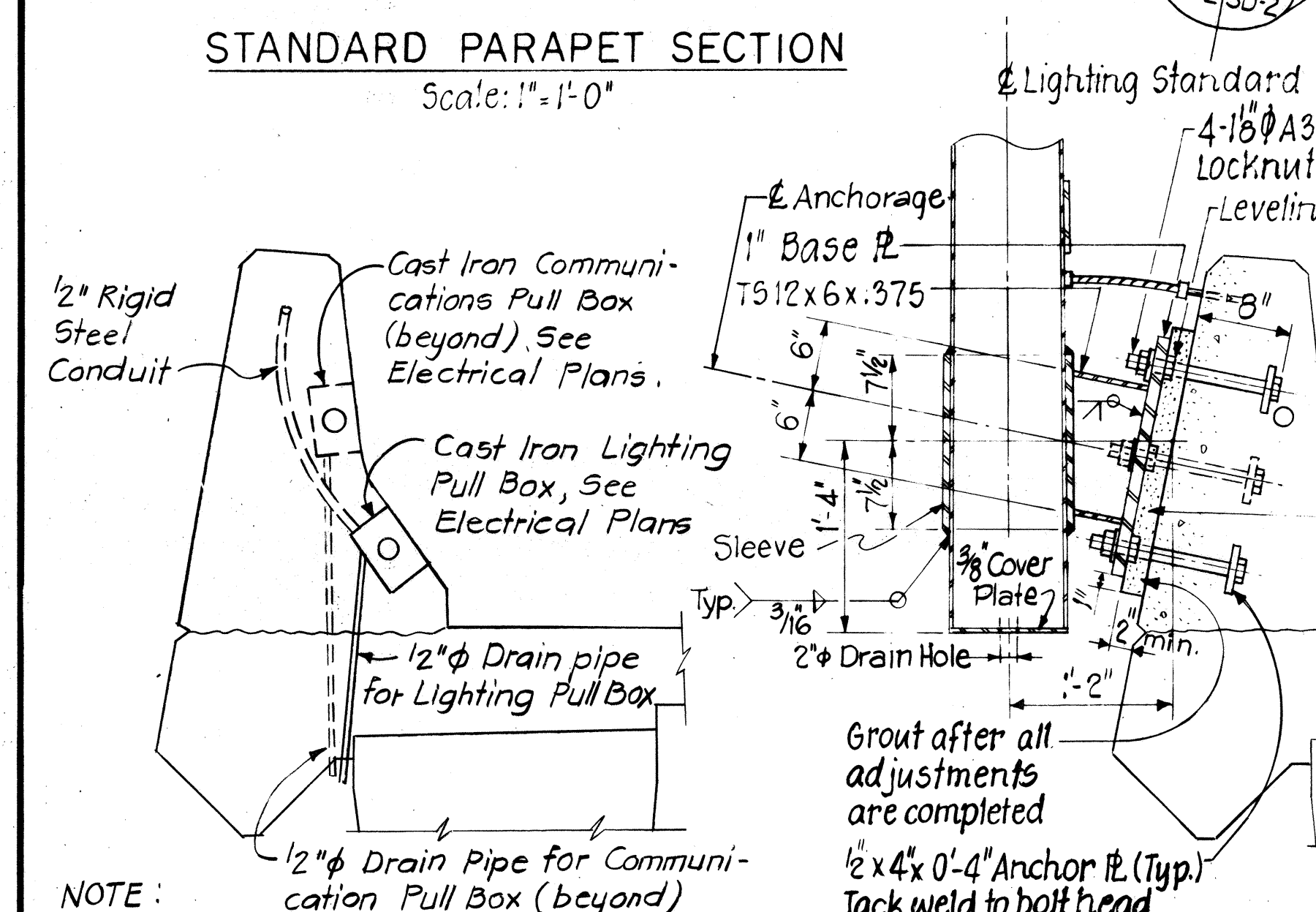
STANDARD PARAPET SECTION
Scale: 1" = 1'-0"



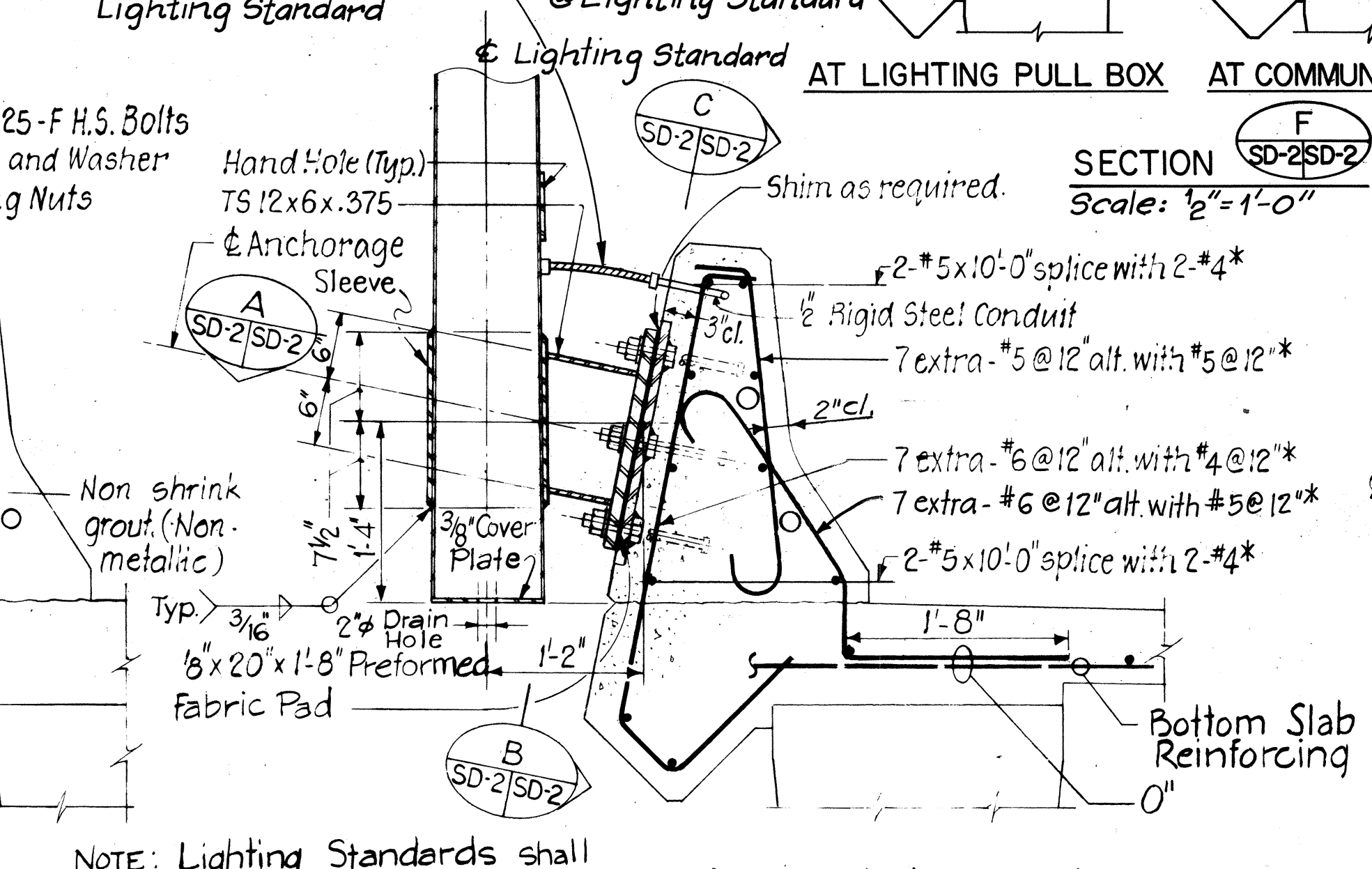
STANDARD PARAPET TYPICAL LONGITUDINAL SECTION
Scale: 1/2" = 1'-0"



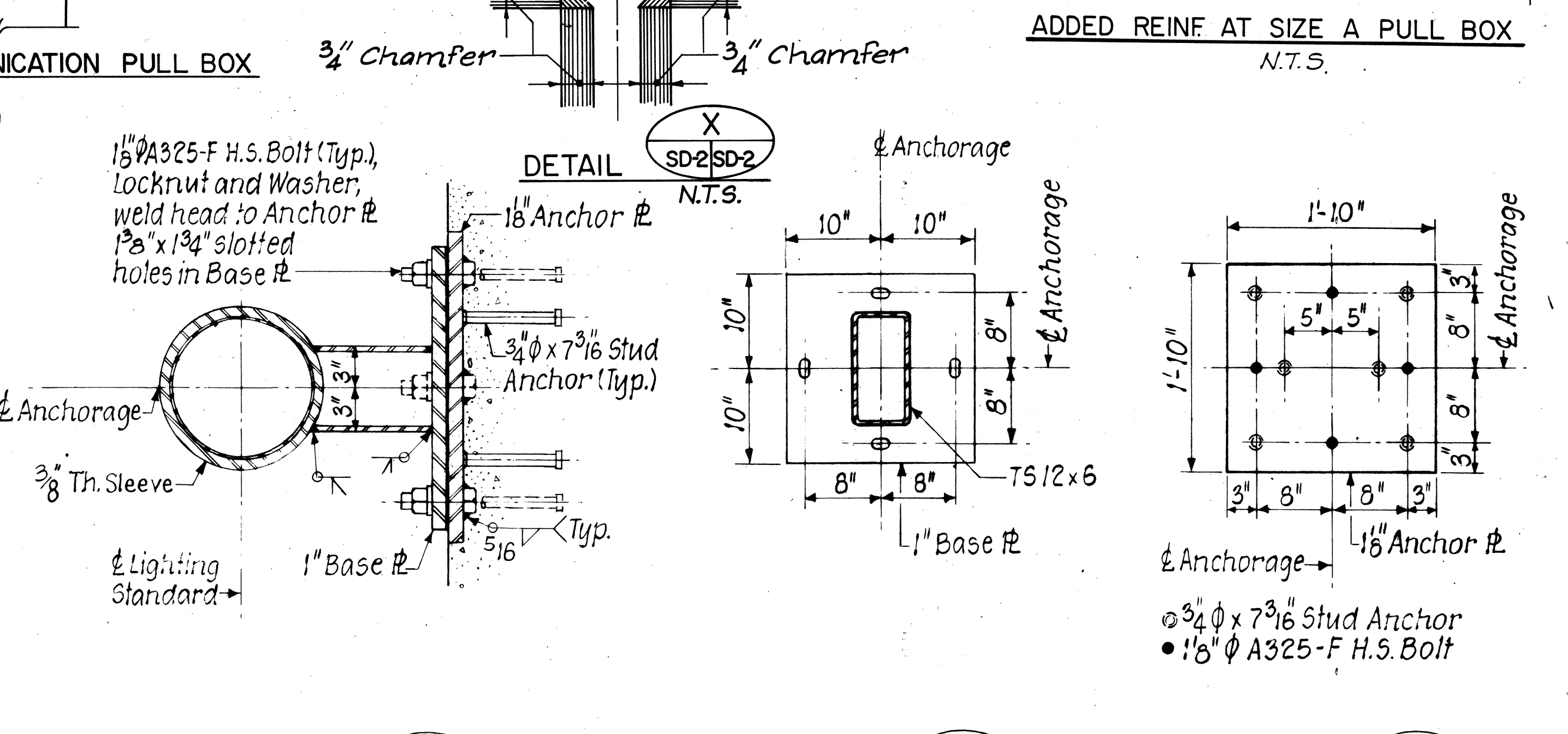
PARAPET REINF. AT LIGHTING STANDARD & JUNCTION BOX TYPICAL LONGITUDINAL SECTION
Scale: 1/2" = 1'-0"



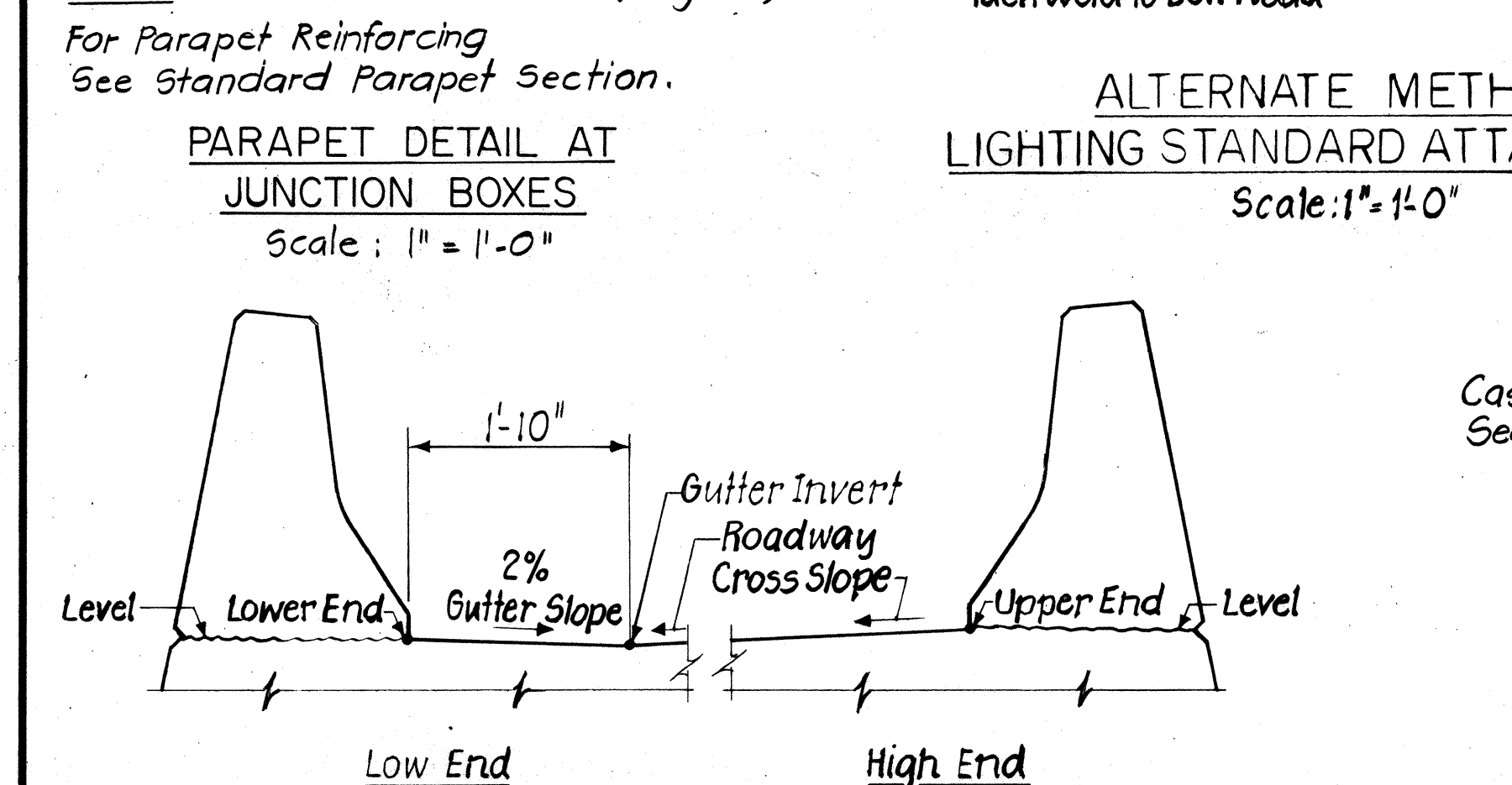
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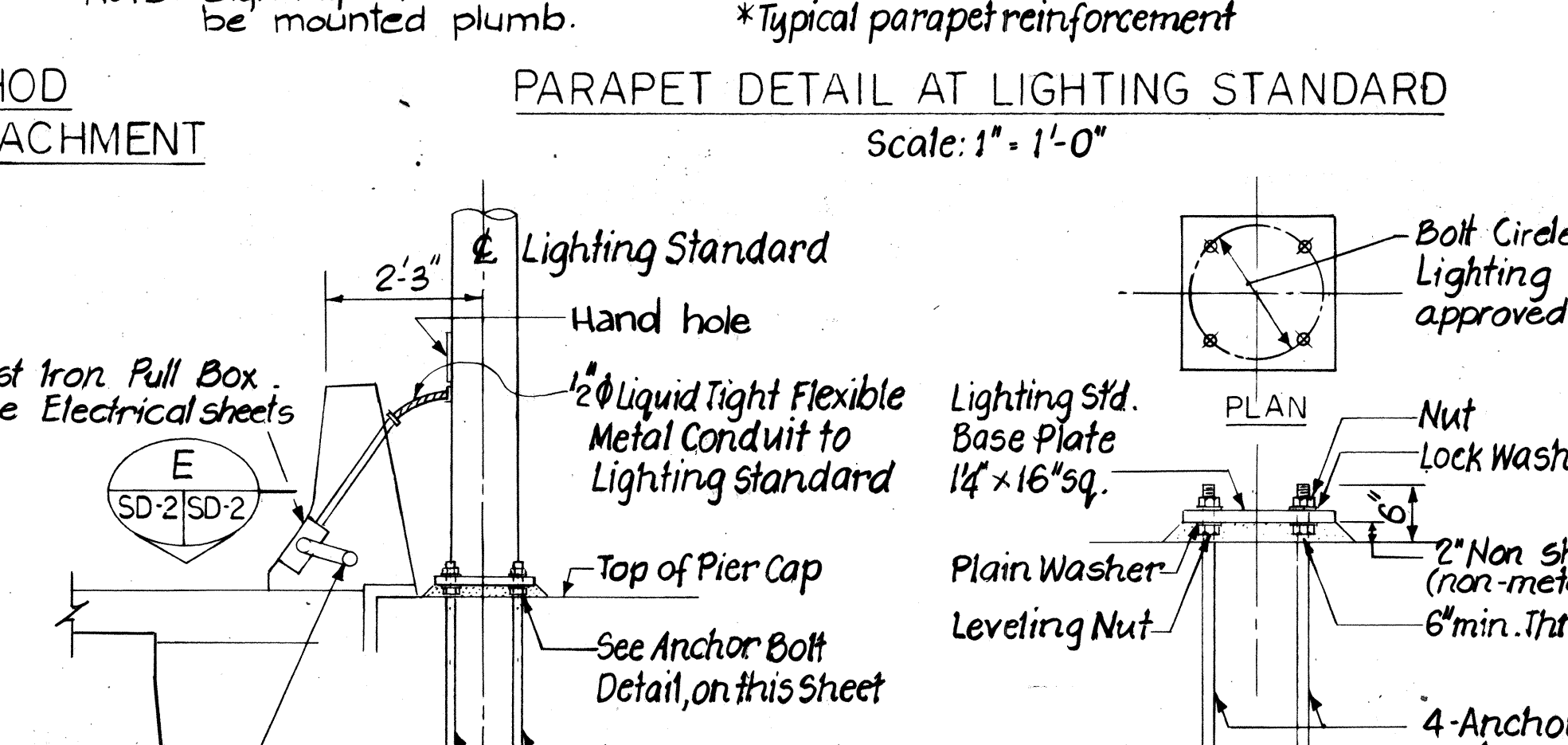
PARAPET DETAIL AT LIGHTING STANDARD
Scale: 1" = 1'-0"



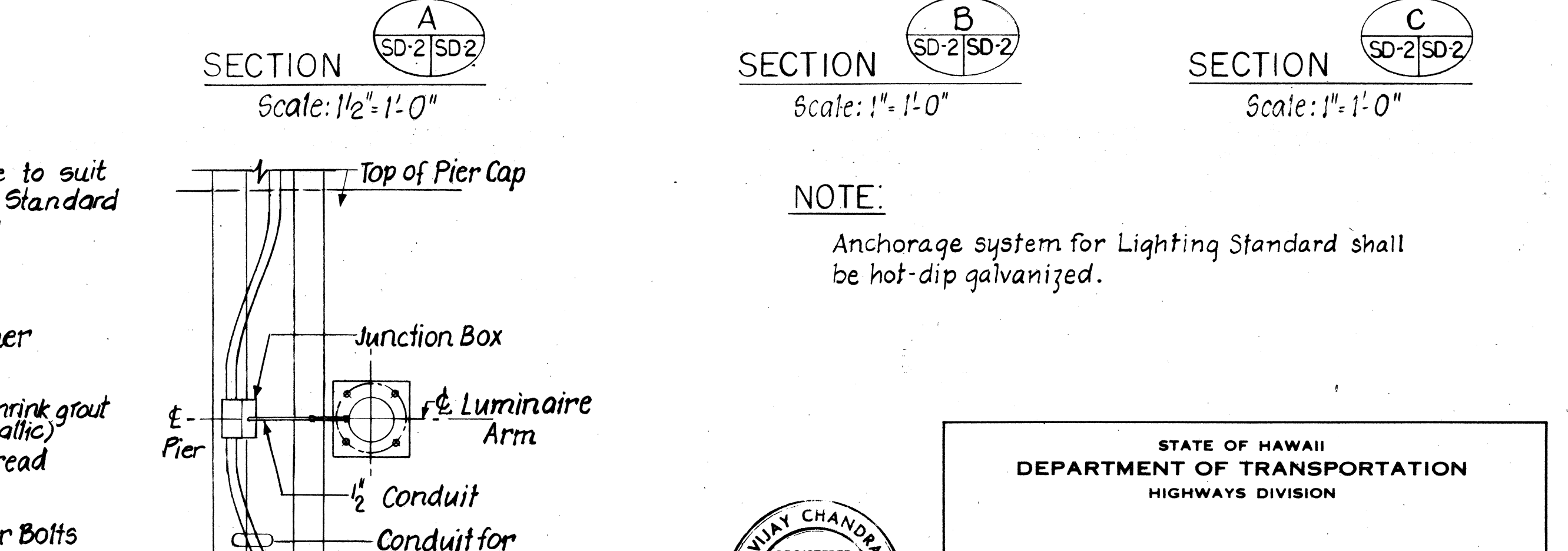
DETAIL
Scale: 1/2" = 1'-0"



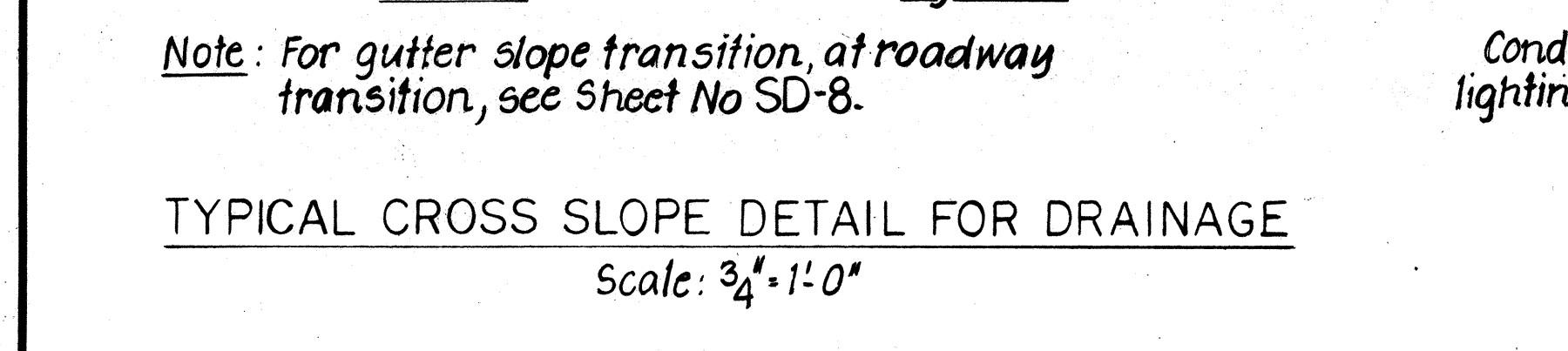
ALTERNATE METHOD LIGHTING STANDARD ATTACHMENT
Scale: 1" = 1'-0"



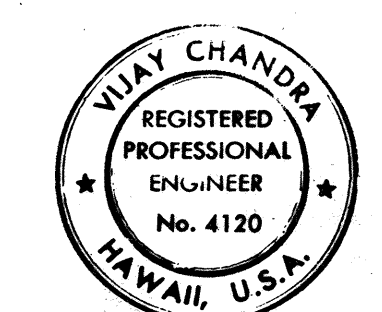
CONNECTION DETAIL
Scale: 1/2" = 1'-0"



PIER MOUNTED LIGHTING STANDARD
Scale: 1/2" = 1'-0"



TYPICAL CROSS SLOPE DETAIL FOR DRAINAGE
Scale: 3/4" = 1'-0"



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Signature: Vijay Chandra

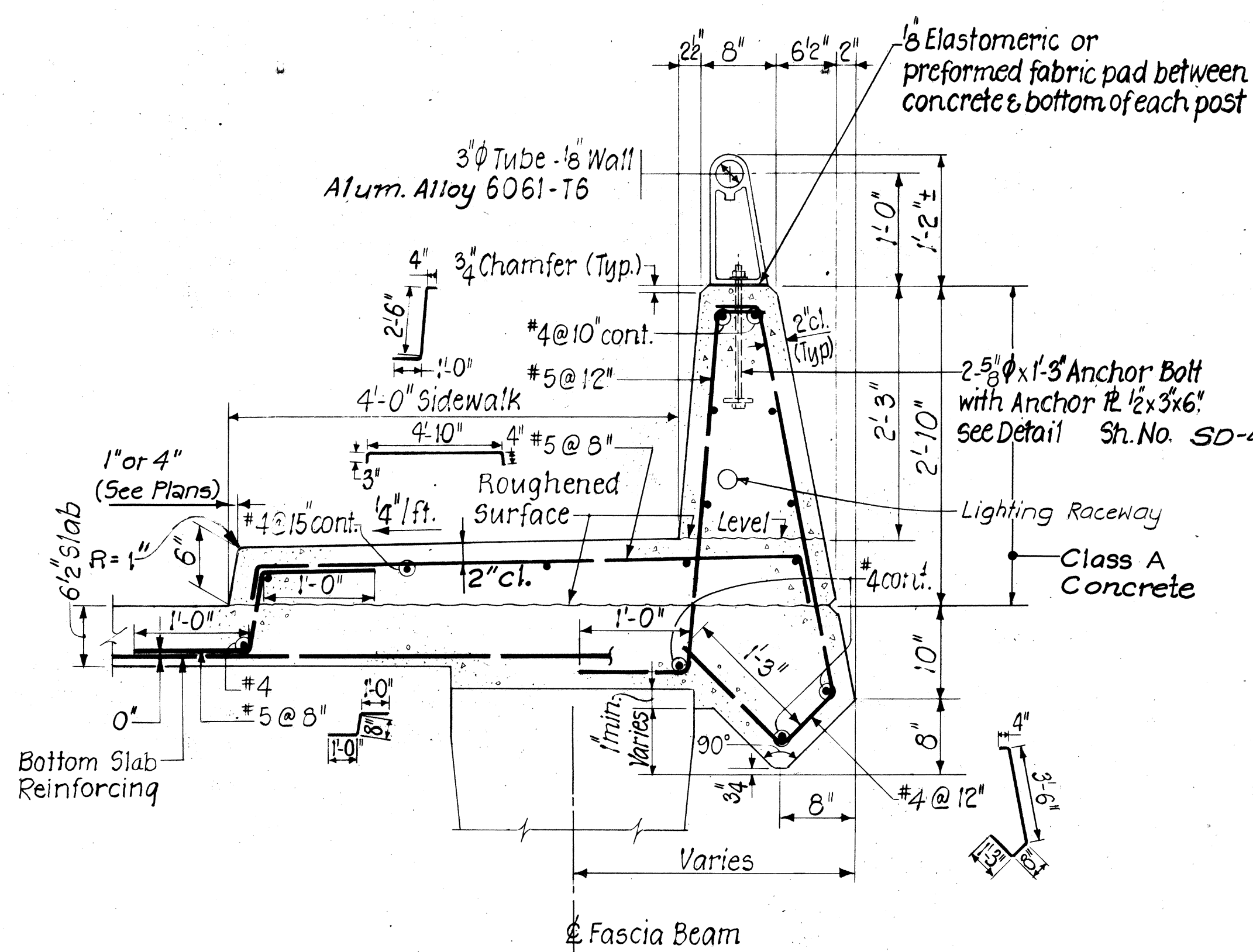
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD PARAPET DETAILS

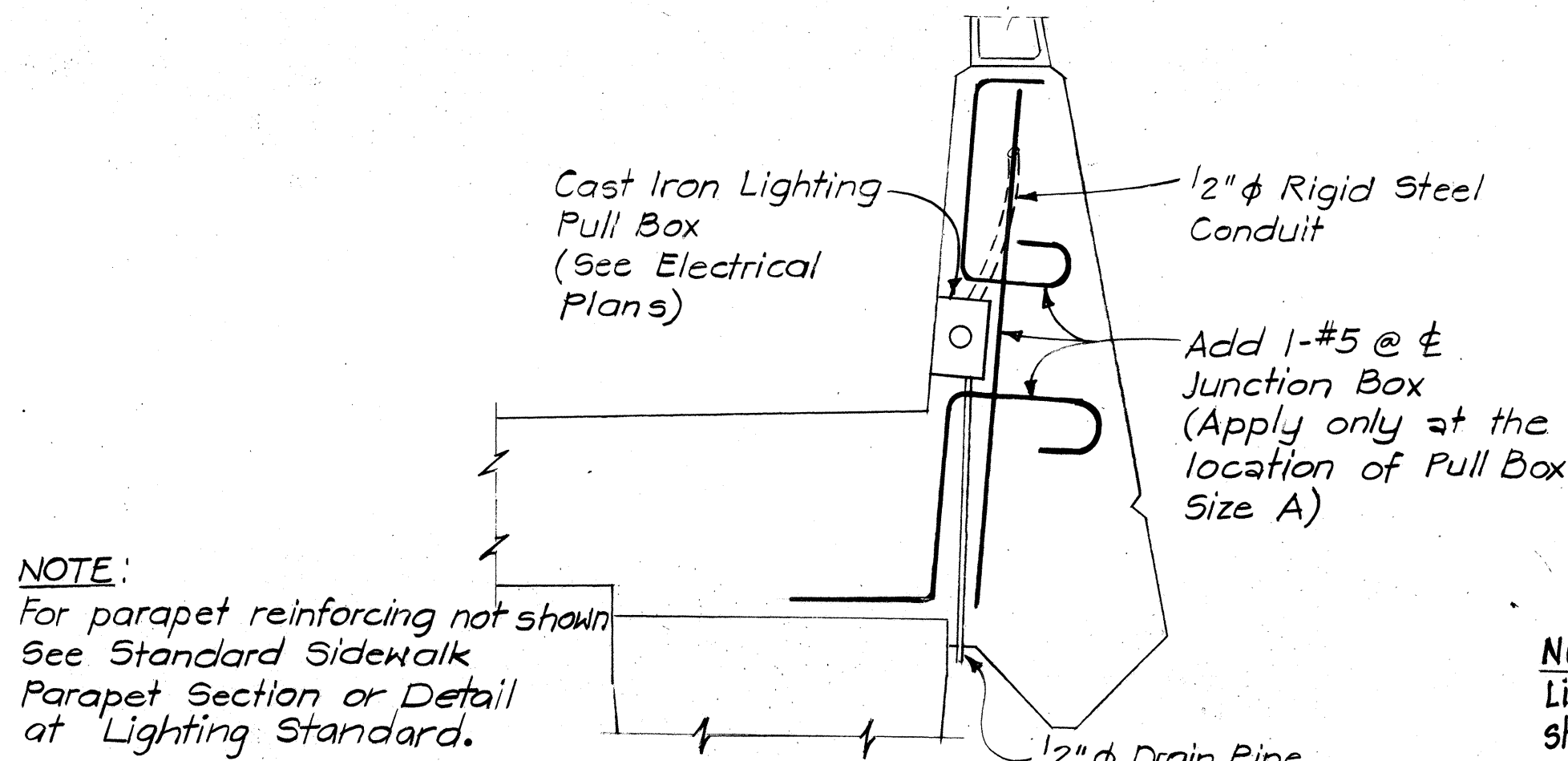
KEEHI INTERCHANGE
F.A.I. PROJECT NO. 1-HI-1(132):17
SCALE: AS SHOWN
DATE: 6/15/81

SHEET NO. SD-2 OF SD-14 SHEETS SD-2

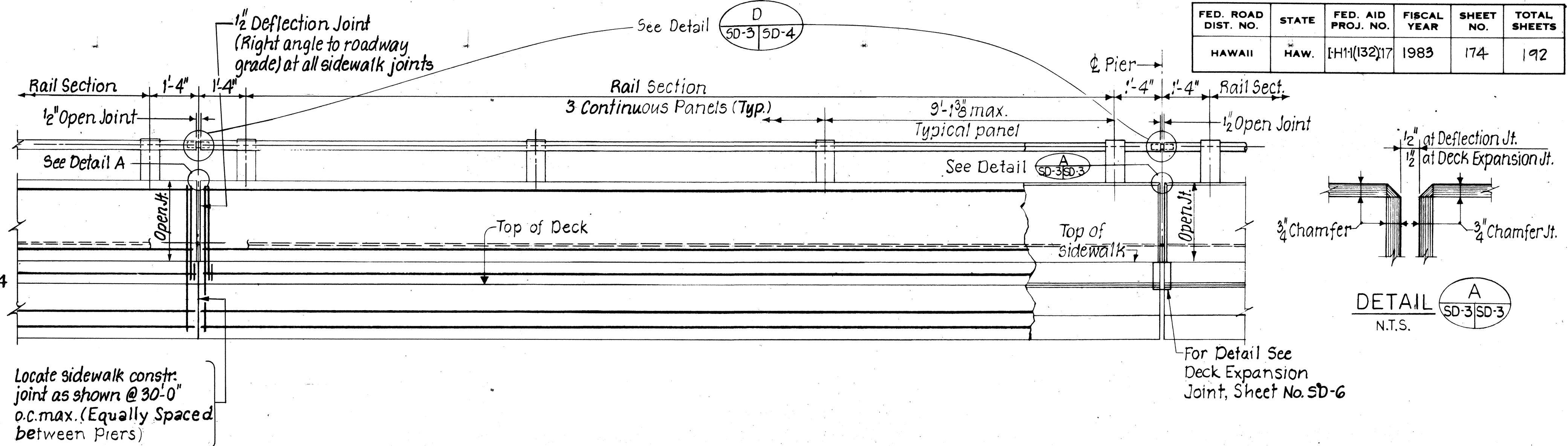
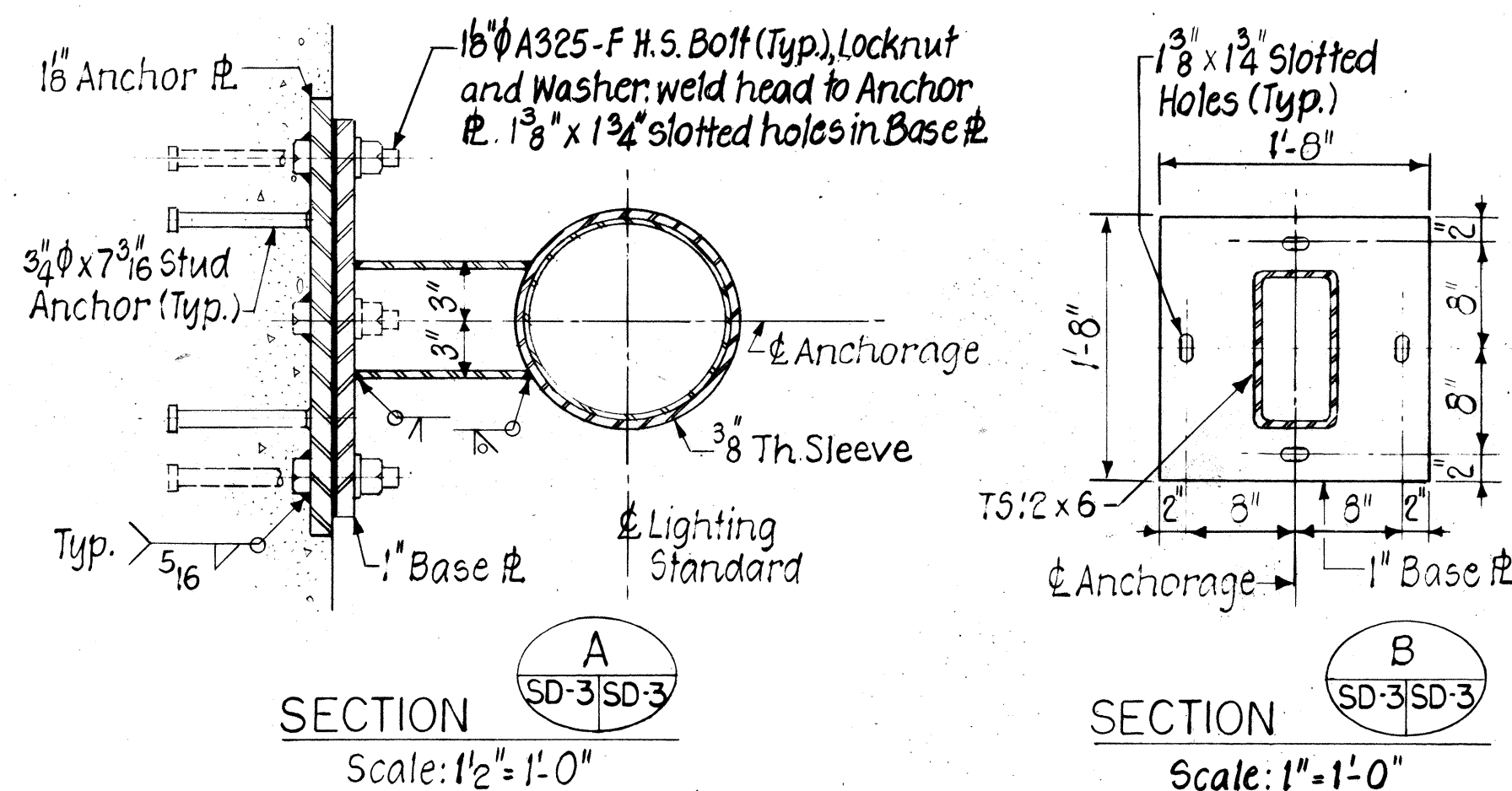
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	[H11(132)]17	1983	174	192



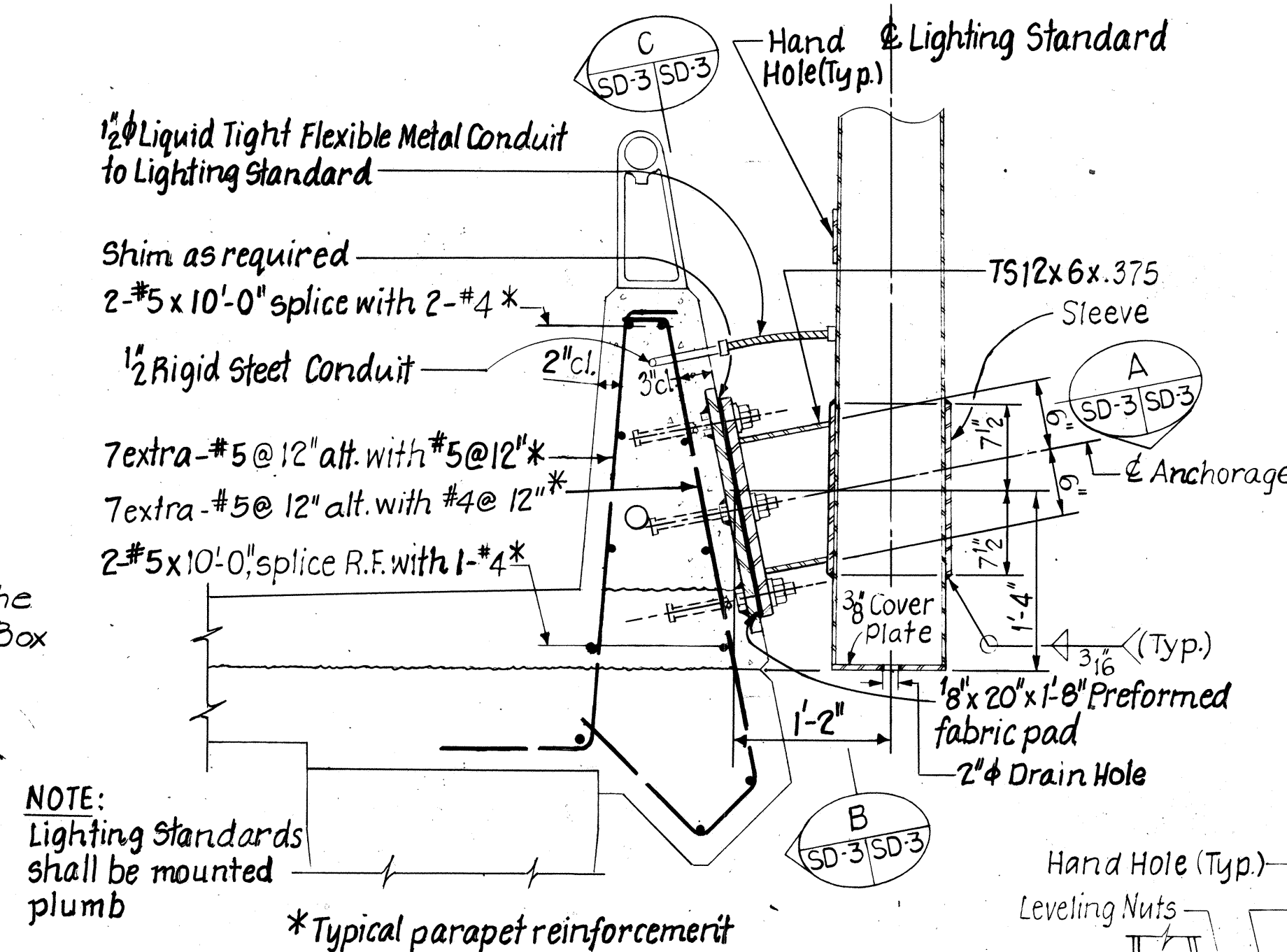
STANDARD SIDEWALK PARAPET SECTION
Scale: 1" = 1'-0"



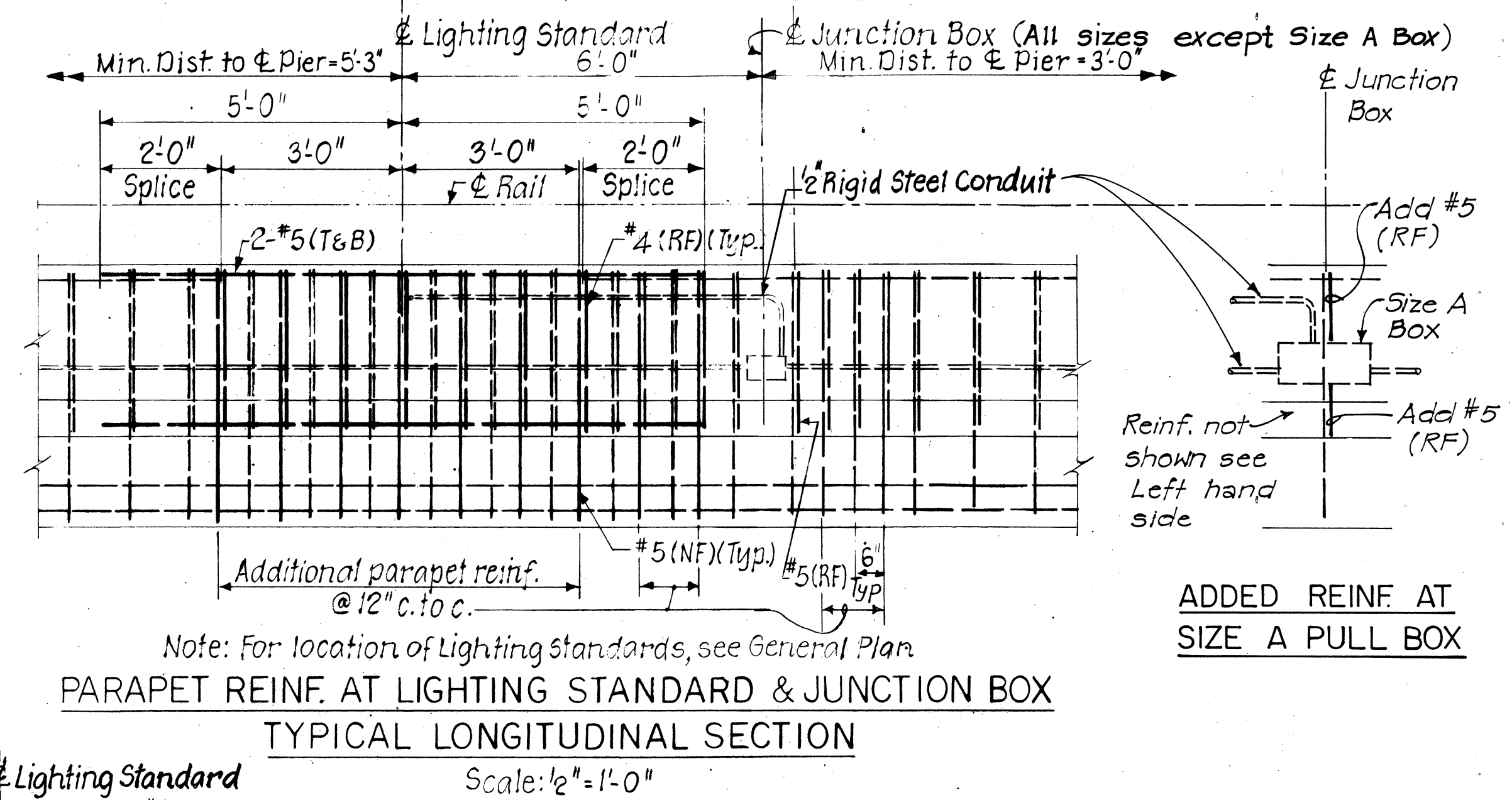
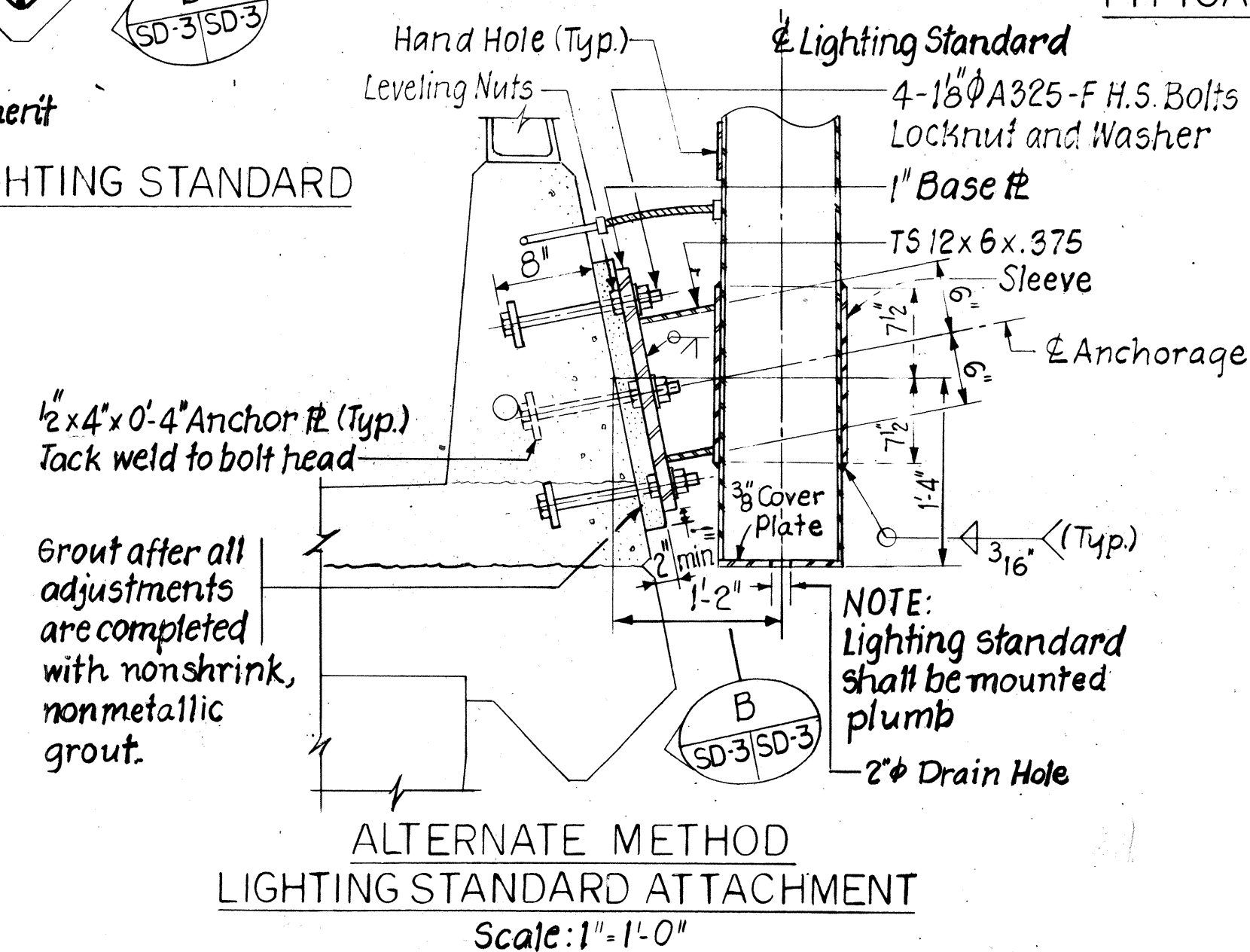
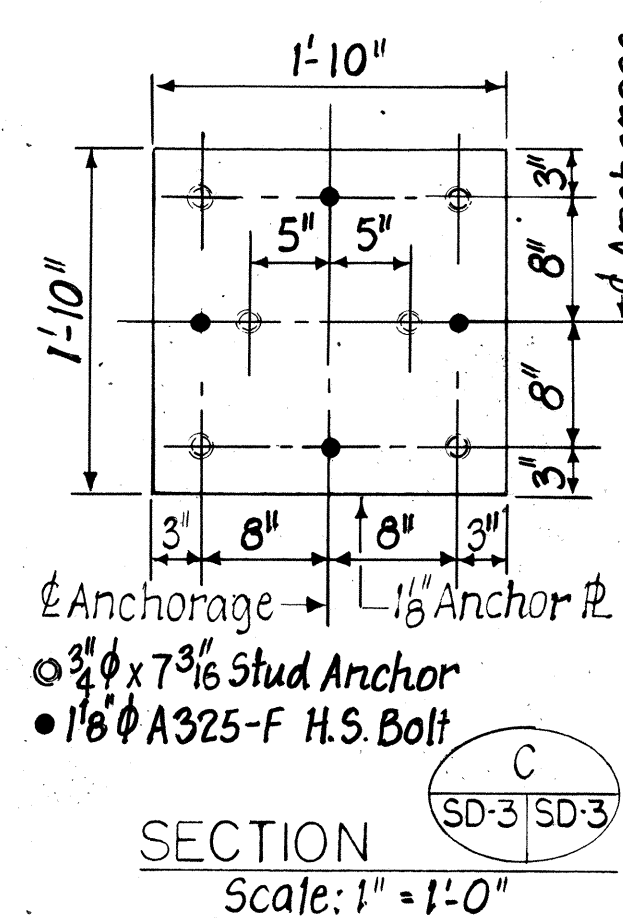
SIDEWALK PARAPET DETAIL AT JUNCTION BOXES
Scale: 1" = 1'-0"



STANDARD SIDEWALK PARAPET
RAILING ELEVATION AND
TYPICAL LONGITUDINAL SECTION
Scale: 1/2" = 1'-0"



SIDEWALK PARAPET DETAIL AT LIGHTING STANDARD
Scale: 1" = 1'-0"

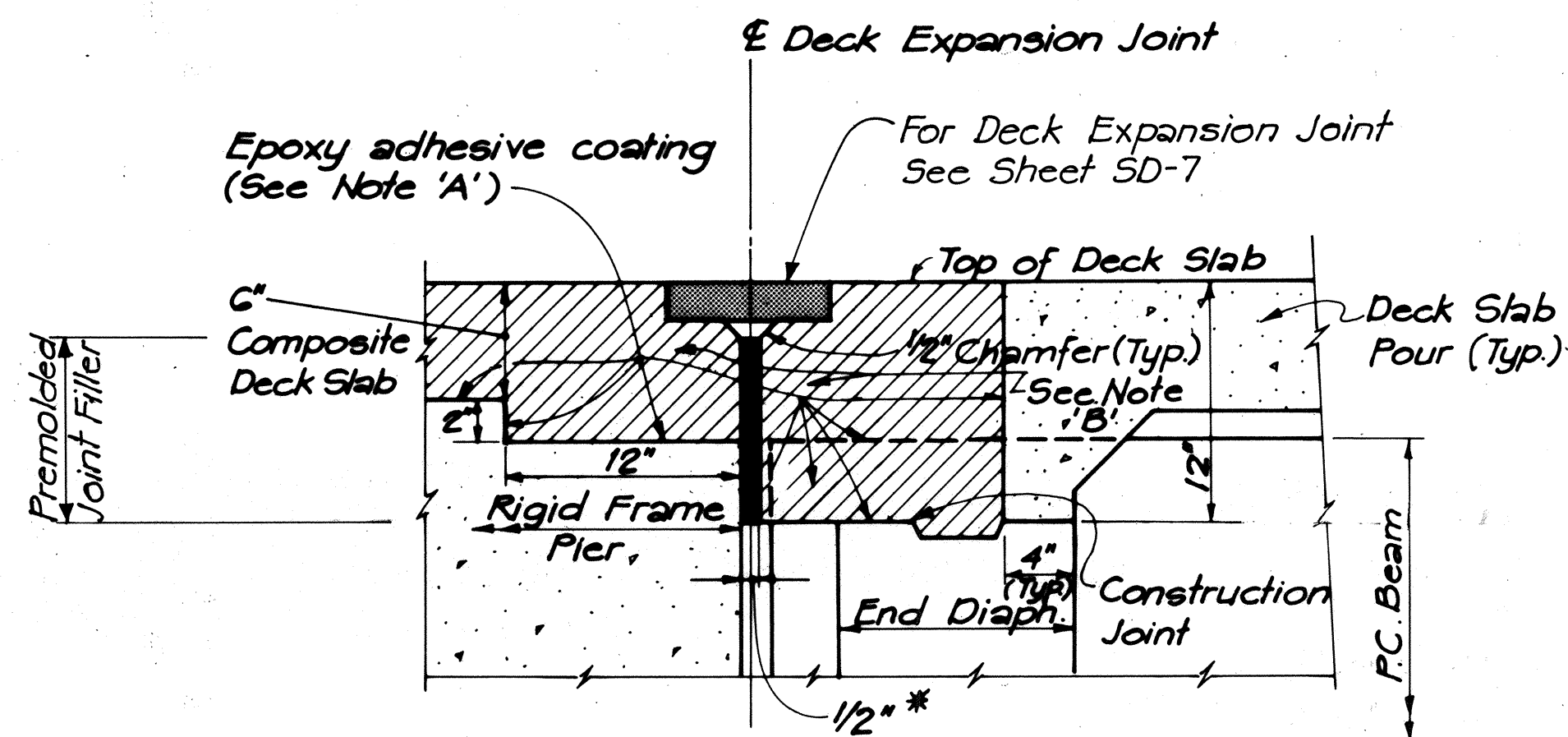


NOTE:
Anchorage system for Lighting Standard shall be hot dip galvanized.

VIJAY CHANDRA
REGISTERED PROFESSIONAL ENGINEER
No. 4120
HAWAII, U.S.A.
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD SIDEWALK PARAPET DETAILS
KEEHI INTERCHANGE
F.A.I. PROJECT NO. 1-H1-1(132):17
SCALE: AS SHOWN DATE: 8/17/81
SHEET NO SD-3 OF SD-14 SHEETS SD-3

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H1-1(132)17	1983	176	192



TYPICAL DECK SECTION AT RIGID FRAME
N.T.S.

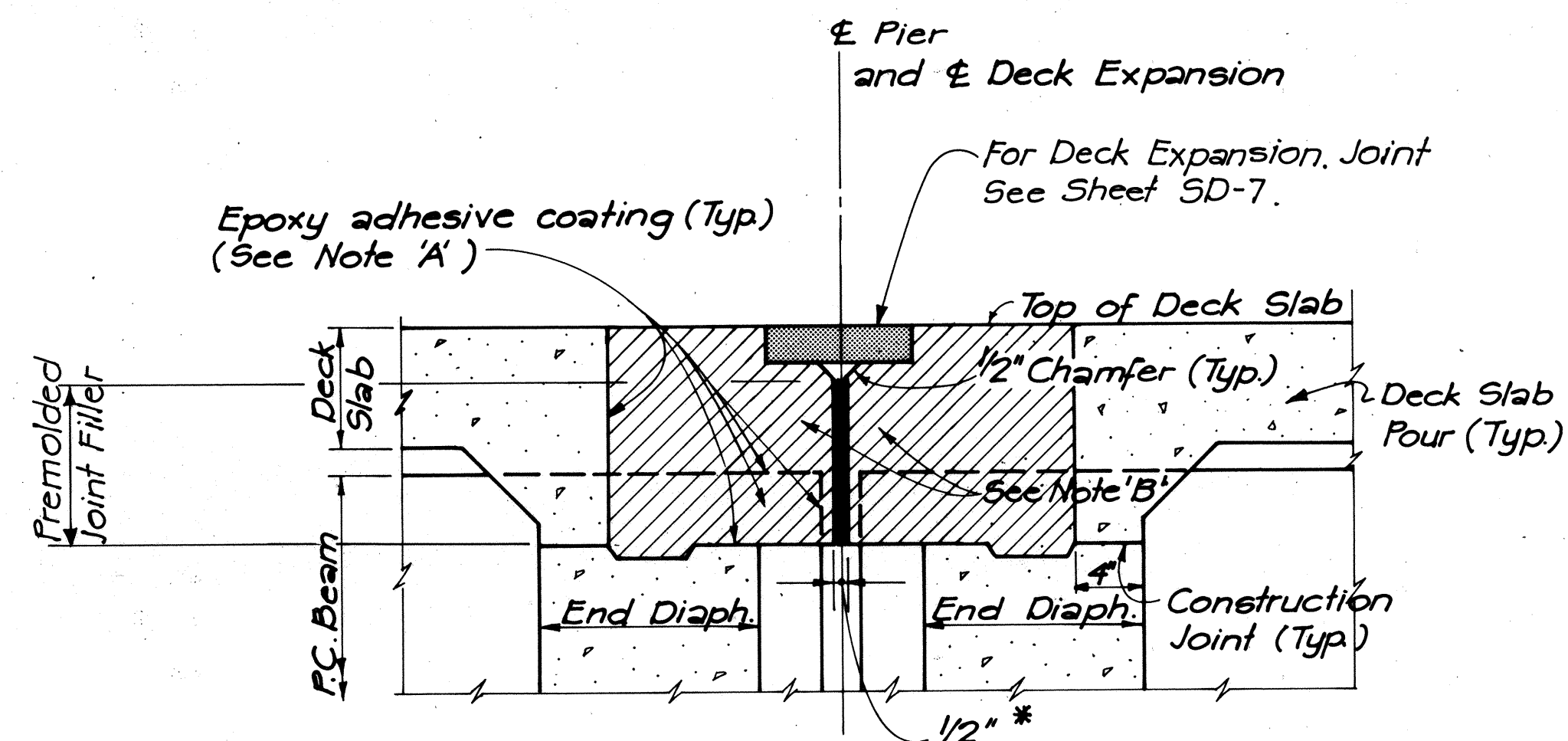
C.C.O. #50 - Delete closure pour from H-1 Viaduct at H-1 (EB) Sta. 221+68.5 to 232+89.38 H-1 (EB) Sta. 232+94.88 to 234+76.73 left of the longitudinal deck construction joint.

NOTE 'A': Just prior to concreting of the hatched areas, coat the indicated surfaces with an epoxy adhesive. (See Special provision Sec. 705.13)

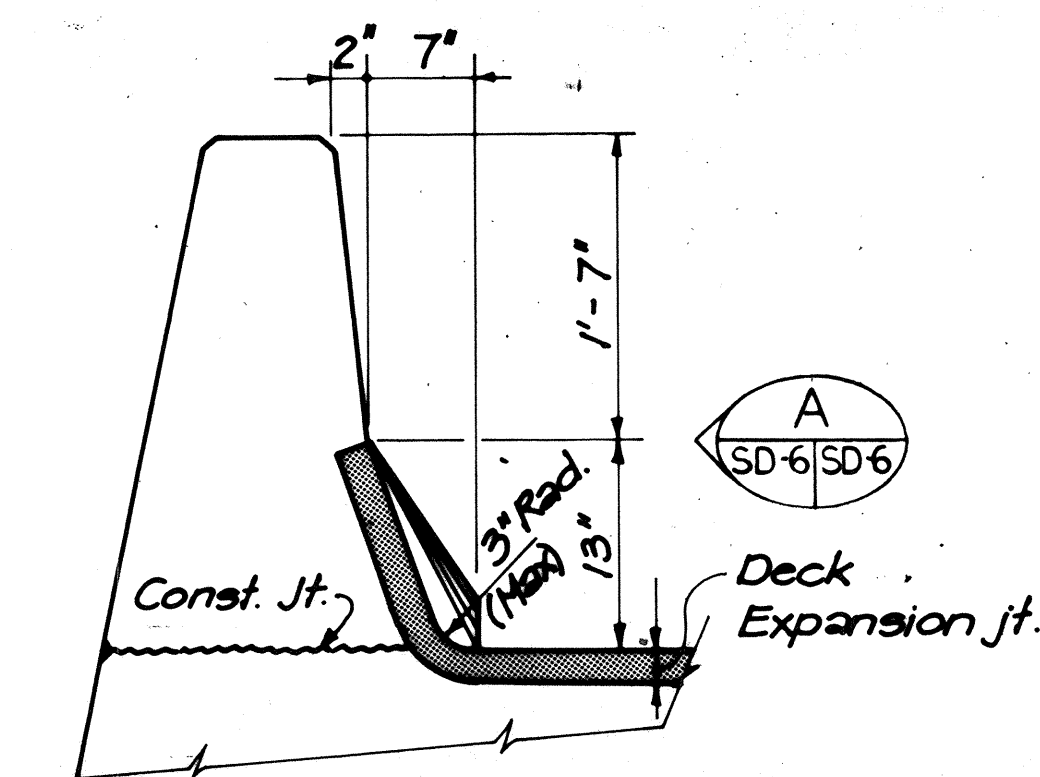
NOTE 'B': Hatched Areas shall be concreted after 14 days of deck slab pour. Anchor devices shall be located and held in their final position, as per Manufacturer's requirement, during the concreting of the hatched areas.

NOTE 'C': The closure pour (hatched areas) for deck expansion joint installation is required for spans with Keehi Type VI & Type IV Beams. The closure pour is optional for spans with beams other than Keehi Type VI & Type IV Beams.

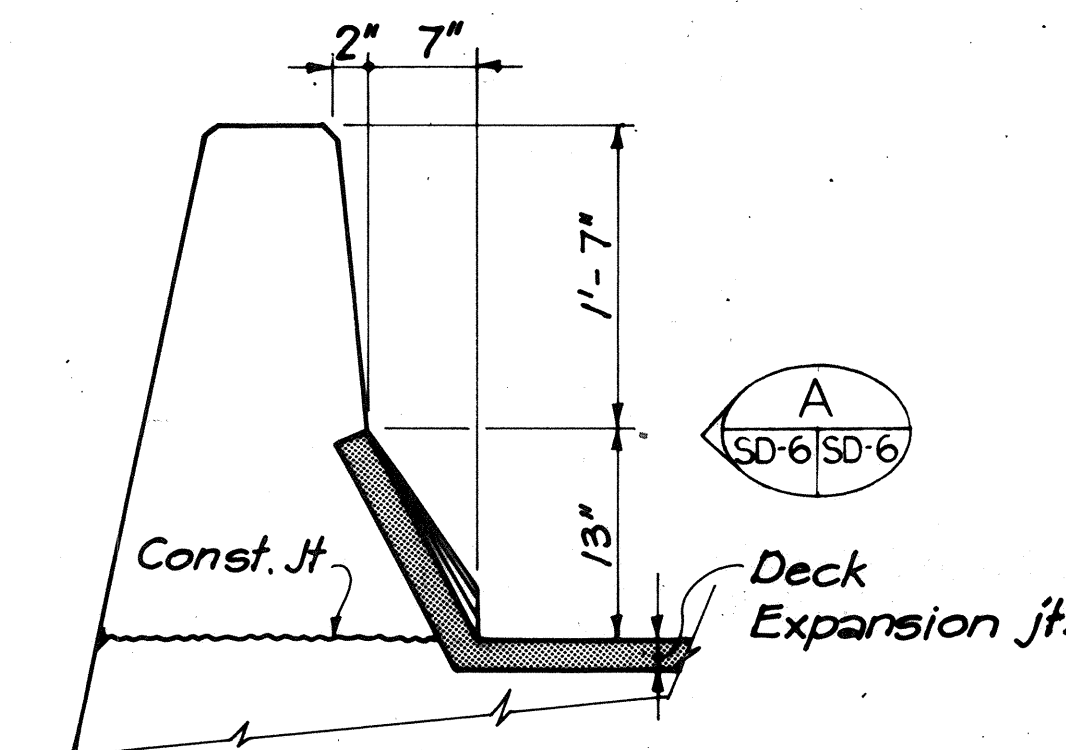
* Joint opening at time of installation of joint. Joint to be formed by premolded filler.



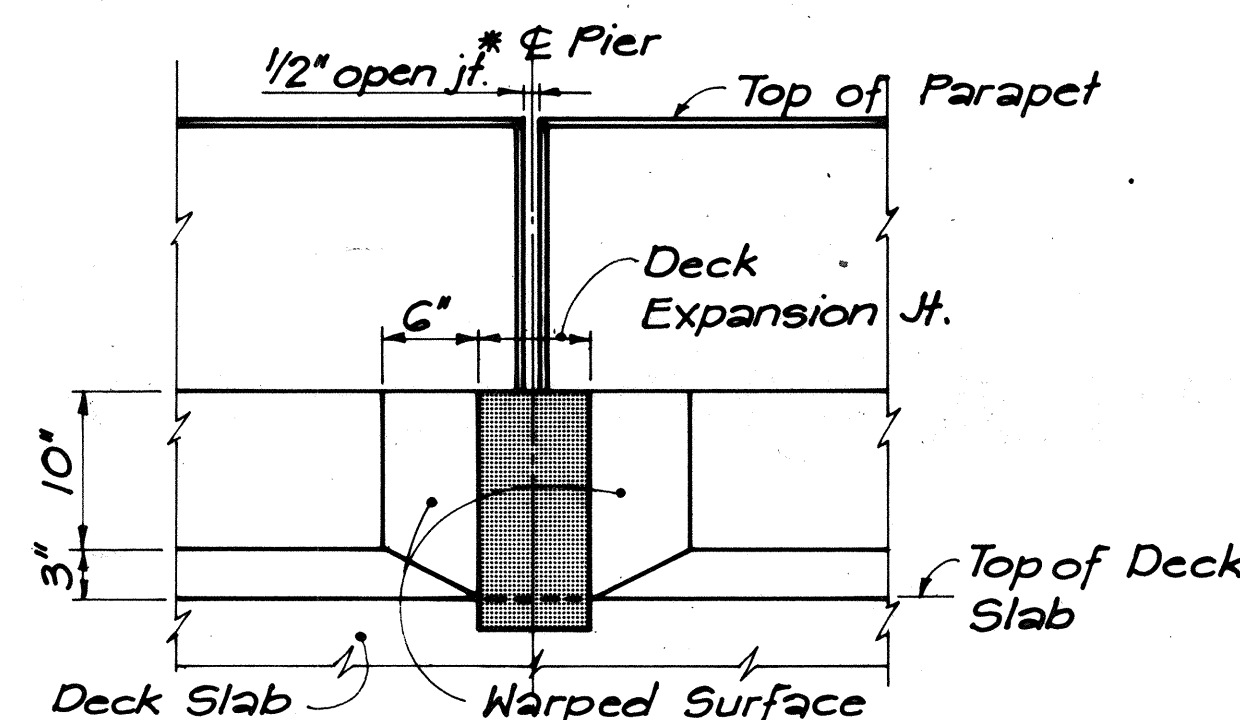
**TYPICAL DECK SECTION
(AT ALL PIERS EXCEPT RIGID FRAMES)**
N.T.S.



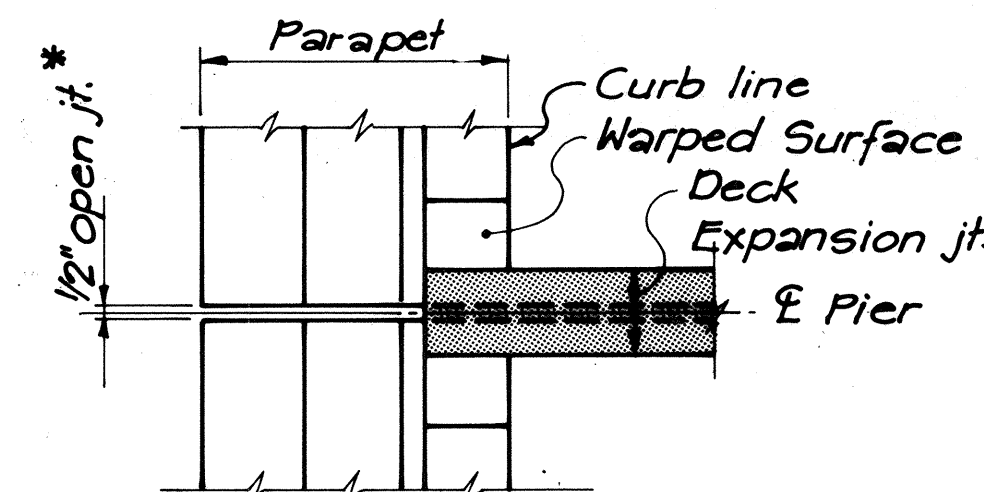
TYPICAL SECTION AT STANDARD PARAPET



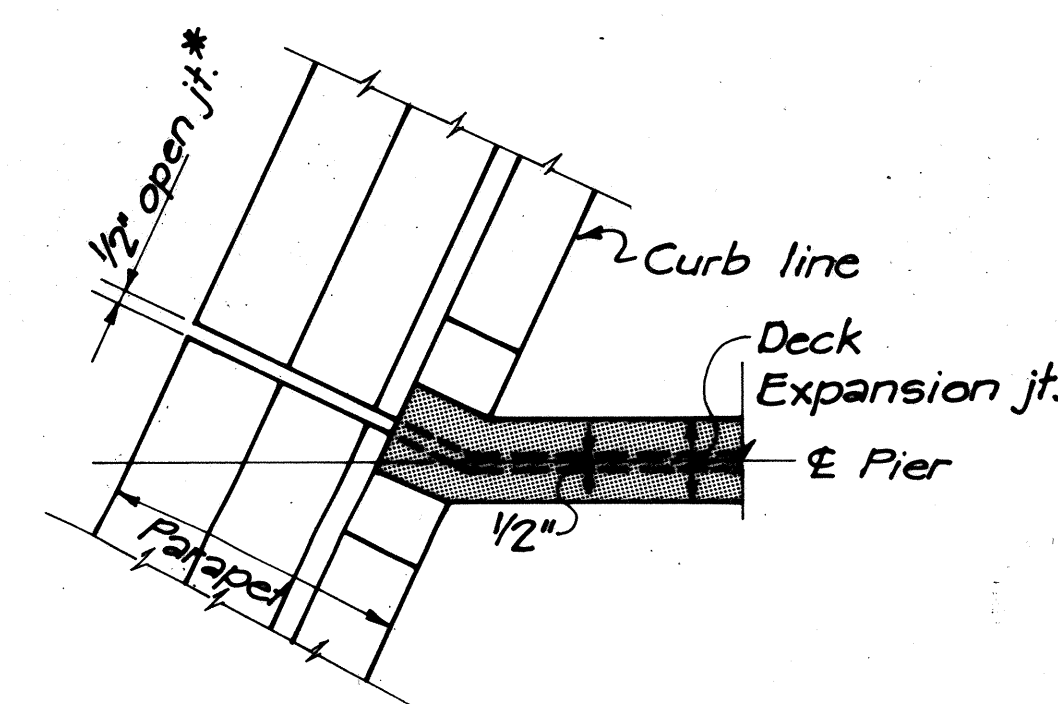
ALTERNATE DETAIL AT PARAPET
N.T.S.



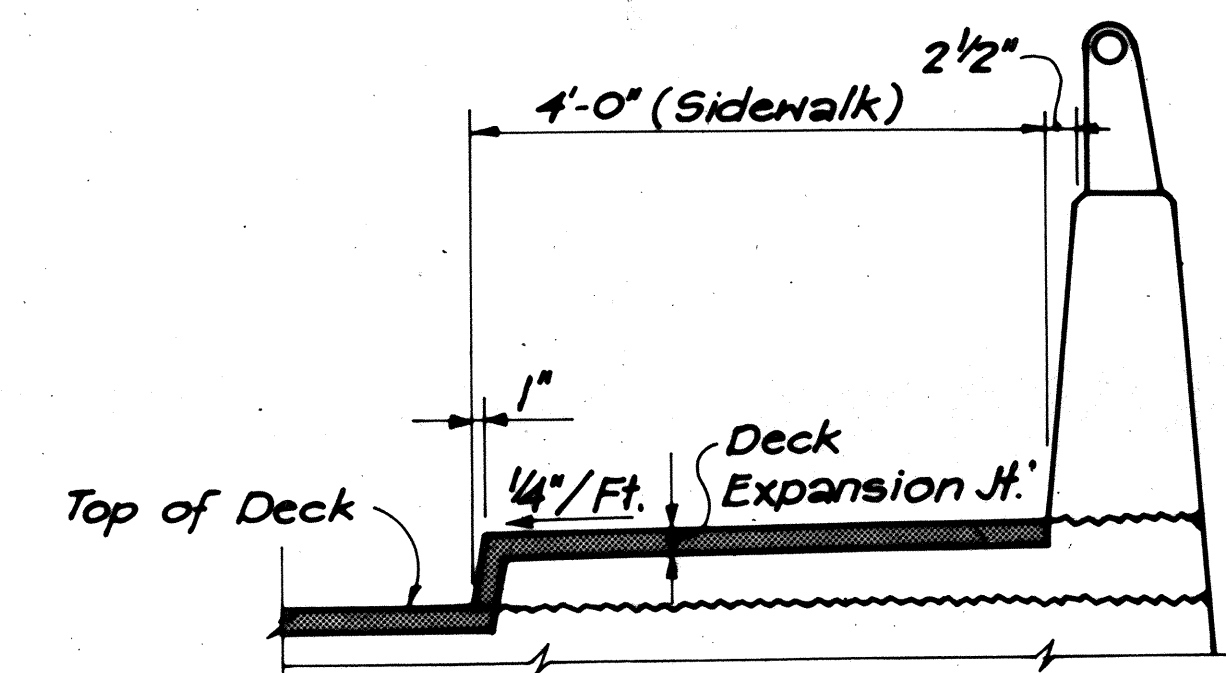
VIEW A
N.T.S.



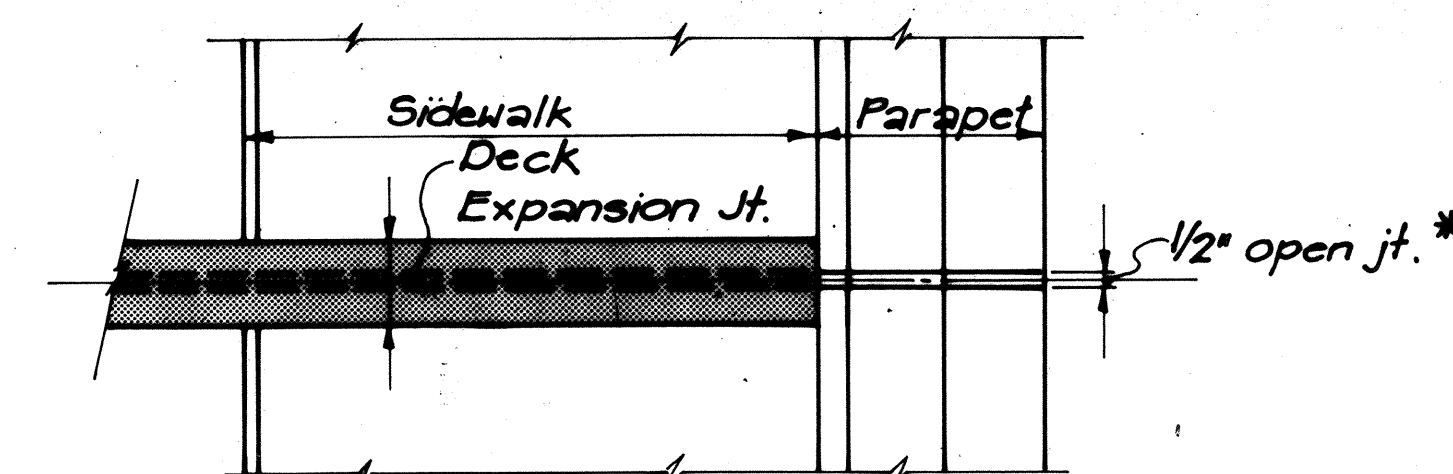
TYPICAL PLAN - SKEW ANGLE = 0°-15°
N.T.S.



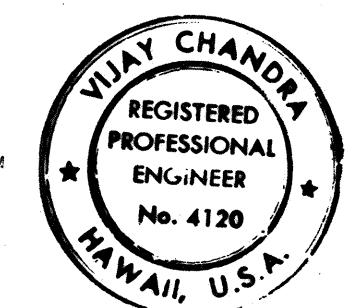
TYPICAL PLAN - SKEW ANGLE = OVER 15°
N.T.S.



TYPICAL SECTION AT SIDEWALK PARAPET
N.T.S.



TYPICAL PLAN
N.T.S.



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Vijay Chandra
Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

DECK EXPANSION JOINT
SHEET 1 OF 2

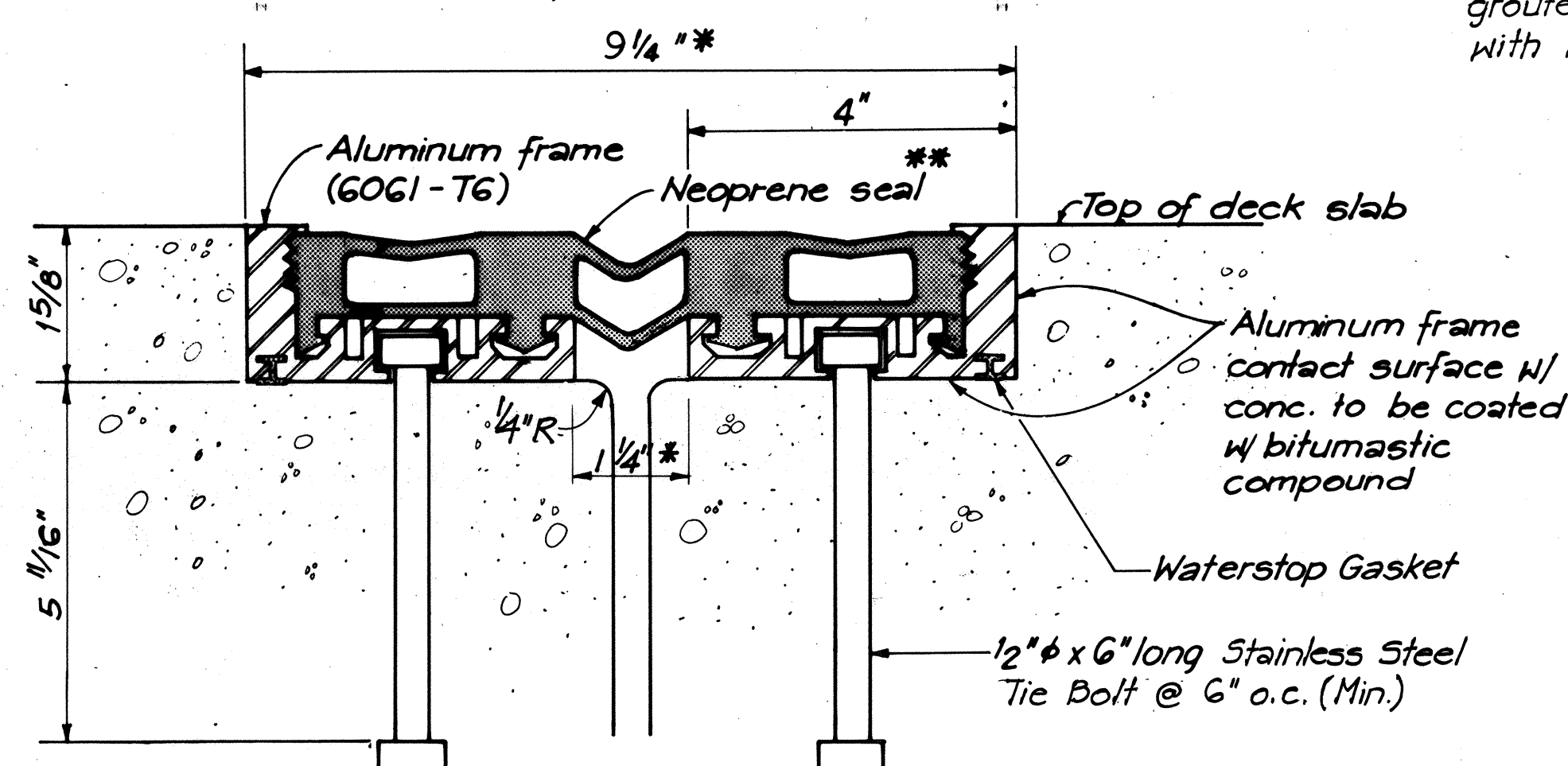
KEEHI INTERCHANGE
F.A.I. PROJECT NO. 1-H1-1 (132) 17

SCALE: DATE: 6/15/81

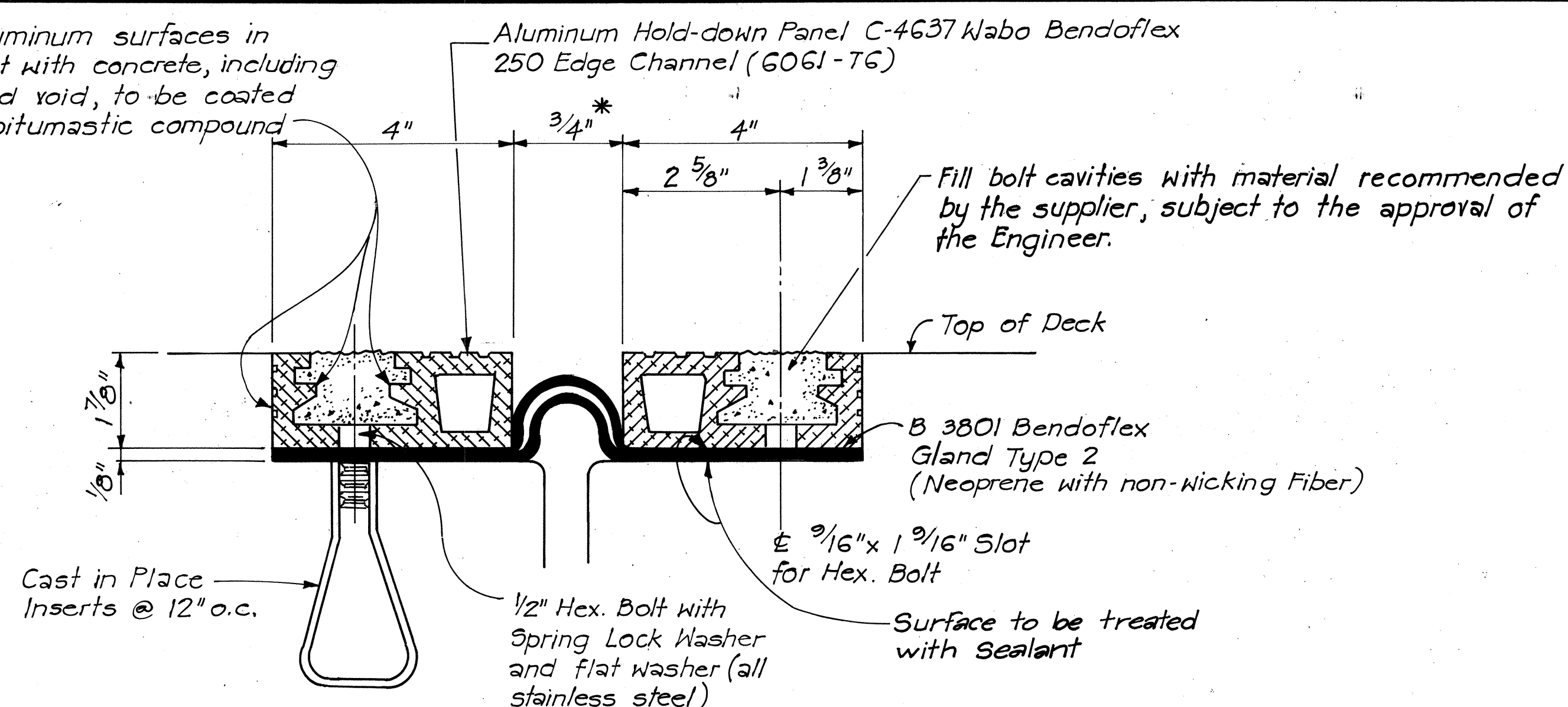
SHEET No. SD-6 OF SD-14 SHEETS SD-6

SURVEY PLOTTED BY	DATE
DESIGNED BY	
TRACED BY	
NOTE BOOK	
QUANTITIES BY	
CHECKED BY	
No.	

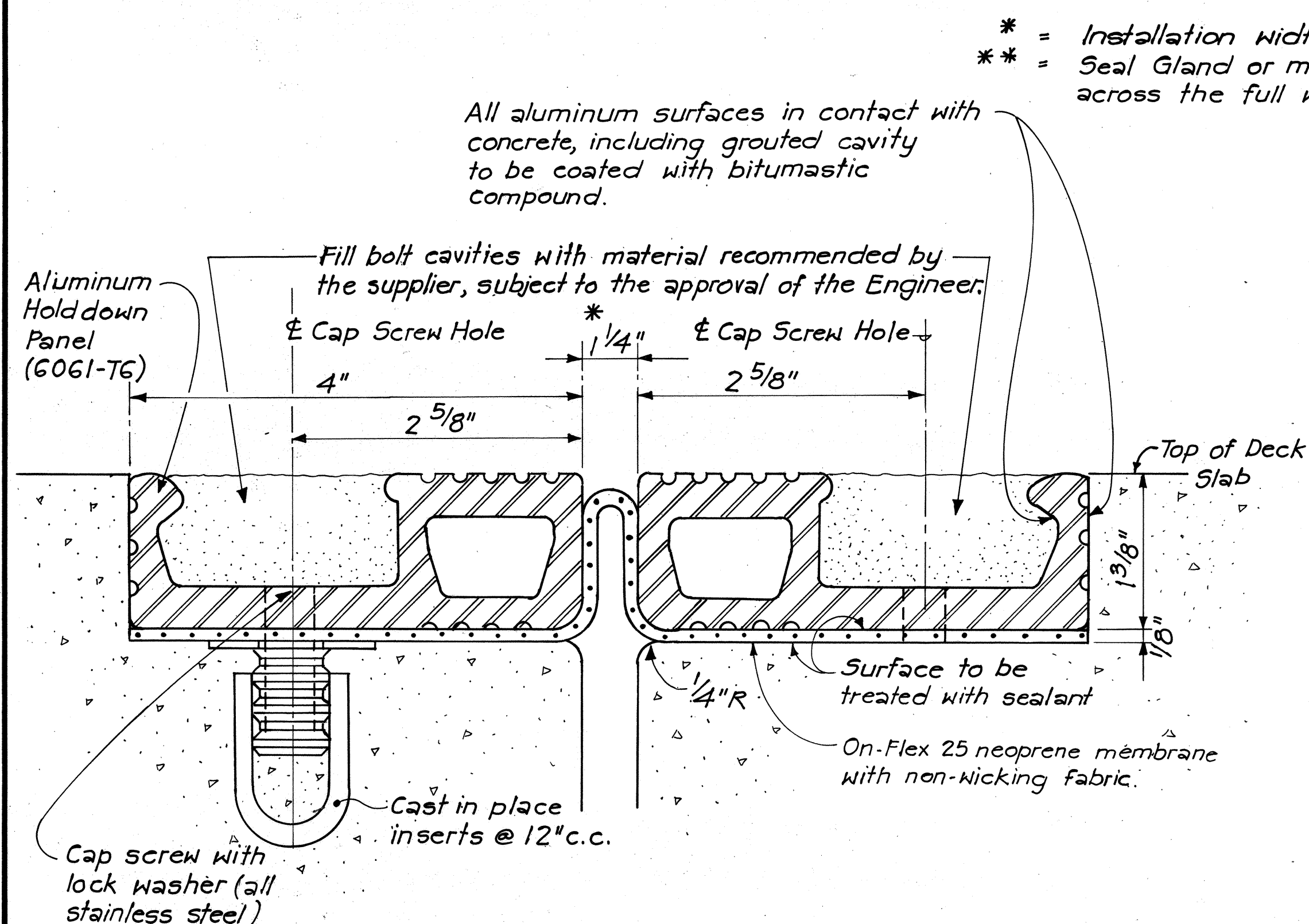
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HAWAII	HAW.	1-HI(132)17	1983	177	192



DELASTIFLEX TYPE SM200
(Manufacturer: D.S. Brown & Co.)



WABO BENDOFLEX 250
(Manufacturer: Watson Bowman Ass. Inc.)



ON-FLEX 25
(Manufacturer: Structural Accessories Inc.)

NOTES:

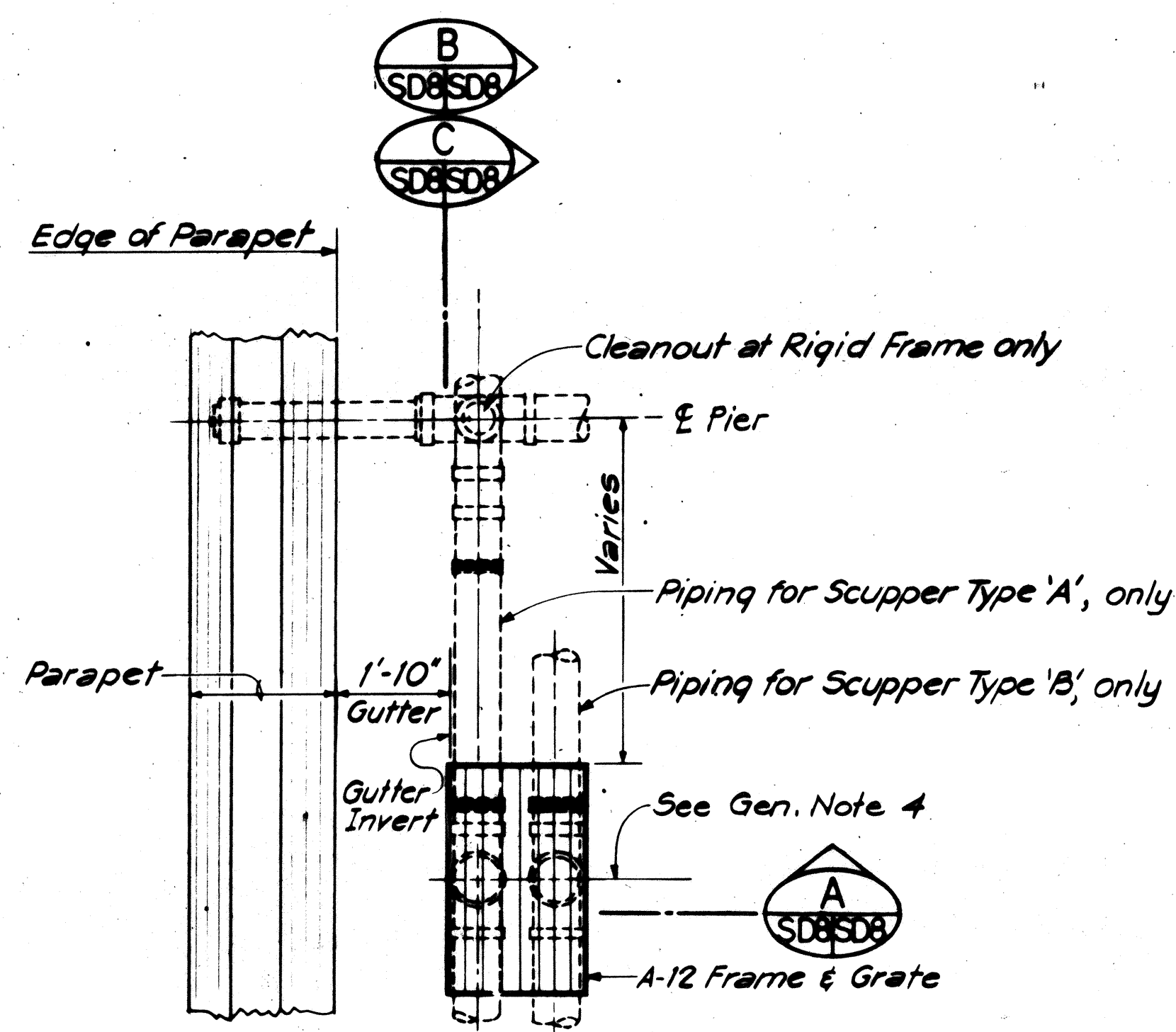
- Three alternative Deck Expansion Joint Systems are shown. Contractor has the option of selecting any one of the systems. The Contractor shall submit detailed shop drawings of the selected joint to the Engineer for approval.
- The Contractor also has the option of using an alternative Deck Expansion Joint System provided it complies with the requirements of the plans and specifications.

DATE	_____
SURVEY PLOTTED BY	_____
DRAWN BY	_____
DESIGNED BY	_____
CHECKED BY	_____
NOTE BOOK	_____
NO.	_____

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
STANDARD DETAILS DECK EXPANSION JOINT SHEET 2 OF 2	
KEEHI INTERCHANGE F.A.I. PROJECT NO. 1-HI-1 (132) 17 SCALE: NONE DATE: 6/15/81	
SHEET NoSD-7 OFSD-14 SHEETS SD-7	

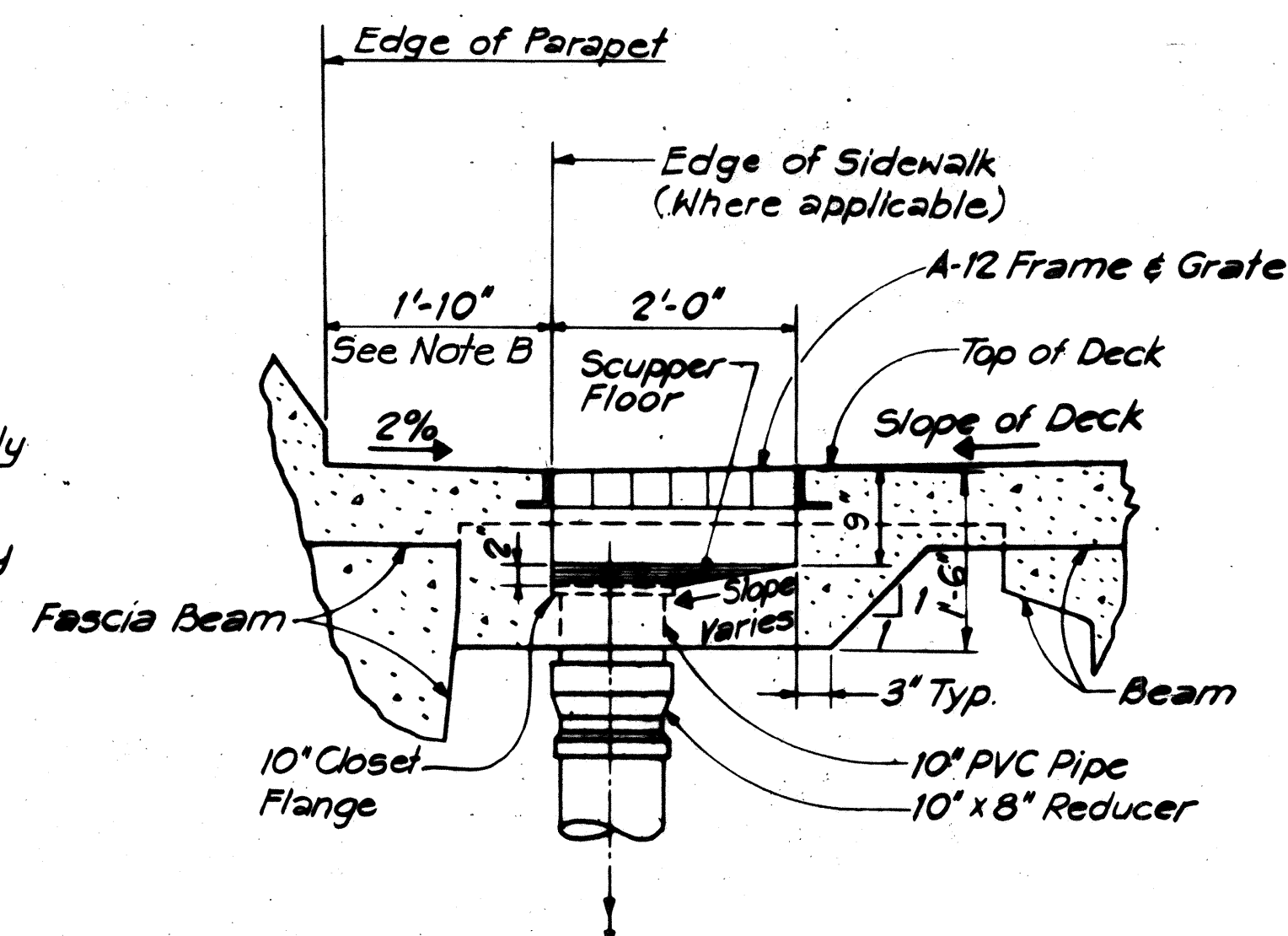
THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION
John P. Johnson

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HH(132)17	1983	178	192

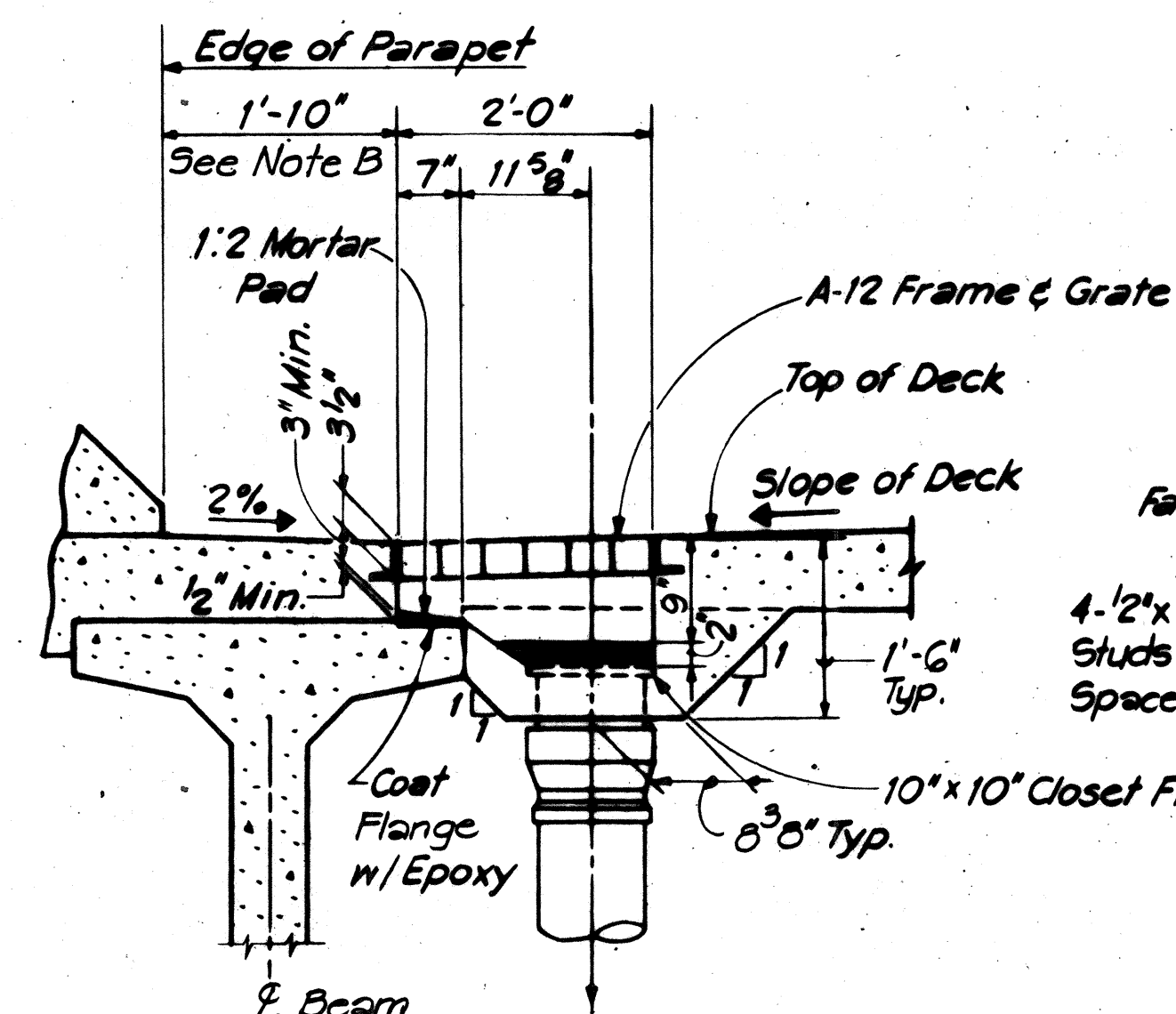


PLAN - SCUPPER
SCALE: 1/2"=1'-0"

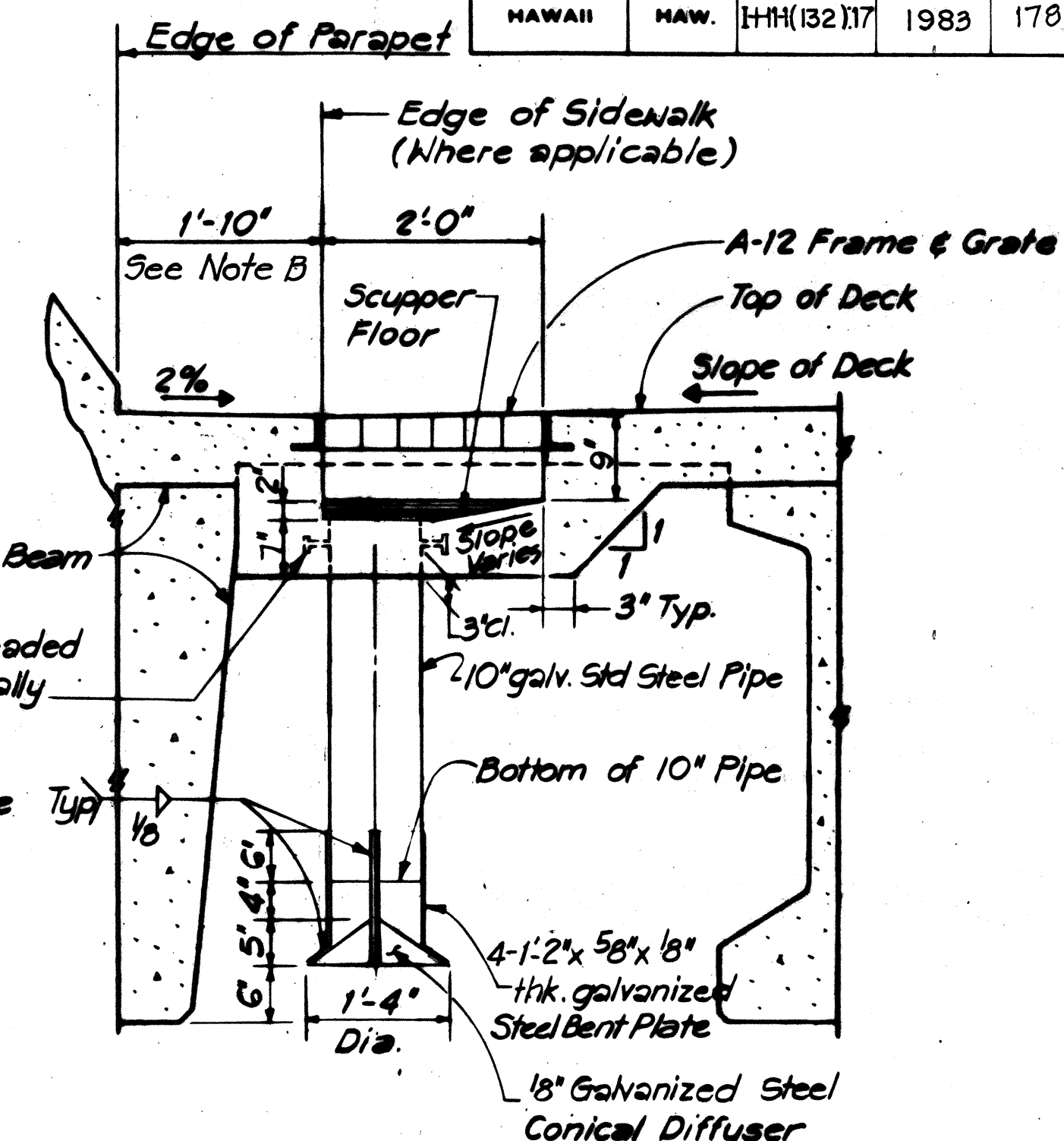
NOTE D:
Provide continuous gutter with 2% cross slope on low side of deck, except as otherwise indicated.



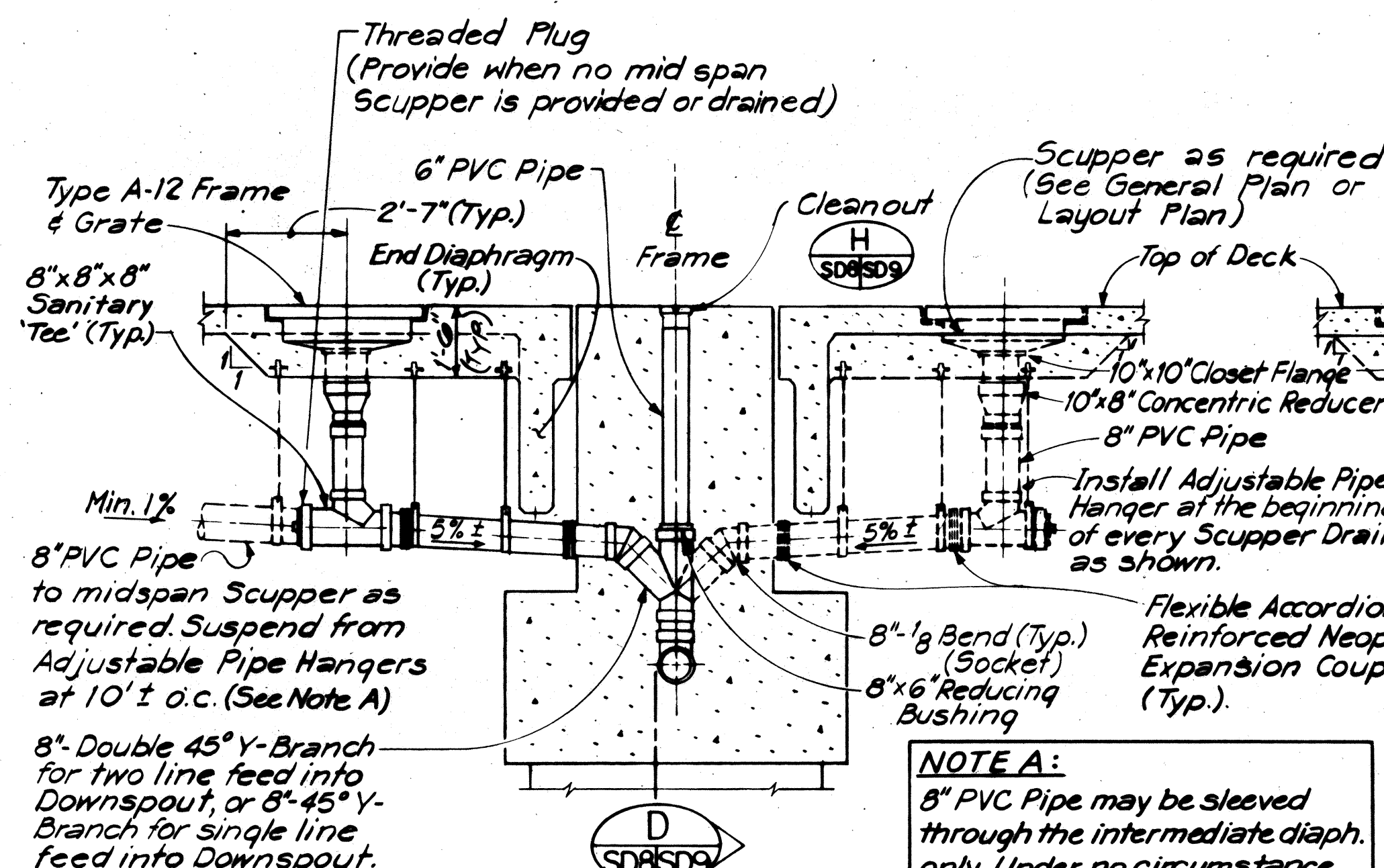
SECTION 
SCUPPER TYPE 'A'
SCALE: 3/4" = 1'-0"



SECTION 
SCUPPER TYPE 'B'
SCALE: 3/4"=1'-0"



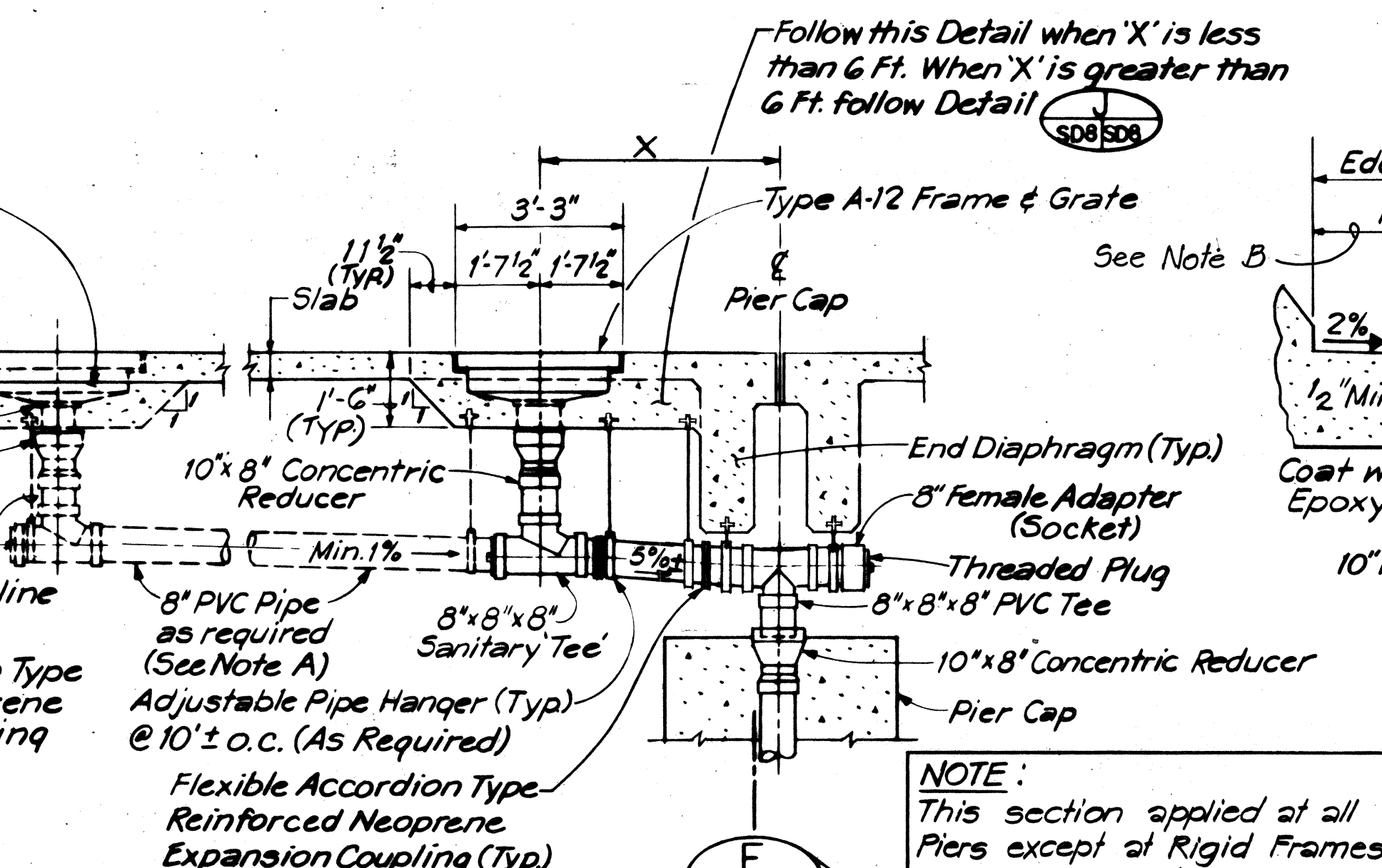
SCUPPER TYPE 'C'
SCALE: 3/4" = 1'-0"



SECTION  shall the 8' through the

TYPICAL SECTION (AT RIGID FRAME PIERS)

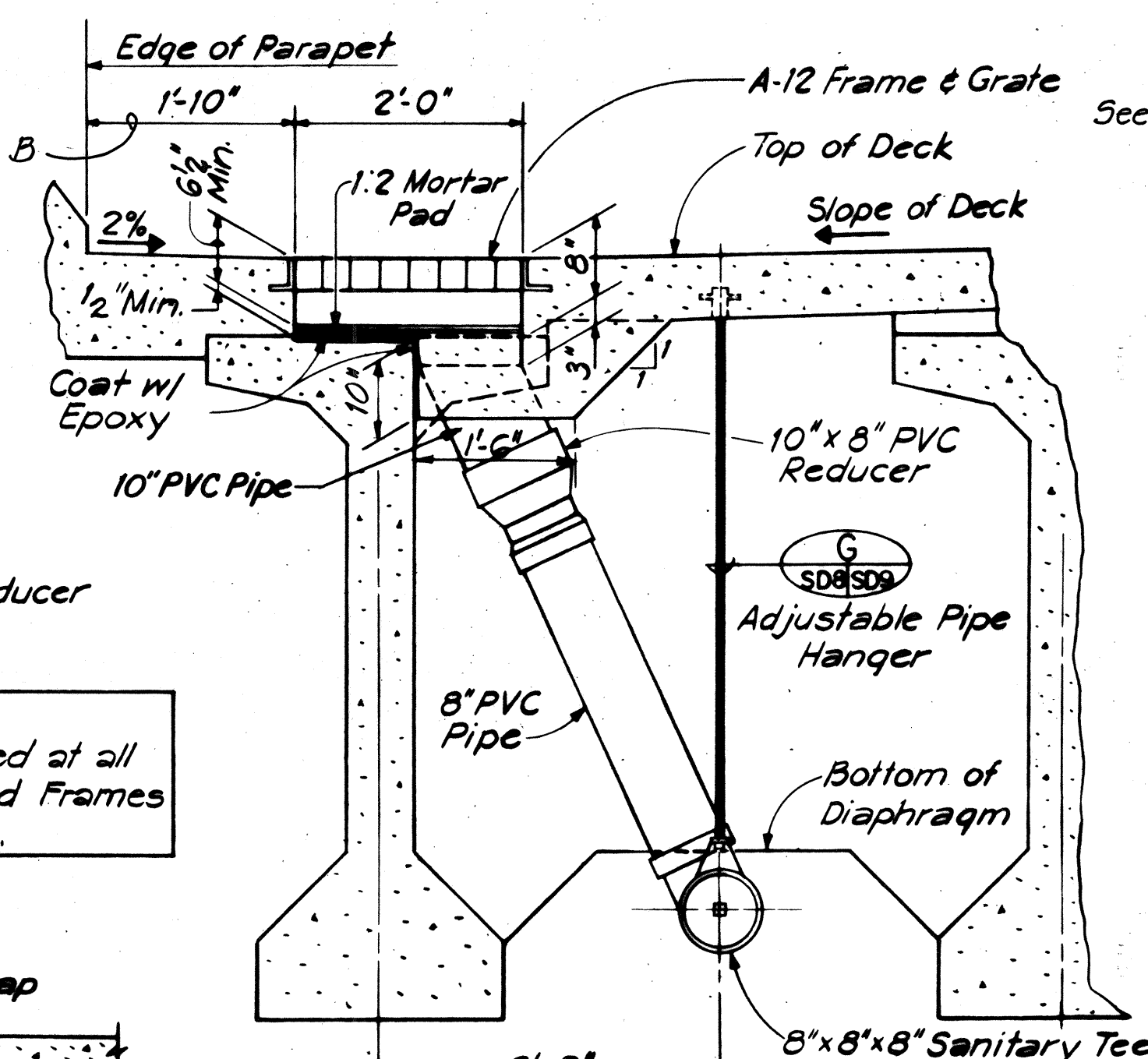
SCALE : 3/8" = 1'-0"



SECTION C
SD8 SD8

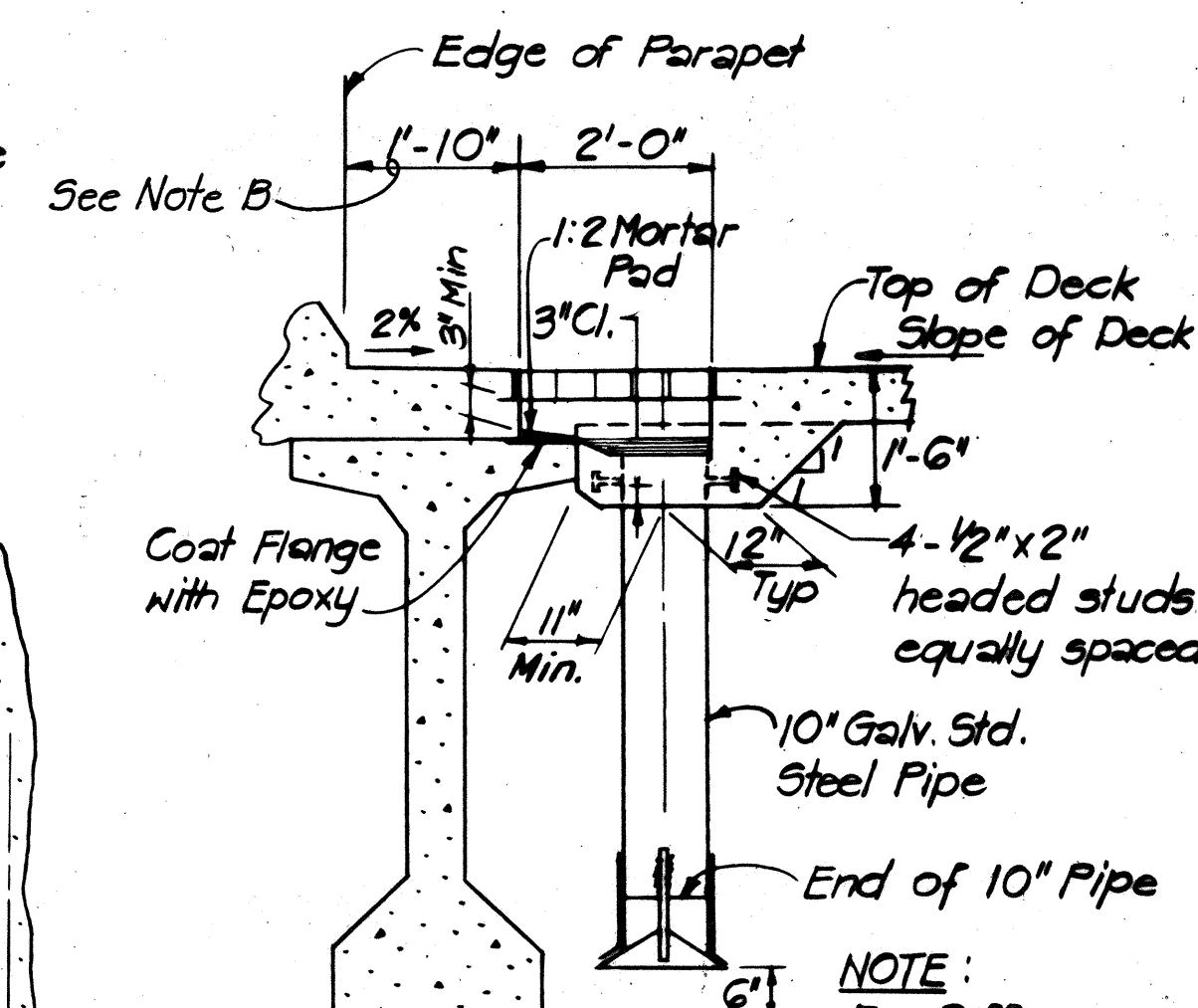
TYPICAL SECTION

SCALE: 3/8" = 1'-0"

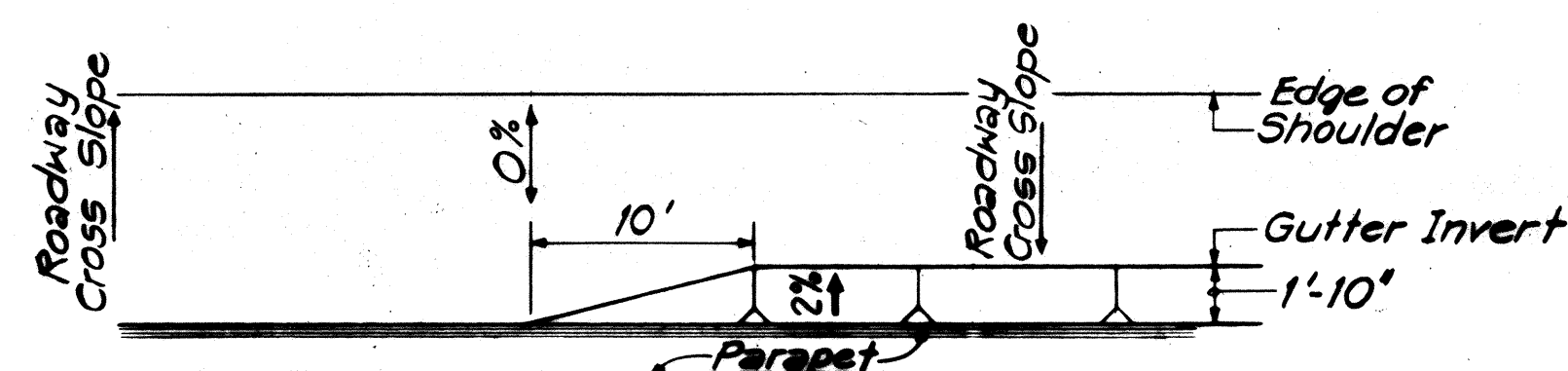


SCUPPER TYPE 'D'

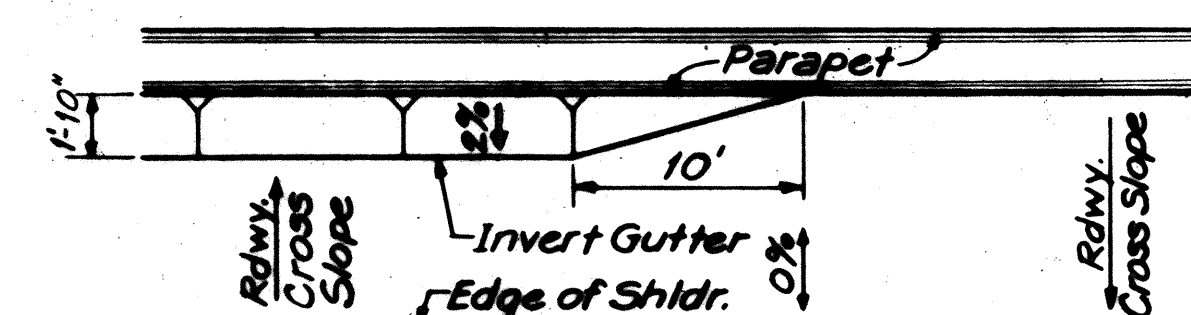
SCALE: 3/4"=1'-0"



SCUPPER TYPE 'E'
SCALE: 1/2" = 1'-0"



TYPICAL GUTTER TRANSITION AT ROLLOVER
N.T.S.



Technical drawing of a pier cap detail. The drawing shows a cross-section of a pier cap with a width of 3'-3". The cap is supported by a pier. Dimensions include 11 1/2" for the cap width on either side of the pier, 1'-6" for the pier width, and 5 1/2" for the pier height. A label "Pier Cap" is present. A note at the bottom left states "For PVC Fittings See Section C". A small detail of a pier cap is shown at the bottom right.

DETAIL
SCALE: 3/8"=1'-0"

NOTE :
This section applied at all
Piers except at Rigid Frames
and C.I.P. Box Piers.

NOTE:
For Diffuser
Details see
Scupper Type 'C'



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ME OR UNDER MY SUPERVISION
Vijay chandra
Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

STRUCTURE DRAINAGE DETAILS

SHEET 1 OF 2

KEEHEE INTERCHANGE
F.A.I. PROJECT NO.1-HI-1 (132) :17

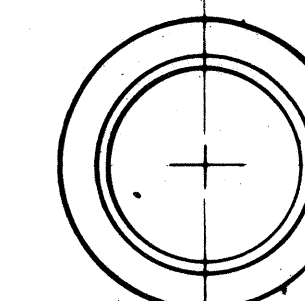
SCALE: AS SHOWN **DATE: 6/15/81**

SHEET NO. SD-8 OF SD-14 SHEETS SD-8

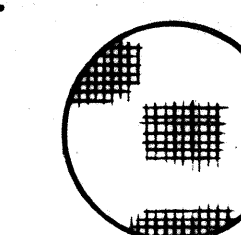
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1414(132)17	1983	179	192

GENERAL NOTES:

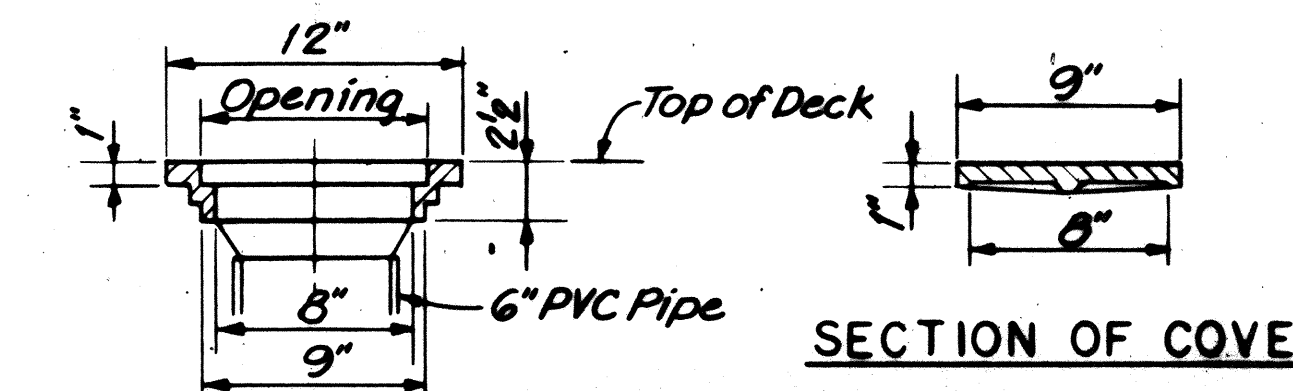
1. All Pipe Slopes shall be maximized to the greatest extent possible without extending below the bottom of the Beams.
2. All PVC Pipes shall be Type I Schedule 40.
3. Deck Drain Cleanout Metal Frame and Cover Casting shall be Ductile Iron designed for Highway Traffic Wheel Loads of 16,000 Lbs And shall conform with ASTM Designation A 536.
4. For Location of Scuppers and Outfall Type, See General Plan (or Layout Plan) of Structure.
5. Deck Drain Cleanout Frame & Cover shall be incidental to Concrete in Bridge, unless otherwise noted on Plans.



PLAN OF FRAME



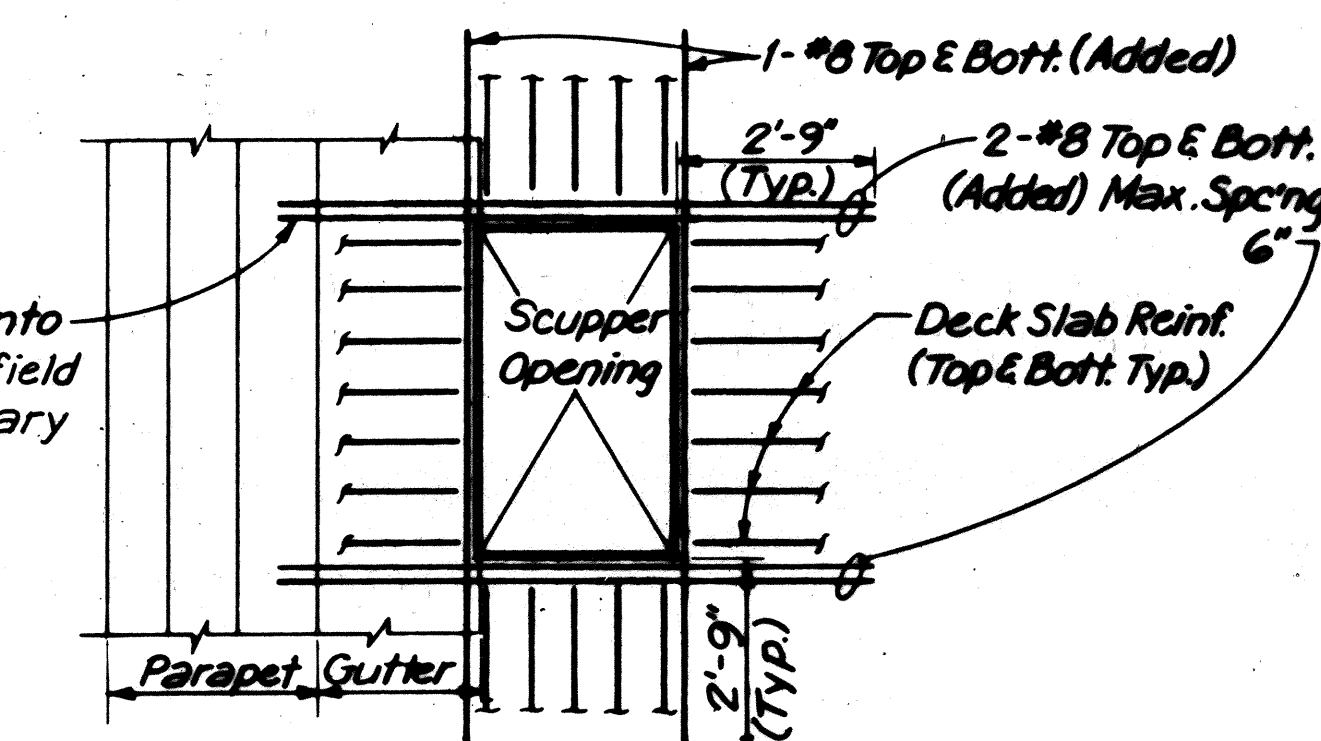
TOP VIEW OF COVER



SECTION OF COVER

SECTION OF FRAME

TYPICAL DECK DRAIN CLEANOUT FRAME AND COVER



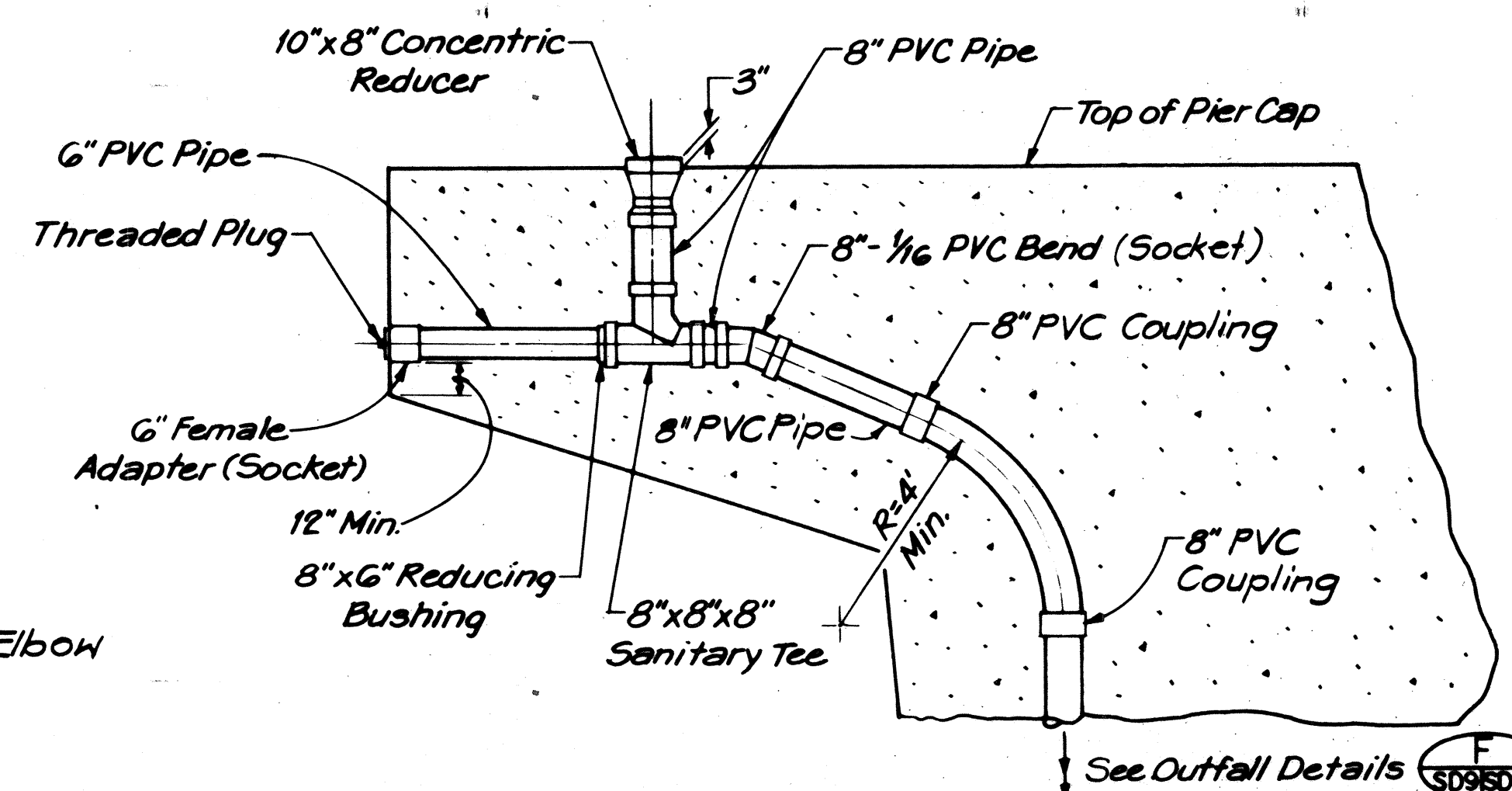
PLAN-SCUPPER

Bend Bar into Slab in the field as necessary

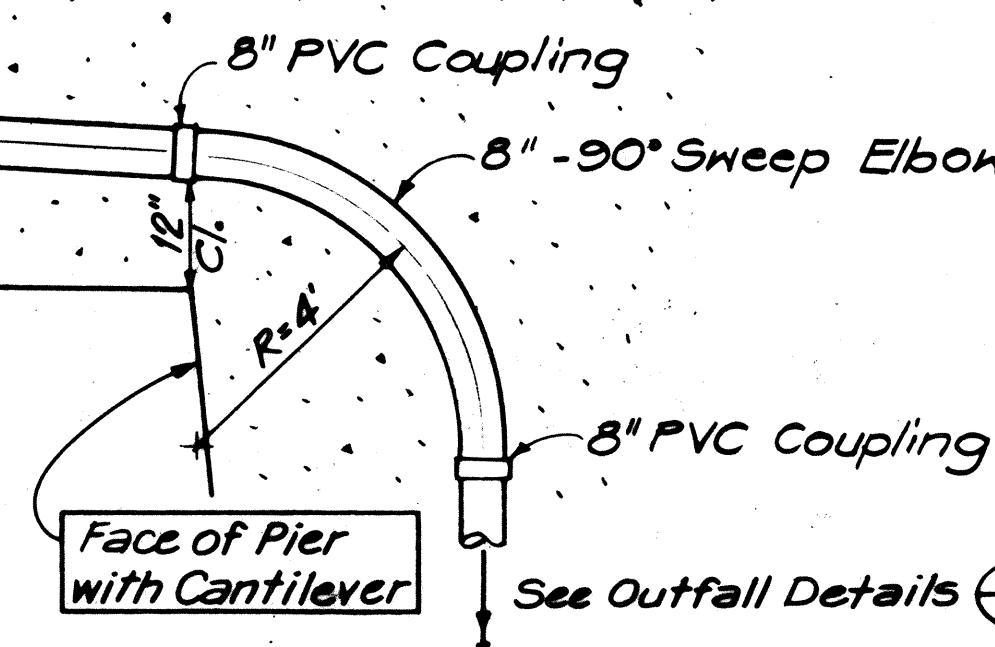
SECTION E

TYPICAL HAMMERHEAD PIER DOWNSPOUT

(Applies to all Piers except Rigid Frames and C.I.P. Box Piers)



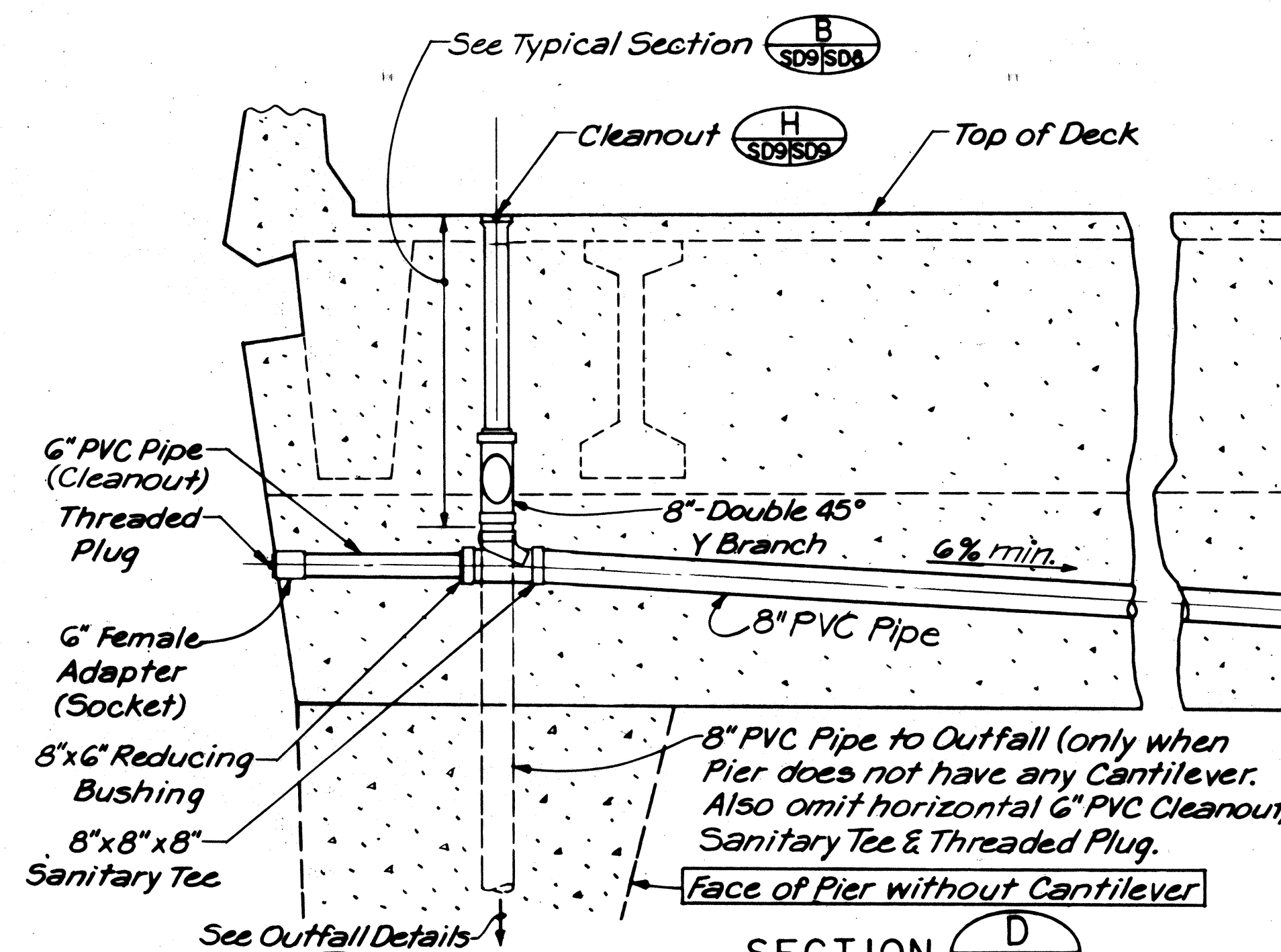
NOTE: Remove Portion of Sweep Elbow as required for Smooth Transition.



See Outfall Details

SECTION D

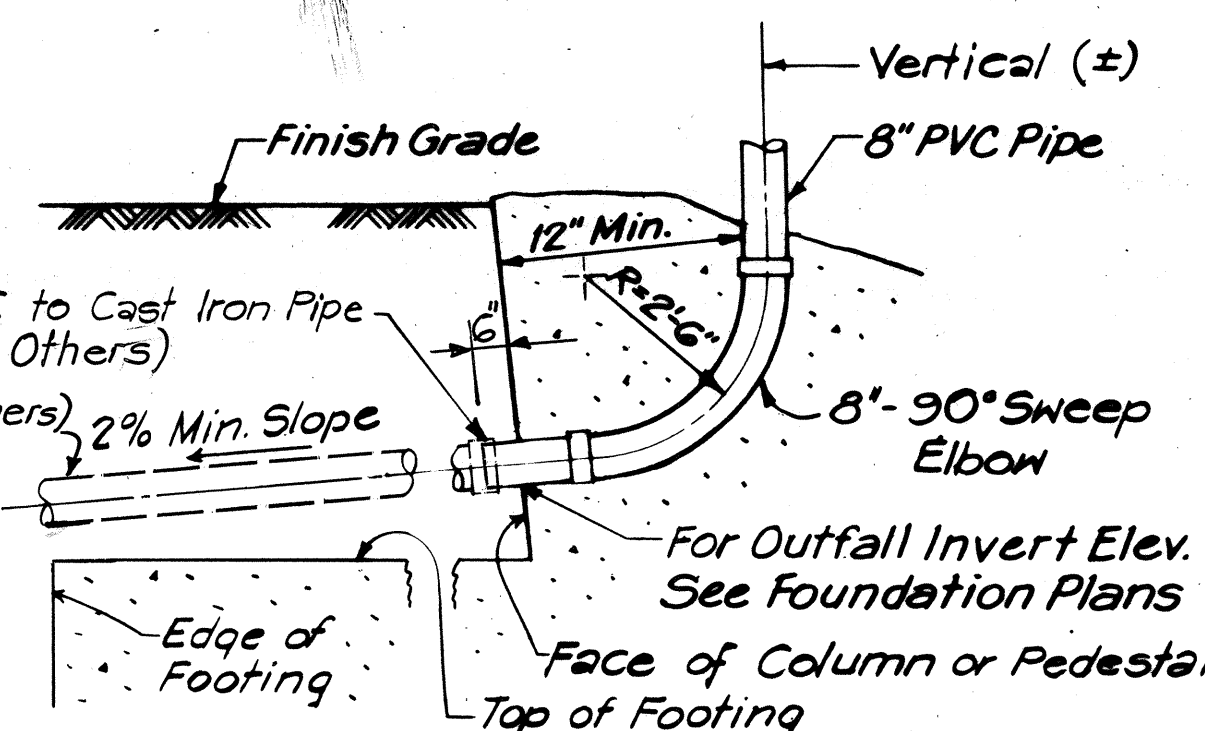
TYPICAL RIGID FRAME PIER DOWNSPOUT



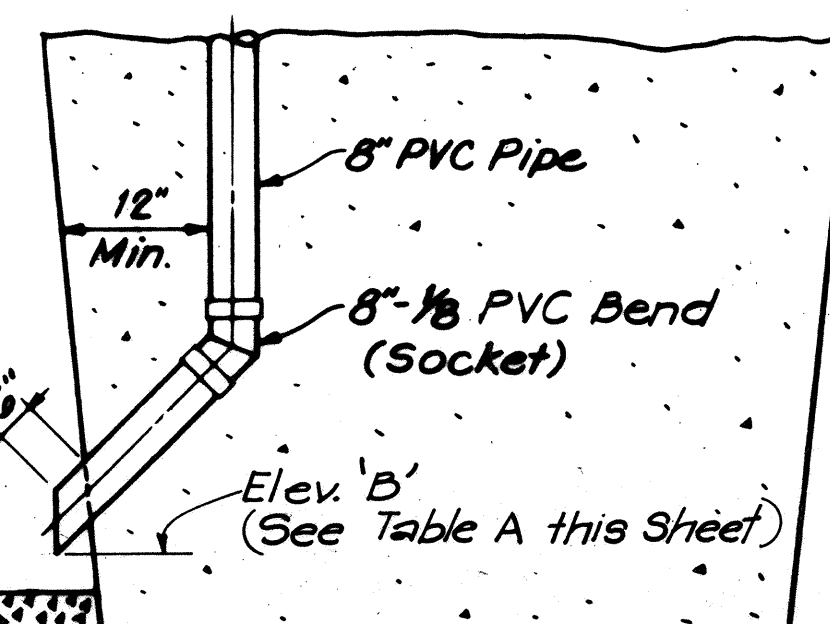
NOTE: Also omit horizontal 6 inch PVC Cleanout, Sanitary Tee & Threaded Plug.

Face of Pier without Cantilever

See Outfall Details



OUTFALL TYPE 1



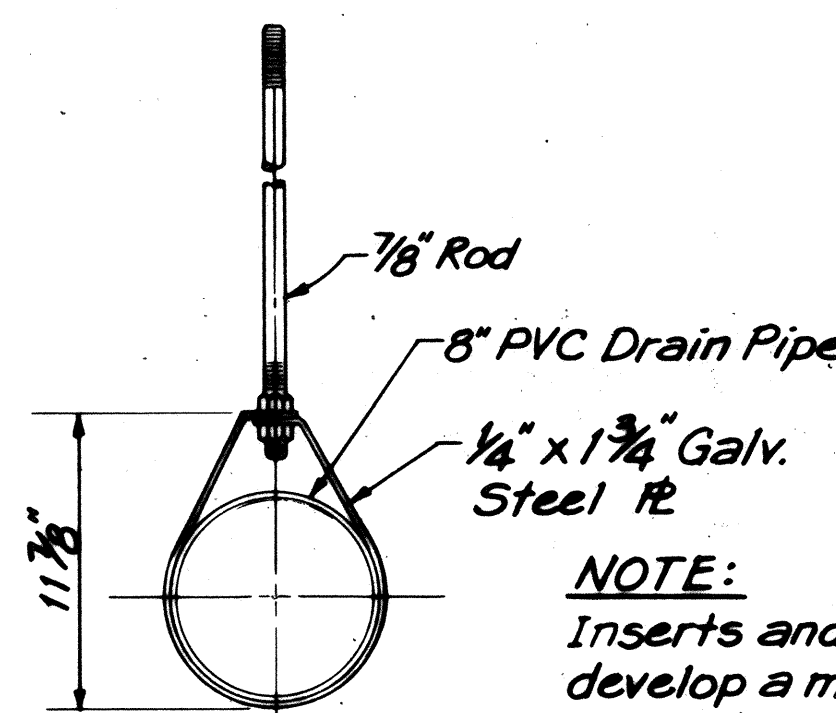
OUTFALL TYPE 2

OUTFALL DETAILS

PIER No.	ELEVATION 'B'
13	8.20
14	7.70
15	7.70
16	2.70
17	2.70
18	2.70
19	2.70
20	2.70
23	6.70
24	6.30
25	7.70
26	7.50
27	6.70
28	6.70
29	6.70

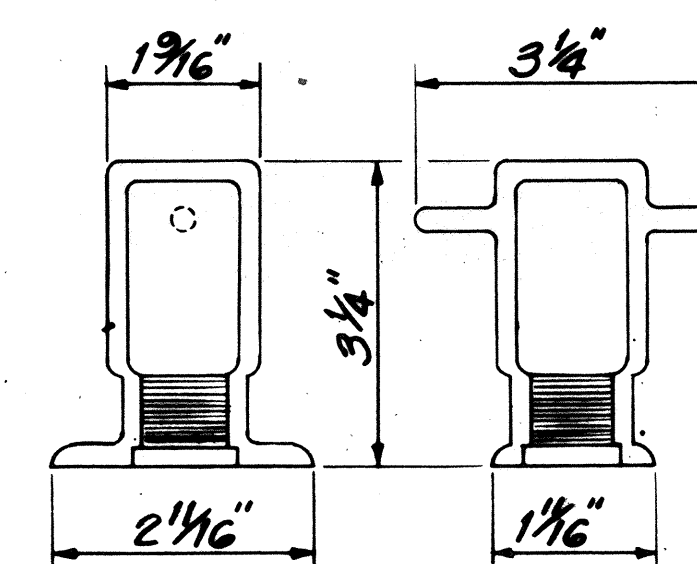
5'-0" x 5'-0" x 6" deep crushed Rock. Provide at each Downspout. (Incidental to "Concrete In Bridges.")

Earth mound to meet final grade as directed by the Engineer.



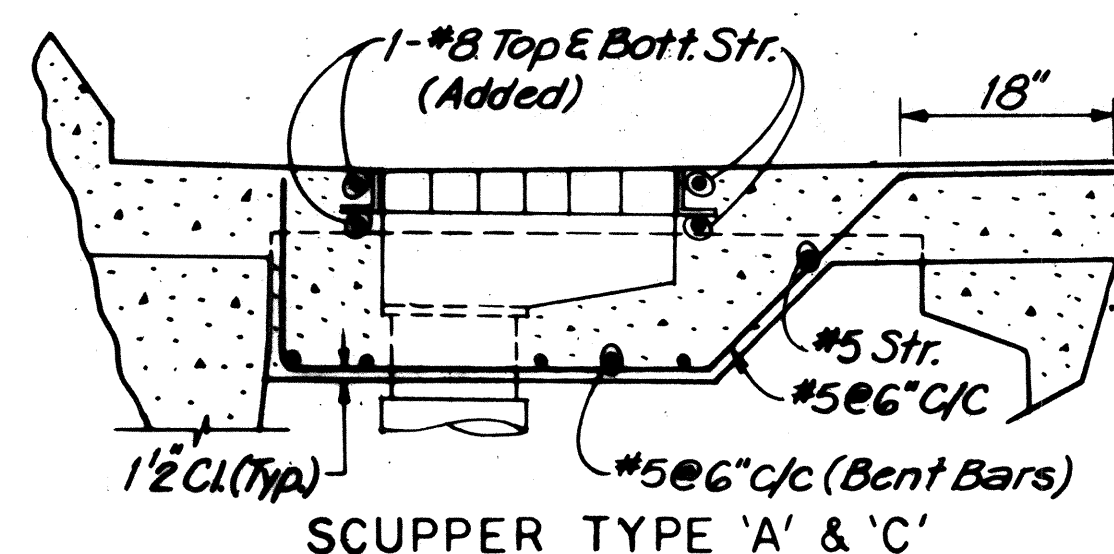
HANGER DETAIL

NOTE: Inserts and Hangers to develop a minimum ultimate pulling strength of 13 kips.

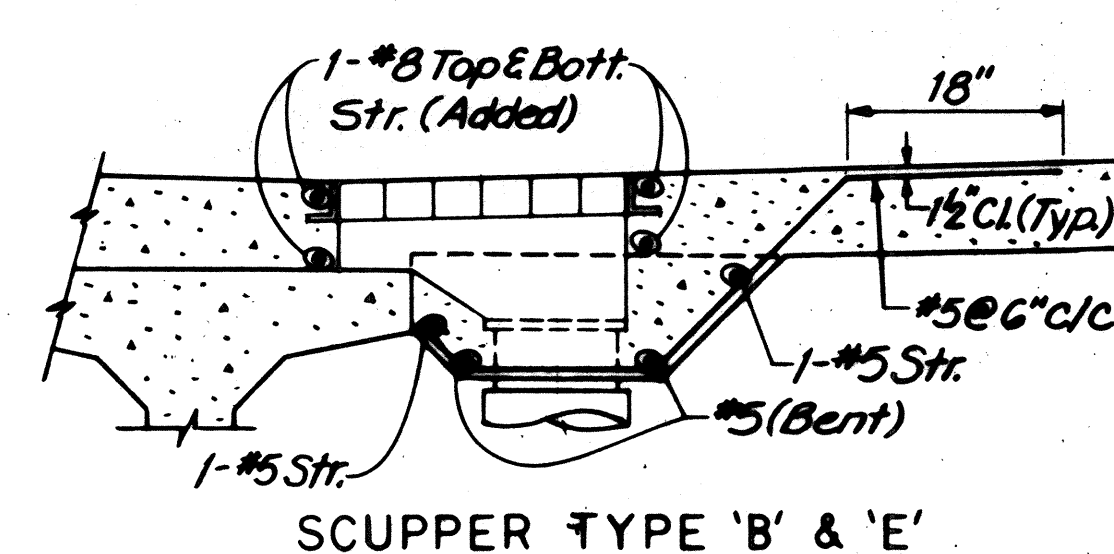


INSERT DETAIL

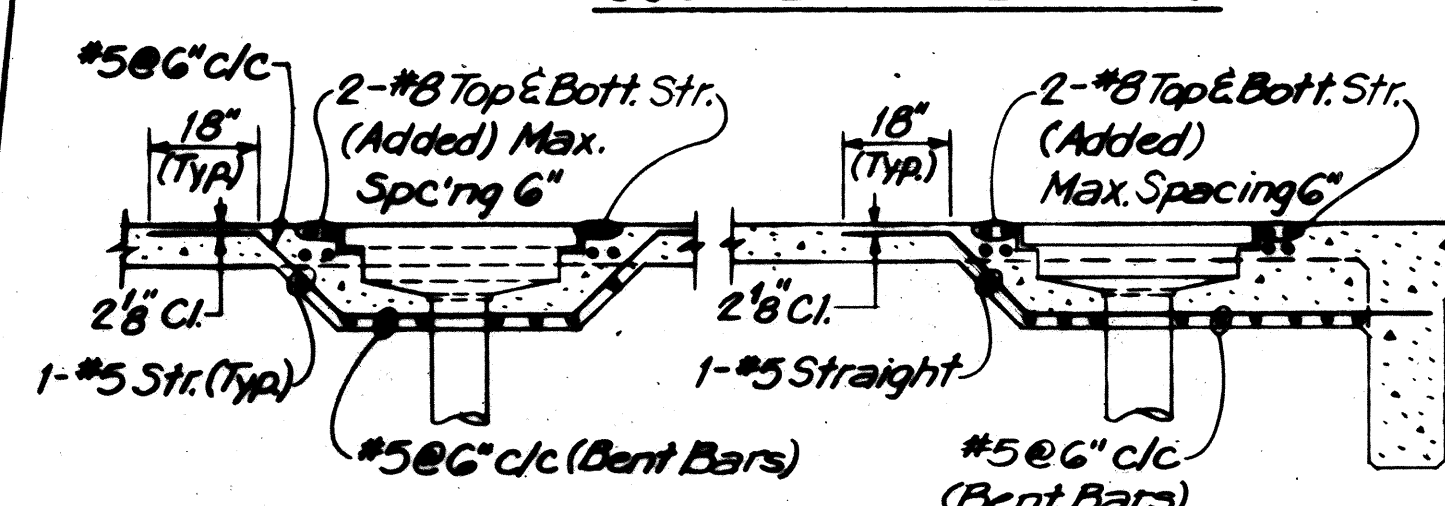
DETAIL OF PIPE HANGERS AND INSERTS



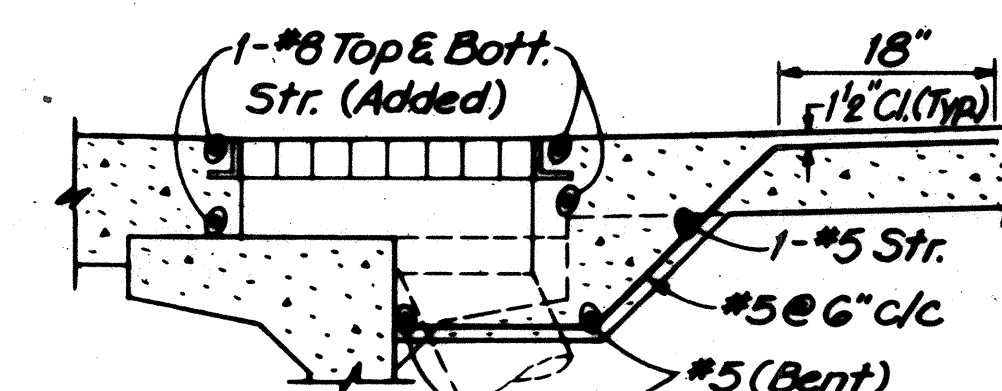
SCUPPER TYPE 'A' & 'C'



SCUPPER TYPE 'B' & 'E'

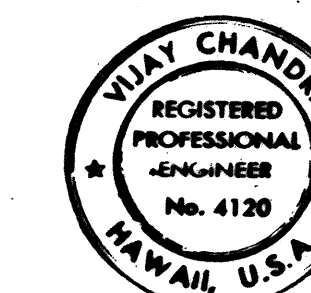


TYPICAL LONGITUDINAL SECTIONS



SCUPPER TYPE 'D'

REINFORCEMENT DETAILS AT SCUPPERS



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Willy Chandra
Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
STRUCTURE DRAINAGE DETAILS
SHEET 2 OF 2

KEEHI INTERCHANGE
F.A.I. PROJECT NO. 1-HI-1 (132) 17
SCALE: N.T.S. DATE: 6/15/81

SHEET No. SD-9 OF SD-14 SHEETS SD-9

DATE _____

SURVEY PLOTTED BY _____

DESIGNED BY _____

QUANTITIES BY _____

CHECKED BY _____

ORIGINAL PLAN _____

NOTE BOOK _____

No. _____

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HI-1(132):17	1983	180	192

NOTES FOR PILE TYPE A

- Concrete shall have a minimum 28-day compressive strength of 6500 psi. Required minimum concrete compressive strength before release of strands=4000 psi.
- Prestressed strands shall be 7 wire stress-relieved strands with an ultimate strength of 270 ksi. Diameter of strands shall be as shown on the Typical Pile Sections. Total loss due to creep, shrinkage, elastic shortening and relaxation of steel =37,000 psi. Total working force shown on the Typical Pile Sections is the net force after all losses.
- Non-prestressed reinforcing steel for pile build-up shall be A.S.T.M. A615 Grade 60. Spiral ties shall be cold drawn A.S.T.M. A82
- For details of pile splices see sheet No. SD-12.
- All piles shall have driving shoes.
- At the top of the top segment of the pile, a female splice as shown on Sheet SD-12 shall be cast with the pile. No pile shall be driven without a female part of the splice at the top of the pile.
- The splice shall be designed for an ultimate moment of 120 ft. Kips.
- Portion of pile embedded into footing (or pile cap) shall be of sound concrete. Damaged portions shall be removed and pile shall be built-up to the cut-off elevation shown on the Plan.
- The plumb of pile shall be checked for conformance to the allowable tolerances, as specified in the Special Provisions, before constructing the build-ups.
- Work of cutting off Prestressed Concrete Piles or Concrete Build-ups shall be performed in such a manner as to avoid spalling or damaging the pile below cut-off. In case of such damage the pile shall be replaced or repaired by the Contractor at his own expense as directed by the Engineer.
- Piles are to be manufactured & installed in accordance with the tolerances specified in the Special Provisions. Piles not conforming to the tolerances shall be rejected and will not be paid for. The Contractor shall furnish necessary labor and/or equipment to aid the Engineer in passing the plumb bob through the central inspection hole of each pile. This shall be done in the fabrication yard and immediately after driving each pile. Such assistance shall be incidental to furnishing piles and will not be paid for separately.
- Defective piles (See Subsection 505.03 (G) of Special Provisions) shall be cut off 1'-0" below bottom of footing or finish grade whichever is lower.

13. Driving on pile build-ups shall not be permitted.

14. The C

NOTE F: The 5" Corrugated Plastic Pipe shall be similar or equal to, as determined by the Engineer, to the Corrugated plastic drainage tubing manufactured by Advance Drainage Systems and shall have a wall thickness of 0.05 inches, 5.73 inches OD on outside of corrugation and 5.07 inches OD on inside of corrugation, and a pitch of 0.7 inches. The pipe shall be furnished in minimum lengths of 10 feet and shall be non-perforated. The 5" Corrugated Plastic Pipe shall be coupled to short 5" PVC pipe lengths at the pile splices. (See Arrangement of PVC Pipe connections at pile splice, sheet No. SD-12).

The short 5" PVC Pipe shall be Schedule 40 (5.563" O.D., 5.047" I.D.) rigid pipe.

NOTE D: In lieu of 2 pile splices shown, the Contractor, at his option, may use only one splice. However length of each segment of pile shall not exceed 100 ft. (Contractor's attention is directed to restrictions due to airplane glide paths. See Special Provisions).

Extend central pipe into receiving sleeve of Rock Driving Shoe

PILE TYPE A

N.T.S.

NOTE A: Provide inspection holes in all piles as follows:

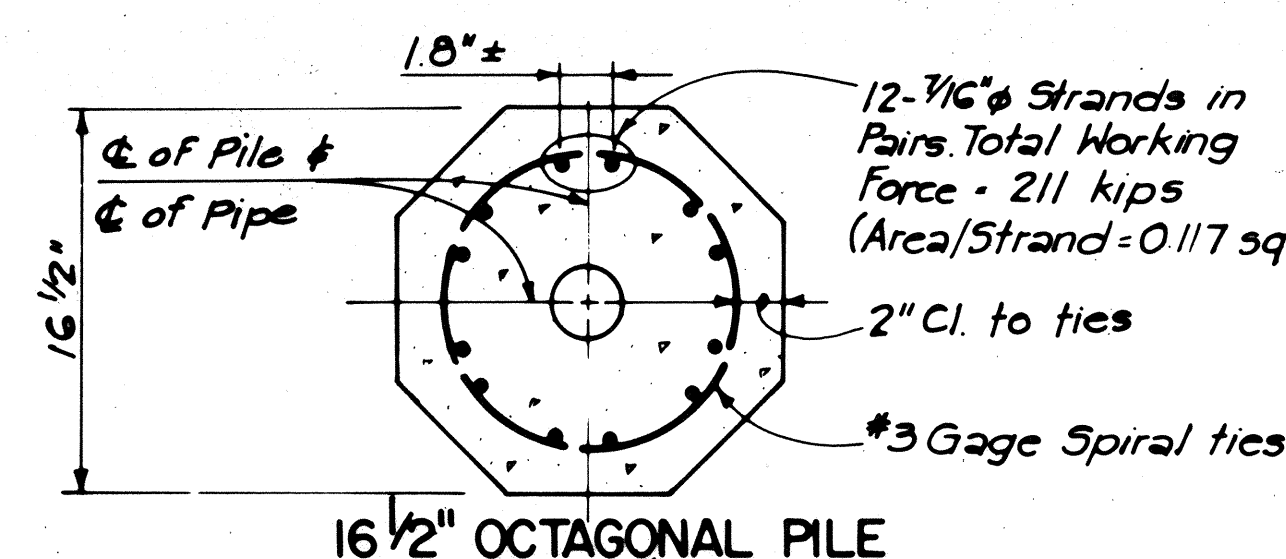
- All piles, except Load Test Piles shall have a 3" PVC Pipe cast in the center of the pile. The pipe shall have a radial tolerance of 1/8" off-set from center of pile except that within 3 feet of the ends of pile segments the radial tolerance shall be 1/6" off-set from the center of the pile. The 3" PVC Pipe shall be Schedule 40 (3.500" O.D., 3.068" I.D.) rigid plain end pipe with separate socket couplings. The allowable deviation from straight for the pipe is 1/8" in any 10 feet of length.
- Load Test Piles shall have a 5" Corrugated Plastic Pipe cast in the center of the pile instead of the 3" PVC pipe. The pipe shall be placed to the same tolerances specified for the 3" PVC pipe. For additional details see Note F.

NOTE B: The Bitumen Coating shall not protrude into footing or Pile Cap. When a pile is exposed above ground, as in the case of certain pile bents, the bitumen coating shall be up to the finished grade (or stream bed) only. If the Pile Tip ends higher than the estimated Pile Tip Elevation, the Contractor shall remove the bitumen coating from the pile head that is to be embedded into the footing (or Pile cap), or the portion above the finished grade as applicable. Payment for removal is incidental to various contr. items.

NOTE C: Remove concrete over this length from top of top segment of pile. Leave Strands & Dowels exposed, for embedment into footing (or pile cap). Cut-off of concrete shall be normal to the axis of pile. For pile cut-off elevations see Foundation Plans.

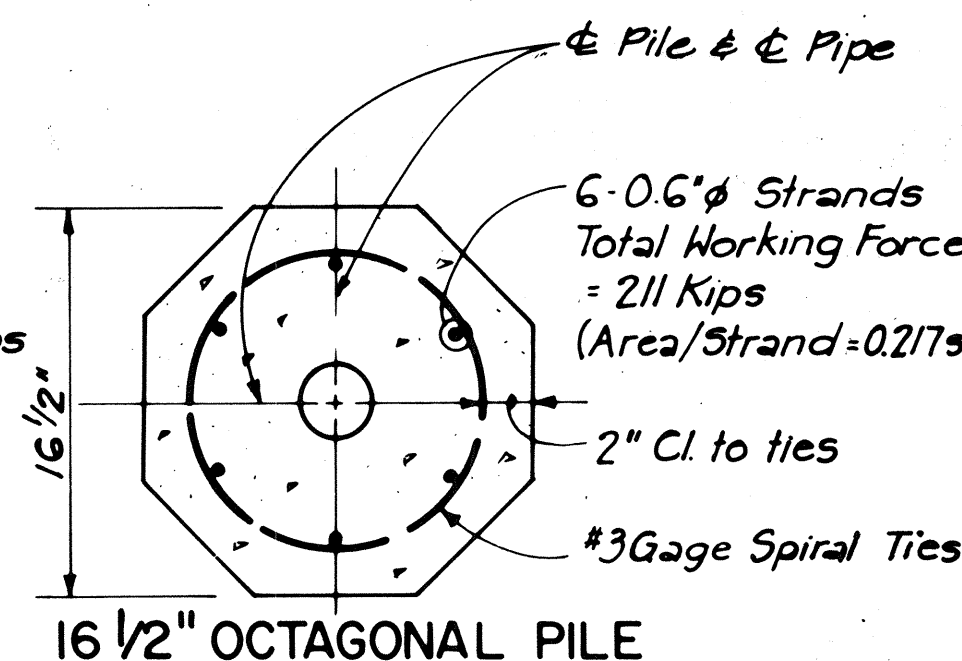
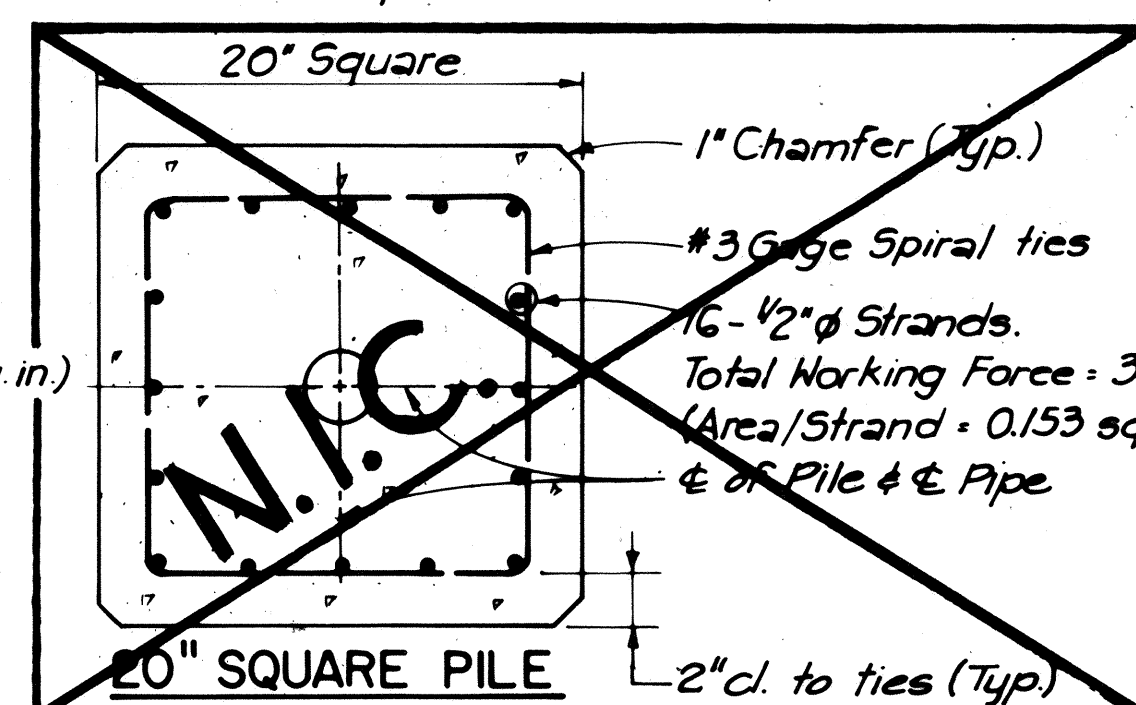
TYPICAL PILE DETAIL

N.T.S.



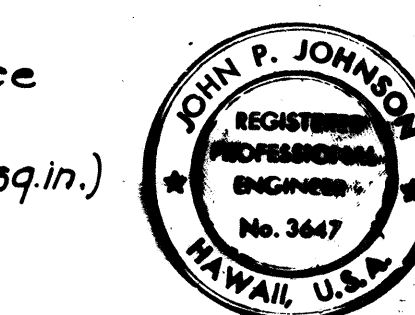
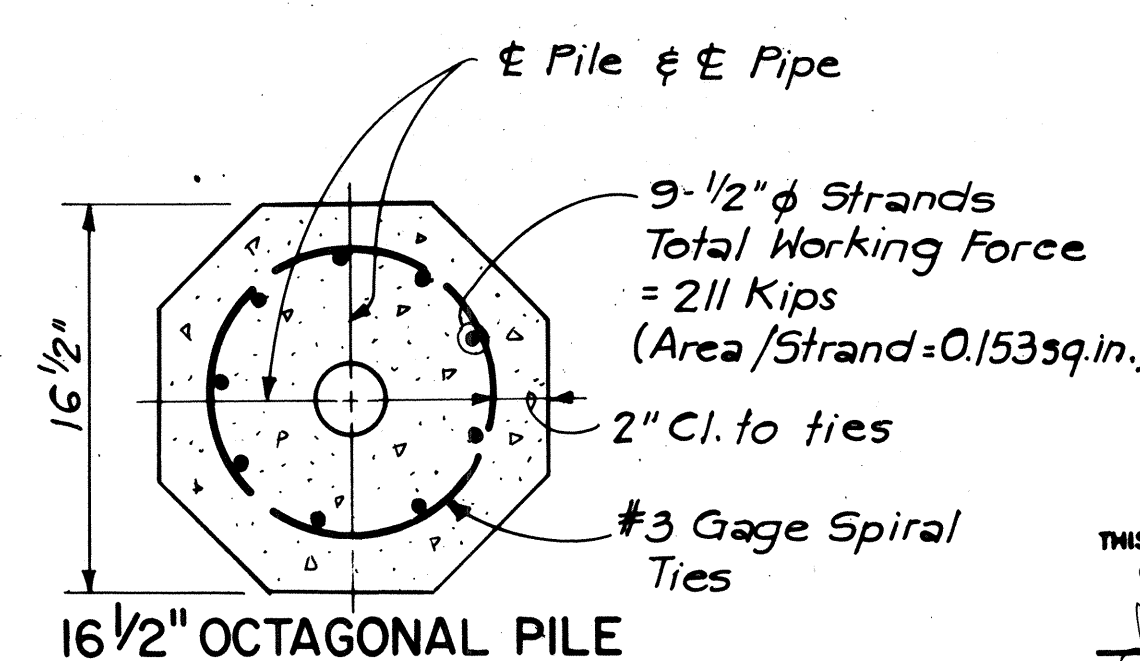
TYPICAL PILE SECTION

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



OPTIONAL STRAND PATTERN

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



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John P. Johnson

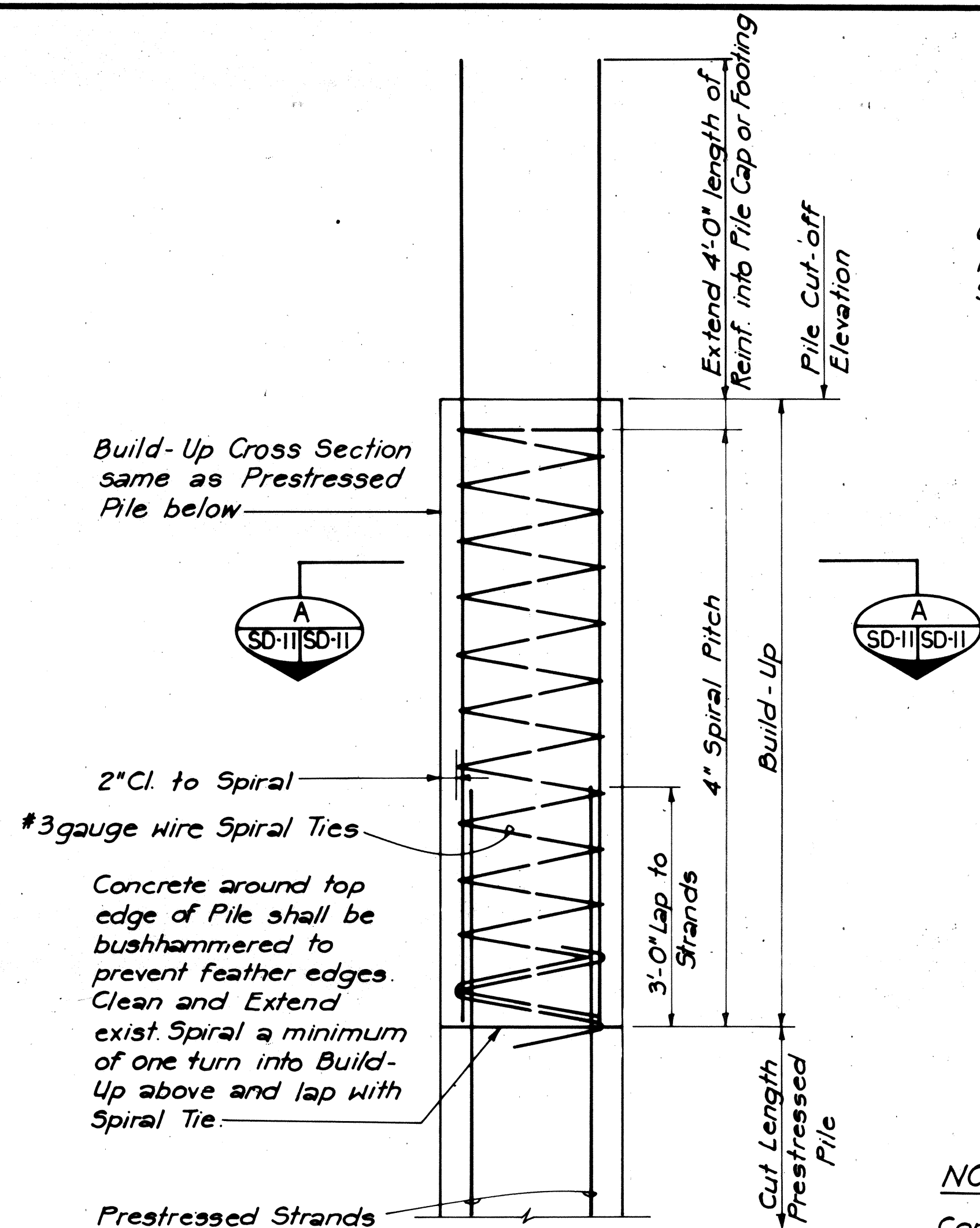
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
PRESTRESSED CONCRETE PILES
PILE TYPE A
SHEET 1 OF 3
KEEHI INTERCHANGE
F.A.I. PROJECT NO. I-HI-1(132):17
SCALE: AS SHOWN
DATE: 6/15/81
SHEET NO. SD-10 OF SD-14 SHEETS SD-10

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H-1 (132) 17	1983	181	192

TABLE OF PILE LOAD TESTS & APPLICABLE FOOTINGS	
Pile Load Test at Pier Number	Applicable to Pier Footings
Pier 18 (B) ** H-1 (WB)	14 (B) thru 22 (B) 15 (A) thru 22 (A)
Pier 23 (B) ** NC (WB)	23 (A) & 23 (B)
Pier 25 (B)	24 (A) thru 26 (A) 24 (B) thru 27 (B)
Pier 28 (B) ** NC (WB)	27 (A) thru 29 (A)
Pier M6 ** Makai Fr. Rd.	28 (B) & 29 (B)

This table subject to change by the Engineer, depending on results of Test Driving Pile.

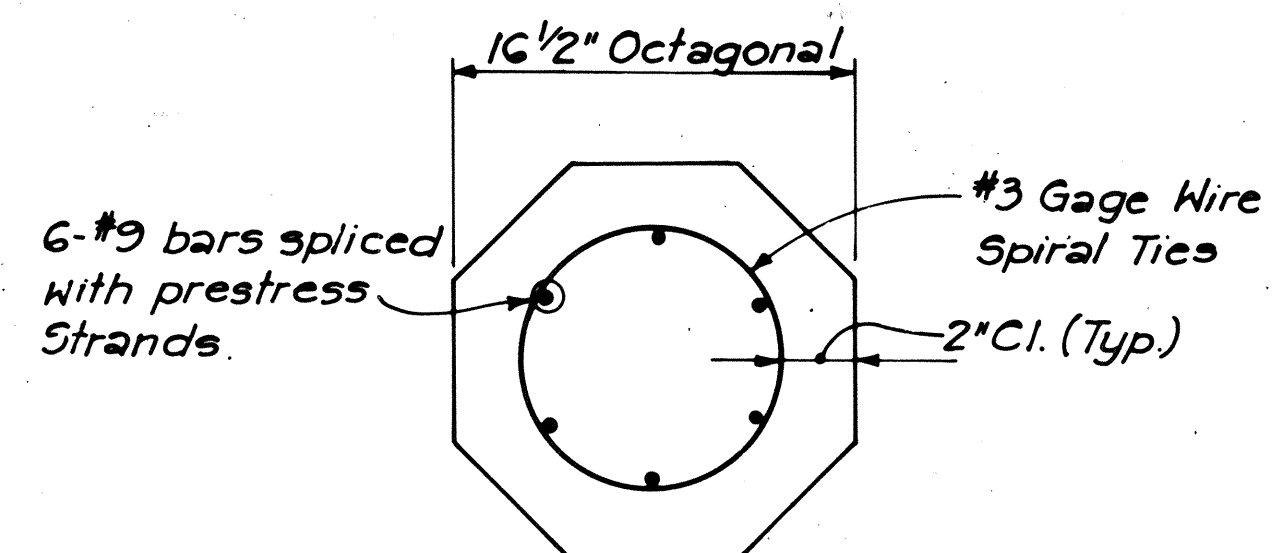
** Denotes Load Test Performed in prior Contracts by Others.



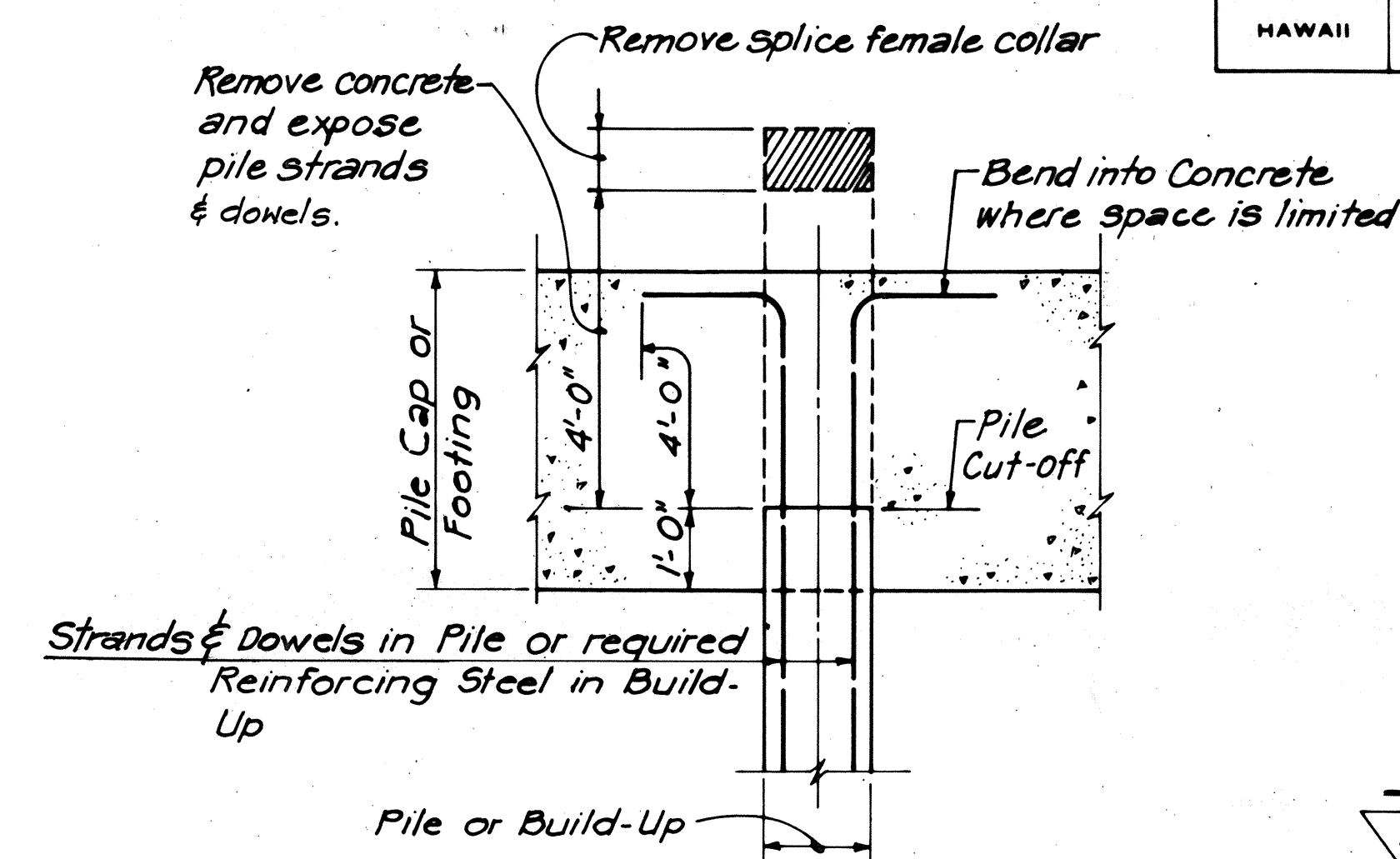
TYPICAL PILE BUILD-UP DETAILS
N.T.S.

NOTE:

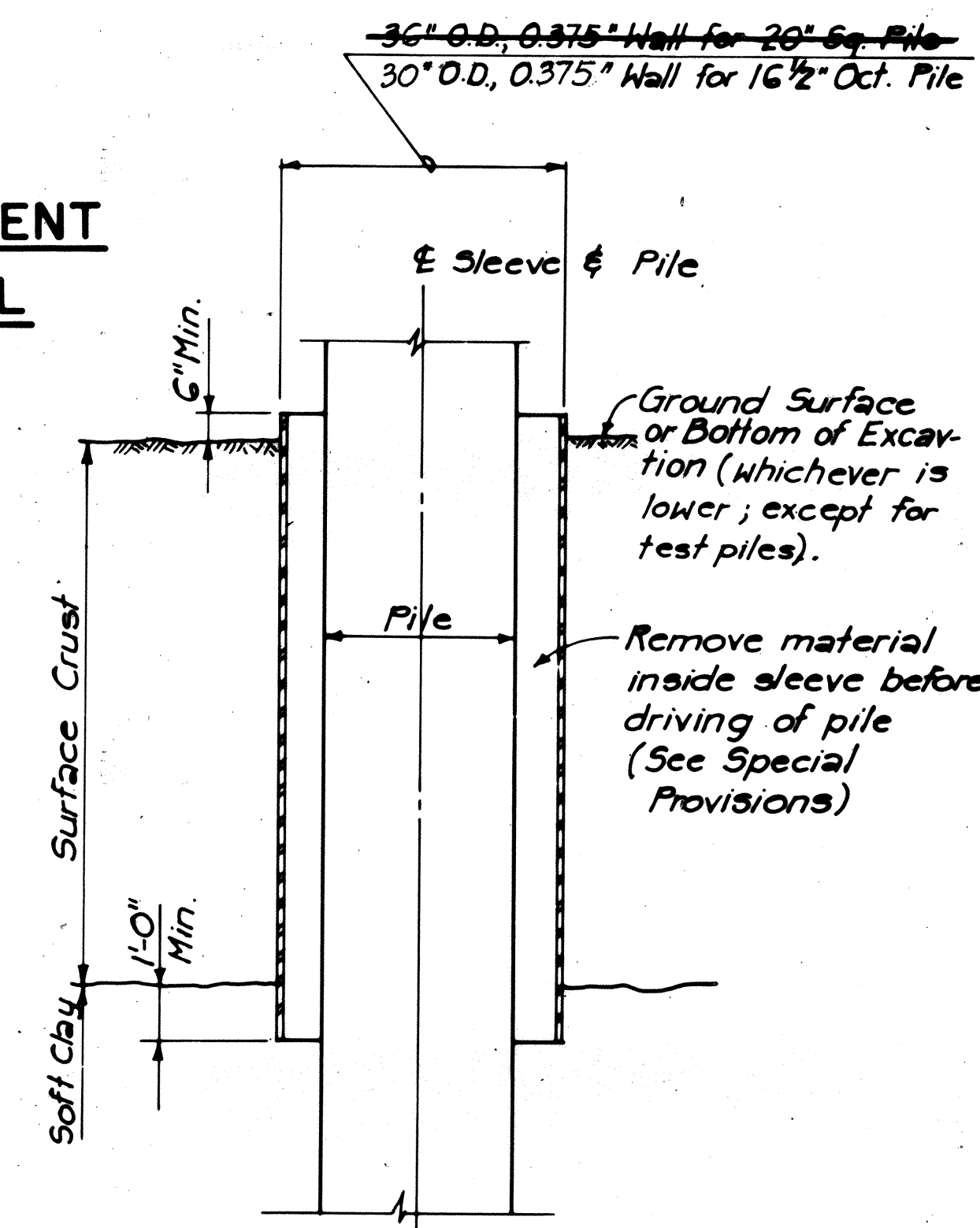
Concrete in pile build-ups shall have a minimum comp. cyl. strength f_c' of 5,000 psi at 28 days.



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



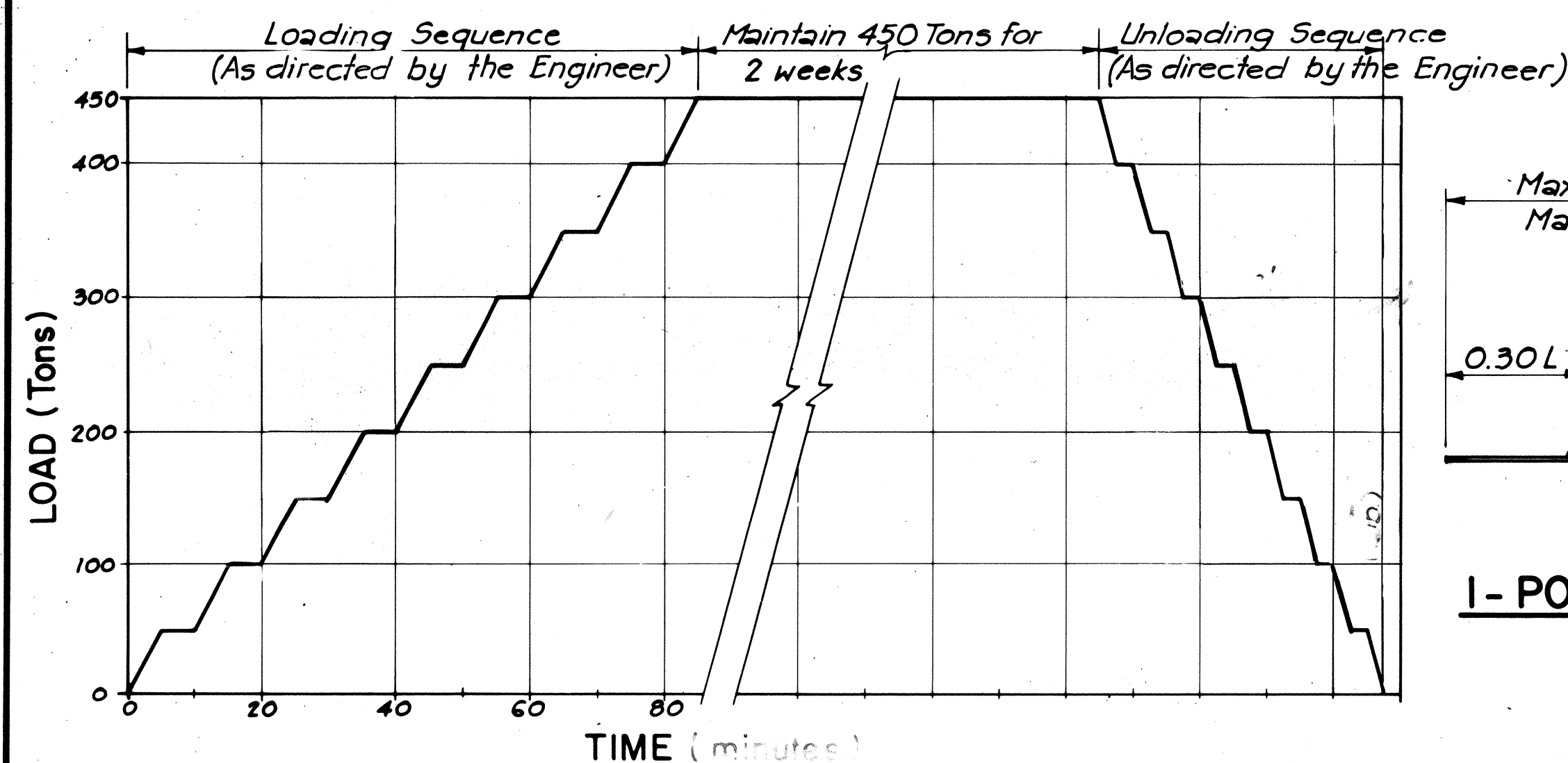
PILE REINFORCEMENT
EXTENSION DETAIL
Scale: 1/2" = 1'-0"



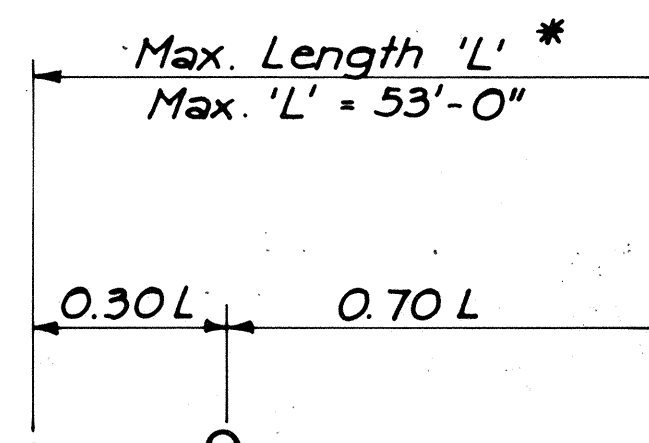
STEEL SLEEVE DETAIL
Not to Scale

NOTES:

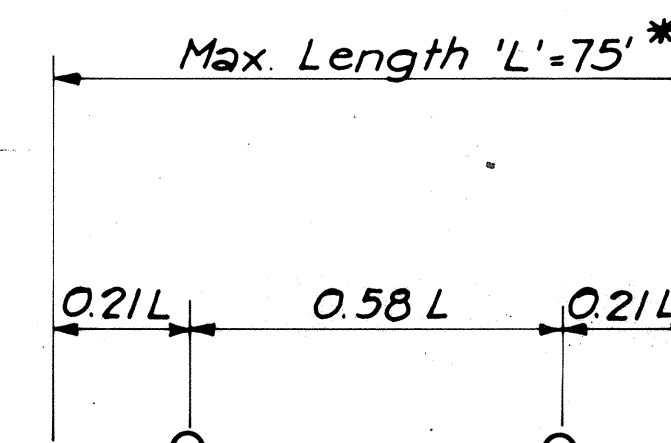
1. No steel sleeve required when there is no bitumen coating on the pile.
2. Surface crust is defined as the material between the ground line, or bottom of excavation, and the uniform soft clays (without the presence of granular materials).
3. Sleeves shall be installed plumb. Allowable deviation from vertical for the sleeve is '8" in 10 feet.
4. Splices, if required, shall be made so that inside face of sleeve is flush.



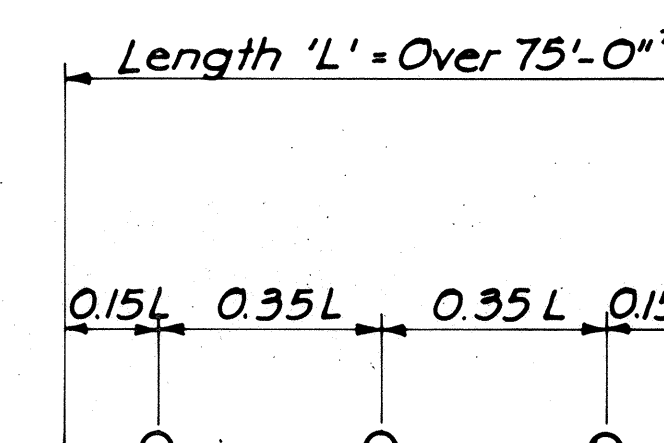
PILE LOAD TEST SEQUENCE DIAGRAM
N.T.S.



1- POINT PICK-UP



2- POINT PICK-UP



3- POINT PICK-UP

* The Length 'L' is the Distance, End-to-End of Pile before Cut-off

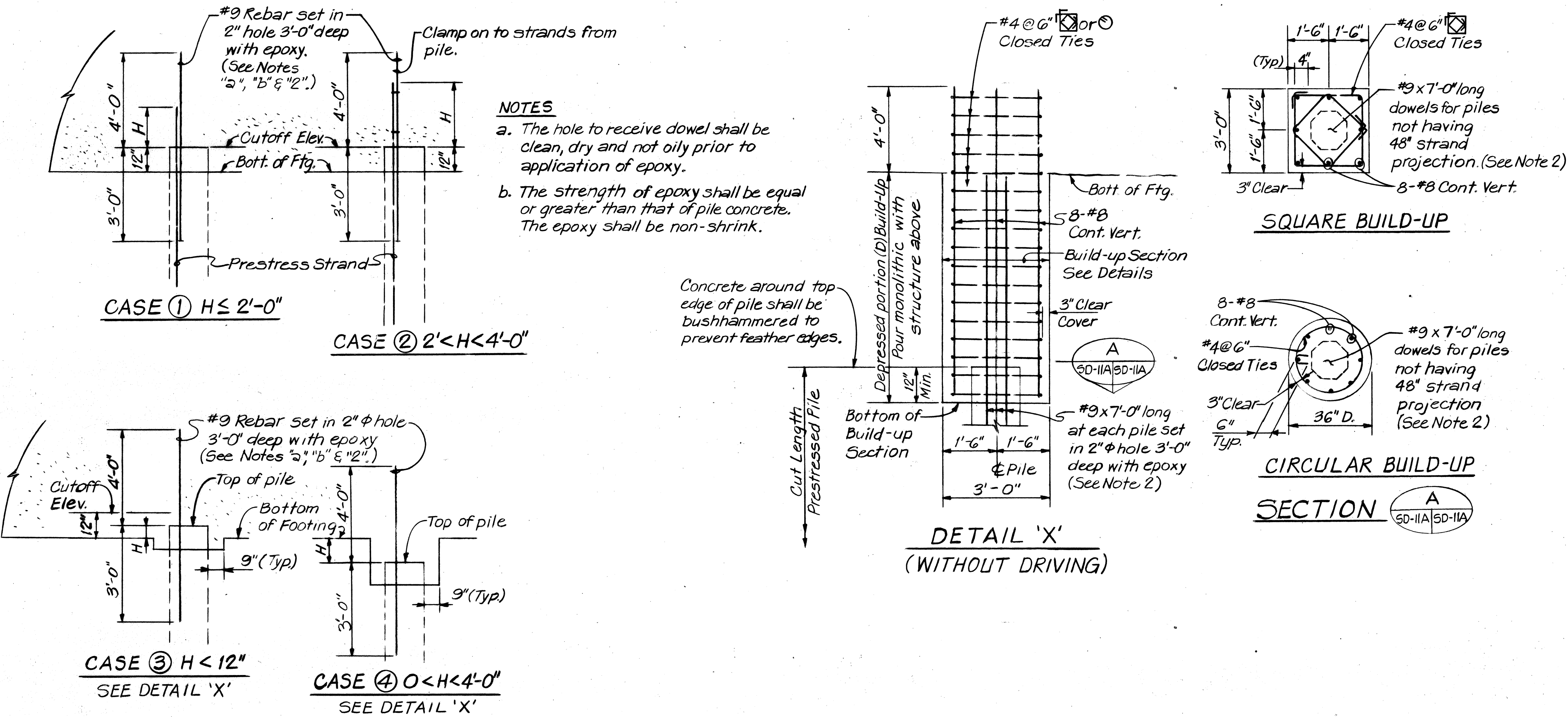
NOTE:

Unless special lifting devices are attached for pick-up points, pick-up points shall be plainly marked on all piles after removal of the forms, and all lifting shall be done at these points. The use of special embedded or attached lifting devices, the employment of pick-up points, or any other method of pick-up shall be subject to approval by Engineer.

VIJAY CHANDRA
REGISTERED
PROFESSIONAL
ENGINEER
No. 4120
HAWAII, U.S.A.
THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION.
Signature
Vijay Chandra

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
PRESTRESSED CONCRETE PILES
DETAILS
SHEET 2 OF 3
KEEHI INTERCHANGE
F.A.I. PROJECT NO. 1-H-1 (132) 17
SCALE: AS SHOWN
DATE: 6/15/81
SHEET No SD-II of SD-14 SHEETS SD-II

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(132)17	1983	182	192

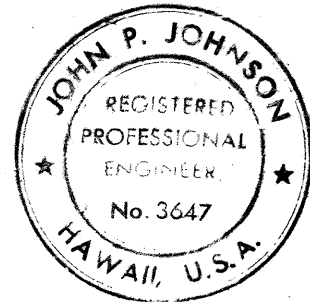


ALTERNATIVE PILE BUILD-UP DETAILS

NOT TO SCALE

(NOTE: This Alternative Pile Build-Up shall not apply to Trestle Type Structures which have pile exposed above finished grade).

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	DESIGNED BY	
	CHECKED BY	

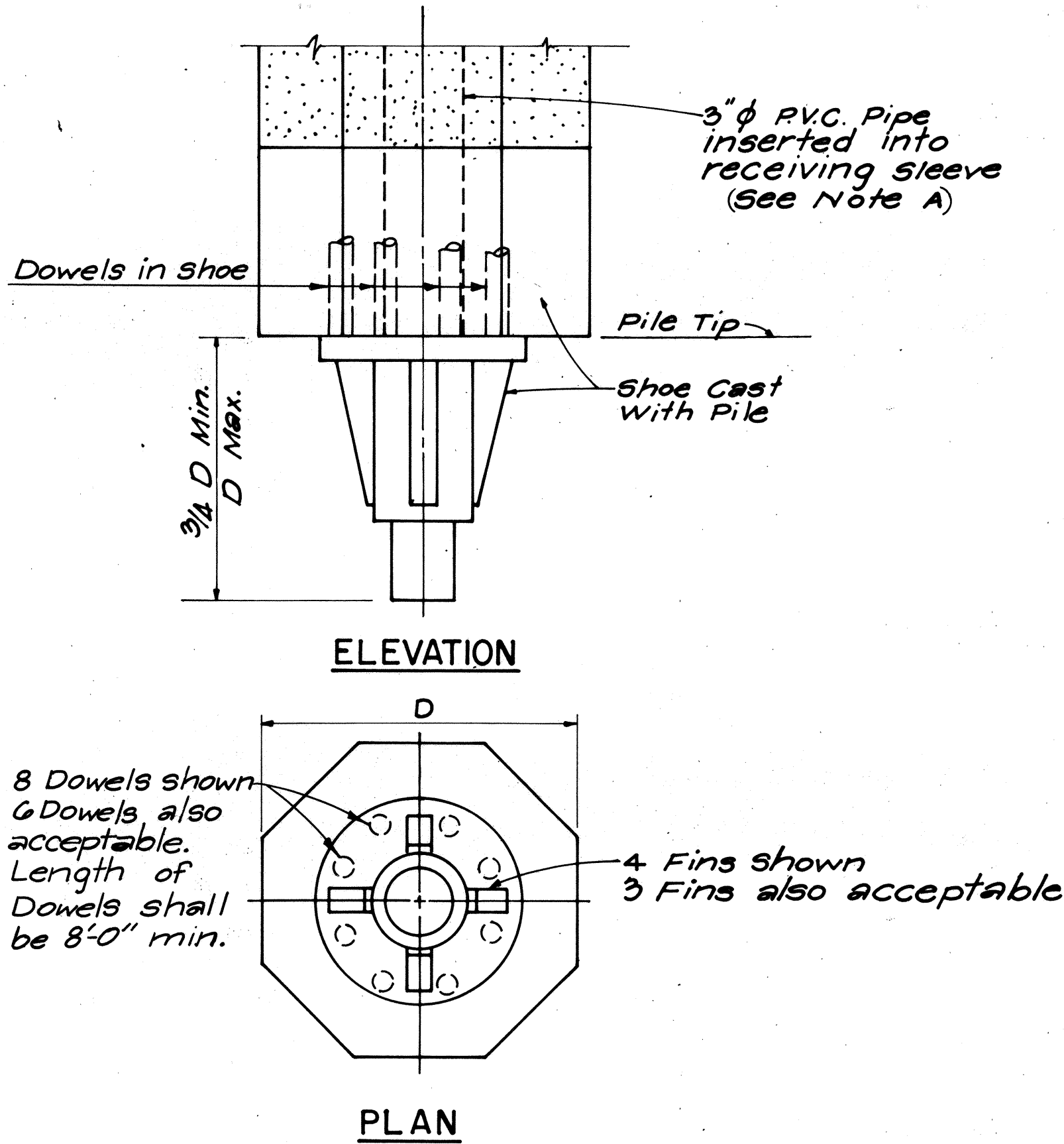


THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION.
John P. Johnson

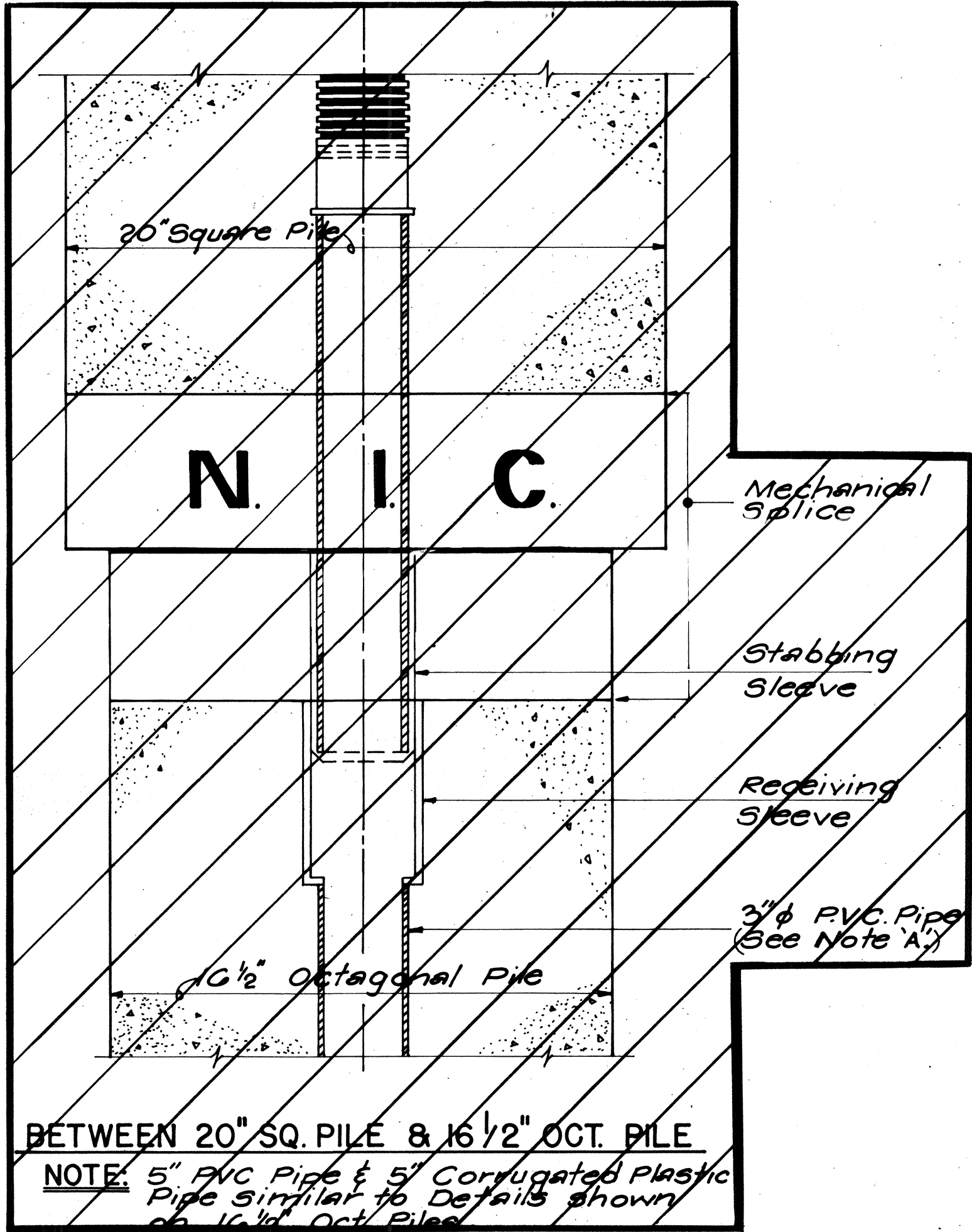
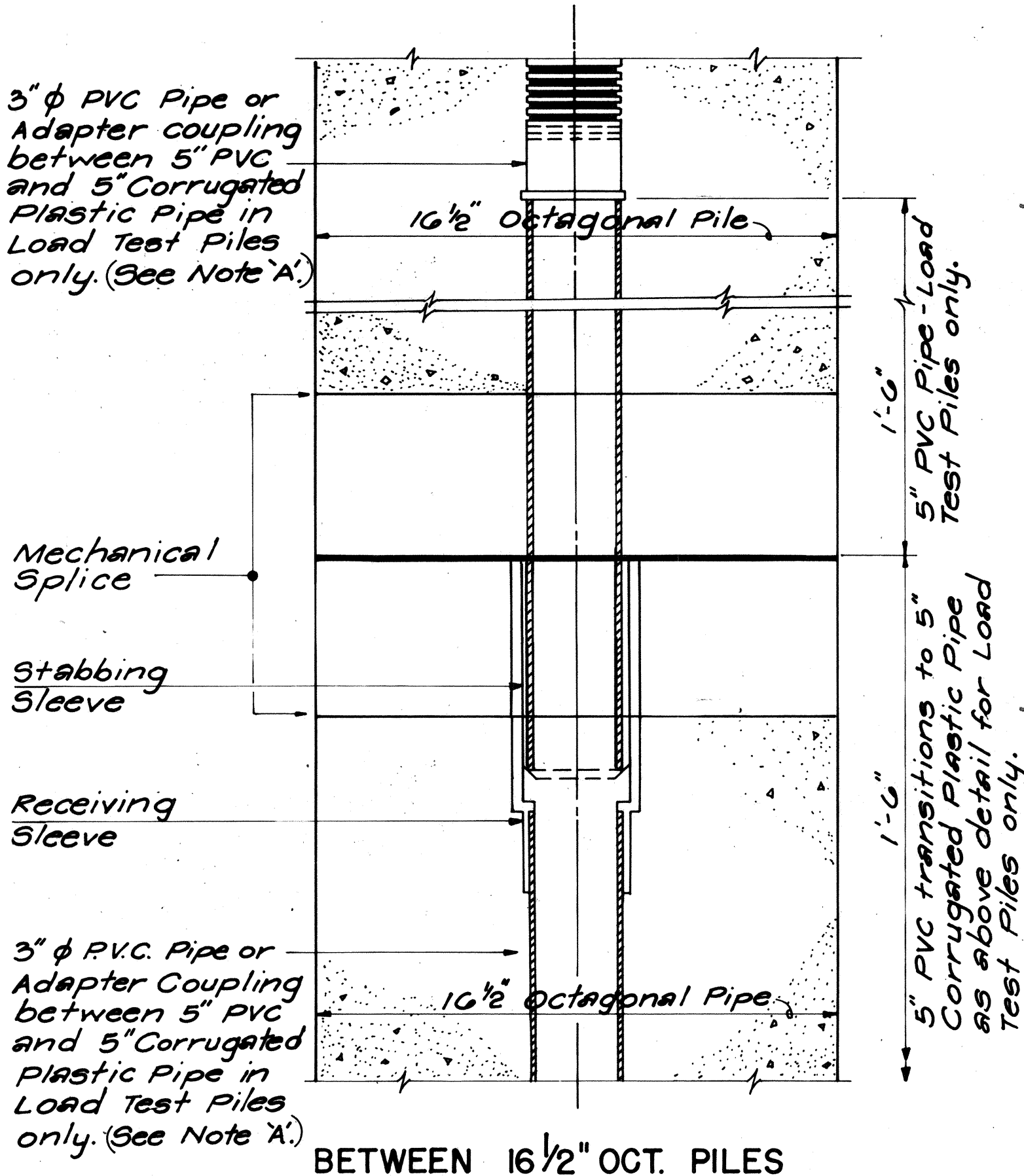
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
PRESTRESSED CONCRETE PILES
DETAILS
SHEET 2A OF 3
KEEHI INTERCHANGE
F.A.I. PROJECT NO. I-HI-1 (132) : 17
SCALE: AS SHOWN
DATE: 6/15/81
SHEET No. SD-1A OF SD-14 SHEETS SD-1A

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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(132)17	1983	183	192



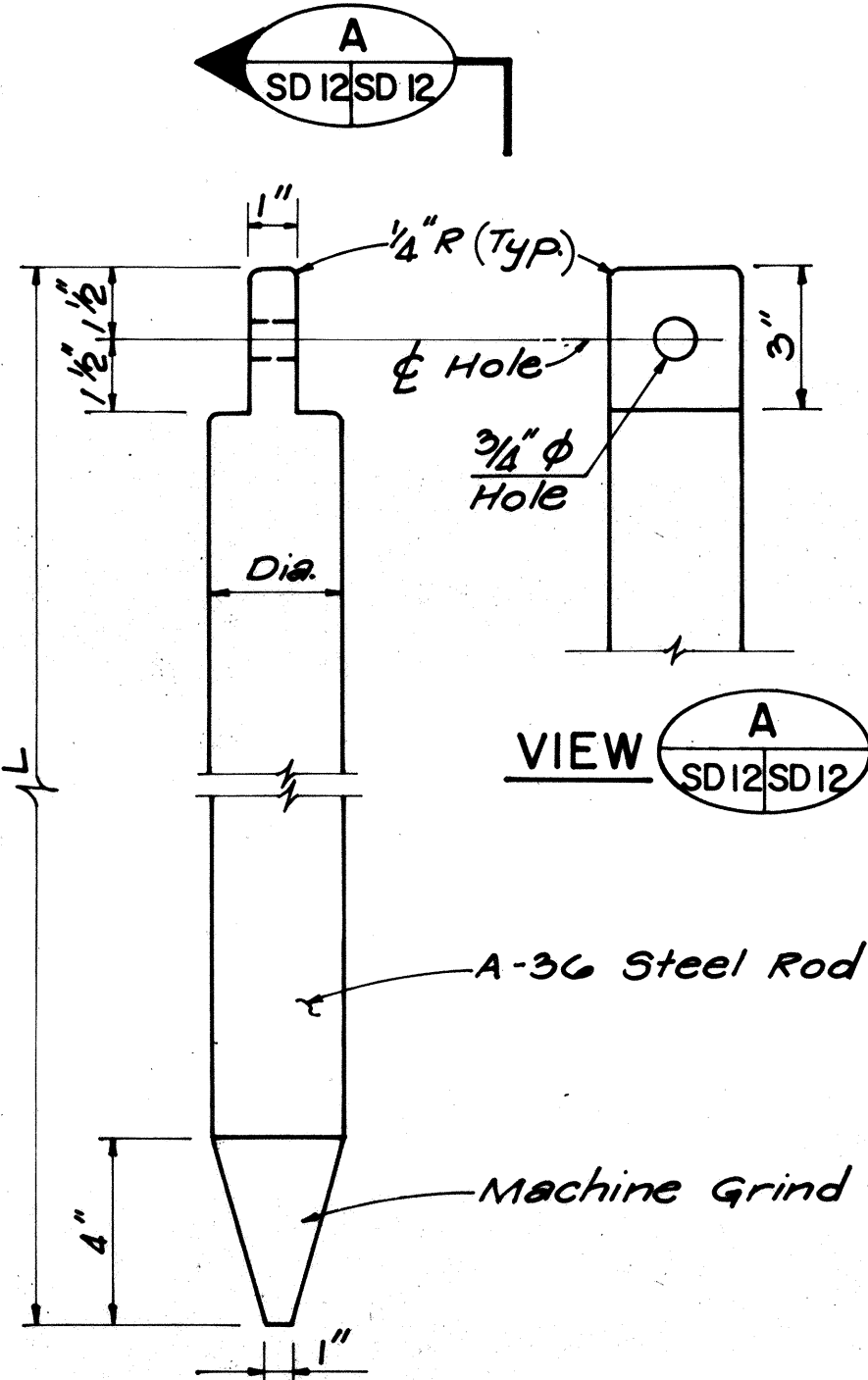
ROCK DRIVING SHOE
NOT TO SCALE



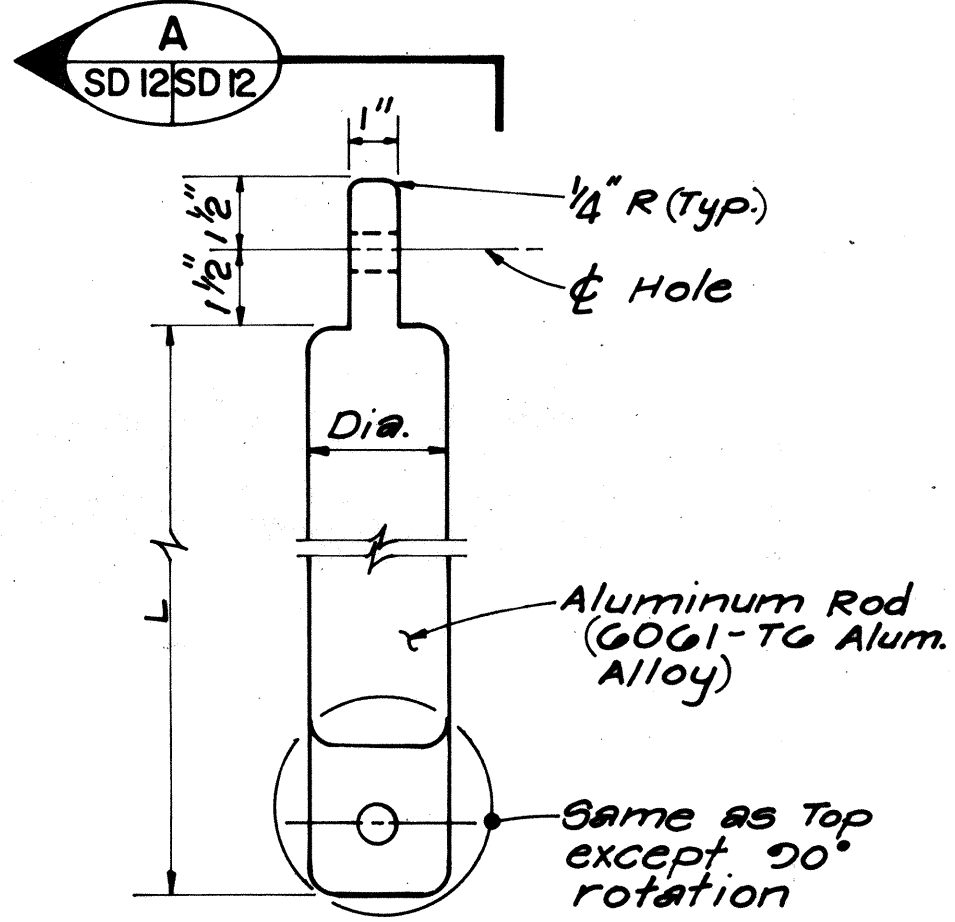
ARRANGEMENT OF PVC PIPE CONNECTIONS AT PILE SPLICE

SCALE: 3"=1'-0"

NOTE 'A' 3" PVC Pipe used throughout pile length except on Load Test Piles. Load Test Piles shall have a 5" ϕ central hole made by 5" Corrugated Plastic Pipe & short 5" PVC segments near splices as shown above.



PLUMB BOB #1 #2 #3 & #4
SCALE: 3"=1'-0"

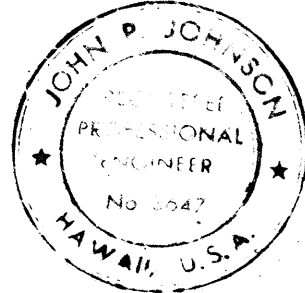


PLUMB BOB #5 & #6
SCALE: 3"=1'-0"

PLUMB BOB NOTES:

- All sharp edges shall be rounded.
- Allowable deviation from straight = 1/8"
- Plumb Bobs shall be attached to a measuring tape with "foot" and "inch" marked graduations.
- Plumb Bobs #1, #2, #3 & #4 shall be used at the driving site. Plumb Bobs #5 & #6 shall be used at the casting yard.

PLUMB BOB	L	DIA.
#1	11'-3"	2 3/4" $\pm$ 0.006"
#2	8'-0"	2 3/4" $\pm$ 0.006"
#3	9'-2"	4 3/8" $\pm$ 0.012"
#4	6'-9"	4 3/8" $\pm$ 0.012"
#5	12'-0"	2 3/4" $\pm$ 0.006"
#6	12'-9"	4 3/8" $\pm$ 0.012"



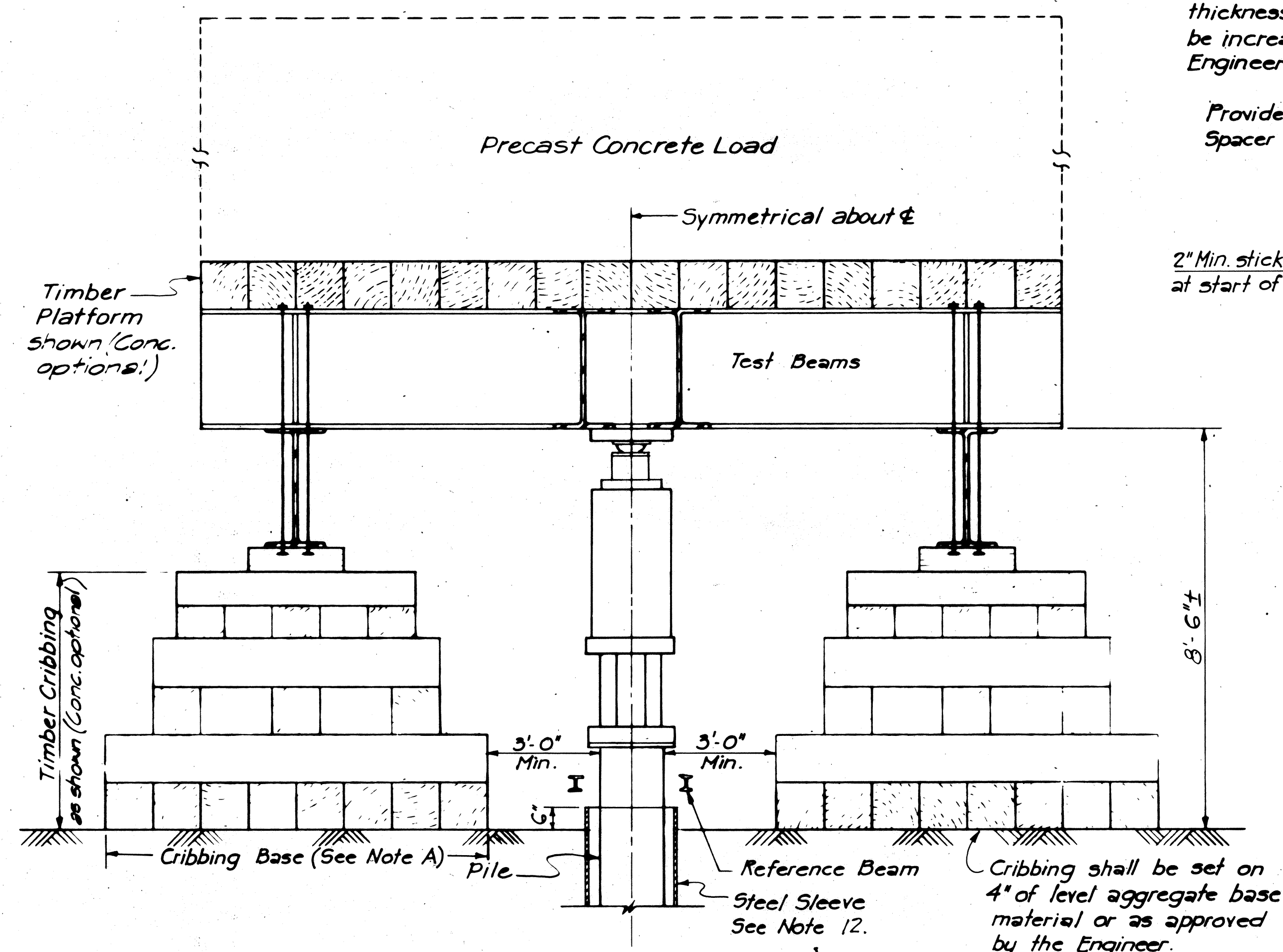
THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION
John P. Johnson

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
PRESTRESSED CONCRETE PILES
DETAILS
SHEET 3 OF 3
KEEHI INTERCHANGE
F.A.I. PROJECT NO. I-HI-1 (132) :17
SCALE: AS SHOWN
DATE: 6/15/81
SHEET NO. SD-12 OF SD-14S SHEETS SD-12

THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION
John P. Johnson

SURVEY PLOTTED BY	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1 (132)	1983	184	192

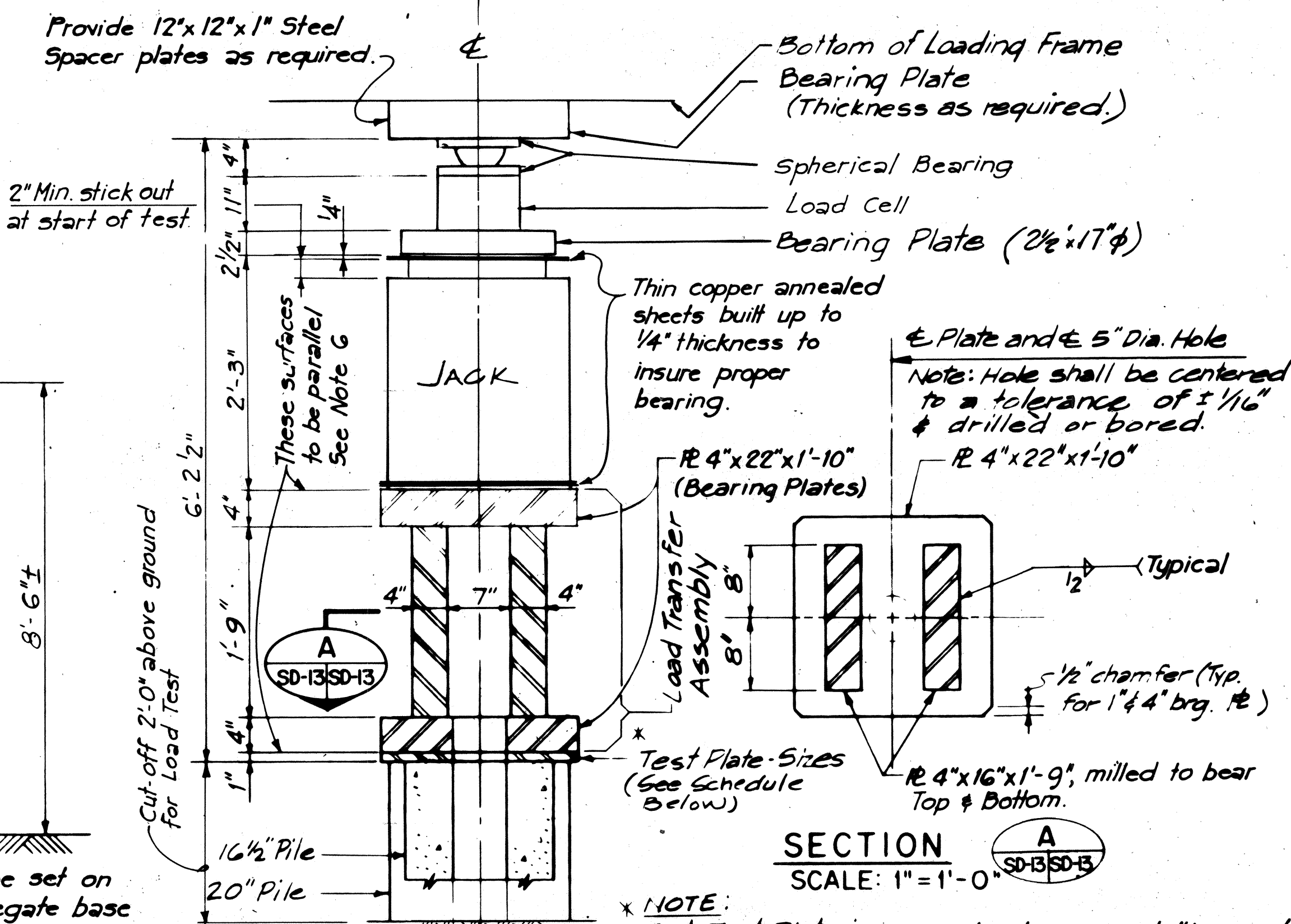


SCHEMATIC SET-UP FOR APPLYING LOADS TO TEST PILE

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

NOTE A'

The Contractor shall determine the thickness of the crust at the locations of load tests before proceeding with the load tests. The cribbing base dimensions are 10' x 24' for a crust of 6' thickness or more. In case the thickness of crust is found to be between 4' to 6', the cribbing base shall be increased to 10' x 28'. If the thickness of crust is less than 4 feet, the Engineer shall designate a new location(s) for the load test(s).



DETAIL FOR JACKING SET-UP

SCALE: 1" = 1'-0"

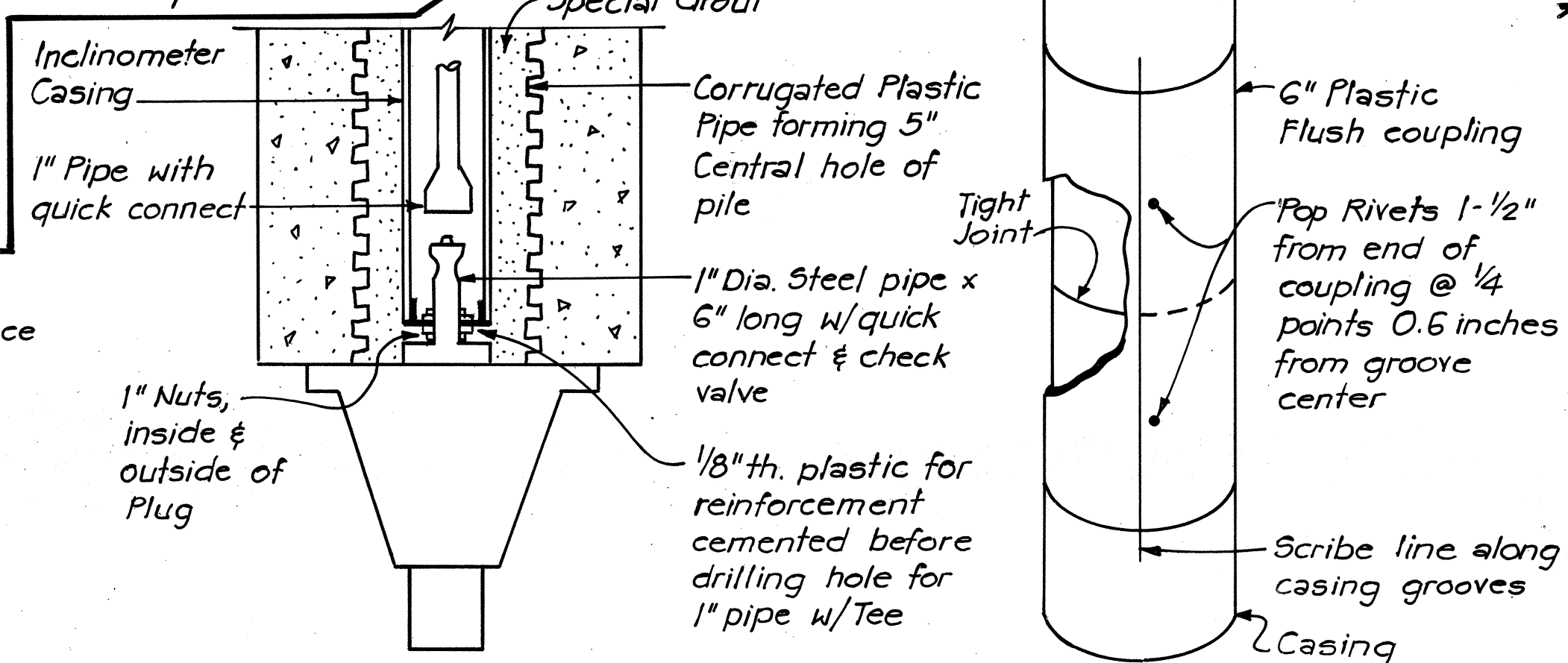
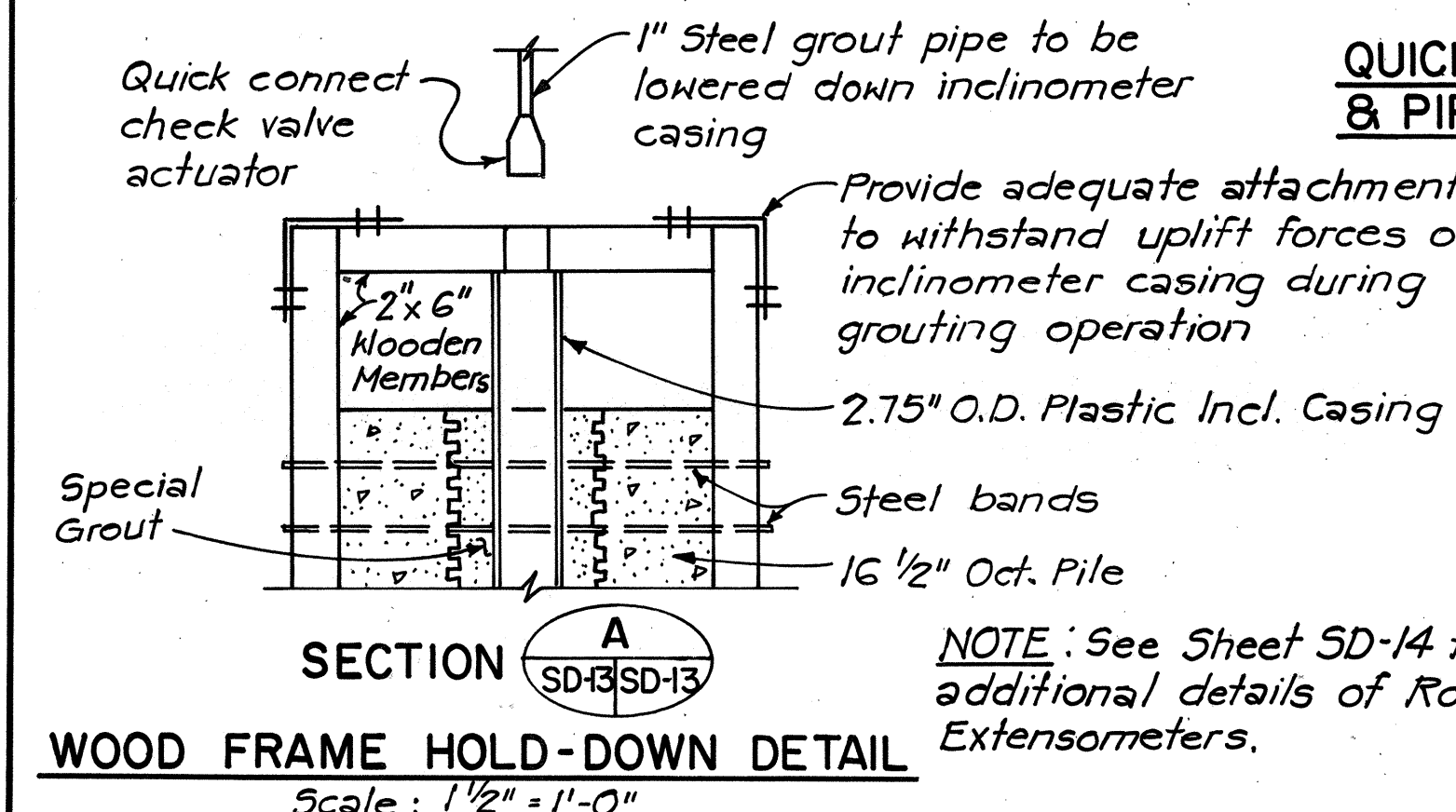
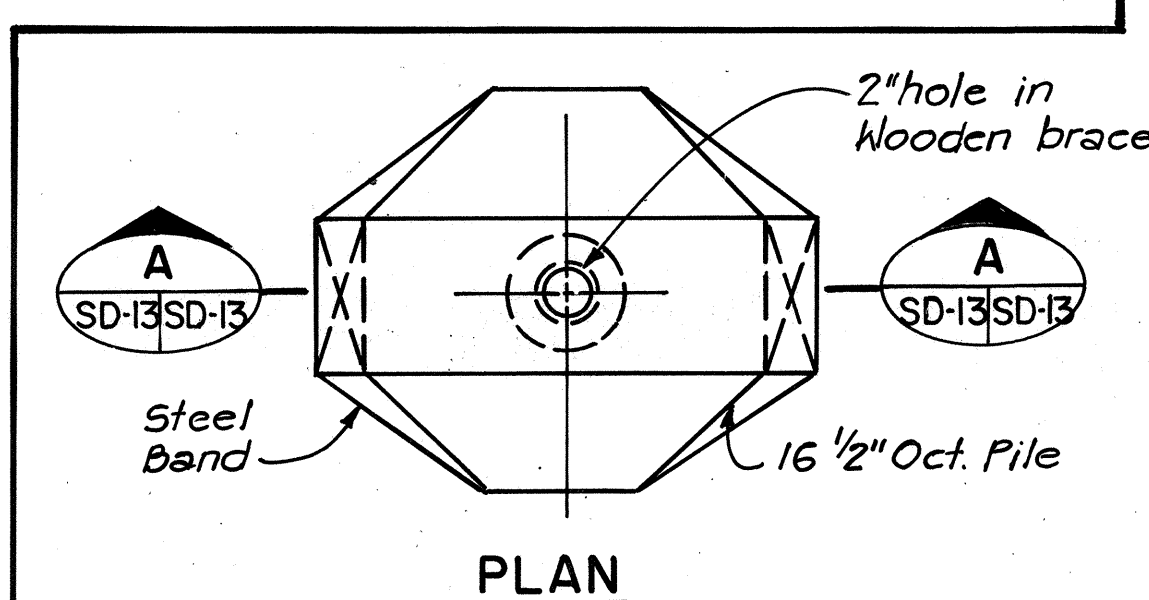
LOAD FRAME NOTES:

1. The Loading Frame shall be designed to support load required to permit the Test Pile to be axially loaded to 500 tons. Loading blocks to be provided by Contractor.
2. Design of Frame shall conform to the latest Edition of the Manual of Steel Construction by the American Institute of Steel Construction. Allowable stresses in this manual may be increased by 20% for main structural members. This increase in allowable stresses will not be allowed for Connections, Bolts and Welds.
3. At the option of the Contractor, the Loading Frame may be fabricated from new or used Structural Steel shapes; or loading frames previously used in other projects may be used provided the design and construction of the frame to be furnished conforms to the requirements in Notes 1 and 2 above.
4. Load test site shall be enclosed with a 5 ft high temporary fence (wire mesh on wood poles). Payment shall be considered incidental to "Pile Load Test".
5. Timber Cribbing and Platform may be of new or used sound timber and shall be of adequate size and grade to safely carry the loads imposed upon them resulting from the Load Tests.
6. Surfaces of all bearing plates shall be planed or milled smooth to provide full surface contact, Top & Bottom of Load Transfer Assembly to be planed after welding.

NOTES:

1. The apparatus for applying known compressive loads to the pile shall be assembled so that the loads are applied axially to minimize eccentric loading.
2. Where necessary, the unsupported length of the pile shall be braced to prevent buckling.
3. The steel test plate shall be set in high-strength quick-setting grout. Full bearing must be achieved between the plate and grout, that is, no voids should exist between them.
4. Two reference beams, one on each side of the pile shall be oriented perpendicular to the direction of the test beams of the load frame. Two dial gages shall be mounted approximately equidistant from the center of and on opposite sides of the pile with stems parallel to the direction of the load application.
5. The reference beams shall be independently supported with supports firmly embedded in the ground at a clear distance of not less than 10 feet from the cribbing.
6. Reference beams shall be of sufficient stiffness to prevent excessive deflections and should be cross connected to provide additional rigidity.
7. One end of each reference beam shall be free to move as the lengths of beams change with temperature variations.
8. Smooth bearing surfaces perpendicular to the direction of measurement shall be provided for the gage stems. These surfaces shall be of glass or hard metal. No wood shall be allowed in these measurement systems.
9. Provisions, such as a protective canopy, shall be made to protect the instrumentation, measuring system, and reference system from adverse wind, rain, and temperature variations or other disturbances.
10. The lateral movements of the pile shall be measured using two dial gages mounted on the reference beams 90 degrees apart with their stems horizontal and bearing against smooth bearing plates or surfaces.
11. Load Test Pile Type A shall be instrumented with rod extensometers to determine the distribution of load transfer to the soil. See Special Provisions & Sheet SD-14.
12. Load Test Pile Type A shall be backfilled and sleeve removed in accordance with Section 505.03 (2) of the Special Provisions prior to conducting the test.

Schedule			
Pile Size	Plate Size	Hole Size	
20"	1" x 22" x 1'-10"	5" φ	
16 1/2"	1" x 18" x 1'-6"	5" φ	



QUICK CONNECT COUPLING & PIPE TEE FOR GROUTING

Not to Scale

PLASTIC INCLINOMETER CASING WITH 6" COUPLING

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

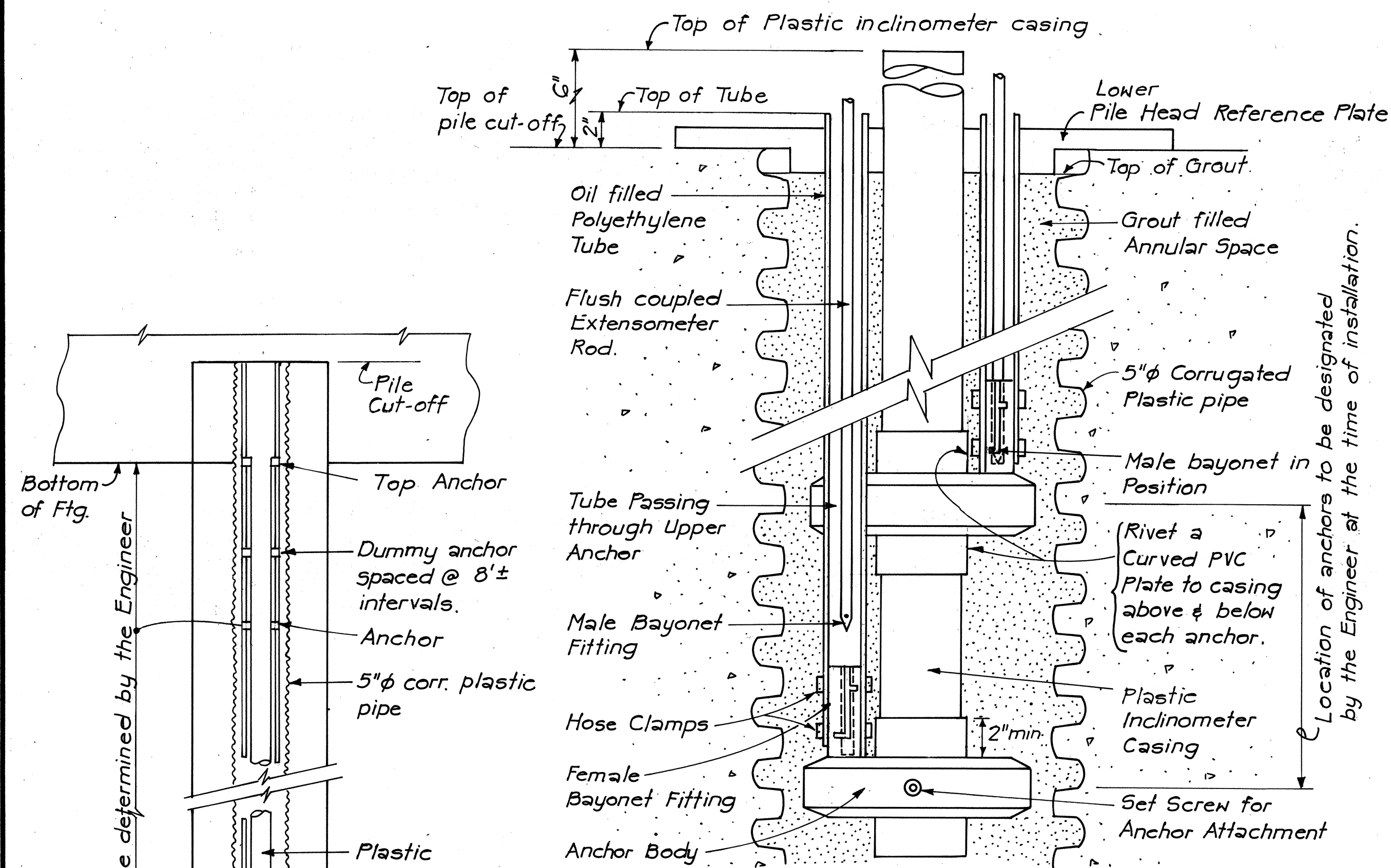
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
LOAD TEST SET-UP

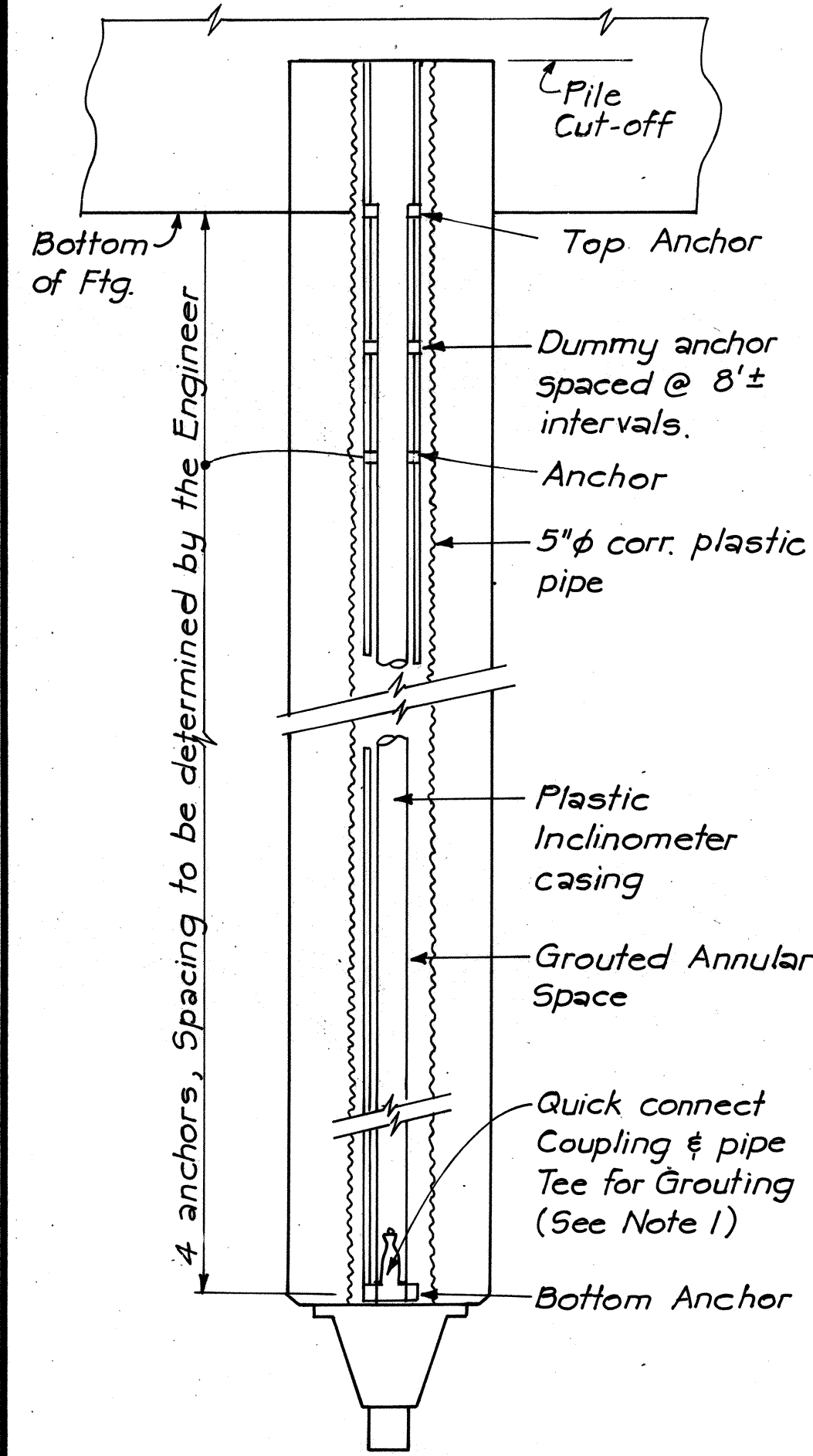
KEEHI INTERCHANGE
F.A.I. PROJECT NO. I-HI-1 (132) : 17

SCALE: AS SHOWN DATE: 6/15/81
SHEET No. SD-13 OF SD-14 SHEETS SD-13

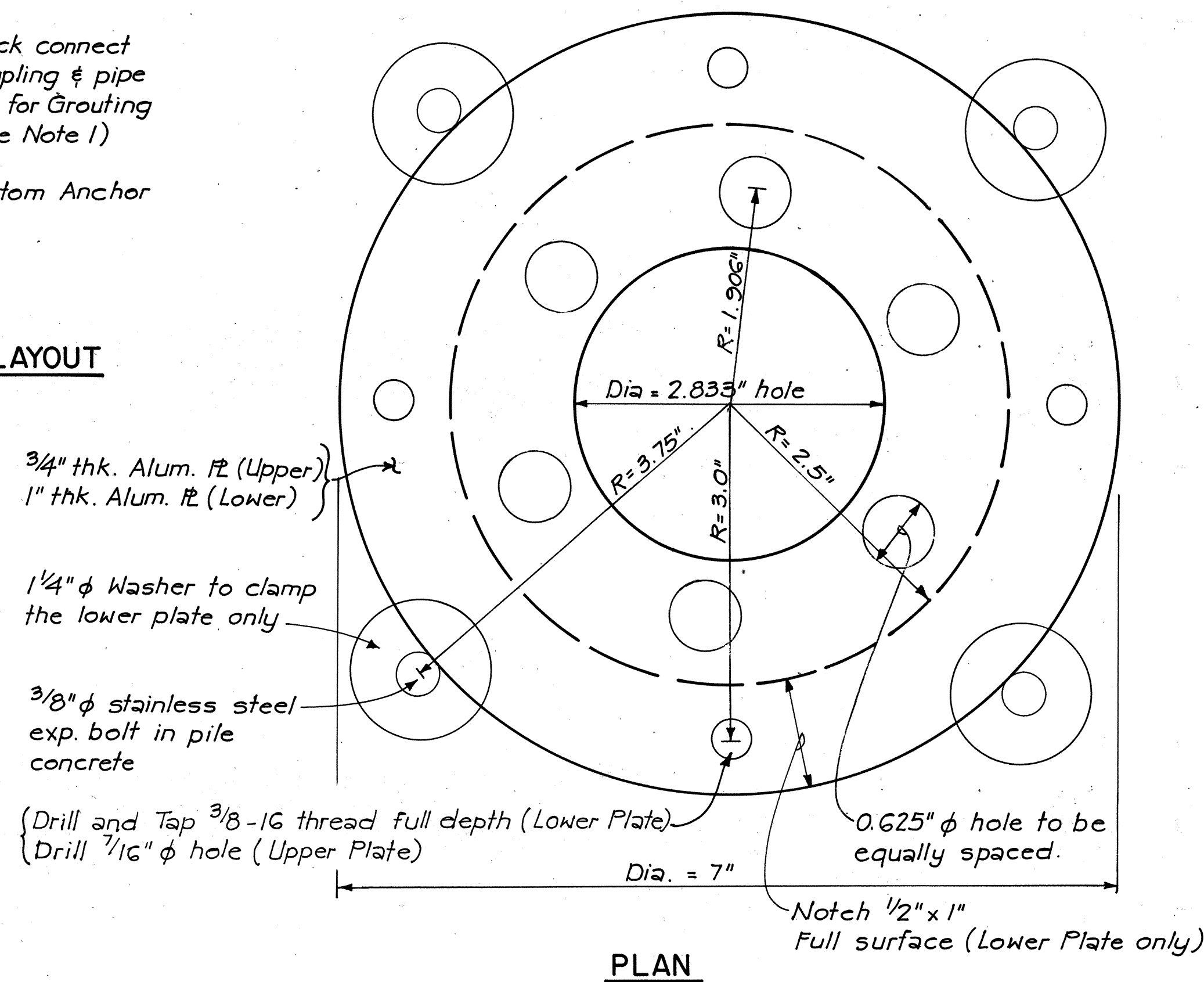
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(132):17	1983	105	142



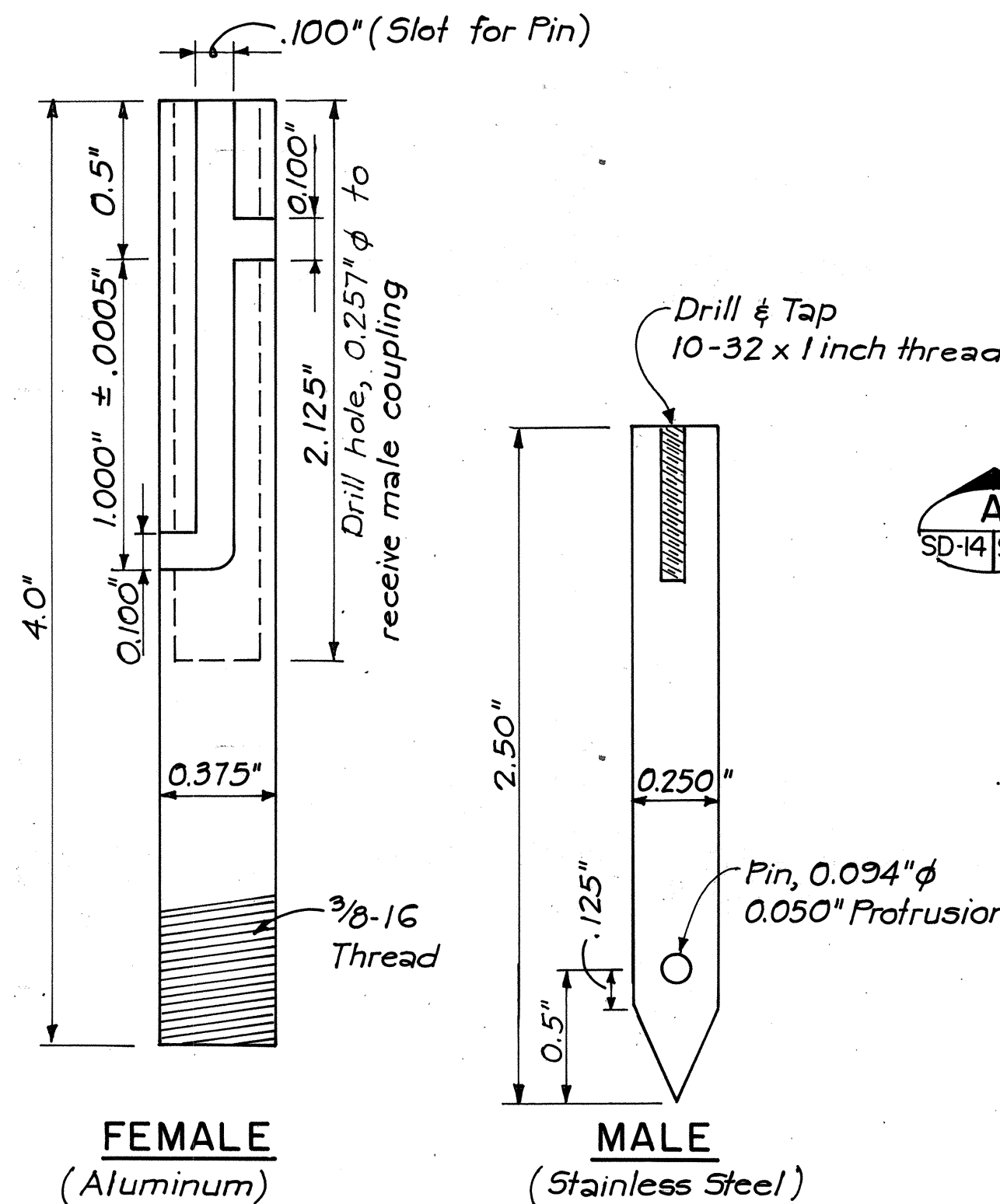
SCHEMATIC OF ROD EXTENSOMETER
N.T.S.



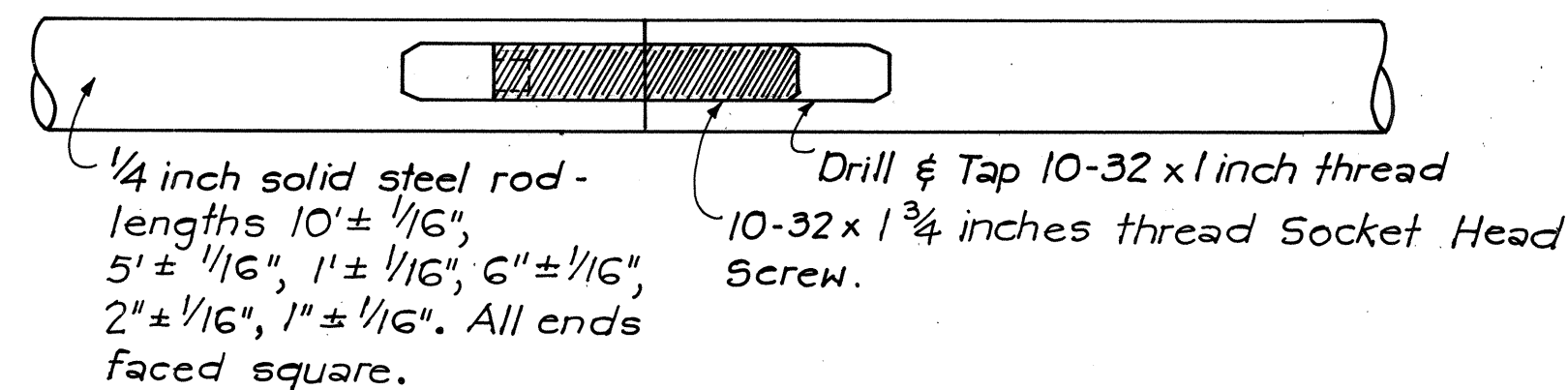
ROD EXTENSOMETER LAYOUT
N.T.S.



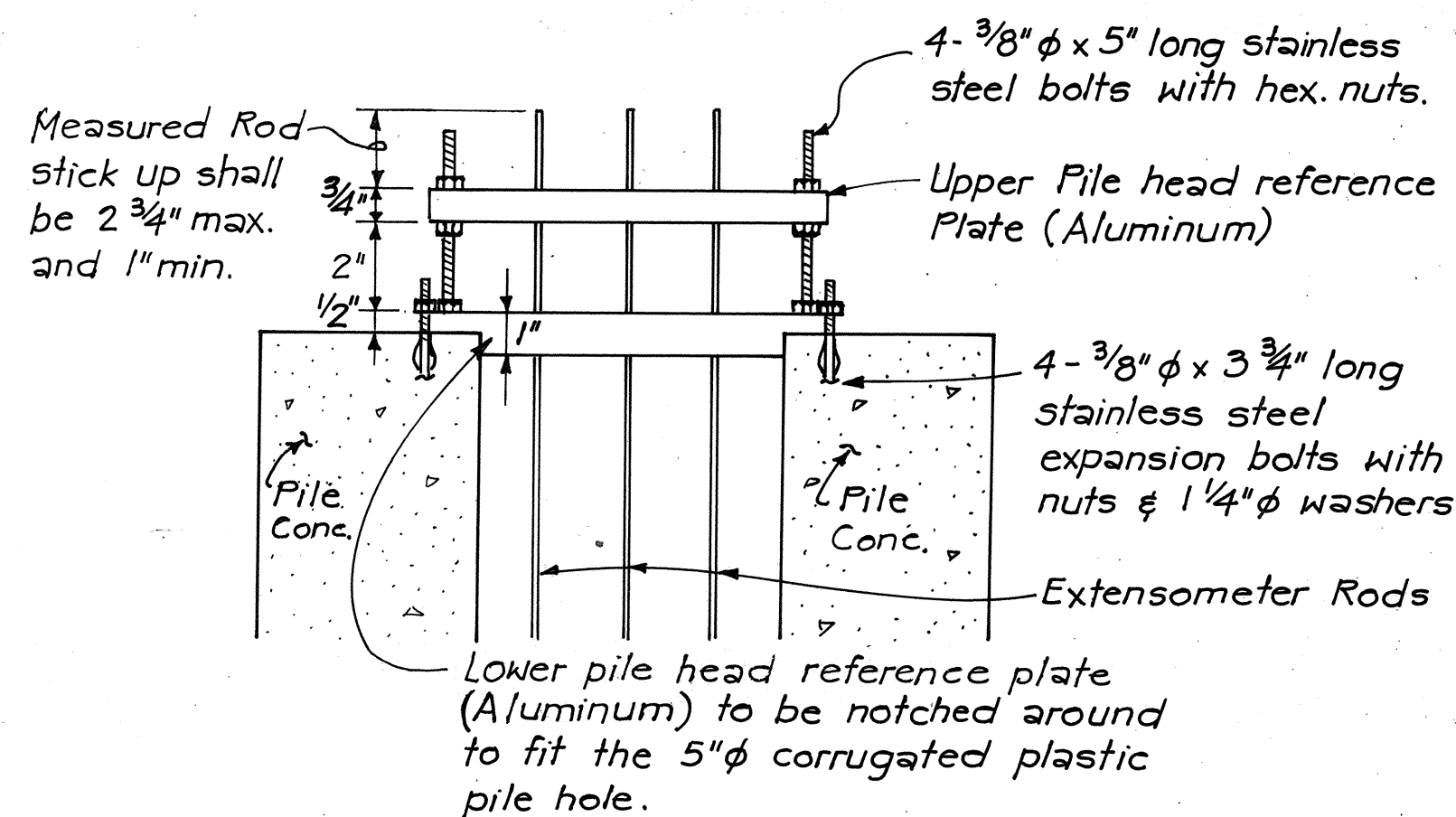
PILE HEAD REFERENCE PLATE DETAIL
(Lower plate as shown, upper plate same except as noted)
Scale: Full Scale



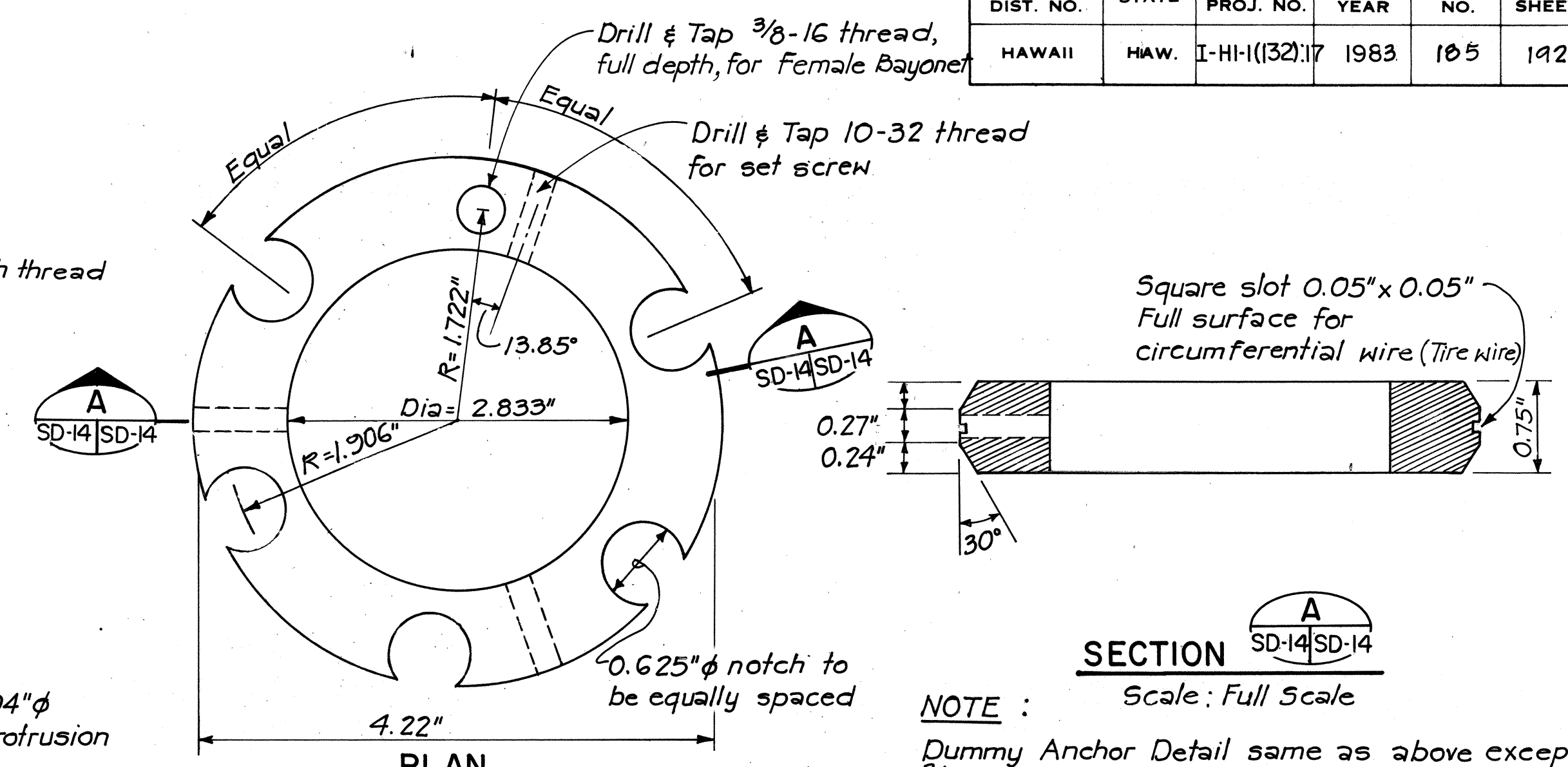
BAYONET COUPLING DETAIL
N.T.S.



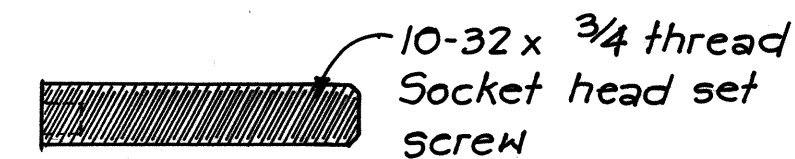
ROD DETAIL
(Mild Steel)



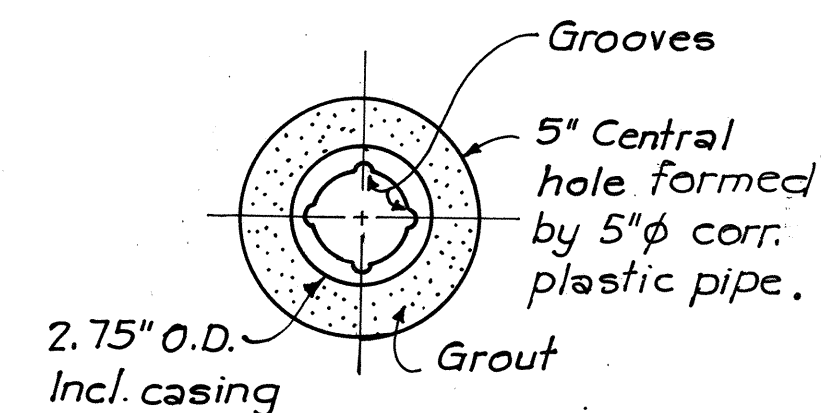
ROD EXTENSOMETER PILE HEAD REFERENCE PLATE FOR MECHANICAL READINGS
N.T.S.



ANCHOR DETAIL
(Aluminum)
Scale: Full Scale



SET SCREW DETAIL
(Mild Steel)



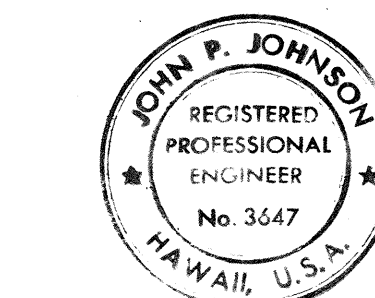
PLASTIC INCLINOMETER CASING
Scale: 3" = 1'-0"

NOTE: Grooves of Incliner Casing to be parallel & perpendicular to pile cap orientation.

NOTE: Dummy Anchor Detail same as above except 3/8-16 threaded hole is replaced with 0.625 inch notch.

NOTES:

- For Wood Frame Hold-Down Detail, Quick Connect Coupling & Pipe Tee for Grouting and Plastic Incliner Casing with 6" Coupling Details see sheet No. SD-13.
- Do not insert set screws or pop rivets through groove of inclinometer casing.
- The Contractor shall furnish the following lengths of Extensometer Rods for each load test pile:
50 Each of 10 feet length
20 Each of 5 feet length
40 Each of 1 foot length
20 Each of 6 inches length
10 Each of 2 inches length
10 Each of 1 inch length
- All aluminum members shall be 6061-T6 Aluminum Alloy.



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

John P. Johnson

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

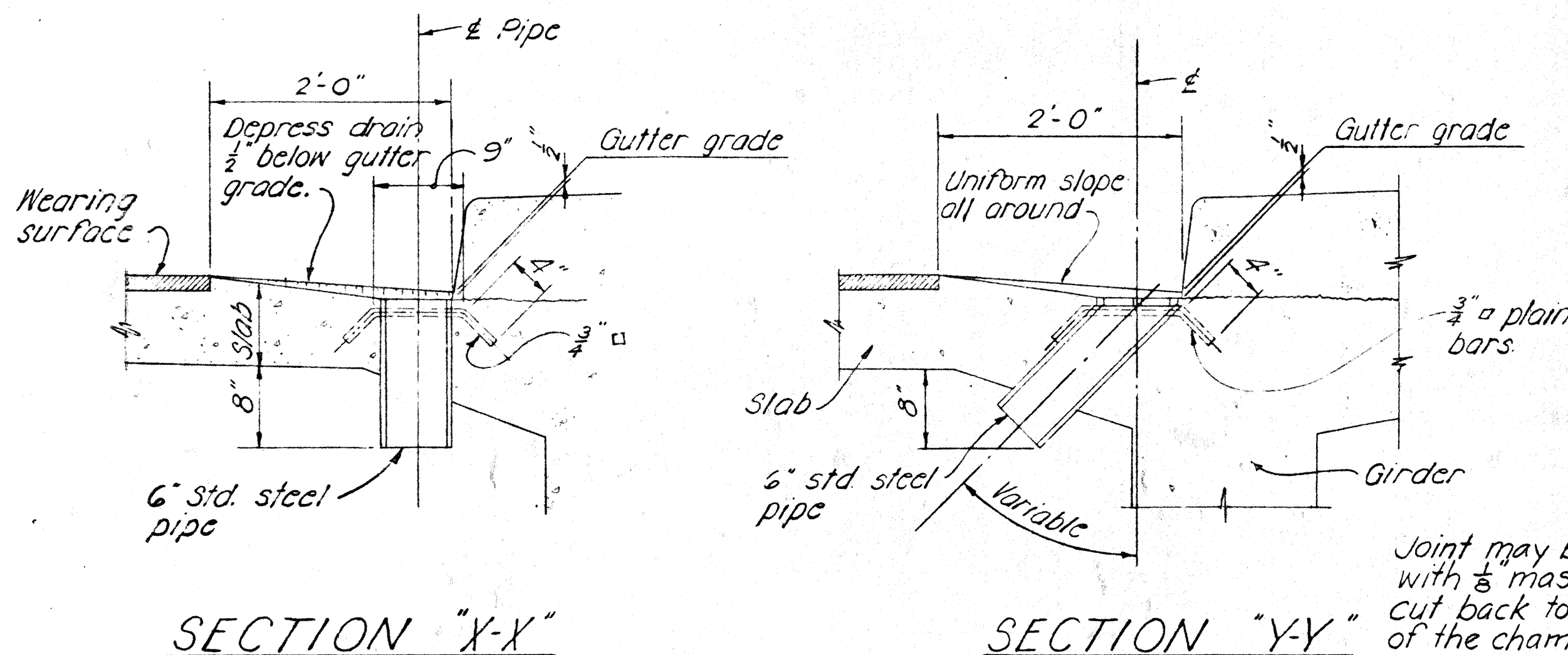
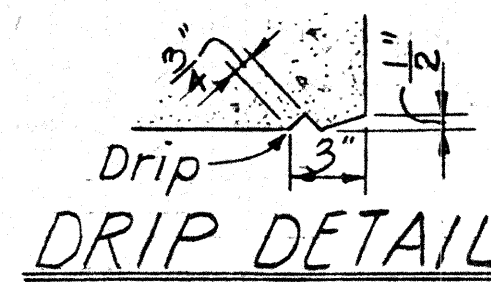
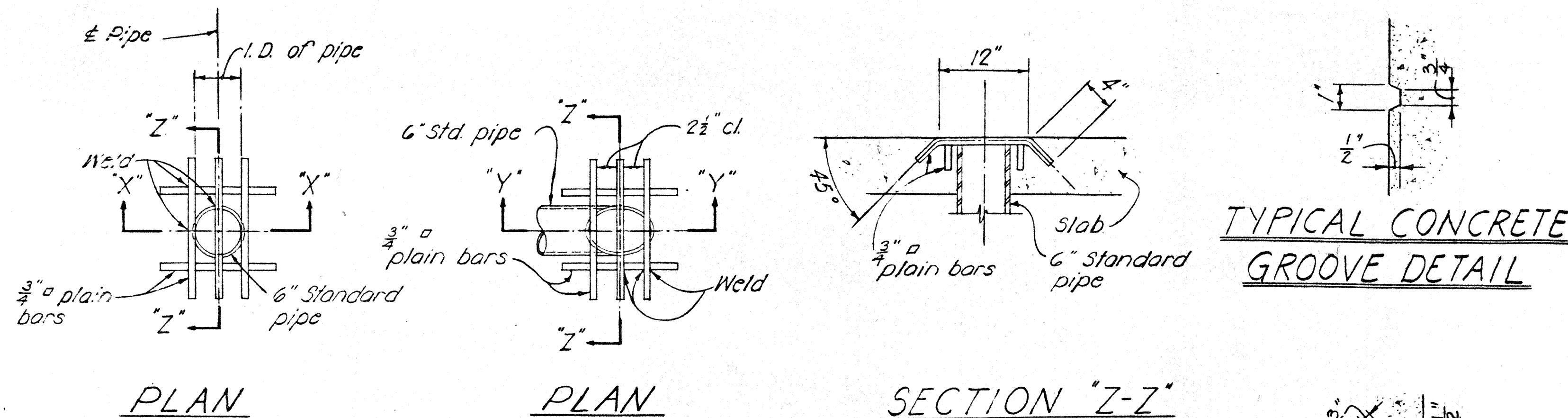
ROD EXTENSOMETERS IN LOAD TEST PILE TYPE A

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(132):17

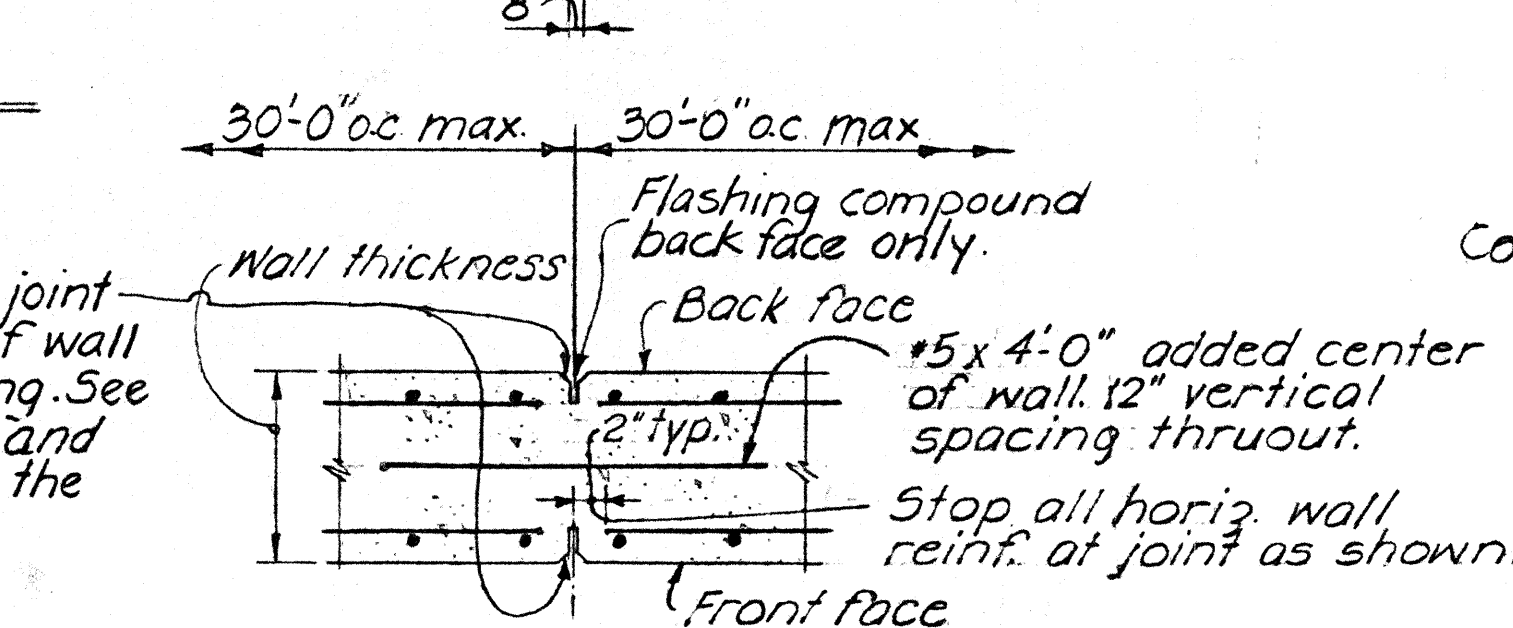
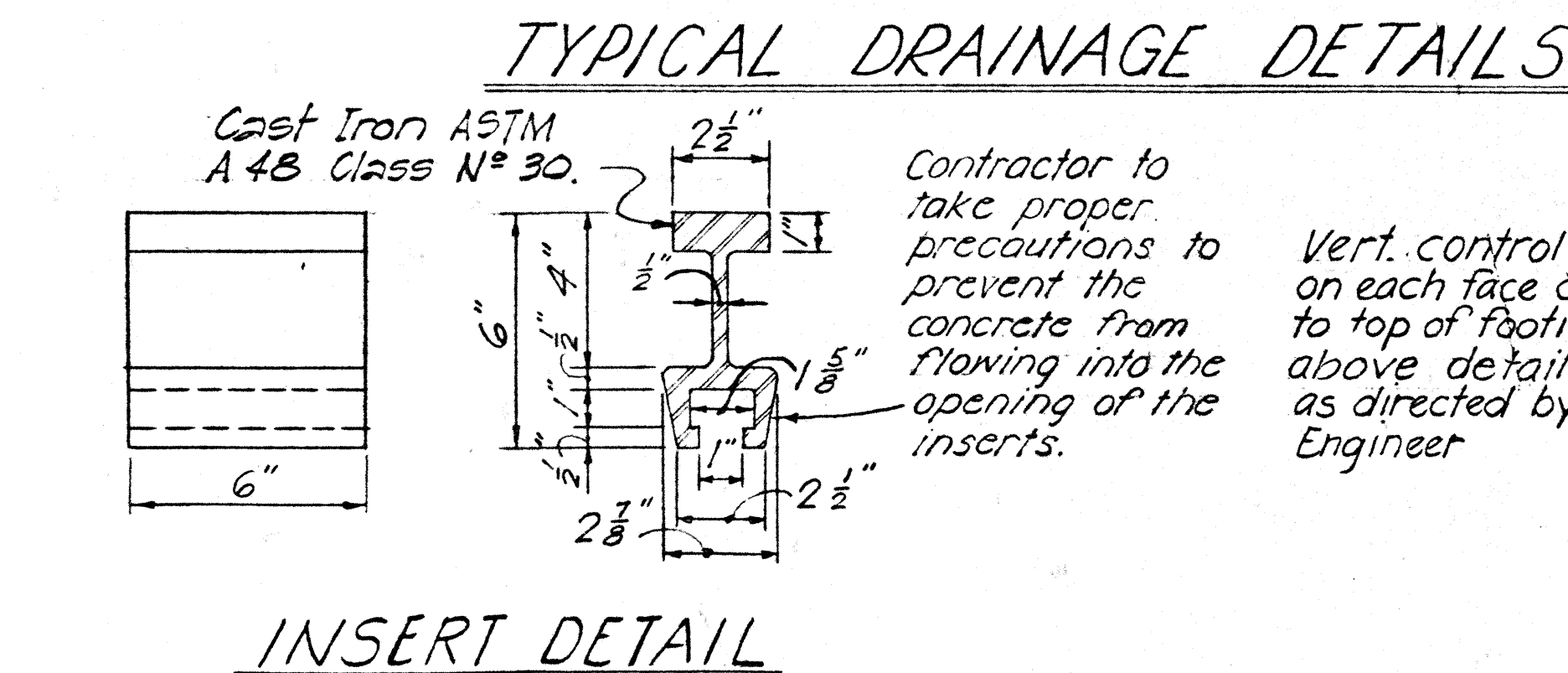
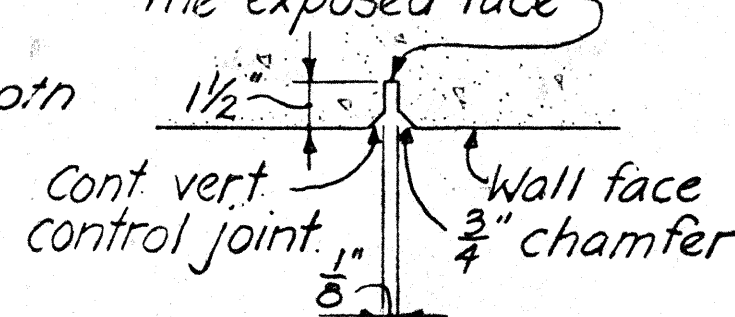
SCALE: AS SHOWN DATE: SHEET NO. SD-14 OF SD-14 SHEETS SD-14

GENERAL NOTES

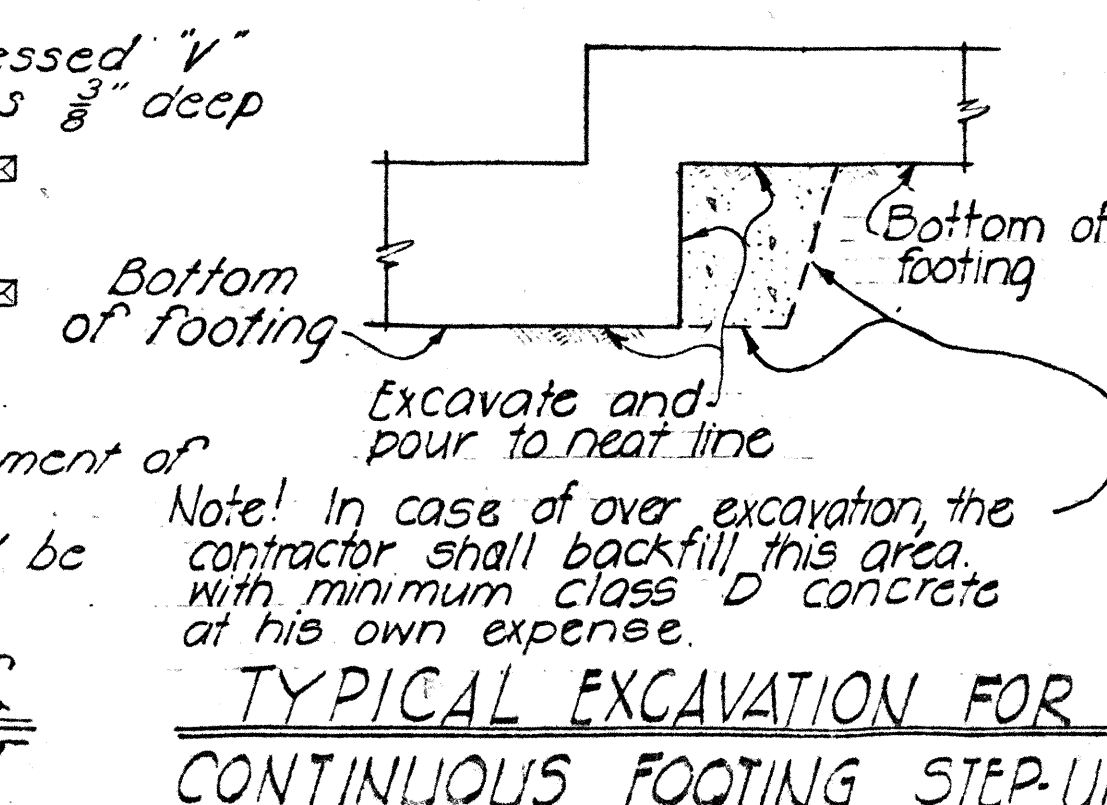
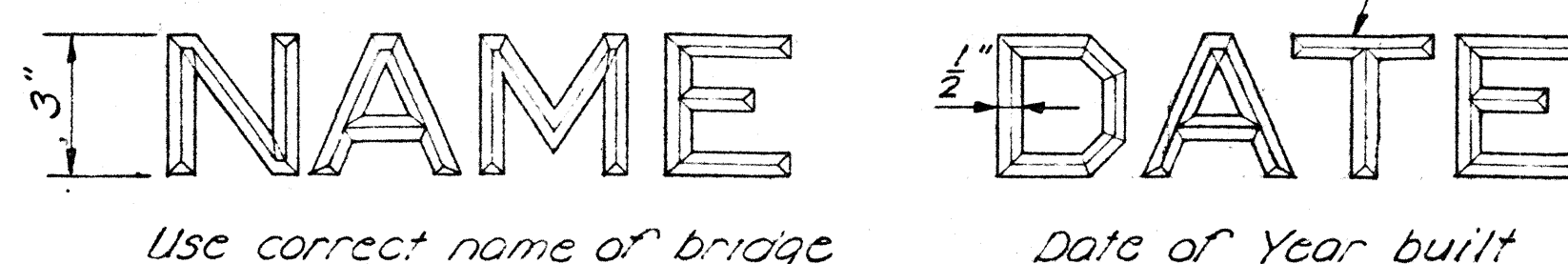
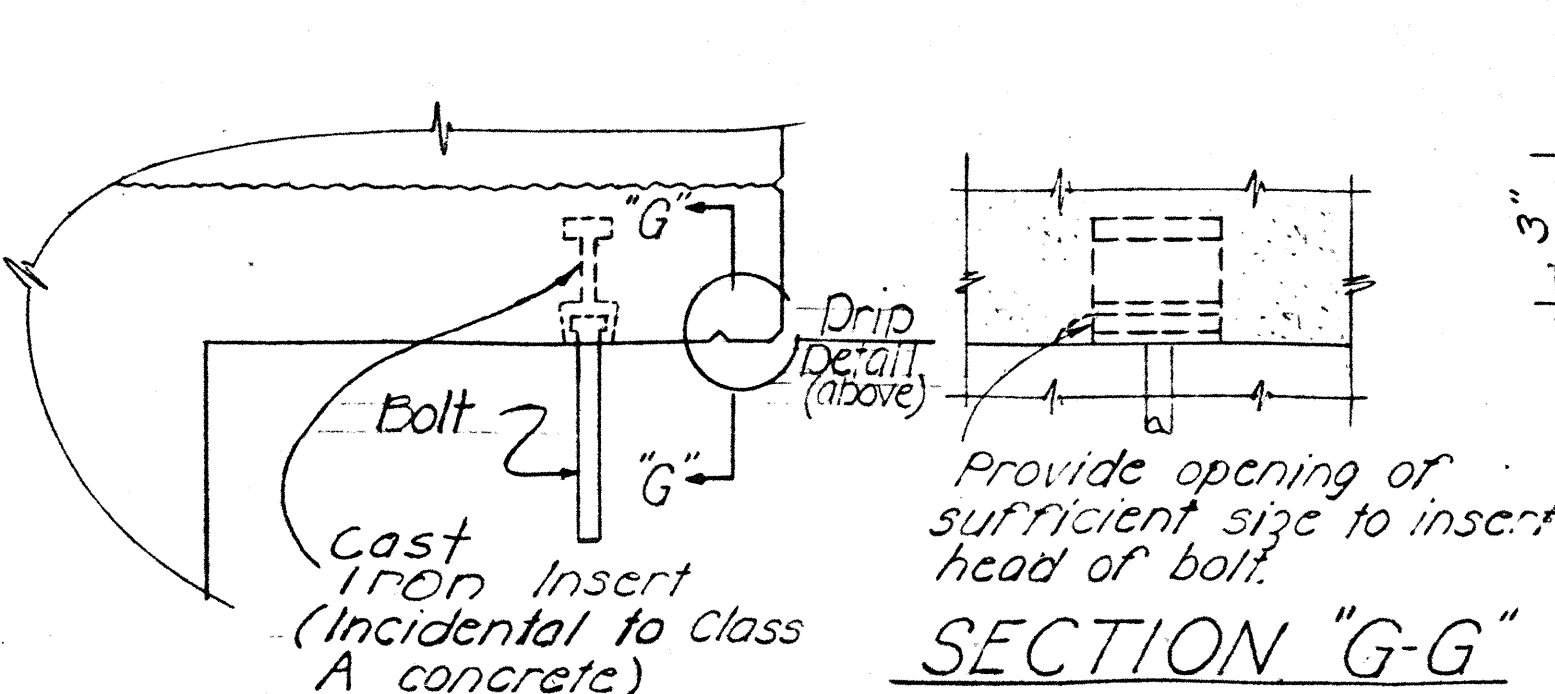
- All concrete shall be Class A unless otherwise noted.
- Reinforcing shall be detailed in accordance with A.C.I. Manual of Standard Practice for Detailing Reinforced Concrete Highway Structures unless otherwise noted.
- Clearance for reinforcing bars shall be as follows, unless otherwise noted:
 - 1/2" For stirrups of beams & pier caps.
 - 2" For ties of columns.
 - 2" For formed walls.
 - 3" For footings.
- Minimum spacing between parallel bars shall be 2 1/2 times the diameter of bars, but in no case shall the clear distance between the bars be less than 1 1/2 times the maximum size of the coarse aggregate.
- All dimensions relating to reinforcing are to centers of bars unless otherwise noted.
- Reinforcing bars shall be securely tied at all intersections & lap splices & shall be held in place during pouring to maintain their proper locations as shown on plans.
- Vertical column bars shall be arranged in such a manner as to miss pier cap bars above as directed by the Engineer.
- Except as otherwise noted on drawings, all exterior corners & re-entrant angles in concrete work shall be chamfered 3/4" x 3/4".
- Concrete seats receiving steel plates, lead plates or neoprene pads shall be poured monolithically with supporting structures & top of concrete seats shall be finished with a steel trowel to a smooth level surface at the elevation shown on the plans.
- Elastomeric Pads: Bottom of bridge bearing pads shall be secured against displacement with adhesives approved by the Engineer. Pads shall be incidental to concrete and will not be paid for separately.
- Forms for all exposed surfaces of separation structures and surfaces of retaining walls visible from a traveled way or from a populated area shall be plywood except that metal forms may be permitted provided a surface finish satisfactory to the Engineer can be obtained and the use of such forms is approved in writing by the Engineer. Forms for round columns shall be made of materials that will give a smooth finish and true dimensions as given in the plans. Forms for prestressed concrete members shall be either metal or plywood.
- Gothic letters and figures approximating dimensions shown will be acceptable if approved by the Engineer.
- The contractor shall verify the location of all existing utility lines and notify the respective owners before commencing work of excavation or driving of piles.
- Standard Detail Drawings refer to all structures in general, except for modifications as may be required for special conditions. For such modifications refer to the corresponding detailed drawings.



NOTE: Metal drains shall be considered incidental to Class A Concrete in both concrete and steel bridges and will not be paid for separately. Assemblage of grillage and pipe shall be hot-dip galvanized after all welding is completed.



TYP. FLASHING COMPOUND WATERPROOFING DETAIL



APPROVAL RECOMMENDED:
Paul T. Yamashita
BRIDGE DESIGN ENGINEER 1-23-70
DATE

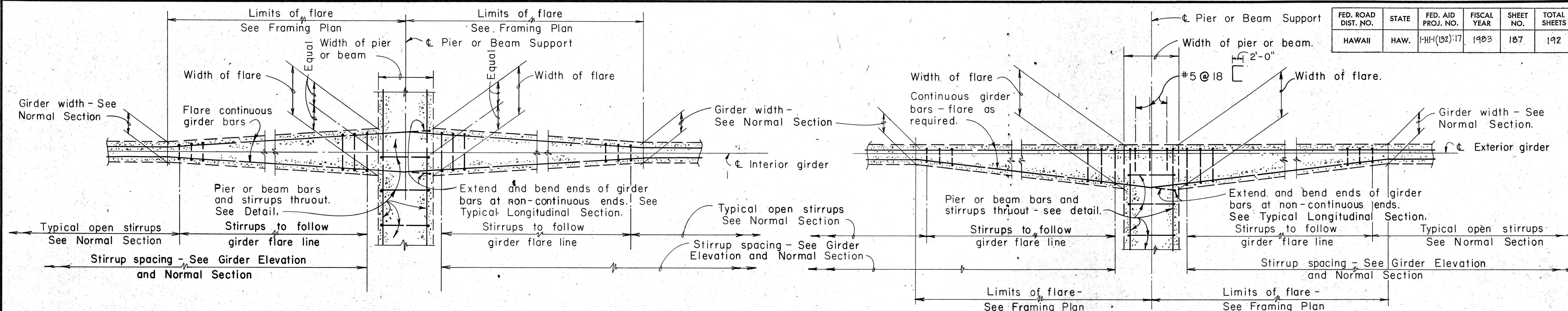
APPROVED
Paul T. Yamashita
1-28-70
DATE
FR ASSISTANT CHIEF, ENGINEERING

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
NOTES AND MISCELLANEOUS
DETAILS

Date: October 1989
SHEET No. 1 OF 3 SHEETS DB-100

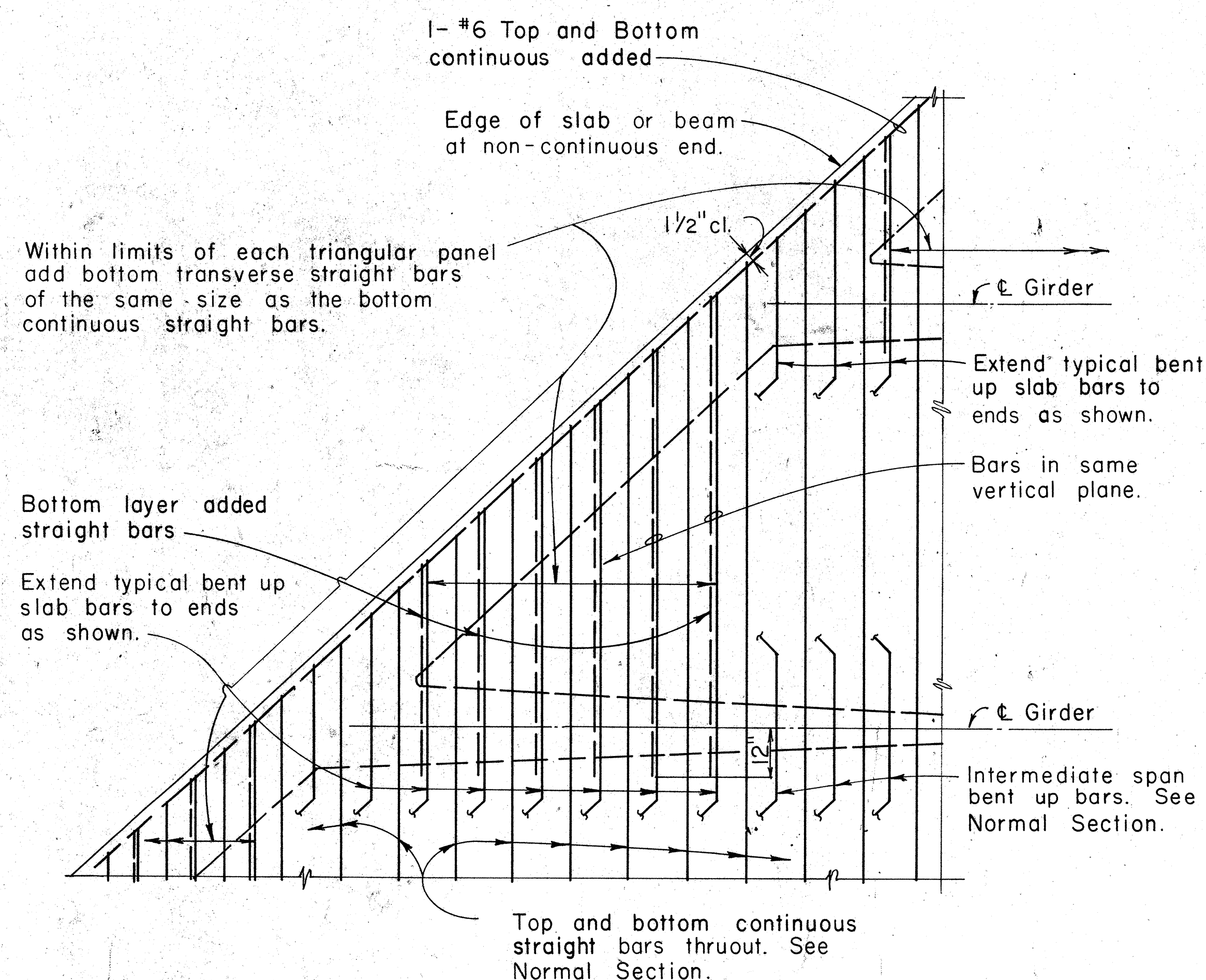
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-HH(132)-17	1983	187	192



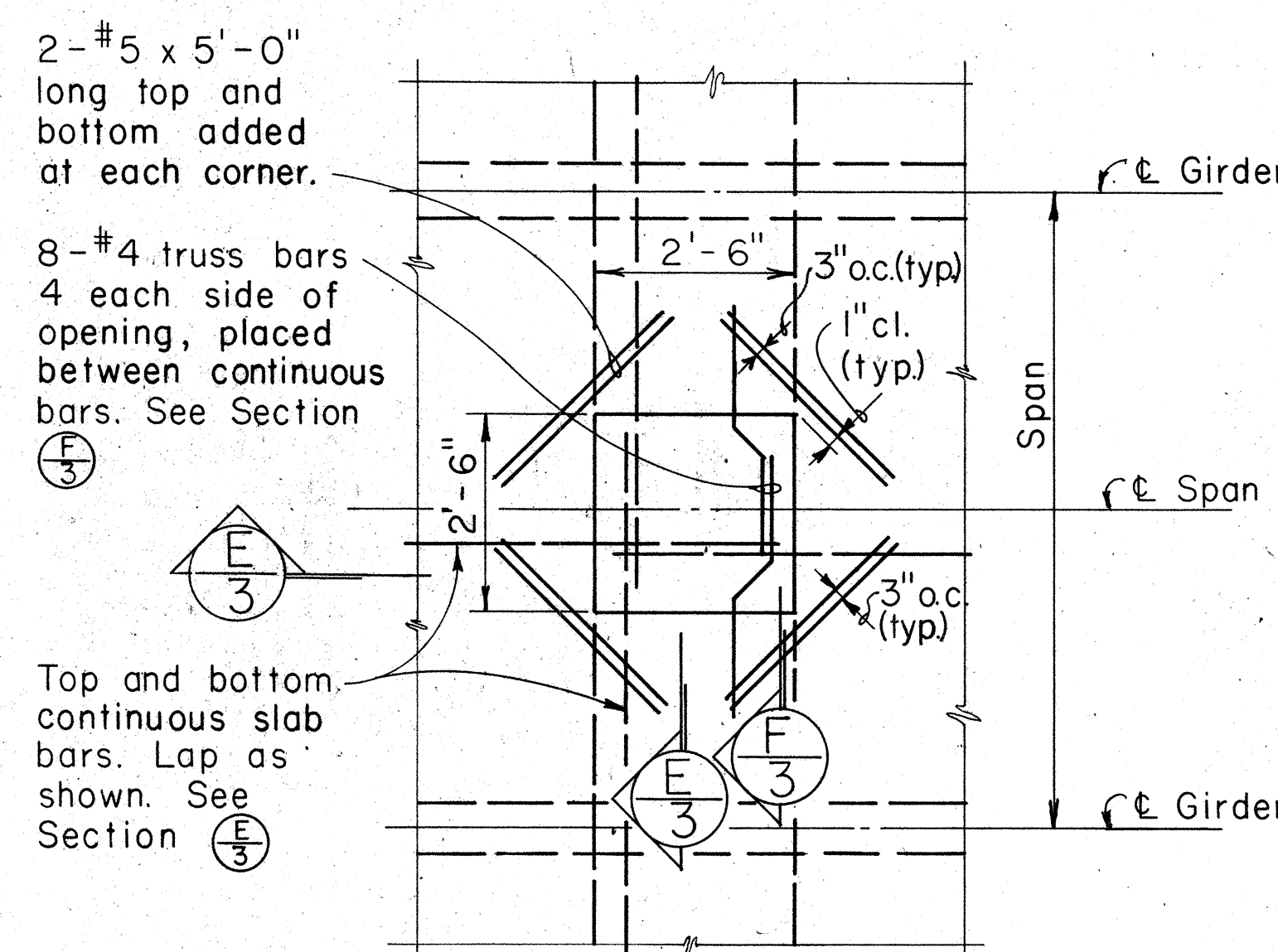
INTERIOR GIRDER

EXTERIOR GIRDER

TYPICAL DETAILS OF GIRDER FLARE AT NORMAL OR RADIAL SUPPORTS - CONTINUOUS ENDS AS SHOWN
(NON-CONTINUOUS ENDS SIMILAR EXCEPT AS OTHERWISE NOTED)

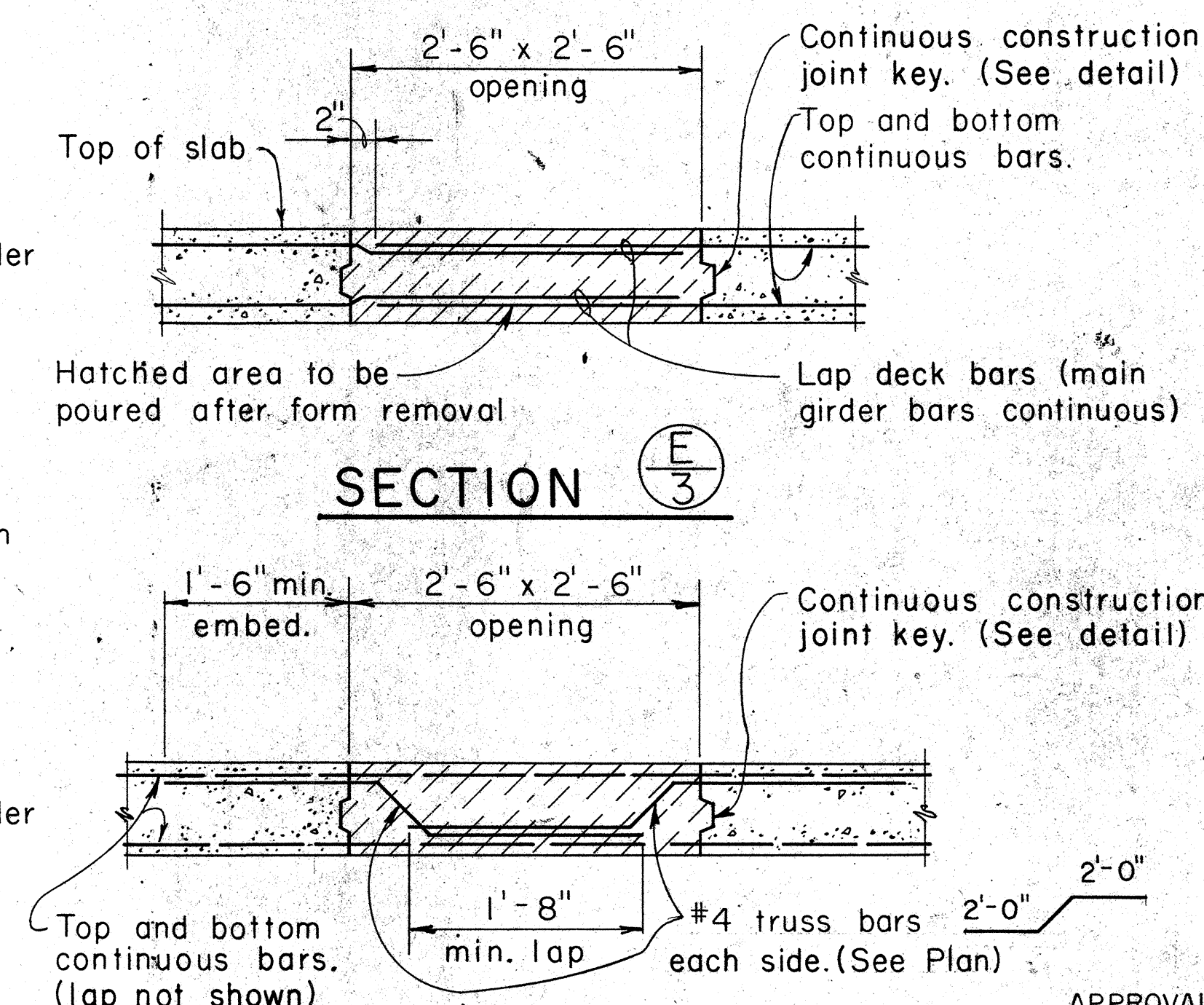


PART PLAN - TYPICAL ARRANGEMENT OF TOP SLAB REINFORCEMENT AT SKEWED ENDS



NOTES

1. Final location of opening shall be determined by the Engineer.
2. Form removal opening at top slab shall not be located where main girder bars occur.
3. Form removal opening may extend from edge of deck.



SECTION E/3

SECTION F/3

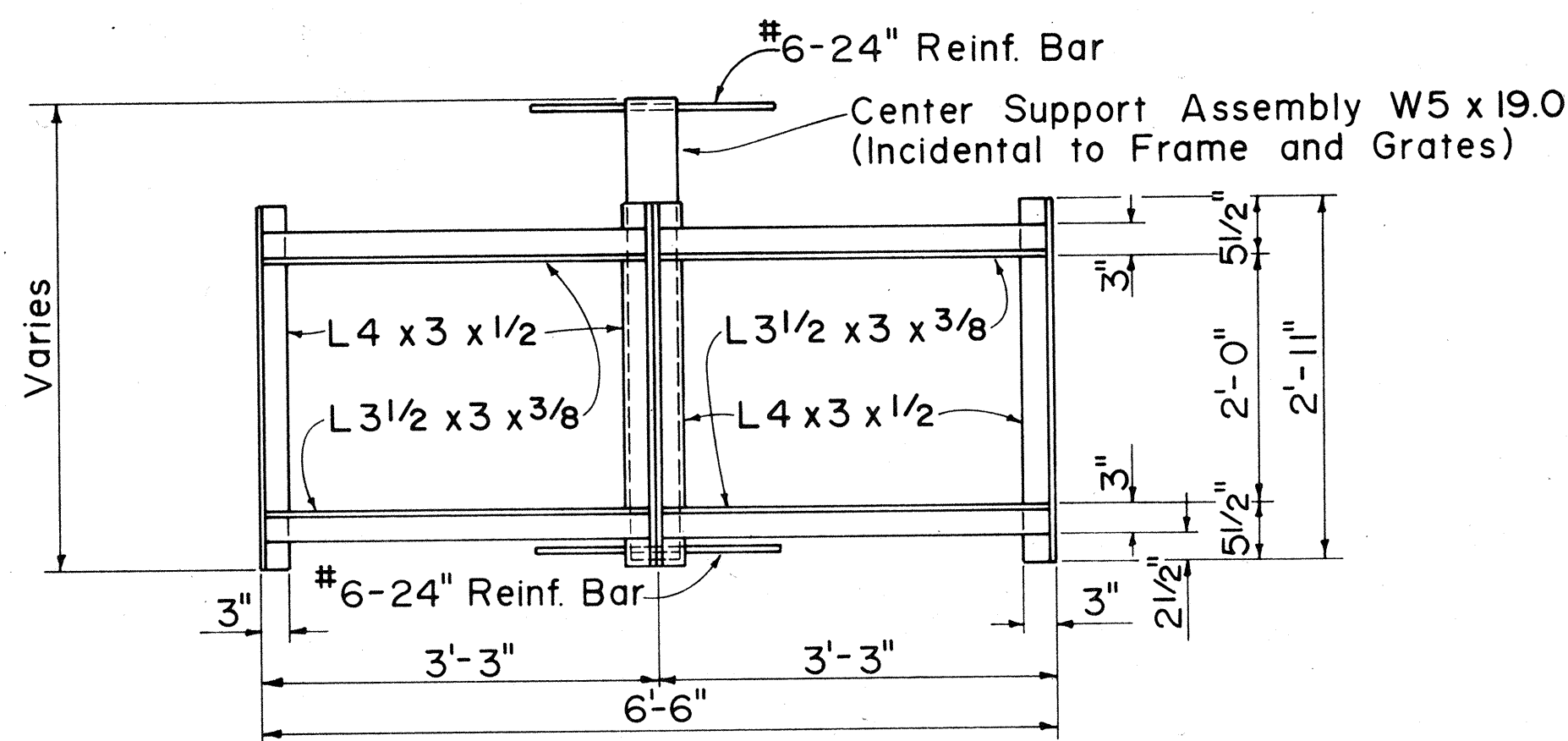
APPROVAL RECOMMENDED
Colman R. Yamamoto
BRIDGE DESIGN ENGINEER
C-1-76
DATE

APPROVED
Harbert S. Salas
ASSISTANT CHIEF, ENGINEERING
C-2-76
DATE

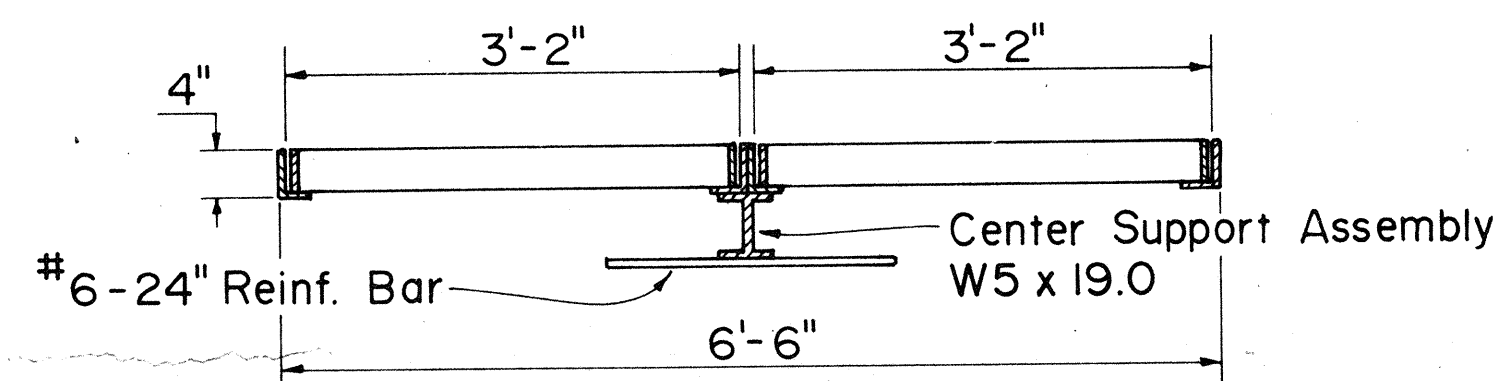
NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
CONCRETE BOX GIRDER
Not To Scale: Date: May 1976
SHEET No. 2 OF 3 SHEETS DB-101-3

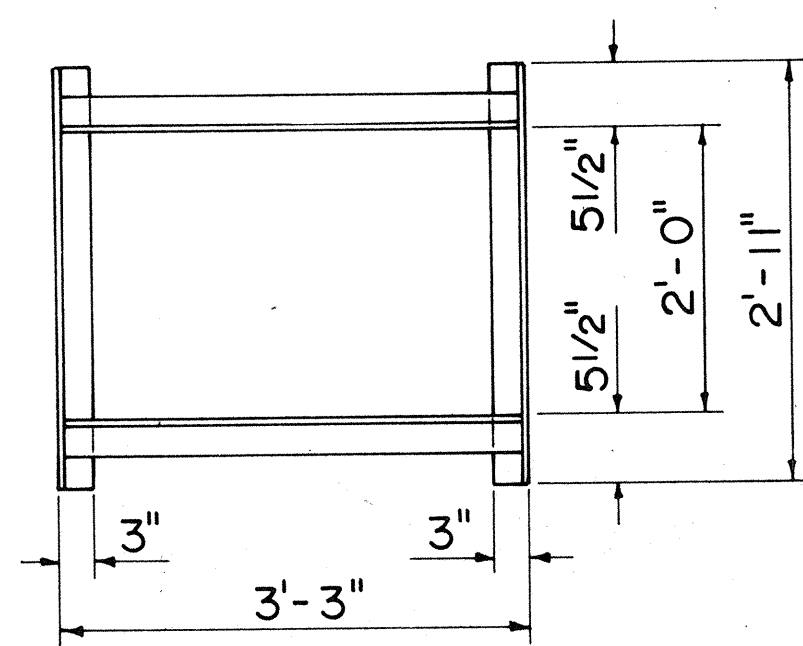
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HI-1(132)-17	1983	188	192



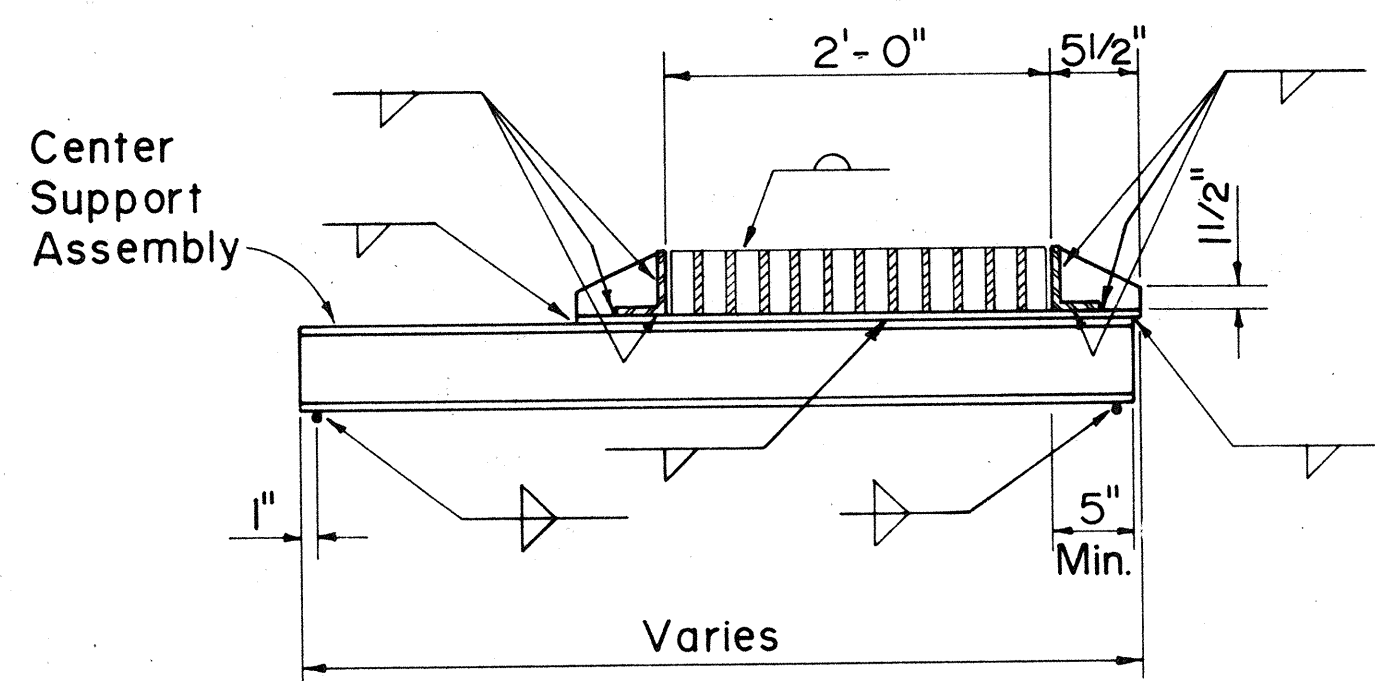
PLAN
(Two or More Grates)



LONGITUDINAL SECTION
(Thru Frame & Gate)

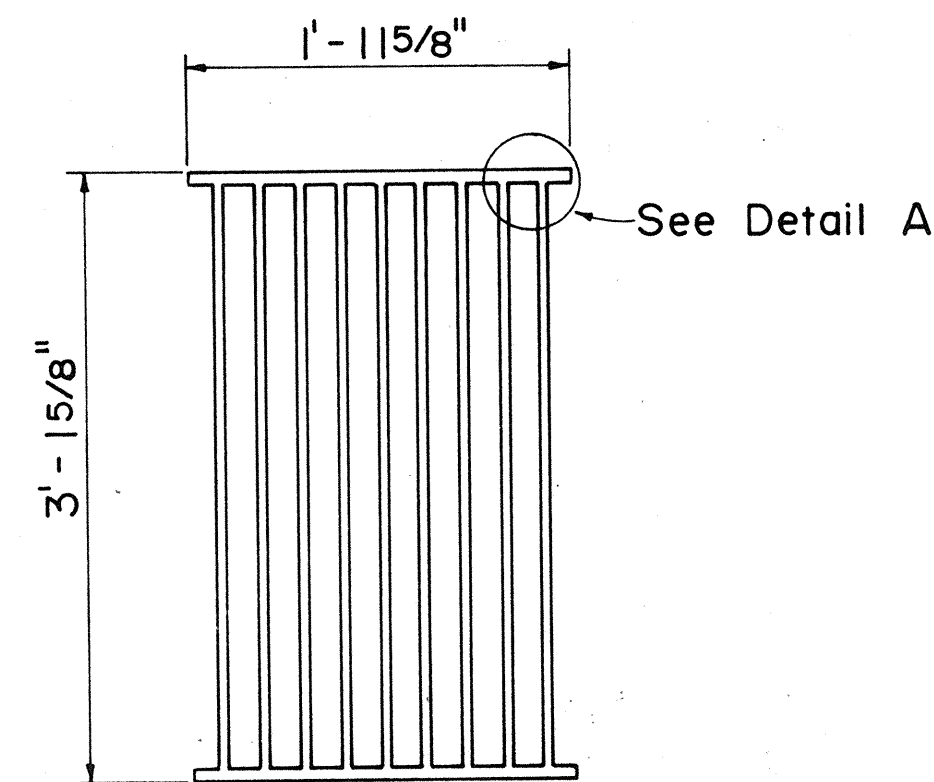


PLAN
(Single Gate)

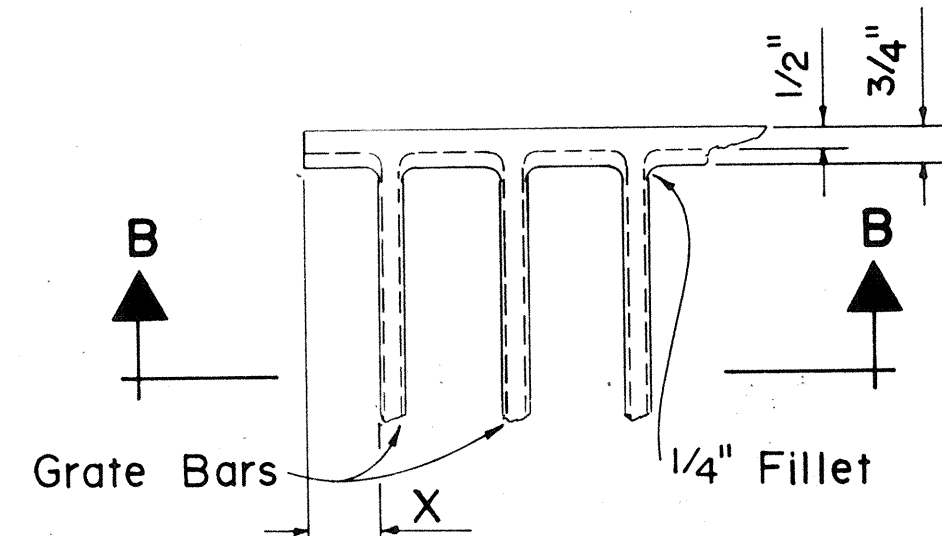


CROSS SECTION
(Thru Frame & Gate)

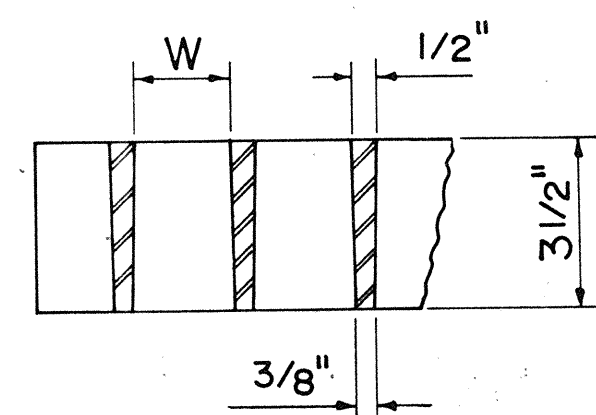
FRAME DETAILS



PLAN

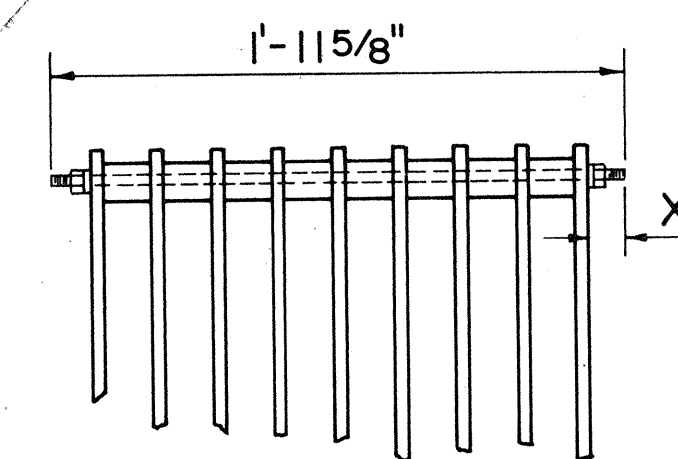


DETAIL A

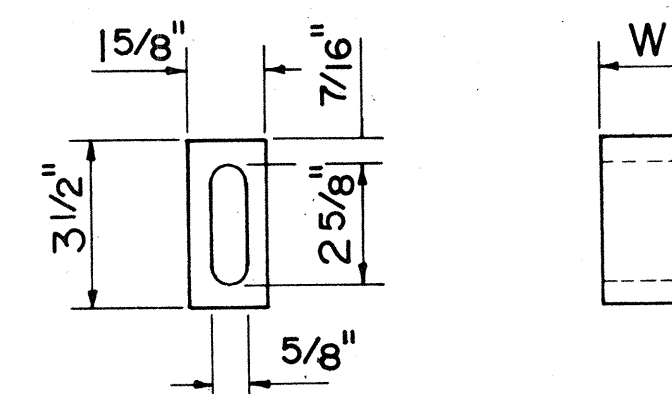


SECTION B-B

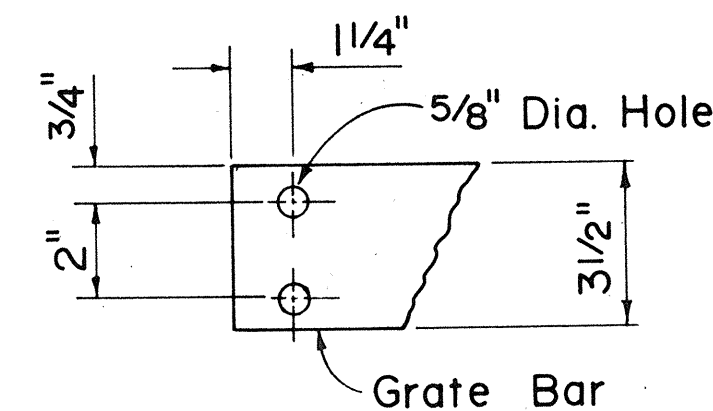
ALTERNATIVE CAST MALLEABLE IRON OR CAST STEEL GRATE



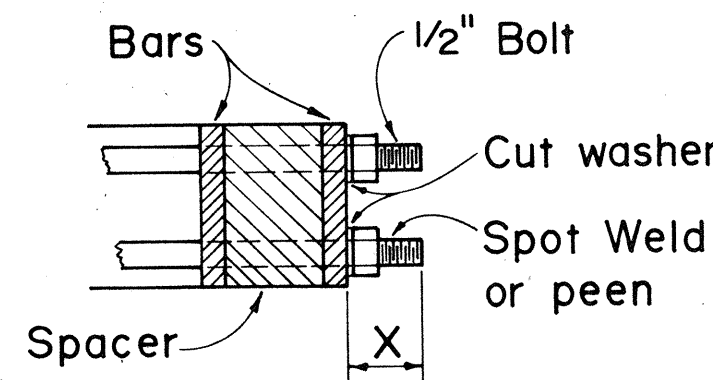
BOLTED END BLOCK



BAR SPACER

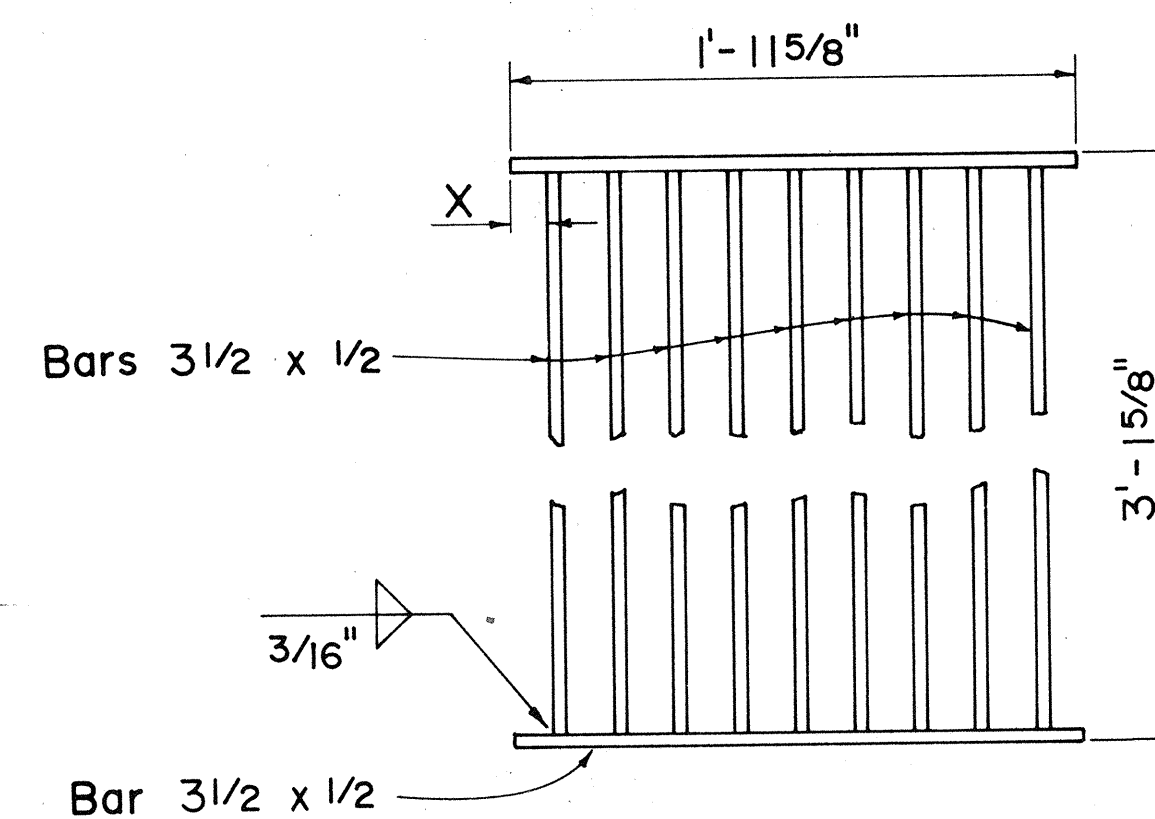


END OF BAR

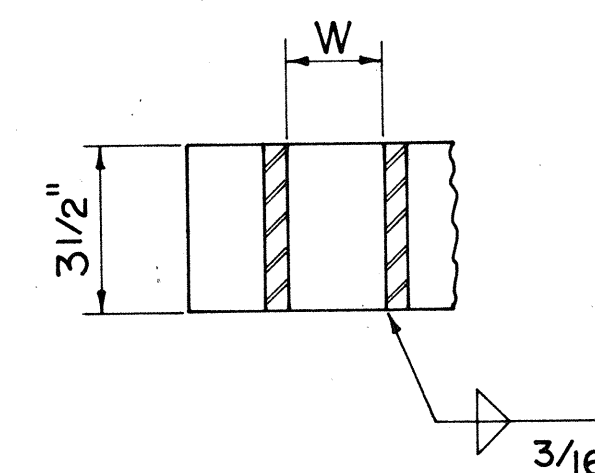


BOLTING DETAIL

ALTERNATIVE BOLTED GRATE



PLAN



SECTION

ALTERNATIVE WELDED GRATE

GRATE BAR SPACING TABLE			
TYPE	NO. BARS	CLEAR BAR SPACING - W	X
A-9	9	2"	1 9/16"
A-12	12	1 3/8"	1 1/4"

NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 7 approved 12-17-69	H.T.	6/22/79
2.	Revise standard nomenclature for rolled steel shapes.	H.T.	4/21/82

APPROVAL RECOMMENDED:
 HYDRAULIC DESIGN ENGINEER
 APPROVED:
 ASSISTANT CHIEF, ENGINEERING

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
STANDARD DETAILS	
TYPE A-9 AND A-12 FRAMES AND GRATES	
Not To Scale	Date: Dec. 1977
SHEET NO. 3 OF 3 SHEETS DH 7	

ORIGINAL	DATE
SURVEY PLOTTED BY	
DRAWN BY	
TRACED BY	
REVIEWED BY	
QUANTITIES BY	
CHECKED BY	
NO.	