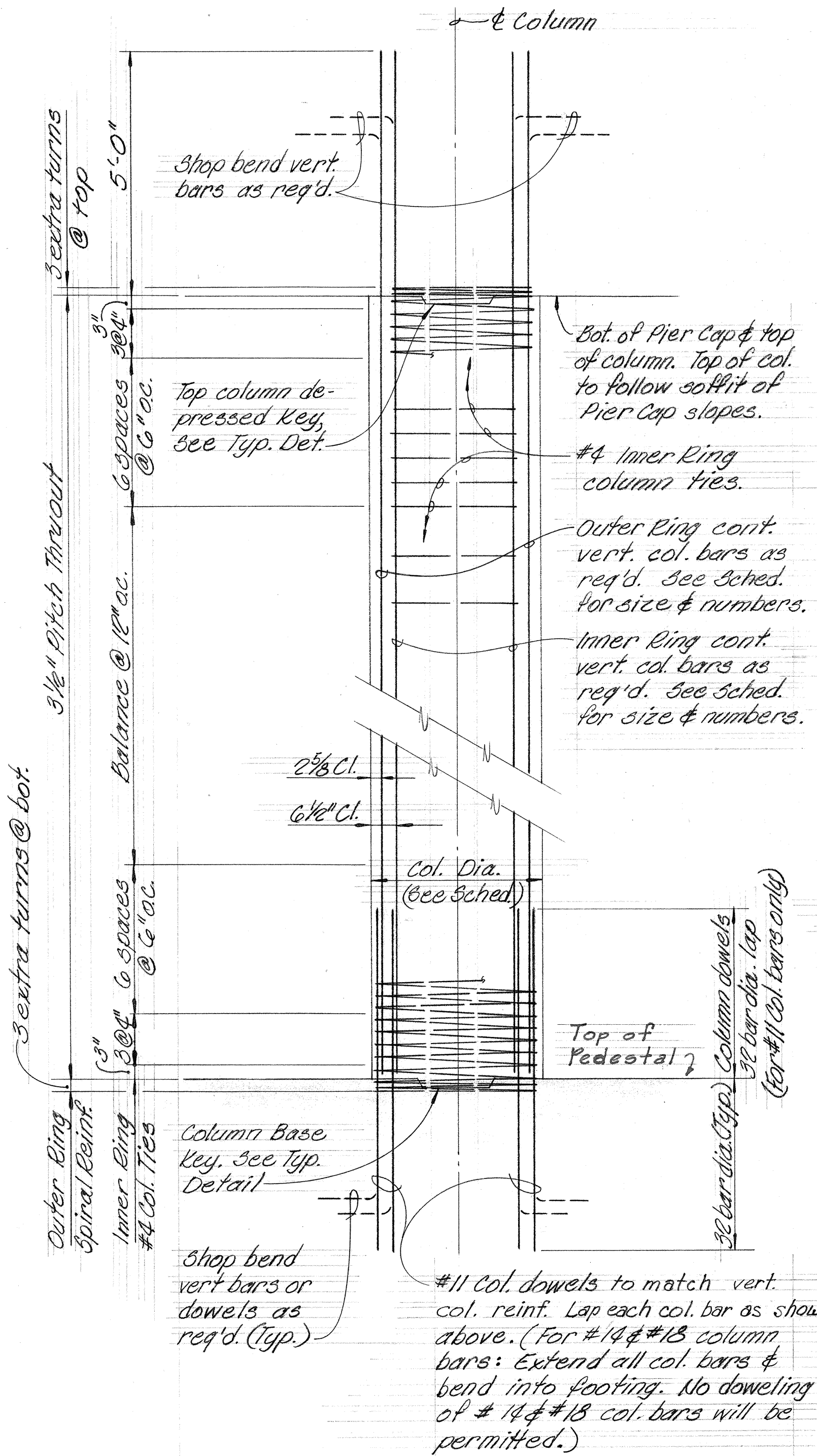


PIER COLUMN SCHEDULE

| BRIDGE No.     | 13                            |           |           |           |           | 14        |           |           |           |           | 15                            |           |           |           |           | 16        |           |           |
|----------------|-------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| PIER No.       | 1 & 2                         | 3         | 4 & 5     | 1         | 2         | 3, 4 & 5  | 1         | 2 & 4     | 3         | 5         | 1, 4 & 5                      | 2         | 3         |           |           |           |           |           |
| CLASS OF CONC. | CLASS F-1                     | CLASS F-1 | CLASS F-1 | CLASS A-1 | CLASS A-1 | CLASS A-1 | CLASS A-1 | CLASS A-1 | CLASS A-1 | CLASS A-1 | CLASS A-1                     | CLASS A-1 | CLASS A-1 | CLASS A-1 | CLASS A-1 | CLASS A-1 | CLASS A-1 | CLASS A-1 |
| REMARKS        |                               |           |           |           |           |           |           |           |           |           | For Pier 6 & 7, See Sh. _____ |           |           |           |           |           |           |           |
| COLUMN SECTION | SIZE                          | 42"Ø      | 48"Ø      | 48"Ø      | 48"Ø      | 48"Ø      | 48"Ø      | 54"Ø      | 54"Ø      | 54"Ø      | 54"Ø                          | 54"Ø      | 54"Ø      | 54"Ø      | 54"Ø      | 54"Ø      | 54"Ø      | 54"Ø      |
|                | OUTER RING CONT. VERT. REINF. | 16-#11    | 16-#11    | 22-#18    | 21-#14    | 20-#18    | 17-#11    | 16-#11    | 22-#14    | 16-#11    | 19-#18                        | 25-#18    | 20-#18    | 21-#11    |           |           |           |           |
|                | INNER RING CONT. VERT. REINF. |           |           | 11-#18    |           |           |           |           | 11-#18    |           |                               |           | 10-#18    |           |           |           |           |           |
|                | SPIRAL REINF.                 | 5/8"Ø     | 5/8"Ø     | 5/8"Ø     | 1/2"Ø     | 1/2"Ø     | 1/2"Ø     | 1/2"Ø     | 1/2"Ø     | 1/2"Ø     | 1/2"Ø                         | 1/2"Ø     | 1/2"Ø     | 1/2"Ø     | 1/2"Ø     | 1/2"Ø     | 1/2"Ø     | 1/2"Ø     |

- Note:
- #11 vertical reinforcing bars and dowels are intermediate grade steel, ASTM Designation, A-615 Grade 40.
  - #14 & #18 Vertical reinforcing bars, unless otherwise noted, are ASTM Designation, A615 Grade 40.
  - No doweling or lapping of #14 or #18 bars will be permitted. Mechanical butt splices will not be permitted.
  - Spiral reinforcement shall conform to ASTM A-82.

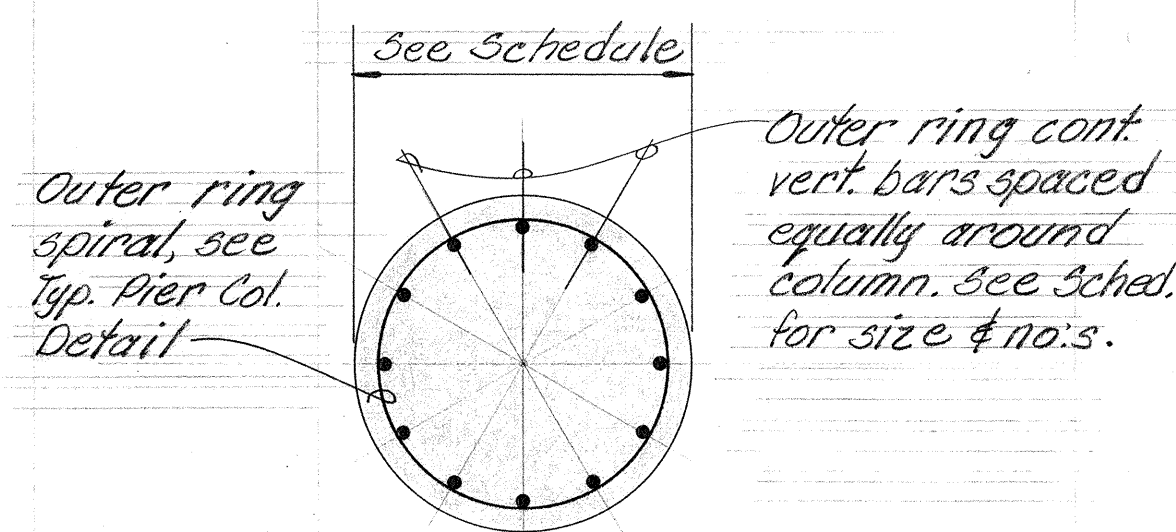


TYPICAL PIER COLUMN DETAIL

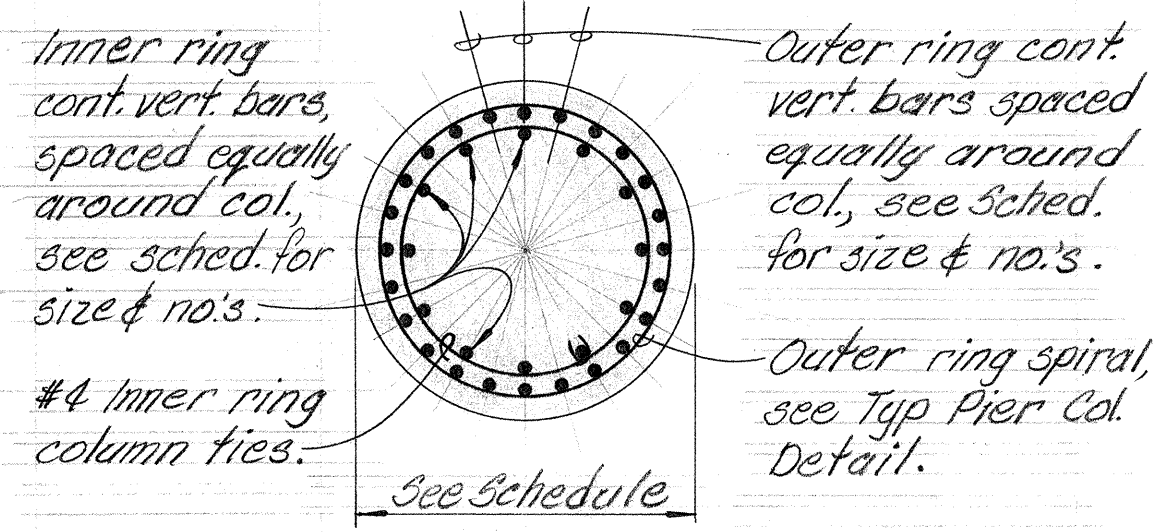
N.T.S.

SPECIAL NOTES

- For General Notes, see Sh. 59.
- References for column lengths:
  - Structure 13 Sh. 6
  - Structure 14 Sh. 6
  - Structure 15 Sh. 8
  - Structure 16 Sh. 7

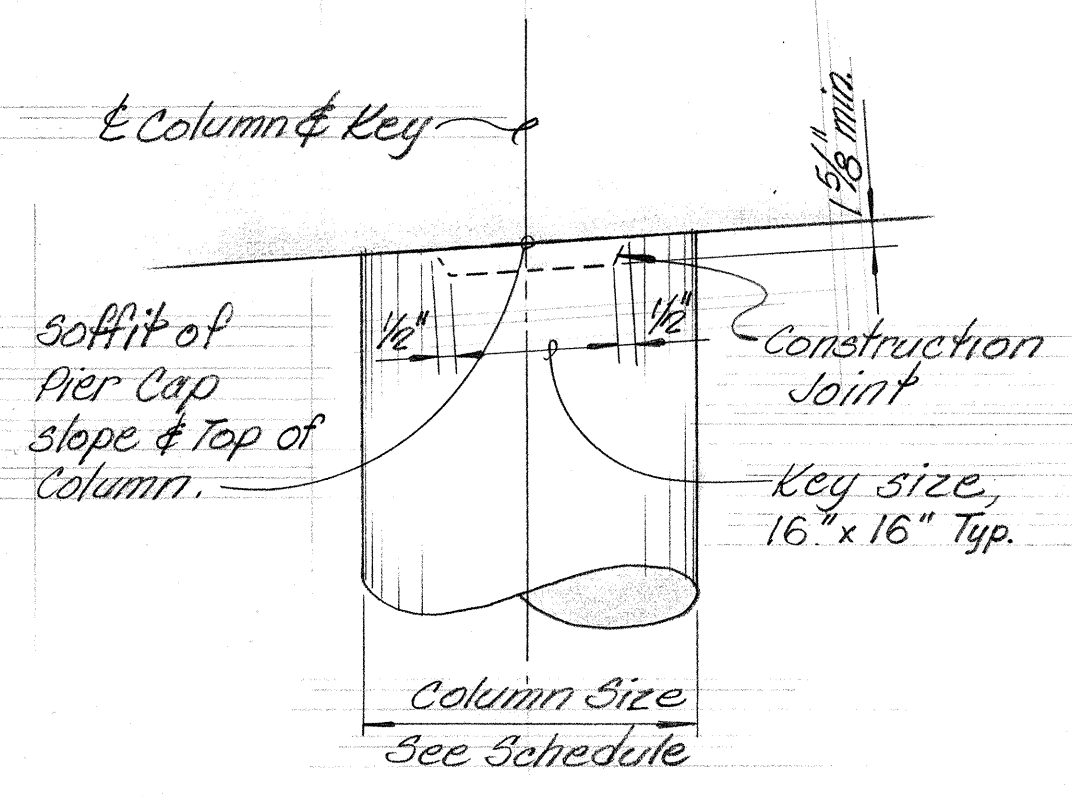


WITH OUTER RING ONLY

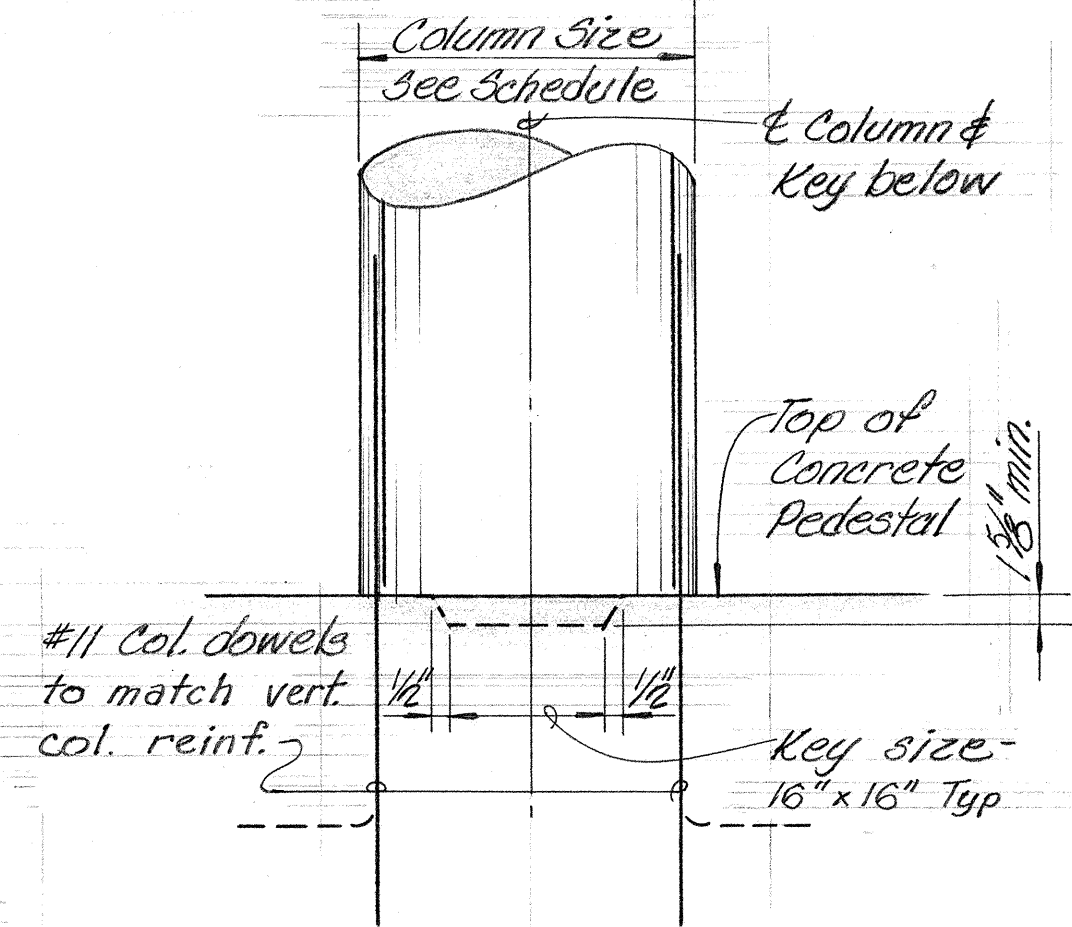


WITH OUTER & INNER RINGS  
TYP. PIER COL. SECTIONS

N.T.S.



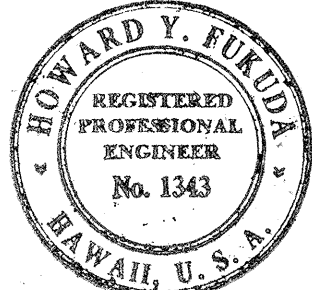
COND. @ TOP



COND. @ BASE  
TYPICAL COLUMN  
KEY DETAIL

N.T.S.

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TYPICAL DETAIL  
PIER COLUMN DETAILS

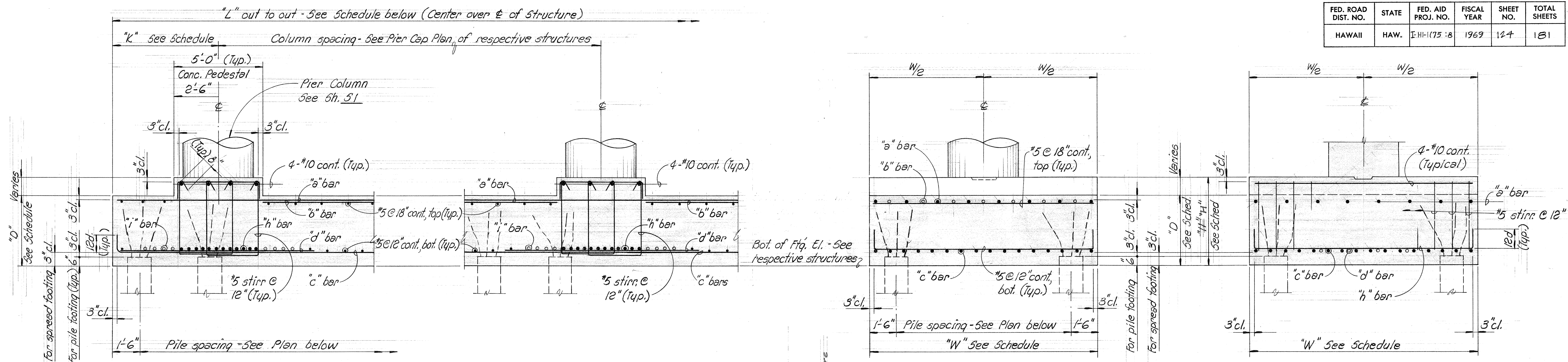
WAI'AWA INTERCHANGE  
F.A.I. Proj. No. I-HI-1(75):8

Scale: As shown Date: JUNE, 1969

SHEET No. 51 OF 16 SHEETS



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 1-H-1(75):8        | 1969        | 124       | 181          |

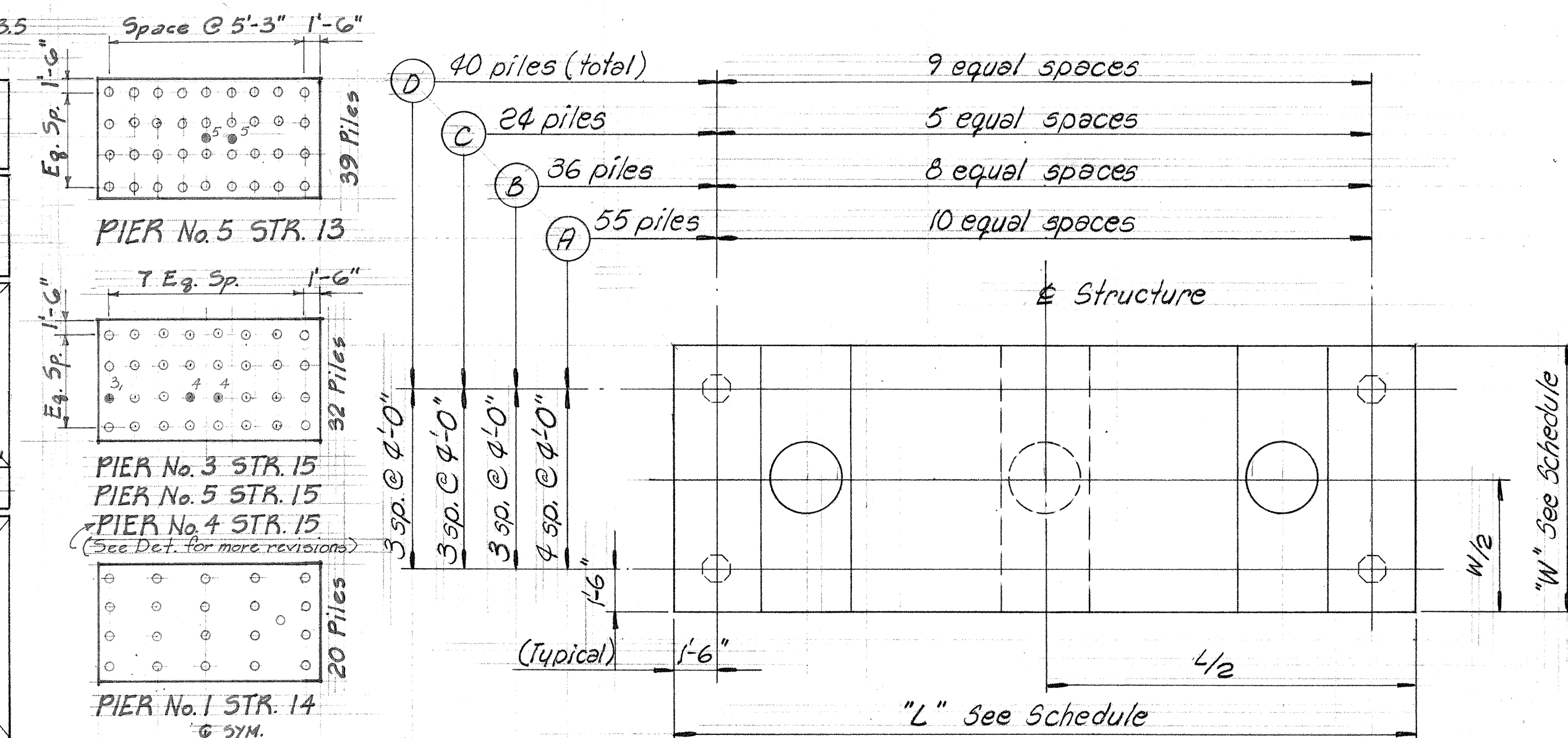


AT EXTERIOR COLUMNS  
AT INTERIOR COLUMNS  
TYPICAL PIER COLUMN FOOTING REINFORCING DETAILS  
Not to Scale

BETWEEN COLUMNS  
AT COLUMNS  
TYPICAL PIER FOOTING SECTIONS  
Not to Scale

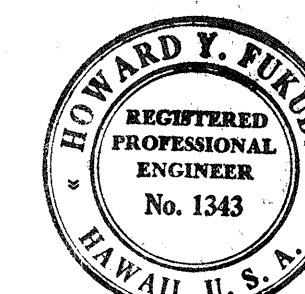
STRUCTURE #15 PIER #4  
Total of 5 added piles.

| FOOTING DIMENSIONS |      |                    |                   |                   |                    |                            |                                                          | FOOTING REINFORCING |                   |                    |                    | PEDESTAL REINFORCING |                    |
|--------------------|------|--------------------|-------------------|-------------------|--------------------|----------------------------|----------------------------------------------------------|---------------------|-------------------|--------------------|--------------------|----------------------|--------------------|
| BRIDGE             | PIER | "L" Footing Length | "W" Footing Width | "D" Footing Depth | "H" Pedestal Depth | "K" Ext. Col. to Ftg. edge | "Footing Type" (A) Denotes pile spacing (See Plan-right) | "a" bar Top cont.   | "b" bar Top added | "c" bar Bot. cont. | "d" bar Bot. added | "h" bar Bot. cont.   | "i" bar Bot. added |
| #13                | #1   |                    | 10'-0"            | 3'-0"             | 4'-0"              | 6'-6"                      | Spread Footing                                           | 8-#9                | 8-#9x12'-0"       | 8-#10              | 4-#10x12'-0"       | 4-#10x11'-0"         | 8-#11              |
|                    | #2   | 40'-0"             | 10'-0"            | 3'-0"             | 4'-0"              | 6'-6"                      |                                                          | 10-#11              | 8-#11x13'-0"      | 12-#11             |                    |                      | 12-#11             |
|                    | #3   | 41'-0"             | 15'-0"            | 3'-3"             | 4'-3"              | 5'-8"                      | (B) Pile Ftg. - 45 Ton<br>Pier #4 See: Tracing #69       |                     |                   |                    |                    |                      |                    |
|                    | #4   | 41'-0"             | 15'-0"            | 3'-3"             | 4'-3"              | 5'-8"                      | (A) Pile Ftg. - 32 Ton<br>See Def. this sheet            | 12-#11              | 11-#11x15'-0"     | 15-#10             |                    |                      | 8-#11              |
|                    | #5   | 45'-0"             | 15'-0"            | 4'-0"             | 6'-0"              | 5'-7"                      |                                                          |                     |                   |                    |                    |                      | 8-#11              |
| #14                | #1   |                    | 15'-0"            | 3'-0"             | 4'-0"              | 5'-6"                      | Spread Footing<br>See Def. this sheet                    | 8-#9                | 8-#9x15'-0"       |                    |                    |                      | 8-#11              |
|                    | #2   | 29'-0"             | 15'-0"            | 3'-6"             | 4'-6"              | 5'-6"                      | (C) Pile Ftg. - 45 Ton<br>See Def. this sheet            | 8-#9                | 8-#9x15'-0"       | 16-#9              |                    |                      | 8-#11              |
|                    | #3   | 29'-0"             | 15'-0"            | 3'-6"             | 4'-6"              | 5'-6"                      |                                                          |                     |                   |                    |                    |                      | 6-#11              |
|                    | #4   | 29'-0"             | 15'-0"            | 3'-0"             | 4'-0"              | 5'-6"                      | Spread Footing                                           | 8-#11               | 8-#11x15'-0"      |                    |                    |                      | 6-#11              |
|                    | #5   | 29'-0"             | 15'-0"            | 3'-0"             | 4'-0"              | 5'-6"                      |                                                          |                     |                   |                    |                    |                      | 6-#11              |
| #15                | #1   | 38'-0"             | 9'-0"             | 3'-0"             | 4'-0"              | 5'-6"                      | Spread Footing                                           | 6-#11               | 6-#11x8'-6"       | 6-#11              | 6-#11x11'-0"       | 6-#11x11'-0"         | 4-#11              |
|                    | #2   | 39'-0"             | 15'-0"            | 3'-6"             | 4'-6"              | 6'-0"                      | (D) 32 Piles Ftg. 45 Ton<br>See Def. this sheet          | 10-#11              | 10-#11x8'-6"      | 10-#11             | 10-#11x11'-0"      | 10-#11x11'-0"        | 5-#11              |
|                    | #3   | 39'-0"             | 15'-0"            | 3'-6"             | 4'-6"              | 6'-0"                      | (E) Pile Ftg. - 45 Ton<br>See Def. this sheet            |                     |                   |                    |                    |                      | 4-#11x12'-0"       |
|                    | #4   | 40'-0"             | 15'-0"            | 3'-0"             | 4'-0"              | 6'-6"                      | Spread Footing<br>32 Piles 45 Ton<br>See Structure #15   |                     |                   | 10-#11             | 10-#11x11'-0"      | 10-#11x11'-0"        |                    |
|                    | #5   | 40'-0"             | 15'-0"            | 3'-0"             | 4'-0"              | 6'-6"                      |                                                          |                     |                   |                    |                    |                      |                    |
| #16                | #1   | 15'-4'-0"          | 3'-0"             | 4'-0"             | 4'-0"              | 5'-6"                      | (C) Pile Ftg. 45 Ton<br>See C.O. #111                    |                     |                   |                    |                    |                      |                    |
|                    | #2   | 15'-0"             | 3'-6"             | 4'-6"             | 4'-6"              | 5'-6"                      | (E) Pile Ftg. 45 Ton                                     | 10-#11              | 10-#11x15'-0"     | 18-#9              |                    |                      | 12-#11             |
|                    | #3   | 18'-4'-0"          | 3'-0"             | 4'-0"             | 4'-0"              | 5'-6"                      | (C) Pile Ftg. 45 Ton                                     |                     |                   |                    |                    |                      | 11-#11             |
|                    | #4   | 18'-4'-0"          | 3'-0"             | 4'-0"             | 4'-0"              | 5'-6"                      | Spread Footing                                           | 8-#11               | 8-#11x15'-0"      |                    |                    |                      | 6-#11              |
|                    | #5   | 9'-0"              | 3'-0"             | 4'-0"             | 4'-0"              | 5'-6"                      |                                                          |                     |                   |                    |                    |                      |                    |



PLAN - TYPICAL PILE SPACING LAYOUT  
Not to Scale

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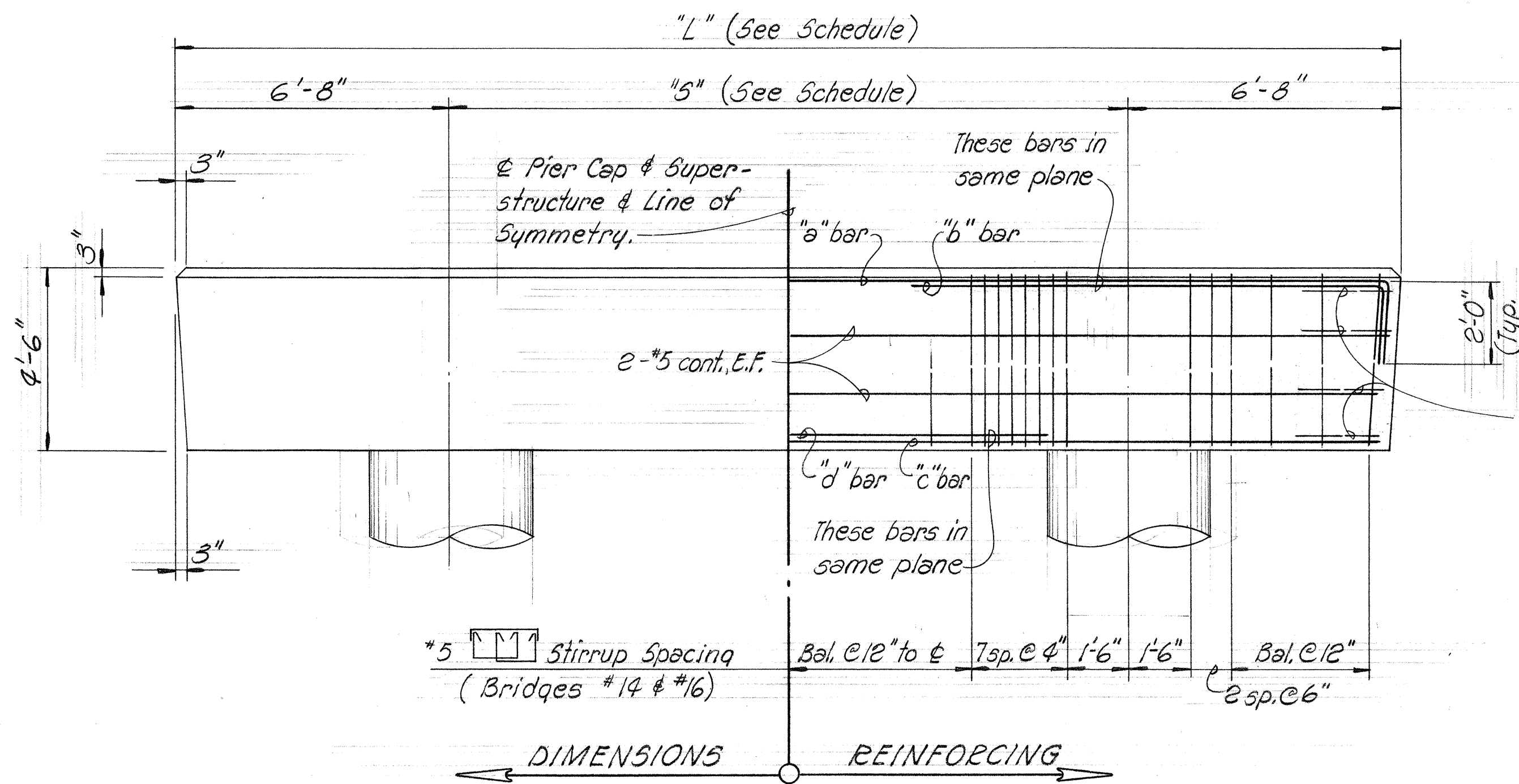
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

TYPICAL DETAIL  
PIER COLUMN  
TYPICAL FOUNDATION DETAILS

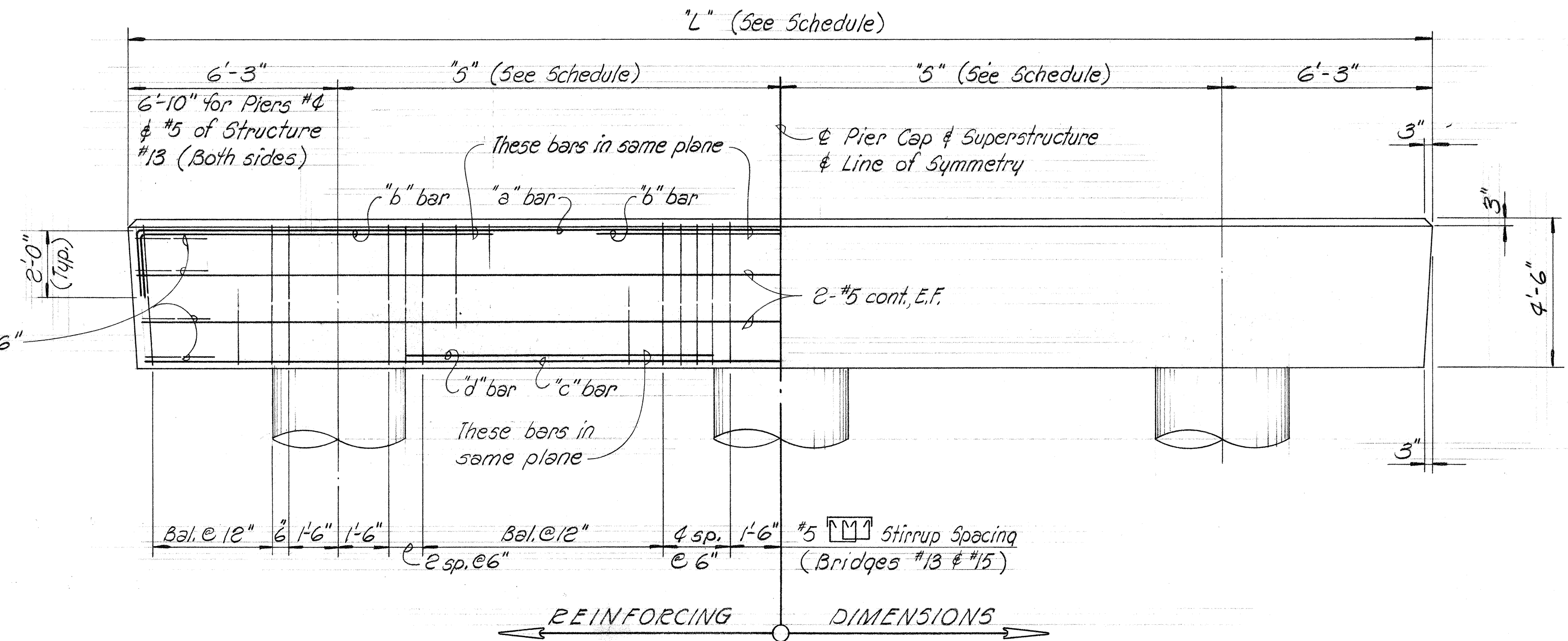
WAIKAWA INTERCHANGE  
F.A.I. Proj. No. I-H-1(75):8

Scale: As shown Date: JUNE, 1969  
SHEET No. 52 OF 16 SHEETS

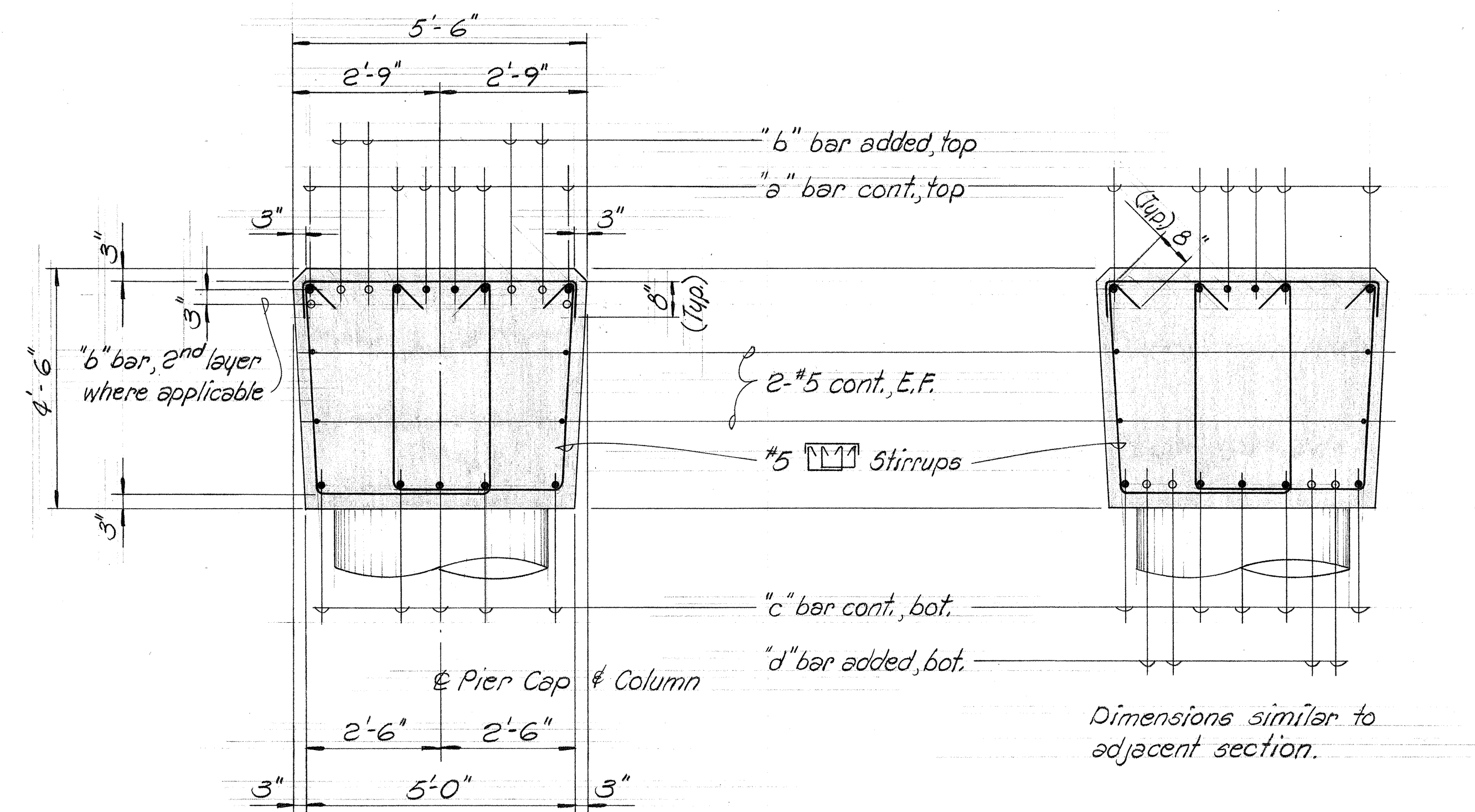




PIER CAP ELEVATION ~ BRIDGES #14 & #16  
Scale: 3/8" = 1'-0"



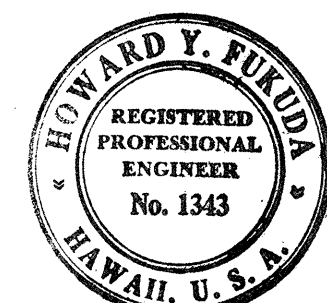
PIER CAP ELEVATION ~ BRIDGES #13 & #15  
Scale: 3/8" = 1'-0"



AT SUPPORTS BETWEEN SUPPORTS  
TYPICAL PIER CAP SECTIONS  
Scale: 1/2" = 1'-0"

| PIER CAP SCHEDULE |          |                                                      |                    |                    |                       |                            |                    |                    |
|-------------------|----------|------------------------------------------------------|--------------------|--------------------|-----------------------|----------------------------|--------------------|--------------------|
| BRIDGE            | PIER     | "L" Pier Cap Length                                  | "S" Column Spacing | "a" bar top, cont. | "b" bar top, added    |                            | "c" bar bot, cont. | "d" bar bot, added |
|                   |          |                                                      |                    |                    | Exterior Column       | Interior Column            |                    |                    |
| #13               | #1 & #2  | 39'-6"                                               | 13'-6"             |                    | 4-#11 11'-6" 2'-0"    | 4-#11 x 10'-0"             |                    | 4-#11 x 10'-6"     |
|                   | #3       | 39'-6"                                               | 13'-6"             |                    | 4-#11 11'-6" 2'-0"    | 4-#11 x 10'-0"             |                    | 4-#11 x 10'-6"     |
|                   | #4       | 43'-4"                                               | 14'-10"            | 6-#11              | 4-#11 2nd layer 2'-0" | 4-#11 x 10'-0" (2nd layer) | 5-#11              | 4-#11 x 14'-0"     |
|                   | #5       | 47'-4"                                               | 16'-10"            |                    |                       |                            |                    |                    |
| #14               | All      | 31'-4"                                               | 18'-0"             | 6-#11              | 4-#11 12'-0" 2'-0"    |                            | 5-#11              | 4-#11 x 15'-0"     |
| #15               | #1 to #5 | 39'-6"                                               | 13'-6"             | 6-#11              | 6-#11 11'-6" 2'-0"    | 6-#10 x 10'-0"             | 5-#11              | 5-#10 x 10'-0"     |
|                   | #6 & #7  | See Sh. for post-tension box girder pier cap details |                    |                    |                       |                            |                    |                    |
| #16               | All      | 31'-4"                                               | 18'-0"             | 6-#11              | 5-#11 16'-0" 2'-0"    |                            | 6-#11              | 4-#11 x 15'-0"     |

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TYPICAL DETAIL  
PIER CAP

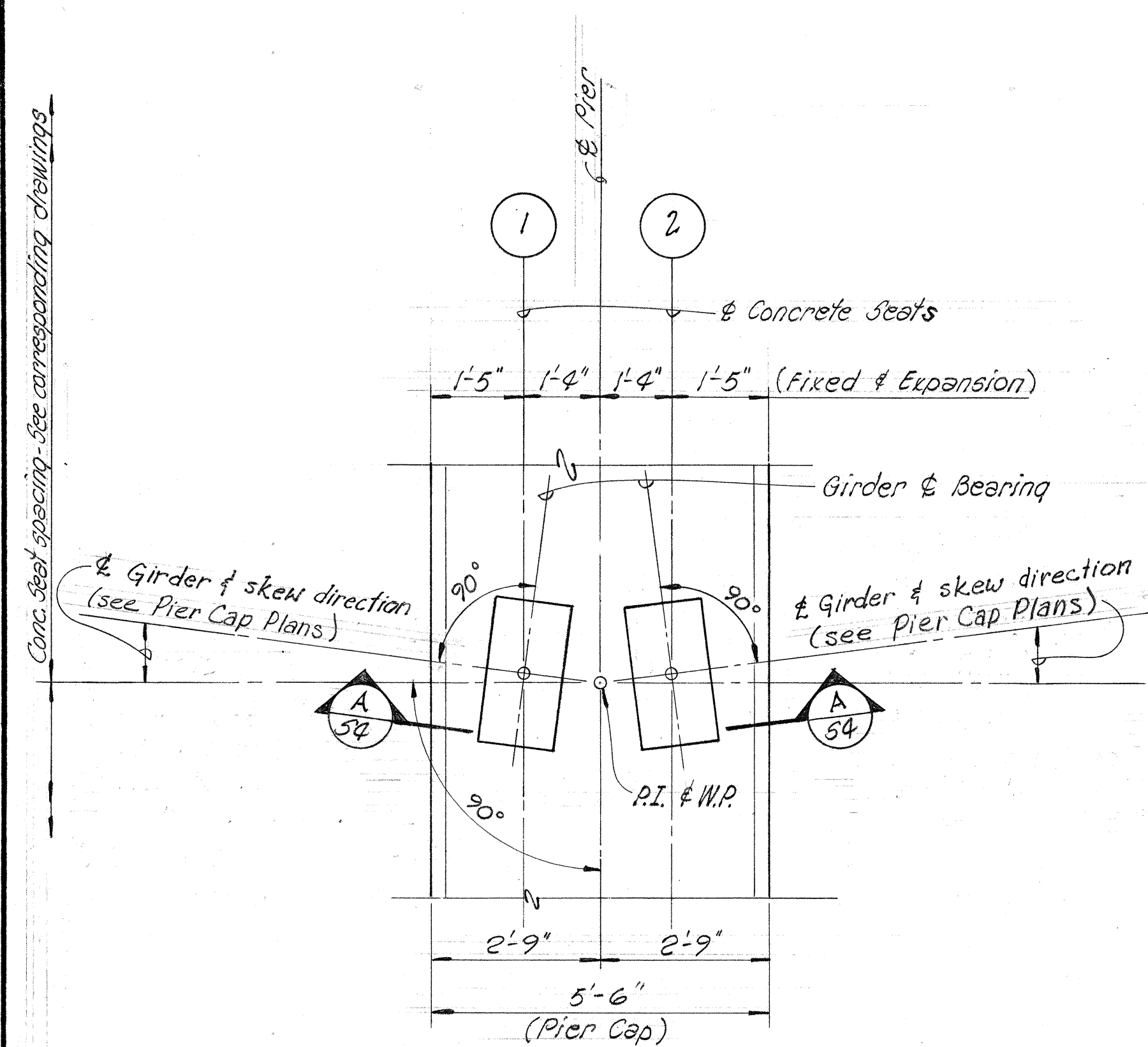
WAI'AWA INTERCHANGE  
F.A.I. Proj. No. I-H-1 (75):8

Scale: As shown Date: JUNE, 1969

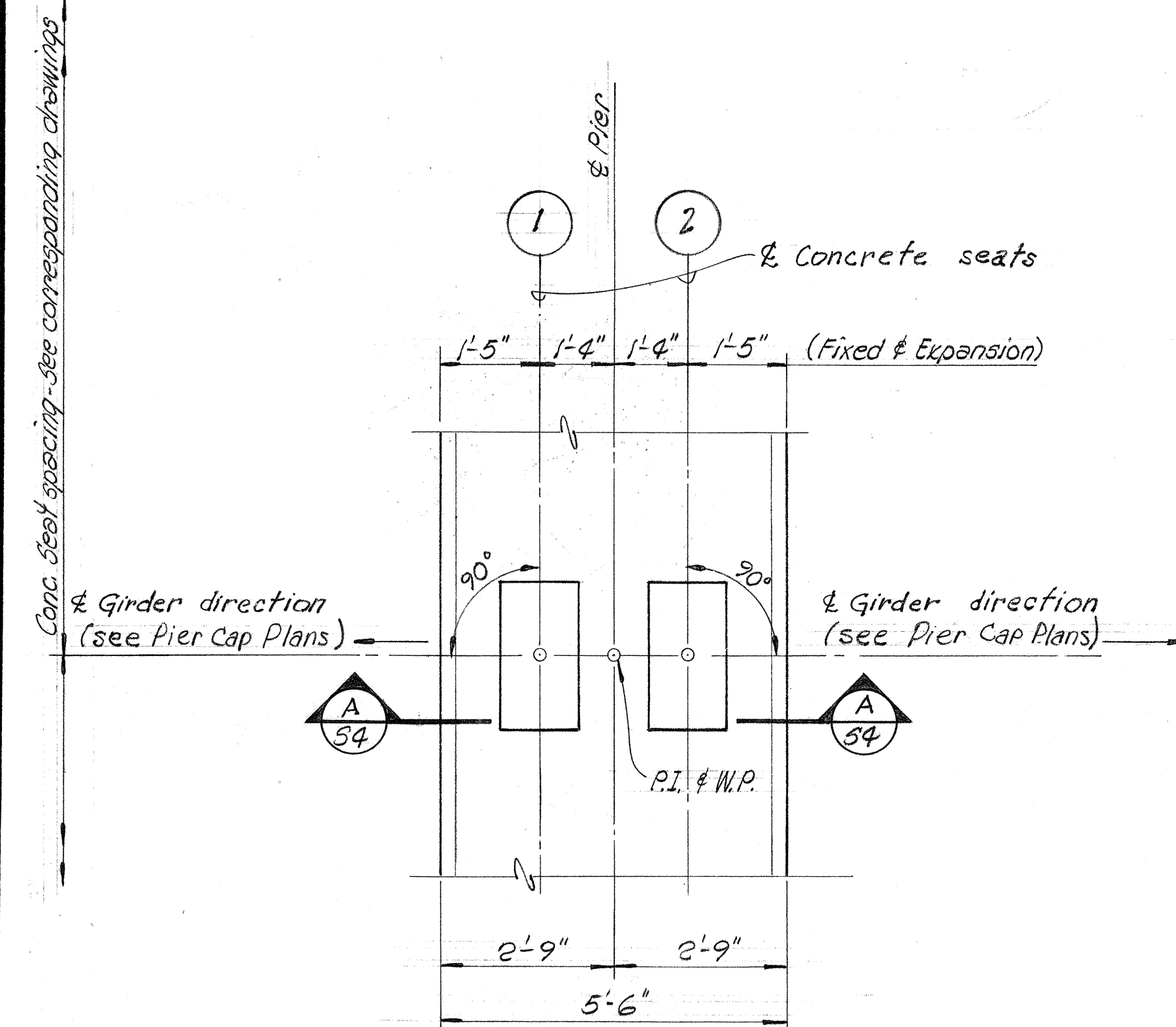
SHEET No. 53 OF 16 SHEETS



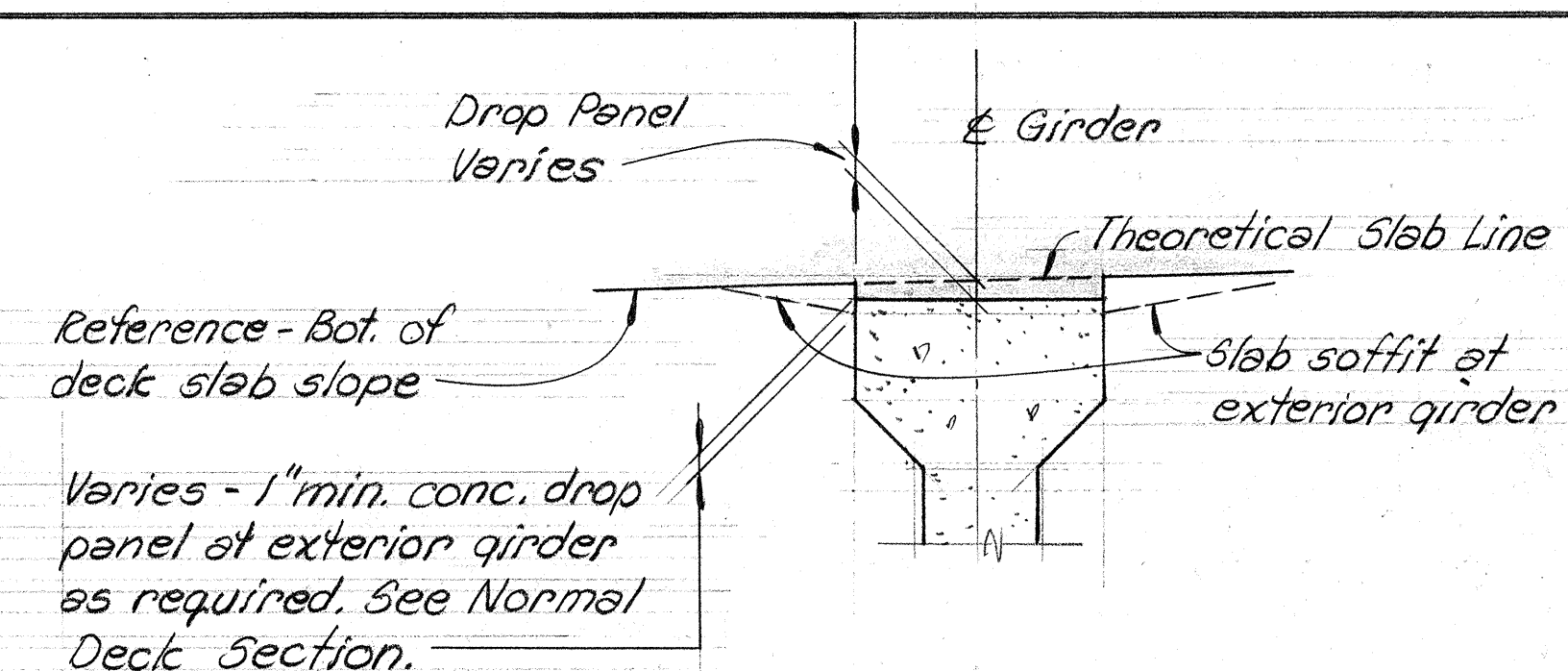
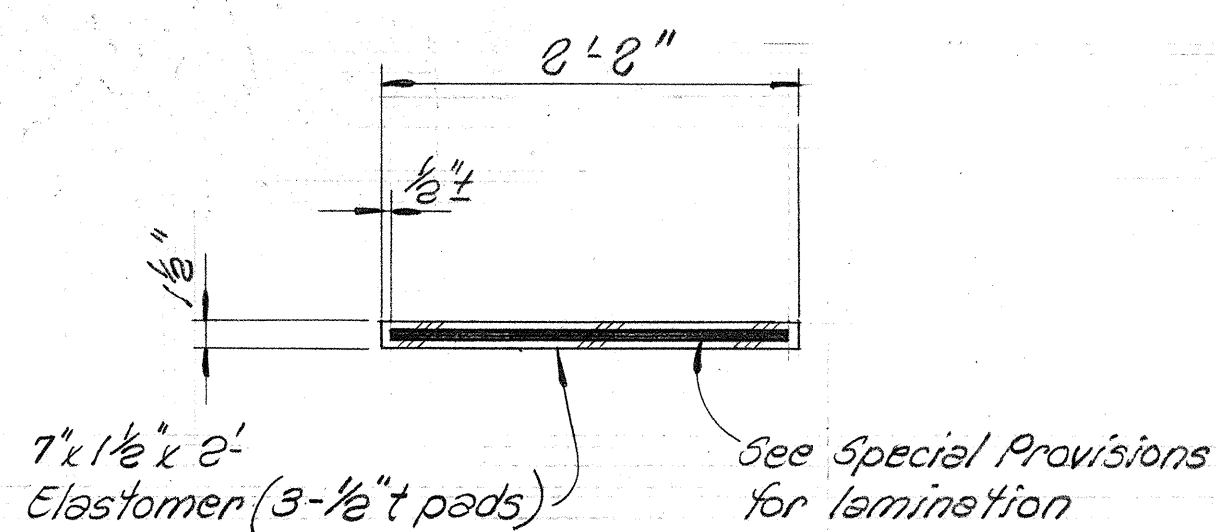
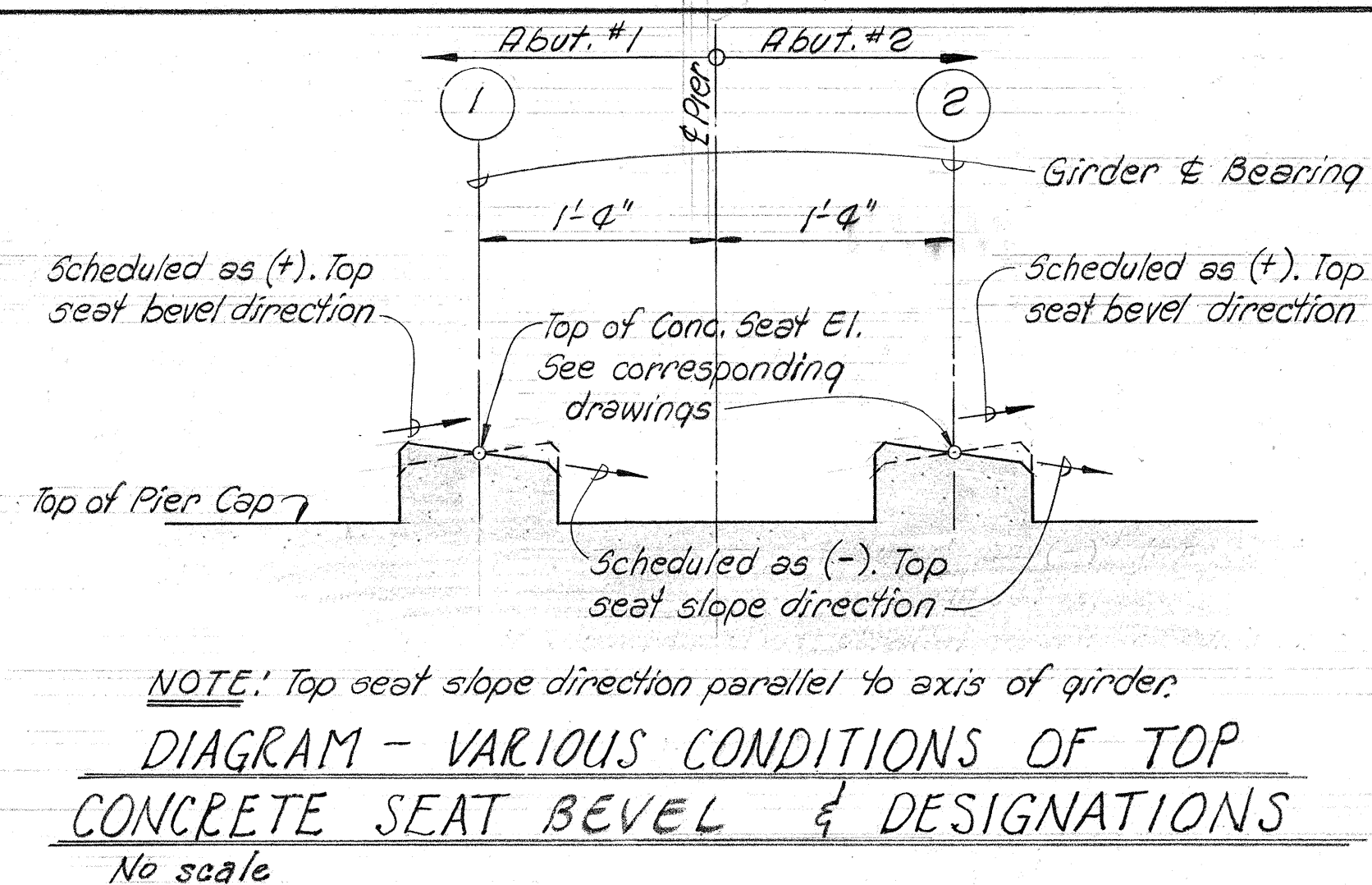
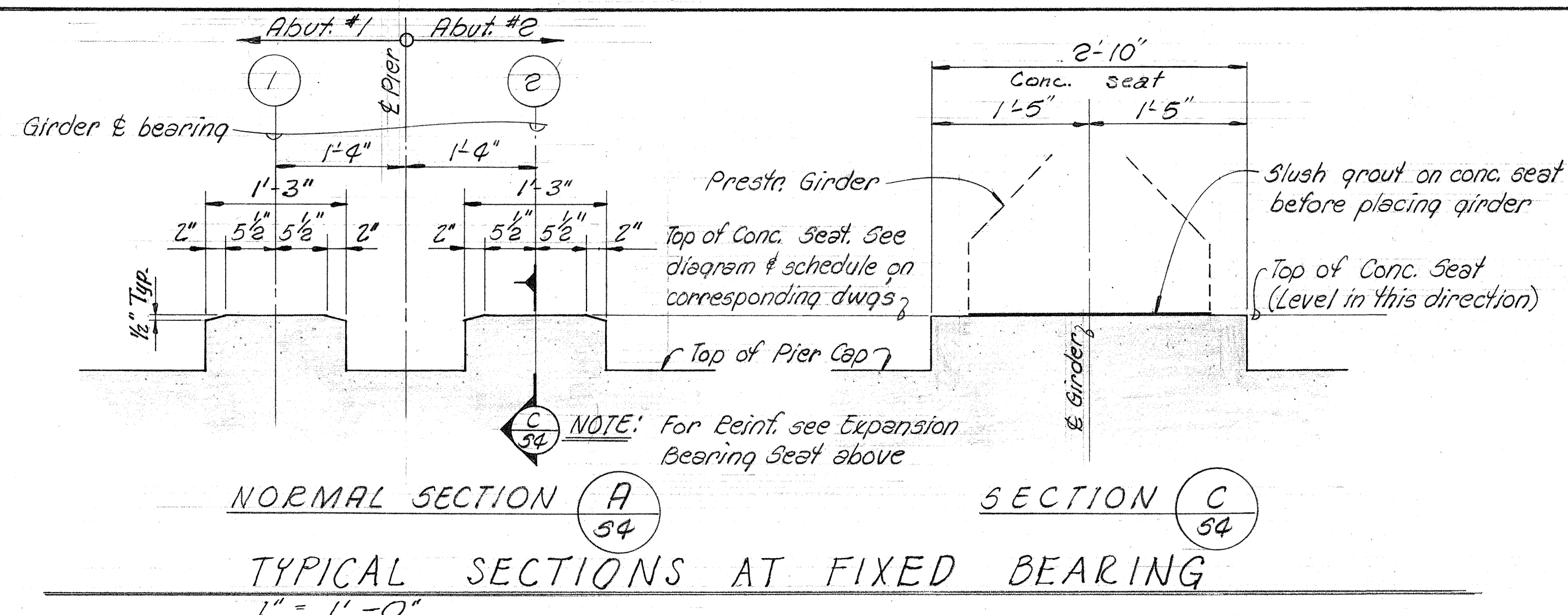
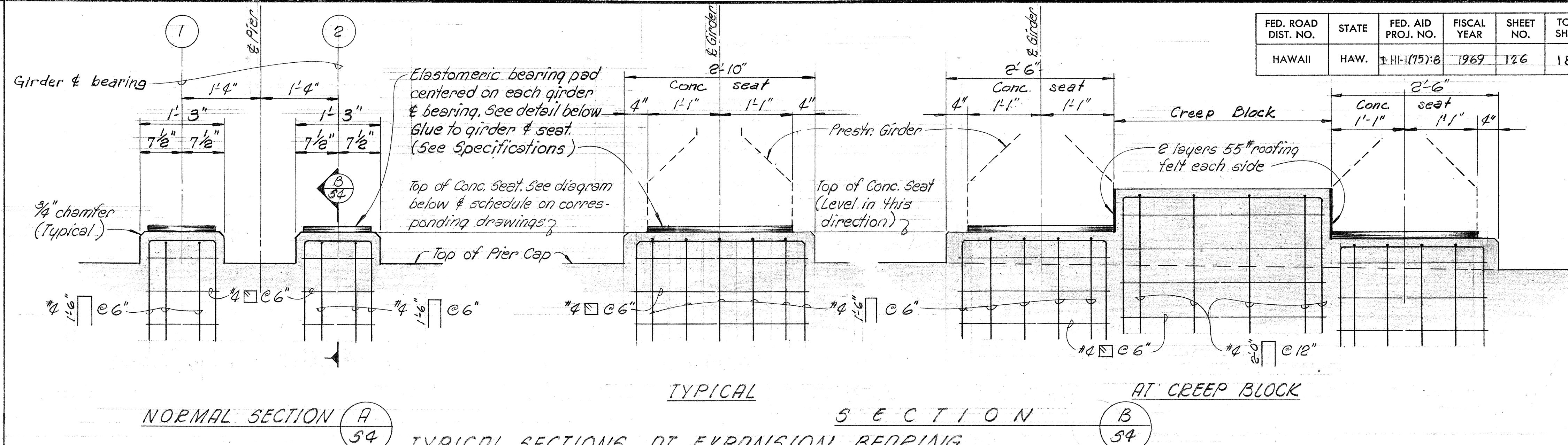
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | I-H-1(75):8        | 1969        | 126       | 181          |



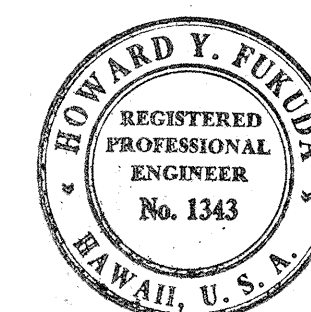
PLAN AT RADIAL PIER  
1/2" = 1'-0"



PLAN AT RIGHT ANGLE PIER  
1/2" = 1'-0"



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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

TYPICAL DETAIL

CONCRETE SEAT & DROP PANEL

WAIKAWA INTERCHANGE  
F.A.I. Proj. No. I-H-1(75):8

Scale: As shown Date: JUNE, 1969  
SHEET No. 54 OF 16 SHEETS



The drawings illustrate the reinforcement details for a beam over fixed pier supports, showing typical details and beam reinforcement for piers 2, 4, and 5 of Structure #15.

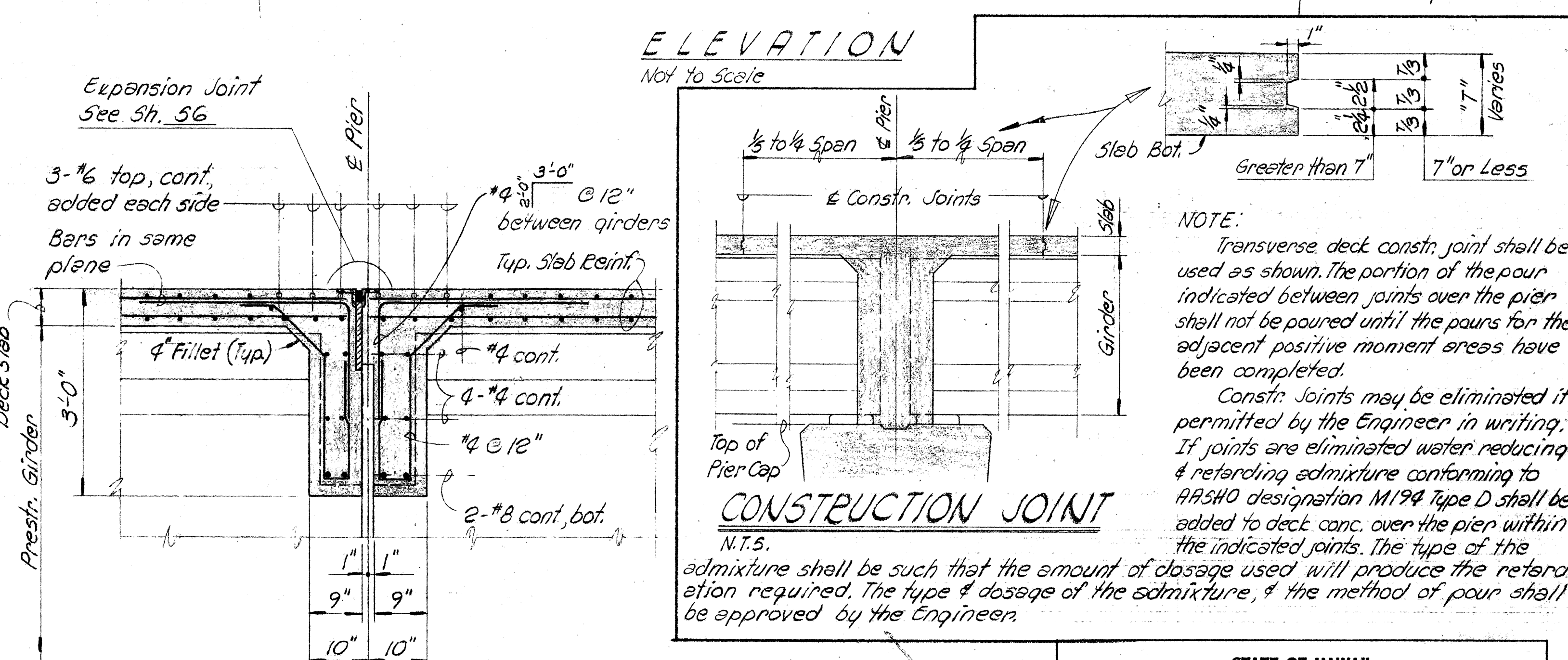
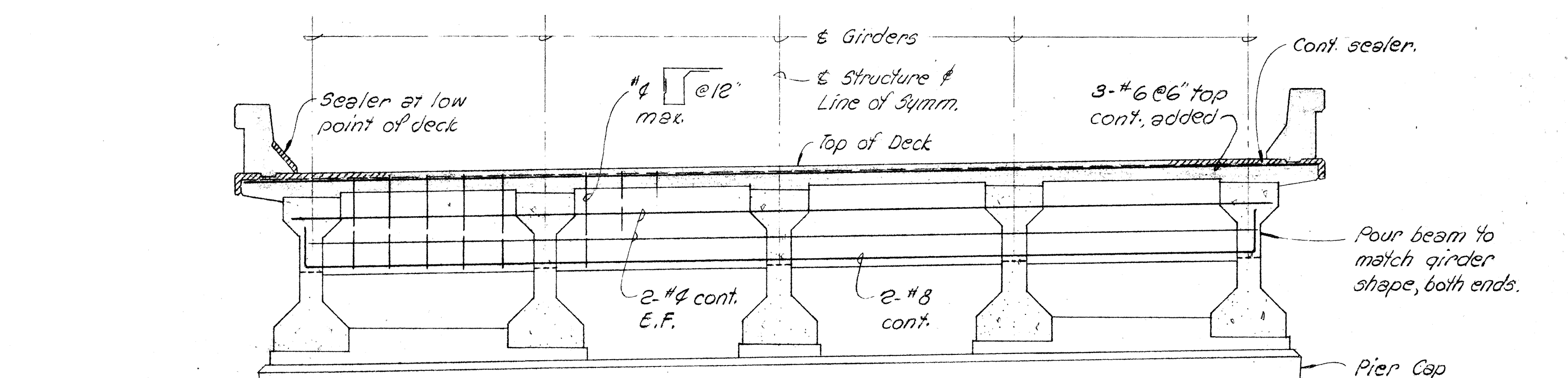
**PLAN BELOW DECK**  
 Not to Scale

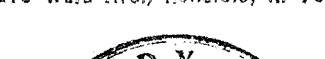
**ELEVATION**  
 Not to Scale

**SECTION ALONG & OF PRESTR. GIRDER**  
 Not to Scale

**SECTION BETWEEN PRESTR. GIRDERS**  
 Not to Scale

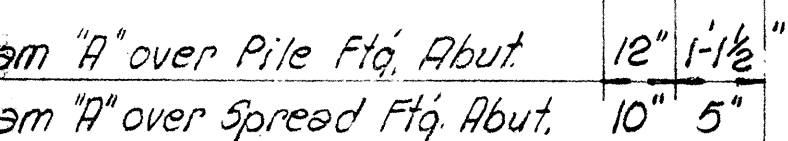
**Typical Details ~ Beam Over Fixed Pier Supports**



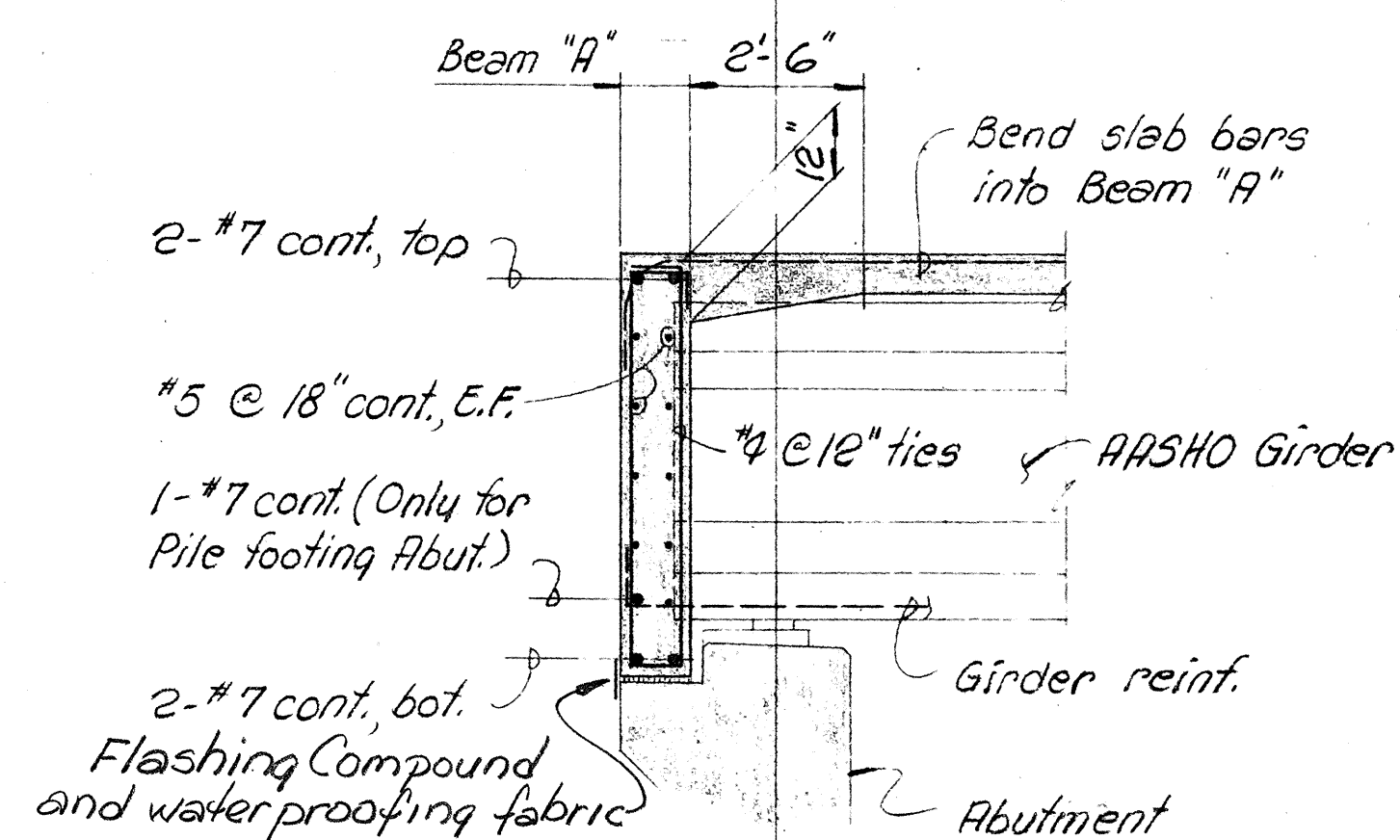
|                                                                                                                                                                    |                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;"><u>TYPICAL SECTION</u><br/>N.T.S.</p> <p style="text-align: center;"><u>TYPICAL DETAILS - BEAM OVER EXPANSION PIER SUPPORTS</u></p> |  | <p style="text-align: center;"><u>TYPICAL DETAIL</u></p> <p style="text-align: center;">BEAM OVER FIXED &amp; EXPANSION PIER<br/>SUPPORTS &amp; DECK CONSTRUCTION JOINT</p> <p style="text-align: center;">WAI'AWA INTERCHANGE<br/>F.A.I. Proj. No. I - HI - 1 (75):8</p> <p style="text-align: center;">Scale: As shown      Date: JUNE, 1969</p> <p style="text-align: center;"><b>SHEET No. 55 OF 16 SHEETS</b></p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 1-HI-1(75):8       | 1969        | 128       | 181          |



PLAN SECTION

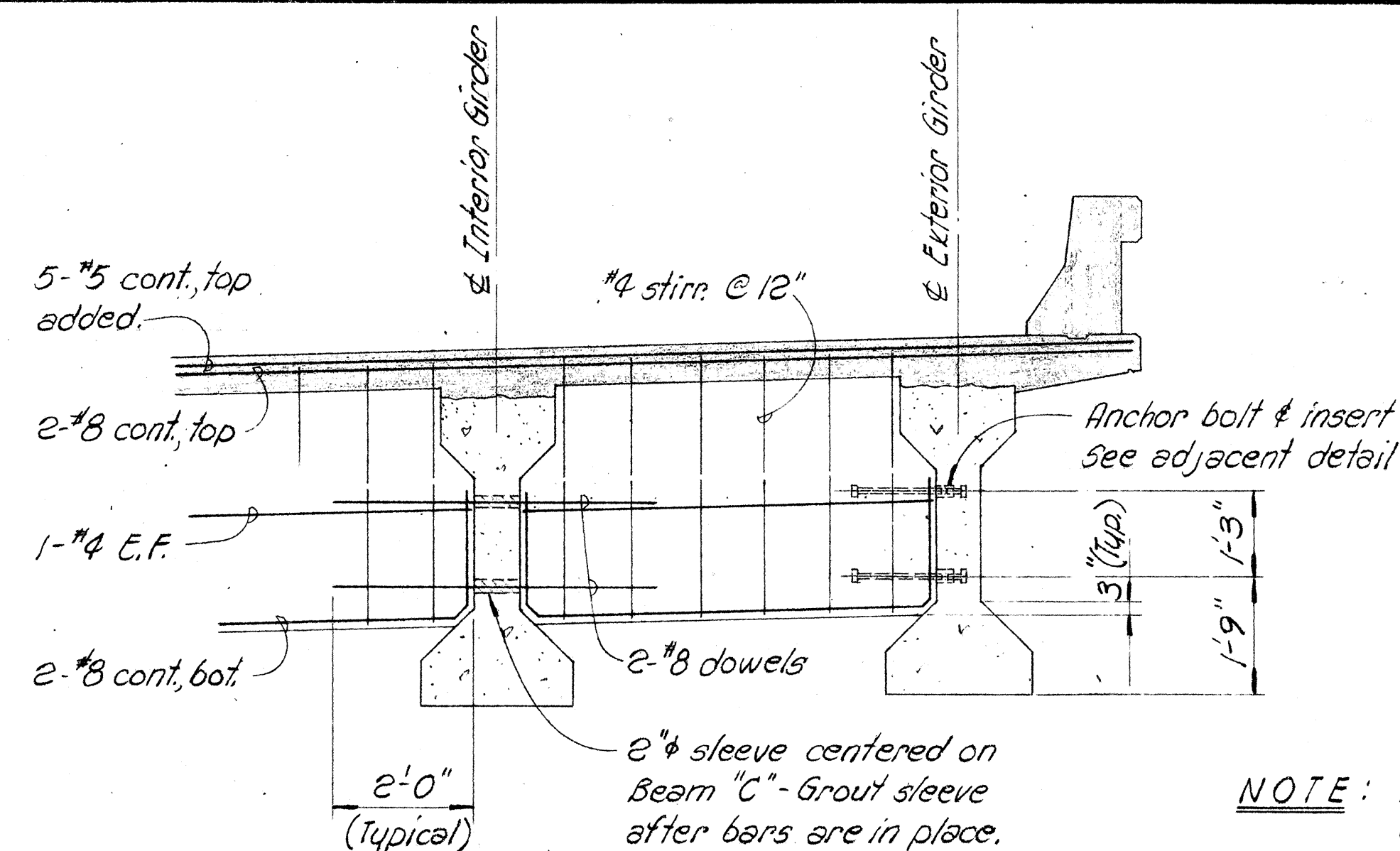


Note: For details & dimensions not shown see respective Abut. sections.

SECTION

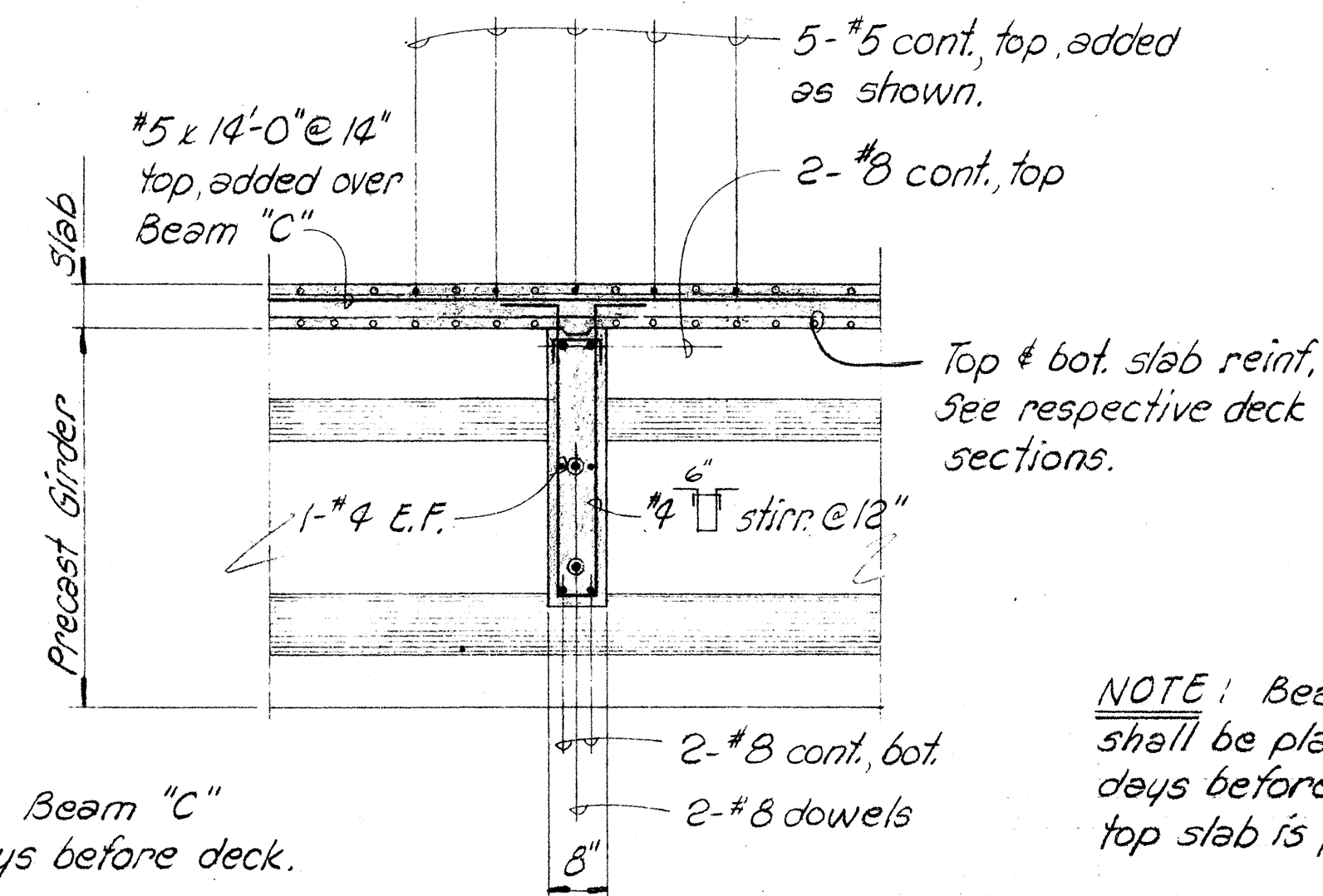
BEAM "A" DETAILS

Scale:  $3/8" = 1'-0"$



## ELEVATION

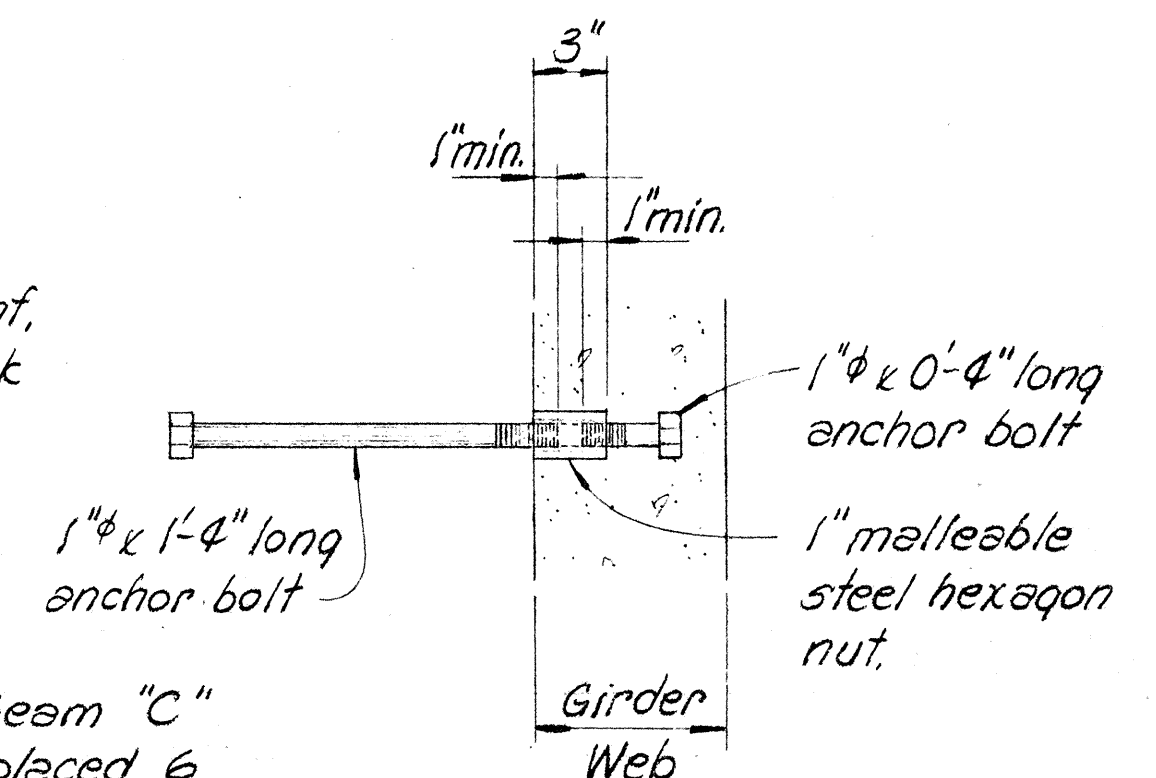
Scale:  $\frac{1}{2}'' = 1'-0''$



SECTION

Scale:  $\frac{1}{2}" = 1'-0"$

NOTE: Pour Beam "C"  
6 days before deck.

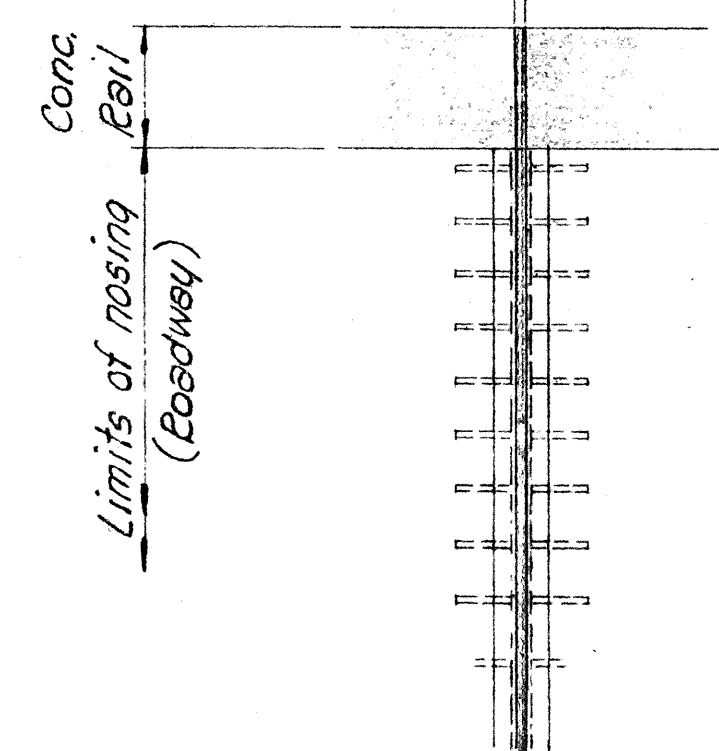


INSERT DETAIL

Scale:  $1\frac{1}{2}'' = 1'-0''$

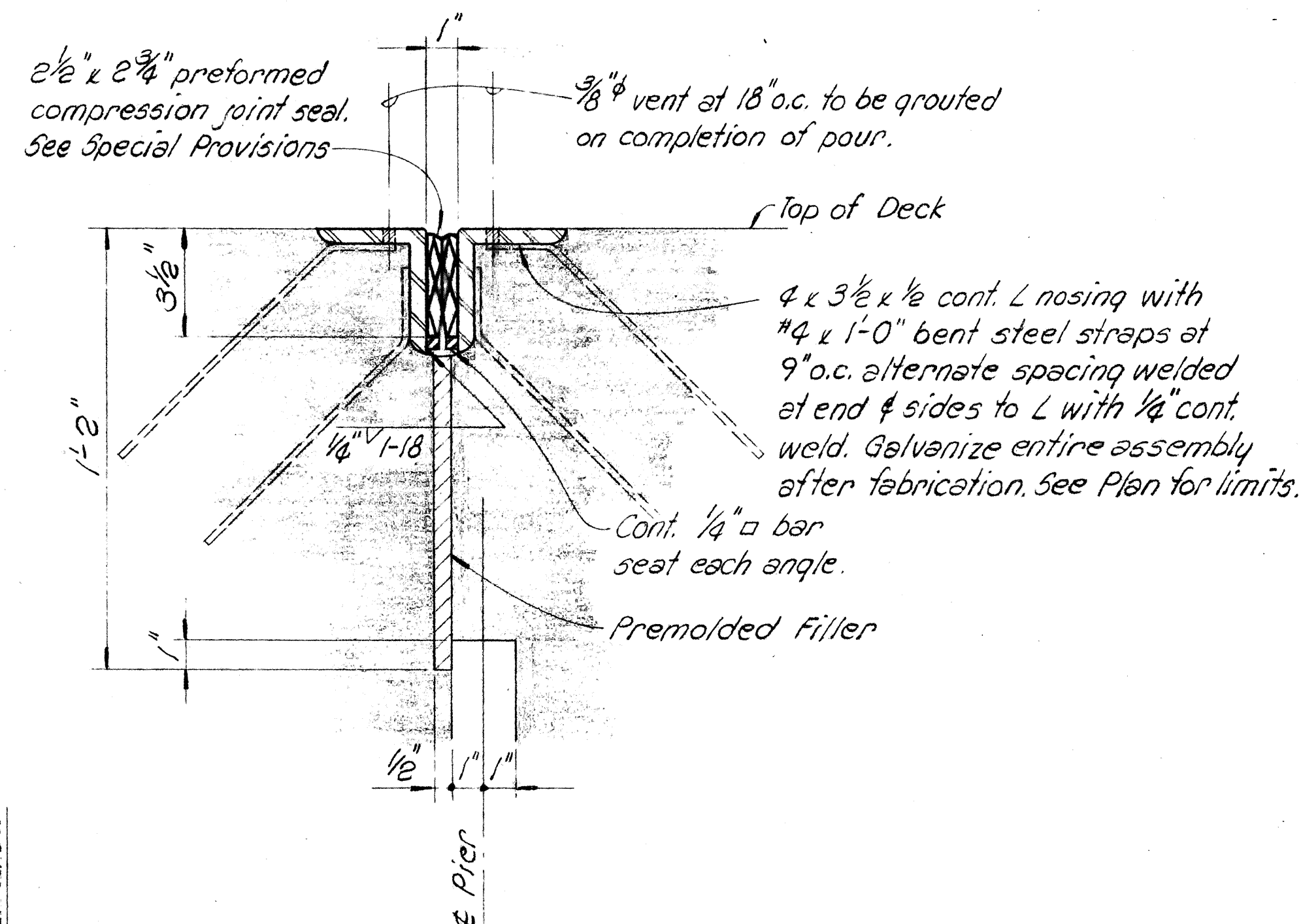
NOTE: Beam "C" shall be placed 6 days before the top slab is placed.

### Precompressed Bealer Expansion Joint



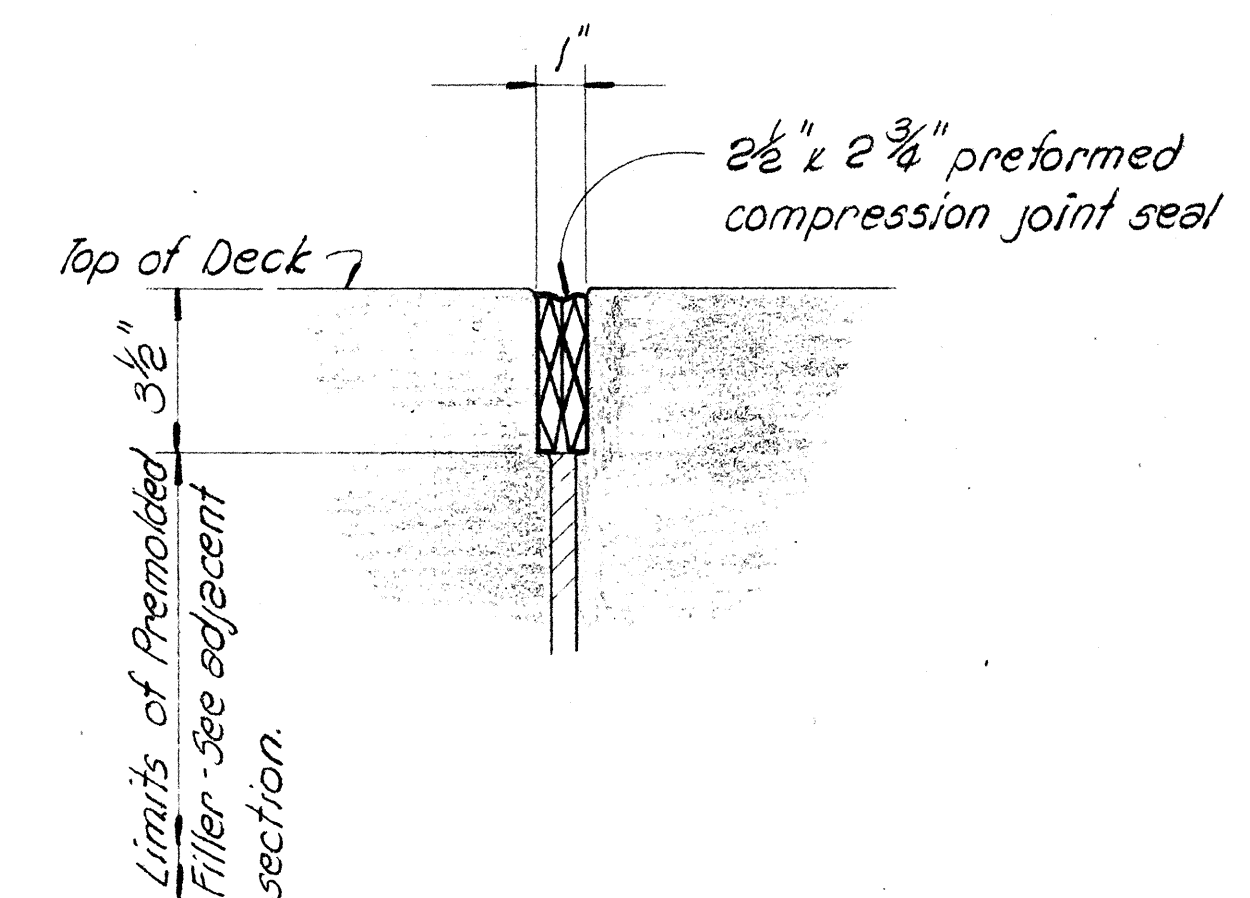
PART PLAN - DECK

Scale:  $3/8" = 1'-0"$



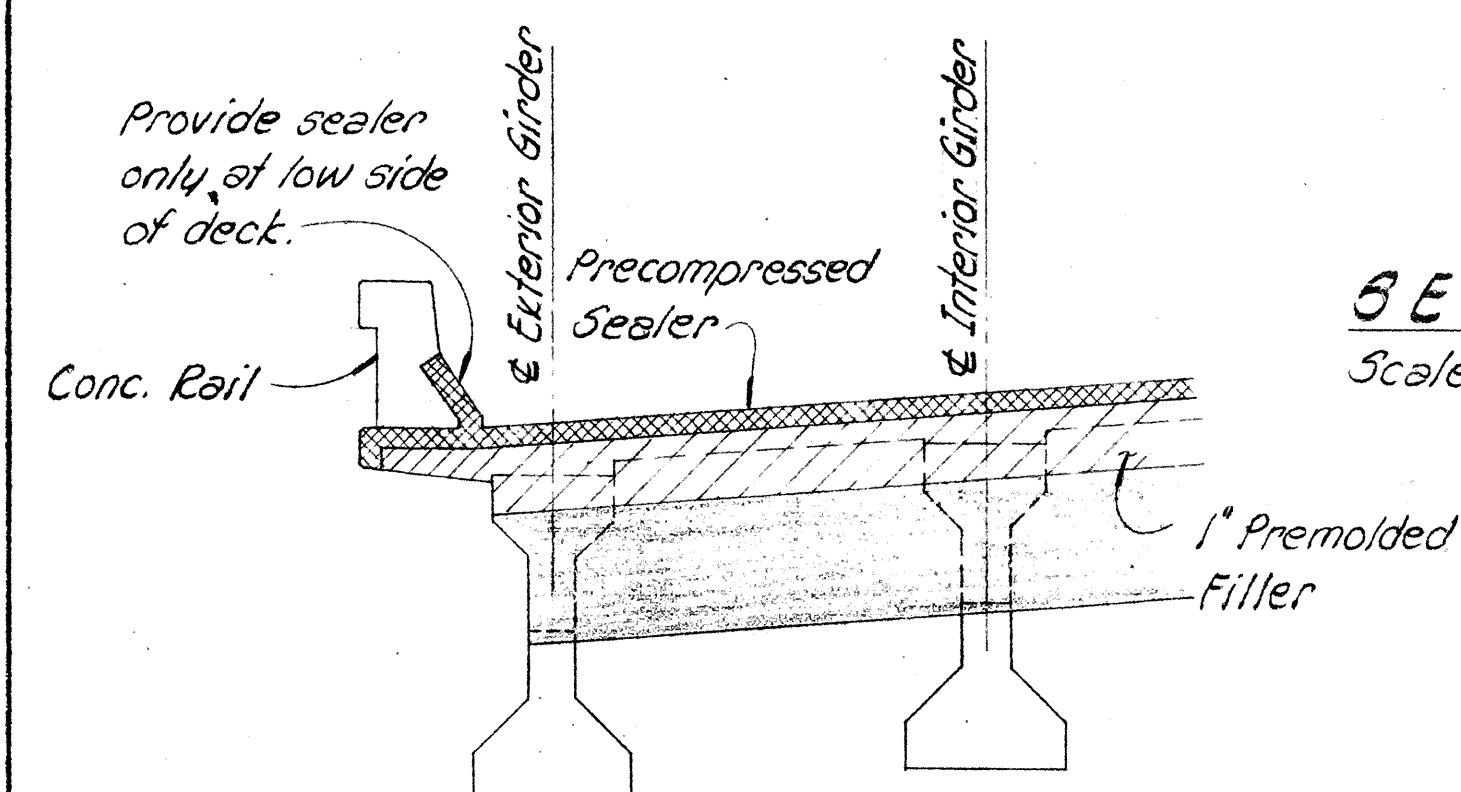
SECTION AT ROADWAY.

Scale: 3" = 1'-0"



SECTION BEYOND ROADWAY

Scale: 3" = 1'-0"



SECTION ALONG JOINT

Scale:  $3/8" = 1'-0"$

## DECK EXPANSION JOINT DETAILS

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TYPICAL DETAIL  
BEAM "A", BEAM "C" &  
DECK EXPANSION JOINT DETAILS

WAIAWA INTERCHANGE  
F.A.I. Proj. No. I-HI-1 (75):8

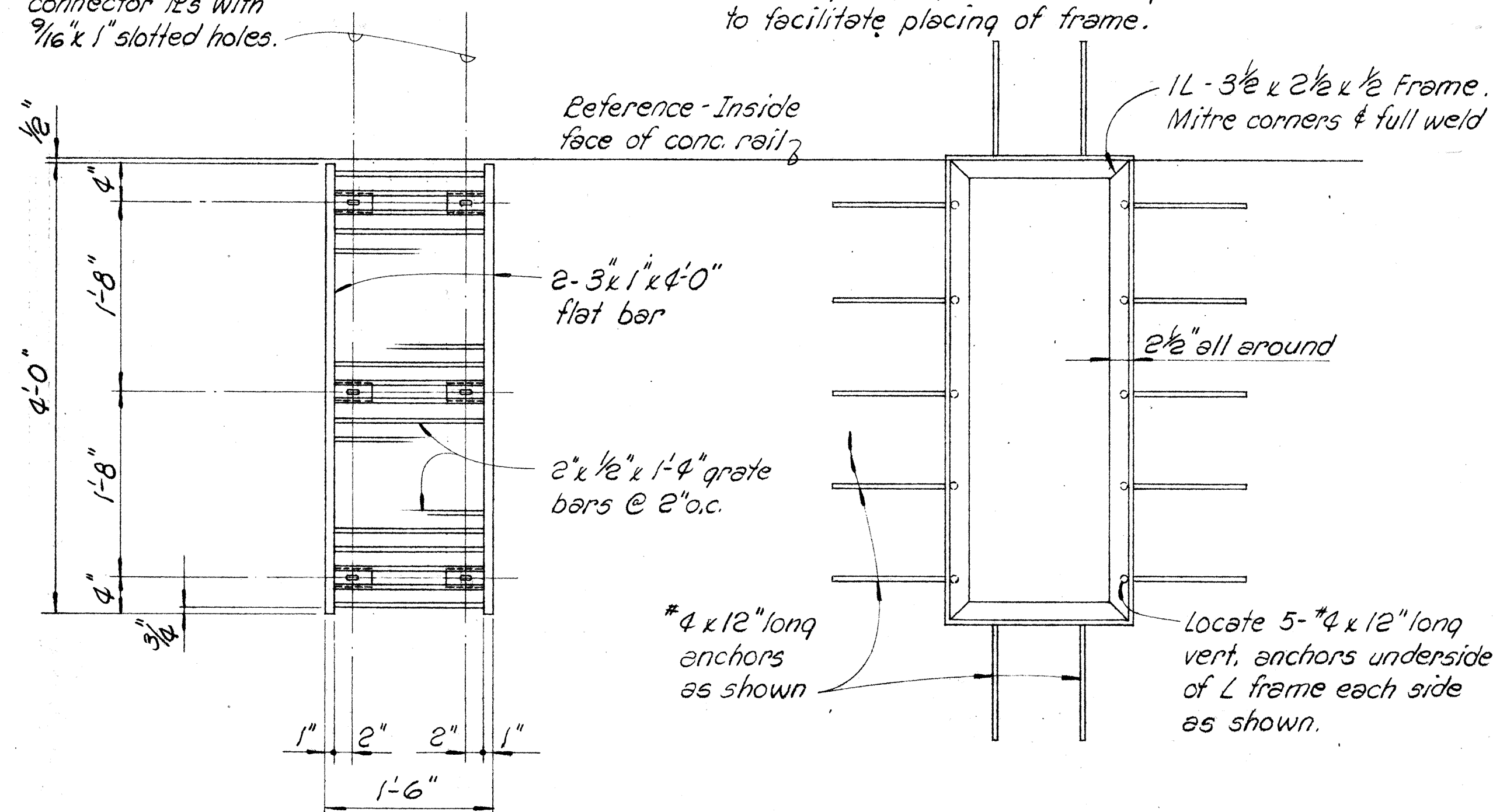
Scale: As shown Date: JUNE, 1969

**SHEET No. 56 OF 16 SHEETS**



6-2"x4"x0'-4" grate connector 12's with 3/16"x1" slotted holes.

NOTE: Shop drawings for frame & grating will be required. Leveling bolts & nuts shall be provided with frame to facilitate placing of frame.

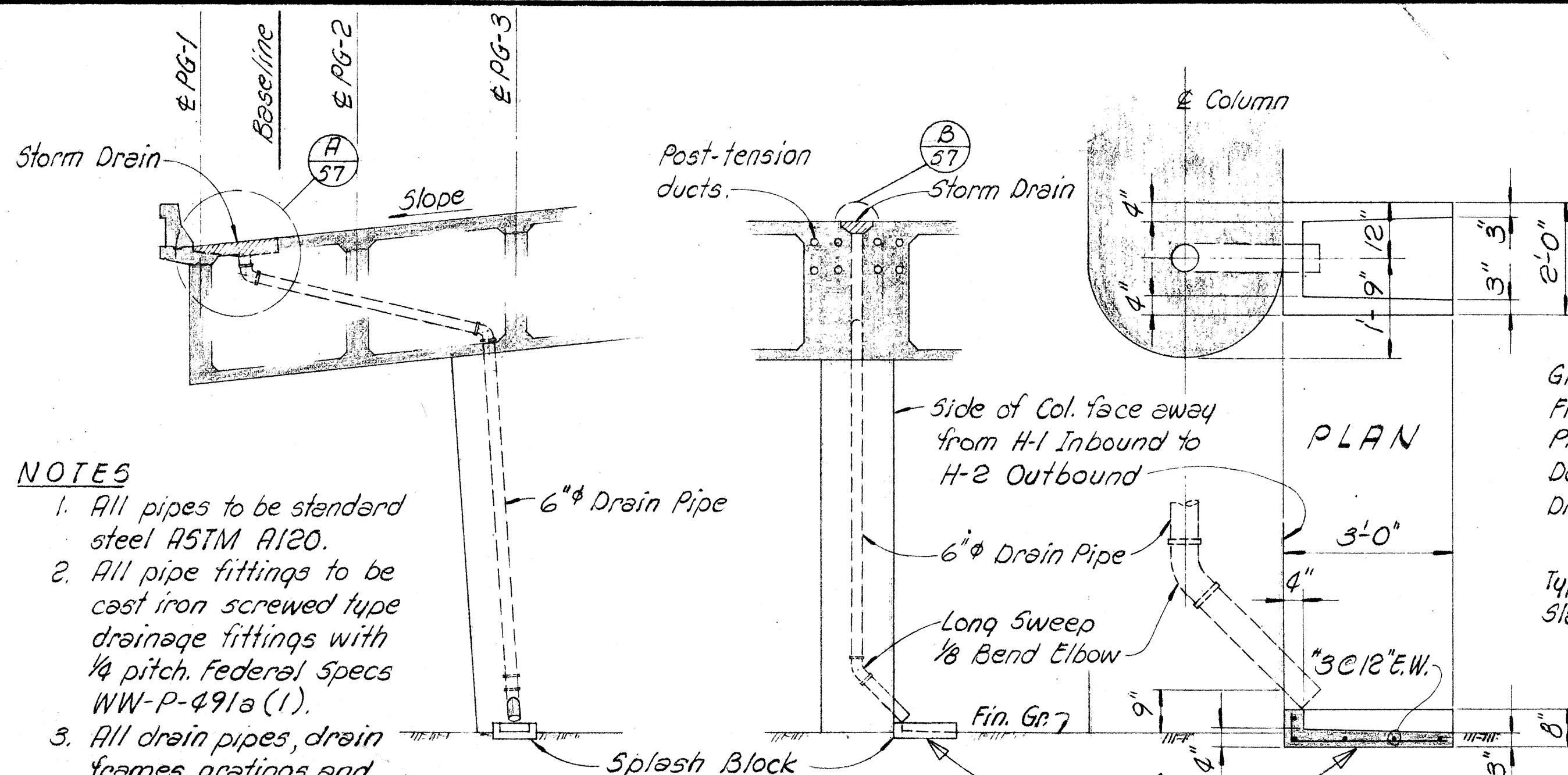


PLAN - GRATING

PLAN - FRAME

# TYPICAL DECK DRAIN GRATE & FRAME

Scale: 1" = 1'-0"



## NOTES

1. All pipes to be standard steel ASTM A120.
2. All pipe fittings to be cast iron screwed type drainage fittings with 1/4 pitch. Federal Specs WW-P-491a (1).
3. All drain pipes, drain frames, gratings and splash blocks to be incidental to "Concrete in Bridge" and will not be paid for separately.

SIDE VIEW

END VIEW

## STORM DRAIN LEADER

Scale: 3/16" = 1'-0"

SECTION

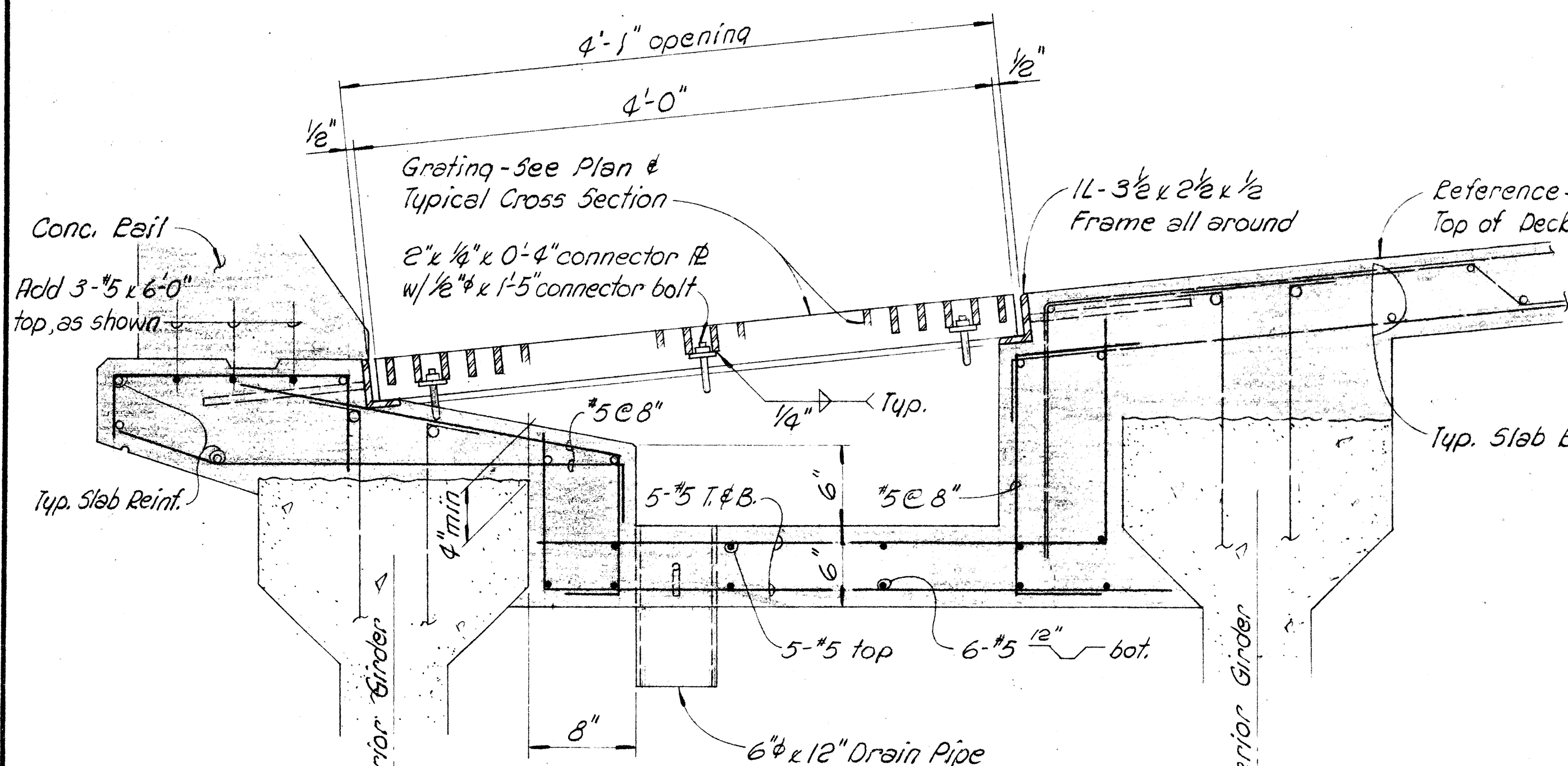
## SPLASH BLOCK

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

DETAIL B

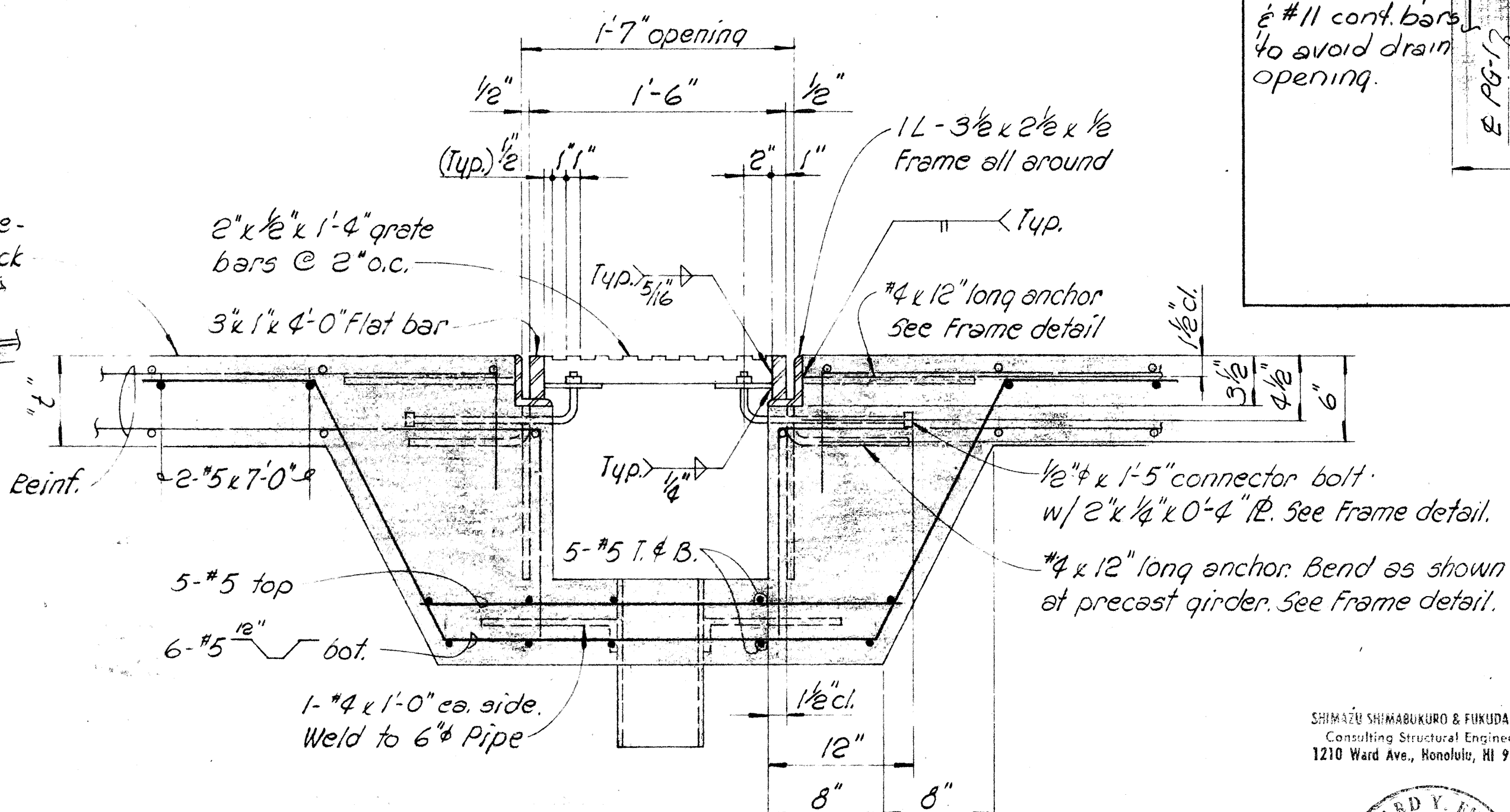
Scale: 1" = 1'-0"

# POST-TENSIONED BOX GIRDER DECK STORM DRAIN GRATE & FRAME DETAILS



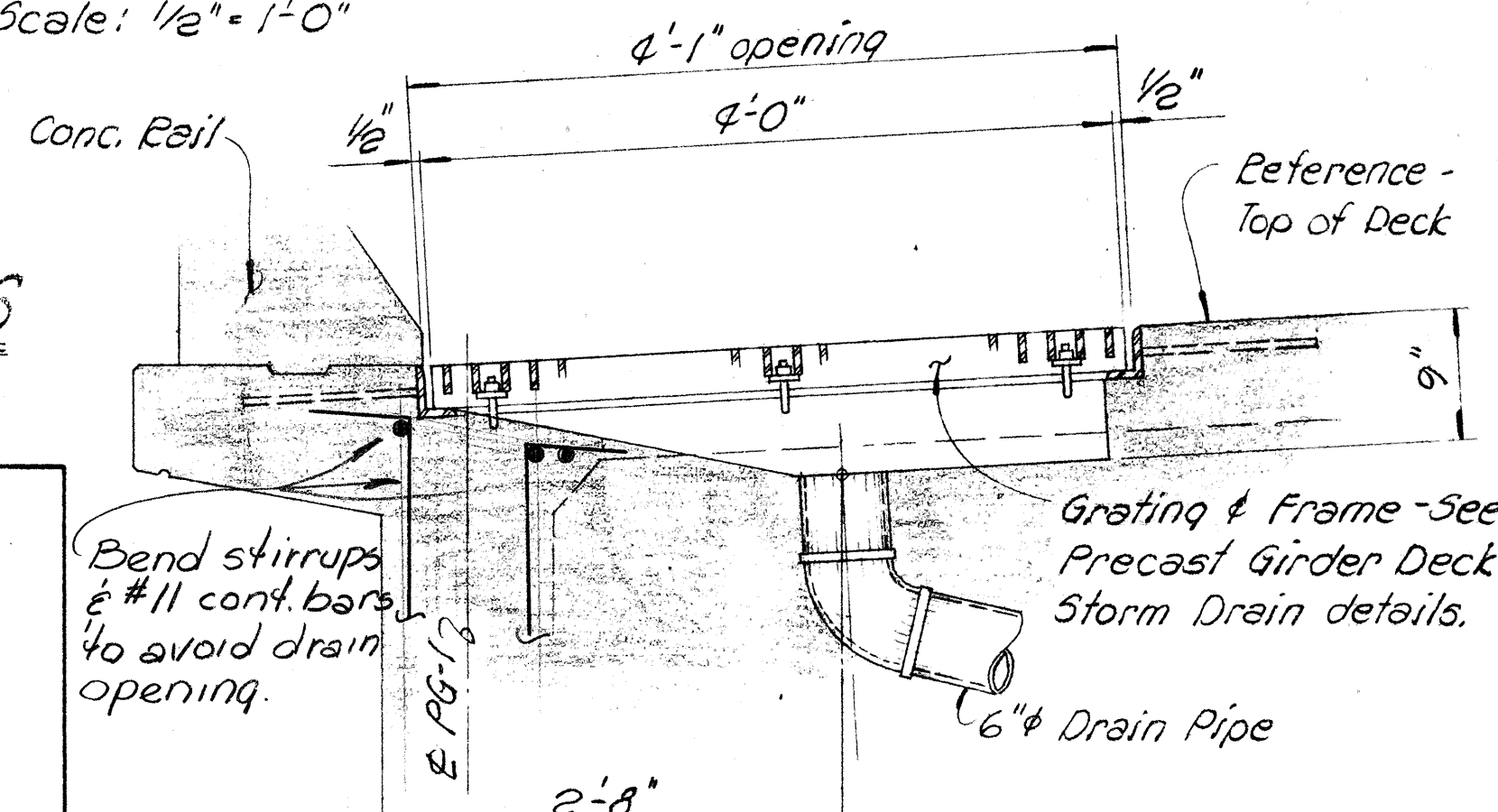
TYPICAL LONGITUDINAL SECTION

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



TYPICAL CROSS SECTION

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



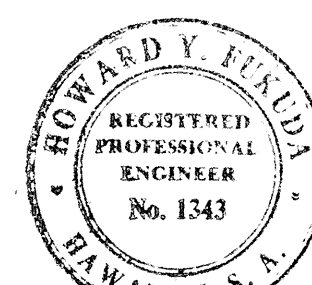
DETAIL A

Scale: 1" = 1'-0"

## NOTES

1. Steel frame & grating shall be designed to carry A H20-44 loading.
2. The Contractor may substitute a similar grating of an equivalent area subject to the approval of the Engineer. See Special Provisions.
3. Drain pipe, frame & grating to be incidental to concrete & shall not be paid for separately.
4. Entire grating assemblage, bolts & anchors to be hot dipped galvanized.

SHIMAZU SHIMABUKURO & FUKUDA, INC.  
Consulting Structural Engineers  
1210 Ward Ave., Honolulu, HI 96814



This work was prepared by me or under my supervision.  
Howard Y. Fukuda

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

## TYPICAL DETAIL STORM DRAIN DETAILS

WAIKAWA INTERCHANGE  
F.A.I. Proj. No. I-HI-1(75):8

Scale: As shown Date: JUNE, 1969

SHEET No. 57 OF 16 SHEETS



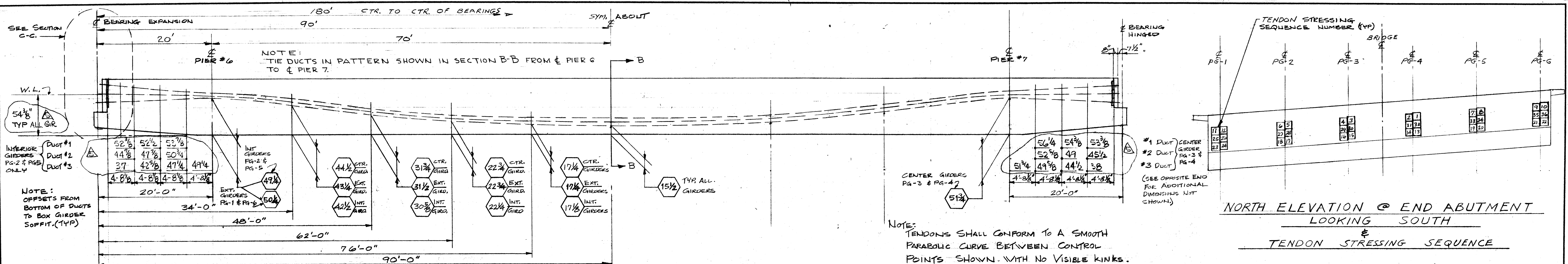
REVISED: 10 DEC. 69

130

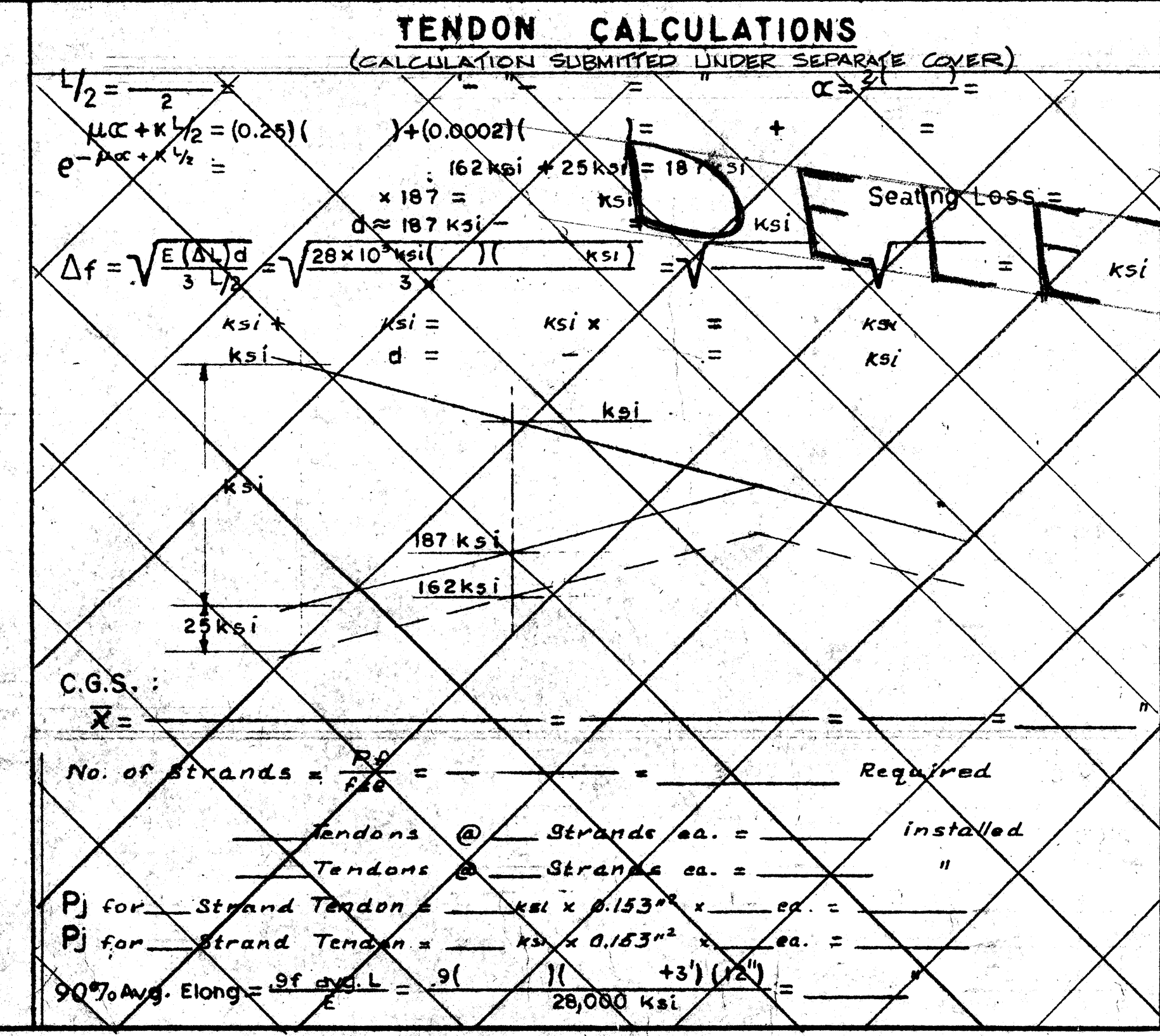
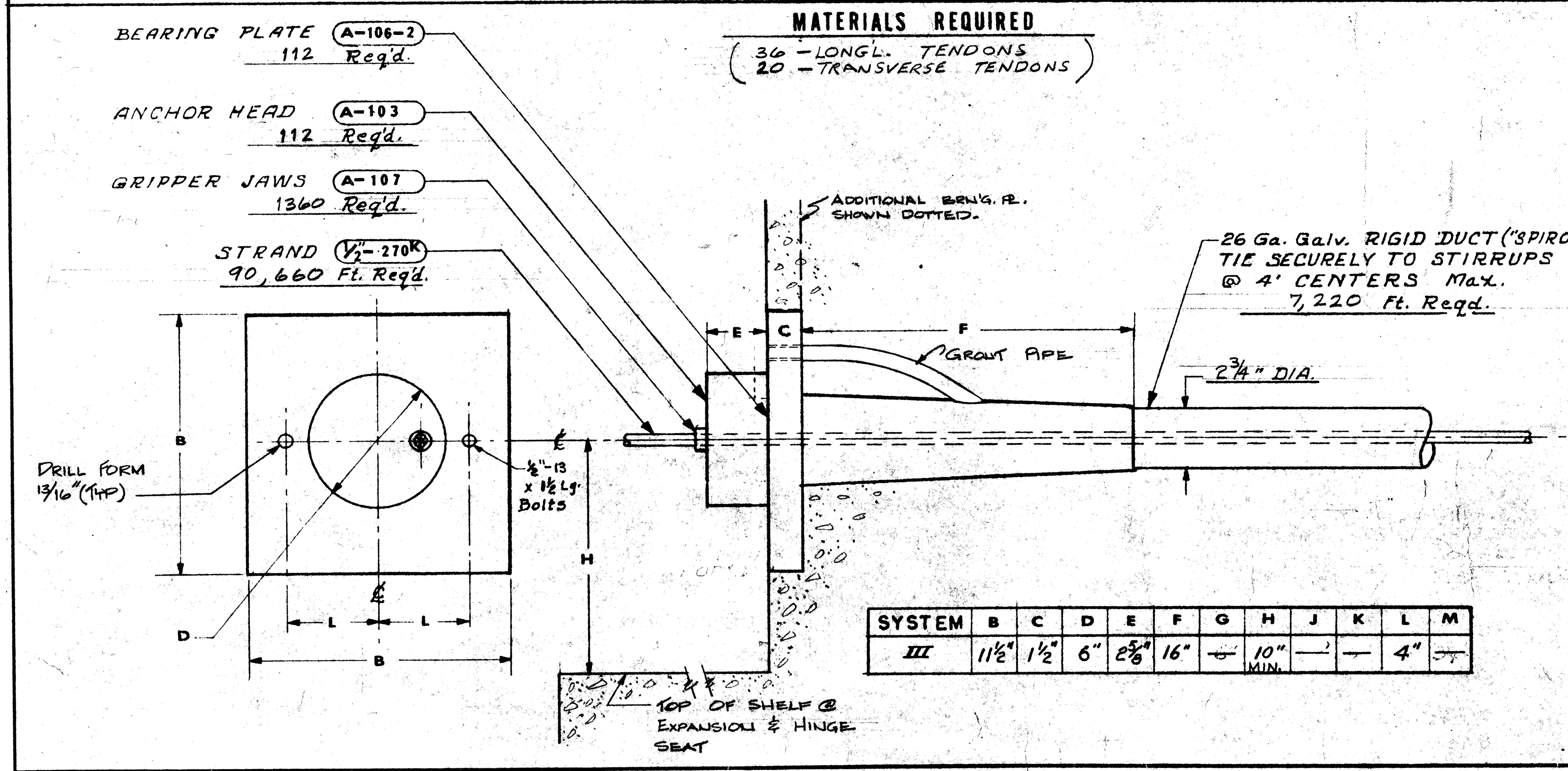
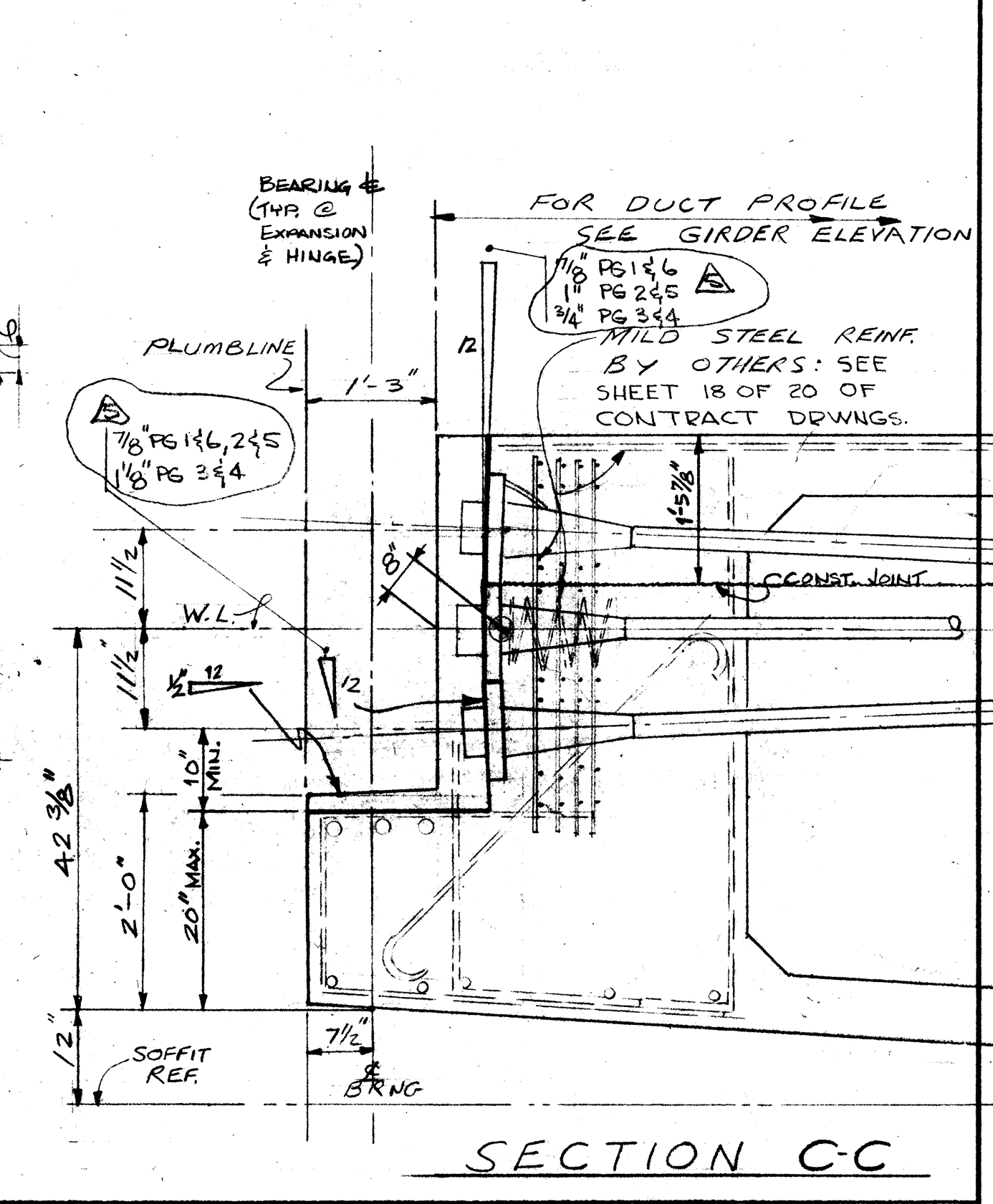
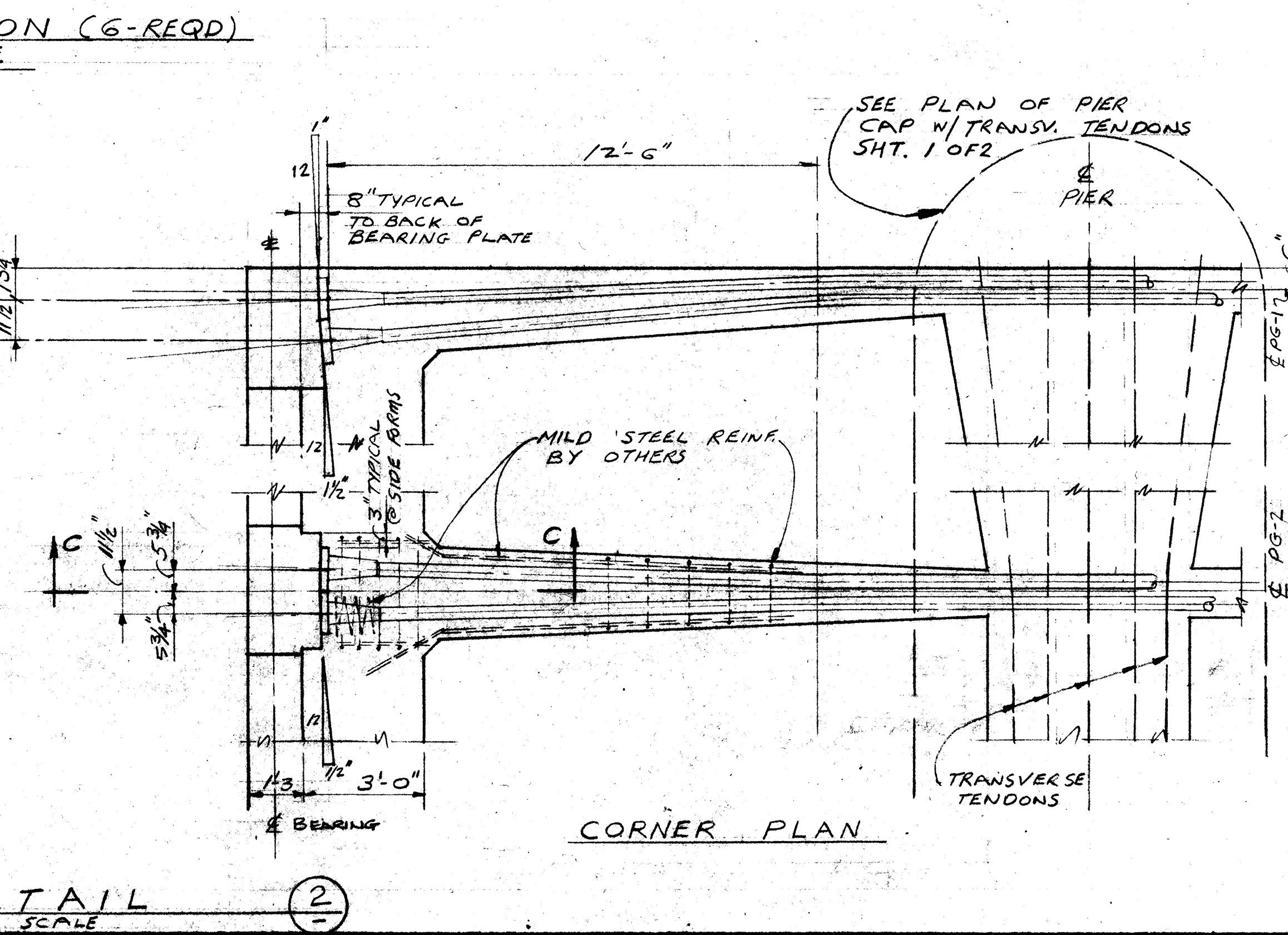
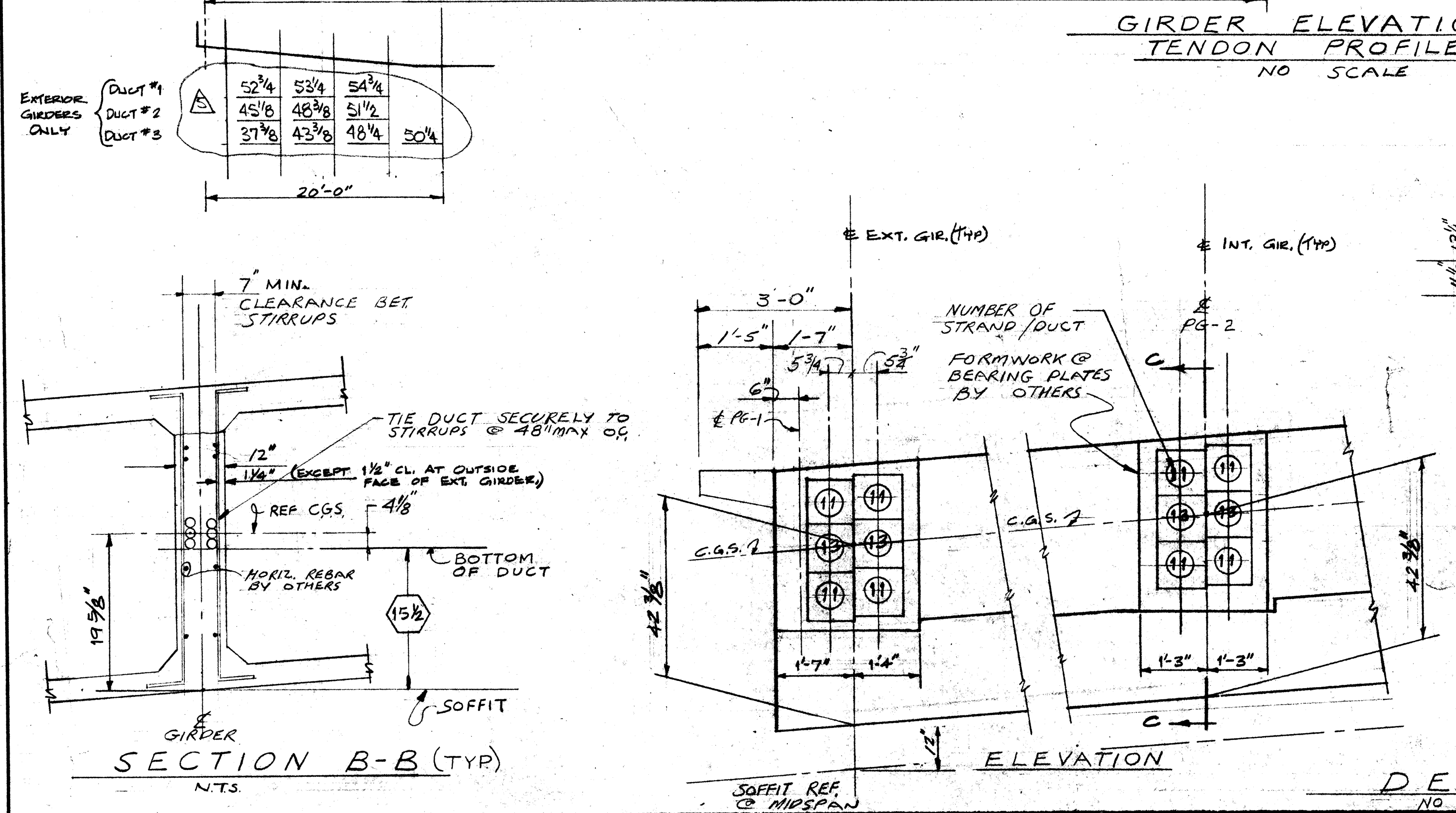








NORTH ELEVATION @ END ABUTMENT  
LOOKING SOUTH  
TENDON STRESSING SEQUENCE



**GENERAL NOTES**

(SEE DWG. NO. 1527-SHT. 1 OF 2)

**PRESSURE-RESISTING STEEL**

1/2" DIA. 7 WIRE STRAND

ULTIMATE STRENGTH =  $f_s = 41.3 \text{ ksi} \approx 270.0 \text{ ksi}$

MAX. JACKING FORCE (0.75  $f_s$ ) =  $31.0 \text{ ksi} \approx 202.5 \text{ ksi}$

MAX. INITIAL FORCE (0.70  $f_s$ ) =  $28.9 \text{ ksi} \approx 189.0 \text{ ksi}$

MAX. WORKING FORCE (0.60  $f_s$ ) =  $24.8 \text{ ksi} \approx 162.0 \text{ ksi}$

All tendons are placed in rigid metal duct immediately prior to stressing and grouting.

**STANDARD STRESSING SEQUENCE:**

Stress no more than one half tendons in one girder before an equal number of tendons are stressed in adjacent girder. At no time during stressing operation will more than one sixth of prestressing force be eccentric about 1/2 of bridge.

**L. R. YEGGE CO.**  
LOS GATOS, CALIF.

PORTLAND  
DATE 3/15/71  
DRAWN PJE  
JOB NO. 702

**POSTENSIONING DETAILS**

FAI PROJECT NO I-HI-1(75)-8

**STRUCTURE NO 15**  
**WAIWA INTERCHANGE**  
ISLAND OF OAHU STATE OF HAWAII

REV 7/19/71 DER 5/22/71 CORRECTION  
10/2/71 GENERAL  
12/1/71 GENERAL  
11/22/72 REVISE LVL OF DUCT  
12/16/72 REVISE CANTILEVER OFFSETS & BOLTS

SCALE: NOTED  
DWNG. NO. 1527  
SHEET 2 OF 2



# REVISION

Jan. '67  
Feb. '67  
Apr. '67  
June '68  
Apr. '69  
May '69

## GENERAL NOTES

Elastomeric Pads: Top & 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.

- The Contractor shall verify the location of all existing utility lines and notify the respective owners before commencing work of excavation.
- All concrete shall be Class A-1 unless otherwise noted.
- Clearance for reinforcing bars shall be as follows, unless otherwise noted:
  - 1-1/2" for stirrups of beams & pier caps.
  - 2" for ties of columns.
  - 2" for formed walls.
  - 3" for footings.
- Concrete seats receiving steel plates, lead plates or neoprene pads shall be poured monolithically with supporting structures & top surfaces of the concrete seats shall be finished with a steel trowel to a smooth level at the elevation shown on the plans.
- Reinforcing shall be detailed in accordance with A.C.I. Manual of Standard Practice for Detailing Reinforced Concrete Highway Structures 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.
- Splices of reinforcing - See Special Provisions.

Waterstop to have 5 or more pairs of raised ribs to provide 0.1 sq. in. min. rib cross-section area on each half of the waterstop. Height of ribs to be 3/32" min.

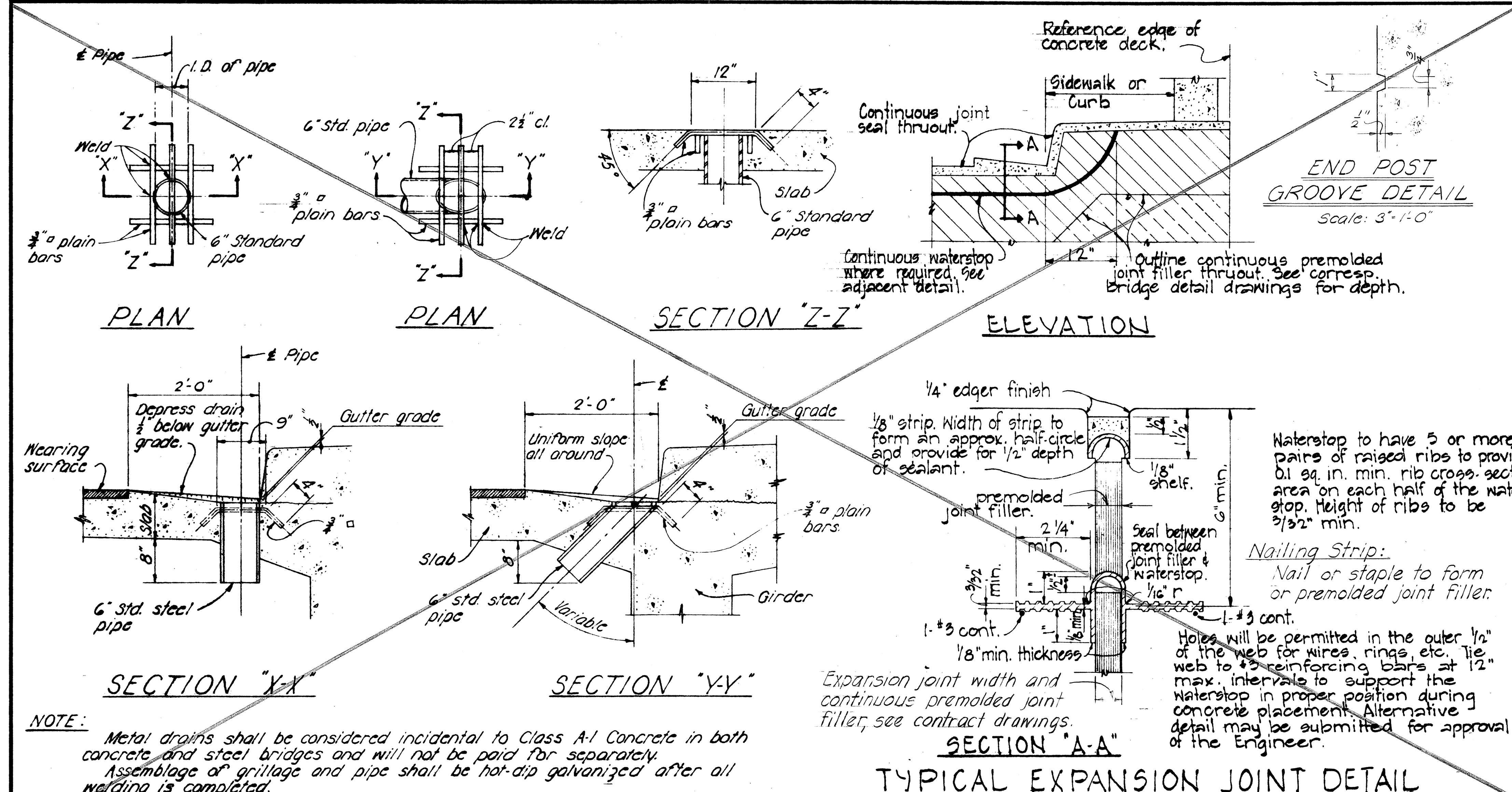
### Nailing Strip:

Nail or staple to form or premolded joint filler.

Holes will be permitted in the outer 1/2" of the web for wires, rings, etc. Tie web to #3 reinforcing bars at 12" max. intervals to support the waterstop in proper position during concrete placement. Alternative detail may be submitted for approval of the Engineer.

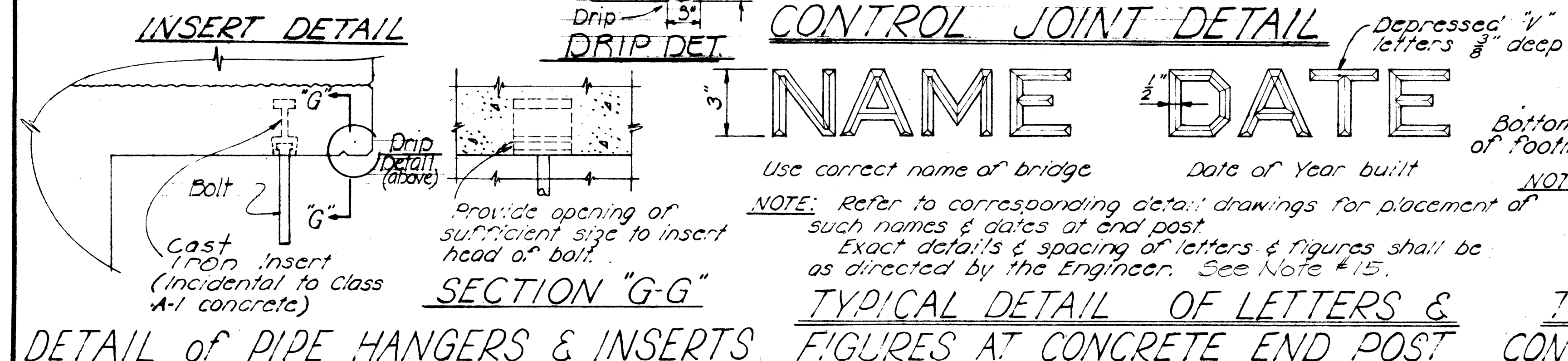
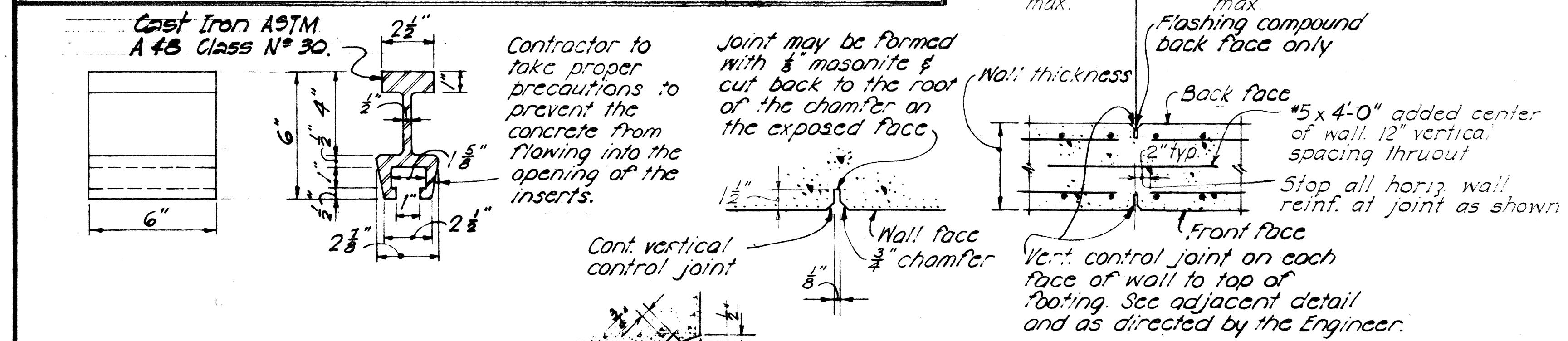
Expansion joint width and continuous premolded joint filler, see contract drawings.

## TYPICAL EXPANSION JOINT DETAIL



**NOTE:** Metal drains shall be considered incidental to Class A-1 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.

## TYPICAL DRAINAGE DETAILS



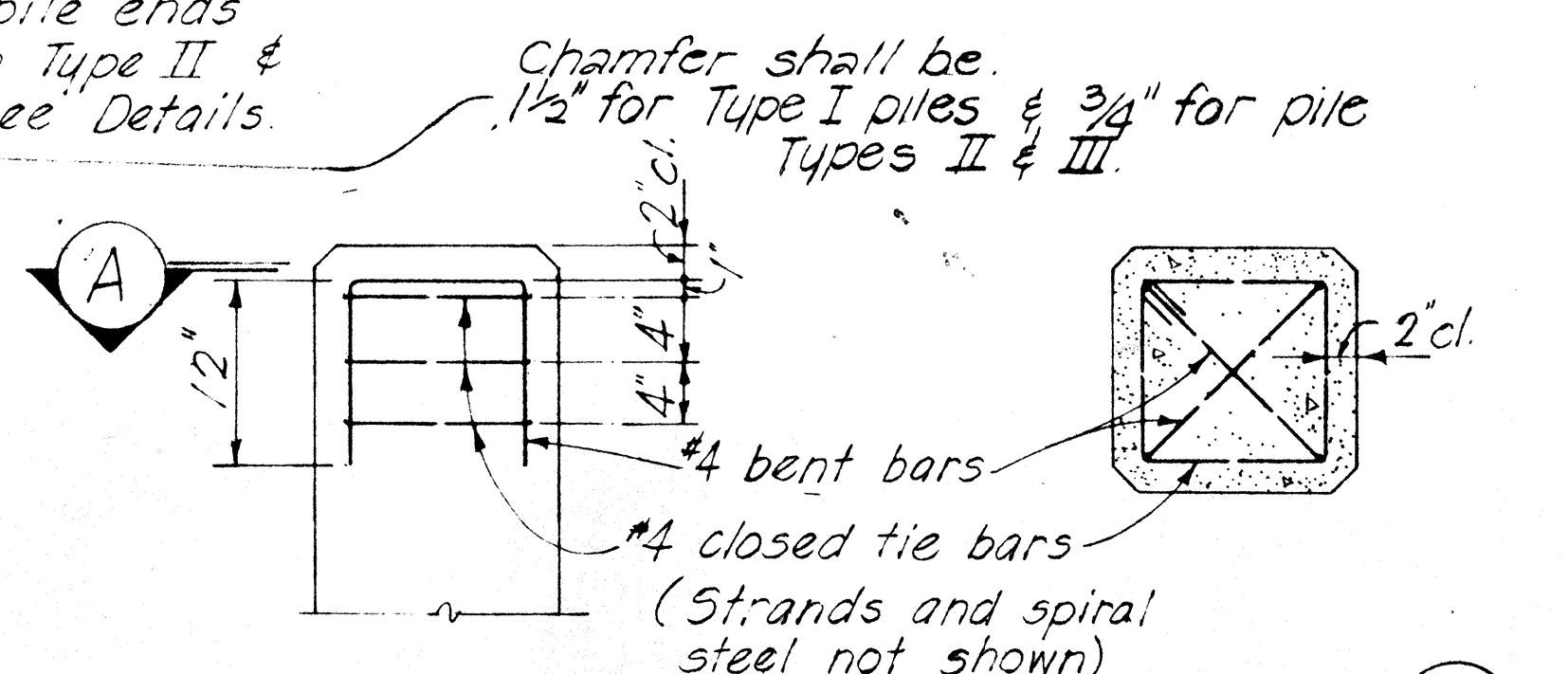
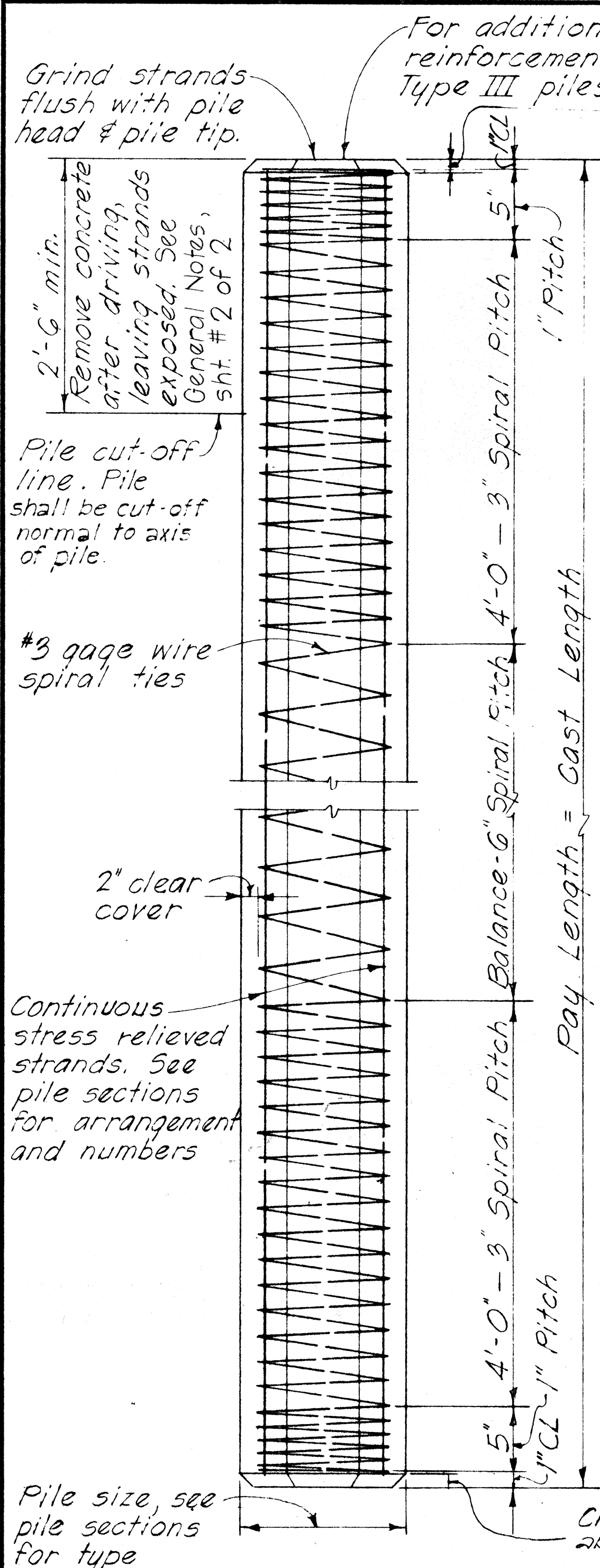
## DETAIL OF PIPE HANGERS & INSERTS

## TYPICAL DETAIL OF LETTERS & FIGURES AT CONCRETE END POST

## TYPICAL EXCAVATION FOR CONTINUOUS FOOTING STEP-UP

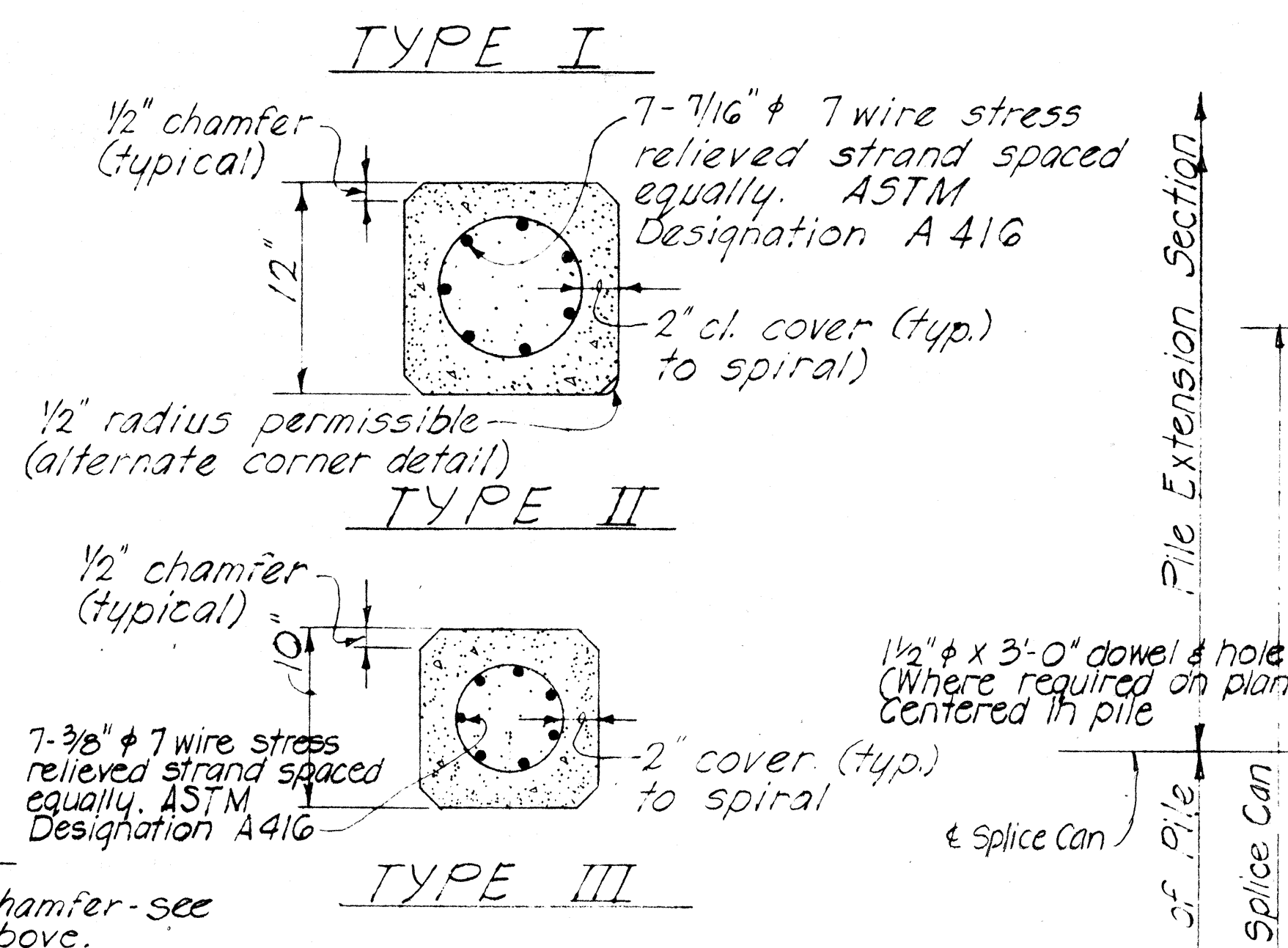
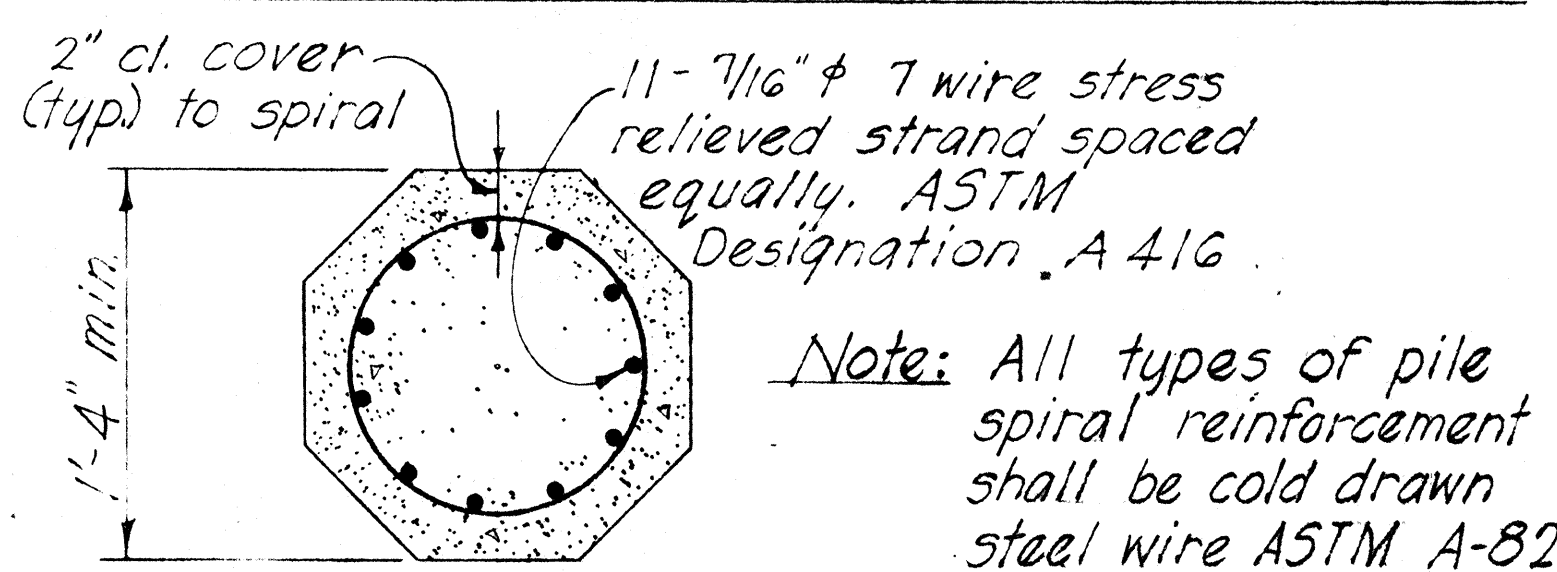
- Minimum spacing between parallel bars shall be 2 1/2 times the diameter of bars, but in no case shall the clear distance between the bars be less than 1 1/2 times the maximum size of the coarse aggregate.
- All dimensions relating to reinforcing are to centers of bars unless otherwise noted.
- Forms 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.
- 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".
- Standard Specifications.
- Concrete Finish - See Special Provisions.
- All welders and welding procedures shall be qualified according to the requirements of the Special Provisions.
- Gothic letters and figures approximating dimensions shown will be acceptable if approved by the Engineer.



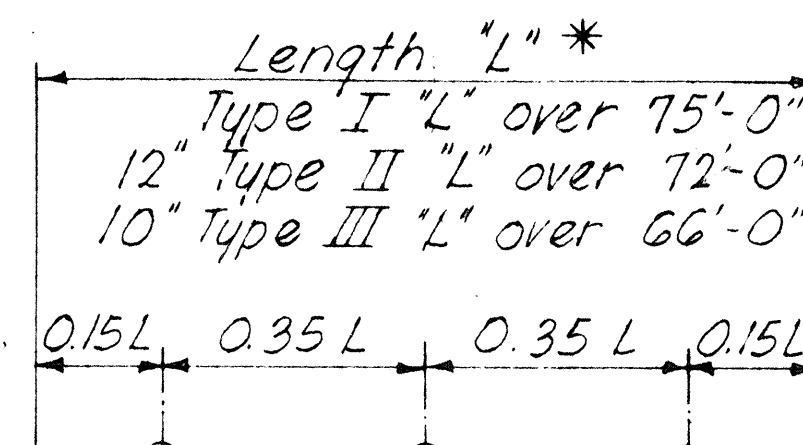
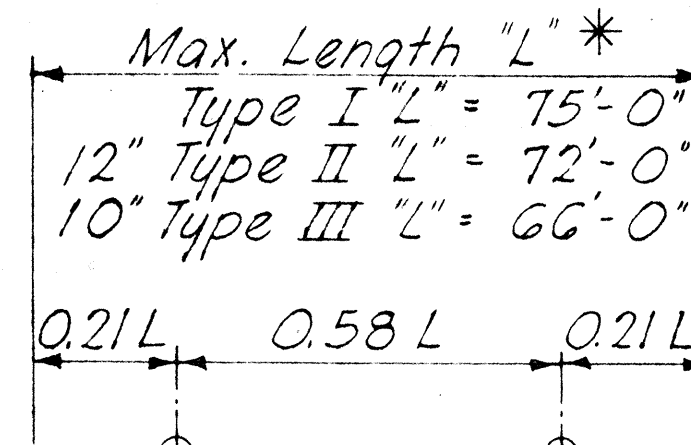
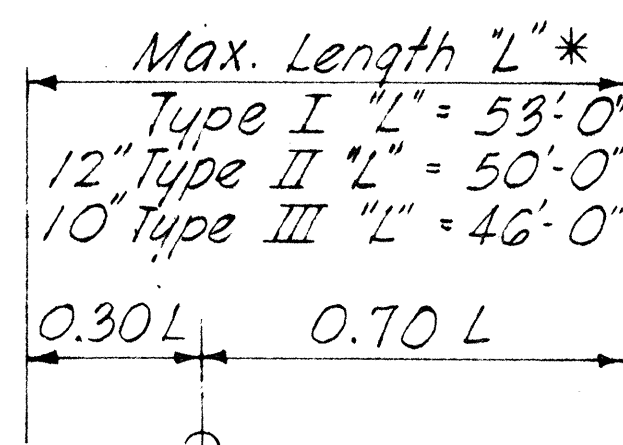


## PART ELEVATION SECTION A

### TYPICAL ADDED REINFORCEMENT PILE ENDS - TYPE II & III ONLY



## TYPICAL SECTIONS THRU PILES



\*The length "L" is the distance end to end of pile.

1 POINT PICK-UP

2 POINT PICK-UP

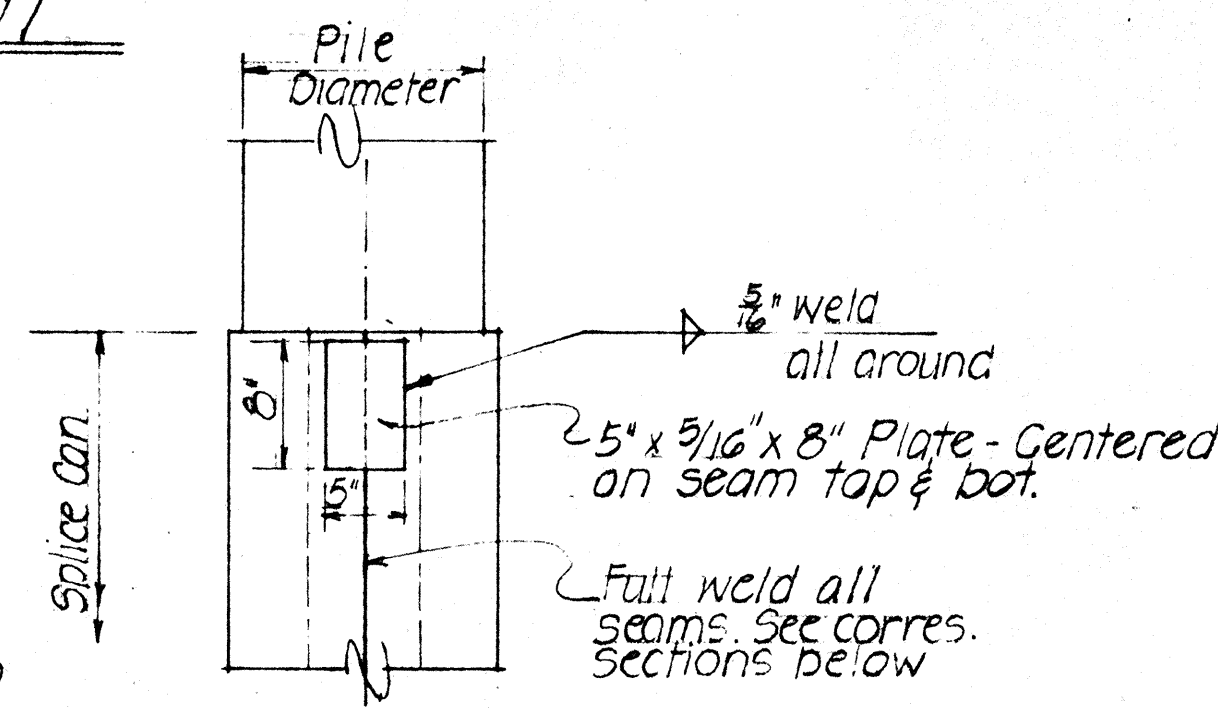
3 POINT PICK-UP

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 other pick-up points or any other method of pick-up shall be subject to approval by the Engineer.

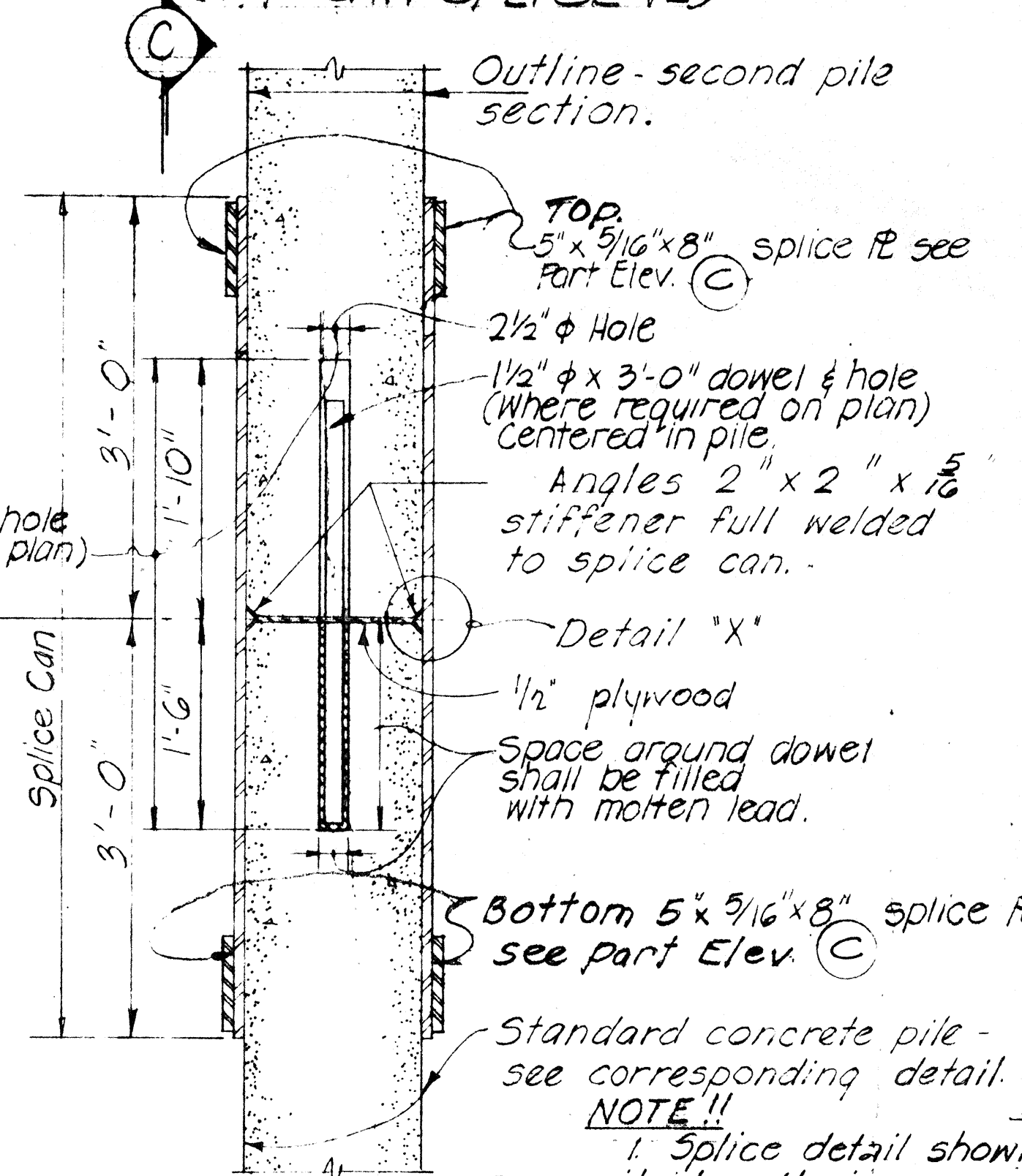
2'-6" min. unless otherwise directed by the Engineer. Remove concrete after driving, leaving reinf. exposed.

## NOTE:

Concrete in pile build-ups without driving shall be Class A Concrete. Concrete in pile build-ups with driving shall have a minimum compressive cylinder strength  $f'_c$  of 5000 p.s.i. at 28 days. Build-ups may be driven if the specimen of concrete from which the piles were poured develops a strength of at least 3500 p.s.i. but not earlier than 7 days.



## PART ELEV. (C) (TYP. CAN SPLICE RE)

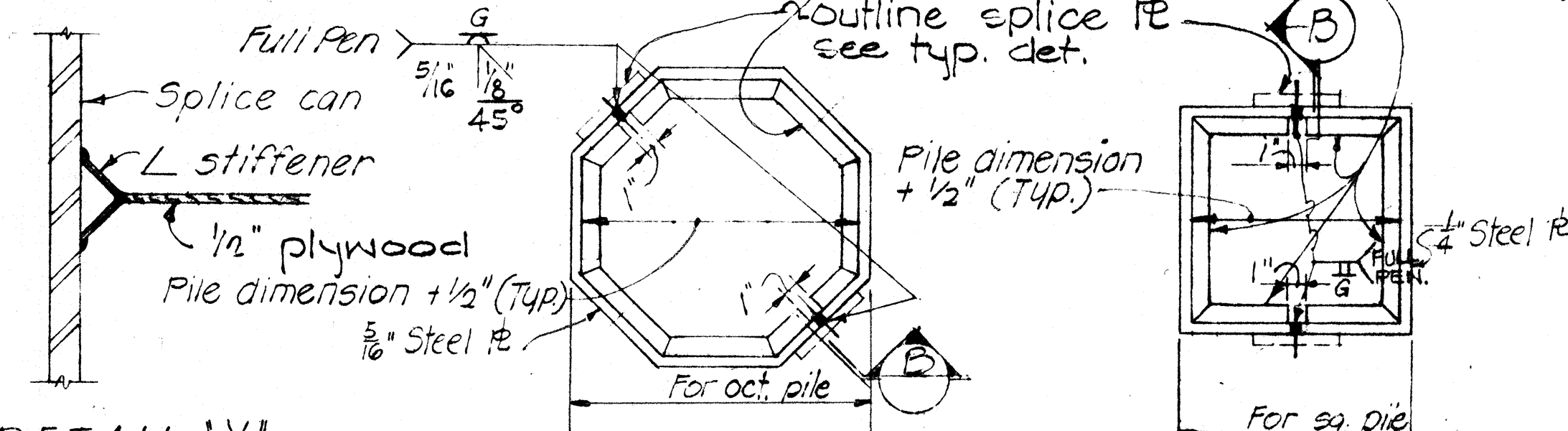


## SECTION (B)

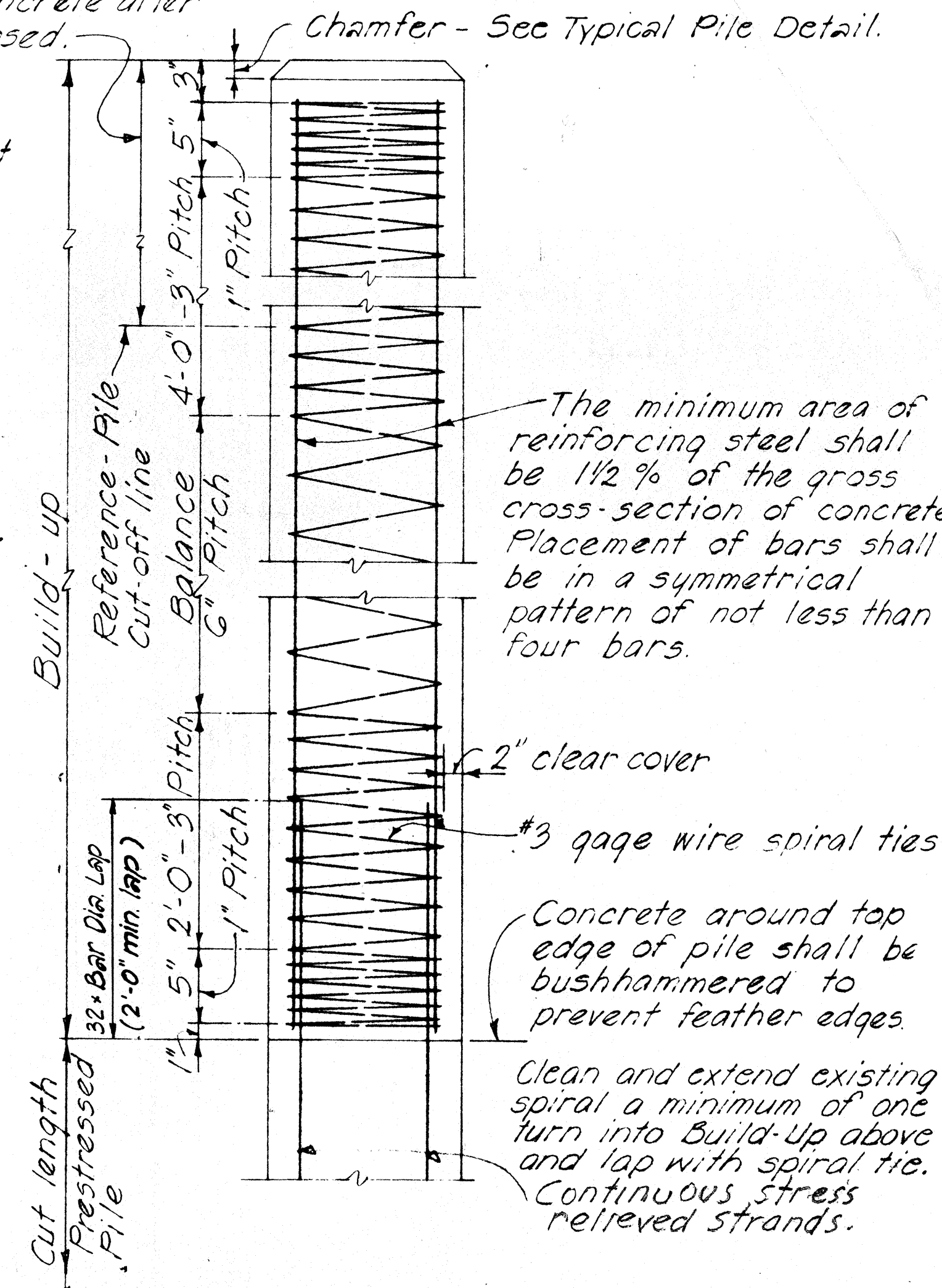
## TYPICAL PILE SPLICE DETAILS (FOR PRESTRESSED CONCRETE PILES WHEN CAST IN TWO OR MORE SECTIONS)

NOTE: 1. Splice detail shown above shall not be used except for pile length in excess of 100'-0" long. (See Specifications) 2. Structural steel for splice can shall be ASTM A-36.

## DETAIL "X"



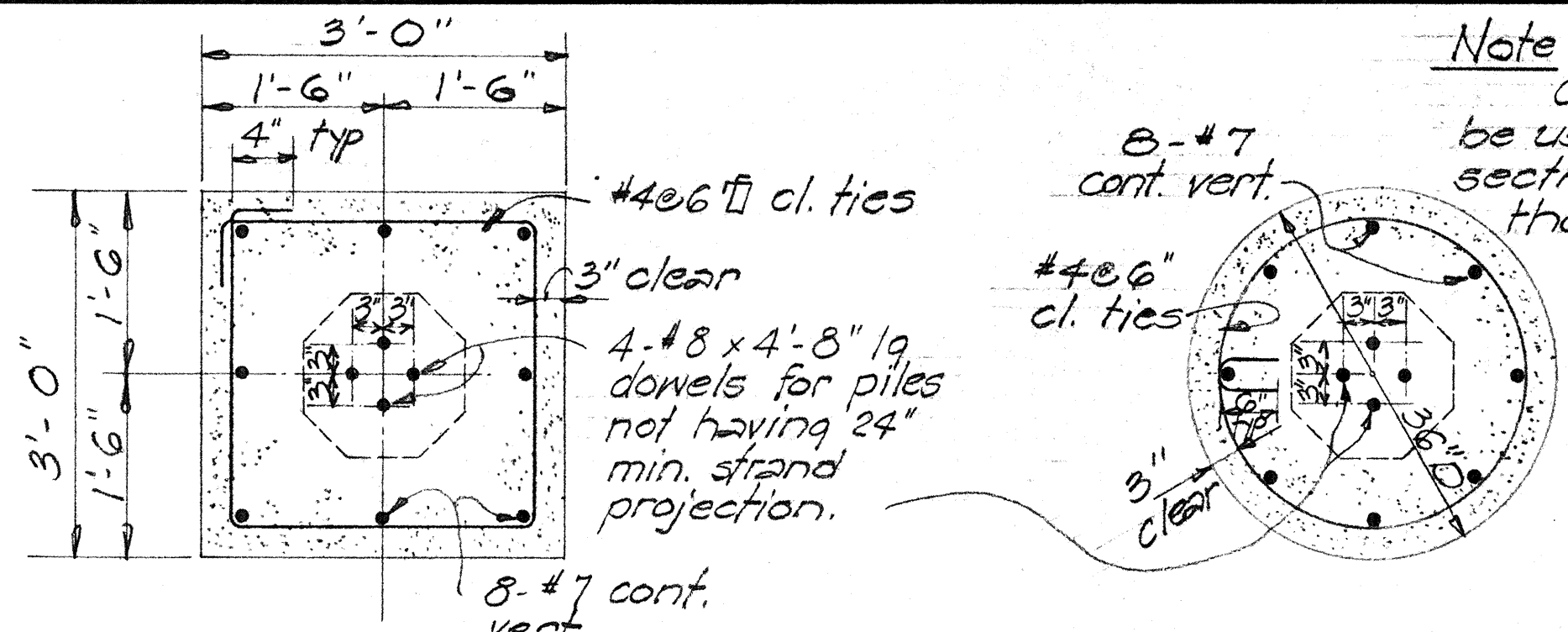
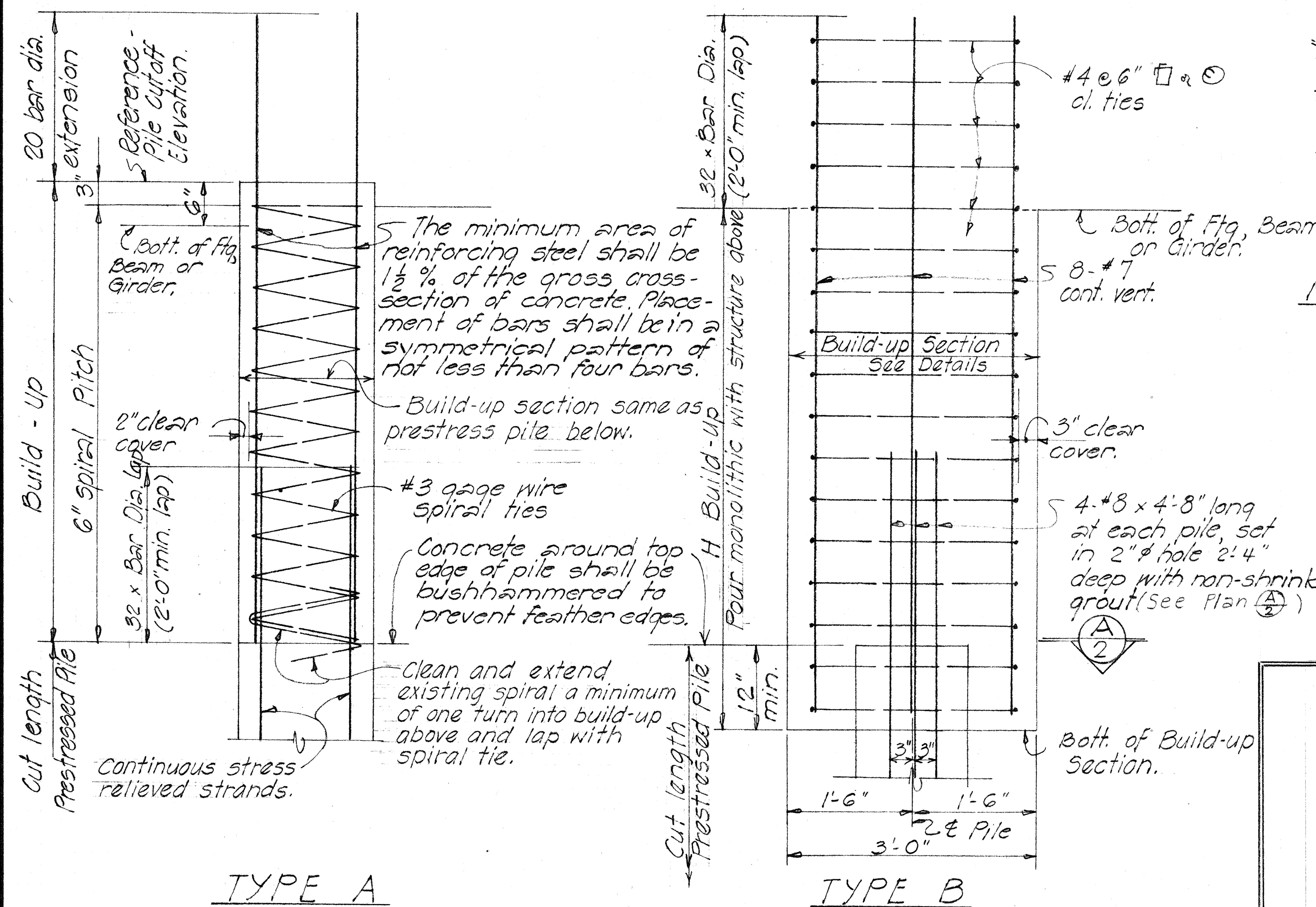
## WITH DRIVING TYPICAL PILE BUILD-UP DETAIL



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
STANDARD DETAILS  
PRESTRESSED CONCRETE PILES



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | I-HI-1(17)-8       | 1969        | 133       | 181          |

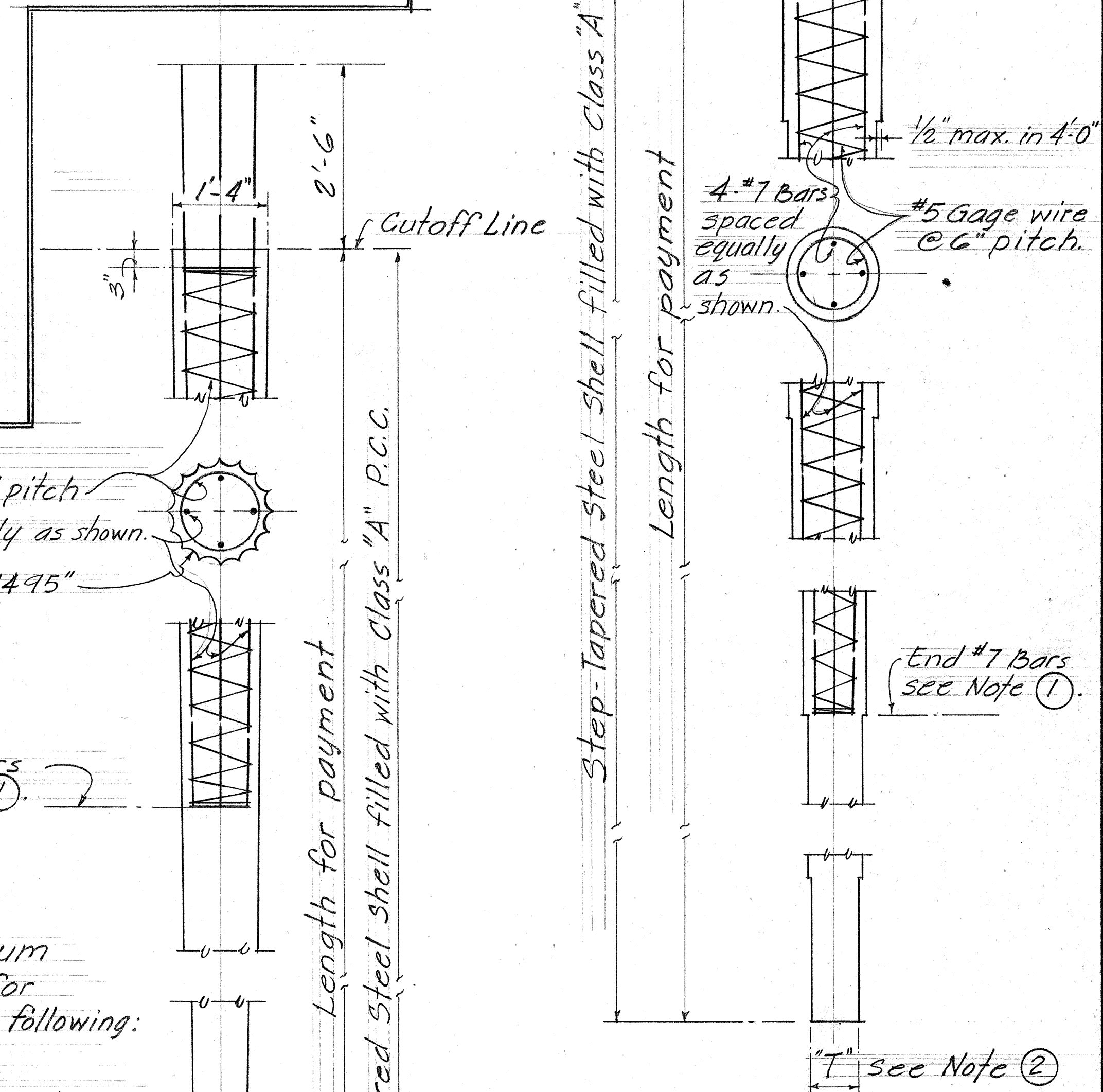


Note !!  
Circular section may be used instead of square section if approved by the Engineer.

SECTION A-2

Notes:

1. Portion of pile embedded into footing shall be of sound concrete. Damaged portions shall be removed and pile cut-off elev. lowered as required by the Engineer.
2. When height of depressed portion of footing (H) exceeds 4', the depressed section shall be poured separately from the main body of the footing.
3. Depressed portion of footing may be omitted for pile heads embedded at least 4' into footing provided at least 90% of the piles in each footing have the minimum embedment into footing as shown in contract plans.



## TYPE A WITHOUT DRIVING - TYPICAL PILE BUILD-UP DETAILS

NOTE: Selection of pile build-up type without driving to be determined by the Engineer.

## GENERAL NOTES

Work of cutting off prestressed concrete piles or concrete build-ups shall be preformed 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 expense.

- Notes:
- ① The #7 bars shall extend a minimum of 12'-0" for Type "A" Pile and 24'-0" for Type "B" Pile below the lowest of the following:
    - (a) Bottom of footing.
    - (b) Top of final ground surface.
    - (c) Top of original ground surface when piles are driven through fills.
  - ② Tip "T" = 8" min. for 32 tons and 10" min. for 45 tons.
  - ③ A 10" min. diameter pipe extension (thickness = 0.1793" min.) may be used at the tip of Alternatives when taper is 30' or more in length.

## CAST-IN-PLACE CONCRETE PILES IN STEEL SHELLS TYPE "A"

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

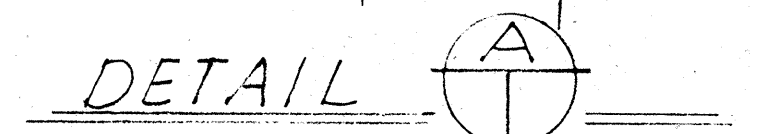
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

STANDARD DETAILS  
PRESTRESSED CONCRETE PILES  
AND  
CAST-IN-PLACE STEEL  
SHELLED CONC. PILES

SHEET No. 311 OF 16 SHEETS



REVISION  
27 Mar 67  
13 Feb 68  
2 Oct. 68  
18 Dec. '68



- No. 1 - Numbers ① & ② indicate sequence of placing bottom slab & girder stem concrete. ② may be placed with ① when approved by the Engineer provided that the ① sections adjoining the ② sections are placed in this pour. For any deviation from the above the Contractor shall submit a diagram to the Engineer for approval.
- No. 2 - No top slab construction joint or form removal opening shall be located in the region over the piers as noted, nor in the supporting section of a hinged span.
- No. 3 - When top slab is not poured continuously, and top slab forms are not removed, construction joint in top slab shall be located over an intermediate diaphragm.
- No. 4 - Top slab concrete shall be placed separately from the stem. Top slab concrete may be placed continuously or in parts as approved by the Engineer, providing pour is not in conflict with the above notes.
- No. 5 - Dimension "X" =  $\frac{1}{4}$  span. "Y" =  $\frac{1}{3}$  span.
- No. 6 - No lapping of main bars shall be permitted at construction joints.

For vertical chamfer detail: see Typical Vertical Chamfer Det.

Edge of Deck

⊕ Exterior Girder

⊕ Interior Girder

⊕ Interior Girder

⊕ Exterior Girder

Control Pt. (Intersection of ⊕ girders and reference line)

"X" or "Y"

"X" or "Y"

⊕ Pier

Bottom slab constr. jt.

W/2

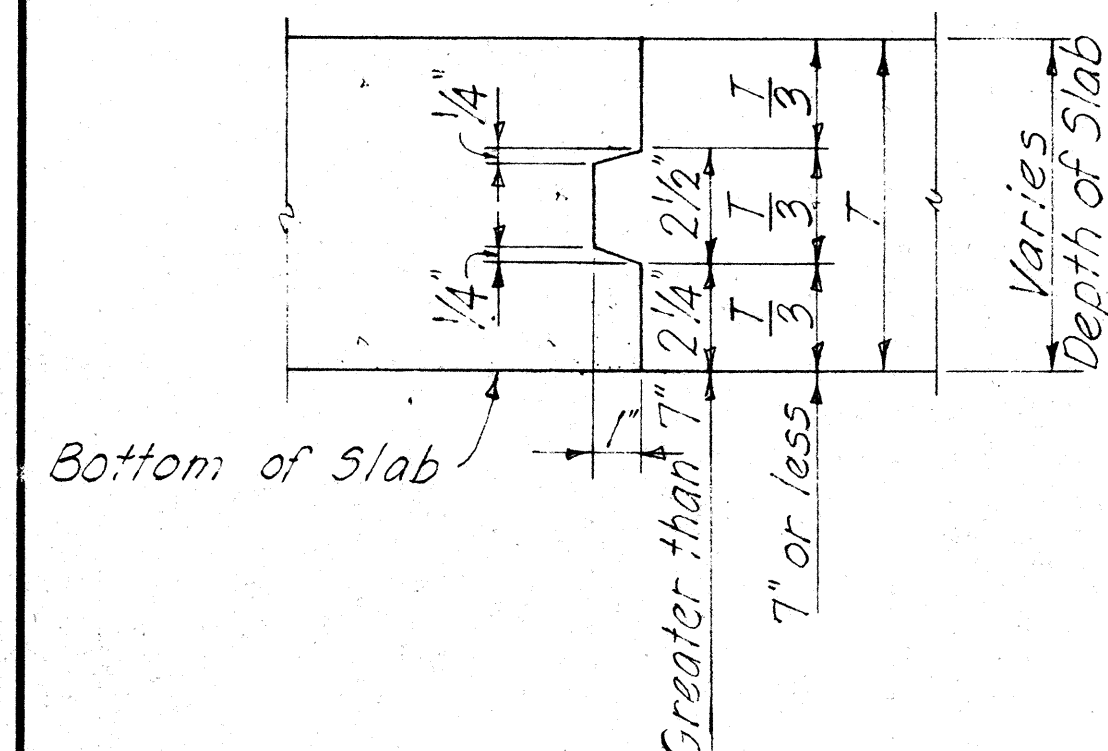
W

Reference Line

SECTION

(B)

JT Top added  
#5 bars at ends.

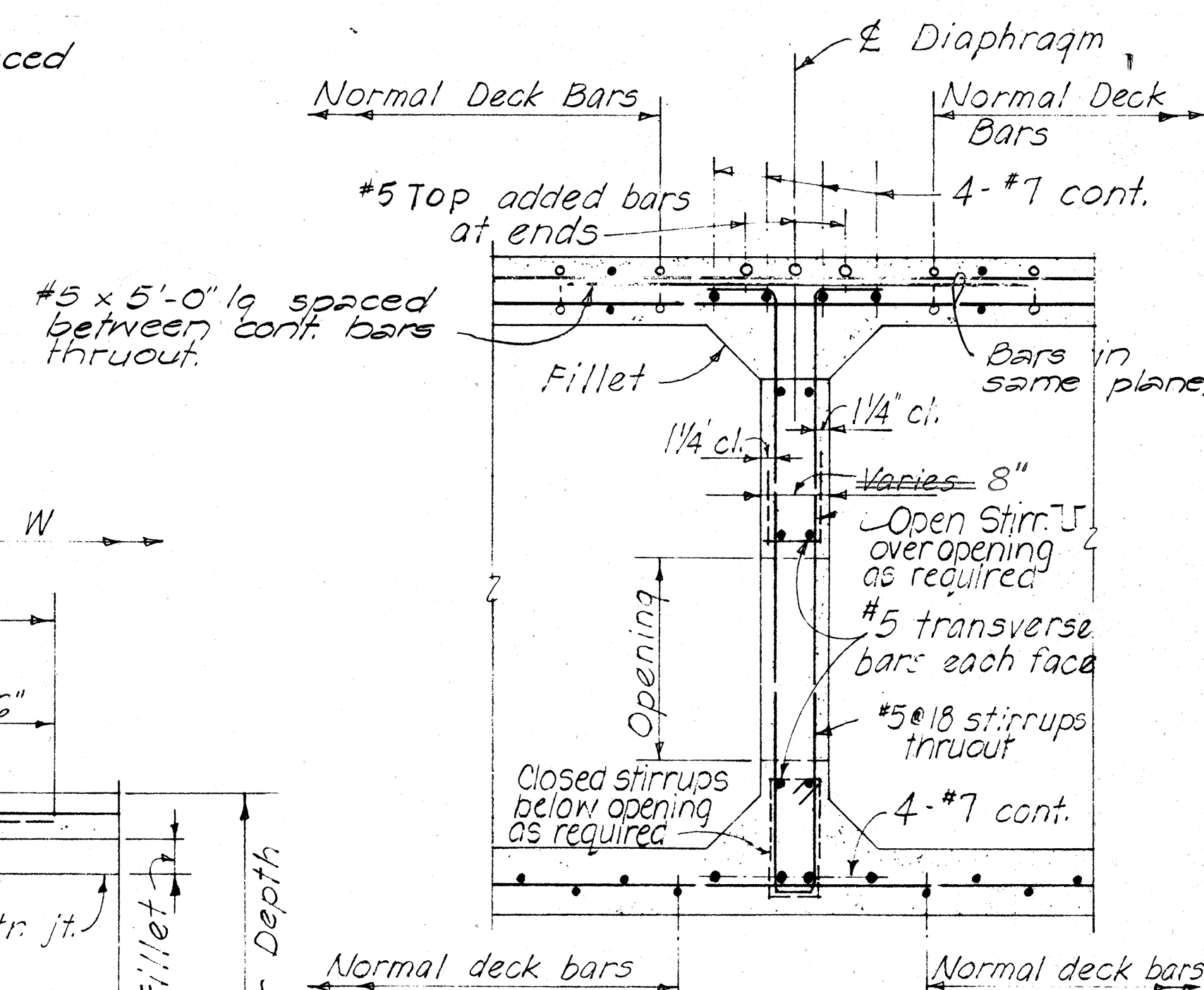
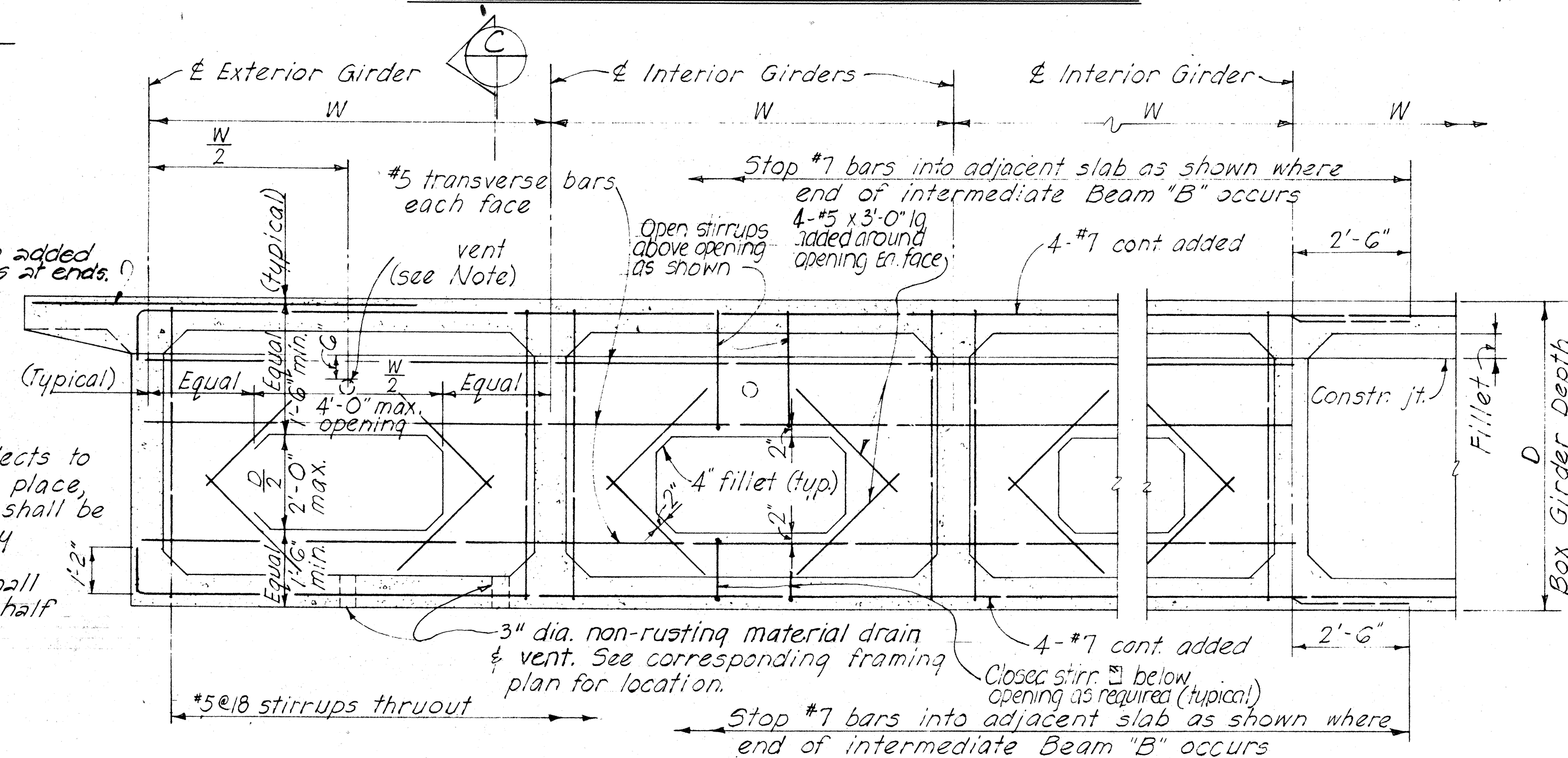


If the Contractor elects to leave top slab forms in place, form removal opening shall be omitted and replaced by 3" vent.

No vertical shoring shall be placed in the center half of top slab span W.



The diagram shows a cross-section of a slab. A vertical line indicates a 3" vent. To the right of the vent, a dimension line indicates a 1/2" distance.



SECTION 

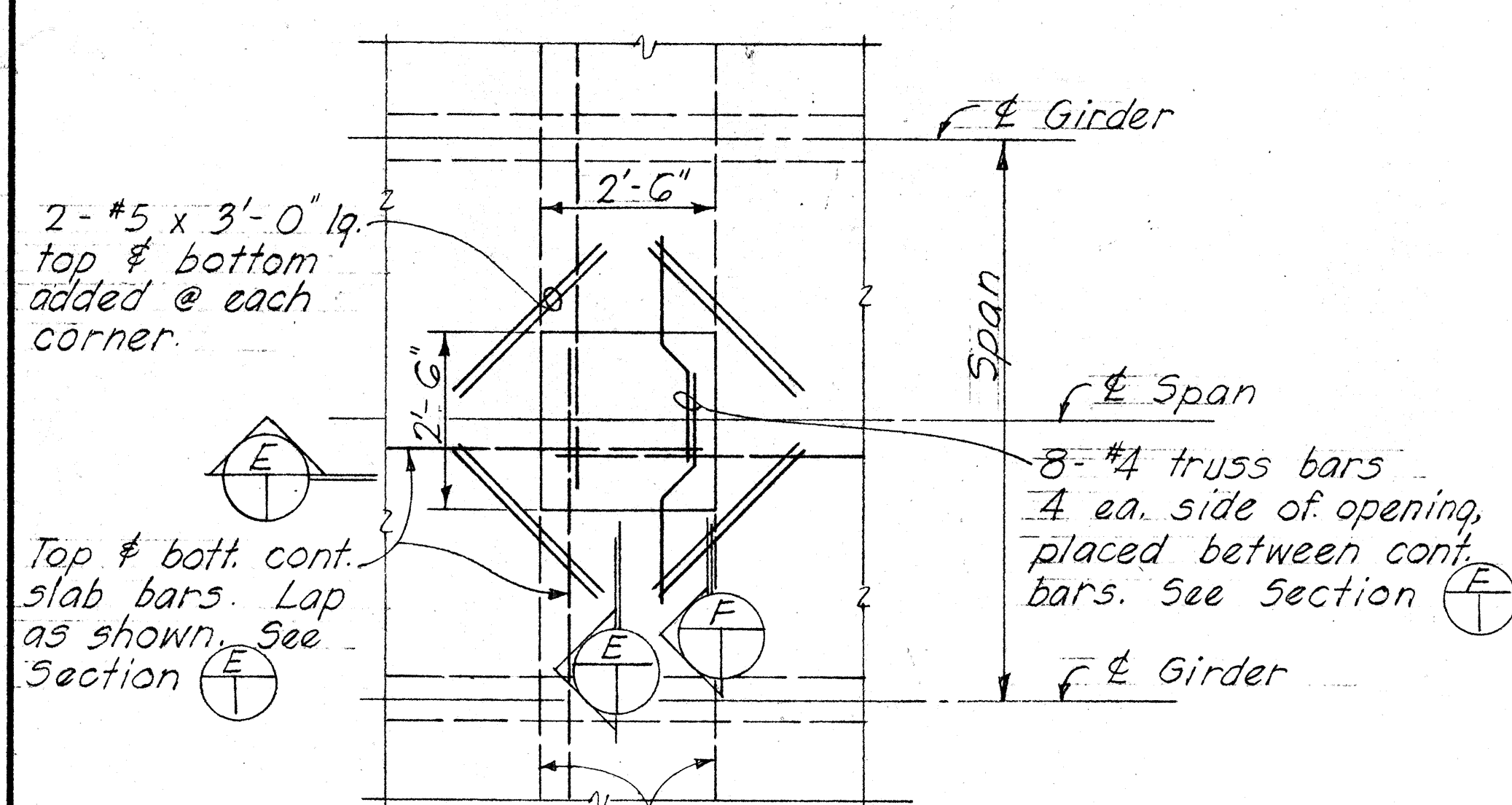
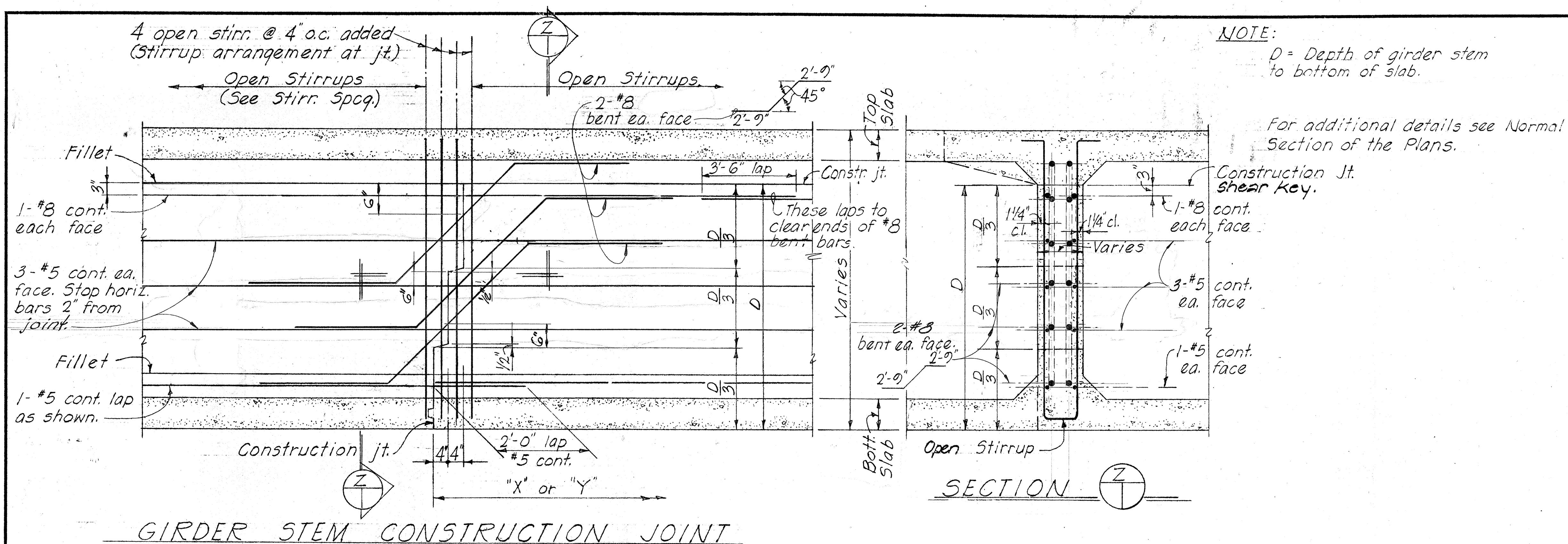
## STANDARD DETAILS

### CONCRETE BOX GIRDER

SCALE AS NOTED      DATE: JUNE, 1969  
SHEET No. 512 OF 16 SHEETS

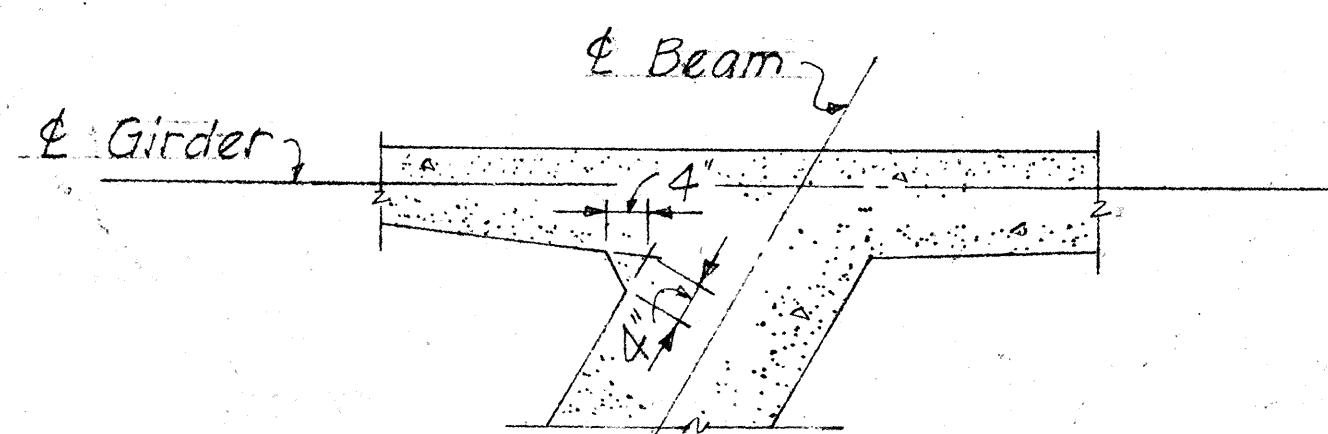


| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | I-HI-1(75)-8       | 1969        | 135       | 181          |

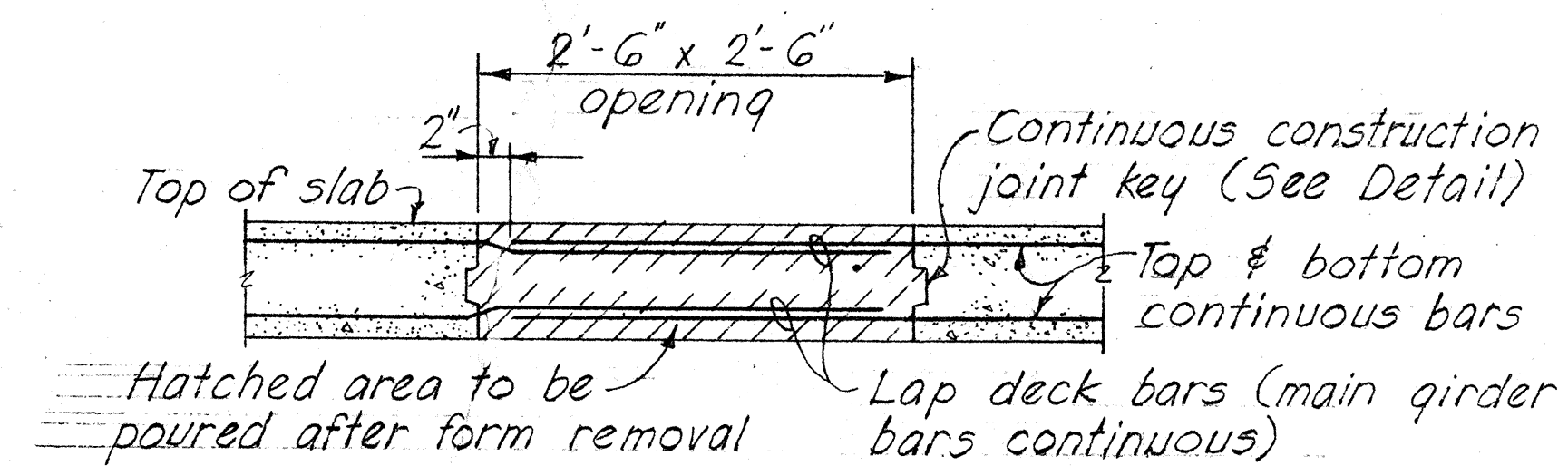


Note: Final location of opening shall be determined by the Engineer.

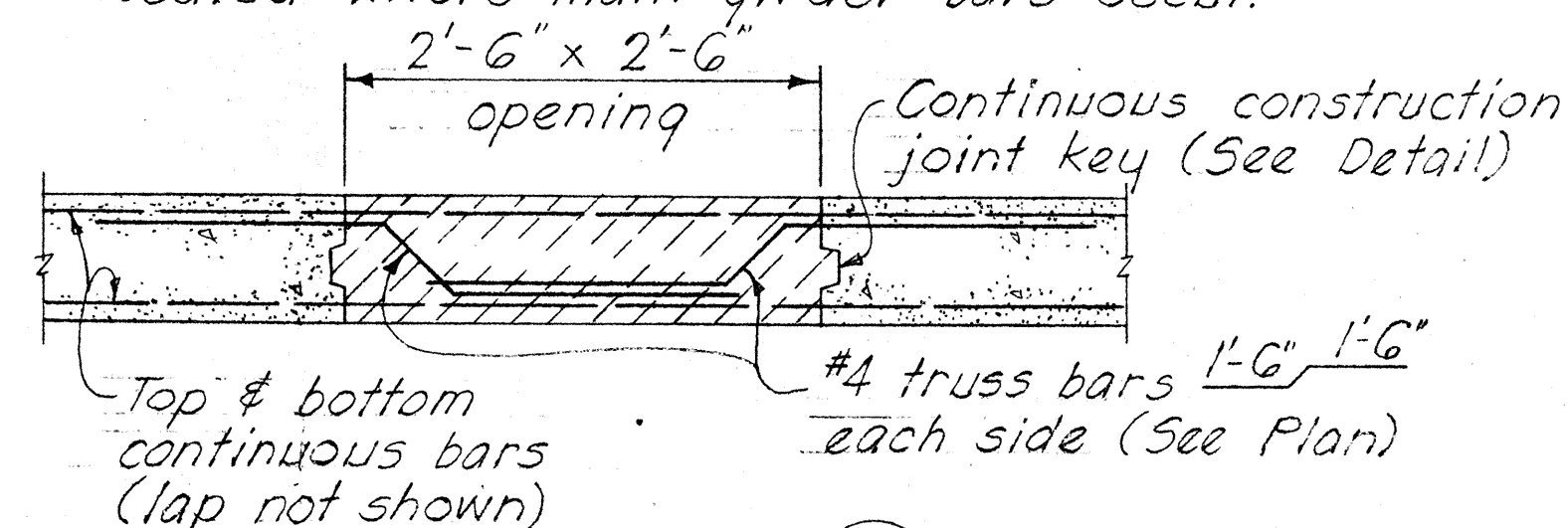
PART PLAN - DECK  
SHOWING FORM REMOVAL OPENING



TYPICAL DETAIL OF VERTICAL  
CHAMFER AT ACUTE INTERSECTION  
OF SKEWED CONCRETE MEMBER

SECTION 

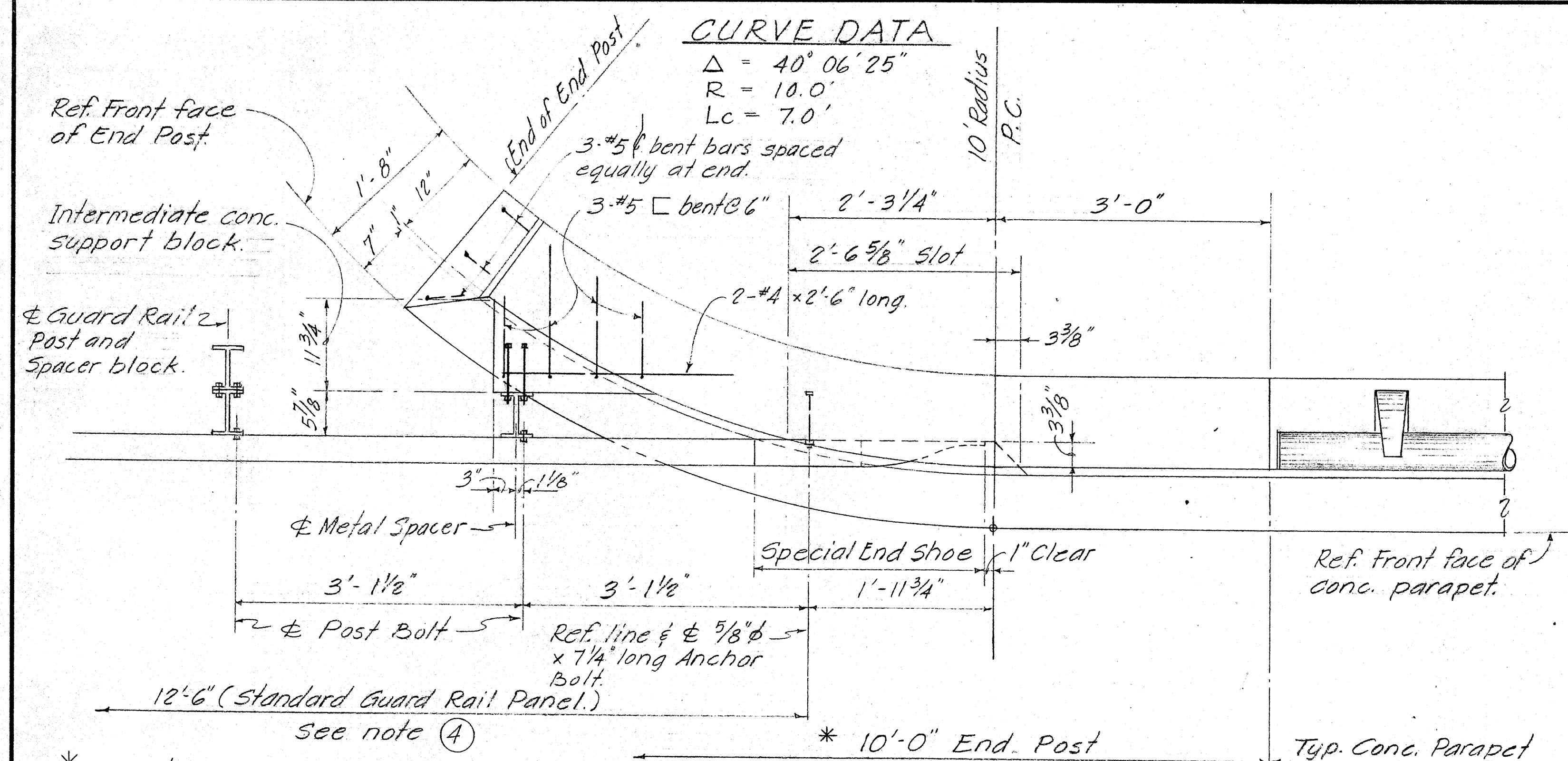
Note: Form removal opening at top slab shall not be located where main girder bars occur.



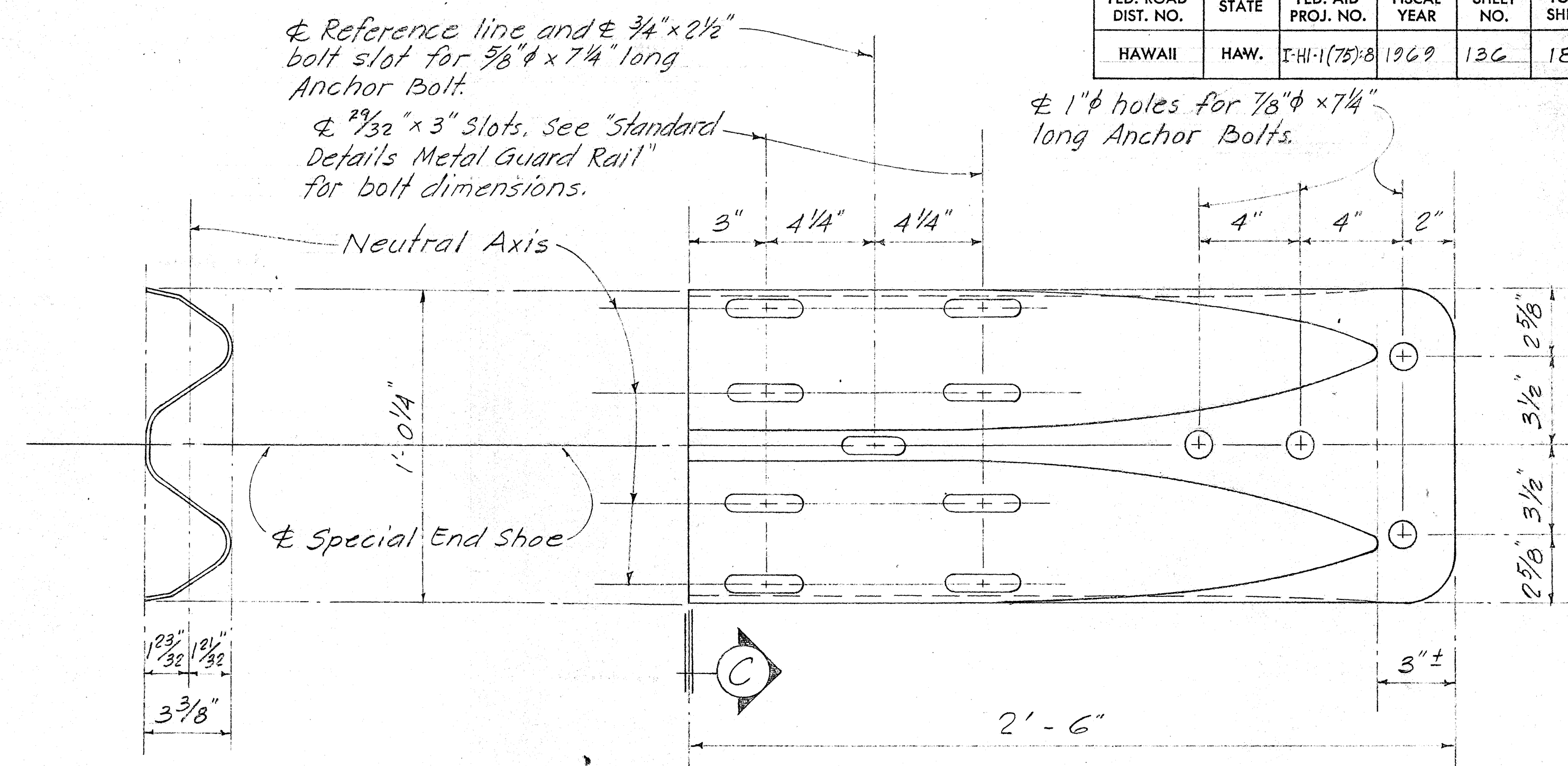
SECTION (F)



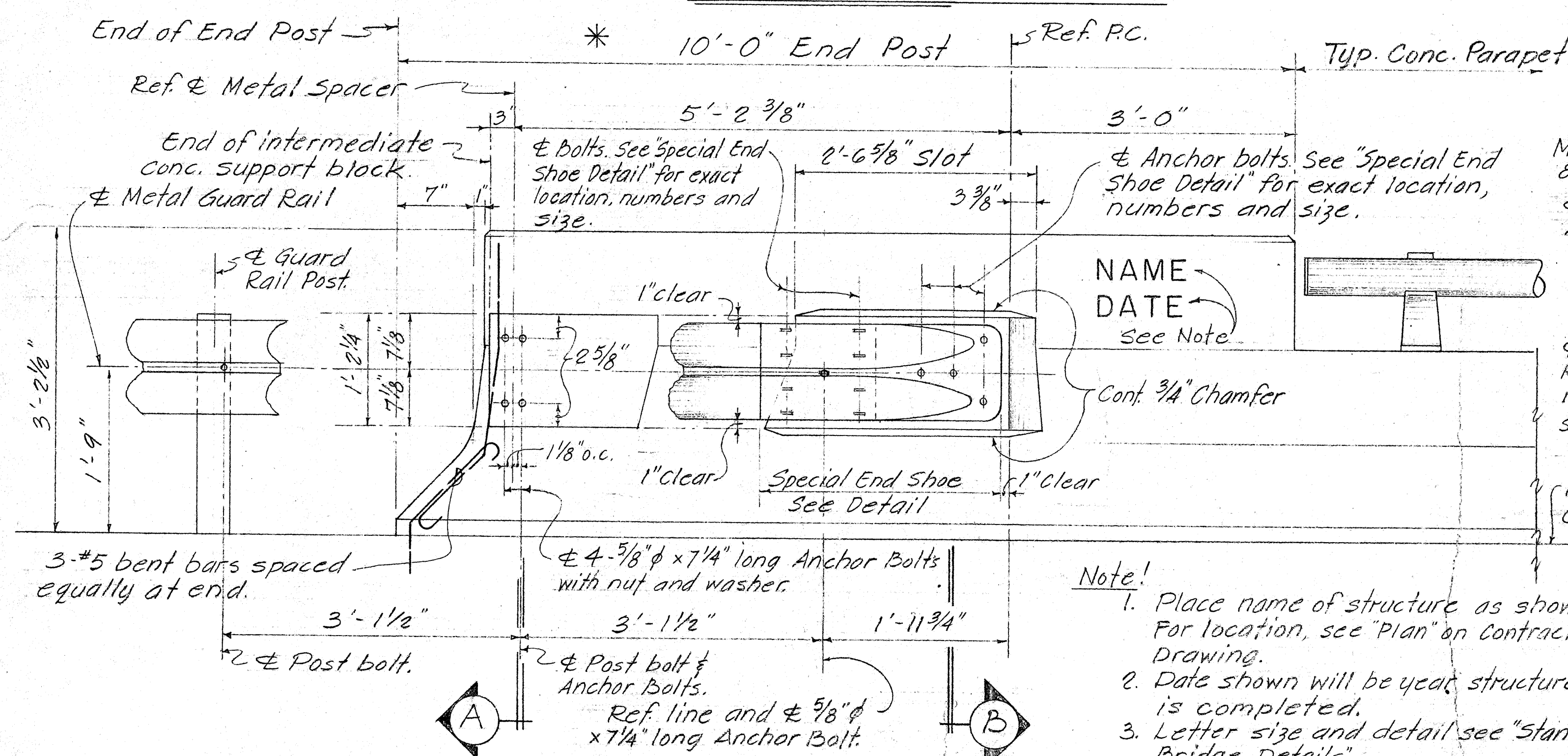
| FED. ROAD<br>DIST. NO. | STATE | FED. AID<br>PROJ. NO. | FISCAL<br>YEAR | SHEET<br>NO. | TOTAL<br>SHEETS |
|------------------------|-------|-----------------------|----------------|--------------|-----------------|
| HAWAII                 | HAW.  | I-HI-1(75):8          | 1969           | 136          | 181             |



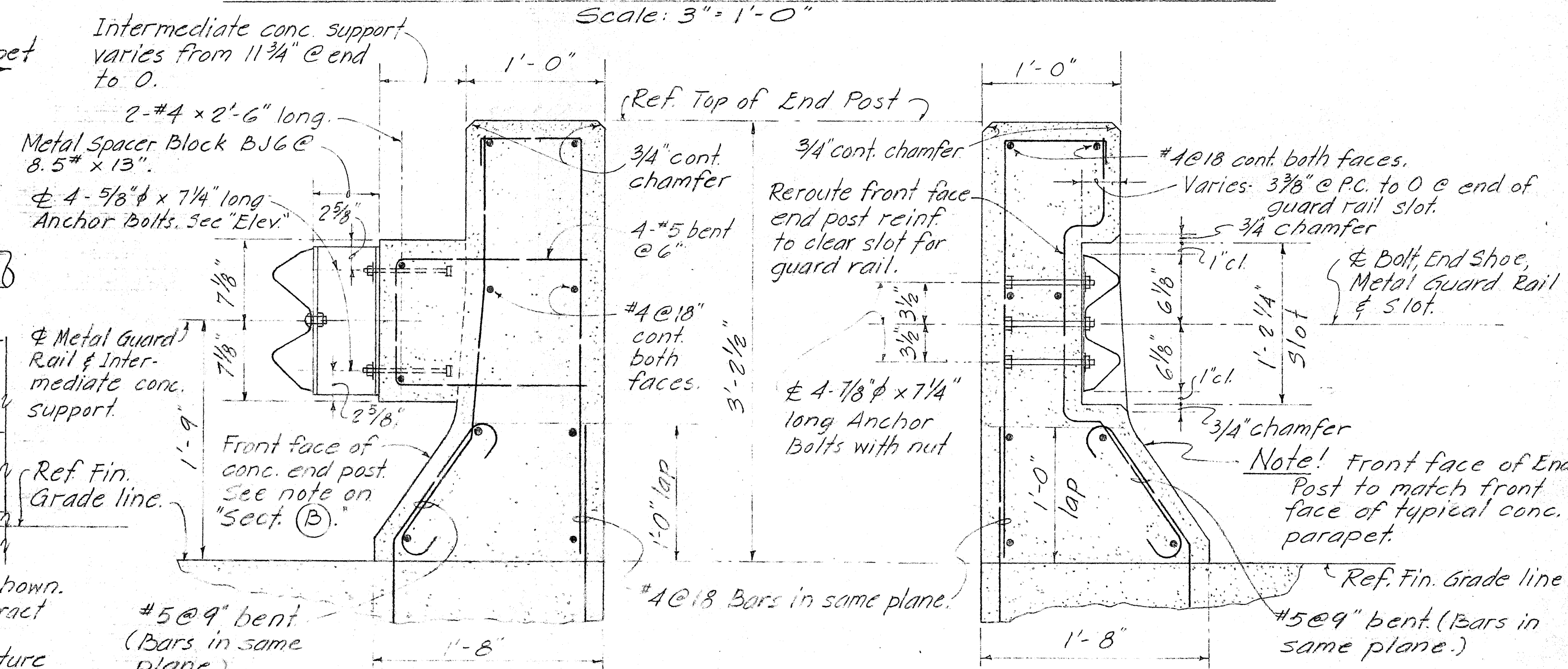
PLAN Scale: 1" = 1'-0"



SECTION (C) ELEVATION  
SPECIAL END SHOE DETAILS



ELEVATION scale: 1" = 1'-0"



SECTION (A)  
Scale:  $1\frac{1}{2}'' = 1'-0''$

SECTION (B)  
Scale:  $1\frac{1}{2}" = 1'-0"$

- Note!
1. Place name of structure as shown. For location, see "Plan" on Contract drawing.
  2. Date shown will be year structure is completed.
  3. Letter size and detail see "Standard Bridge Details"

# NOTES

- ① All Anchor Bolts shall be High Strength bolts conforming to the requirements of ASTM A-325.
- ② All Shoe assembly, including anchor bolts, nuts and washers, shall be galvanized.
- ③ Special End Shoe shall be fabricated from 10 gage steel conforming to the requirements of AASHTO 180.
- ④ First Guard Rail Panel adjoining "Special End Shoe" shall be of galvanized steel. See Special Provisions for requirements.
- ⑤ Anchor Bolt length given from under bolt head.

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

CONNECTION DETAILS OF  
METAL GUARD RAIL TO  
SLOPED FACE CONC. END POST

SCALE AS SHOWN  
DATE: MARCH, 1969

SHEET No. 314 OF 16 SHEETS

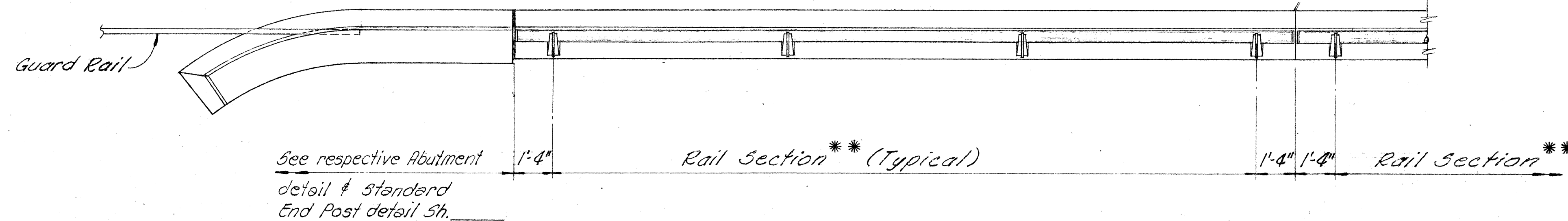


**\*NOTE:** The Contractor shall lay out the railing to provide 3 continuous panels per section where possible. 2 or 4 panels in end sections will be permitted to complete the layout when 3 continuous panels cannot be made. Single panels will not be permitted.

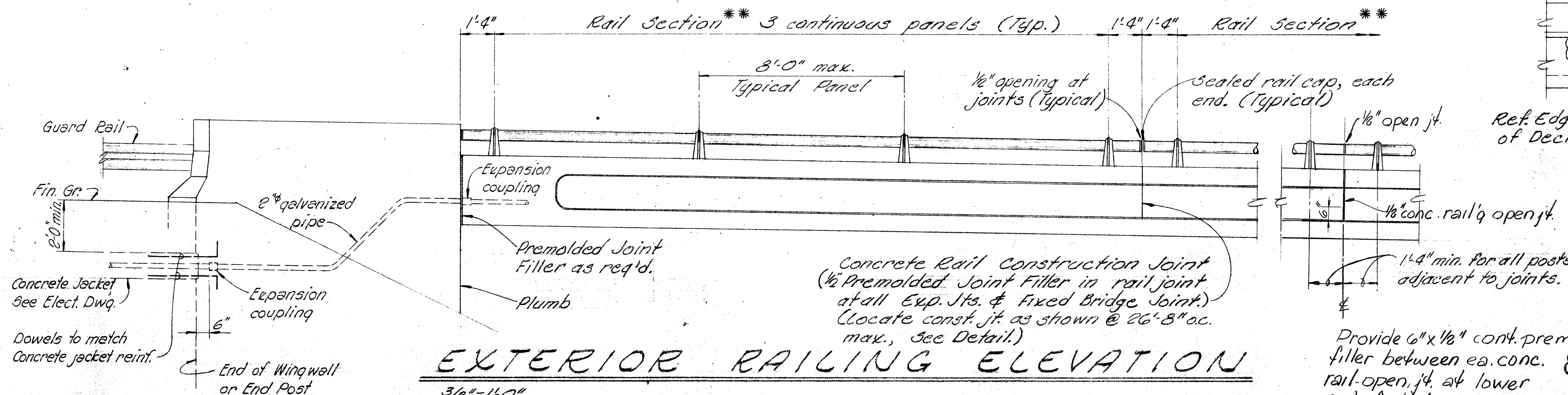
**NOTES:** 1- Rail posts shall be normal to grade.  
2- Provide double posts at each expansion joint, fixed bridge joint & as shown on detailed drawings.

**NOTE:** Details shown on this sheet are standard details except for modifications as may be required for special conditions. For such conditions refer to corresponding details shown on the plans.

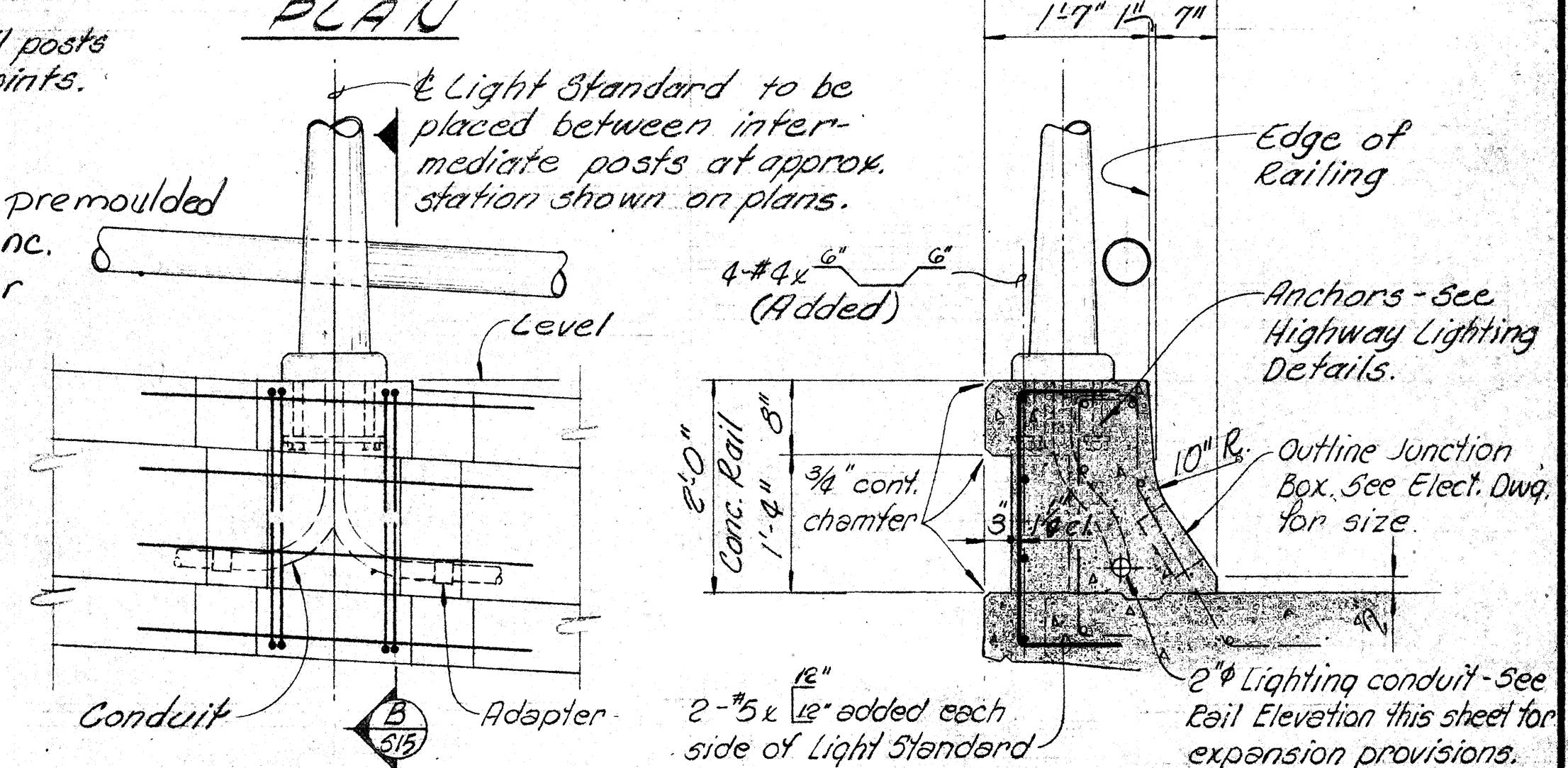
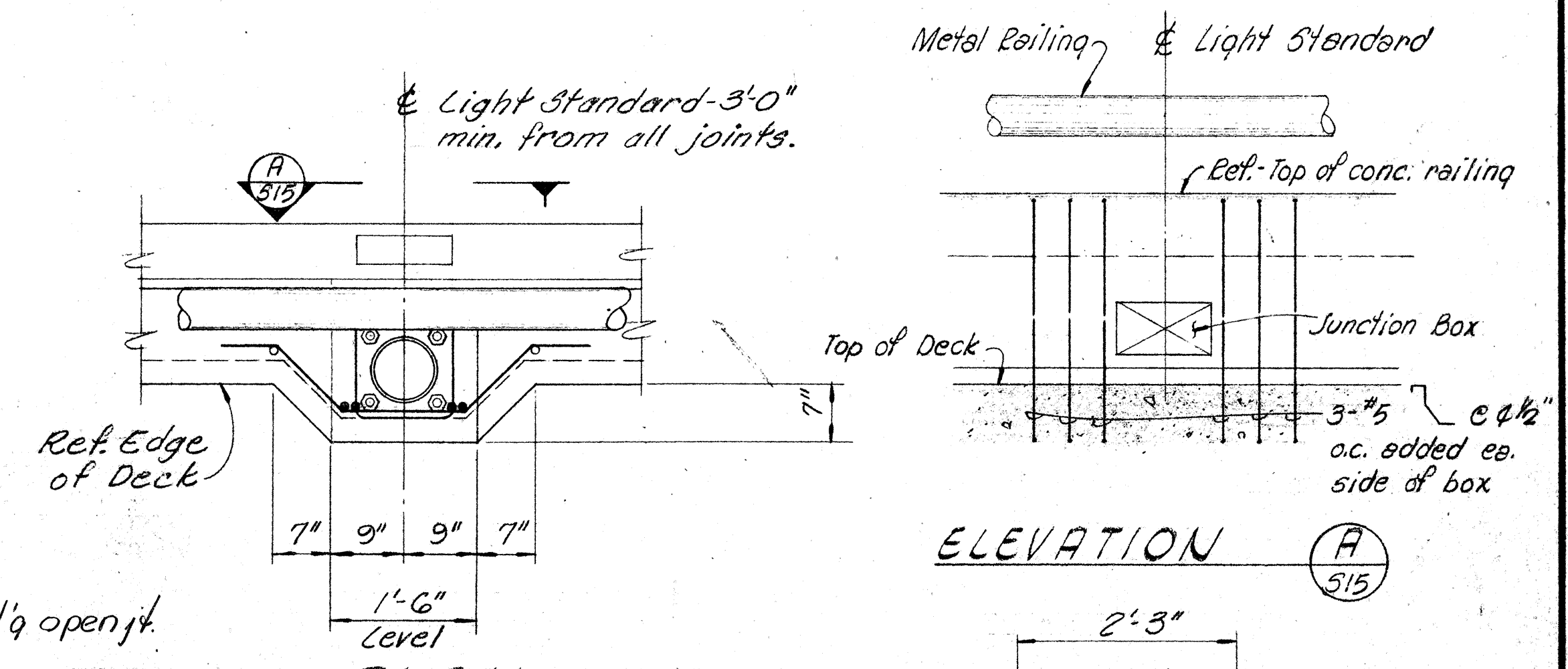
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | F-H-1(7)18         | 1969        | 137       | 138          |



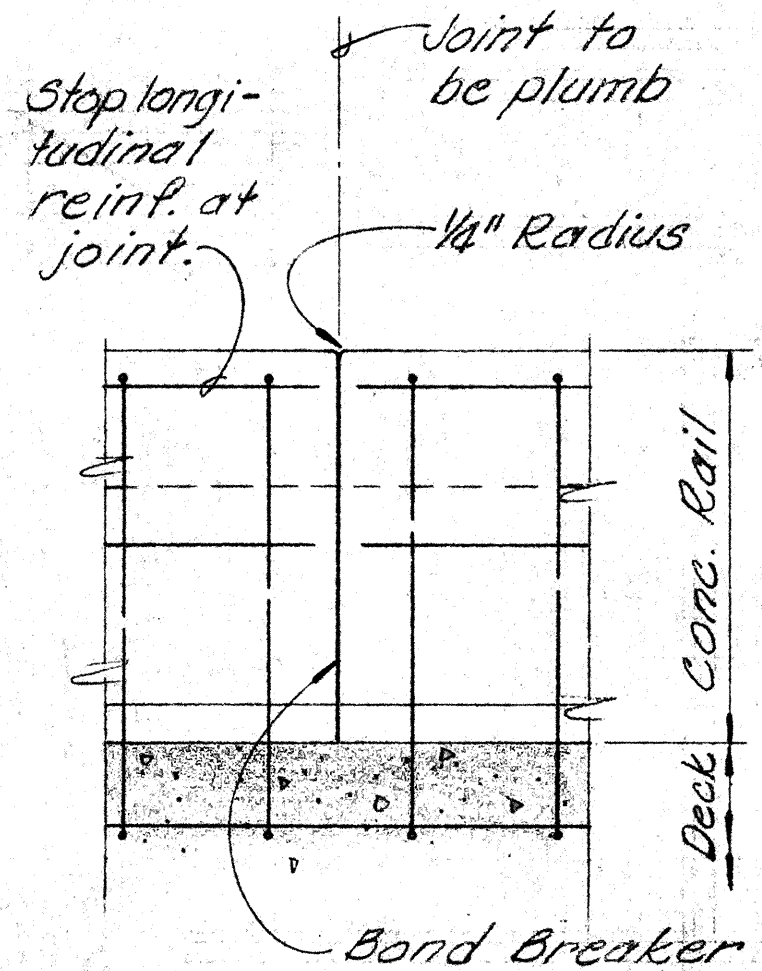
**RAILING PLAN**  
3/8" = 1'-0"



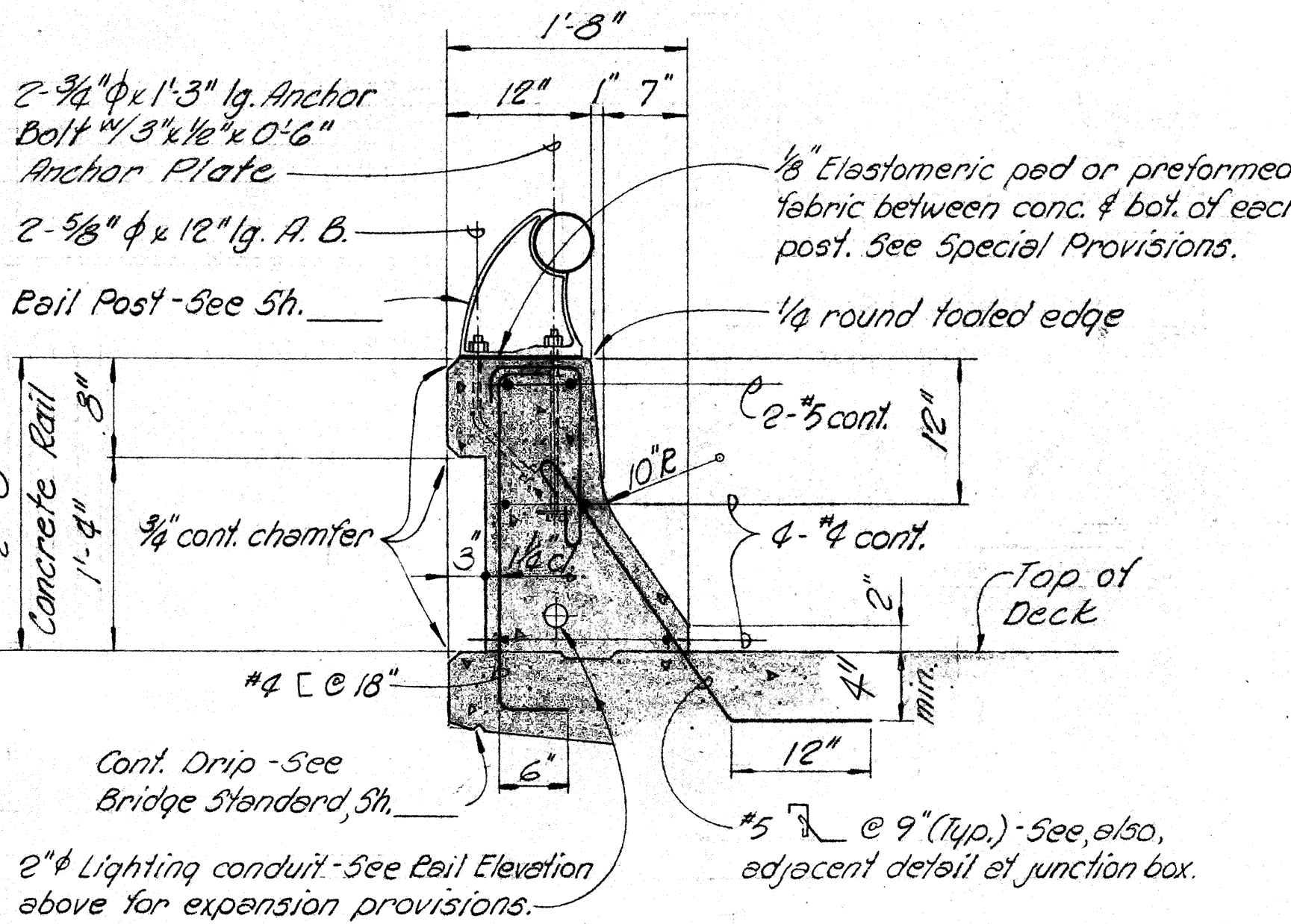
**EXTERIOR RAILING ELEVATION**  
3/8" = 1'-0"



**SECTION LIGHT STANDARD DETAILS**  
3/4" = 1'-0"



**CONCRETE RAIL CONST. JT. DETAIL**  
1" = 1'-0"



**TYP. CONC. RAILING SECT.**  
1" = 1'-0"

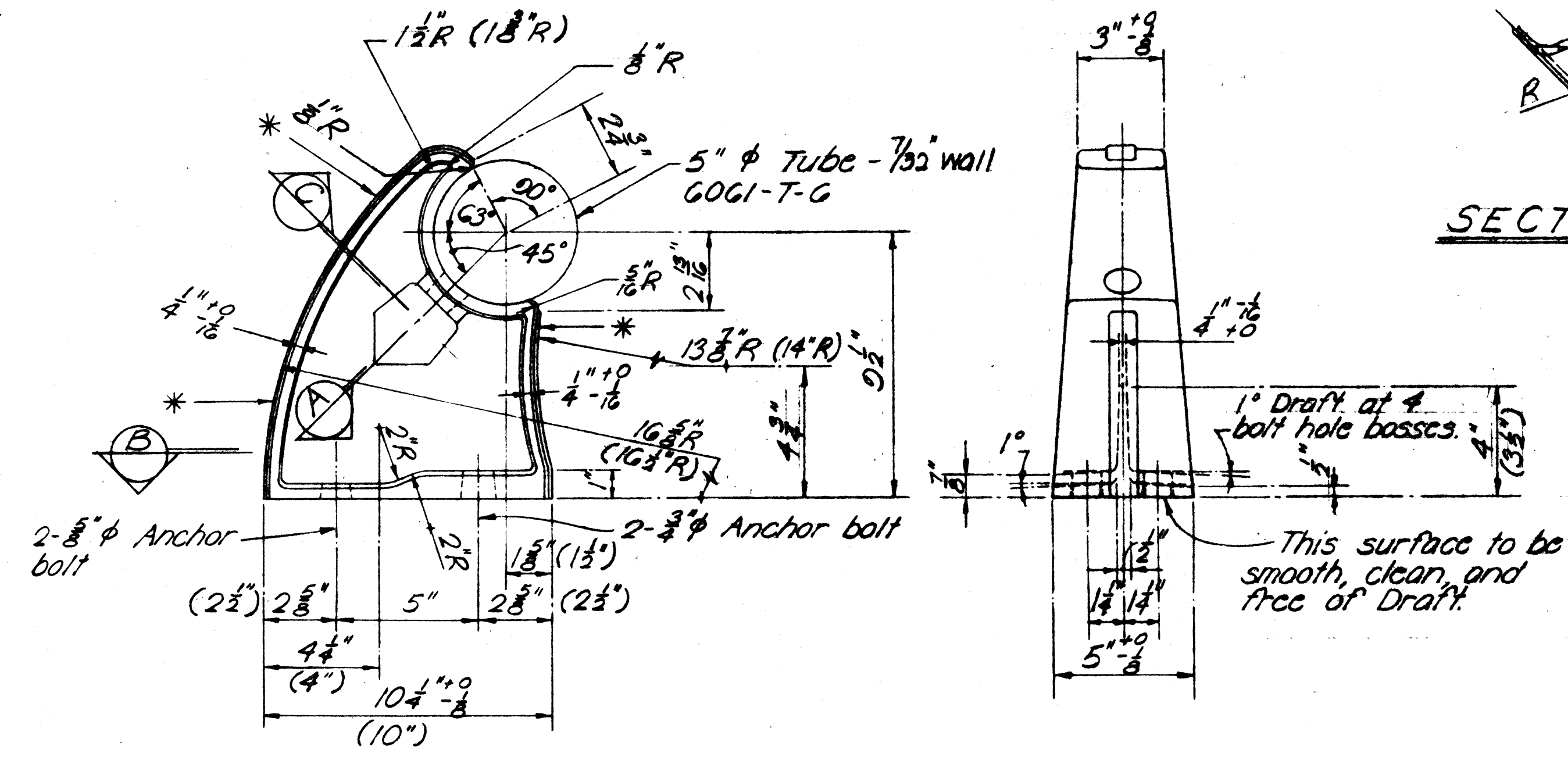
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

STANDARD DETAILS

METAL BRIDGE RAILING SINGLE RAIL  
COMBINATION TYPE ON PARAPET

Scale: As shown  
SHEET No. 515 OF 16 SHEETS



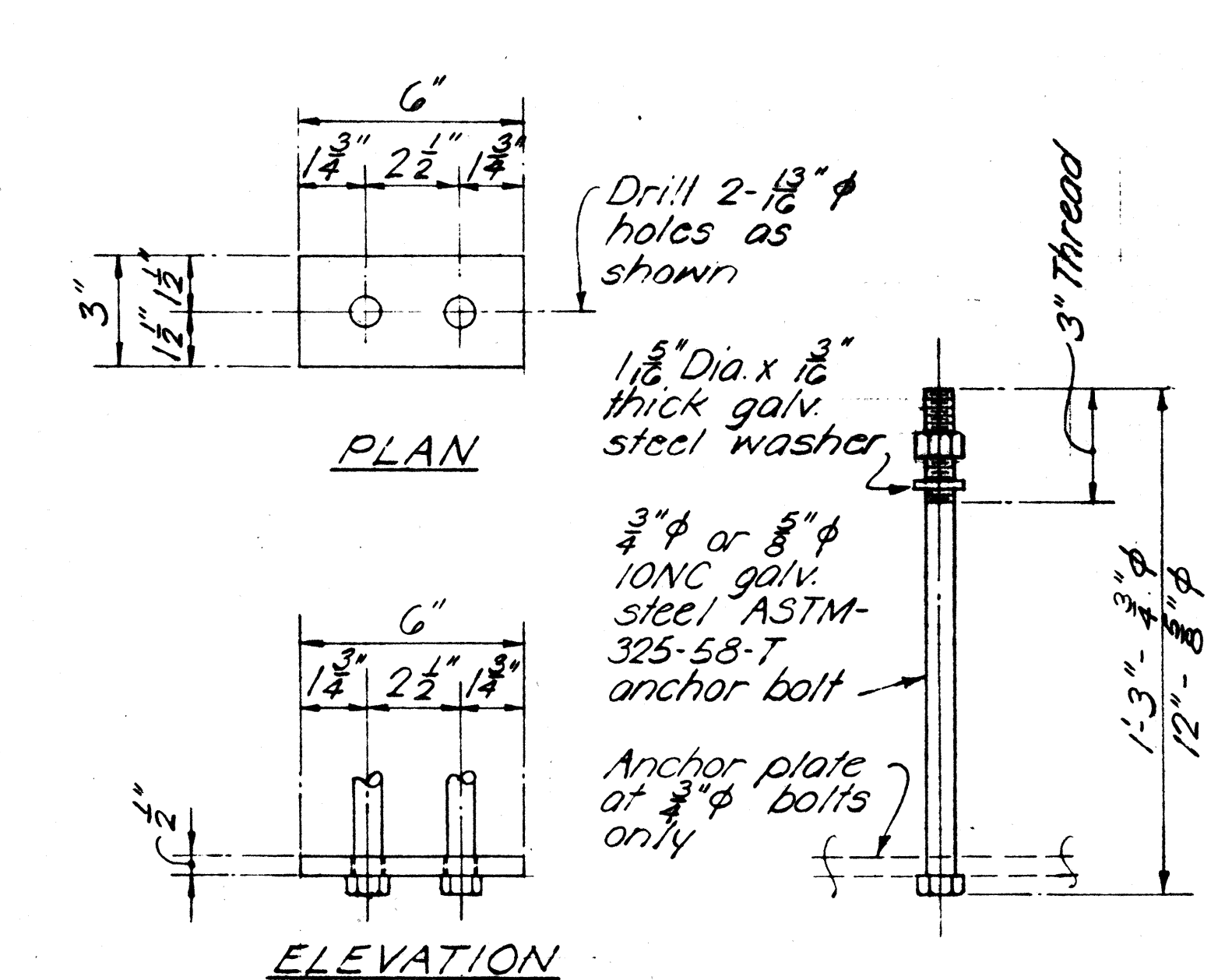


**SIDE ELEVATION** **END ELEVATION**

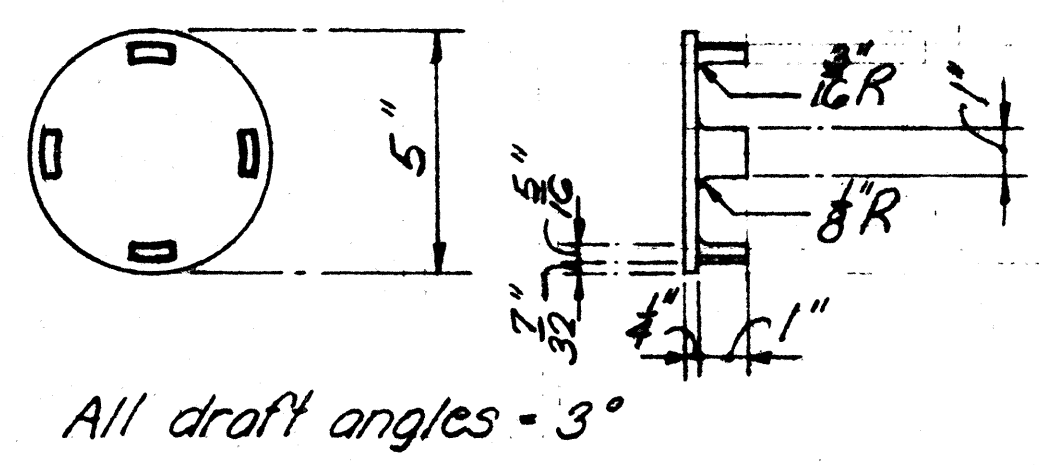
**NOTE:**  
 \* Casting to be supplied with a standard scratch brush finish on entire gating rib surface and as indicated by an asterisk (\*). Finish shall be approved by the Engineer.  
 Casting to be neatly trimmed and any protruding flash to be broken off.  
 For cast post specifications, see Special Provisions.  
 Unless otherwise specified, draft angles to be 3°, corner radii to be 3/32\"/>

**TYPICAL RAIL POST DETAILS**

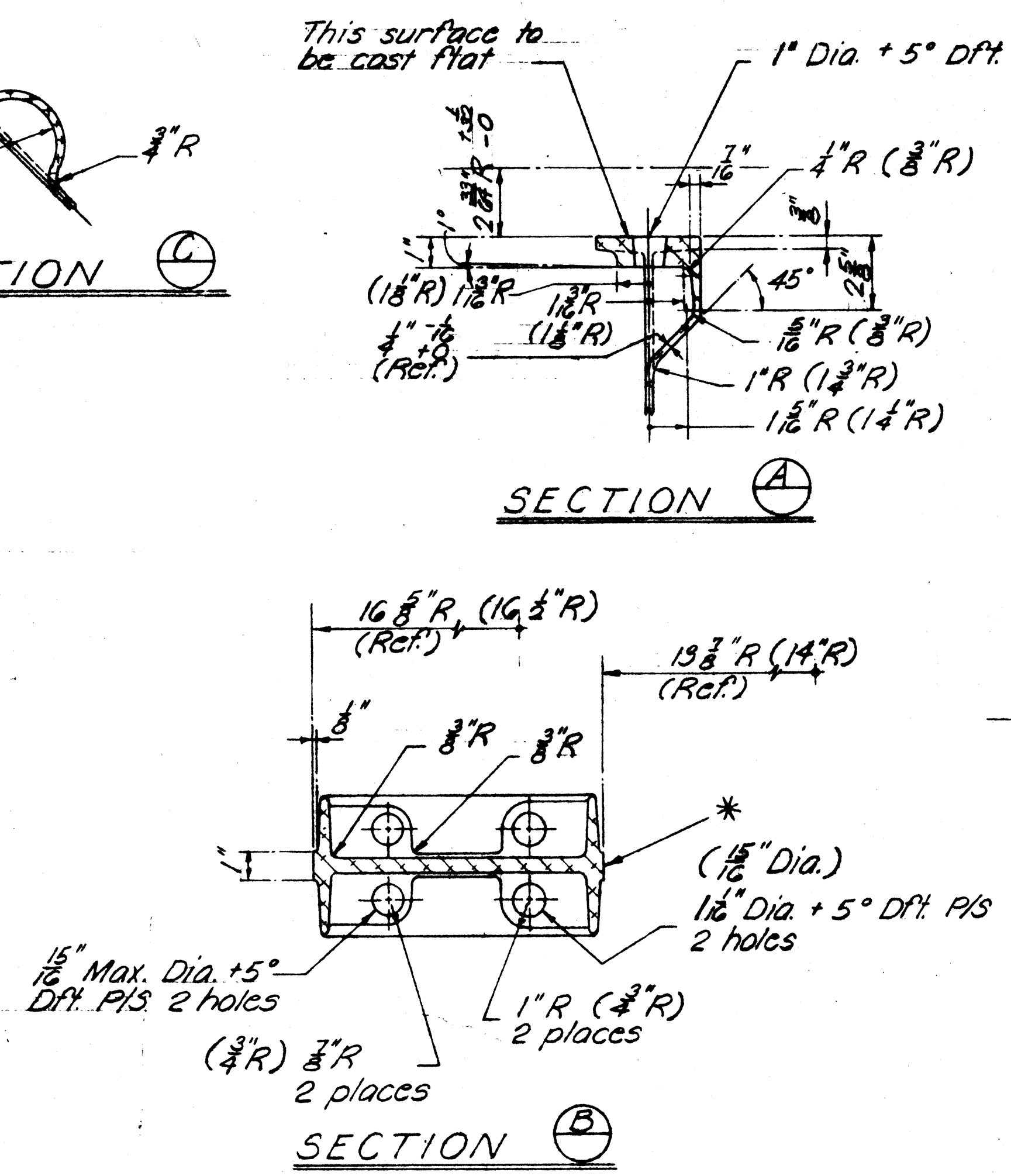
Scale: 3\"/>



**ANCHOR BOLT DETAIL** **ANCHOR BOLT**  
**TYPICAL RAIL POST**  
**ANCHOR BOLT ASSEMBLY**  
 Scale: 3\"/>

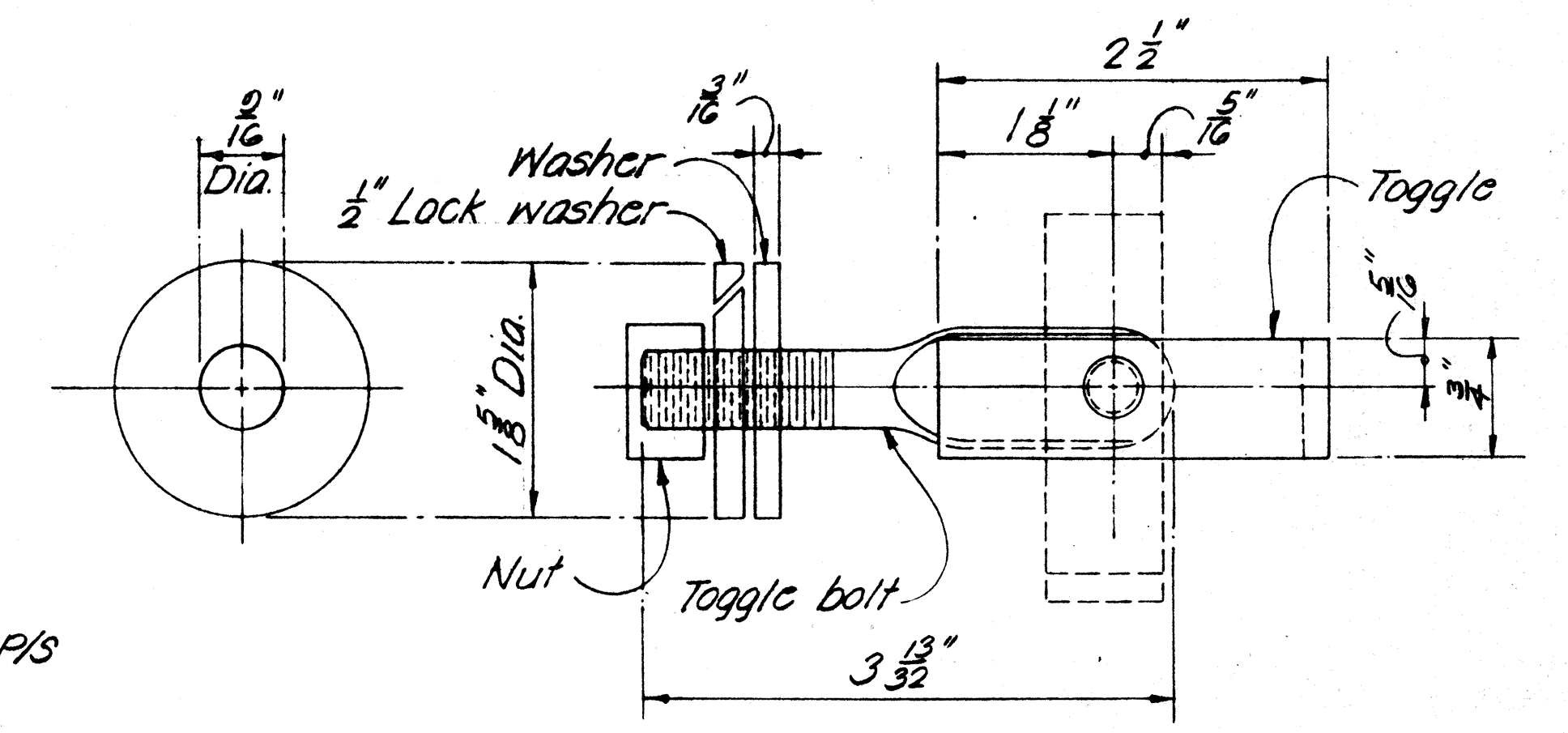


**RAIL CAP DETAIL**  
 Scale: 3\"/>

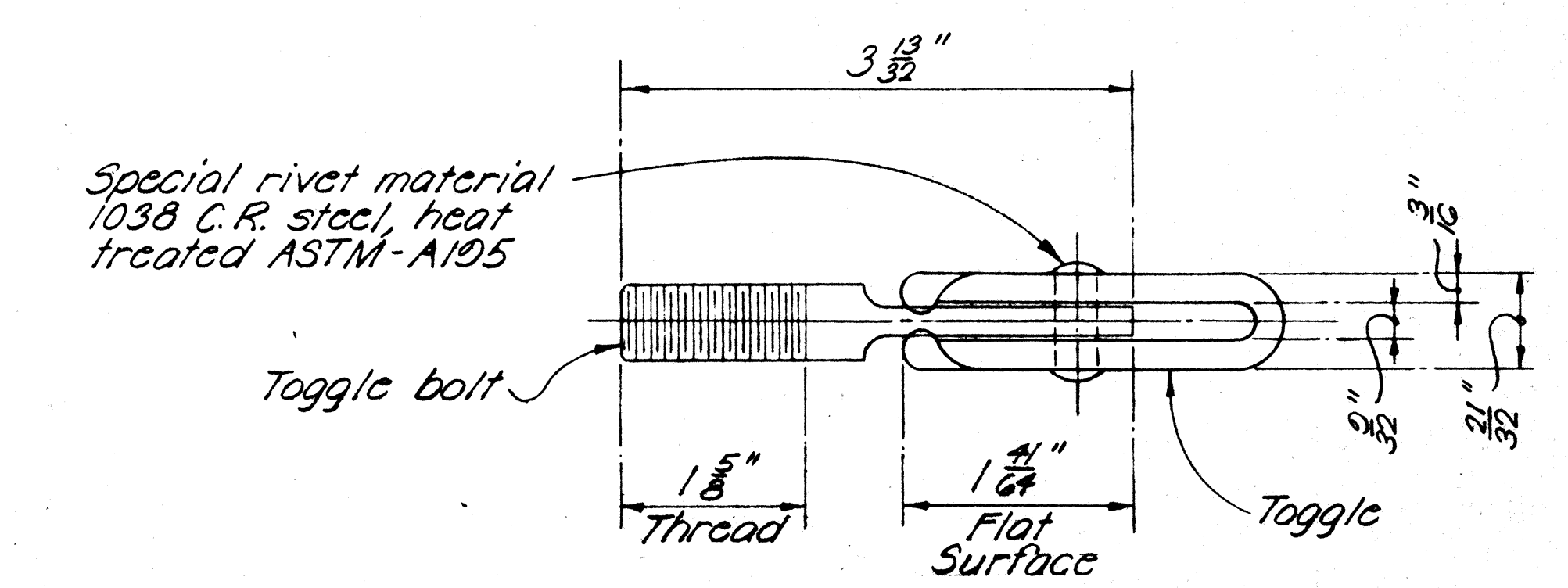


**SECTION A** **SECTION B** **SECTION C**

**NOTE:**  
 Toggle Bolt Material - 1/2\"/>



**WASHER** **SIDE ELEVATION ASSEMBLY**



**1/2\"/>**

**GENERAL NOTES**  
 Metal bridge railing shown is for Aluminum bridge railing. See Special Provisions for alternate railing in steel.

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**STANDARD DETAILS**  
**METAL BRIDGE RAILINGS**  
**SINGLE RAIL**

Scale as noted Date: JUNE, 1969

SHEET No. 516 OF 16 SHEETS