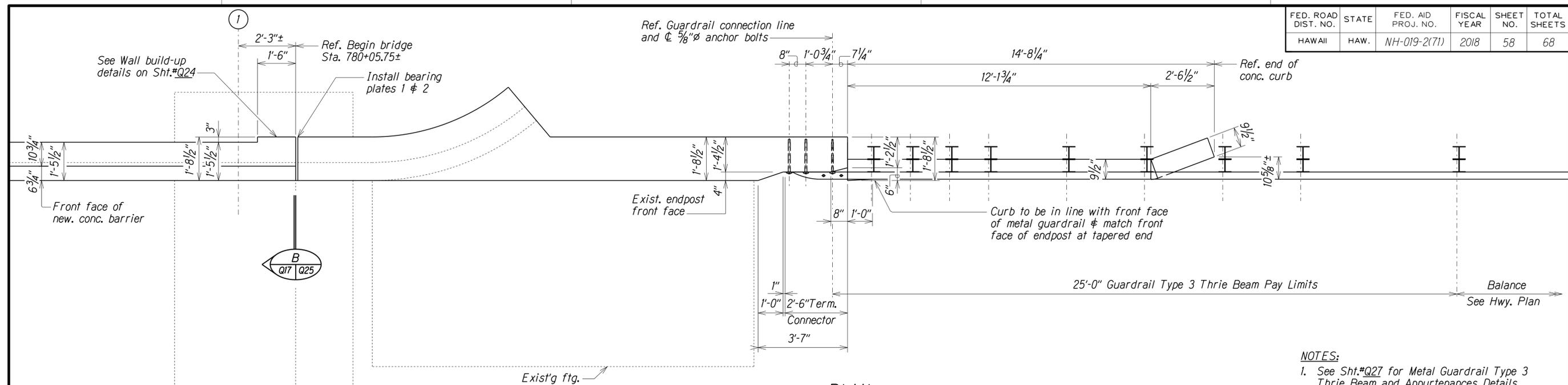
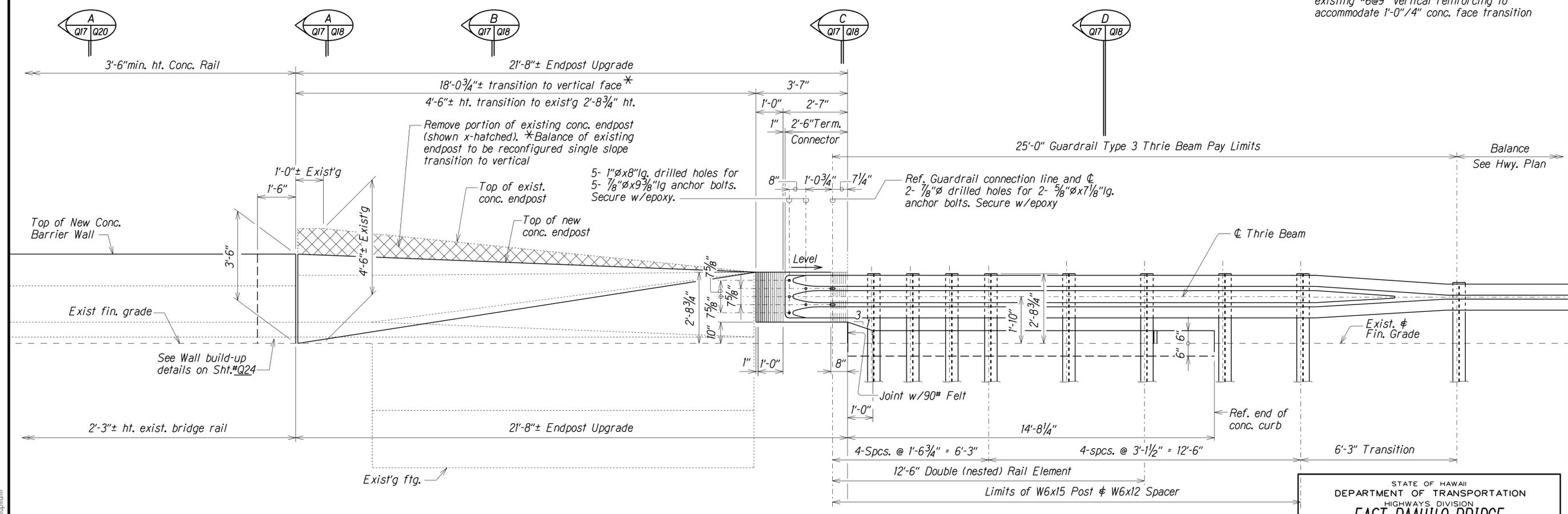


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(71)	2018	58	68



PLAN

- 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 1/4" conc. face transition



ELEVATION

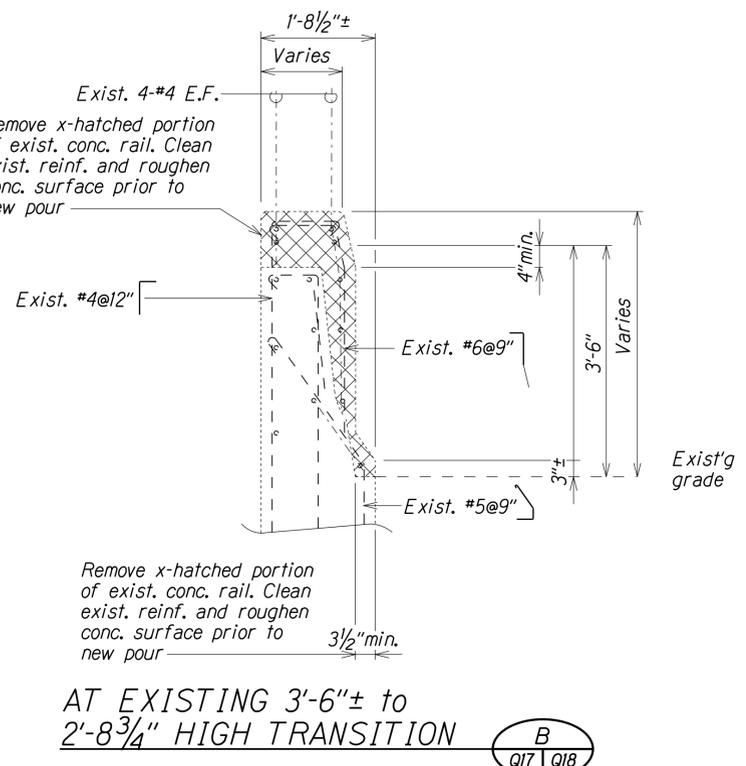
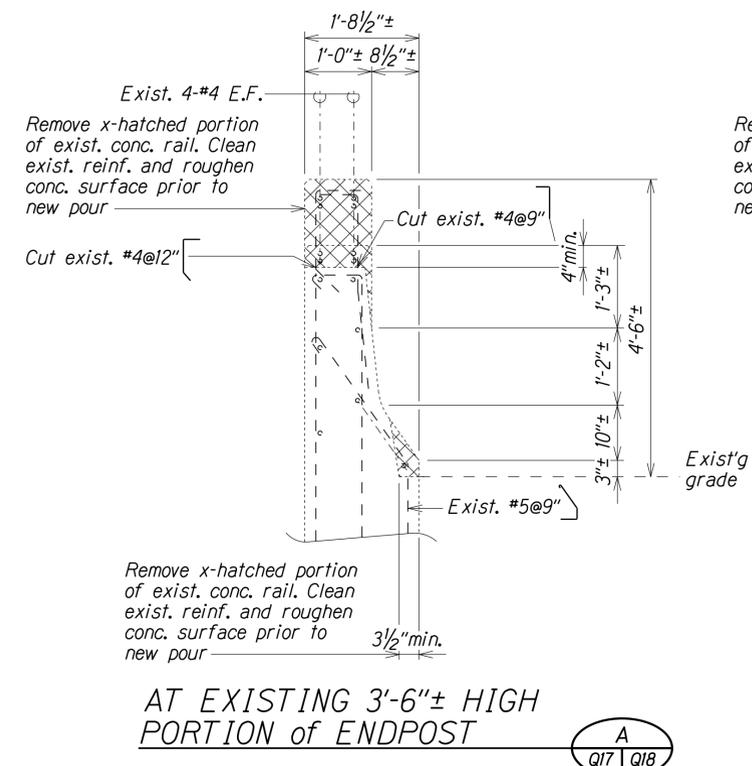
ENDPOST UPGRADE at WINGWALL NO. 1 -- EAST PAAUILO BRIDGE

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

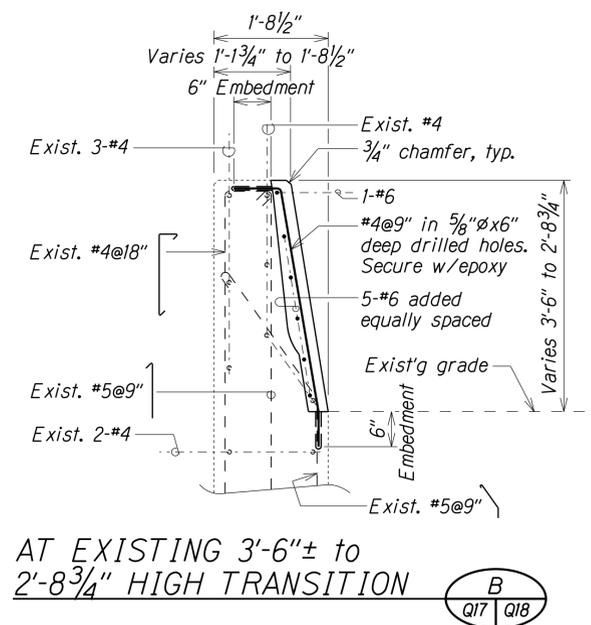
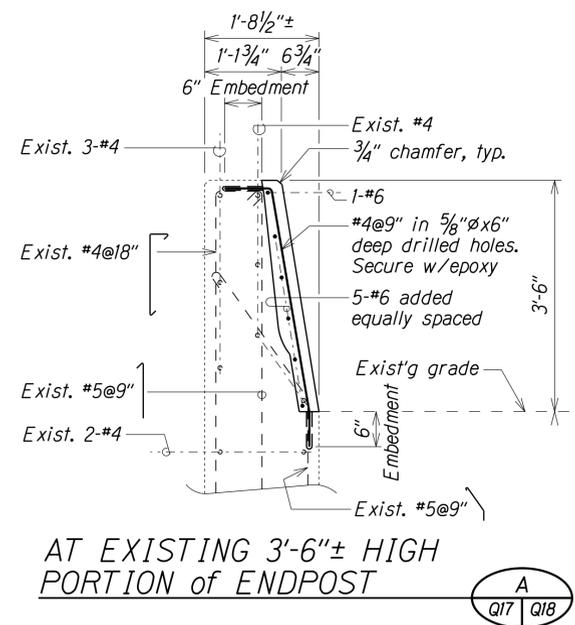
DATE: _____
 SURVEY PLOTTED BY: _____
 DRAWN BY: _____
 TRACED BY: _____
 NOTE BOOK: _____
 QUANTITIES BY: _____
 CHECKED BY: _____
 d04/d5/052/ksg/km/honolulu

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. Paauilo 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	59	68



TYPICAL SECTIONS SHOWING LIMITS of REMOVAL



TYPICAL SECTIONS SHOWING UPGRADES

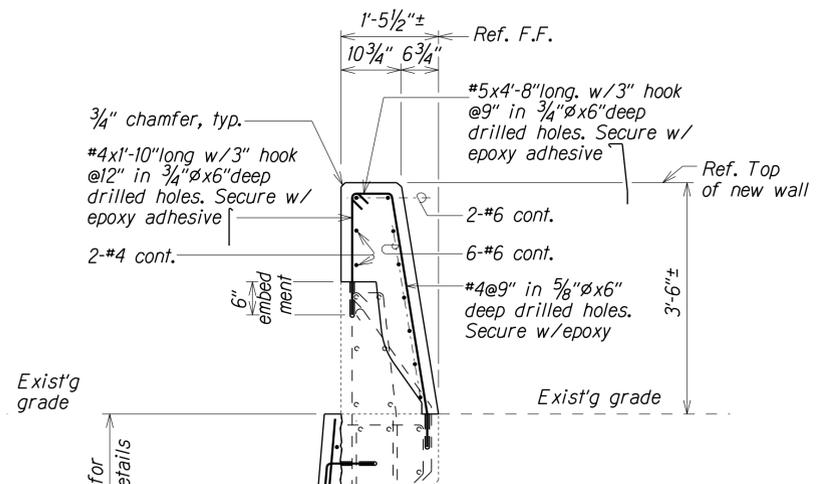
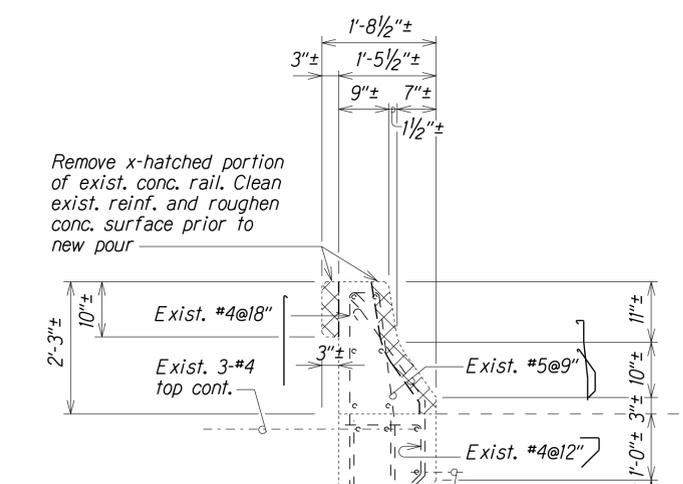
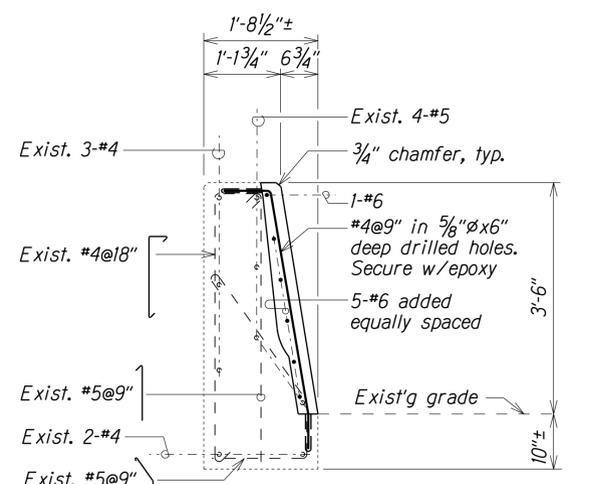
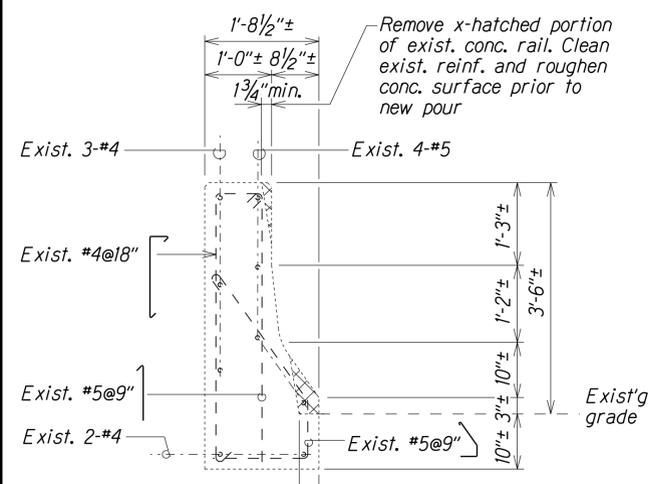
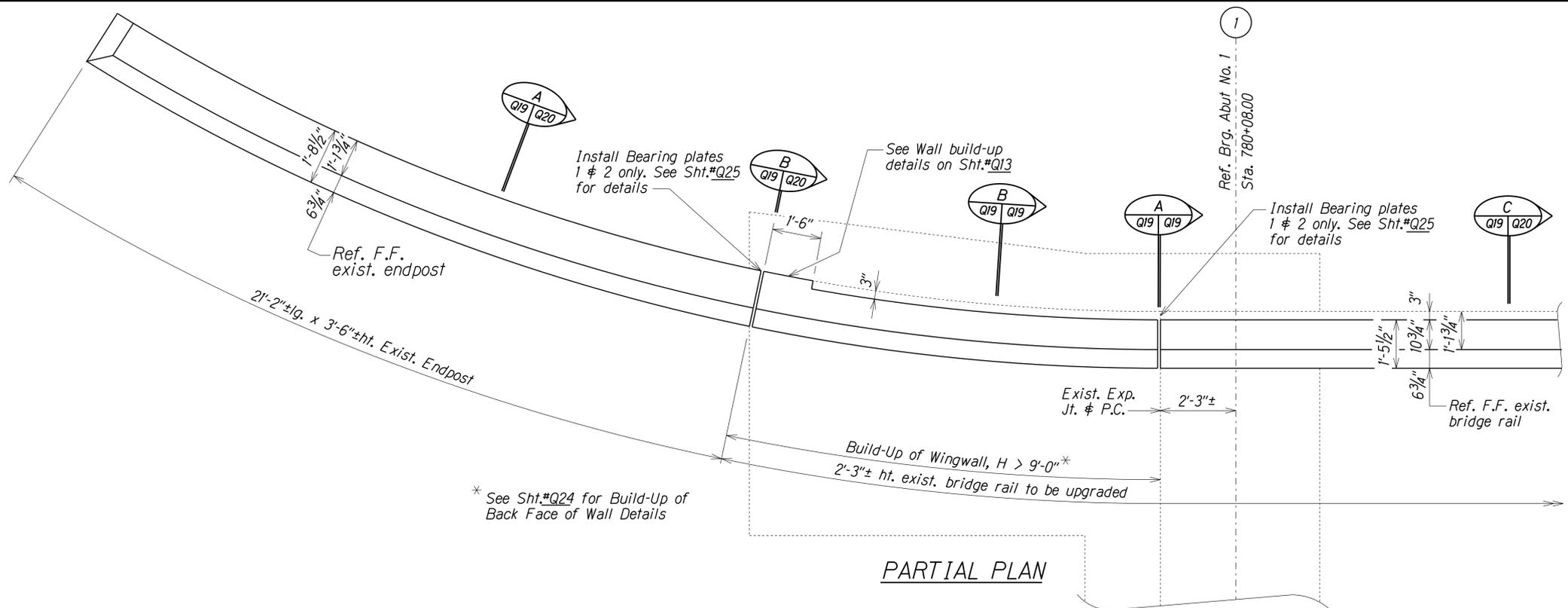
ENDPOST UPGRADE at WINGWALL NO. 1 -- EAST PAAUILO BRIDGE

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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	XXX 1991
	TRACED 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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(71)	2018	60	68



ORIGINAL PLAN
NOTE BOOK
No. XXXXXX

SURVEY PLOTTED BY: XXX
DRAWN BY: XXX
DESIGNED BY: XXX
CHECKED BY: XXX

DATE: XXX/XXX/2018

Remove x-hatched portion of exist. conc. rail. Clean exist. reinf. and roughen conc. surface prior to new pour

3 1/2" min.

SECTION A
Q19 Q19

SECTION B
Q19 Q19

ENDPOST UPGRADE at WINGWALL NO. 2 -- EAST PAAUILO BRIDGE

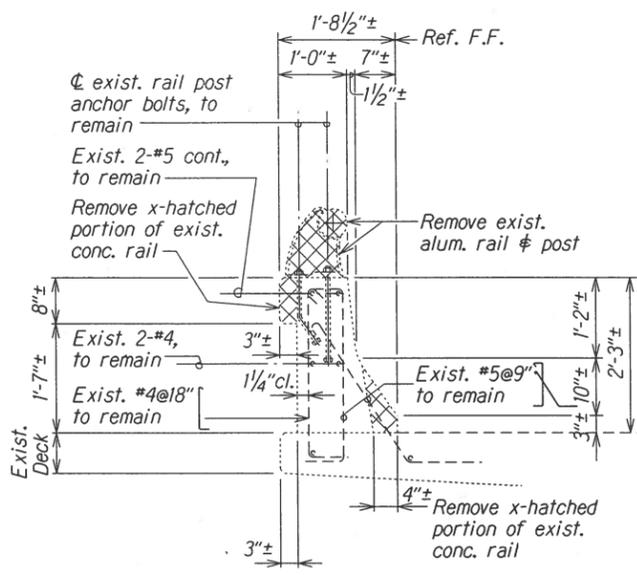
Scale: 1/2" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

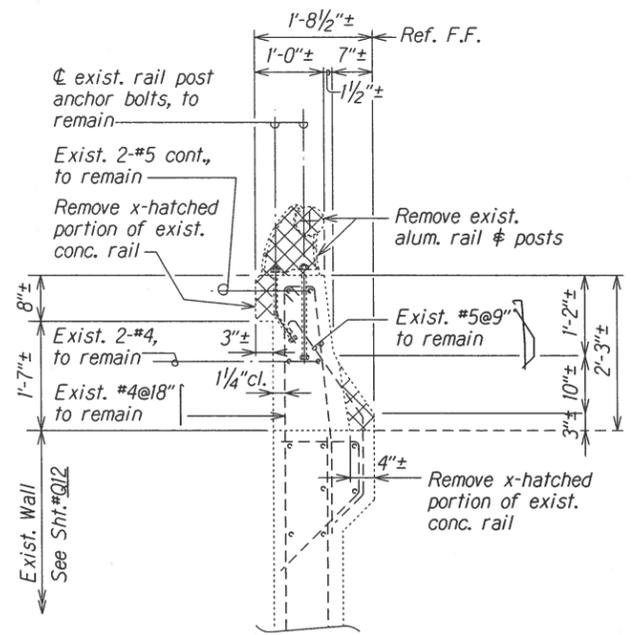
EAST PAAUILO BRIDGE
ENDPOST UPGRADE at WINGWALL NO. 2
HAWAII BELT ROAD GUARDRAIL AND
SHOULDER IMPROVEMENTS
Vicinity of Kalopa Bridge and Kaunaloa Bridge to E. Paauiilo Bridge
Federal-Aid Project No. NH-019-2(71)

Scale: As Noted Date: Nov., 2018

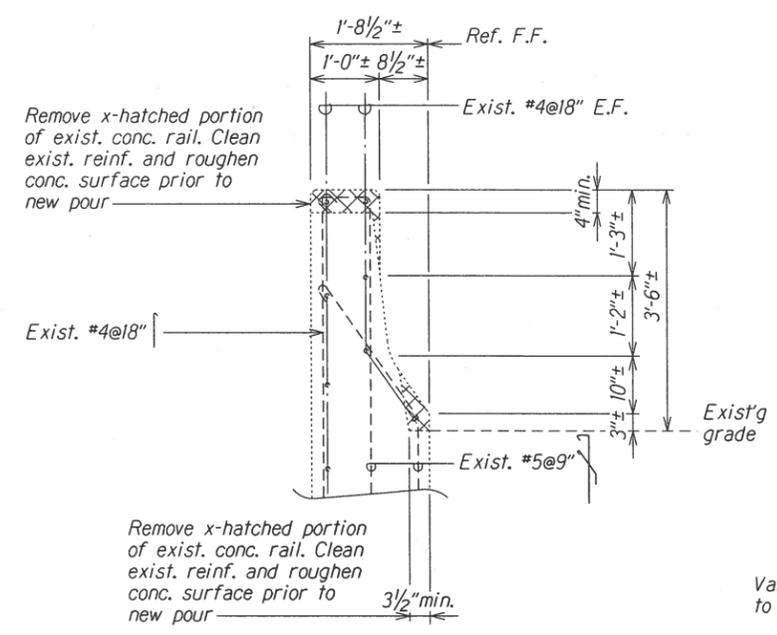
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(71)	2018	XXX	XXX



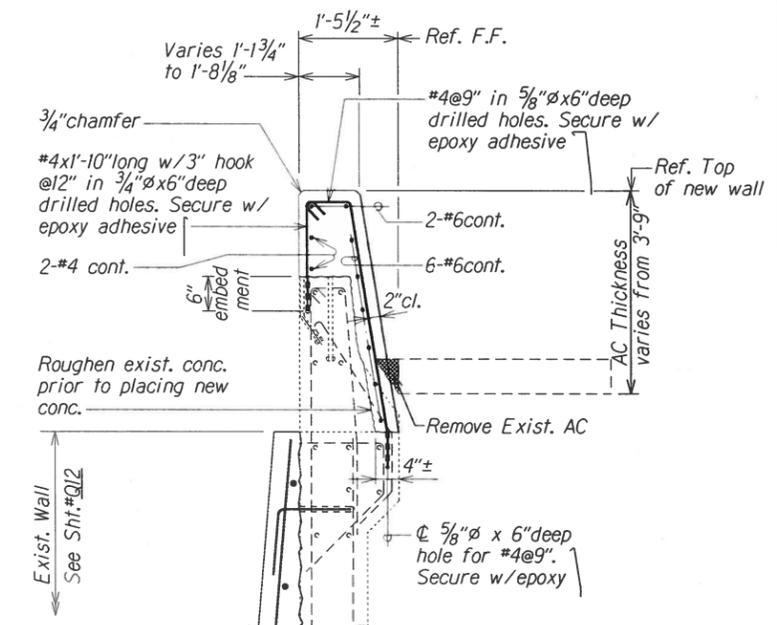
AT BRIDGE DECK **A**
Q17, Q21, Q23, Q20



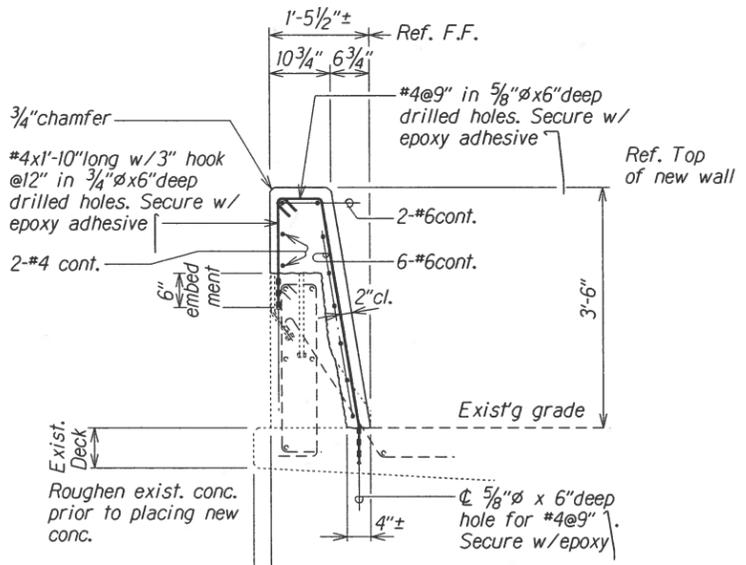
AT WINGWALLS **B**
Q17, Q21, Q23, Q20



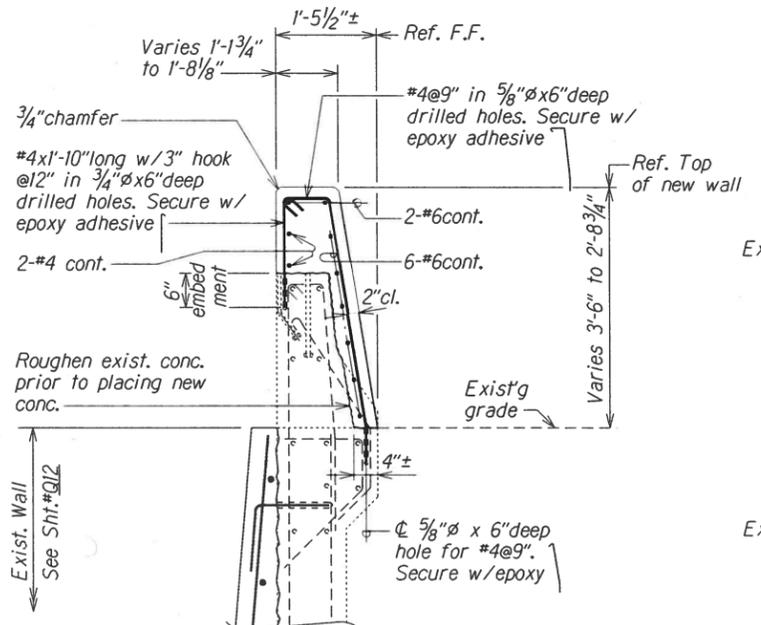
AT ENDPOSTS **C**
Q17, Q19, Q21, Q23, Q20



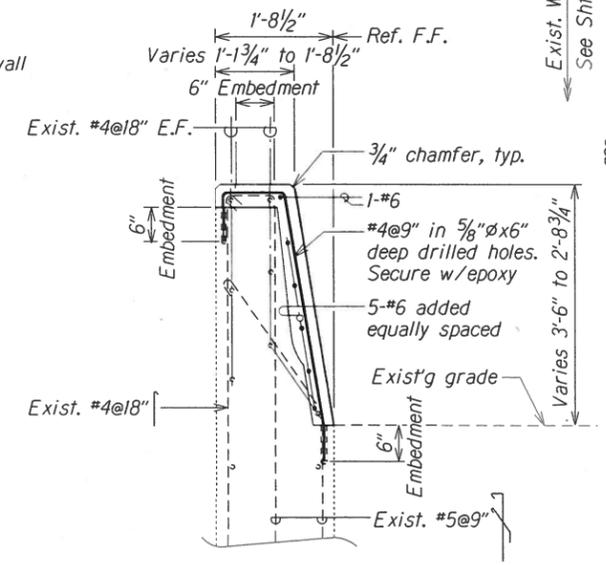
AT WINGWALLS No. 4 **B**
Q17, Q21, Q23, Q20



AT BRIDGE DECK **A**
Q17, Q21, Q23, Q20



AT WINGWALLS **B**
Q17, Q21, Q23, Q20



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

TYPICAL SECTIONS SHOWING LIMITS OF REMOVAL

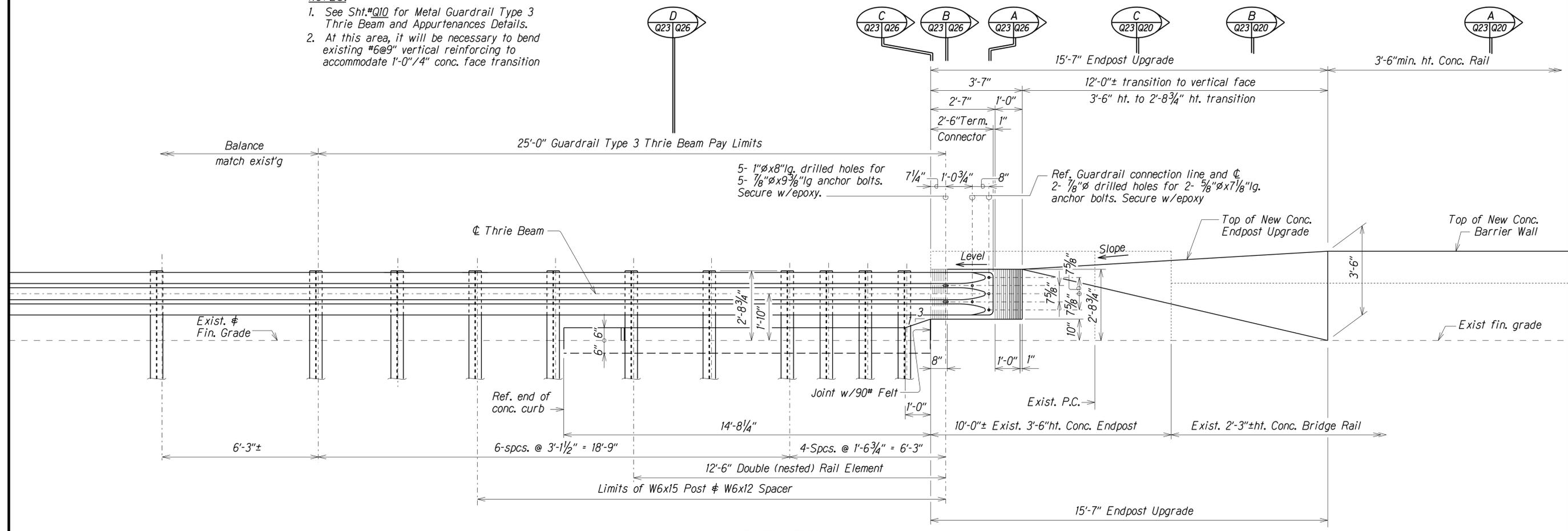
TYPICAL RAIL UPGRADE SECTIONS
Scale: 3/4" = 1'-0"

SURVEY PLOTTED BY	DATE	XXX/1991
DRAWN BY	XXX	XXX/1991
DESIGNED BY	XXX	XXX/1991
CHECKED BY	XXX	XXX/1991
ORIGINAL PLAN		
NOTE BOOK		
N. XXXXXXXX		

AS BUILT Corrections:		
Annotation Revisions & clarifications		
DATE	REVISION	APP'D.
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION EAST PAAULO BRIDGE TYPICAL RAIL UPGRADE SECTIONS 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. Q20 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	64	68

- NOTES:**
- See Sht.#Q10 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

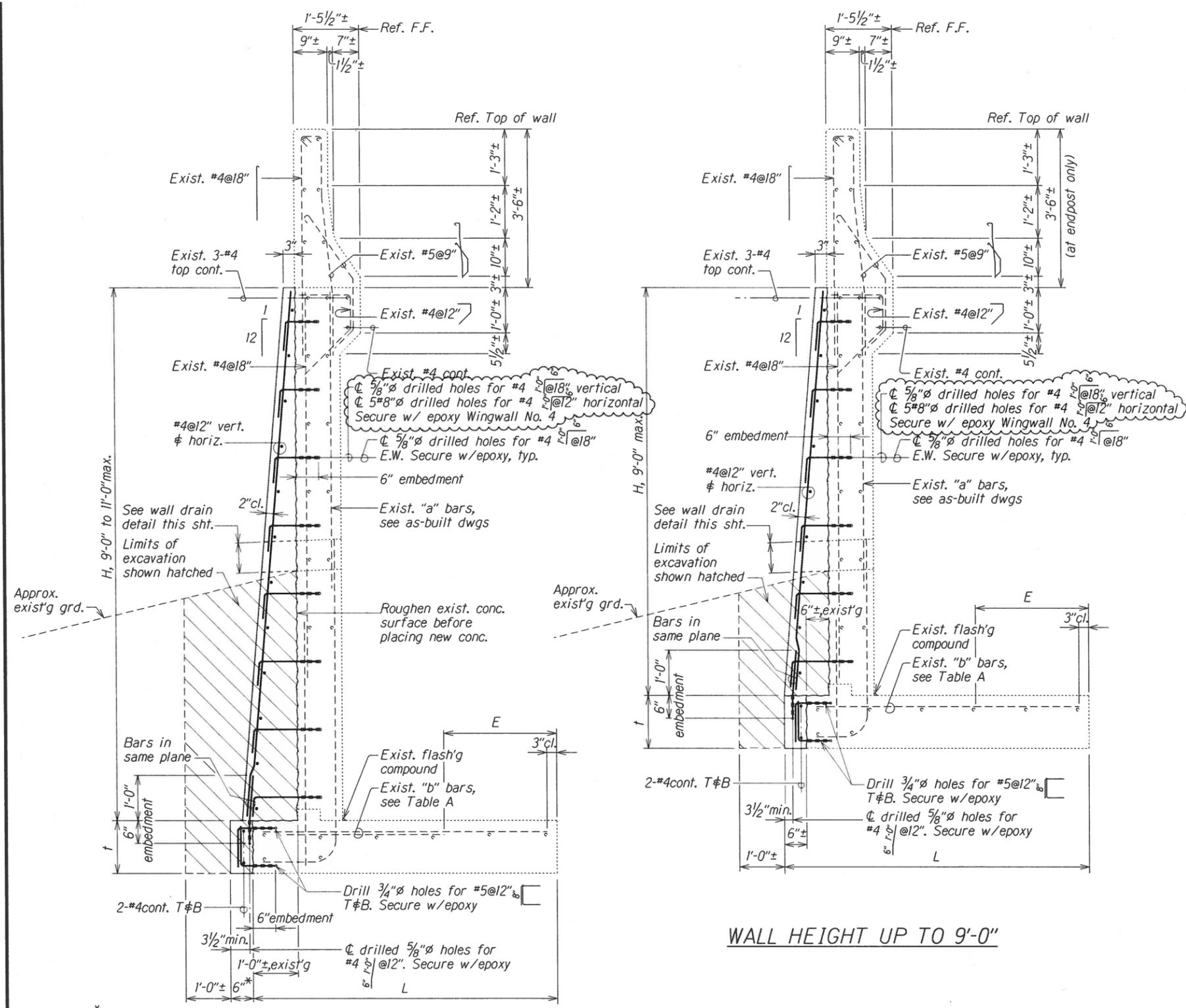


ELEVATION
ENDPOST UPGRADE at WINGWALL NO. 4 -- EAST PAAUILO BRIDGE
 Scale: 1/2" = 1'-0"

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
QUANTITIES BY	TRACED BY	
CHECKED BY	QUANTITIES 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. Paauilo Bridge
 Federal-Aid Project No. NH-019-2(71)
 Scale: As Noted Date: Nov., 2018

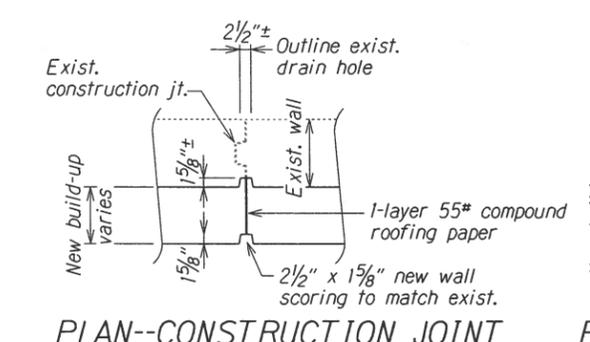
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(71)	2018	XXX	XXX



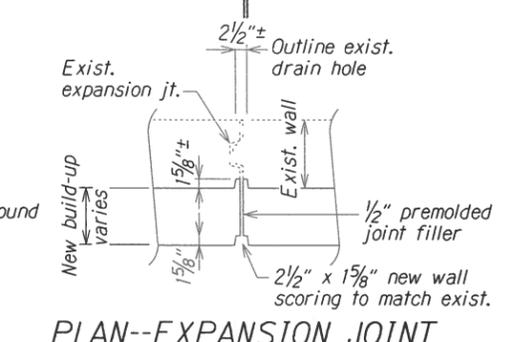
WALL HEIGHT UP TO 9'-0"

WALL HEIGHT OVER 9'-0"

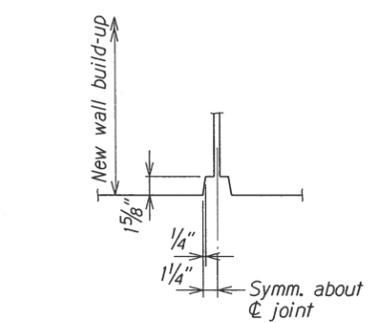
TYPICAL WALL BUILDUP DETAILS
Scale: 3/4" = 1'-0" (A) Q15, Q16, Q24



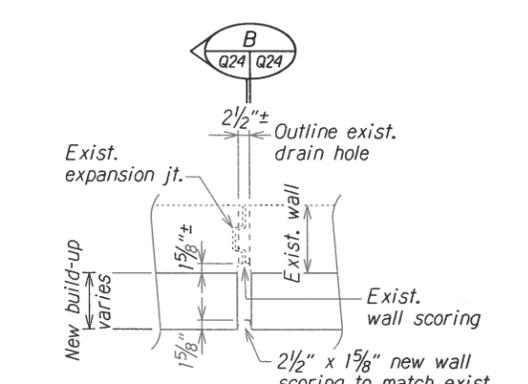
PLAN--CONSTRUCTION JOINT



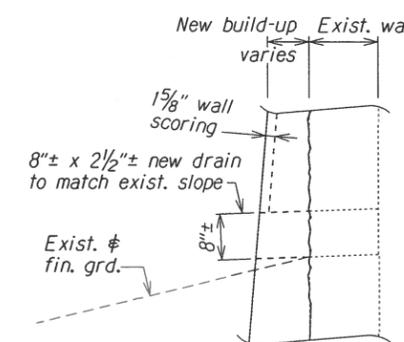
PLAN--EXPANSION JOINT



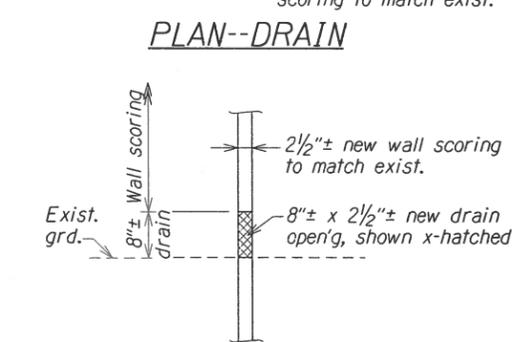
PLAN--WALL SCORING



PLAN--DRAIN



SECTION (B) Q24, Q24

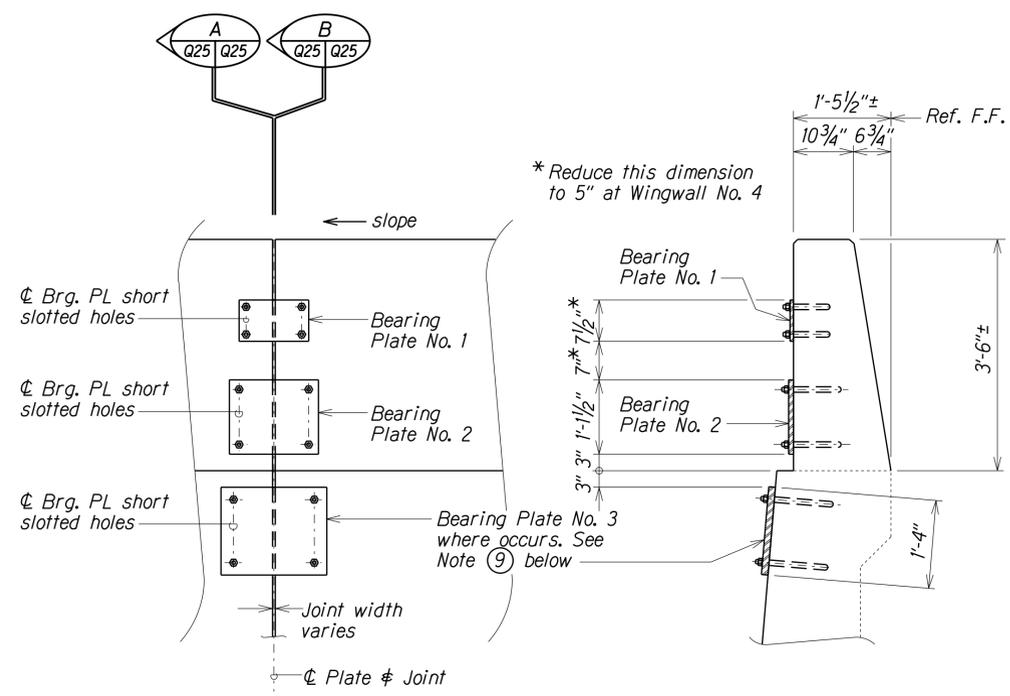


ELEVATION

WALL DRAIN and SCORING DETAILS
Not to Scale

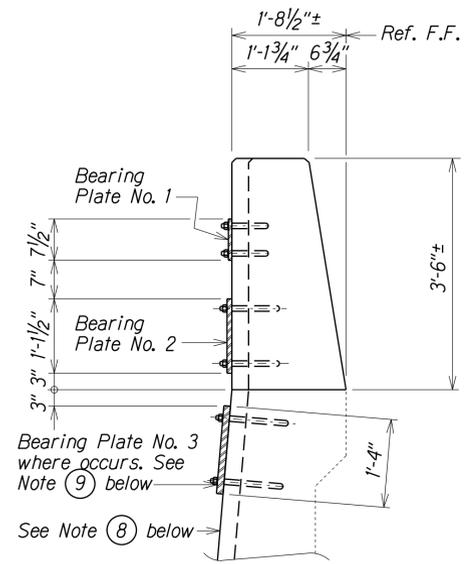
SURVEY PLOTTED BY	DATE	XXX/1991
DRAWN BY	XXX	XXX/1991
DESIGNED BY	XXX	XXX/1991
CHECKED BY	XXX	XXX/1991
ORIGINAL PLAN		
NOTE BOOK		
N. XXXXXXXXX		

AS BUILT Corrections:		
Annotation Revisions & clarifications		
DATE	REVISION	APP'D.
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION EAST PAAULO BRIDGE 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		

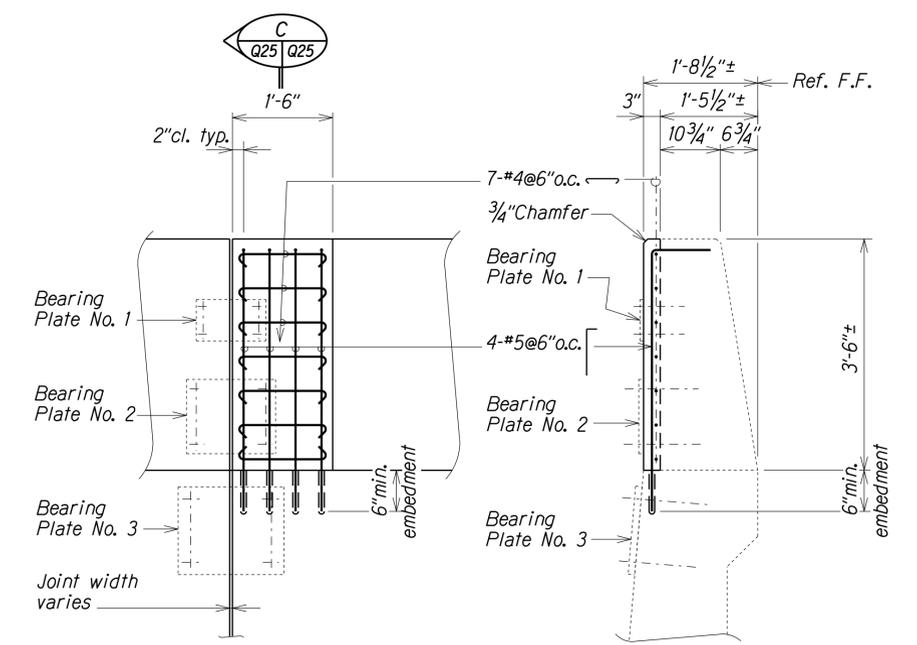


ELEVATION

SECTION AT 1'-5 1/2" WALLS



SECTION AT 1'-8 1/2" WALLS



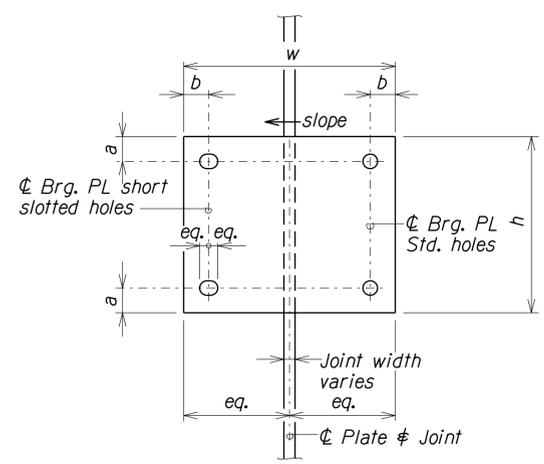
ELEVATION

SECTION C

WALL BUILD-UP DETAILS at WALL to ENDPOST 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

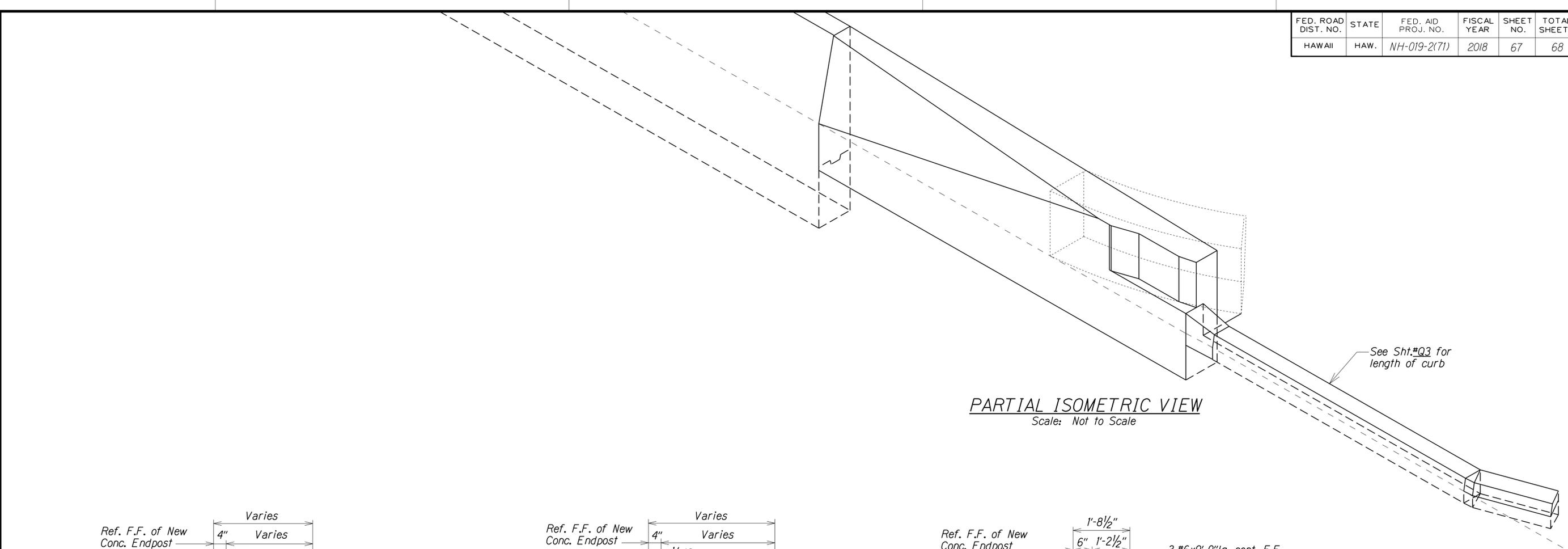
NOTES:

- 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

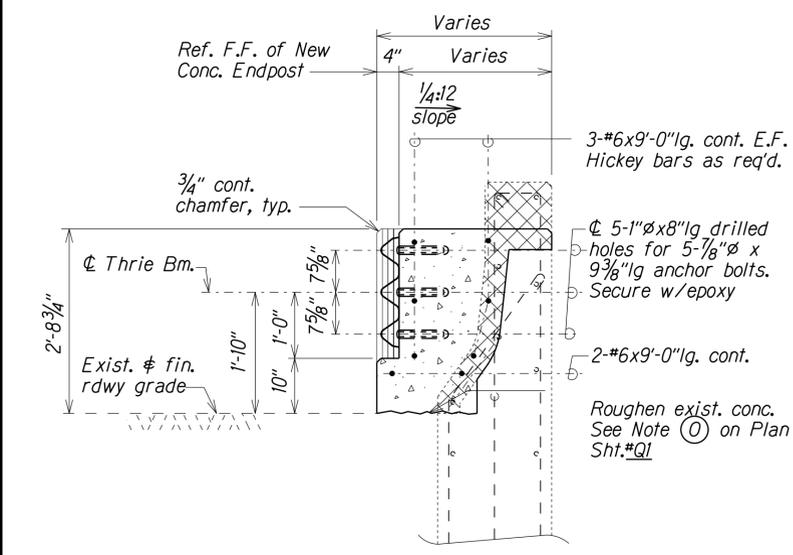
DATE: XXX 1992
 SURVEY PLOTTED BY: XXX
 DRAWN BY: XXX
 TRACED BY: XXX
 DESIGNED BY: XXX
 CHECKED BY: XXX
 ORIGINAL PLAN: XXX
 NOTE BOOK: XXX
 No. XXXXXXXXXX

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

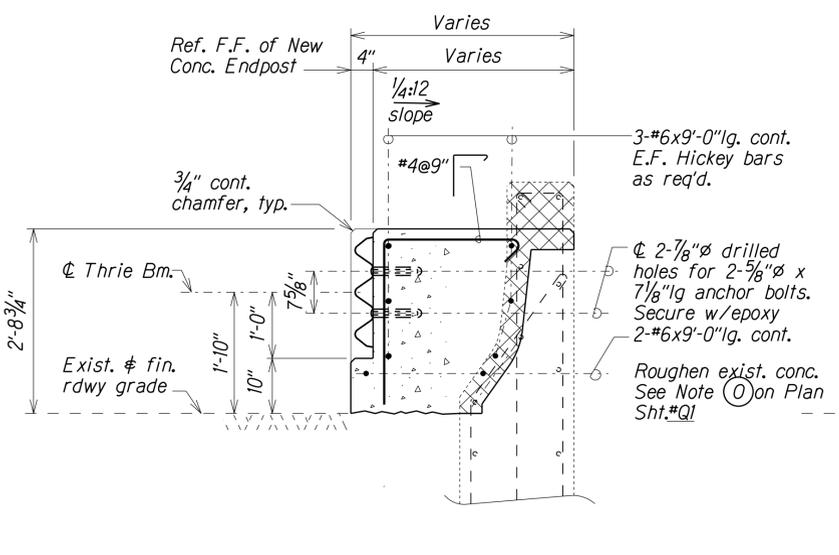
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(71)	2018	67	68



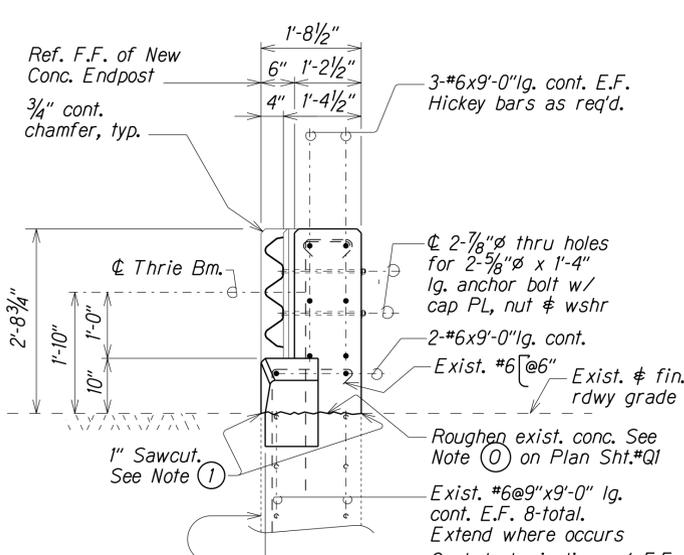
PARTIAL ISOMETRIC VIEW
Scale: Not to Scale



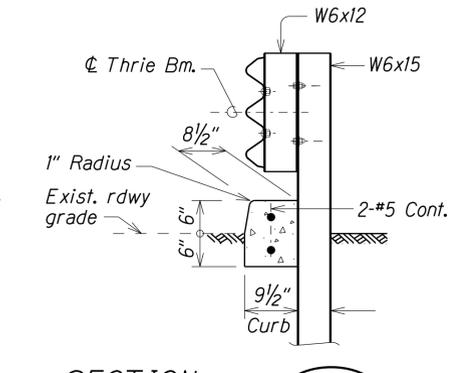
SECTION A
Scale: 3/4" = 1'-0"
Q12, Q14, Q26



SECTION B
Scale: 3/4" = 1'-0"
Q12, Q14, Q26



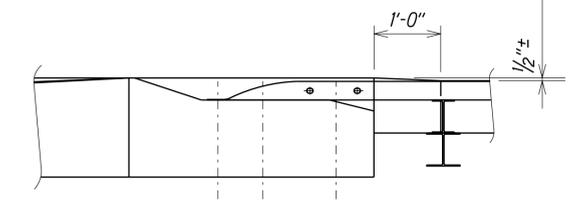
SECTION C
Scale: 3/4" = 1'-0"
Q17, Q21, Q23, Q26



SECTION D
Scale: 3/4" = 1'-0"
Q17, Q21, Q23, Q26

NOTE:
For Sections "A" and "B" (on this sheet only), sawcut existing concrete to a depth of 1" before removing all concrete end post above existing grade. For Sections "A" and "B" (on this sheet only), during removal of concrete, all existing vertical reinforcing in existing top portion of end post (#6@9" & #4@12") shall be **RETAINED** and **CLEANED** prior to new concrete pour. During removal of concrete, all existing horizontal reinforcing in existing top portion of end post shall be discarded and replaced with new.

TYPICAL SECTIONS - ENDPOST DETAILS



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

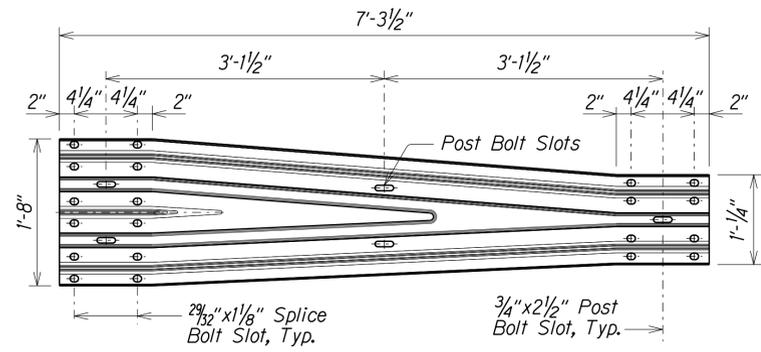
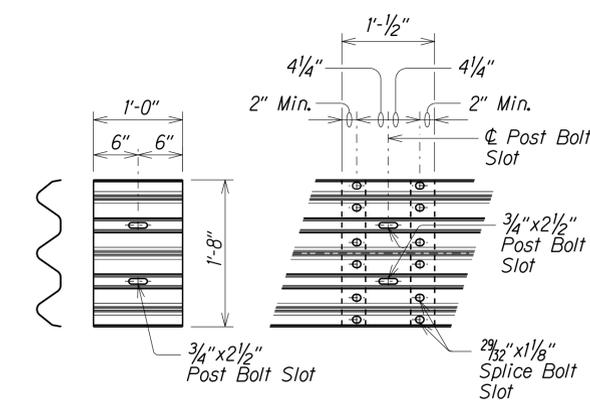
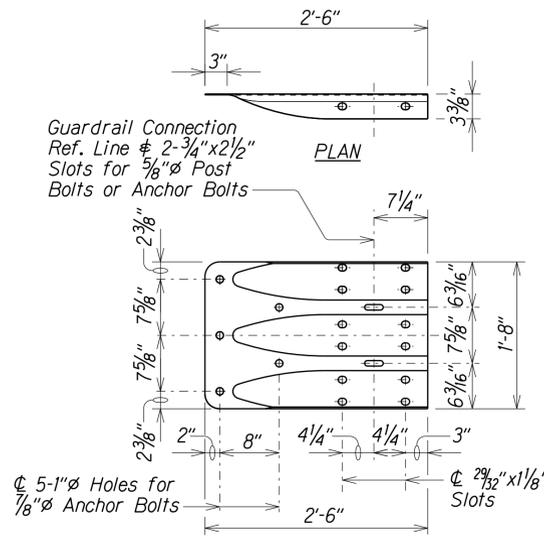
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
TYPICAL SECTIONS and PARTIAL ISOMETRIC VIEW
HAWAII BELT ROAD GUARDRAIL AND SHOULDER IMPROVEMENTS
Vicinity of Kalopa Bridge and Kaunaloa Bridge to E. Paaulo Bridge
Federal Aid Project No. NH-019-2(71)
Scale: As Noted Date: Nov., 2018
SHEET No. Q26 OF 27 SHEETS

ORIGINAL PLAN SURVEY PLOTTED BY DATE
DRAWN BY
TRACED BY
DESIGNED BY
CHECKED BY
db4746/ksr/21/ksq/honopolii/

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

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.

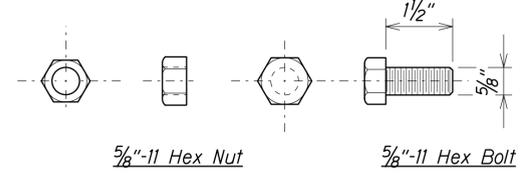
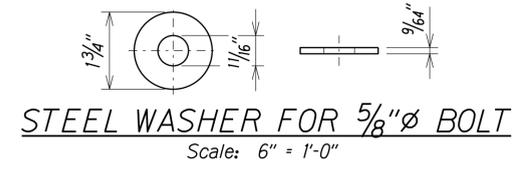
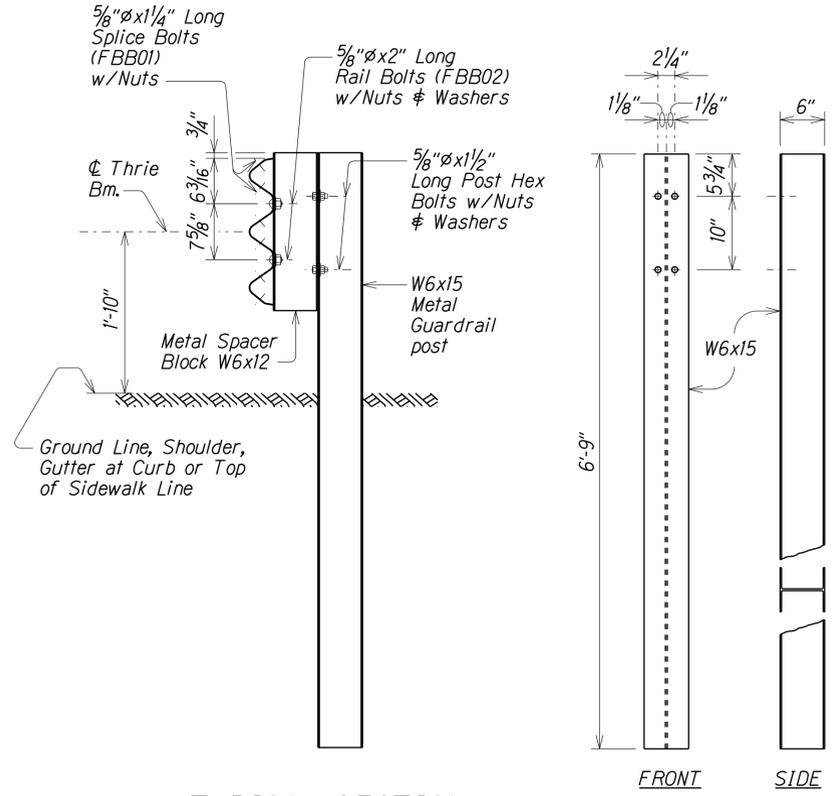
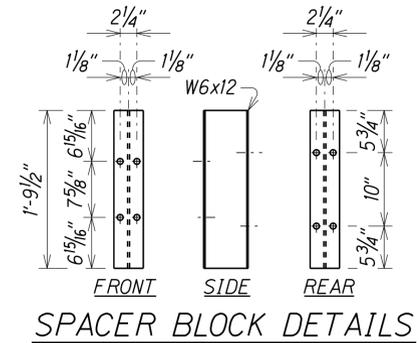
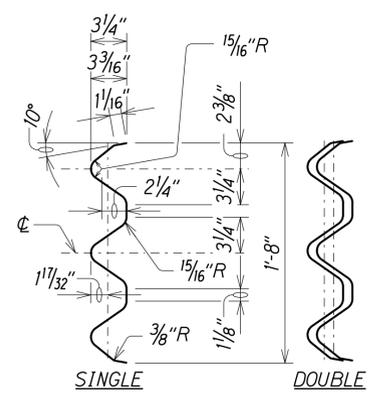


TERMINAL CONNECTOR
Scale: 1" = 1'-0"

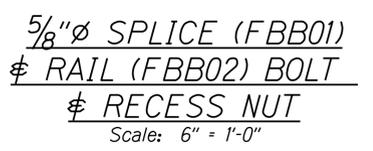
BACKUP PLATE Scale: 1" = 1'-0"

RAIL SPLICE Scale: 1" = 1'-0"

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



L	Thread Length
L	Full thread
L	1/2" min. thread length



METAL GUARDRAIL TYPE 3 THRIE BEAM AND APPURTENANCES DETAILS

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

ORIGINAL PLAN
DRAWN BY
TRACED BY
DESIGNED BY
CHECKED BY
DATE