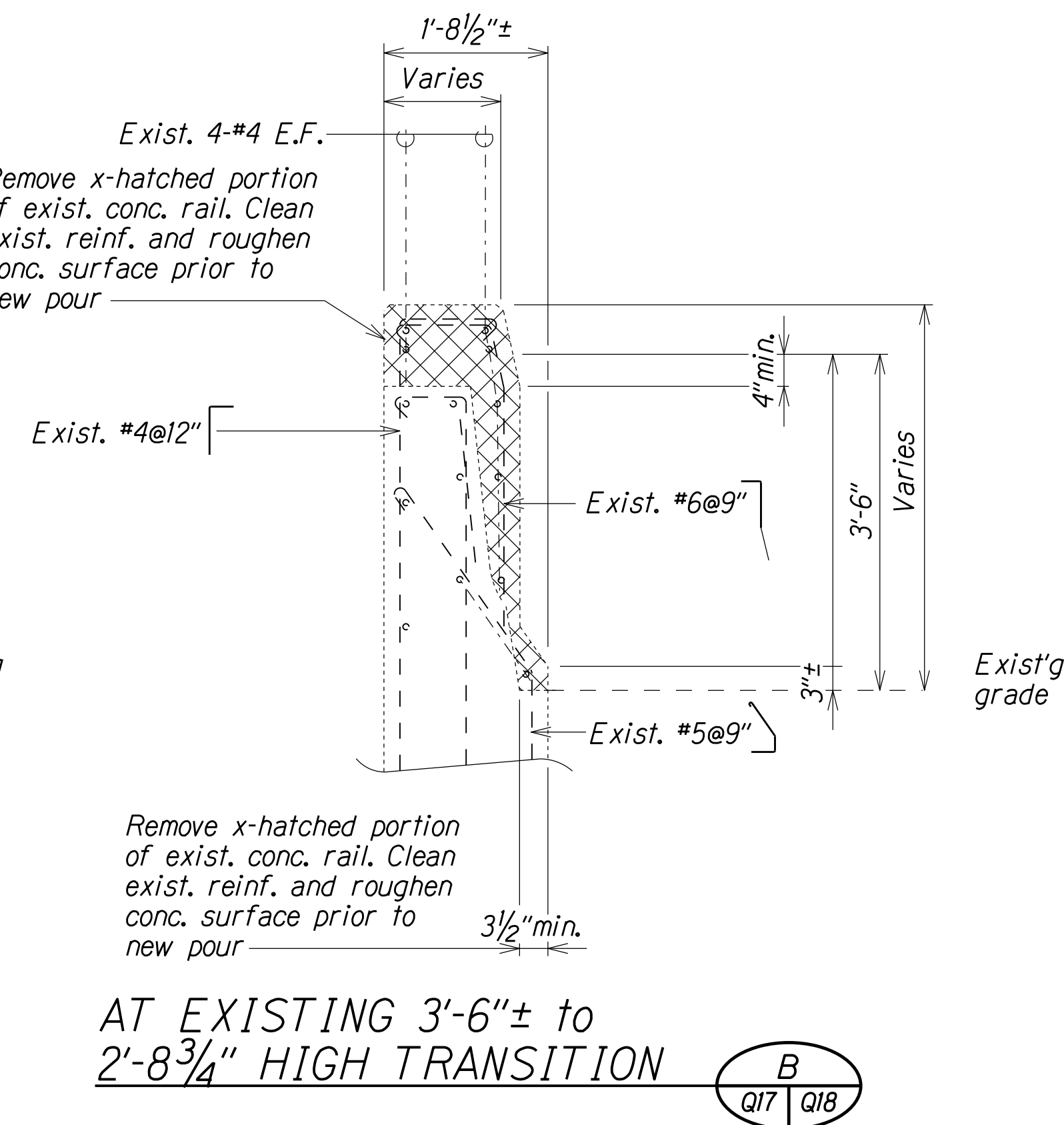
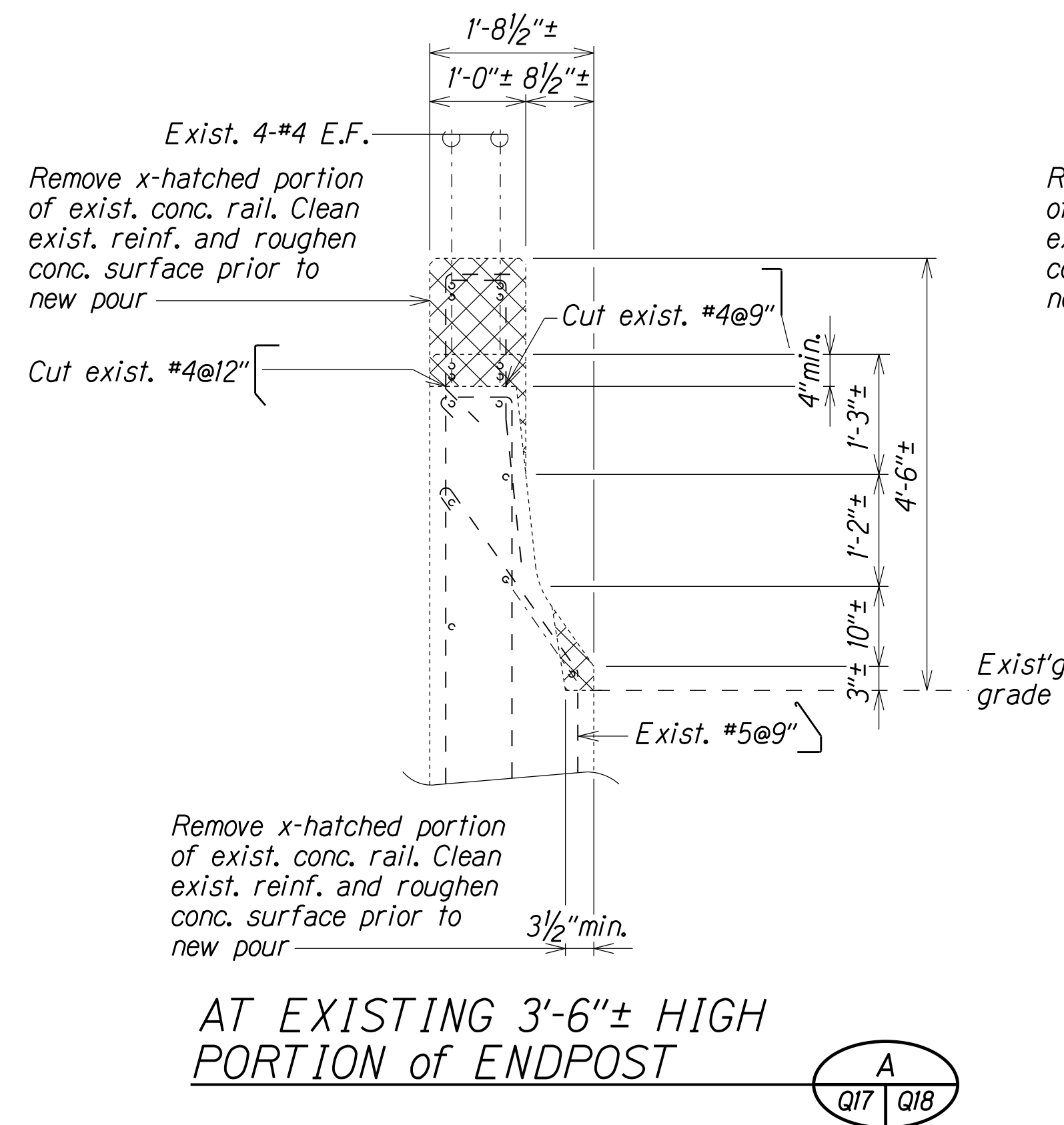
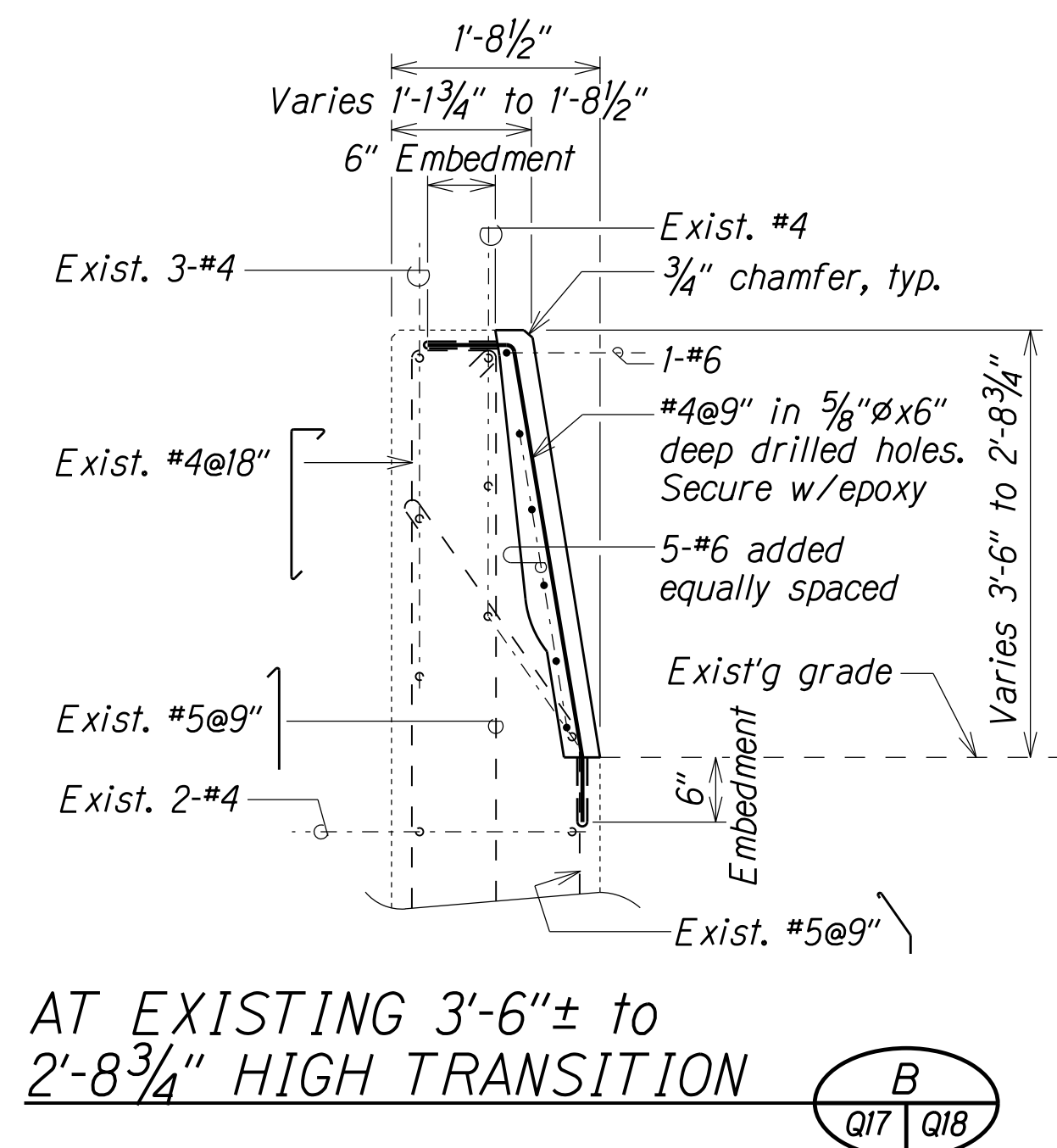
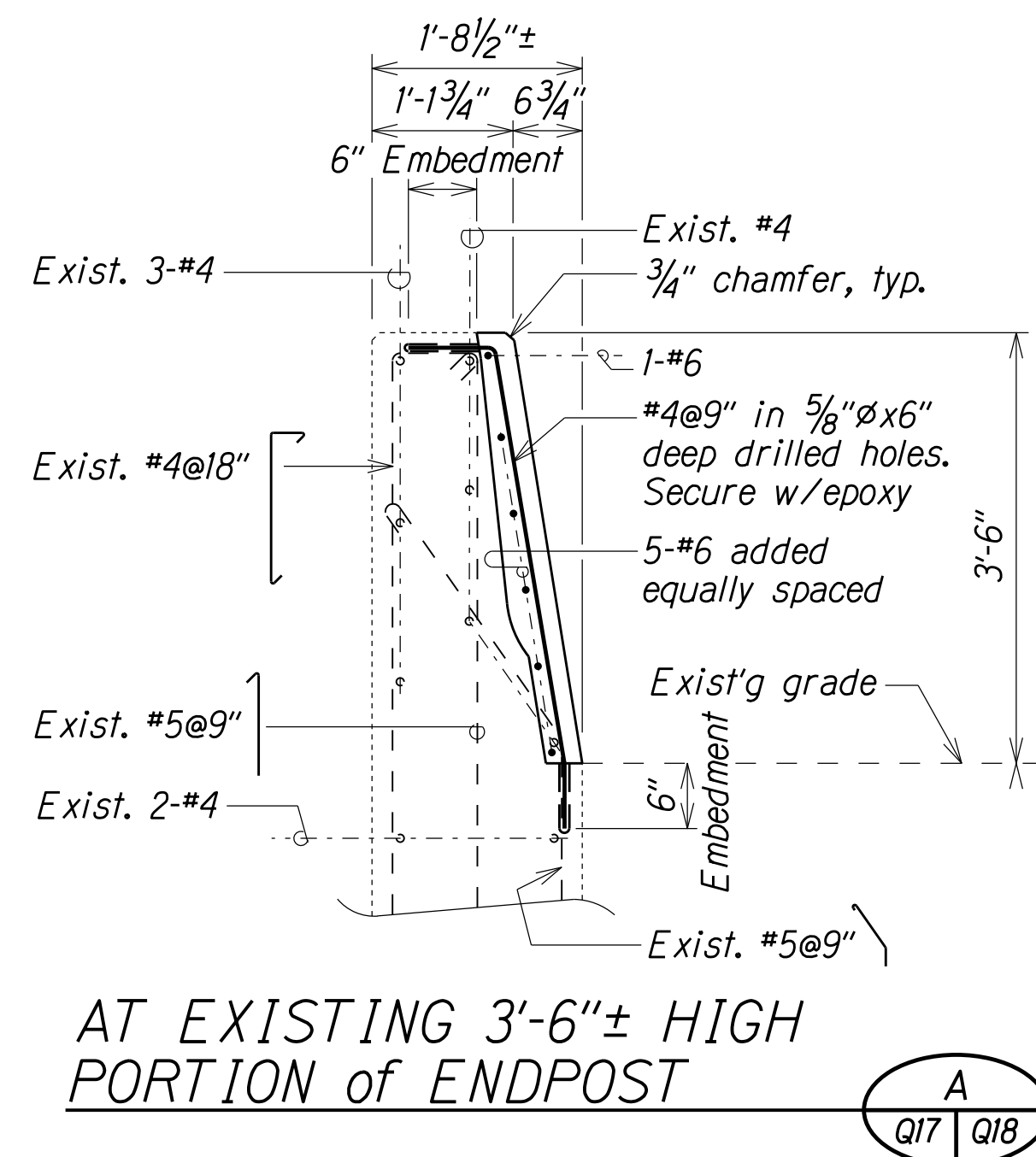




FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(71)	2018	59	68



TYPICAL SECTIONS SHOWING LIMITS of REMOVAL



TYPICAL SECTIONS SHOWING UPGRADES

ENDPOST UPGRADE at WINGWALL NO. 1 -- EAST PAAUILO BRIDGE

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

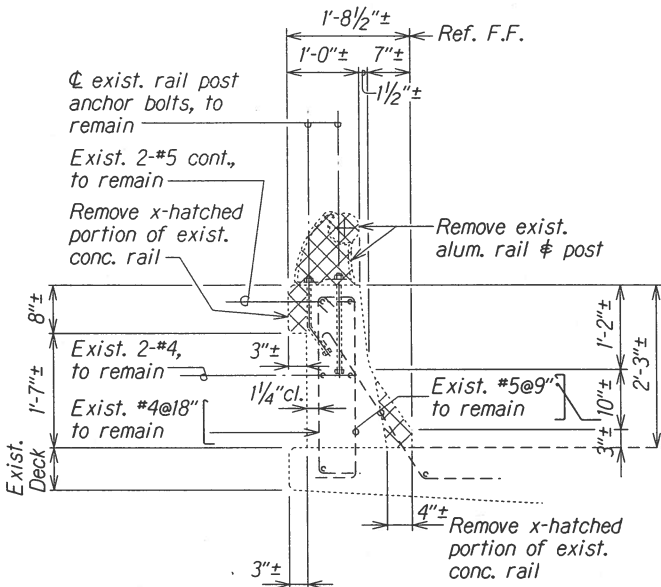
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	XXX 1991
	DESIGNED BY	XXX 1991
	CHECKED BY	XXX 1991
		XXX 1991

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**EAST PAAUILO BRIDGE**  
**ENDPOST UPGRADE at WINGWALL NO. 1**  
**HAWAII BELT ROAD GUARDRAIL AND**  
**SHOULDER IMPROVEMENTS**  
Vicinity of Kalopa Bridge and Kaunaloa Bridge to E. Paauiilo Bridge  
Federal-Aid Project No. NH-019-2(71)  
Scale: As Noted Date: Nov., 2018

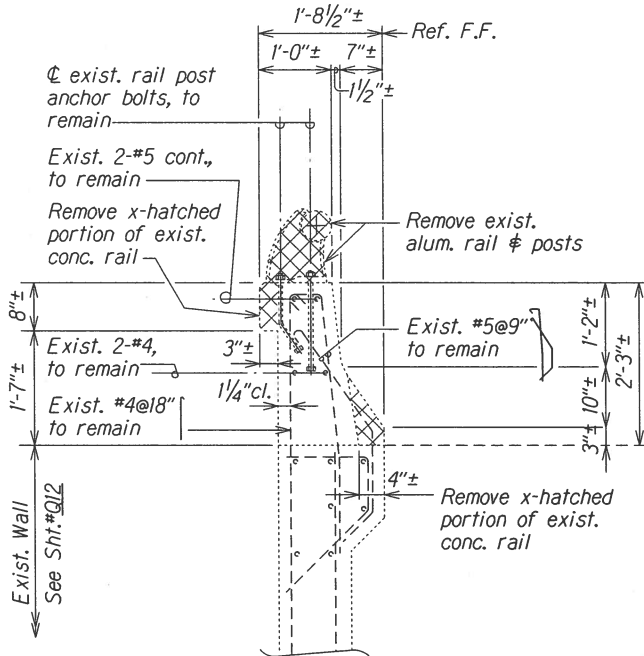
SHEET No. Q18 OF 27 SHEETS



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(71)	2018	XXX	XXX

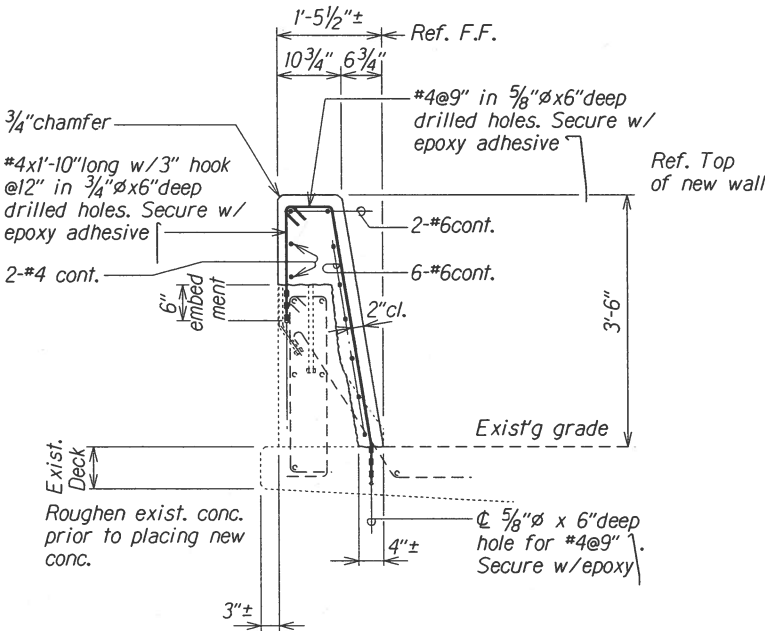


AT BRIDGE DECK  
A  
Q17,Q21,Q23,Q20

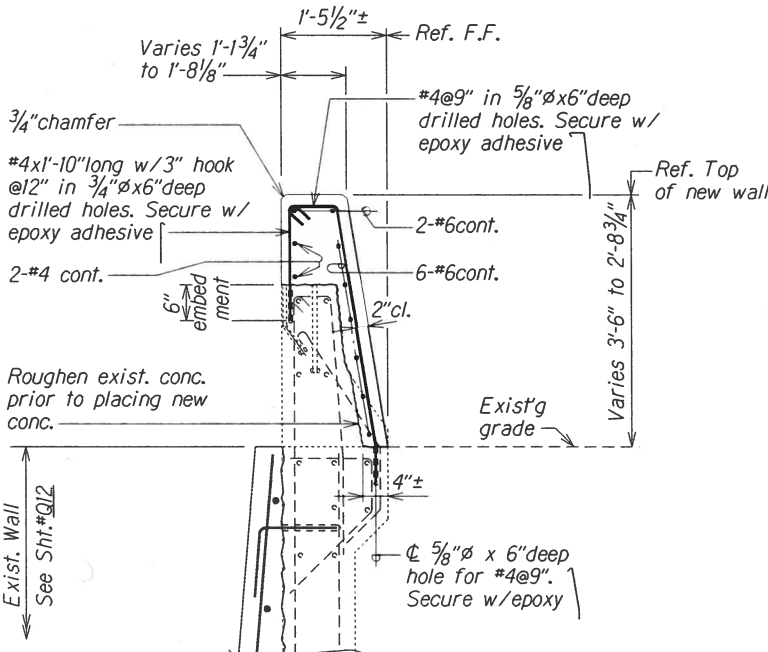


AT WINGWALLS  
B  
Q17,Q21,Q23,Q20

TYPICAL SECTIONS SHOWING LIMITS of REMOVAL



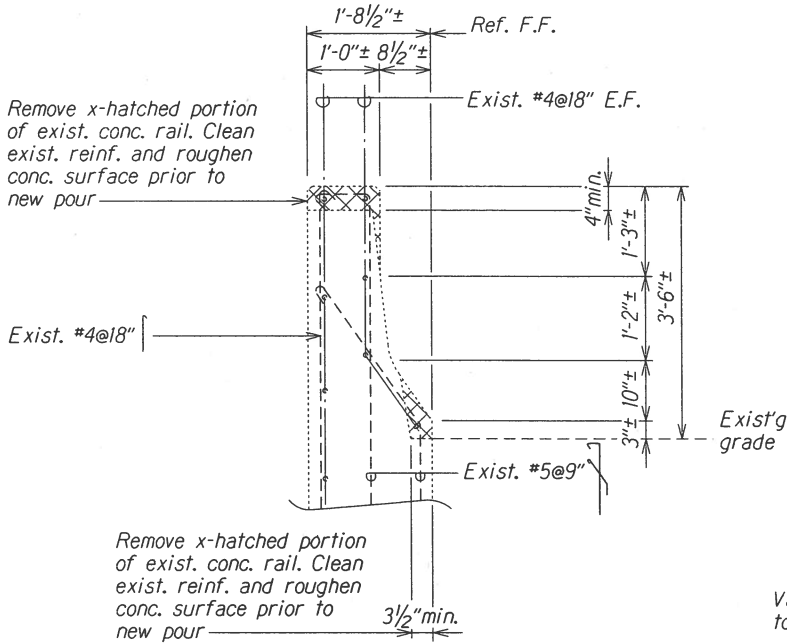
AT BRIDGE DECK  
A  
Q17,Q21,Q23,Q20



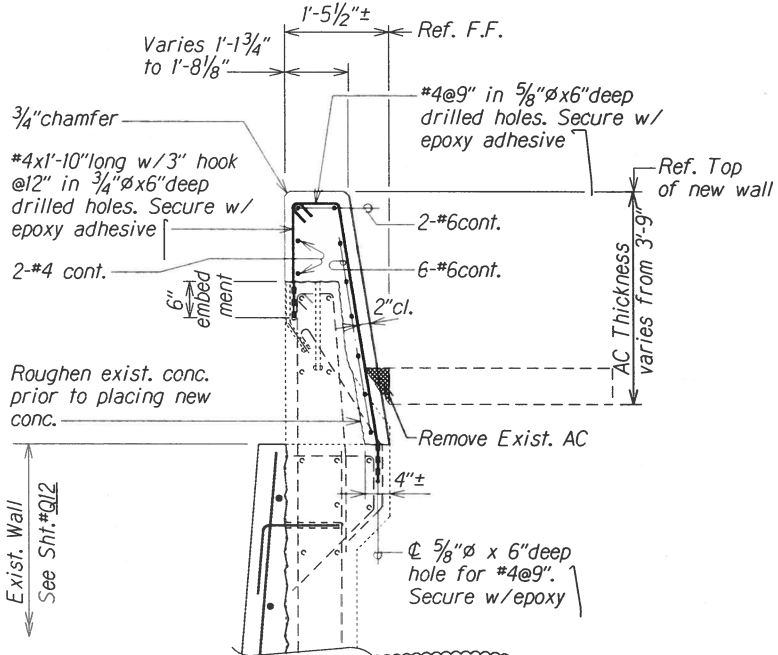
AT WINGWALLS  
B  
Q17,Q21,Q23,Q20

TYPICAL RAIL UPGRADE SECTIONS

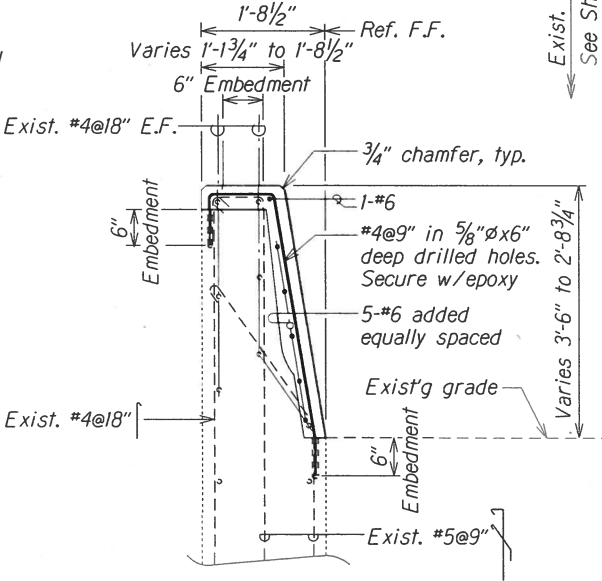
Scale: 3/4" = 1'-0"



AT ENDPOSTS  
C  
Q17,Q19,Q21,Q23,Q20



AT WINGWALLS No. 4  
B  
Q17,Q21,Q23,Q20



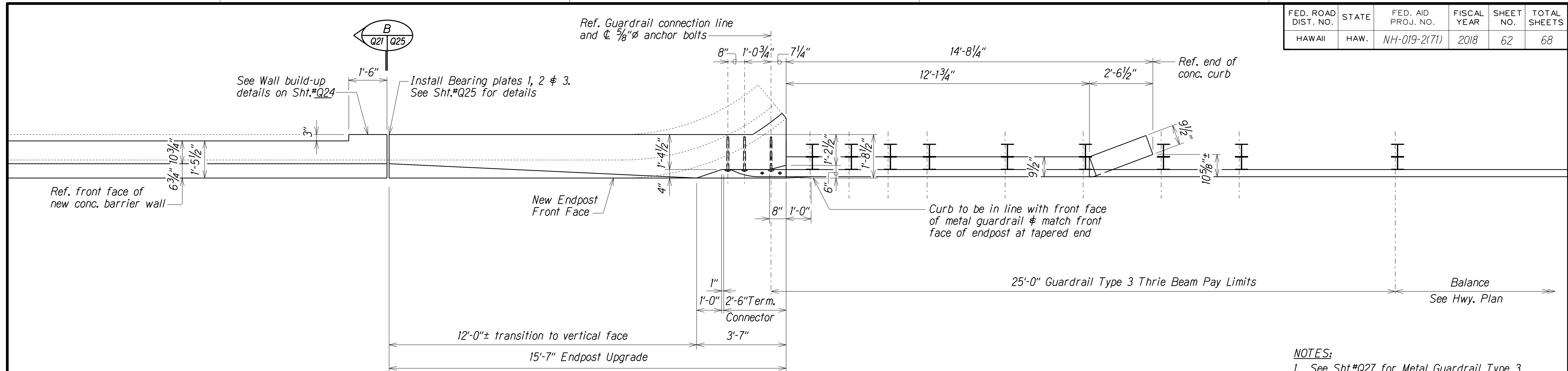
AT ENDPOSTS  
C  
Q17,Q19,Q21,Q23,Q20

AS BUILT Corrections:		
Annotation Revisions & clarifications		
DATE	REVISION	APP'D.
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION <b>EAST PAAULO BRIDGE</b> <b>TYPICAL RAIL UPGRADE SECTIONS</b> <b>HAWAII BELT ROAD GUARDRAIL and SHOULDER IMPROVEMENTS</b> Vicinity of Kalopa Bridge and Kaunaloa Bridge to E. Paaulo Bridge Federal Aid Project No. NH-019-2(71) Scale: As Noted Date: Nov, 2018		

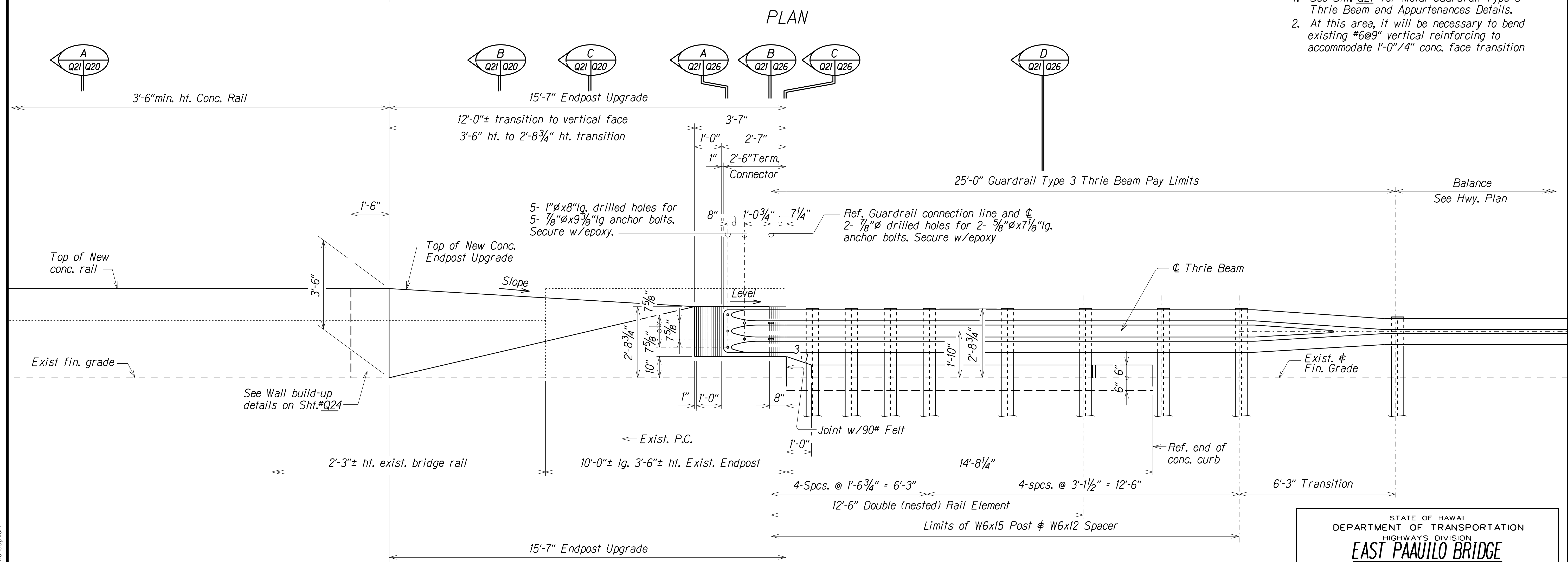
SHEET No. Q20 OF 27 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(71)	2018	62	68



- NOTES:
- See Sht.\*Q27 for Metal Guardrail Type 3 Thrie Beam and Appurtenances Details.
  - At this area, it will be necessary to bend existing #6@9" vertical reinforcing to accommodate 1'-0"/4" conc. face transition



## ENDPOST UPGRADE at WINGWALL NO. 3 -- EAST PAAUILO BRIDGE

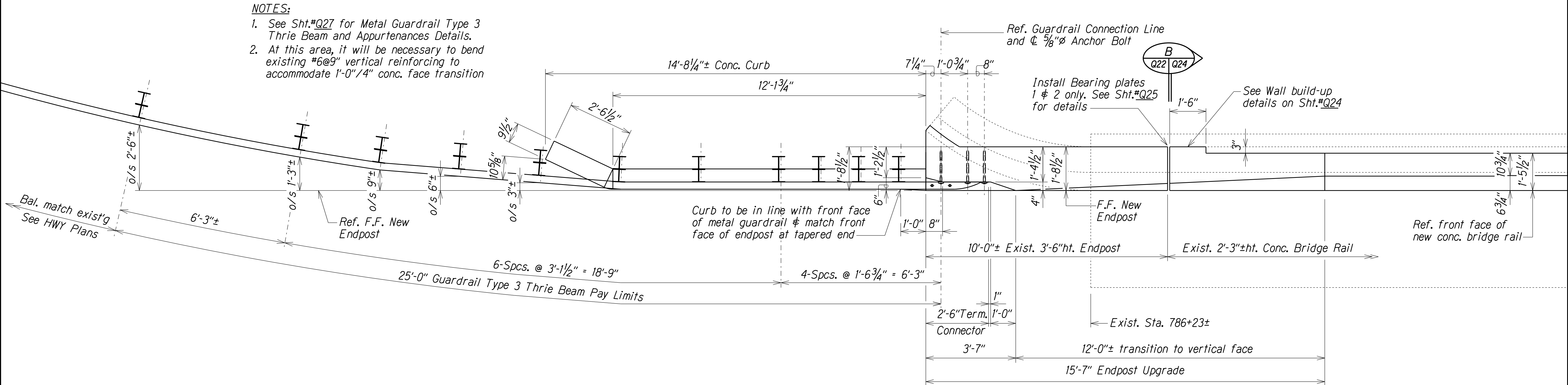
Scale: 1/2" = 1'-0"

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**EAST PAAUILO BRIDGE**  
**ENDPOST UPGRADE at WINGWALL NO. 3**  
**HAWAII BELT ROAD GUARDRAIL AND**  
**SHOULDER IMPROVEMENTS**  
Vicinity of Kalopa Bridge and Kaunaloa Bridge to E. Paauilo Bridge  
Federal-Aid Project No. NH-019-2(71)  
Scale: As Noted Date: Nov., 2018

SHEET No. Q21 OF 27 SHEETS



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(71)	2018	63	68



PLAN

ENDPOST UPGRADE at WINGWALL NO. 4 -- EAST PAAUILO BRIDGE

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

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

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

EAST PAAUILO BRIDGE

ENDPOST UPGRADE at WINGWALL NO. 4

HAWAII BELT ROAD GUARDRAIL AND SHOULDER IMPROVEMENTS

Vicinity of Kalopa Bridge and Kaunaloa Bridge to E. Paauiilo Bridge

Federal-Aid Project No. NH-019-2(71)

Scale: As Noted

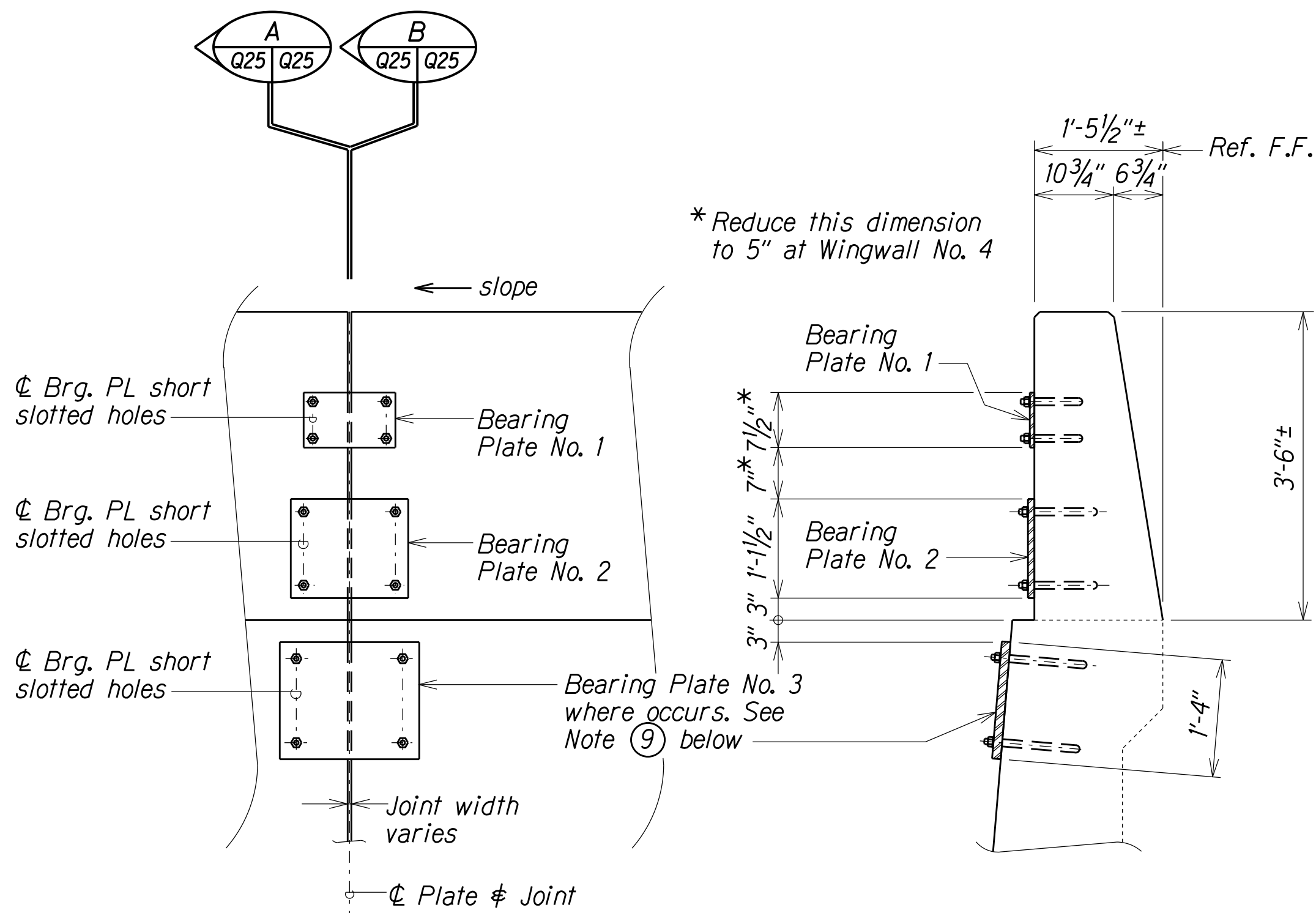
Date: Nov., 2018





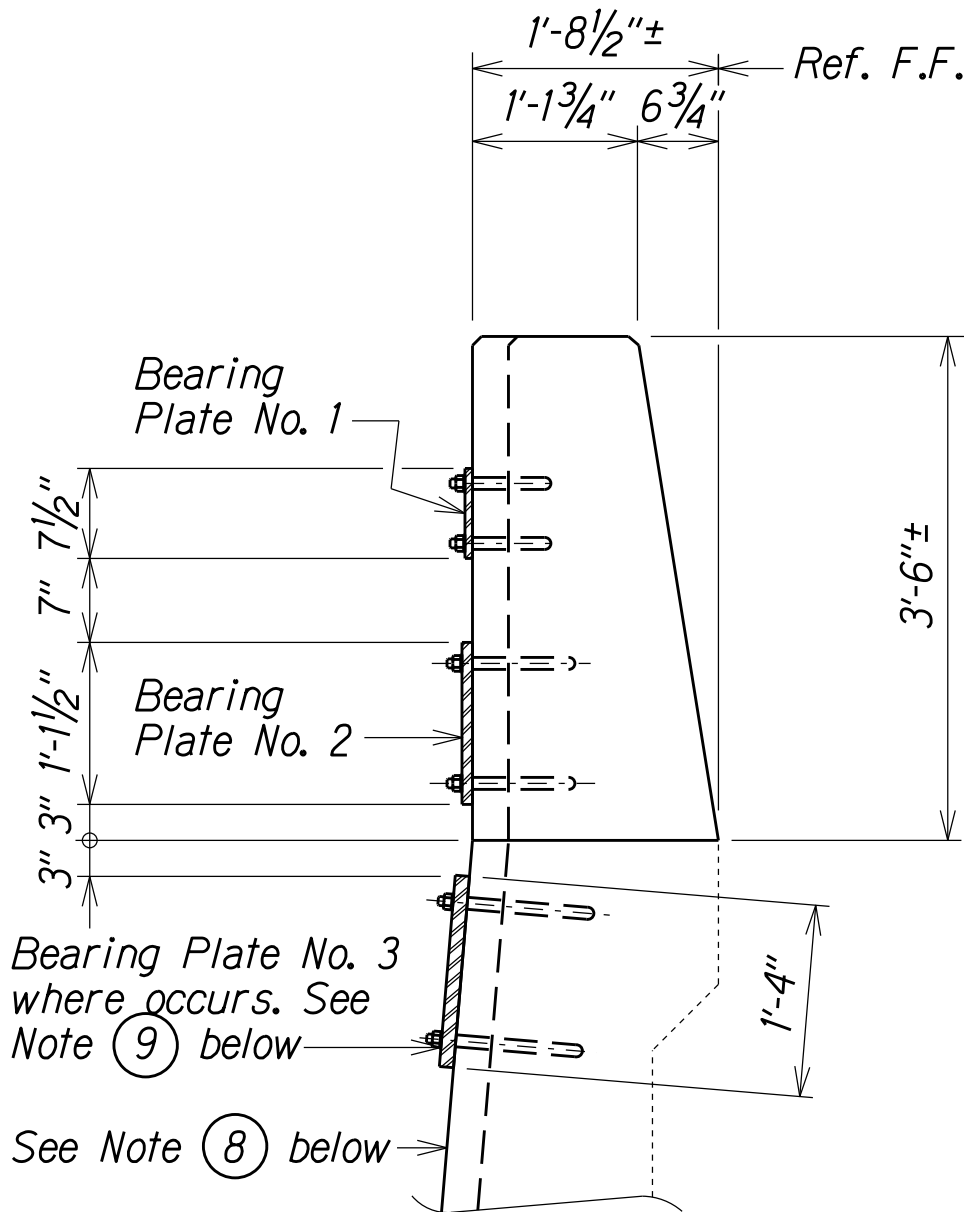


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(71)	2018	66	68

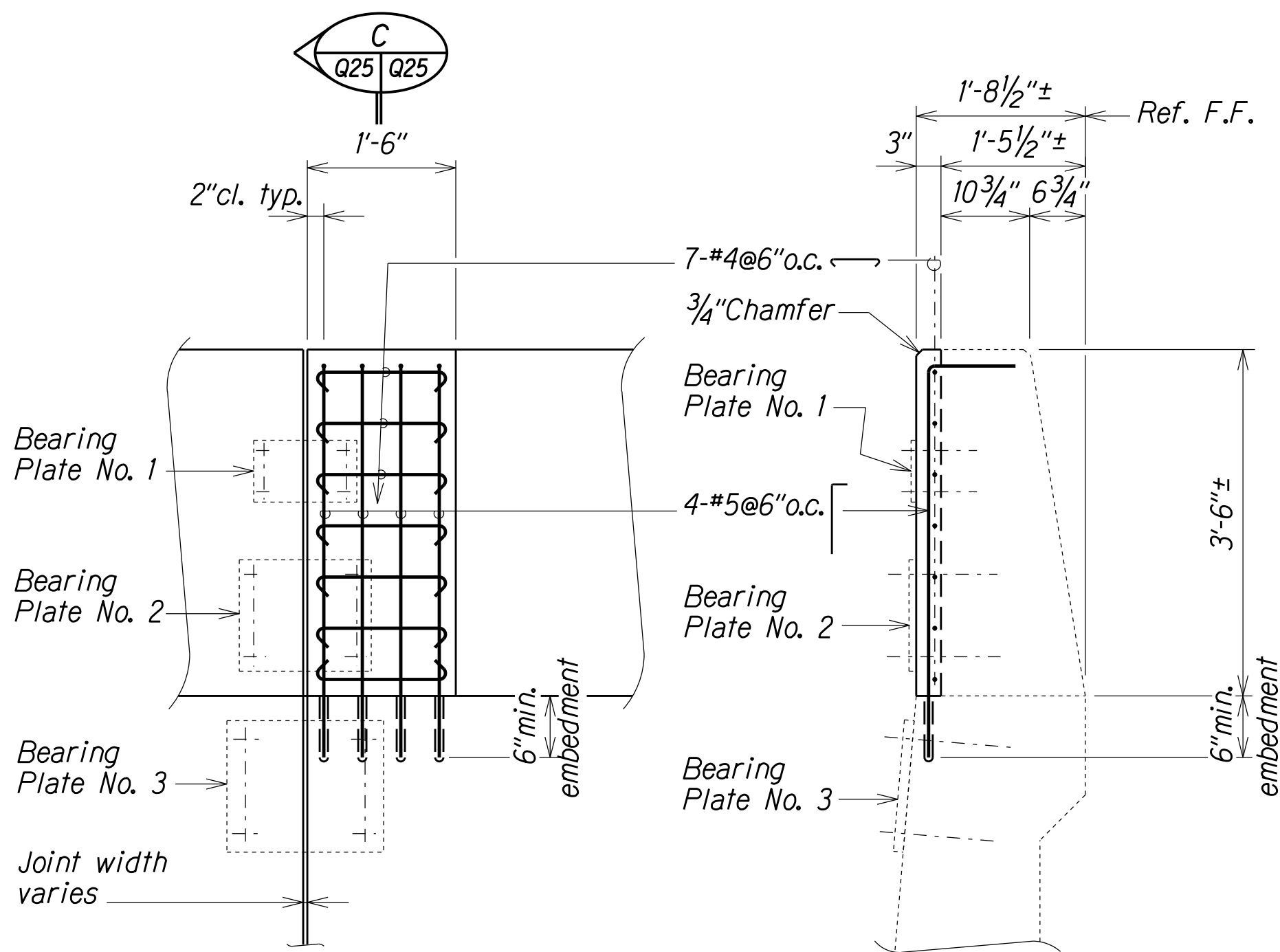


ELEVATION

SECTION  
AT 1'-5 1/2" WALLS



SECTION  
AT 1'-8 1/2" WALLS



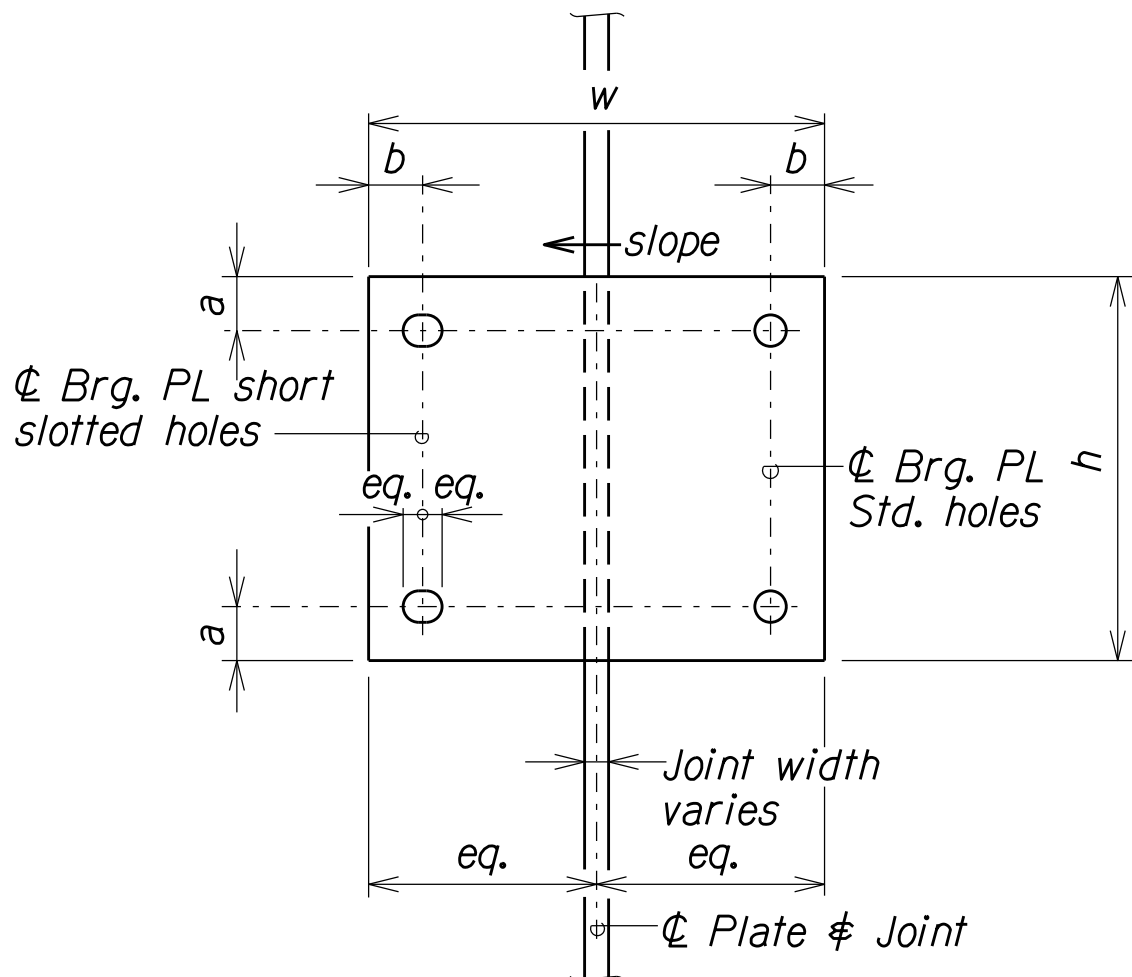
ELEVATION

SECTION  
C  
Q25 Q25

WALL BUILD-UP DETAILS at WALL to ENDPPOST CONNECTION  
Scale: 3/4" = 1'-0"

AT JOINTS on BARRIERS and WALLS												
Bearing Plate No.**	Bearing Plate					Rods		Drilled Holes		Bearing Plate Holes		
	h	w	t	a	b	diam.	length	diam.	length	qty per plate	Short Slotted height	Std. width diam.
1	7 1/2"	1'-0 1/2"	5/16"	1 1/4"	1 1/4"	3/4"ø	8 5/8"	7/8"ø	7"	2 ea.	1 3/16"	1" 1 3/16"ø
2	1'-1 1/2"	1'-4"	1"	1 3/4"	1 3/4"	1"ø	11 1/4"	1 1/8"ø	9"	2 ea.	1 1/16"	1 5/16" 1 1/16"ø
3	1'-4"	1'-7"	1 3/16"	2 1/4"	2 1/4"	1 1/4"ø	1'-2 1/8"	1 3/8"ø	11 1/2"	2 ea.	1 5/16"	1 5/8" 1 5/16"ø

\*\*Walls Only



BEARING PLATE DETAILS  
Not to Scale

NOTES:

- All anchor rods shall be placed in drilled holes and secured with epoxy
- All anchor rods shall be ASTM F 1554, Grade 105 and threaded
- All nuts shall be ASTM A 563 Grade DH, heavy hex
- All washers shall be ASTM F 436, Type I
- All bearing plates, bolts, nuts and washers shall be hot-dipped galvanized
- All bearing plates shall be ASTM A 709, Grade 50
- Short slotted holes shall be located at the downslope side of the joint
- At Wingwall No. 1; back face is vertical, as well as bridge railing
- See Plan and Elevation Sht.#Q1 and Q2 for locations of Bearing Plate 3

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	XXX 1991
	DESIGNED BY	XXX 1991
	CHECKED BY	XXX 1991
		XXX 1991

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**EAST PAAULO BRIDGE**  
**BEARING PLATE and WALL BUILD-UP DETAILS**  
HAWAII BELT ROAD GUARDRAIL AND SHOULDER IMPROVEMENTS  
*Vicinity of Kalopa Bridge and Kaunaloa Bridge to E. Paaulo Bridge*  
Federal Aid Project No. NH-019-2(71)

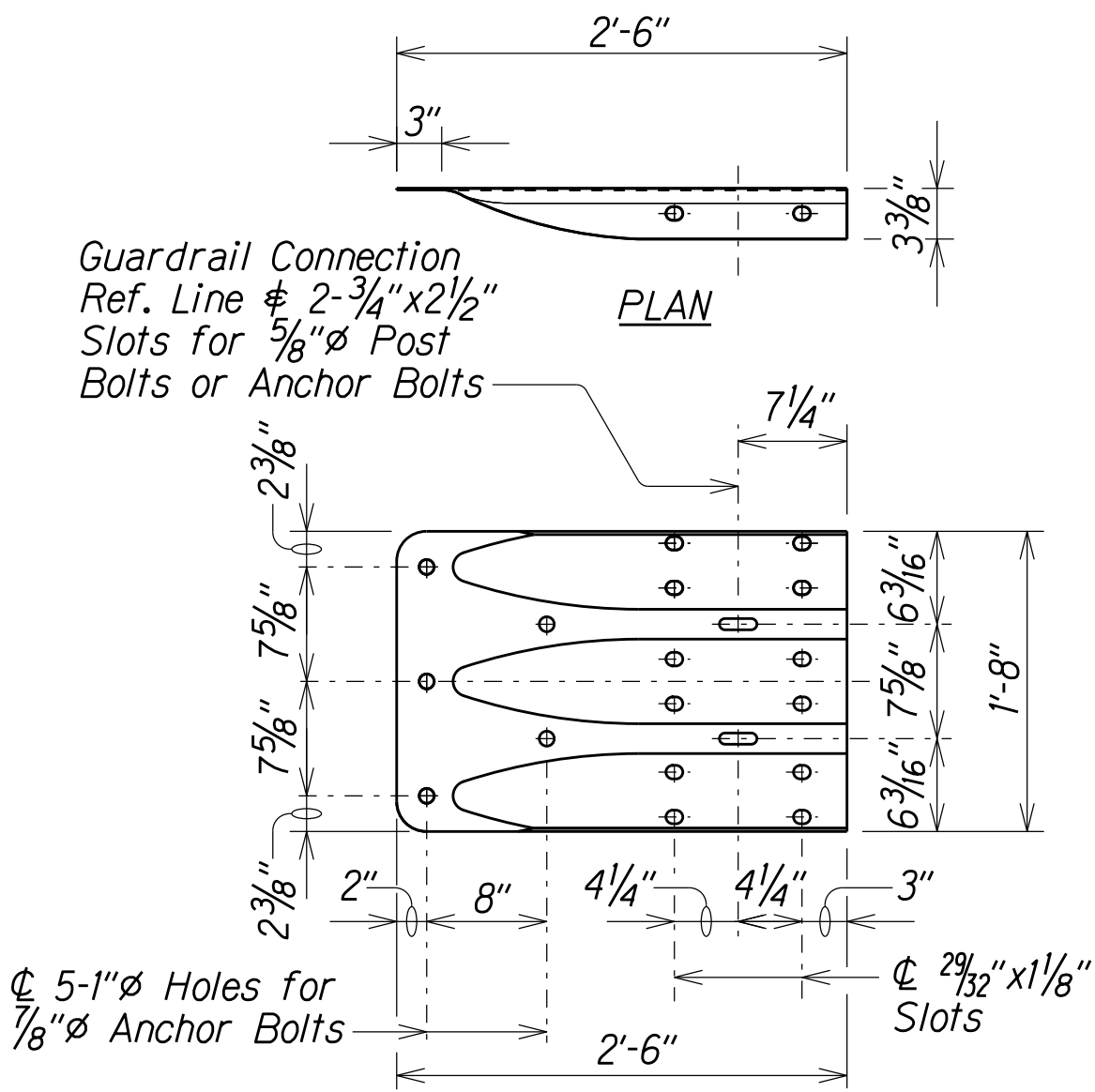
Scale: As Noted
Date: Nov., 2018

SHEET No. Q25 OF 27 SHEETS



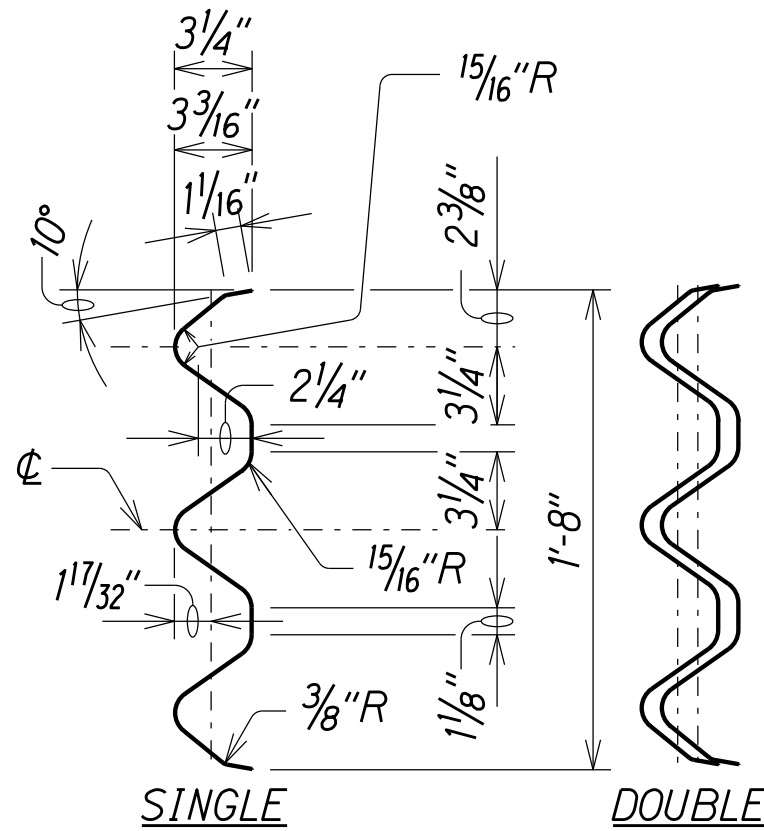
NOTES:

- A. The work necessary to connect guardrail to concrete endpost shall include all labor, materials, tools, equipment and incidentals necessary to complete the work and will not be paid for separately.
- B. Lap terminal connector and rail element in direction of traffic to prevent snagging.
- C. Splice bolt (FBB01), rail bolt (FBB02), and recessed nut shall conform to AASHTO M180 and be hot dipped galvanized in accordance with AASHTO M232, Class C.
- D. Post hex bolt and nut shall conform to Hawaii Standard Specifications, Section 710.08.
- E. "Terminal Connector" and standard spacer, including all anchor bolts, cap PL, nuts and washers, shall be hot-dip galvanized after fabrication.
- F. "Terminal Connector", "Transition Section" and thrie beam shall be fabricated from 10 gauge steel conforming to the requirements of AASHTO M180, Type II, Class B. All other rail shall conform to the requirements of AASHTO M180, Type II, Class A.
- G. Cap PL shall be fabricated from steel meeting the requirement of ASTM A36.
- H. First 25'-0" of guardrail adjoining "Terminal Connector" shall be galvanized steel and supports spaced as shown on the detail drawings. This section of rail shall be placed on tangent to endpost or parallel to roadway, unless conditions at site renders it impossible to do so. For Wingwall No. 4, the flare point to be determined in field.
- I. Double (nest 1st panel) thrie beam elements at all endpost connections, except on highways with one-way traffic pattern, use single thrie beam elements at endpost on trailing end only.
- J. Where double (nested) beam occur, 12" "Back-up Plate" not required.
- K. Heads of through anchor bolts shall be placed on the traffic side of the rail.
- L. W-beam structural steel shapes shall conform to ASTM A992. Structural steel plates and bars shall conform to ASTM A36.
- M. No bolts are to be cut after manufacturing and galvanizing.



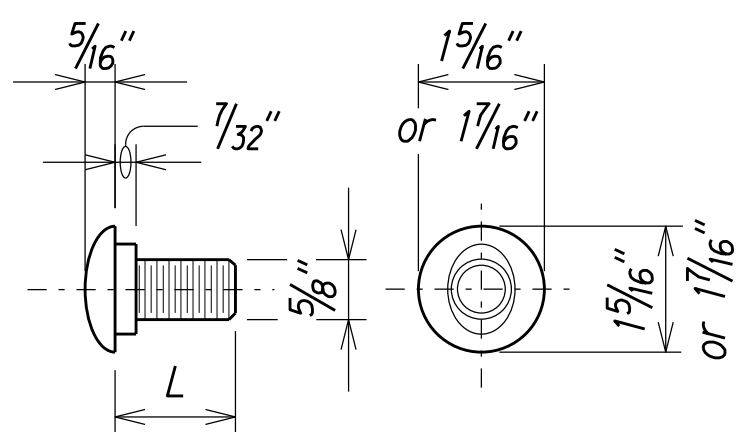
TERMINAL CONNECTOR

Scale: 1" = 1'-0"



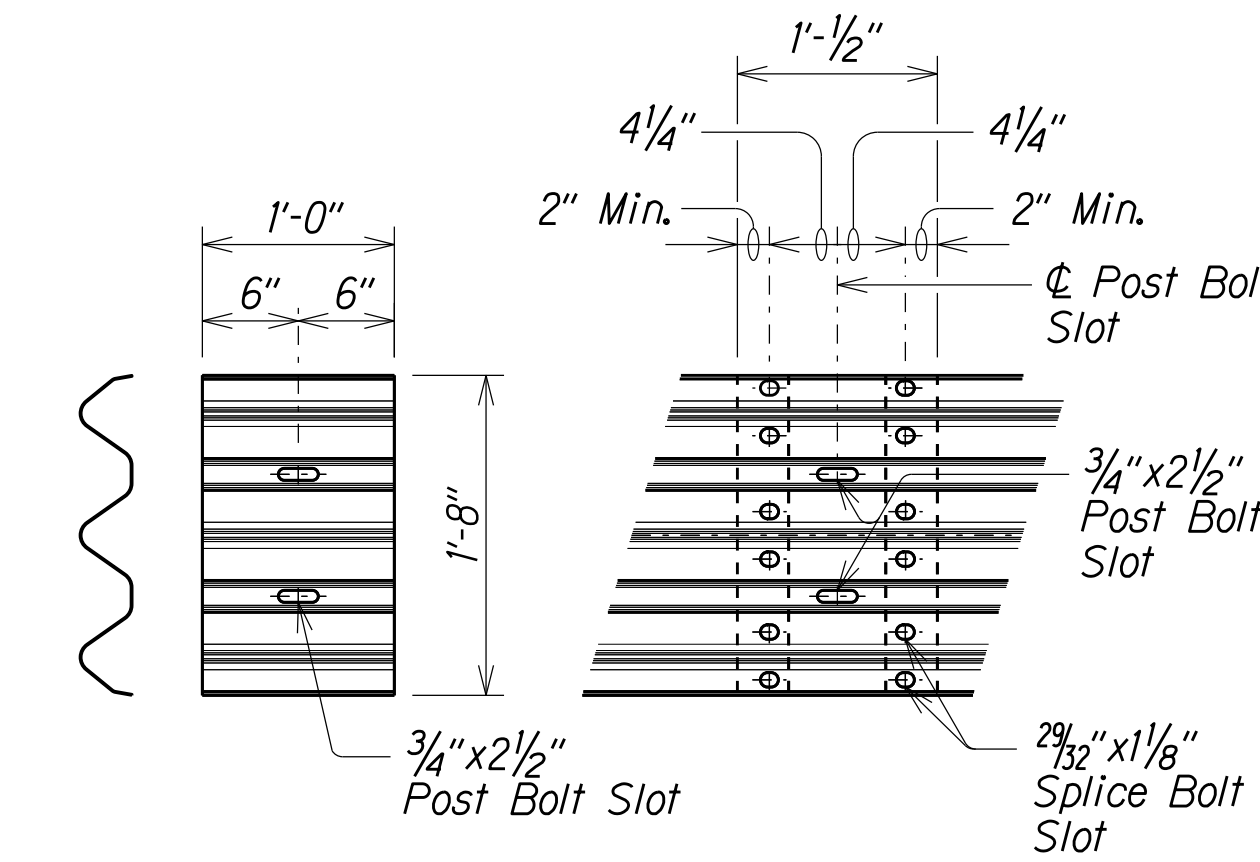
SECTION THRU  
RAIL ELEMENT

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



5/8"  $\varnothing$  SPLICE (FBB01)  
 $\nabla$  RAIL (FBB02) BOLT  
 $\nabla$  RECESS NUT

Scale: 6" = 1'-0"

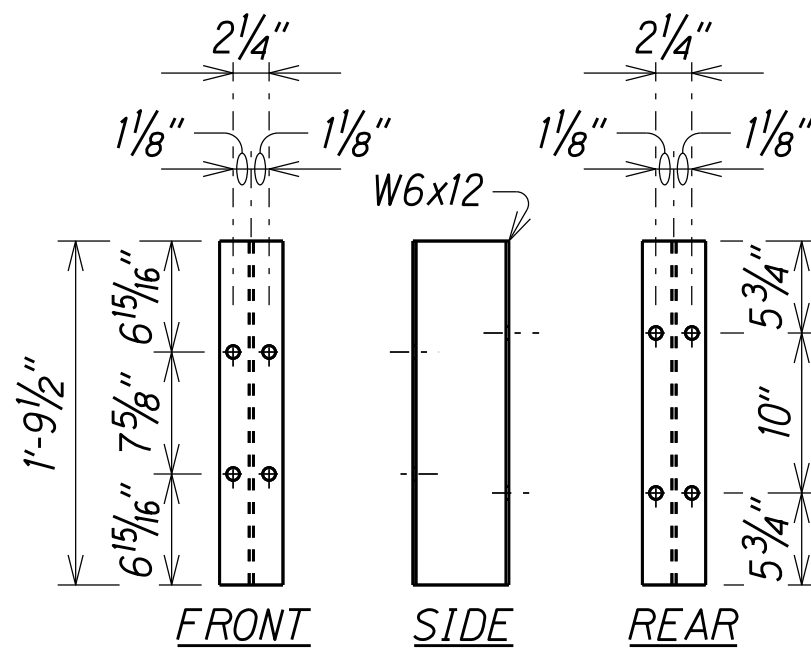


BACKUP PLATE

Scale: 1" = 1'-0"

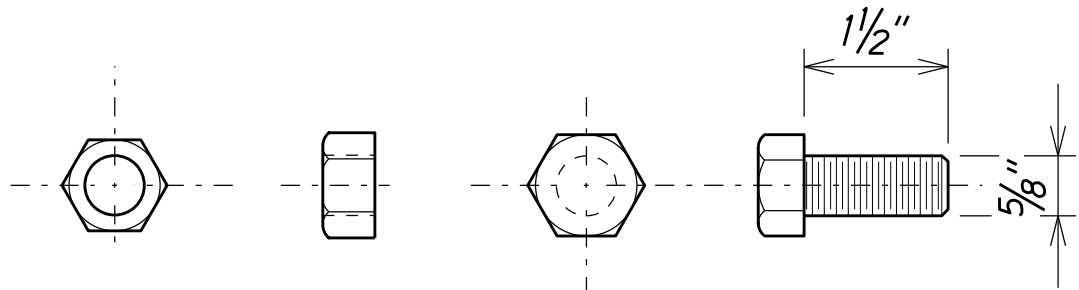
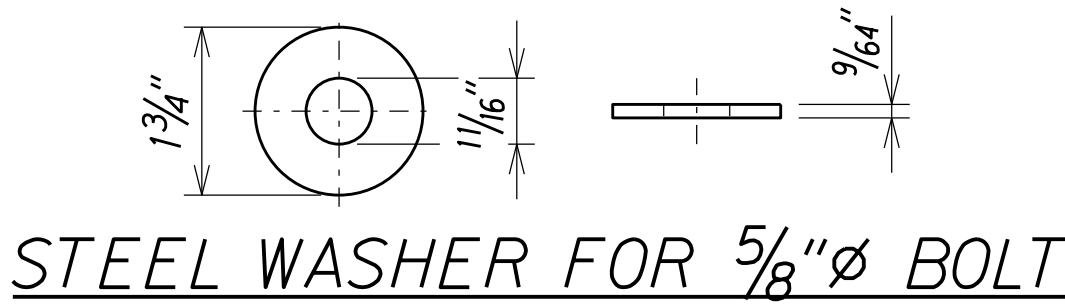
RAIL SPLICE

Scale: 1" = 1'-0"



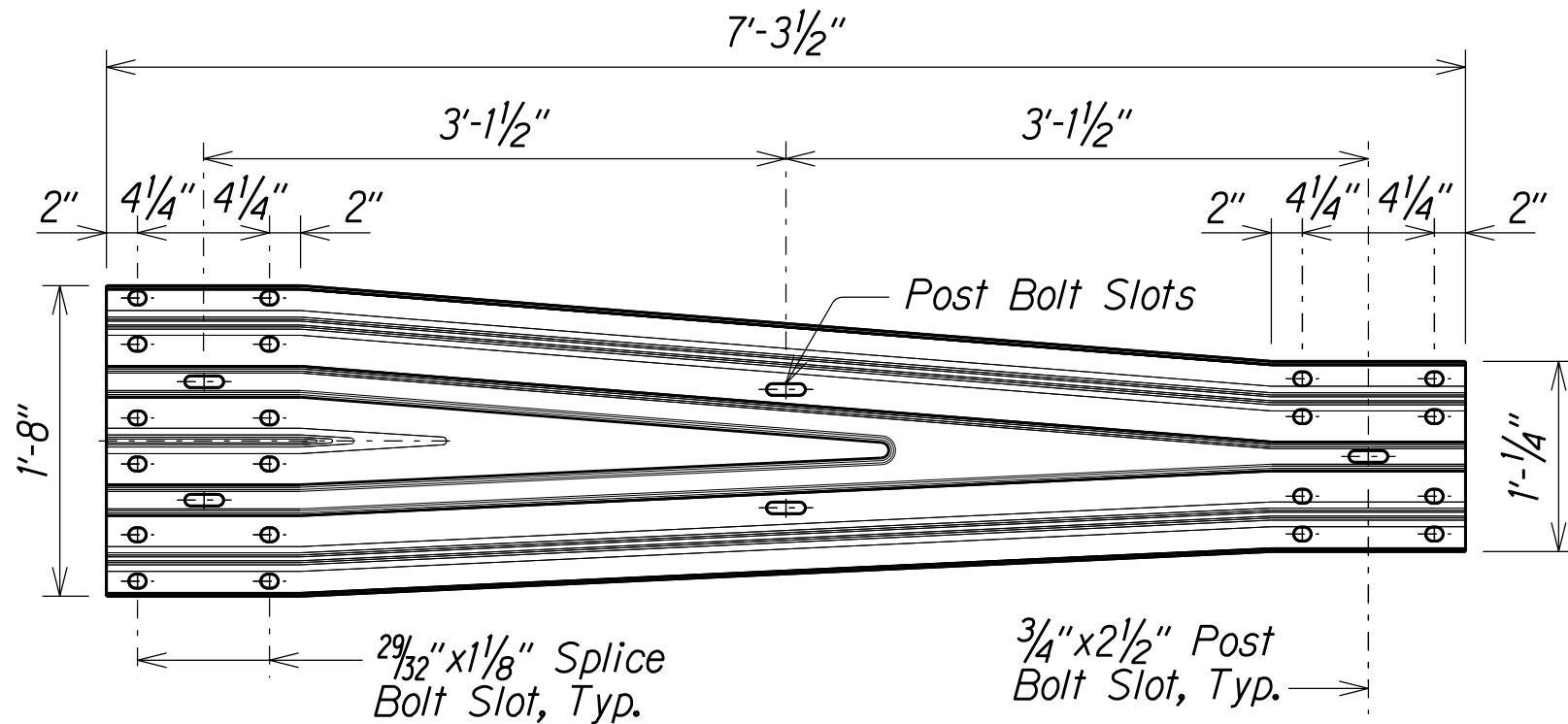
SPACER BLOCK DETAILS

Scale: 1" = 1'-0"



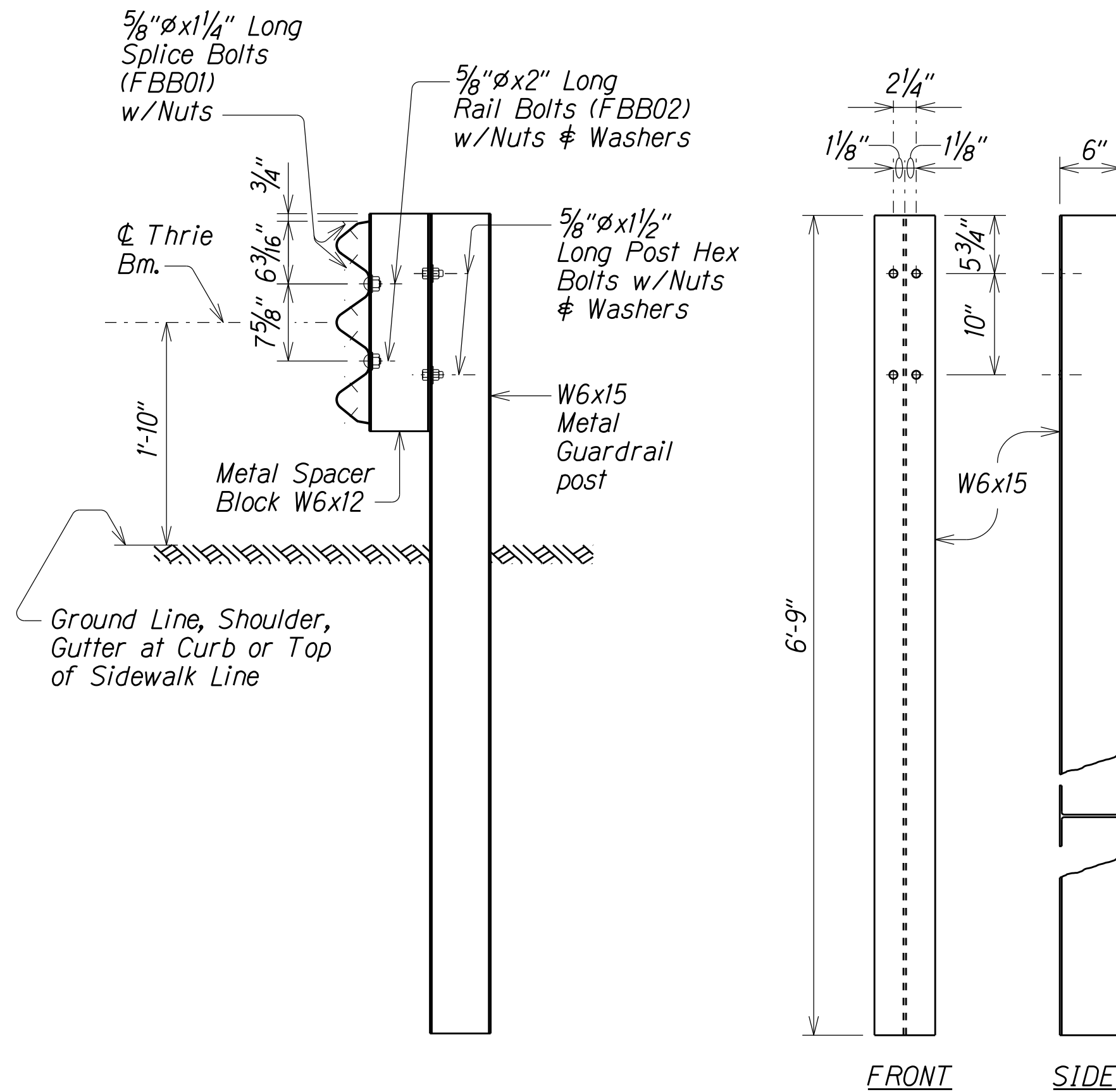
5/8"  $\varnothing$  POST HEX BOLT  $\nabla$  NUT

Scale: 6" = 1'-0"



TRANSITION SECTION

Scale: 1" = 1'-0"



TYPICAL SECTION  
METAL GUARDRAIL ON METAL POST  
WITH METAL SPACER BLOCK

Scale: 1" = 1'-0"

POST DETAILS

Scale: 1" = 1'-0"

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**EAST PAAUILO BRIDGE GUARDRAIL TYPE 3**  
**THRIE BEAM and APPURTENANCES DETAILS**  
HAWAII BELT ROAD GUARDRAIL AND  
SHOULDER IMPROVEMENTS  
Vicinity of Kalopa Bridge and Kaunaloa Bridge to E. Paauiilo Bridge  
Federal-Aid Project No. NH-019-2(71)  
Scale: As Noted Date: Nov., 2018

SHEET No. Q27 OF 27 SHEETS