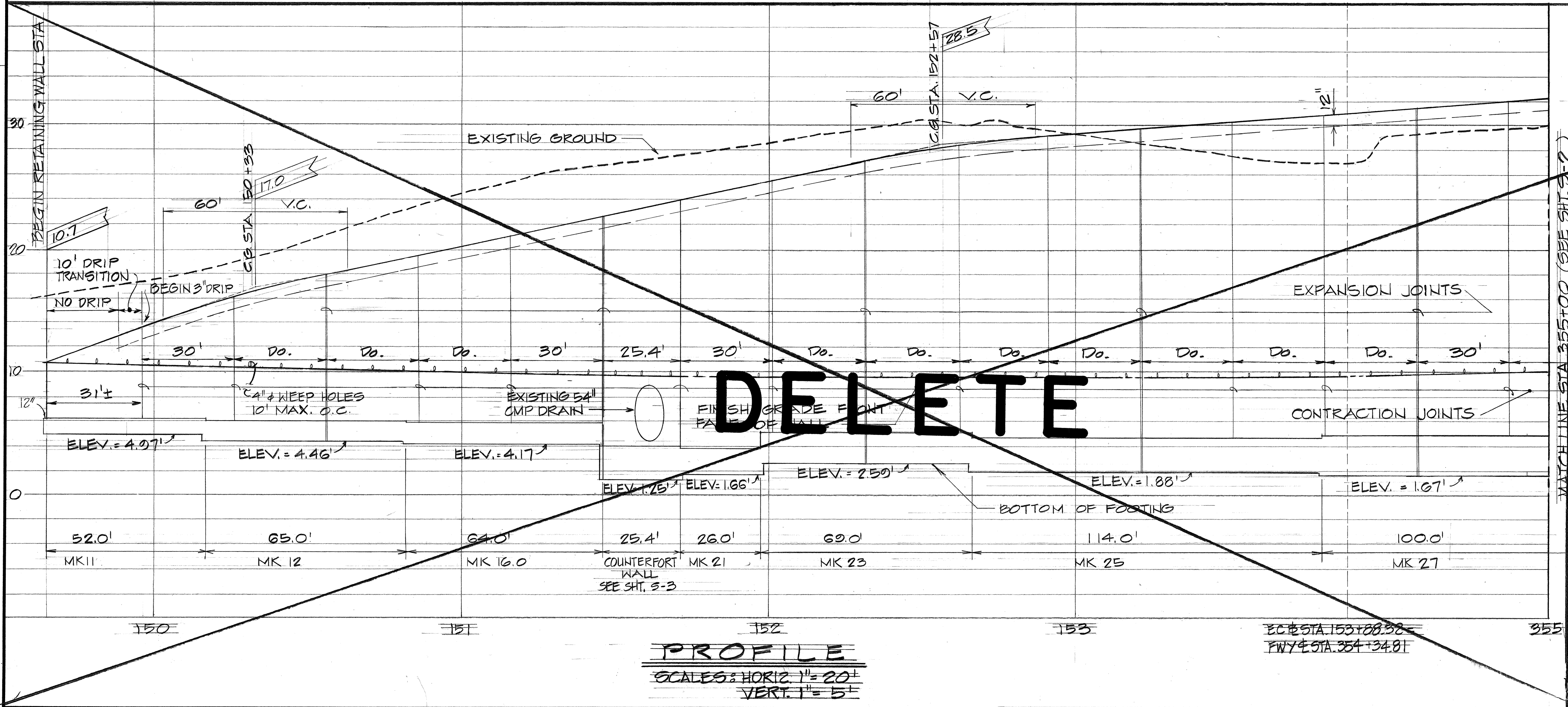
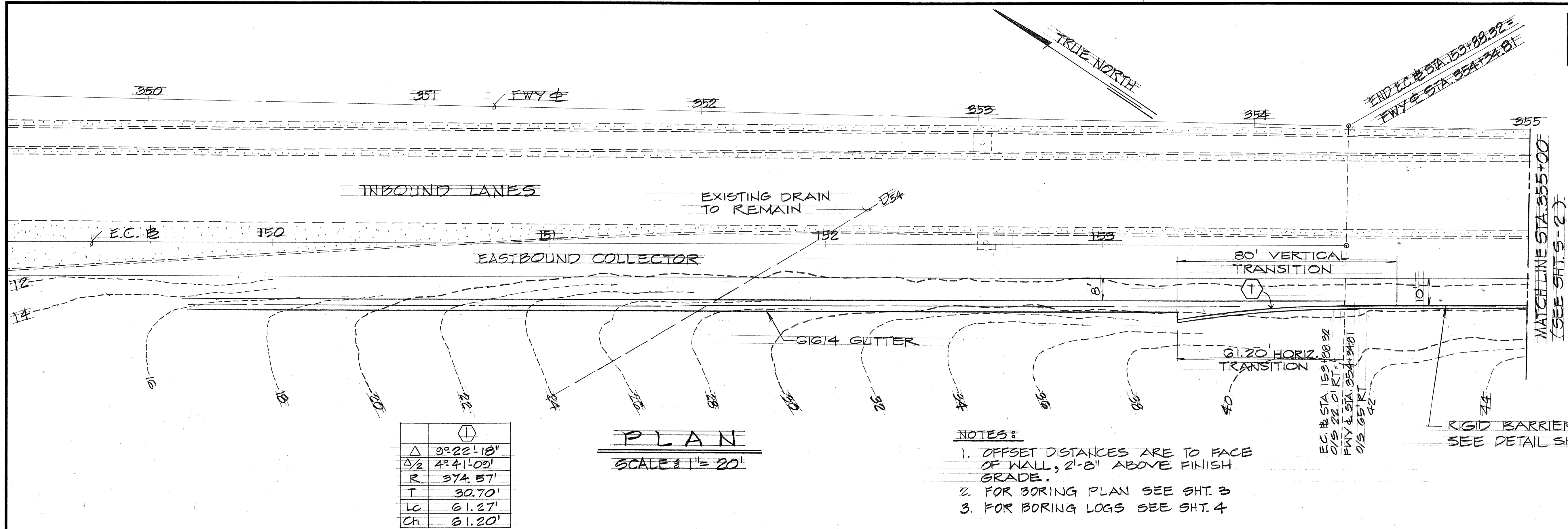


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F.F.F-078-116	1977	95	147



11/21/77
DATE

ADDED RIGID BARRIER (TYPE A)
DELETED RETAINING WALL NO. 4
REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

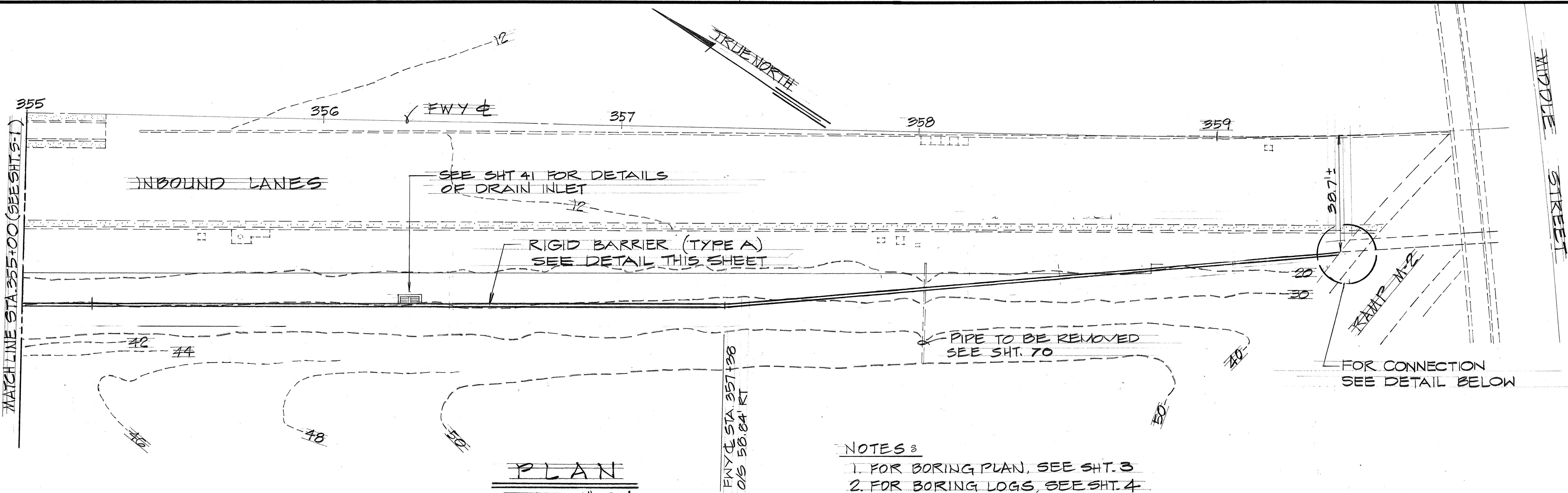
**RIGID BARRIER (TYPE A)
PLAN**

MOANALUA ROAD
PUULOA I.C. TO MIDDLE ST.-UNIT 1A
P.A. Proj. No. F.F.F-078-1(16)

SCALE: AS SHOWN DATE: DEC. 17, 1976
SHEET No. 9-1 OF 18 SHEETS

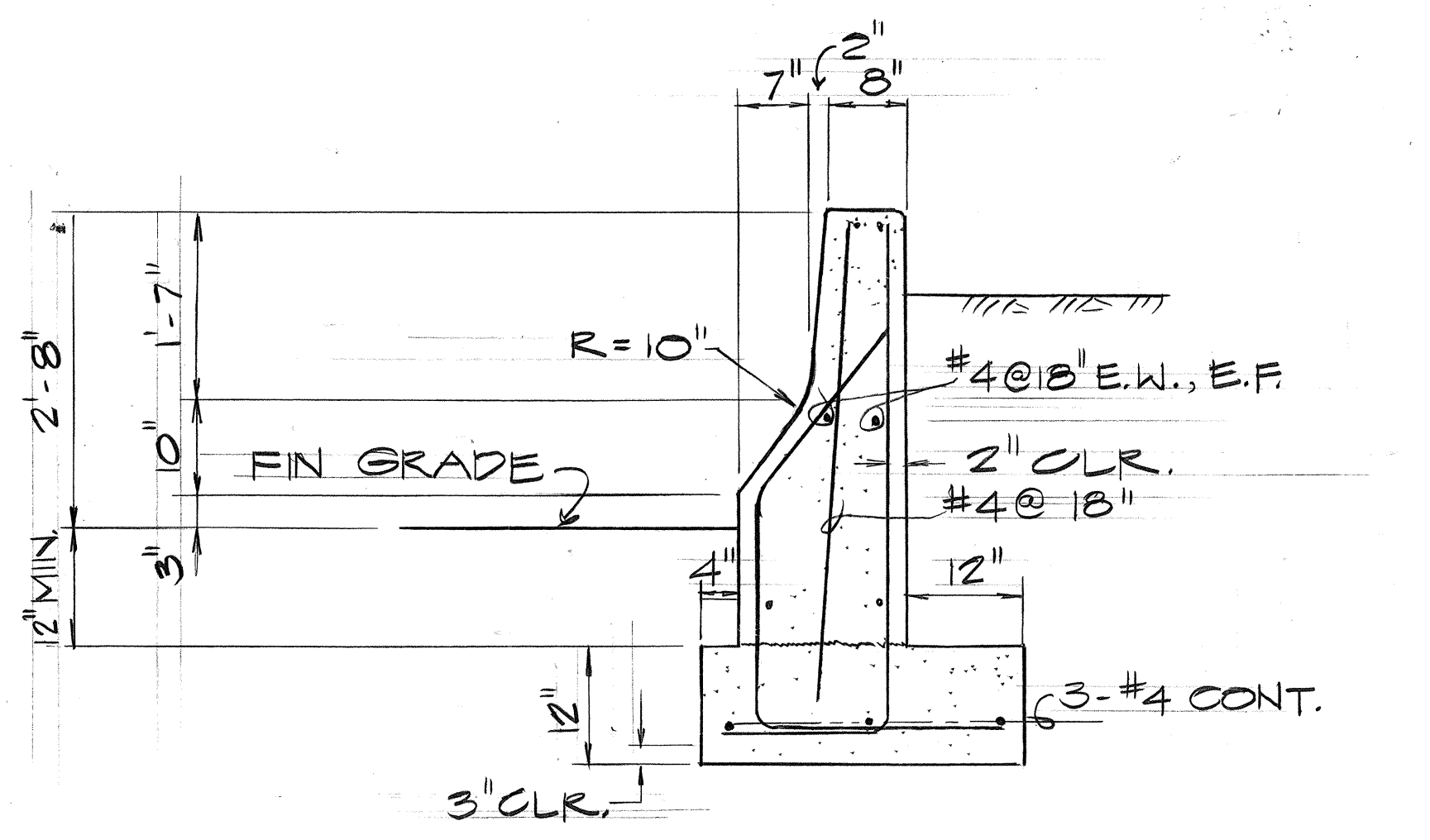
DATE	11/21/77
SURVEY PLOTTED BY	...
DRAWN BY	...
TRACED BY	...
NOTED BY	...
CHECKED BY	...
ORIGINAL PLAN	...
NOTE BOOK	...
NO.	...

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FF-078-1(16)	1977	96	147

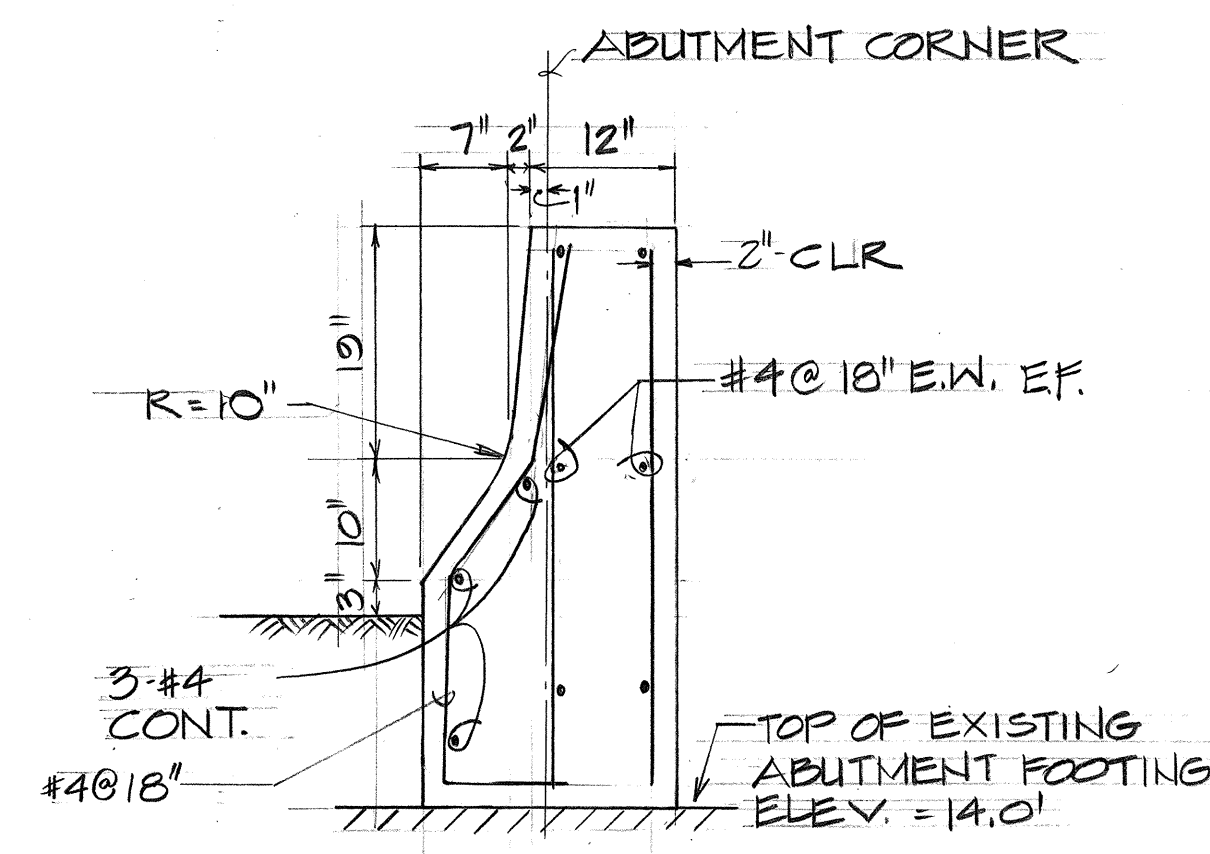


PLAN
SCALE: 1" = 20'

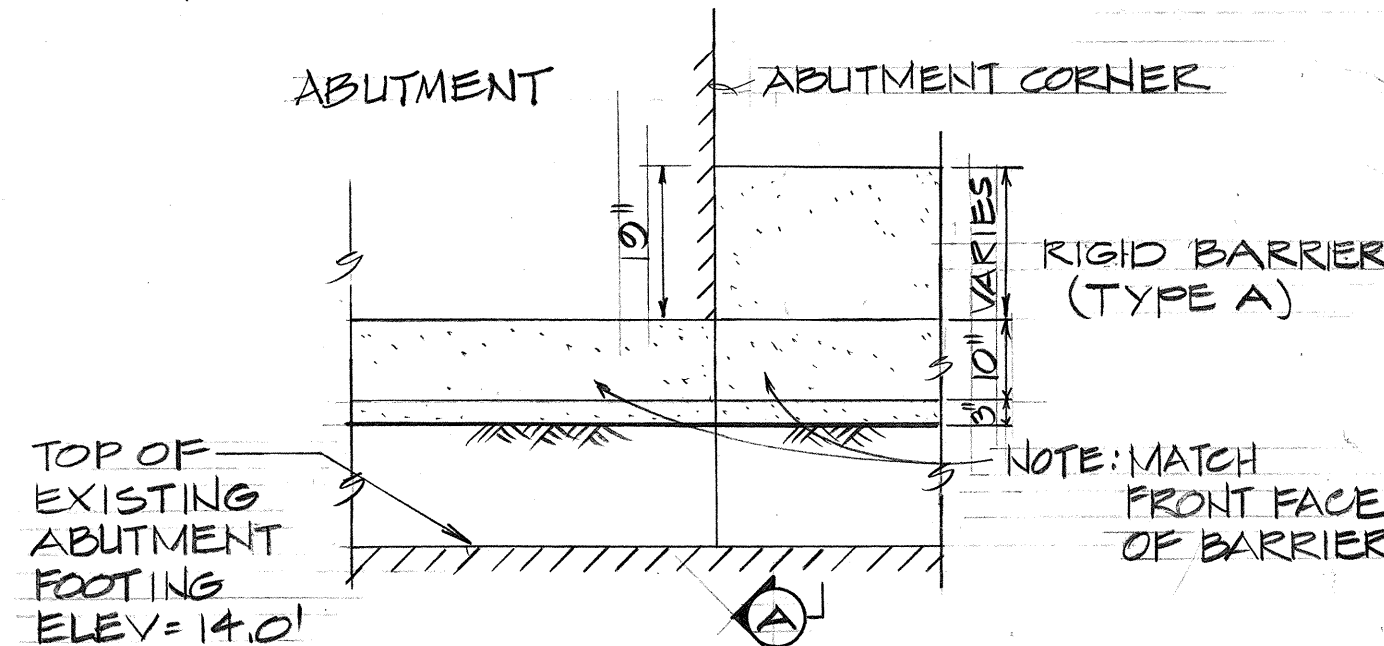
- NOTES:**
1. FOR BORING PLAN, SEE SHT. 3
 2. FOR BORING LOGS, SEE SHT. 4
 3. FOR DETAIL PLAN OF ROADWAY SEE SHT. 15
 4. FOR GRADING AND DRAINAGE PLAN SEE SHEETS CO. 32 & CO 32 5-1
 5. SEE DT 521 FOR EXPANSION AND CONTROL JOINTS (SHT. 146)



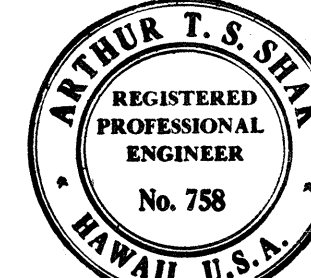
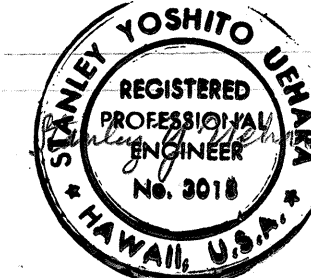
RIGID BARRIER (TYPE A)
SCALE: 3/4" = 1'-0"



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



DETAIL (FRONT FACE OF WALL)
SCALE: 1/2" = 1'-0"



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RIGID BARRIER (TYPE A)
PLAN AND DETAILS
MOANALUA ROAD
PUULOA I.C. TO MIDDLE ST. - UNIT 1A
P.A. Proj. No. F.F-078-1(16)

SCALE: AS SHOWN
DATE: DEC 17, 1976
SHEET NO. 3-2 OF 18 SHEETS

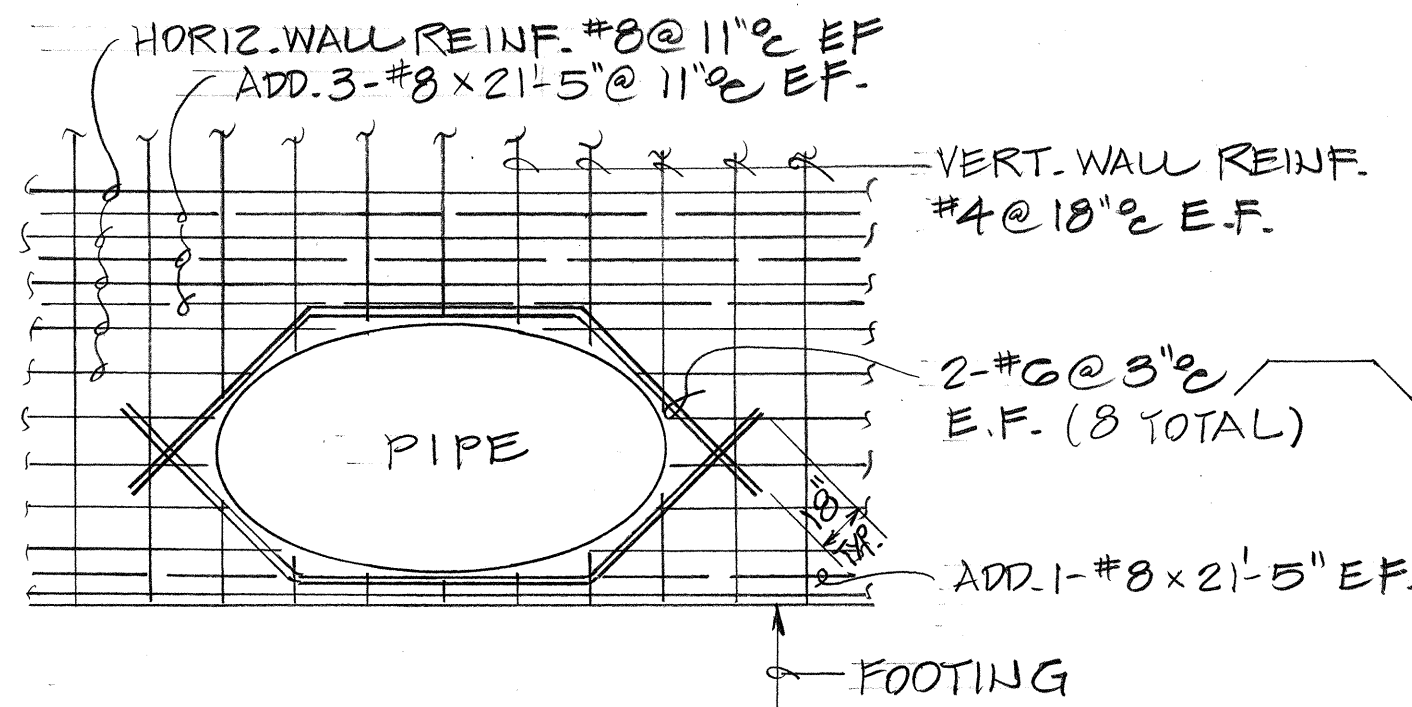
Arthur T. S. Shak
THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION.

11/21/77	DELETED RETAINING WALL AND ADDED RIGID BARRIER
DATE	REVISION

SURVEY PLOTTED BY	DATE
ORIGINAL PLAN	
DESIGNED BY	
CHECKED BY	
NO.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FF-078-1(16)	1977	97	147

SCHEDULE OF DIMENSIONS AND REINFORCING STEEL													
MK No.	4	11	12	14	16	18	21	23	25	27	29a	29b	30
a	1'-0"	3'-0"	3'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"
b	—	—	—	—	0'-7"	1'-0"	1'-0"	2'-4"	1'-3"	1'-10"	2'-2"	2'-0"	2'-1"
d	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	2'-0"	2'-0"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"
+	0'-9"	1'-3"	1'-6"	1'-9"	1'-9"	2'-0"	2'-3"	2'-6"	2'-9"	3'-3"	3'-3"	3'-3"	3'-3"
L	3'-6"	7'-4"	9'-11"	9'-10"	10'-0"	12'-2"	13'-8"	15'-0"	19'-0"	21'-5"	24'-0"	21'-6"	24'-5"
BATTER	0:12	0:12	0:12	½:12	½:12	½:12	½:12	½:12	¾:12	¾:12	¾:12	¾:12	¾:12
"a" BAR	#4@18"	#5@12"	#5@12"	#6@10"	#6@9"	#6@9"	#6@9"	#6@9"	#7@8"	#7@9"	#7@9"	#7@9"	#7@8"
"b" BAR	—	—	—	—	—	—	#6@17"	#7@16"	#7@14"	#7@13"	#7@11"	#7@11"	#7@10"
"c" BAR	—	#5@18"	#6@16"	#6@18"	#7@18"	#9@18"	#10@17"	#10@16"	#10@14"	#10@13"	#10@11"	#10@11"	#10@10"
"d" BAR (SHORT)	#4@18"	#5@18"	#6@16"	#6@18"	#7@18"	#9@18"	#10@17"	#10@16"	#10@14"	#10@13"	#10@11"	#10@11"	#10@10"
"d" BAR (LONG)	—	#5@18"	#6@16"	#6@18"	#7@18"	#9@18"	#10@17"	#10@16"	#10@14"	#10@13"	#10@11"	#10@11"	#10@10"
"e" BAR	—	—	—	#4@18"	#4@18"	#5@18"	#8@17"	#8@16"	#8@14"	#8@13"	#8@11"	#8@11"	#8@10"
"f" BAR	—	—	—	—	—	—	#4@17"	#4@16"	#4@14"	#4@13"	#4@11"	#4@11"	#4@10"
C	2'-1"	2'-3"	3'-0"	3'-7"	3'-9"	4'-0"	3'-7"	4'-2"	5'-8"	6'-7"	6'-11"	6'-6"	6'-10"
d	—	0'-3"	0'-3"	0'-3"	0'-3"	0'-3"	1'-10"	3'-0"	3'-10"	4'-0"	5'-5"	4'-0"	5'-9"
Z1	—	1'-4"	1'-6"	1'-6"	2'-0"	3'-2"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"
Z2	—	—	—	—	—	—	3'-5"	3'-8"	4'-0"	4'-5"	4'-5"	4'-5"	4'-8"



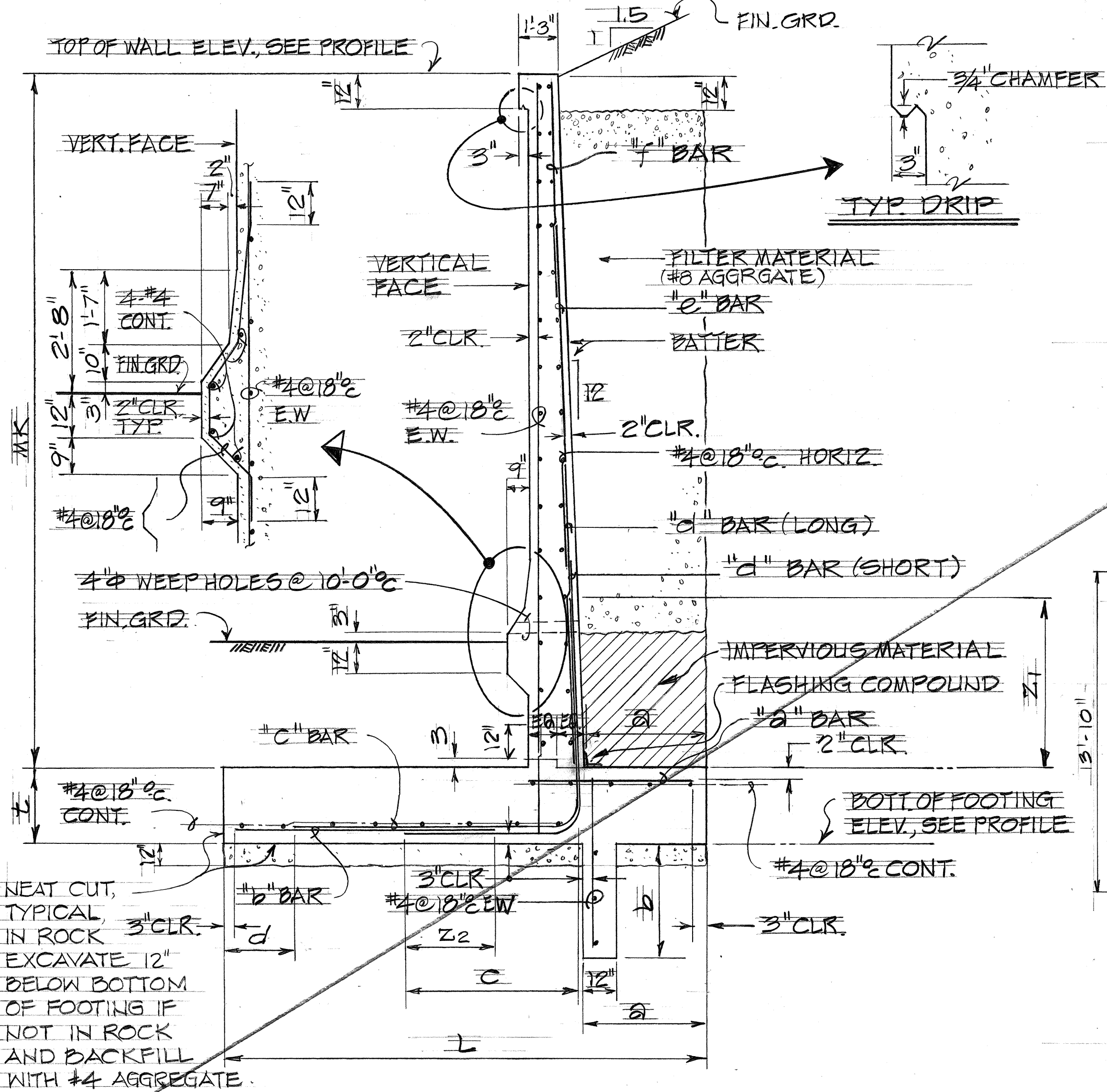
NOTE: ALL BARS 1" CLR. FROM PIPE WALL

HOLE REINFORCING
NOT TO SCALE

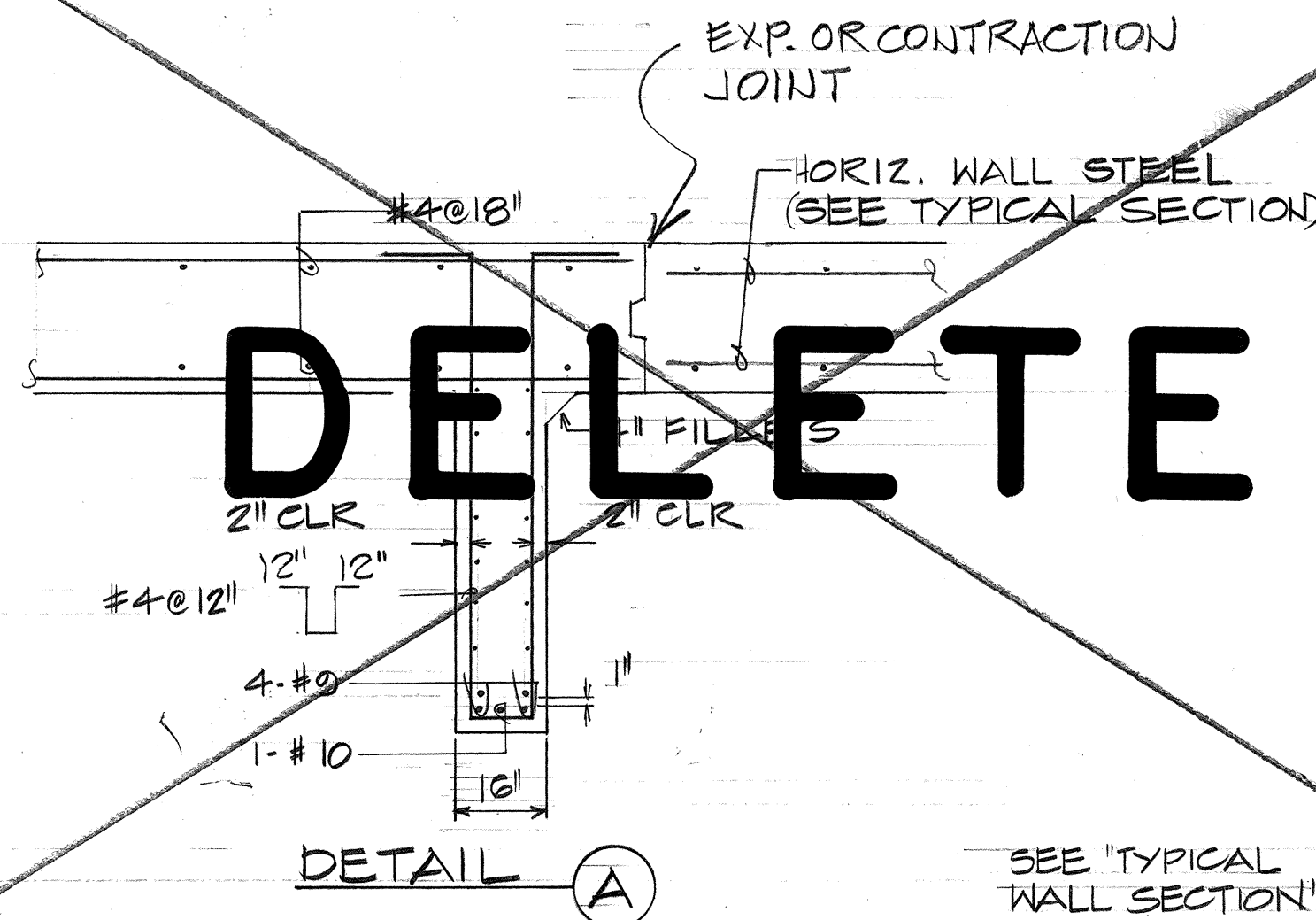
LEGEND
S SPLICE "e" & "f" BARS

SPLICES: S₁ = 3'-3"
S₂ = 1'-9"

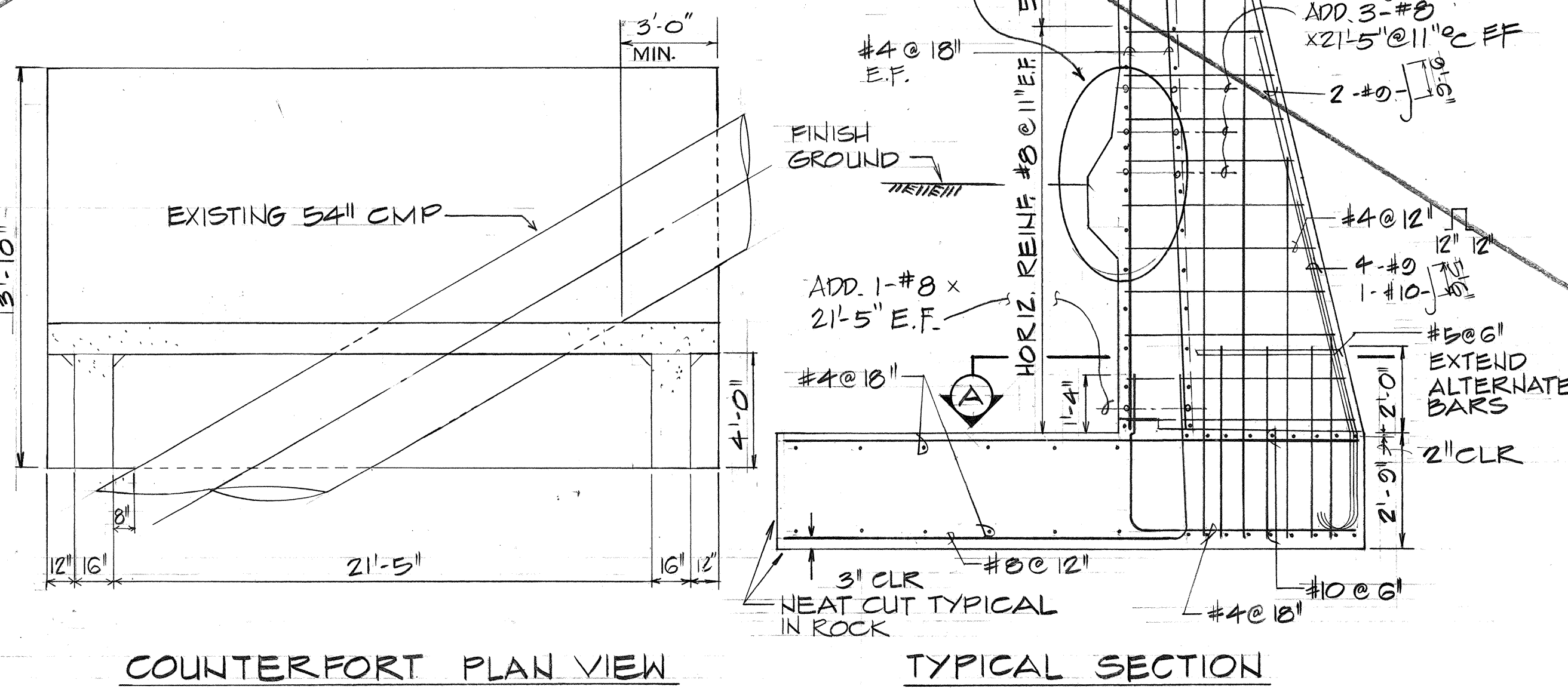
VERTICAL REINFORCING STEEL ARRANGEMENT



TYPICAL WALL SECTION
NOT TO SCALE

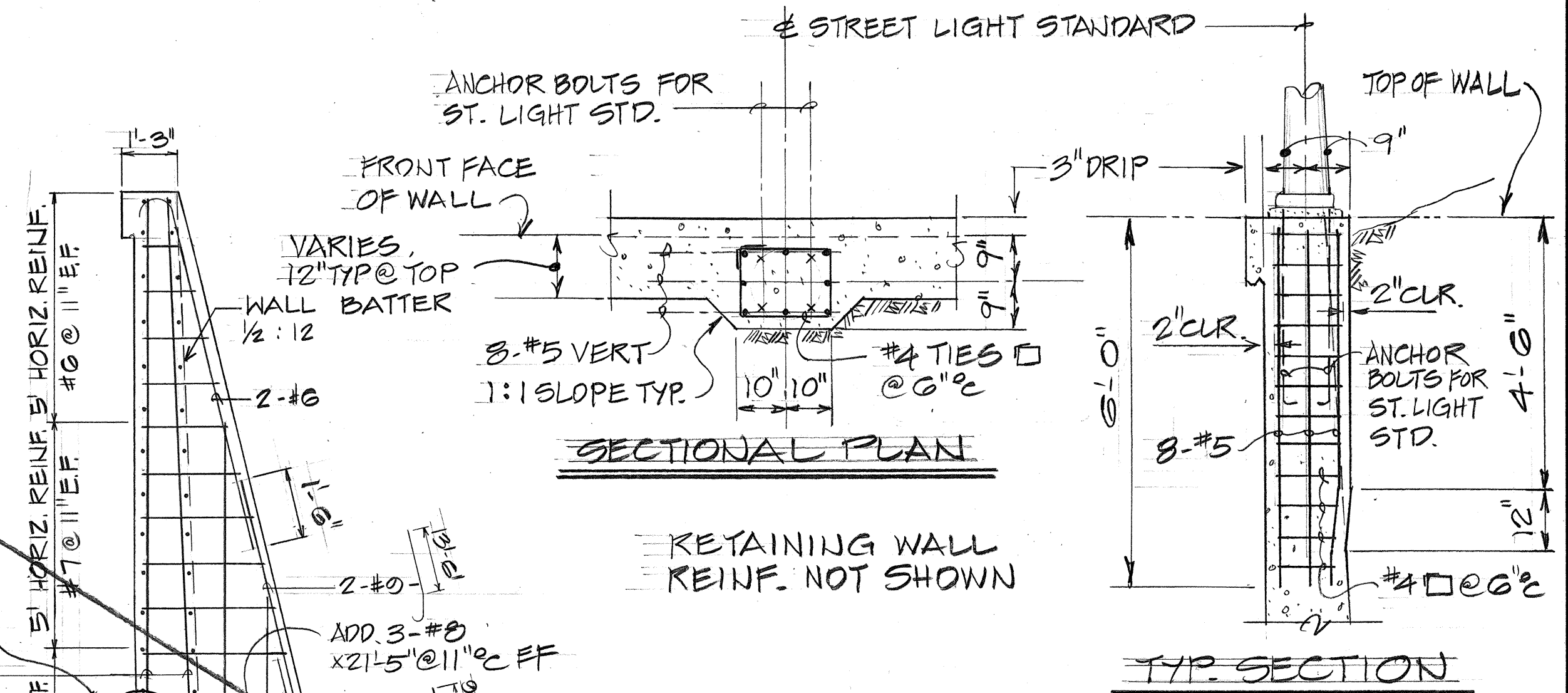


DETAIL A



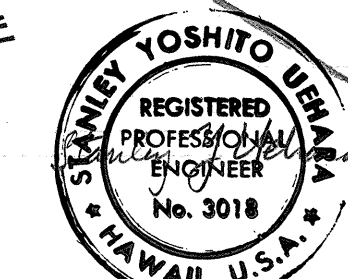
COUNTERFORT PLAN VIEW

COUNTERFORT WALL
NOT TO SCALE



SECTIONAL PLAN

STREET LIGHT STANDARD BASE
DETAILS AT RETAINING WALL
SCALE: 1/2" = 1'-0"

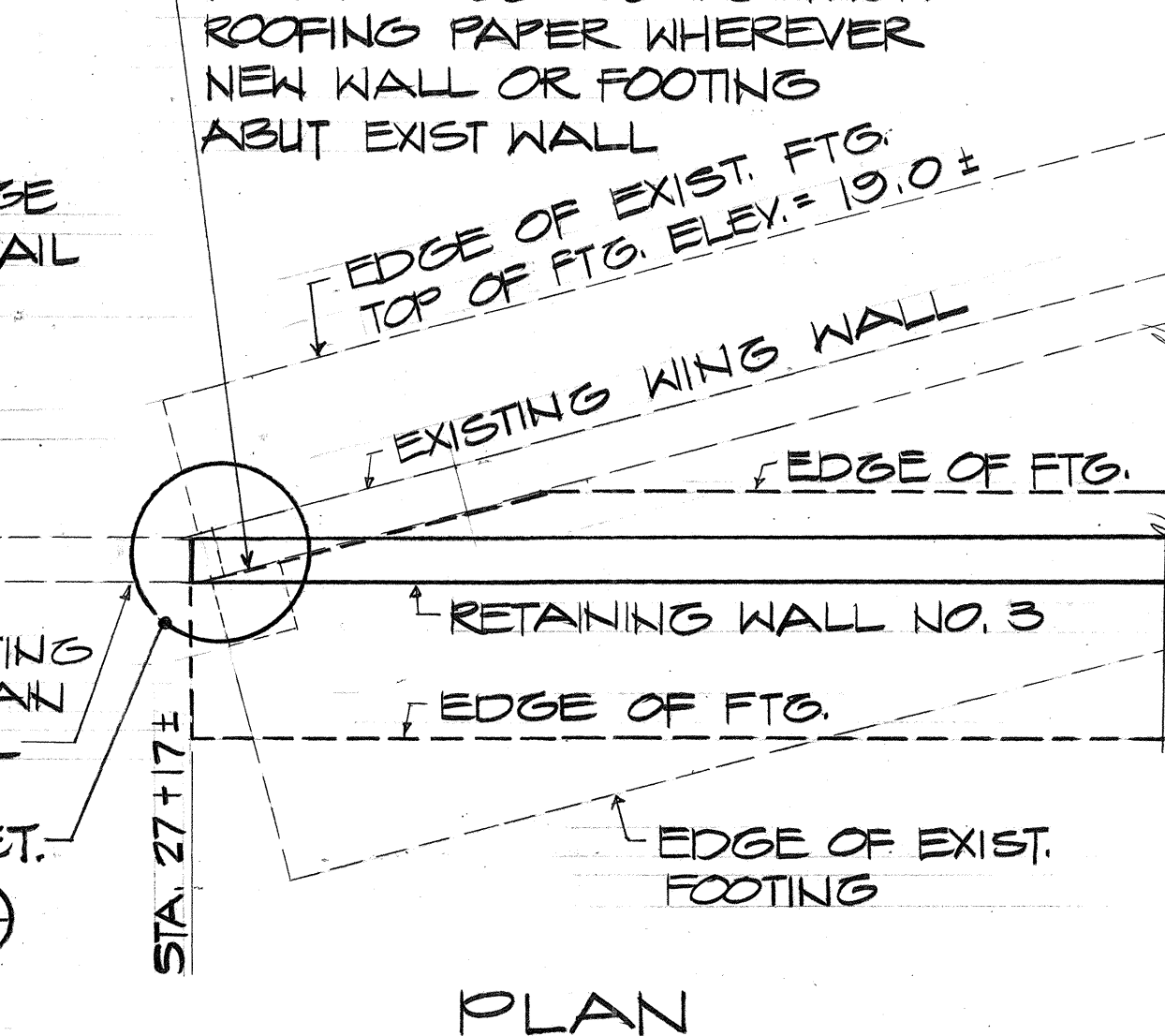
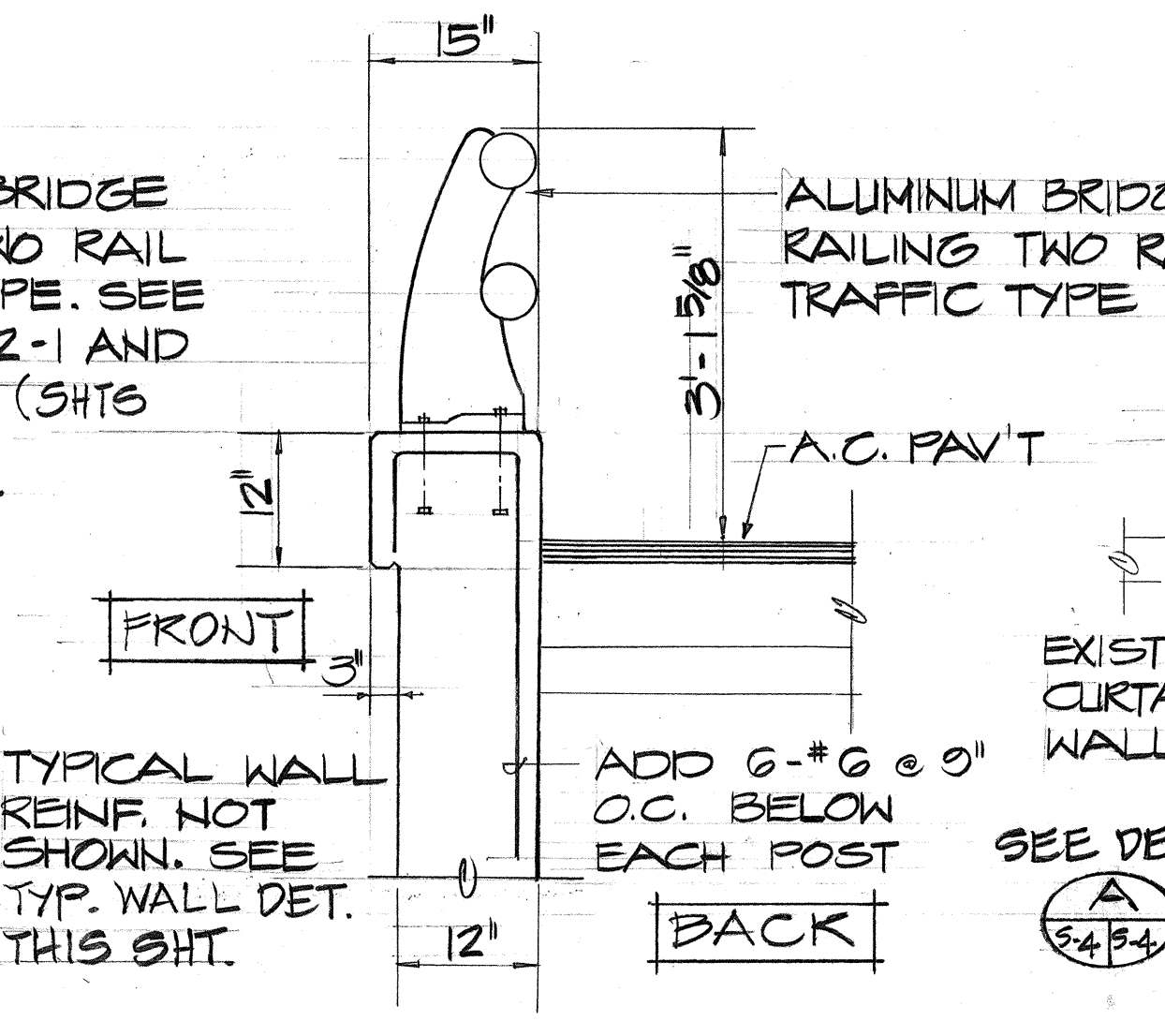
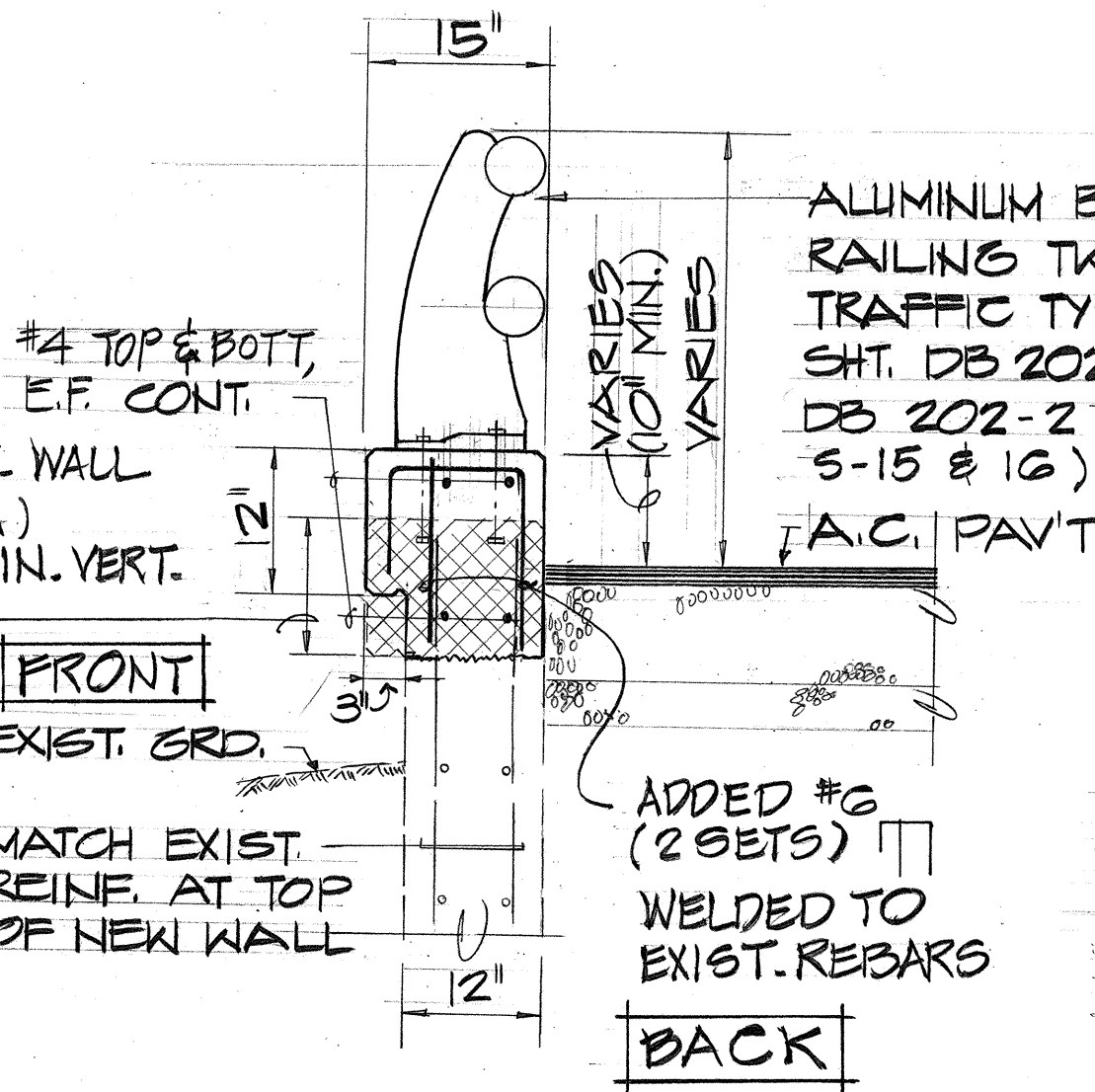
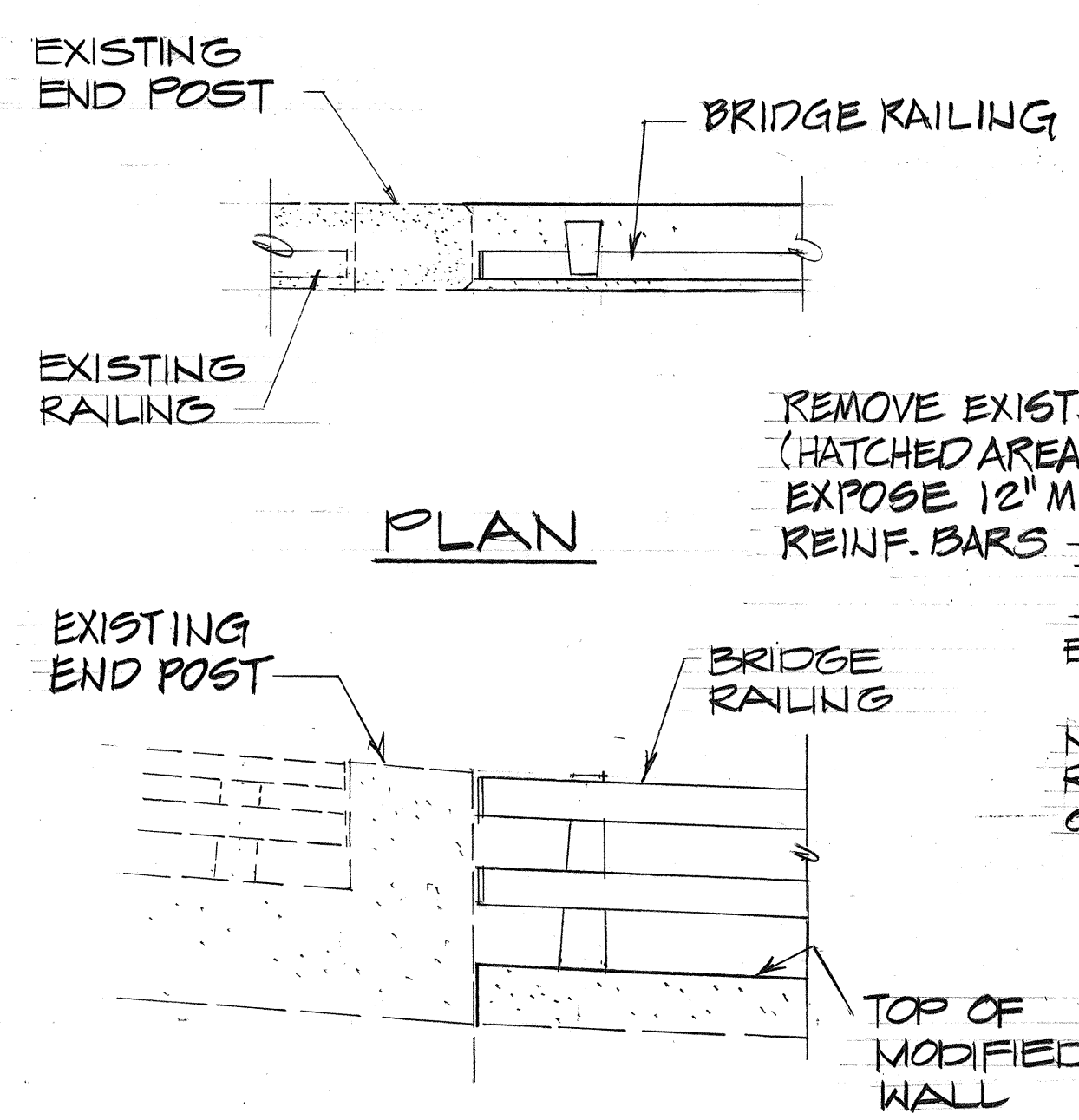
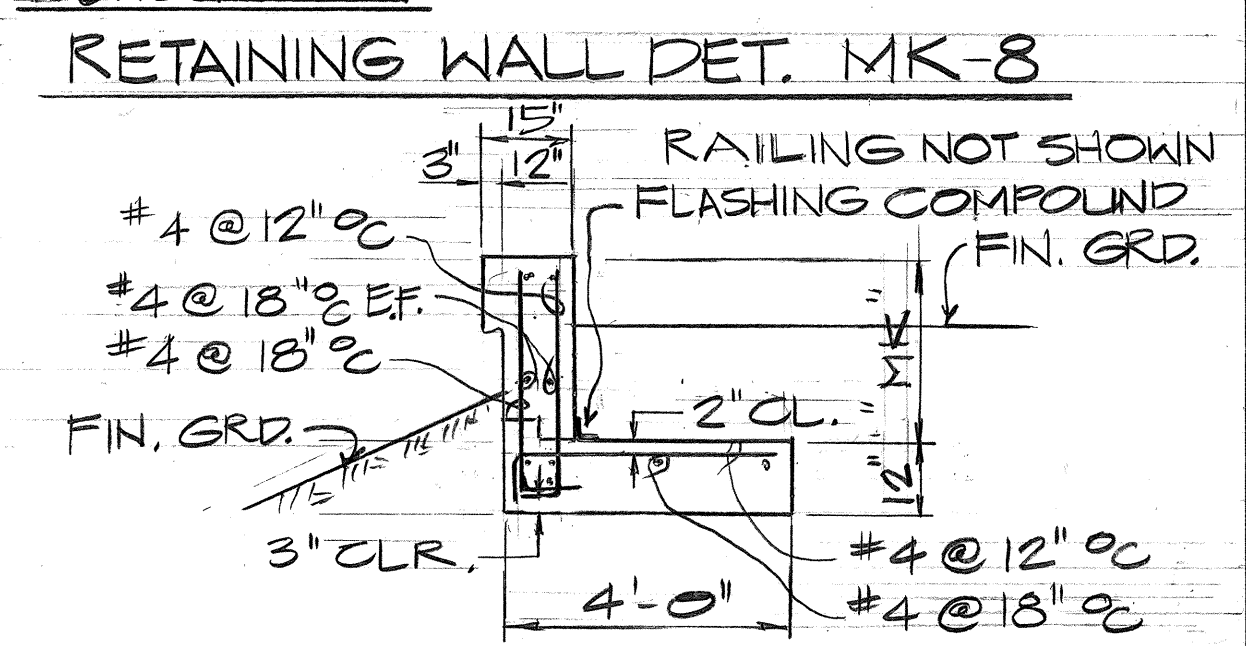
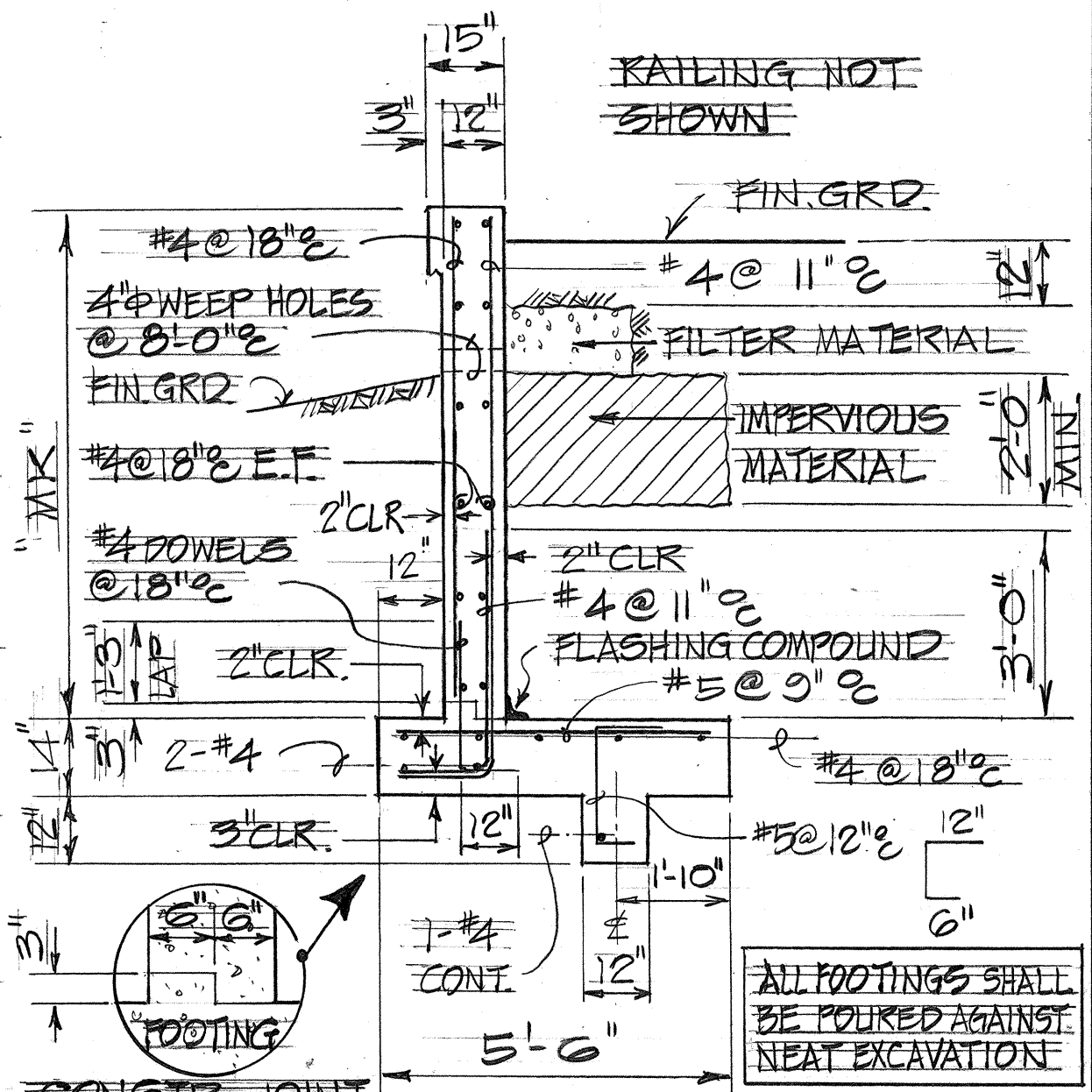
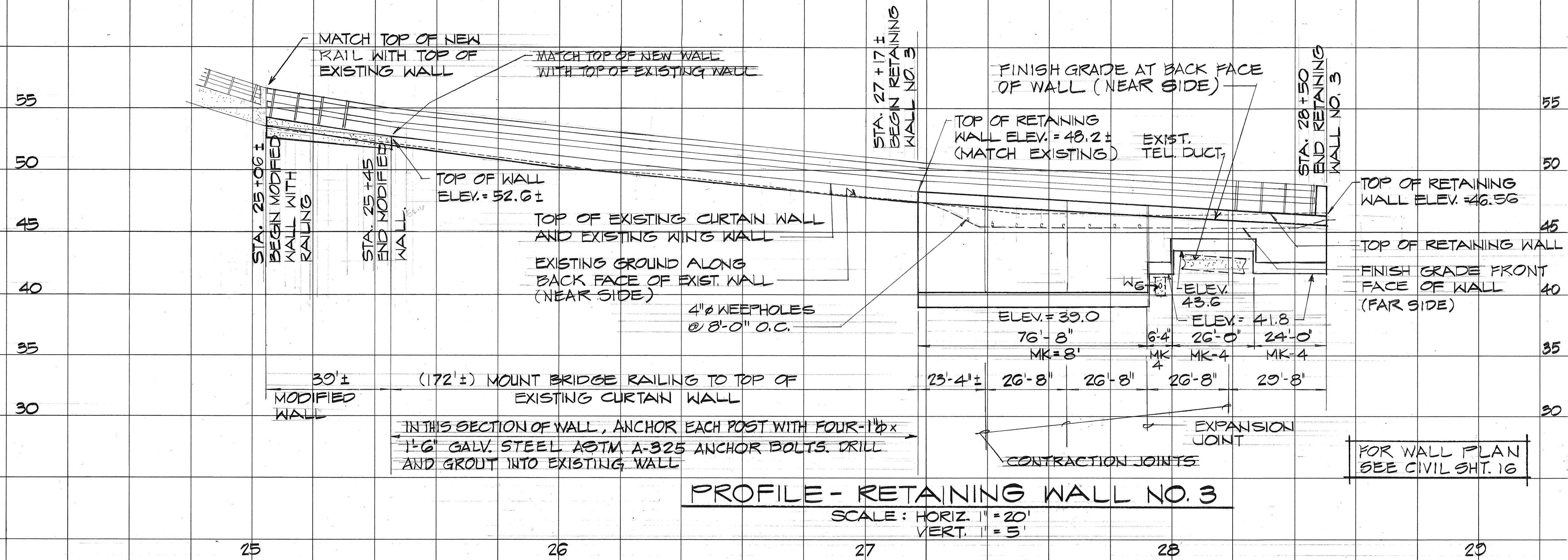


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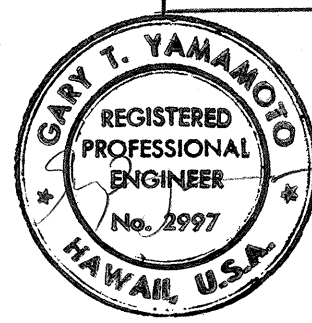
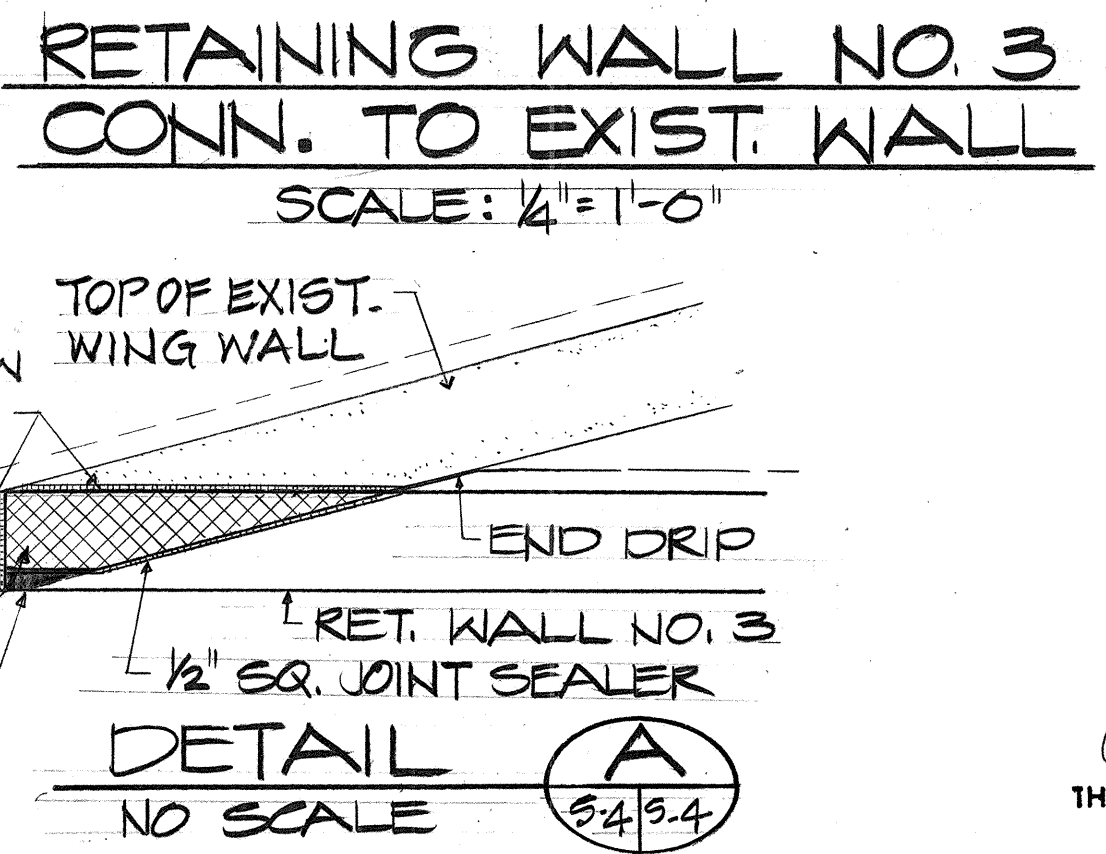
11/21/77	DELETED DETAILS
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
RETAINING WALL NO. 4	
DETAILS	
MOANALUA ROAD PUULOA I.C. TO MIDDLE ST. UNIT 1A P.A. Proj. No. F-FF-078-1(16)	
SCALE AS SHOWN DATE DEC. 17, 1976	
SHEET NO. 93 OF 18 SHEETS	

C.O. 97

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F.F.F-078-1(16)	1977	98	147



RETAINING WALL NO. 3 QUANTITY EST.				
ITEM NO.	ITEM	UNIT	QUANTITY	
206.40	STRUCTURE EXCAVATION FOR RETAINING WALLS	Cu.Yd.	219	
206.43	STRUCTURE BACKFILL FOR RETAINING WALLS	Cu.Yd.	170	
206.80	FILTER MATERIAL	Cu.Yd.	6	
503.04	CONCRETE IN RETAINING WALL NO. 3	Cu.Yd.	61	
507.16	METAL BRIDGE RAILING - TWO RAILS (TRAFFIC TYPE)	Lin.Ft.	341	
602.05	REINFORCING STEEL IN RETAINING WALL NO. 3	Lb	5037	



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**RETAINING WALL NO. 3
PROFILE & DETAILS**

MOANALUA ROAD
PUULOA I.C. TO MIDDLE ST. - UNIT 1A
P.A. PROJ. NO. F.F.F-078-1(16)
SCALE: AS SHOWN DATE: DEC. 17, 1976
SHEET NO. 3-4 OF 18 SHEETS

11/10/77	REVISED PROFILE, DETAILS AND QUANTITY EST.
DATE	REVISION

SURVEY PLOTTED BY: _____
DRAWN BY: _____
DESIGNED BY: _____
CHECKED BY: _____
ORIGINAL PLAN: _____
NOTE BOOK: _____
No. _____

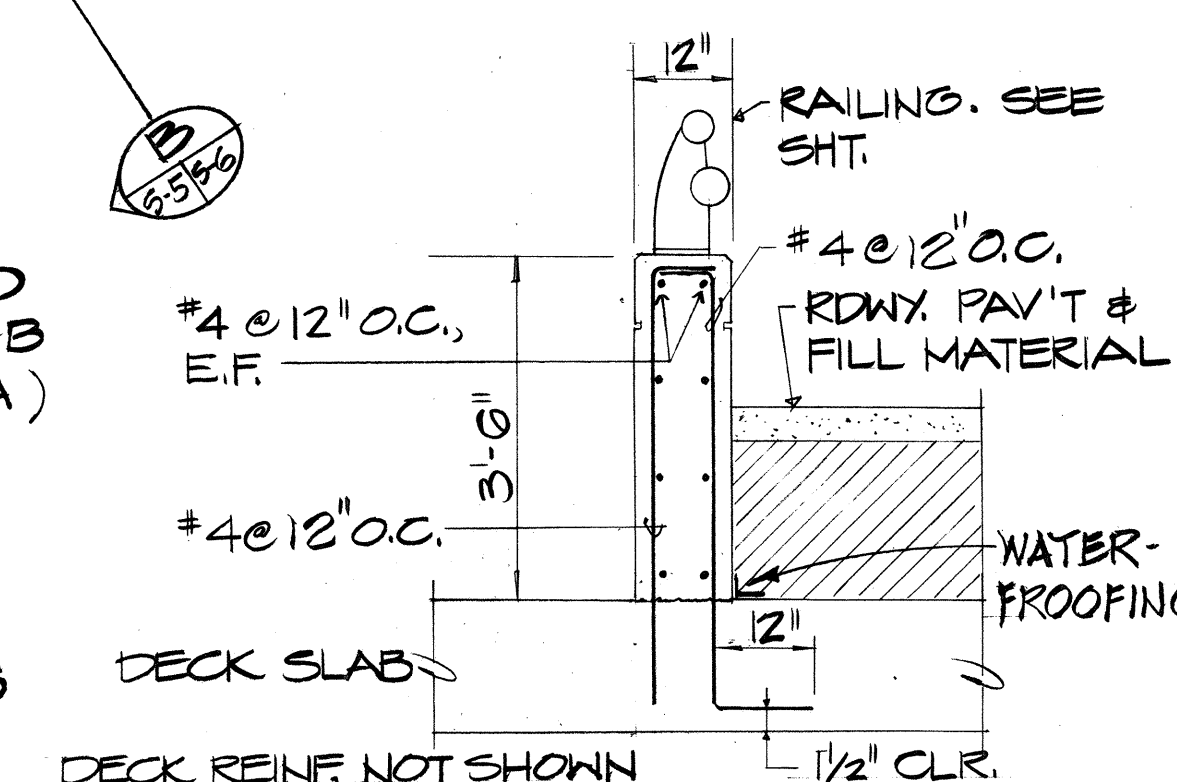
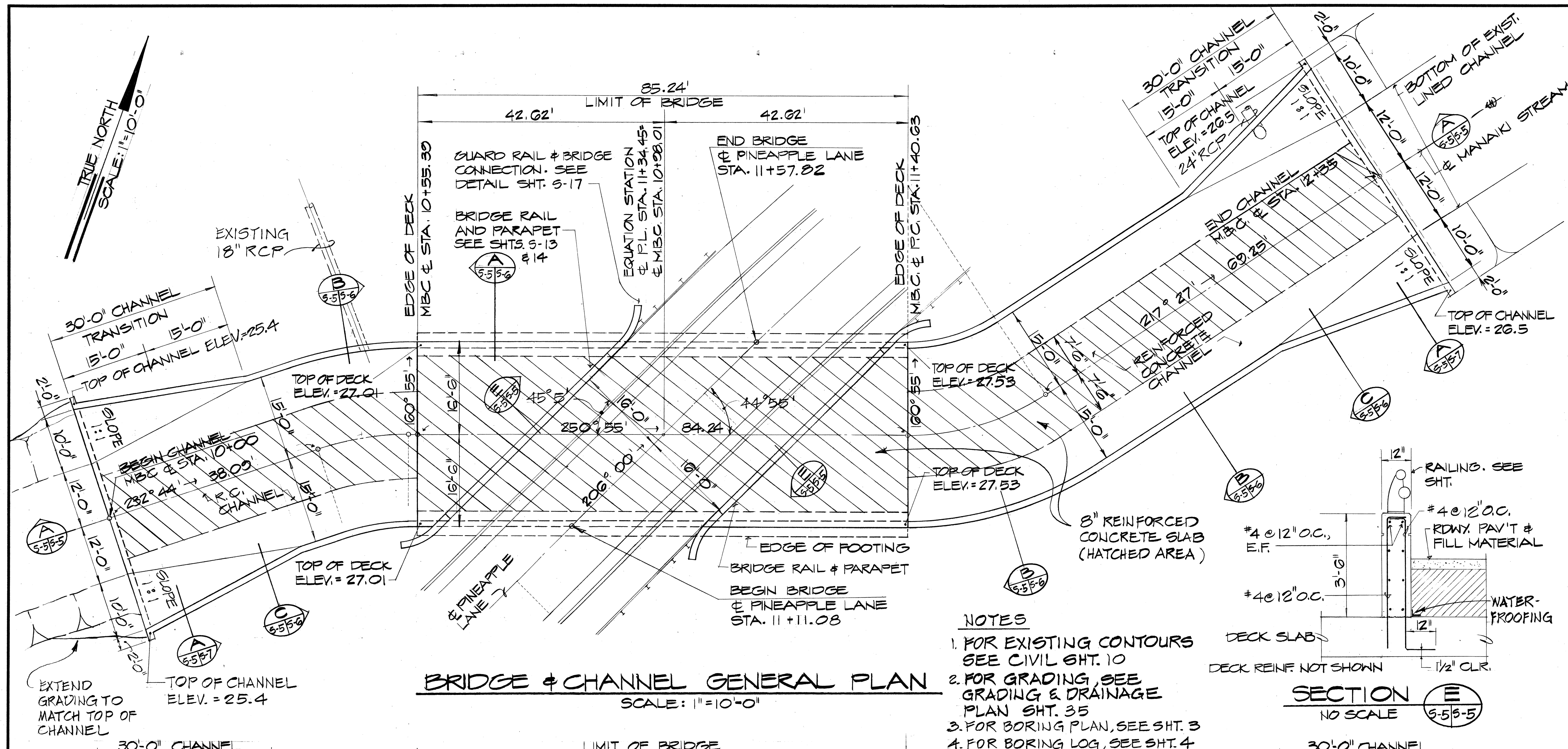
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F.F.F-078-1(16)	1977	99	147

DESIGN CRITERIA :

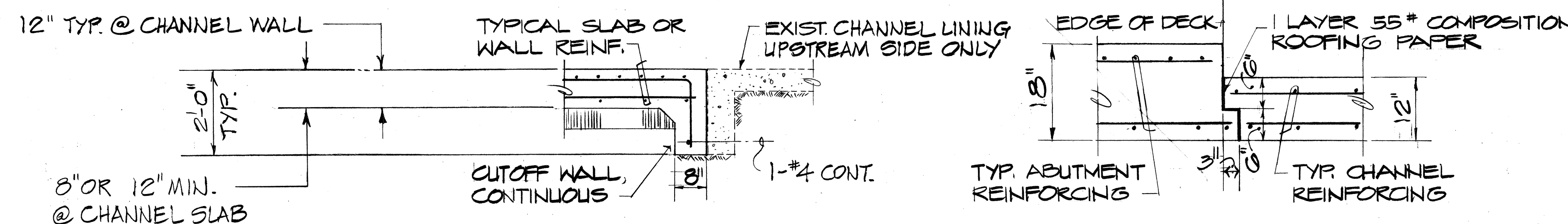
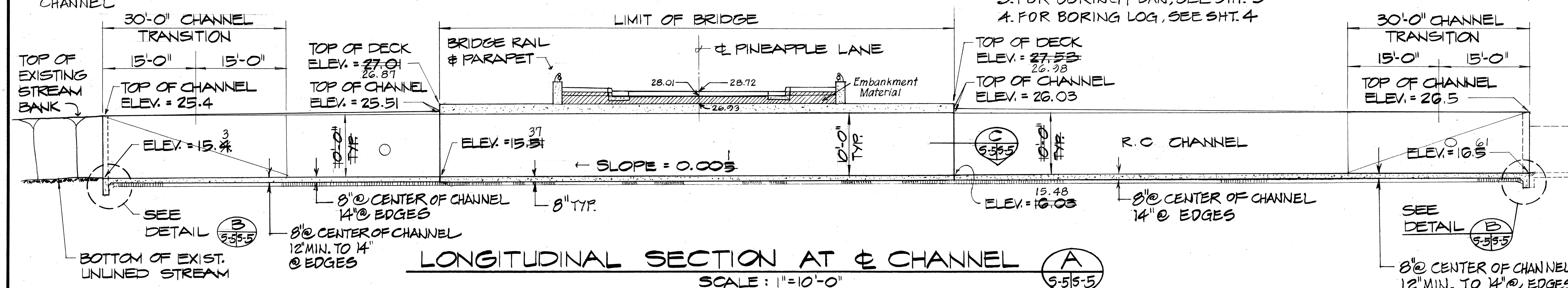
1. DESIGN LIVE LOAD : HS 20-44
2. SPECIFICATIONS : STD. SPECIFICATIONS FOR HIGHWAY BRIDGES, AASHTO, 1973, 11TH EDITION W/ SUBSEQUENT INTERIM SPECIFICATIONS.
3. ALLOWABLE FOUNDATION PRESSURE : 4000 PSF.
4. 28 DAY CONCRETE STRENGTH : $f'_c = 3000$ PSI
5. REINFORCING STEEL : ASTM A615, GRADE 40
6. EQUIVALENT FLUID PRESSURE : 37 PCF

NOTES:

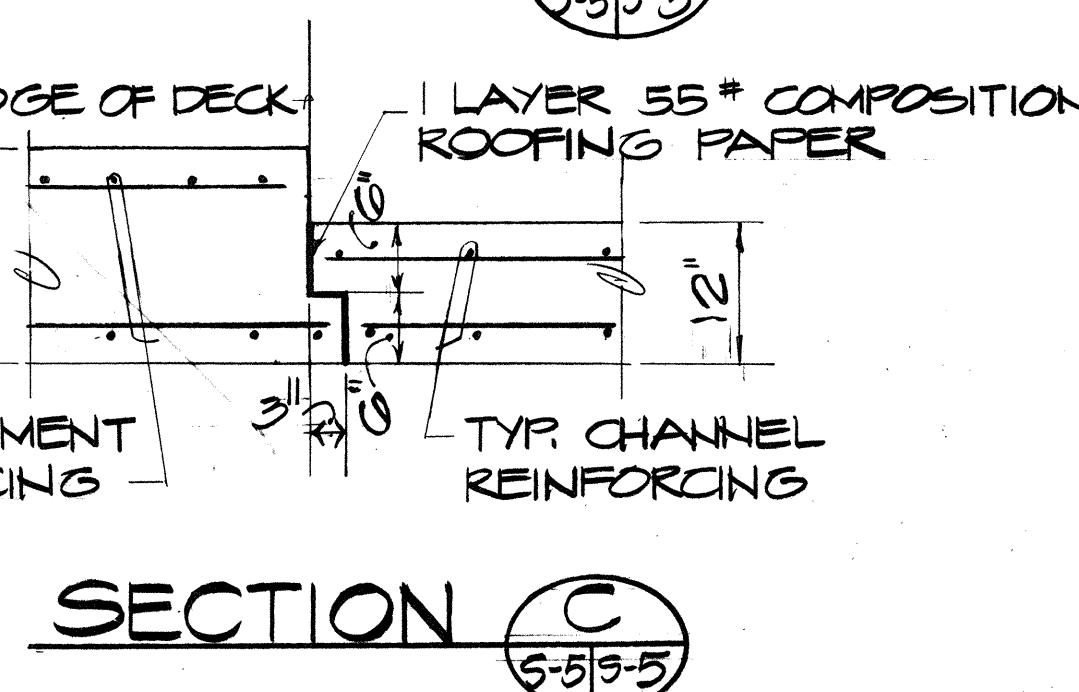
1. REFER TO CIVIL DWGS. FOR PINEAPPLE LN.
E AND CHANNEL E CONTROLS.
2. WEEPHOLE PIPES, WATERPROOFING, ROOFING
FELT CONSIDERED INCIDENTAL TO
CLASS A CONCRETE.
3. PROVIDE 1" CHAMFER FOR ALL EXPOSED
EDGES.
4. BACKFILLING:
 - a. NO BACKFILLING AGAINST SIDES UNTIL
THE CONCRETE FOR THE WALLS HAVE
CURED FOR A MINIMUM OF 15 DAYS.
 - b. FILL ON BOTH SIDES OF CHANNEL
SHALL BE PLACED SUCH THAT THE
DIFFERENCE IN HEIGHT OF FILL
SHALL NOT EXCEED 2 FEET AT
ANY TIME IN 25'-0" CHANNEL LENGTHS.
5. SEE SHT. 6-11 FOR TYP. STRUCTURAL
EXCAVATION & BACKFILL DETAILS.



SECTION E
NO SCALE 5-55-5



DETAIL B
9-55-5



SECTION C
5-55-5

BRIDGE QUANTITY ESTIMATES			
ITEM NO	ITEM	UNIT	QUANTITY
206.60	STRUCTURE EXCAVATION FOR BRIDGES	Cu.Yd.	394
206.80	FILTER MATERIAL	Cu.Yd.	101
503.0704	CONCRETE IN BRIDGES - MANAIKI BRIDGE	Cu.Yd.	337
507.15	METAL BRIDGE RAILING-TWO RAILS ON PARAPET	Ln. Ft.	120
507.70	CONC. BRIDGE PARAPET, INCLUDING END POST	Ln. Ft.	120
602.014	REINFORCING STEEL IN BRIDGES-MANAIKI BRIDGE	Lb.	46,335
603.90	BEDCOURSE MATERIAL FOR BOX CULVERTS & CHANNEL	Cu.Yd.	43

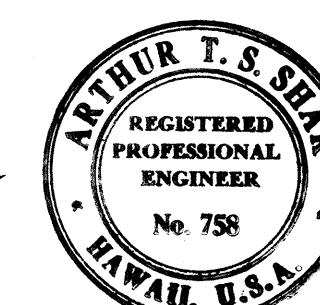
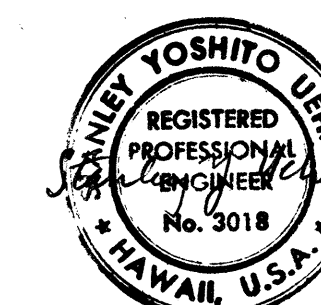
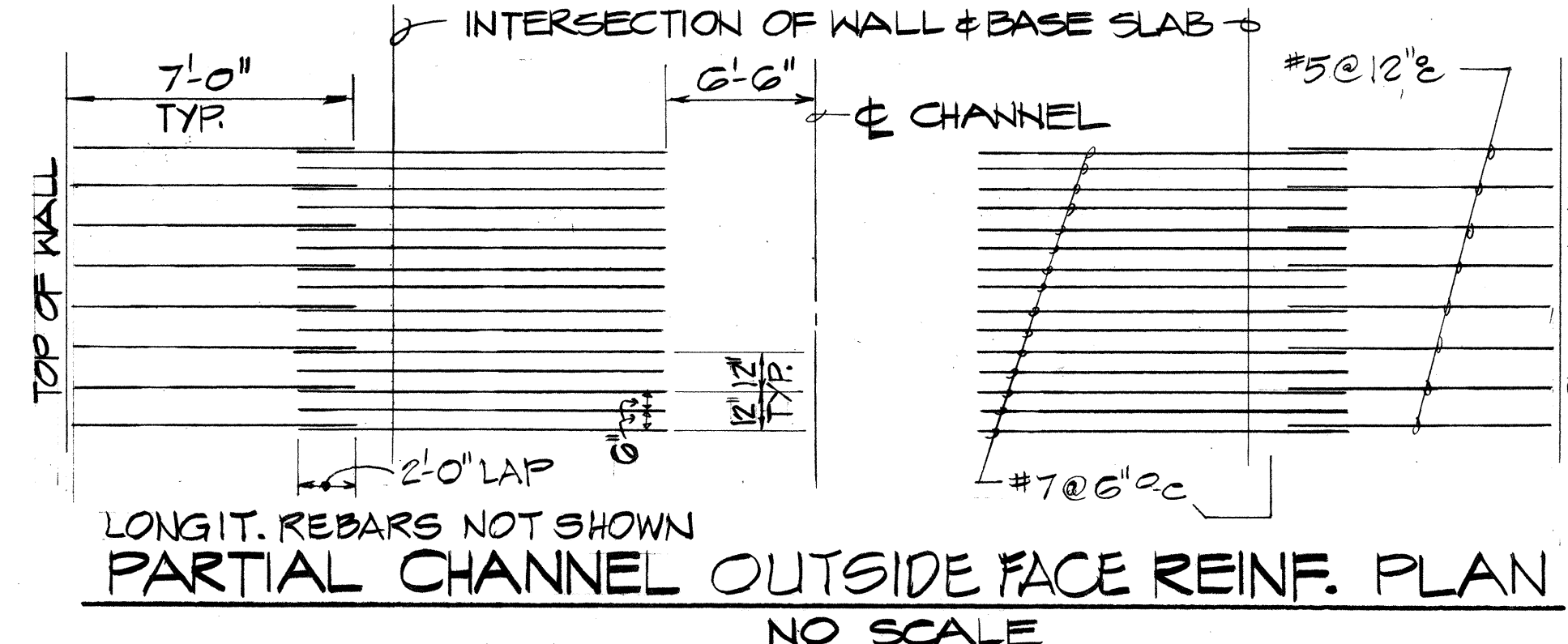
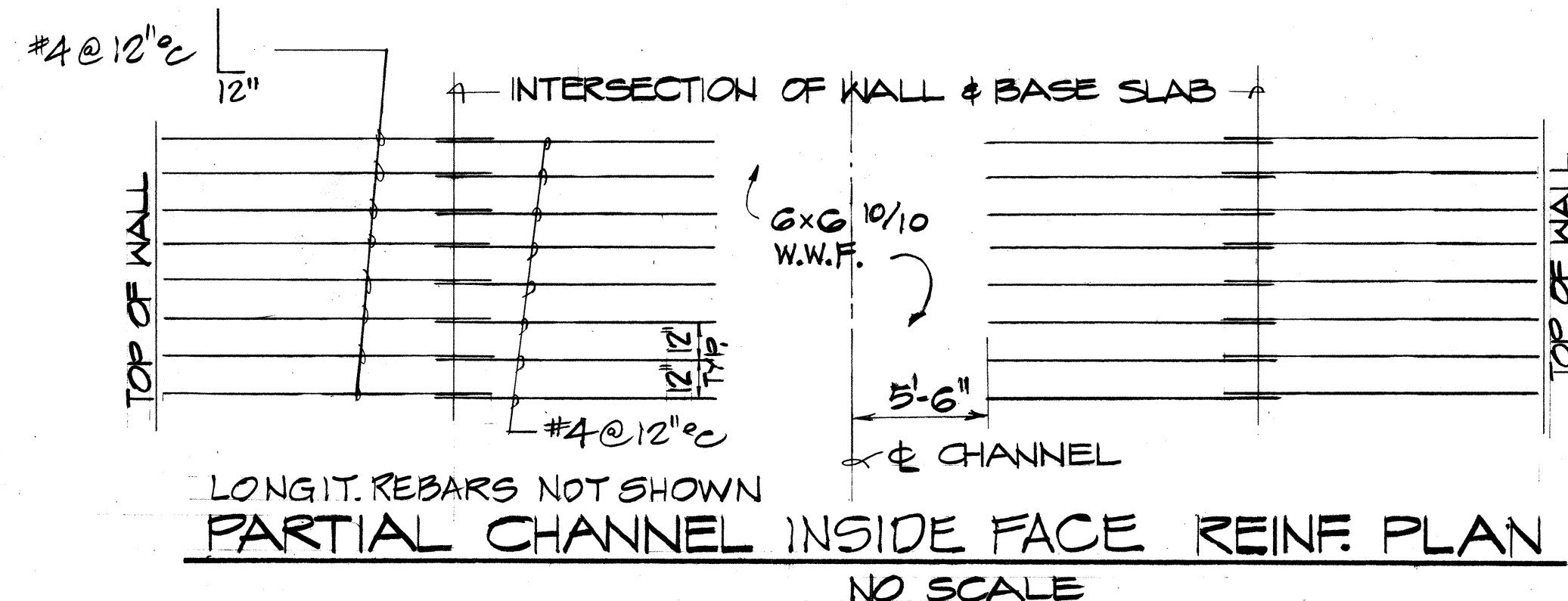
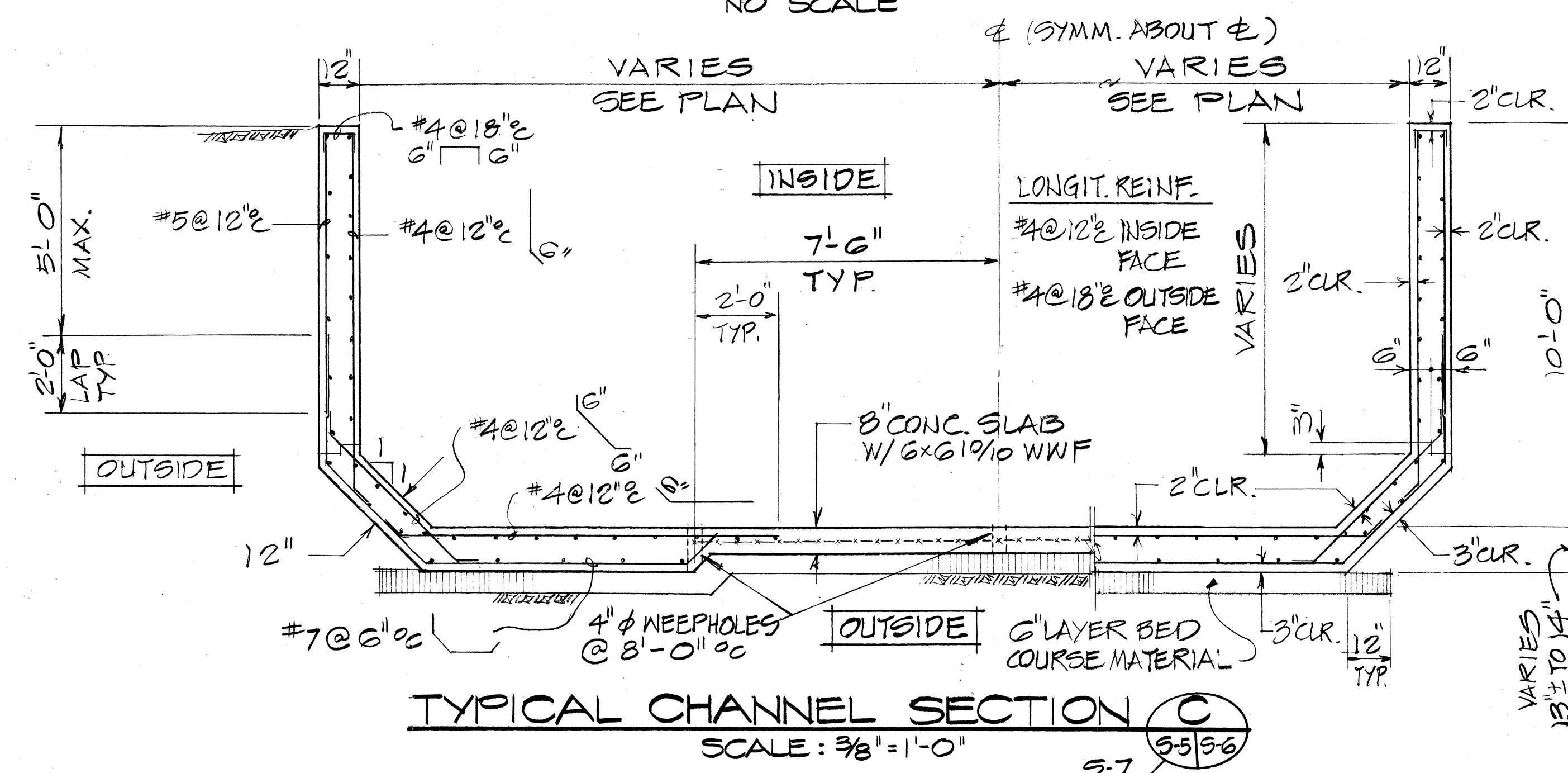
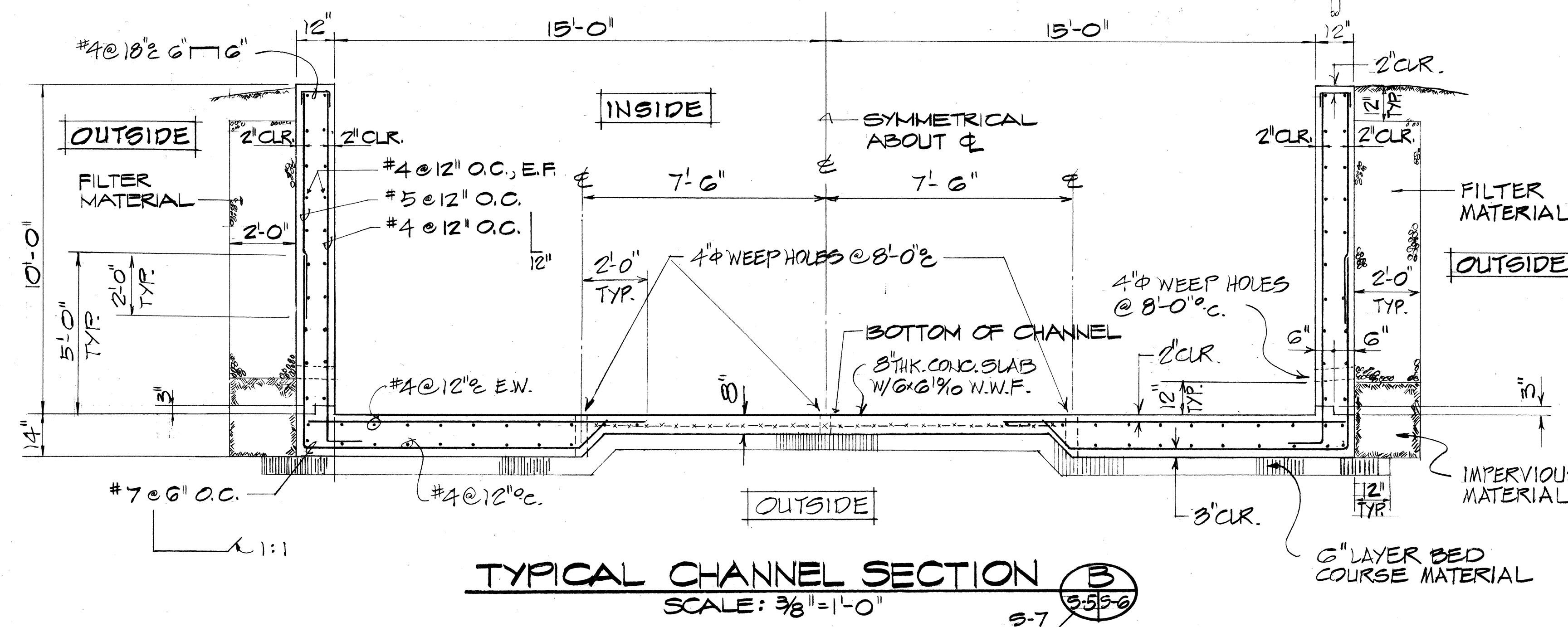
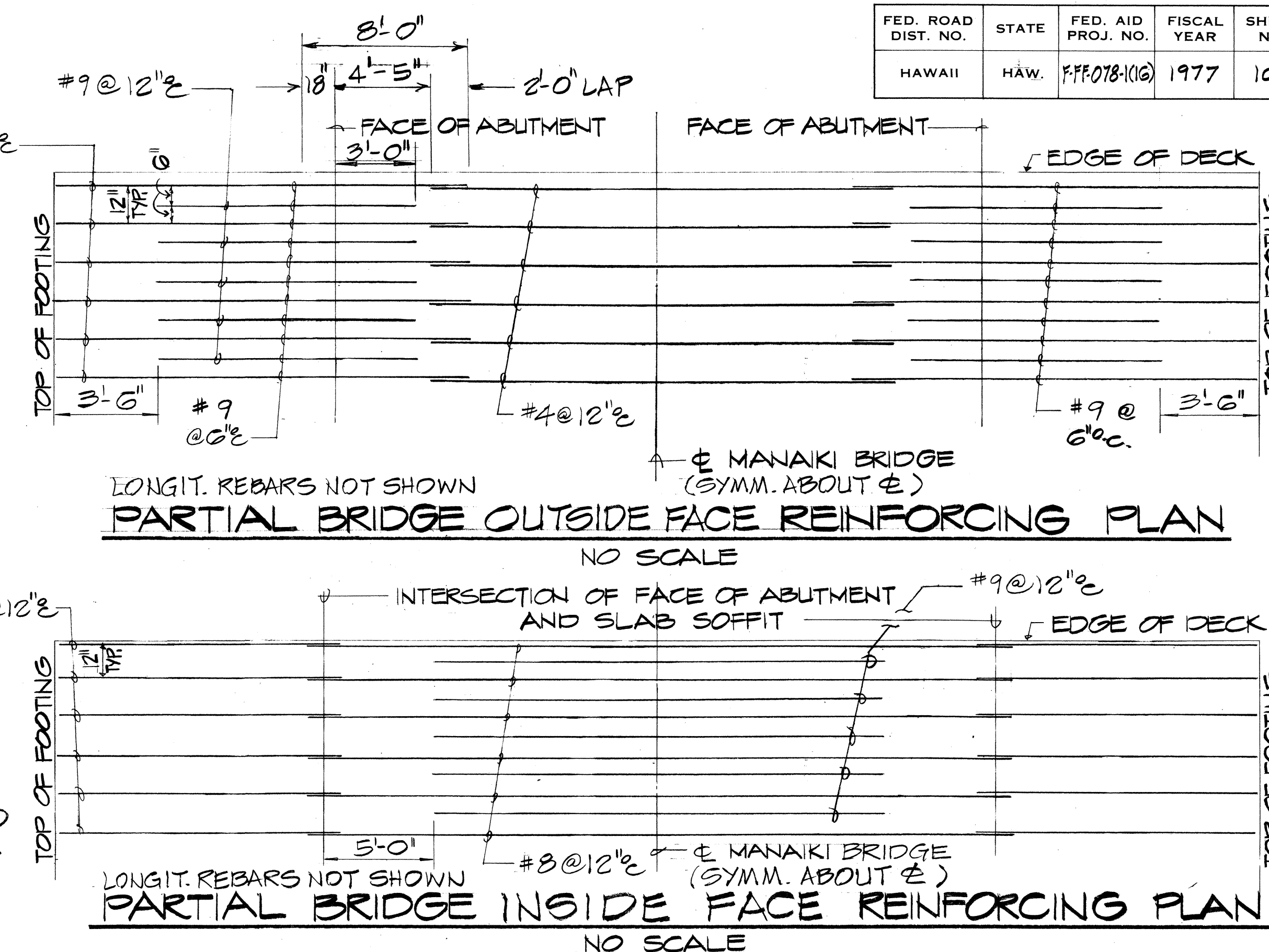
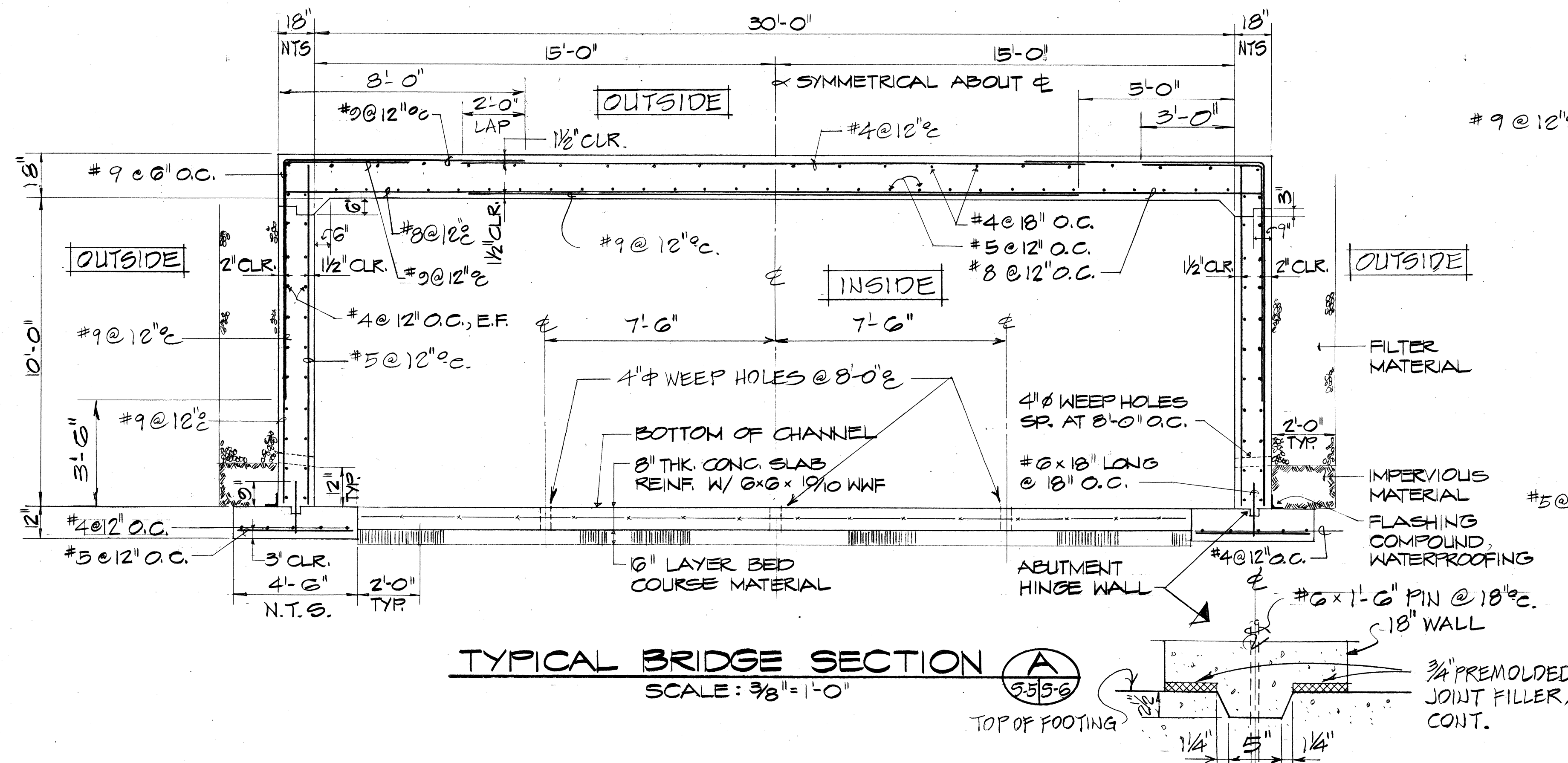
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MANAIKI BRIDGE AND CHANNEL GENERAL PLAN & DETAILS

MOANALUA ROAD
PUULOA I.C. TO MIDDLE ST. - UNIT 1A
E.A. Proj. No. F-PF-078-1 (16)
SCALE: AS SHOWN DATE: DEC. 17, 1976
SHEET NOS. 5 OF 18 SHEETS

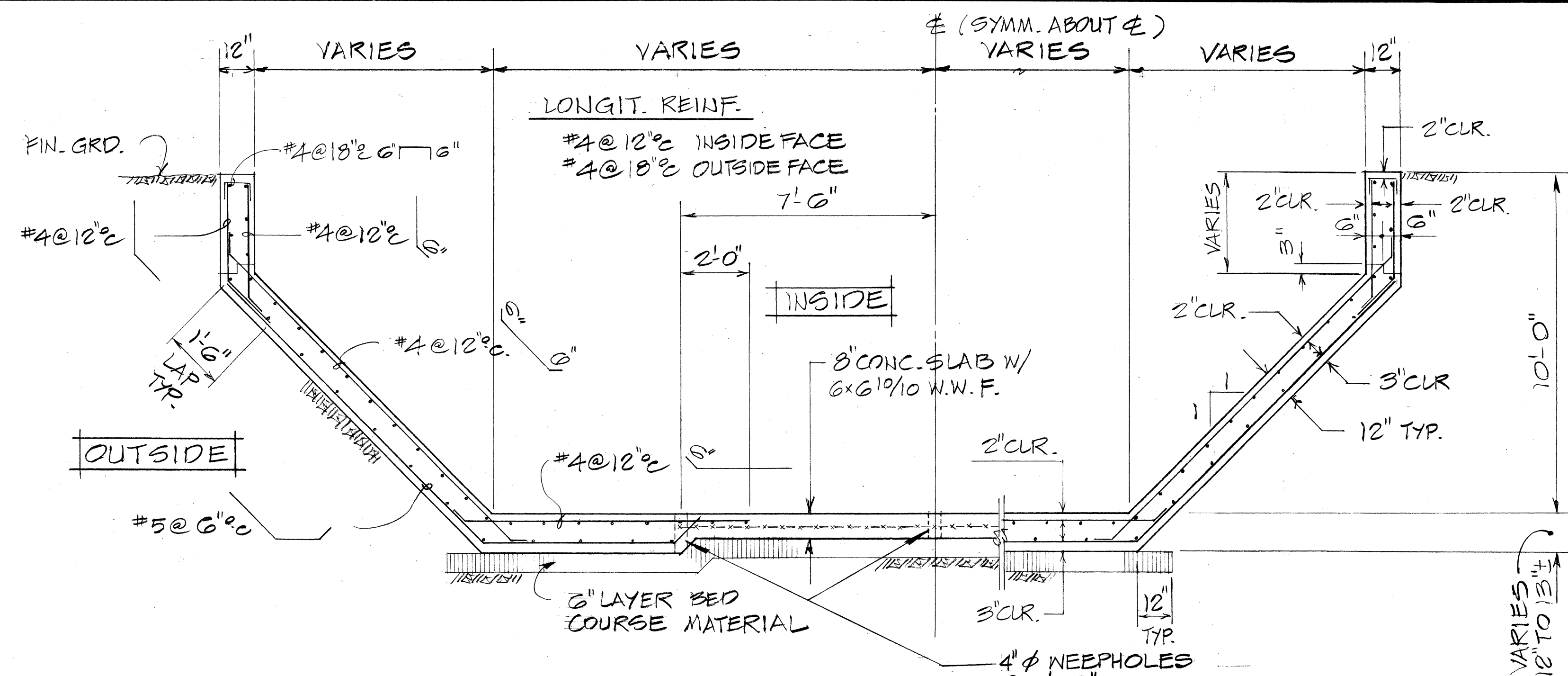
Arthur J. Shakk
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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FF-078-1(16)	1977	100	147

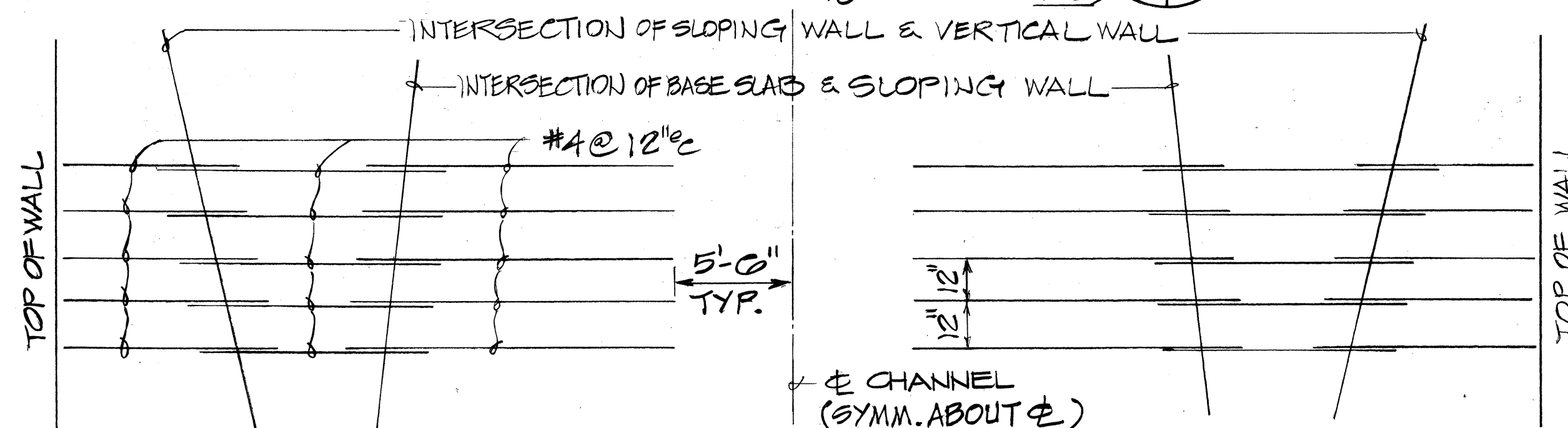


STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**MANAHI BRIDGE AND CHANNEL
DETAILS**
MOANALUA ROAD
PUULOA I.C. TO MIDDLE ST. - UNIT 1A
P.A. PROJ. NO. F-FF-078-1(16)
SCALE: AS SHOWN DATE: DEC. 17, 1976
SHEET NO. 3-6 OF 18 SHEETS

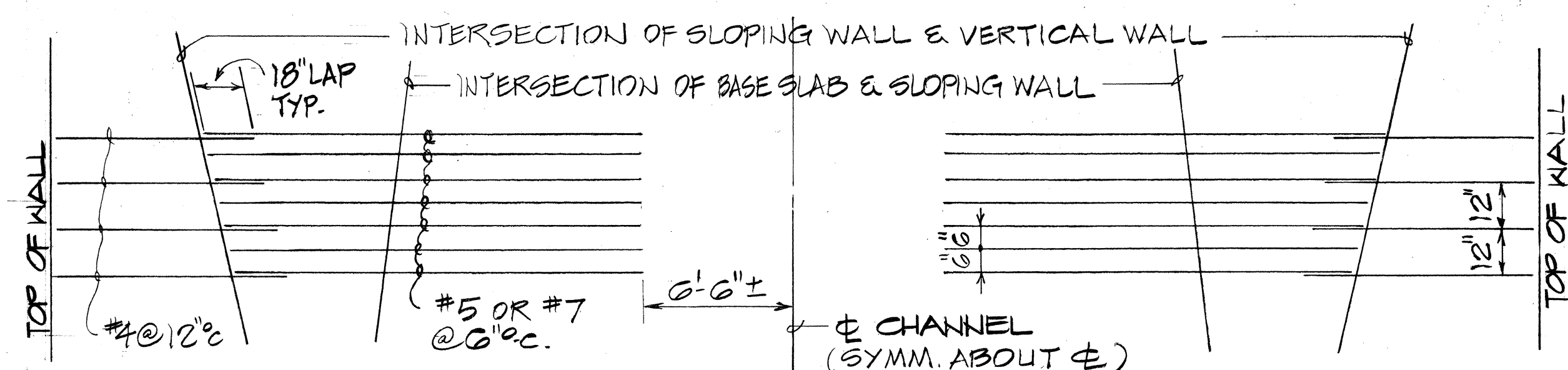
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F.F.F-078-1(16)	1977	101	147



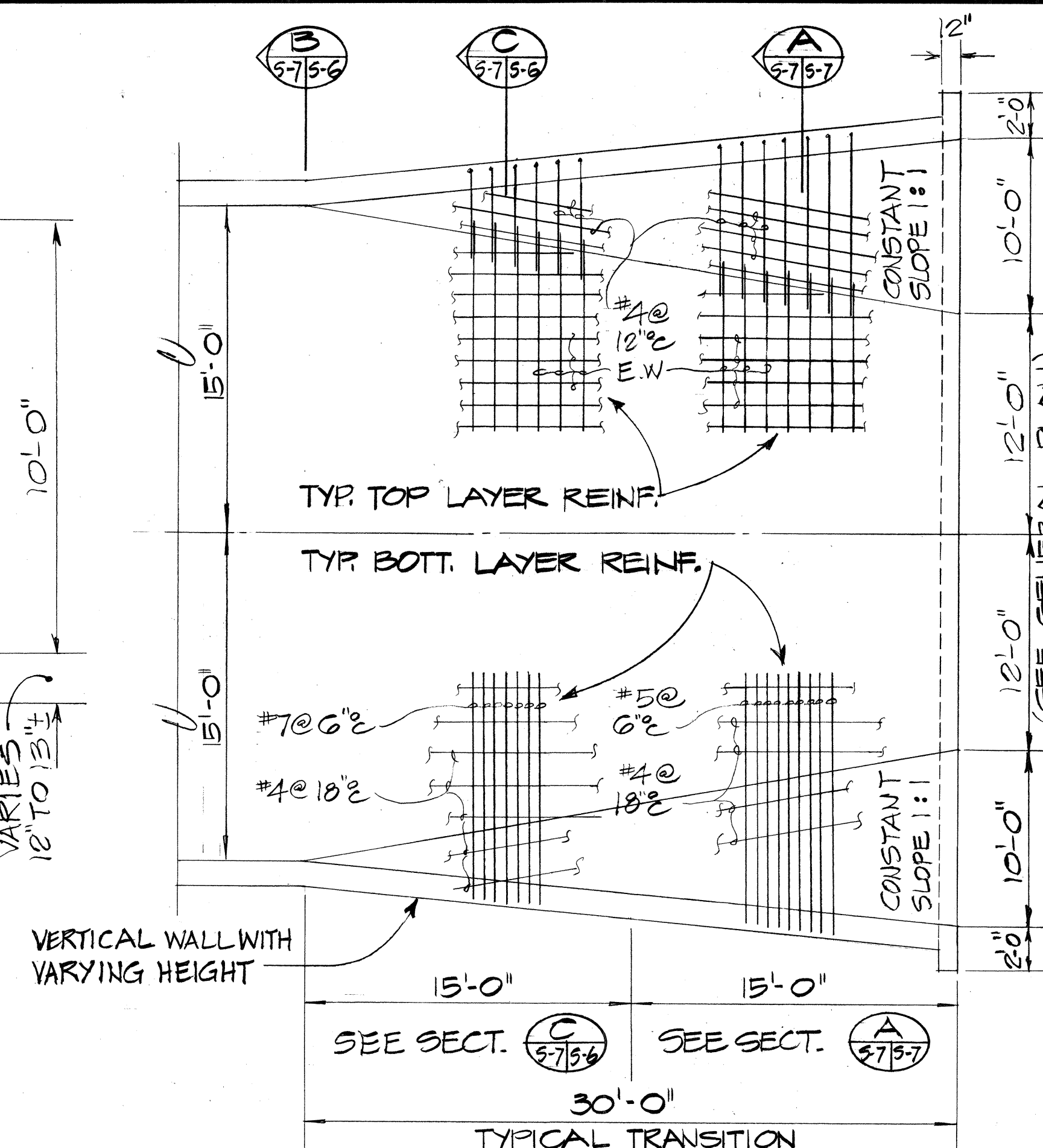
TYPICAL CHANNEL SECTION A
SCALE: 3/8"=1'-0" 5-5 5-7 5-7



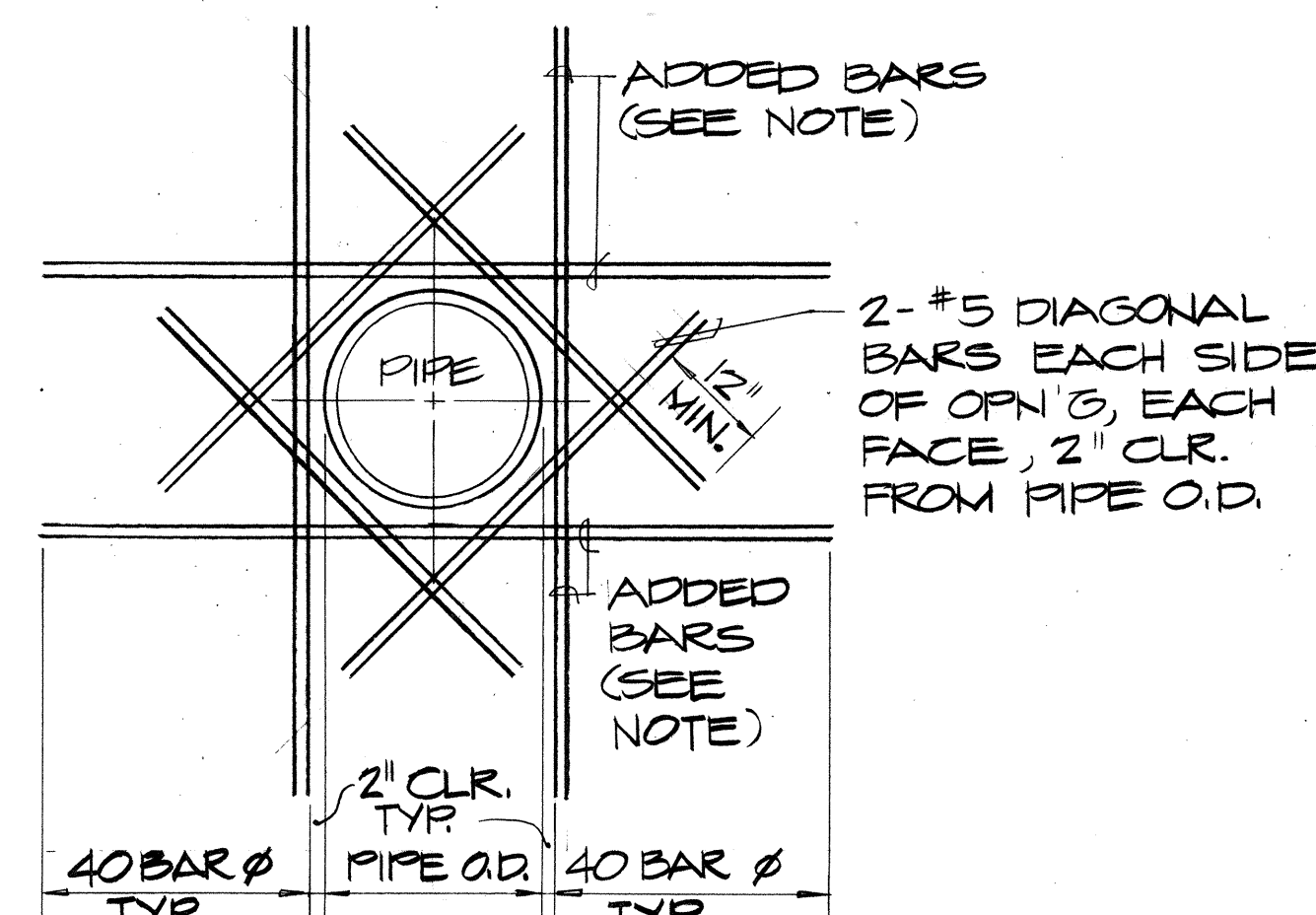
LONGIT. REINF. NOT SHOWN
PARTIAL CHANNEL INSIDE FACE REINF. PLAN
NO SCALE



LONGIT. REINF. NOT SHOWN
PARTIAL CHANNEL OUTSIDE FACE REINF. PLAN
NO SCALE



TYPICAL CHANNEL TRANSITION
NO SCALE

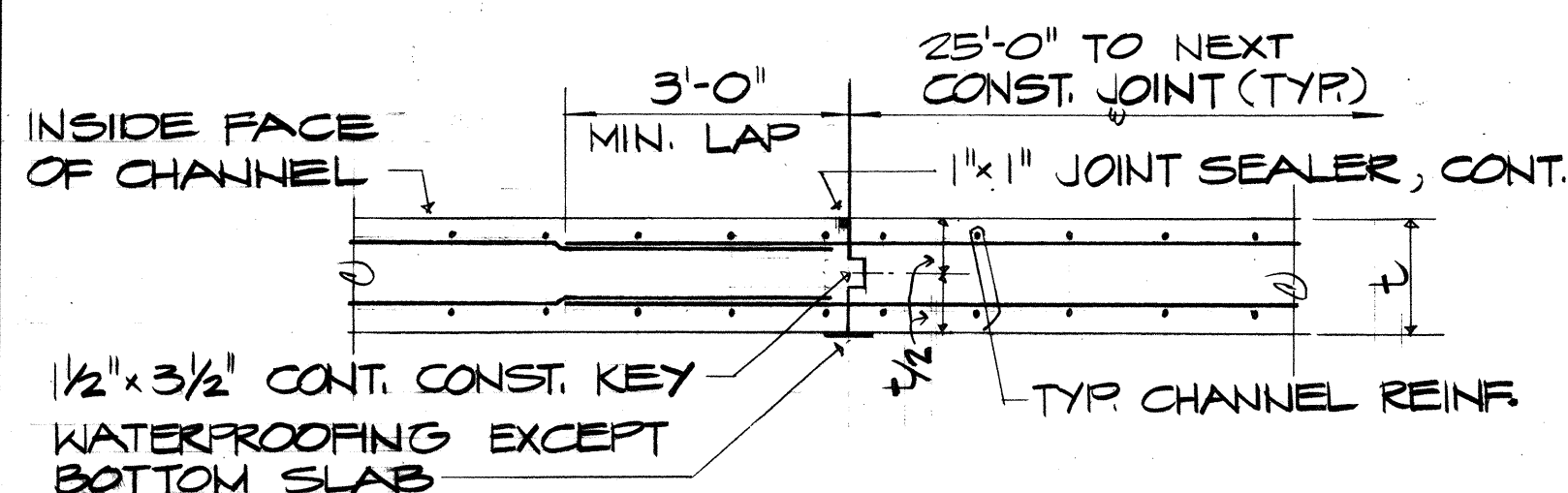


TYPICAL REINF. AT PIPE OPENING C
NO SCALE

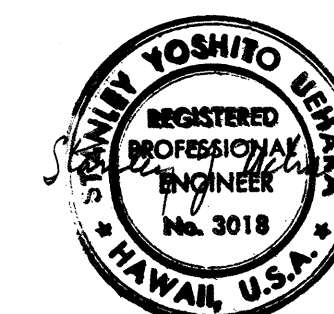
- NOTES:**
1. ADDED BARS SHOWN IS FOR EACH LAYER OF NORMAL BARS. ADDED BARS SHALL BE OF SIZE AND NUMBER EQUAL TO OR GREATER THAN THE NORMAL BARS CUT AT THE OPENING AND SHALL BE DISTRIBUTED EQUALLY ON BOTH SIDES OF THE OPENING.
 2. REFER TO CIVIL DRAWINGS FOR DRAIN PIPE LOCATION AND INVERT.

CHANNEL HYDRAULIC DATA						
	Q (CFS)	V ₀ (FPS)	d ₀ (FT)	d ₀ (FT)	S ₀	V ₀ (FPS)
50-YEAR	3770	12.2	6.5	7.9	.005	15.9
100-YEAR	5010	21.0	7.9	9.5	.005	17.5

CHANNEL QUANTITY ESTIMATES			
ITEM NO.	ITEM	UNIT	QUANTITY
206.25	STRUCTURE EXCAVATION FOR BOX CULVERTS & CHANNELS	Cu.Yd.	559
206.70	STRUCTURE BACKFILL FOR BOX CULVERTS & CHANNELS	Cu.Yd.	12
206.80	FILTER MATERIAL	Cu.Yd.	106
503.0706	CONCRETE IN CHANNELS	Cu.Yd.	275
602.016	REINF. STEEL IN CHANNELS	Lb	33,018
603.90	BED COURSE MATERIAL FOR BOX CULVERT & CHANNEL	Cu.Yd.	93



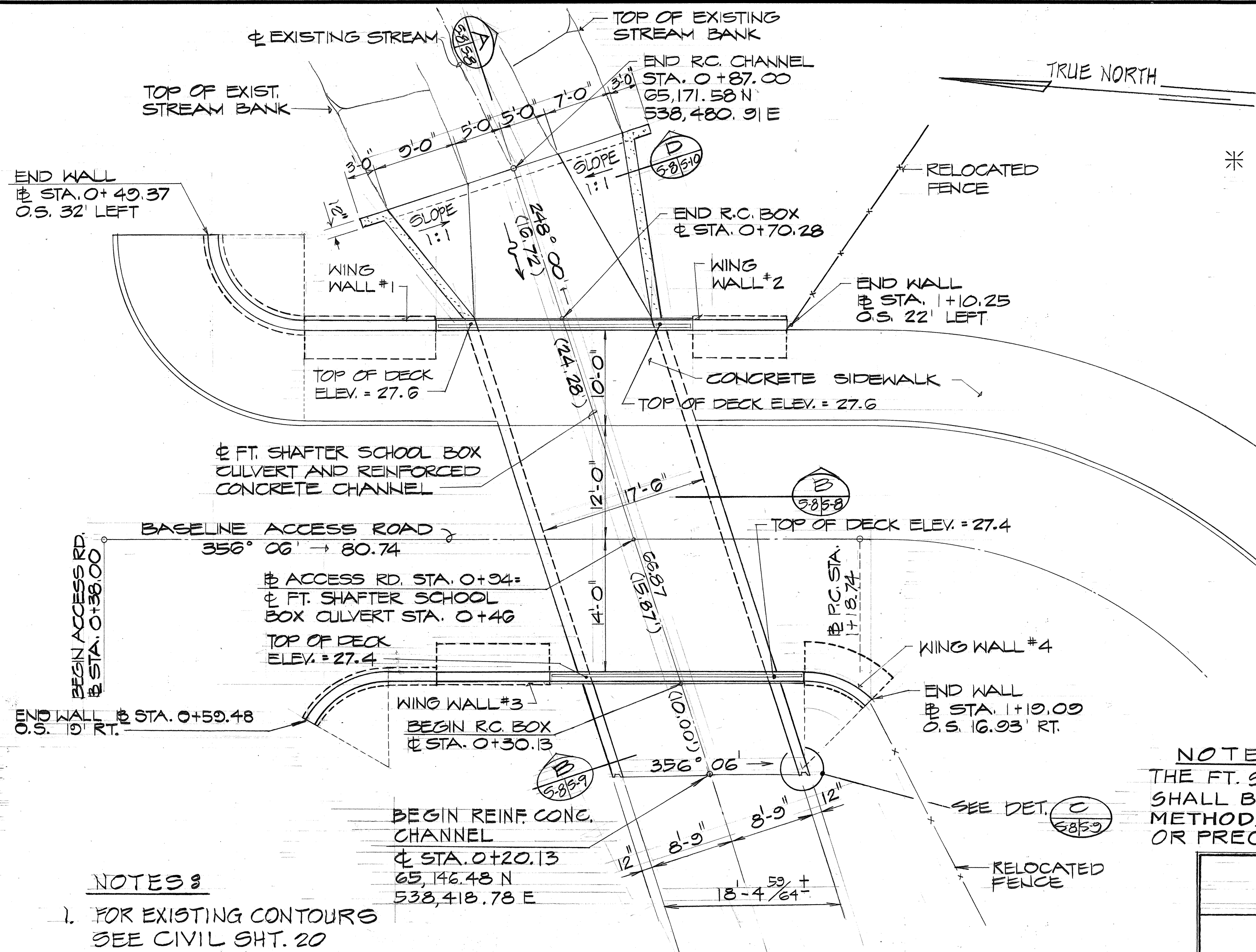
TYP. CONST. JOINT B
NO SCALE



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**MANAHI BRIDGE AND CHANNEL
CHANNEL TRANSITION
DETAILS**
MOANALUA ROAD
PULUOA I.C. TO MIDDLE ST. - UNIT 1A
F.A. PROJ. NO. F.F.F-078-1(16)
SCALE: AS SHOWN DATE: DEC. 17, 1976
SHEET NO. 9-7 OF 18 SHEETS

Arthur F. R. Smith
THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F.F.F-078-1(16)	1977	102	147



NOTES:

1. FOR EXISTING CONTOURS SEE CIVIL SHT. 20
2. SEE SHT. 5-11 FOR STRUCTURAL EXCAVATION & BACKFILL DET.
3. FOR BORING PLAN, SEE SHT. 3
4. FOR BORING LOG, SEE SHT. 4

NOTE:
THE FT. SHAFTER SCHOOL BOX CULVERT SHALL BE CONSTRUCTED BY EITHER METHODS, CAST-IN-PLACE STRUCTURE OR PRECAST STRUCTURE.

CHANNEL HYDRAULIC DATA

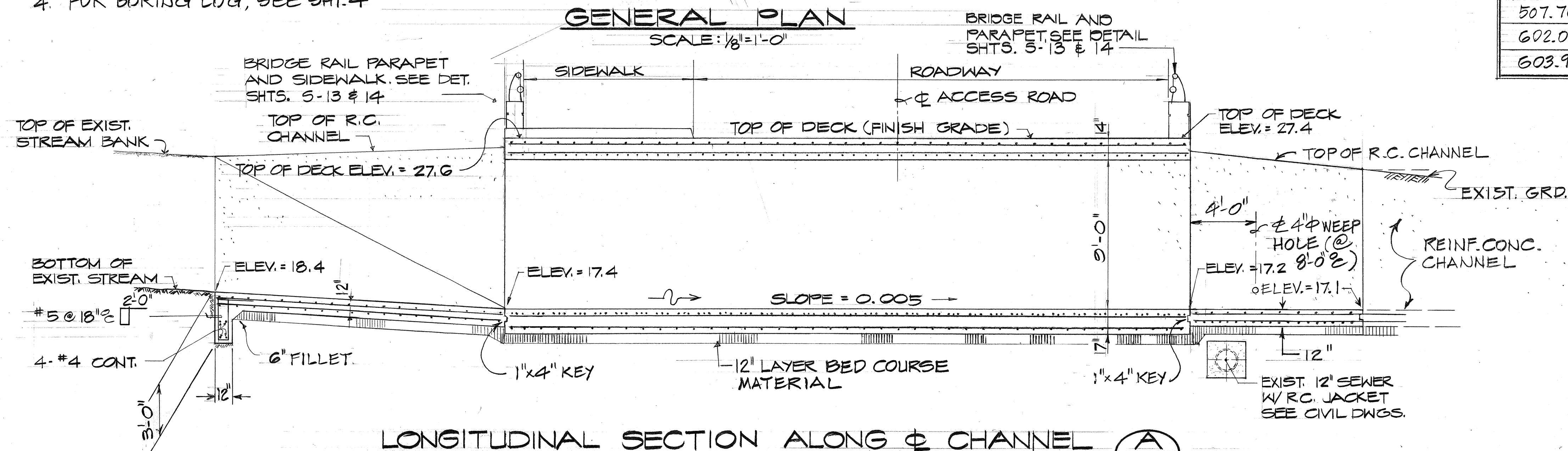
	Q (CFS)	V _n (FPS)	d _n (FT.)	S _o
50-YEAR	1400	10.3	7.4	.010
100-YEAR	1800	10.3	9.5	.010

BOX CULVERT QUANTITY ESTIMATES

ITEM No.	ITEM	UNIT	QUANTITY
206.60	STRUCTURE EXCAVATION FOR BRIDGES	Cu.Yd.	136
206.65	STRUCTURE BACKFILL FOR BRIDGES	Cu.Yd.	35
503.070	CONCRETE IN BRIDGES - F.S.S. BOX CULVERT	Cu.Yd.	108
507.15	METAL BRIDGE RAILING-TWO RAILS ON PARAPET	Lin.Ft.	54
507.70	CONC. BRIDGE PARAPET, INCLUDING END POST	Lin.Ft.	54
602.015	REINF. STEEL IN BRIDGES - F.S.S. BOX CULVERT & CHANNEL	Lb	18,093
603.90	BED COURSE MATERIAL FOR BOX CULVERT	Cu.Yd.	32

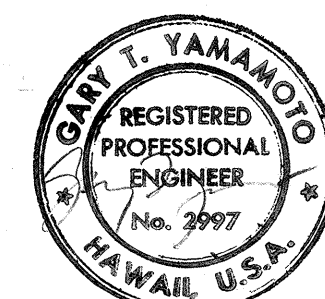
GENERAL PLAN

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



LONGITUDINAL SECTION A-A

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



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5/20/77
ADDED NOTE FOR ALTERNATIVE METHODS OF CONSTRUCTION OF BOX CULVERT PER ADDENDUM NO. 1.

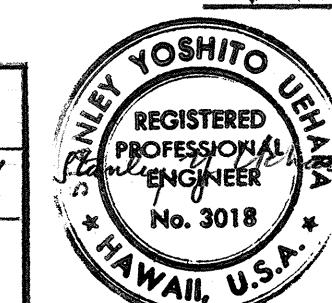
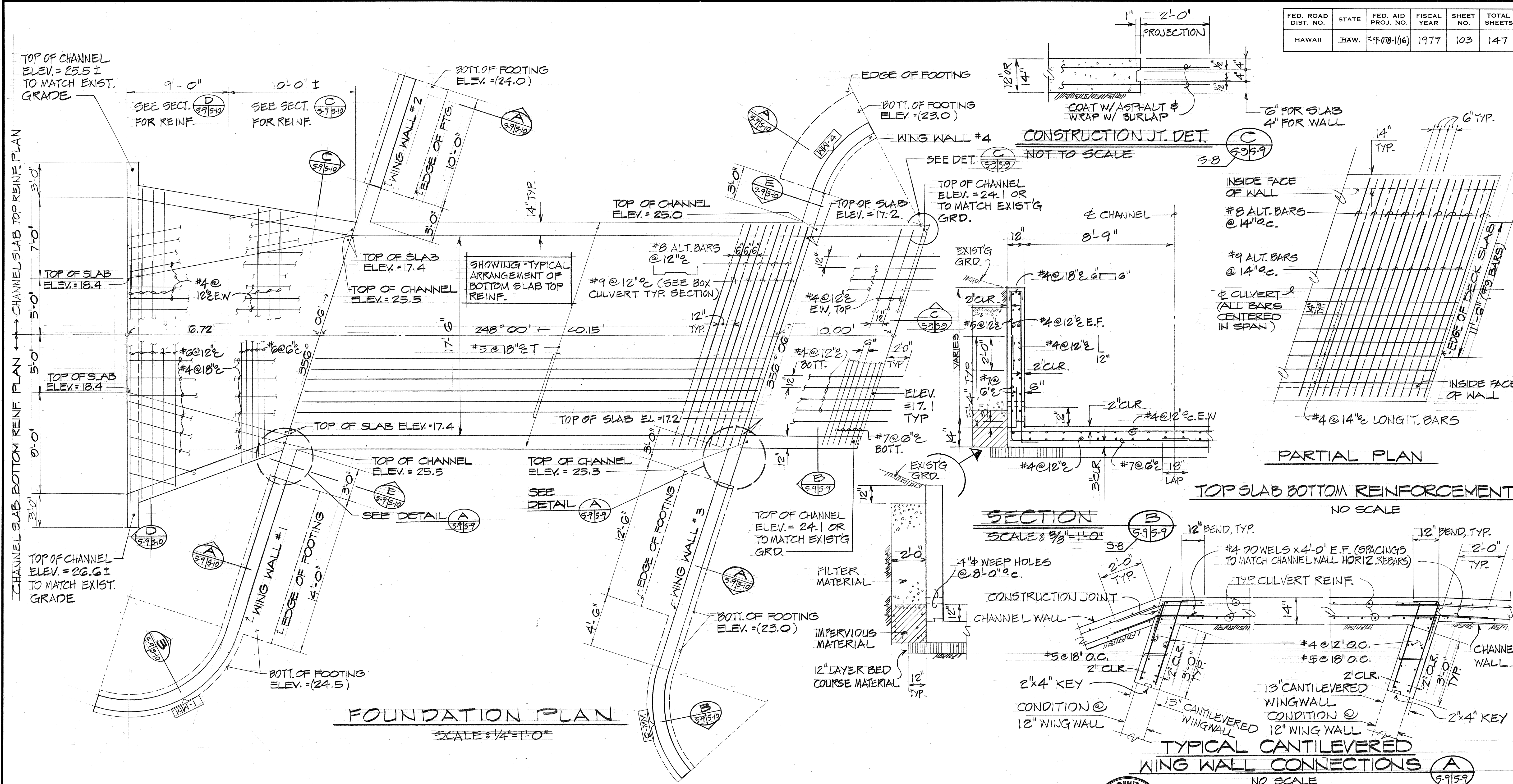
DATE REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

FT. SHAFTER SCHOOL BOX CULVERT
PLAN & SECTIONS

MOANALUA ROAD
PUULOA I.C. TO MIDDLE ST. - UNIT 1A
F.A. Proj. No. F.F.F-078-1(16)
SCALE: AS SHOWN DATE: DEC. 17, 1976
SHEET NO. 5 OF 18 SHEETS

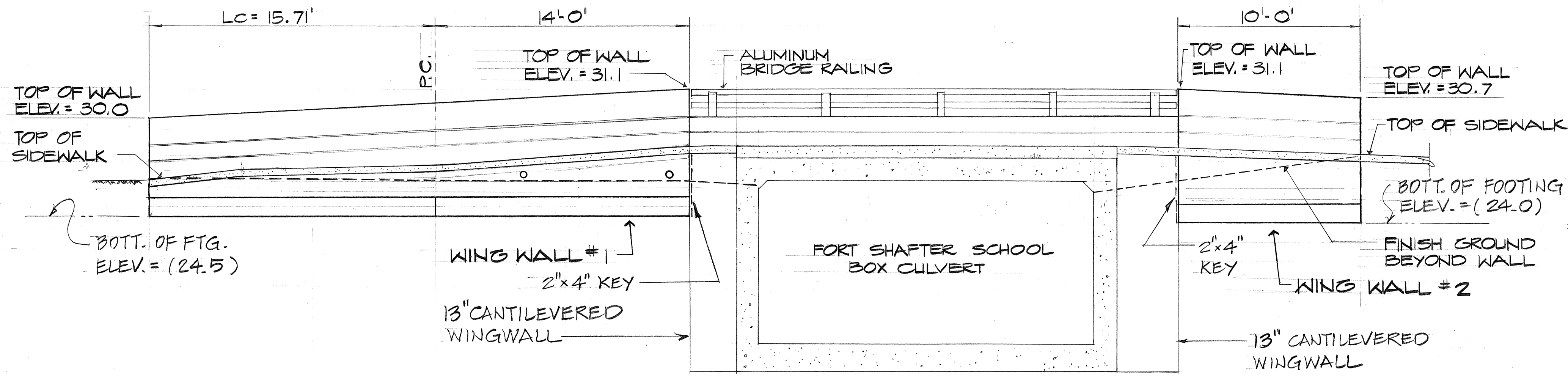
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FF-078-1(16)	1977	103	147



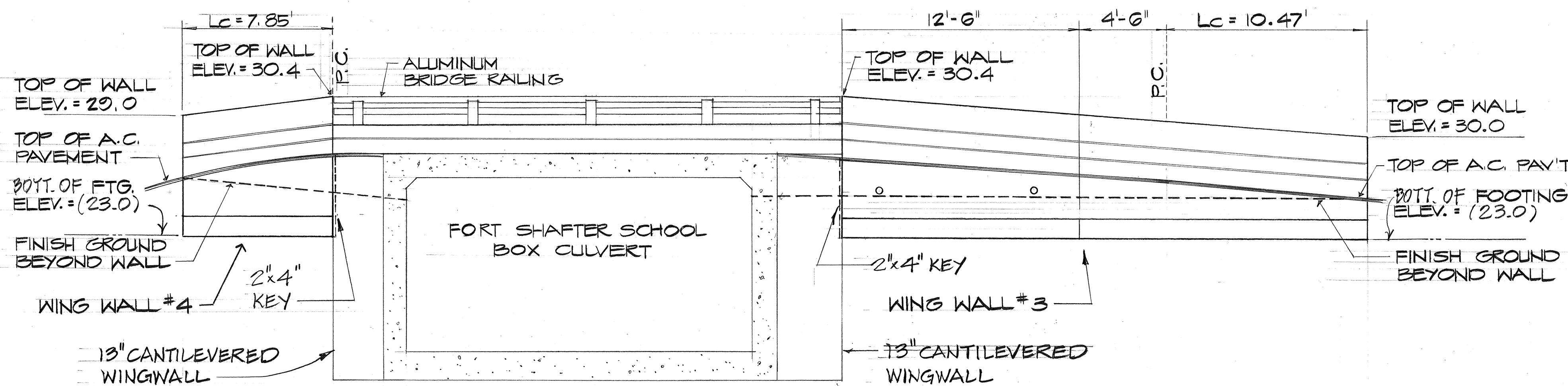
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
FT. SHAFTER SCHOOL BOX CULVERT
REINFORCING DETAILS
AND FOUNDATION PLAN
MOANALUA ROAD
PHILOA I.C. TO MIDDLE ST. - UNIT 1A
P.A. Proj. No. FF-078-1(16)
SCALE: AS SHOWN DATE: DEC. 17, 1976
SHEET NO. 5-9 OF 18 SHEETS

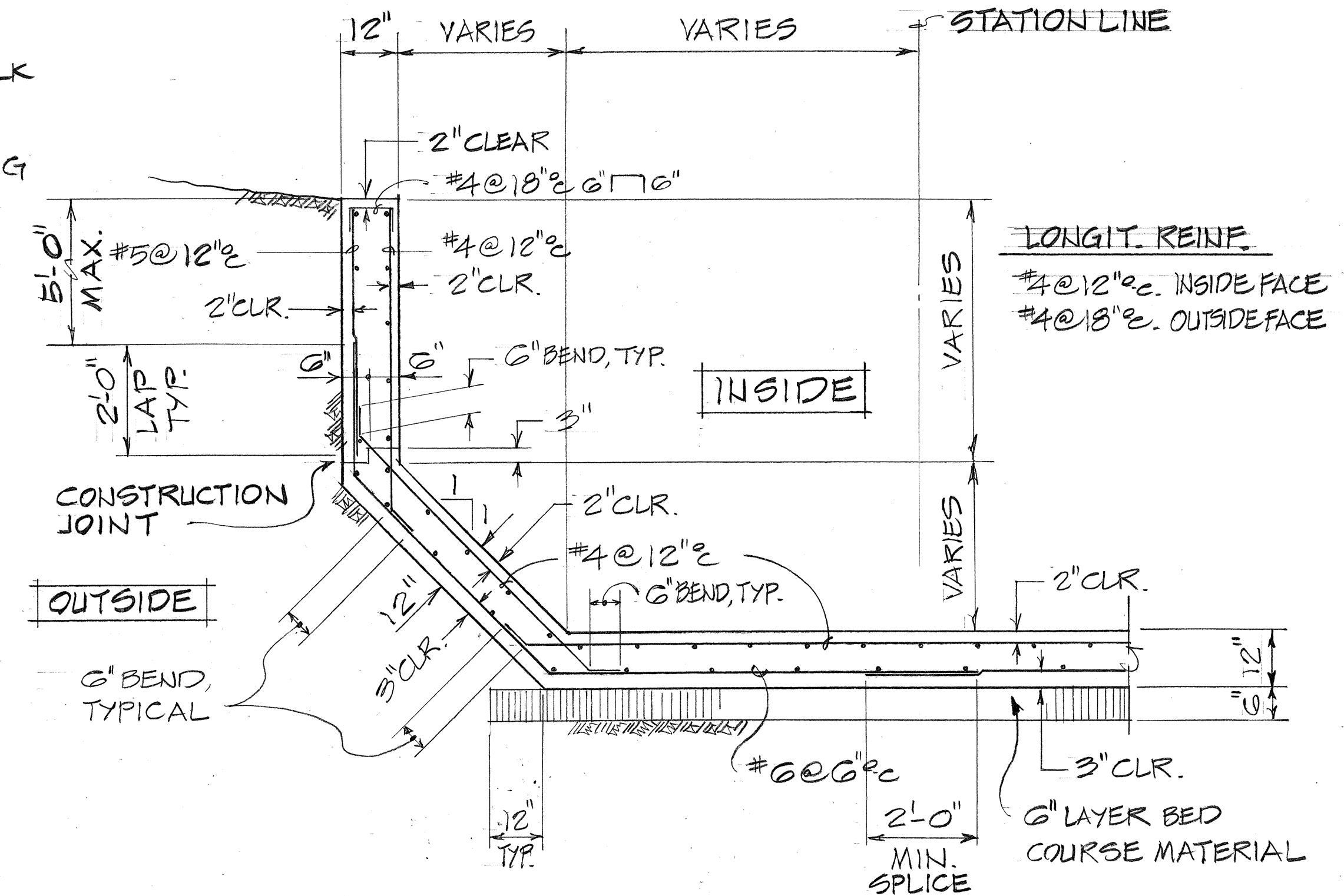
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FF-078-1(16)	1977	104	147



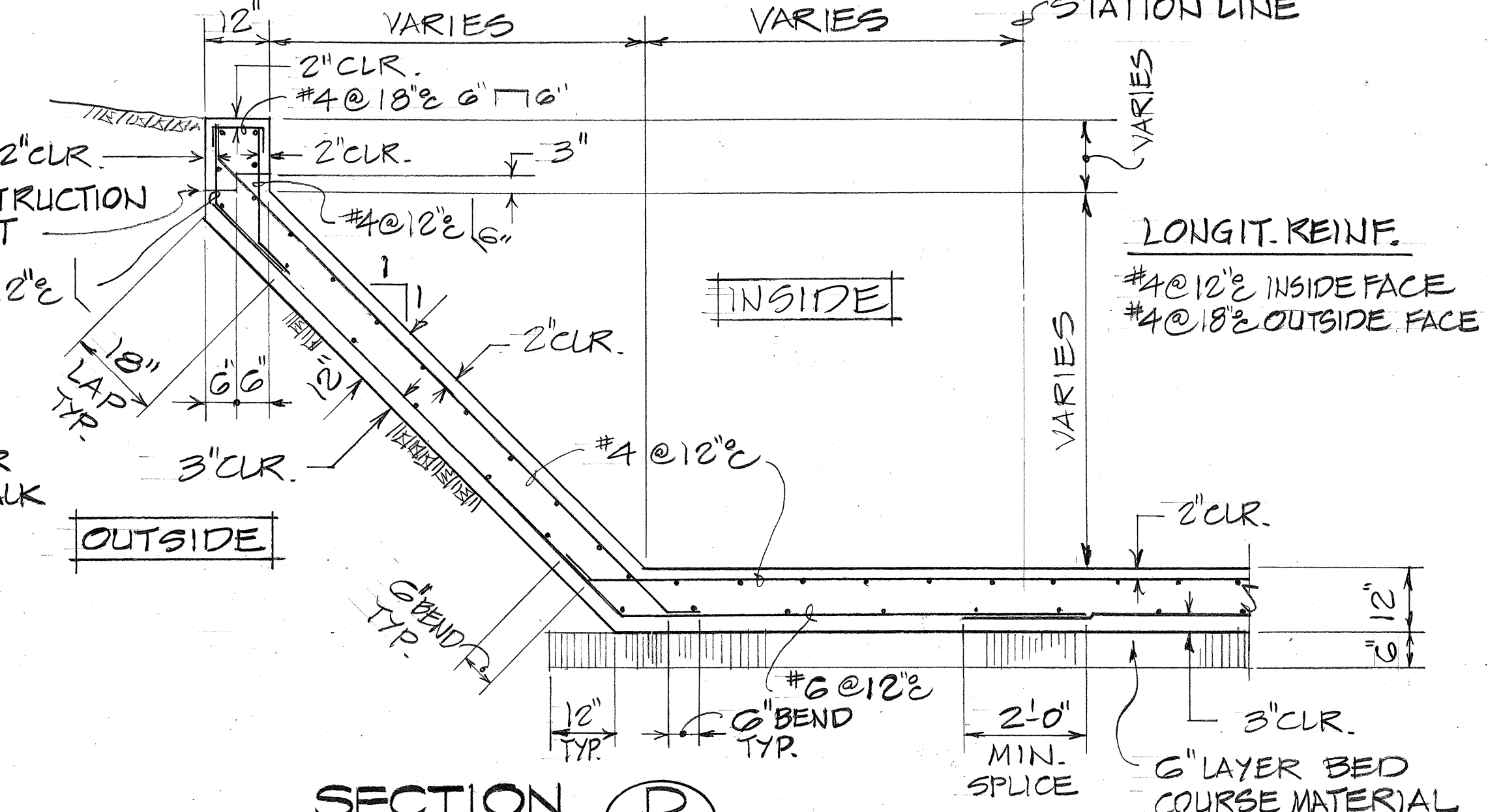
ELEVATION - WING WALL #1 & #2
SCALE: 1/4" = 1'-0"



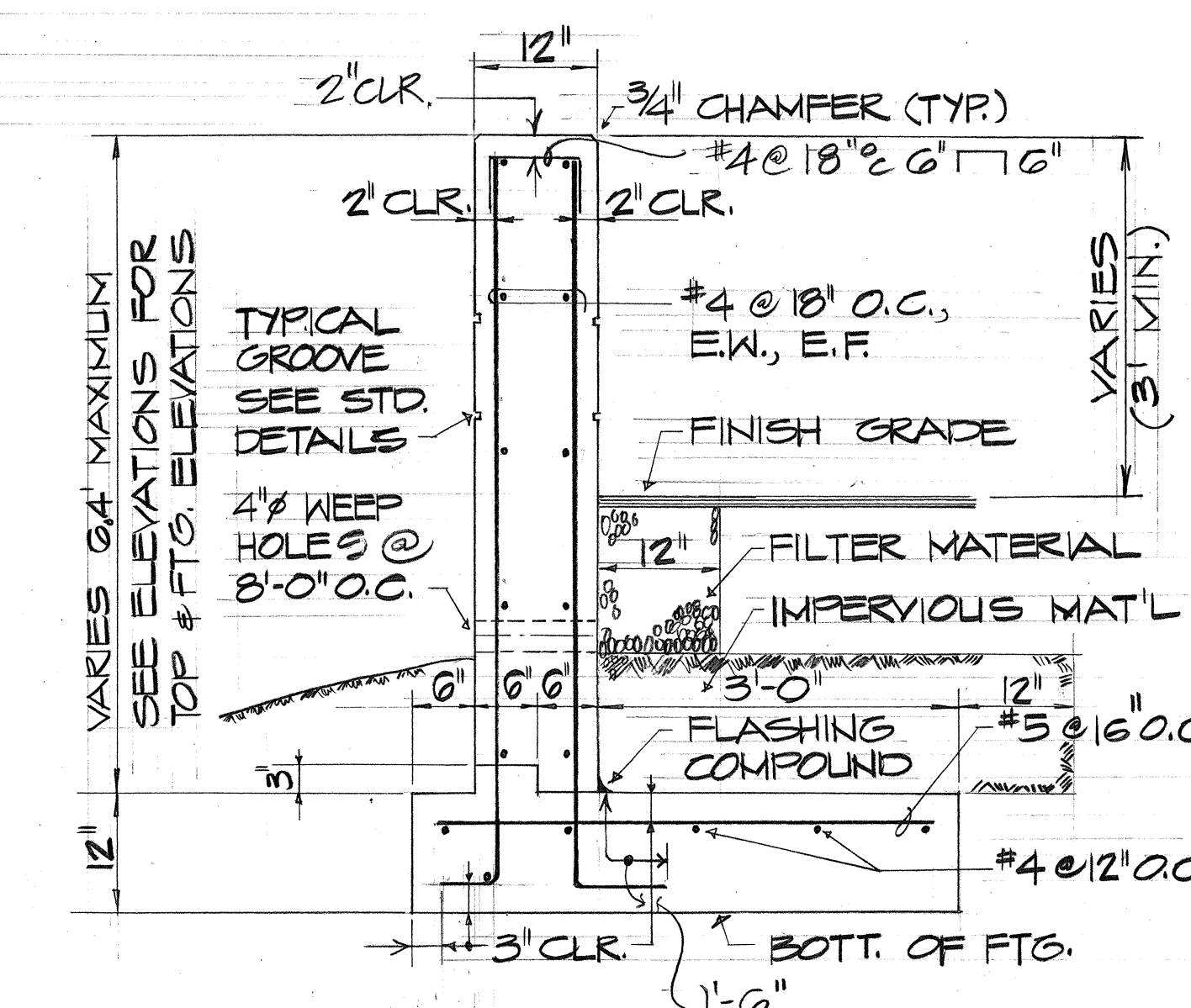
ELEVATION - WING WALL #3 & #4
SCALE: 1/4" = 1'-0"



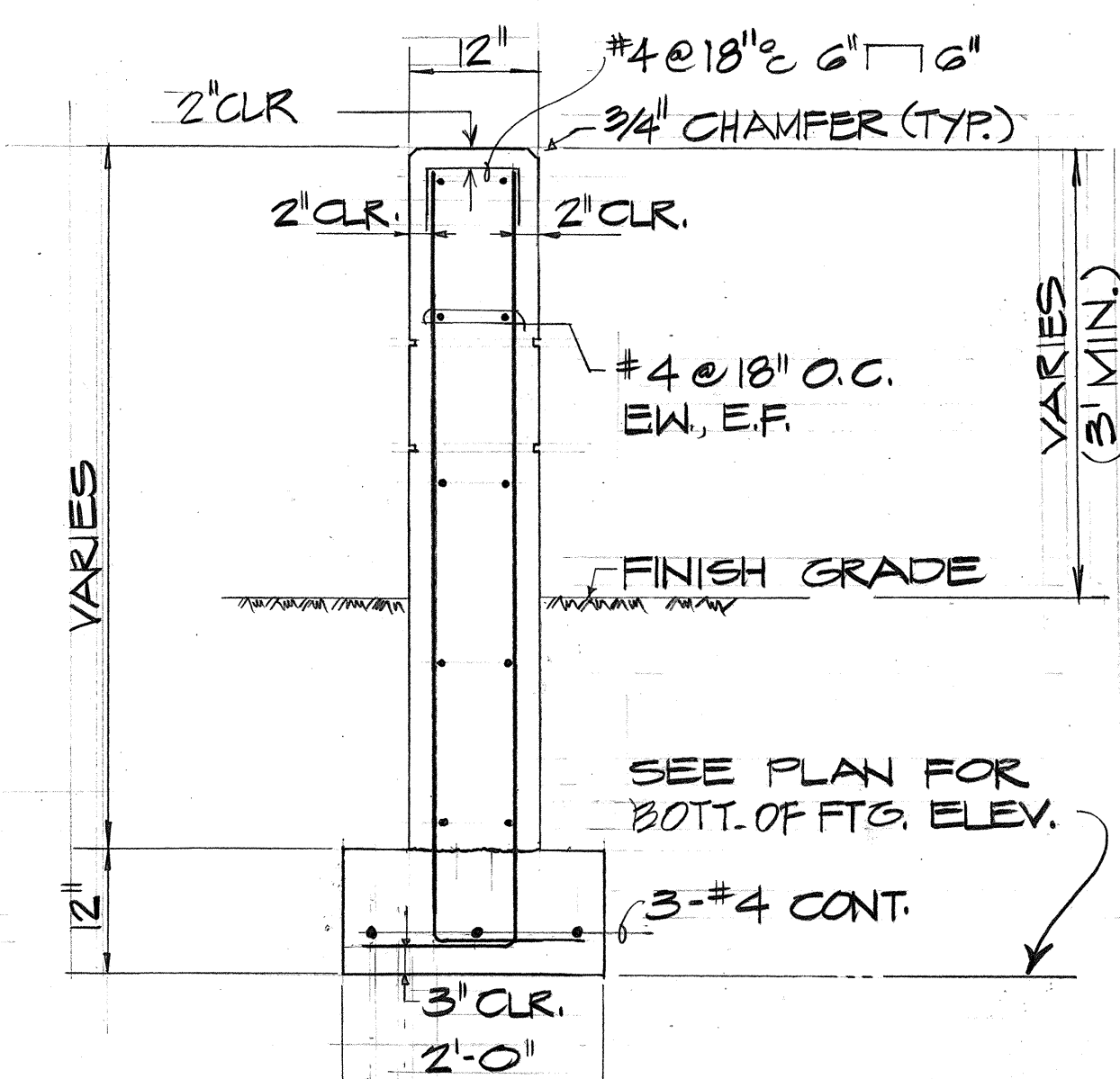
SECTION C
NO SCALE 5-9/5-10



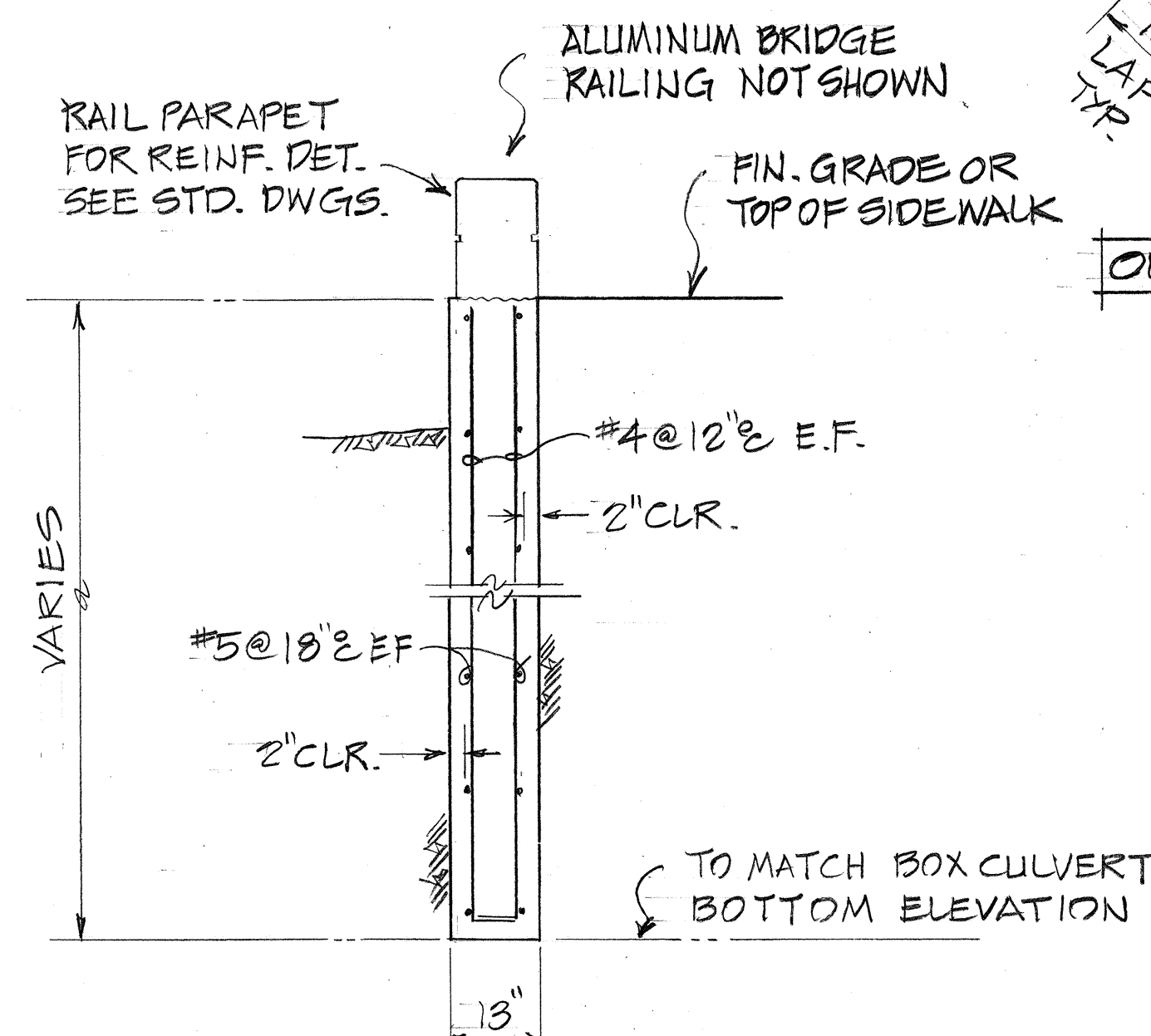
SECTION D
NO SCALE 5-9/5-10



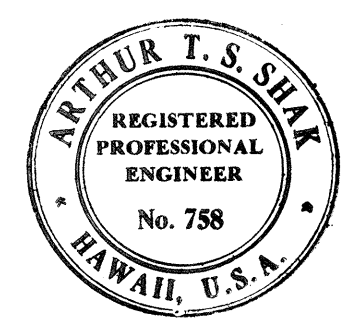
TYP. WING WALL SECT. A
SCALE: 3/4" = 1'-0"



TYP. BARRIER SECT. B
SCALE: 3/4" = 1'-0"



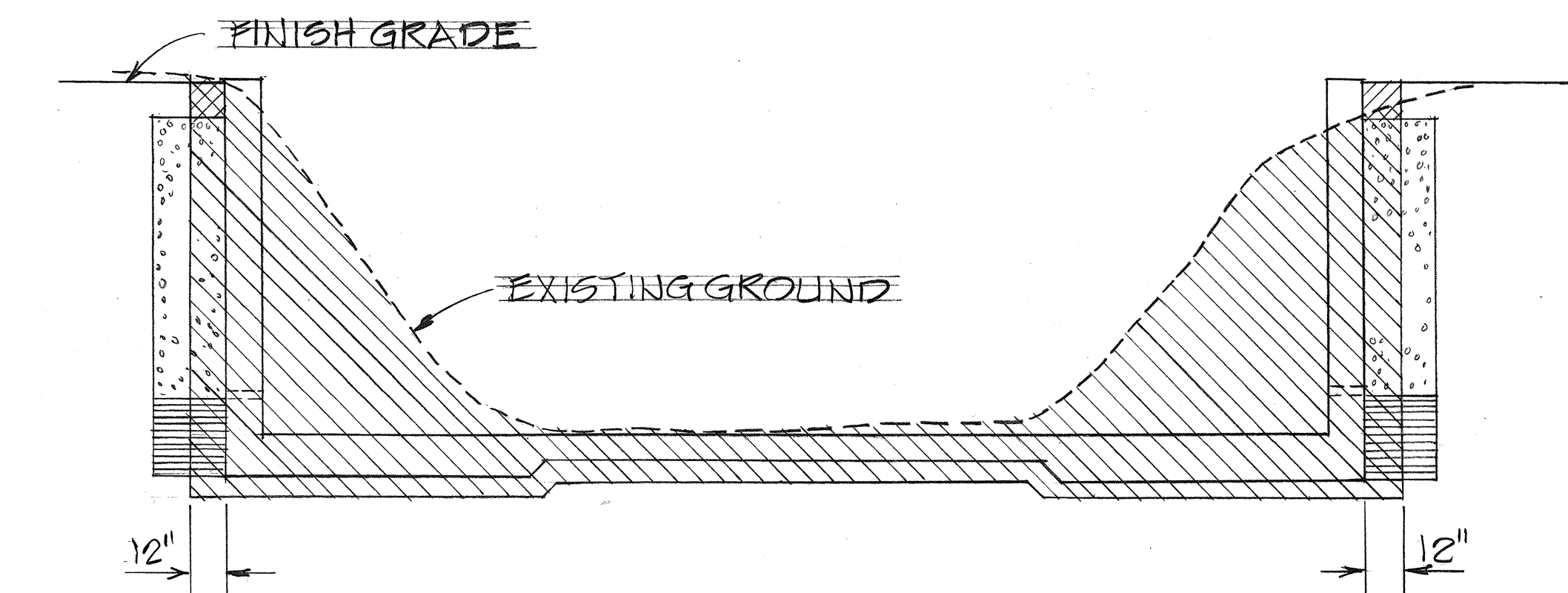
TYP. CANTILEVERED WINGWALL SECT. E
SCALE: 1/2" = 1'-0"



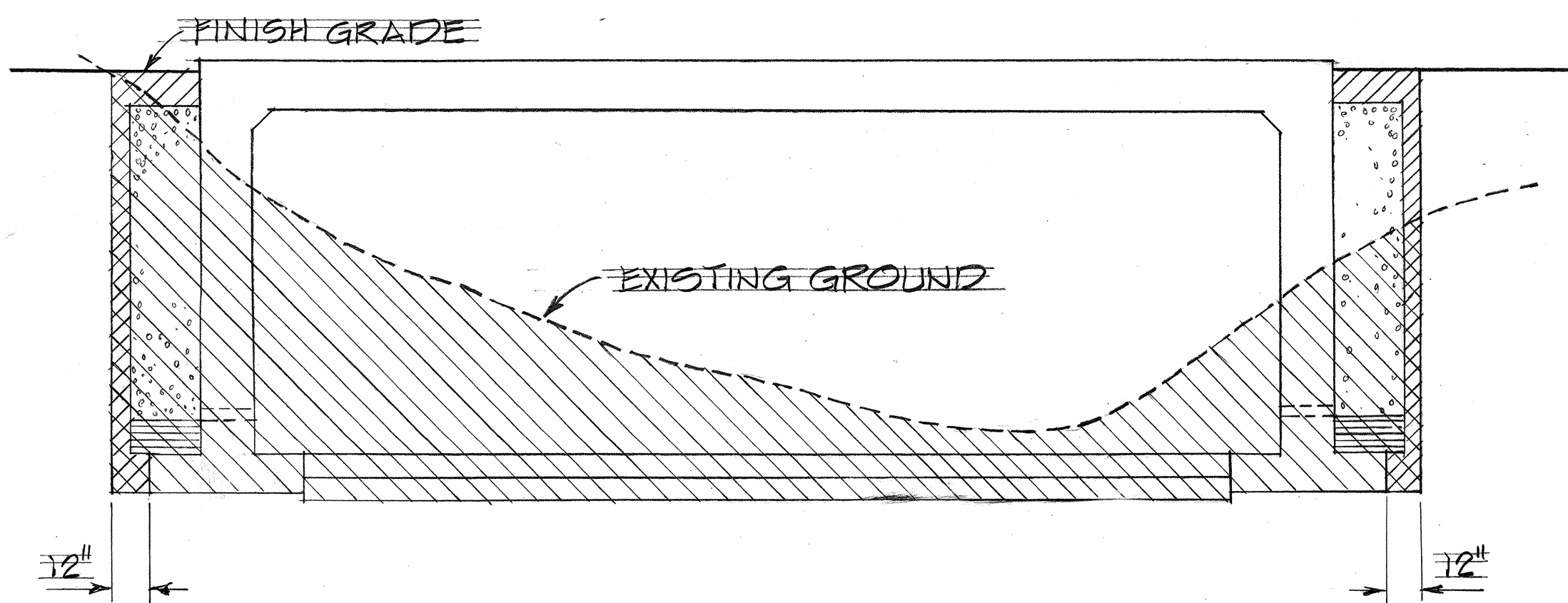
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**FT. SHAFTER SCHOOL BOX CULVERT
WING WALLS AND
CHANNEL TRANSITION DETAILS**
MOANALUA ROAD
PUULOA I.C. TO MIDDLE ST. - UNIT 1A
P.A. PROJ. NO. FFF-078-1(16)
SCALE: AS SHOWN DATE: DEC. 17, 1976
SHEET NO. 5-10 OF 18 SHEETS

Arthur T.S. Shih
THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION.

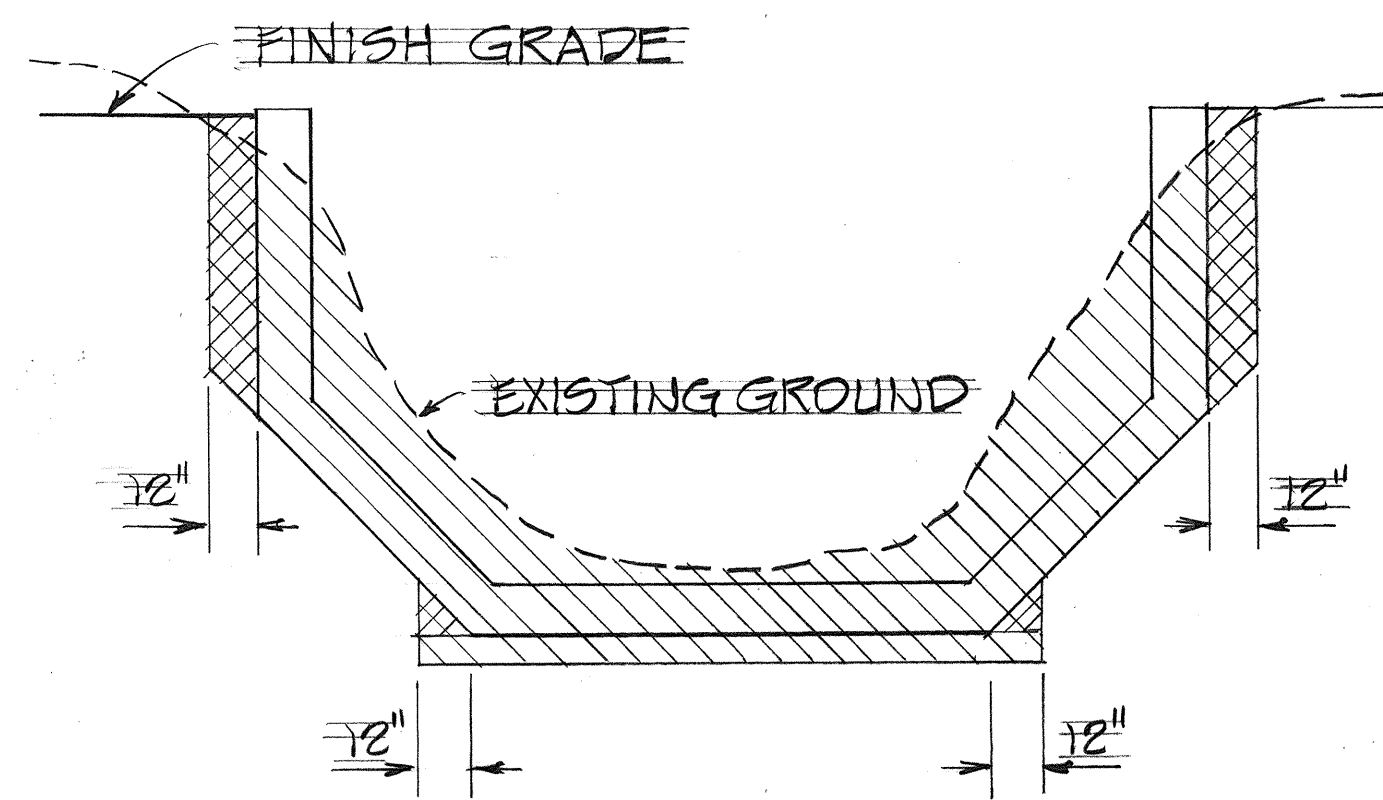
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FFP078-1(16)	1977	105	147



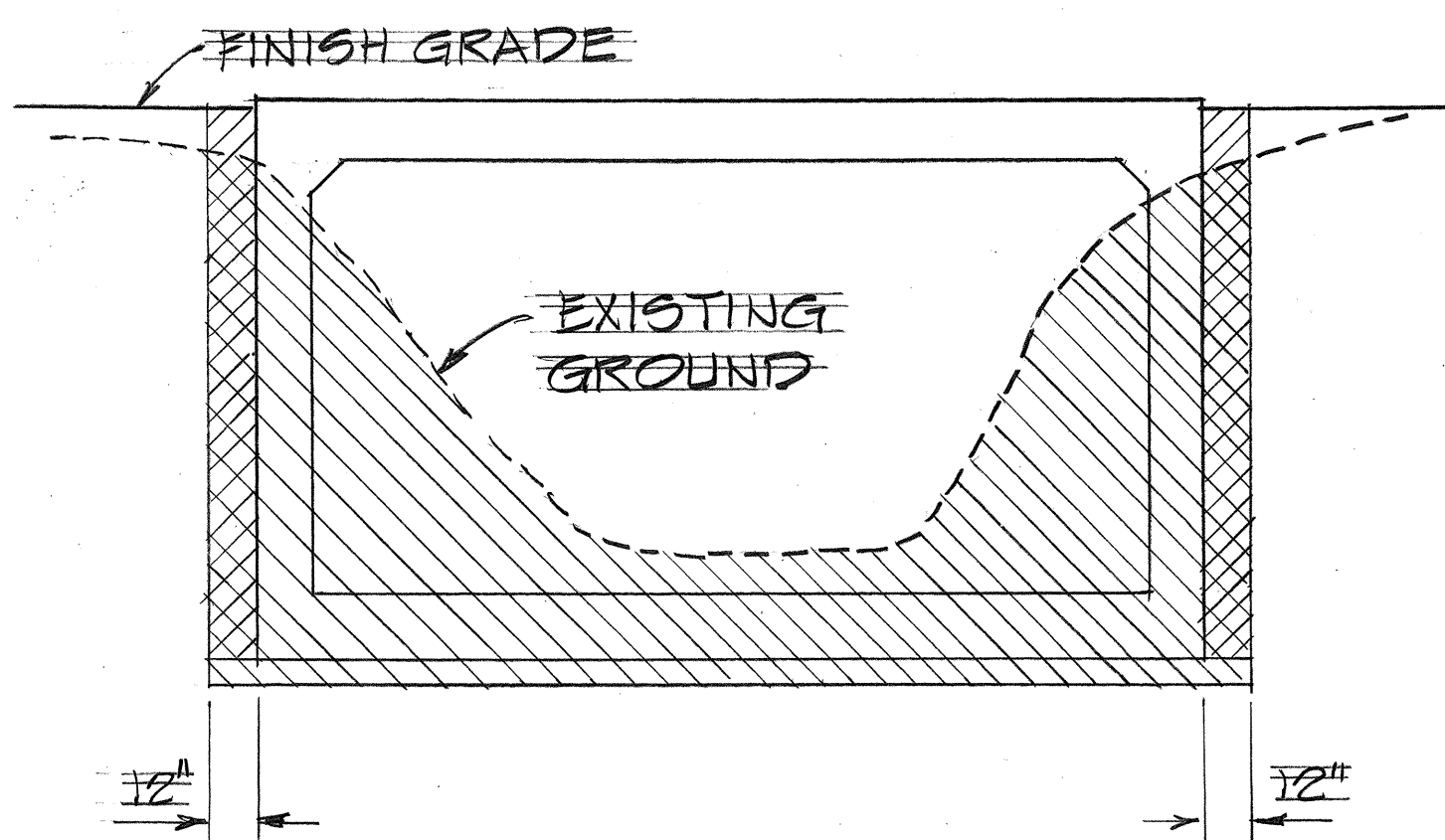
TYPICAL OPEN CHANNEL DETAIL



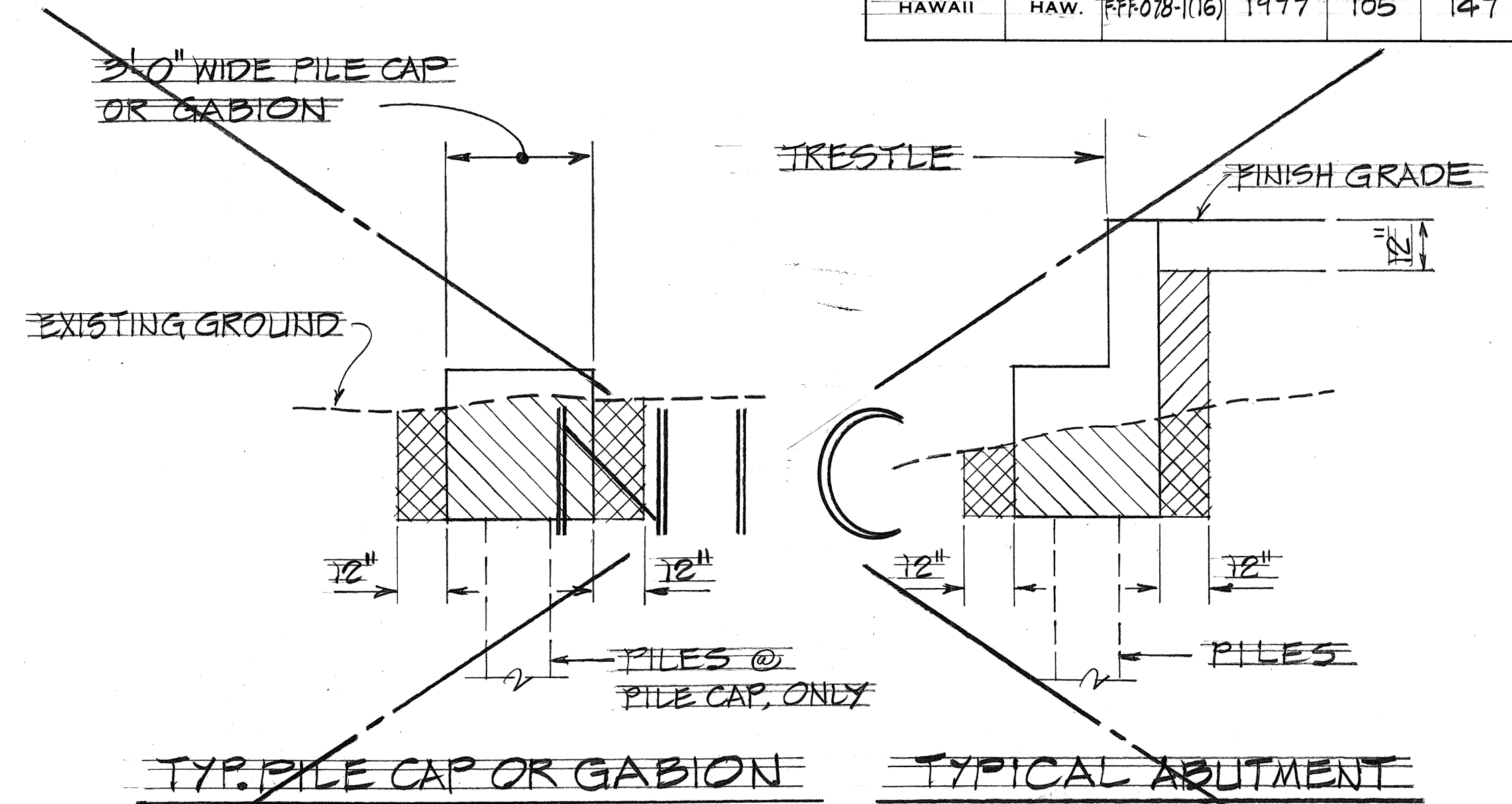
TYPICAL BRIDGE DETAIL



TYP. BROKEN BACK CHANNEL DET.

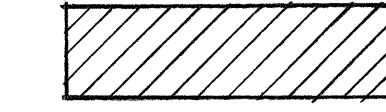


TYP. BOX CULVERT DETAIL



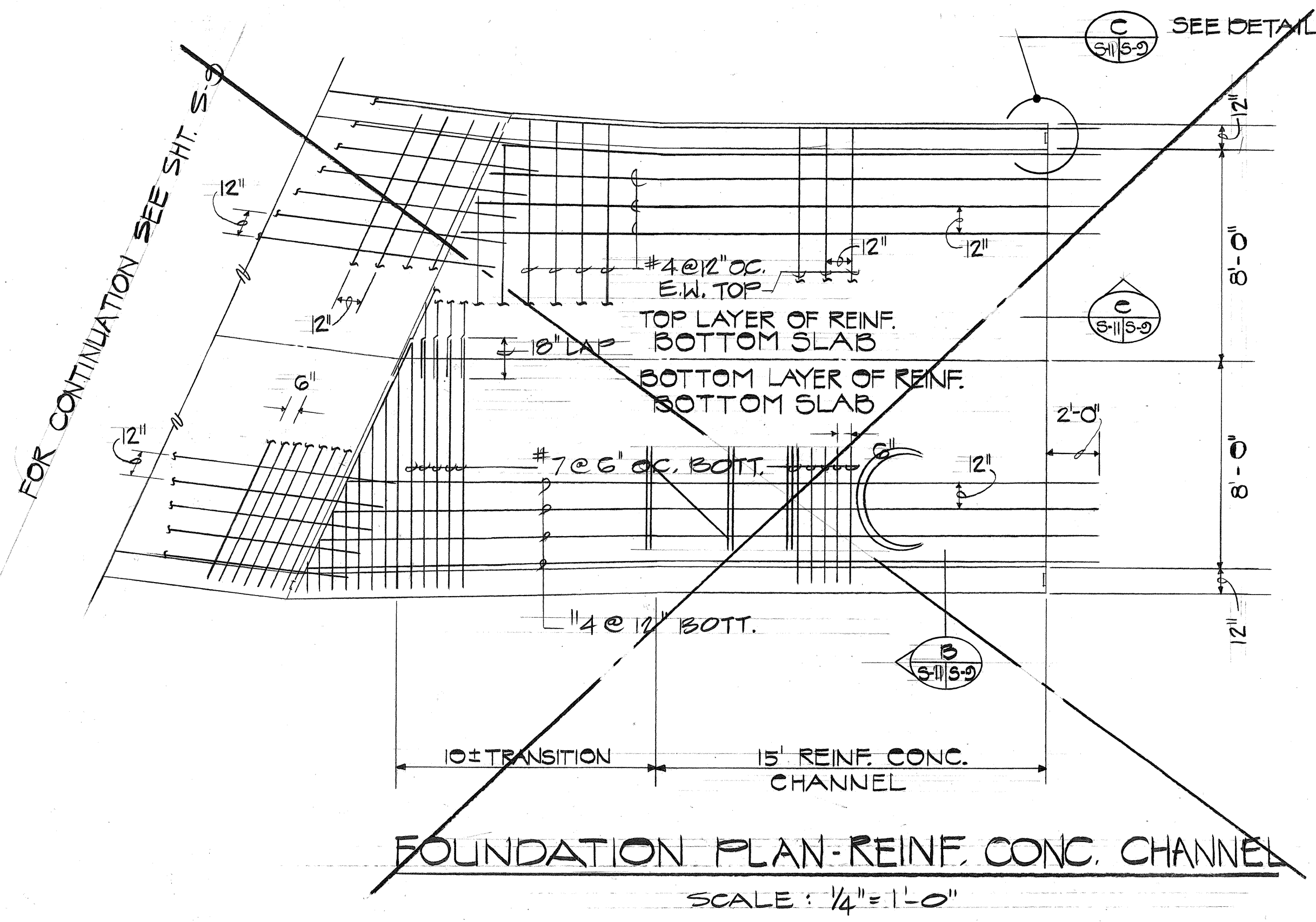
E.C. TRESTLE STRUCTURES #1 & #2
NOT TO SCALE

LEGEND:

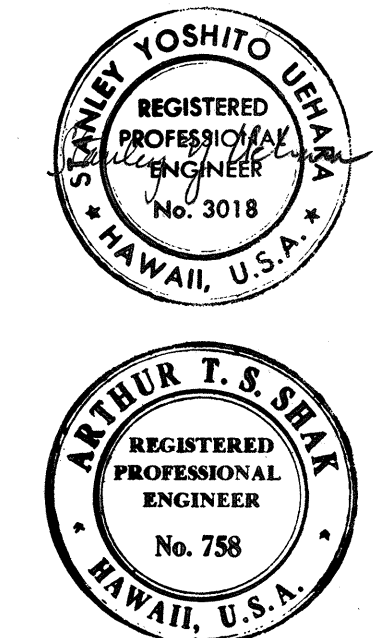
-  STRUCTURAL EXCAVATION
-  STRUCTURAL BACKFILL

NOTES:

IF NO ROADWAY EXCAVATION IS INVOLVED AT THE WALL, STRUCTURAL EXCAVATION WILL BE MEASURED FROM EXISTING GROUND.



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



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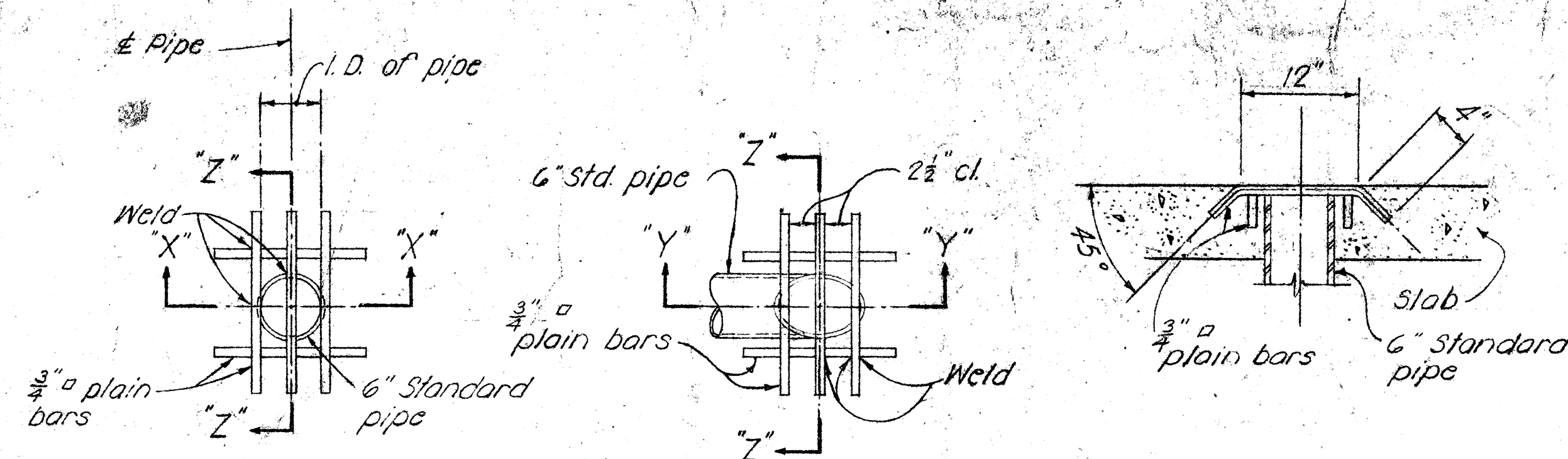
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL STRUCTURAL EXCAVATION AND BACKFILL DETAILS

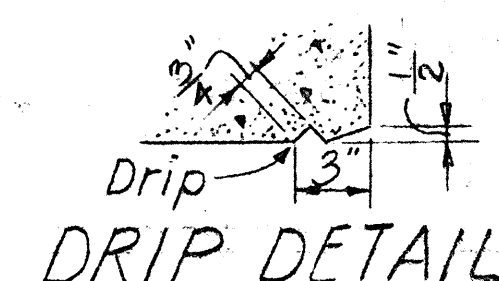
MOANALUA ROAD
PULUOA I.C. TO MIDDLE ST. - UNIT 1A
E.A. Proj. No. FFP-078-1(16)
SCALE AS SHOWN DATE DEC. 17, 1976
SHEET No. 3-11 OF 18 SHEETS

GENERAL NOTES

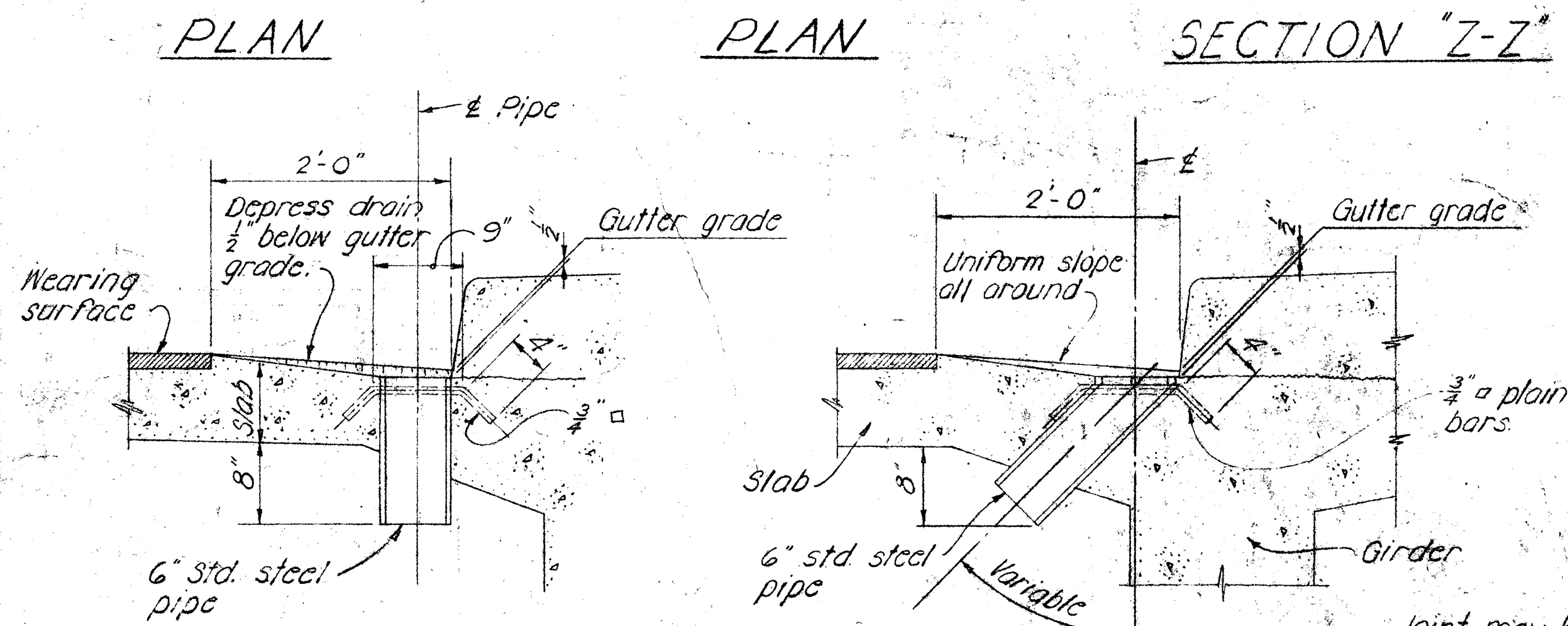
- All concrete shall be Class A unless otherwise noted.
- Reinforcing shall be detailed in accordance with A.C.I. Manual of Standard Practice for Detailing Reinforced Concrete Highway Structures unless otherwise noted.
- Clearance for reinforcing bars shall be as follows, unless otherwise noted:
 - $1\frac{1}{2}$ " 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 $2\frac{1}{2}$ times the diameter of bars, but in no case shall the clear distance between the bars be less than $1\frac{1}{2}$ 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 $\frac{3}{4} \times \frac{3}{4}$ ".
- 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 at 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.



TYPICAL CONCRETE GROOVE DETAIL



DRIP DETAIL

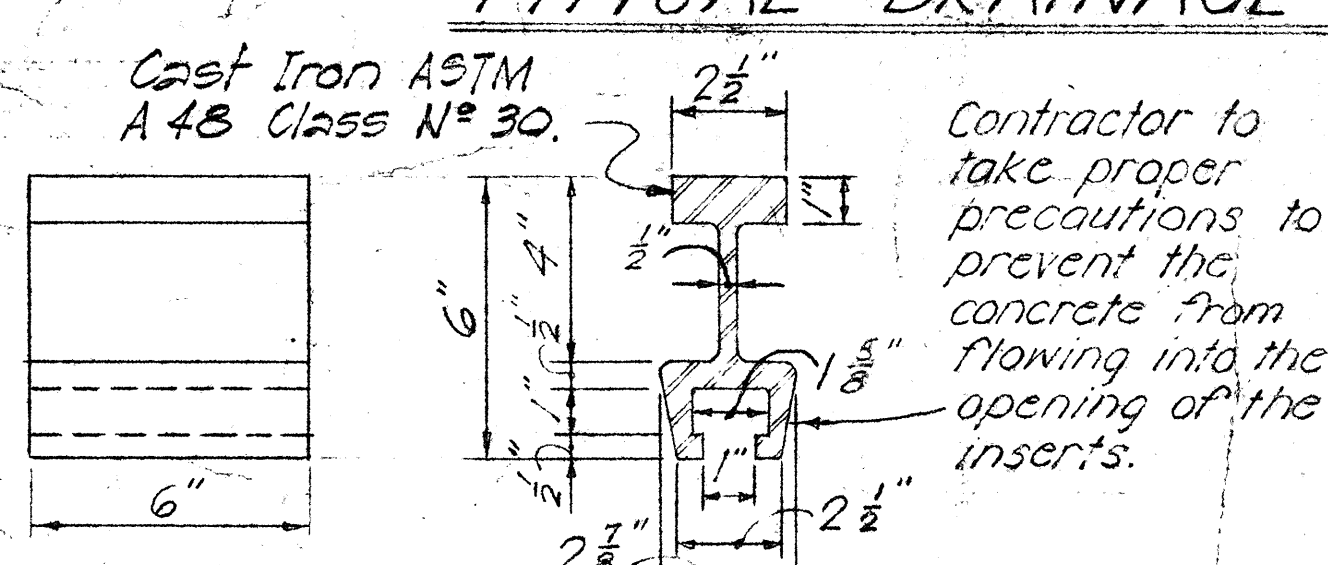


SECTION "X-X"

SECTION "Y-Y"

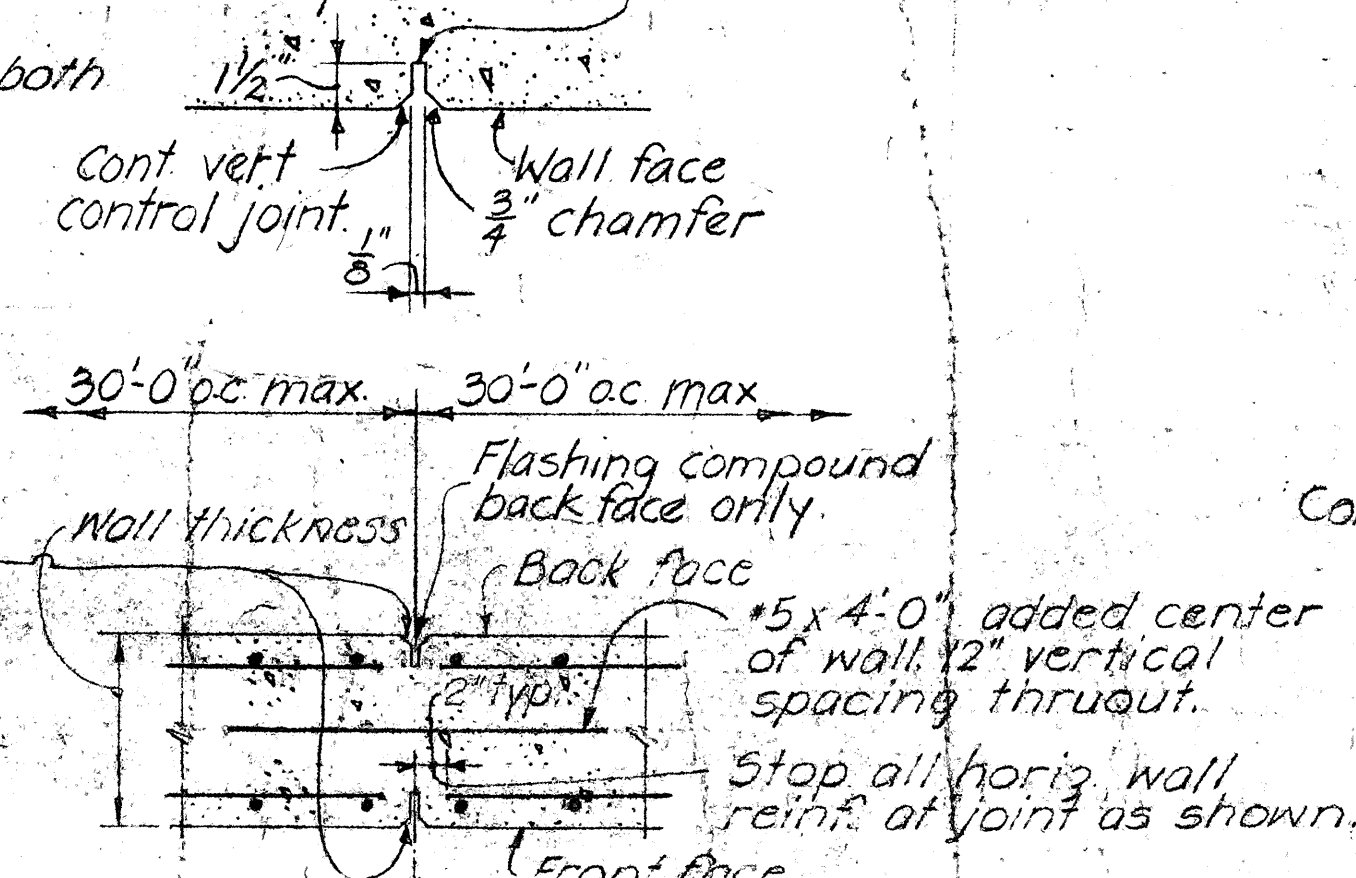
NOTE: Metal drains shall be considered incidental to Class A Concrete in both concrete and steel bridges and will not be paid for separately. Assembly of grillage and pipe shall be hot-dip galvanized after all welding is completed.

TYPICAL DRAINAGE DETAILS



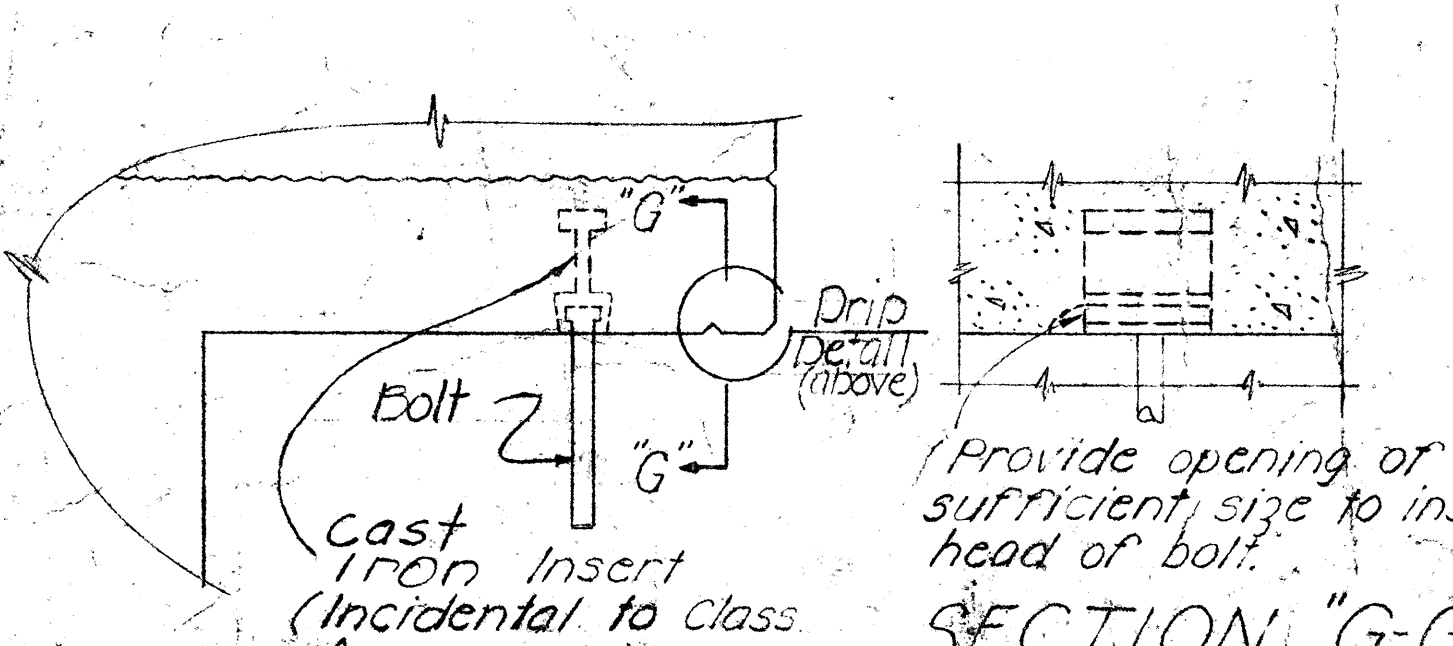
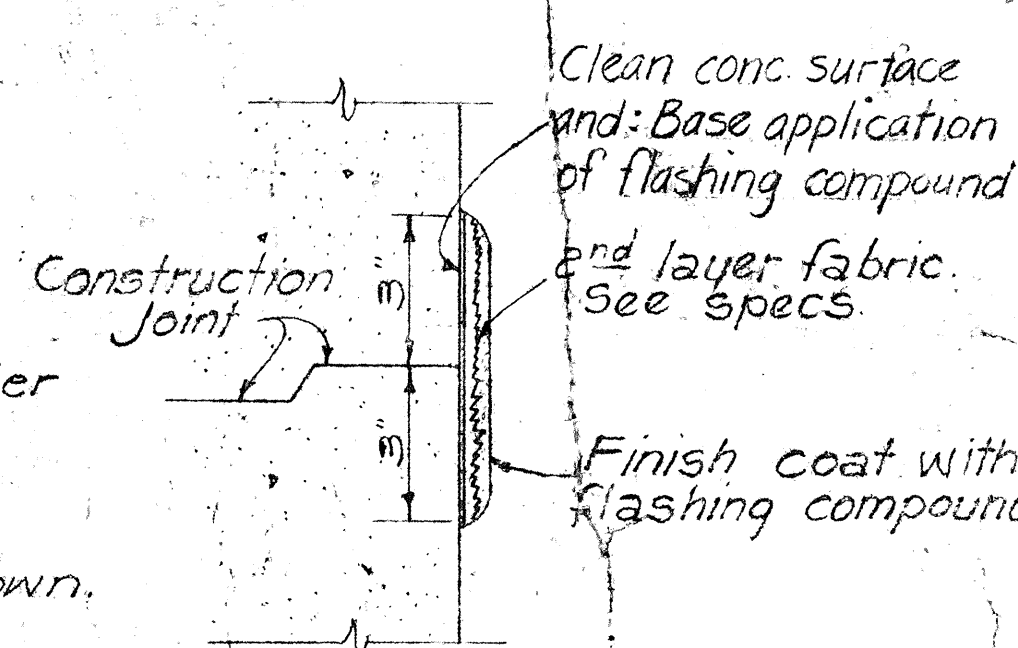
INSERT DETAIL

Contractor to take proper precautions to prevent the concrete from flowing into the opening of the inserts.

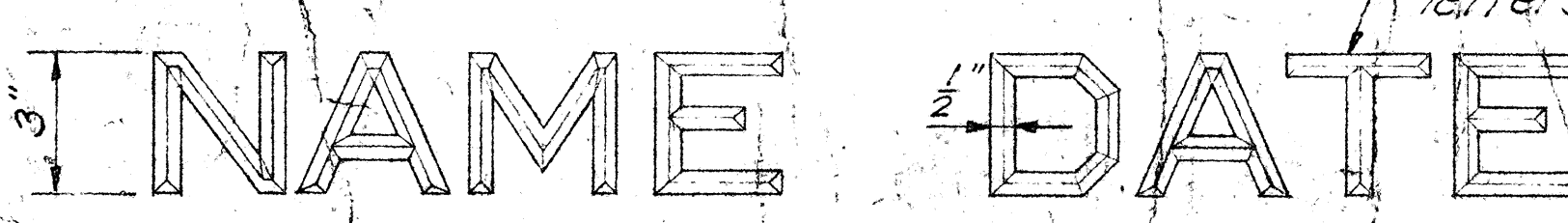


CONTROL JOINT DETAILS

TYP. FLASHING COMPOUND WATERPROOFING DETAIL

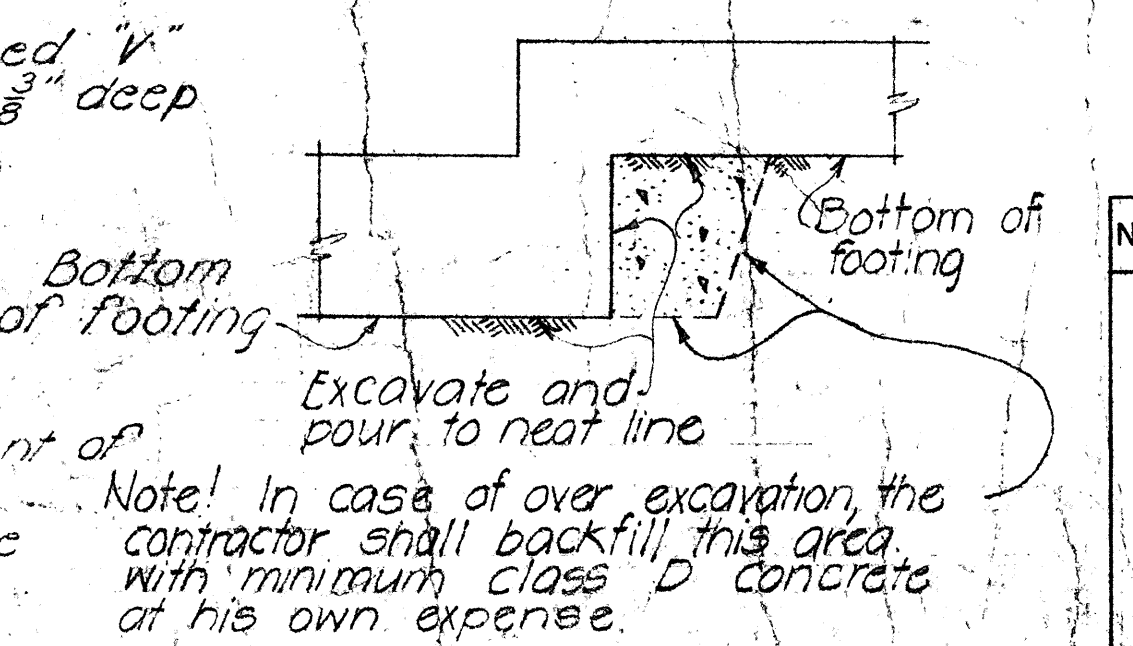


DETAIL OF PIPE HANGERS & INSERTS



NOTE: Refer to corresponding detail drawings for placement of such names & dates at end post. Exact details & spacing of letters & figures shall be as directed by the Engineer. See Note #12.

TYPICAL DETAIL OF LETTERS & FIGURES AT CONCRETE END POST



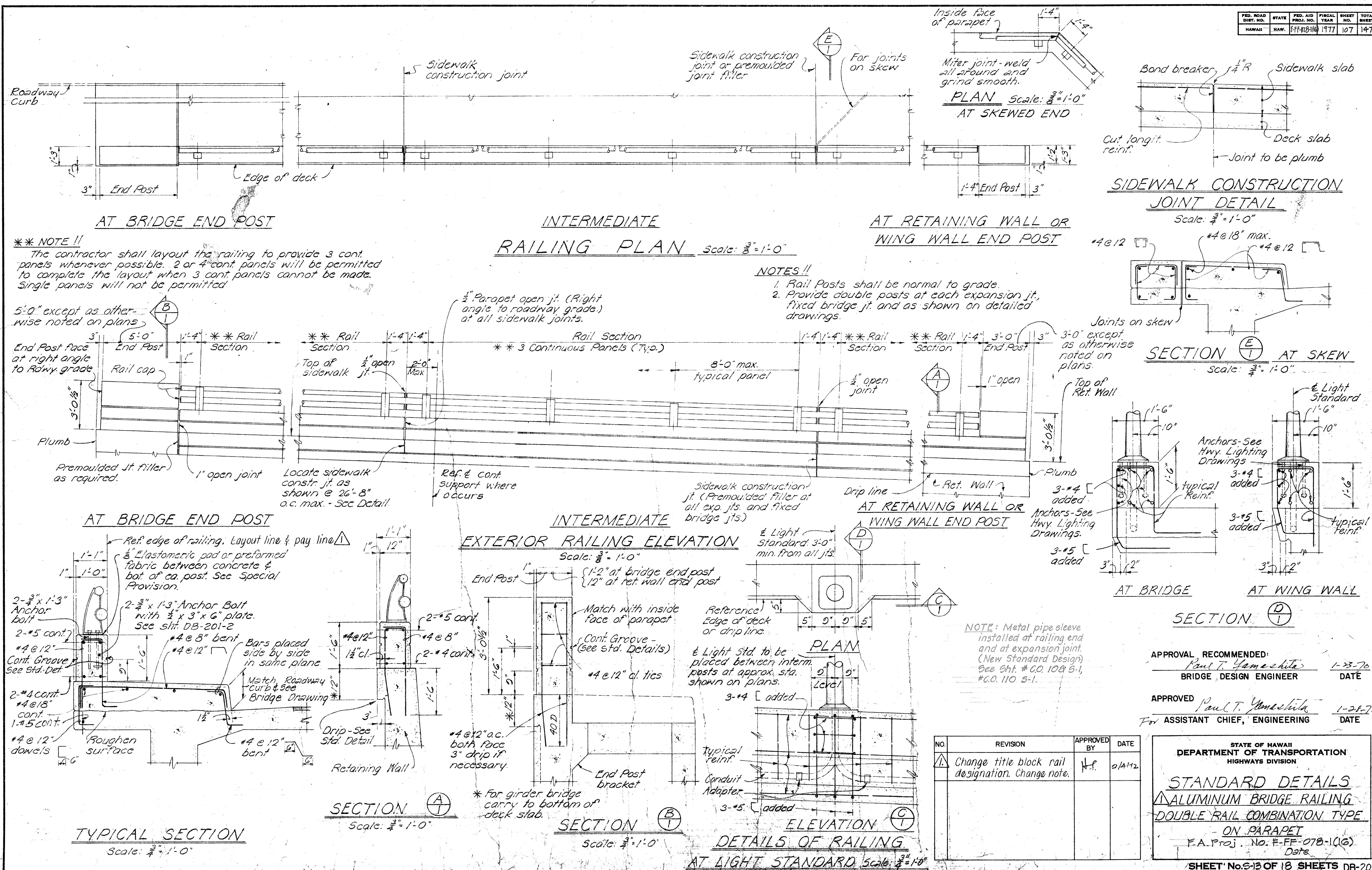
TYPICAL EXCAVATION FOR CONTINUOUS FOOTING STEP-UP

APPROVAL RECOMMENDED:
Paul T. Yamashita
BRIDGE DESIGN ENGINEER
DATE 1-23-79

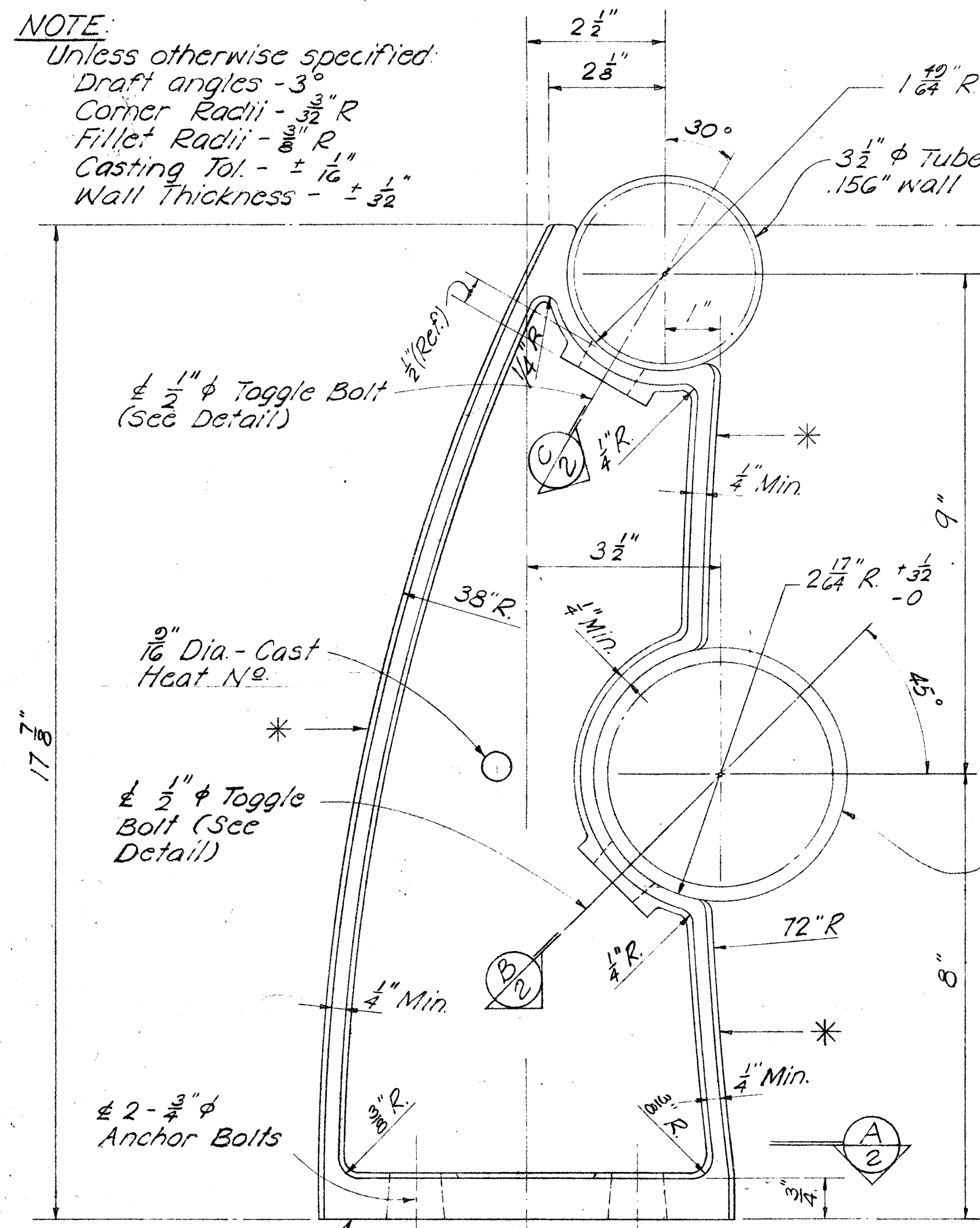
APPROVED
Paul T. Yamashita
ASSISTANT CHIEF, ENGINEERING
DATE 1-28-79

NO.	REVISION	APPROVED BY	DATE

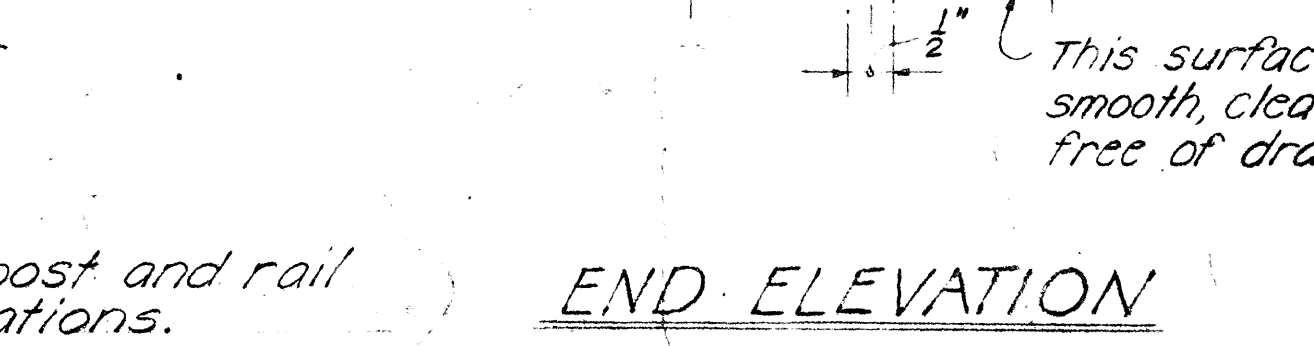
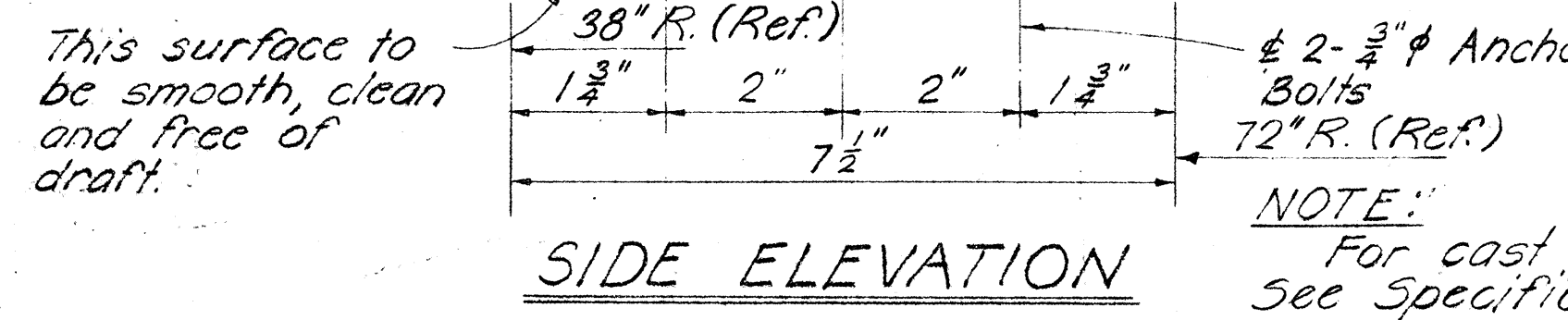
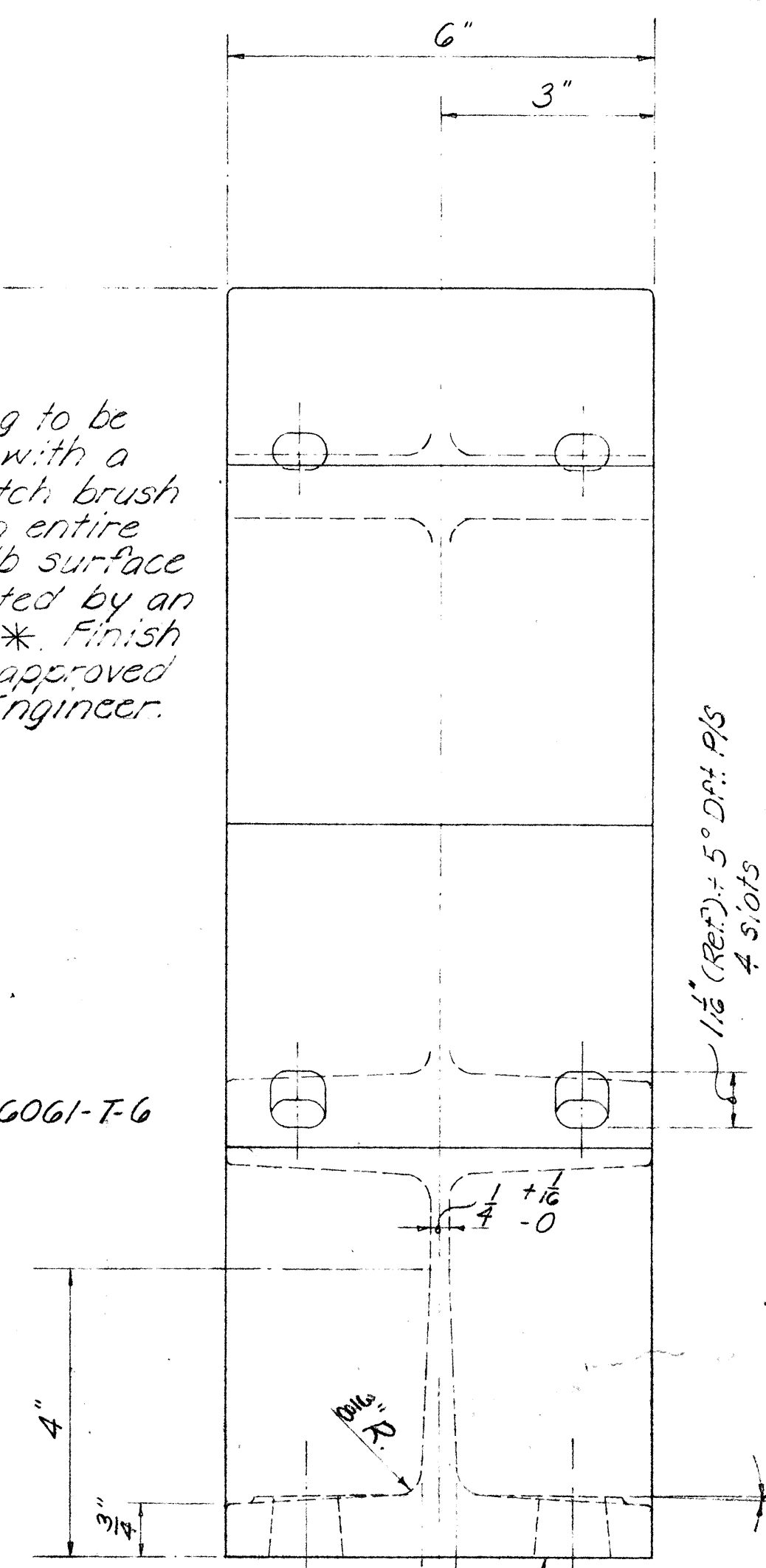
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
NOTES AND MISCELLANEOUS
DETAILS
F.A. Proj. No. FF-078-1(16)
Date: October 1969
SHEET No. 5-12 OF 18 SHEETS DB-100



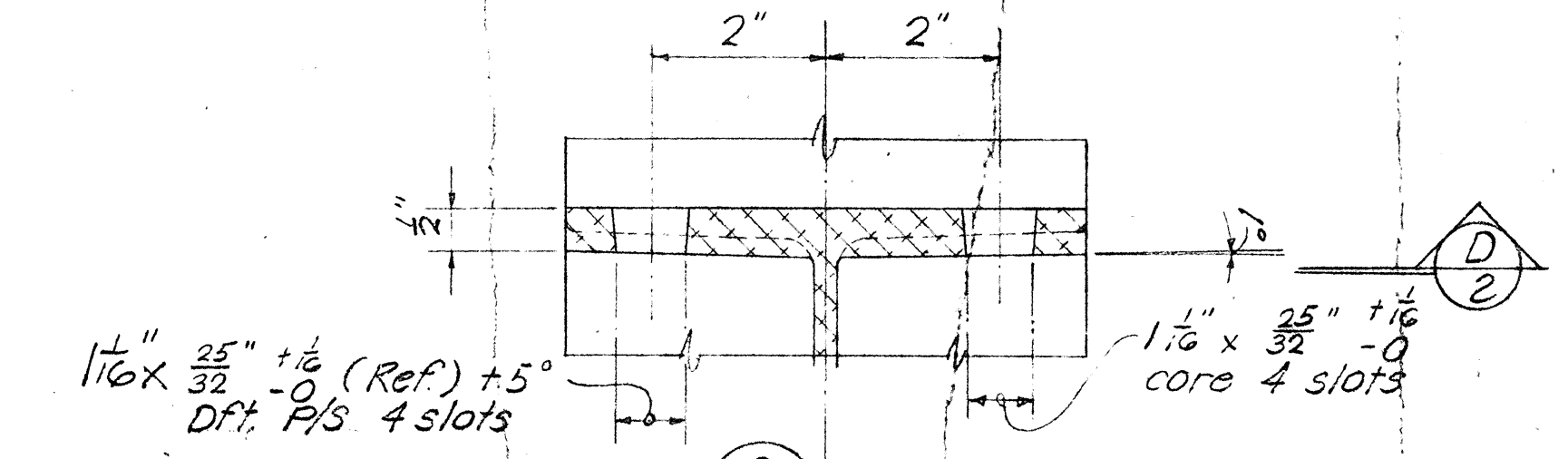
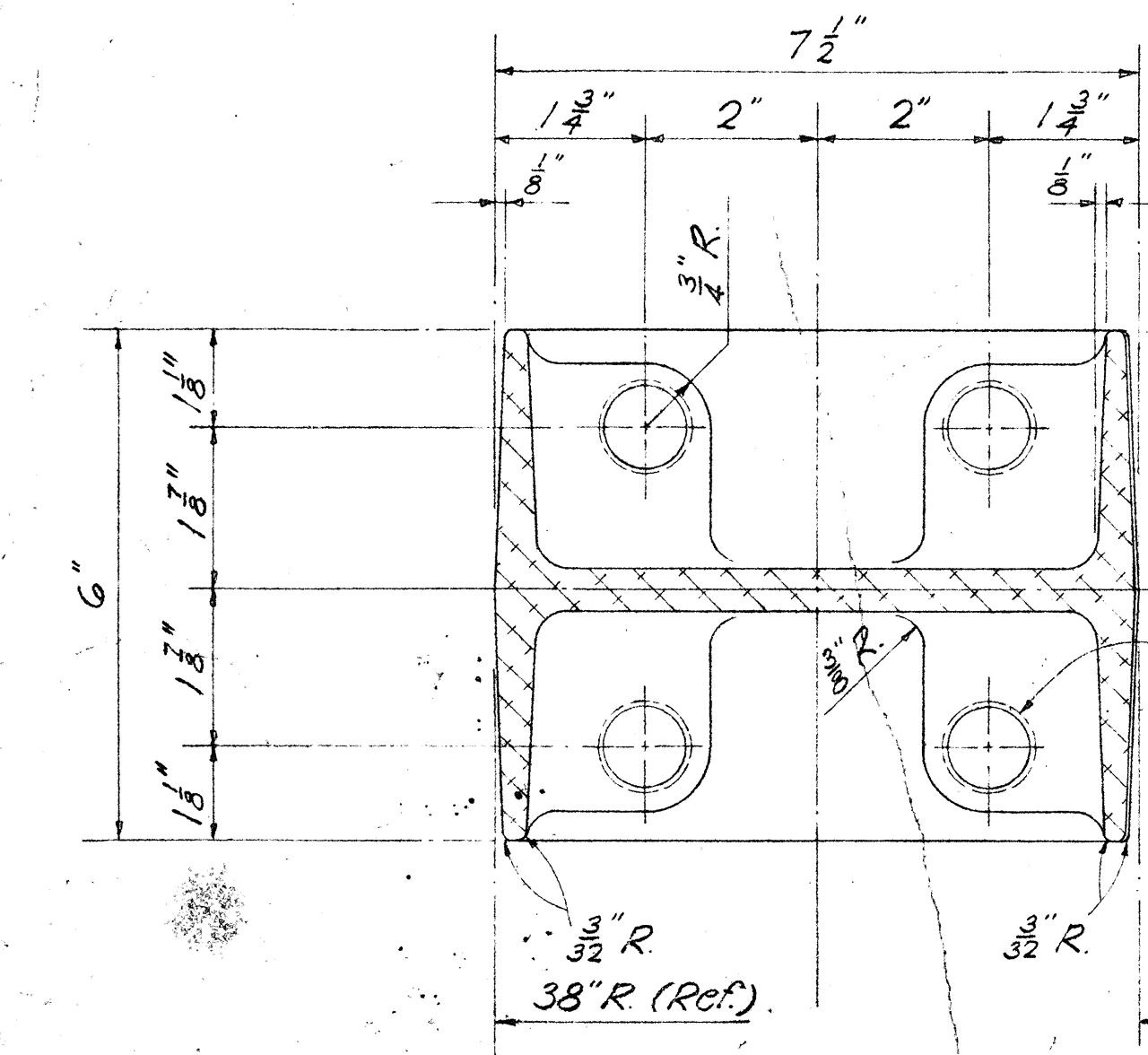
NOTE:
 Unless otherwise specified:
 Draft angles - 3°
 Corner Radii - $\frac{3}{32}$ " R
 Fillet Radii - $\frac{3}{8}$ " R
 Casting Tol. - $\pm \frac{1}{16}$ "
 Wall Thickness - $\pm \frac{1}{32}$ "



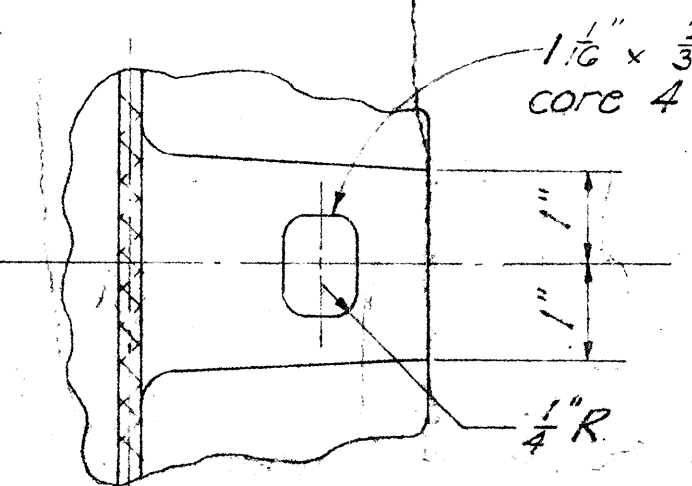
* Casting to be supplied with a std. scratch brush finish on entire gating rib surface as indicated by an asterisk *. Finish shall be approved by the Engineer.



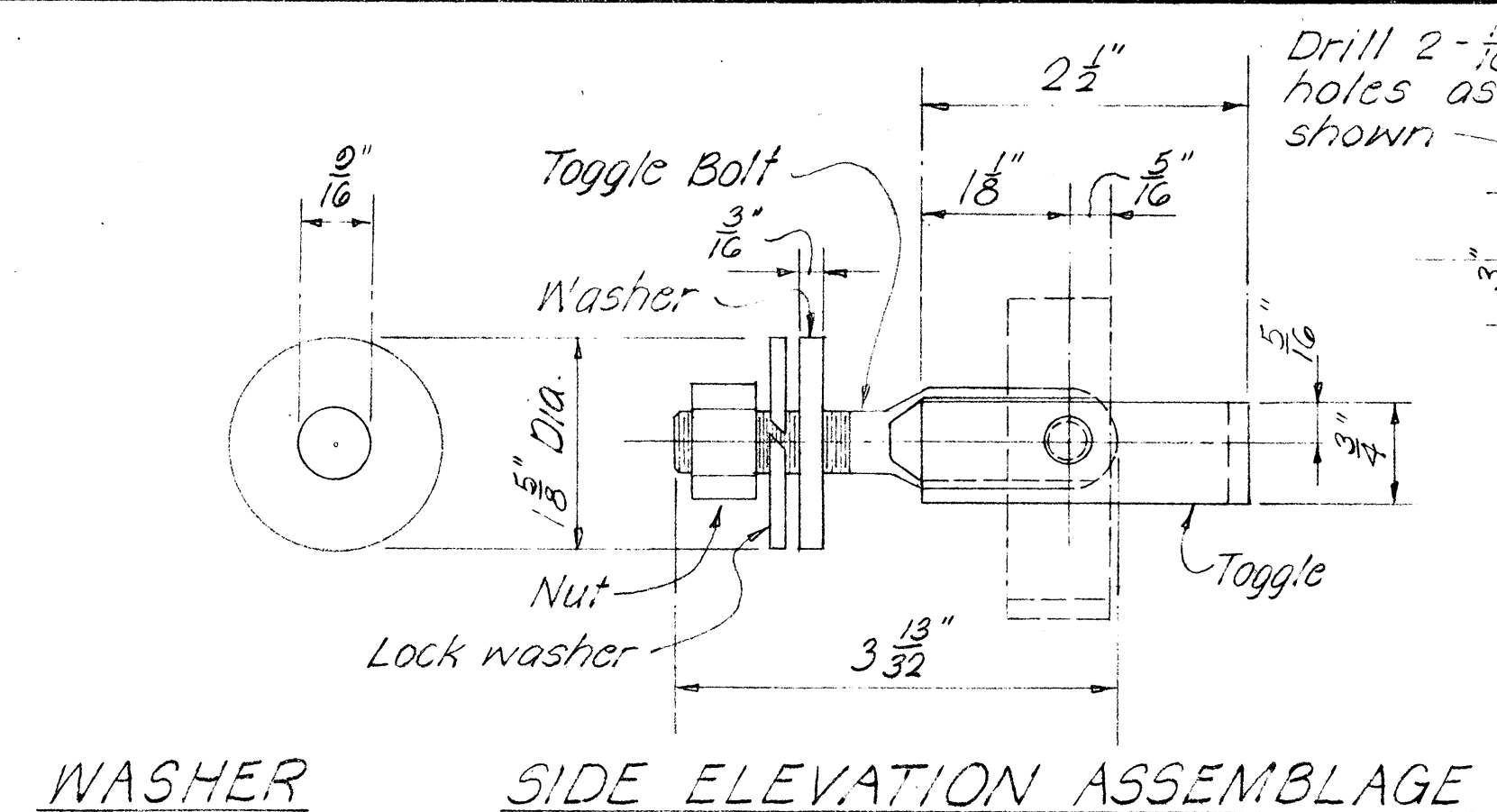
TYPICAL RAIL POST DETAILS
 Scale: 6" = 1'-0"



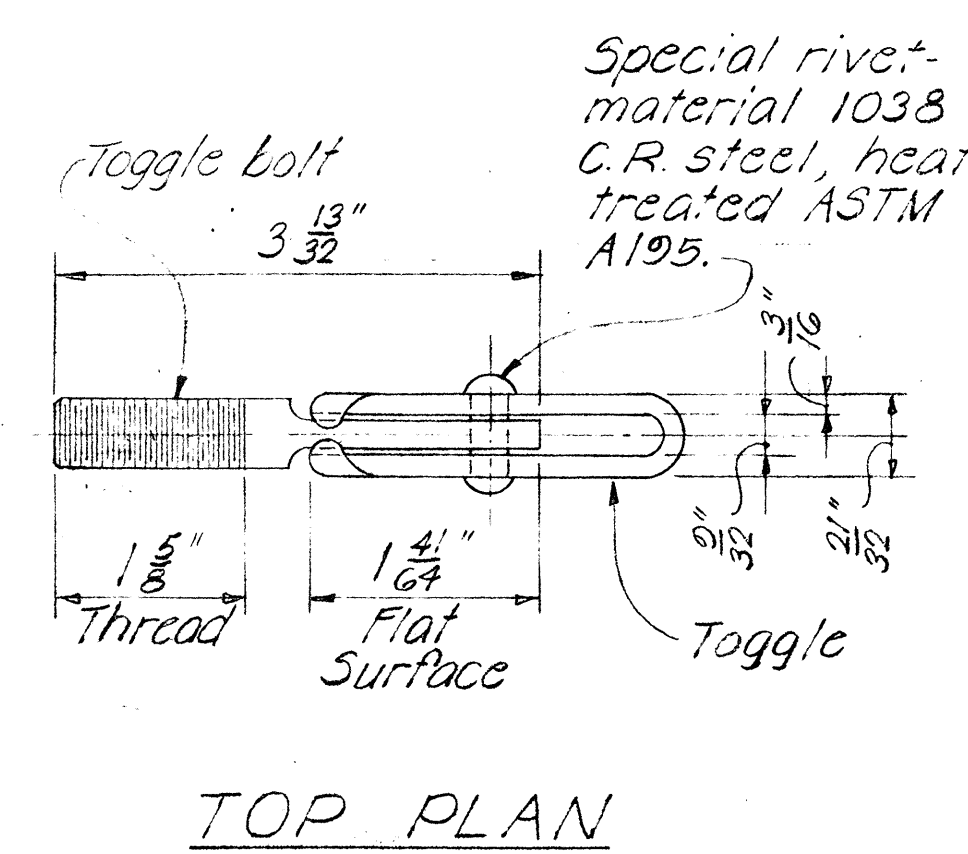
SECTION C-C (SECTION B-B SIMILAR)
 Scale: 6" = 1'-0"



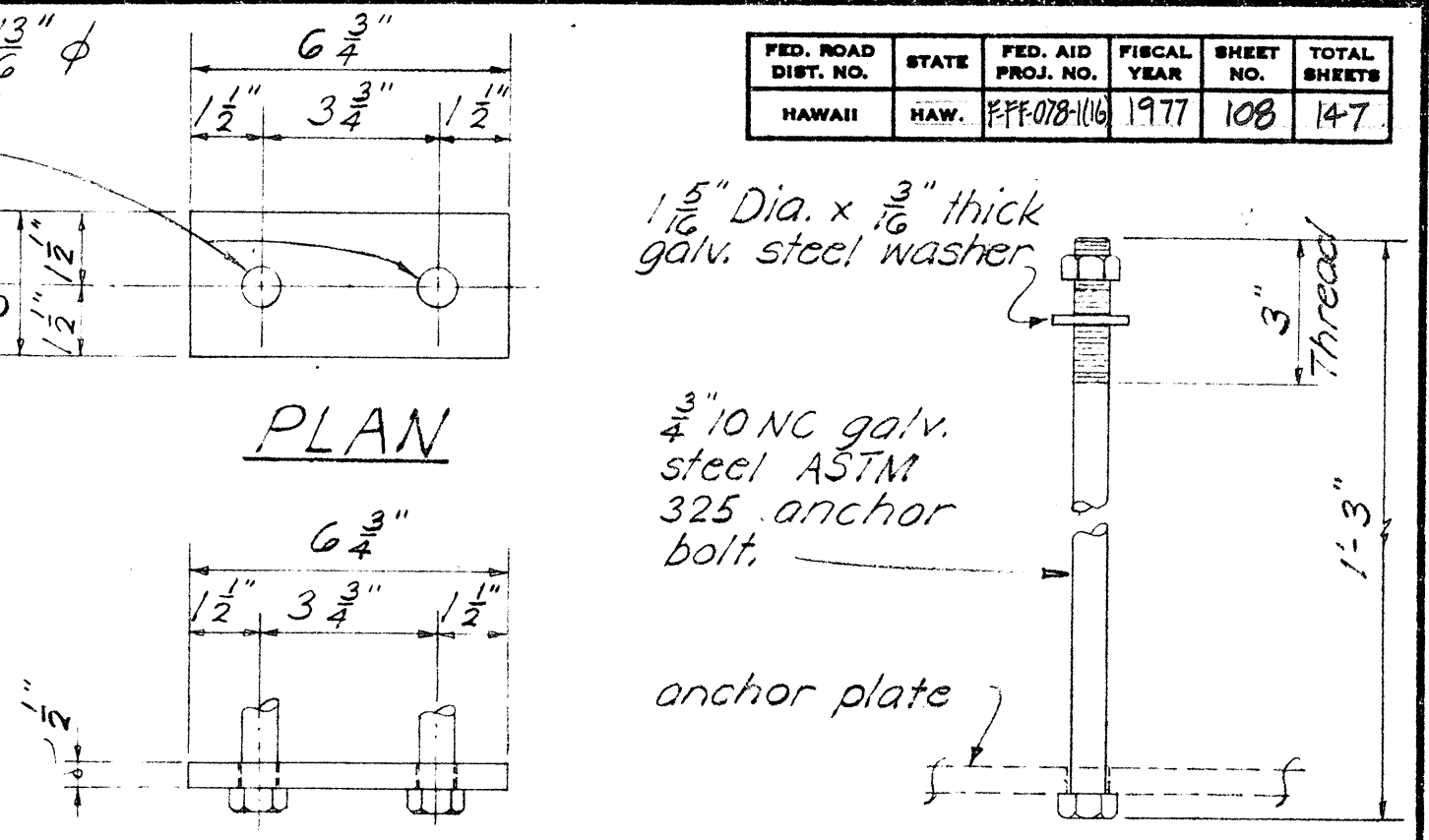
SECTION D-D
 Scale: 6" = 1'-0"



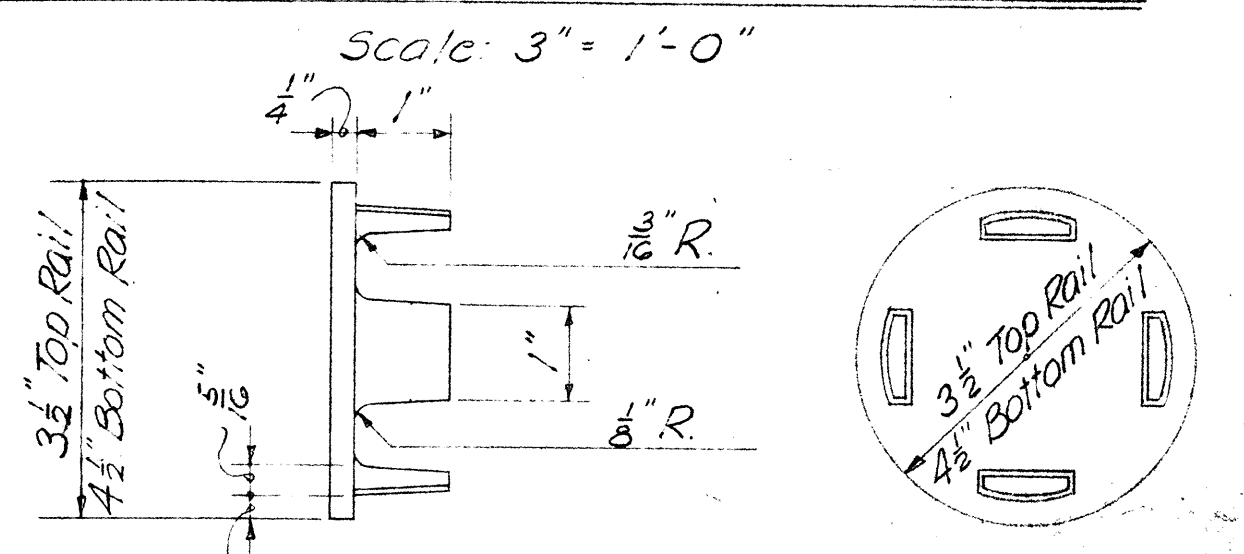
NOTE:
 TOGGLE BOLT
 Cadmium plating on steel -
 Type NS 0.0005" thick ASTM-
 A105 (all parts).



1/2" Ø STEEL TOGGLE BOLT DETAIL
 Scale: 3" = 1'-0"



TYPICAL RAIL POST STEEL ANCHOR BOLT ASSEMBLY
 Scale: 3" = 1'-0"



RAIL CAP DETAIL
 Scale: 6" = 1'-0"

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

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

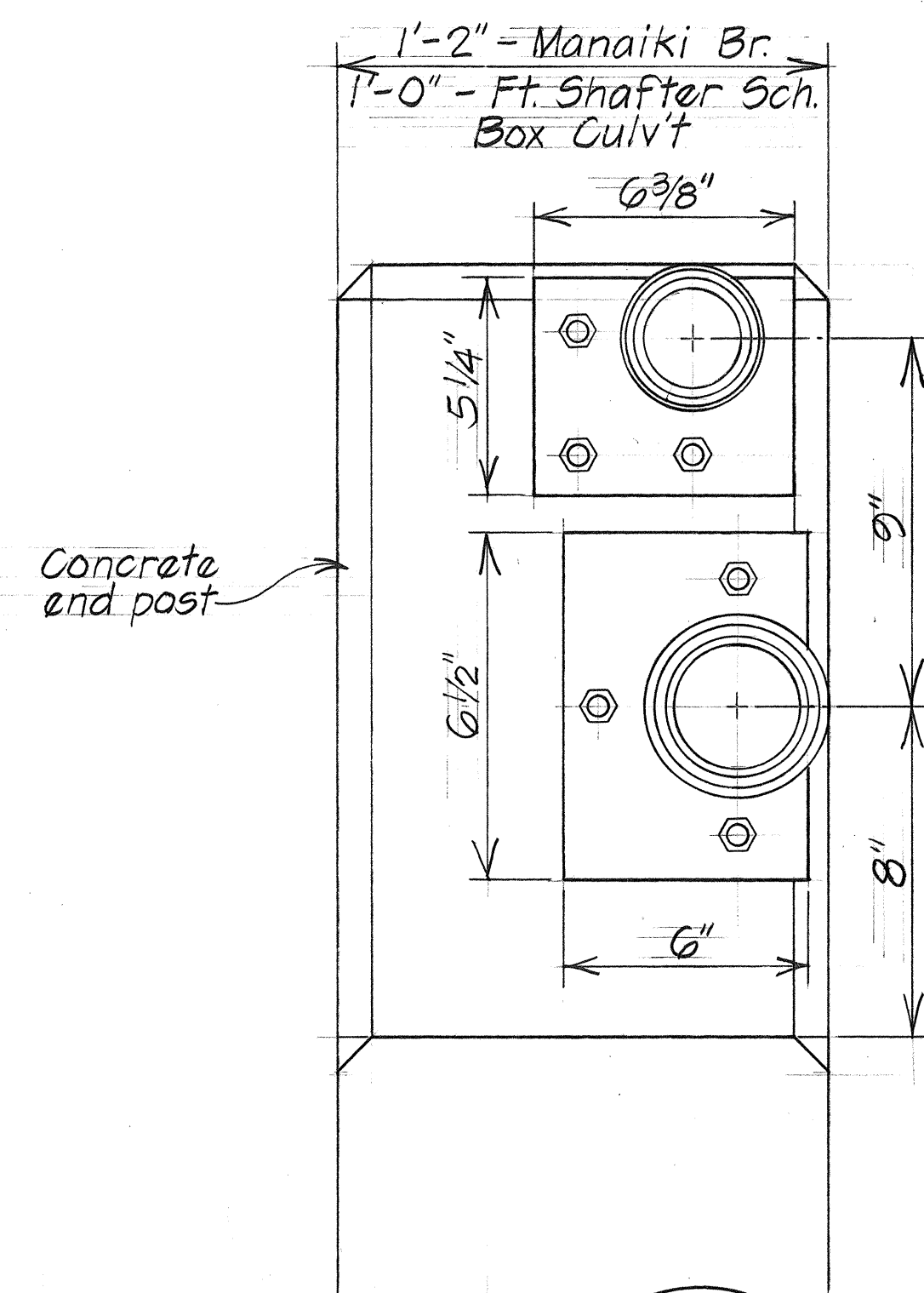
NO.	REVISION	APPROVED BY	DATE
1	Change title block rail designation. Delete note.	Hf	2-4-72

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

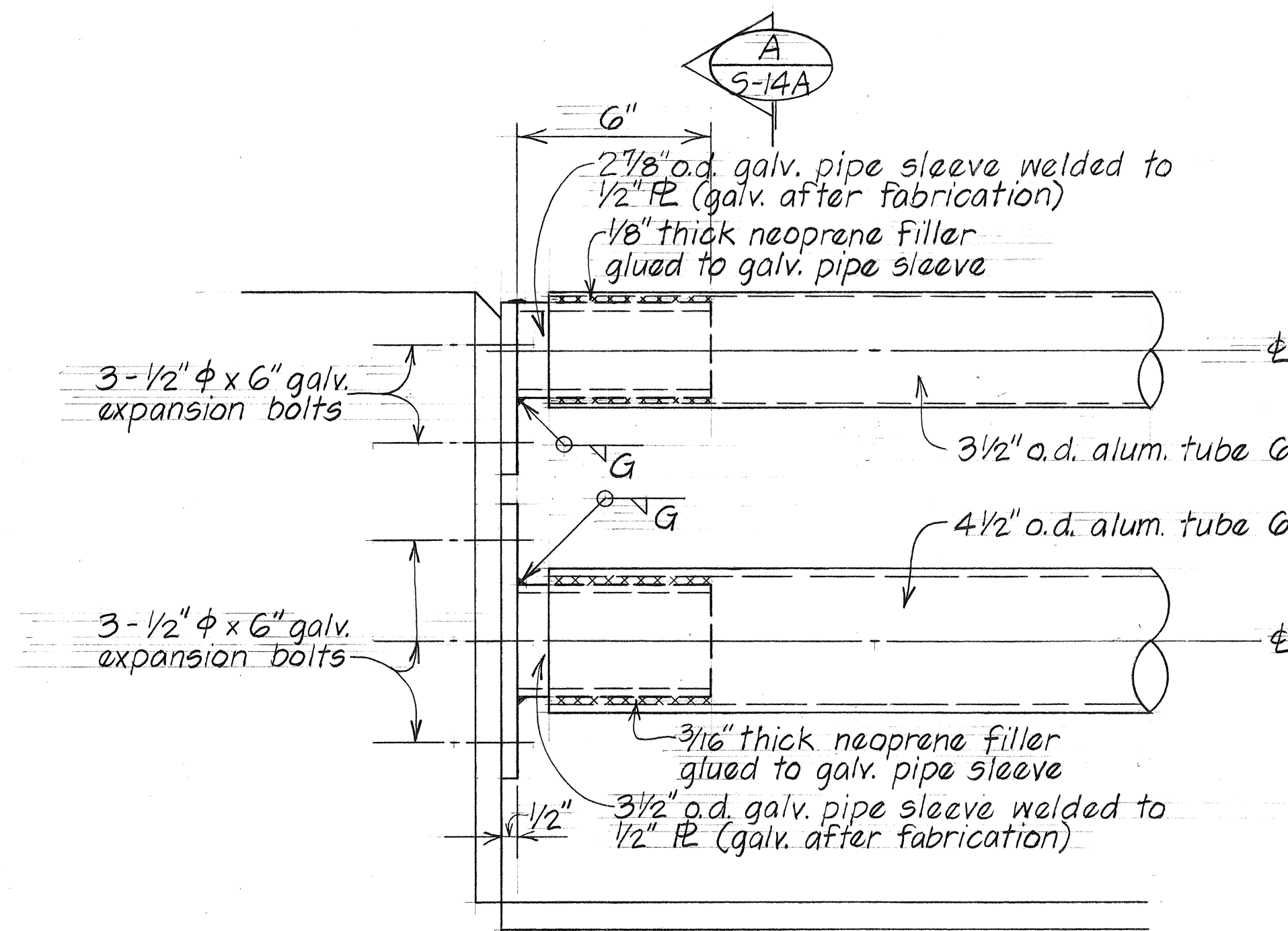
STANDARD DETAILS
 ALUMINUM BRIDGE RAILING
 DOUBLE RAIL COMBINATION TYPE
 ON PARAPET
 F.A. Proj. No. F-FF-078-1 (16)
 Date

SHEET No. 9-14 OF 18 SHEETS DB-201-2

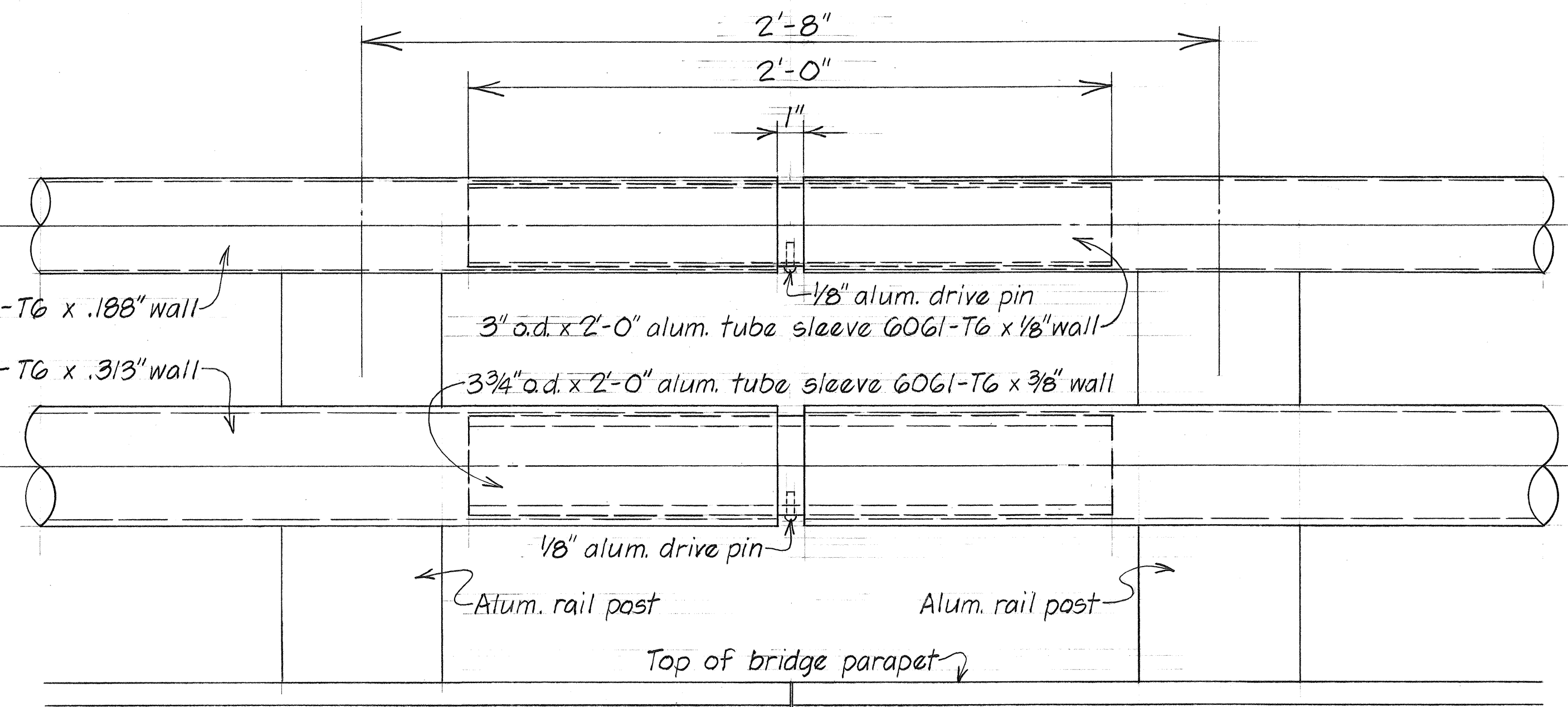
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-FF-078-1(16)	1982	CO 108 S-1	147



SECTION A-5-14A
Scale: 3" = 1'-0"



ELEVATION
Scale: 3" = 1'-0"



SPlice JOINT DETAIL
Scale: 3" = 1'-0"

NOTE: This tracing prepared during "As-Built" postings.

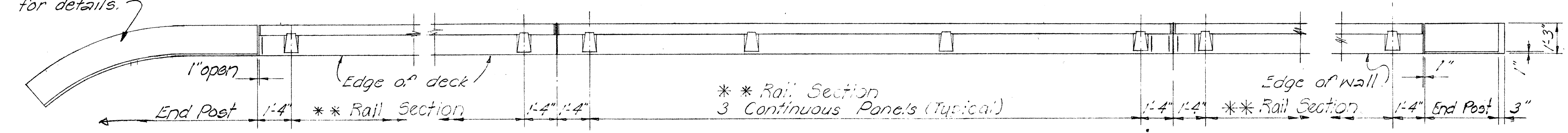
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
**ALUMINUM BRIDGE RAILING -
SPlice JOINT & RAILING CON-
NECTION TO END POST DETAILS**

F.A. Proj. No. F-FF-078-1(16)
Scale: As Noted Date: July 1981
SHEET No. 5-14A OF 18 SHEETS

CO 108 S-1

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	TRACED BY	
	CHECKED BY	
	QUANTITY BY	
	CHECKED BY	

See Sht # DB-205 for details.



AT BRIDGE END POST

INTERMEDIATE

AT RET. WALL END POST

**** NOTE !!**

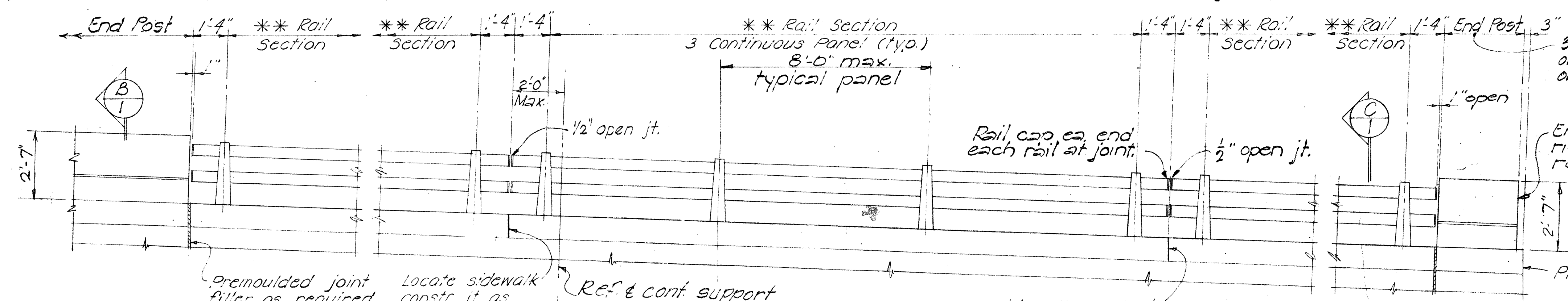
The contractor shall layout the railing to provide 3 cont. panels whenever possible. 2 or 4 cont. panels will be permitted to complete the layout when 3 cont. panels cannot be made. Single panels will not be permitted.

RAILING PLAN

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

NOTES !!

1. Rail Posts shall be normal to grade.
2. Provide double posts at each expansion jt., fixed bridge jt. & as shown on detailed drawings.



AT BRIDGE END POST

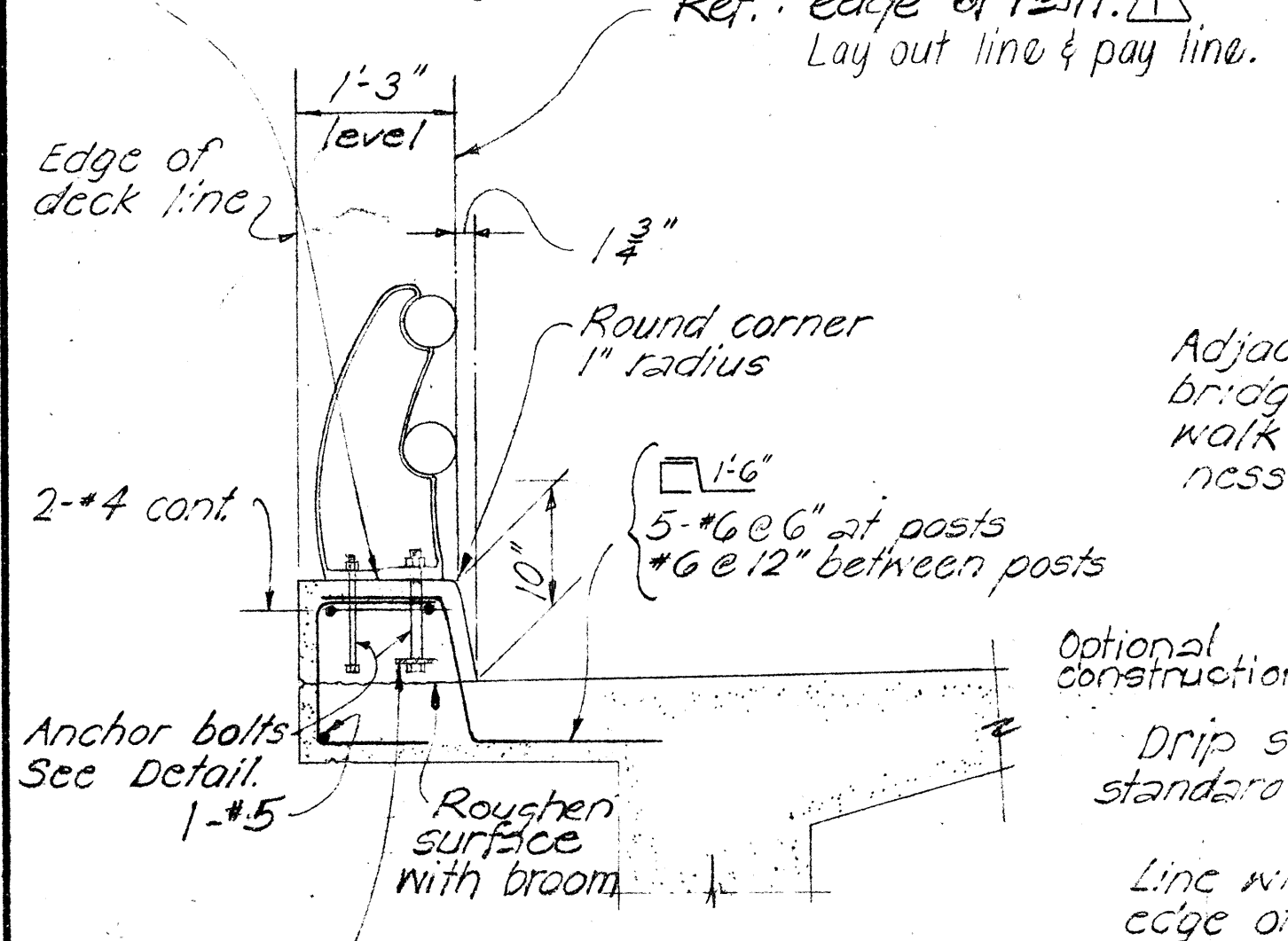
INTERMEDIATE

AT RET. WALL END POST

EXTERIOR RAILING ELEVATION

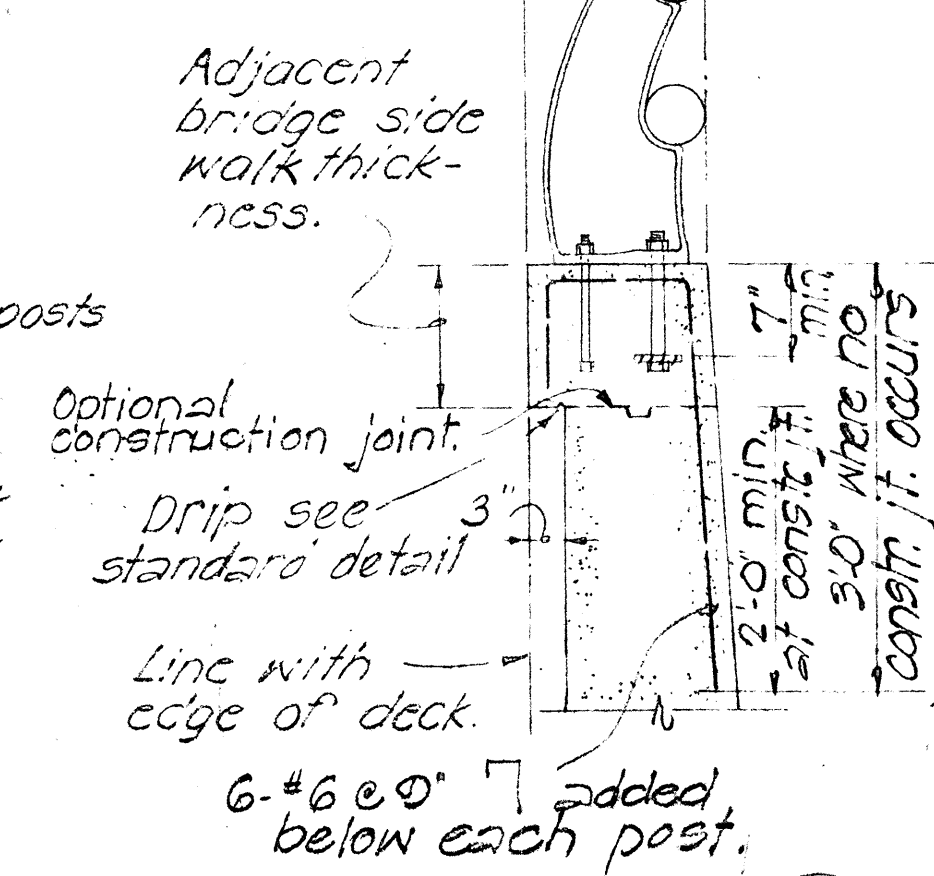
Scale: 3/8" = 1'-0"

1/2" Neoprene Pad or preformed fabric between concrete and bottom of each post. See Special Provisions. This item shall be incidental and not paid for separately.



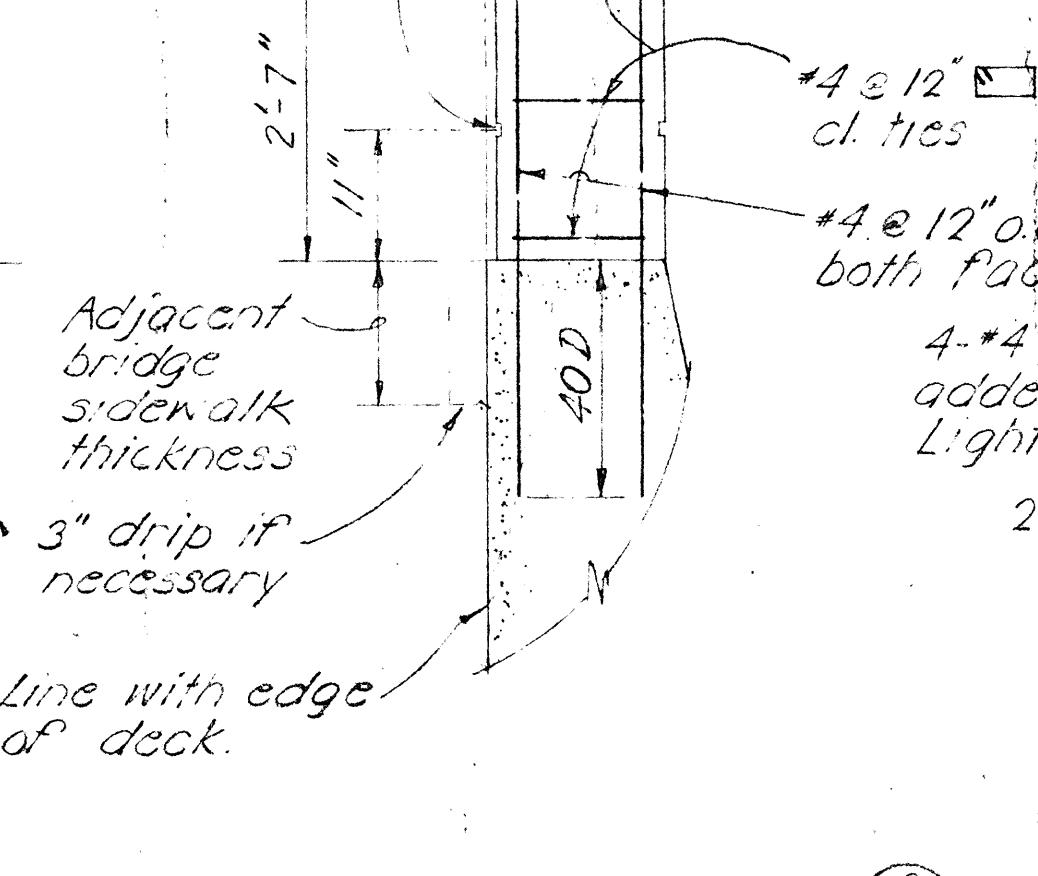
TYPICAL SECTION

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



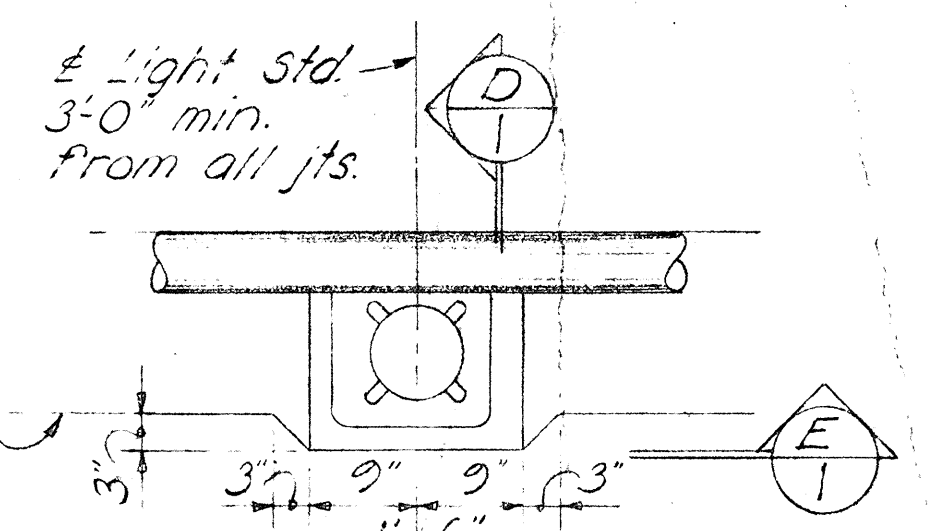
SECTION

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

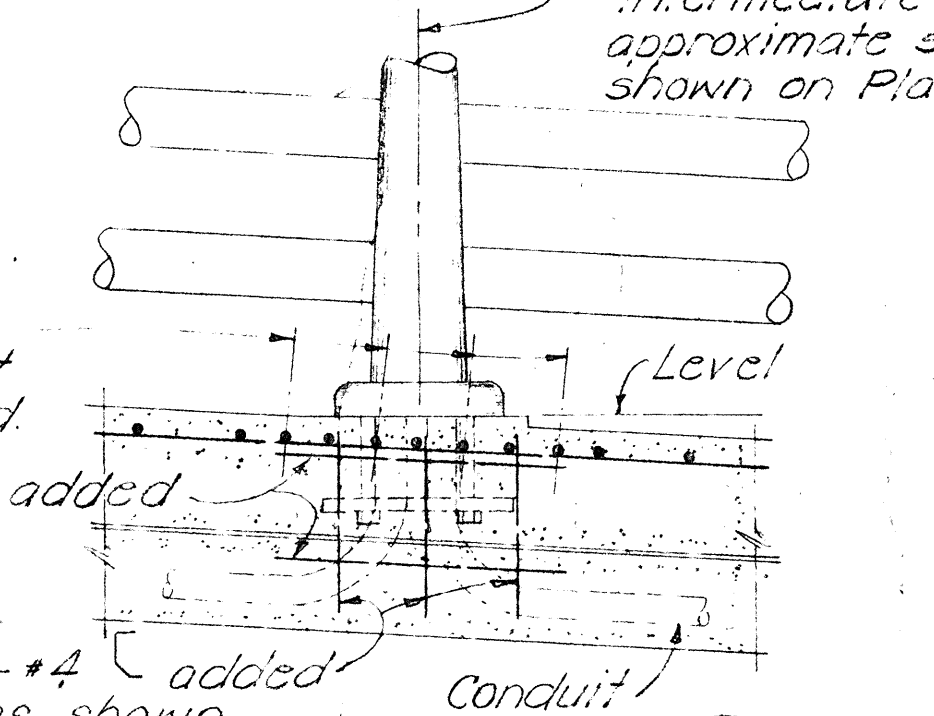


SECTION

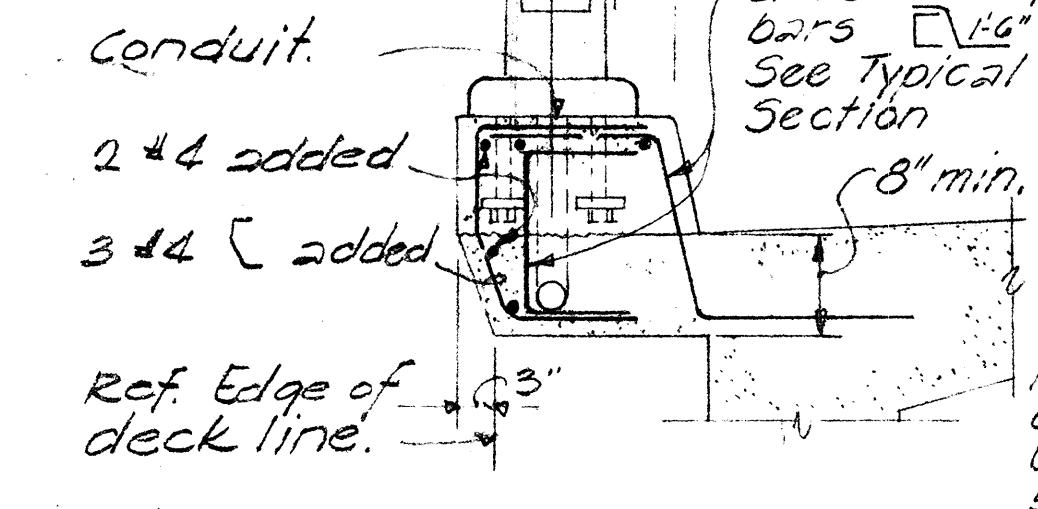
Scale: 3/4" = 1'-0"



PLAN



SECTION



AT BRIDGE

TYPICAL SECTION

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

APPROVAL RECOMMENDED
Paul T. Yamashita
BRIDGE DESIGN ENGINEER

1-23-70
DATE

APPROVED
Paul T. Yamashita
for ASSISTANT CHIEF, ENGINEERING

1-28-70
DATE

NO.	REVISION	APPROVED BY	DATE
1.	Change title block rail designation, Change note.	H.T. 2-4-72	2-4-72

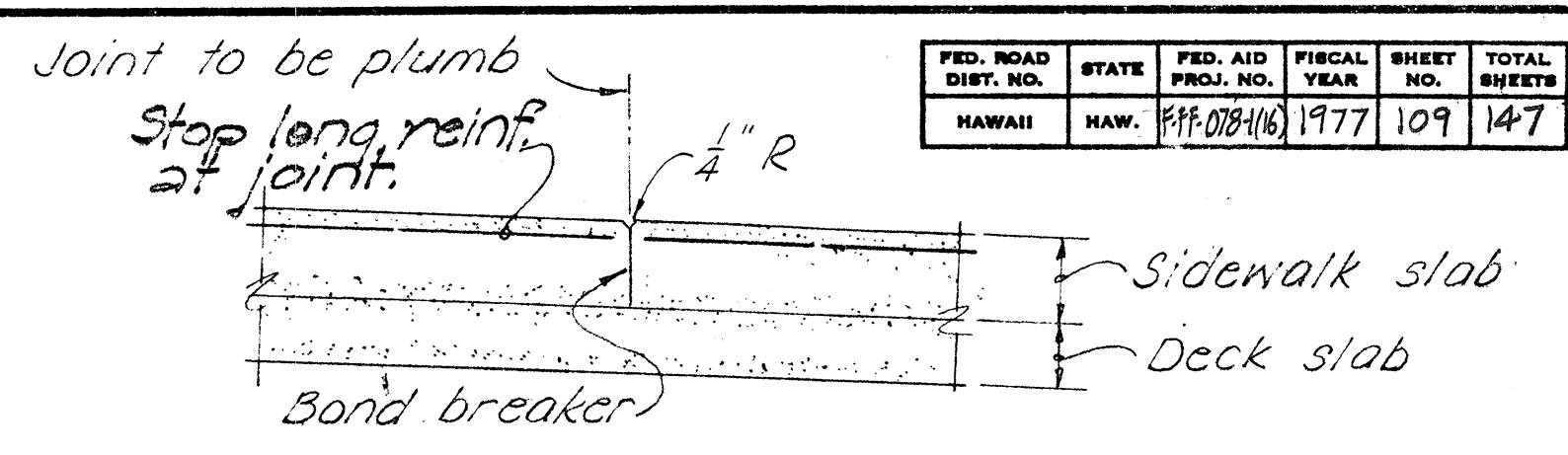
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

ALUMINUM BRIDGE RAILING

TWO RAIL TRAFFIC TYPE

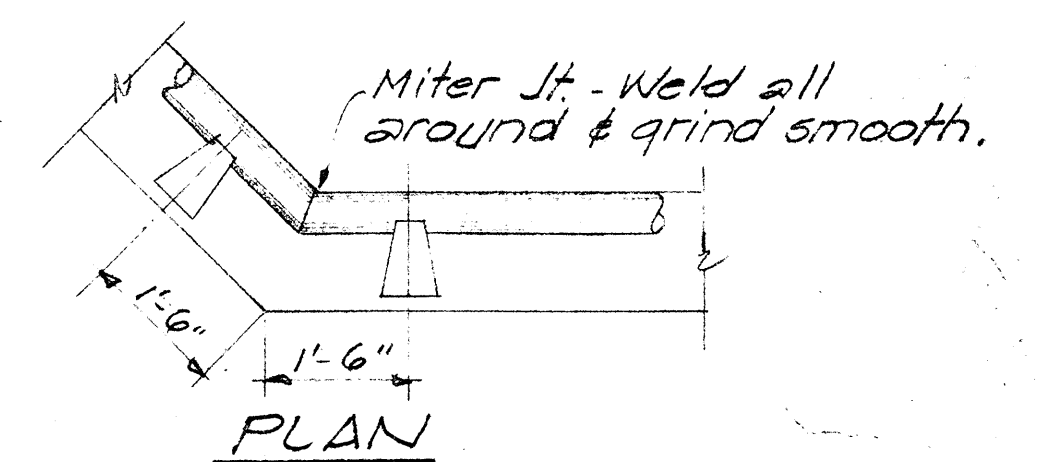
F.A. Proj. No. F-FF-078-1(16)
SCALE As NOTED Date
SHEET No. 5-15 OF 18 SHEETS DB-202-1



SIDEWALK CONSTRUCTION JOINT DETAIL

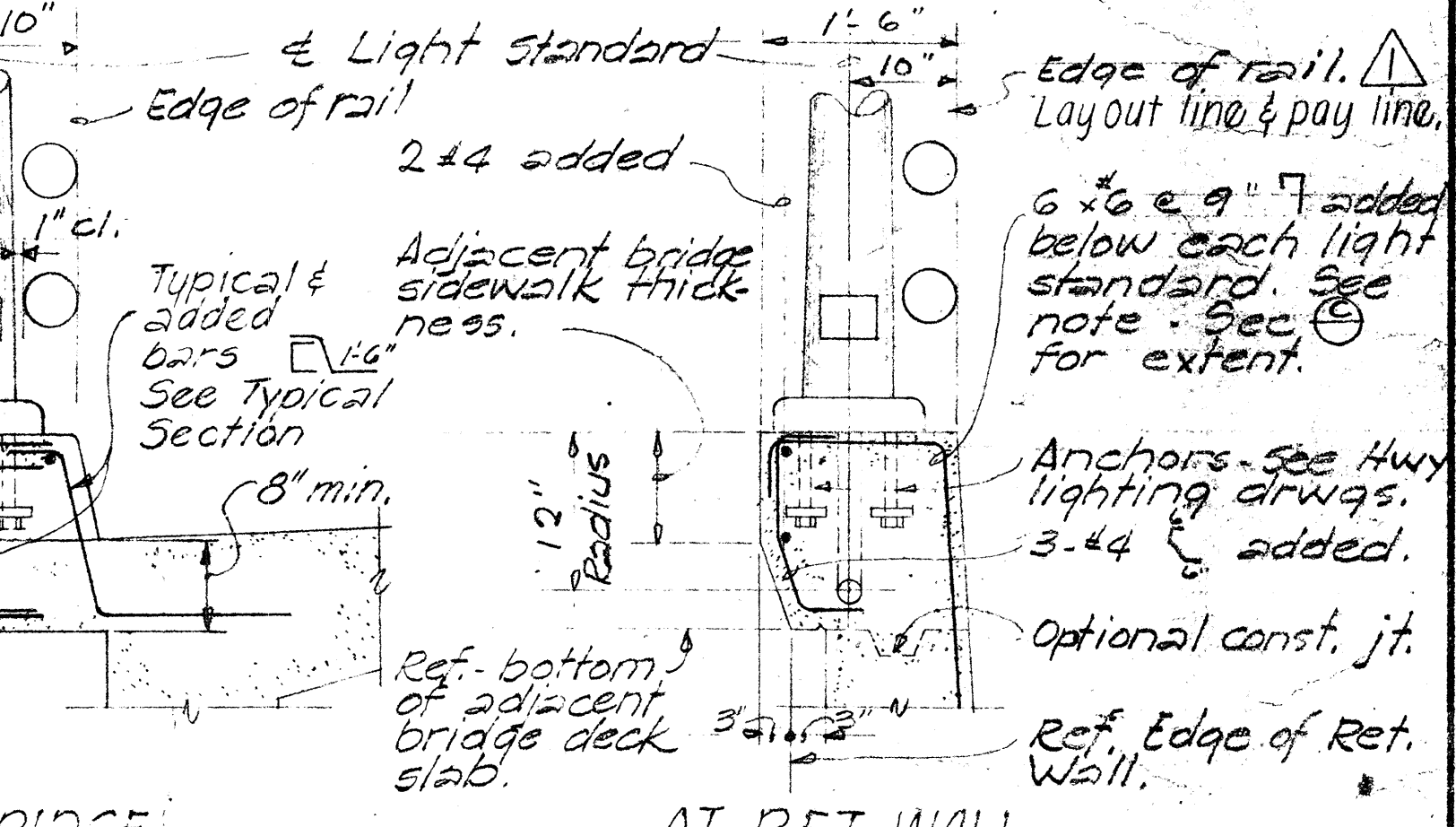
Scale: 1/2" = 1'-0"

NOTE: Metal pipe sleeve installed at railing end and expansion joint (New Standard Design)



TREATMENT OF RAILING AT SKEWED ENDS

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



AT RET. WALL

TYPICAL SECTION

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

APPROVAL RECOMMENDED
Paul T. Yamashita
BRIDGE DESIGN ENGINEER

1-23-70
DATE

APPROVED
Paul T. Yamashita
for ASSISTANT CHIEF, ENGINEERING

1-28-70
DATE

NO.	REVISION	APPROVED BY	DATE
1.	Change title block rail designation, Change note.	H.T. 2-4-72	2-4-72

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

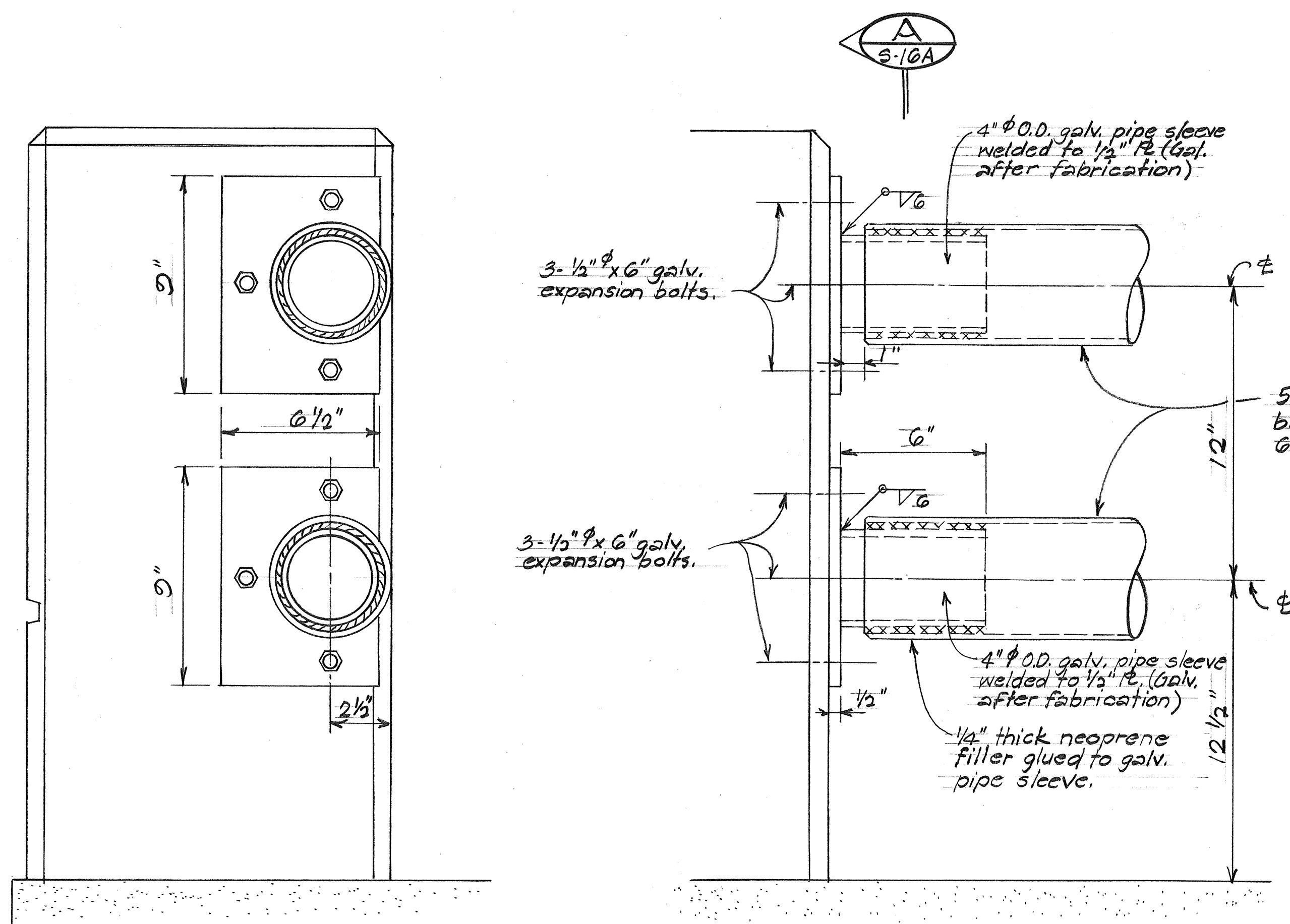
STANDARD DETAILS

ALUMINUM BRIDGE RAILING

TWO RAIL TRAFFIC TYPE

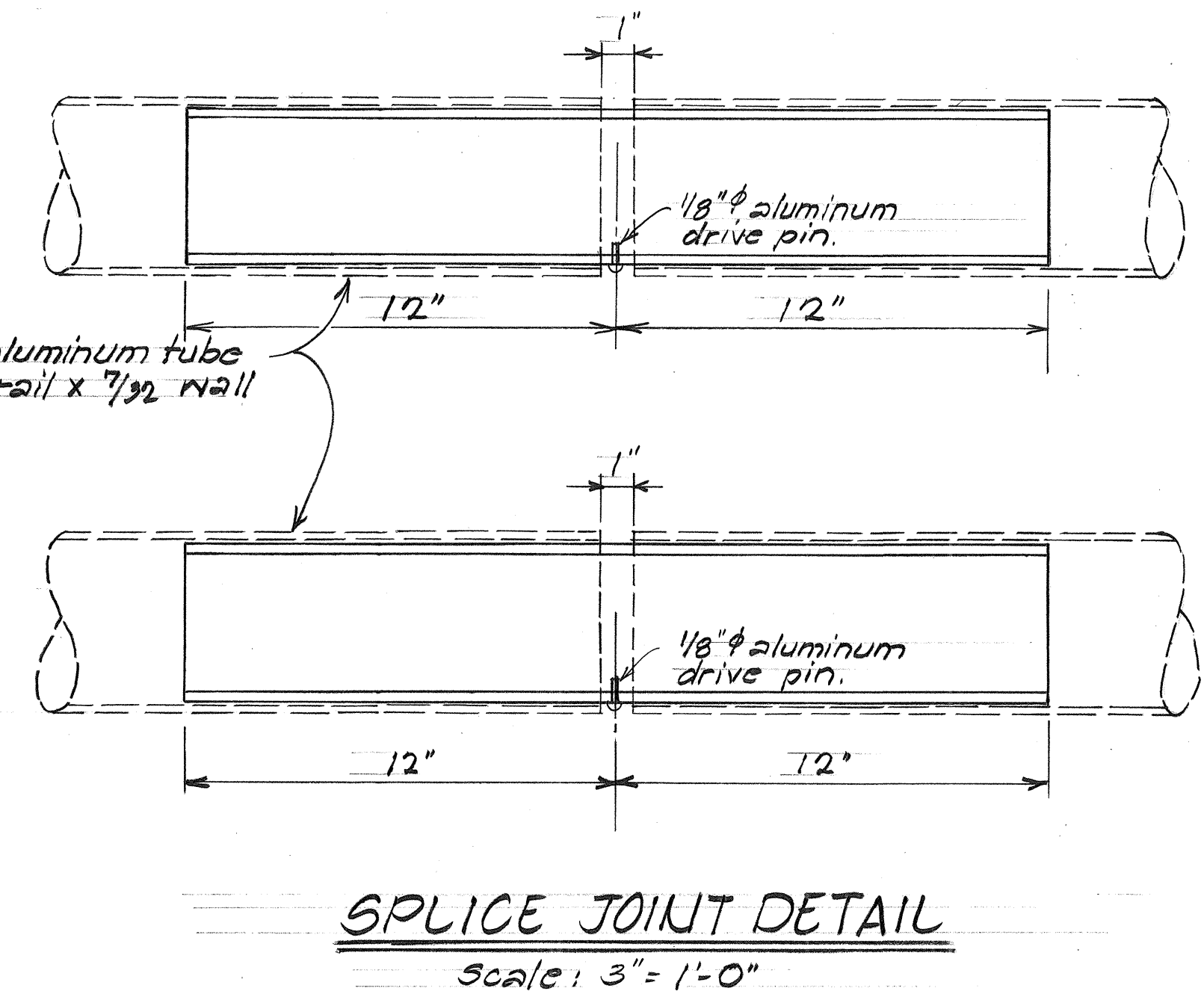
F.A. Proj. No. F-FF-078-1(16)
SCALE As NOTED Date
SHEET No. 5-15 OF 18 SHEETS DB-202-1

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FF-081-1(16)	1982	CO 110 S-1	147



SECTION
Scale: 3" = 1'-0"

ELEVATION
Scale: 3" = 1'-0"



SPLICE JOINT DETAIL
Scale: 3" = 1'-0"

NOTE !!
This tracing prepared during
"As-Built" postings.

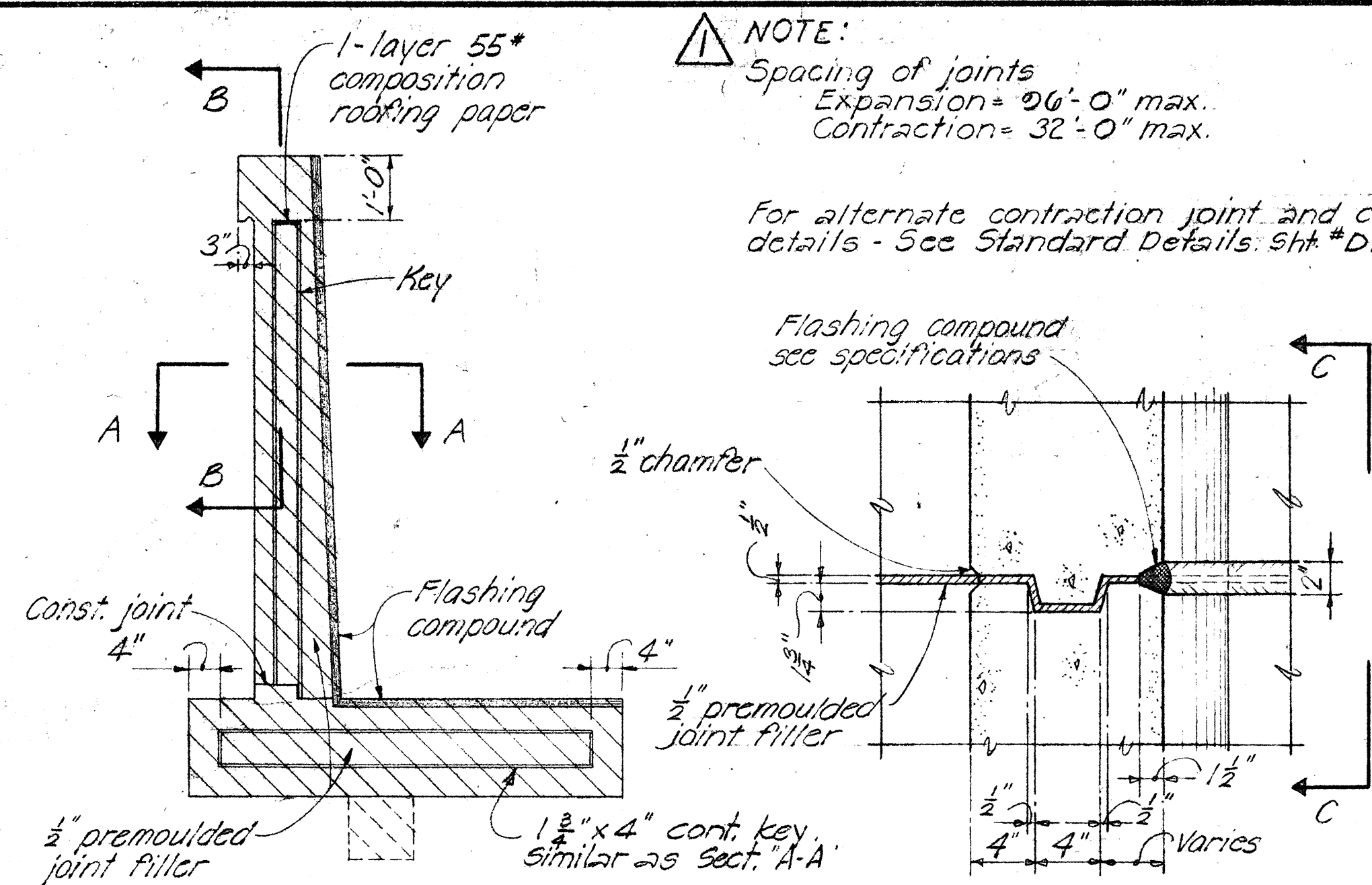
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
ALUMINUM BRIDGE RAILING
SPLICE JOINT & RAILING
CONNECTION TO END POST DETAILS
F.A. Proj. No. F-FF-078-1(16)
Scale: As Noted Date: July 1981
SHEET No. 5-16A OF 18 SHEETS

CO 110 S-1

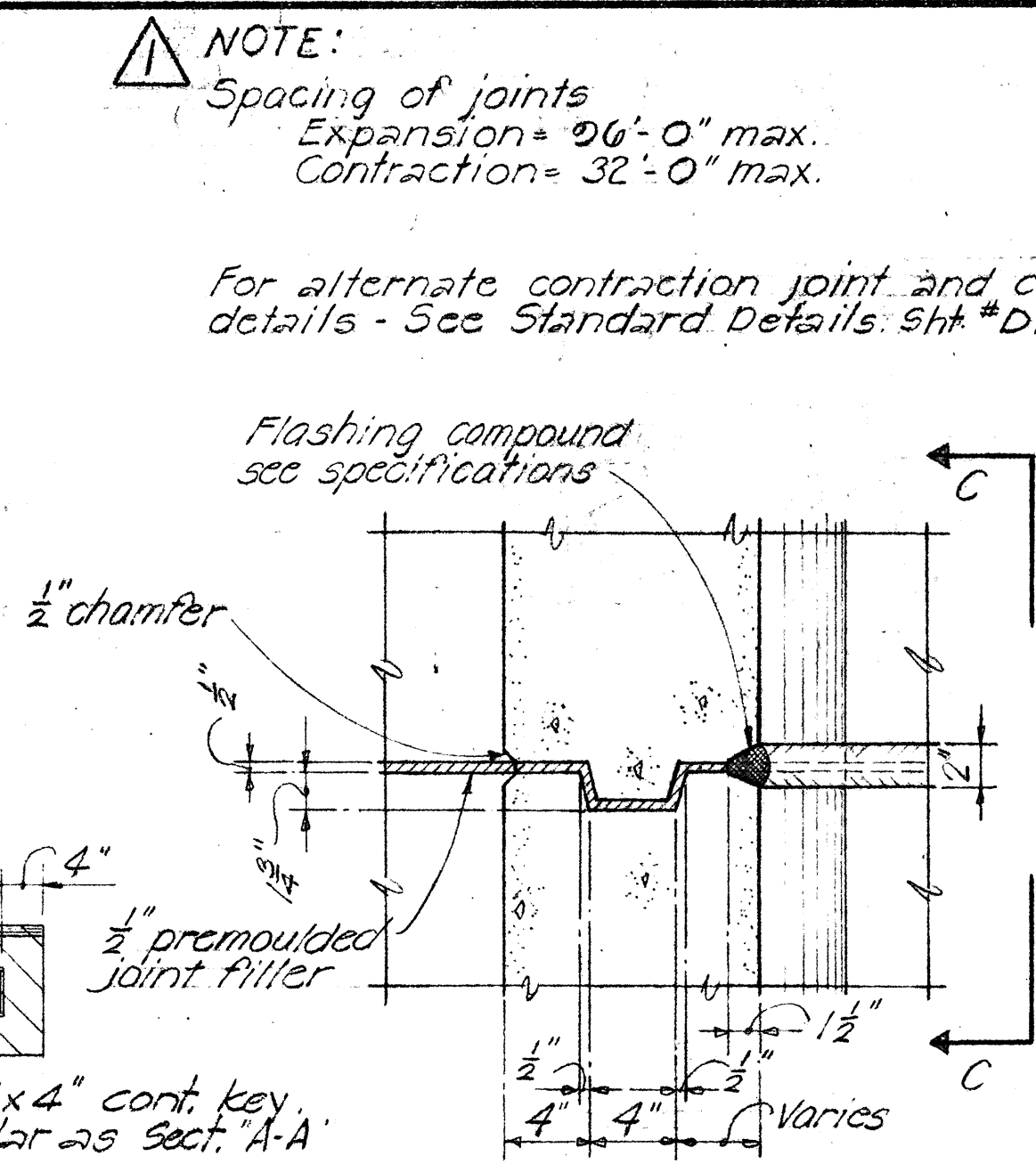
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
No.	TRACED BY	
	QUANTITIES BY	
	CHECKED BY	

CURVE DATA

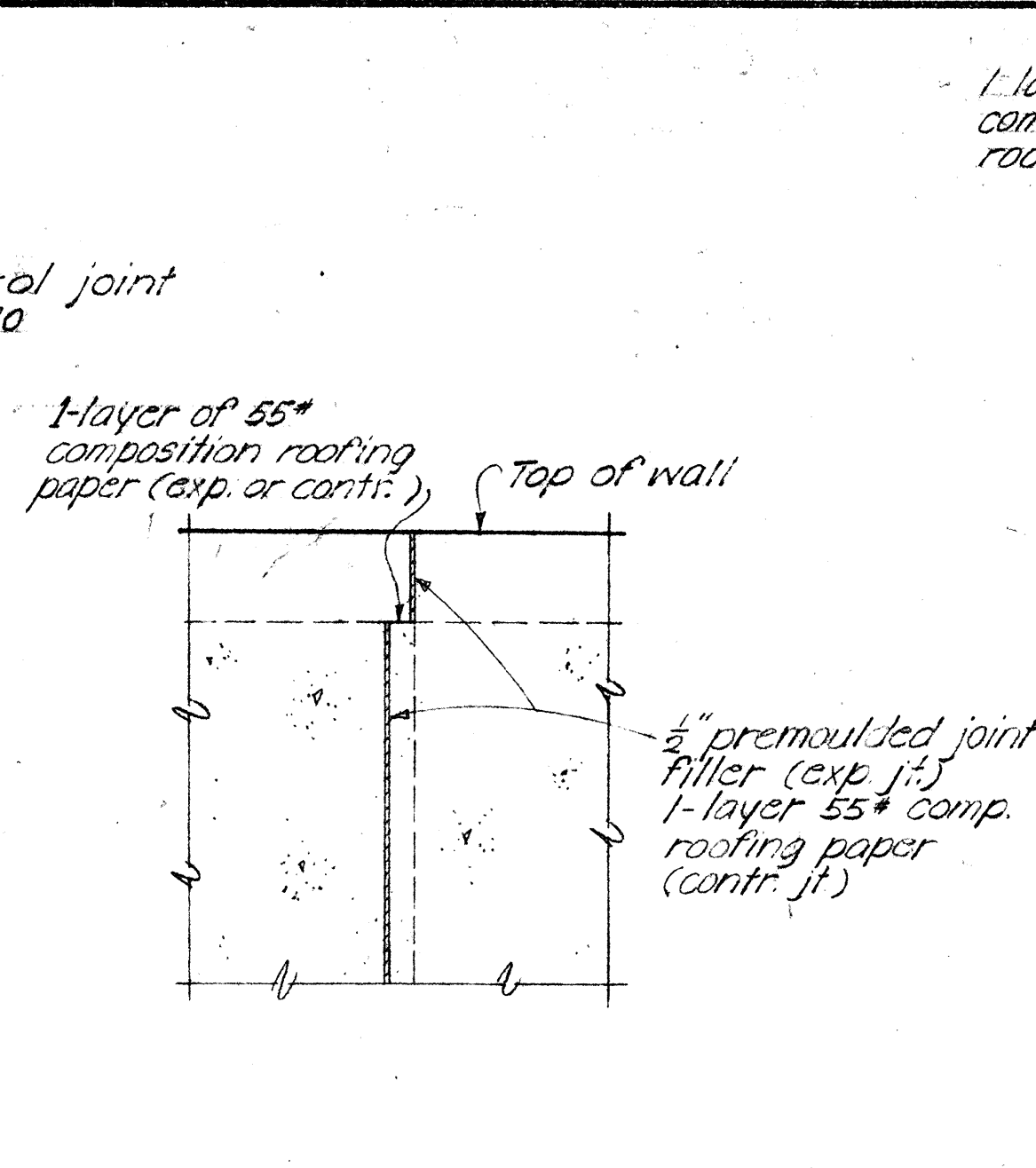
141



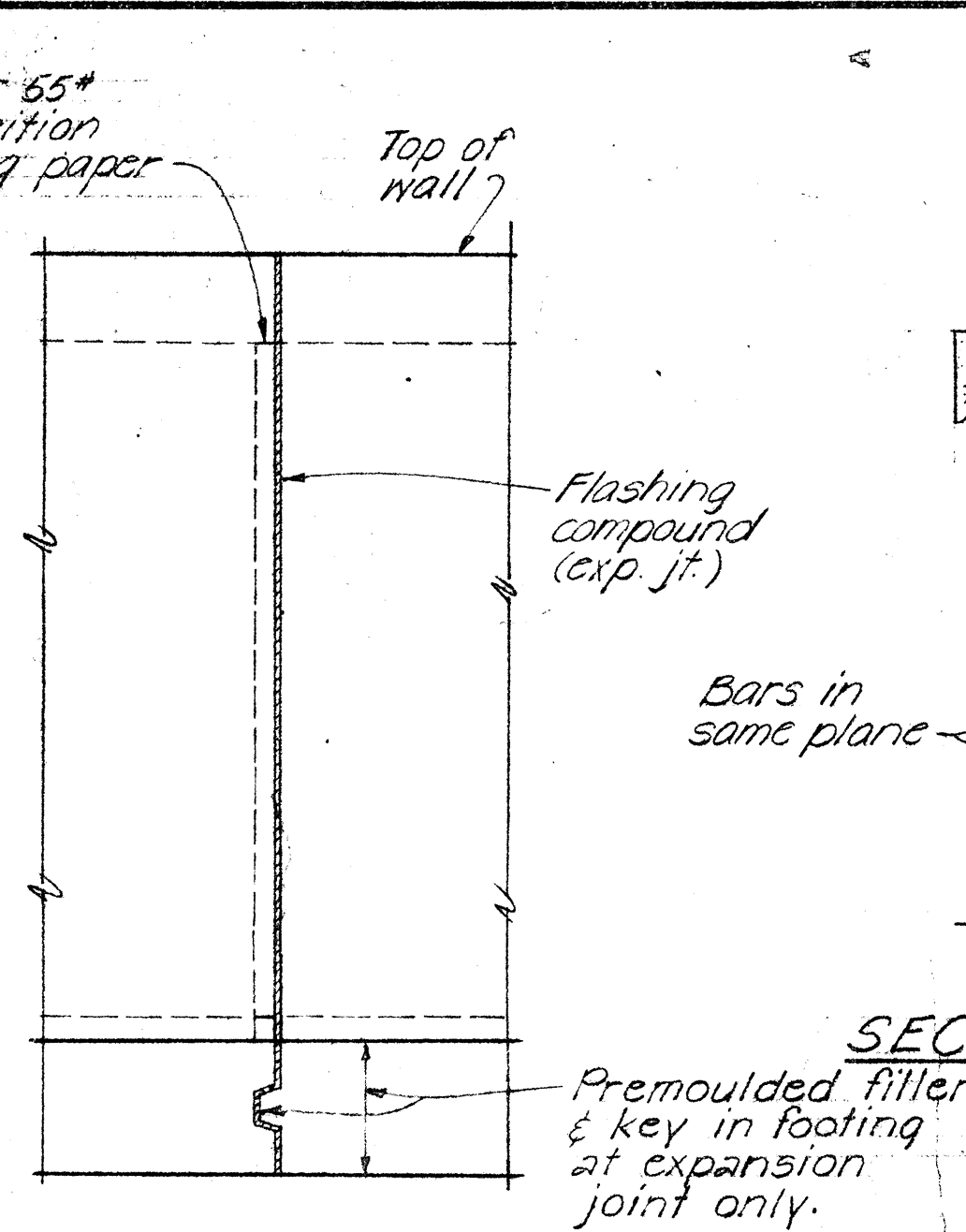
JOINT ELEVATION



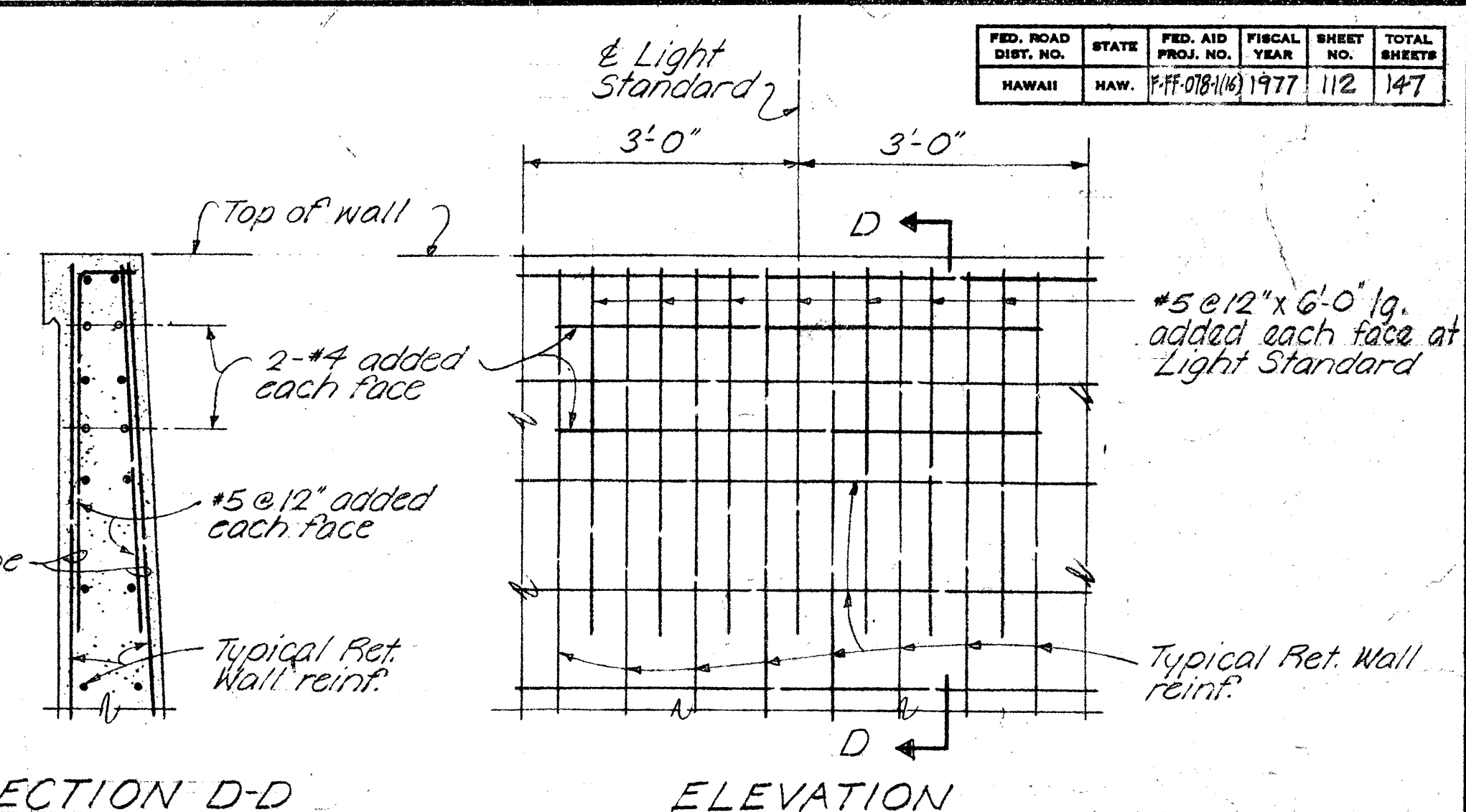
SECTION A-A



SECTION B-B



SECTION C-C

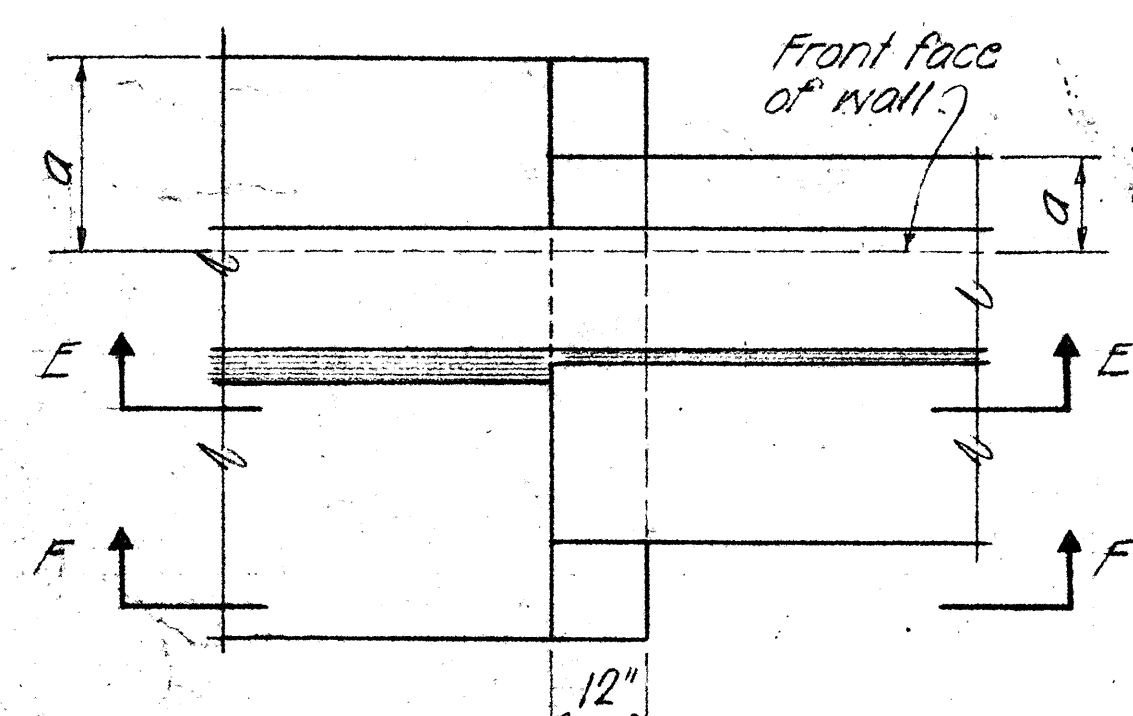


SECTION D-D

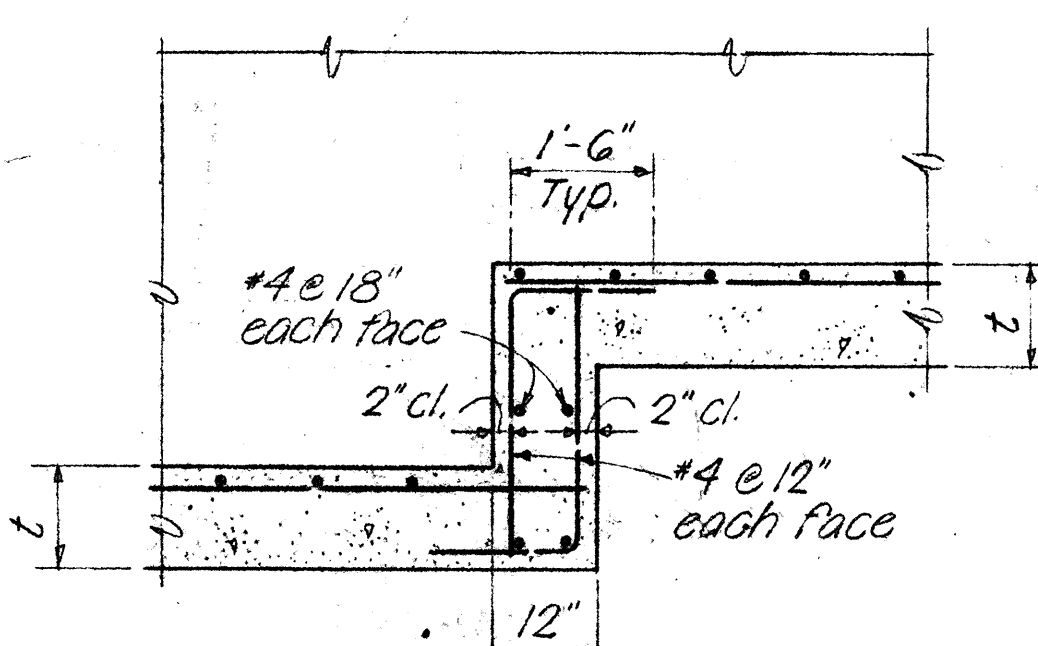
ELEVATION

TYPICAL ADDED REINFORCEMENT

AT LIGHT STANDARD BASE No scale

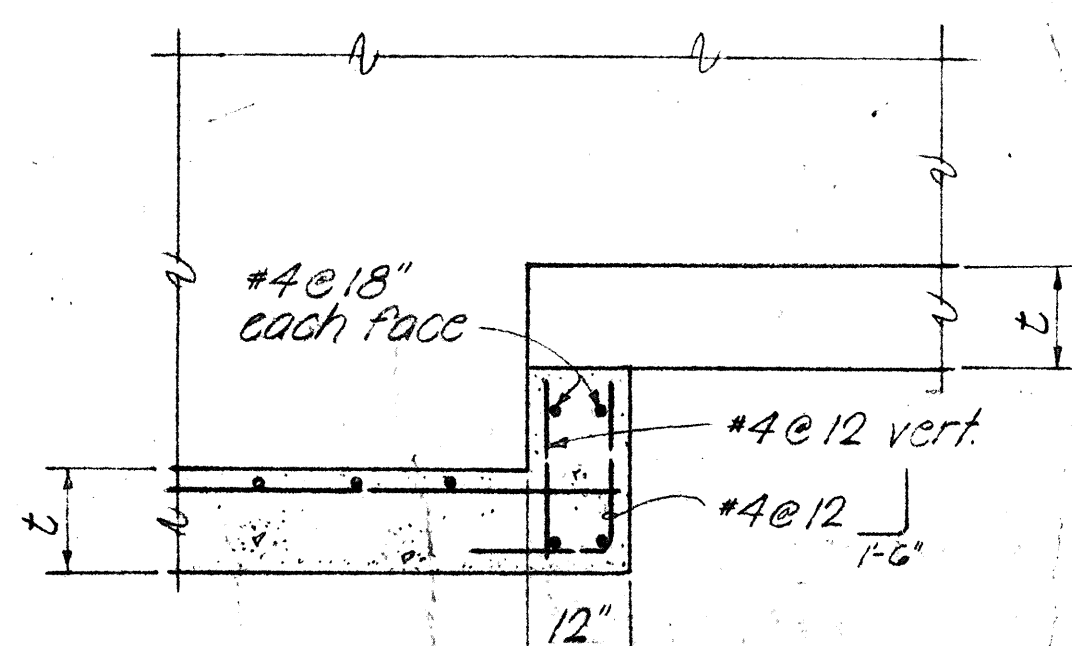


PLAN

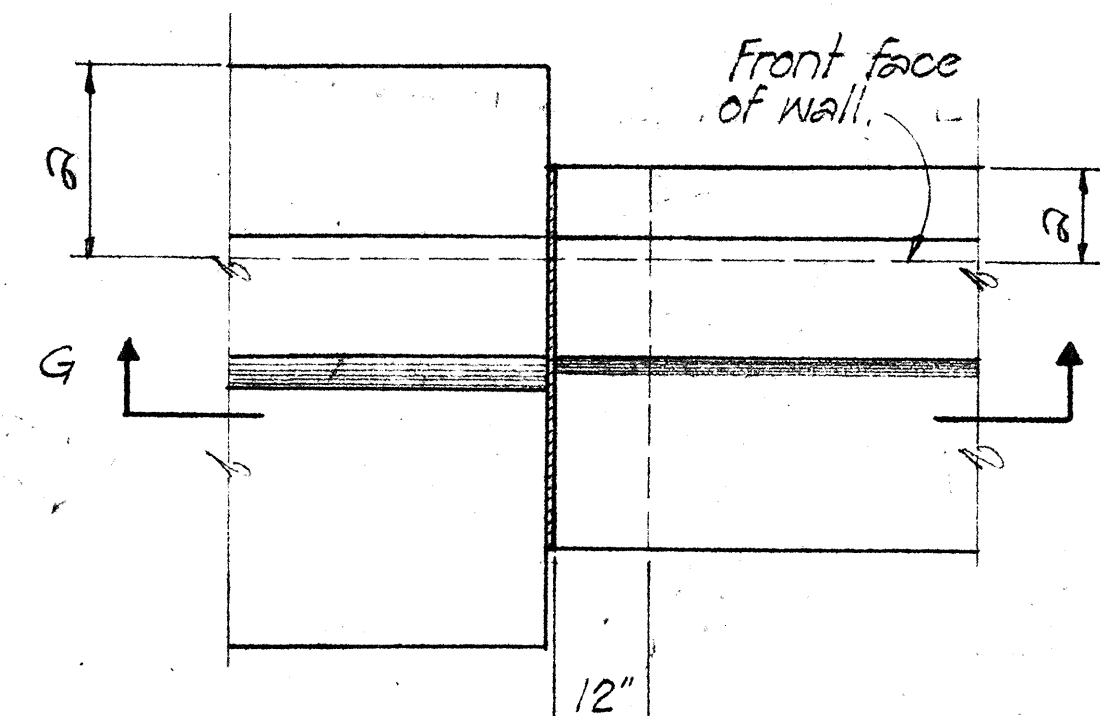


SECTION E-E

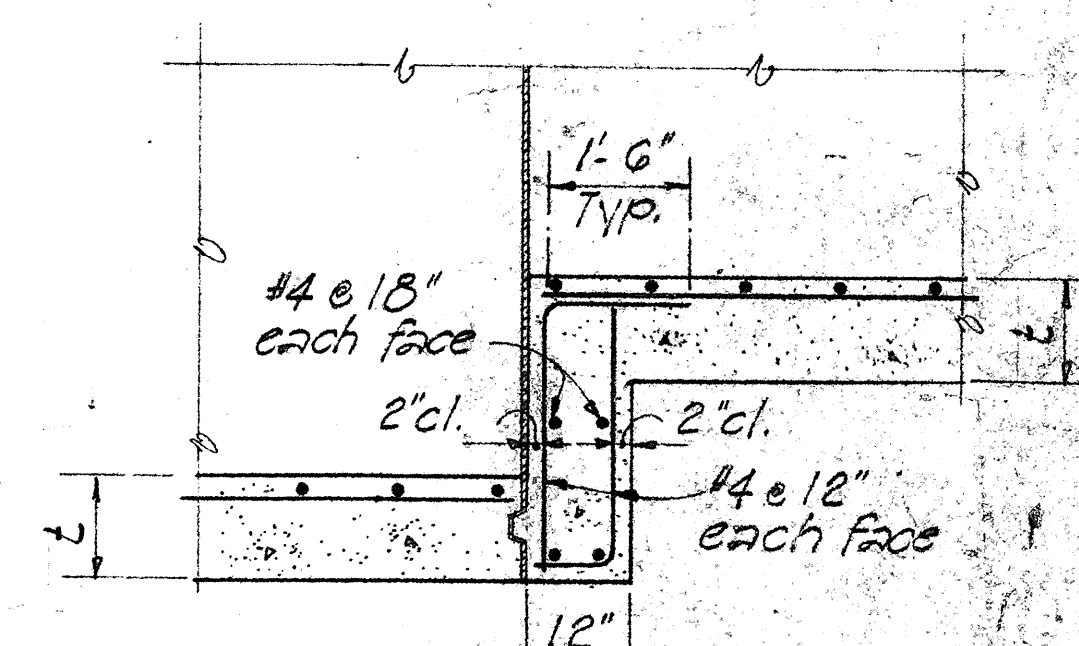
AT CONTINUOUS FOOTING



SECTION F-F

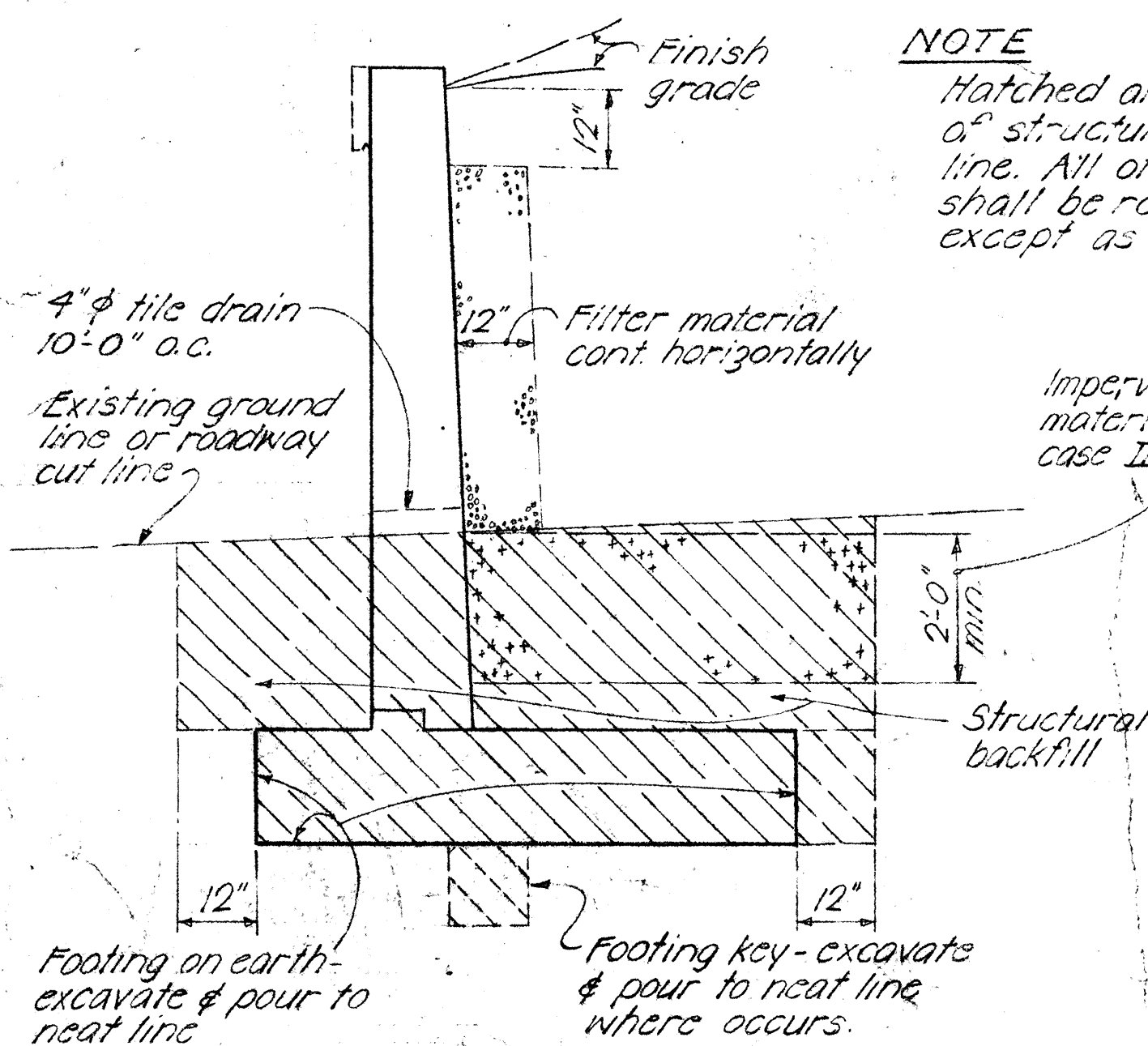


PLAN

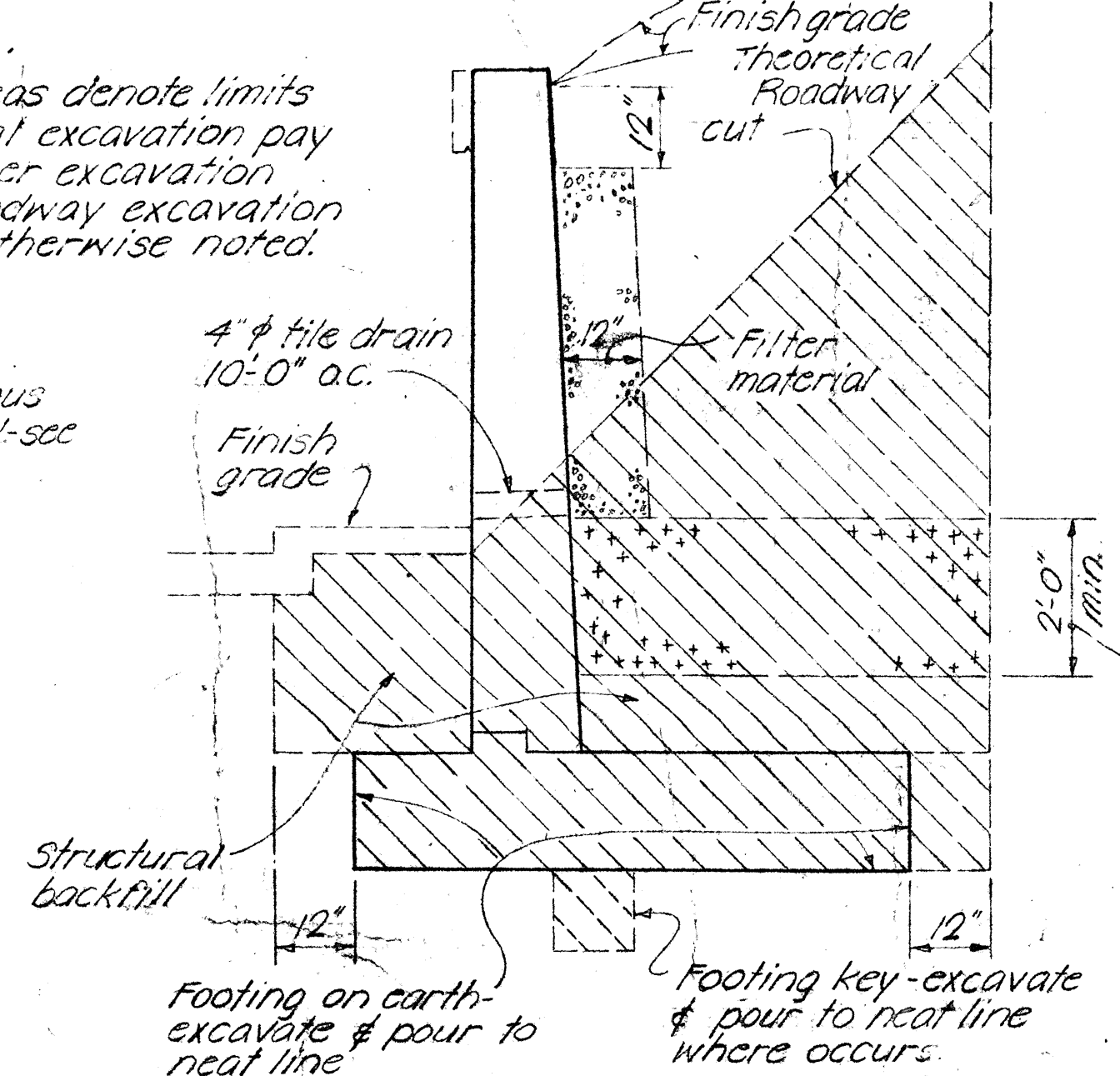


SECTION G-G

AT EXPANSION JOINT



CASE I



CASE II

STRUCTURAL EXCAVATION & DRAINAGE DETAILS No SCALE

NOTE

Hatched areas denote limits of structural excavation pay line. All other excavation shall be roadway excavation except as otherwise noted.

Impervious material as selected by the Engineer incidental to structural excavation.
The subgrade upon which filter material is to be placed shall be made as impervious as possible by pneumatic tamping or other approved methods.

Impervious material shall be incidental to roadway excavation or imported borrow when used in embankment area.

APPROVAL RECOMMENDED:

Paul T. Yamashita
BRIDGE DESIGN ENGINEER

1-23-70
DATE

APPROVED

For ASSISTANT CHIEF, ENGINEERING DATE

NO	REVISION	APPROVED BY	DATE
△	Change note spacing of joints.	H. f.	9.4.7

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
RETAINING WALL TYPE T

F.A.Proj. No. F-FF-078-1(16)

SCALE AS NOTED DATE:

SHEET No. 5-18 OF 18 SHEETS DB-207-2