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Q10	Structure 12 - Layout Plan
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Q13	Structure 12 -Type "C" Upgrade Bridge Railing Elevation and Sleeve Details
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Q15	Upgrade Type 3 Thrie Beam Guardrail and Metal Guardrail With Rubrail and Concrete Ramp Details

ESTIMATED QUANTITIES			
ITEM NO.	ITEM	UNIT	QUANTITY
507.7610	Type A Upgrade Bridge Railing Including End Post	LF	885.00
507.7620	Type B Upgrade Bridge Railing	LF	2,110.00
507.7630	Type C Upgrade Bridge Railing Including End Post	LF	720.00
507.7640	Type D Upgrade Bridge Railing Including End Post	LF	146.00
507.7650	Type E Upgrade Bridge Railing	LF	146.00
606.3112	Guardrail Type 3 Thrie Beam	LF	600.00
606.3200	Guardrail Type 3 Single With Rubrail on Steel Post	LF	150.00

GENERAL NOTES

1. See Standard Specifications for Road & Public Works Construction, (Hawaii, 1994) & Special Provisions.

2. Guardrail Type 3 Thrie Beam--see "Department of Transportation Standard Plan TE-57", and additional details on Sht.#Q15.

3. "Terminal Connector" shall be fabricated from 10 gauge steel conforming to the requirements of AASHTO M 180.

4. All anchor bolts shall be high strength bolts conforming to the requirements of ASTM A 325 and Standard Specification, Section 713.04.

5. Anchor bolt embedment length shall be such that a snug fit of the elements and full thread engagement plus 1/4"(max.) is attained.

6. Terminal Connector, W8x10 spacer with rail post on base plate, and standard spacer including all anchor bolts, cap plates, nuts and washers, shall be hot-dip galvanized after fabrication.

7. First 25'-0" of guardrail adjoining Terminal Connector shall be of galvanized steel and supports spaced as shown on the detail drawings. This section of rail shall be placed on tangent to end post or parallel to roadway unless conditions at site renders it impossible to do so. Flare point to be determined in field.
8. Heads of through anchor bolts shall be placed on the traffic side of the rail.

9. Large impacting or vibratory type of equipment will not be permitted for drilling.

10. Drilling of through holes shall be done in such a manner as to prevent cone puncturing of the daylighting end.

11. Contract items will be paid for in units indicated in the Estimated Quantities.

12. The Contractor shall verify all dimensions in field before commencing with work.

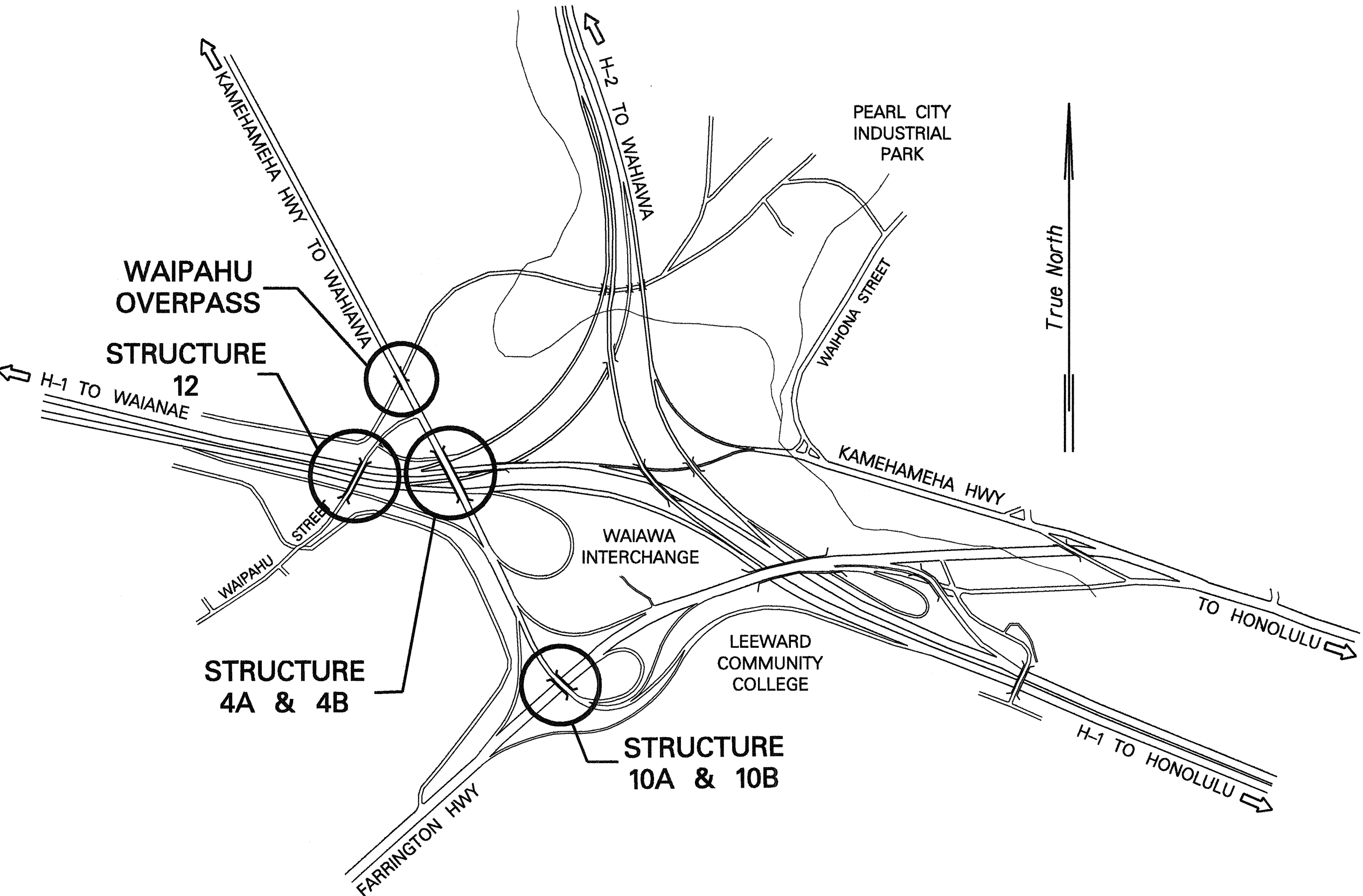
13. The Contractor shall verify the location of all existing utility lines near structures and notify their respective owners before commencing with work.

14. The Contractor shall be responsible for the maintenance of the roadway prism and the protection of the adjacent property, utilities and existing and new structures from damage due to his operation and shall repair any damage at his expense to the satisfaction of the Engineer.

15. Existing structure shown by hatched lines. Limits of removal of existing

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-099-1(13)	1995	30	58

ABBREVIATIONS									
Abut.	Abutment	Col.	Column	Ga.	Gage	No.	Number	Spcs.	Spaces
AB	Anchor Bolt	Conc.	Concrete	Galv.	Galvanized	OD	Outside Dimension	Spcg	Spacing
Alum.	Aluminum	Cont.	Continuous	HS	High Strength	PL	Plate	Sta.	Station
Approx.	Approximate	C.R.	Corrosion Resistant	Horiz.	Horizontal	R	Radius	Std.	Standard
Bal.	Balance	Def.	Detail	Jt.	Joint	Rdwy.	Roadway	Struct.	Structural
Beg.	Begin, Beginning	Dia.	Diameter	LC	Length of Curve	Ref.	Reference	T&B	Top and Bottom
⌀	Baseline	Ea.	Each	Lg.	Long	Reinf.	Reinforcing	Thk.	Thick
Bm.	Beam	EF	Each Face	Longit.	Longitudinal	Req'd	Required	TS	Tubular Steel
Brg., Brgs.	Bearing, Bearings	Exist.	Existing	Max.	Maximum	Sect.	Section	Typ.	Typical
⊕	Center line	Exp.	Expansion	Min.	Minimum	Sht.	Sheet	Vert.	Vertical
Cl.	Clear	Fin.	Finish					w/	with



BRIDGE LOCATION PLAN

Not To Scale

SYMBOLS

Detail or section designation
Sheet number section is cut or detail section
Sheet number detail is drawn on

ORIGINAL PLAN	DATE
DRAWN BY	OCT 1994
DESIGNED BY	OCT 1994
CHECKED BY	OCT 1994
NOTED BY	OCT 1994
SCALE	AS NOTED

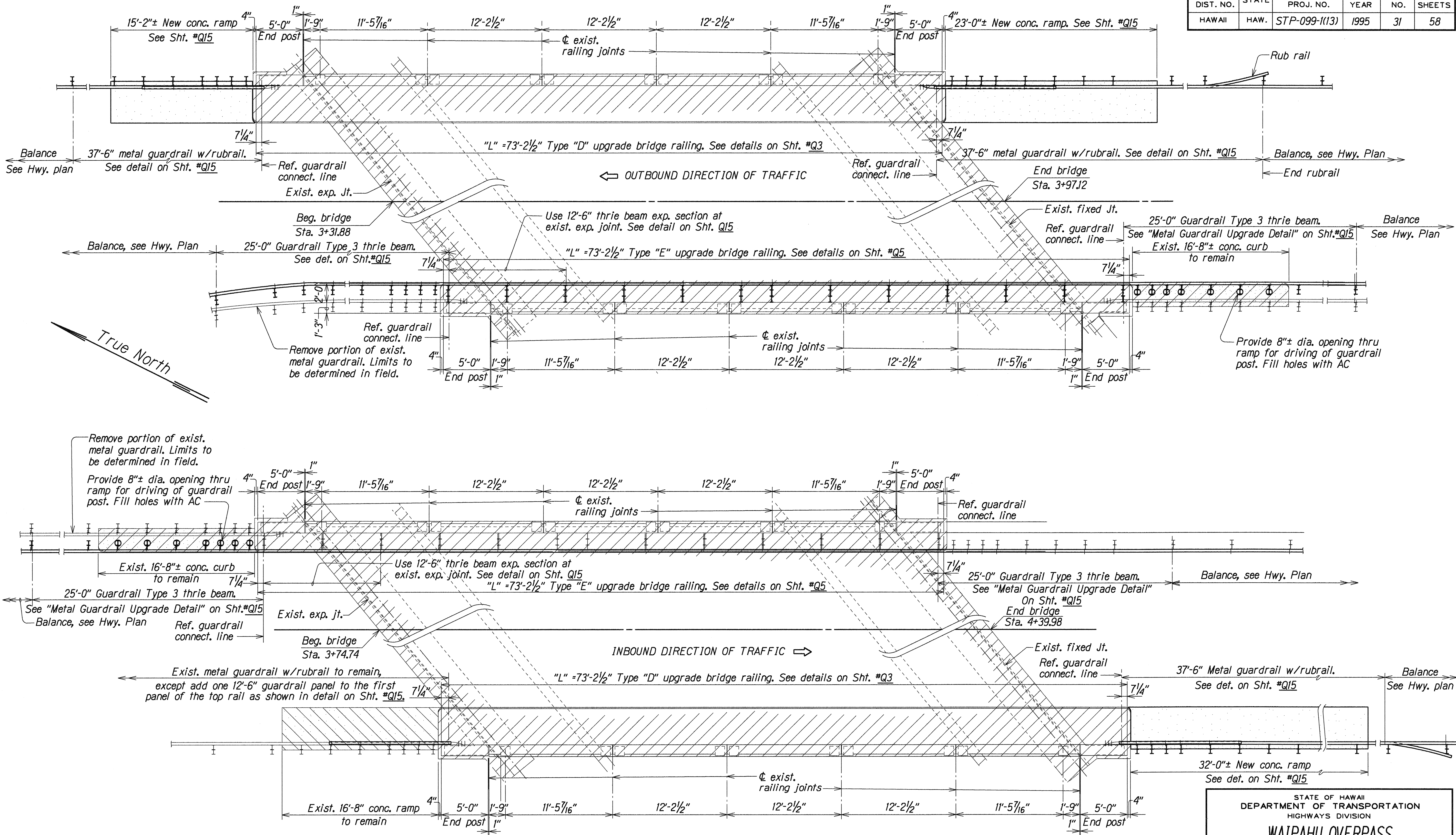
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BRIDGE RAILING UPGRADE
LOCATION PLAN, GENERAL NOTES,
ESTIMATED QUANTITIES

KAMEHAMEHA HIGHWAY RESURFACING
LUMIAINA STREET TO FARRINGTON HIGHWAY
Federal Aid Project No. STP-099-1(13)

Scale: As Noted
Date: Oct. 1994

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-099-1(13)	1995	31	58



ORIGINAL PLAN	DATE	10/1/94
SURVEY PLOTTED BY	TKM	
DRAWN BY	TS	
CHECKED BY	MS	
NOTED BY	MS	

WAIPAHU OVERPASS LAYOUT PLAN
Scale: 1" = 5'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WAIPAHU OVERPASS
LAYOUT PLAN
INBOUND AND OUTBOUND BRIDGE
KAMEHAMEHA HIGHWAY RESURFACING
LUMIAINA STREET TO FARRINGTON HIGHWAY
Federal Aid Project No. STP-099-1(13)

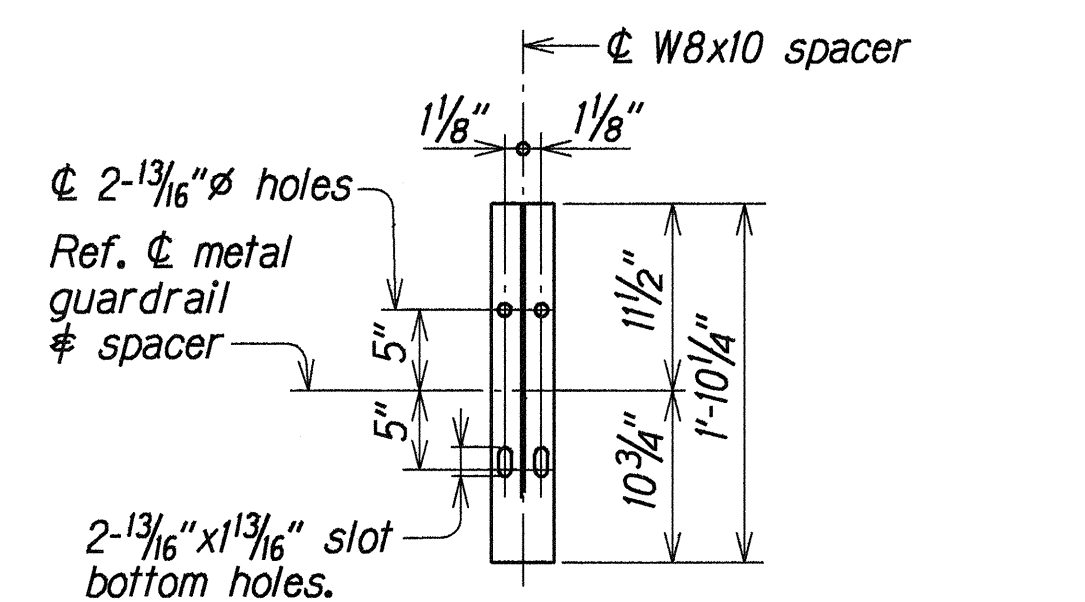
Scale: As Noted
SHEET No. Q2 OF 15 SHEETS

Date: Oct. 1994

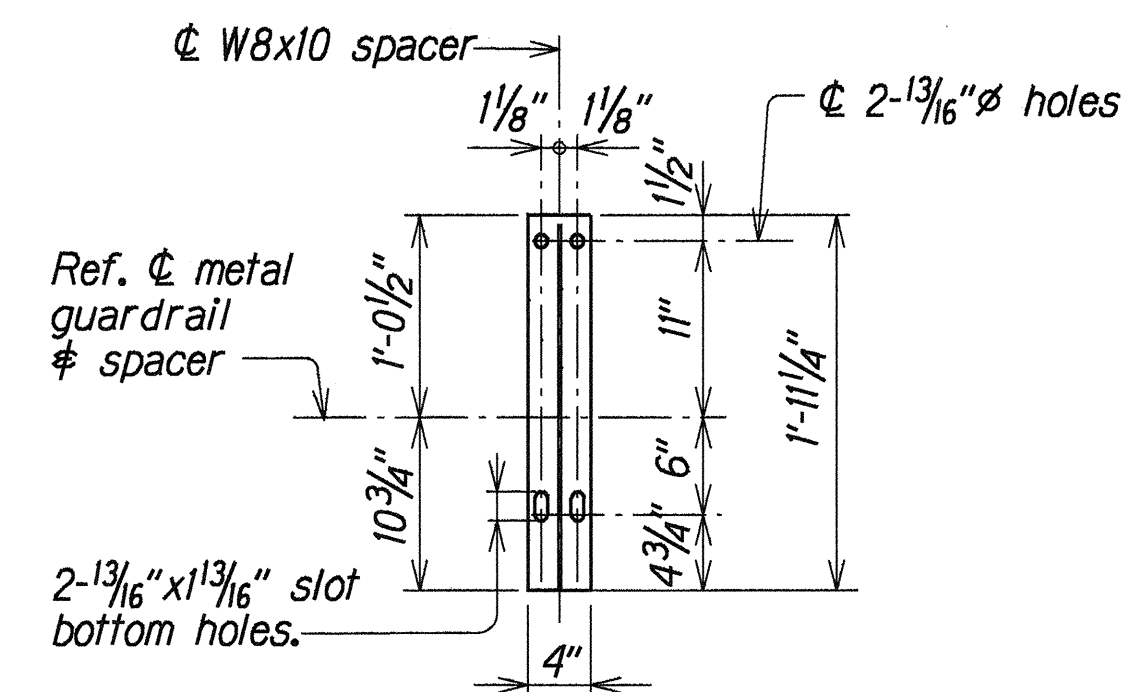
This diagram shows the elevation view of a concrete curb and guardrail assembly. The assembly consists of a concrete curb with a rear flange and a metal guardrail mounted on top. Key dimensions and components are labeled:

- Top of exist. curb**: Indicated by a dashed line.
- Rdwy. fin. grade**: The finished road surface level.
- 6" min.**: Minimum clearance from the road surface to the bottom of the guardrail post.
- W8x10 spacer**: Vertical support for the guardrail.
- Exist. conc. rail to remain**: Existing concrete railing.
- Rear flange of W8x10 shown by dash lines**: Hidden part of the beam.
- Ref. ϕ metal guardrail & spacer**: Reference to the guardrail and its supporting structure.
- ϕ 2- $\frac{5}{8}$ " anchor bolts w/nut & washer embedded in $1\frac{1}{4}$ " ϕ x6" deep holes. 1 ea. at alternate side of web as shown. See notes on Sht. #Q1.**: Anchor bolts securing the guardrail to the curb.
- Dimensions**:
 - Vertical dimensions from road surface: 9", 13 $\frac{1}{4}$ ", 1'-10".
 - Horizontal dimensions: 1 $\frac{1}{8}$ ", 1 $\frac{1}{8}$ ", 4 $\frac{3}{4}$ ", 3 $\frac{1}{2}$ ".
 - Guardrail height: 1'-11 $\frac{1}{4}$ ".
 - Spacer height: W8x10 spacer.
- Overall width**: 6'-3" (typ.)
- Note**: See "Layout Plan" on Sht. #Q2 for spacing.

TYPICAL W8X10 SPACER AND POST PLACEMENT DETAIL
Scale: 1'=1'-0"

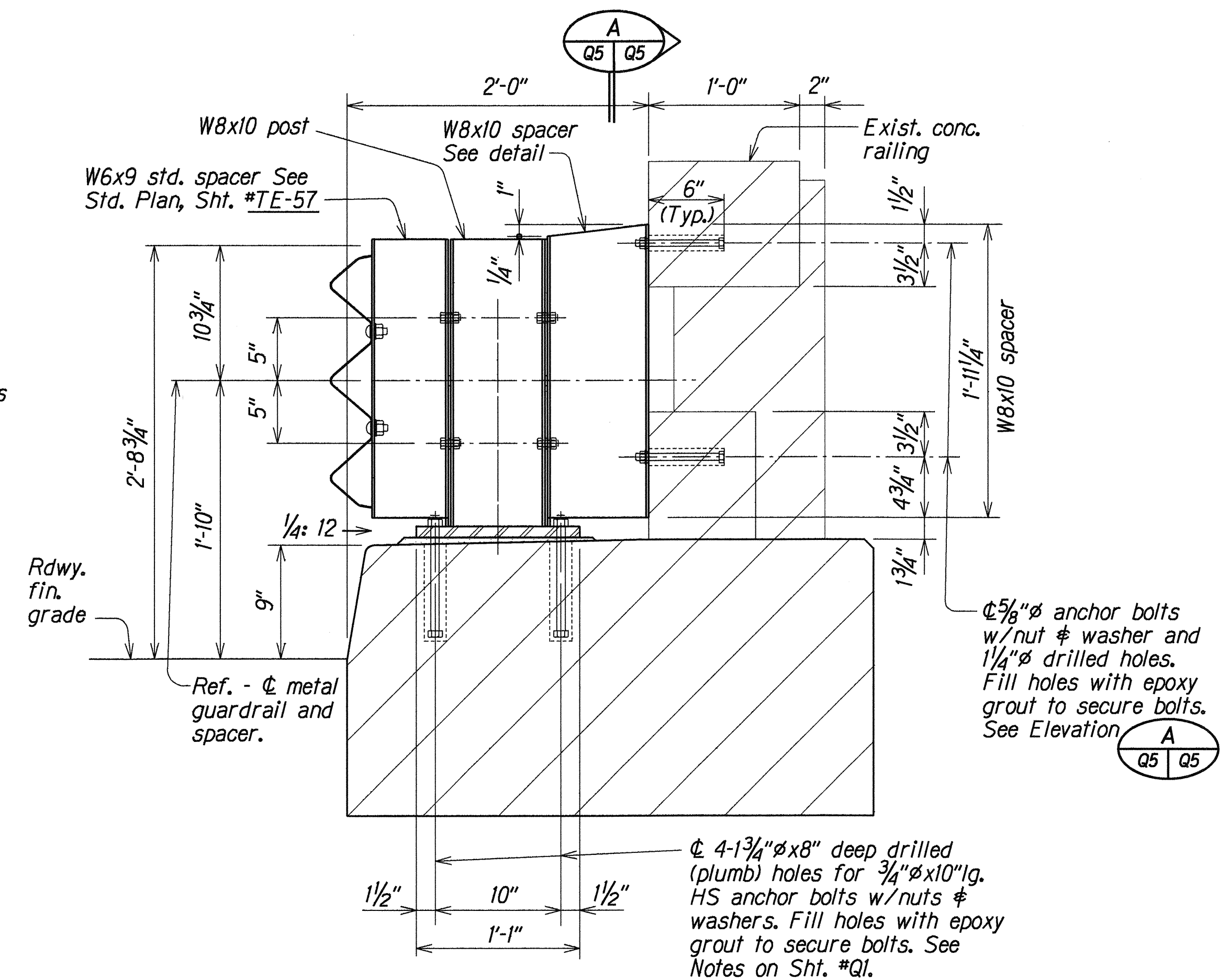


FRONT FLANGE



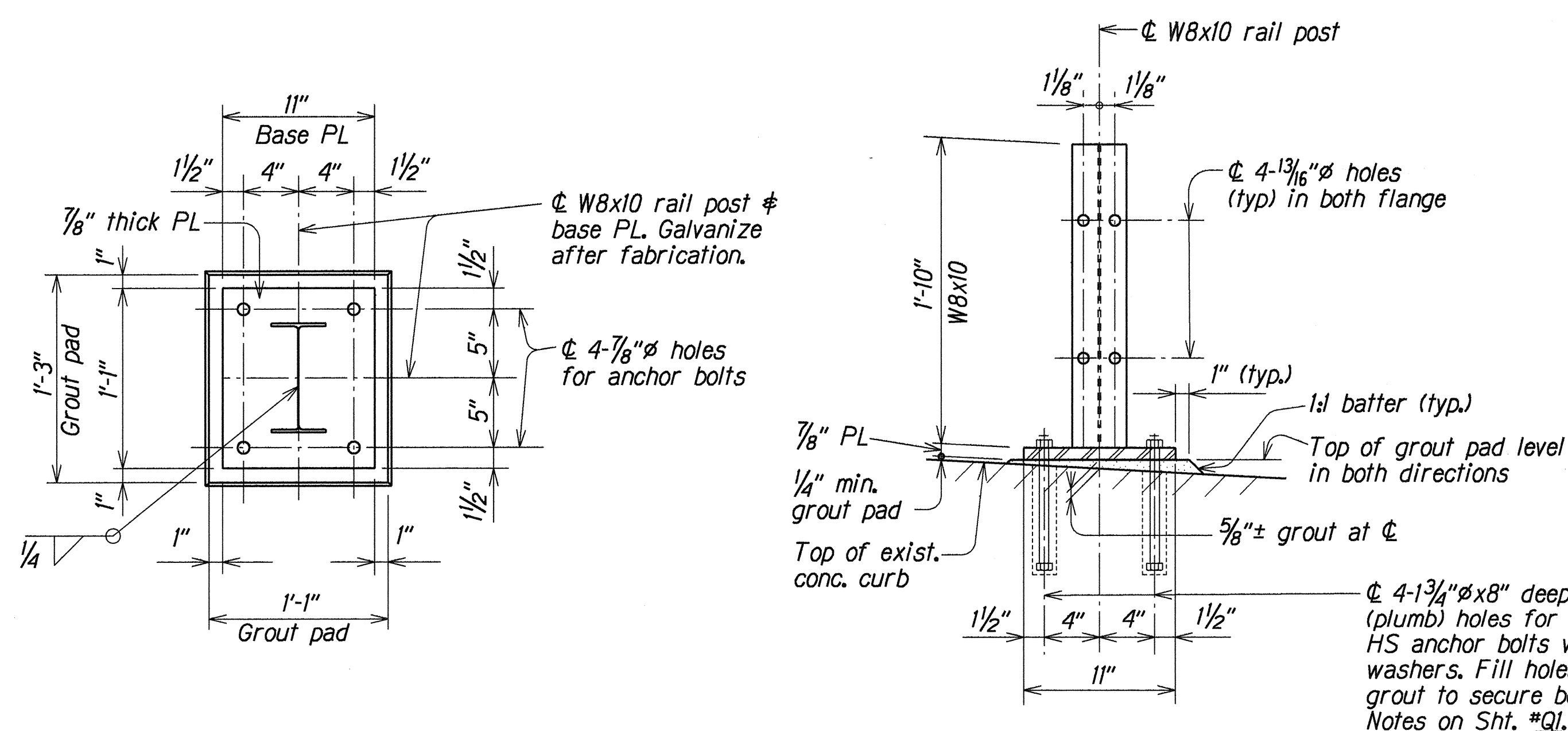
REAR FLANGE

Scale: 1"=1'-0"



TYPICAL SECTION THRU
TYPE "E" UPGRADE BRIDGE RAILING

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

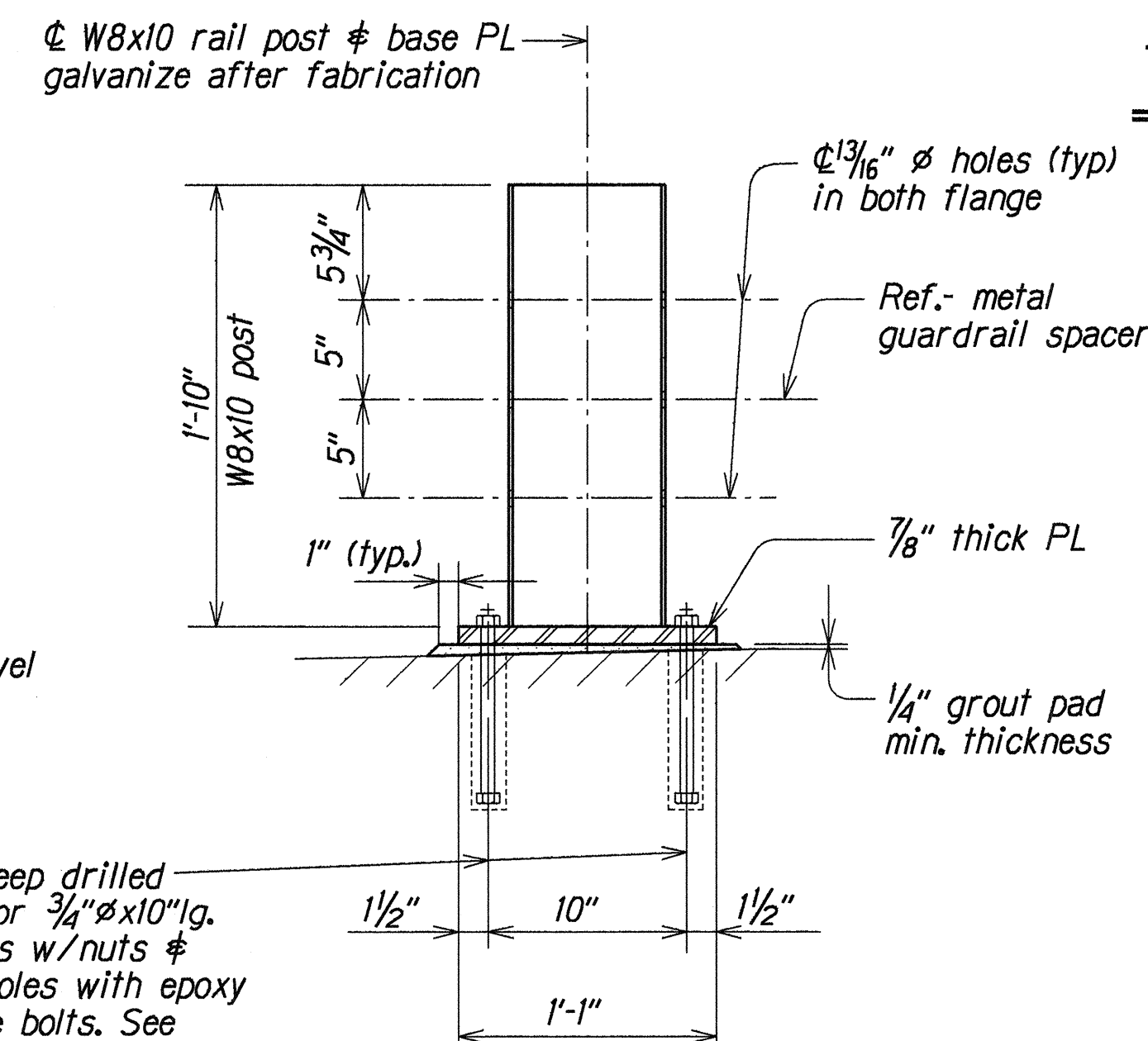


TOP VIEW

FRONT VIEW

TYPICAL W8X10 POST ON BASE PLATE DETAIL

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



SIDE VIEW

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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The layout plan shows two bridge structures, No. 4A and No. 4B, crossing a roadway. Structure No. 4A is a Type "B" upgrade bridge railing with a total length of 536'-1 1/2". It features a 24'-11" section at each end and a central section of 486'-3 1/2". The roadway width is 47'-4 1/2". Structure No. 4B is also a Type "B" upgrade bridge railing with a total length of 525'-1 1/2". It has a 24'-11" section at each end and a central section of 475'-3 1/2". The roadway width is 47'-4 1/2". Both structures are flanked by 25'-0" Guardrail Type 3 Thrie Beam sections. The plan includes various callouts for dimensions, guardrail details, and roadway alignment. A north arrow points towards the top left. The title "LAYOUT PLAN" is centered below the structures, with a scale of 1"=5'-0".

NOTE:
See Sht.*Q7 for guardrail connection details and Sht.*Q15 for additional information and details.
For cont. metal guardrail beyond 25'-0" Guardrail Type 3 Thrie Beam. See Hwy. Plan.

LAYOUT PLAN

Scale: 1"=5'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURES NO. 4A AND NO. 4B
LAYOUT PLAN
KAMEHAMEHA HIGHWAY RESURFACING
LUMAINA STREET TO FARRINGTON HIGHWAY
Federal Aid Project No. STP-099-1(13)

Scale: As Noted Date: Oct. 1994

SHEET No. Q6 OF 15 SHEETS

For cont. metal guardrail beyond
25'-0" Guardrail Type 3 Thrie Beam.
See Hwy. Plan.

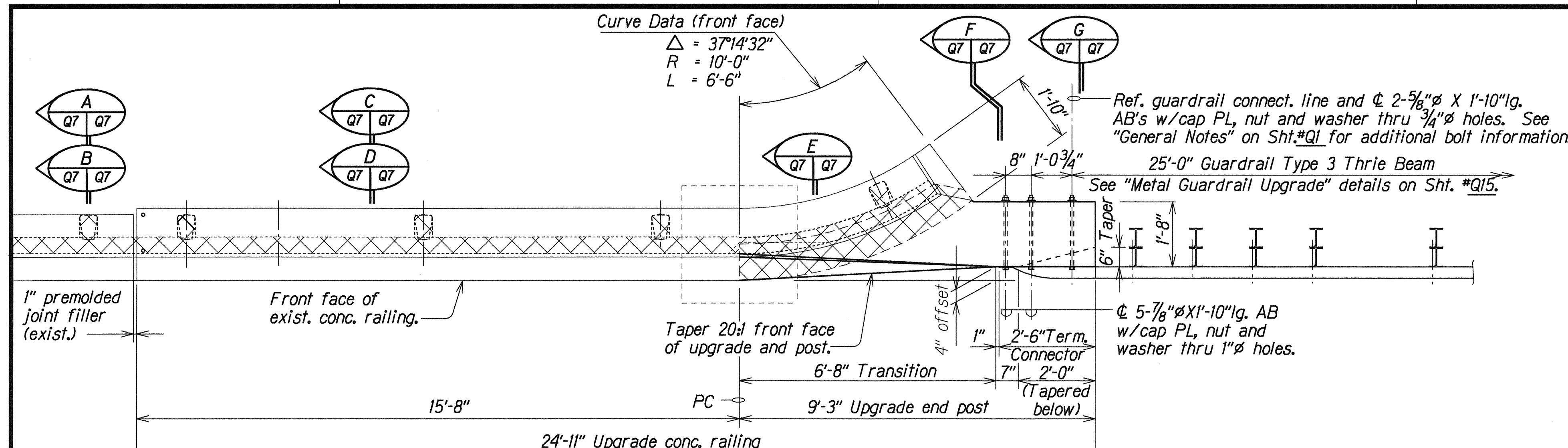
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURES NO. 4A AND NO. 4B
LAYOUT PLAN
KAMEHAMEHA HIGHWAY RESURFACING
LUMIAINA STREET TO FARRINGTON HIGHWAY
Federal Aid Project No. STP-099-1(13)

Date: Oct. 1994

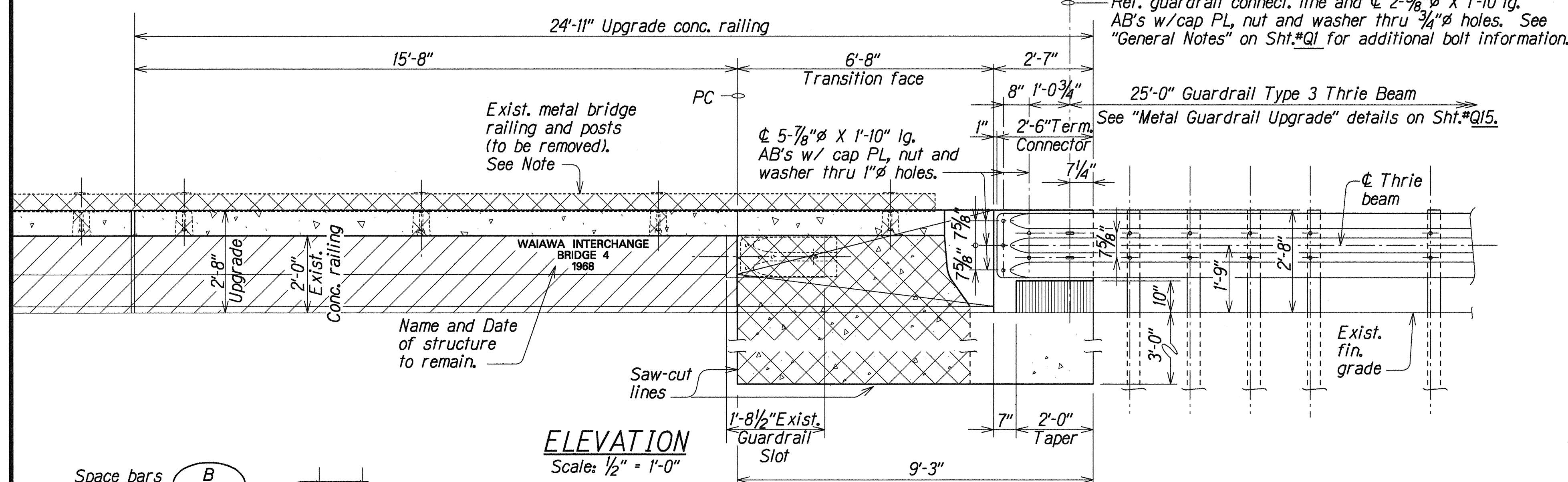
SHEET No. 06 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-099-1(13)	1995	36	58



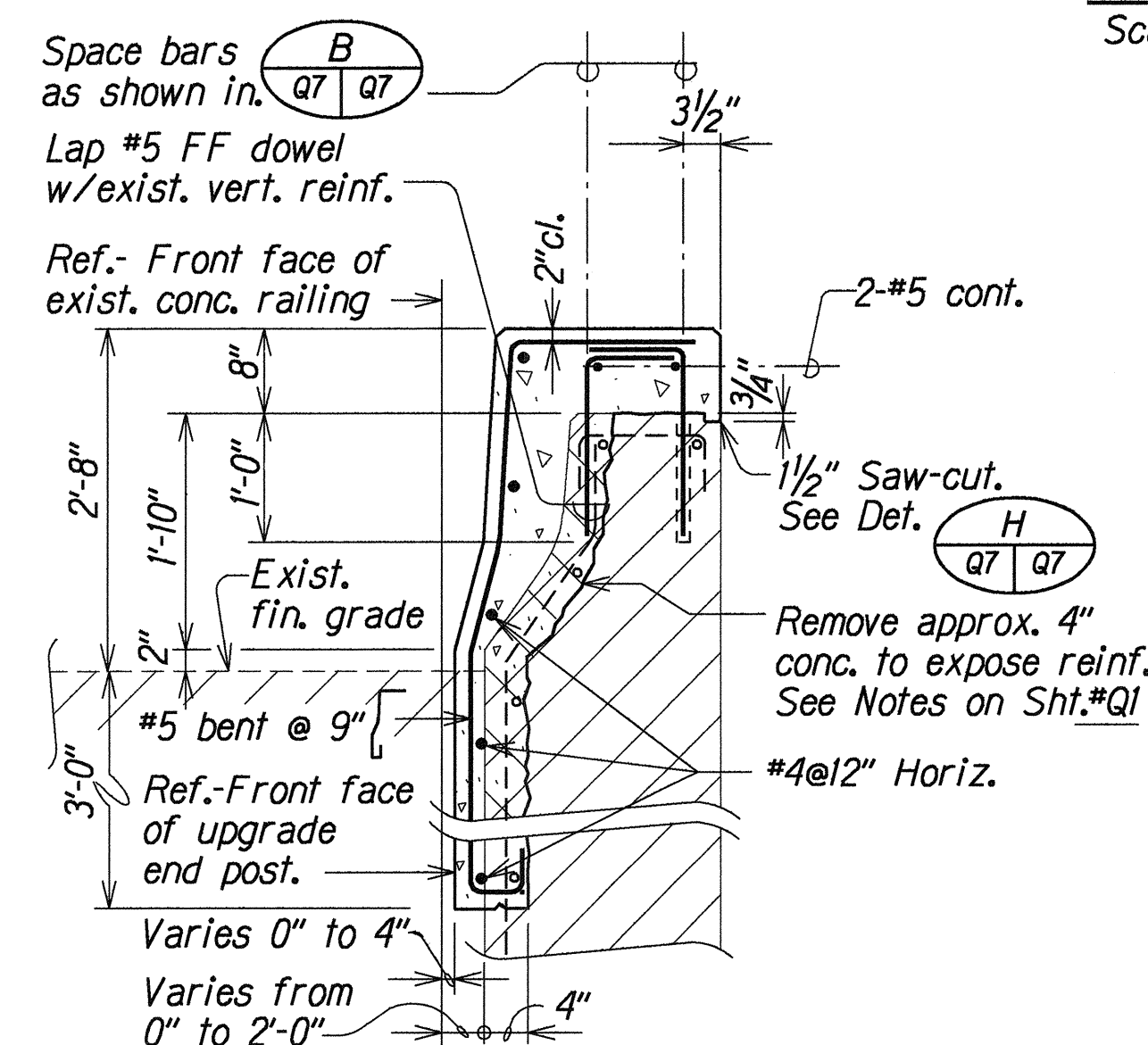
TYPICAL RAILING PLAN OVER EXISTING WINGWALL

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



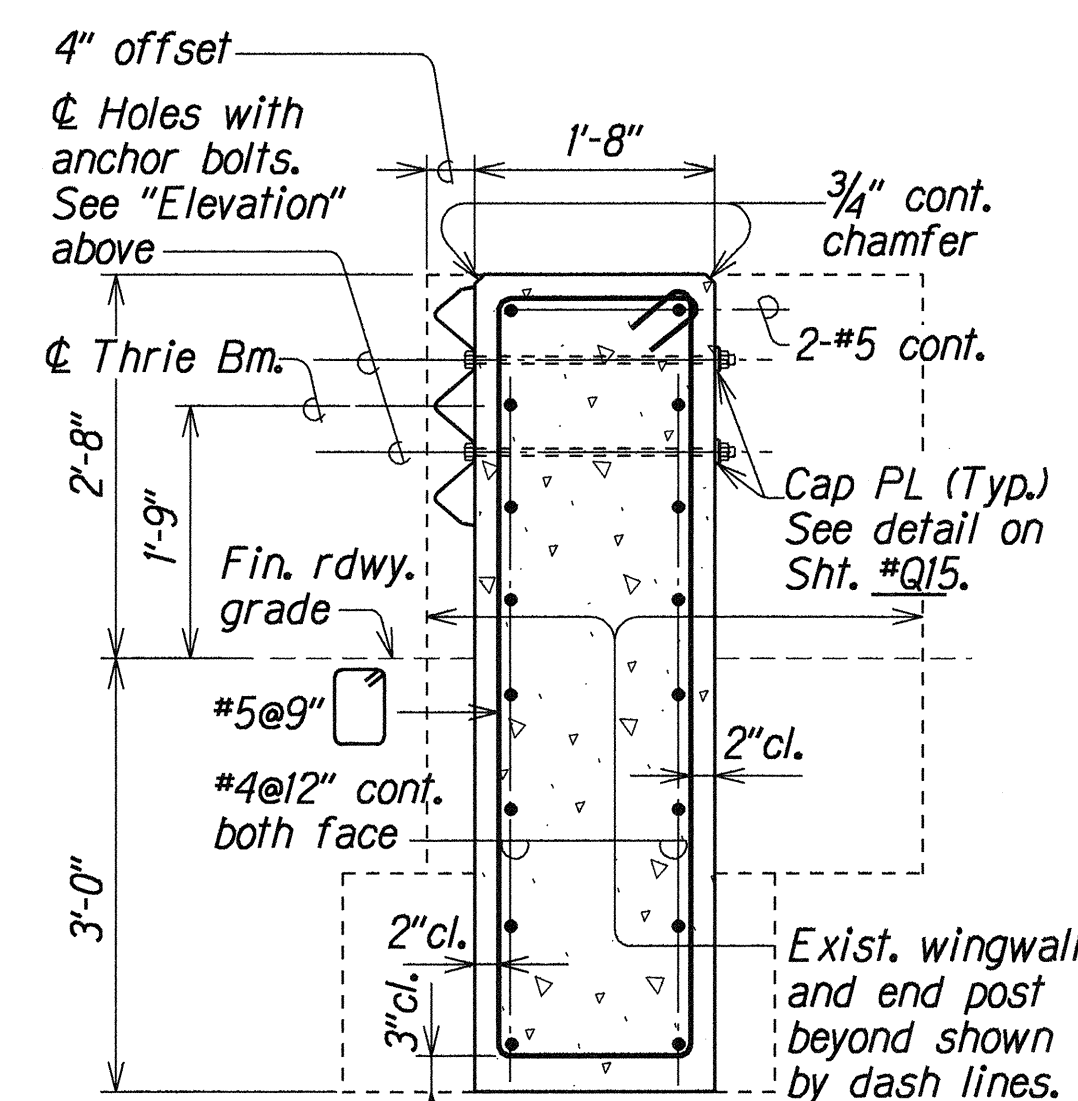
ELEVATION

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



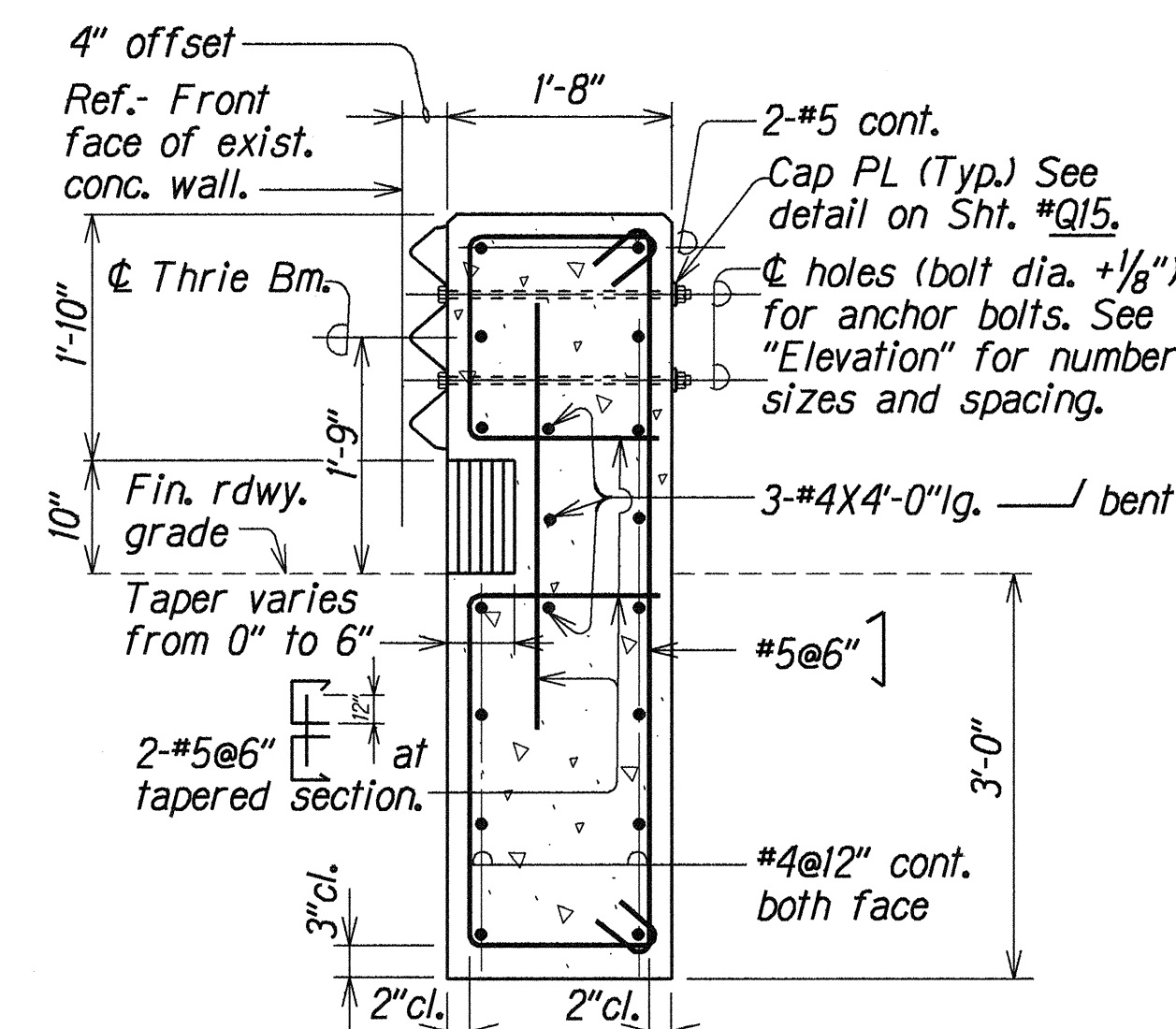
UPGRADE SECTION E

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



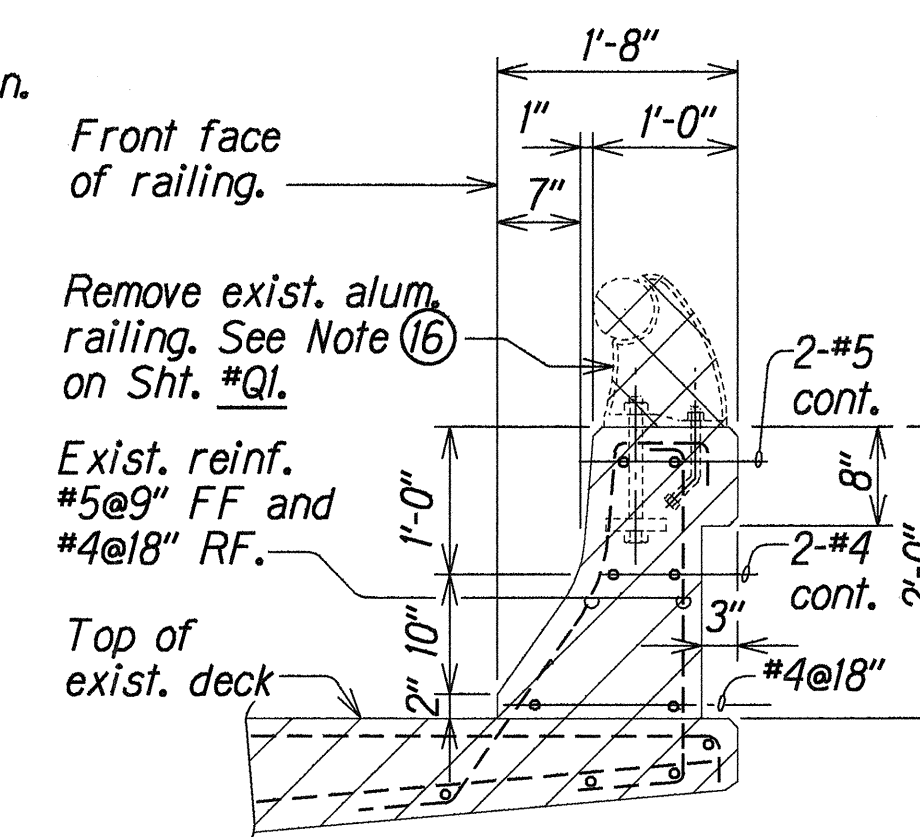
SECTION F

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



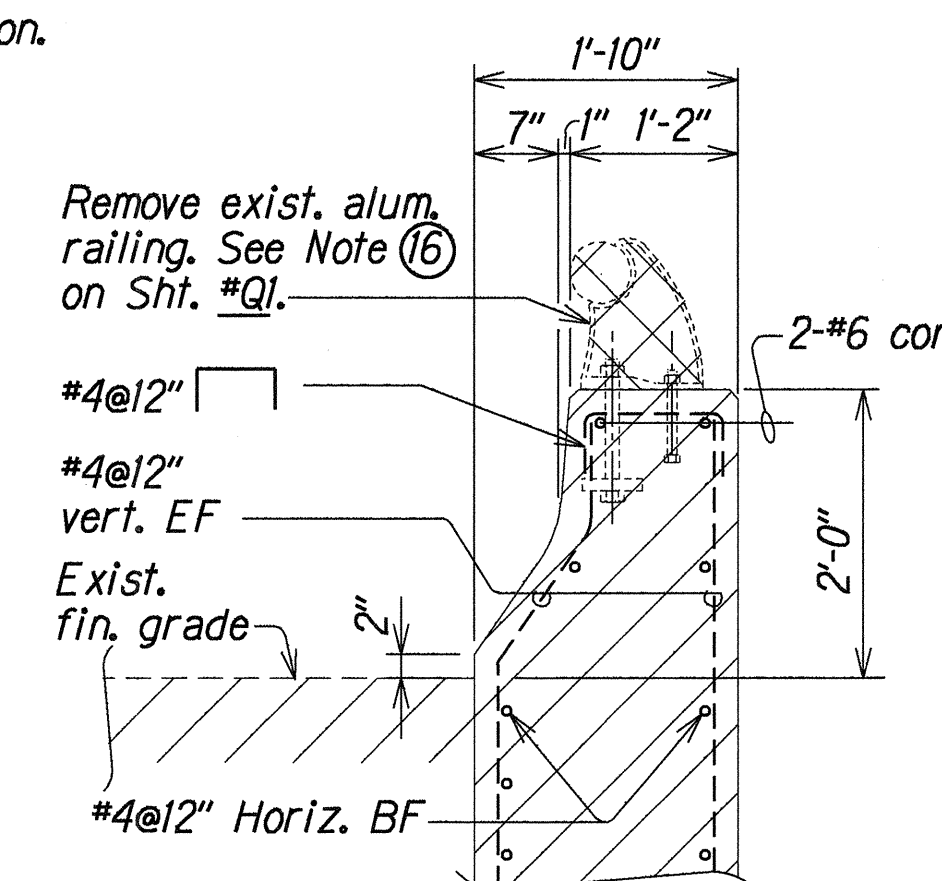
SECTION G

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



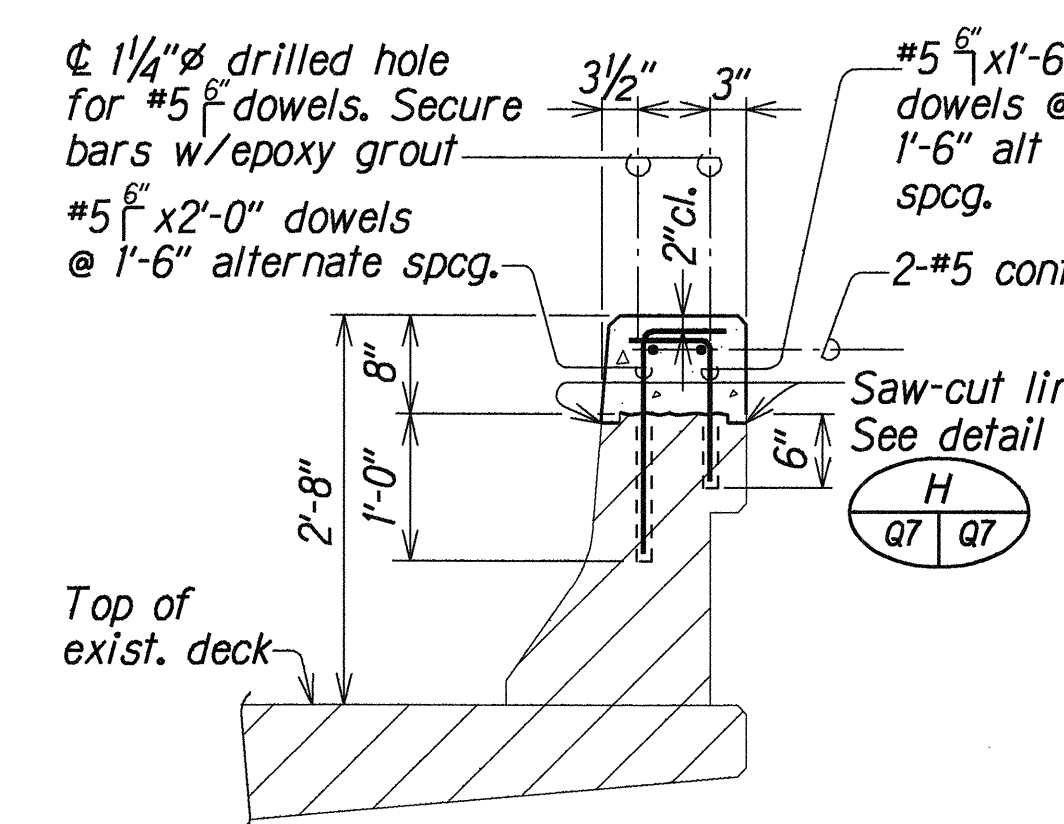
EXIST. SECTION A

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



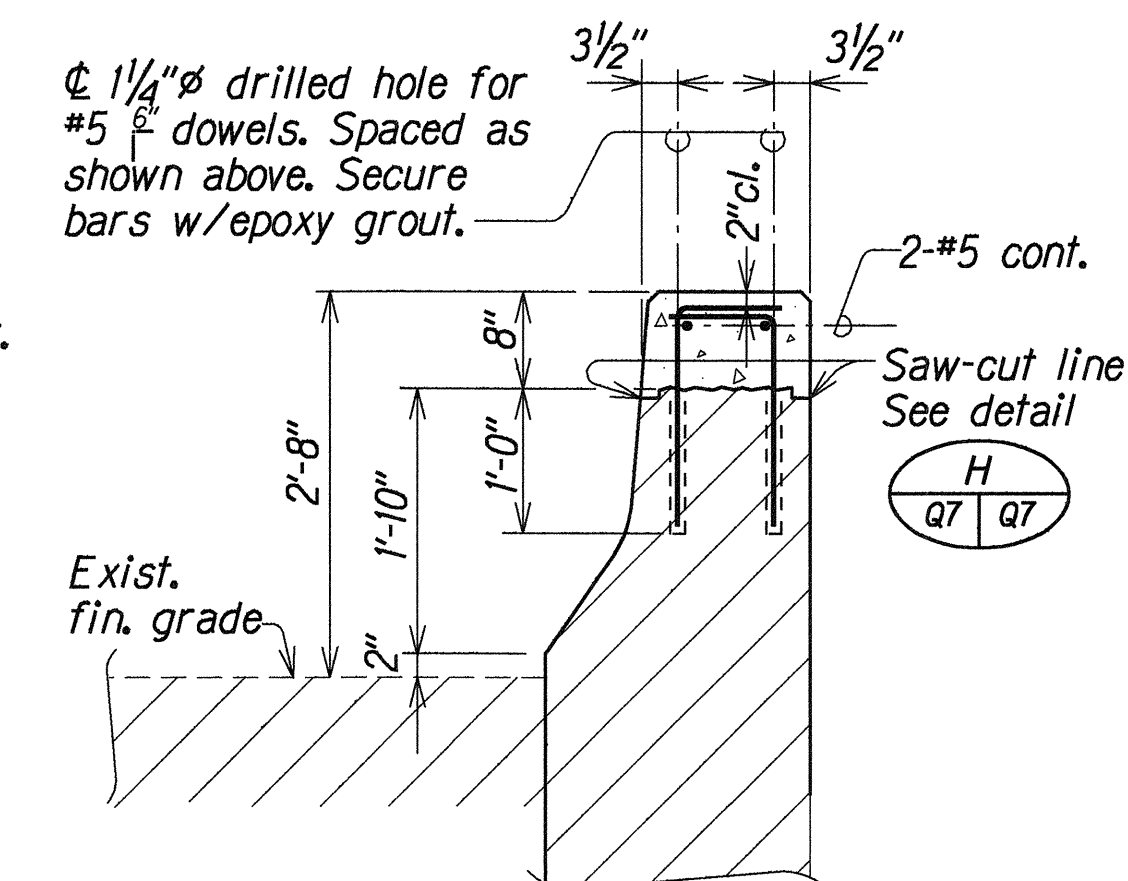
EXIST. SECTION C

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



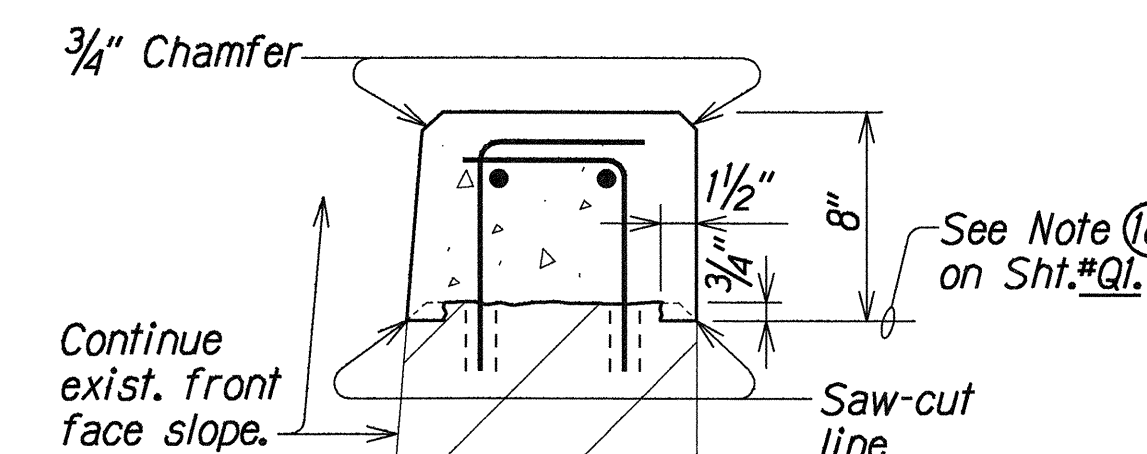
UPGRADE SECTION B

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



UPGRADE SECTION D

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



DETAIL H

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

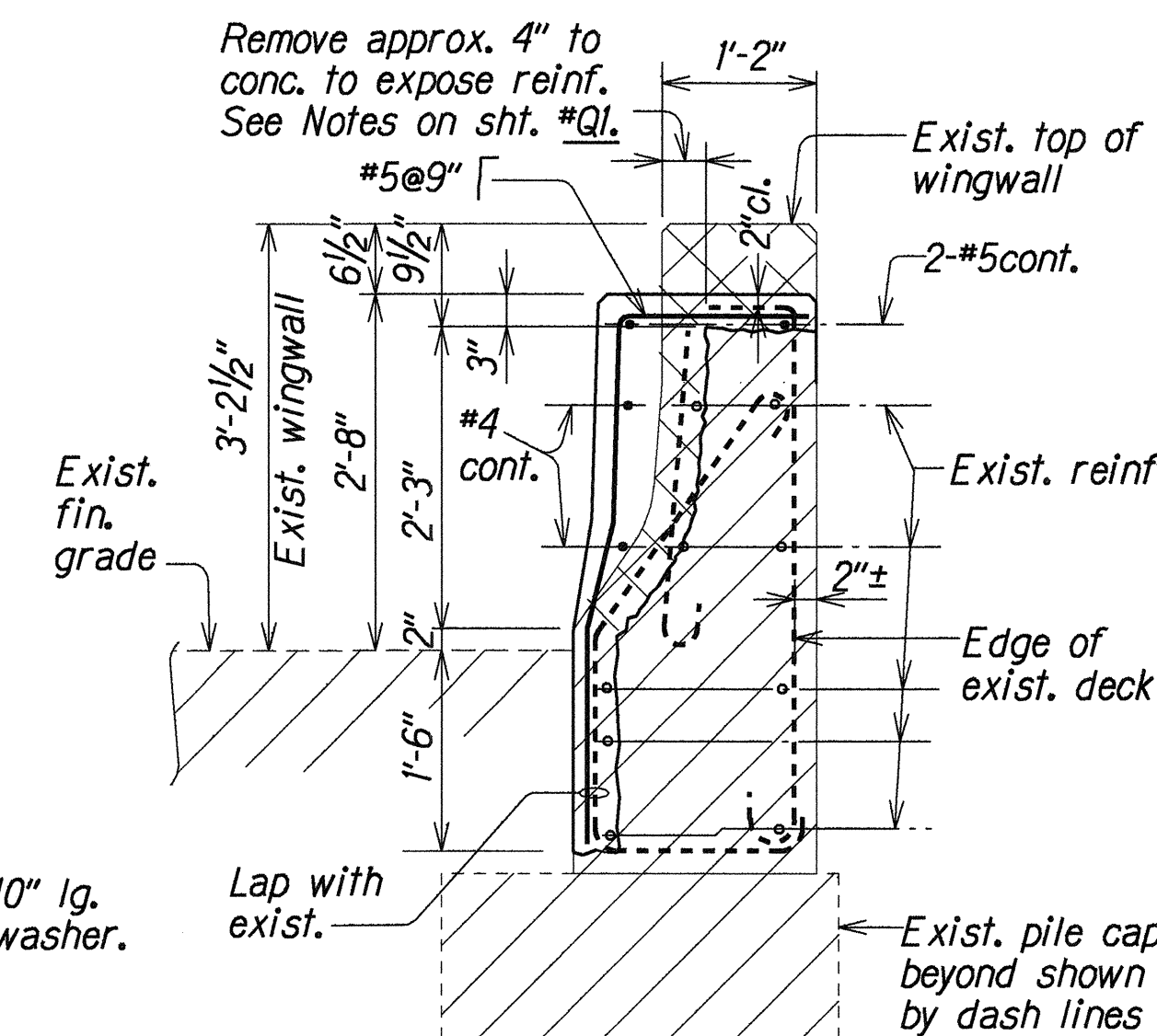
STRUCTURES NO. 4A AND NO. 4B
TYPE "B" UPGRADE, BRIDGE RAILING
AND END POST DETAILS
KAMEHAMEHA HIGHWAY RESURFACING
LUMIAINA STREET TO FARRINGTON HIGHWAY
Federal Aid Project No. STP-099-1(13)

Scale: As Noted Date: Oct. 1994

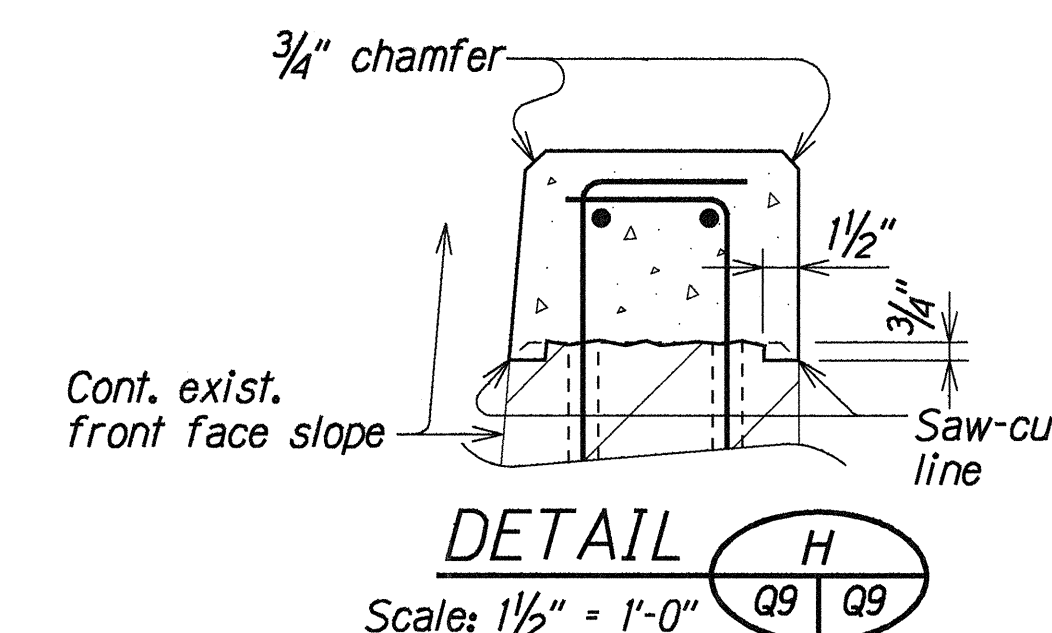
SHEET No. Q7 OF 15 SHEETS

This diagram shows the elevation view of a wingwall cross-section. The structure is 3'-0" high and 2'-8" wide at the top. The reinforcement includes:

- Top longitudinal bars: 2-#5 continuous.
- Bottom longitudinal bars: #4 @ 12" continuous on both faces.
- Vertical spacing: #5 @ 9" for the upper portion.
- Horizontal dimensions: 1'-8" width for the main section, with a 4" offset at the top and 2" clearances at the bottom.
- Details: 3/4" continuous chamfer at the top corner, and a 3" clearance at the base.
- Notes: "Cap. PL (Typ. See detail of Sht. #Q15." and "Exist. wingwall beyond shown by dash lines."

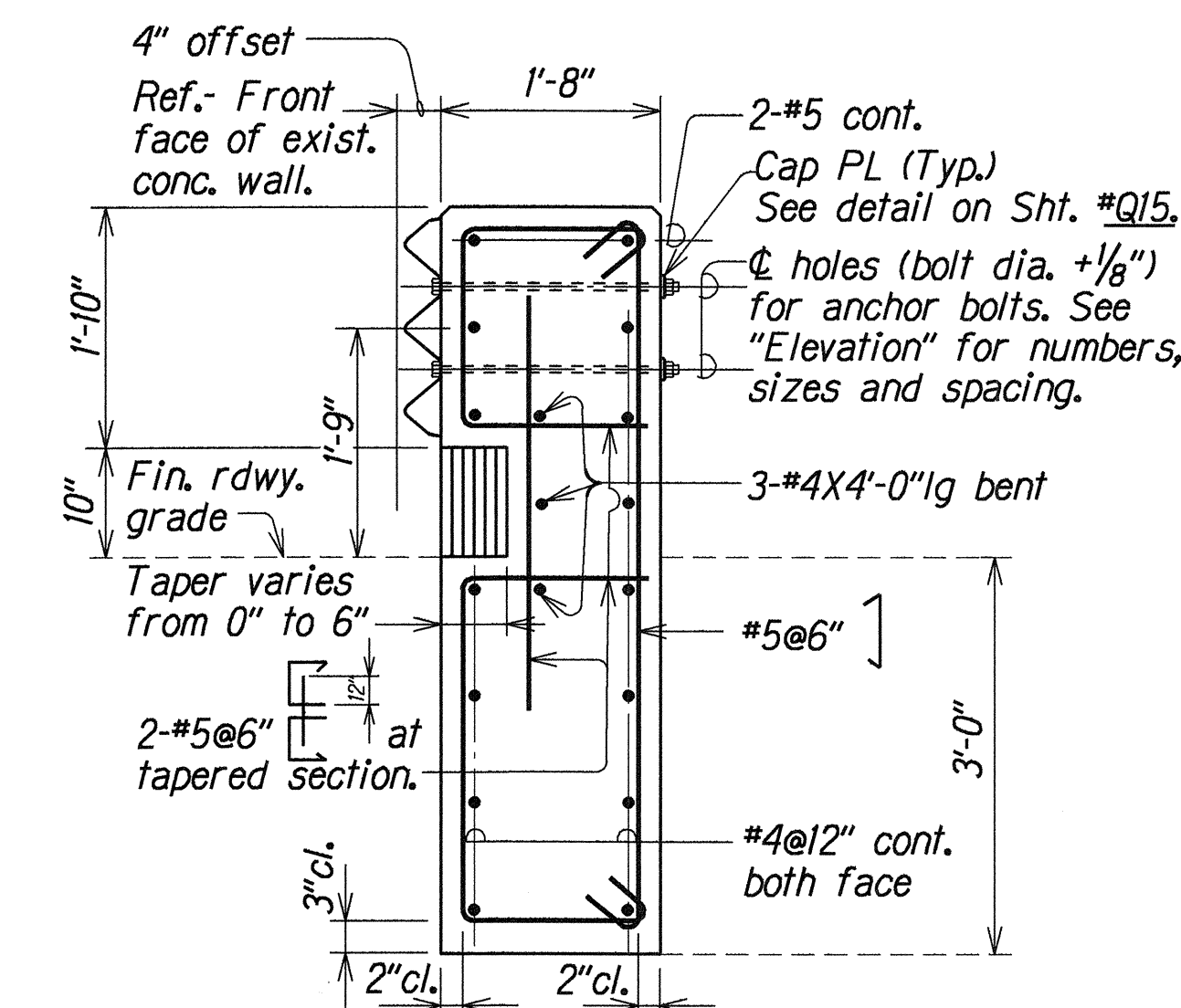


SECTION F
Scale: $\frac{3}{4}" = 1'-0"$ Q9 | Q9

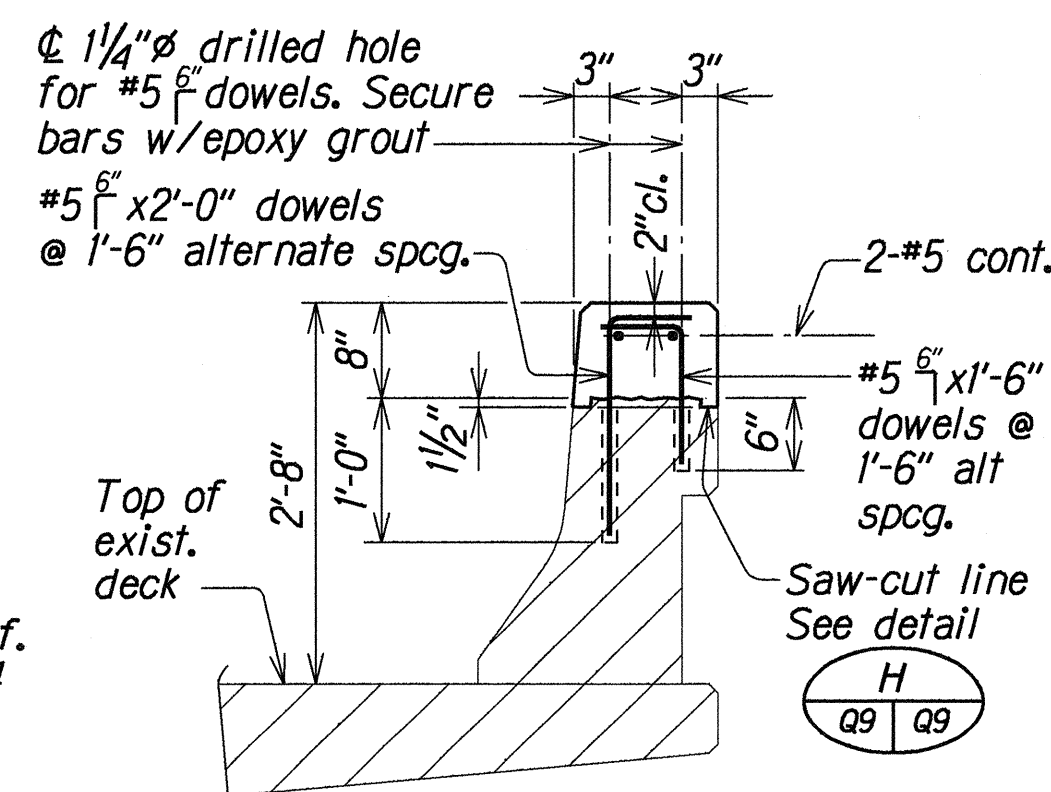


DETAIL 

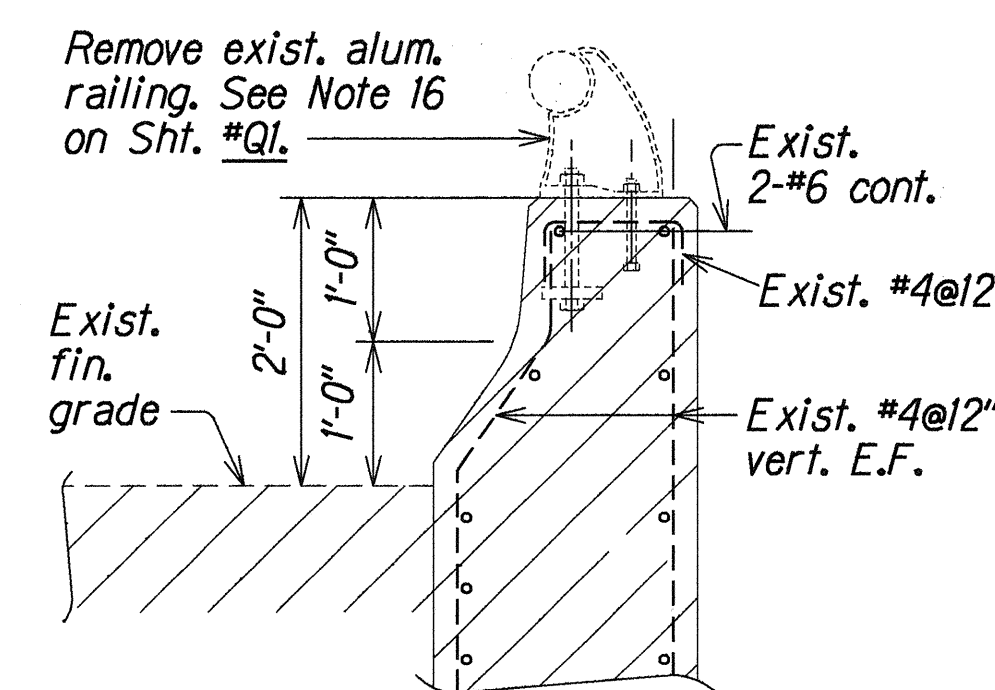
Scale: $1\frac{1}{2}" = 1'-0"$



SECTION G
Scale: $\frac{3}{4}" = 1'-0"$ Q9 Q3



EXIST. SECTION 
Scale: $\frac{3}{4}" = 1'-0"$

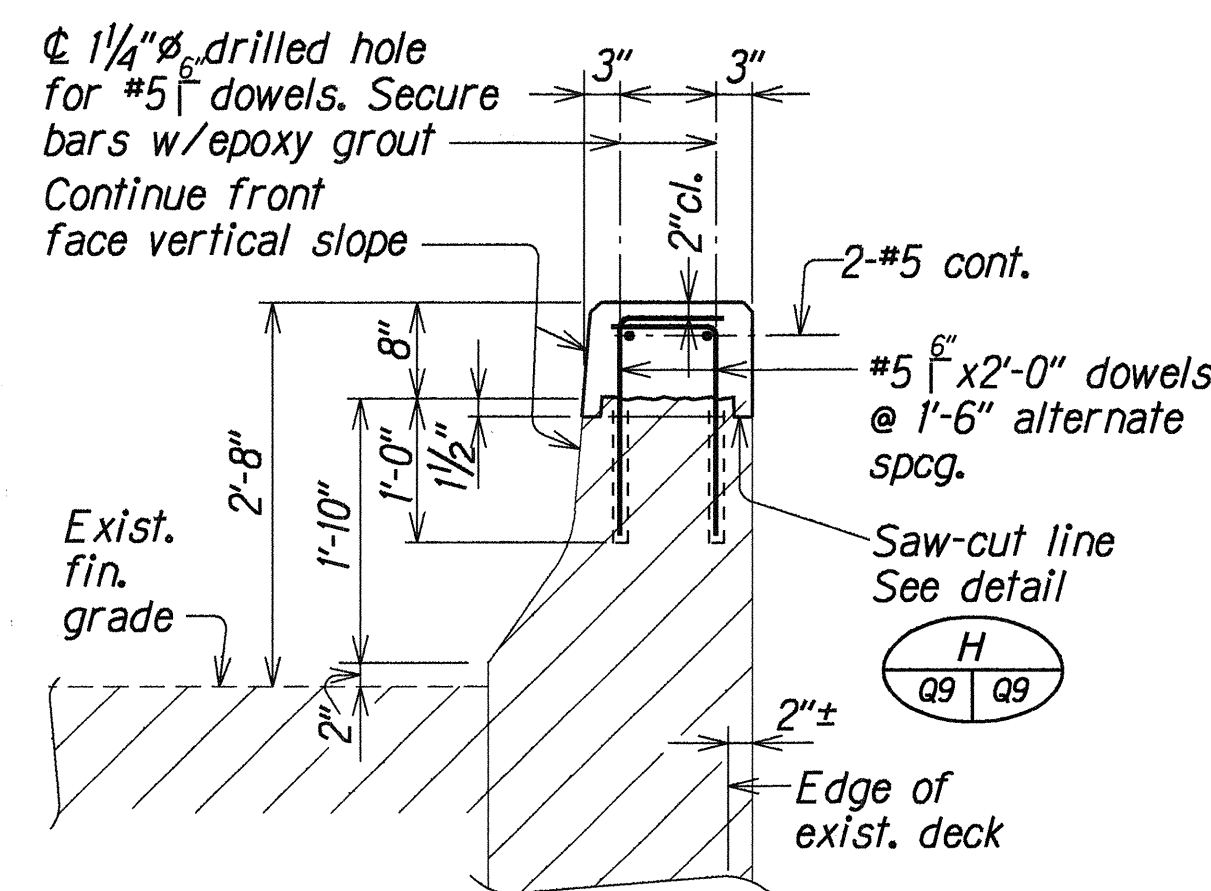


UPGRADE SECTION

Scale: $\frac{3}{4}" = 1'-0"$

B

Q9 Q9



UPGRADE SECTION 
Scale: $\frac{3}{4}'' = 1'-0''$

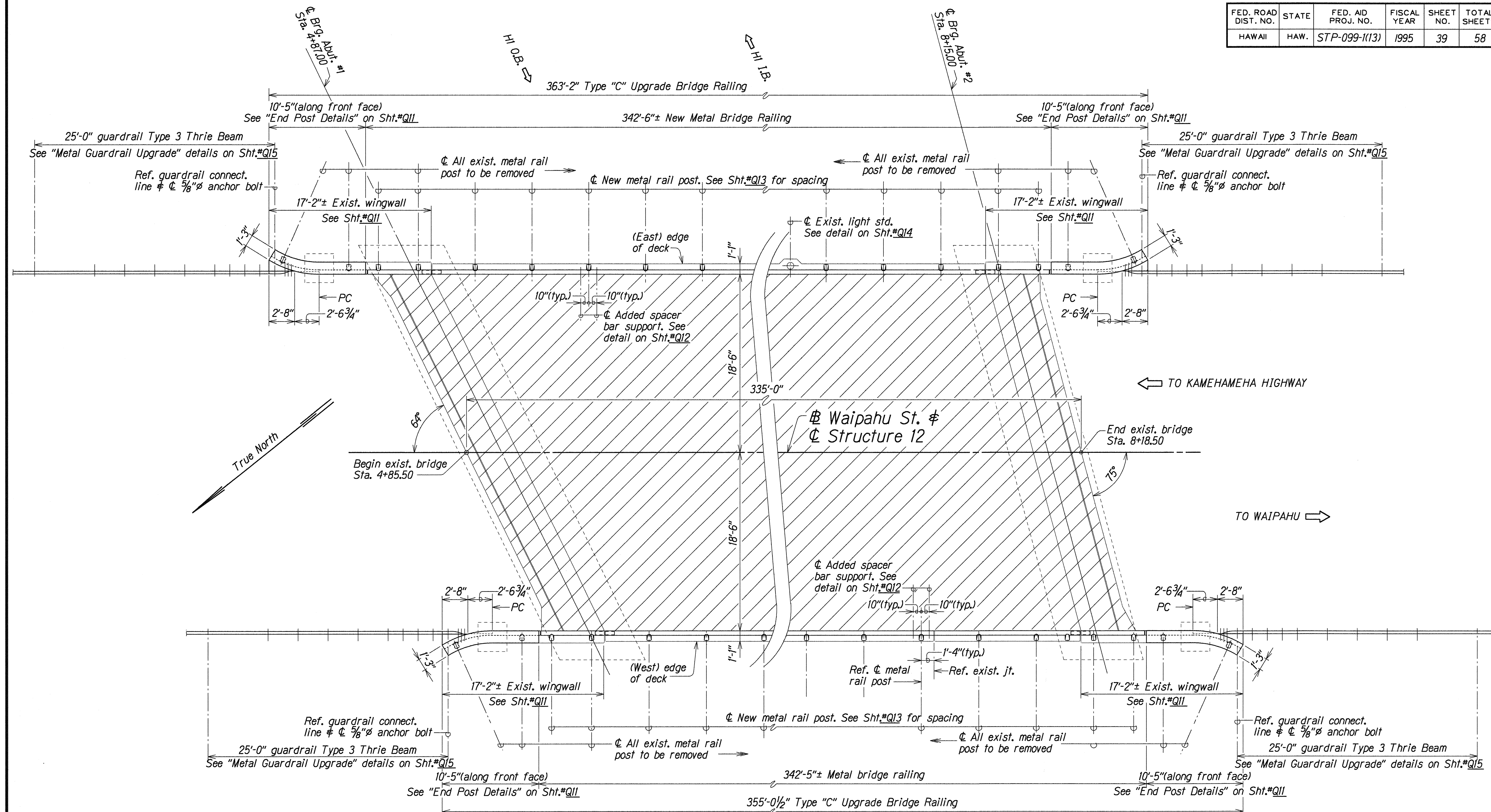
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURE NO. 10A AND NO. 10B
TYPE "A" UPGRADE
BRIDGE RAILING AND END POST DETAILS
KAMEHAMEHA HIGHWAY RESURFACING
LUMAITA STREET TO FARRINGTON HIGHWAY
Federal Aid Project No. STP-099-1(13)

Scale: As Noted Date: Oct. 1999

SHEET No. 09 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-099-1(13)	1995	39	58



LAYOUT PLAN
Scale: 1"=5'-0"

Note:
For cont. metal guardrail beyond
25'-0" Guardrail Type 3 Thrie Beam.
See Hwy Plan.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

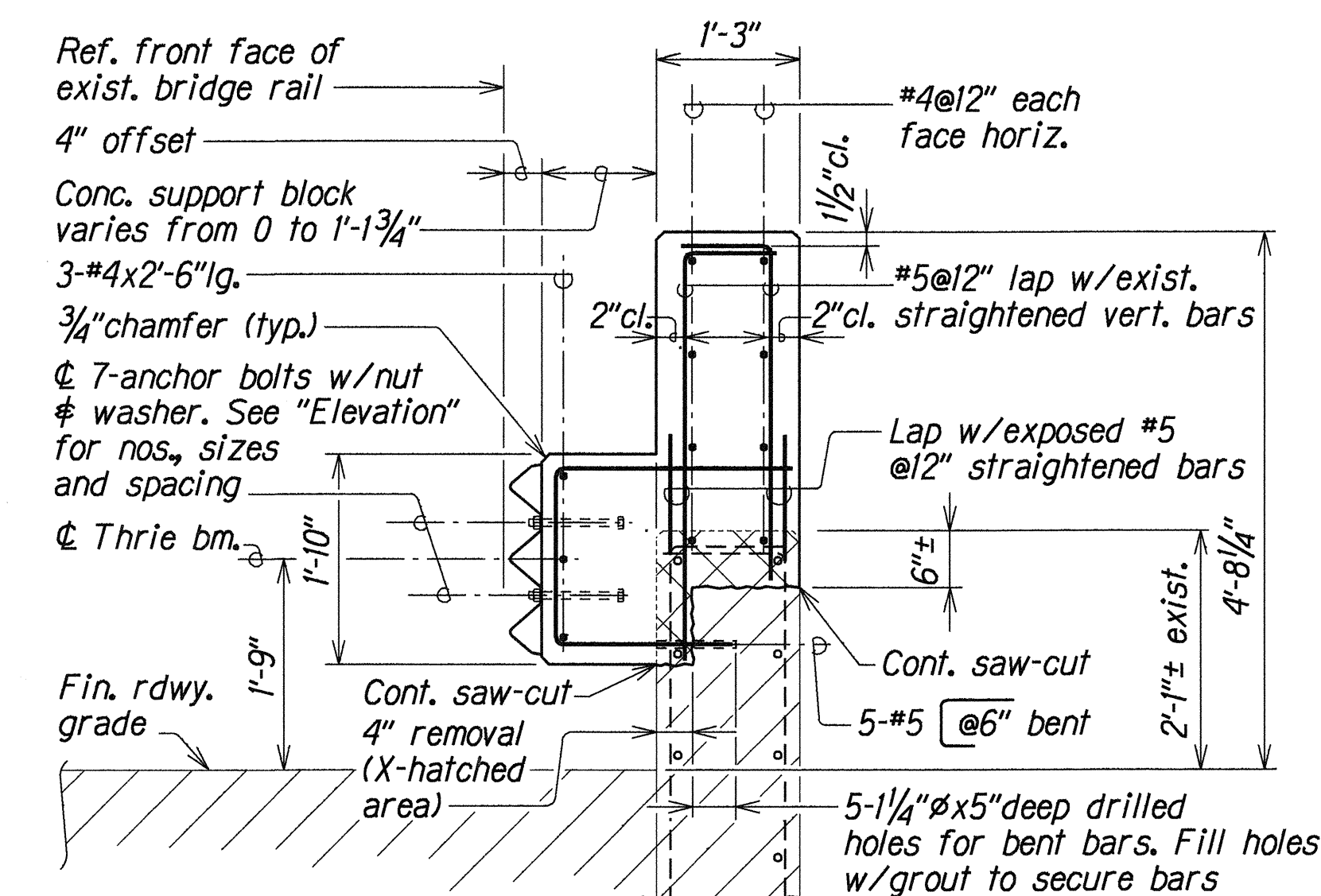
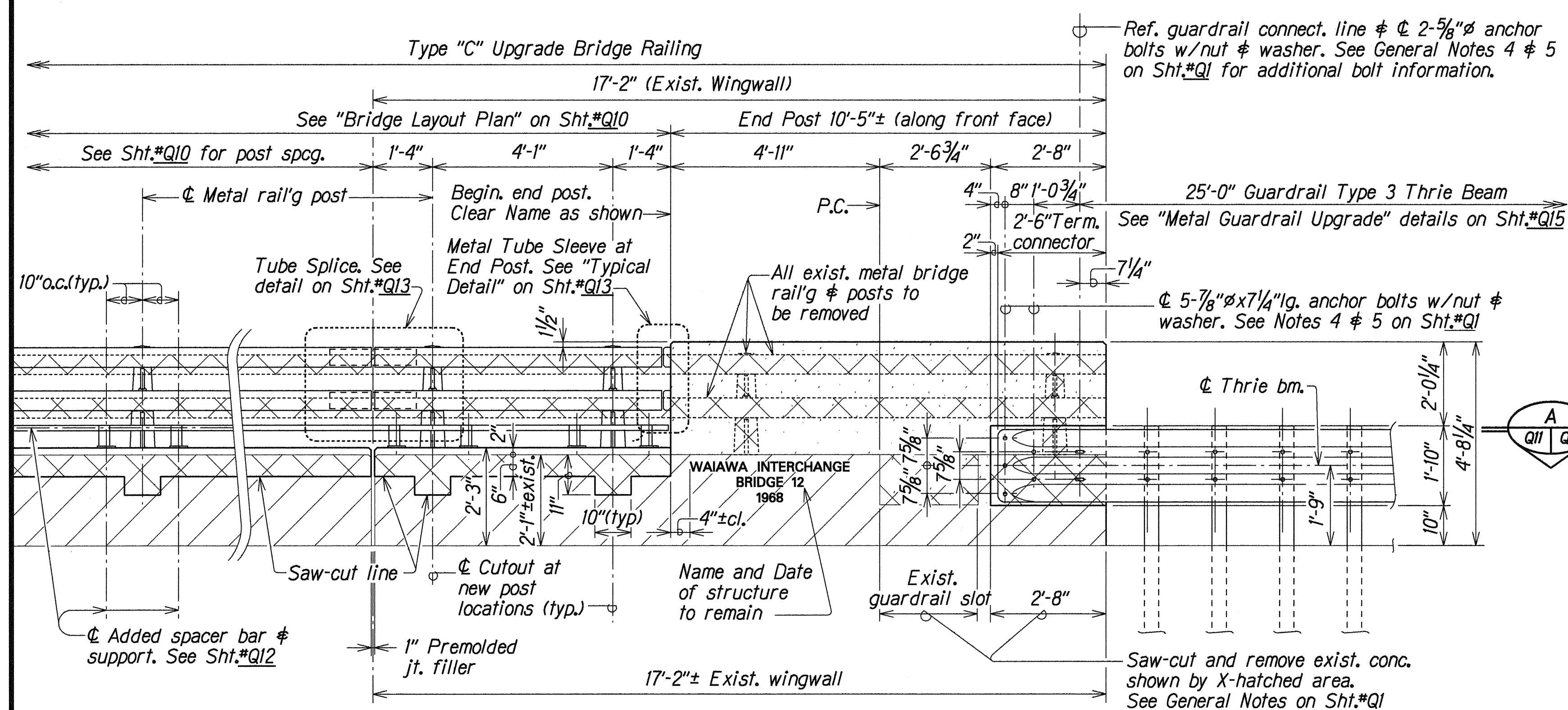
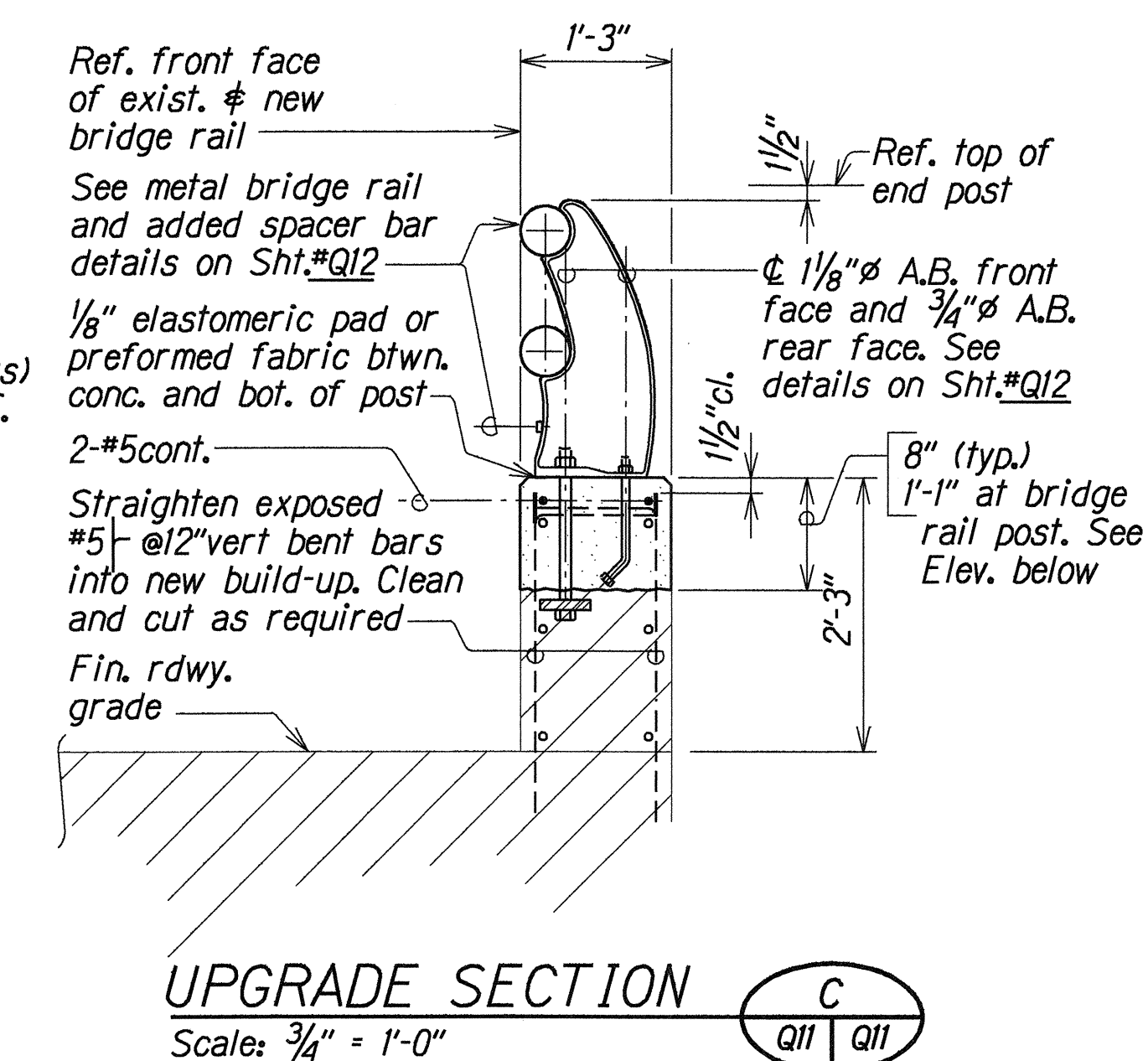
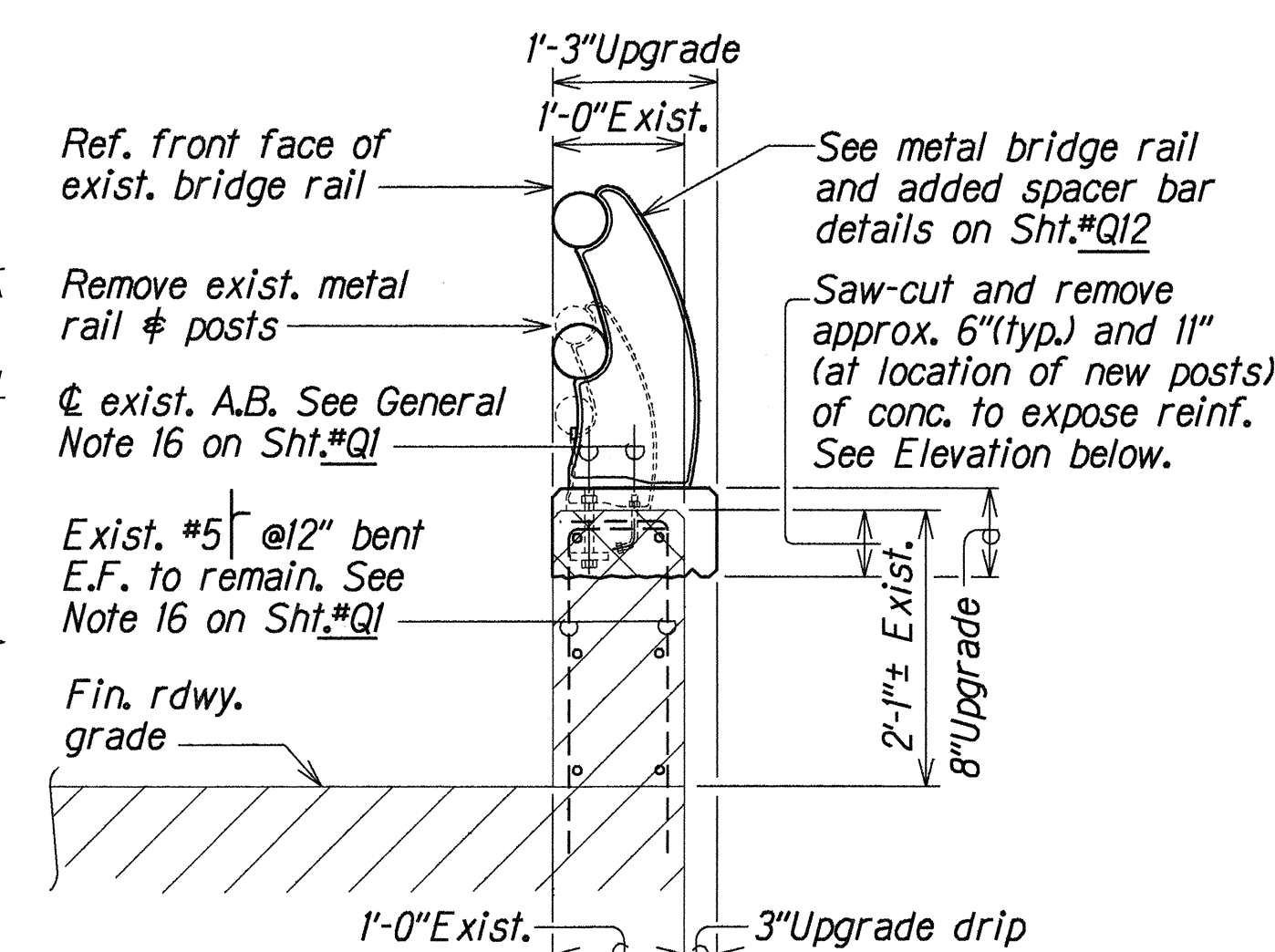
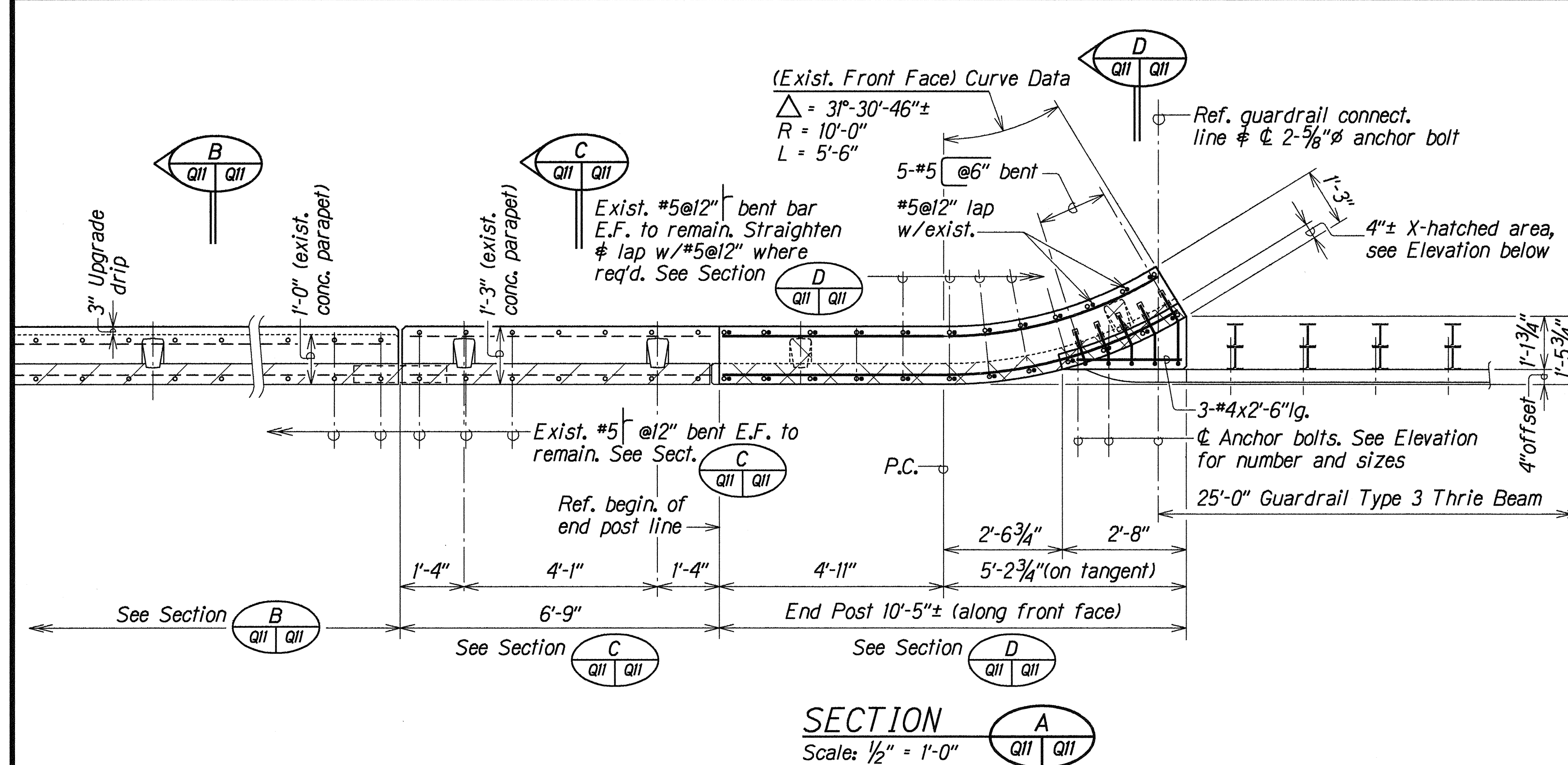
STRUCTURE NO. 12
LAYOUT PLAN
KAMEHAMEHA HIGHWAY RESURFACING
LUMIAINA STREET TO FARRINGTON HIGHWAY
Federal Aid Project No. STP-099-1(13)

Scale: As Noted Date: Oct. 1994

SHEET No. Q10 OF 15 SHEETS

ORIGINAL PLAN	DATE: OCT 1994
DRAWN BY: KSG/LHM	DESIGNED BY: TS
CHECKED BY: MS	DATE: OCT 1994

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEET
HAWAII	HAW.	STP-099-1(13)	1995	40	58



UPGRADE SECTION

Scale: $\frac{3}{4}" = 1'-0"$

D

Q11 Q11

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

UPGRADE CONCRETE RAILING AND END POST DETAILS

Scale: As Noted

ORIGINAL PLAN	SURVEY PLOTTED BY _____	DATE _____
	DRAWN BY _____	_____
	TRACED BY _____	_____
	DESIGNED BY _____	_____
	QUANTITIES BY _____	_____
	CHECKED BY _____	_____

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURE NO. 12

TYPE "C" UPGRADE BRIDGE RAILING AND
END POST DETAILS

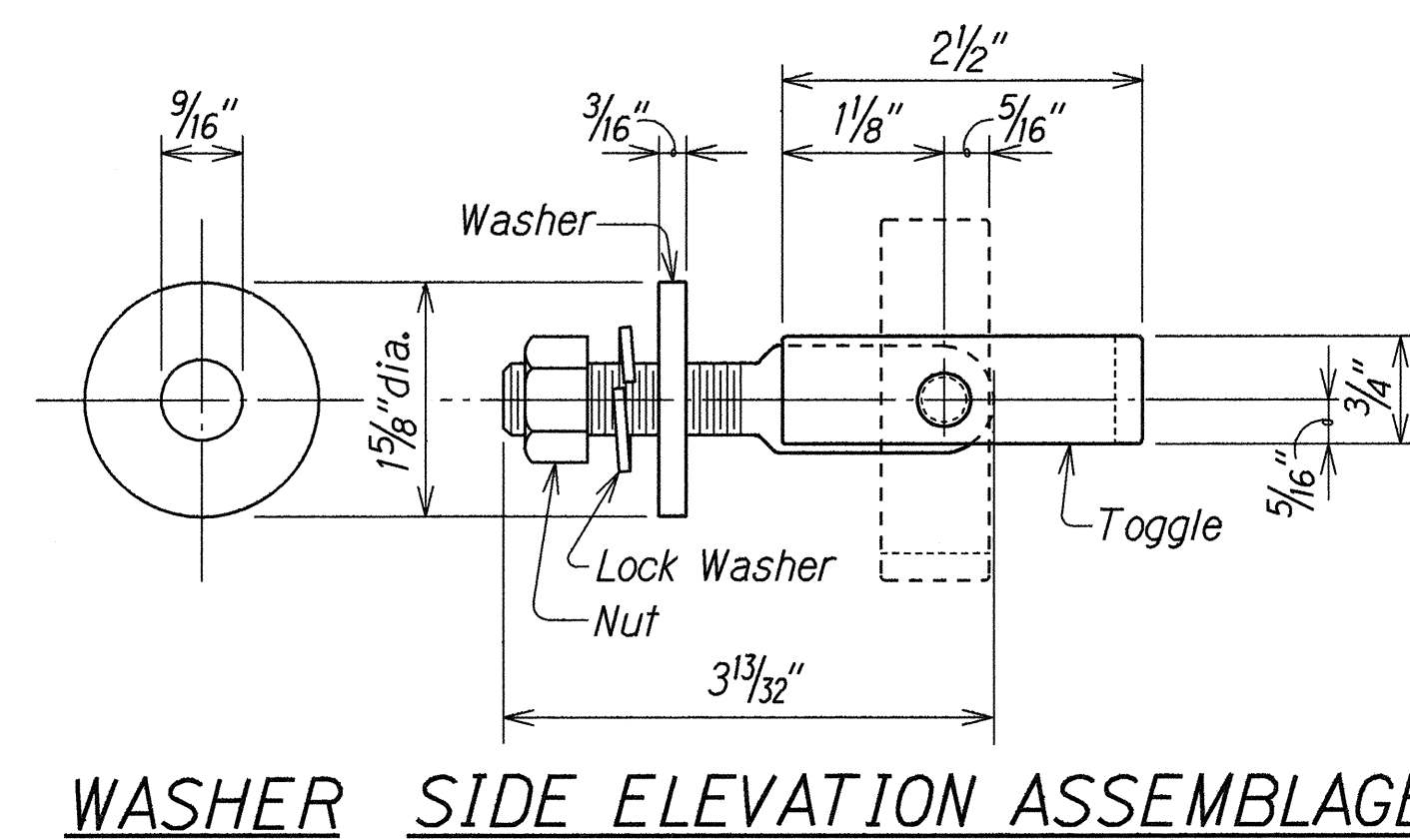
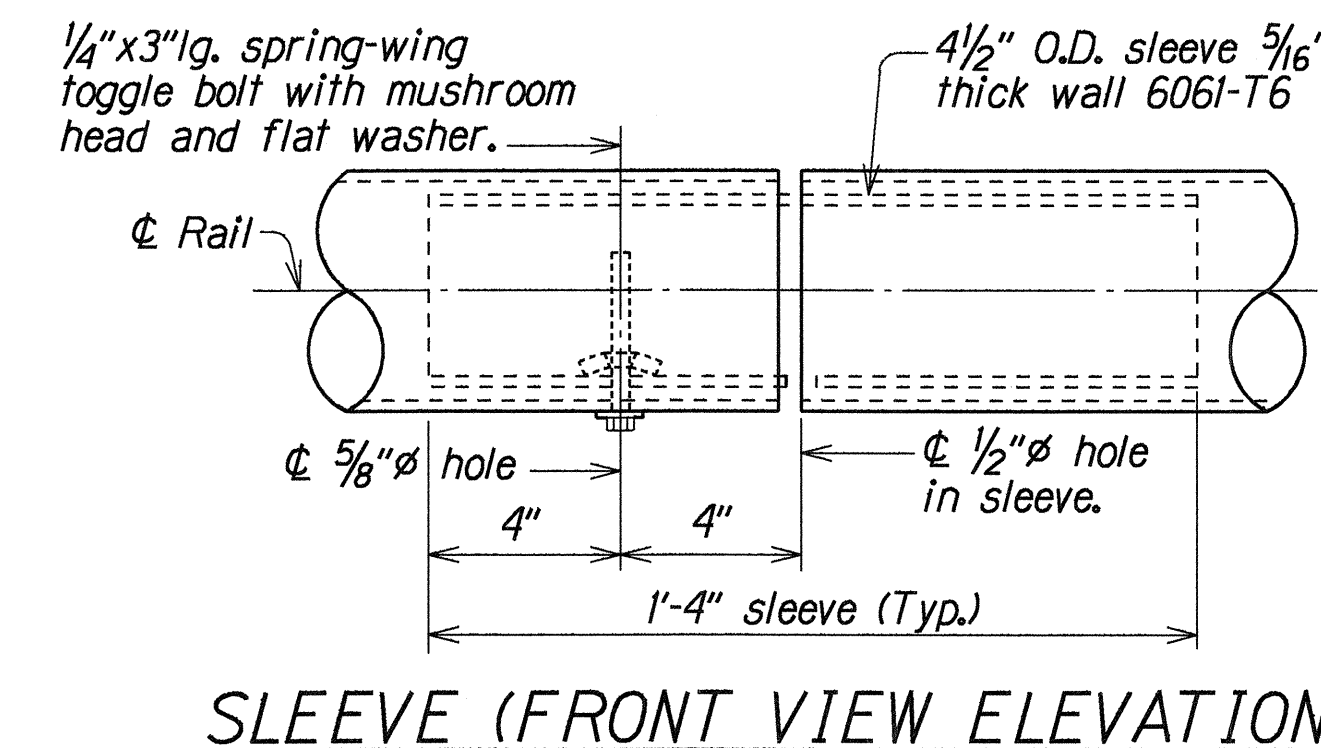
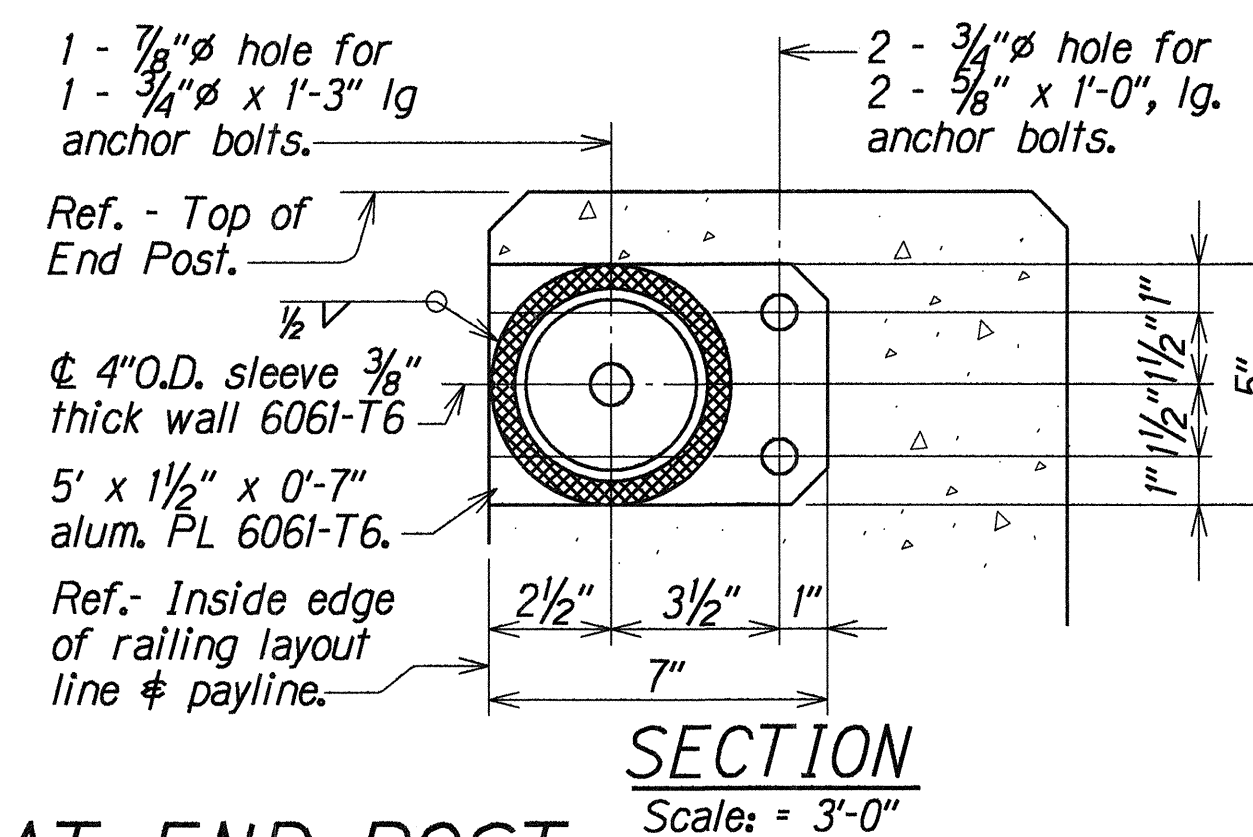
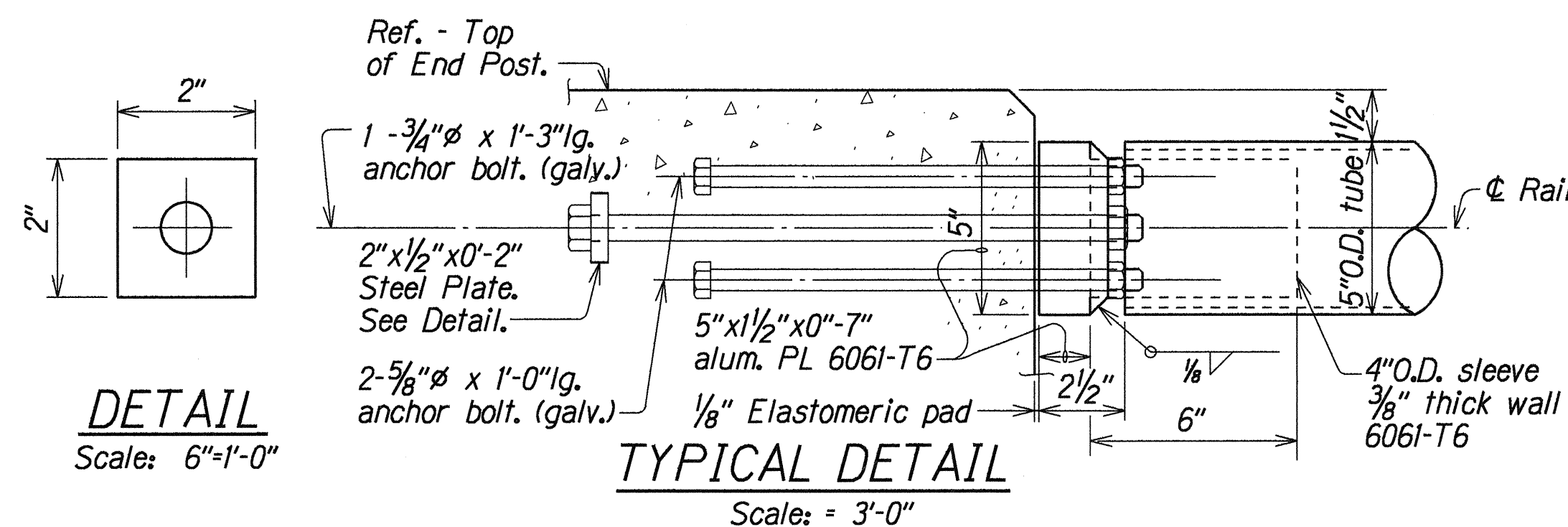
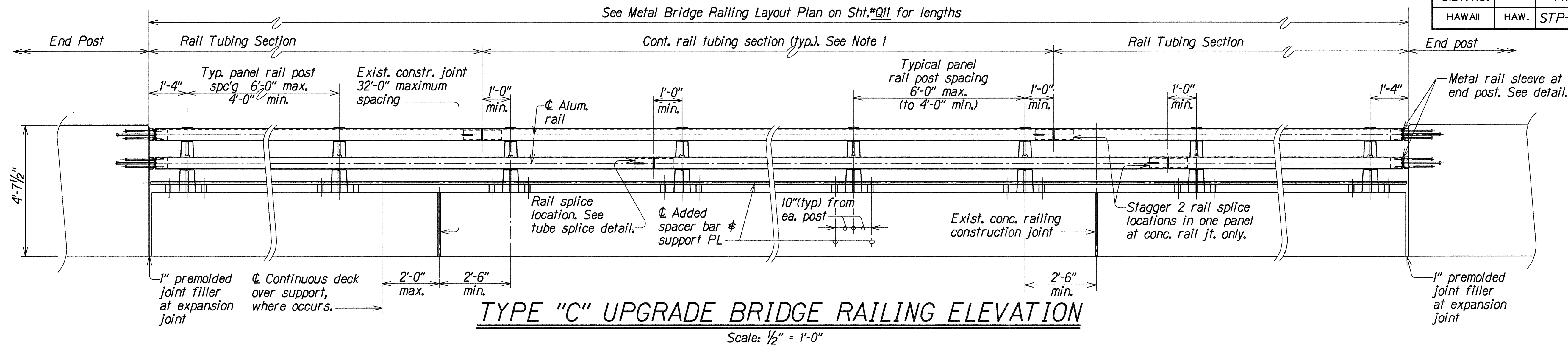
KAMEHAMEHA HIGHWAY RESURFACING
LUMIAINA STREET TO FARRINGTON HIGHWAY
Federal Aid Project No. STP-099-1(13)

Scale: As Noted Date: Oct. 1991

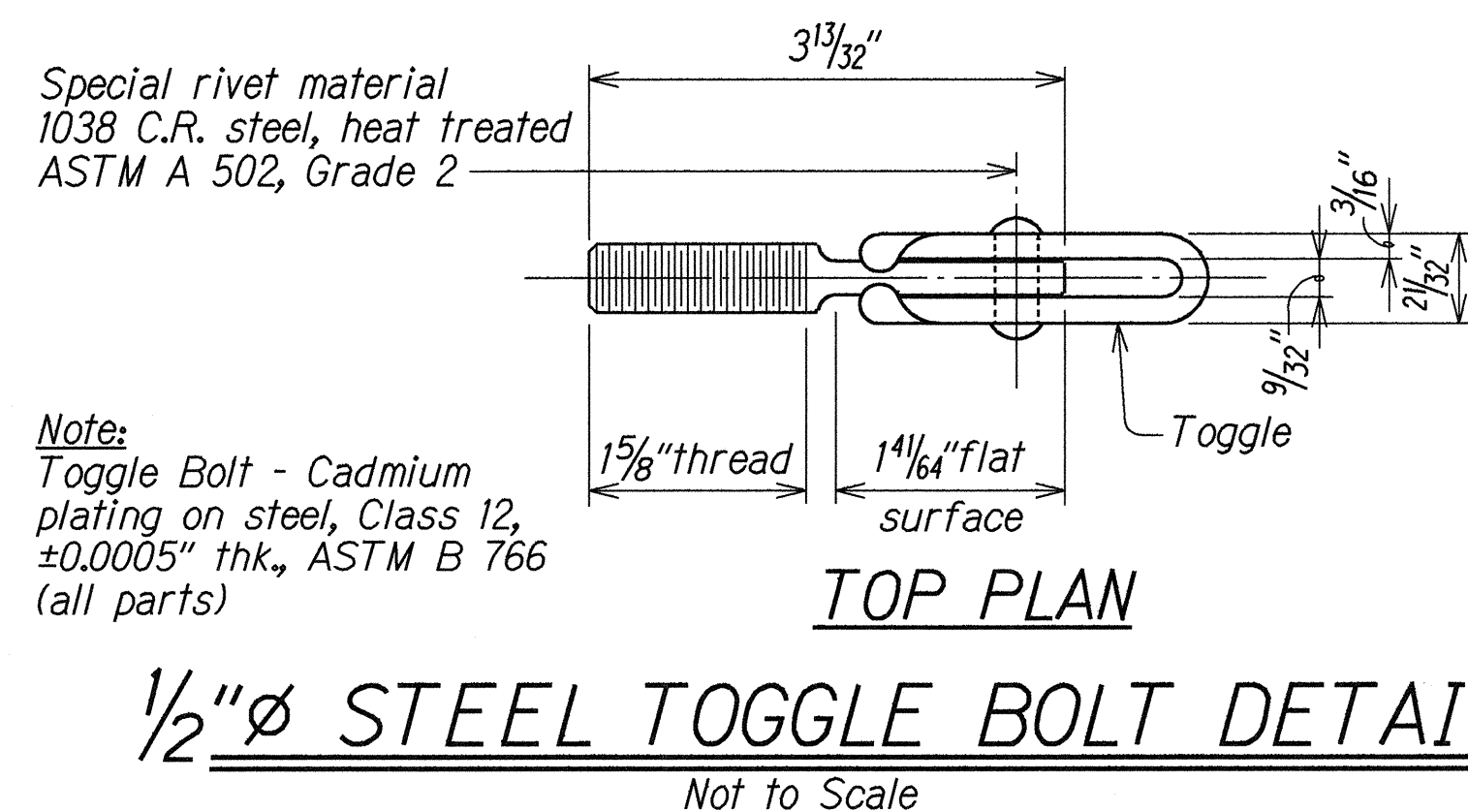
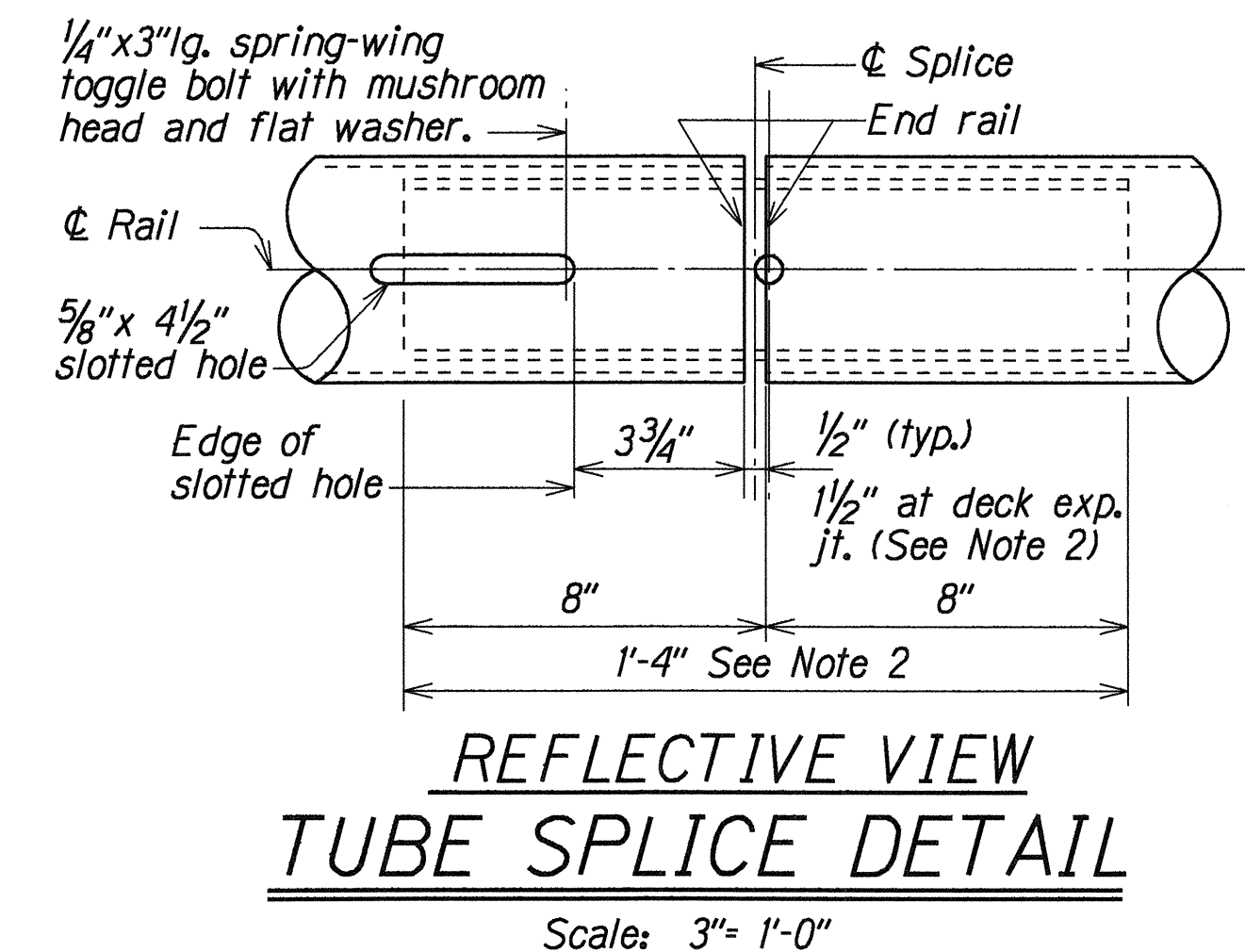
SHEET No. 011 OF 15 SHEETS

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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-099-1(13)	1995	42	58



- NOTES:**
1. Tubing shall be continuous over not less than 4-posts unless noted otherwise.
 2. All tubes shall be spliced in the panel spanning deck expansion joints. Increase joint width between tubes to 1 1/2" and increase sleeve length by 1". See Tube Splice Detail.
 3. Rail post shall be normal to grade.
 4. No more than one tube splice per panel shall be permitted.
 5. 1/8" thk., full size elastomeric pads shall be placed between every post base and concrete surface.
 6. Welding of aluminum shall conform to Subsection 713.14(B)(1) of the Standard Specifications.



ORIGINAL PLAN	DATE: 007 1991
DESIGNED BY: TMM/KSG	DRAWN BY: TMM/KSG
CHECKED BY: TMM/KSG	DATE: 007 1991
APPROVED BY: TMM/KSG	DATE: 007 1991

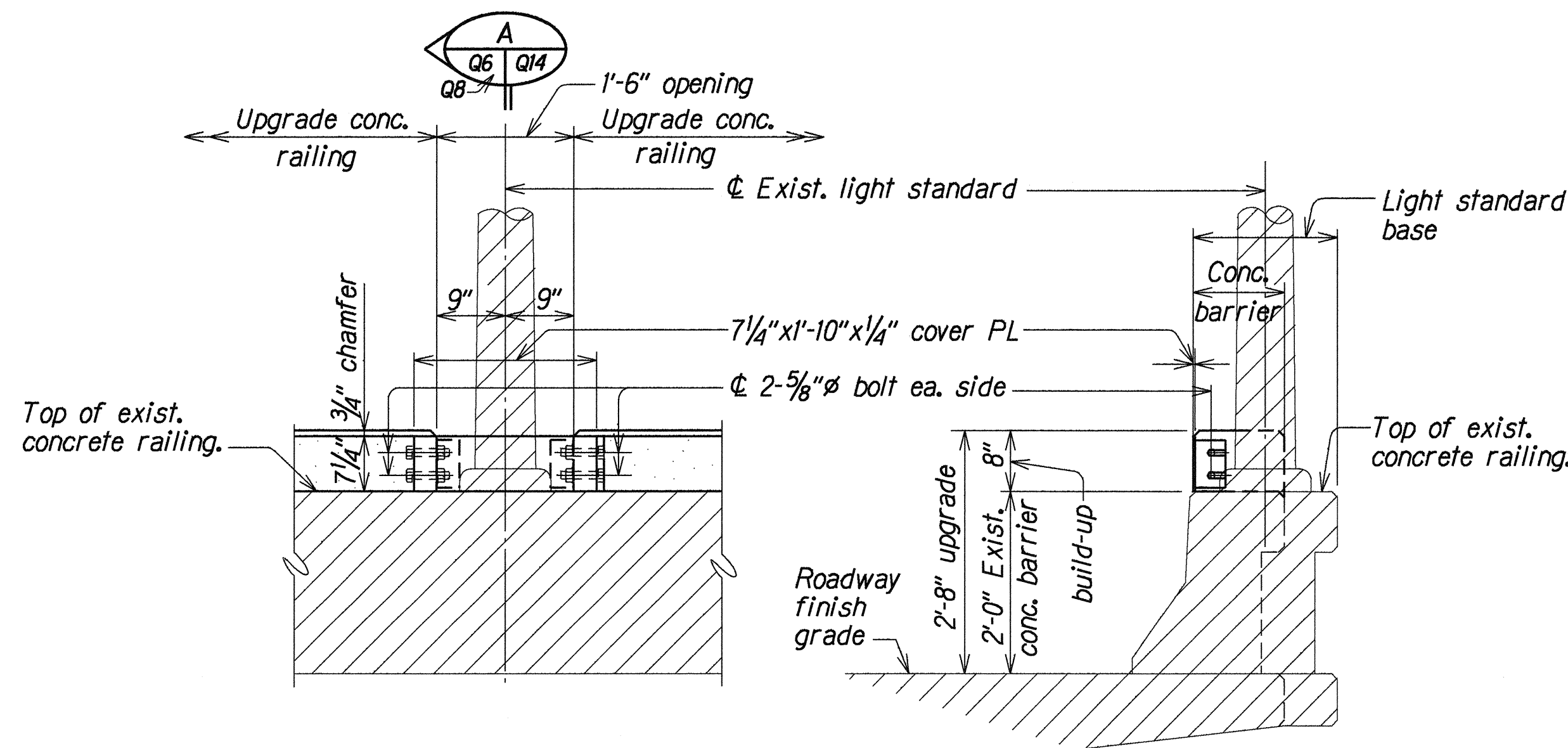
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURE NO. 12
TYPE "C" UPGRADE BRIDGE RAILING
ELEVATION AND SLEEVE DETAILS
KAMEHAMEHA HIGHWAY RESURFACING
LUMIAINA STREET TO FARRINGTON HIGHWAY
Federal Aid Project No. STP-099-1(13)

Scale: As Noted
Date: Oct. 1994

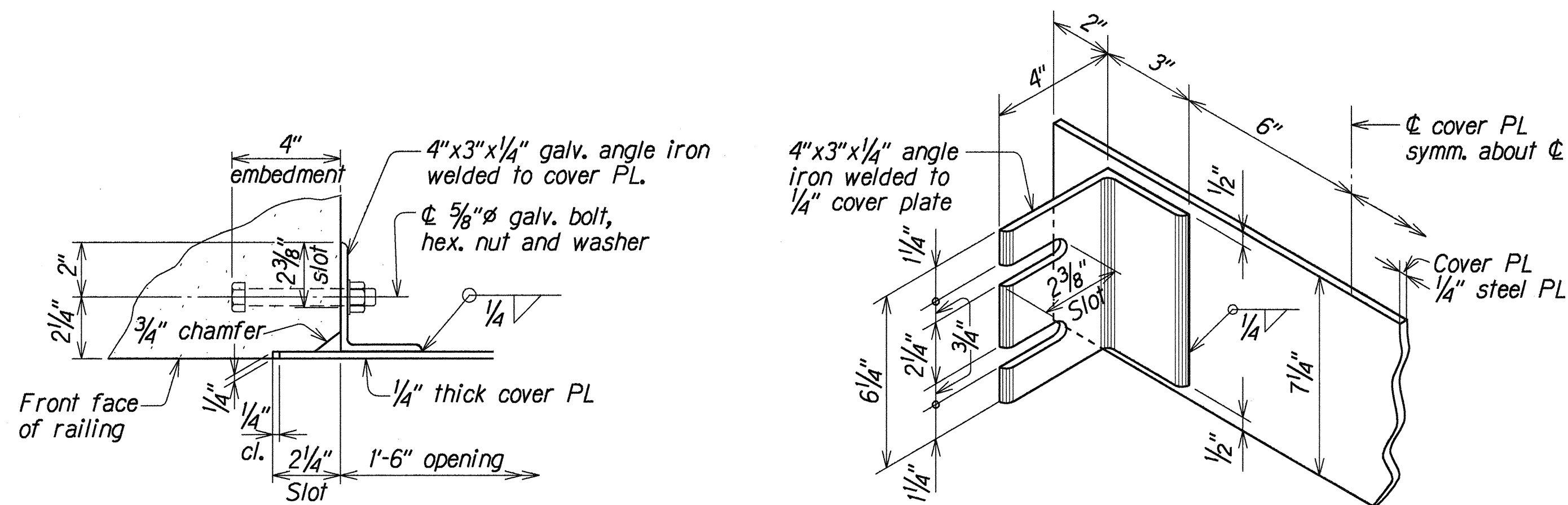
SHEET No. Q13 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-099-1(13)	1995	43	58



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

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

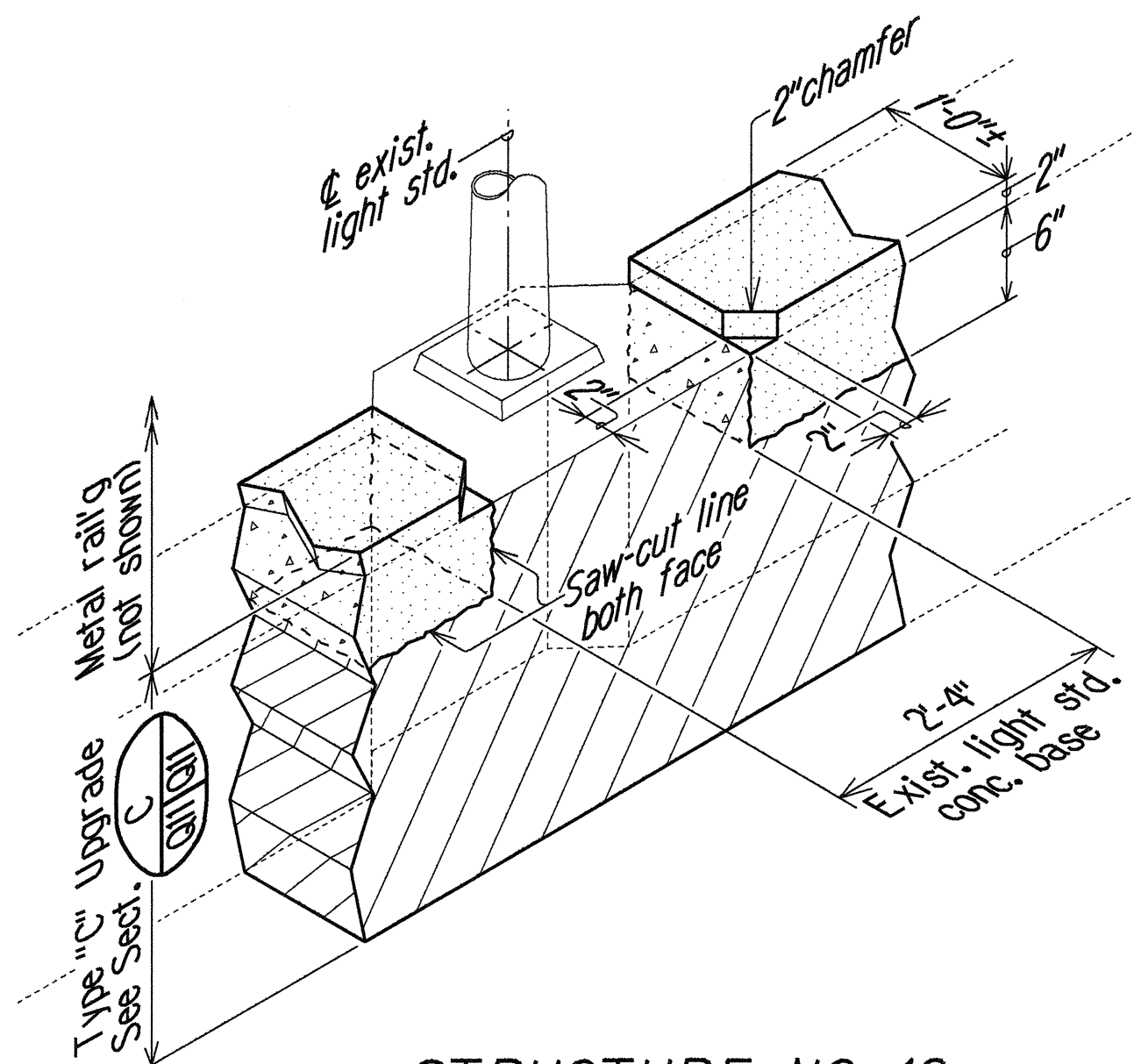


ANCHOR DETAIL
Scale: 3" = 1'-0"

ANGLE IRON CONNECTION TO COVER PLATE DETAIL
Scale: 3" = 1'-0"

TYPICAL UPGRADE CONC. RAILING COVER PLATE DETAIL AT LIGHT STANDARD

NUMBER OF COVER PLATE REQUIRED	
LOCATION	NO. REQUIRED
Bridge No. 4A Eastside Railing	1
Bridge No. 4B Westside Railing	2
Bridge No. 10A Eastside Railing	1
Bridge No. 10B Westside Railing	1
TOTAL	5



STRUCTURE NO. 12 UPGRADE CONC. RAILING DETAIL AT LIGHT STANDARD
Not to Scale

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	OCT 1994
SEALING	DESIGNED BY	OCT 1994
	CHECKED BY	OCT 1994
	APPROVED BY	OCT 1994

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

UPGRADE BRIDGE RAILING
DETAILS AT EXISTING
LIGHT STANDARD
KAMEHAMEHA HIGHWAY RESURFACING
LUMIAINA STREET TO FARRINGTON HIGHWAY
Federal Aid Project No. STP-099-1(13)

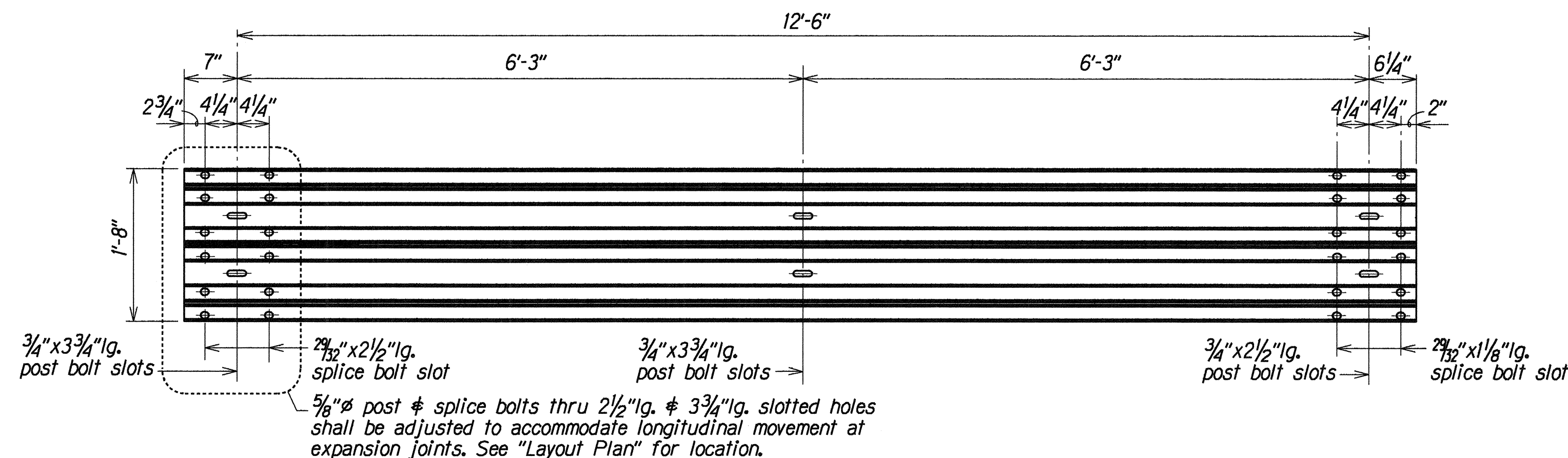
Scale: As Noted
Date: Oct. 1994

SHEET No. Q14 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-099-1(13)	1995	44	58

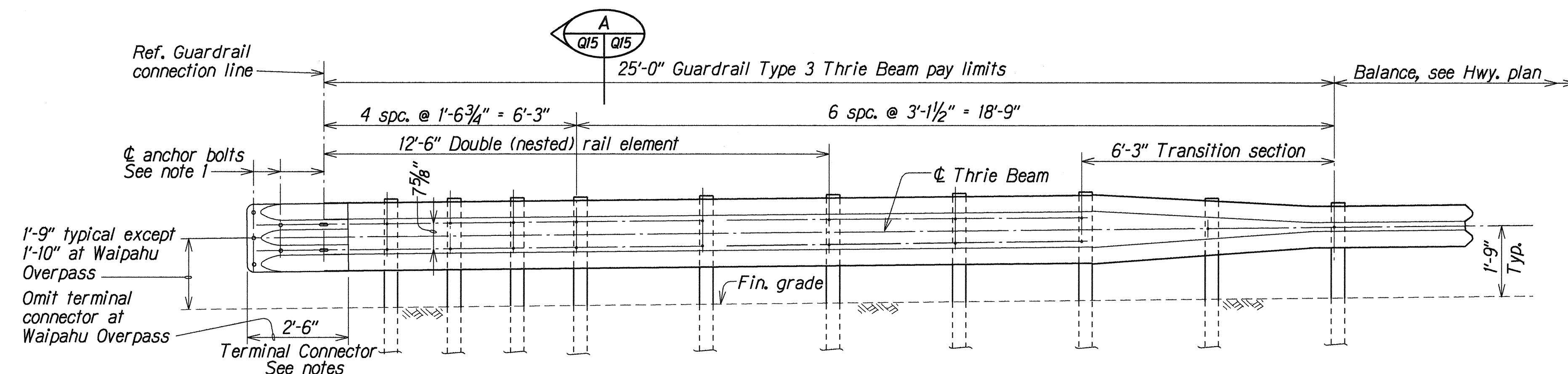
NOTES:

- The work necessary to connect guardrail to concrete end post shall include all labor, materials, tools, equipment and incidentals necessary to complete the work and shall be incidental to the metal guardrail and will not be paid for separately.
- See "DOT Standard Plan" Sht. *TE-57 for guardrail Type 3 thrie beam details and Sht. *TE-50 & *TE-51 for W beam metal guardrail details. Lap terminal connector and rail element in direction of traffic to prevent snagging.
- Terminal connector not required at Waipahu Overpass (Type "E" upgrade bridge rail).
- See "General Notes" on Sht. *Q1 for additional guardrail and drilling information.
- Construction of ramp shall conform to the requirements of Section 608--Sidewalks, of the Standard Specifications.



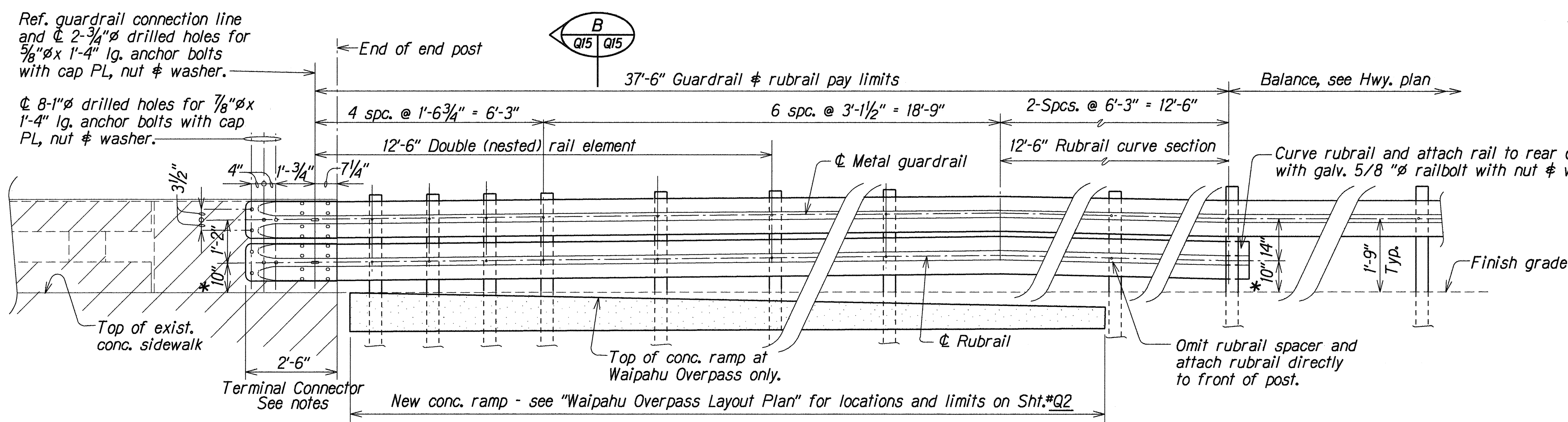
THRIE BEAM EXPANSION SECTION
Scale: 1" = 1'-0"

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



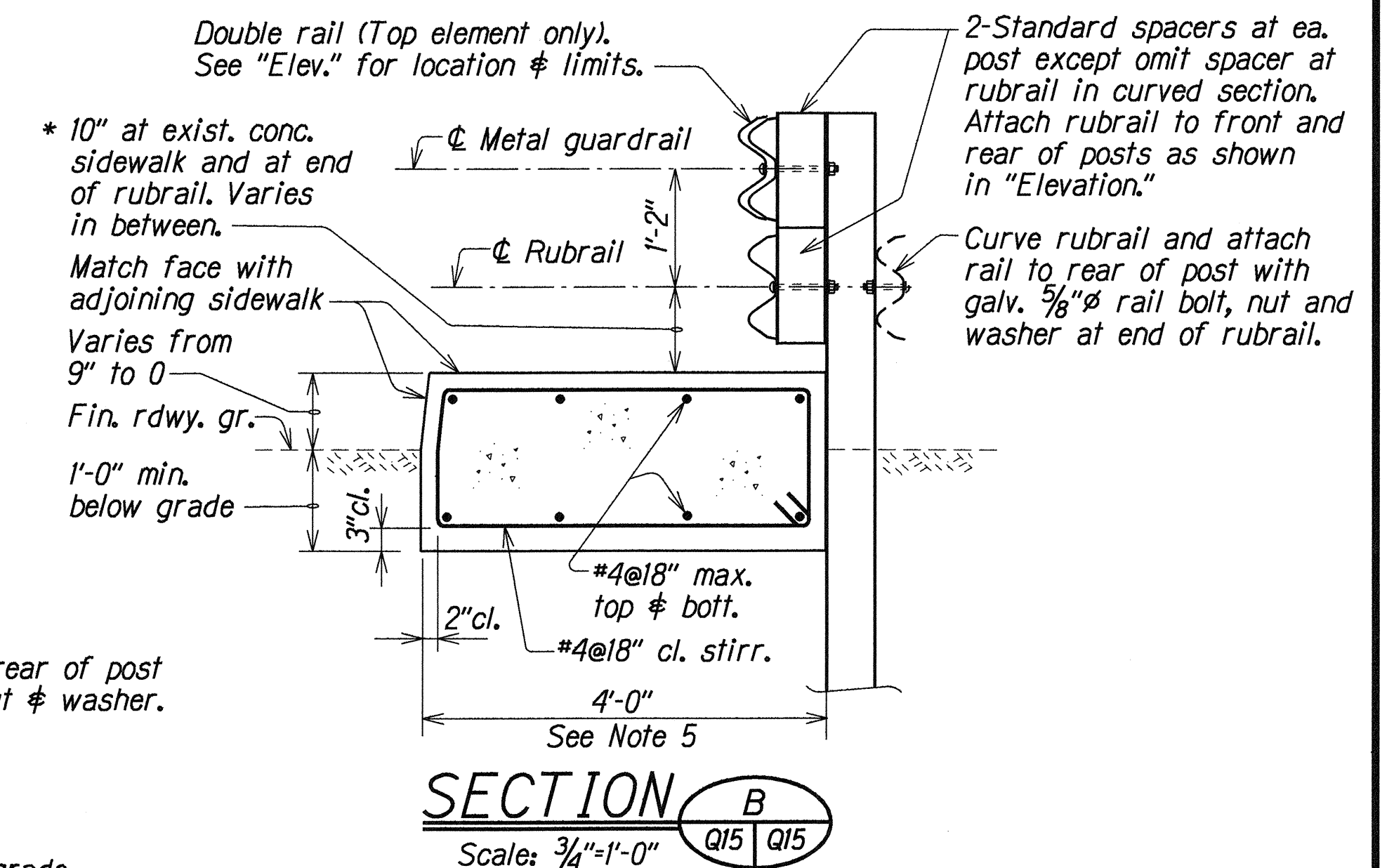
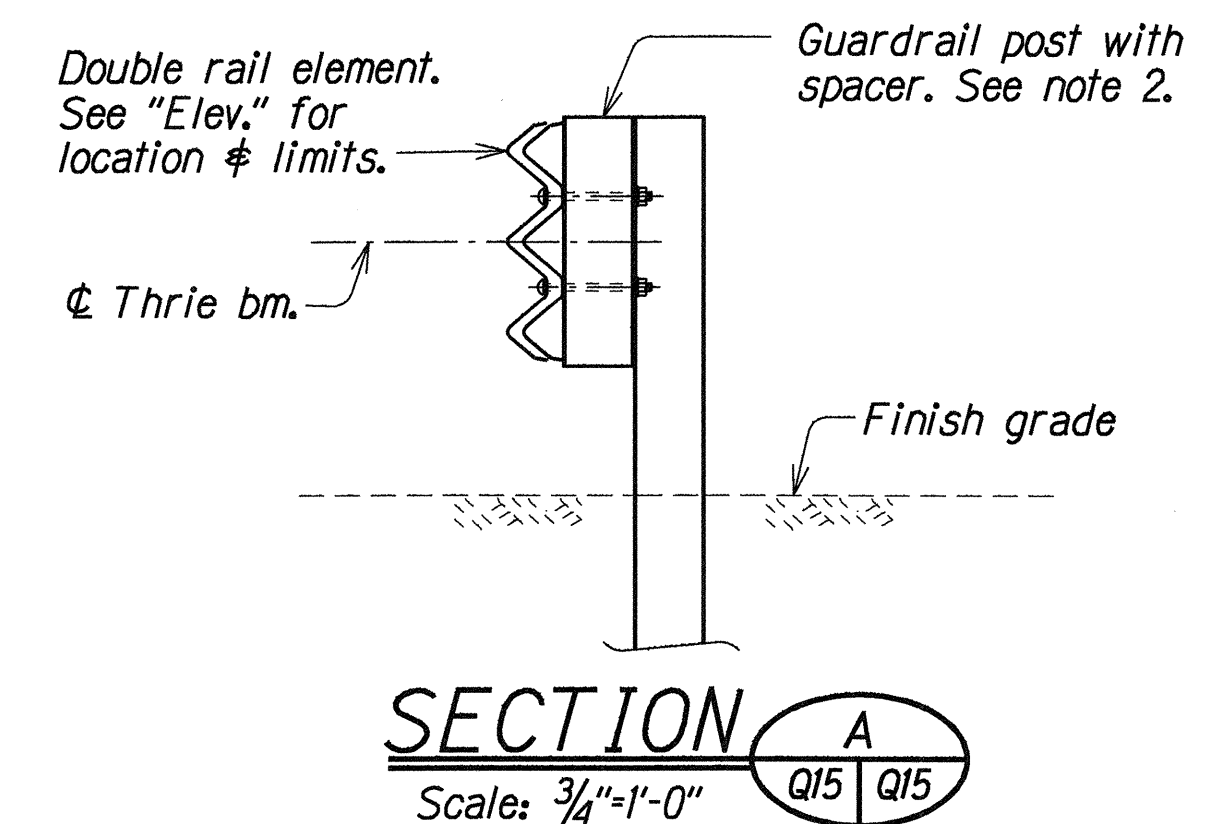
ELEVATION

TYPICAL TYPE 3 THRIE BEAM METAL GUARDRAIL UPGRADE
Scale: 1/2" = 1'-0"



ELEVATION

TYPICAL METAL GUARDRAIL & RUBRAIL UPGRADE WITH CONCRETE RAMP
Scale: 1/2" = 1'-0"



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

UPGRADE TYPE 3 THRIE BEAM GUARDRAIL
METAL GUARDRAIL WITH RUBRAIL
AND CONCRETE RAMP DETAILS
KAMEHAMEHA HIGHWAY RESURFACING
LUMJAINA STREET TO FARRINGTON HIGHWAY
Federal Aid Project No. STP-099-1(13)

Scale: As Noted
Date: Oct. 1994

SHEET No. Q15 OF 15 SHEETS

ORIGINAL PLAN	DATE	DESIGNED BY	CHECKED BY
NOTE BOOK	010	007 1994	007 1994
DESIGNED BY	007 1994	007 1994	007 1994
CHECKED BY	007 1994	007 1994	007 1994