

INDEX TO DRAWINGS

SHEET NO.	DESCRIPTION
1	INDEX TO DRAWINGS, GENERAL NOTES & LOCATION PLAN
2	GENERAL RAILING LAYOUT PLAN, 10th AVE. MEDIAN BARRIER LAYOUT PLAN
3	GENERAL RAILING LAYOUT PLAN
4	OLD WAIALAE ROAD UNDERPASS - END POST & FENCE DETAILS
5	RAMP (HI-O) RAILING - PLAN & ELEVATION
6	RAMP (HI-O) & RAMP (WL-O) RAILING - DETAILS
7	RAMP (WL-O) RAILING - PLAN, ELEVATION & DETAILS
8	FREEWAY (IB) RAILING - PLAN & ELEVATION
9	FREEWAY (IB) RAILING - DETAILS
10	RAMP (HI-I) RIGHT RAILING - PLAN & ELEVATION (N.I.C.)
11	RAMP (HI-I) RIGHT RAILING - DETAILS
12	RAMP (HI-I) LEFT RAILING - PLAN, ELEVATION & DETAILS
13	10th AVE. SEPARATION (IB) RAILING - PLAN, ELEVATION & DETAILS
14	10th AVE. SEPARATION (O.B) RAILING - PLAN, ELEVATION & DETAILS
15	CATCH BASIN DETAILS AT 10th AVE. SEPARATION RAILINGS
16	METAL GUARD RAIL CONNECTION - DETAILS AT VARIOUS RET. WALLS
17	CONCRETE MEDIAN BARRIER - (MANOA-PALOLO DRAINAGE CANAL BRIDGE)
18	CONCRETE MEDIAN BARRIER - (MANOA-PALOLO DRAINAGE CANAL BRIDGE)
19	CONCRETE MEDIAN BARRIER - (KAPIOLANI SEPARATION STRUCTURE)
20	CONCRETE MEDIAN BARRIER - (KAPIOLANI SEPARATION STRUCTURE)

TD1	TYPICAL DETAILS - ALUMINUM BRIDGE RAILING TWO RAIL ON CONCRETE CURB
TD2	TYPICAL DETAILS - GUARD RAIL CONNECTION DETAILS
TD3	TYPICAL DETAILS - CONCRETE MEDIAN BARRIER TRAFFIC TYPE

REFERENCE PLANS

PLAN SHEET NO.	DESCRIPTION
ED1 thru ED4 Inclusive	EXISTING BRIDGE DRAWINGS - (FOR INFORMATION ONLY)

DESIGN SPECIFICATIONS:

Standard Specifications for Highway Bridges as adopted by the American Association of State Highway and Transportation Officials (12th Edition, with subsequent interim specifications, 1973-1982).

DESIGN LOADS:

Traffic rail loads in accordance with AASHTO I.1.8.

DESIGN STRESSES:

Reinforced concrete - see AASHTO Specification and Special Provisions.

$f'_c = 3,000$ psi
 $f_s = 20,000$ psi

MATERIALS:

1. Reinforced concrete - Class A.
2. Reinforcing steel - ASTM A615 Grade 40
3. All anchor bolts shall conform to ASTM A325 and shall be hot-dip galvanized.
4. Electrodes for welding A325 bolts shall be Class E110 low hydrogen such as All State - Low Hydrogen 110 psi, Eutectic - 680 120 psi, Missile Rod, or approved equal.
5. Structural steel shapes, plates & bars shall conform to ASTM A-36.

CONSTRUCTION METHODS:

1. See Hawaii Standard Specifications for Road and Bridge Construction (1976) and Special Provisions.
2. All dimensions are horizontal measurements.
3. Existing sidewalks, curbs, railing, end blocks and other items designated for removal shall be removed in such a manner as to preclude any damage to the existing structures. Large vibratory type of equipment will not be permitted in the removal operation, nor for drilling holes for dowels. Only small vibratory hand tools, approved by the Engineer will be allowed. Any damage to the existing structure due to the Contractor's operation or negligence shall be repaired to the Engineer's satisfaction, by the Contractor, at his expense, with no additional cost to the State.
4. All existing reinforcing that can be incorporated in the new work shall be bent as required, cleaned and utilized in the new work.
5. All existing reinforcing that cannot be incorporated in the new work shall be removed to a minimum depth of 1 1/2 inches below finish grade and the area patched with mortar.
6. All existing concrete face, receiving new concrete in the finish product, shall be roughen and cleaned prior to placement of new pour, unless indicated otherwise or directed by the Engineer.

GENERAL NOTES

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	38	114

CONSTRUCTION METHODS (Cont.):

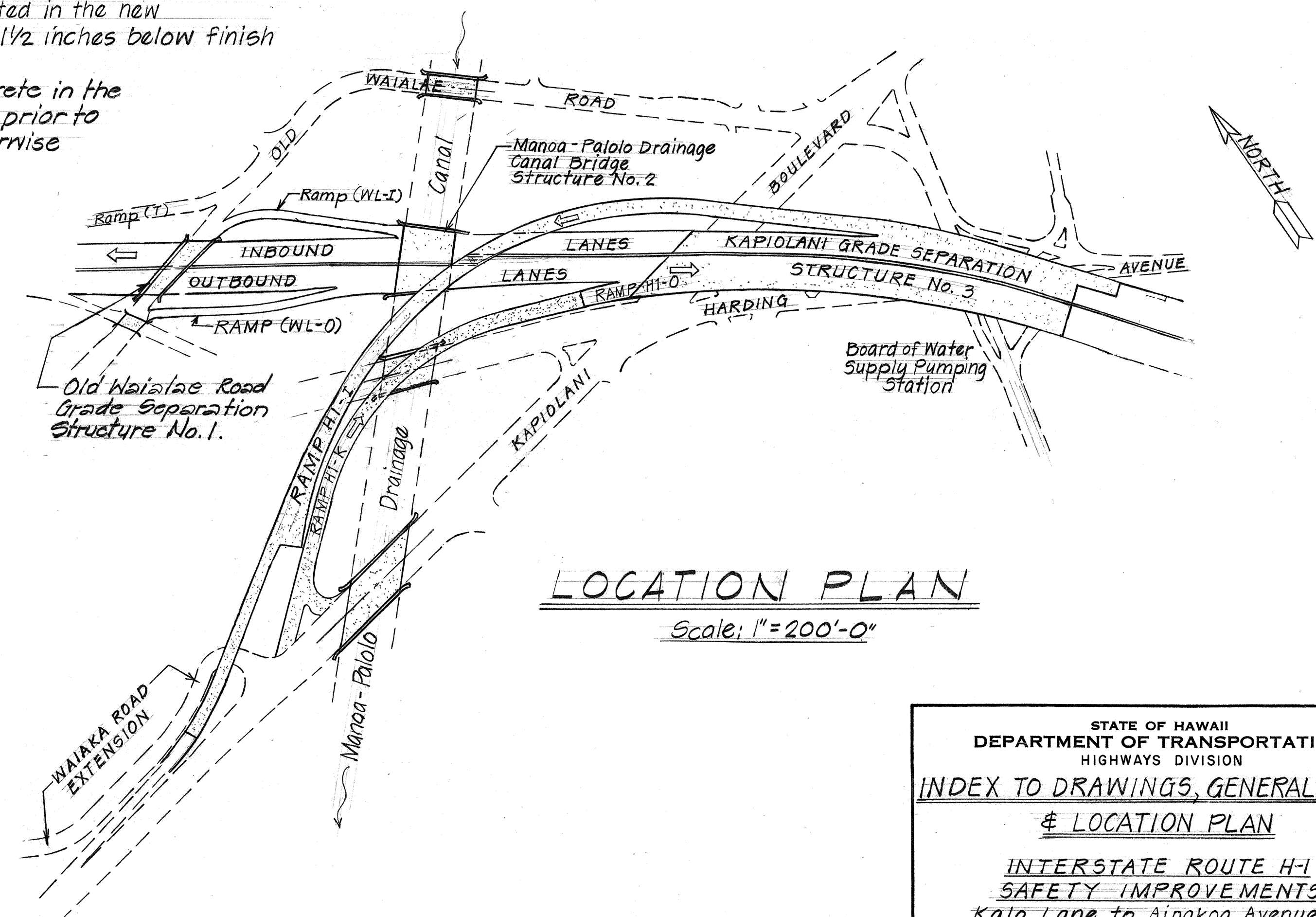
1. Unless noted otherwise, all concrete areas left exposed due to the removal of existing concrete, shall be ground smooth and grooved to extend the existing roadway grades.
8. All work involved in the installation of concrete median barrier and restoring exposed pavement, including removing reinforcement, patching resultant holes, grinding and grooving exposed concrete pavement, and any work necessary to complete the total work, but otherwise not specifically specified shall be incidental to concrete median barrier and will not be paid for separately.
9. All anchor bolts and reinforcing dowels shall be inserted in holes of the following sizes (unless noted otherwise) and filled with epoxy.

ITEM	HOLE SIZE
5/8" ϕ anchor bolt	1 1/2" ϕ x 0'-10"
3/4" ϕ anchor bolt	1 3/4" ϕ x 1'-2"
1" ϕ anchor bolt	2 1/4" ϕ x 0'-10"
#3 reinf. bar	3/4" ϕ x 0'-6" min.
#4 reinf. bar	7/8" ϕ x 0'-6" min.
#5 reinf. bar	1" ϕ x 0'-6" min.
#6 reinf. bar	1 1/8" ϕ x 1'-0"

10. Minimum concrete cover for reinf. bar shall be 2" unless noted otherwise.

SYMBOL

Sht. no. sect. is cut or det. location  sht. no. detail is drawn



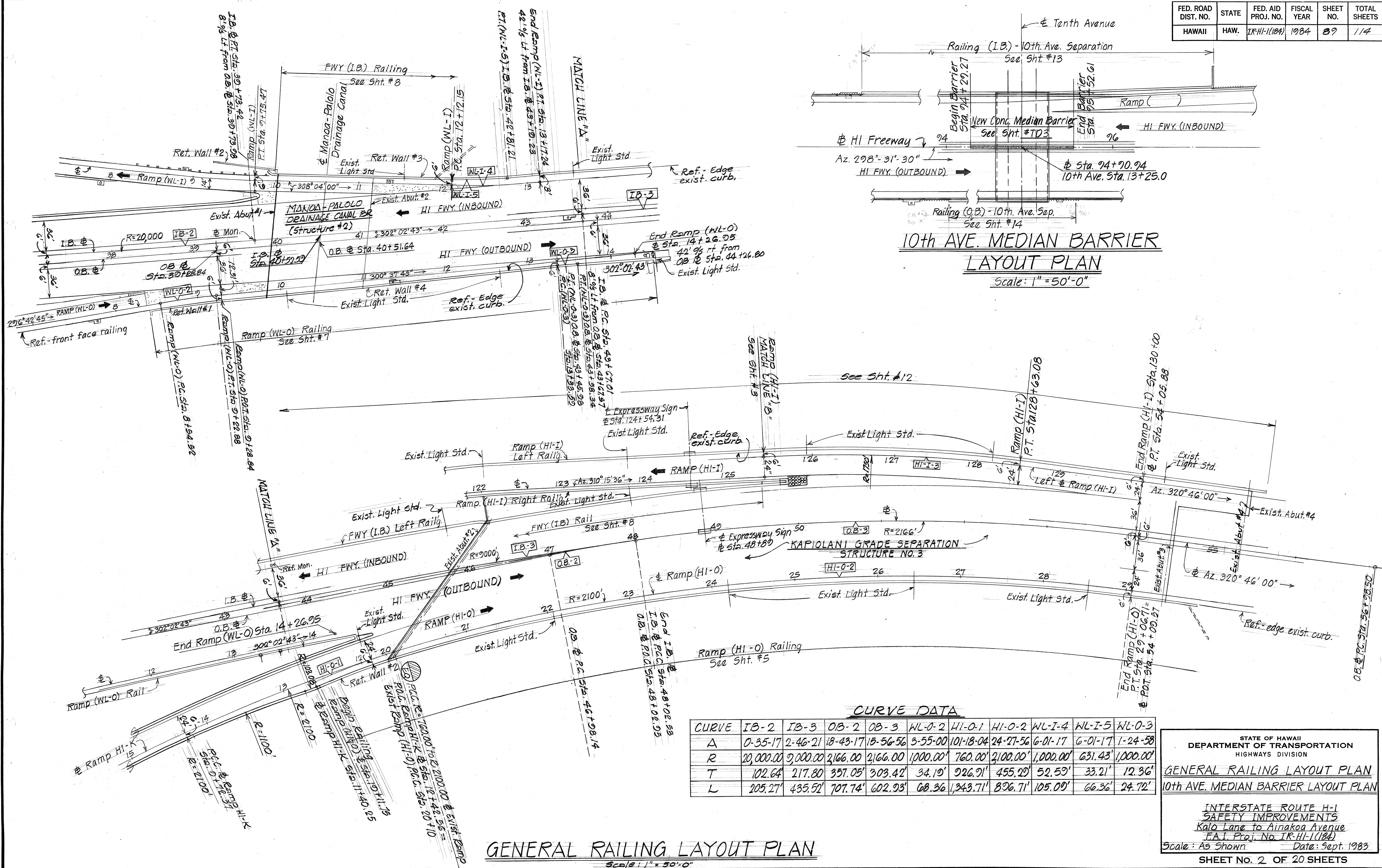
LOCATION PLAN

Scale: 1"=200'-0"

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
INDEX TO DRAWINGS, GENERAL NOTES & LOCATION PLAN
INTERSTATE ROUTE H-1 SAFETY IMPROVEMENTS Kalo Lane to Ainakoa Avenue F.A.I. Proj. No. IR-HI-1(184)
Scale: As Shown Date: Sept. 1983
SHEET No. 1 OF 20 SHEETS

ORIGINAL PLAN	DATE	3/81
DRAWN BY	DATE	3/81
CHECKED BY	DATE	3/81
QUANTITIES BY	DATE	3/81
NO.		

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	89	114



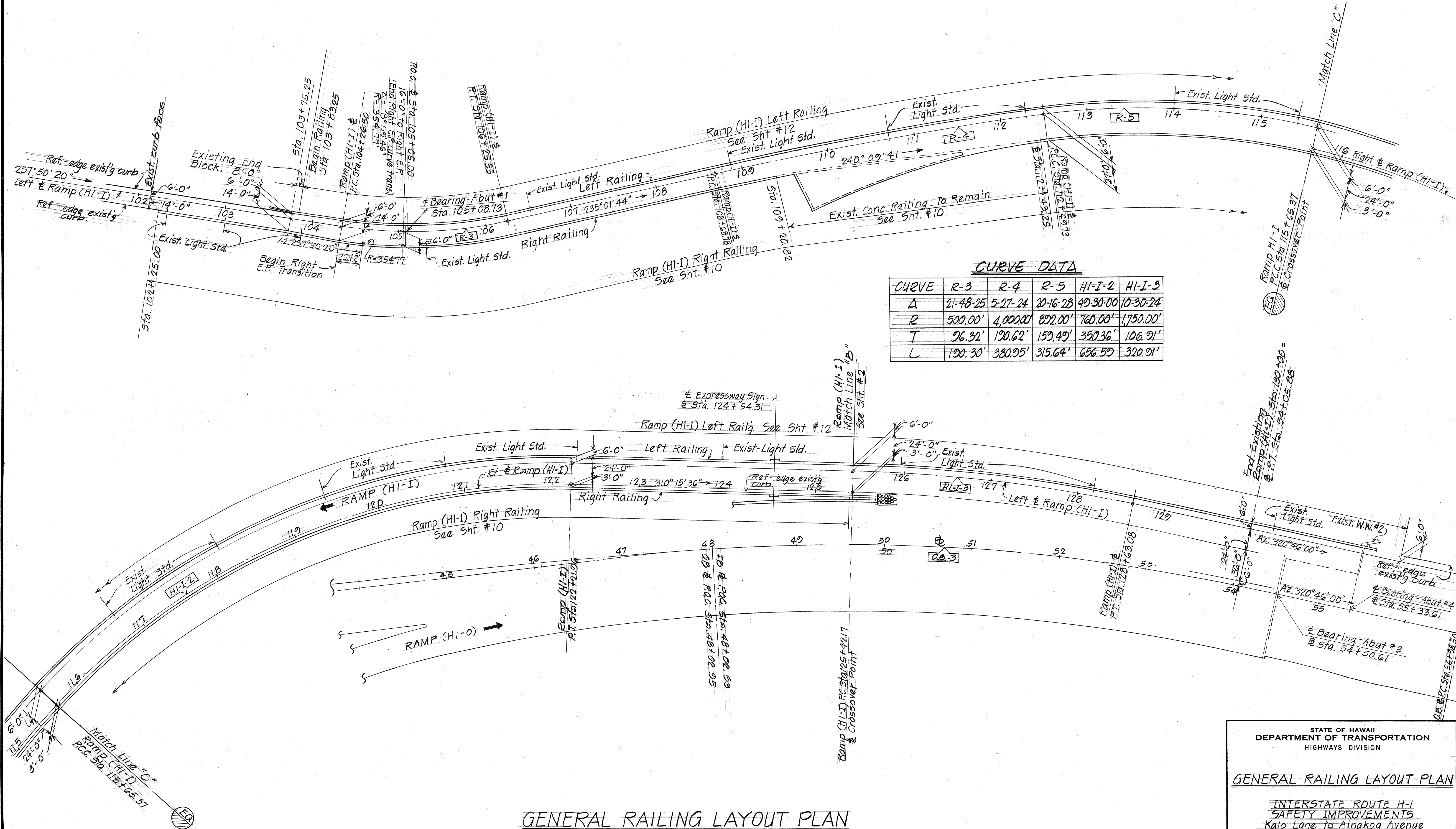
CURVE DATA									
CURVE	IB-2	IB-3	OB-2	OB-3	WL-0-2	HI-0-1	HI-0-2	WL-1-4	WL-1-5
A	0-35-17	2-46-21	18-43-17	15-56-56	3-55-00	101-18-04	24-27-56	6-01-17	6-01-17
R	20,000.00	2,000.00	2,166.00	2,166.00	1,000.00	760.00	2,100.00	1,000.00	631.43
T	102.64	217.80	357.05	303.42	34.10	926.91	455.29	52.59	33.21
L	205.27	435.52	707.74	602.93	68.36	1,343.71	896.71	105.00	66.36

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL RAILING LAYOUT PLAN
10th AVE. MEDIAN BARRIER LAYOUT PLAN
INTERSTATE ROUTE H-1
SAFETY IMPROVEMENTS
Kalo Lane to Ainakoa Avenue
F.A.I. Proj. No. IR-HI-1(184)
Scale: As Shown Date: Sept. 1983
SHEET NO. 2 OF 20 SHEETS

SURVEY PLOTTED BY	DATE
DRAWN BY	3/8
TRACED BY	3/8
DESIGNED BY	3/8
CHECKED BY	3/8
NOTE BOOK	
No.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	90	114



ORIGINAL PLAN	DATE	3/81
DRAWN BY L.M.A., S.Y.		
CHECKED BY E.N.		
NOTED BY E.N.		
QUANTITIES BY E.N.		
CHECKED BY E.N.		
NO.		

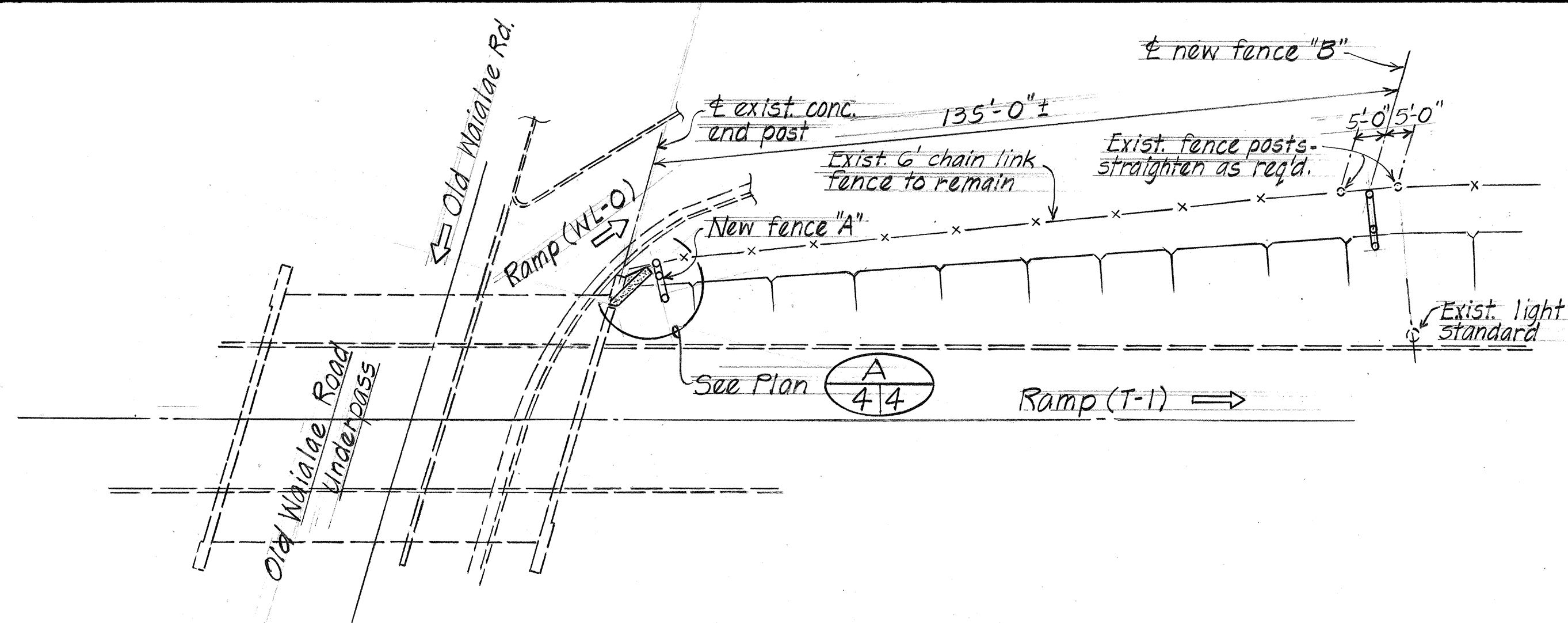
GENERAL RAILING LAYOUT PLAN
Scale: 1" = 50'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

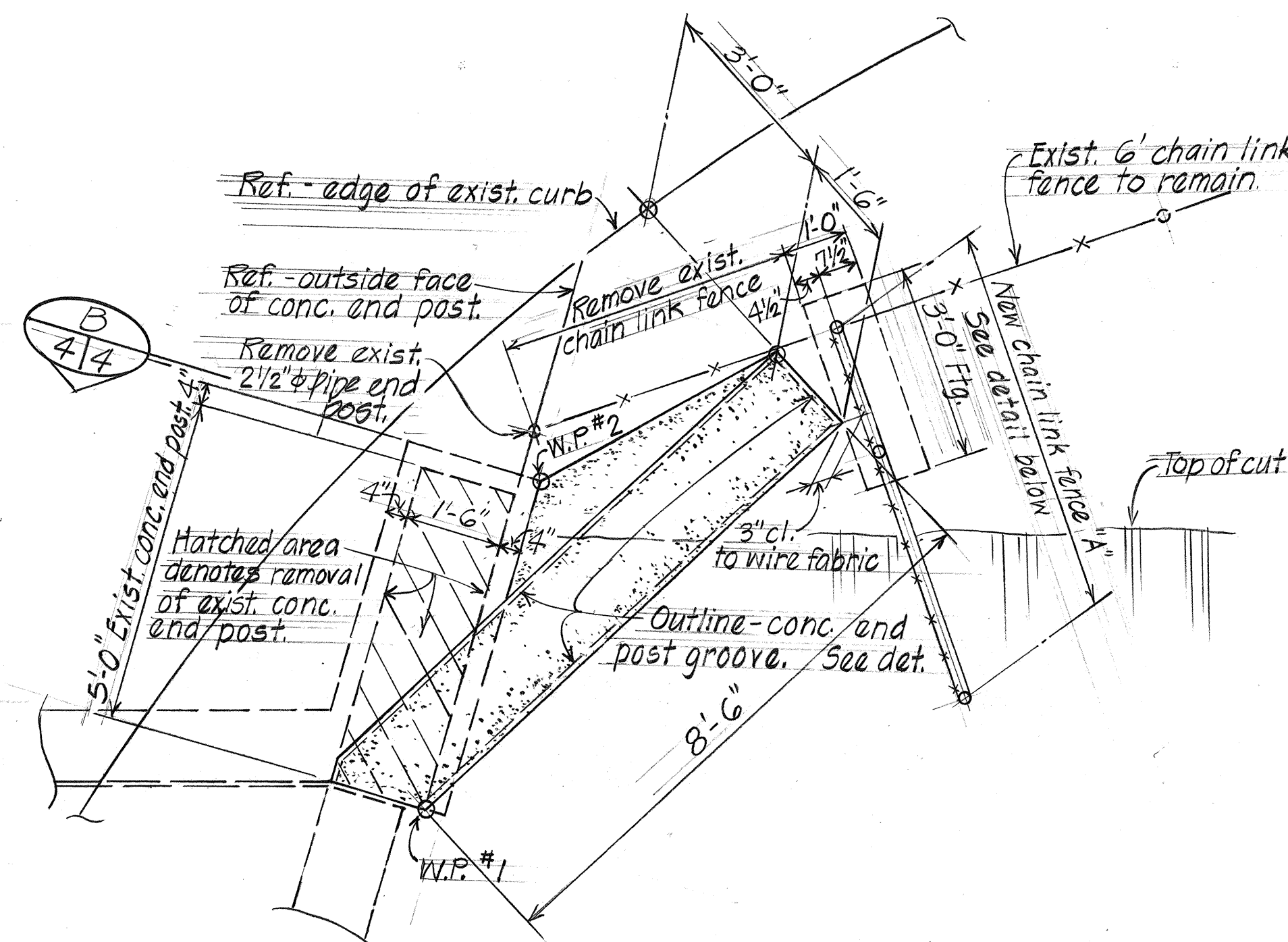
GENERAL RAILING LAYOUT PLAN

INTERSTATE ROUTE H-1
SAFETY IMPROVEMENTS
Kalo Lane to Ainakoa Avenue
F.A.I. Proj. No. IR-HI-1(184)
Scale: As Shown Date: Sept. 1983
SHEET NO. 3 OF 20 SHEETS

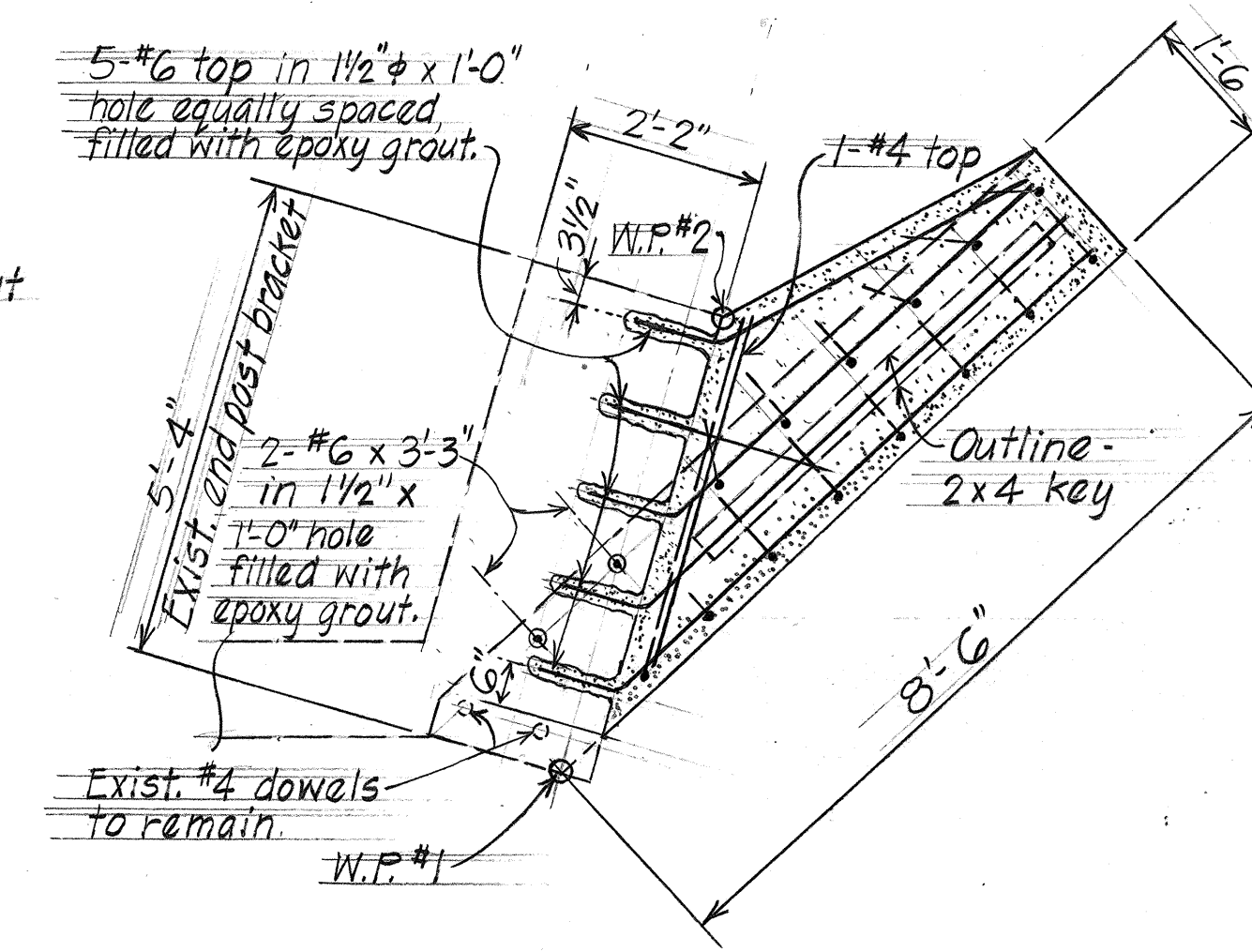
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	91	114



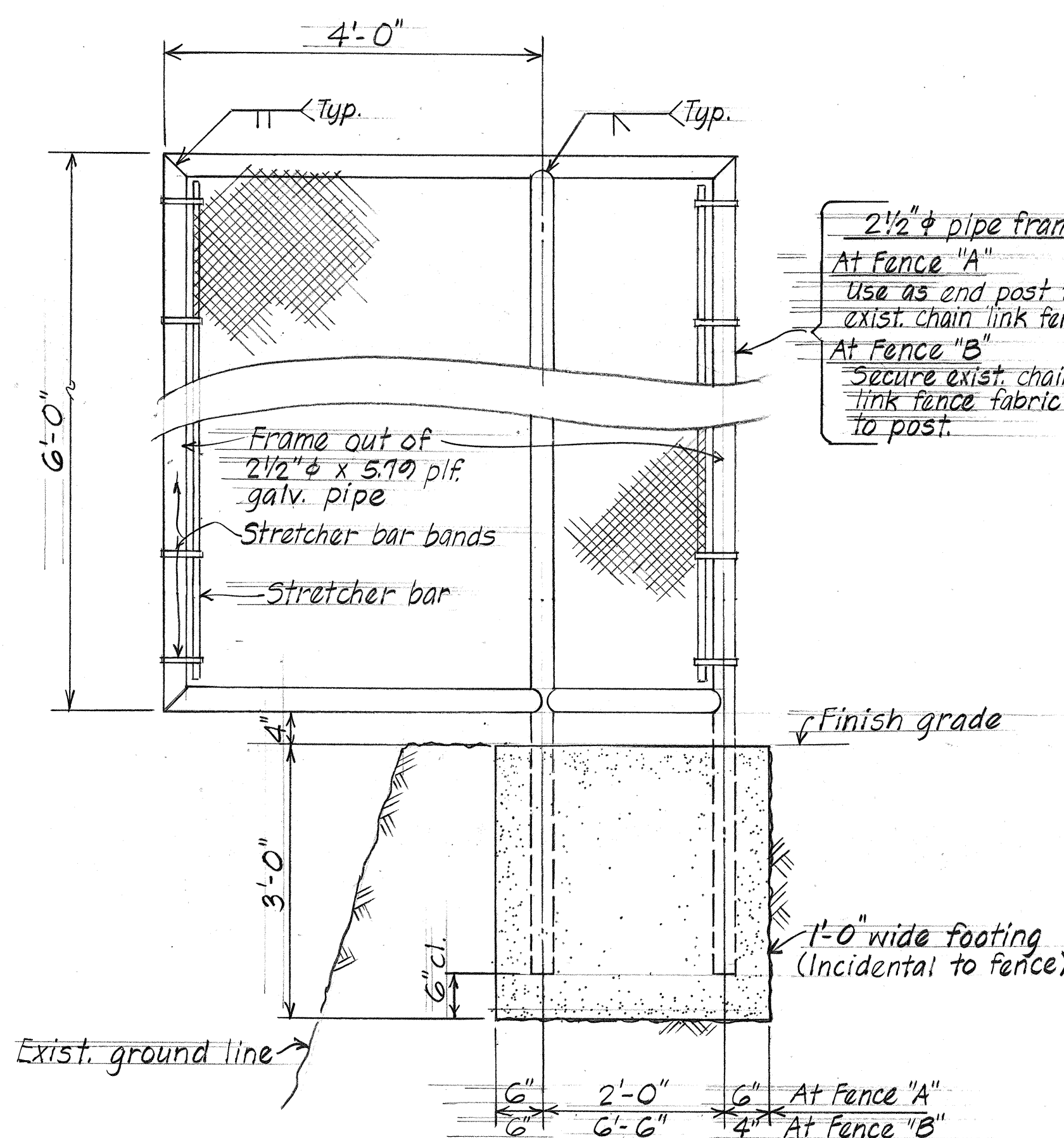
LOCATION PLAN
Scale: 1" = 20'-0"



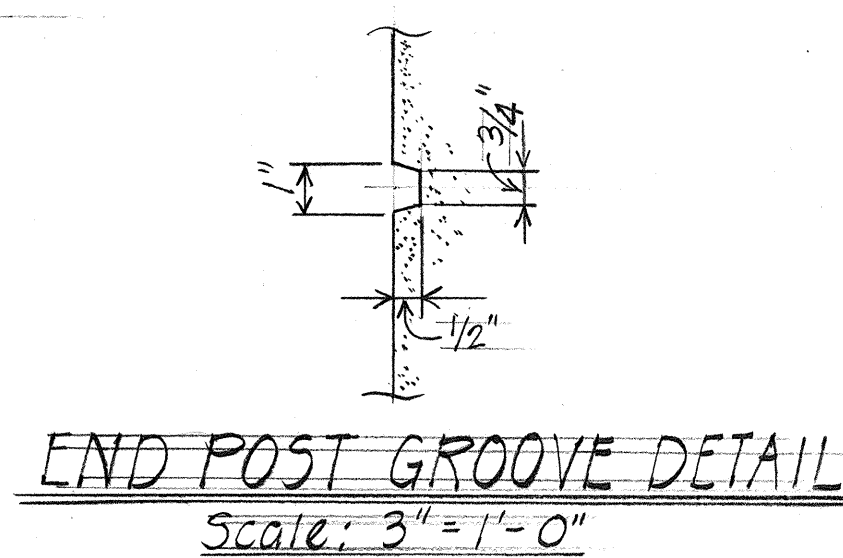
PLAN A 4/4
Scale: 1/2" = 1'-0"



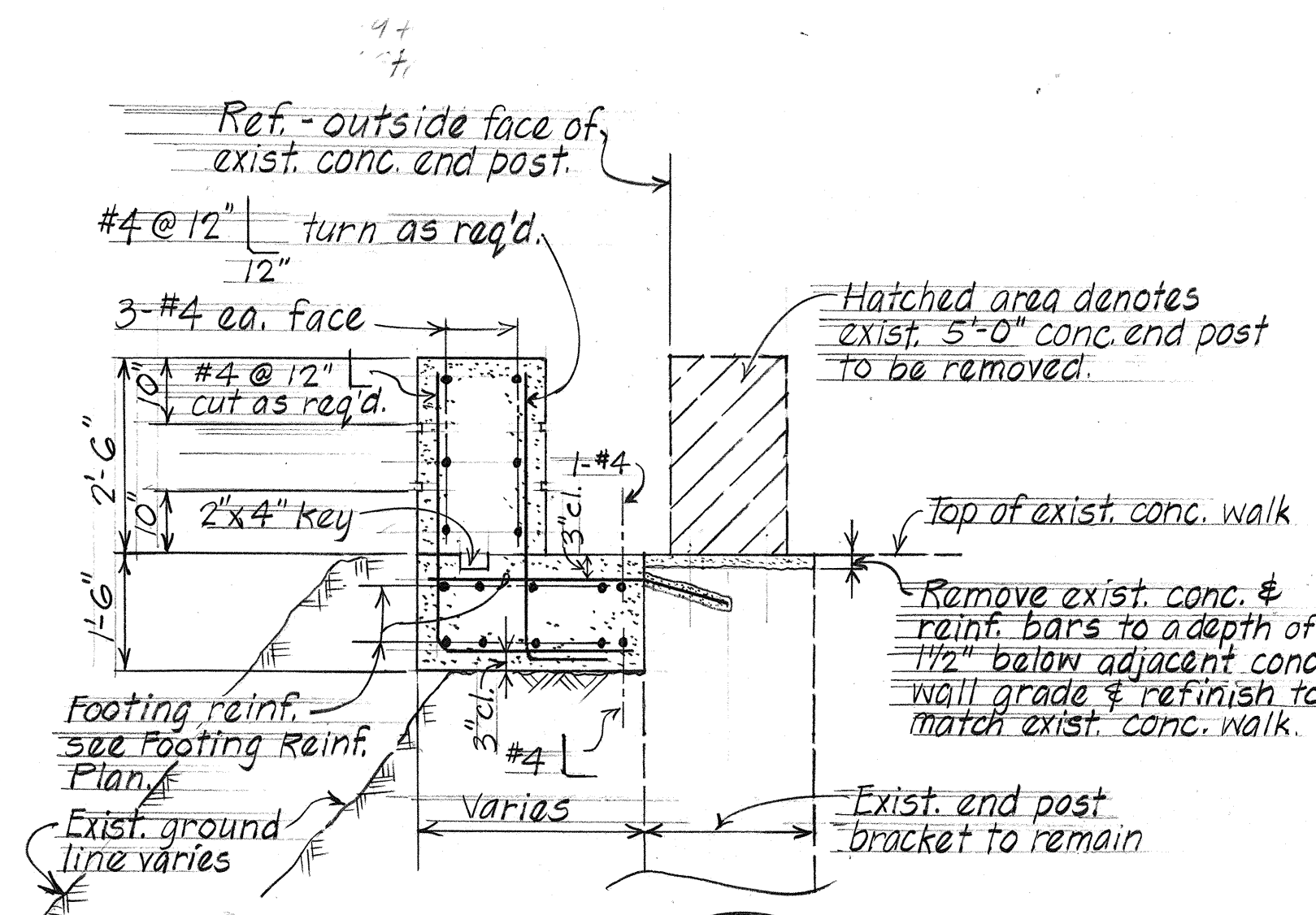
TOP REINFORCEMENT



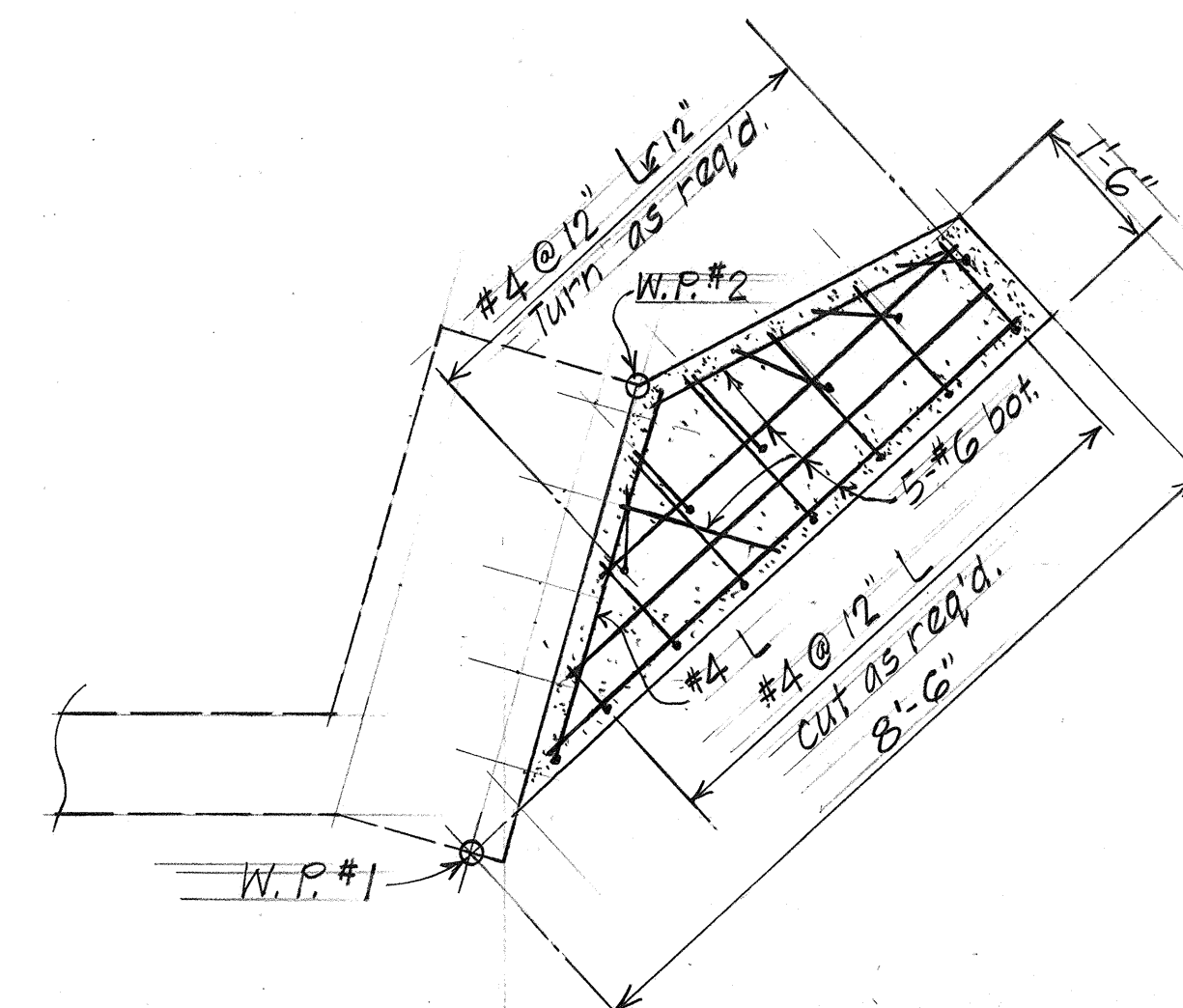
TYPICAL FENCE DETAIL
Scale: 3/4" = 1'-0"



END POST GROOVE DETAIL
Scale: 3" = 1'-0"



SECTION B 4/4
Scale: 1/2" = 1'-0"

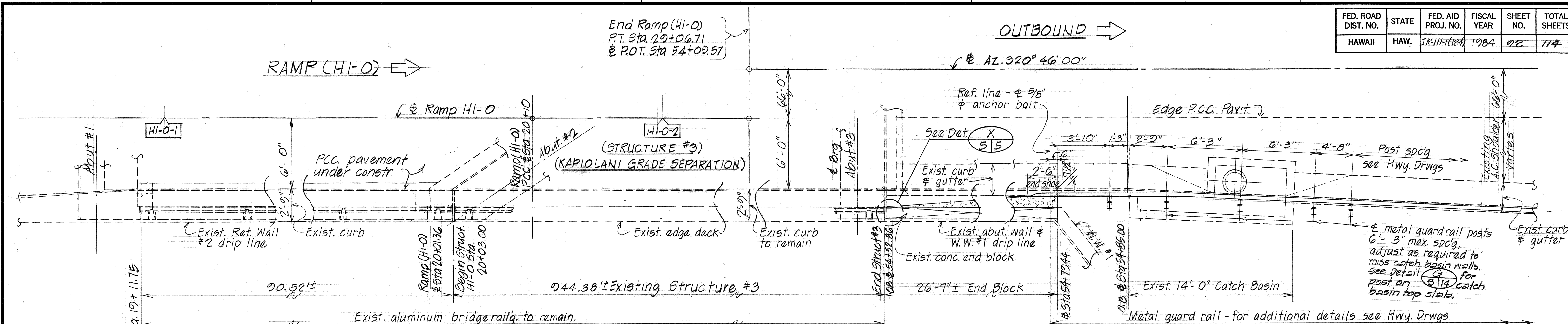


BOTTOM REINFORCEMENT
FOOTING REINFORCEMENT PLAN
Scale: 1/2" = 1'-0"

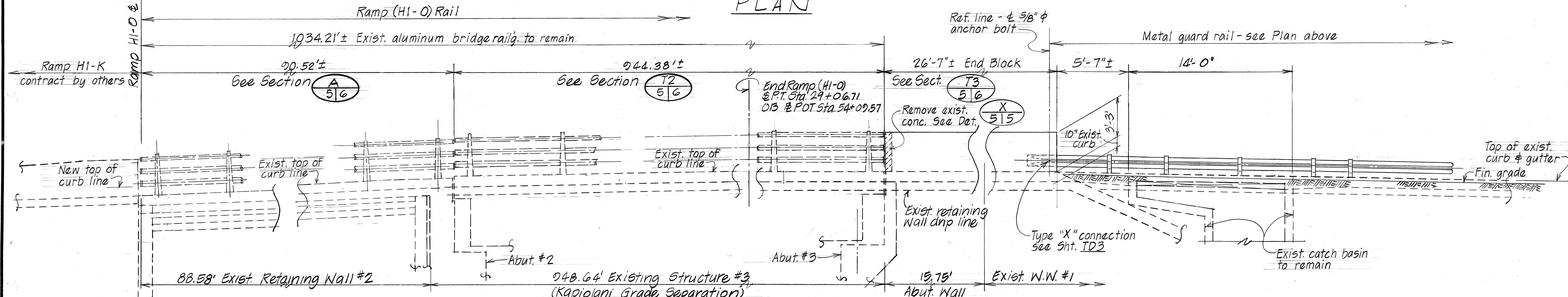
DATE	
SURVEY PLOTTED BY	
DRAWN BY	
TRACED BY	
CHECKED BY	
NOTED BY	
NO.	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
OLD WAI'ALAE ROAD UNDERPASS
END POST & FENCE DETAILS
INTERSTATE ROUTE H-1
SAFETY IMPROVEMENTS
Kalo Lane to Aieakoa Avenue
F.A.I. Proj. No. IR-HI-1(184)
Scale: As Shown Date: Sept. 1983
SHEET No. 4 OF 20 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	92	114

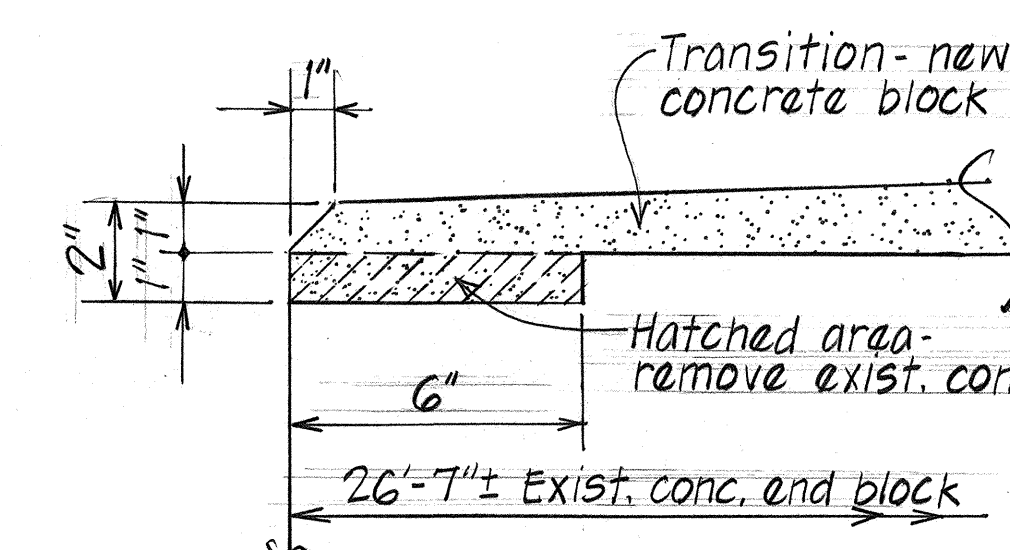


PLAN



ELEVATION
RAMP (HI-O) RAILING

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



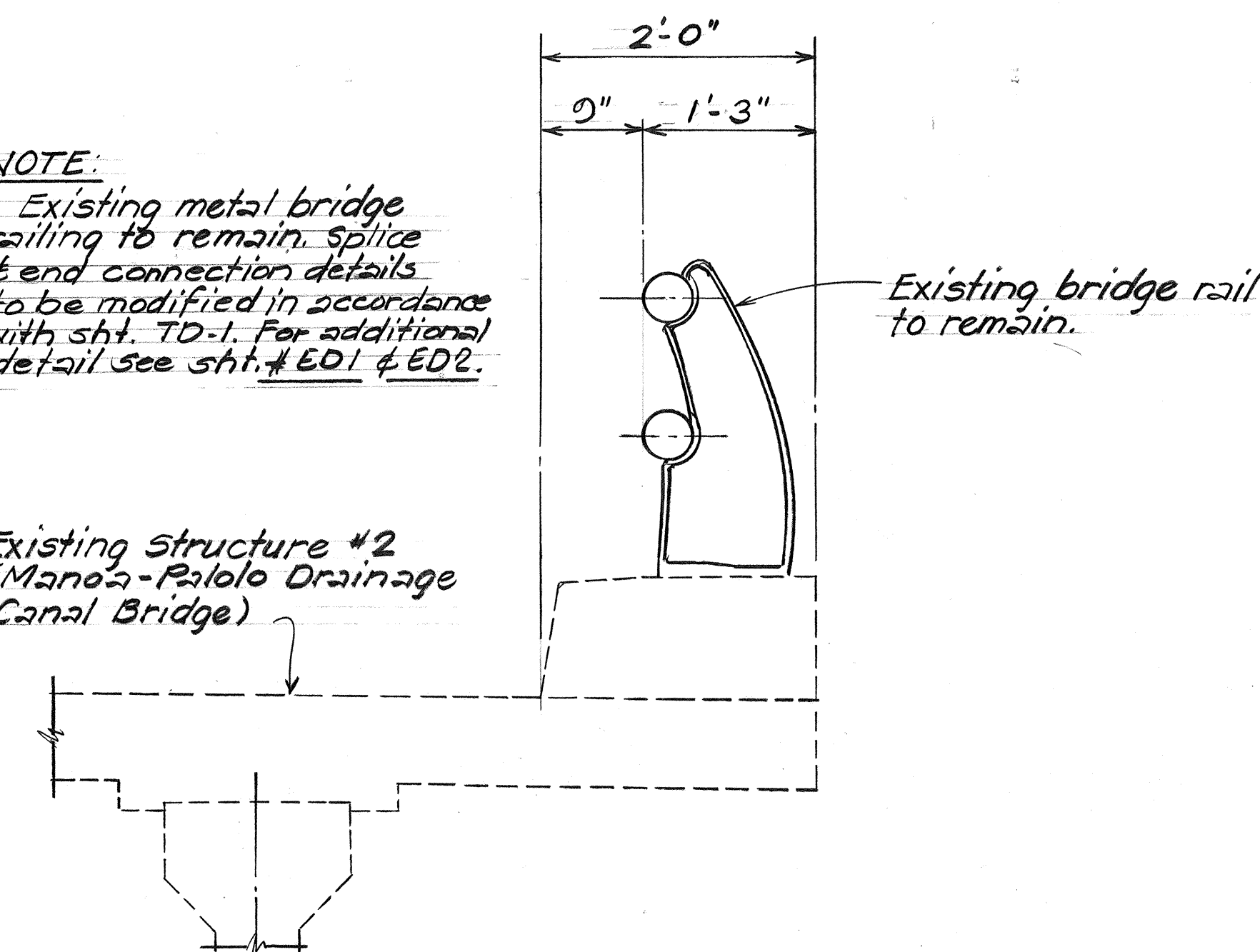
DETAIL X 515
Scale: 3" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
RAMP (HI-O) RAILING
PLAN & ELEVATION
INTERSTATE ROUTE H-1
SAFETY IMPROVEMENTS
Kalo Lane to Ainakoa Avenue
F.A.I. Proj. No. IR-HI-1(184)
Scale: As Shown Date: Sept. 1983
SHEET NO. 5 OF 20 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	93	114

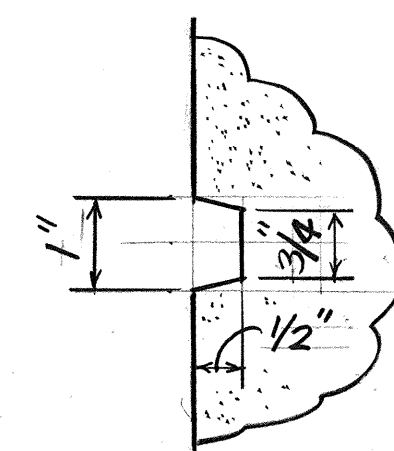
NOTE:
Existing metal bridge railing to remain. Splice & end connection details to be modified in accordance with sht. TD-1. For additional detail see sht. # E01 & E02.

Existing Structure #2
(Maha-Palolo Drainage Canal Bridge)



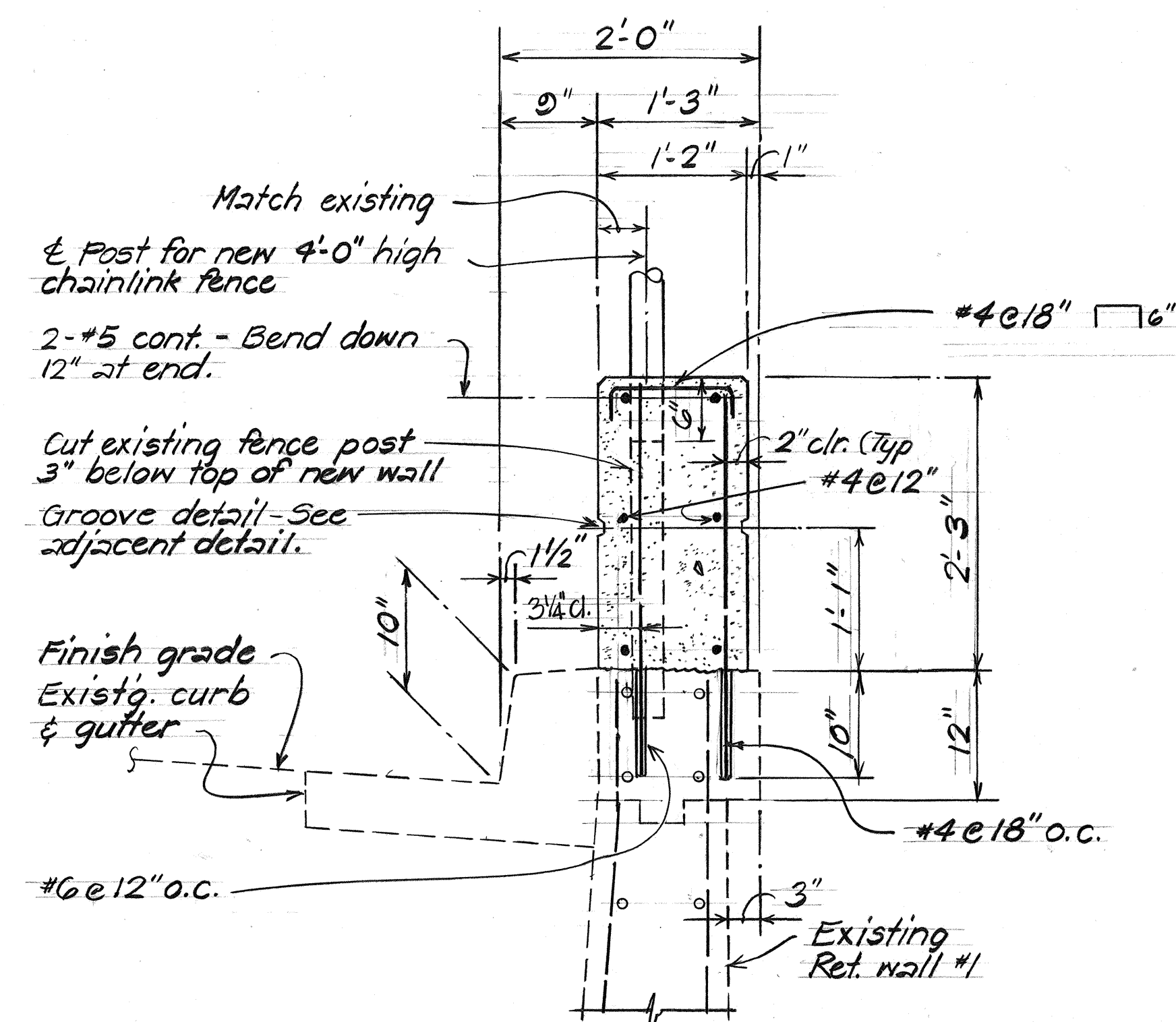
TYPICAL SECTION

Scale: 1"=1'-0"



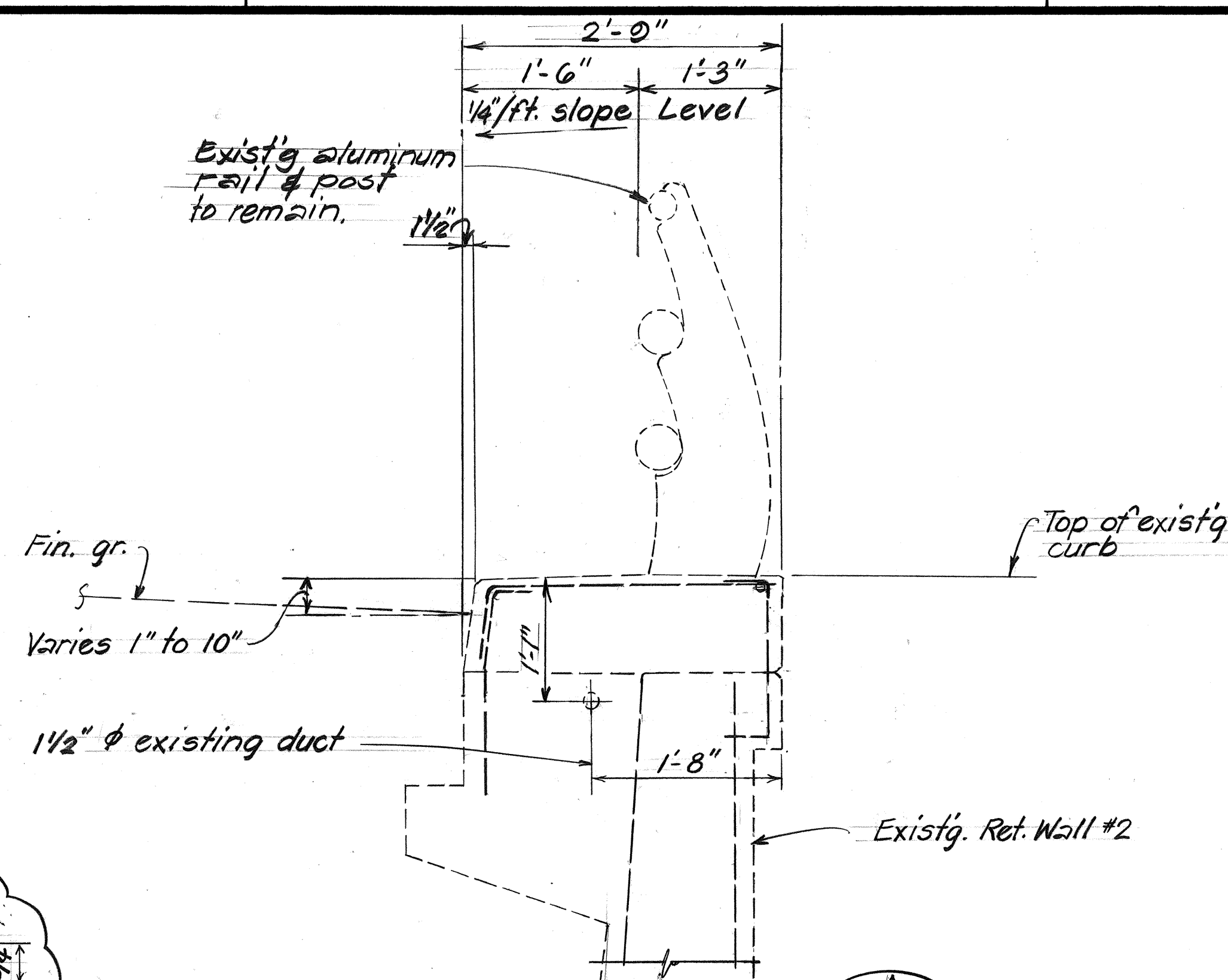
GROOVE DETAIL

Scale: 6"=1'-0"



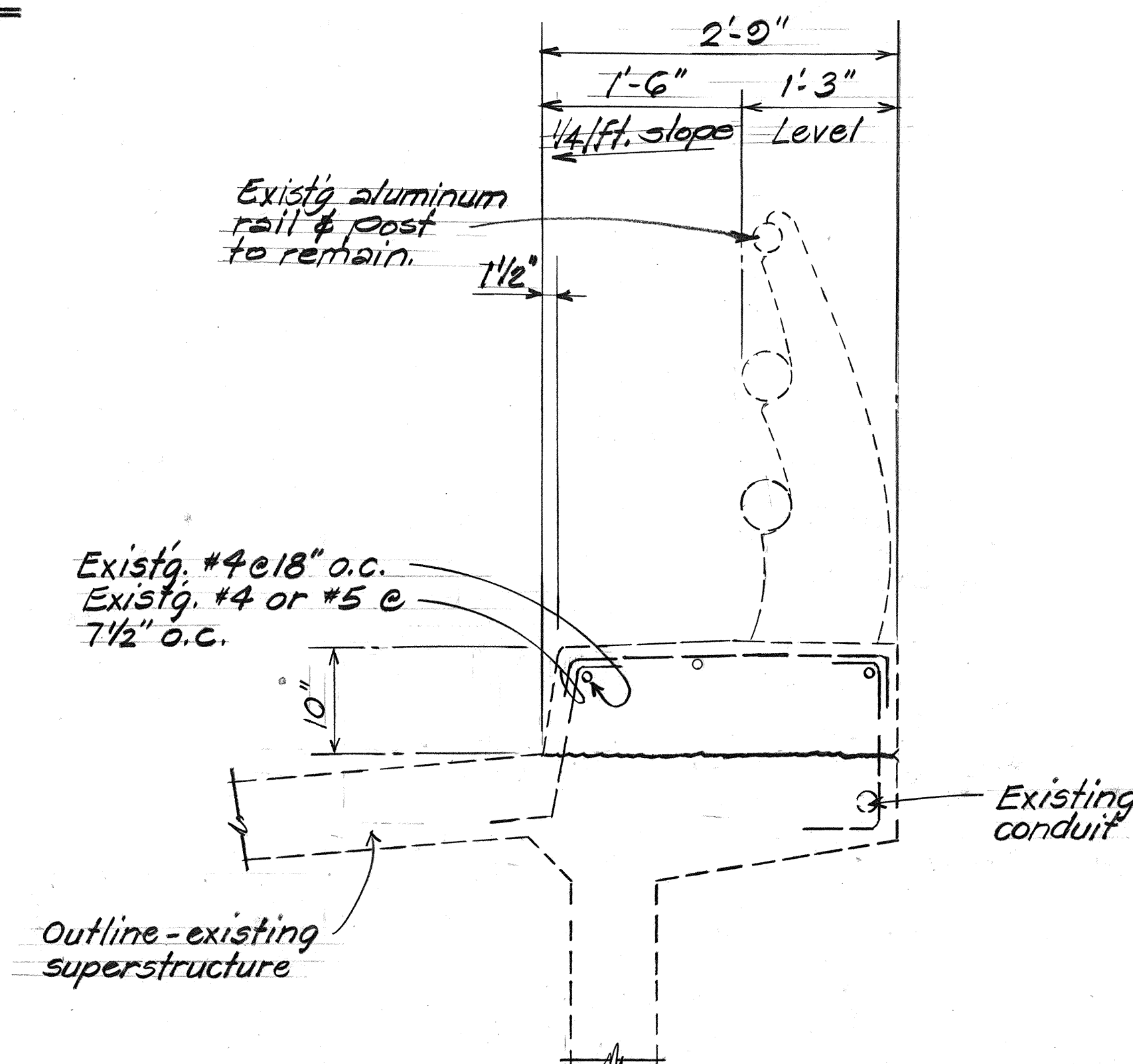
SECTION

Scale: 1"=1'-0"



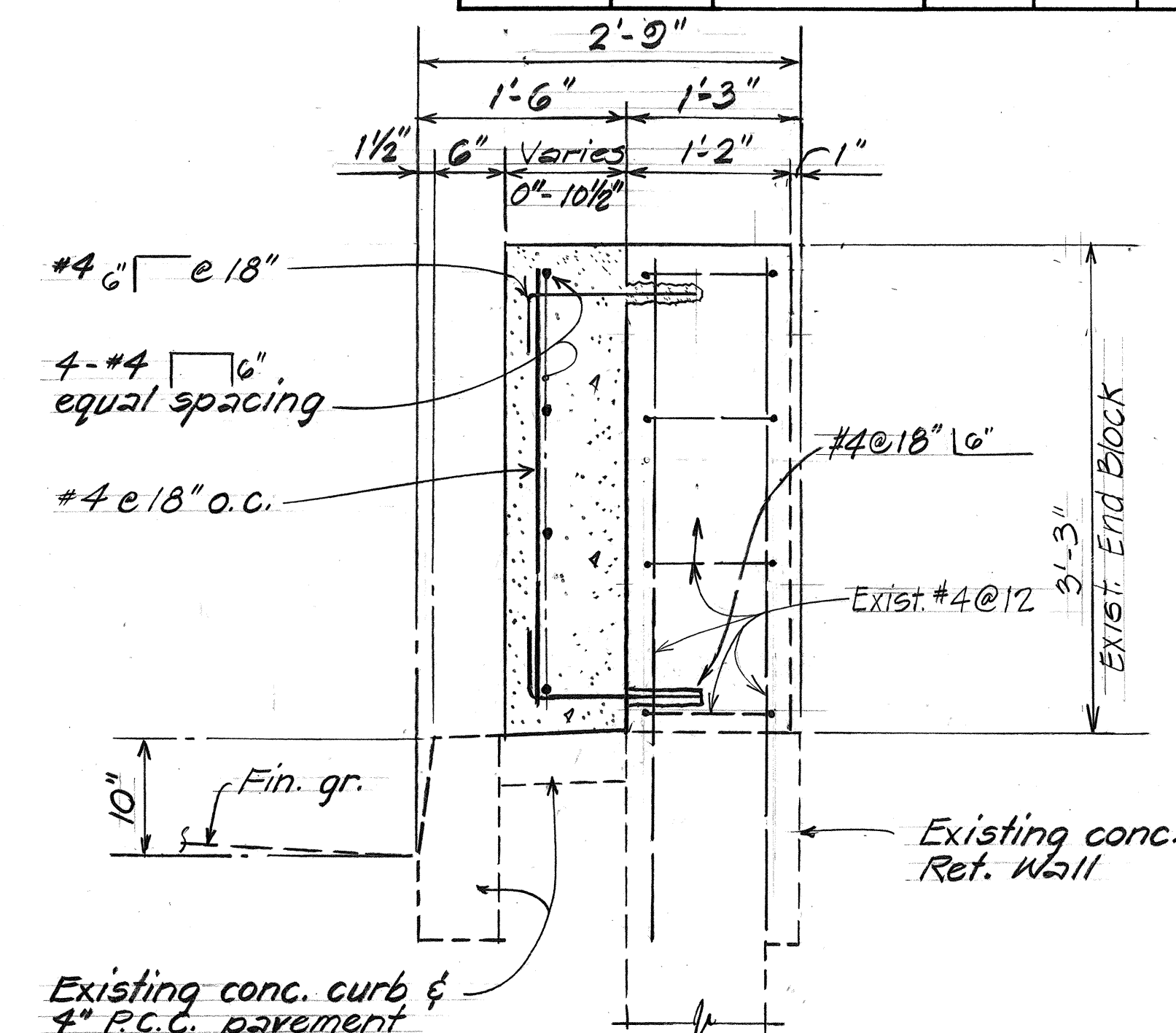
SECTION

Scale: 1"=1'-0"



SECTION

Scale: 1"=1'-0"

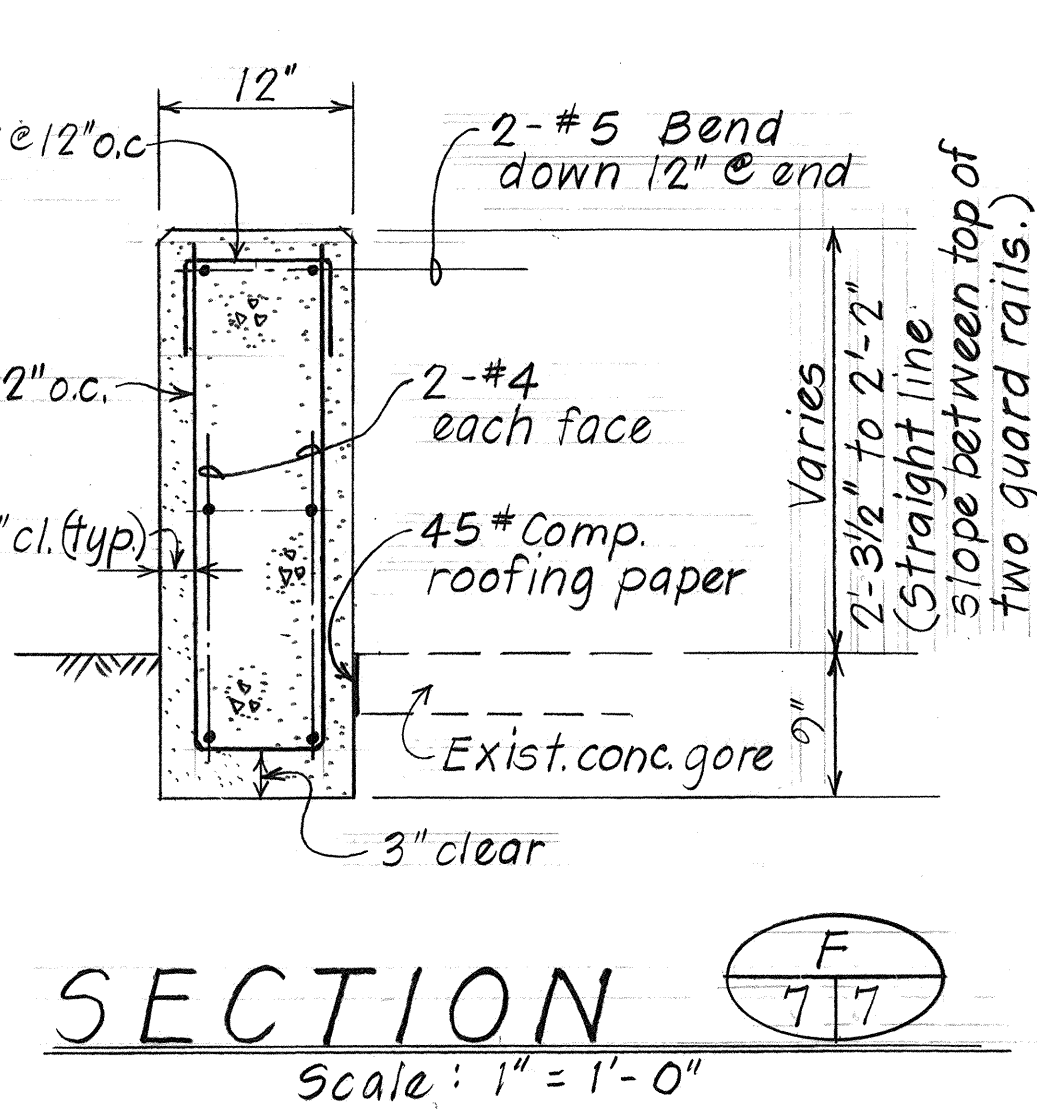
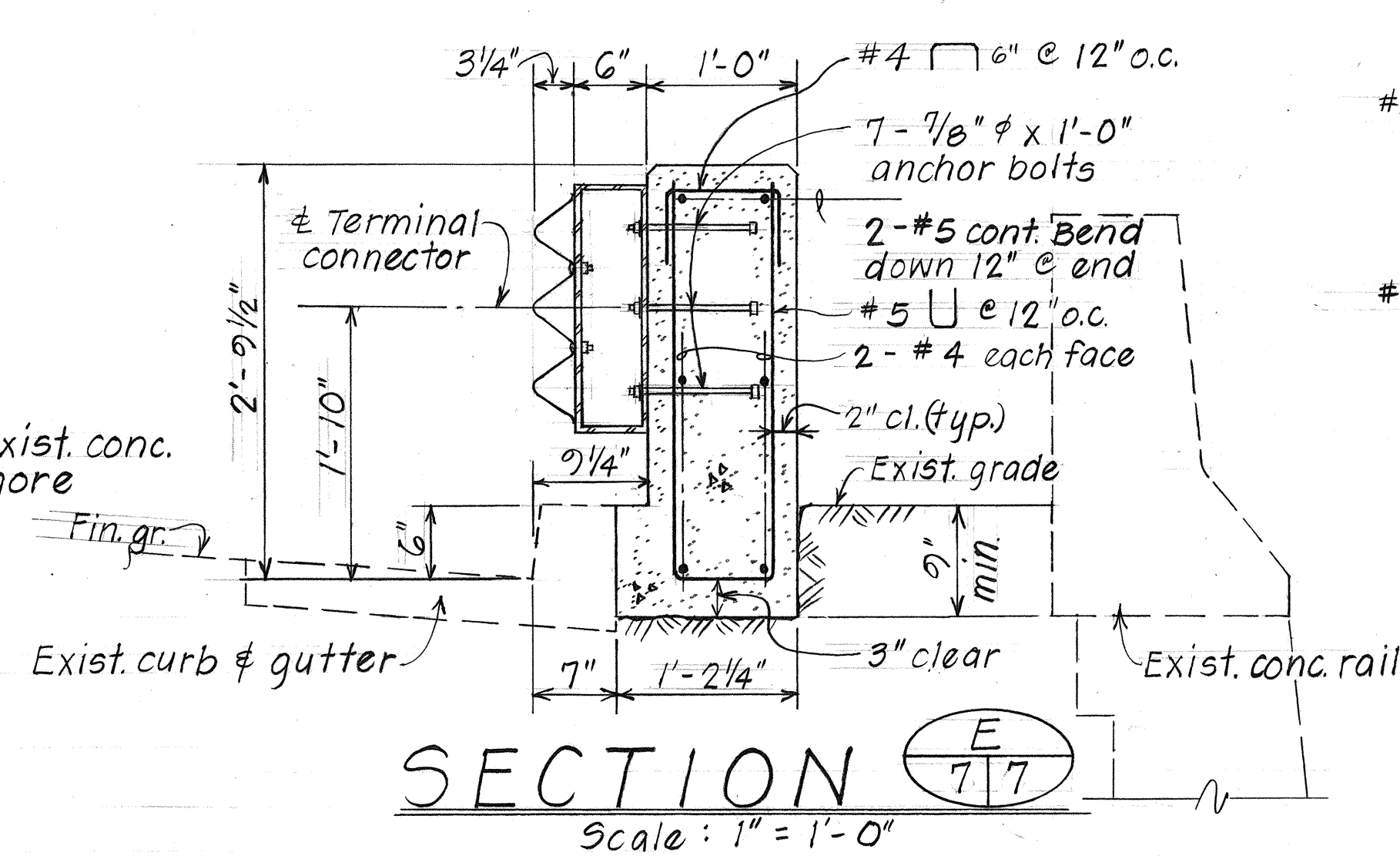
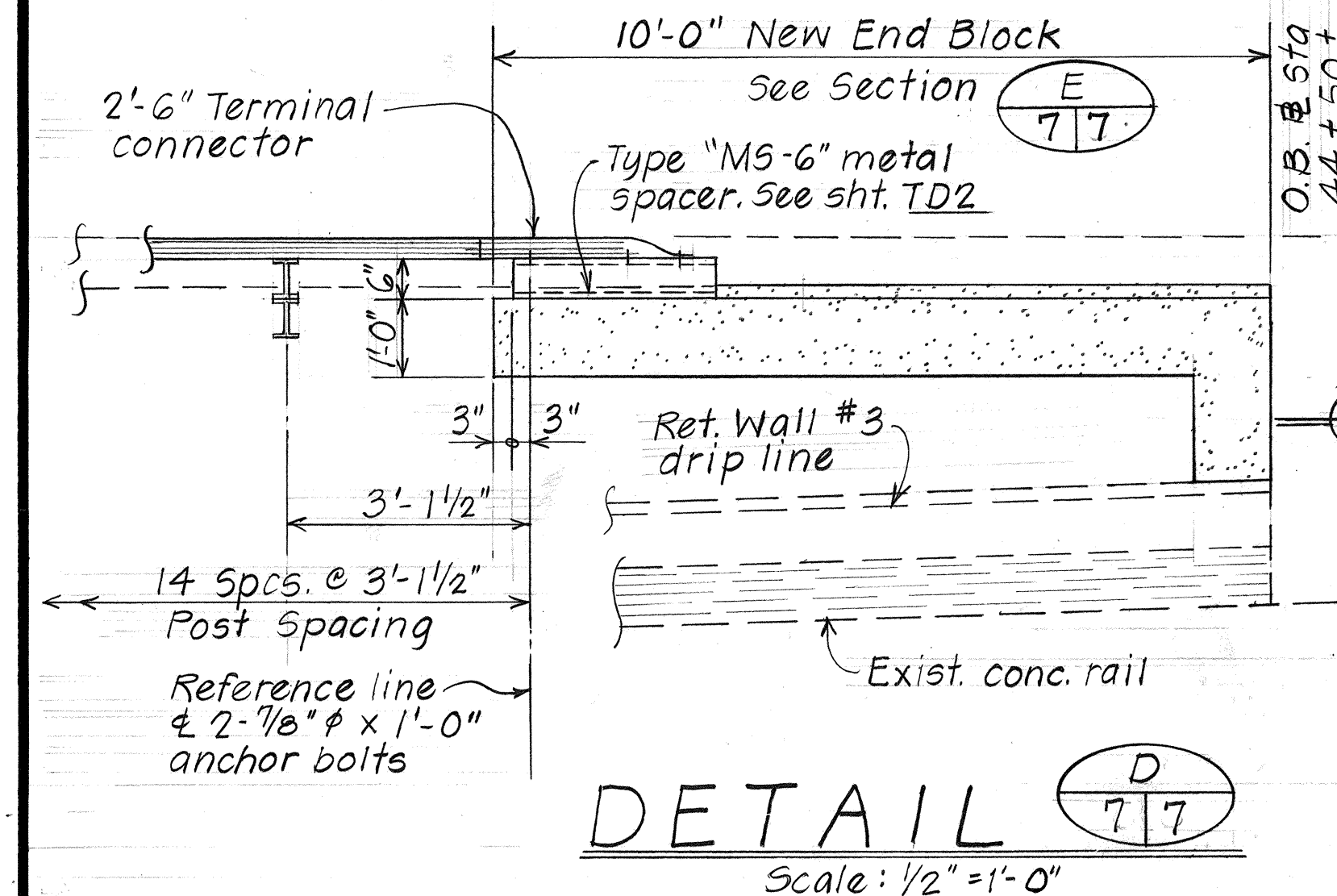
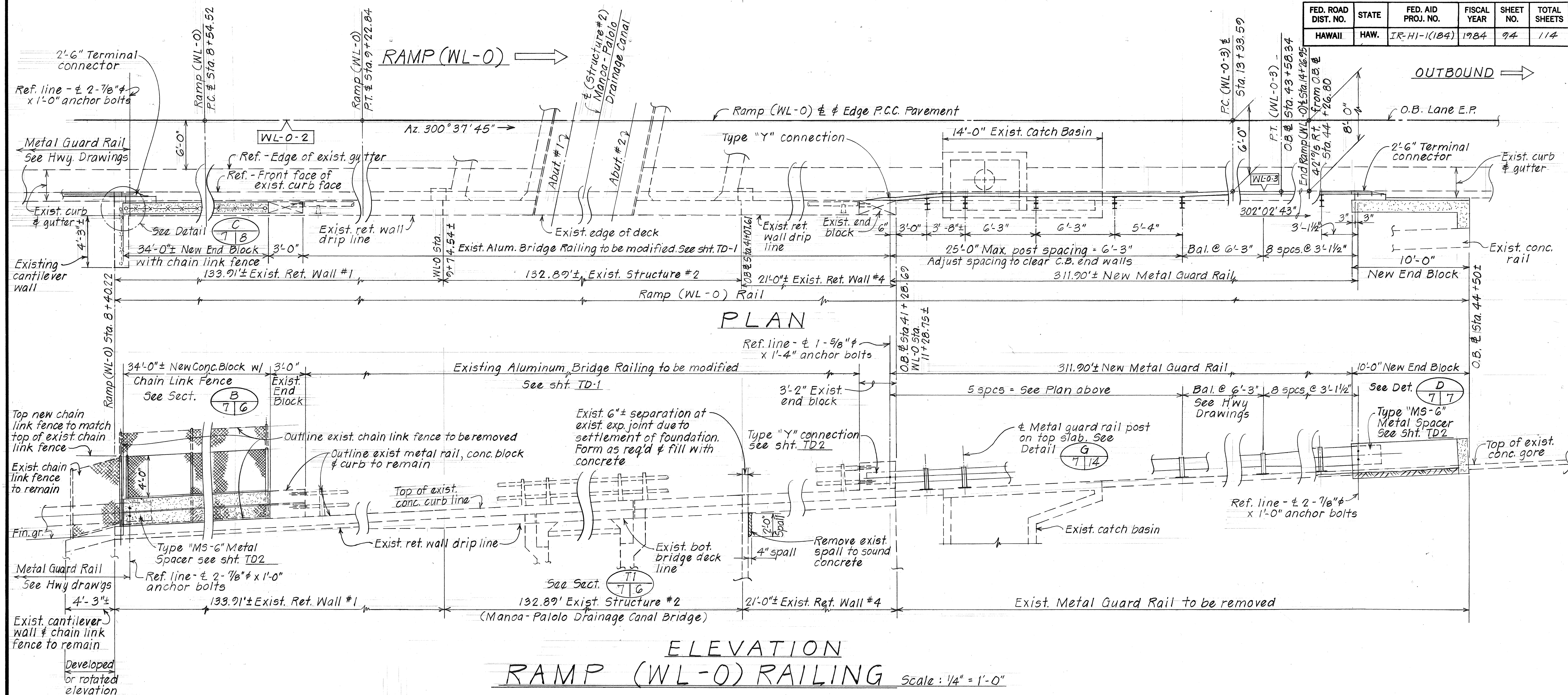


SECTION

Scale: 1"=1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
RAMP (HI-0) & RAMP (WL-0)
RAILING DETAILS
INTERSTATE ROUTE HI-1
SAFETY IMPROVEMENTS
Kalo Lane to Aiea Avenue
F.A.I. Proj. No. IR-HI-1(184)
Scale: As Shown Date: Sept. 1983
SHEET NO. 6 OF 20 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	94	114

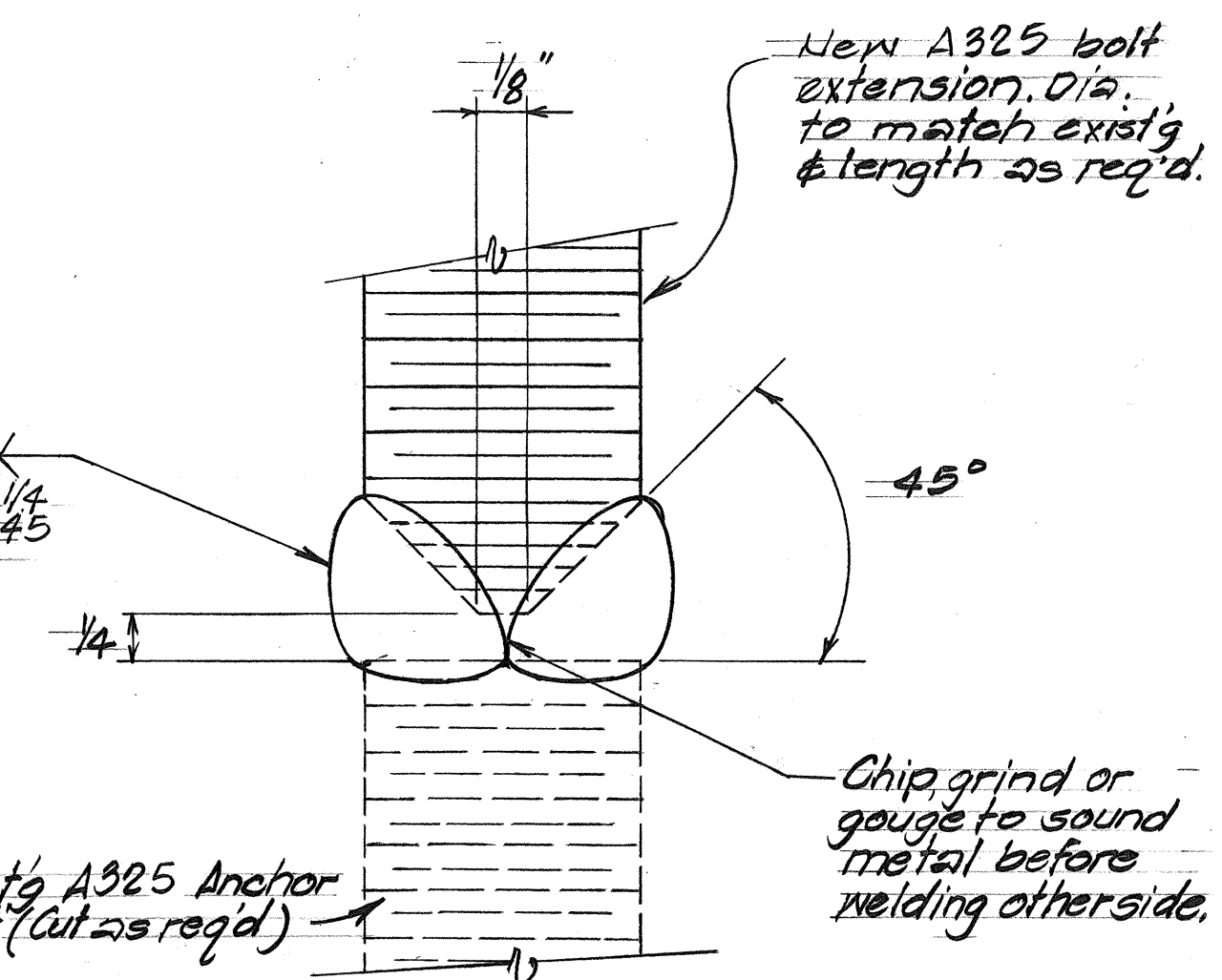


STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
RAMP (WL-0) RAILINGS
PLAN, ELEVATION, & DETAILS
INTERSTATE ROUTE H-1
SAFETY IMPROVEMENTS
Kalo Lane to Aieakoa Avenue
F.A.I. Proj. No. IR-HI-1(184)
Scale: As Shown Date: Sept. 1963
SHEET NO. 7 OF 20 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY _____	DATE _____
	DRAWN BY <u>NY 144</u>	" "
	TRACED BY _____	" "
NOTE BOOK	DESIGNED BY <u>EN</u>	" "
	QUANTITIES BY _____	" "
No. _____	CHECKED BY <u>EN</u>	" "

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
FREEWAY (IB) RAILINGS
DETAILS
INTERSTATE ROUTE H-1
SAFETY IMPROVEMENTS
Kalo Lane to Ainakoa Ave.
F.A.I. Proj. No. IR-HI-1(184)
Scale: As Shown Date: Sept. 1964

SHEET No. 9 OF 20 SHEETS



SECTION C
8 9
Scale: 1" = 1'-0"

for
11
alts
s

1 3/8" ϕ A325 bolt w/ washer,
lock washer ϕ nut

1'-6"

1/2" ϕ

Ref. - Edge of exist.
Struct. #3 (Kapiolani
Grade Separation)

Exist. End
Block

1"

1'-2"

2'-0"

1'-6"

1/4" ϕ Galv. rod w/ welded eye
metal guard rail anchor
(See Hwy. Plan & DT 520
for additional information)

ϕ 4 - 1" ϕ holes in ϕ
 ϕ 7/8" ϕ exp. bolts.

Ref. - Edge of exist. end post.

Exist. Wing Wall

10"

5"

4"

3"

6"

3"

1'-6"

4 - 1" ϕ holes in PL

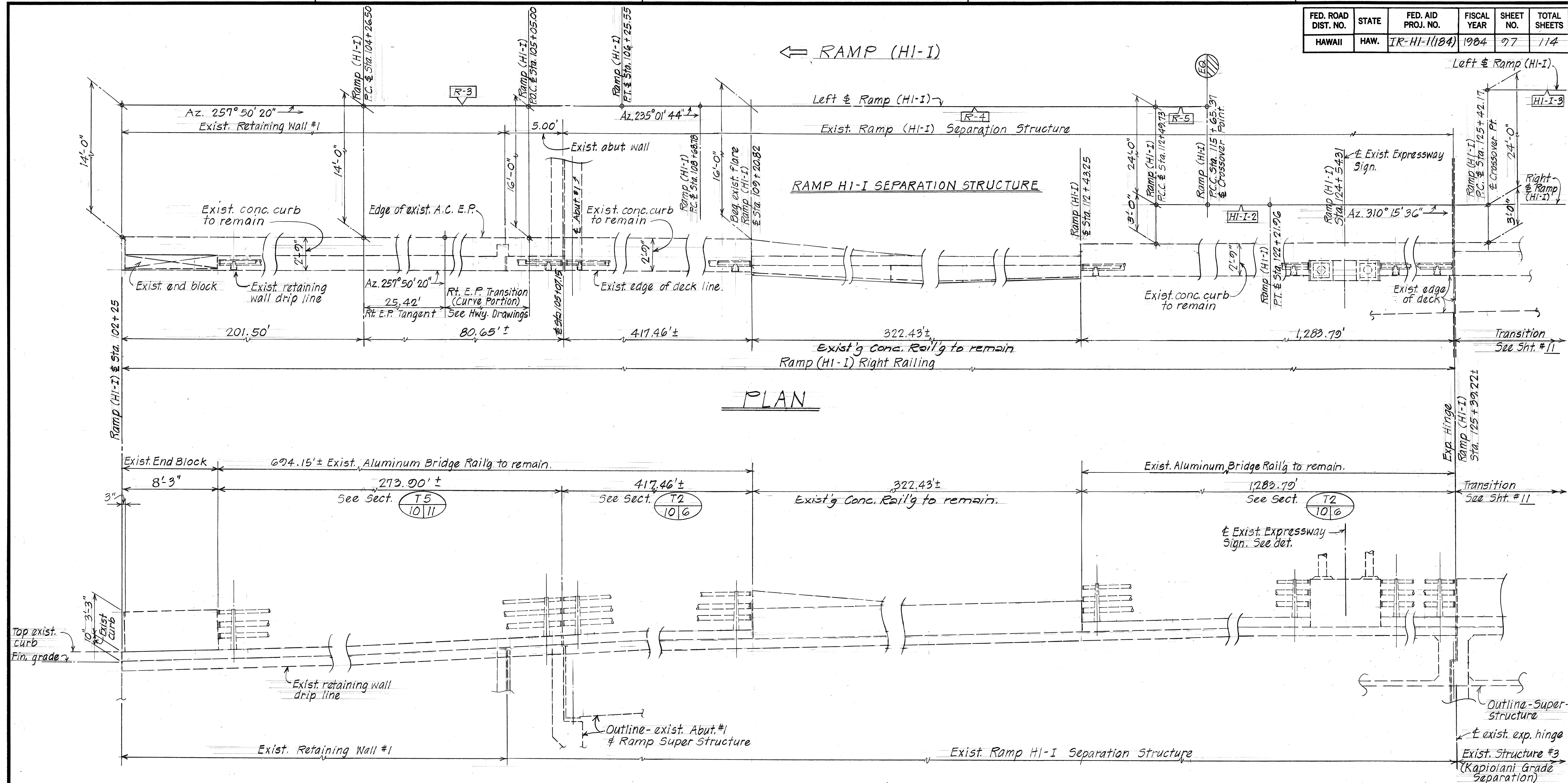
7/8" ϕ exp. bolts w/ lock washer

1'-6" x 10" x 1/2" Steel PL & 1/2" ϕ hole (Galv. after fabrication)

SECTION 
Scale: 1" = 1'-0"

96

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	97	114



ELEVATION

RAMP (HI-I) RIGHT RAILING

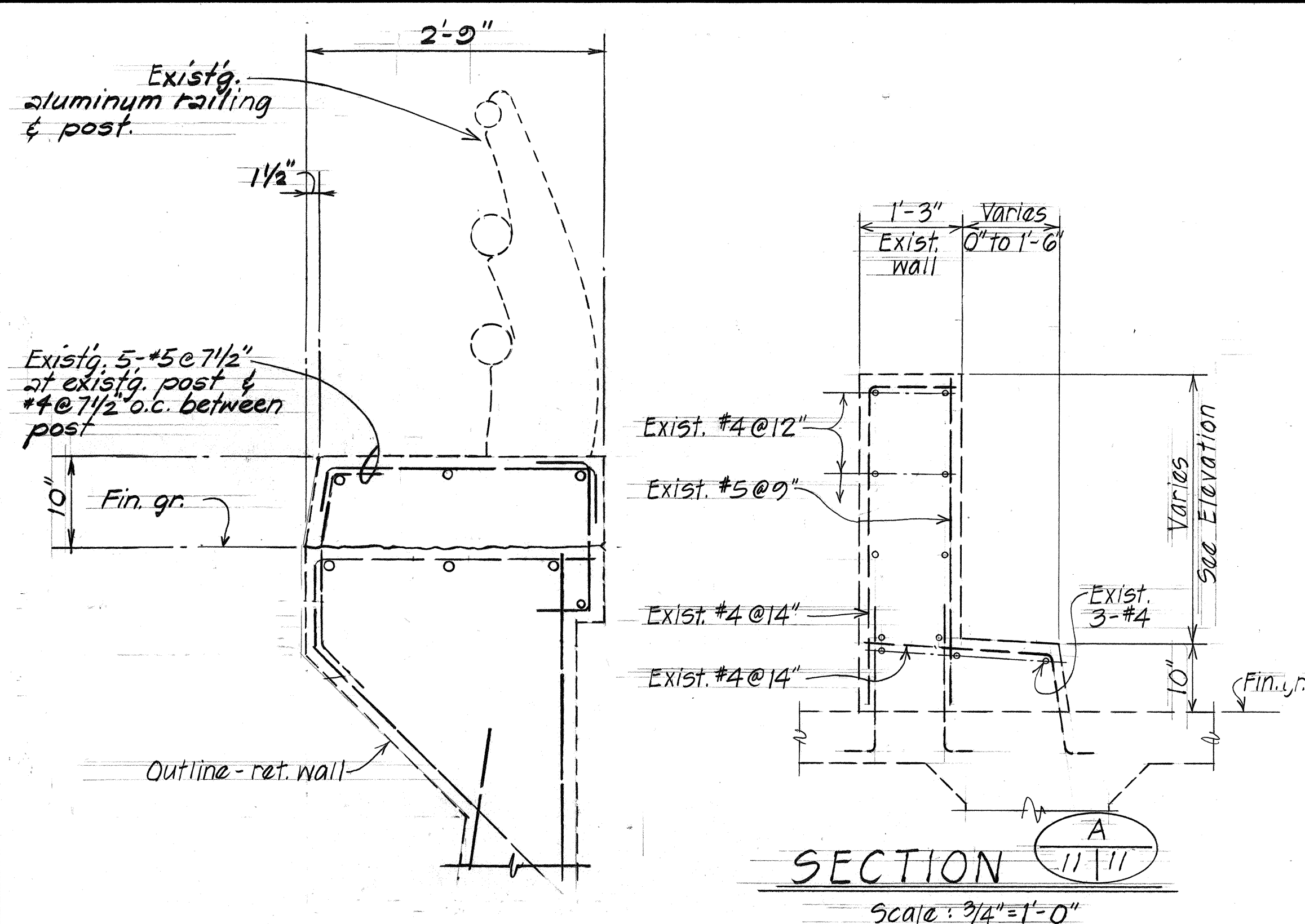
Scale: $\frac{1}{4}" = 1'-0"$

THIS SHEET NOT IN CONTRACT

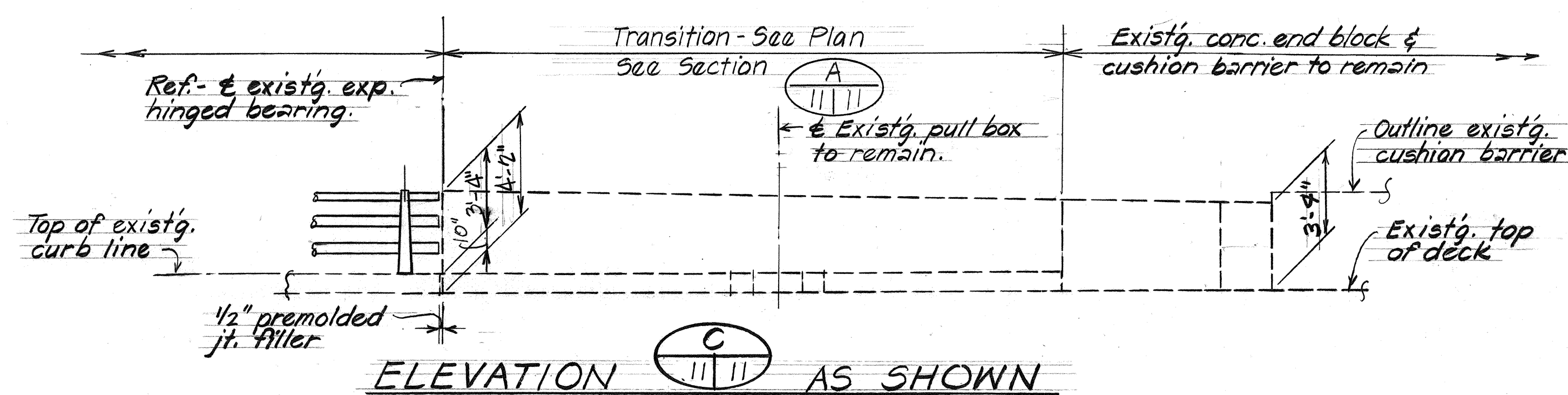
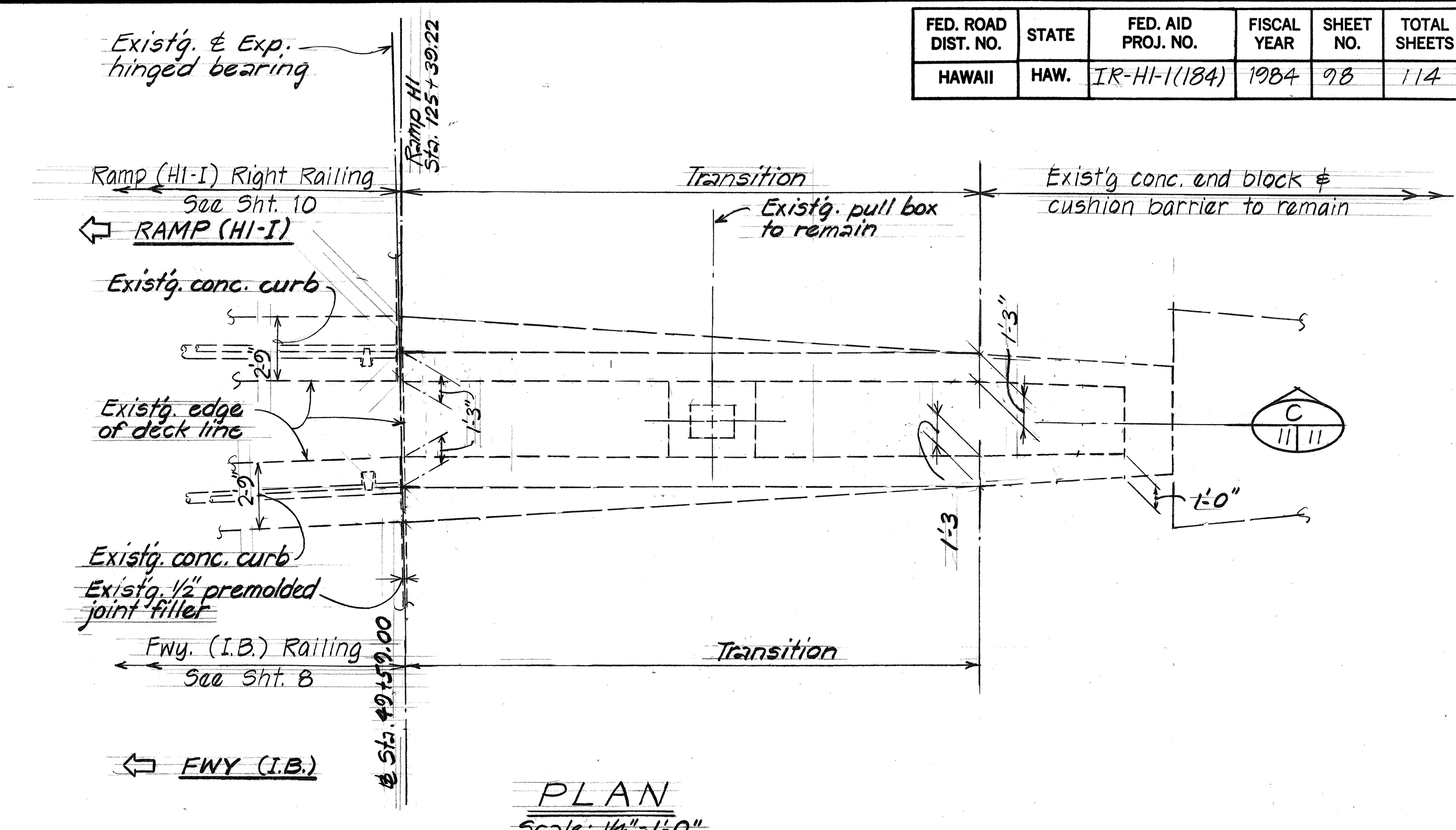
ORIGINAL PLAN	SURVEY PLOTTED BY _____		DATE _____
NOTE BOOK	DRAWN BY _____	_____	_____
	TRACED BY _____	_____	_____
	DESIGNED BY _____	_____	_____
	QUANTITIES BY _____	_____	_____
No. _____	CHECKED BY _____	_____	_____

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
RAMP (HI-1) RIGHT RAILING
PLAN & ELEVATION
INTERSTATE ROUTE H-1
SAFETY IMPROVEMENTS
Kalo Lane to Ainakoa Ave.
FAI Proj. No. IR-HI-11084
Scale: As Shown Date: Sept. 1983
SHEET NO. 10 OF 20 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	98	114



SECTION 12
Scale: 1" = 1'-0"



ORIGINAL	DATE
PLAN	
NOTES	
QUANTITIES	
CHECKED BY	
NO.	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
RAMP (HI-I) RIGHT RAILING
DETAILS

INTERSTATE ROUTE H-1
SAFETY IMPROVEMENTS
Kalo Lane to Aiea Koa Ave.
F.A.I. Proj. No. IR-HI-1(184)

Scale: As Shown Date: Sept. 1983
SHEET NO. 11 OF 20 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY _____	DATE _____
	DRAWN BY <u>NY L. 14, A₁</u>	" _____
	TRACED BY _____	" _____
NOTE BOOK	DESIGNED BY <u>EN</u>	" _____
	QUANTITIES BY _____	" _____
No. _____	CHECKED BY <u>EN, L. T. A</u>	" _____

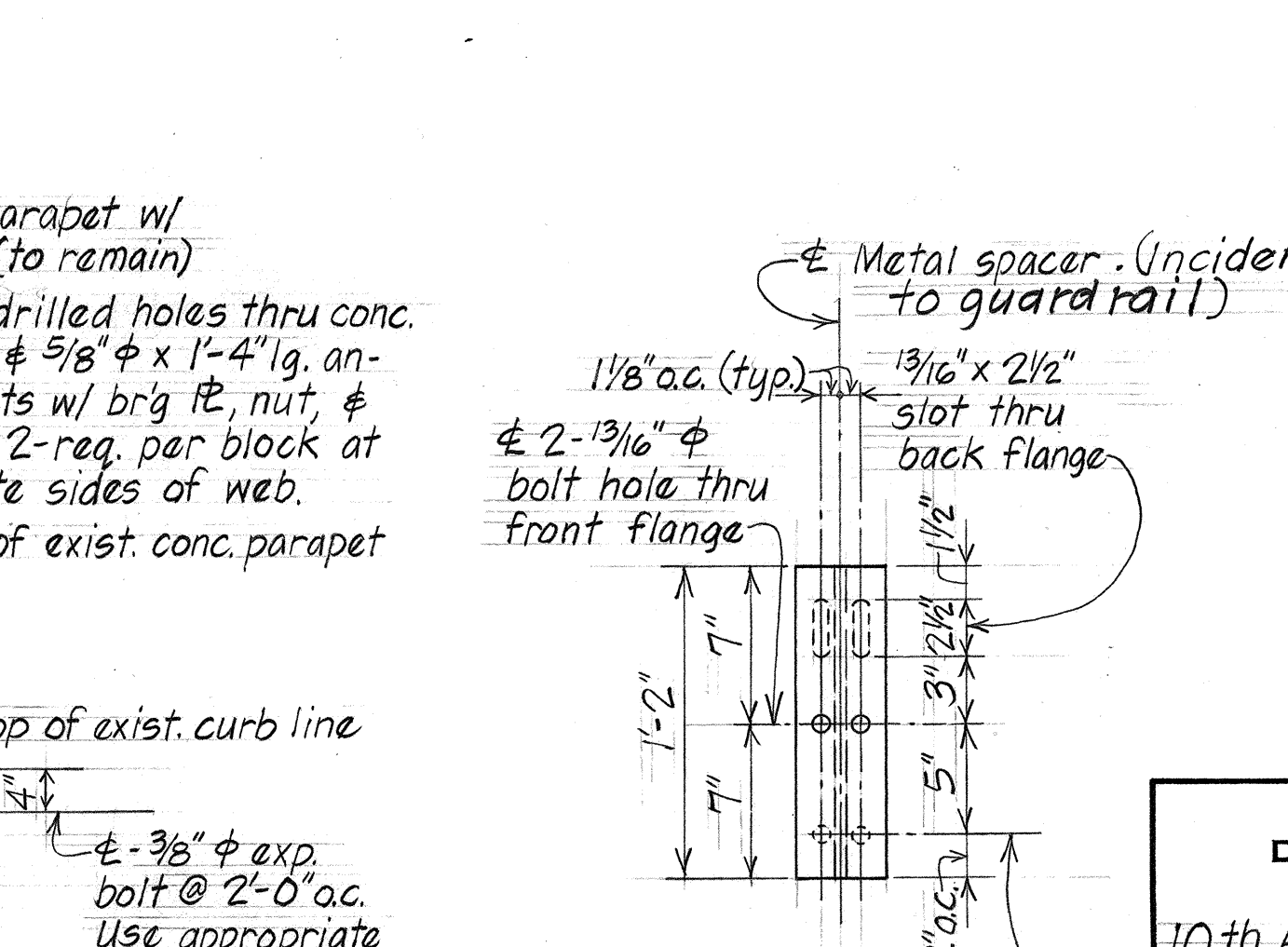
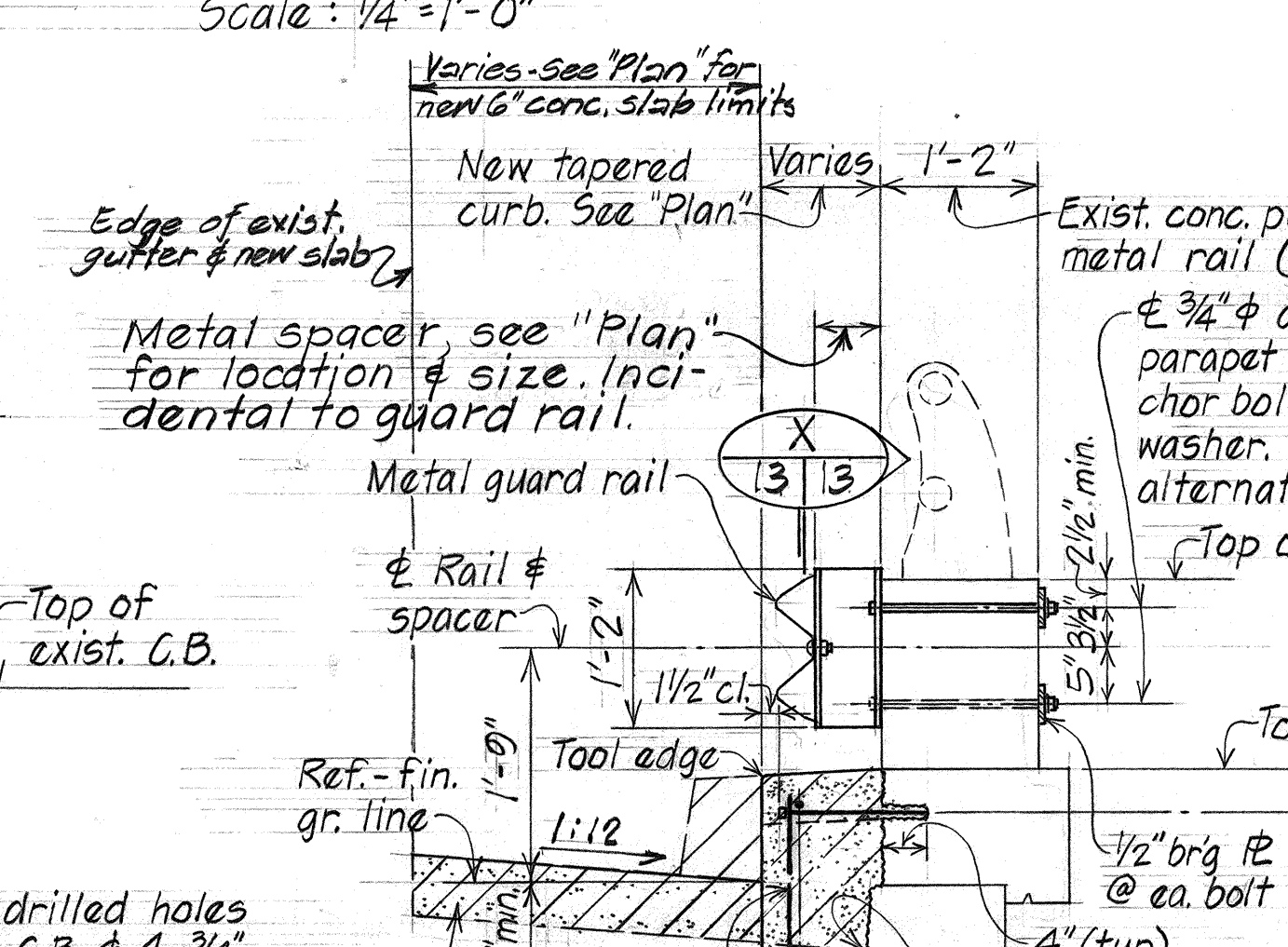
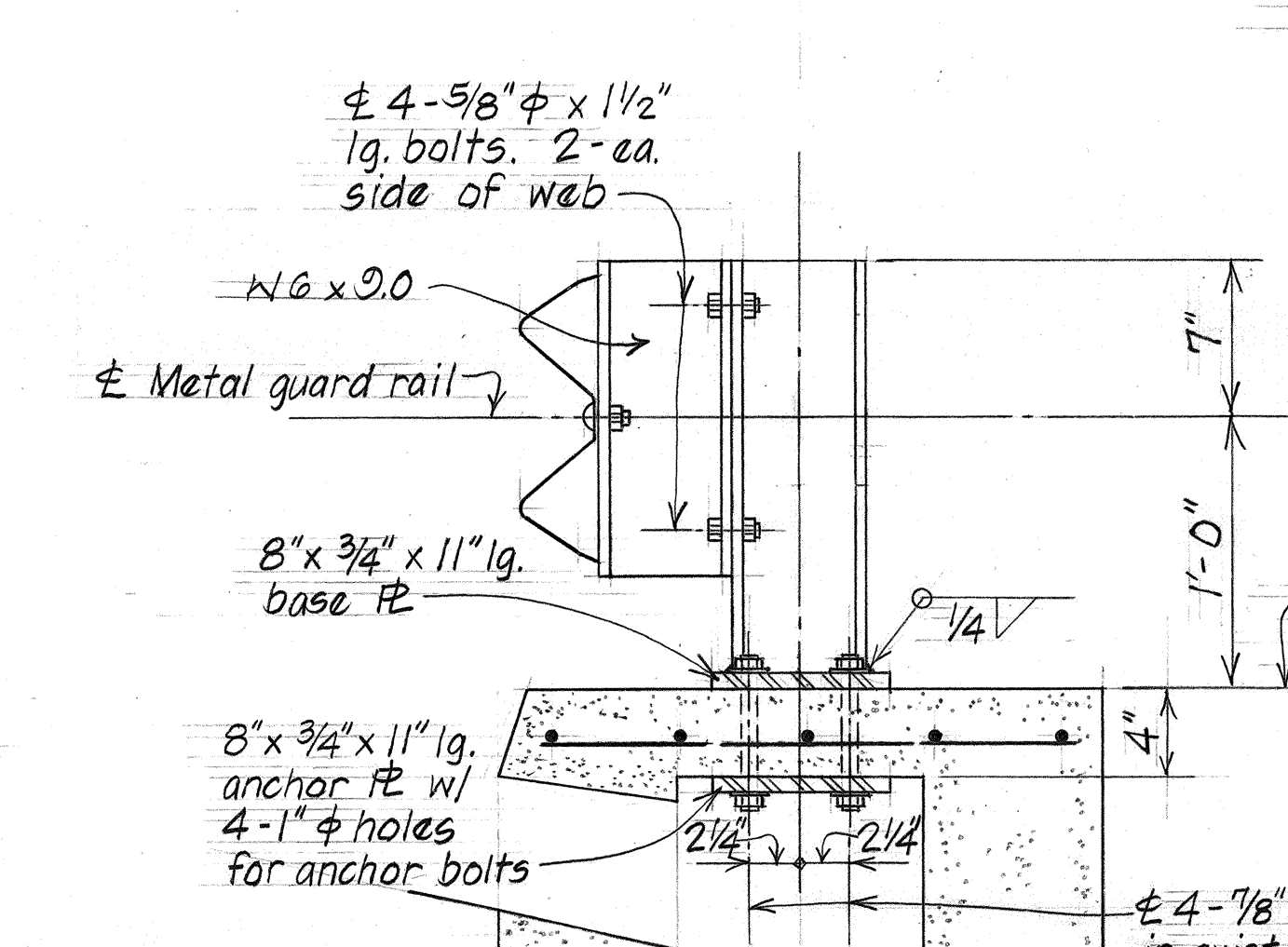
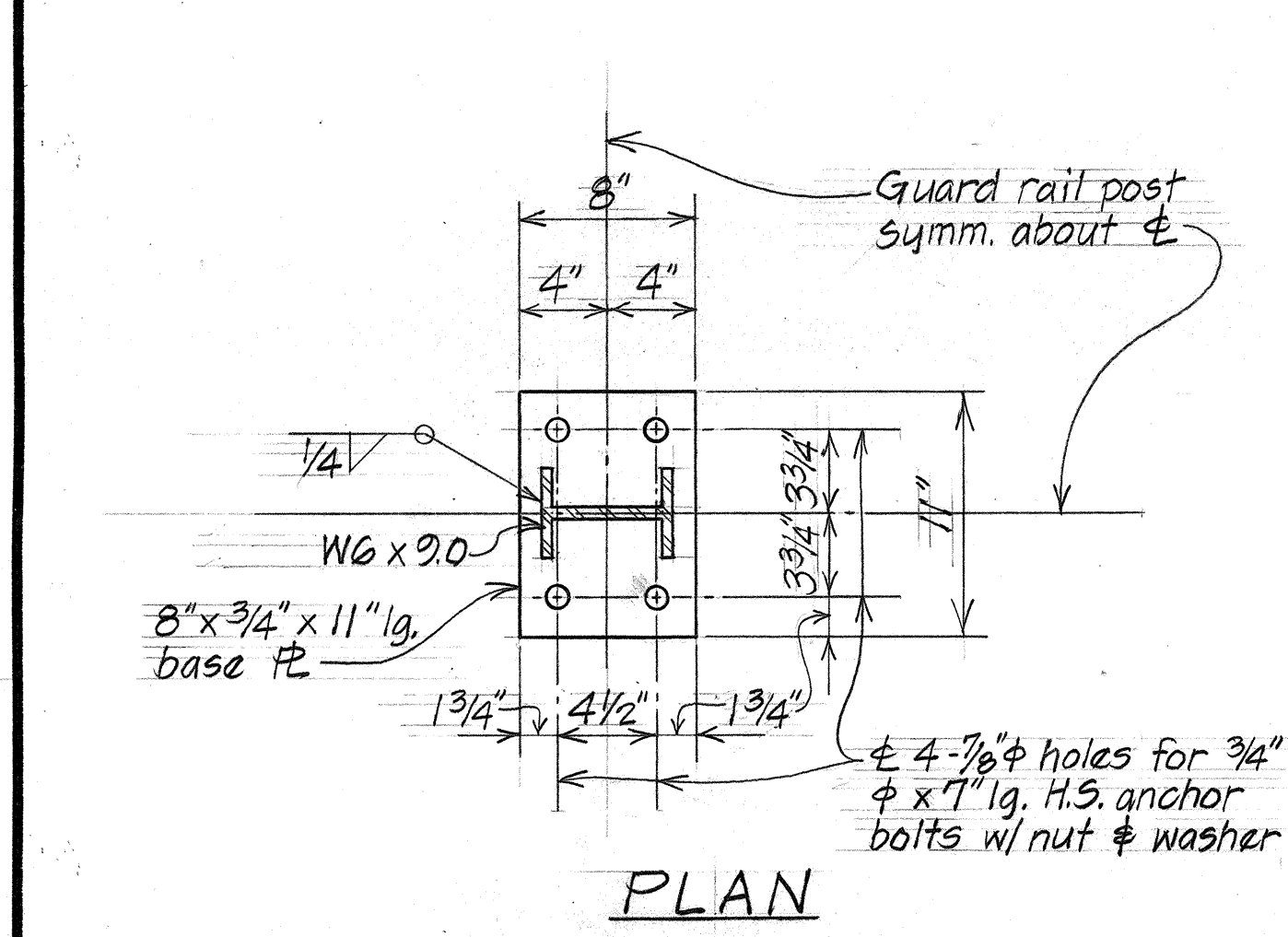
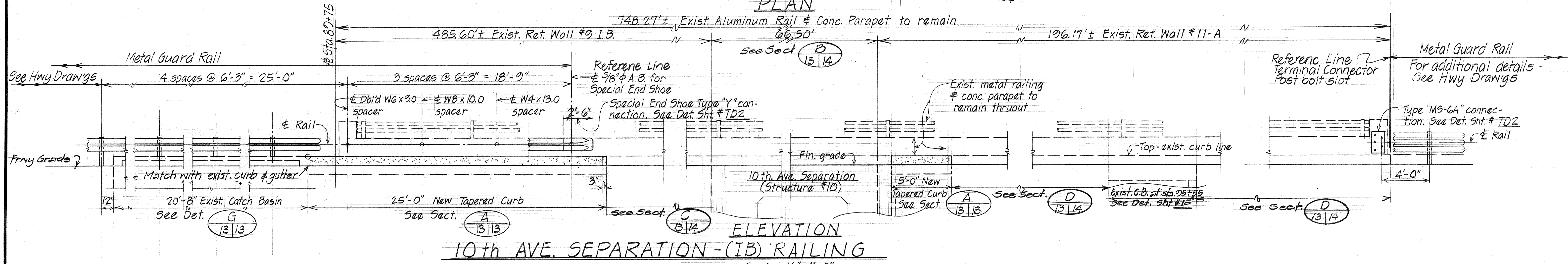
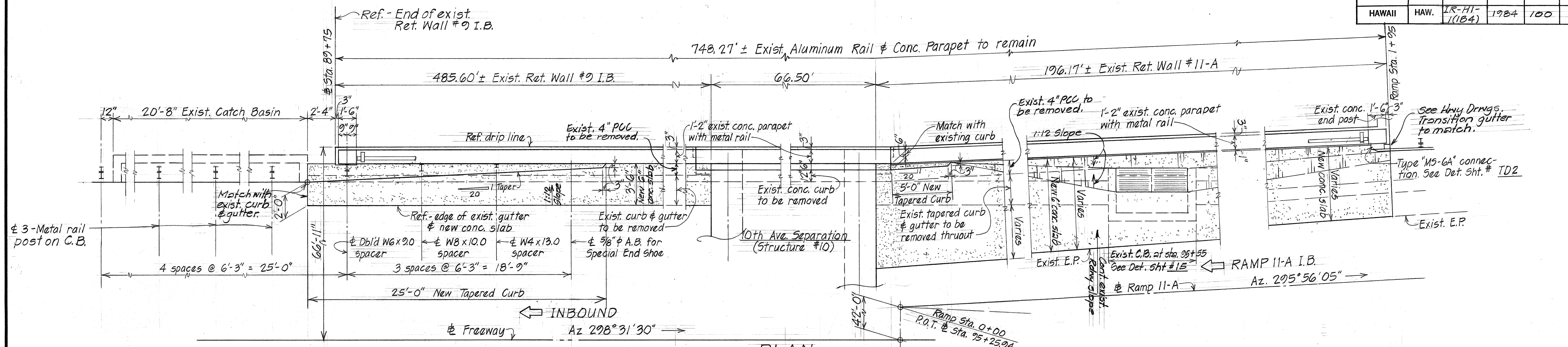
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
RAMP (HI-1) LEFT RAILING
PLAN, ELEVATION & DETAILS

INTERSTATE ROUTE HI-1
SAFETY IMPROVEMENTS
Kalo Lane to Aieakoa Avenue
E.A.I. Proj. No. IR-HI-1(184)

Scale: As Shown Date: Sept. 1983

SHEET NO. 12 OF 20 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	100	114



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

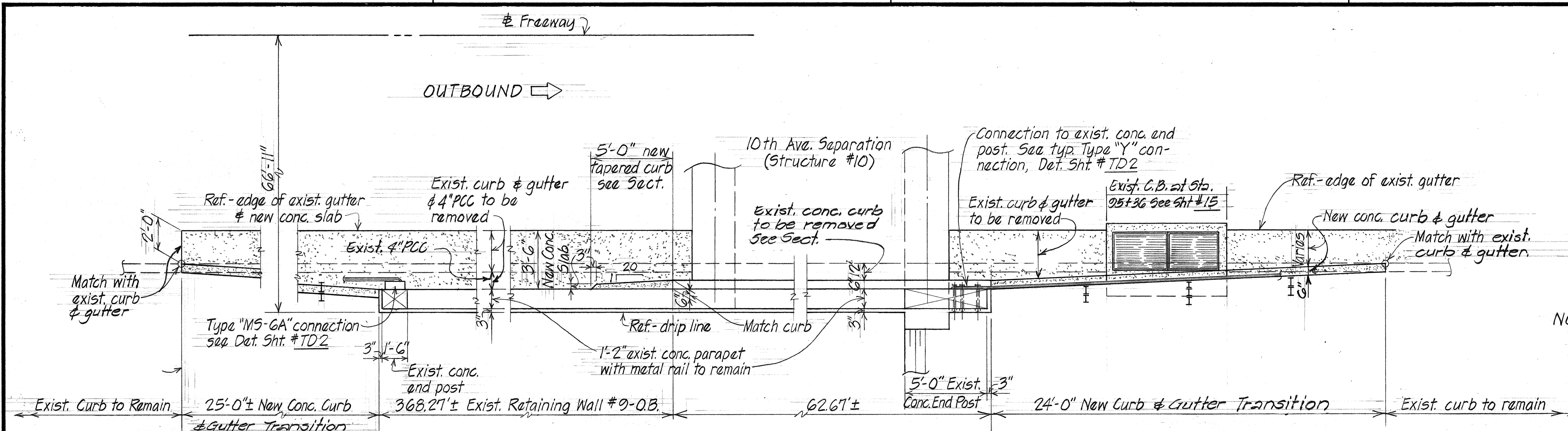
10th AVE. SEPARATION (IB) RAILING
PLAN, ELEVATION & DETAILS

INTERSTATE ROUTE H-1
SAFETY IMPROVEMENTS
Kalo Lane to Aiea Avenue
F.A.I. Proj. No. IR-HI-1(184)

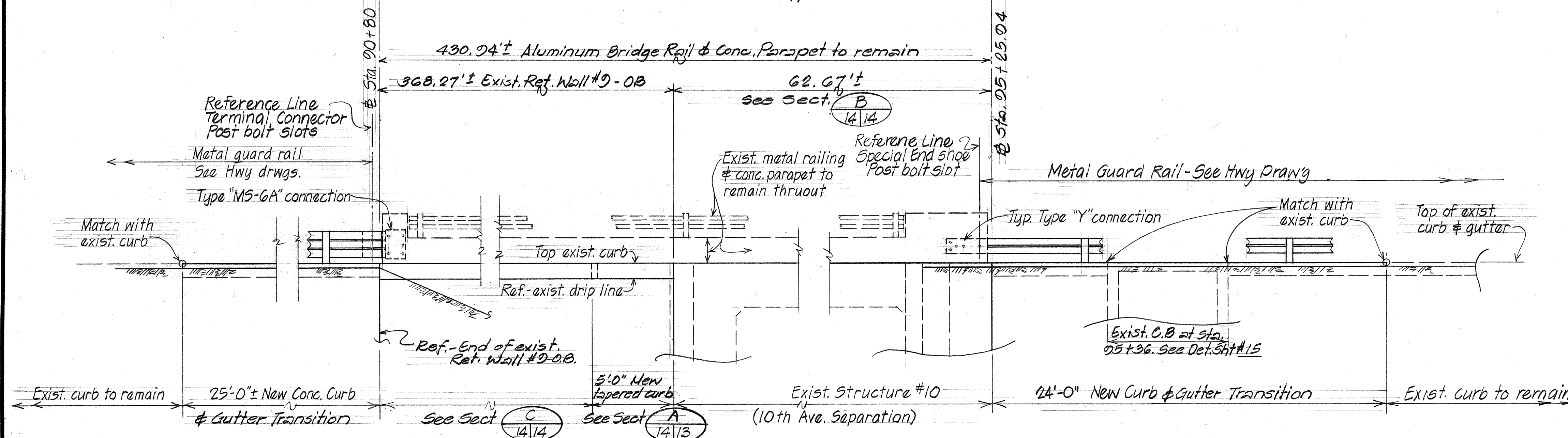
Scale: As Shown Date: Sept. 1983
SHEET No. 13 OF 20 SHEETS

SURVEY PLOTTED BY	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
QUANTITIES BY	
NO.	

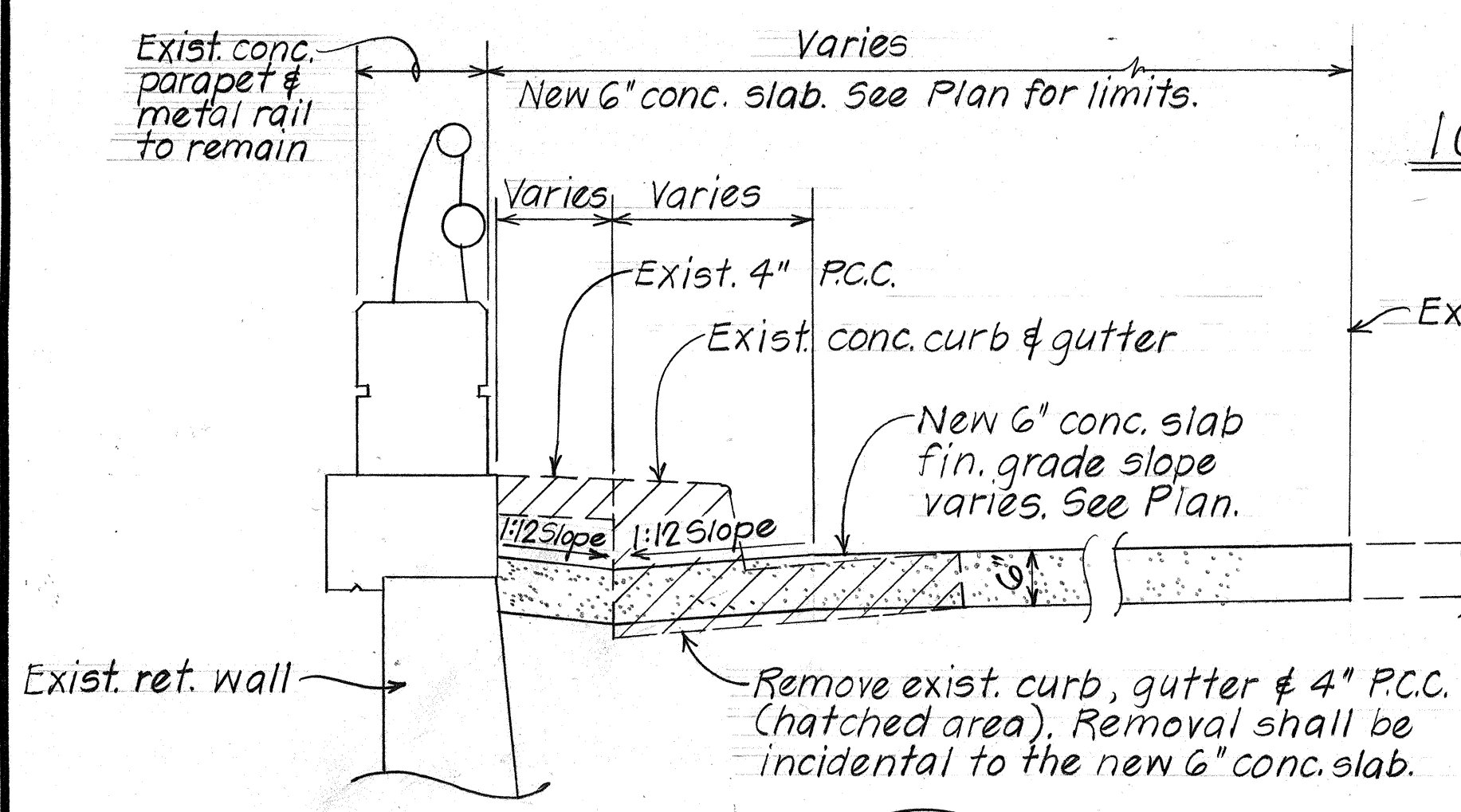
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	101	114



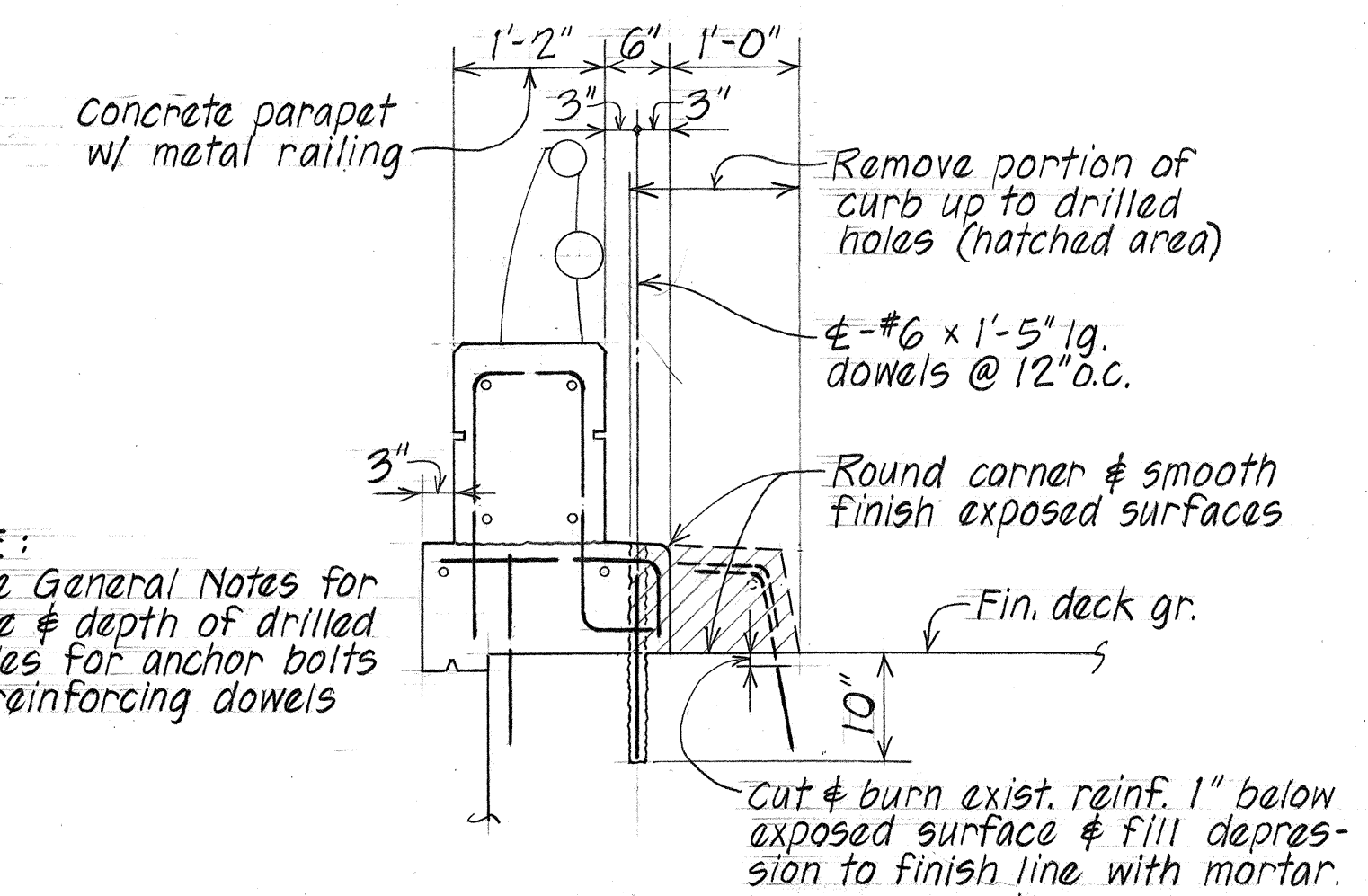
PLAN
Scale: 1/4" = 1'-0"



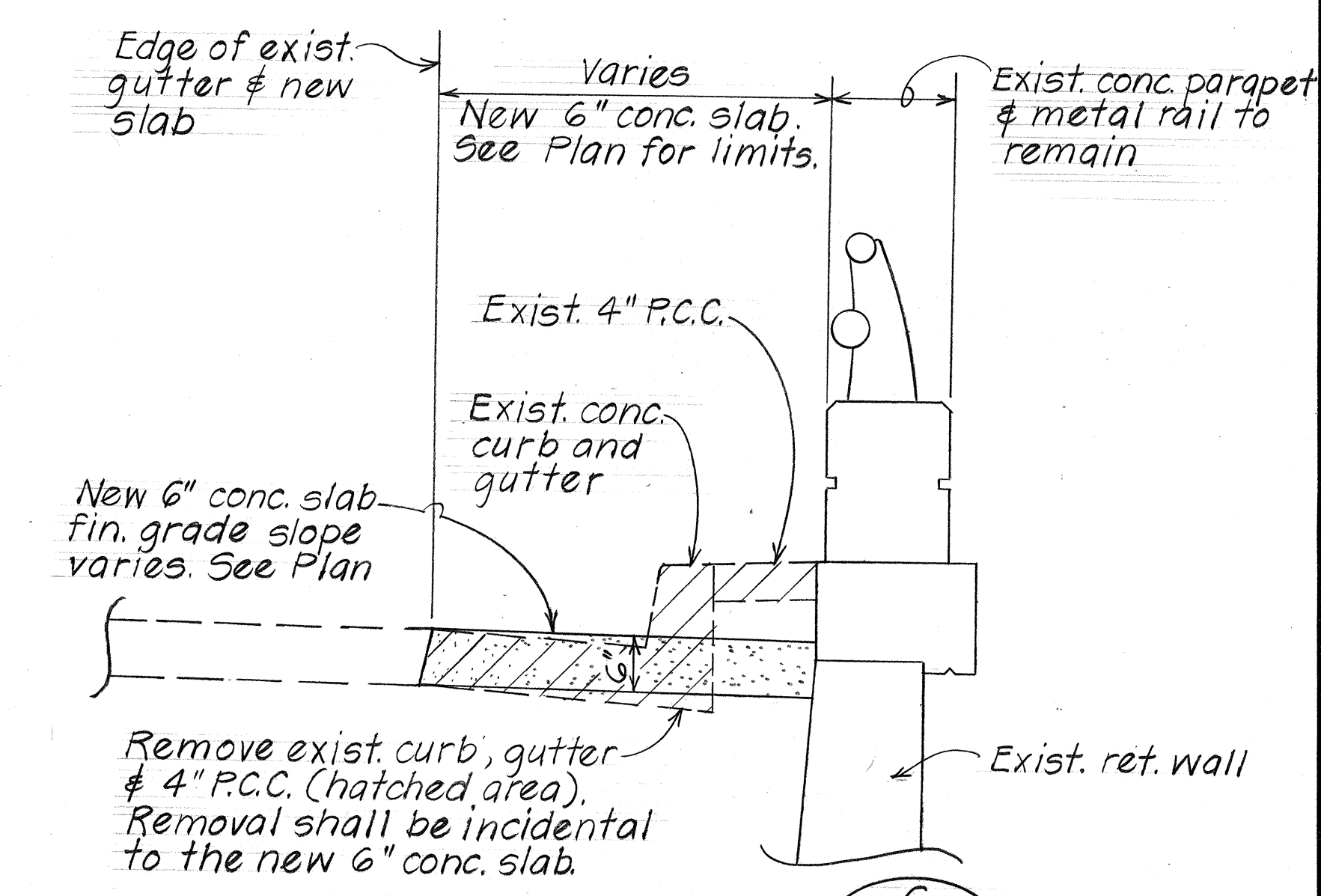
ELEVATION
Scale: 1/4" = 1'-0"
10th AVE SEPARATION (OB) RAILING
Scale: 1/4" = 1'-0"



SECTION D
NEW 6" CONC. SLAB DETAIL
Scale: 3/4" = 1'-0"



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

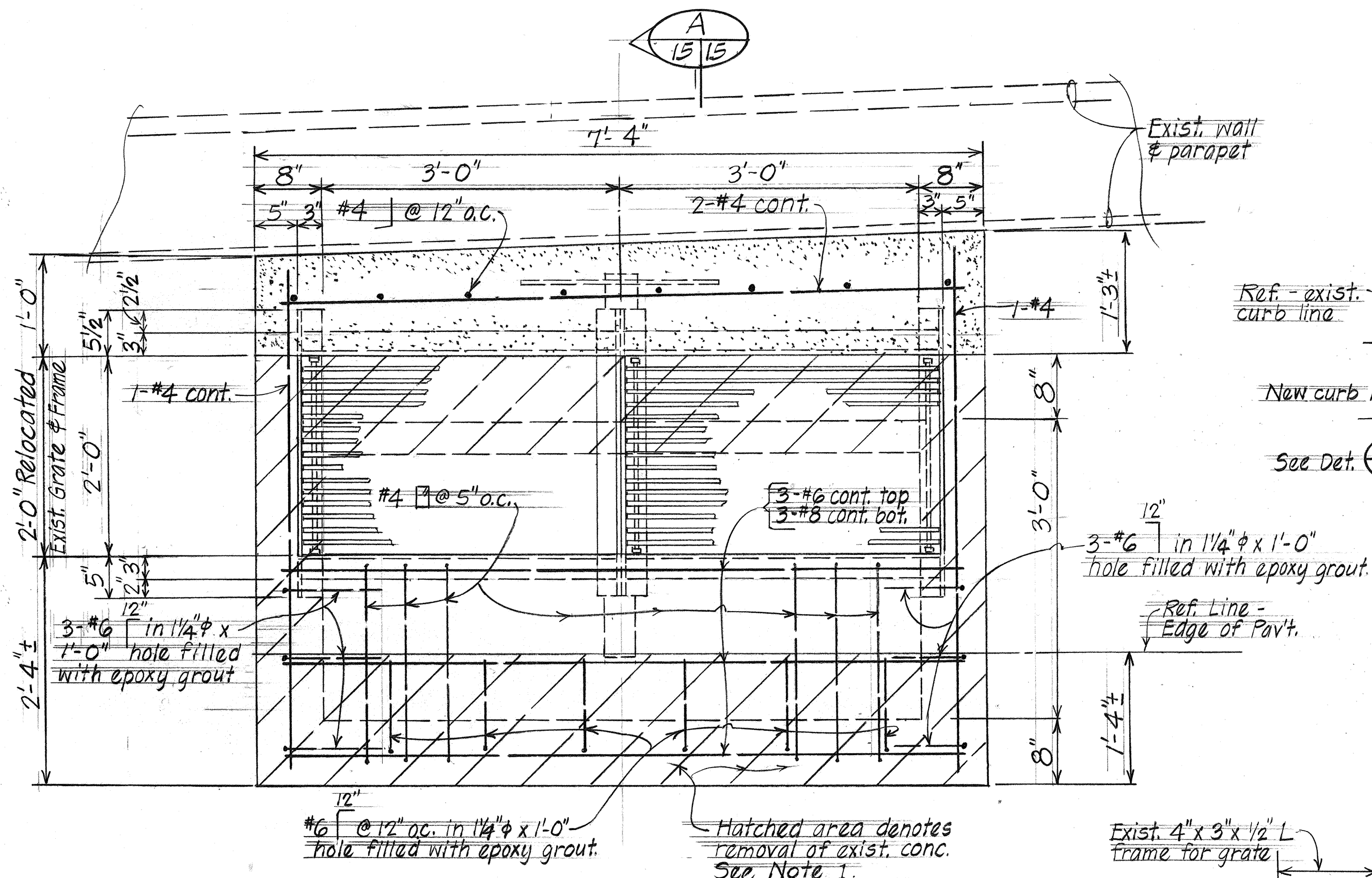


SECTION C
NEW 6" CONC. SLAB DETAIL
Scale: 3/4" = 1'-0"

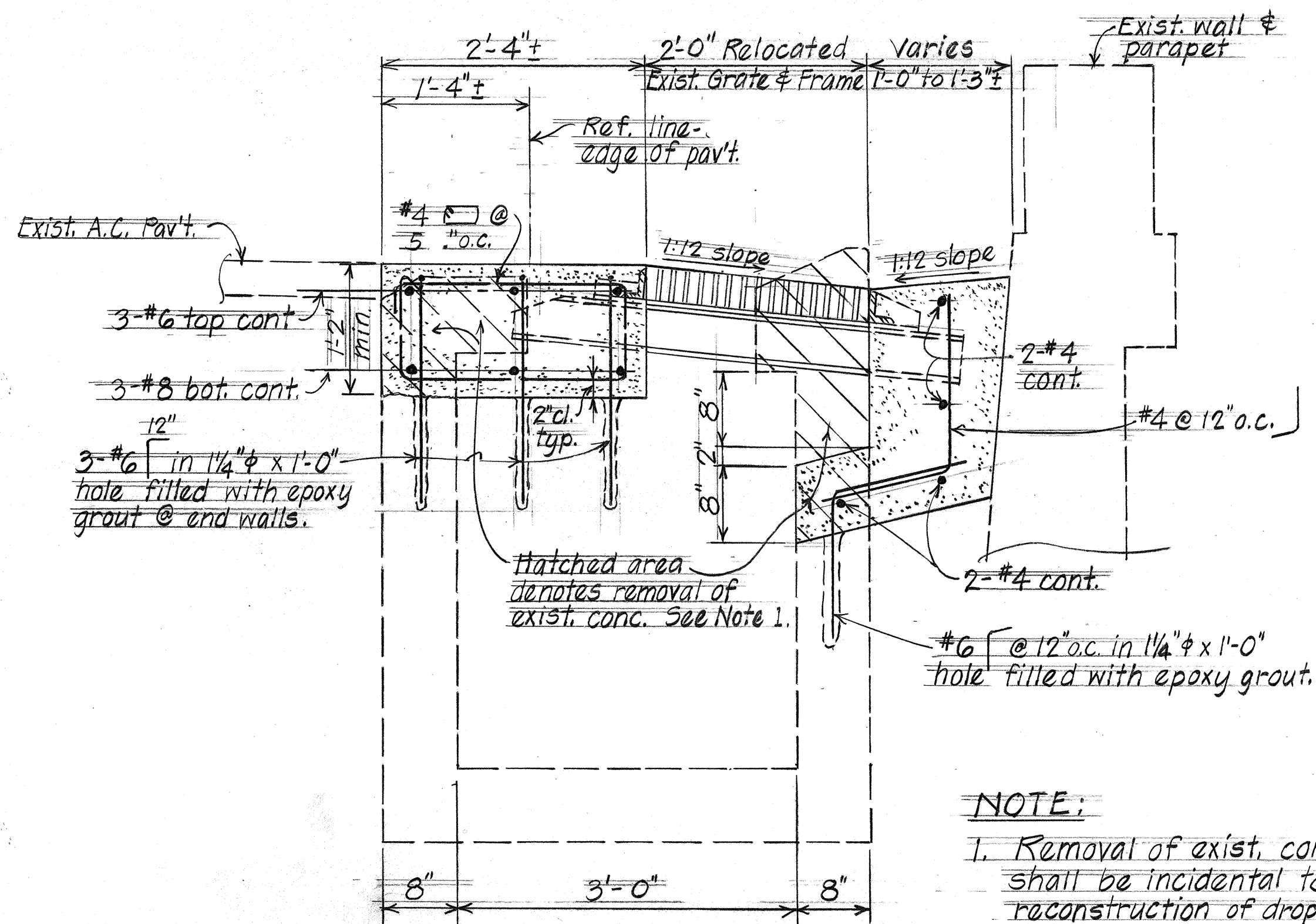
SURVEY PLOTTED BY	DATE
DRAWN BY	GU
CHECKED BY	EN
NOTED BY	EN
QUANTITIES BY	EN
ORIGINAL PLAN	No.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
10th AVE SEPARATION (OB) RAILING
PLAN, ELEVATION & DETAILS
INTERSTATE ROUTE H-1
SAFETY IMPROVEMENTS
Kalo Lane to Ainakoa Avenue
F.A.I. Proj. No. IR-HI-1(184)
Scale: As Shown Date: Sept. 1983
SHEET No. 14 OF 20 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	102	114

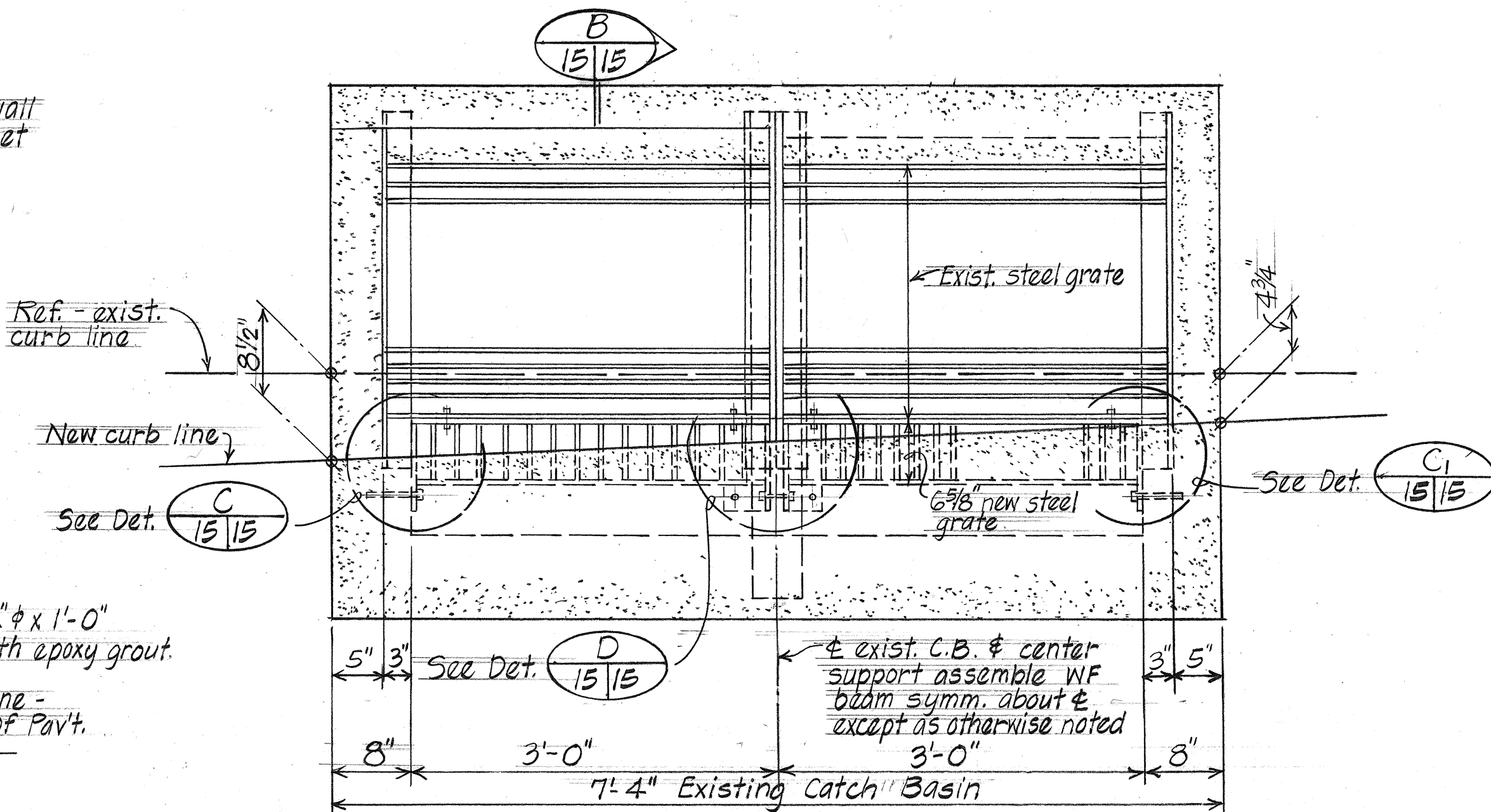


PLAN - CATCH BASIN
I.B. (FREEWAY & STA. 95+55±)
Scale: 1" = 1'-0"

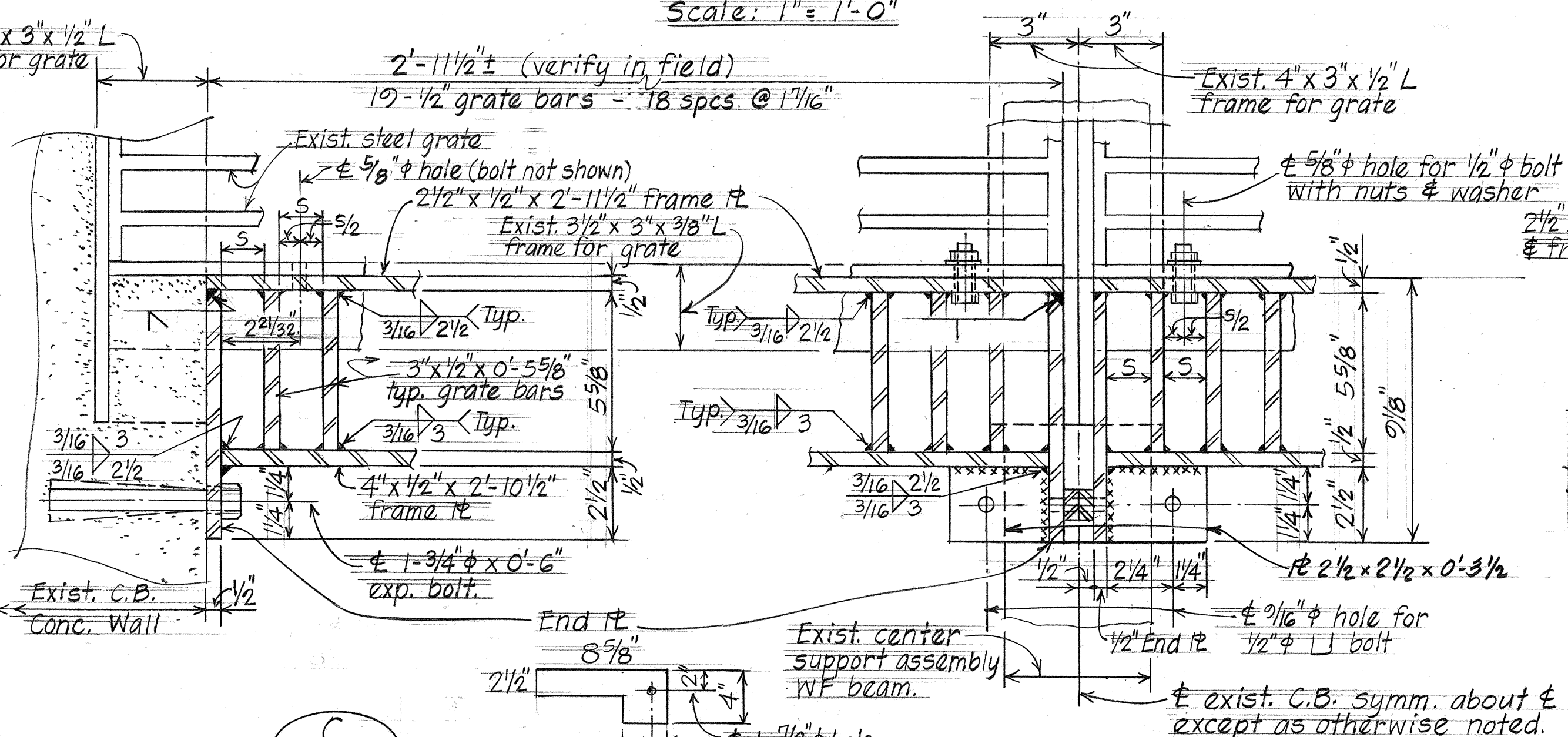


SECTION A-A
Scale: 1" = 1'-0"

NOTE:
1. Removal of exist. conc. shall be incidental to the reconstruction of drop intake.

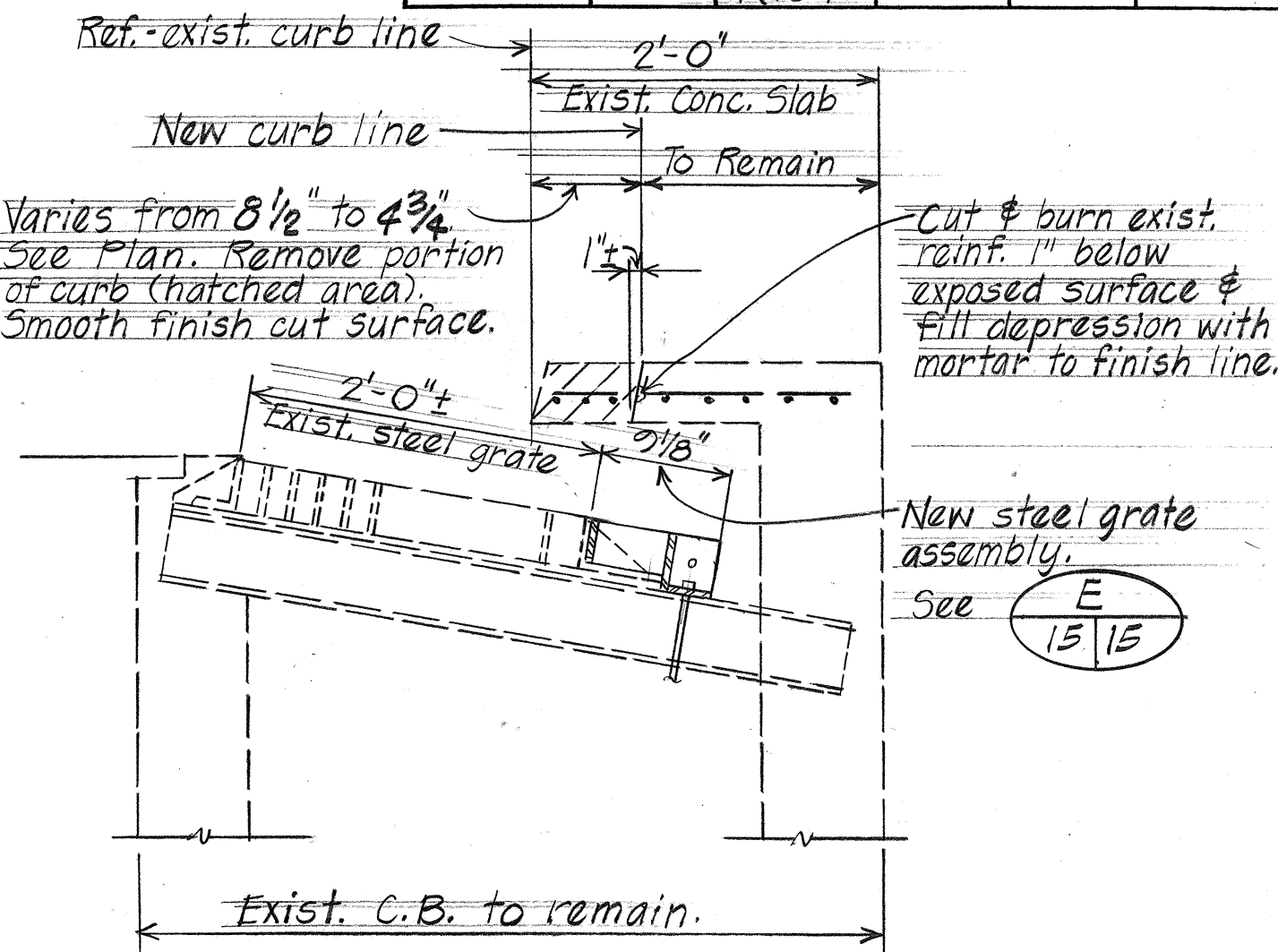


PLAN - CATCH BASIN
O.B. (FREEWAY & STA. 95+36±)
Scale: 1" = 1'-0"

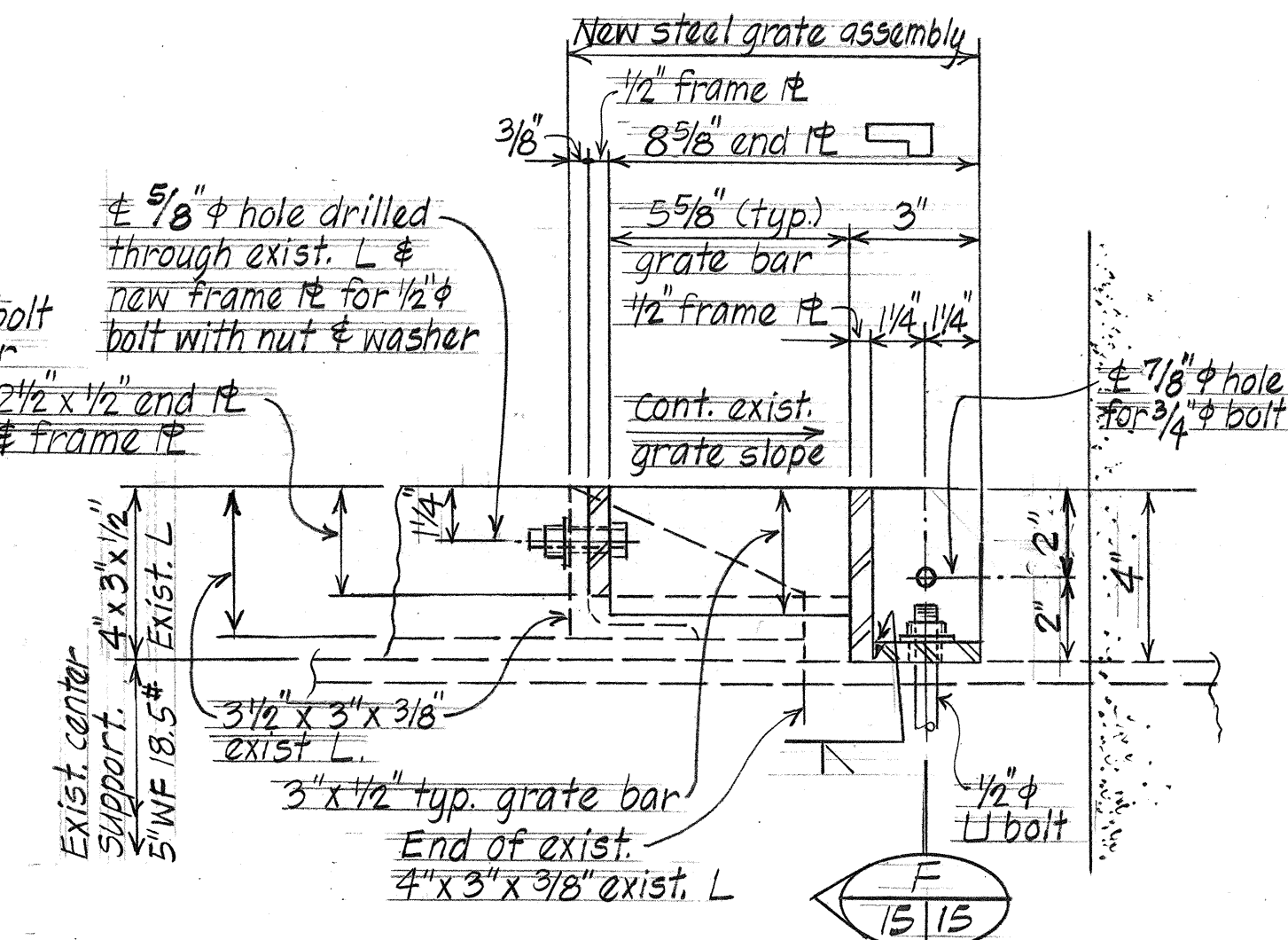


DETAIL C
Scale: 3" = 1'-0"

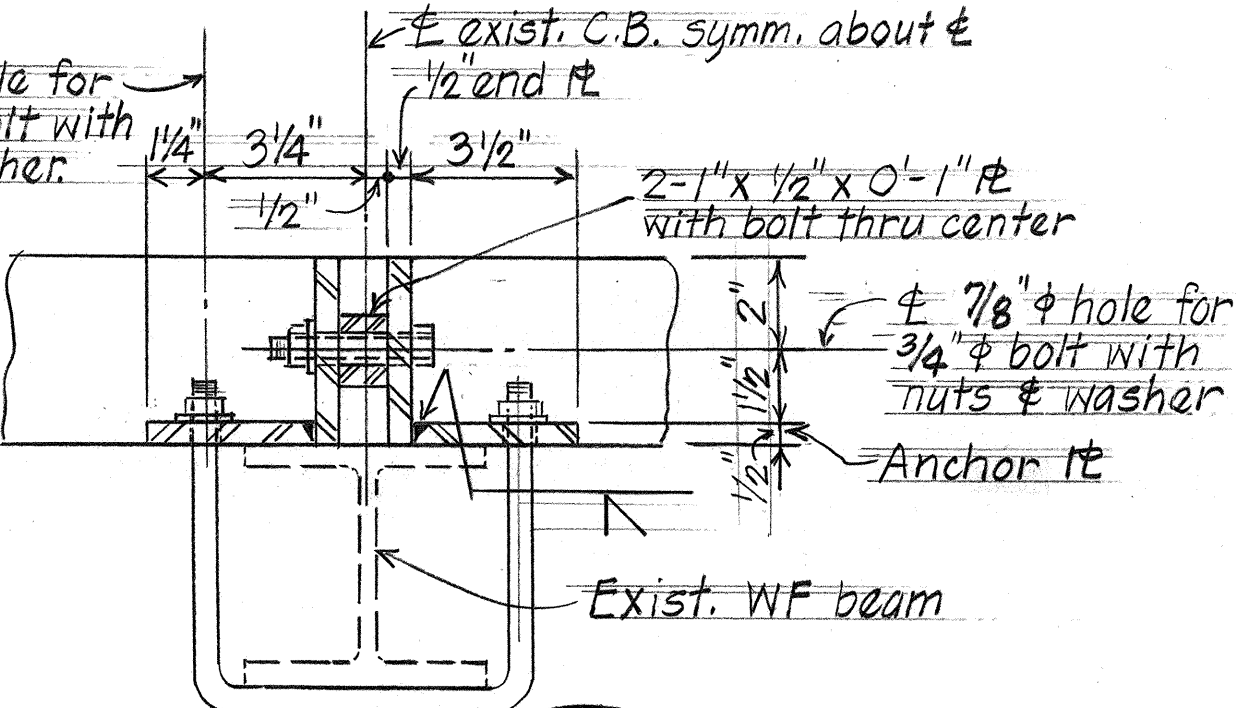
DETAIL D
Scale: 3" = 1'-0"



SECTION B-B
Scale: 1" = 1'-0"



SECTION E-E
Scale: 3" = 1'-0"



SECTION F-F
Scale: 3" = 1'-0"

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

LAND TRANSPORTATION FACILITIES DIVISION

CATCH BASIN DETAILS

AT 10th AVE. SEPARATION RAILINGS

INTERSTATE ROUTE H-1

SAFETY IMPROVEMENTS

Kalo Lane to Aieakoa Avenue

F.A.I. Proj. No. IR-HI-1(184)

Scale: As Shown

Date: Sept. 1983

SHEET No. 15 OF 20 SHEETS

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

Technical drawing of a metal guard rail panel showing dimensions and components. The drawing includes the following labels and dimensions:

- 12'-6" Cont. Metal Guard Rail Panel (Shown by dash lines)**
- Balance**
- 4'-0" 3'-1 1/2"**
- 4'-0" 3'-1 1/2"**
- At Ret. Wall #3 I.B.**
- At Ret. Wall #12 I.B.**
- 3"**
- Reference line-Special End Shoe post bolt slot & 1-5/8" Exp bolt**
- 1'-9"**
- 2'-4"**
- 3'-2 3/4"**
- Type "MS-3" Metal Spacer**
- See Det. on sht #TD2**
- Top of Conc. Ret. Wall**
- Roadway grade**
- Determine in field**
- End of Ret. Wall**
- Post bolt**
- Metal Guard Rail, Special End Shoe & Spacer**
- 5/8" Exp. bolt**
- P.I. Bott. of Drip & Top of Spacer**
- 7" 7" 1'-2"**

Reference line - Terminal Connector post bolt slot & ± 2-7/8" Ø Exp bolts & ± 2-9/8" Ø H.S. bolts

Top of Conc. Ret. Wall

12'-6" Cont. Metal Guard Rail Panel (Shown by dash lines)

6'-3" 6'-3"

4'-0" Max. Balance 2 Spaces @ 3'-1 1/2"

± Post bolts

± Metal Guard Rail, Terminal Connector & Spacer

Roadway grade

1'-0 1/2" 10 3/4" 10 3/4"

2'-8 3/4"

2'-2 3/4" Determine in field

Type "MS-9" Metal Spacer See Det. on sht. # TD2

End of Ret. Wall

3"

1'-10"

12'-6" Cont. Metal Guard Rail Panel (Shown by dash lines)

[illegible]

Technical drawing of a metal guard rail cross-section. The drawing shows a side view of the rail assembly. Key dimensions and components are labeled:

- Reference line-Special End Shoe post bolt slot & 1-5/8" Exp bolt**: Points to the top of the rail assembly.
- 12'-6" Cont. Metal Guard Rail Panel (Shown by dash lines)**: Indicates the length of the continuous panel.
- Balance 4'-0" Max.**: Indicates the maximum balance length.
- Top of conc. Ret. Wall**: Points to the top of the concrete retaining wall.
- Drip**: Points to the drip edge of the rail.
- Determine in field**: Points to the section of the rail between the end shoe and the post.
- P.I. Bott. of drip & top of spacer**: Points to the point of intersection of the drip and the top of the spacer.
- 3"**: Dimension from the top of the concrete retaining wall to the top of the spacer.
- 2'-4"**: Dimension from the bottom of the rail to the top of the spacer.
- 11'-0"**: Dimension from the bottom of the rail to the top of the concrete retaining wall.
- End of Ret. Wall**: Points to the end of the concrete retaining wall.
- Post bolt**: Points to the bolt securing the post to the rail.
- 7"**: Dimension from the top of the rail to the top of the spacer.
- 1'-2"**: Dimension from the top of the rail to the top of the spacer.
- Top of curb**: Points to the top of the curb.
- Roadway grade**: Points to the roadway grade.
- 3'-2 3/4"**: Dimension from the end of the concrete retaining wall to the end of the rail.
- Type "MS-3" Metal Spacer**: Points to the metal spacer.
- See Det. on sht. #TD2**: Points to the metal spacer.
- & Metal Guard Rail, Special End Shoe & spacer**: Points to the metal guard rail, special end shoe, and spacer.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

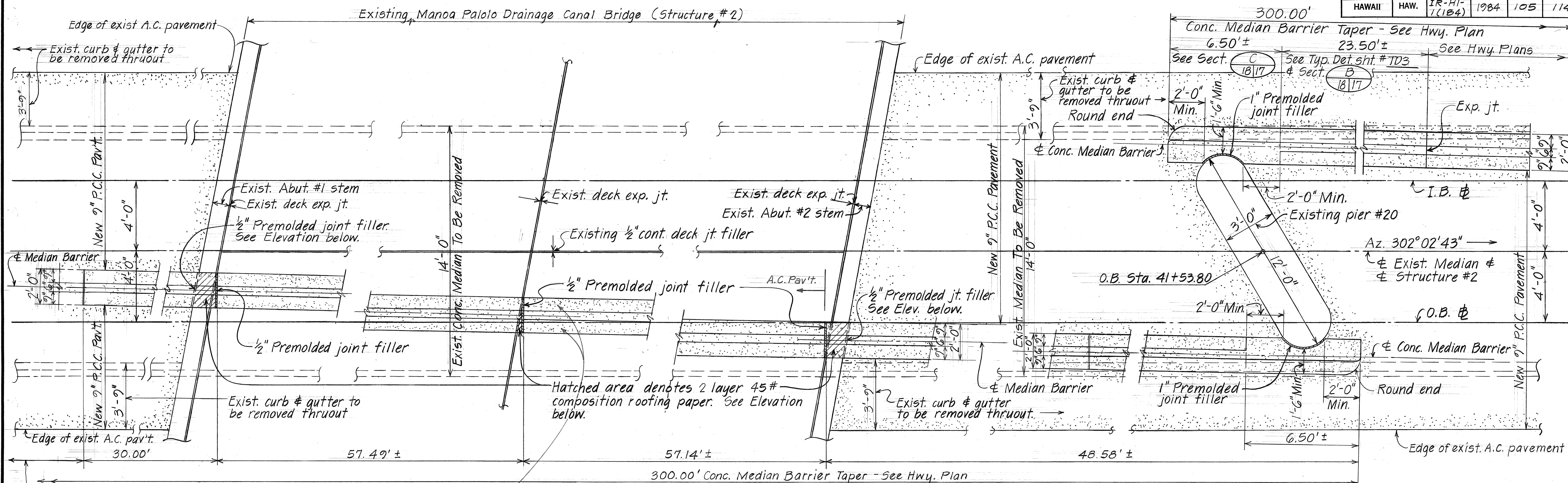
METAL GUARD RAIL CONNECTION
DETAILS AT VARIOUS RET. WALLS

INTERSTATE ROUTE H-1
SAFETY IMPROVEMENTS
Kalo Lane to Aieakoa Avenue
F.A.I. Proj. No. IR-HI-1(184)

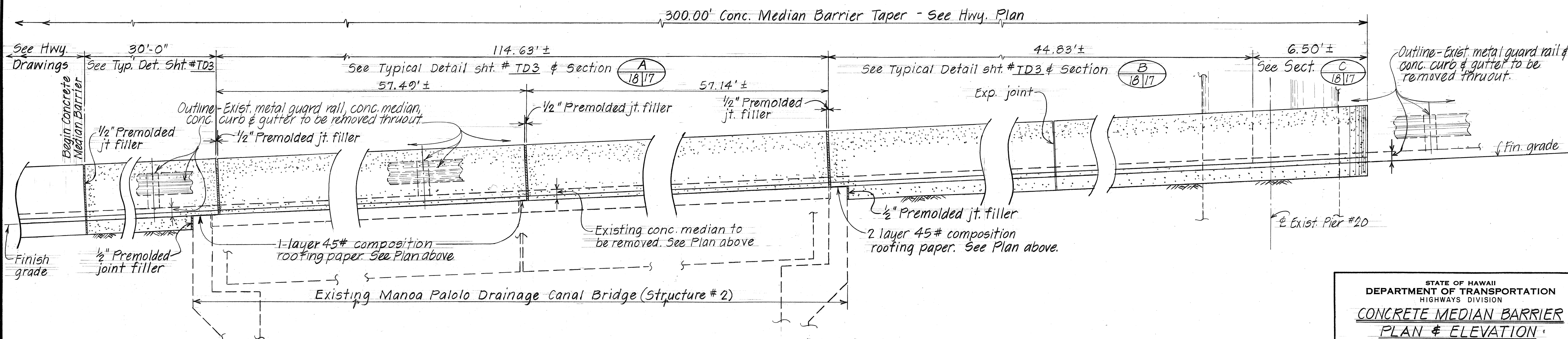
Scale: As Shown Date: Sept. 1983

SHEET NO. 16 OF 20 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	105	114



PLAN



ELEVATION

CONCRETE MEDIAN BARRIER OVER EXIST. STRUCTURE #2 (MANOA PALOLO DRAINAGE CANAL BRIDGE)

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**CONCRETE MEDIAN BARRIER
PLAN & ELEVATION**

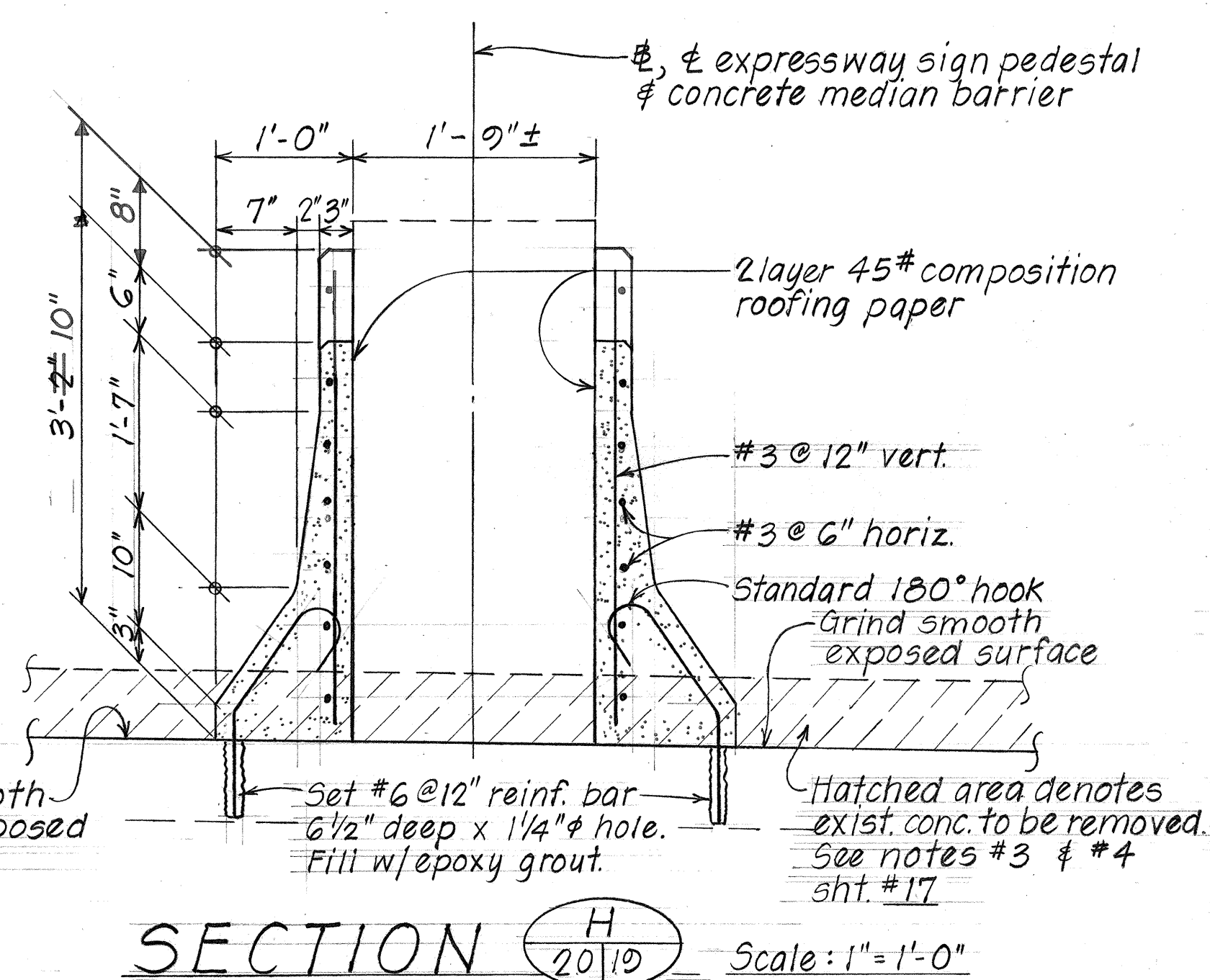
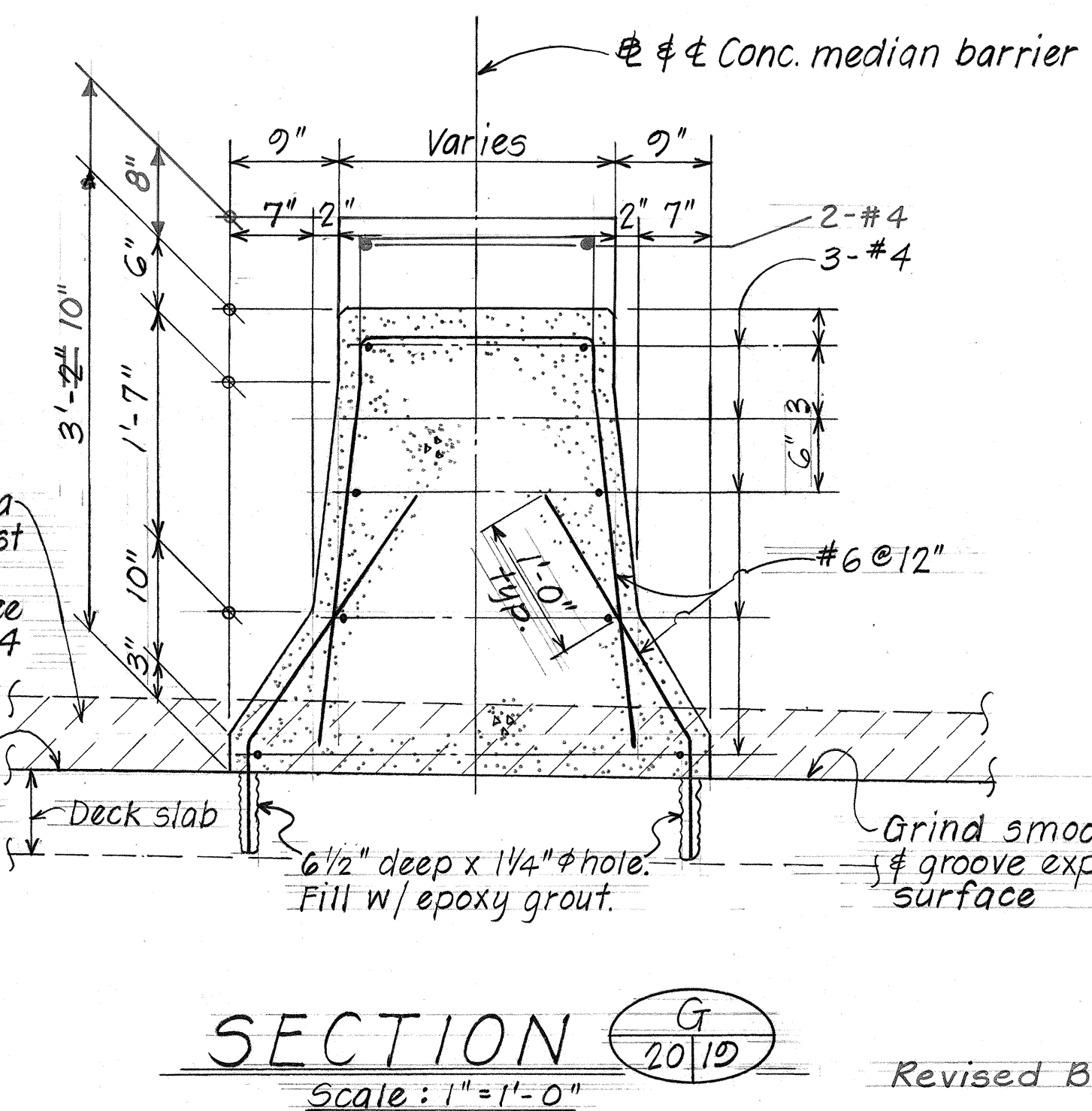
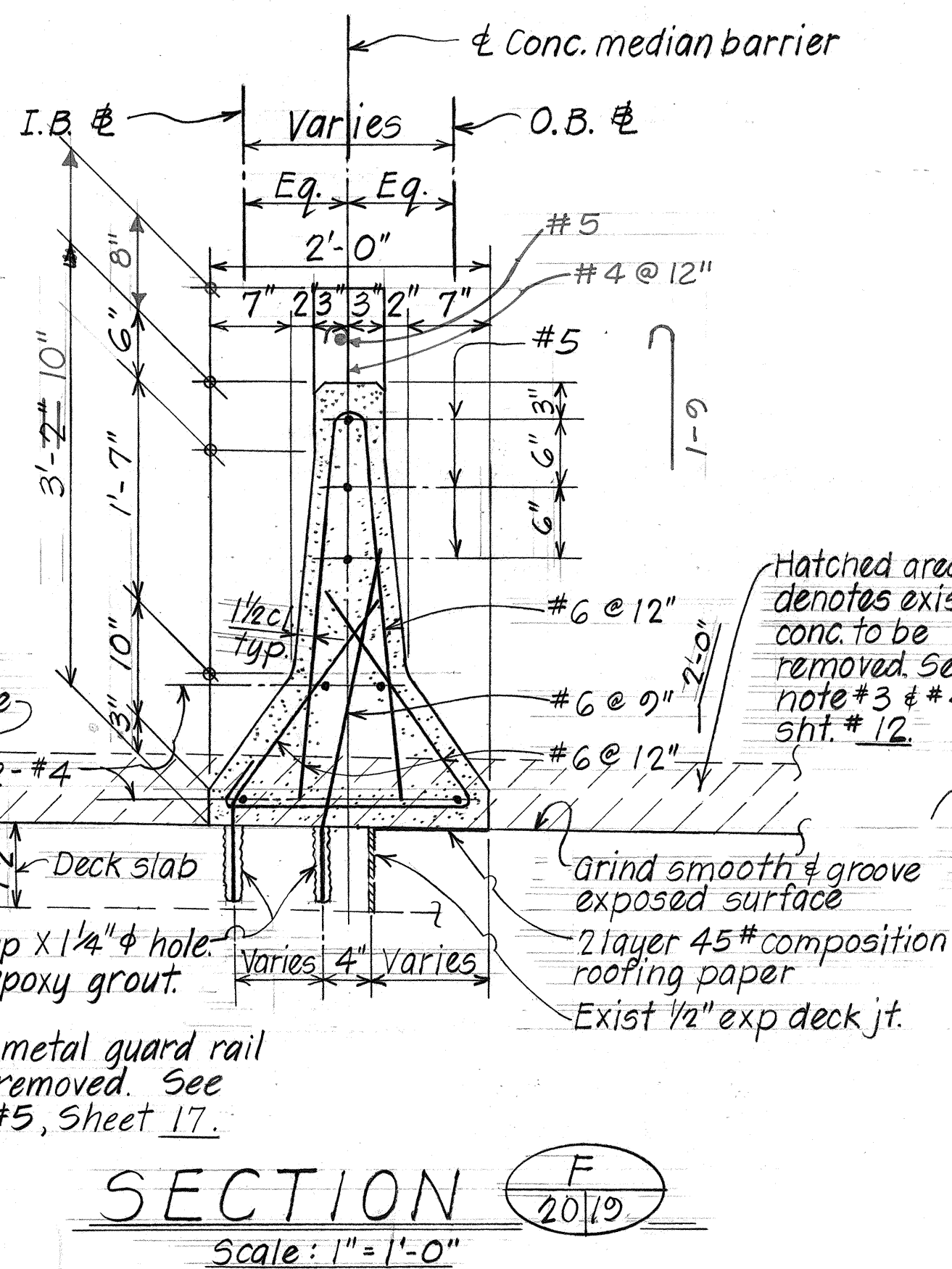
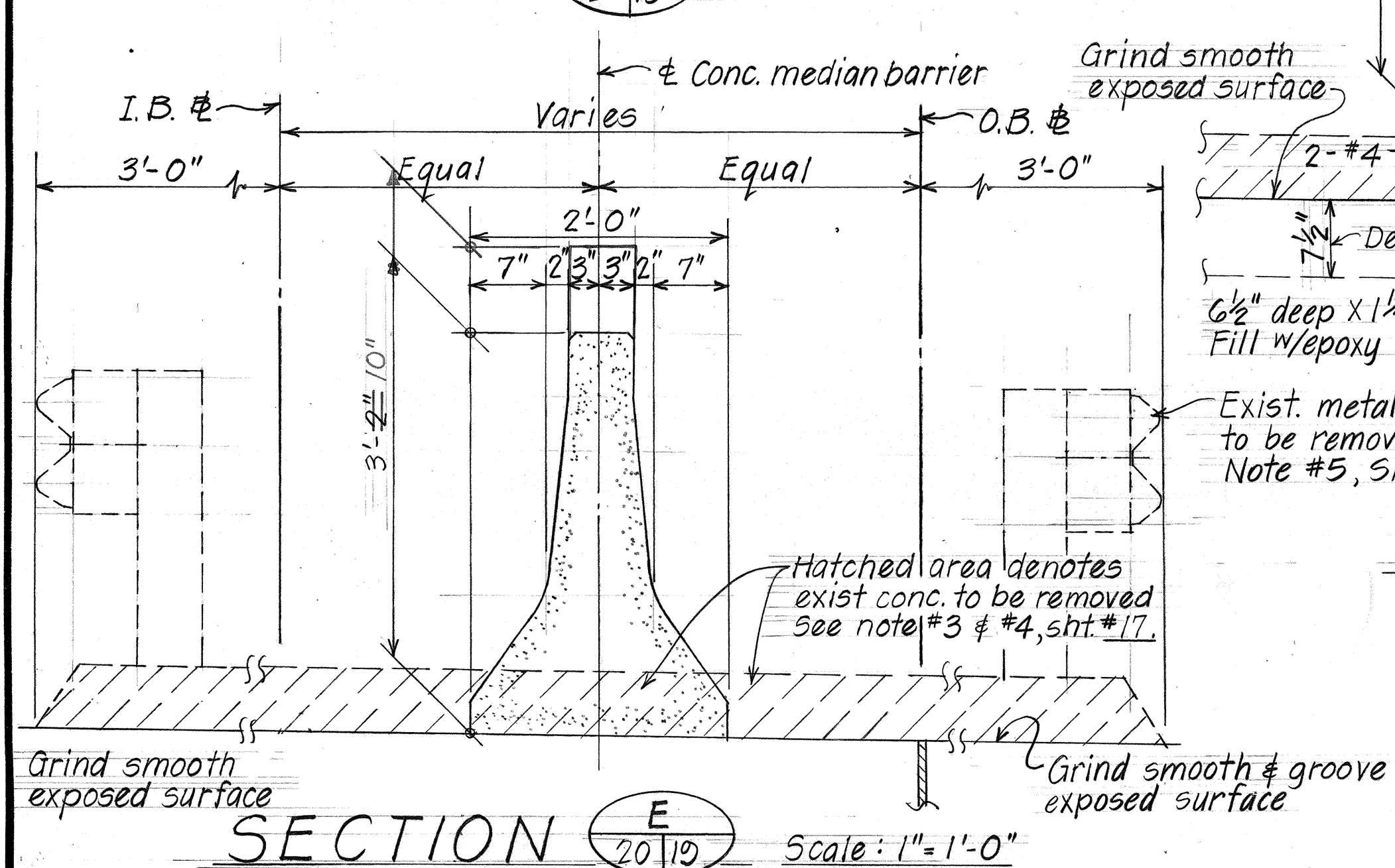
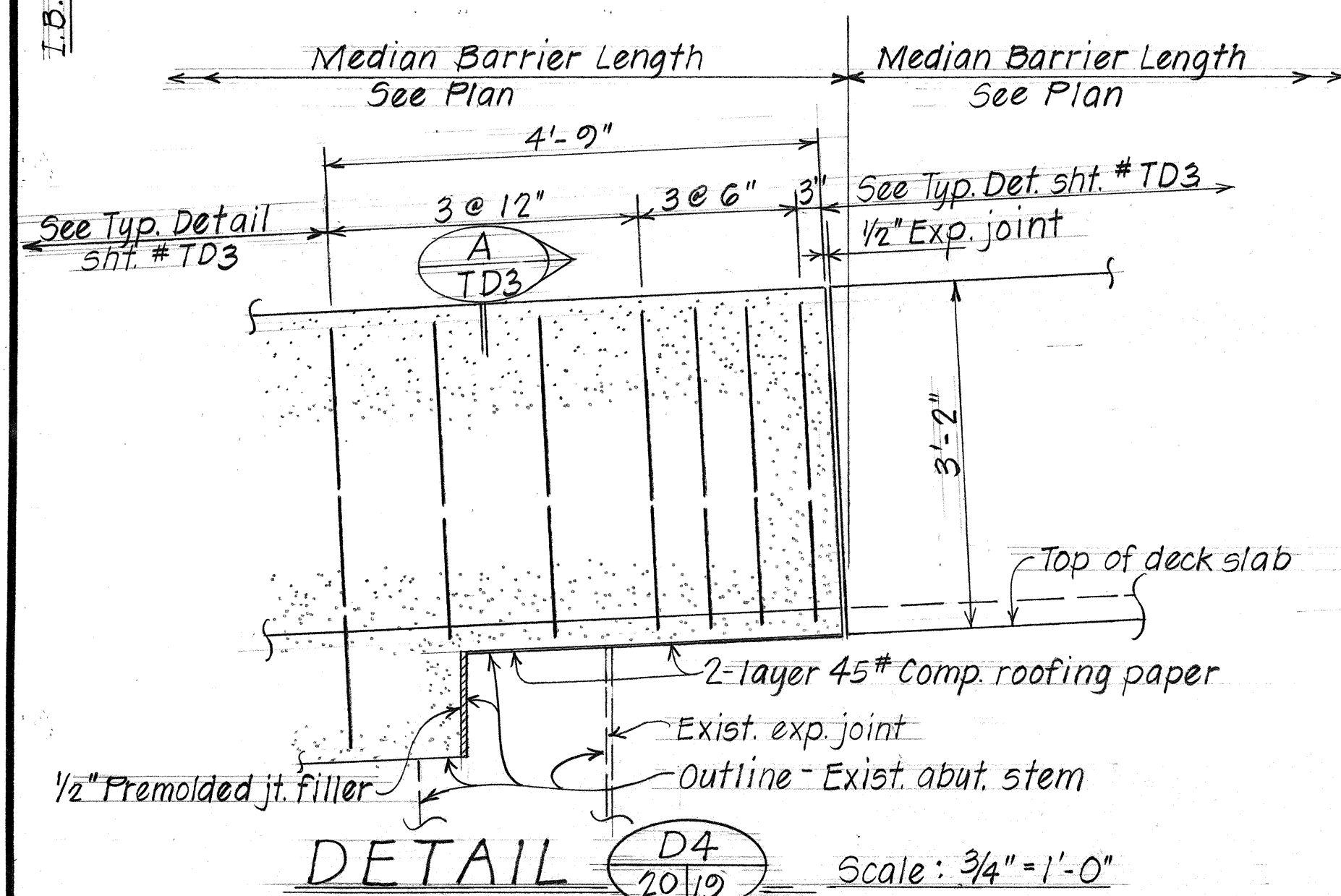
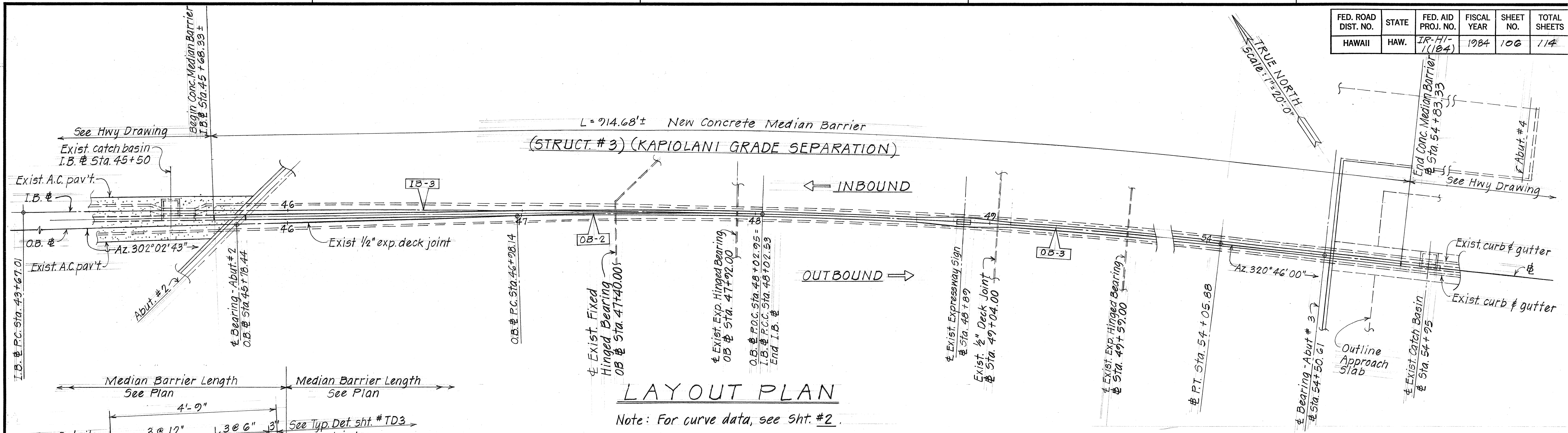
(MANOA-PALOLO DRAINAGE CANAL BRIDGE)

INTERSTATE ROUTE H-1
SAFETY IMPROVEMENTS
Kalo Lane to Ainakoa Avenue
F.A.I. Proj. No. IR-HI-1(184)

Scale: As Shown Date: Sept. 1983

SHEET No. 18 OF 20 SHEETS

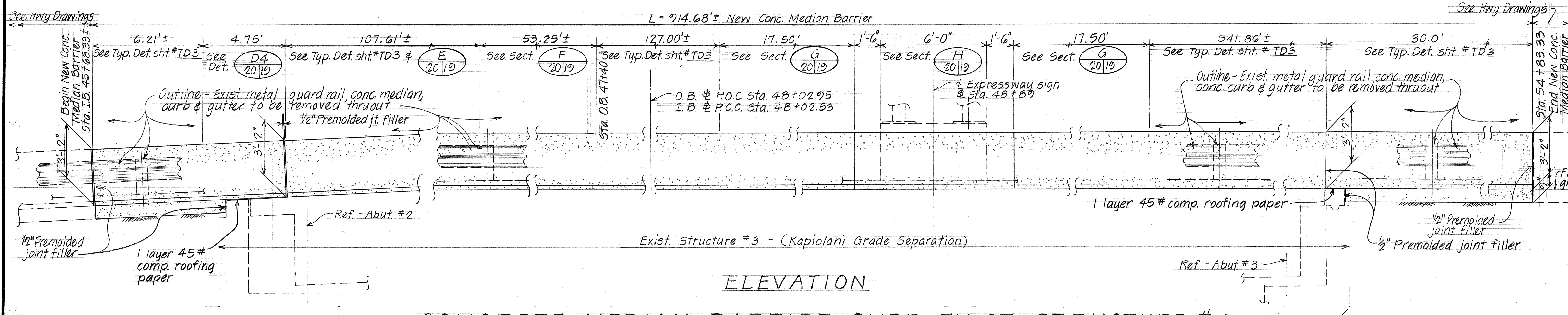
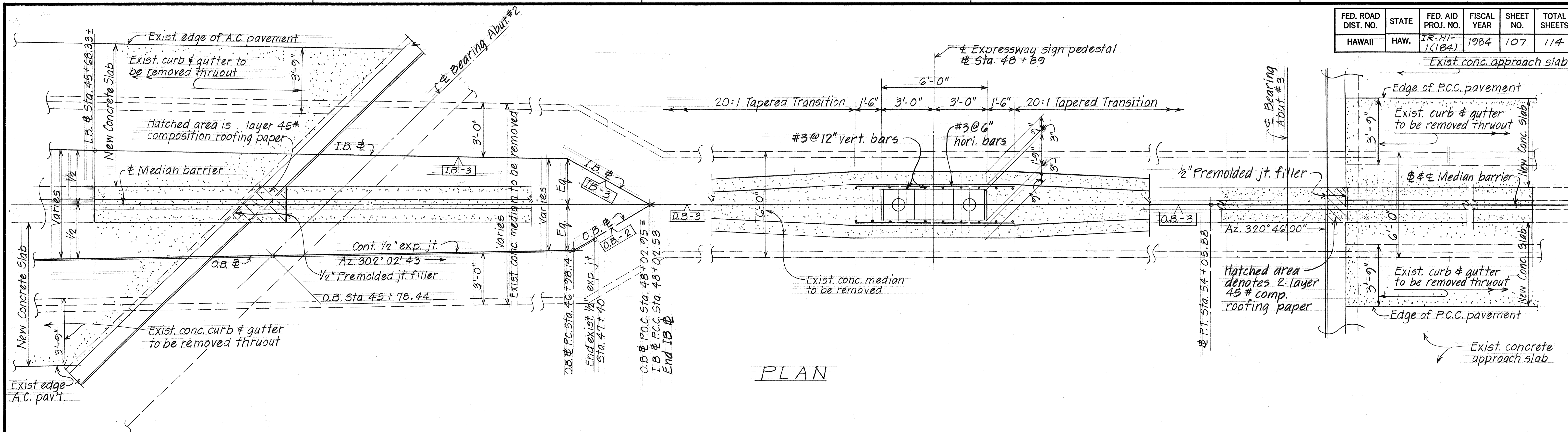
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	106	114



Revised By C.C.O. No. 2

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**CONCRETE MEDIAN BARRIER
LAYOUT PLAN & DETAILS**
(KAPIOLANI SEPARATION STRUCTURE)
INTERSTATE ROUTE H-1
SAFETY IMPROVEMENTS
Kalo Lane to Aieakoa Avenue
F.A.I. PROJ. NO. IR-HI-1(184)
Scale: As Shown Date: Sept. 1983
SHEET NO. 10 OF 20 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	107	114



CONCRETE MEDIAN BARRIER OVER EXIST. STRUCTURE #3 (KAPIOLANI GRADE SEPARATION)

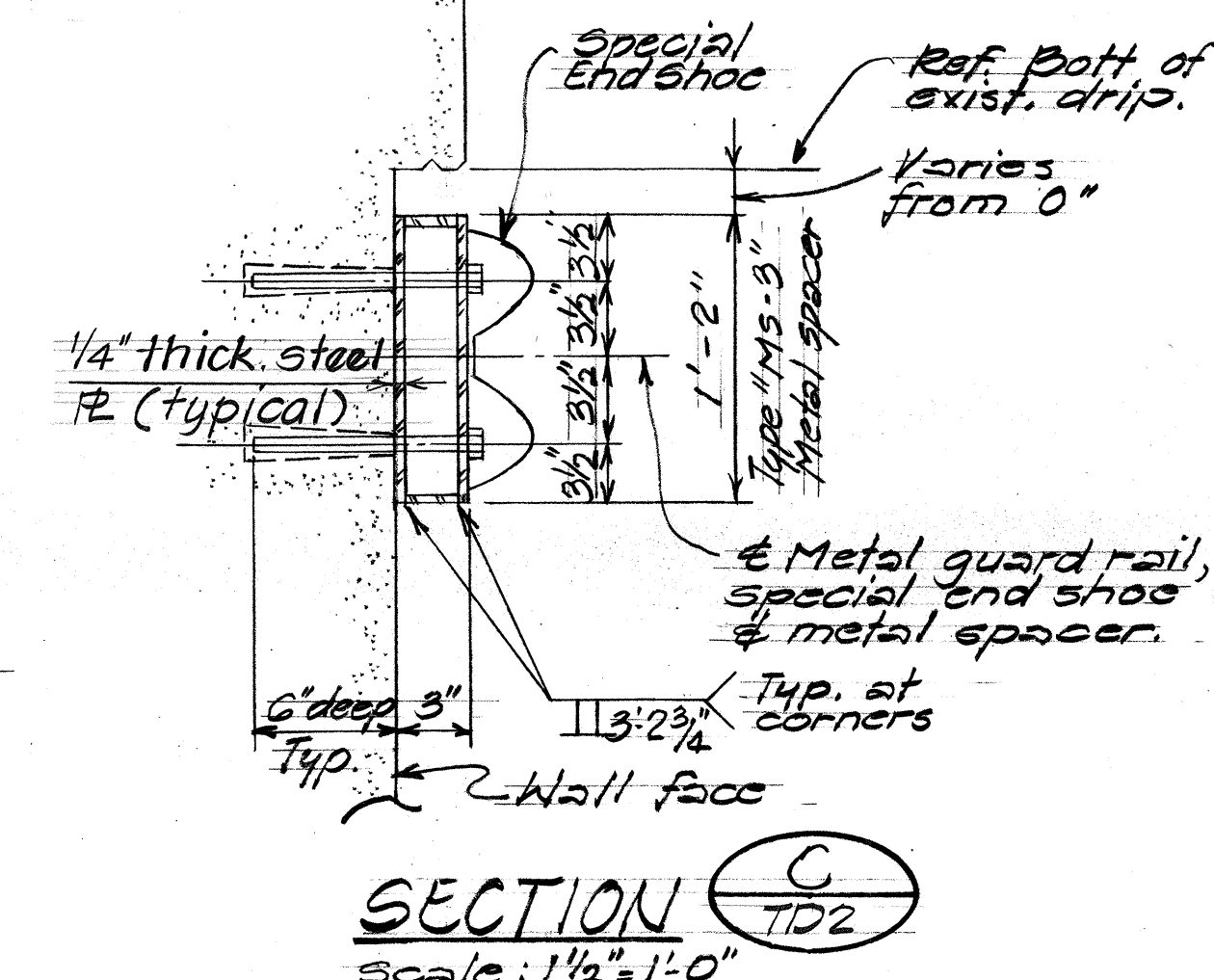
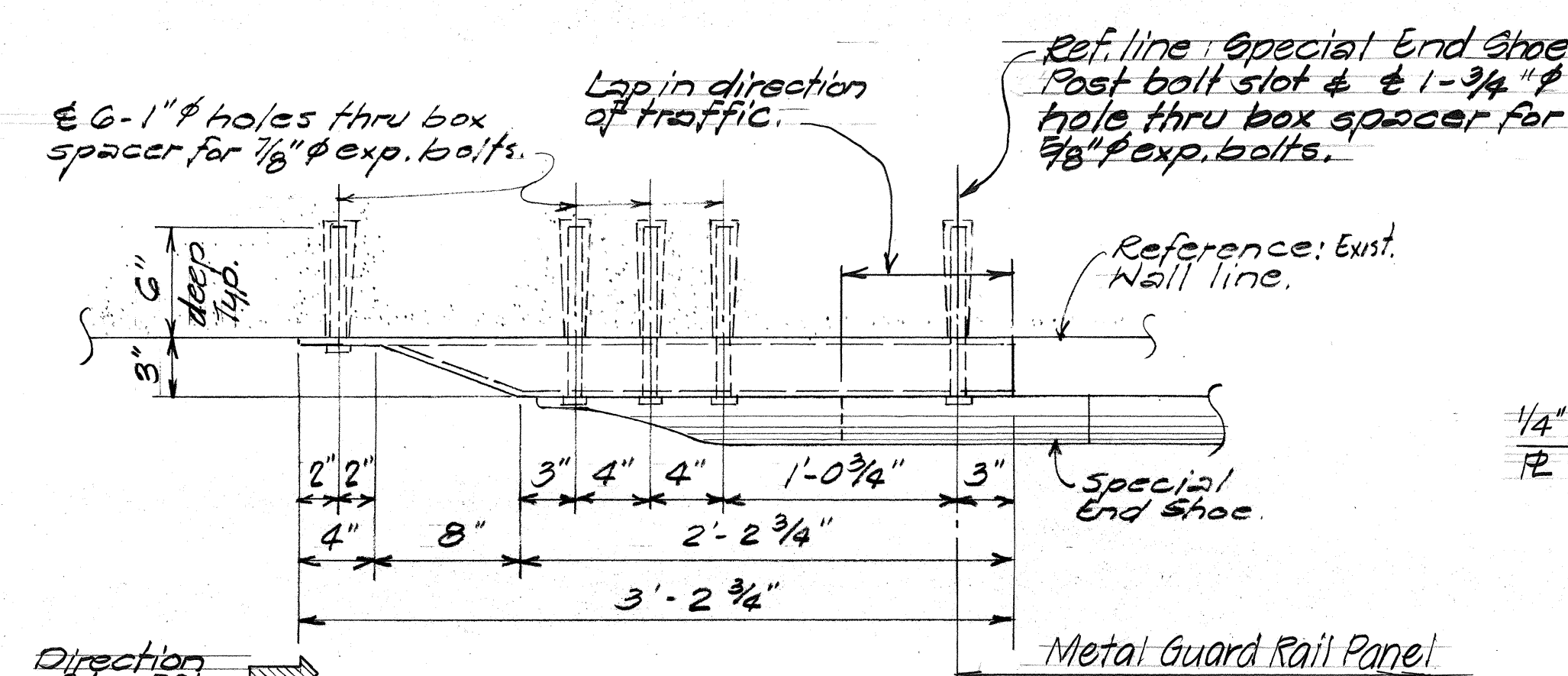
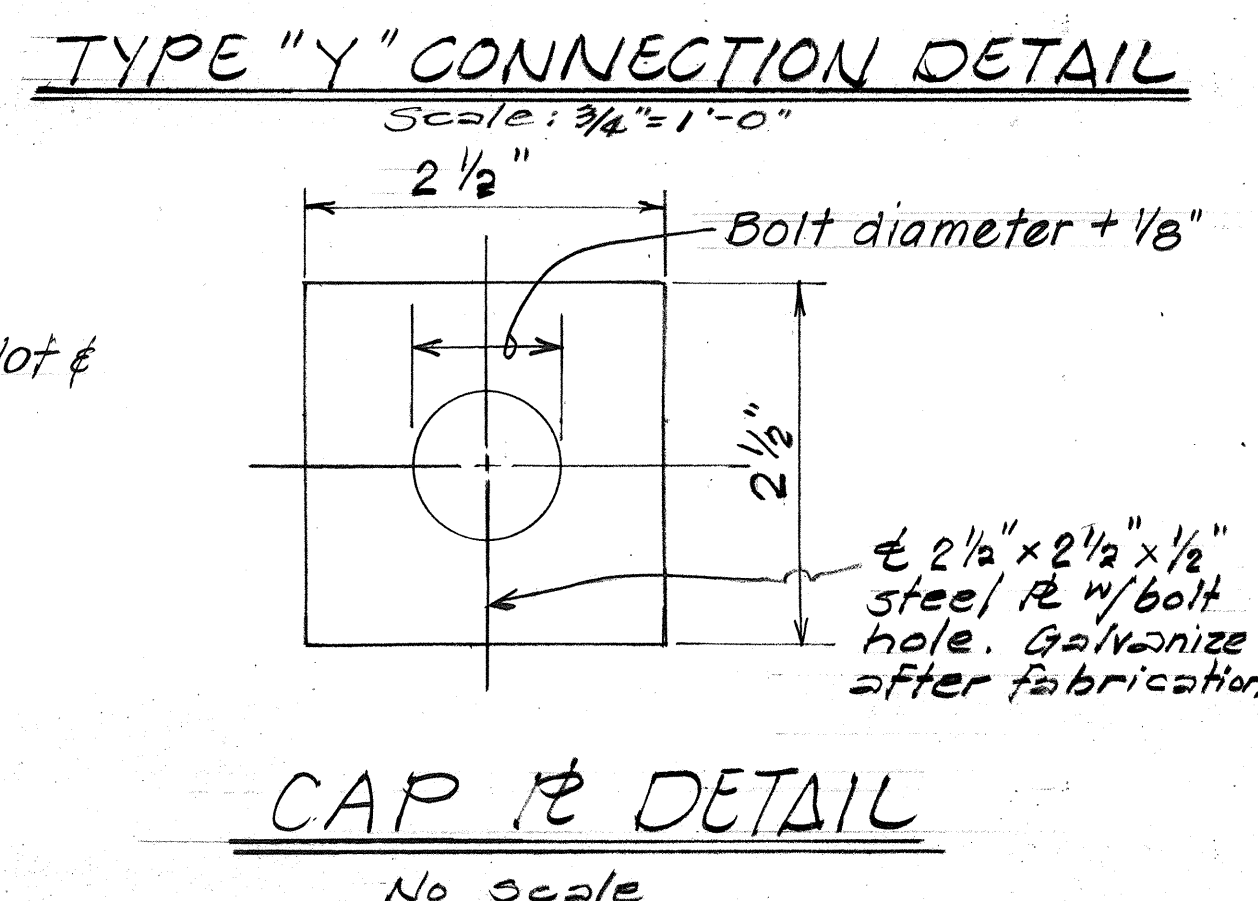
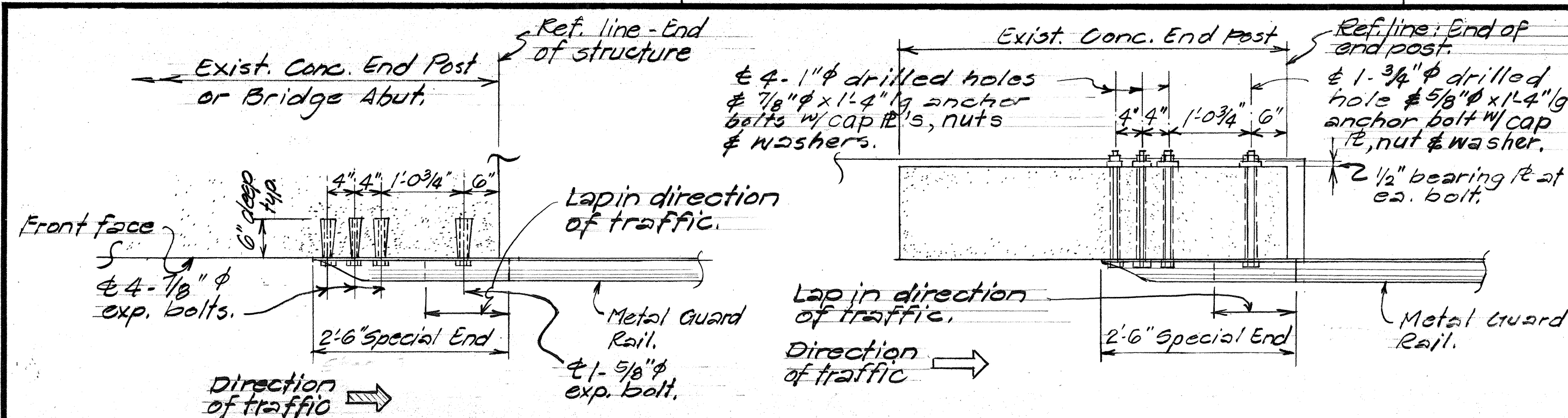
Scale: 3/8" = 1'-0"

SURVEY PLOTTED BY	DATE
DRAWN BY	3/81
TRACED BY	3/81
NOTED BY	3/81
CHECKED BY	3/81

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
CONCRETE MEDIAN BARRIER
PLAN & ELEVATION
(KAPIOLANI SEPARATION STRUCTURE)
INTERSTATE ROUTE H-1
SAFETY IMPROVEMENTS
Kalo Lane to Aieakoa Avenue
F.A.I. PROJ. NO. IR-HI-1(184)
Scale: As Shown Date: Sept. 1983
SHEET No. 20 OF 20 SHEETS

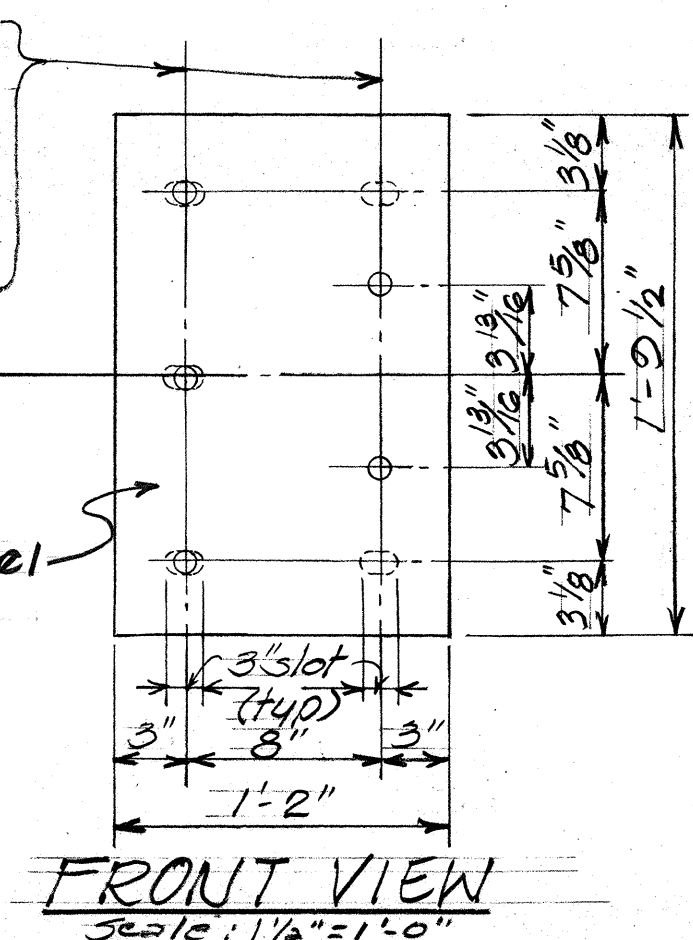
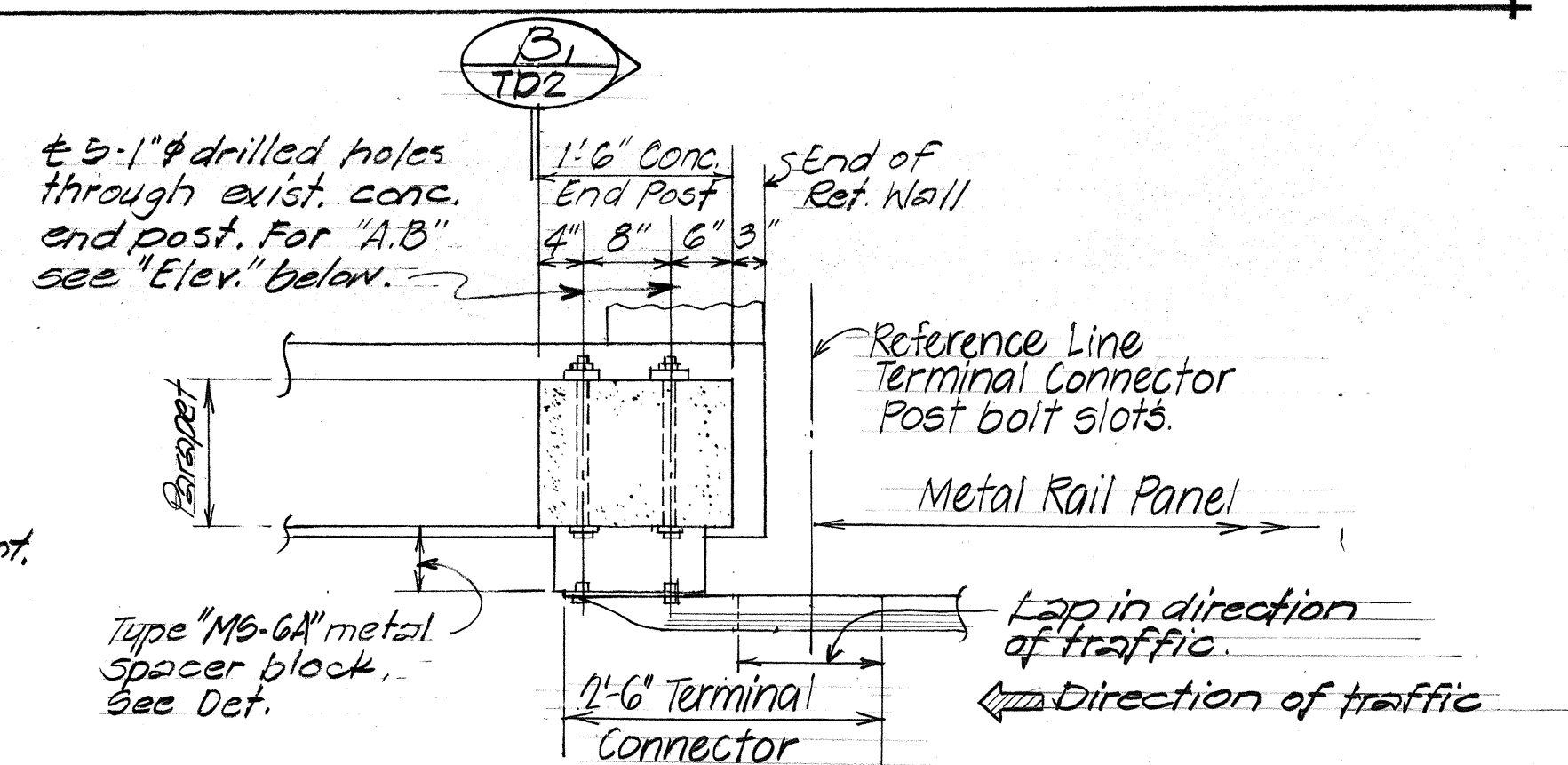
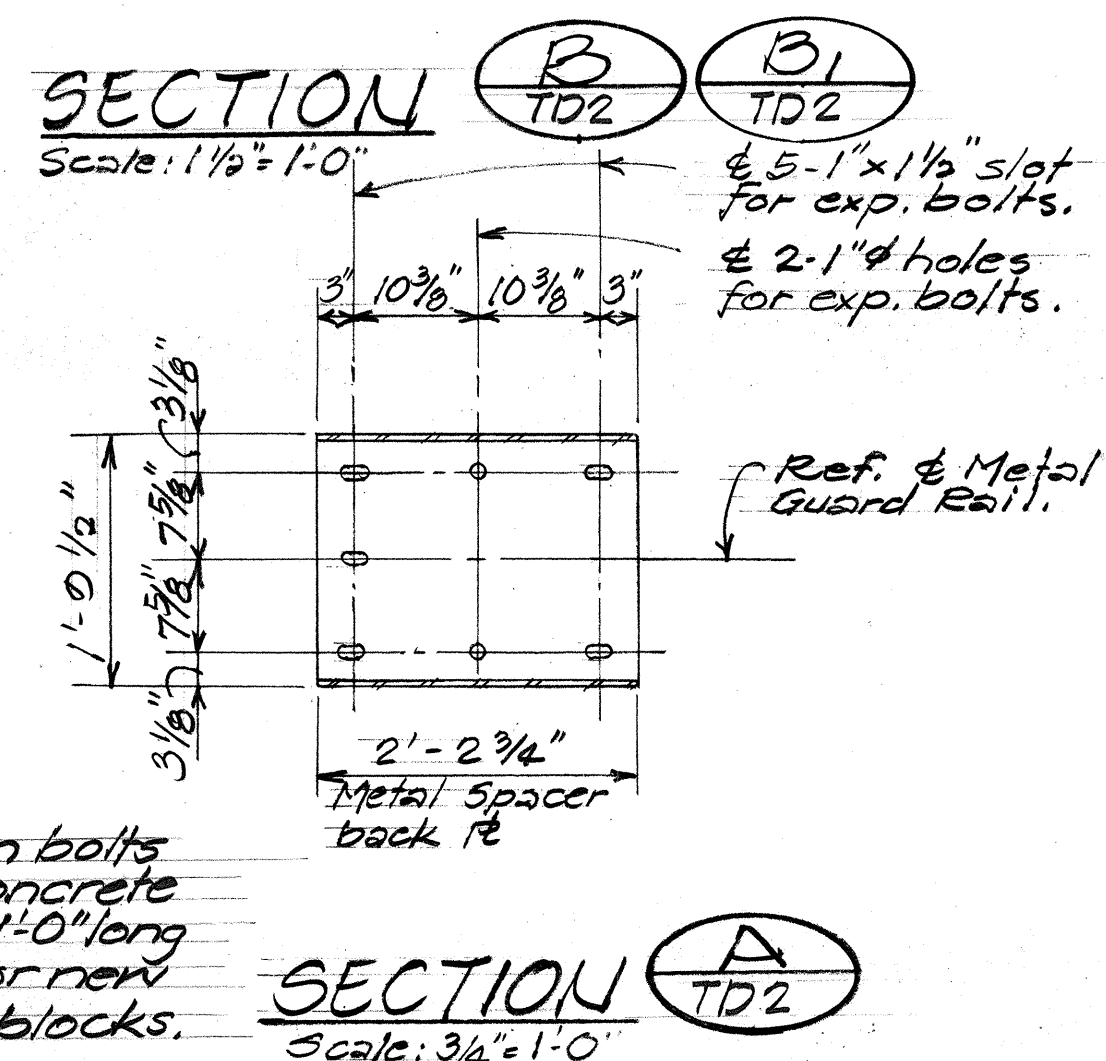
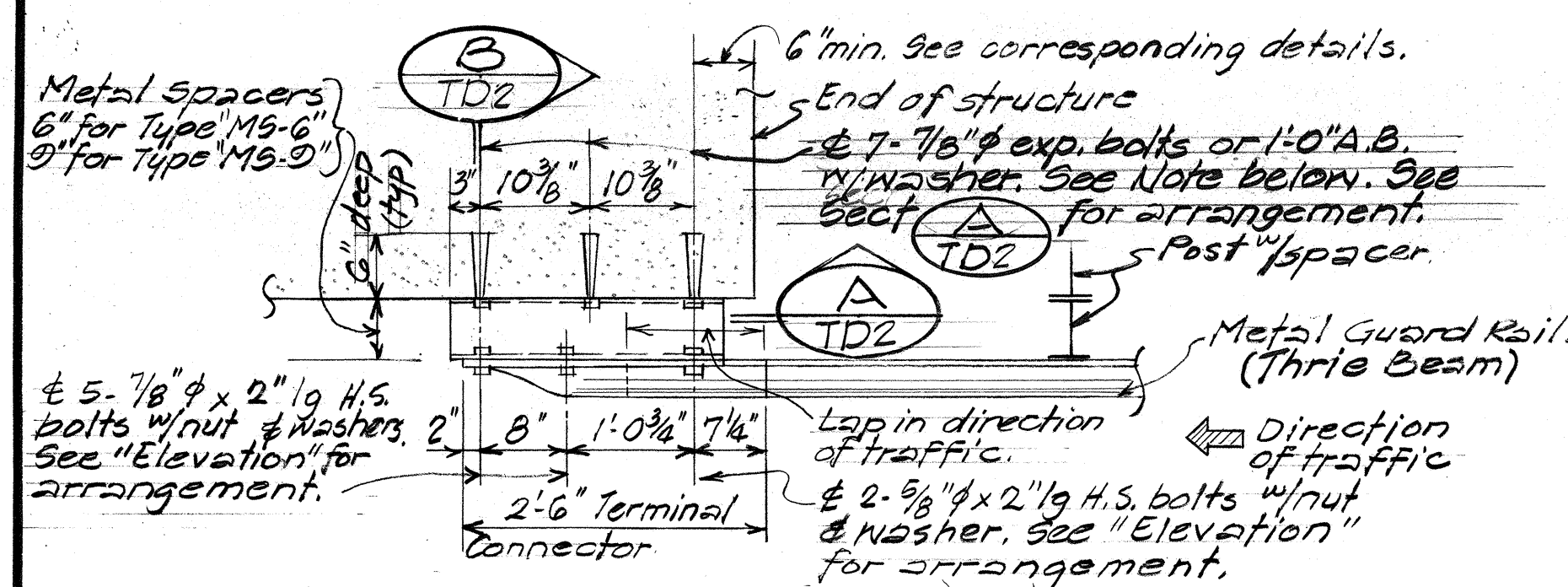
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	"
	TRACED BY	"
NOTE BOOK	DESIGNED BY	"
	QUANTITIES BY	"
No.	CHECKED BY	"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	109	114



GENERAL NOTES

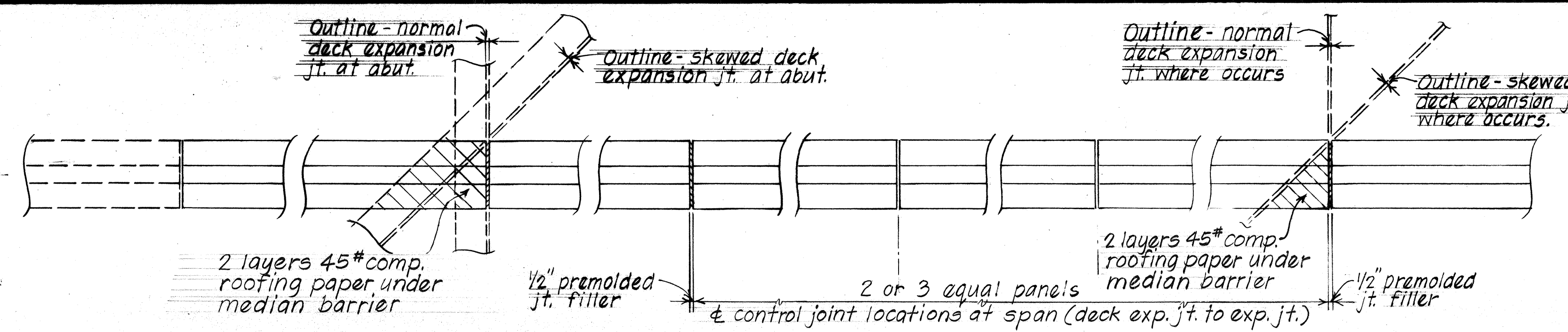
- All metal box spacers, anchor bolts & accessories involved in the connection details shall be incidental to the respective connections and will not be paid for separately.
- Anchor bolt length given under bolt head.
- Special end shoe, structural steel shapes, plates, metal supports, and all anchor bolts, nuts and washers shall be hot dip galvanized after fabrication.
- All welding shall conform to the latest specifications for Welded Highway and Railway Bridge Design Construction and Repair of the American Welding Society.



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

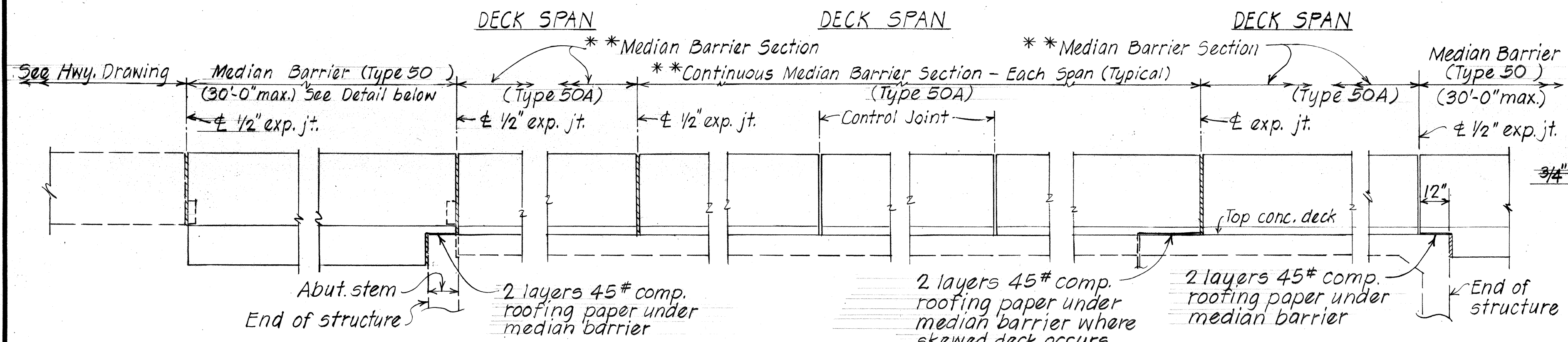
TYPICAL DETAILS
Interstate Route HI-1
Safety Improvements
Kalo Lane to Ainakoa Ave.
FAI Proj. No. IR-HI-1(184)
Scale: As Shown Date: Sept. 1983
SHEET NO. TD2 OF TD3 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-1(184)	1984	110	114



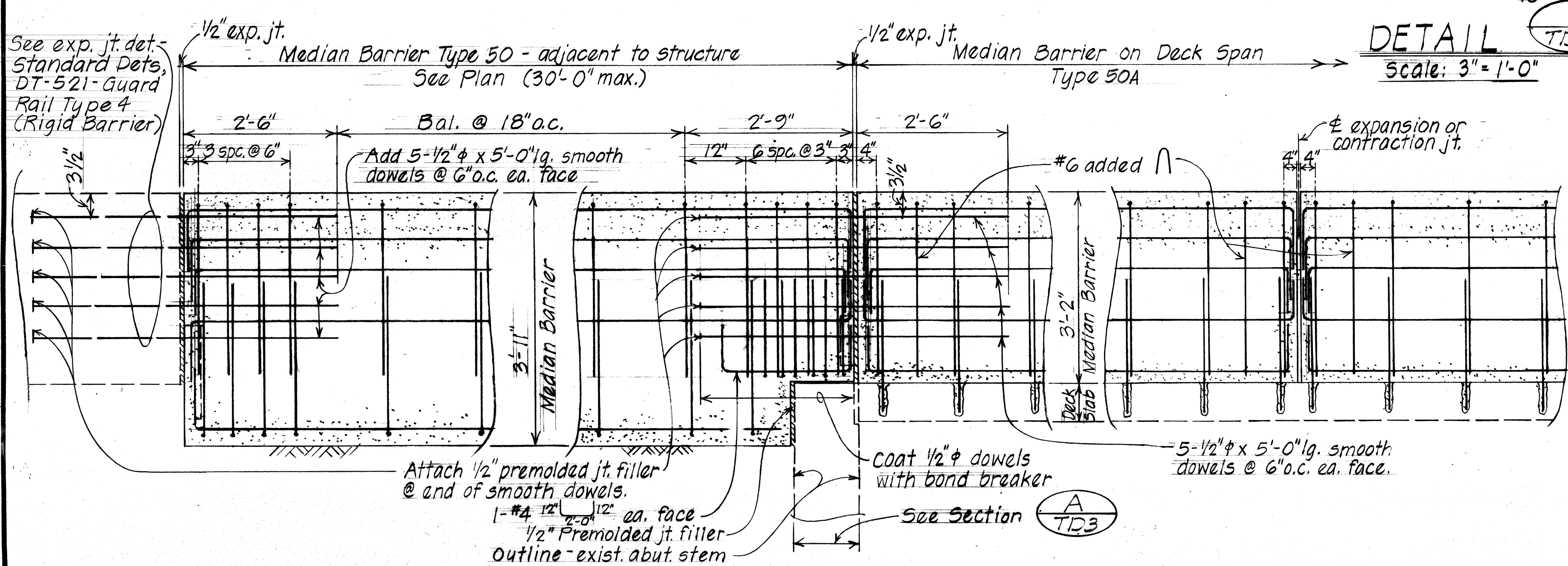
AT BRIDGE END INTERMEDIATE
MEDIAN BARRIER LAYOUT PLAN Scale: 3/8" = 1'-0"

** Median barrier section shall be constructed on deck slope with 2 or 3 equal panels, 30'-0" max. in length, within any deck span. Locate control joints at interior panel junctions (typical)

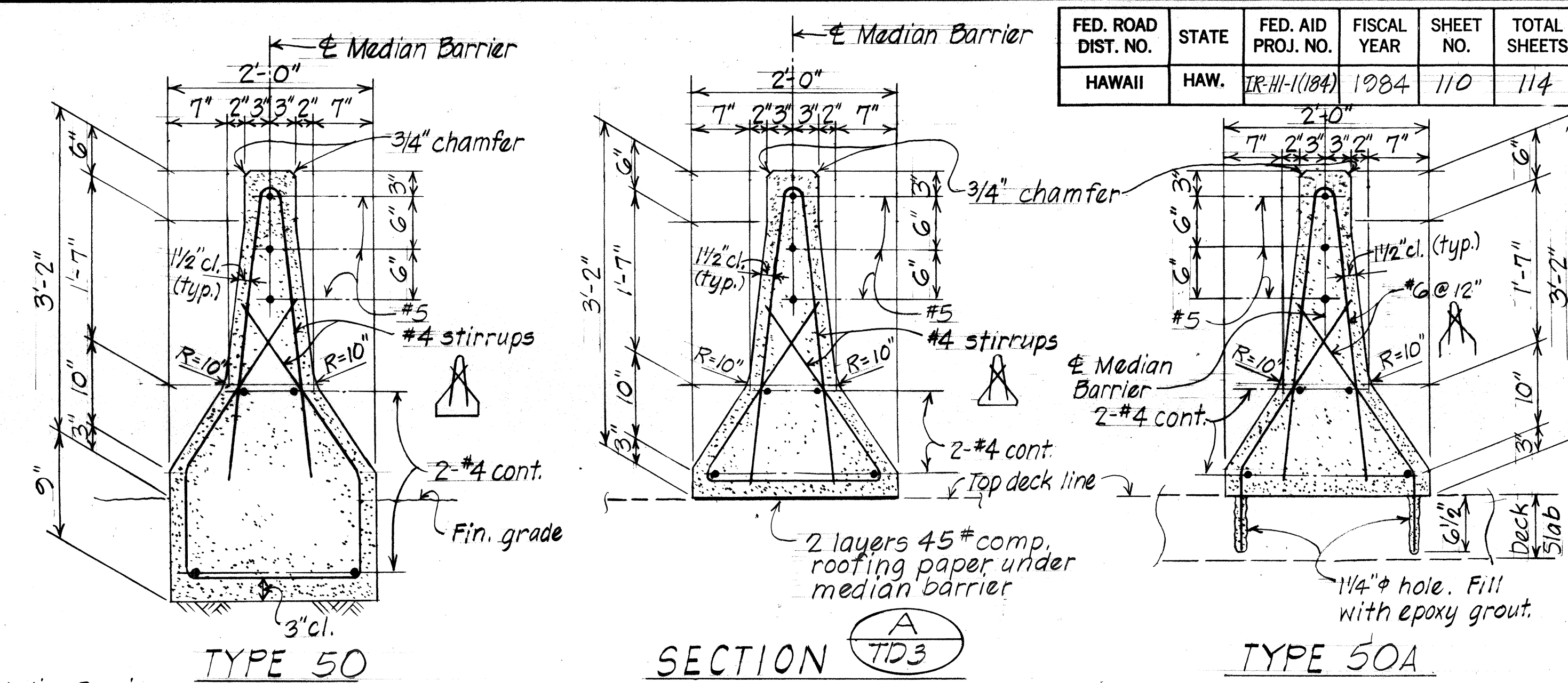


AT BRIDGE END INTERMEDIATE
MEDIAN BARRIER ELEVATION Scale: 3/8" = 1'-0"

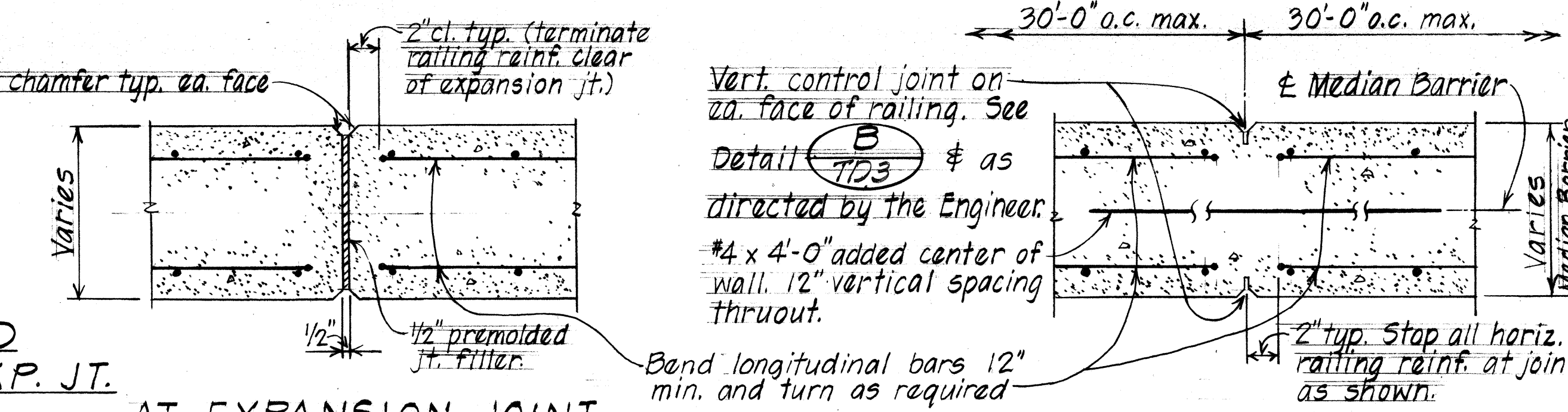
Joint may be formed with 1/8" masonite & cut back to the root of the chamfer on the exposed face



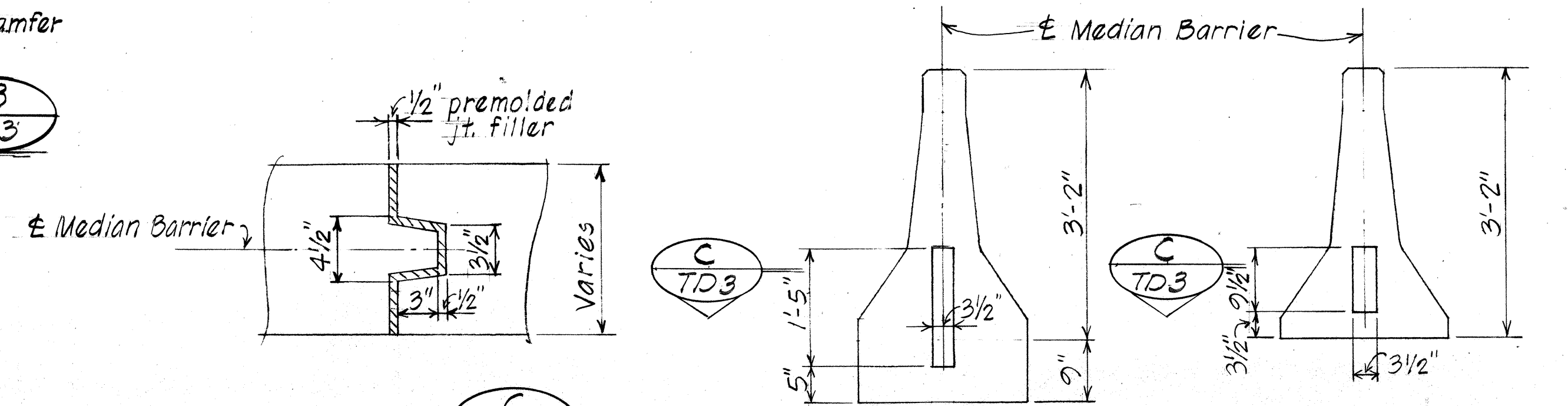
MEDIAN BARRIER ON GRADE ELEVATION - TYPICAL MEDIAN BARRIER Scale: 3/4" = 1'-0"



TYPICAL SECTIONS - MEDIAN BARRIER Scale: 1" = 1'-0"



AT EXPANSION JOINT AT CONTROL JOINT
TYPICAL JOINT DETAILS - TYPE 50A MEDIAN BARRIER Scale: 1 1/2" = 1'-0"



ON GRADE AT BRIDGE END
TYPICAL EXPANSION JOINT DETAILS - TYPE 50 MEDIAN BARRIER

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 LAND TRANSPORTATION FACILITIES DIVISION
TYPICAL DETAILS
CONCRETE MEDIAN BARRIER
TRAFFIC TYPE
INTERSTATE ROUTE H-1
Safety Improvements
Kalo Lane to Ainakoa Avenue
E.A.I. Project No. IR-HI-1(184)
 Scale: As Shown Date: Sept. 1983
 SHEET NO. TD3 OF TD3 SHEETS

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